How to change Hyundai Santa Fe 2.7L 2001-2006 timing belt (DIY)

The Hyundai dealer will charge you $600 plus tax to change your 2.7L Santa Fe timing belt. Is it worth 6 or 7 hours of your time to save $500? Well, the belt itself will cost you only $90 at the dealer (ask for a 10% discount on the part). (I don't recommend using an off-brand belt. Why skimp just to save $20, when you're putting in 6 hours of labor, and a failed belt will trash your engine's valves?) So if you'd gladly put in 6 hours of labor to "earn" $500, read on.

I have a 2002 Santa Fe 2.7L 2WD, but any 2001-2006 2.7L Santa Fe engine should be pretty identical. Took me about 7 hours to replace the timing belt. One hour was figuring out how to get the crankshaft pulley off – the instructions below will save you that aggravation!

Replacing the timing belt is not difficult – just a bit time-intensive to remove everything to get to the belt. If you have access to Chilton manuals or AllData, then you can get some pics to go with what I describe below.

Here's the basics for changing a Hyundai Santa Fe 2.7L timing belt:

OVERALL: Everything is metric. You'll need a good metric socket set. In my opinion, the longer the socket wrench you have, the easier and quicker the job will go. You'll find most bolts are "stuck" and take a good amount of force to initially break loose. But with a long socket wrench, you don't have to push that hard to apply this force. Once the bolts initially break free, most of them can be unscrewed the rest of the way by hand. Seriously, having a long socket wrench will take an hour off the job. Also, a good air-driven impact wrench is a MUST for this job. You cannot complete the job without it (unless you have a special tool to hold the crankshaft pulley from rotating while unbolting it, or are willing to do something dangerous like put a socket on the crankshaft, wedge it against something and then crank the engine).

BEFORE STARTING: Remove the battery cables from the battery.

1. Remove the plastic engine cover. 5 or 6 bolts.

2. Remove the front passenger wheel. Put an extra jack stand underneath the car frame for safety.

Note: I actually dropped my vehicle on the rotor because the Hyundai Santa Fe's rear spare tire carrier bolt gets so rusty, it really shakes the car trying to unscrew it and get the spare tire out (and that's after two liberal dousings with WD-40) – the vibrations and shaking can cause the vehicle to fall off the wimpy car jack that comes with the vehicle. I eventually had to replace the spare tire carrier bolt, and from the replacement part I discovered that Hyundai had changed the design.

3. Remove the plastic wheel well panel behind the front passenger wheel. It's held on by 3 or 4 bolts along the top of the panel. To see these bolts, you kinda have to get your head into the wheel well and look up at the top of the panel. Removing this panel gives you access to the front of the engine (which faces the passenger side of the vehicle).

4. Remove the serpentine accessory belt. Just take an extra-long socket wrench – the wrench's square fits in the end of the belt tensioner – and pull the tensioner clockwise to take tension off the belt, and then slip the belt off one of the pulleys. Easiest to do this coming through the wheel well, but could probably be done from above, too. The belt will not actually come completely off until you unbolt the tensioner.

5. Unbolt the serpentine belt tensioner. There are two long bolts that hold it on. Take the tensioner and serpentine belt off. You'll see that the tensioner covered a hole in the timing belt case, and through that hole you should now see a portion of the cogged timing belt.

6. Unbolt the power steering pump pulley. It's the top pulley in the middle. You'll need to stick something through one of the holes in the pulley to keep the pulley from turning as you unbolt it. I used a smaller socket wrench with a long socket on it, holding on to the socket wrench and sticking the socket through the pulley's hole, jamming the socket against the body of the power steering pump behind the pulley. Remove the nut and the pulley.

7. You may need to unbolt the cruise control module at this point in preparation for jacking the engine. I did as a precaution, but discovered that on the 2002 Santa Fe, I really didn't need to. However, I have read an internet post that pointed out that on their Santa Fe, failure to unbolt the cruise control module caused the cable to come uncrimped when the engine was jacked, and that caused the engine to race after everything was put back together. Unbolting the module prevents its cable from getting pulled too far when you jack the engine.

8. Place a block of wood on a hydraulic jack underneath the engine oil pan, and jack it up to support the front of the engine. ("Jack it up" here means to raise up the jack, not "ruin it".) The oil pan is immediately below the front of the engine (just behind the pulleys).

9. Unbolt the front engine bracket and take it off. This is done from the top. One bolt on the vehicle frame side (on top of the wheel well) and three bolts and/or nuts on the engine side.

10. Remove the serpentine belt idler pulley. Easy to come off. No need to hold pulley from turning, because the bolt goes through to the engine. Be careful once you get the bolt off – basically you have this pulley sandwiched by two plates – make sure you don't lose the back plate and you know which way it goes back on the pulley.

11. Remove the other half of the engine bracket still attached to the engine. First, you'll need to remove the small bolt on this bracket that faces the front of the vehicle. This bolt holds on the engine oil dipstick tube. Then, you'll find another small bolt facing the passenger side near the top of the bracket – this bolt is impossible to see, but you'll be able to feel for it. Access this bolt from under the hood. Then return to the wheel well and remove three large bolts and the bracket will be free.

Before you remove the crankshaft pulley, you'll need to make sure the timing belt is properly aligned. To do so, you must remove the top half of the timing belt cover next.

12. Remove top half of the timing belt cover, by removing three bolts around rear sprocket, three bolts around front sprocket, and one long bolt at the bottom of this cover. This cover only goes halfway down the engine, so you can get to all these bolts from the engine compartment. I believe they require a 10mm socket.

13. Once the top half of the cover is removed, you will want to locate the timing marks on the exposed sprockets. It's a little dot imprinted on the front of each sprocket. Best viewed looking under the hood from the passenger side. The dots need to be aligned with the timing marks on the engine case. The timing mark on the engine case for the left sprocket towards the rear of the vehicle) is a little notch located at about 11:00, and the timing mark for the right sprocket (towards the front of the vehicle) is at about 1:00.

14. Once you've located the timing marks on the sprockets and the engine, put a long wrench on the crankshaft pulley center nut and rotate the pulley clockwise until you get the top sprocket timing marks in place. (The crankshaft pulley is the very bottom center pulley. You access it through the wheel well.) You'll notice that when you get the top timing marks in place, the crankshaft pulley timing mark will be more or less aligned with a protrusion on the timing belt cover (at about the 1:00 position). If the bottom pulley is not perfectly aligned with one of the marks, don't worry about it. The important thing is to have the top timing marks for both sprockets perfectly aligned. Once you remove the crankshaft pulley and bottom half of the pulley cover, you'll see that the crankshaft sprocket tooth is properly aligned. You'll also notice that you have to turn the crankshaft pulley two entire revolutions to get the top sprockets to turn a single revolution. They are geared exactly 2:1.

15. Soak the crankshaft pulley bolt with WD-40 (or even better, I'm told, use PB Blaster or Breakfree) where its shoulder meets the pulley. I found this to be important.

16. Use an air impact wrench to remove the crankshaft pulley bolt (counterclockwise). I found that the air impact wrench on maximum setting was enough to loosen the bolt without actually turning the crankshaft. It may take about half a minute to loosen up. If it doesn't want to come off, try some more WD-40 and let it sit awhile. If you try to use a socket wrench, you'll just end up turning the engine backwards. AN AIR IMPACT WRENCH IS A MUST TO DO THIS, unless you have a special tool to hold the crankshaft pulley still while turning its bolt counterclockwise. The crankshaft pulley bolt will come off along with a thick spacer.

17. Remove the crankshaft pulley. You'll probably need to wiggle it back and forth as you pull it straight off. The more you can wiggle it, the easier it is to come off. The pulley is "keyed" to the crankshaft with a pin (located now at about the 1:00 position). This pin will stay on the crankshaft, and will be what you use to make sure the crankshaft is aligned once you get the new timing belt on.

18. Remove the lower timing belt cover. 10mm socket is used to remove the 4 or so bolts holding it on (best accessed through wheel well).

19. Notice now that the crankshaft (where you pulled the crankshaft pulley off from) has its pin (the pin we mentioned in step 17) aligned with a timing mark on the engine. Take note of this alignment! You'll see the teeth on the crankshaft that drive the timing belt. One of these teeth is aligned with the pin, and therefore aligned with the mark on the engine.

NOTE: Take stock of how taut the timing belt is at this point. This is what the belt feels like under tension. It's pretty tense, right?

20. Remove the timing belt auto-tensioner. It is the cylinder-looking thing up and to the left of the crankshaft. Two bolts hold it on. Unbolt these bolts, and tension on the timing belt is released.

21. After removing the timing belt auto-tensioner, use a large C-clamp to slowly compress the pin in the auto-tensioner all the way, until you can slip a smooth end of an old drill bit (or other comparable pin or nail) in through the little hole on the top of the auto-tensioner. This hole locks the tensioner's pin in the compressed position. Before you put the drill bit in, cover it with WD-40 (PB Blaster) , and spray a little WD-40 (PB Blaster) in the little hole on the top of the auto-tensioner too (front and back). The drill bit should go all the way through from the front, through the center pin, and through the back. Enough of the drill bit should be sticking out the front so you can later grab it with a pair of pliers and pull it out.

22. Enough tension should have been released from the timing belt so you can now gently pull it off.

CAUTION!! Be very careful not to rotate the belt as you are taking it off, or as you are putting the new belt on. Also be very careful not to rotate the left top sprocket at all after the belt is off. The reason is because the left top sprocket has its springs in the compressed position (at the top of the hill, so to speak). If you rotate this left top sprocket even one tooth, its compressed energy will cause it to rotate about 8 teeth, taking it out of timing with the crankshaft and the right top sprocket. This is the voice of experience talking. (If this does happen to where the top left sprocket gets pushed 8 teeth forward, I think I got everything back in sync by also rotating the right top sprocket 8 teeth forward, putting the timing belt back on, rotating everything slowly through 1 crankshaft revolution, taking the belt back off, then rotating the crankshaft foward the additional 8 teeth.)

CHECK: Check the idler and tensioner pulleys that they are in good condition, and turn freely with little to no play. Replace if needed.

23. Temporarily put the crankshaft pulley back on (no need to put its bolt in), and rotate the crankshaft pulley by hand back (counter clockwise) about 5 degrees. Shouldn't be too hard to do, because the crankshaft is not in a position where it takes much force to move at this point. Pull the pulley back off and check where you are at. Keep doing this until you have moved the crankshaft by one tooth. In other words, you need to rotate the crankshaft so that instead of the crankshaft pin being aligned with the mark on the engine, the tooth to the right (clockwise) of that pin is aligned with the mark on the engine. WHY DO WE DO THIS? Because there will be a little bit of slack between the right top sprocket and the crankshaft sprocket when you install the new belt. You'll find that after taking up this slack, the crankshaft will be properly aligned with the top sprockets. But don't worry. We'll be double-checking to make sure we got it right.

NOTE: The timing belt tensioner pulley is towards the left (rear of vehicle), and the idler pulley is towards the right (front of vehicle).

24. Put on the new timing belt in this order: First, put it on the crankshaft sprocket at the bottom. Next, from under the hood pull the timing belt snug against the idler pulley (don't pull hard – just enough to remove most of the slack), and wrap the belt counter clockwise around the right top sprocket (the sprocket towards the front of the vehicle). With the teeth of the belt engaged on the right top sprocket, pause to check the play in the belt between the sprocket and the crankshaft sprocket. Remember when you took stock of how taut the old belt was? The belt should not be this tight. But then, it shouldn't be so loose that it comes off the idler pulley. There should be just a little bit of slack, which will be taken up when you later on replace the crankshaft pulley. Continue wrapping the new timing belt around the water pump pulley (smack dab in the middle of the engine, between all 3 sprockets, and then back up around the left top sprocket (toward the rear of the vehicle). Make sure that there is AS LITTLE PLAY in the belt between the two top sprockets as possible. The belt should be nice and snug between these two. The belt should be pretty tight at this point. You should have just enough play left in the belt to muscle it over the tensioner pulley (which is currently not under tension). If that is so, you can be assured that your timing belt is probably properly installed.

25. Now we check the timing belt installation. DO NOT CHECK THE SPROCKET ALIGNMENT YET. FIRST WE HAVE TO ROTATE THE TIMING BELT CLOCKWISE TO DISTRIBUTE THE TENSION ON THE BELT PROPERLY. Bolt the tensioner pulley auto-tensioner back on (two bolts). In one quick movement, pull out the pin (or old drill bit) from the auto-tensioner with a pair of pliers.

26. Temporarily put the crankshaft pulley back on, and screw in on with its center bolt.

27. With a long wrench on the crankshaft pulley center bolt, rotate this pulley two entire revolutions until the two top sprocket timing marks have made one entire revolution and are lined up once again with the timing marks on the engine. As you start to rotate the crankshaft pulley, you should see the auto-tensioner pin come out and return to its normal length. The entire timing belt should return to the tension you observed on the old belt before removing the auto-tensioner. If not, then you need to remove the auto-tensioner and check it.

28. Remove the crankshaft pulley center bolt with the air impact wrench, and remove the pulley.

29. CHECK THE ALIGNMENT CAREFULLY. ALL THREE SPROCKETS SHOULD NOW BE ALIGNED TO THEIR TIMING MARKS. If even one timing mark is off, you'llneed to pull the belt back off and reinstall. It is easy to see if a timing mark is off by one tooth. Just look at the belt and the sprockets and observe the distance from one tooth to the next. If any one of the three timing marks is off by this amount or more, your timing is maligned. But if the marks are off only a smidgen (a small fraction of the distance between two adjacent teeth), then your timing is aligned.

30. IF YOUR TIMING BELT IS MISALIGNED, GO BACK TO STEP 20. Note that it is easier to align the crankshaft individually than the top sprockets, so if the top sprockets are in sync with each other but out of sync with the crankshaft, turn the crankshaft until the top sprockets are aligned with their timing marks, remove the belt, then temporarily put the crankshaft pulley back on and adjust it.

NOTE: It is ok to turn the crankshaft back a few degrees if you need to. You may be able to do this by hand by just pushing the crankshaft pulley on the crankshaft (without its mounting bolt) and turning the pulley by hand. However, if you need to adjust the top sprockets, you'll probably need to do so with timing belt installed, and turning the crankshaft in clockwise direction using a socket on its center bolt. If you need to go an entire revolution on one of the top sprockets, you'll need to do so with the timing belt installed, so the entire engine rotates more or less in sync. REMEMBER THE CAUTION ABOUT THE LEFT FRONT SPROCKET. IF YOU TRY TO MOVE IT CLOCKWISE EVEN JUST A LITTLE BIT PAST THE TIMING MARK WITH THE TIMING BELT OFF, ITS LOADED SPRINGS WILL LIKELY SUDDENLY POP THE SPROCKET FORWARD ABOUT 8 TEETH.

NOTE 2: After each time you rotate the crankshaft pulley with timing belt installed (using a socket on the crankshaft pulley's center mounting bolt) you'll need to remove the crankshaft pulley again with the air impact wrench.

31. IF YOUR TIMING BELT IS NOW ALIGNED (all three timing marks on the sprockets are lined up with the three timing marks on the engine) , IT'S TIME TO PUT EVERYTHING BACK TOGETHER, in the reverse order of what you took it off.

NOTES: When reinstalling the top half of the engine bracket (the one that attaches between engine and frame), you may need to jack the engine a little higher in order to get this bracket snug against the bottom half of the engine bracket.

DO NOT RESTART YOUR ENGINE UNTIL YOU WORK YOUR WAY BACK PAST STEP 4. (But don't put the vehicle in drive until you work your way back past step 2.)