**GPI LT External Oil / Vacuum Pump Installation Instructions**

This kit is designed specifically for the 6th Gen Camaro, but it can also be installed on any LT based vehicle where clearance permits. Its primary function is to supply non-aerated oil to the engine across all RPM ranges. The pressure will fluctuate depending on oil viscosity and clearance. The installation requires the air conditioner compressor to be removed or relocated. GPI currently has no plans to create an A/C relocation kit, as we believe vehicles that need this product will benefit more from the weight reduction than the conditioned interior air.

**Step-by-Step Instructions**

1. **Removing Original Parts:**
	* Remove the OE oil pan.
	* Remove the Harmonic Balancer.
	* Remove the timing cover.
	* Remove the OE oil pump.
	* Remove the timing chain tensioner.
2. **Installing New Parts:**
	* Install the block off plug in the small oil passage behind the chain tensioner.
	* Install the supplied timing chain damper.
	* Install the supplied block off plate over the 5/8” oil passage left exposed from pump removal.
3. **Reinstalling Parts:**
	* Reinstall the timing cover using the supplied GM gray RTV. Torque the bolts to 18 LB Ft.
	* Install the GPI modified oil Pan, complete with the Oil cooler delete. Use the supplied GM gray RTV and torque all 8MM bolts to 18 Lb. Ft. Torque the long rear 6MM bolts to 106 lb. in.
4. **Balancer Installation:**
	* Install the ATI balancer 918856 using the following procedure as it applies to your bolt choice.
		+ *If using the GM Factory Bolt:*
			- Note! The GM factory bolt is a 1-time use bolt! Directions are for installing a new bolt only (p/n 951499 for wet sump LS or p/n 951500 for LS7 / LS9).
			- Use your old bolt to install the damper and torque to 240 ft/lbs, then remove it. This is to seat the damper completely.
			- Install your new bolt and tighten to 37 ft/lbs. We recommend Blue or Red Loctite here if you are doing any high-performance driving with this engine.
			- This step is to get a reference on the front of the engine. With the torque wrench hanging at the spot where the 37 ft/lbs was achieved, reference 140° clockwise for another tightening cycle. Put a mark or a piece of tape where you need to tighten.
			- Then go another 140° from the 37 ft/lbs starting point and you are now tight.
		+ *If using an aftermarket ARP Bolt for any LS damper:*
			- Apply high temperature RTV to both sides of the washer prior to installation.
			- Use 262 Red Loctite and tighten to 230 ft/lbs.
	* Attach the supplied drive mandrel to the balancer at 28 lb. ft using blue Loctite.
5. **Coolant Line Removal and Installation:**
	* Remove the oil cooler coolant line from the driver’s side of the water pump, then remove the quick disconnect nipple with vise grips. This is a press fit into the pump housing and will come out by applying downward pressure while wiggling horizontally.
	* Tap the supplied expansion plug into the water pump housing passage, replacing the removed nipple.
	* Remove the other oil cooler coolant line from the “T” in the lower radiator hose. Install and clamp the supplied rubber cap.
6. **Pump Installation:**
	* Install the oil pumpmounting bracket to the block, positioning spacers as needed. Torque to 18 lb. ft using blue Loctite.
	* Install the oil / Vac pump and belt with the 2 supplied 7/16 Allen head bolts and washers. HTD belts perform best when lightly tensioned. A properly tensioned belt can be slid off and reinstalled on the driven pulley for pre-oiling. Check alignment and adjust if needed by loosening and re-torquing the 5 set screws retaining the pulley to the pump shaft.
7. **Installation of Hoses and Lines:**
	* Install the -16 oil supply hose from the pump to the pan. AN fittings don't need sealer or tape—just clean the mating surfaces and moderately tighten.
	* Install the -10 pressure feed line from the filter adapter to the pump outlet.
	* Thread the 90-degree fitting of the -12 Vac hose between the block and pump mounting bracket. Attach the 120-degree fitting to the vacuum regulator.
	* After adjusting the regulator, your work under the car is now complete.
8. **Final Steps:**
	* Remove the OE valve cover from the driver's bank and install the supplied valve cover with the -12 fitting.
	* Connect the 90-degree -12 Vac hose from the pump to the valve cover.
	* Fill the crankcase and cooling system with the specified fluids.
9. **Priming the System:**
	* On initial startup, if a 90-degree drill is available, attach a 7/16 socket and spin the pump shaft clockwise with the belt removed to prime the system.
	* If no drill is available, we recommend removing spark plugs and disabling the ignition and fuel systems. Crank the engine over until pressure is achieved.
10. **Catch Can Installation:**
* Connect the outlet fitting of the Vac pump to a catch can of your choice. We recommend a minimum 1 qt capacity unit with a single -12 fitting and open breather filter such as the Moroso 85465. A Moroso 85485 can also be plumbed in series with the pump inlet for additional oil control. As many of our customers may already have a suitable catch can and location preference varies, we have not included one in the kit as a standard feature but offer it as an option.
1. **Final Adjustments:**
* Install a rubber cap on the passenger side valve cover.
* Remove the dipstick and install a Vacuum gauge on the tube.
* Run the engine at 3500 RPMs and observe the crankcase Vacuum.
* Without the use of DLC coated engine components, GPI recommends 10-13 in HG. Also note:  Vacuum requirements vary with each build and components, consult your builder for vac recommendations. Adjust the regulator as needed.

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