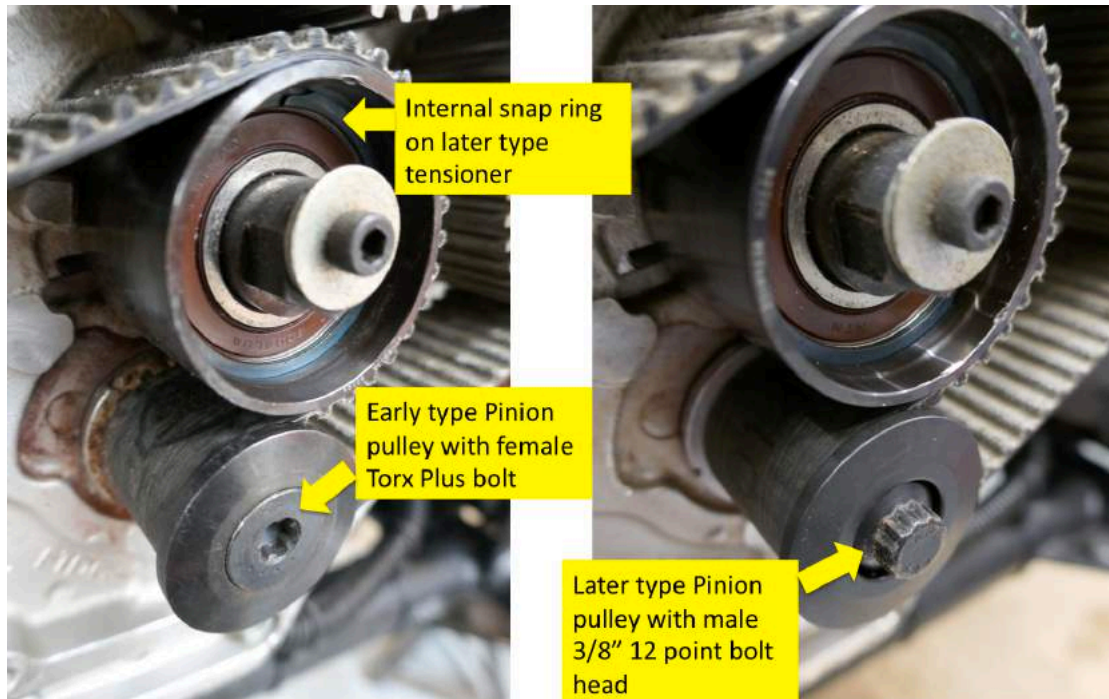


Crank/Pinion Pulley Upgrade

Firstly, do you need to upgrade your pinion pulley? Remove the front cam cover and take a look at the pinion pulley which is at the bottom of the chamber.



If the bolt looks like the one on the left then the upgrade hasn't been done and you run the risk of the bolt working loose and forcing its way through the cam cover. If the pulley bolt protrudes like the one on the right then you have the latest spec one.

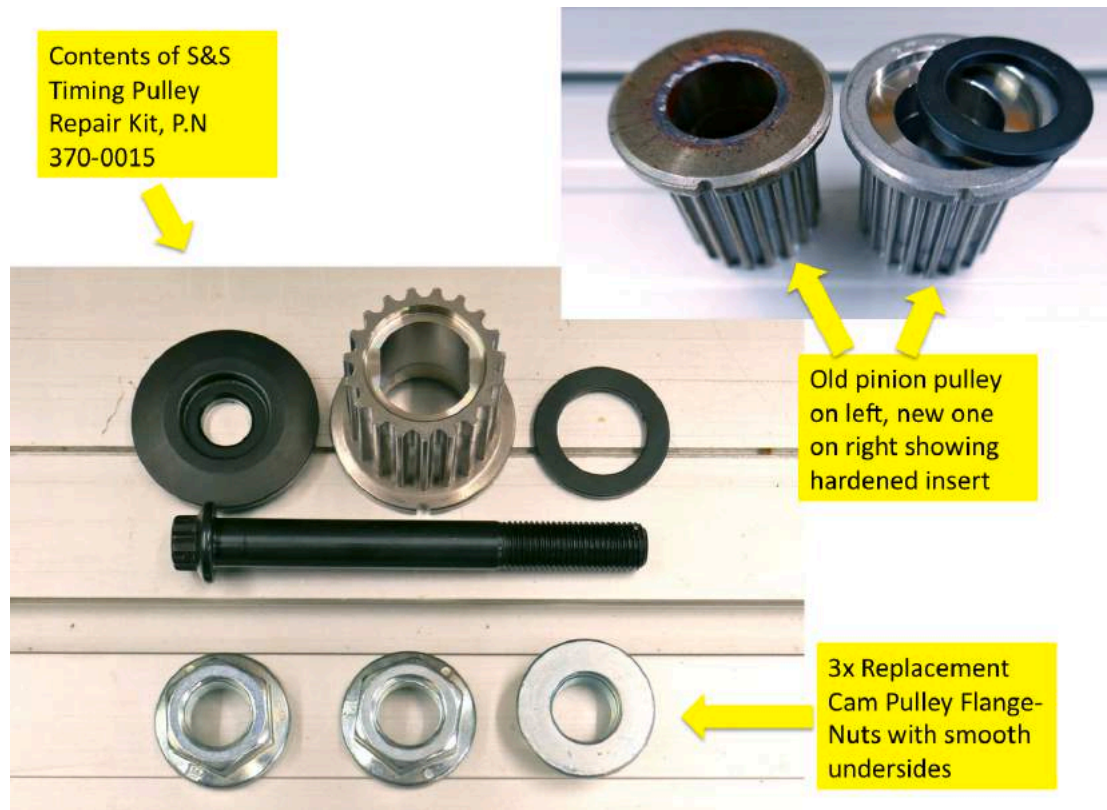
While you're in there, take a look at the tensioner pulley directly above the pinion pulley. Does it have an internal snap ring? If so it is the later type. If you can see the shiny outer bearing ring then you should investigate getting the S&S tensioner & idler upgrade kit. At one stage these were free of charge from S&S but I don't know what the current situation is.

There are some tools that are needed for this job that you will probably not have lying around in your garage. I find it's better to gather the necessary tools over a period of time rather than get 'stuck' in the middle of a job without a particular tool.

The tools and materials that I used are listed at the end of this document.

As with most jobs there are a number of ways to accomplish the same thing but this is how I did it.

X-Wedge Pinion Pulley Replacement (Version 1 – May 2018)



This guide will only cover replacement of the pinion pulley. I was going to replace the cam pulley nuts that came in the kit but found that I couldn't remove the old ones without a special S&S tool (PN 530-0016). In any case, the existing nuts are on so tight that I'm not too worried about them coming loose!

This guide is designed to augment the S&S instructions that come with the kit. In addition, I have extracted information from various sources as follows.

References:

- S&S 510-0319 - Timing Pulley Repair Kit Instructions
- S&S X-Wedge Service Manual page 3-39 to 3-41
- 'Installation of updated pinion pulley and camshaft flange nuts' by Jamie Havlik, dated 9/18/14
- MOG Magazine dated May 2016. Pages 70 & 71 'In The Workshop'

X-Wedge Pinion Pulley Replacement (Version 1 – May 2018)

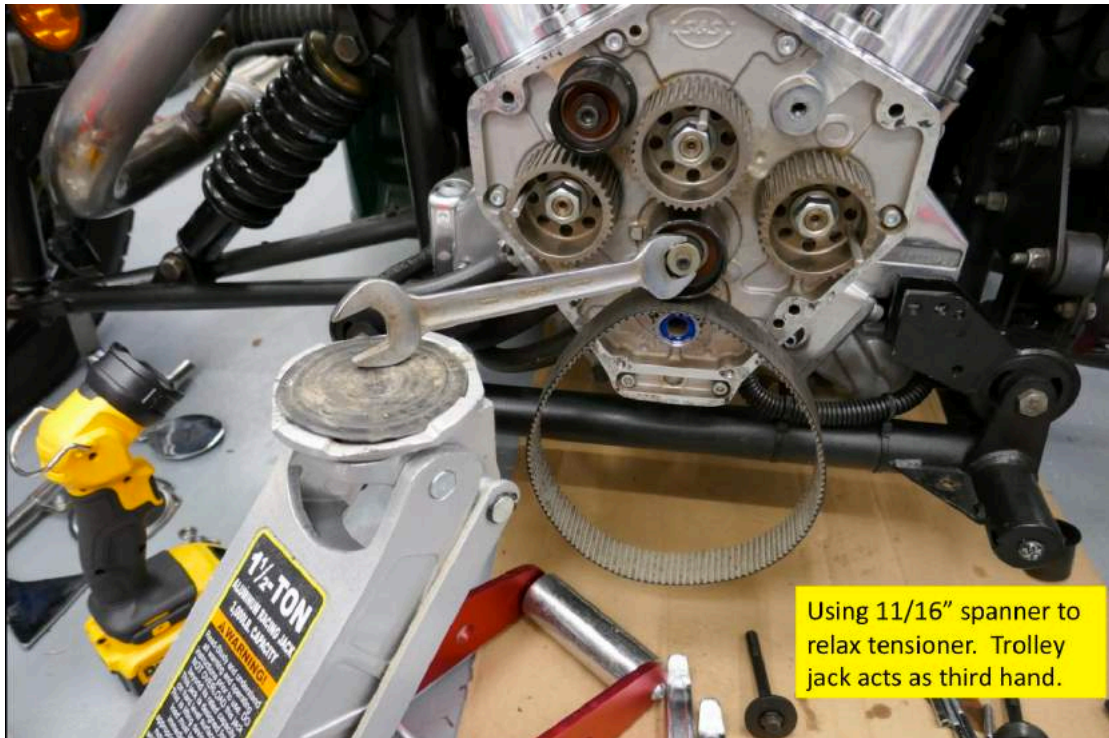
Procedure

You will have already removed the cover. I recommend taking a photo of the timing belt chamber innards. It may be a useful reference later!

Before removing the belt, use a ratchet and your Torx Plus bit in the pinion pulley bolt. Slowly turn the engine clockwise until the notch on the pinion pulley lines up with the FTDC marker on the casting. This is to the lower left of the pulley. It will be quite stiff and you will hear internal air movements.

Insert the 3/16in metal dowels through the small holes in the three upper cam pulleys and into the backplate casting. If the holes don't quite line up you can rock the pulleys slightly by gently turning the Torx Plus bolt one way or the other.

Now rotate the tensioner clockwise using a 11/16in spanner. This releases the belt tension. Holding the spanner in position with jack helps with the next steps.

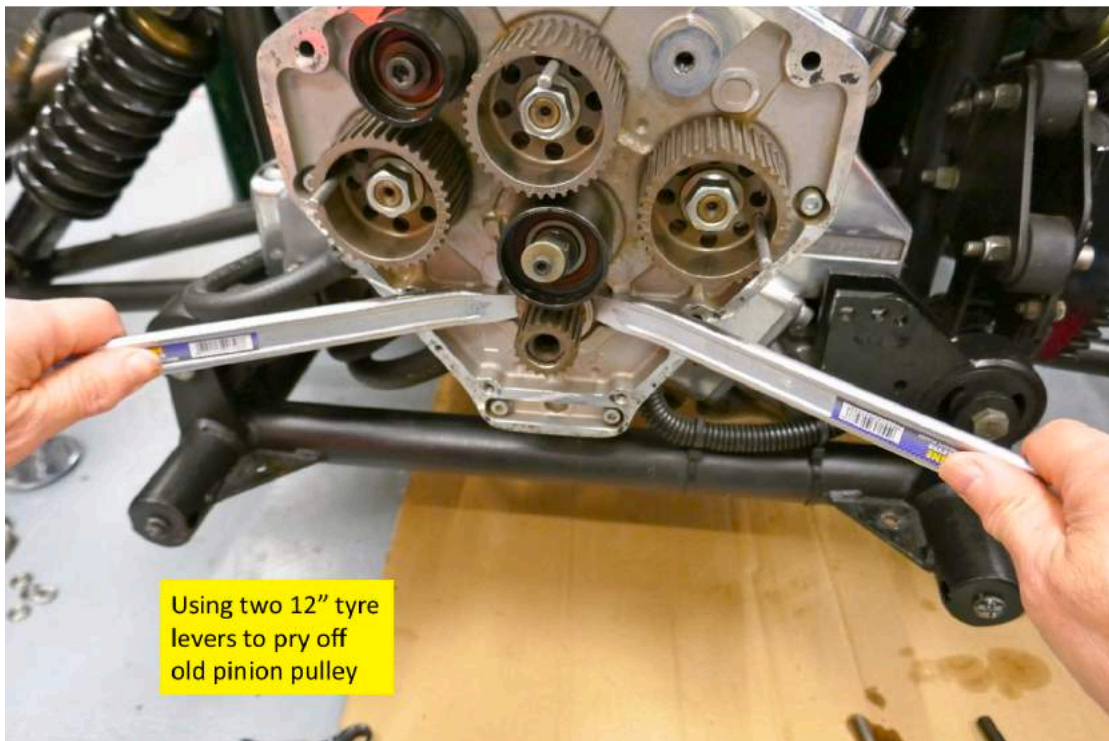
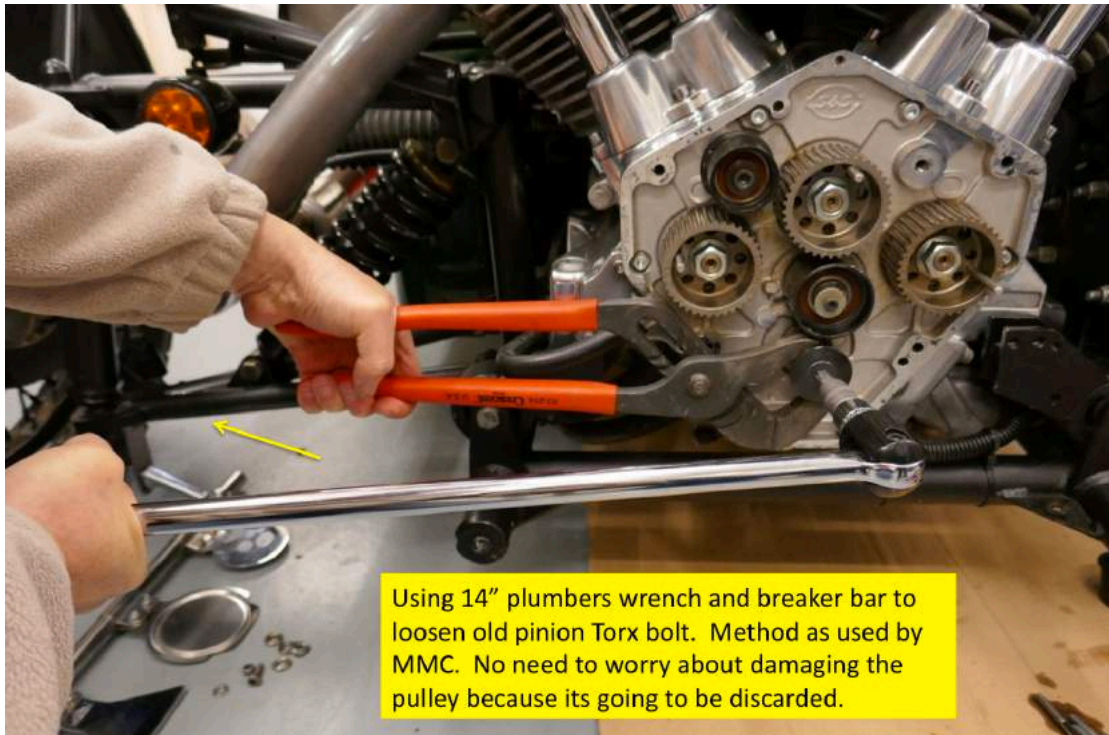


Note this photo illustrates using a jack as a 'third hand' to release the tensioner. The belt will actually still be in place at this stage.

Remove the upper right idler. The belt should now be loose enough to slip off the pulleys. If you need more slack, you can remove the left hand idler but I found this wasn't necessary.

With the belt removed, you can lower the jack and remove the spanner from the tensioner.

X-Wedge Pinion Pulley Replacement (Version 1 – May 2018)



With the old pulley removed, it's time for a good clean up of the chamber. Check the tensioner & idler pulleys for 'pick-up' and clean if necessary.

X-Wedge Pinion Pulley Replacement (Version 1 – May 2018)

My pinion shaft was quite corroded so I spent a little time cleaning it up with some fine abrasive paper & wire wool.

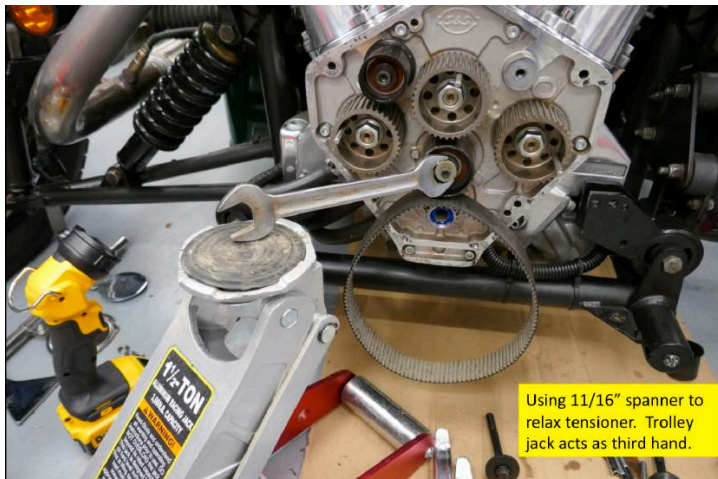


Do a trial fit of the new pulley onto the shaft to make sure that you've cleaned up the shaft sufficiently. It should be a reasonably snug fit but not too tight.

Now clean up the whole area using the brake cleaner. In particular use a cotton bud & solvent to clean where the pinion shaft meets the oil seal. Also clean the shaft itself and the inside of the new pulley with the brake cleaner.

Place the hardened ring from the kit fully onto the shaft.

Use a cotton bud to apply Loctite 243 to the shaft and the inner surface of the new pulley but only where it contacts the shaft before sliding the pulley into place. I'm not sure if it's possible to put the pulley on 180 degrees out, but just to be sure, check that the notch in the new pulley still lines up with the FTDC mark on the casting.



Now hang the belt over the new pulley with the writing on the belt the 'right way round', i.e. so that you can read the printing.

Use the 11/16in spanner and jack on the tensioner as before.

X-Wedge Pinion Pulley Replacement (Version 1 – May 2018)

Thread the belt around the pulleys. Refer to your photo if necessary!

The belt will be a snug fit but should go on OK. Make sure that it is tight against the pulleys with the only slack being in the vicinity of the missing idler.

The service manual suggests using clothes pegs or paper clips to hold the belt against the pulleys at this stage but I didn't find this necessary.

Remember that you can always temporarily remove the left hand idler to give yourself more wriggle room. If you do this, replace this idler first once the belt is in position.

Replace the right hand idler. Hold it tight against the belt while doing up the idler bolt. If the idler doesn't fit then you are a notch out on the belt somewhere.

Tighten the idler bolts to 15-18 ft-lb (20-24Nm).

Once the belt is fitted, lower the jack and remove the spanner from the tensioner.

At this stage, the belt should be fully located onto the pulleys and snugly in position. The cam pulley alignment pins are still in place and the pinion pulley notch is lining up with the FTDC mark.

Apply loctite 243 to the new pinion bolt threads and tighten the bolt using the 12-point socket and torque wrench. Tighten to 60 ft-lb (81Nm).

Remove the three metal dowels.

With your 12 point socket, manually rotate the pinion pulley clockwise and check that the belt tracks as it should.

Stand back and start the engine. Once again, visually check that the belt is tracking nicely.

Turn off the engine and replace the cam cover. Make sure that you use the cam cover spacers (S&S PN 500-0257).

Torque the cover bolts to 12 ft-lb (16 Nm). The service manual mentions using Loctite 242 on the cover bolts but I'm not sure if anyone actually does this.

Postscript

Soon after writing the above, I was able to borrow the 'special tool' to allow the cam pulleys to be held in place while removing the associated nuts. This is a quick and easy procedure in which the original serrated flange nuts are replaced by smooth flange nuts and plenty of Loctite. I really can't add anything to the procedure as described in the instructions - Timing Pulley Repair Kit Instructions [S&S 510-0319]. For simplicity I chose not to remove the cam pulleys.

Tools & Materials Used

- Obviously you need the S&S timing pulley repair kit S&S 370-0015 and, if you plan to replace it, a new timing belt S&S 106-0571.
- Also get S&S PN 500-0257 if you need the cam cover spacers
- 3/16in Allen type socket for timing cover bolts
- 1/4in Allen type socket for the idler bolts
- 11/16in Spanner for releasing the belt tensioner
- 3/8in 12-point socket for tightening the new pinion pulley bolt
- 3x 3/16in metal dowels. These are used to locate the cam pulleys. I bought a short length of rod off eBay and cut into 45mm lengths for an all-in cost of £2.95! Alternatively, you could use 3/16in drill bits if you have them to hand.
- Torx Plus 45 socket for removing old pinion pulley bolt. **IMPORTANT: Note that this is must be Torx Plus which is different to the regular Torx.**
- Two 12in tyre levers for prising off old pinion pulley. Under £5 a pair on eBay.
- Large (14in) plumbers wrench to hold old pinion while undoing bolt.
- Loctite 243 (blue)
- Torque wrench (18in type preferable as you will need to torque up to 60lb-ft (81Nm))
- 24" Breaker bar
- 3/8in & 1/2in socket ratchets
- Adapter 1/2in > 3/8in if your Torx plus bit is 3/8in drive
- Small trolley jack
- Fine emery paper or wire wool to clean up pinion shaft.
- Brake cleaner solvent spray
- Cotton buds

