

Edelbrock Universal <u>Supercharger</u> GEN III LS

Part #15450, 15460, 15461





Installation Instructions

INTRODUCTION

Thank you for purchasing the Edelbrock Universal Supercharger System for the GM Gen III LS Engines. The Edelbrock E-Force Supercharger System for LS Engines utilizes Eaton's new Gen VI TVS Supercharger rotors, featuring a four lobe design with a full 160° of twist for: maximum flow, minimum temperature rise, quiet operation, and the reliability for which Eaton is known. The Edelbrock Supercharger is a complete system that maximizes efficiency and performance by minimizing air restriction into, and out of, the supercharger. This results in maximum airflow, with minimal temperature rise and power consumption. The supercharger housing itself is integrated into the intake manifold for a seamless design with minimal components, eliminating the possibility of vacuum leaks between gasket surfaces. The system also utilizes a front drive, front inlet configuration giving it the shortest, least restrictive inlet path on the market. The supercharger is inverted, expelling the air upward. Air pressure then builds in the plenum, before being drawn down through each of two intercooler cores, oriented horizontally, next to, and below the supercharger outlet. After passing through the intercooler cores, the air travels through the long 12" individual intake runners, which route underneath the supercharger housing to the cylinder head ports, in a horizontal, nested configuration. The upper plenum area is enclosed by a top cover and matching side covers that have been designed to provide an appealing and distinctive under-hood appearance. The Edelbrock supercharger provides amazing performance that is safe to operate on a completely stock engine.

NOTE: This kit is designed around an engine equipped with the following GM Performance Parts: LS engine, LS controller kit and Corvette/Camaro accessory drive. If you intend to use other LS components, please contact Edelbrock tech support for assistance.

TOOLS REQUIRED

- Jack and Jack Stands **OR** Service Lift
- Metric Socket Sets w/1/2", 3/8" & 1/4" Drive Ratchets
- 10mm Swivel Socket, 1/4" Drive
- Complete Set of Metric Wrenches
- Crescent Wrench
- 1/2" Breaker Bar
- Flat Blade & Phillips Screwdrivers
- Compressed Air
- Torx-20 Driver
- Allen Wrenches

- Torque Wrench
- Pliers **OR** Hose Clamp Removal Tool
- Pneumatic or Power Drill
- Impact Wrench
- Red & Blue Loctite or equivalent
- O-ring Lube
- Thread Sealing Compound
- Anti-seize
- Masking Tape
- J-42386-A Flywheel Holding Tool

ANCILLARY PARTS REQUIRED FOR INSTALLATION

- Low Temperature Radiator
 - #15405: Full Face Universal Fit
 - #15406: Compact Single
- Belt:
- For GM Performance-Corvette Accessory Drive utilize Goodyear Gatrorback #4061015
- All other accessory drive configurations will require installer to determine the optimal belt length.
- Fuel Pump: As shipped, the kit is approx. 600+ HP, depending on cam and header selection. A minimum fuel flow of 65gph @ 60psi is required. It is the responsibility of the customer to ensure that adequate fuel flow is achieved at the operating voltage of the fuel pump. Engine damage can occur if fuel flow is insufficient. Below is a list of potential fuel pumps.
 - #1790 or #1794
 - Or a custom set up, such as: dual 255 l/hr in-tank pumps
- Fuel Pressure Regulator w/ Boost Reference



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INSTALLATION HARDWARE IDENTIFICATION GUIDE







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HOSE IDENTIFICATION GUIDE





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INTERCOOLER PLUMBING DIAGRAM





Supercharger Installation

1. Disconnect the battery.

2. Disconnect all hoses from the intake manifold. This includes the brake booster, PCV and EVAP hoses (if equipped). Disconnect the fuel input line and eight fuel injector connectors. The fuel rails and injectors will be removed with the manifold.

3. Unbolt and remove the intake manifold. Then use masking tape to cover the exposed intake ports on the cylinder heads. Save the intake gaskets, throttle body and throttle body gasket.

4. Disconnect the ignition coil harness (blue) and O2 sensor connectors then disconnect the spark plug wires (red) from the ignition coils.

5. Use a 10mm socket to remove the five retaining bolts (green) from the coil bracket on each valve cover, then remove both coil bracket assemblies.



6. Engines using the Corvette front accessory drive setup will need to remove the power steering reservoir and determine an alternate mounting location due to interference with the supercharger snout. Inspect the engine bay for any other items that may interfere with the installation of the supercharger.

NOTE: The following steps, while not strictly related to installing the supercharger, detail the process required for installing a lock pin between the harmonic balancer and the crankshaft nose. The factory design uses a press-on balancer that does not include an anti-rotation mechanism to prevent the balancer from loosening. The additional torque of the E-Force system increases the likelihood of this occurring. If you have already had this procedure performed on your vehicle, skip ahead to step #30.

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NOTE: Vehicles equipped with a manual transmission may skip Steps: 7-14 and 22-27 by using an assistant to manually secure the drivetrain while the harmonic balance bolt is removed. Begin by placing a passenger in the car to shift into first gear and firmly apply the brake at which point, you may begin removing the bolt.

WARNING: Do not attempt this method if the rear wheels are on the ground as vehicle damage and/or injury could result.

7. Disconnect the oil level sensor electrical connector from the passenger side of the oil pan.



8. Use a 10mm socket to remove the starter support bracket bolt.



9. Use a 13mm socket to remove the two starter bolts.



10. Use an 8mm wrench to remove the three bolts retaining the starter heat shield.

11. Disconnect electrical connector at top of starter.



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12. Use a 13mm socket to remove the nuts retaining power wires to the starter.



13. Remove the starter and bracket.

14. Install a GM Flywheel Holding Tool (#J-42386-A), or equivalent, to prevent the crank from rotating while loosening the balancer bolt. Torque the flywheel holding tool bolts to 37 ft/lbs.

15. Use a breaker bar and a 24mm socket to loosen and remove the crank bolt. **NOTE**: A long pipe slid over the breaker bar can be helpful for increasing leverage.



16. Install the drill guide and the M16 x 120mm guide bolt supplied in Bag #4 onto the end of the crankshaft.



17. Measure 1.7" from the tip of the 15/64" drill bit supplied in Bag #4 and mark the position with a piece of masking tape. Lubricate the drill bit with a small amount of engine oil. Then locate the guide hole with the drilling bushing. Begin drilling using a Right Angle Drill (or equivalent) and the supplied 15/64" drill bit. The drilling process is complete when the tape mark on the bit meets the guide.

18. Loosen the balancer bolt and remove any metal debris with compressed air. Rotate the guide until the ream hole lines up with the new dowel pin hole on the crank. Use the supplied .2500" ream tool to verify that the holes are aligned. Then tighten the bolt and ream the hole.

19. Use compressed air to clean out any metal flakes then loosen the guide bolt and remove the drill guide.

20. Apply green 609 Loctite (*red Loctite will suffice if green Loctite is not readily available*) retaining compound to the supplied crank pin and tap it into the reamed hole until it is flush with the crank snout.



21. Install the crank bolt supplied in Bag #4 and torque it to 37 ft-lbs then rotate it an additional 140° .

22. Remove GM Flywheel Holding Tool #J-42386-A.

23. Lift the starter support bracket and starter into place then use a 13mm wrench to reinstall the power wire onto the starter.

24. Reconnect the starter solenoid electrical connector.

25. Use an 8mm wrench to reinstall the three bolts that hold the starter heat shield in place.

26. Use a 13mm socket to install the two starter bolts.

27. Use a 10mm socket to reinstall the starter support bracket bolt.



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This concludes the crank pinning procedure.

28. Disconnect the oil pressure sensor electrical connector at the rear of the valley plate.

NOTE: The oil pressure sensor has to be relocated as it will interfere with the supercharger manifold.

29. Unplug the oil pressure sensor. Use a 27mm wrench to remove the oil pressure sensor located behind the valley tray.



30. Using a 8mm Allen wrench, remove the factory plug towards the front driver side of the block, adjacent to the crank pulley. Apply thread sealant w/ PTFE to the threads of the factory oil pressure sensor and install the sensor in the location of the plug. Torque to 26 ft/lbs (35 Nm).

NOTE: DO NOT use Teflon tape as it will not seal properly.



31. Apply thread sealant w/ PTFE to the threads on the plug removed from the engine block and install it to the factory oil sensor location.

NOTE: DO NOT use Teflon tape as it will not seal properly.

32. Connect the supplied oil pressure sensor extension harness to the factory oil pressure harness. Route the extension harness over the driver side valve cover towards the front of the vehicle. Then straight down and connect it to the oil pressure sensor. Keep the harness away from the exhaust manifold and secure it with wire ties to nearby vehicle harnesses.

NOTE: The factory valley tray bolts have to be replaced as it will interfere with the supercharger manifold.

33. Using a 13mm socket, remove ten (10) valley tray bolts and replace with ten (10) button head bolts supplied in Bag #6 using a 5mm Hex tool. Tighten in a criss cross pattern starting from the inside and working outwards. Torque bolts to 18 ft/lbs (25 Nm).

34. Since two of the stock manifold bolt hole provisions in the cylinder heads break into the crankcase and are not used with this supercharger, install the two button head bolts supplied in Bag #3 in the front passenger side and rear driver side bolt holes to ensure a good seal.

35. Remove the gaskets on the factory intake manifold if not already done so. Using side cutters or equivalent, trim down the three (3) retention clips and the center locating tab. Use CAUTION while trimming the clips. Re-inspect the gaskets after modification for any tears and replace as necessary. Install onto the manifold to verify a flush fit.





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36. Install the intake manifold gaskets onto the supercharger manifold using the installed bushings as guides.



37. Clear the engine valley of any hoses, wires, tools, etc. and remove the tape covering the intake ports. With the assistance of one or more people, lift the supercharger assembly onto the engine.

38. Use a 10mm socket to install eight M6 x 45mm intake manifold bolts from bag #3 following the torque sequence below. Torque the bolts to 4 ft-lbs in the first pass, then to 7.5 ft-lbs in the second.



39. Apply O-ring lube to the O-ring of the four supplied fuel rail fittings. Use a 3/4" wrench to install the two plug fittings to the front of each fuel rail then install the -6 AN fittings in the rear of both fuel rails.

40. Take the fuel injectors out of their boxes and remove their protective covers.

41. Apply O-ring lube to the upper injector seals, then slide the injectors into the rails so that the electrical connectors face away from the supercharger manifold. 42. Apply O-ring lube to the lower seals of each of the fuel injectors.

43. Install the fuel rails by sliding the injectors down into the manifold provisions and applying pressure until the mounting holes in the rails line up with the manifold.

44. Use a 5mm Allen tool to install four M6 x 12mm fuel rail bolts supplied in Bag # 3 and torque them to 91 in-lbs.

45. Connect your fuel supply inlet/ crossover hose to the two rear fuel rail fitting. Then connect the fuel input hose *(not included)* to the fitting on the crossover.

46. Install the supplied injector wire adapters to each injector and connect to the factory injector connectors.

47. Use a small flathead screwdriver to remove the wire covers at the back of the coil brackets. Note that you will need to separate the covers from the bracket, then split the two halves of the cover.



48. Tuck any loose wiring under each coil bracket then use a 10mm socket and the ten stock bolts to install the coil brackets on to each valve cover.

WARNING: Be careful not to pinch any wires.

49. Reconnect the ignition coil harness electrical connectors and the spark plug wires to the ignition coils.

50. Attach the brake booster hose to the 1/2" fitting on the drivers side of the supercharger inlet, then route it along the driver side valve cover to the fitting on the brake booster. Trim the hose to length, as needed.



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NOTE: Steps 51-59 are for vehicles with Corvette Belt Offsets using P/N 15460. Disregard otherwise.

51. Use a 15mm socket to remove the two bolts retaining the stock belt tensioner.

52. Apply blue loctite to the threads of one M8 x 20mm bolt supplied in Bag #1, then use a 12mm socket and a supplied M8 washer to mount the pulley on the new lower idler bracket and torque it to 18 ft-lbs.



53. Use a 10mm socket to remove the three bolts on the passenger side of the water pump.



54. Using a 6mm Allen tool and the three M8 x 90mm bolts supplied in Bag #1, install the lower idler bracket onto the water pump then torque them to 18 ft-lbs.



55. Apply blue Loctite to two stock tensioner bolts which were removed during Step 53. Mount the new tensioner bracket onto the water pump using the stock bolts and a 15mm socket. Apply blue Loctite to the M10 x 45mm bolt supplied in Bag #1 and install the bolt to the left provision on the bracket. Torque all three bolts to 37 ft-lbs.



56. Apply blue loctite to the threads of one M8 X 20mm bolt supplied in Bag #1, then use a 12mm socket and the supplied washer to mount the pulley on the tensioner bracket and torque it to 18 ft-lbs.

57. Use a 15mm socket and the M10 x 75mm bolt supplied in Bag #1 to install the supplied tensioner on the new bracket and torque it to 37 ft-lbs.





58. Route the serpentine belt (*not included*) according to the diagram below. Note that you must slide the belt around the bottom of the bracket to get the belt on the lower passenger side idler pulley.



59. Use a breaker bar and a 16mm socket to release the tension on the tensioner enough to get the belt on. Double check the routing and make sure the belt is seated properly. Proceed to Step 74.

NOTE: Steps 60-69 are for vehicles with Gen IV Camaro ('98-'02) Belt Offsets using P/N 15450. Disregard otherwise.

60. Use a 15mm socket to remove the two bolts retaining the belt tensioner.



61. Apply blue loctite to the threads of one M8 x 20mm bolt supplied in Bag #1, then use a 12mm socket and a supplied M8 washer, from bag #1, to mount the pulley onto the new

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62. Use a 10mm socket to remove the three water pump bolts indicated.



63. Apply blue Loctite to the threads of the M8 x 100mm bolts supplied in Bag #1 then use a 6mm Allen tool to install the idler bracket onto the water pump. Torque bolts to 18 ft-lbs





64. Use a 15mm socket to remove the nut retaining the ground strap on the passenger side cylinder head then use a 15mm deep socket to remove the ground strap stud.



65. Install the supplied tensioner bracket to the water pump using the spacers from bag #6, three M10 x 65mm bolts from bag #1, and blue Loctite. The two short spaces go onto the two provisions on the water pump with two 65mm hex flange bolts, and the long spacer goes on the cylinder head provision with the 65mm socket head bolt.



66. Apply blue Loctite to the threads of an M8 x 20mm bolt supplied in Bag #1. Install the supplied idler pulley onto the tensioner bracket using a 12mm socket, the M8 x 20mm bolt and a supplied M8 washer, from bag #1. Torque bolt to 18 ft-lbs.



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67. Apply blue Loctite to the threads of the M10 x 75mm Hex flange bolt supplied in Bag #1. Use a 15mm socket to install the supplied tensioner onto the tensioner bracket. Torque bolt to 37 ft-lbs.



68. Use a 12mm socket and an M8 x 20mm bolt supplied in Bag #1 to secure the ground strap to the back side of the tensioner bracket.

69. Route the serpentine belt (*not included*) according to the diagram below. Use a 16mm socket and a breaker bar to loosen the tension on the tensioner enough to install the belt. Inspect the belt installation to make sure it is properly aligned. Proceed to Step 74.





NOTE: Steps 70-73 are for vehicles with Truck Belt Offsets using P/Ns 15700. Disregard otherwise.

70. Install the supplied rubber grommet into the hole located in the upper cavity of the alternator bracket. Using a 15mm socket, install the alternator bracket with the factory alternator bolts. Route the actuator hose through the grommet as shown, and re-connect to the actuator.



71. Remove the bolt, washer and bushing from the stock 90mm pulley and install them on the supplied 76mm pulley.



72. Apply Loctite to the threads on both idler pulley bolts. Then use a 15mm socket to install the 76mm idler pulley with the factory hardware to the left idler pulley location. Install the additional idler pulley to the right idler pulley location with the M8 x 20mm bolt and M8 washer from Bag #1. Torque both pulley bolts to 18 ft-lbs. Verify that both pulleys spin freely.



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73. Route the serpentine belt (*not included*) using the diagram below. Use a 15mm socket to release tension from the tensioner and re-tension after the belt is routed. Proceed to Step 74.



Intercooler and Water pump Mounting

74. Determine the best mounting location for the intercooler heat exchanger. It is important that the heat exchanger receives the coldest air possible, which means mounting it in front of the radiator, A/C condenser and any oil or trans cooler the vehicle might have equipped.

75. Determine the best mounting location for the water pump. A universal mounting bracket has been supplied to simplify installation. Please note that the pump should be mounted no higher than the inlet of the heat exchanger. The inlet of the pump is in line with the axis of the pump motor, while the outlet extends out perpendicularly from the pump body.

76. Determine the best mounting location for the intercooler reservoir. To simplify installation, a universal mounting bracket and a groove around the perimeter of the tank, for use with a large worm clamp, have been included.

NOTE: Be sure to mount the tank as high as possible to prevent air bubbles from accumulating in the cooling system.

77. Refer to the diagram for the suggested

intercooler plumbing. Note that the routing can also be inverted so that the pump and tank are mounted on the driver side. Regardless of component mounting locations, it is important that the correct direction of flow is maintained.



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The correct order, starting with the intercooler reservoir tank, is to have water flow as follows: From the bottom fitting of the tank to the water pump inlet; from the water pump outlet to the top of the heat exchanger; from the bottom of the heat exchanger to the intercooler inlet hose assembly; from the intercooler outlet hose assembly to the upper reservoir tank fitting.

78. The intercooler inlet and outlet hose assemblies have been designed so that they will only attach to their correct corresponding fittings on the supercharger. The outlet hose assembly attaches to the upper-rear facing fittings, while the inlet hose assembly attaches to the lower, outward facing fittings.

79. Bulk 3/4" hose has been supplied to plumb the gap from the reservoir tank to the pump, the pump to the heat exchanger, the heat exchanger to the inlet hose assembly and the outlet hose assembly to the reservoir tank.

80. Trim the bulk 3/4" hose as needed to accommodate your chosen mounting locations then secure each end with one of the supplied hose clamps.

Manifold Component Installation

81. Using the supplied throttle body adapter, install the stock throttle body onto the supercharger using the stock O-ring gasket and bolts.

82. Install the MAF sensor *(Not Included)* into the slot on the plastic mass air housing so that the direction of air flow will match the direction of the arrow on the sensor. Secure the sensor using the two supplied #8-16 screws.

83. Determine the best mounting location for the air filter and mass air housing so that coldest air possible (i.e. that coming from outside the engine bay) will be drawn into the engine. The mass air housing includes three M6 x 1.0 inserts to facilitate the use of a custom bracket or shroud.

84. Construct an air intake tube between the mass air housing and the throttle body (*tube must have an inside diameter of 4" or greater. The use of silicone elbows to achieve proper sealing is recommended*). Drill a 5/8" hole with step drill, install the supplied grommet into the custom tube, then the fitting into the grommet. Attach the supplied air filter to the large end of the MAF housing.

NOTE: Do not drill into, or otherwise modify the MAF housing.

WARNING: The air intake system past the MAF sensor MUST be air tight. This includes any PCV or crank case breathers. These should not be used. It should be installed as we describe using PCV hoses. Any leaks in the system will cause the engine to run lean, which in turn, could result in catastrophic engine damage.

85. Connect the 90° end of one of the supplied PCV hoses to the fitting that was just installed on the intake tube. Connect the straight end of the of PCV hose to the fitting on the passenger side valve cover.

86. Use a pair of pliers to remove the vacuum cap from the rear of the driver side valve cover, then Install the straight end of the second supplied PCV hose to the 10mm tube fittings on the supercharger snout and 90° fitting onto the driver side valve cover.



87. Install the supplied ETC extension harness between the main engine wiring harness and the throttle body.

88. Connect the supplied MAFS harness to the MAF sensor, the MAF and MAP connectors on the main engine wiring harness, and the TMAP sensor at the back of the supercharger. Route the harness so that it will not be abraded, pinched or scorched by other engine parts.

89. Determine appropriate mounting locations for the fuse holder and the relay on the intercooler water pump harness, then attach the appropriate connectors to their corresponding locations



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90. Start the car and allow it to idle while closely inspecting the engine bay for any fuel or coolant leaks. Repair any leaks before operating vehicle.

91. The vehicle must be taken to a chassis dyno to verify/ adjust AFR to the desired values. You can do this by either having the vehicle custom tuned or by simply using the handheld tuner to adjust fueling up or down:

Congratulations on the installation of your new Edelbrock E-Force Supercharger System.