

Recently I installed an engine oil cooler system in a '03 Z06. The car is tracked recreationally and street driven, so I wanted a system that was transparent in use, and above all it had to be reliable! This drove me to two decisions at the start: First, I would only use AN hardware, no barbed connections, and second, I'd install a thermostat. Without a thermostat the oil temperature would never get hot enough on the street to cook out the contaminants that are a normal part of engine operation. Adding the thermostat was a significant headache, but a necessary one. A third decision at the beginning was not to use a oil filter adapter to get the oil out of the engine, but rather to use an existing port that GM uses for a factory engine oil cooler in its heavy duty truck packages. This was done to keep the oil filter from hanging down below the suspension.

So, let's get to the install.

This Z06 has LG long tube headers installed and has been lowered within the limits of the existing hardware, but is otherwise stock.

The parts list that I used was:

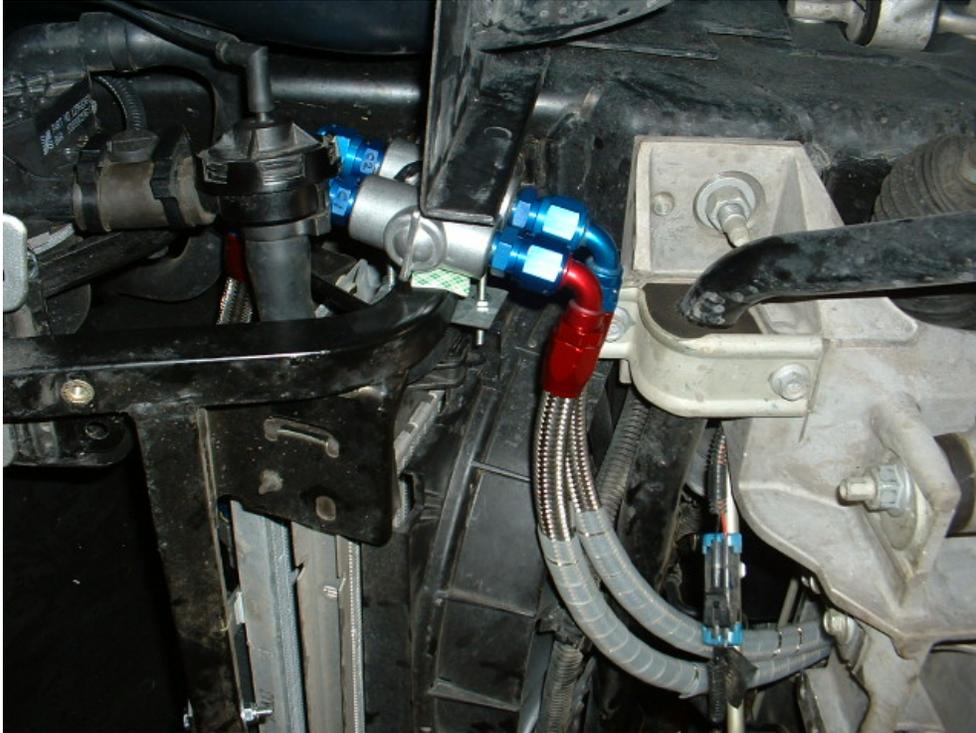
- Perma Kool engine oil cooler, 450 h.p. rating, 3/8" female NPT threads
- Perma Kool thermostat, 3/8" female NPT threads
- Xtreme Motorsports LS-1 adapter (comes with AN hose end fittings)
- 4 90 degree -8 (1/2 inch diameter) hose end fittings
- 2 straight -8 hose end fittings
- 5 straight AN-8 3/8" NPT fittings
- 1 45 degree AN-8 fitting
- 10 feet 1/2" braided hose
- Thermal insulation tape
- 1/2" Nylon wire loom
- Sticky-back foam tape
- Steel bar, various nuts and bolts

I started off installing the oil cooler on the front of the air conditioning compressor. Using 1" steel bar, I mounted the cooler to the air deflector frame, holding the cooler parallel to the air conditioning condenser. I put sticky-sided tape on the mounts to protect the condenser coils, and mounted the cooler up high enough to not interfere with the air deflector position.





The next step was to locate and mount the thermostat. It took several attempts, but I finally mounted it right next to the AIR pump forward of the left front wheel well. It's pretty tight in there, but using 90 degree hose end fittings it ended up working well, and I didn't have to move around any hardware to fit it in.



Oh, and on the subject of hoses. It's possible to have a shop make up your hoses, but it's a lot faster if you do it yourself. First, measure the length of hose you need (including the hose ends) and mark the braid with a felt tip pen. Then, straddle your mark with a single width of electrical or masking tape (electrical works better), about 3 or 4 layers. Then, using either a hacksaw or cutting wheel, cut through the middle of the tape. The tape will help keep the ends of the braid from fraying.



However, it doesn't do a perfect job. So, a hint: take a wire tie and wrap it tightly around the hose. Then slide the tie up to the very end of the hose, and voila!, all the strands will go to their appropriate position. Then take the shell of the hose end and press it onto the end of the hose

with a twisting motion, working to keep the frayed ends from popping out. It's a good idea to use gloves at this point to keep from getting those dreaded blood tests (ouch!).



Then use some clean engine oil to lubricate the hose end and tapered fitting, and push/turn the tapered end into the shell until the threads are engaged.



This next step is important: **KEEP THE HOSE FROM TURNING** while you continue to screw the fitting halves together. Some people say to mark the hose where it comes out of the connector

In any installation, but especially one with headers such as this Z06, thermal tape is really good idea to keep the hose from absorbing radiant heat. After all, the whole point of the exercise is to cool the engine oil, not warm it up! I wrapped the length of the hoses that were adjacent to the engine, then secured the ends of the tape with some aluminum duct tape.



I routed the hose along the engine, exiting underneath the steering rack and bending left to mount to the thermostat.





Note the nylon spiral wrap. As you can tell, I don't really care about how pretty the stainless braided hoses look; I care about reliability and durability. Braided SS lines and aluminum engine, suspension pieces, other SS hard lines, etc. are a fantasy world for chafing. So, what part of the hose wasn't wrapped in thermal tape I wrapped in nylon wire loom, available at Home Depot. I also wrapped the lines from the cooler to the thermostat with nylon to keep the chafing hounds at bay.



And, that's about it. I tried to figure out a way to pre-fill the system with oil, but ended up just starting the engine, counting to five, and shut down. At that point the "Low Oil Pressure" message had just come up on the DIC, so I waited about 30 seconds, turned the oil pressure (which I was monitoring on the DIC) was reading 12 psi, so I started the engine again, and the pressure came up normally. After about 5 minutes, I shut everything down and looked for leaks. There were two that I found that cleaned up after I tightened the flare nuts about one flat.

Then we did a short driving test, and the oil temps came up to normal, around 200, which told me that the thermostat was not flowing oil at full rate into the cooler (it always flows a minimum of 5% to keep fresh oil in the cooler). We haven't had the car on the track, yet, to see what happens to the temps on the track. Hopefully we'll find out about that in a week.

### **April 2006 Update:**

Two things have happened since I wrote this install guide over a year ago: I removed the oil cooler system from the '03 Z06 and re-installed it on my stock LS-1 (without the LG Longtube headers, which made the installation of the oil fitting adapter much, MUCH easier). If you are considering installing both a set of longtubes and an oil cooler, install the oil cooler first; it'll make life a lot easier.

Second, over the winter I had problems with the oil temps taking too long to get up to a decent temperature. It would eventually get to the 180 degree set point, but it could take 15 minutes or more. So, I fabricated a simple cover that cut the warm up time in about half, and now allows the oil to climb up to 190+ in 70 degree weather (it used to never get off the 180 degree set point in my LS-1).

So, here's how I made and installed it:

The cover is made of thin gauge steel sheet I got from Home Depot, 12" wide. Add about 1/8" to each dimension of the cooler for the bend radiuses (radii?), and bend it into a "C" shape with about a 1/2" lip on the top side and 1/8" on the bottom. I found a friend with a small sheet metal brake to make the bends, but some good C clamps and 2x4s could be used as well.



To install the cover, loosen the two bolts securing the oil cooler mounting bars and hook the 1/2" lip on the top.



Then reattach the lower mounting bolts and you're done! It takes less than five minutes to remove or replace, and I do it while I'm swapping out my race tires.

