

Lingenfelter 630HP ZL1 Camaro Kit Installation Instructions (2012-2015 6.2L LSA V8 engine)



PN: L250356512

Parts List

#	Part number	Description
1	8PK1655	8 rib 1655mm belt
1	L250150309	LSA LS9 10 bolt supercharger Pulley Hub Kit
1	L220300709	2.55" 8 rib 10 bolt pulley
1	ETN307091	Pulley Cap
1	L960202012	Solid SC isolator coupling
2	SPIR-69427	Supercharger cover alignment dowel pin
1	82180	Permatex Ultra Black Gasket Maker, 3.35 oz.
1	ETN86063	Vacuum bypass positioning tool
1	L310065307	160 degree thermostat
1	L650182012	Lingenfelter High Flow ZL1 Camaro Air Intake
1	L450110095	LPE diagnostic port cover kit
1	L920010000	LPE decal
1		Instructions

Tools & Materials Required

- Ratchet
- Torque wrench
- 7 mm socket
- 8 mm socket
- 10 mm socket
- 18 mm socket
- 10 mm wrench
- 8 mm hex bit Allen socket
- 6" socket extension
- 1/2" breaker bar
- T-20 Torx head driver or socket
- T-25 Torx head driver or socket
- Hose clamp pliers or standard pliers
- Hammer
- Punch
- Mallet
- Fork type pry tool
- Wooden block
- Flat head screwdriver
- Pulley removal tool
- Die grinder/Dremel tool (optional - needed if you are making the alteration to the factory air box)
- Cut-off attachment (optional - needed if you are making the alteration to the factory air box)
- Razor blade or gasket scraper
- Drill press (optional - needed if you are drilling into the pulley for the dowel pin)
- 3/16" hardened solid/tipped carbide 2-fluted drill bit (optional - needed if you are drilling into the pulley for the dowel pin)
- 3/32" Allen wrench
- Scouring Pads
- 50/50 Dex-Cool

Optional Items

Description	Part number
LPE pulley removal and installation tool	L950066509
LSA damper kit (SC pulley required)	L220050709
Stock diameter LSA pulley for LPE LSA damper, 8 rib, 7.87"	L220646509
6% OD LSA pulley, 8.25", for LSA damper kit	L220060709
11% OD LSA pulley, 8.66", for LSA damper kit	L220070709
18% overdrive LSA damper pulley, 9.17" OD	L220170709
23% overdrive LSA damper pulley, 9.55" OD	L220290709
28% overdrive LSA damper pulley, 10" OD	L220380709
LSA Idler Pulley Relocation Bracket Kit	L220636509
76mm idler kit	L250120309
90mm idler pulley kit	L250260090
100mm idler pulley kit	L250130309
Lingenfelter High Capacity Gen 5 Camaro Intercooler Radiator kit	L320061410
EFI Live programming tool	EFIFS2-T
Throttle body gasket	12576549
Supercharger manifold gasket kit	19180613
Supercharger manifold gasket rivets (also part of manifold gasket kit)	12558759
Charge air cooler housing gasket	12613457
Charge air cooler insulator	12612467
Supercharger actuator kit	19180860

The Lingenfelter 630HP ZL1 Camaro Kit is designed to increase the horsepower of your 2012-2015 ZL1 Camaro. The primary method of doing this is increasing the speed of the LSA Eaton TVS1900 supercharger in order to deliver increased airflow resulting in increased boost and power. The supplied Lingenfelter 2.55" LSA pulley is a roughly 18% overdrive compared to the stock 3.0" pulley, resulting in gains of approximately 3 to 4 psi of boost on an otherwise stock vehicle.

The supplied Lingenfelter low restriction air intake system helps reduce inlet depression, further increasing engine power.

This upgrade kit is designed to work with the stock engine and premium unleaded fuel. Recalibration of the production ECM is required when installing this kit.

The production fuel injectors and production fuel pump are able to supply the correct amount of fuel for this power level so no changes to the injectors or the fuel system are needed if you are only installing this kit. If you are using these parts in combination with a larger supercharger drive pulley on the damper or a larger supercharger you will need larger fuel injectors and you may need to increase fuel pump output as well.

The belt size included with this kit is designed for use with the stock diameter damper.

The production ZL1 spark plugs are the same spark plugs used in the Z06 and ZR1 Corvettes and in the Cadillac CTS-V. In engine dynamometer, chassis dynamometer and track testing performed by LPE, we have found these spark plugs to be well suited to stock to highly modified LSA, LS9 and LS7 engines. Unless you are running top speed testing or endurance type road racing applications or this is a marine engine application, LPE recommends retaining the stock LSA spark plugs at the production gap of 0.040" (1 mm). If you do find you need to go to a colder range spark plug, the production 12571165 (AC Delco 41-104) iridium spark plugs are roughly the same heat range as the Denso IT20 spark plugs and the NGK TR7ix spark plugs. The next stage in colder plugs would be a Denso IT22 or an NGK TR8ix.

If you do not feel comfortable pulling the pulley off or pressing the LPE supplied hub on, you can send your supercharger front cover to LPE to have this work performed for you.

Read the entire instruction manual before beginning installation. Many of the stock parts will be used in reassembly.

Be careful not to damage any components while removing them from the vehicle. Some parts cannot be purchased by themselves from GM and must be purchased as part of an entire assembly.

When referencing the side of the vehicle, the driver side of the vehicle is considered the left side and the passenger side of the vehicle is considered the right side of the vehicle.

Torque value warning - the torque values for the fasteners are provided in metric (Nm) and then imperial units. For the imperial units some are referenced in lb-ft and others in lb-in. Make sure you notice the difference and set your torque wrench correctly.



1. Open the hood of the vehicle. If you have been driving the vehicle, allow the vehicle to cool down for a few hours before beginning this work.

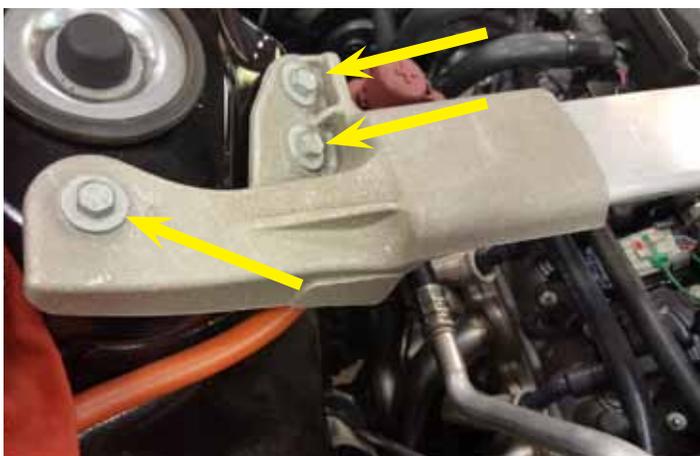


2. If you need to lift the vehicle using a floor jack, remove the belly pan from the underside of the vehicle by removing the fourteen bolts using a 10 mm socket.



3. Remove the ground cable from battery (located in the trunk). Raise and properly support the Camaro using a jack and jack stands, or a lift. Please follow the GM lifting procedure for the 5th Gen Camaro.

WARNING: Be careful not to short the wrench across the terminals. We recommend using an insulated wrench for safety reasons.



4. Remove the strut tower bar by unbolting 6 bolts. There are 3 bolts on each side of the strut tower. Carefully lift the strut tower brace out.

5. Loosen the front suspension crossmember fasteners 3/4 of the way to allow the assembly to be lowered approximately 1 inch.

6. Lower the engine and front suspension crossmember using a suitable jack.

7. Remove the oil cap. Then remove the engine cover by pulling the front of the cover up and away from the engine. Re-install the oil cap.

8. Unplug the Mass Air Flow (MAF) sensor connector, which is located on the side of the airbox inlet, by first sliding the grey tab to unlock the connector. Then, press on the center tab and pull the connector away from the airbox inlet.

Do NOT pull the sensor connector by the wires - pull from the plastic connector itself.





9. Loosen the hose clamps securing the rubber air inlet tube to the throttle body using an 8mm socket.



10. Remove the two (2) nuts that hold the airbox in place using a 10mm deep socket.



11. The positive crankcase ventilation (PCV) tube goes from the driver-side valve cover to the rubber air inlet tube. Disconnect the PCV tube from the air inlet tube by pressing the retaining tab on the fitting and pulling up on the tube.



12. Remove the air inlet tube from the throttle body and pull up on the airbox to remove the air inlet tube and airbox assembly.



13. Using a 1/2" breaker bar, release the tension in the supercharger belt tensioner located on the passenger side by turning the tensioner counter-clockwise. Grab the belt in an open location and remove from the pulleys

CAUTION: Pinch Hazard! Do not place fingers in between belt and pulleys.



14. Disconnect the throttle actuator electrical connector from the throttle body.



15. Using a 10 mm socket, remove the four (4) bolts that secure the throttle body to the supercharger assembly.



16. Carefully remove the throttle body. Do not allow dirt or debris to enter the throttle body or front cover during the installation.



17. Remove the barometric pressure (BARO) sensor electrical connector from the left front of the intercooler.



18. Remove the supercharger inlet air temperature sensor (IAT2) electrical connector from the sensor on the left side of the intercooler.



19. Disconnect the manifold absolute pressure (MAP) sensor electrical connector from the left rear of the intercooler.



20. Disconnect the brake booster hose from the top of the supercharger front cover.



21. Disconnect the purge solenoid electrical connector from the top of the supercharger front cover.



22. Disconnect the evap line from the purge solenoid on the left side of the supercharger front cover.



23. Unbolt the purge solenoid using a 10 mm ratchet and extension and carefully remove the purge solenoid.

IMPORTANT: GM does not offer the O-rings separate from any of the sensors. Handle with extreme care.



24. Disconnect the electrical connector to the inlet air pressure sensor from the supercharger front cover.

25. Disconnect the exhaust valve actuator control vacuum line from the top of the supercharger cover.

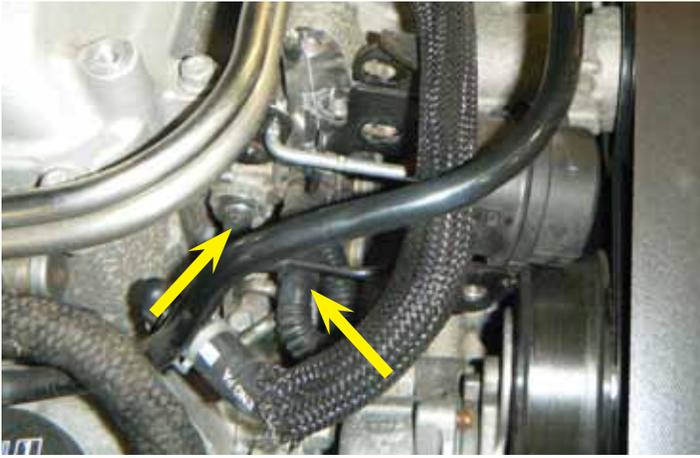
26. Remove the two (2) vacuum lines from the bypass actuator to the intercooler and boost solenoid.

27. Using a 10 mm socket, remove the boost solenoid bracket from the bypass actuator. Make sure any vacuum lines that are connected from the solenoid are disconnected.

28. Using a 10 mm socket, remove the two bolts on the bypass actuator bracket.

NOTE: Do not remove the actuator at this time.





29. Remove the vacuum line and PCV line as indicated on the left.



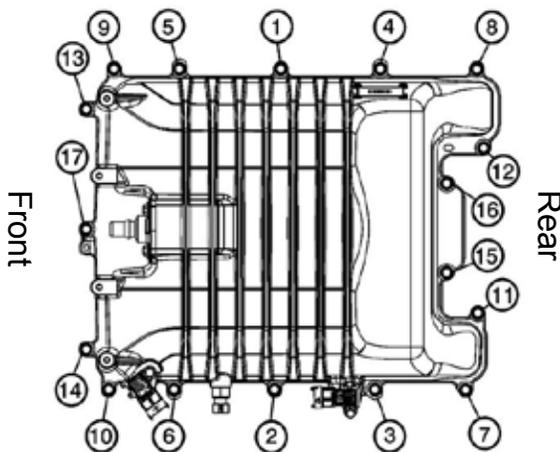
30. Remove the bypass actuator by tilting it upward and removing the metal bar from the bypass shaft linkage.

31. Using a 10 mm socket, start with the back six (6) bolts and remove the sixteen (16) bolts from the supercharger cover. Refer to the bolt locations below.

Reminder: In order to access the rear supercharger cover bolts you need to perform steps 13 and 14.

NOTE: Use caution when removing and installing cover and supercharger bolts. They have plastic Isolators in the bolt holes that can fall out. Isolators must be re-used.

(BOLT LOCATIONS)





32. Carefully remove the supercharger cover and lay it upside down on the passenger inner fender. Cover the supercharger cover with rags or plastic to prevent debris from entering the cover.

Note: The hoses will still be connected which will limit how much you can move the supercharger cover.



33. Cover the supercharger inlet with rags or plastic to prevent debris from entering the supercharger.



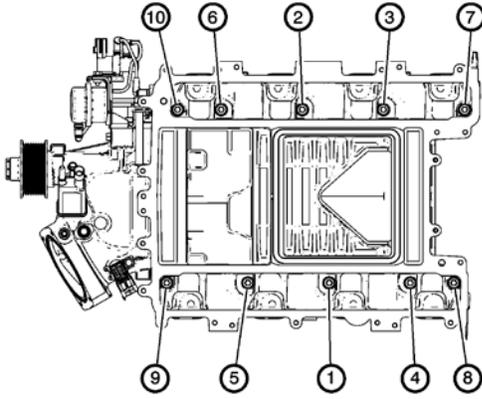
34. Using a 10 mm wrench, remove the inlet air pressure sensor. Handle the sensor and O-ring with care.



35. Using an 8 mm socket, remove the ten (10) bolts from the supercharger. Refer to the bolt locations below.

NOTE: Use caution when removing and installing cover and supercharger bolts. They have plastic Isolators in the bolt holes that can fall out. Isolators must be re-used.

(BOLT LOCATIONS)



36. Carefully lift up on the front of the supercharger and place a wooden block or equivalent underneath to wedge the front of the supercharger up 1" to 2". Make certain your wedging device is clean and clear of debris

Note: Be careful not to tear the intake gaskets.



37. Using a 10 mm socket, remove the (6) bolts on the front supercharger cover.



38. Using a pry bar, carefully pry the front cover in the location shown. Make certain any wires or lines are not in the way. This step may require a rubber mallet. Gently tap on the front of the supercharger cover to loosen and continue prying.



39. Carefully remove the supercharger front cover from the assembly.



40. Remove dowel sleeves from supercharger front cover (they may also still be in the supercharger) by squeezing with a pair of pliers while twisting and pulling the sleeves out of the cover. You will be replacing these sleeves with new ones.

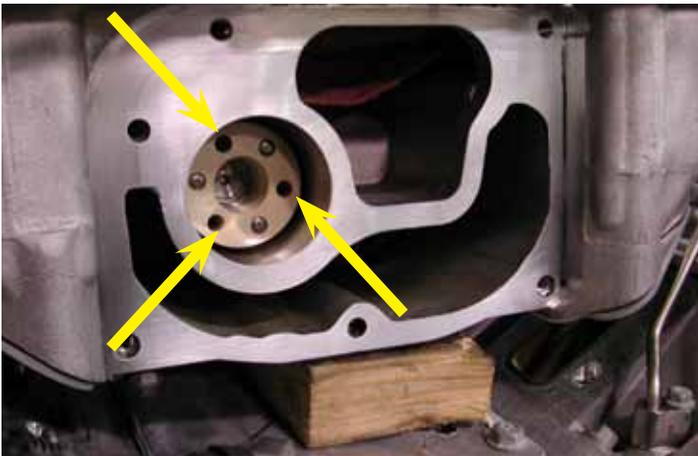


41. If you are installing the pulley hub on the front cover yourself, follow the steps in the instructions included with the 10 bolt press on hub kit (part # L250150309). LPE can also perform the pulley installation for you. We also offer porting and polishing of the front cover (as shown). Contact LPE or your LPE dealer for more details.

42. Once you have installed the 10 bolt press-on hub and the 10 bolt 2.55" pulley, you are ready to continue the installation process.



43. Clean the mounting surface of the supercharger housing with a razor blade and Scotch pads.



44. Replace the factory isolator coupling with the supplied LPE solid supercharger isolator coupling (LPE part # L960202012).

45. Notice the unoccupied holes on the coupler. The drive pins on the supercharger cover shaft will go into these holes.



46. Using a razor blade and Scotch pads, scrape and clean the mounting surface of the supercharger front cover.



47. Insert the LPE provided dowel sleeves (part # SPIR-69427) into the two (2) locations shown on the supercharger housing by squeezing and twisting them in with pliers.

48. Thermostat installation:

Drain the engine coolant by turning the petcock counterclockwise located on the bottom of the radiator.

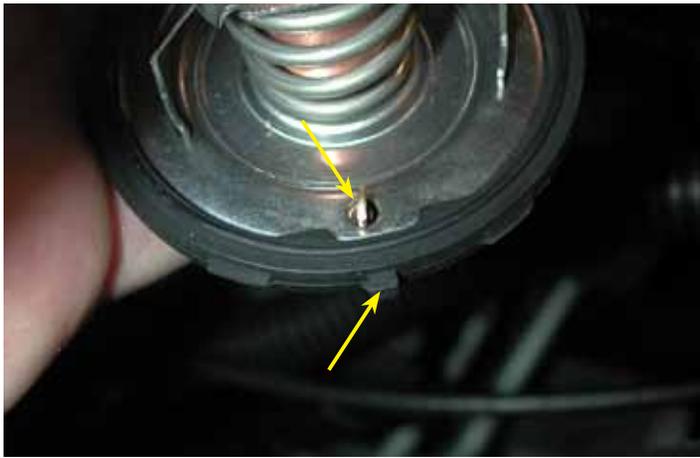
Remove the large radiator hose from the engine coolant inlet. There may be residual coolant in the system so have a drain pan or catch can ready to catch the residual coolant.



49. Using a 10 mm socket and extension, remove the two (2) bolts that hold the engine coolant inlet.



50. Remove the old thermostat from the inlet.



51. On the new thermostat, make sure that the small square tab is lined up with the check valve on the engine side of the thermostat.



52. Insert the thermostat assembly in the inlet with the square tab aligned with the notched out portion of the inlet. Make sure to press down firmly to properly seat the thermostat and gasket in the housing.



53. Using a 10 mm socket and torque wrench, torque the inlet bolts to 89 lb-in.



54. Apply a thin bead of the supplied Permatex Ultra Black Gasket maker to the mounting surface of the front cover as shown.

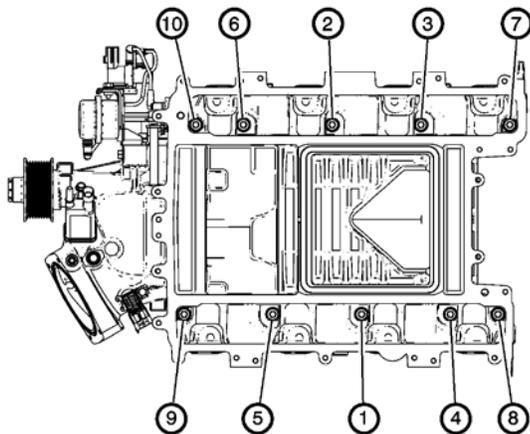


55. Carefully place the supercharger front cover on the supercharger housing. Make sure the pins insert into the empty isolator coupler holes. Using a 10 mm ratchet, torque down the six bolts to 20 lb-ft (27 Nm). As the front cover is being pulled to the supercharger, slight tapping with a rubber mallet on the pulley will help seat the isolator and allow it to spin freely.

NOTE: The torque pattern is not critical on this component.



56. Lift up on the front of the supercharger and remove the wood block or wedge that was inserted earlier. Line up the supercharger bolt holes with the corresponding holes in the cylinder heads and insert the ten (10) bolts that secure the supercharger.

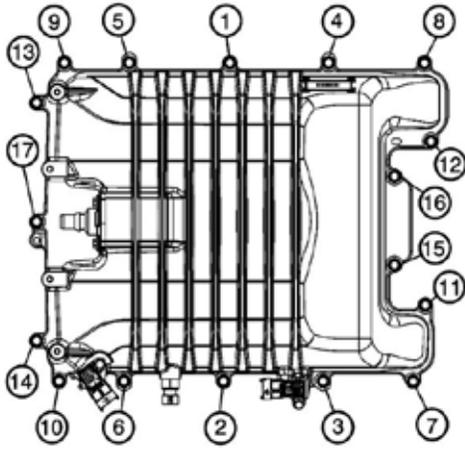


57. Tighten the bolts down in the order shown, using an 8 mm socket make a first pass of 44 lb-in (4 Nm). Then make a final pass in sequence to 89 lb-in (10 Nm).

NOTE: Use caution when removing and installing cover and supercharger bolts. They have plastic Isolators in the bolt holes that can fall out. Isolators must be re-used.

58. Inspect the supercharger cover seal and insulator seal for wear or damage. Replace if needed. Then, reinstall the supercharger cover. Using a 10 mm socket torque each bolt down on the first pass to 44 lb in (5 Nm) then on a final pass of 89 lb in (10 Nm). Make certain to use the order shown below.

NOTE: Use caution when removing and installing cover and supercharger bolts. They have plastic Isolators in the bolt holes that can fall out. Isolators must be re-used.



(FASTENER TORQUE SEQUENCE)

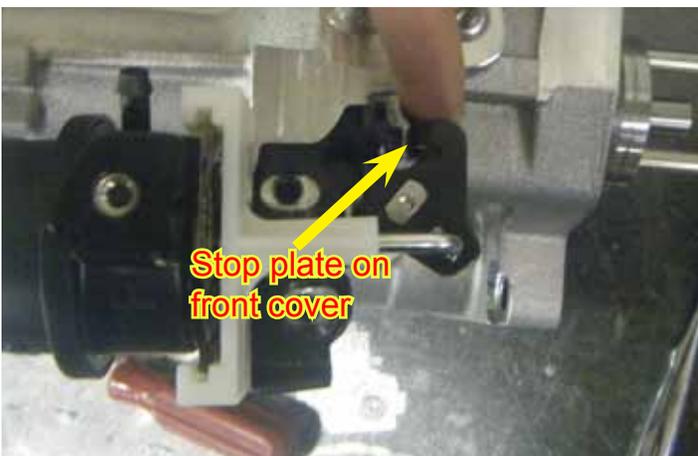


59. Insert the bypass actuator arm into the supercharger front cover bracket. Replace the PCV hose and correct vacuum hose as shown.

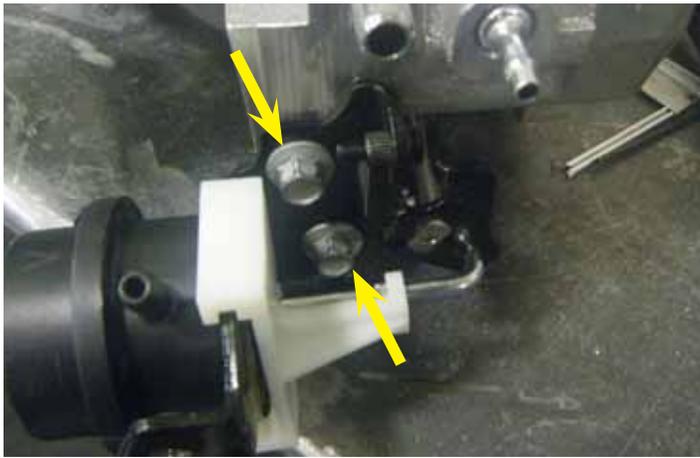


60. Use the set tool to set the actuator position [tool part # ETN86063]. Place the vacuum bypass positioning tool so that the actuator arm teeth are located in the position shown. Note the bypass set screw position.

NOTE: The front cover and bypass actuator are shown off of the vehicle for illustrative purposes only.



61. Hold the bypass stop plate back so that the bypass valve blade is in the closed position. The stop plate should not be touching the set screw on the bypass actuator. The set screw can be adjusted using a 3/32" Allen wrench.



62. Install the two (2) 10 mm bolts and torque them to 21 lb-ft (28.5 Nm).



63. Tighten the set screw so that it barely touches the stop plate on the front cover. After the initial contact, tighten the set screw 1/8 to 1/4 turn **more** to set the bypass valve blade into position. The set screw should now be touching the stop plate on the front cover. This will prevent the bypass valve blade from getting stuck on the front cover casting. Remove the bypass actuator set tool.



64. Install the boost solenoid bracket onto the bypass valve actuator. Torque the bolt down to 89 lb-in (10Nm).



65. Reconnect the vacuum hose from the bypass valve actuator to the supercharger.



66. Using a 10 mm socket, replace the inlet air pressure sensor and torque down to 89 lb-in (10 Nm).



67. Replace the inlet air pressure electrical connector.

68. Reconnect the exhaust control vacuum actuator line to the top of the supercharger cover.



69. Install the purge solenoid onto the front cover. Using a 10 mm socket, torque the fastener to 10 Nm (89 lb-in).



70. Replace the PCV hose on the purge solenoid.



71. Replace the electrical connector to the purge solenoid.



72. Replace the electrical connector to the MAP sensor.



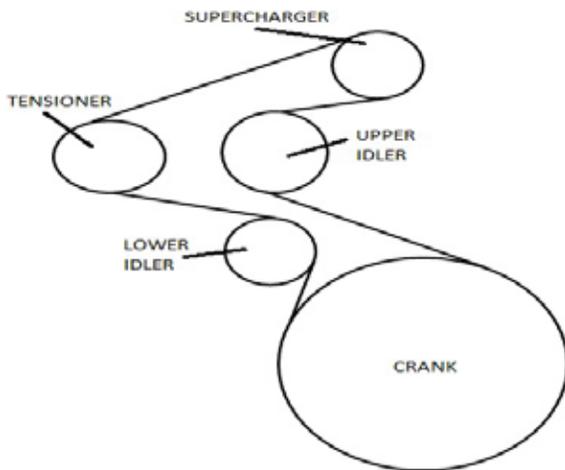
73. Replace the electrical connector to the IAT2 sensor.



74. Replace the electrical connector to the BARO sensor.



75. Re-connect the brake booster hose on the top of the supercharger front cover.



76. Supercharger belt layout



77. Using a breaker bar, release the tension on the tensioner by turning it counter-clockwise. While the tension is released install the LPE supplied belt (part # 8PK1655). See Table 1 on page 33 for recommended belt and idler sizes for the different supercharger pulley and damper diameter combinations.

CAUTION: Pinch Hazard! Do not place fingers in between belt and pulleys.



78. Place the throttle body on the end of the supercharger front cover. Using a 10 mm socket, torque down the four (4) bolts to 89 lb-in (10 Nm).



79. Replace the throttle actuator electrical connector to the throttle body.

81. Raise the vehicle so you can tighten the front suspension crossmember fasteners from step 12. First pass to 5 Nm (44 lb in). Second pass to 10 Nm (89 lb in).

82. Reinstall your large radiator hose on your inlet. Refill your coolant using the coolant that you removed or with DexCool 50/50 to the proper level.

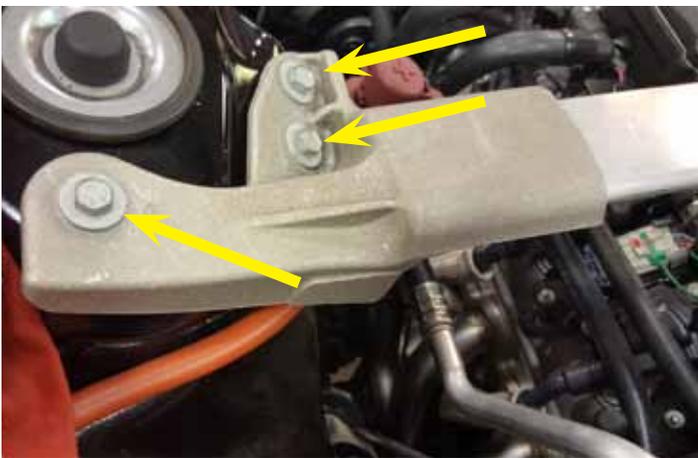
80. Follow the supplied instructions to install the low restriction air intake kit.

83. Reinstall the belly pan, tightening the 14 10mm head bolts to 7 lb-ft (9 Nm).

NOTE - if you are using jacks and jackstands to support/lift the car you may need to lower the vehicle first and then install the belly pan.

84. Reinstall the strut tower bar. There are 3 bolts on each side of the vehicle. Torque the bolts to 16 ft lbs (22Nm).

85. Program the vehicle's engine control module (ECM).





86. You can purchase vehicle programming hardware and software from LPE, you can send in your ECM for us to calibrate or you can have a local tuning shop calibrate your vehicle.

NOTE - some pulley combinations require ignition timing changes in order to operate with pump gas. The increased boost levels risk damaging your engine if the correct calibration changes are not made.



87. DLC port cover kit installation.

Apply the supplied decal to the DLC port cover as shown.



88. Install the supplied diagnostic port (DLC port) cover onto the DLC port in the driver foot well. Secure the strap that retains the DLC cover to the vehicle.

This cover is meant to notify dealerships and other service facilities that this vehicle has custom programming installed for the new supercharger pulley ratio and it should not be programmed with the stock GM calibration files when being serviced.

89. Start your vehicle and listen for any leaks. If there are any problems check all the sensors and vacuum lines for proper hook up and position.

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PERFORMANCE ENGINEERING

Table 1 - belt length and idler pulley diameters required for different LSA supercharger pulley and damper pulley combinations.

Crank Pulley PN (Crank only OD%)	Supercharger Pulley	Supercharger Pulley PN	Belt length	Belt PN (imperial)	Belt PN (metric)	Upper Idler	Lower Idler	Idler Bracket (PN)	Pulley Ratio	Total OD%	SC Speed @ 6500 RPM Engine Speed
stock 7.8" (L220646509) (0%)	stock 3.0"	*	stock 1680mm	12628026 (GM)		stock 90 mm	stock 70 mm	stock	2.6	N/A	16,900
	2.55" press-on	L220030709	1655mm/65.2"	K080653	8PK1655	stock 90 mm	stock 70 mm	stock	3.1	18%	19,900
	2.55" 10 bolt	L220300709	1643mm/64.5"	K080645	8PK1643	stock 90 mm	stock 70 mm	stock	3.3	26%	21,300
	2.38" 10 bolt	L220310709	stock 1680mm	12628026 (GM)		stock 90 mm	stock 70 mm	stock	2.8	6%	17,900
8.25" L220060709 (6%)	2.55" press-on	L220030709	66.0"	K080660	8PK1676	LPE 100 mm, 0.350" spacer, M10x1.5x60mm cap head screw	stock 70 mm	stock	3.2	25%	21,000
	2.55" 10 bolt	L220300709	stock 1680mm	12628026 (GM)		stock 90 mm	stock 70 mm	stock	3.5	34%	22,500
8.66" L220070709 (11%)	stock 3.0"	*	67.5"	K080675	8PK1715	stock 90 mm	stock 70 mm	stock	2.9	11%	18,800
	2.55" press-on	L220030709	67.0"	K080670	8PK1702	stock 90 mm	stock 70 mm	stock	3.4	31%	22,100
	2.55" 10 bolt	L220300709	67.0"	K080670	8PK1702	stock 90 mm	stock 70 mm	LPE (L220636509)	3.6	40%	23,700
	2.38" 10 bolt	L220310709	68.0"	K080680	8PK1727	stock 90 mm	stock 70 mm	LPE (L220636509)	3.1	18%	19,900
9.17" L220170709 (18%)	2.55" press-on	L220030709	67.5"	K080675	8PK1715	stock 90 mm	stock 70 mm	LPE (L220636509)	3.6	38%	23,400
	2.55" 10 bolt	L220300709	67.5"	K080675	8PK1715	stock 90 mm	stock 70 mm	LPE (L220636509)	3.9	48%	25,000
	2.38" 10 bolt	L220310709	67.0" (light)	K080670	8PK1702	stock 90 mm	stock 70 mm	LPE (L220636509)	3.2	23%	20,700
	stock 3.0"	*	69.0"	K080690	8PK1753	stock 90 mm	stock 70 mm	LPE (L220636509)	3.8	44%	24,300
9.55" L220290709 (23%)	2.55" press-on	L220030709	68.5"	K080685	8PK1742	stock 90 mm	stock 70 mm	LPE (L220636509)	4.0	54%	26,000
	2.55" 10 bolt	L220300709	68.0" (light)	K080680	8PK1727	stock 90 mm	stock 70 mm	LPE (L220636509)	3.3	28%	21,700
	2.38" 10 bolt	L220310709	68.0"	K080680	8PK1727	stock 90 mm	stock 70 mm	LPE (L220636509)	3.9	51%	25,500
	stock 3.0"	*	70.8" (light) 70.0" (light)	K080708 K080700	8PK1797 8PK1775	stock 90 mm	stock 70 mm	LPE (L220636509)	4.2	62%	27,300
10.0" L220380709 (28%)	2.55" press-on	L220030709	69.6"	K080696	(-)	LPE 76 mm, 0.200 spacer, M10x1.5x60mm cap head screw	LPE 76 mm, 0.200 spacer, M10x1.5x60mm cap head screw	LPE (L220636509)	3.5	35%	22,800
	2.55" 10 bolt	L220300709	69.0" (light)	K080690	8PK1753	stock 90 mm	stock 70 mm	LPE (L220636509)	3.1	N/A	20,100
	2.38" 10 bolt	L220310709	69.0"	K080690	8PK1753	stock 90 mm	stock 70 mm	LPE (L220636509)			
	stock 3.0"	*	70.8" (light) 70.0" (light)	K080708 K080700	8PK1797 8PK1775	stock 90 mm	stock 70 mm	LPE (L220636509)			
9.73" 10 rib L220450709 (requires 10 rib tensioner pulley)	2.70" 10 rib	XX03873-0004 (tensioner pulley PN L220620709)	67.5"	K100675	10PK1715						
	2.95" 8 rib	Included with Magnuson LSA TVS2300 Heartbeat Kit	68.0"	K080680	8PK1727						

Supercharger speeds above 23,000 RPM are not recommended. To calculate supercharger speed, multiply your maximum engine speed by the pulley ratio value listed above.

Pulley ratios above 35% should only be used in applications with proportionally lower maximum engine speeds (below 6500 RPM).

For applications where the crank pulley diameter is greater than or equal to 9.17", LPE idler relocation bracket (PN: L220636509) is required in order to provide enough clearance between the crank pulley and the lower idler pulley. For bearing durability reasons LPE does not recommend using idler pulleys smaller than 70mm.

An LPE idler pulley is required for these pulley/belt combinations.

*A stock diameter 10 bolt pulley is also available from LPE, PN L220600709

Many other items are available from LPE for your ZL1 Camaro including low temperature thermostats, camshafts, ported throttle bodies and much more. Contact LPE, visit our web site, or contact your LPE distributor for information about our other products.

For additional product installation information and technical support, contact LPE or your LPE products distributor. You can also find technical support and usage discussions regarding this product and many other LPE products in our Internet forums:

<http://www.lingenfelter.com/LPEforumfiles>



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L250356512 Lingenfelter 630HP ZL1 Kit v1.7.indd