

Hypermax

HYPERMAX ENGINEERING PULSE TURBOCHARGER SYSTEM *** 6.9/7.3L FORD DIESEL PICKUP TRUCK *** INSTALLATION INSTRUCTIONS

Time will be saved if these instructions are read PRIOR to installation of turbocharger package.

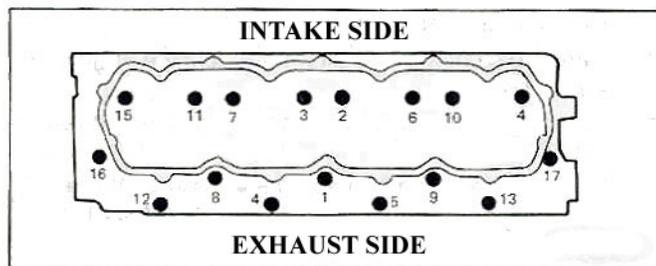
A. ITEMS TO BE REMOVED:

1. Negative battery cables.
2. Exhaust piping and muffler (DO NOT remove manifold).
3. Air filter
4. Crankcase breather valve (CDR) and valley cover grommet.
5. Auto trans filler tube and dipstick-take precautions to avoid foreign material entering transmission during installation.
6. Transmission modulator tube.
7. Transmission downshift rod.
8. Pickup Trucks Equipped with Optional Firewall Sound Insulation Package- a 32”w x 21” H section of the firewall insulation MUST BE CUT AWAY at the rear of the engine to provide turbocharger and pipe clearance. Since the turbocharger itself reduces engine combustion noise, the effect of removing the insulation will not be noticeable.

NOTE: Right side refers to passenger-side of vehicle.

B. PRELIMINARY SET-UP:

1. To reduce the possibility of cylinder head gasket leakage, it is advisable to re-torque the cylinder head bolts to (6.9L-85 Ft./Lbs. 7.3L-110 Ft./Lbs.) after 3,000 miles has been accumulated on the vehicle. Reinstall the rocker arms and posts in their original location with the timing mark on the front pulley at the 11.00 o'clock position as viewed from the front of the engine. Torque the post bolts to 20 ft.-lbs. Before replacing the valve covers proceed with step 2.



FACTORY IDI TURBOCHARGER REPLACEMENT ONLY:

When replacing the Factory IDI Turbocharger with a Hypermax Turbocharger System, remove the CDR bracket from the left valve cover (saw bracket or drill/grind spot welds).

Do not thread the plastic breather hose fitting too far into the valve cover grommet, thereby causing the passage to be blocked or restrictive. Blow through the fitting to be certain there is no restriction. If necessary, the plastic fitting may be shortened or the valve cover baffle dented to reduce flow restriction. The loose baffle retained by the grommet and provided in the hardware package is not utilized with baffled valve cover.

The factory turbocharged air cleaner must also be replaced with a non turbocharged air cleaner assembly as found on the 1993 f350 Diesel powered pickup trucks. Ford part number: E8TZ 9600C. Proceed to step 3.

2. Provide a 1-5/16" diameter hole in the center of the rear circular impression (1983-89 Models) or the middle circular impression (1990 & Later Models) on the left hand valve cover. This will allow for the installation of the grommet and baffle for the crankcase breather. Note: If your valve cover has a circular impression in the center of the valve cover regardless of model/year utilize it. A smooth edge is required on this hole, use silicone sealer if hole quality is in question. The baffle is most easily installed under the valve cover then hooking the baffle onto this portion of the grommet. The remaining portion of the grommet can then be worked into the valve cover and baffle simultaneously.
3. **1983 Model** - remove oil pressure sending unit line and fitting from rear of engine. Install late model adaptor fitting provided into block. Proceed with 1986-1989 instructions. The sending unit is moved from firewall directly on to engine.

1984 & Later Models – remove oil pressure sending unit and replace it with the combination sending unit turbo lube line assembly fitting. Orientate the fitting such that the sending unit can be reinstalled facing the driver's seat with approximately 1/4" clearance between sending unit and intake manifold.

Factory IDI Turbocharged Models – the oil pressure sending unit is located on top of the turbocharger. Remove the sending unit. The Hypermax Pulse turbocharger is lubricated from the same location on the engine. Remove the brass fitting from the long fitting that is screwed into the block and replace it with the combination sending unit turbo lube line assembly fitting. Bolt on extension wire to the sending unit with the wire facing down and connect the other end to the wiring harness. Fasten the wire to the combination fitting with a zip tie provided. Note: this wire is not used when replacing a Factory IDI Turbocharger System with a Hypermax Pulse System.

4. Install the rubber expansion plug into the rear of the intake manifold. Use "Loctite" on threads.

5. Some intake manifold/tappet chamber cover gaskets do not allow adequate turbocharger oil drain back. This is due to a manufacturing variance. To ensure adequate drain back, punch three holes (1/8" to 3/16" diameter) with a sharp pointed punch or awl through the grommet hole to the gasket

baffle chamber. It will be necessary to perforate two layers of the steel gasket. The layers are about 1" apart. The first layer is the top of the baffle chamber, the second is the bottom of the chamber. Be careful not to go any deeper than necessary to perforate both layers to avoid damaging the roller tappet retainer located about 1" below the baffled chamber.

6. Install the 3/4" I.D. grommet into the opening in the engine valley cover.
7. Re-adjust Fuel Injection Pump. Refer to Fuel Injection Pump Adjustment Instructions to obtain desired setting.

C. REROUTING FUEL RETURN LINES, ELECTRICAL AND CONTROL CABLES:

1983 MODELS

1. Remove the right bank injection nozzle fuel return hose that connects the last injector (No.7) to the main return line fitting.
2. Connect the right and left bank injector returns at the front of the engine with the 28" length of hose provided. This hose can be shortened if desired. Reuse hose clamps.
3. Cap-off the (No.7) injector and the main return line fitting with the caps removed from (No. 1 & No. 2 injectors in step 2. Reuse clamps.
4. Reroute the glow plug wiring harness at (No. 7) cylinder with the throttle and cruise control cables, causing the glow plug harness to be on top of the cables. Fasten the bundle to the threaded boss at the right rear of the intake manifold inlet with (2) zip ties provided.

1984 & LATER MODELS

Note: This step does not apply to the Factory IDI Turbocharged Models. Proceed down to "ALL MODELS"

1. Remove the return hose connecting the right and left injection nozzle banks at the rear of the engine and retain the clamps (discard hose). Note: 1990 & later models use 3/16" or 1/4" inside diameter return hose. Install the same size replacement hose (both sizes are provided for this model year).
2. Slide the clamps on both ends of the 28" length of hose provided.
3. Route the hose around the front of and underneath the intake manifold to reconnect the right and left Bank nozzle return fittings. (Refer to Fig.1)

4. Tie wrap the hose to one of the injection lines on the passenger side of the engine for maximum clearance between the turbocharger and hose.

ALL MODELS

1. Remount the vacuum manifold (Except 1992 & later models with serpentine belt engine) 6" toward passenger-side of engine compartment and reroute vacuum hoses along with the air-conditioning hose.

For vehicles without air-conditioning, use the (2) mounting zip ties provided and attach just below weather strip on firewall Take precautions to avoid drilling chips from entering engine during these operations.

2. Straighten the bend closest to the frame on the fuel return line so it can be zip tied to the transmission linkage bracket. Also tie the transmission wiring harness to the threaded boss located at the rear of the transmission housing. Note: 5-speed transmission wire harness must be rerouted away from transmission and zip tied to fuel return line along frame for maximum clearance of driver side exhaust manifold pipe. The line for the hydraulic clutch must be DOUBLE zip tied along with the fuel return line and the transmission linkage bracket away from the manifold pipe.
3. If equipped with a fuel return hose facing rearward out of the top fitting of injection pump, remove this hose. Turn fitting 180 degree while holding hex adaptor with wrench. NOTE: Use extreme caution when turning fitting. Turning hex adaptor in aluminum pump hosing will result in thread damage. Remove steel fuel return line and cut bend off. Deburr, clean and reinstall fuel line. Connect new hose and hose clamp supplied.
4. Remove throttle and cruise control cables from injection pump and re-route under 3/8" fuel return line at left rear of engine. Fasten both cables to the threaded boss at the right rear of the intake manifold inlet with (2) zip ties provided. Cables must clear fuel return line and downshift rod.
5. 1984-1987: Reroute the glow plug wiring harness at (No. 7) cylinder with the throttle and cruise control cables, causing the glow plug harness to be on top of the cables. Fasten the bundle to the (2) zip ties provided.
6. 1994 vehicles have a vacuum line that must be routed with the air-conditioning lines along the tip edge of the firewall.

D. TRANSMISSION DOWNSHIFT ROD & MODULATOR TUBE (C-6 AUTOMATIC TRANSMISSION)

1. Transmission downshift lever on injection pump must be cut to 1/4" radius around the pivot point to provide air cleaner mount clearance. The lever must be removed from the injection pump for this modification.
2. Install downshift rod and check for clearance with the fuel return line, turbo oil feed line, and the throttle and cruise cables. Downshift rod must travel unobstructed.

3. Recheck downshift rod for clearance and connect downshift return spring to down shift rod.
4. Adjust the downshift rod length by setting a .030 gap at the adjusting screw on the injection pump lever with the injection pump at full fuel position and the transmission lever at its full travel.
5. Install the transmission modulator tube utilizing stock spring clips. Connect the vacuum hose from the injection pump (marked trans) to the modulator tube.

Note: Factory IDI Turbocharged Diesel – glow plug harness does not need to be rerouted unless an Intercooler System is installed.

1. Unplug glow plug harness on passenger side 1987-1991 models or drivers side on 1992 & later models, unbolt relay and ground wire from intake manifold. Label sender connections and disconnect glow plug, injection pump, fuel filter, oil pressure, and water temperature sender leads. Remove entire glow plug harness from vehicle with relay intact.
2. Modifying wire harness involves removing split loom sheathing, tape and redressing wires for new relay location. Harness wiring is used with NO cutting or splicing.
3. Lay harness out on table and reverse position of relay from rear to left front of engine as shown on Fig. 1. Keeping right and left sides of harness the same.
4. Attach relay and ground wire to mounting plate with bolts and locknuts provided. Relay wire exit should face front of engine.
5. Set glow plug relay mounting plate in position on intake manifold pad with bumper on valve cover. See attached illustration Fig. 1.
6. Lay harness loosely into position on engine. Oil pressure sender lead will follow left bank glow plug wire and exit at rear. Coolant temperature sender leads will exit near A.C. compressor (on 1992 & later models leads will exit near harness connector and will need to be protected).

Fuel filter and injection pump leads will exit near No.1 injector. Wiring bundle can be taped at intervals and split loom replaced. Split loom from original fuel return line can be used.
7. Position harness under (No. 3 and No. 1 cylinder) injection lines. Start from wiring harness connector located on passenger side fender well.
8. Remove throttle cable bracket from intake manifold. Move injection line clamp (right front) toward center of engine to provide clearance for wire to lifting eye. Reinstall throttle cable bracket – tighten bolts.
9. Position harness below the transmission down shift rod (1987-1988 C-6 auto trans only) and also clamp to rear bolt of air cleaner glow plug relay mount. Continue to route under injection line (No. 2 cylinder) to glow plug relay.

10. Loop glow plug wires over and below the relay mounting plate and connect to the glow plugs.
11. Connect passenger side glow plugs and remaining oil, fuel, temperature and injection pump leads to terminals.
12. One line clamp (which was removed with harness) must be drilled for 3/8" diameter bolt.

F. TURBOCHARGER MOUNT INSTALLATION:

1. Clearance must be made to allow drivers side manifold pipe to pass between firewall and transmission. Firewall and firewall lower lip can be modified with a Porta-Power or pipe/wood lever against transmission. Avoid damage to oil pressure sender.
2. Bolt the turbocharger mounting plate onto the rear face of the right hand cylinder head with (3) 3/8" NC x 1" bolts and lock washers. Center the plate on the bolts to tighten.
3. Check for clearance between the turbocharger mount and firewall and the right and left exhaust manifold connecting pipes with the floor pan. One half inch clearance is sufficient. If necessary, pry the firewall away from the turbocharger mount with a length of wood or small bar. REMOVE MANIFOLD CONNECTING PIPES FOR INSTALLATION AT A LATER TIME.

G. FINAL TURBOCHARGER INSTALLATION:

1. Flush turbocharger oil feed tube (1/4" diameter) with solvent. Lubricate seal grommets. Install the oil feed tube on the combination fitting installed in section B-3, leaving the turbo side unconnected.
2. Grease the end of the turbocharger oil drain tube and insert it into the grommet previously installed in the engine valley cover.
3. Install turbocharger (with factory housing alignment as is) using "Never Seeze" compound on the exhaust gasket. Center exhaust housing on studs and tighten.
4. Bolt drain tube with its gasket to turbocharger with (2) 3/8" NC x 1" bolts and lock washers.
5. Recheck for optimum drain tube to grommet alignment.
6. Tighten turbocharger mounting and drain tube bolts for final time.
7. Remove plastic plug from oil inlet passage at top of turbocharger and fill passage with clean oil.
8. Install turbocharger oil lube fitting using pipe sealer on threads. Fitting should face rearward. DO NOT over tighten.
9. Connect the feed line to the fitting in the turbocharger.

10. Tighten flex fitting nuts until they just bottom on their fittings.

NOTE: The turbocharger compressor and/or exhaust housing maybe re-aligned if the drain tube or compressor discharge alignment is not optimum.

H. REMAINING EXHAUST CONNECTION:

1. Install exhaust housing (turbine) discharge pipe between the engine and firewall. THE MANIFOLD CONNECTING PIPES SHOULD NOT BE IN PLACE AT THIS TIME. Use “Never Seeze” at seal ring and turbine housing joint. Push discharge pipe into turbine housing until it bottoms. The firewall might require slight bending to install pipe

NOTE: The E4OD and the 4-spd transmission have a protrusion that may need to be filed for clearance with the discharge pipe.

2. The inner wheel well on the passenger side will have to be clearanced to allow the connecting pipe to be installed.
3. Install the (2) 5/16” NC x 1/2” bolts and lock washers through the discharge pipe mounting tab and into the turbocharger mounting plate.
4. Slip the expanded end side of the connecting pipe on the discharge pipe. Use the torcrite band clamp on this connection. Orientate the clamp opening upward with the bolt heads facing the transmission. Center the connecting pipe and tighten the clamp.
5. Install the right and left hand exhaust manifold connecting pipes into the turbocharger mount. Leave nuts loose enough to adjust for the best pipe joint alignment. Install the (2) 1/4” NC x1/2” stainless steel bolts through the mounting tabs and into the mounting plate. Adjust for best pipe alignment and tighten manifold nuts. Then tighten the tab bolts. Note: Tabs must be tight against the mount plate. It may be necessary to grind a fin on manual transmission bell housings to provide clearance for the right manifold pipe.
6. Hang 3-1/2” tail pipe from stock hanger.
7. Abandon the existing front and rear muffler hangers. Utilize the ones provided to hang the muffler.
8. Slide the 2-1/2” to 3-1/2” diameter adaptor pipe over the previously installed muffler connecting pipe. Slip the pipe into the muffler, then the whole assembly onto the tailpipe. Install and tighten all remaining clamps and the tailpipe. Install and tighten all remaining clamps and tailpipe hanger nuts.
9. Check for clearance between the floorboard heat shield and exhaust pipe clamp. Shield may be bent if necessary.

I. INTAKE MANIFOLD COVER INSTALLATION:

1. Slide compressor discharge hose and clamps onto the manifold cover.
2. Lightly grease the intake cover “O” ring and install it on the intake manifold.

3. Install intake manifold cover and hose onto the compressor discharge and onto intake manifold simultaneously.
4. Rotate cover for optimum hose alignment. Be certain cover is bottomed against intake manifold.
5. Install 3/8" NC x 4" bolt with "Loctite" with its "O" ring and back up washer. Tighten only enough to compress "O" ring – DO NOT over tighten! Tighten compressor discharge clamps.

J. AIR CLEANER MOUNT INSTALLATION:

1. Install the 3" X 2-3/4" Dia. 90 degree rubber elbow onto the air cleaner mount.
2. Install the hose onto the turbocharger air inlet and bolt the air filter mount securely in place above the spacer or glow plug relay mounting plate, using the (2) 3/8" NC x 1-1/4" bolts and lock washers on left side of engine. Check for injection line clearance and bend as necessary.
3. Install and tighten hose clamps securing 90 degree rubber elbow to turbocharger and air filter mount.
4. Install crankcase breather grommet into valve cover and baffle (if not done in step B-2), screw in 90 degree nylon fitting. Mount crankcase breather valve (CDR) onto air cleaner mount with original bolts. Use lock washers supplied. Install hose.

NOTE: Pre 1989 Models may require shortening the long leg of the hose approximately one inch. Models using the center circular impression on valve cover shorten the long leg of the hose approximately 4-1/2".

K. AUTOMATIC TRANSMISSION FILLER TUBE:

1. Install the transmission filler tube with "O" ring and secure it with the rear valve cover mounting bolt.

E4OD Transmission Only: once the new dipstick tube is installed it may be necessary to bend the existing intermediate tube forward to clear the discharge pipe.

2. Re-install dipstick. **Note:** Factory IDI turbocharger replacement vehicles must use dipstick Ford P/N (F9TZ*7A020*A).
3. Check for clearance between the trans filler tube and the floorboard heat shield. Bend heat shield if necessary.

L. MISCELLANEOUS:

1. Refer to the Fuel Injection Pump Adjustment Instructions to obtain the desired setting. California engines require 1-1/2 – 2 flats increase in fuel delivery and two degrees retarded injection pump timing.
2. Examine the entire installation. Check for interference and contact between wires, tubes and cables with the hot side of the turbocharger.
3. Bend the (2) tabs on the bottom on the stock air cleaner out approximately 1/2". Drill a 1/4" hole in lower front portion of air cleaner for moisture if this hole is not present.

NOTE: The lower air filter housings on some pickup trucks incorporate a baffle which may cause a restriction when the filter assembly is mounted. Remove the baffle and stud-guide by drilling out the spot welds or by sawing.

4. Mount air cleaner. Check that air cleaner base is not touching "Hold Down" bolt on intake manifold cover. If it touches, clearance air cleaner base. Be sure air cleaner gasket is in 100% contact with mount.
5. 1988 and later pickup trucks with factory cold air ducts require that the hose end of the duct be cut off at the inside radius. Maintain as much straight section of the duct as possible, connect the modified air duct to the air cleaner with the hose provided.
6. The air-conditioning hoses may have to be rotated downward – this can be accomplished without breaking system seal.
7. If factory exhaust system is utilized, remove the screens at the tailpipe exit to reduce the system back pressure.
8. Affix the C.A.R.B. exemption label to the top of air cleaner housing or some obvious location in the engine compartment.
9. Reconnect batteries – start engine and check for leaks.

M. OPERATING NOTES:

1. As with any turbocharged diesel engine, use a brand name Series Three lubricating oil.
2. Injection pump timing should be at the nominal factory specification or California setting of 2 deg. Retard. If it has been advanced or combustion noise is unusually loud, have timing checked.
3. The turbocharger supplied with this package has been matched to the vehicle's exhaust system and will not over-boost the engine. DO NOT alter the exhaust system to exceed 12 PSIG intake manifold pressure.
4. When the fuel injection pump is adjusted for 1-1/2 – 2 flats (required California setting), a pyrometer must be installed on the vehicle. Limit turbine inlet temperature to 1300 degrees f. A pyrometer tap

is provided in the exhaust connector pipe. A boost pressure tap is provided in the intake manifold cover.

5. The 1983 and early 1984 6.9L cylinder head gaskets may develop a slight external coolant leak under prolonged high output operation. This is not due to a combustion leak but rather the result of thermal and mechanical deformation of the cylinder heads at the lower corners.

If this problem occurs, the EARLY GASKETS should be replaced. Installing 1986 CYLINDER HEAD GASKETS will permanently alleviate this problem.

Should a leak develop with the EARLY GASKETS, the addition of a product such as “Prestone” Heavy Duty Cooling System Sealer to the radiator will provide a temporary fix for this problem.

6. Remember to retorque the cylinder head bolts to (6.9L – 85 Ft./Lbs., 7.3L – 110 Ft./Lbs.) approximately 3000 miles after installing new cylinder head gaskets.

HYPERMAX ENGINEERING has accumulated a considerable amount of data during the 6.9/7.3L turbocharger development program. Should you encounter any problems with the installation of operation of the turbocharger system, call a Hypermax Engineering technician for assistance.

TURBOCHARGER / INTERCOOLER

LIMITED WARRANTY

All Hypermax Engineering, Inc. non-competition products or merchandise are warranted to be free from defects in material and workmanship, under normal use and service for a period of one year (365 days) from date of delivery to the initial end user.

Hypermax Engineering, Inc.'s liability under this warranty is limited to repair or replacement at its option, subject to the provisions set forth herein, of any parts which upon examination by Hypermax Engineering, Inc. are found to be defective. The user shall prepay cost of transportation of defective parts to Hypermax Engineering, inc. for inspection.

Hypermax Engineering, Inc. shall not have any responsibility under this warranty unless the defect results in a claim arising within the operational periods listed above, the part was properly installed, normally maintained and not subject to misuse, negligence or accident, and the turbocharger and or intercooler, parts, system components and/or accessories were not repaired or altered in such a way that, in the judgment of Hypermax Engineering, Inc. its performance or reliability was adversely affected.

Remedies are expressly limited to the repair or replacement of defective Hypermax Engineering Inc. products or merchandise as specified herein. Neither Hypermax Engineering Inc. nor its distributors or dealers have any liability for any other claims including claims for special, indirect, or consequential damages (including but not limited to turbocharger and or intercooler removal installation, equipment down time, perspective profits or other economic loss) because of any defect. Any claim arising from defects in material or workmanship must be presented in writing to Hypermax Engineering Inc. within thirty (30) days after the date on which the claim arises, and any action of the claim must be commenced within six (6) months after original Hypermax Engineering Inc. shipping date.

These systems are legal in California and all other states. The HYPERMAX Turbocharger and or Intercooler System have been tested for emissions compliance by the state of California and have been issued an exemption under Section 27156 of the California Motor Vehicle Code rendering them legal for sale, installation, and use in the State of California under Executive Order D-175. By satisfying the requirements of the State of California, these systems also satisfy the requirements of Memorandum 1A of the United States Environmental Protection Agency and are thereby legal for sale, installation, and use in all 50 states. No modifications to these systems as supplied by Hypermax Engineering Inc. are permitted.

THIS REPRESENTS THE COMPLETE WARRANTY OFFERED BY HYPERMAX ENGINEERING, INC. AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO PERSON IS AUTHORIZED TO BIND HYPERMAX ENGINEERING, INC. TO ANY WARRANTY OR TERMS NOT SET FORTH HEREIN.

6.9/7.3L FUEL INJECTION PUMP ADJUSTMENT

The fuel injection pump must be adjusted to realize any performance improvement with the 6.9/7.3L turbocharger package.

By following this simple procedure, the adjustment can be made WITHOUT removing the injection pump from the engine.

ALL MODEL YEARS:

1. Locate the triangular-shaped cover plate on the passenger-side of the fuel injection pump – below the throttle lever.
2. Remove (2) 1/4" hex head screws retaining the cover to the pump housing. Place rags under the pump to absorb the fuel that will drain from the pump when the cover is removed.
3. Prepare to rotate the engine by hand using a 15/16" socket, 3" extension and ratchet on the crankshaft damper retaining bolt. Rotate the engine clockwise as viewed from the front to avoid loosening the bolt.
4. By directing a flashlight on to a small mirror and aiming the light onto the hole (exposed by removing the cover plate), a 5/32" hex allen screw is the leaf spring or fuel screw. Turning the screw in a clockwise direction increases the fuel delivery.
5. Have an assistant rotate the engine by hand until the 5/32" hex socket screw comes into view. (2) revolutions of the engine may be required to bring the hex screw into alignment with the hole.
6. Refer to the BHP VS Fuel Flow Curve attached (upper curves) and decide what power level is desired. Note: The California setting is 1-1/2 to 2 flats increase in fuel delivery and two degrees retarded injection pump timing.

The injection pump timing is retarded two degrees by loosening the three mounting stud nuts and rotating the injection pump clockwise two degrees (as viewed from the drive end or front of the engine) this corresponds to 1/16" on the circumference of the mounting flange. If these instructions are not understood by the installer take the vehicle to a qualified diesel injection shop for these adjustments.

Example: If 227 horsepower is desired at 3300 RPM, the 5/32" hex screw must be rotated 180 degrees in a clockwise direction; this corresponds to turning the 5/32' allen wrench (3) flats as indicated by the lower set of fuel curves.

NOTE: It is important to obtain a high quality 5/32" allen wrench to avoid damaging the hex driver portion of the screw since rotating the screw will require considerable effort.

7. After rotating the fuel screw to the desired setting, replace the housing cover plate.

1992-1/2 MODELS (Identifiable with a serpentine belt system):

This model 7.3L engine is equipped with an injection pump incorporating an adjustment feature that reduces fuel delivery at 3300 RPM. This adjustment may in some cases cause unacceptable performance by reducing the fuel delivery at too low of an engine speed. If the boost pressure seems to drop off before 3200 RPM a readjustment may be desired. The screw affecting this adjustment is located at the top left rear of the injection pump housing at about a 45 deg. Angle and is covered with a plastic seal cap. Remove the plastic cap and discard. Loosen the jam nut and rotate the allen screw 3 turns out (CCW). Retighten the jam nut. The absence of the seal cap only indicated the screw has been readjusted and it is not reused.

NOTE: After all adjustments are completed, start the engine and check for fuel leaks.

CONSIDERATIONS

The fuel curves indicated that rotating the fuel screw (4) flats (wide open – 240 degrees) will raise the fuel delivery and subsequent power from a non-turbocharged setting (N.A. 160-170 HP) to maximum turbocharged power of 250 HP. This is only valid for injection pumps set for operation at sea level. Injection pumps set for high altitude (5000 Ft. above sea level) will require rotating the fuel screw (6) flats (wide open –360 degrees). FOR COMMERCIAL APPLICATIONS: Be conservative on the fuel setting i.e., (1-1/2) flats will probably satisfy the operator.

You can identify an altitude set engine by observing the sticker on the valve cover. An altitude engine sticker is punched at 150 HP; a sea level engine is punched at 170 HP.

If the vehicle is to be operated at 5000 Ft. and above for prolonged periods, it would be prudent not to set the fuel injection pump wide open since even the turbocharged air delivery at that altitude would not be sufficient to produce 250 HP and fuel will be wasted at wide open throttle.

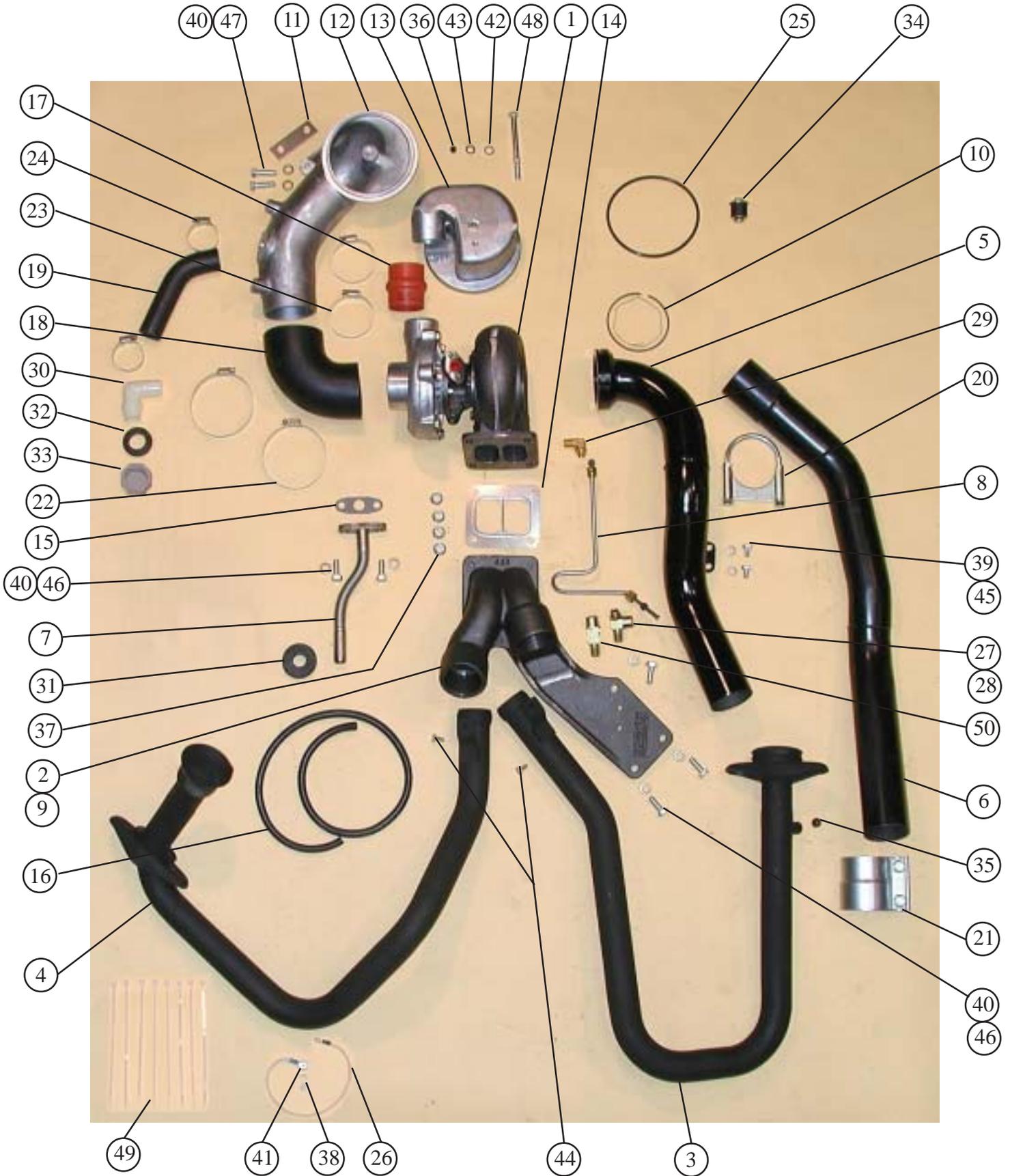
It should be stressed that operating the engine above 1300 degrees F exhaust temperature (turbine inlet temperature) or in excess of 13 PSIG intake manifold pressure is harmful and should be avoided.

Should either of these limits be exceeded on a grade or prolonged wide open throttle operation, simply back-off on the accelerator pedal or shift to a lower gear.

A certain percentage of injection pumps will not respond to the setting procedure described above. This is due to their being at the high or low end of the maximum fuel delivery specifications as a result of manufacturing tolerances. The low delivery injection pumps yield slightly lower power causing no problems, but the high delivery pumps should be reduced between (1) and (2) flats counterclockwise.

Hypermax

1983 - 1986 PULSE TURBOCHARGER





1983 - 1986 PULSE TURBOCHARGER PACKAGE

ITEM	DESCRIPTION	PART NO.	QTY
1	TURBOCHARGER		1
2	MOUNT - TURBOCHARGER	HYP-177	1
3	PIPE - RIGHT EXHAUST MANIFOLD	HM-13	1
4	PIPE - LEFT EXHAUST MANIFOLD - **AUTO**	HM-14	1
4	PIPE - LEFT EXHAUST MANIFOLD - **MANUAL**	HM-12	1
5	PIPE ASSEMBLY - TURBINE DISCHARGE	HYP-186	1
6	PIPE - MUFFLER CONNECTING	HYP-171	1
7	TUBE ASSEMBLY - TURBO OIL DRAIN		1
8	TUBE ASSEMBLY - TURBO OIL SUPPLY		1
9	STUD - 3/8 x 1 1/2	HYP-381	4
10	SEAL & EXPANDER RING		1
11	SPACER - AIR CLEANER MOUNT		1
12	MOUNT - AIR CLEANER	HYP-155	1
13	COVER - INTAKE MANIFOLD	HYP-113	1
14	GASKET - TURBOCHARGER - DIVIDED		1
15	GASKET - TURBO OIL DRAIN		1
16	HOSE - FUEL RETURN 3/16" x 28"		1
17	HOSE - TURBO COMPRESSOR DISCHARGE		1
18	HOSE - TURBO COMPRESSOR INLET	HYP-19	1
19	HOSE - CDR BREATHER CONNECTING	HYP-156	1
20	CLAMP - MUFFLER 2 1/2"		1
21	CLAMP - TORCTITE 2 1/2" BAND CLAMP		1
22	CLAMP - TURBO COMPRESSOR INLET		2
23	CLAMP - TURBO COMPRESSOR DISCHARGE		2
24	CLAMP - CDR HOSE		2
25	O-RING - INTAKE MANIFOLD COVER		1
26	EXTENSION WIRE ASSEMBLY - OIL PRESS.		1
27	90 DEGREE NTP 1/4" FITTING		1
28	1/4" x 1/8" CONNECTOR		1
29	FITTING - 1/4" TUBE TO 1/4" NPT		1
30	FITTING - 1" X 90 DEGREE		1
31	GROMMET - TURBO DRAIN TUBE		1
32	GROMMET - VALVE COVER BREATHER		1
33	BAFFLE - VALVE COVER BREATHER	HYP-211	1
34	PLUG - RUBBER EXPANSION 1"		1
35	PLUG - 1/4" NPT		1
36	PLUG - 1/8" NPT		1
37	FLANGE NUT - 3/8		4
38	NUT - 10-32		1
39	WASHER - 5/16" LOCK		2
40	WASHER - 3/8" LOCK		7
41	WASHER - 10-32 LOCK		1
42	WASHER - 3/8 AN FLAT		1
43	WASHER - 3/8 O-RING		1
44	BOLT - 1/4-20 X 1/2" STAINLESS STEEL		2
45	BOLT - 5/16-18 X 1/2"		2
46	BOLT - 3/8-16 X 1"		5
47	BOLT - 3/8-16 X 1 1/4"		2
48	BOLT - 3/8-16 X 4"		1
49	TIES - PLASTIC ZIP		8
50	FIITTING - OIL FEED REDUCING - **1983 ONLY**		1



1987 - 1994 PULSE TURBOCHARGER PACKAGE

ITEM	DESCRIPTION	PART NO.	QTY
1	TURBOCHARGER		1
2	MOUNT - TURBOCHARGER	HYP-177	1
3	PIPE - RIGHT EXHAUST MANIFOLD	HM-13	1
4	PIPE - LEFT EXHAUST MANIFOLD - **1987-1988 AUTO**	HM-14	1
4	PIPE - LEFT EXHAUST MANIFOLD - **1989-1991 AUTO**	HM-16	1
4	PIPE - LEFT EXHAUST MANIFOLD - **1992-1994 AUTO**	HM-22	1
4	PIPE - LEFT EXHAUST MANIFOLD - **MANUAL**	HM-12	1
5	PIPE ASSEMBLY - TURBINE DISCHARGE	HYP-186	1
6	PIPE - MUFFLER CONNECTING	HYP-171	1
7	TUBE ASSEMBLY - TURBO OIL DRAIN		1
8	TUBE ASSEMBLY - TURBO OIL SUPPLY		1
9	STUD - 3/8 x 1 1/2	HYP-381	4
10	SEAL & EXPANDER RING		1
11	PLATE - GLOW PLUG CONTROL MOUNTING	HYP-143	1
12	MOUNT - AIR CLEANER	HYP-155	1
13	COVER - INTAKE MANIFOLD	HYP-113	1
14	GASKET - TURBOCHARGER - DIVIDED		1
15	GASKET - TURBO OIL DRAIN		1
16	HOSE - FUEL RETURN 3/16" x 28" - **1987-1989**		1
16	HOSE - FUEL RETURN 1/4" x 28" - **1990-1994**		1
17	HOSE - TURBO COMPRESSOR DISCHARGE		1
18	HOSE - TURBO COMPRESSOR INLET	HYP-19	1
19	HOSE - CDR BREATHER CONNECTING	HYP-156	1
20	CLAMP - MUFFLER 2 1/2"		1
21	CLAMP - TORCTITE 2 1/2" BAND CLAMP		1
22	CLAMP - TURBO COMPRESSOR INLET		2
23	CLAMP - TURBO COMPRESSOR DISCHARGE		2
24	CLAMP - CDR HOSE		2
25	O-RING - INTAKE MANIFOLD COVER		1
26	EXTENSION WIRE ASSEMBLY - OIL PRESS.		1
27	90 DEGREE NTP 1/4" FITTING		1
28	1/4" x 1/8" CONNECTOR		1
29	FITTING - 1/4" TUBE TO 1/4" NPT		1
30	FITTING - 1" X 90 DEGREE		1
31	GROMMET - TURBO DRAIN TUBE		1
32	GROMMET - VALVE COVER BREATHER		1
33	BAFFLE - VALVE COVER BREATHER	HYP-211	1
34	PLUG - RUBBER EXPANSION 1"		1
35	PLUG - 1/4" NPT		1
36	PLUG - 1/8" NPT		1
37	FLANGE NUT - 3/8		4
38	NUT - 10-32		1
39	WASHER - 5/16" LOCK		2
40	WASHER - 3/8" LOCK		7
41	WASHER - 10-32 LOCK		1
42	WASHER - 3/8 AN FLAT		1
43	WASHER - 3/8 O-RING		1
44	BOLT - 1/4-20 X 1/2" STAINLESS STEEL		2
45	BOLT - 5/16-18 X 1/2"		2
46	BOLT - 3/8-16 X 1"		5
47	BOLT - 3/8-16 X 1 1/4"		2
48	BOLT - 3/8-16 X 4"		1
49	TIES - PLASTIC ZIP		8
50	RUBBER BUMPER BUTTON		1
51	PLUG - AIR CLEANER GROMMET		1
52	LOCK NUT - 1/4-20		2
53	HOSE - AIR FILTER INLET - **1988-1994 ONLY**		1
54	HOSE - INJECTION NOZZLE FUEL RETURN - **1987 ONLY**		1