

TBSS Cam installation

Published with permission from Mike (MKEngineer)

I finished up my cam installation the other day; from start-to-finish it was all done by my lonesome in my garage. Total installation time from the first-bolt removed to the final filling of the coolant was a casual/relaxed 18 hours, spread over the course of 6 nights/days. This was my 5th cam installation on an LSx, 1st on a TBSS / LS2 and 1st with an Auto (previous were all M6's). If (when) I have to do another one on an SS, I could easily reduce it to 12 hours, knowing now what front-end parts need to be removed (and which ones can stay-put). Nevertheless, the breakdown consisted of ~7-8 hours for the plugs / coils / valvecovers / valvesprings and about 10 hrs for the items pertaining to the camswap.

Here's what I installed:

LPE GT2-3 Cam (207/220 .57x" 118.5LSA)... Perfect cam for the forthcoming MP112HH.

PSI-LS1511 Beehive Valvesprings (120# seat, 350# open). Likely *the best* LSx beehive valvespring on the market.

PSI Titanium Retainers

Comp hardened locks

Trend (aka Comp) 7.425" pushrods (needed due to the smaller BC of the GT2-3)

NGK TR6 Sparkplugs @ .035" Gap (also in prep for the SC)

160* T-stat

Anyways the standard LS1 cam-installation "how-to's" found from LS1Tech that have been around for years still much applies. Much of the installation is still the same as those, but I wanted to share a few other tips 'n tricks as well.

- For draining the coolant, instead of just disconnecting the lower radiator hose and watching 2-3 gallons spill all over your garage, use your wet-dry vacuum and suck the coolant out of the radiator fill-cap. Works like a charm. I also used the wet-vac when disconnecting the lower rad-hose, but after sucking it out of the fill-neck only 1/3 gallon came out from below so the mess/cleanup was absolutely minimal.

- Use those \$1.99 pen-magnets to help hold-up the lifters during the cam removal. I ALSO used two "oiled" 5/16" wooden dowels (cut at 20" lengths) and slid them in as well. Doing either one of these methods is fine for holding up the lifters, doing both is 2x the insurance. (I actually have heard of someone still dropping a lifter when just using the dowel-method... methinks he was using the wrong size, but I didn't care to risk it... And to boot I already had the dowels & pen-magnets so it was free and easy). Just make sure you pre-lube the wooden (or aluminum) dowels with oil for easy insertion / removal, as they are a snug fit.

- Make your own valvespring compressor tool. Mine looks like a crow's foot, has a "fork" on one end, a hole in the middle (for a stock rocker bolt), and then a flat surface on the other end that sets on the edge of the head and acts as a cantilever. This handy tool is 10x easier and faster than those screw-type over-the-spring compressors. You can purchase variants of the homemade tool for \$50-80, but..why? It will take you all of about 15 minutes to make it. I made mine 3 swaps ago, and it still works 100% perfectly.

- You do NOT have to purge/remove the A/C condensor to remove/install the camshaft! I had heard of some early TBSS cam-installs that said the A/C purge was necessary...not the case! A simple and easy wiggling of the condensor away from the engine is all you need - it is still a very tight install - you

need 19" of space from the engine to the condenser to allow for the cam to "fit", so the condenser needs to move away from the engine by ~3-4". This was accomplished by removing the hardware in front of the condenser (ie, removing the bolts that snug the front headlight/grille support, removing the hood-latch support). Of course, the radiator does need to be removed to get this cam-clearance. Other items that do not require to be removed: Stock airbox, MAF, TB, alternator & mounting bracket.

- Speaking of the front headlight/grille support, you do not need to remove the headlights. All that is needed to be removed from the front clip area is the grille, hood-latch & associated body crossbeam, and the 5 local fasteners of the h'light/grille support (there are about 12 total that affix this support to the body). Here's where I spent a lot of time figuring out what needed to be removed...and how. Not to mention a lot of items that I did needlessly remove.

- The Kent-Moore J-tool for locking the flywheel is immensely useful. I highly recommend it. The only PITA is getting it 'in' there, not a lot of working space. Cost was about \$30 from eBay. I simply did not trust the "screwdriver method", hence why I bought the right tool.

- To use the flywheel locking tool, you must of course get the starter out of the way. To remove the starter, the Helms manual states to remove the transmission crossmember, remove this brace, remove that brace, remove everything in a 3' area it seems (and to do much of it requires a domino-effect of removing various other brackets). Mind you, I'm doing this job laying on my back, with the truck only about a foot off the garage-cement, so much of this was not an (easy) option. Instead, I chose to not *re*move the starter, but just *move* the starter. Take out the two bolts, then the starter area has enough void that you can push it forward and towards the pass-side wheelwell to gain enough space for the flywheel tool. Worked like a charm. BTW, for the tool you need to also purchase a 120x1.5xM8 and a 40x1.5xM8 bolt.

- To remove the A/C belt, release the tensioner (a 3/8" ratchet extension square-end fits perfectly in the hole) then push the belt off the tensioner TOWARDS the engine, then push the belt off the A/C pulley TOWARDS the engine. This is the only way I could get the belt off...and it took a few minutes of trying to pull it off away from the engine before I realized doing it the opposite-way is the proper way. Once the belt is off the tensioner and A/C pulley, it'll come off the crank-pulley obviously very easily. Then just shimmy it around the other pulleys and its removed...

- The crank-pulley installation tool I purchased from a fella on LS1Tech is worth every \$30 it costs. This tool completely eliminates the possibility of stripping any crank-threads, and makes the installation of the pulley a cinch. I did my first two camswaps years-ago using the stock crank-bolt, and never again will I do so. The stock bolt is just a smidge too short to do the pulley removal and reinstallation with any degree of confidence that you won't strip any threads. (at worst-case, you're only engaging 1/2 of one turn of threads to the crank! NO WAY!)

- I reused all of the gaskets that were on the truck. Just in case, I had new water-pump gaskets, a new timing-cover gasket, and a new crank-pulley gasket...but after close inspection the ones on the truck all looked fine so they stayed. After starting the truck and 20 miles - no leaks!

- To remove the stock fan clutch, I could not find the proper tool for under \$50. Using the strap-wrench method did NOT work for me, the nut was on much too tight. Instead, I used a fan-clutch holder for most "bolted" fan-clutches (ie, like on my '02 TB), and two grade 9.8 M6 bolts that fit perfectly into the clutch's holes. Connected the holder-tool onto these two bolts, and then used my 1-7/16" wrench (correct size is 36mm but I didn't have it), and the nut then came off easily. I wrestled with how to get this fan-clutch off for a solid hour before I wisened-up and mimicked how to take off the clutch on my '02 TB...then it took about 5 minutes. Incidentally, a cam-swap also is a perfect time

to install you favorite set of E-Fans, since the shroud and fan clutch are coming off anyways....

- After refilling the radiator & letting it burp-itself for a while (you should be able to put in 2+ gallons), the little trick for removing all the air from the system is to pull the rubber coolant hose that adjoins the heater-core line to the pass-side head. Remove the clamp that connects this rubber-line at the head and then disconnect the rubber-line from the barb. Start the truck & let it idle (with heat 'on') until you see coolant coming from the open-barb on the head. Then reconnect this line and you should be all set.

Other very handy tools: Magnetic flexible pickup tool, especially when you drop a valvespring lock; Air-line hose that threads into the sparkplug hole to pressurize the cylinder, calibrated click-torque wrench, etc.

There may be more tips, but for now this'll do.

