

ENGINE ASSEMBLY STOCK TO 250 HP



Fig. 3

The stock **ECOTEC** engine has proven reliable to 250 hp.(Fig. 3) Performance upgrades are available from GM Performance Parts and aftermarket companies. You can purchase upgraded components such as:

- Air Intake Systems
- Exhaust Systems
- Exhaust Headers
- Adjustable Cam Gears
- Nitrous Oxide Systems
- Supercharger Kits

ADJUSTABLE CAM GEARS



Fig. 4

An excellent way to optimize cam timing is to install GM Performance Parts Adjustable Cam Gears part number 88958613. (Fig. 4)

NITROUS OXIDE SYSTEMS



Fig. 5

With a stock cobalt, the maximum nitrous jet you should use is 75 hp. Nitrous Express offers a stand-alone kit which has been tested and proven to work well. The Nitrous Express Kit contains a single nozzle with a nitrous jet and a fuel jet. Use a pressure tap on the production fuel rail for the fuel jet's supply. (Fig. 5)

SUPERCHARGER



Fig. 6

GM Performance Parts has developed a bolt-on supercharger kit (part number 1780003) for the 2.2L **ECOTEC** engine. Fits 2003-2005 model year Cavalier and Sunfire. Also fits certain 2002 Cavalier and Sunfire equipped with Delphi fuel injectors. This kit contains all the components necessary for installation. (Fig. 6)

ECOTEC SUPERCHARGER INSTALLATION

Thank you for choosing GM Performance Parts as your high performance source. GM Performance Parts is committed to providing proven, innovative performance technology that is truly more than just power. GM Performance Parts are engineered, developed and tested by the factory to exceed your expectations for fit and function. To contact us call 1-800-GMUSEUS for the GM Performance Parts Authorized Center nearest you or visit our website at www.gmgoodwrench.com.

This section provides general information on components and procedures that may be useful when installing or servicing an **ECOTEC** supercharger package. Please read this entire section before starting work.

The **ECOTEC** supercharger package was designed by GM to be a true performance bolt on package. When this package is properly installed, it looks like original factory equipment. The fact that the parts have been designed to GM standards ensures a quality product. All of the fasteners required for installation are included in the package. All of the service components for the package are available from any GM dealer. The package was designed to retain the use of cruise control, air conditioning and other vehicle options.

The Powertrain Control Module (PCM) calibration is a key factor in both performance and drivability. This supercharger package has its own unique calibration designed specifically for **ECOTEC** engines used in Chevrolet Cavaliers and Pontiac Sunfires. The package has been calibrated to GM standards, and the package is emission legal in all 50 states. As part of the calibration process for this package, the supercharged engine was tested on a dynamometer to develop the base fueling and spark requirements. All of this testing is necessary to develop a package that meets GM standards for performance, drivability, and durability.

It is not the intent of these specifications to replace the comprehensive and detailed service practices explained in the GM service manuals. GM service manuals are available from:

Helm Incorporated
PO Box 07130
Detroit, MI 48207

Observe all safety precautions and warnings in the service manuals when installing the **ECOTEC** supercharger package. Wear eye protection and appropriate protective clothing. When working under or around the vehicle support it securely with jack stands. Use only the proper tools.

Exercise extreme caution when working with flammable, corrosive, and hazardous liquids and materials. Some procedures require special equipment and skills. If you do not have the appropriate training, expertise, and tools to perform any part of this conversion safely, this work should be done by a professional.

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1. Disconnect the negative battery cable.

NOTE: Minimum of 92 octane fuel is required after this installation.

2. Vent radiator cap and drain coolant.
3. Remove air duct clamps and air duct. Save the clamps.



Fig. 7

4. Remove the air box at throttle body by removing metal hose clamps. Save the two clamps from the PCV hose. (Fig. 7)
5. Remove the IAT plug. Remove the vacuum hose from the fuel regulator to air box. (Fig. 8)



Fig. 8

6. Remove the upper radiator hose. Remove the lower clamp from under the car. (Fig. 9)



Fig. 9

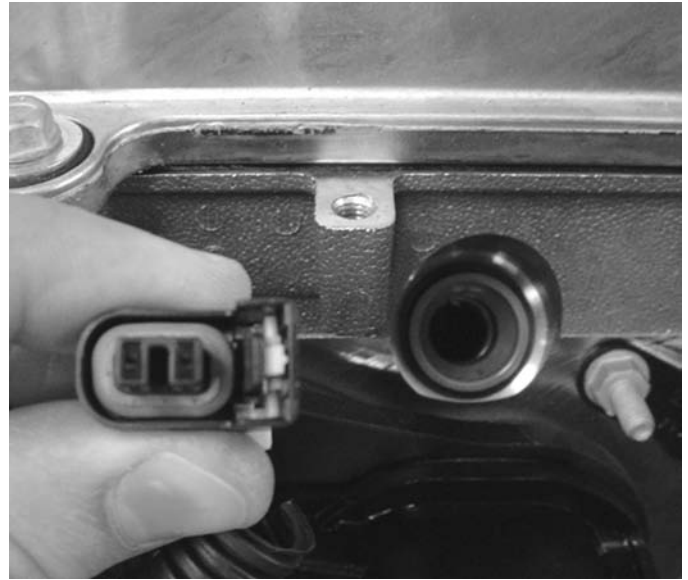
7. Remove the throttle cable and cruise control cable from the throttle body. Remove the cruise control cable from the cruise motor by twisting and pulling. Disconnect the ribbon from the cable. Remove the throttle/cruise cable bracket on top of the cam cover. Save this bracket. Replace the stud. (Fig. 10)

**Fig. 10**

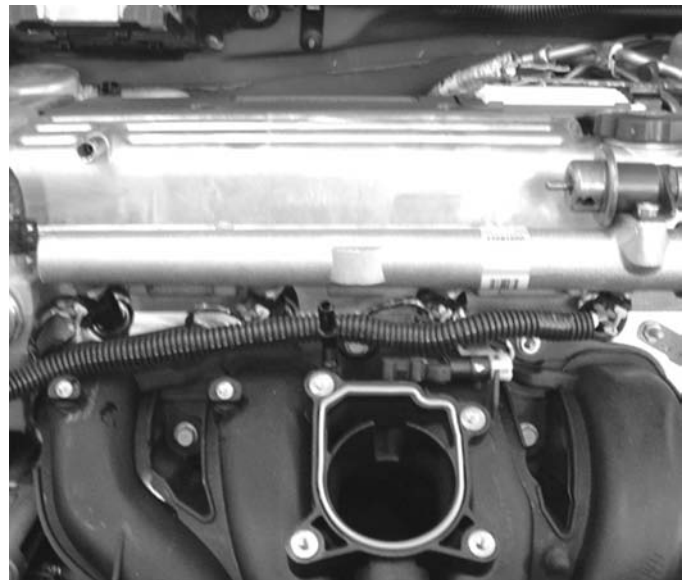
8. Unplug the two sensors from the throttle body. The throttle position sensor (TPS) has a lock. Reinstall this lock to keep from losing it. Remove the throttle body (four bolts). Set aside the throttle body with bracket. They will be reused. (Fig. 10)
9. Remove the fuel canister purge from the purge valve on the intake manifold. (Fig. 11)

**Fig. 11**

10. Remove the coil connection on top of the cam cover. (Fig. 11)
11. Remove the four wire connectors from the fuel injectors. Pull up the green tab and press in on the black tab and release the injector. Make sure that the red seals stay with the connector. (Fig. 12)

**Fig. 12**

12. Remove the two nuts from the fuel lines mounted to the left side of the cam cover and two studs from the front of the fuel rail. Remove fuel rail from cylinder head and set it aside, leaving fuel lines connected. Make sure the gray injector seats stay in the cylinder head.
13. Unplug the MAP sensor from the intake manifold. (Fig. 13)

**Fig. 13**

14. Remove the two bolts that hold the heater hose in place from the front of the intake manifold. (Fig. 14)



Fig. 14

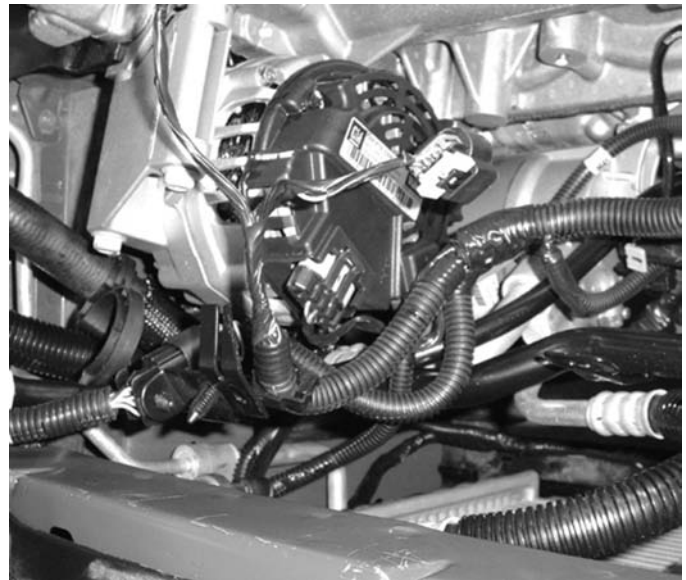
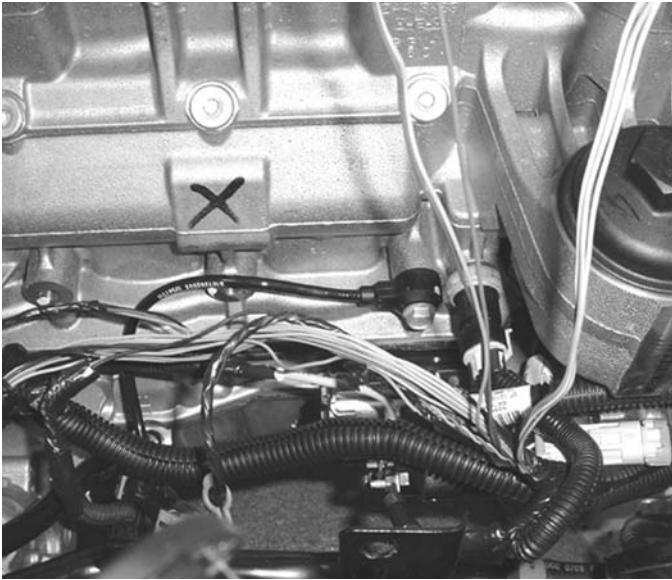


Fig. 15

15. Remove the bracket for the oil level tube and the attaching connector clips.
16. Remove the intake manifold bolts. Remove the intake and at the same time, remove the vacuum port from the brake booster line at bottom left of the intake. Remove the wire harness from the looms at underside of the manifold.
17. Remove the other end of the brake booster line from the tank and discard it.
18. Remove the two top outer studs at the intake flange on the cylinder head.
19. Remove the accessory belt. Use a 3/8" drive breaker bar for the tensioner. Turn it counter clockwise.
20. Remove all the electrical connections and the three mounting bolts from the generator. Remove the generator. (Fig. 15)
21. Remove and untie about 18" of the IAC and TPS sensor wires from wire the harness conduit. (Fig. 16) and (Fig. 17)



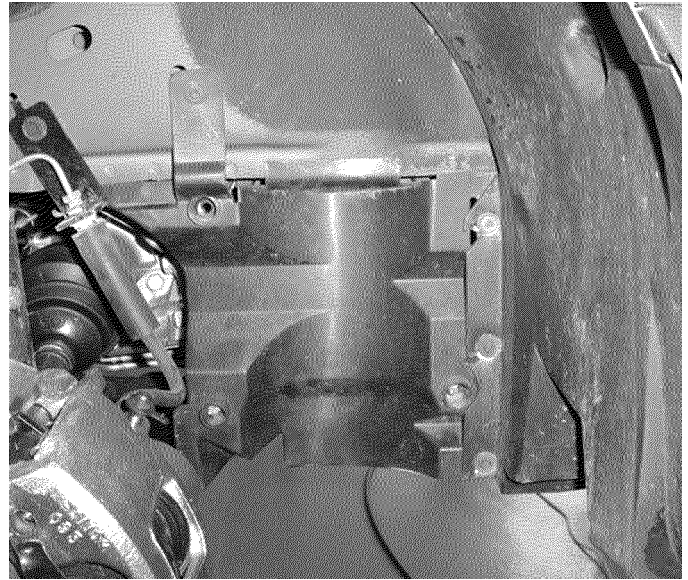
Fig. 16

**Fig. 17**

22. Use two feet of 13 mm diameter conduit to wrap the wires on the IAC and TPS sensor wires that you removed from the harness. (Fig. 18)

**Fig. 18**

23. Remove the right front wheel.
24. Remove six bolts, three plastic rivets (push pins) and three electrical harness clips from the splash shield. Remove the splash shield. (Fig. 19)

**Fig. 19**

25. Locate and remove the tensioner with 15 mm box end wrench. (Fig. 20)

**Fig. 20**

26. Reuse the tensioner bolt and install the new idler pulley into the same location. (Fig. 21)



Fig. 21

27. Tape off the intake ports, fuel injector holes, upper radiator hose, radiator fill cap, PCV and fuel fitting. (Fig. 22)

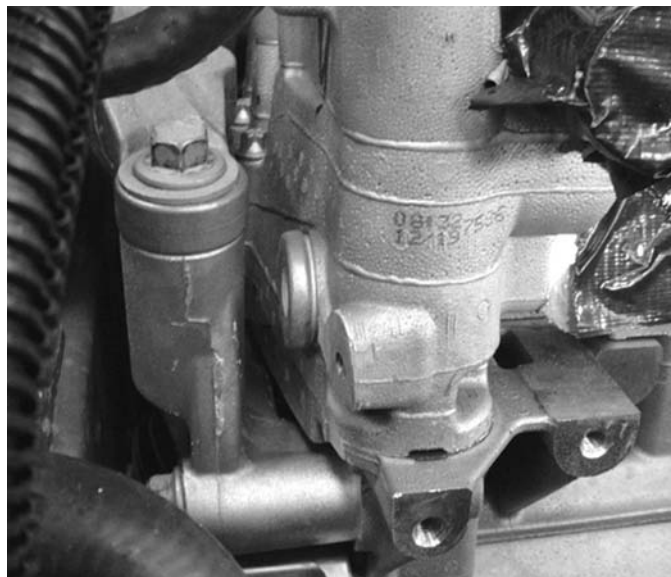


Fig. 23

29. Position the new generator bracket and lift hook assembly. (Fig. 24) shows the bolt painted yellow that must be ground down to clear the cylinder head when installed.



Fig. 22

28. Remove the front engine lift hook. The cylinder head must be modified to accept new belt tensioner to be installed later. (Fig. 23) shows the cylinder head boss that must be ground off.



Fig. 24

30. Install the bracket with the one bolt (part number 11518048) from the idler pulley to bracket (part number 11518048), and the second bolt (part number 11518051) from the bracket to the engine block.

31. Position the hydraulic tensioner on the engine to verify that the cylinder head casting was properly ground. If clearance is adequate install hydraulic tensioner using upper bolt (part number 11589147) and lower bolt (part number 11589312).

32. Loosen the starter wire bolt and reposition the wire. (Fig. 25)

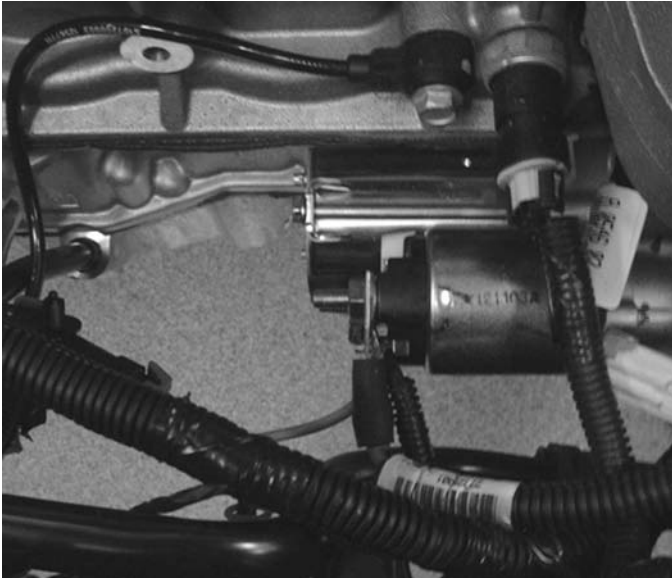


Fig. 25

33. Place the generator in position with new longer bolts. DO NOT mount at this time. Make all electrical connections. If you do not install all the electrical connections you cannot install the generator after the intake is installed.
34. Install the intake manifold support bracket using the two bolts (part number 11516342) supplied. (Fig. 26)

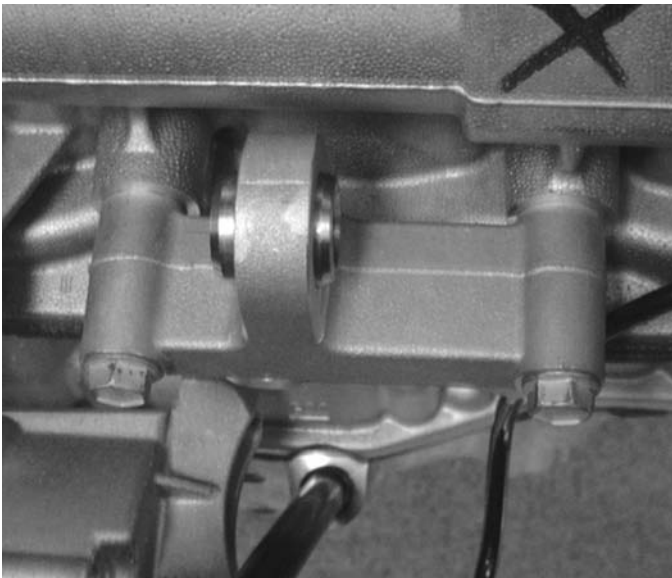


Fig. 26

35. Install five short intake manifold studs (part number 12590821) finger tight. Make sure the studs are seated. Locate and loosely install two long intake manifold studs (part number 12590822) in the remaining locations and make sure they seat to casting. If necessary use an M6 x 1.00 tap to clean out the holes

where the previous two short studs were located. When all studs seat correctly remove the two long studs. Tighten the remaining five bolts, DO NOT over tighten.

36. Position the intake manifold gasket and template (part number 12593902). Trim the gasket if necessary (Fig. 27) and (Fig. 28). After the gasket is trimmed, apply high temperature RTV to the front and back in the locations shown in (Fig. 29)



Fig. 27



Fig. 28

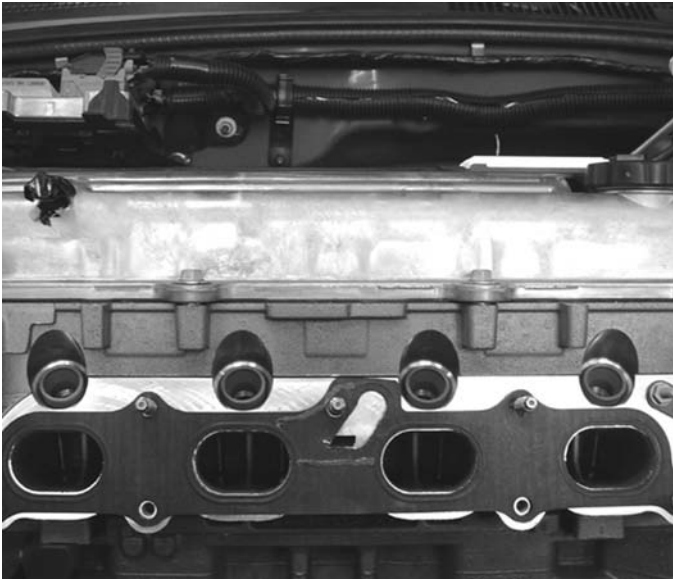


Fig. 29

37. Place the intake manifold in position and install the intercooler port caps (part number 15544596) and clamps (part number 11516226). (Fig. 30)

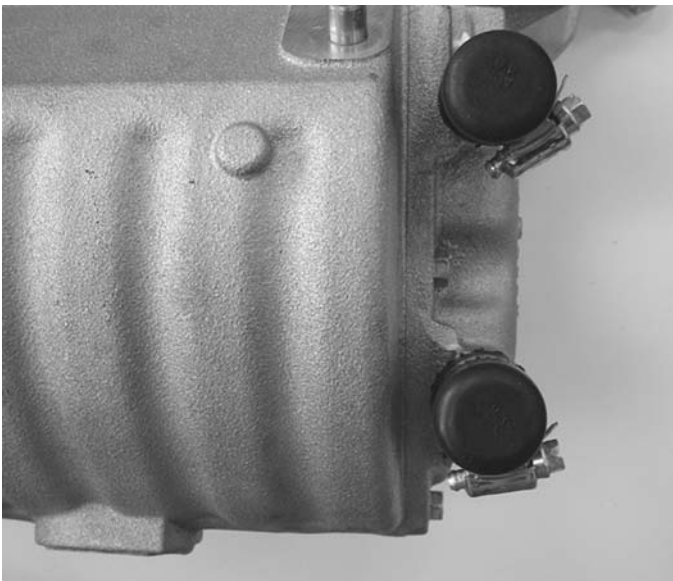


Fig. 30

38. Install the intake manifold on the cylinder head. Install and tighten the long studs into the open locations. Install the seven nuts and torque to 15 +/- 2 Nm.
39. Install the lower bolt through the lower support to the intake manifold.
40. Tighten all the generator bolts.
41. Position the throttle cable bracket as shown in (Fig. 31). Cut the bracket to the specifications of the template provided.



Fig. 31

42. Install the modified bracket to the oil level indicator bracket and tighten the bolts. Attach the bracket to side of the intake manifold using bolt (part number 11589299) and 4 mm thick washer (part number 12593677). Use one u-nut (part number 88961517) and bolt (part number 11588062) for the bracket to oil level indicator bracket.
43. Remove the metal clips from the fuel injectors. Remove the fuel injectors from the fuel rail. Be careful fuel may spill from the fuel rail.
44. Install new fuel injectors supplied with the electrical connector in the same orientation. Retainer clips snap into place.
45. Install the fuel rail to the cylinder head using original nuts and studs. Apply motor oil (5W-30) to the o-rings on each fuel injector.
46. Install two studs to the front of the fuel rail and two nuts to the side of cam cover.
47. Install the supplied fuel regulator hose (part number 12584337) from the port on the intake manifold using supplied clip (part number 10028454). Install the adjacent end to the regulator on fuel rail. (Fig. 32)

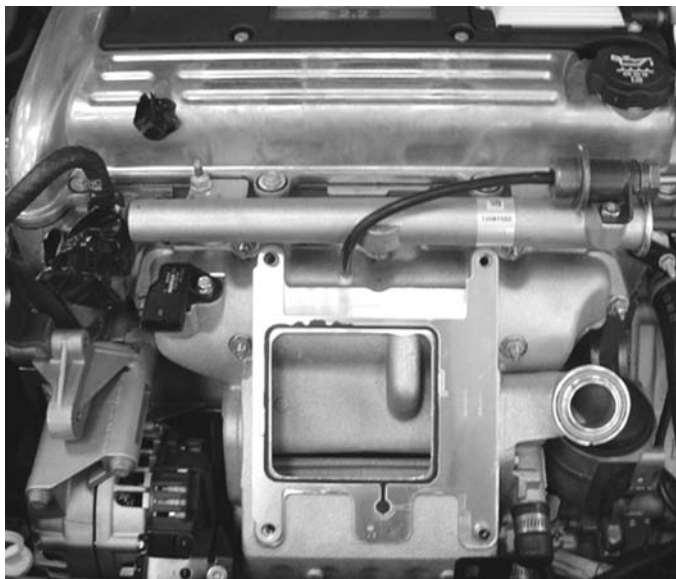


Fig. 32

48. Install the new radiator hose to the radiator. Rotate the engine inlet side of the radiator hose 3/8" off center clockwise at the engine to allow more clearance for the accessory drive belt. (Fig. 33)



Fig. 33

49. Position supplied metal expansion plug (part number 12593906) (Fig. 34). Tap the plug into place. (Fig. 35)

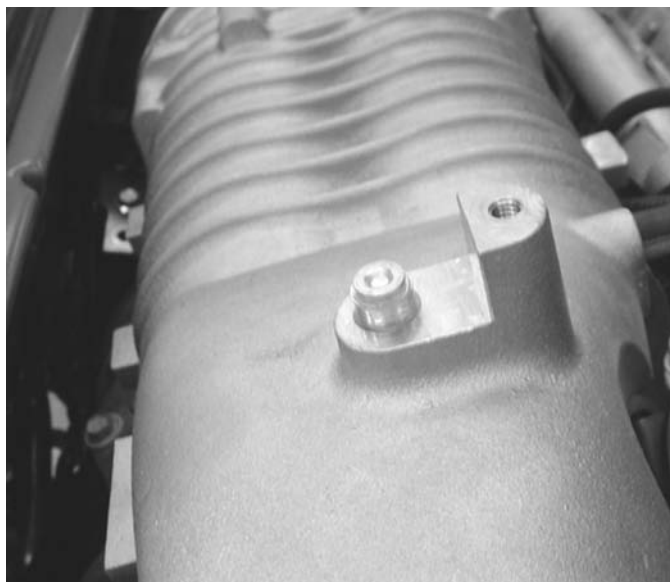


Fig. 34



Fig. 35

50. Install the supercharger gasket to the intake manifold.
(Fig. 36)

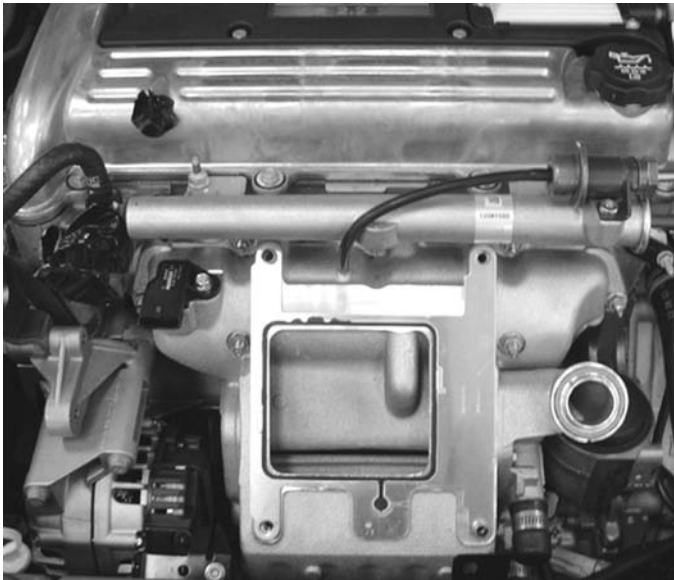


Fig. 36

51. Install the supercharger over the locating pins. Install four bolts (part number 11589214) finger tight. When viewing the car from the front, attach the heater hose bracket to the lower right bolt use the supplied flat washer (part number 12593677) and supplied bracket (part number 12594613).
52. Tighten all four bolts on supercharger to specification.
53. Install the J-nut (part number 11516076) on the heater hose bracket. Hand tighten the bolt (part number 11516757) into the J-nut. After the brackets are tightened, the metal heater pipe between intake manifold and coolant fans may have to be adjusted.
54. Use the 90 degree elbow from the original vacuum line and install it on the can. (Fig. 37) and (Fig. 38)

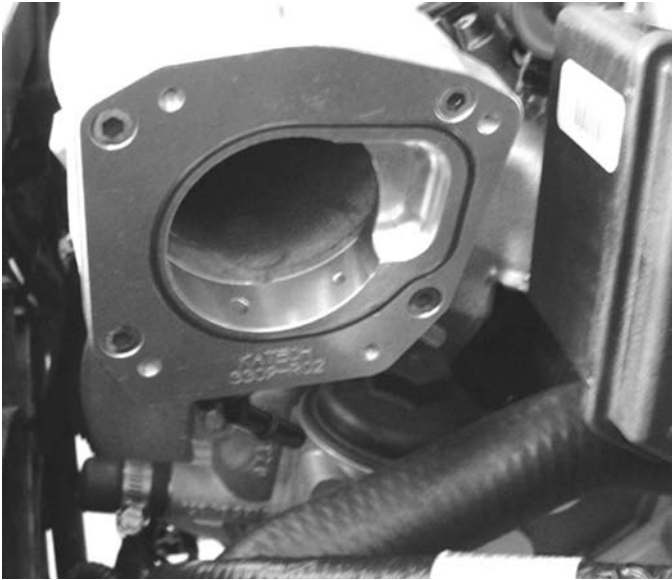


Fig. 37



Fig. 38

55. Position the rubber o-ring and throttle body adapter. Install the o-ring (part number 12593905) into the groove on the adapter (Fig. 39). This may be easier to do on a flat surface.

**Fig. 39**

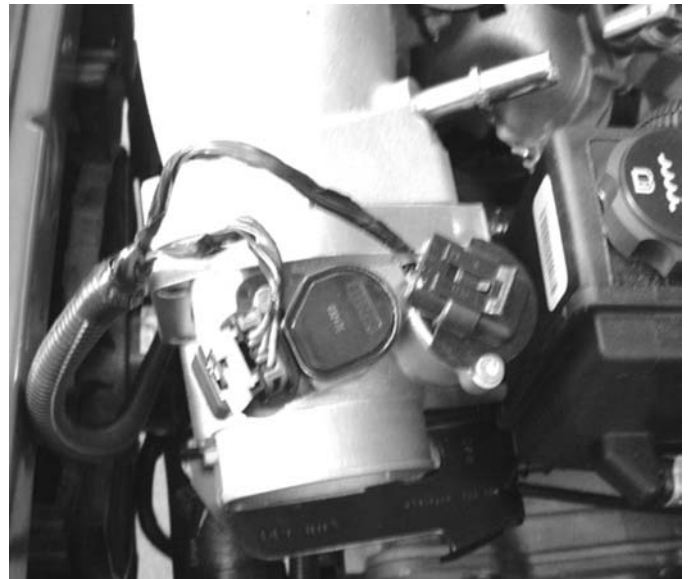
56. Install the plastic tube from the original intake manifold on the throttle body adapter with self tapping screw.
57. Install the throttle body adapter on the supercharger using the four bolts (part number 12593676). (Fig. 40)

**Fig. 40**

58. Install the throttle and cruise cables on the throttle body. Install the throttle body to adapter using original bolts. (Fig. 41)

**Fig. 41**

59. Replace the connectors on the throttle body. (Fig. 42)

**Fig. 42**

60. Trim the rubber seal from the original air box, and install it trimmed on the throttle body. Trim the locating tabs from the perimeter of the air intake snorkel and install it with the original hose clamps.
61. Install a new purge line to the throttle body adapter plastic port. Then lower 90° fitting as necessary. Install the opposite end to purge valve.
62. For an automatic transmission, connect the remaining vacuum port on the throttle body adapter to the vacuum accumulator port. For a car with a manual transmission, cap the port.
63. Install the supplied PCV hose from the cam cover to the supplied fitting on the air intake snorkel.

- 64. Install a new brake boost line from the brake booster to the inlet port on the supercharger.
- 65. MAP sensor and IAT sensor connector change.
- 66. Locate the gray MAP sensor connector and remove the terminals with a small pointed tool. After the terminals have been removed, bend them back to allow them to snap into place in the new connector. Do not damage the terminals. Locate the supplied three wire black connector (part number 12110293) and insert the wires into the connector: the orange/black into location A, light green into location B, and gray into the location C. Install the connector lock. (Fig. 43)



Fig. 44



Fig. 43

- 67. Position the gray two wire IAT sensor connector (Fig. 44). Cut the wires close to the connector (Fig. 45). Strip the wire to prep for new terminals. Install the supplied blue seals (part number 12048087) onto each wire. Crimp as shown in (Fig. 46). Position the supplied black two wire connector (part number 12052641) and insert wires into the connector: light brown into location A and black into location B. Install the supplied connector lock (part number 12052634).



Fig. 45



Fig. 46

68. Locate wire harness (part number 12590818) and connect it to the four wire connector at the intake manifold next to the engines upper radiator hose. Plug in the two wire connector to the modified IAT sensor connector. Leave the three wire MAP sensor connector unplugged until the GM dealer has updated the PCM with the new calibration. After the new calibration is complete, install the three wire MAP sensor connection.

POWERTRAIN CONTROL MODULE RECALIBRATION

Important: The Product Information Label (part number 12593900) must be presented to dealer in order to receive the new calibration.

For the engine controls to function properly, the on-board Powertrain Control Module (PCM) must be calibrated after the GM Performance Parts ECOTEC Supercharger Kit (part number 17800003) has been installed. **Note: failure to recalibrate the PCM will result in voiding both the product and vehicle warranty. Warning: Driving the vehicle prior to receiving the new calibration is neither recommended nor approved by GM Performance Parts and will result in voiding both the product and vehicle warranty.**

GM Performance Parts recommends on-board recalibration be performed by an Authorized GM Dealership. This process may require a full day for service and must be scheduled in advance with an Authorized GM Dealership. During the recalibration process, the Authorized GM Dealership activates the supercharger kit warranty and validates the installation. The limited GM Performance Parts supercharger warranty will only be honored if the Authorized GM Dealership verifies proper installation and a properly maintained and fully operational GM Powertrain. In order for the dealership to access the new calibration, contact the Techline Customer Support Center (TCSC) at 1-800-828-6860. The dealer will be able to access the new calibration, GM part number 12590819 for Automatic Transmission / 12590820 for Manual Transmission, through the system.

Warning: Failure to install the supercharger kit properly and completely, failure to recalibrate the PCM or failing to maintain the full powertrain will void both the product and vehicle warranty. Warranty does not cover installation or installation related issues involving supercharger kit installed outside an Authorized GM Dealership.

69. Install the accessory drive belt.
70. Cut off one inch of coolant reservoir tank hose. Zip tie all hoses away from accessory drive belt. Make sure there is enough clearance when the engine is running. Check periodically to make sure that hoses are not rubbing against other components.
71. Affix "Premium Fuel Only" label to fuel door.

SUPERCHARGER PARTS LIST

PARTS LIST	
Part Description	Part Number
Supercharger Kit	1780003
Clamp - Fuel Pressure Regulator Hose-Intake Manifold End	10028454
Hose, Brake Booster	10358940
Nut - U-Nut Oil Level Indicator Tube Support	11507067
Nut - U-Nut Radiator Hose Support	11507067
Clamp - Coolant Hose Cap	11516226
Bolt/Screw - Intake Manifold Bracket-to-Engine Block	11516342
Bolt/Screw - Intake Manifold Bracket-to-Intake Manifold	11516506
Nut - Intake Manifold	11516076
Bolt/Screw - Radiator Hose Support	11516757
Bolt/Screw - Drive Belt Idler Pulley Bracket	11518048
Bolt/Screw - Generator Relocation Bracket	11518051
Bolt/Screw - Intake Manifold	11518062
Nut - Intake Manifold-to-Head	11518532
Bolt/Screw - Generator Relocation Bracket	11589134
Bolt/Screw - Drive Belt Tensioner	11589147
Bolt/Screw - S/C TO Intake Manifold	11589214
Bolt/Screw - Oil Level Indicator Tube	11589299
Bolt/Screw - Drive Belt Tensioner	11589312
Pin, Connector – Female	12048074
Connector Pin Seals	12048087
Lock-Connector - IAC Connector	12052634
IAT Connector Replacement	12052641
Map Connector Replacement	12110293
Zip Tie	12355066
Connector - PCV Tube	12581198
Tensioner Assembly - Drive Belt	12583180
Supercharger Assembly	12584331
Vacuum Hose - Fuel Pressure Regulator	12584337
Gasket - Supercharger Outlet	12584342
Manifold Assembly – Intake	12584348
Gasket - Intake Manifold	12584359
Bracket Assembly - Drive Belt Idler Pulley	12584364
Bracket - Generator Relocation	12584365
Tube Assembly - Intake Manifold-to-Fuel Regulator (LSJ Purge Valve Hose)	12584369
Brace - Intake Manifold	12586632

PARTS LIST	
Part Description	Part Number
Adapter - Throttle Body	12590814
Belt - Accessory Drive	12590815
Wire Assembly - Map Sensor	12590818
Data File – PCM Engine Calibration	12590819
Data File - PCM Engine Calibration	12590820
Stud - Intake Manifold	12590821
Stud - Intake Manifold	12590822
Bolt/Screw - Throttle Body Adapter (M6 X 20 mm Socket Head Cap Screw)	12593676
Washer - 17 mm OD For a M8 Bolt x 4 mm Thick	12593677
Sticker, Carb E/O	12593900
Template - Intake Manifold Gasket Cut Out	12593902
Instruction Cd	12593903
Injector Assembly – Fuel	12593904
Plug, Map Sensor	12593906
Gasket - Throttle Body Adapter Plate (O-Ring)	12593905
Template - Dip Stick Tube Support Bracket	12593907
Support - Radiator Hose	12594613
Cap Assembly - Cool Hose	15544596
Cable Assembly - Cruise Control	22688111
Hose Assembly - Radiator Inlet	22718761
Vacuum Fitting - Waste Gate	24507839
Air Duct	24575436
Premium Fuel Decal	25602518