

I thought I would share my experiences so far regarding my 2001 XKR supercharger pulley upgrade. As many of you know the 4.0 and 4.2 L supercharged XKRs use an jaguar specific Eaton M112 supercharger. AFAIK, there are three pulley change approaches to getting the supercharger to spin faster.

- 1) +1.5 PSI supercharger pulley upgrade, available from Mina, Eurotoys, Paramount and others
- 2) +3 PSI supecharger pulley upgrade available from Eurotoys, Phoenix Coachworks, and others
- 3) +3 to 4.5 PSI Crankshaft pulley upgrade available from Eurotoys, Phoenix Coachworks, Paramount Performance and others

Note that it is possible to use approach 1 and 3 or approach 2 and 3 in combination, but the heat generated will almost certainly require a better than stock intercooling solution.

Approaches 1 is the least expensive in terms of parts and labor. Basically it requires just pulling or cutting the old pulley off, and pressing on the new one. (On an XKR, this also means draining the coolant and removing the aluminum pipes and thermostat housing that is over the top of the supercharger snout). A special tool for this can be rented or purchased. These pulleys are pressed on extremely tightly, and an ordinary 3 jaw puller will likely not work and may damage your supercharger. Gain is reportedly around 15 bhp. In my opinion, probably not worth the trouble. Also the same supercharger belt can be used.

Approach 2 is roughly the same in terms of parts (although some outfits charge more for this one), but requires significantly more labor in terms of modifying the supercharger snout. The +3 PSI pulley is about 2.6 inches in diameter, and this is just too small to fit over the supercharger snout. Once the old pulley is removed, it is necessary to grind down the snout diameter by about 4-5mm. Supposedly, the snout casting is still strong enough after this mod. Another potential disadvantage is that such a small pulley is more prone to belt slippage, but according to marketing and anecdotal sources, a steel pulley will be less prone to slippage than an aluminum one, and a Goodyear Gatorback belt is less prone to slippage than other brands (although the stock belt size still can be used). Gain is reportedly around 30 bhp.

Approach 3 is the most costly, but requires no modification to the supercharger itself. The crank pulley and damper assembly is removed using a puller, and typically sent off to have a machine shop add an outer, larger diameter pulley. (Some vendors offer a range of sizes for this outer ring, which may be user changed once the original damper is reworked). The new unit is then reinstalled. Normally a larger belt is required. Gain can be up to around 45 bhp, depending on the ring size.

In all cases, the larger the gain, the more you will need additional charge air cooling to receive maximum benefit. There are also diminishing returns, because the M112 is already being run at or near its maximum efficiency in the stock configuration.

For my car, I chose approach 2, the +3 PSI, 2.6" pulley from Phoenix Coachworks in the UK (<http://www.phoenix-coachworks.co.uk/superchargers.html>). They are currently selling at auction on ebay (<http://cgi.ebay.com/Jaguar-XKR-XJR-S-Type-Performance-Supercharger-pulley->

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/130457911792?pt=UK\_CarsParts\_Vehicles\_CarParts\_SM&hash=item1e5fe5c1f0) for around \$200. This appears to be one of the better values out there. It is a high quality, steel pulley, and comes with a nylon dummy pulley with a window cut out to help you gauge your progress when grinding the snout.

Rather than use the pulley cut off method for removal and heat up method for installation as described on the Phoenix web site, I chose to purchase a puller/installer tool from Eurotoys ([http://eurotoysltd.com/catalog/product\\_info.php?cPath=58&products\\_id=636](http://eurotoysltd.com/catalog/product_info.php?cPath=58&products_id=636)), which at \$110 was one of the less expensive ones.

Removal of the old pulley went flawlessly. However, the next step, grinding the snout, was tedious work. I used a belt sander, and about six 36 grit extra course belts, plus a medium grit and a fine grit for final smoothing. I found that this job would be easier if the entire supercharger is removed first. The problem with doing it on the car is limited access with the belt sander, and all the abrasive grit that get over your car, even with a drop cloth under the snout. It turned out that I roughed it in with the belt sander, and then did the final trimming by hand sanding about a 90 degree arc at a time on the supercharger snout. It was tedious, and I did about an hour a day over 5 evenings.

Unfortunately the nylon dummy pulley gauge, though a good idea, was just a tad too large, and when I installed the new pulley there was a very slight binding spot. I went to pull it off and had a serious 'oh s--' moment...the puller was too big for the reduced size pulley. After calming down, I fashioned an 'adapter' of sorts for the puller from some 1/8" hardened steel strips I had lying around from another tool. It worked and I got the new pulley off, then worked on grinding for another hour or so and re-installed the new pulley. I cleaned up the engine compartment with a vacuum and then with compressed air. If you do it on the car, it is imperative that you use fender protectors..the airborne grit will otherwise settle on the car and rub between your legs and the car and scratch the finish. It can be polished out, but its best to avoid in the first place as much as possible. Also, when you are done, wash the car vigorously with a hose, to get off any grit without rubbing it in. I also found a pair of inexpensive calipers was invaluable for judging the correct diameter of the snout.

Once the pulley was installed, I replaced my thermostat with the Eurotoys 170 degree (13 degrees cooler) version. I reinstalled the aluminum pipe /thermostat housing assembly using new seals (two required of Jaguar P/N C2C11477). I also replace the bearing on my supercharger idler pulley, because mine had excessive play and some noise. Finally, I chose to replace my supercharger belt with a Goodyear Gatorback belt.

Once all back together, with fresh coolant, I reset the ECU.

It has been 2 days now, and so far I am quite pleased. The 170 degree thermostat is causing no issues. It seems as if the performance continues to improve as the ECU re-adapts. These cars, though fantastic at accelerating at the higher revs, are geared such that they are a little slow getting going from a standstill. The 3 lb pulley really improves performance significantly in that regard.

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I hope to make some inter-cooling improvements in the future (it gets awful hot here in the summer) and perhaps add a thermostatic or manual auxiliary fan switch in the not too distant future. Then I will get some dyno numbers.

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