

THIS KIT DOES NOT COME WITH ELECTRONICS!
 YOU WILL NEED CUSTOM TUNING SOFTWARE (EFI
 LIVE OR HP TUNERS) TO ELIMINATING VGT AND EGR
 DTCS FROM LIMITING YOUR ABILITY TO DRIVE.



BD SUPERMAX Turbocharger

2004 1/2-2006 Chevrolet/GMC LLY/LBZ Duramax Turbo Kit

Part# 1046210 LLY

Part# 1046215 LBZ

***PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLATION.
 UNLESS AN EO# IS LISTED, THIS PRODUCT IS LEGAL IN CALIFORNIA FOR
 RACING VEHICLES ONLY, WHICH MAY NEVER BE USED UPON A HIGHWAY.***

BD ENGINE BRAKE, INC.




Plant Address: A10-33733 King Rd, Abbotsford, BC, Canada V2S 7M9




US Shipping Address: 88-446 Harrison St, Sumas, WA 98295 US Mailing Address: PO Box 231, Sumas, WA 98295




Phone: 604-853-6096 Fax: 604-853-8749 Internet: www.bd-power.com

KIT CONTENTS:

Please check to make sure that you have all the parts listed in this kit before you start the disassembly your truck.

1406201/1406202	1462327	1462326
		
SuperMAX Turbo Qty: 1	Check Valve Qty: 1	12mm O-ring Plug Qty: 1

1462323	1462324	1462325
		
14mmx JIC -6 Adapter Qty: 1	Lower Oil Feed Line Qty: 1	Upper Oil Feed Line Qty: 1

1462310	1406210	1462410
		
Lower Oil Block Gasket Qty: 1	Turbo Adapter (Pedestal) Qty: 1	Feed Pipe Gasket (Upper) Qty: 2


1462300	2405006	1462301	1110062
			
Oil Outlet Block Qty: 1	Oil Drain Gasket Qty: 1	Oil Outlet Mounting Stud Qty: 2	Oil Outlet Mounting Nut Qty: 2





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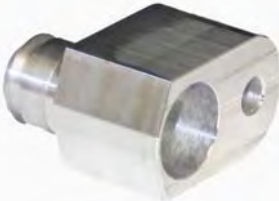

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1462420	1462430	1462440	1040142
			
Feed Pipe Gasket (Lower)	Turbo Mount Stud	Turbo Mount Nut	Heat Wrap
Qty: 1	Qty: 4	Qty: 4	Qty: 2


1459113	1453516	1453504	1405926
			
Heat Wrap Wire	Header Wrap	Stainless Zip Tie	Turbo V-Band Clamp
Qty: 5 ft.	Qty: 10 ft.	Qty: 3	Qty: 1




1100740	1462120	1462107	1462109
			
S/S Exhaust Clamp	Oil Drain Hose Splice	PCV Hose Spacer	PCV Hose Spacer Bolt
Qty: 1	Qty: 1	Qty: 1	Qty: 1



1462108	1462122	1462123
		
PCV o-ring	Coolant Hose Plug 3/8"	Coolant Hose Plug 1/2"
Qty: 1	Qty: 2	Qty: 1

1462905

Dipstick Tube
Qty: 1

1462501

Turbo Down Pipe
Qty: 1

1110032	1462106Z	1300131
		
Lock Washer	Intake Mount Spacer	Zap Strap
Qty: 2	Qty: 1	Qty: 2

1462105	1462103
	
Offset Intake Boot	Heat Shield
Qty: 1	Qty: 1

Pre-Installation

A turbocharger is driven solely on exhaust energy. Therefore, if the vehicles current exhaust manifold is cracked or is leaking, it is recommend that new exhaust gaskets and a heavy-duty exhaust manifold be used.

Installation should occur on a cold vehicle, as turbo and exhaust components become very hot with use.

The **BD SuperMax Turbocharger System** is recommended for trucks with 400-550 RWHP with a maximum efficient boost pressure of 45psi. For optimum performance, the turbo should operate between 40–45psi. Greater boost pressure is a function of the amount of fuel that is being fed to the engine. The adjustable wastegate should be tuned based on power level.

Upgrade Options

Description	Part #
BD Allison Torque Convertor	CALL
BD Allison H/D Transmission	CALL
BD X-Monitor Digital Gauge Package	1086210
BD Deep Sump Transmission Pan	1061600
BD Cool Down Timer	1081150

Pre-Installation

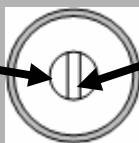
Record your radio settings if you prefer as you will lose them once your batteries are disconnected.

Disconnect the negative terminals on both of the vehicle's batteries, and then disconnect the positive terminals.

If the stock turbocharger has failed, perform the following steps to verify the condition of the #4 camshaft. Although this oil feed does not supply the BD turbo, it is always recommended to check the state of your engine.

- A. Visually inspect for correct alignment of the #4 camshaft bearing oil hole through the turbocharger oil supply hole in the block.**
- B. Turn the engine over by hand (1/2 turn) and inspect for camshaft bearing movement, indicating a spun camshaft bearing.**
- C. If the bearing is spun the engine *MUST* be replaced.**

CAMSHAFT BEARING HOLE
MUST BE VERTICAL AND
NOT MOVE WITH ENGINE



CAMSHAFT LUBRICATION
GROOVE, WILL ROTATE
WITH ENGINE

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Installation

Removal of Stock Turbo & Parts

Remove the factory plastic engine cover or intake plenum. You can also remove the intake tube, but you can leave the air box in place.

Using the petcock on the bottom of the radiator, drain the engine coolant into a clean container to reuse later.



Using a 1/2" breaker bar, relax the belt tensioner and remove the belt.

Disconnect the Air Conditioning clutch and high-pressure cutout electrical connectors.



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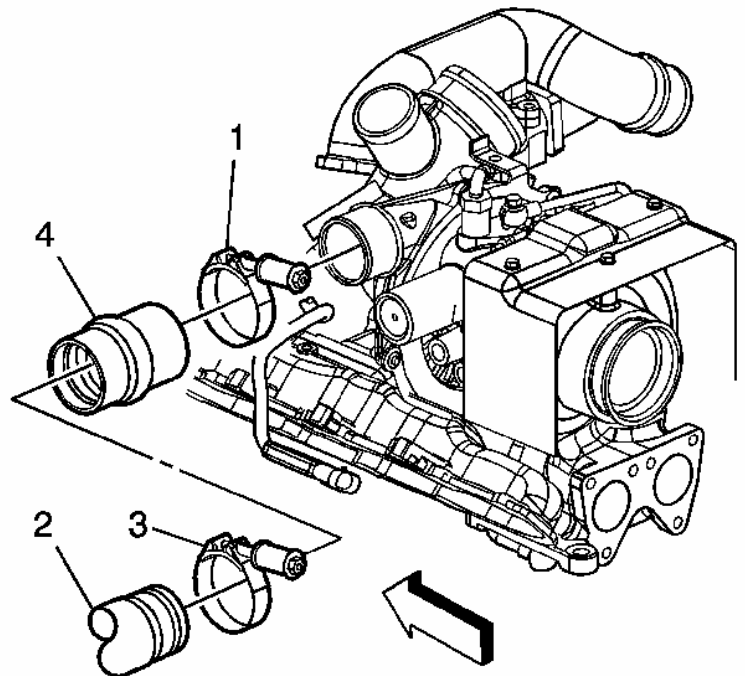
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Using a 15mm socket, remove the four A/C compressor mounting bolts to move the A/C compressor for easy access to the turbo assembly. Be careful not to discharge the A/C line.



Using a 7/16" deep socket, remove the compressor outlet clamps and remove the silicon boot. The charge air cooler piping can then be pushed down towards the valve cover, and out of the way.



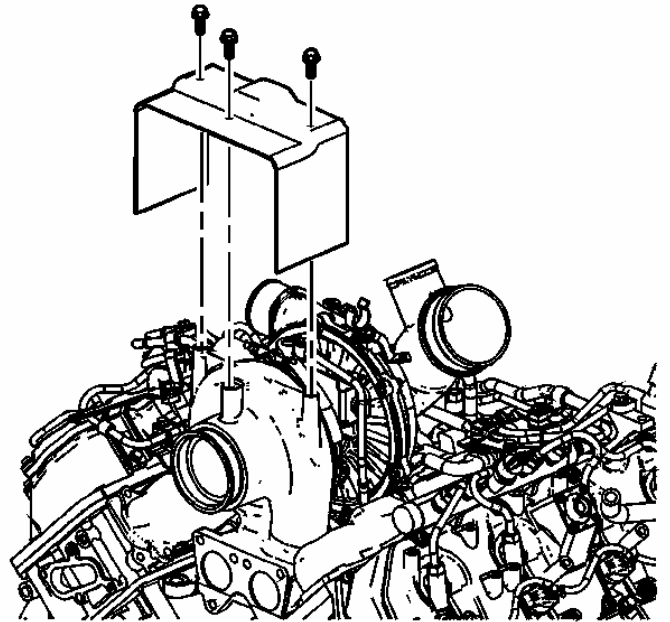
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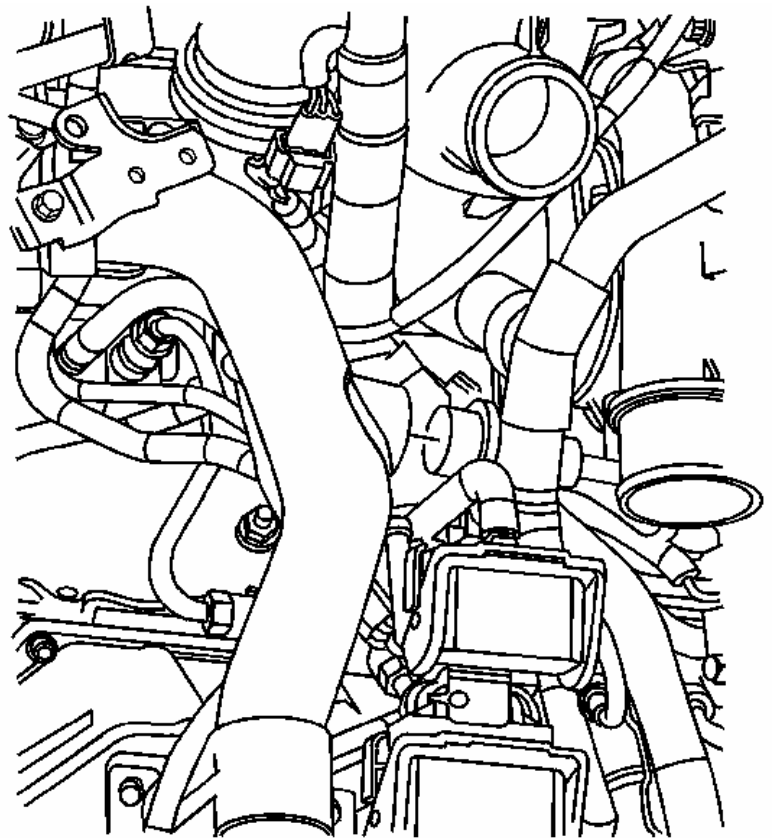
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Using a 10mm socket, remove the three upper heat shield mounting bolts, and remove the heat shield protecting the exhaust turbine housing. Two of the bolts will be reused later.



Remove the turbocharger inlet coolant hose from the turbocharger coolant bypass valve.

Disconnect the VGT solenoid wiring.



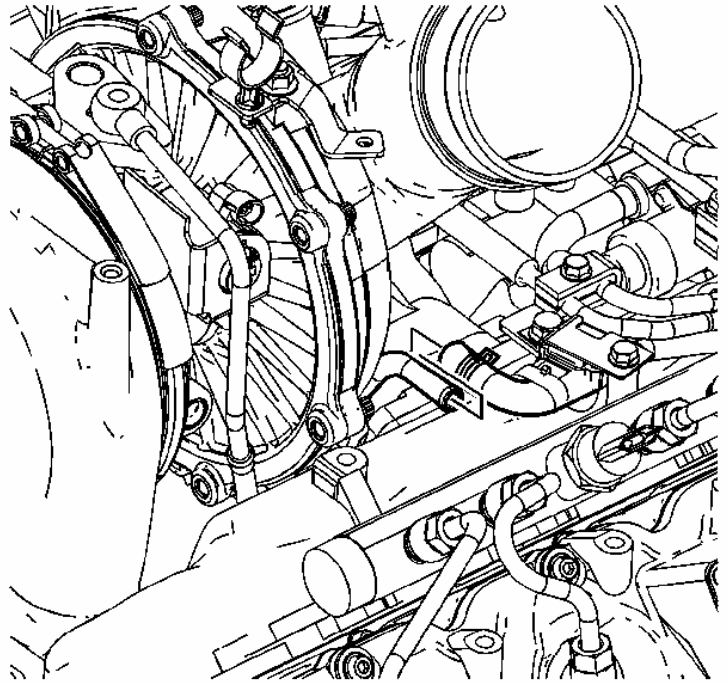
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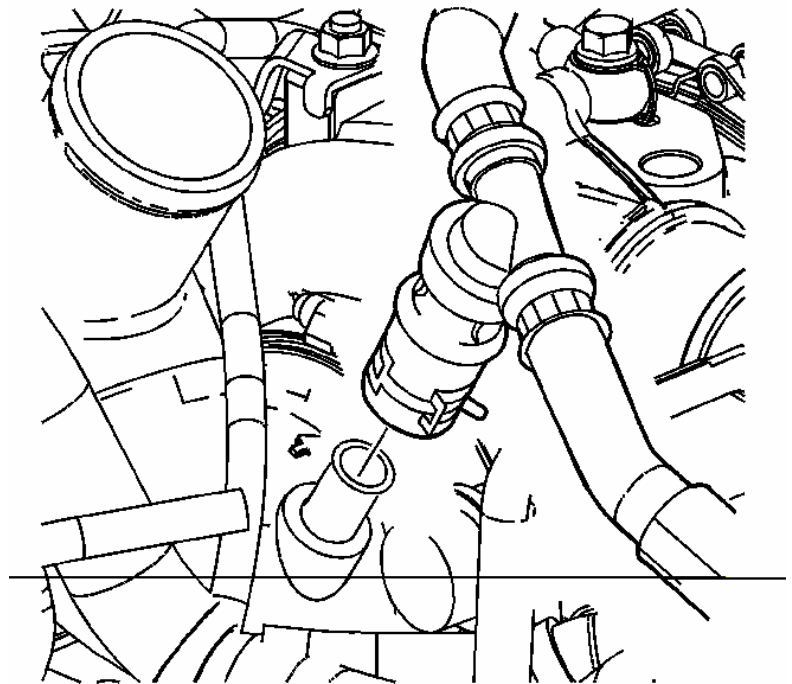
Reposition the hose clamp and remove the turbocharger outlet coolant hose from the turbocharger.



Reposition the positive crankcase ventilation (PCV) hose clamp.

Remove the PCV hose from the air inlet pipe.

Remove the PCV hose from the clip on the top of the turbocharger.



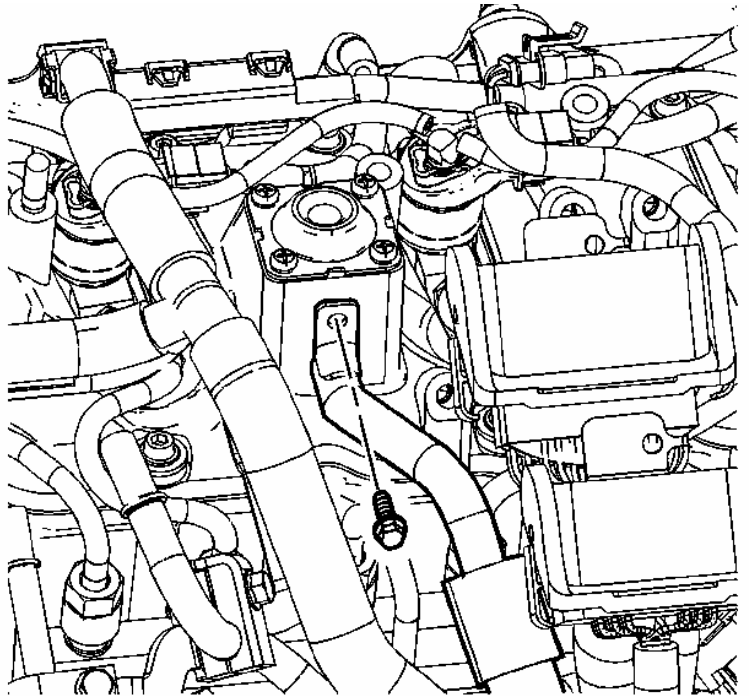
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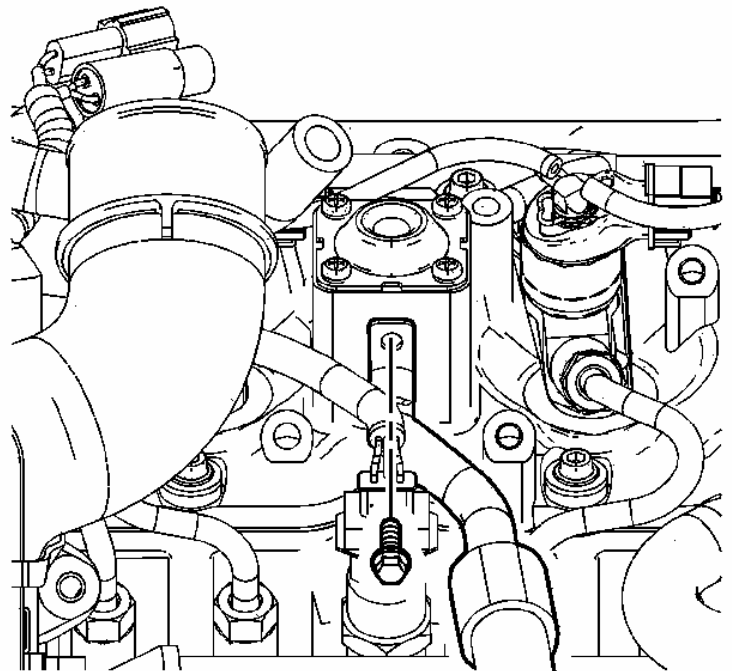
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Remove the left PCV hose/pipe bolt.



Remove the right PCV hose/pipe bolt.

Remove the PCV hose/pipe.



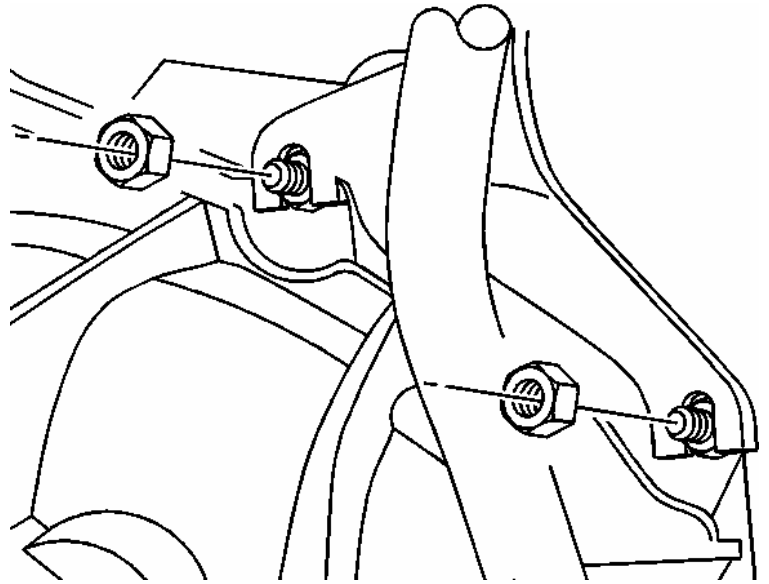
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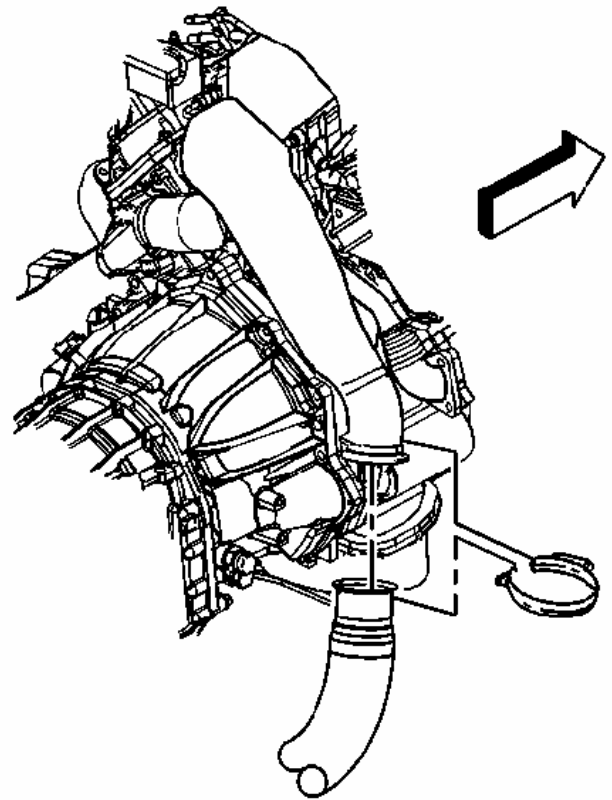
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Using a 13mm socket, remove the two nuts holding the transmission dipstick tube to the transmission bell housing and remove the tube.

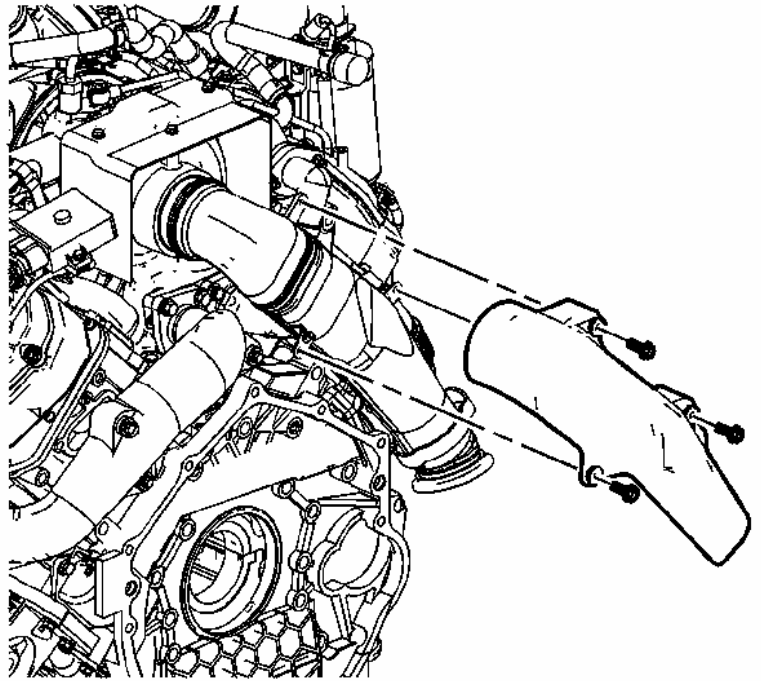


Loosen and remove lower down pipe clamp.

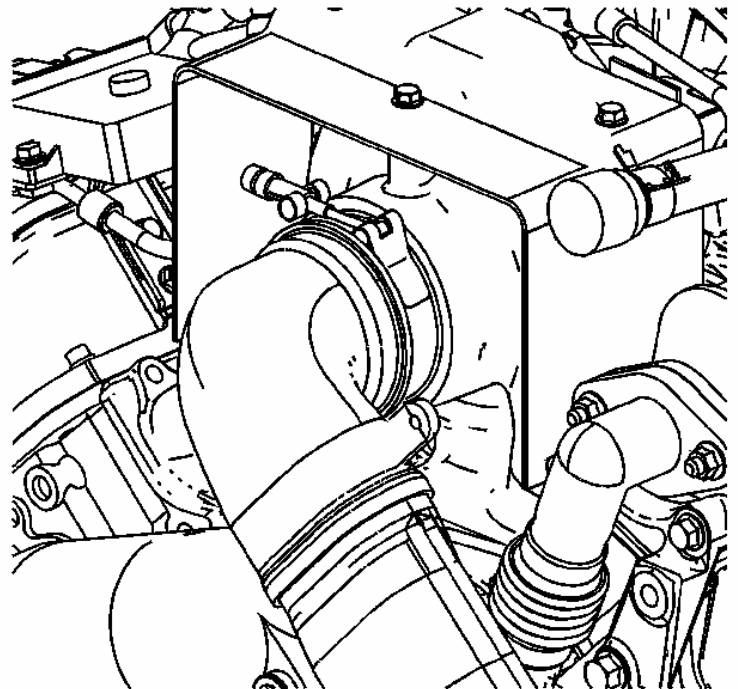


Using a 10mm wrench, remove the three rear heat shield mounting bolts. This will allow you to remove the heat shield protecting the down pipe.

To ease access to rear of the turbo, you can remove the transfer case vent.



Loosen exhaust outlet clamp and remove exhaust down pipe.



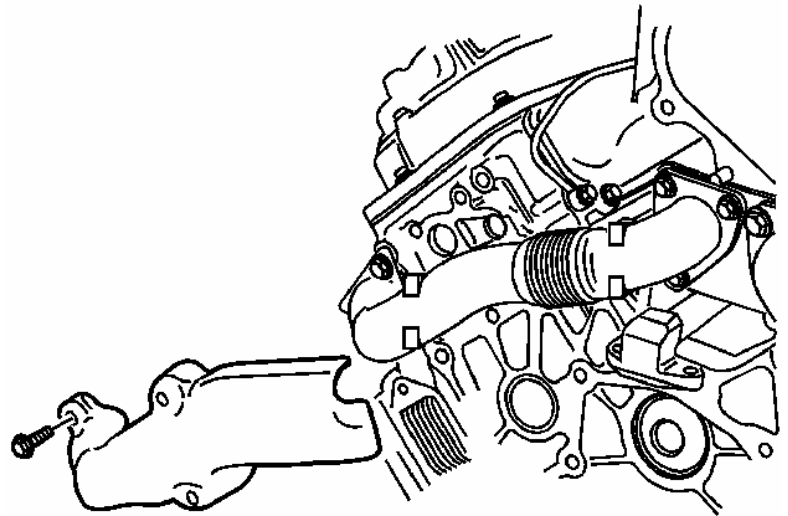
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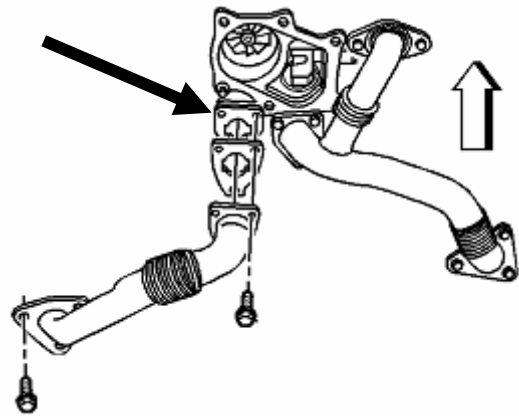
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Using a 10mm wrench, remove the four drivers side feed pipe heat shield bolts: three from the top and one from the bottom. Remove heat shield.

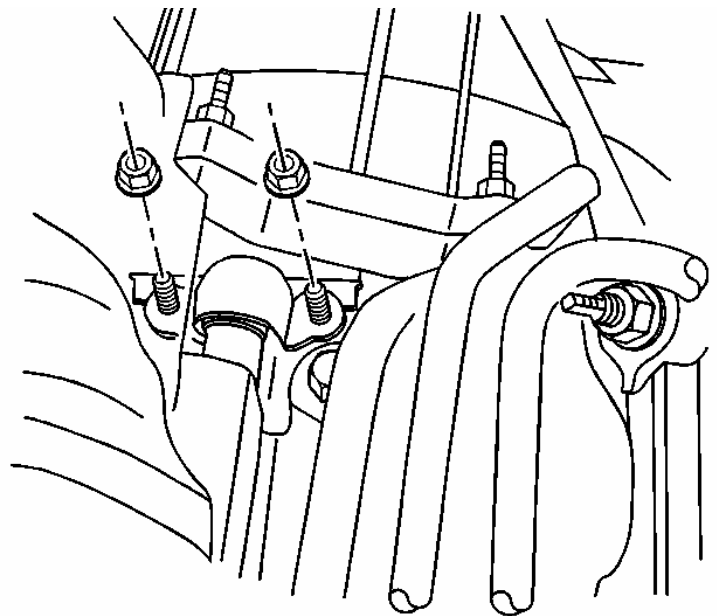


Using a 12mm - **12 point** socket, remove the six upper feed pipe bolts. Note that they may be extremely difficult to remove and may require heat to break them loose or penetrating oil.



To aid later install loosen the EGR cooler nuts.

Using a 12mm deep socket, remove the oil drain flange nuts that secure the drain tube to the center of the block.



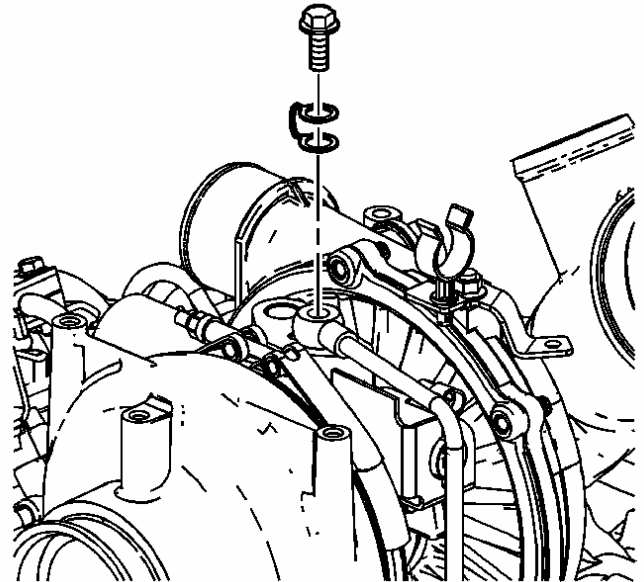
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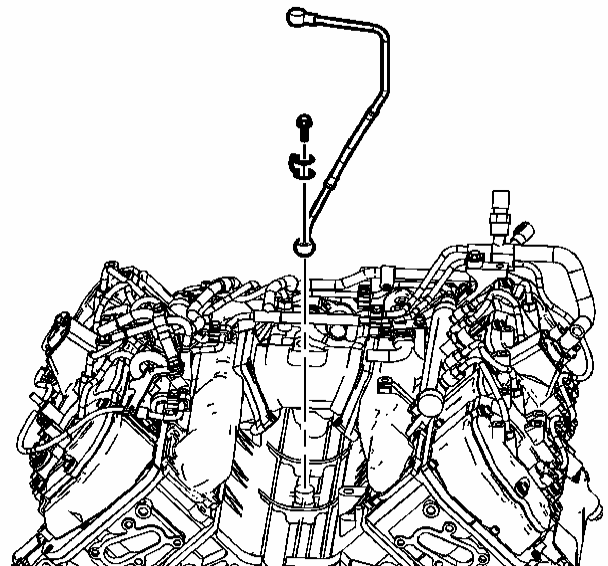
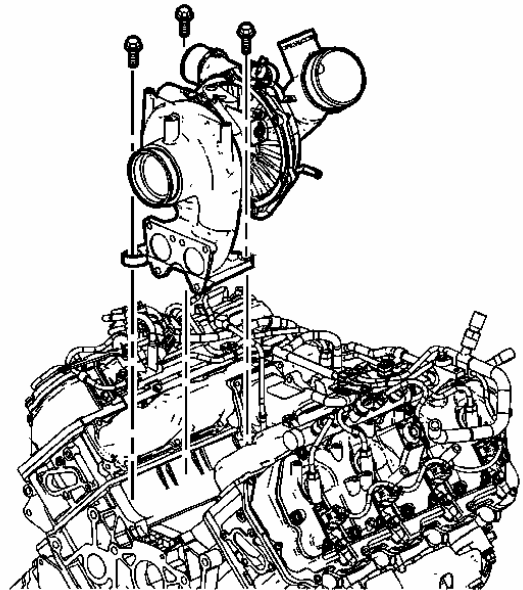
Remove the turbocharger oil feed pipe banjo bolt and washer.



Remove the three turbocharger bolts.

Remove the turbocharger with the oil return pipe attached.

In order to remove the turbo you will need to remove the turbocharger oil supply line.



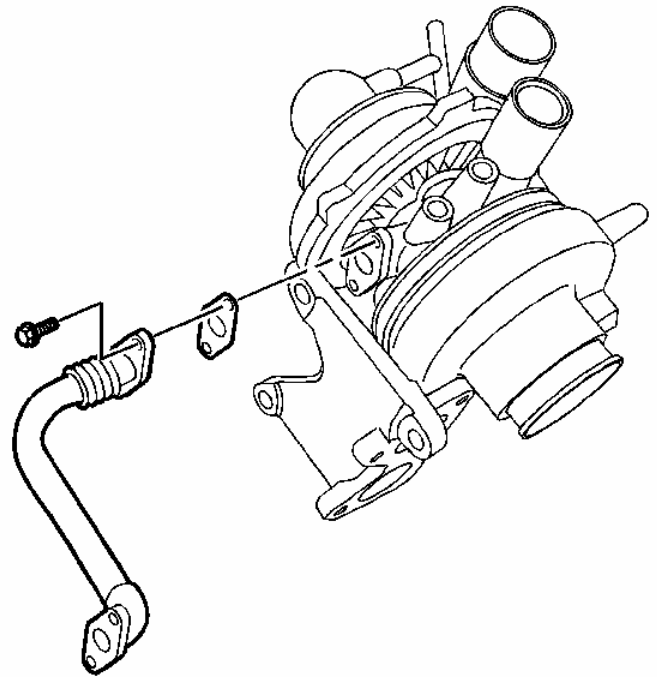
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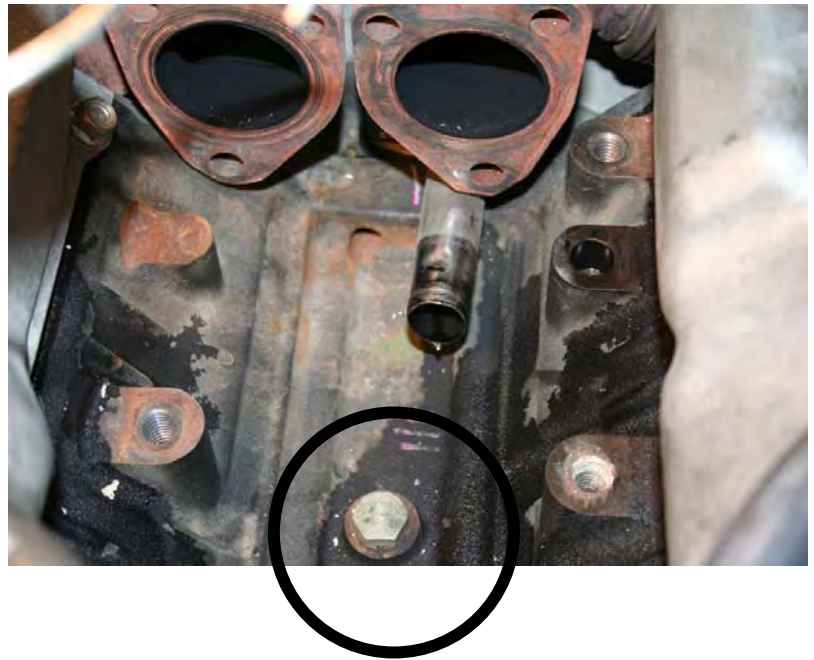
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Remove the factory oil drain from the turbocharger.



Turbo Installation

Install the 12mm ORB plug into the factory turbo oil supply port. Be sure not to tighten the plug so much that the O-ring is distorted.



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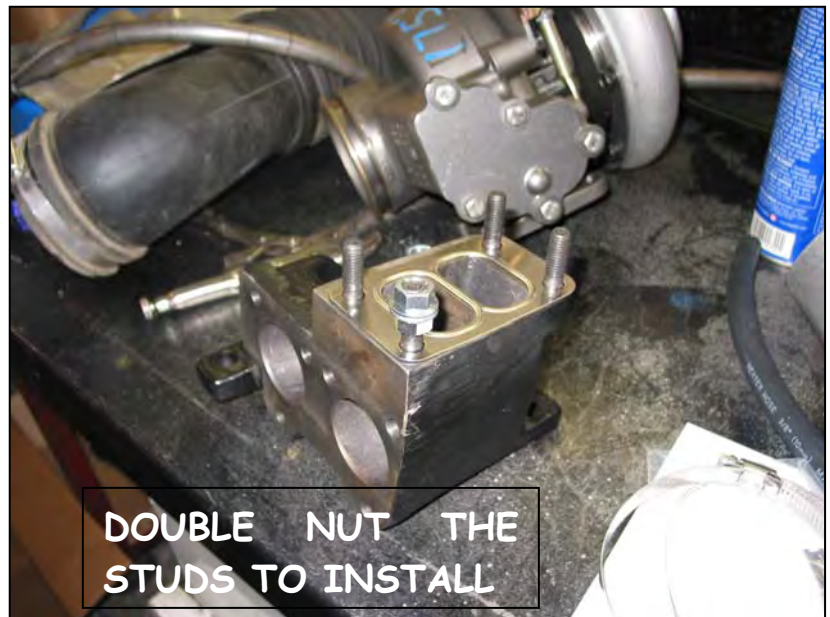
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Install the four studs into the turbo pedestal by screwing together two nuts onto the studs and tighten the assembly into the pedestal.

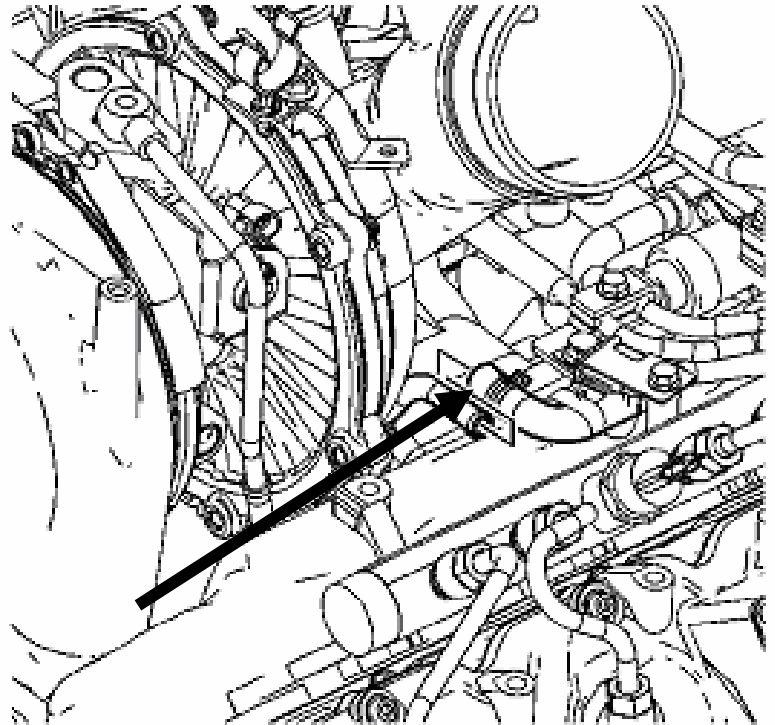
Install the turbo to the cast pedestal with the steel gasket and supplied nuts, tighten with 15mm wrench.



Install the newly supplied coolant hose plugs (1462122 & 1462123).

Note that there are two different sizes. LLY models will use the two 1462122, while LBZ models will use one of the 1462123.

Use the original clamps to hold the plugs in place.

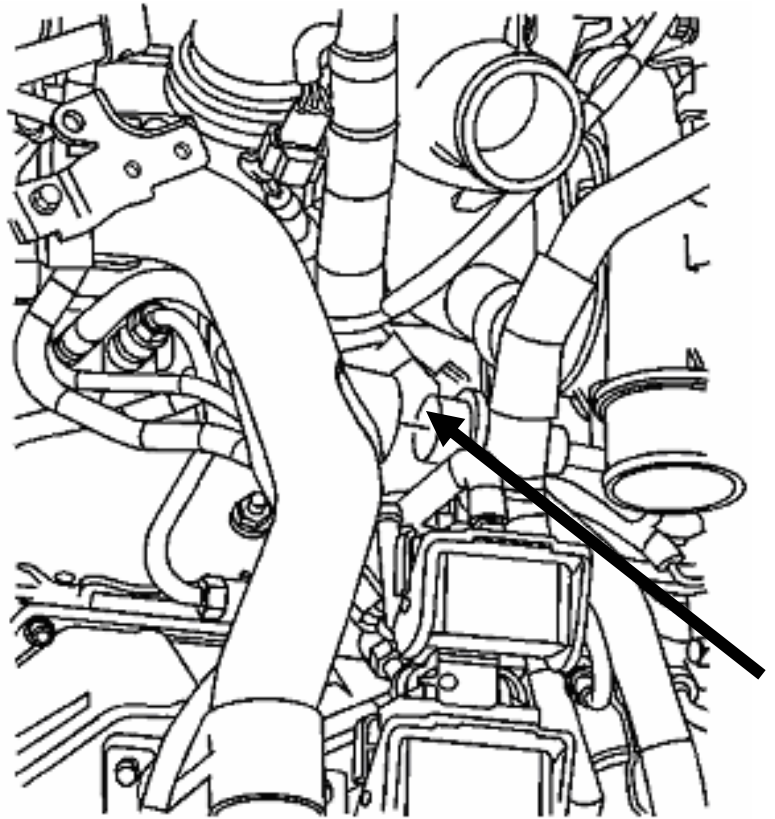


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You will need to cut the oil drain tube. Cut the tube in about the middle of the straight section. Thereby ensuring that there is enough room on either side of the tube to slide the silicone adapter in place.

We will be moving the oil drain flange 1.5"-2" forward.



Install the drain tube with extension in place so as to line up with the turbo.

Be sure to tighten the two hose clamps.

Remove the drain assembly once complete.



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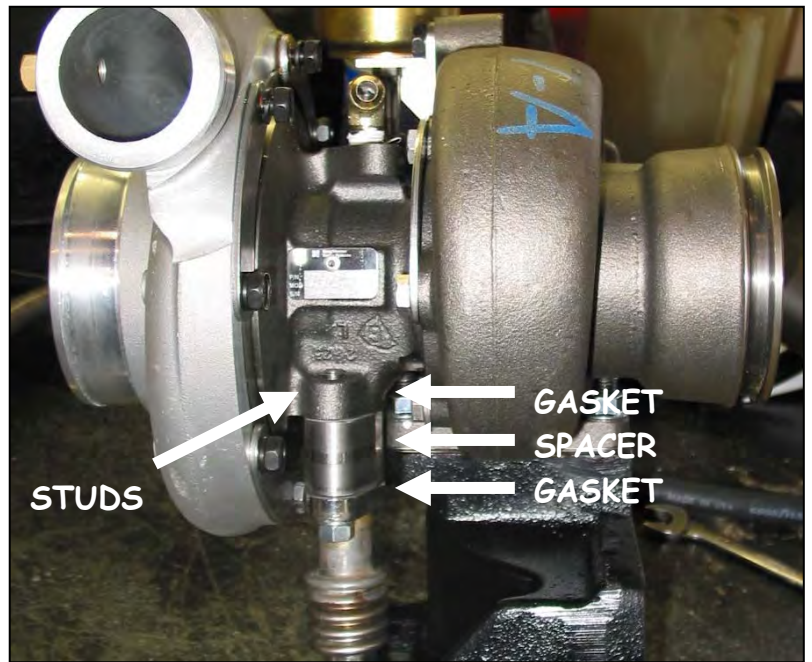
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Install the two step studs for the oil drain spacer into the bottom of the turbo and tighten with double nuts. Install the oil drain spacer with a gasket on each side.

Install the factory oil drain tube with the two 5/16" UNF nuts and lock washers and tighten to the bottom of the spacer.

You may need to grind a 1/16" off of the factory drain tube flange to allow clearance between the flange and the compressor housing short head bolt.



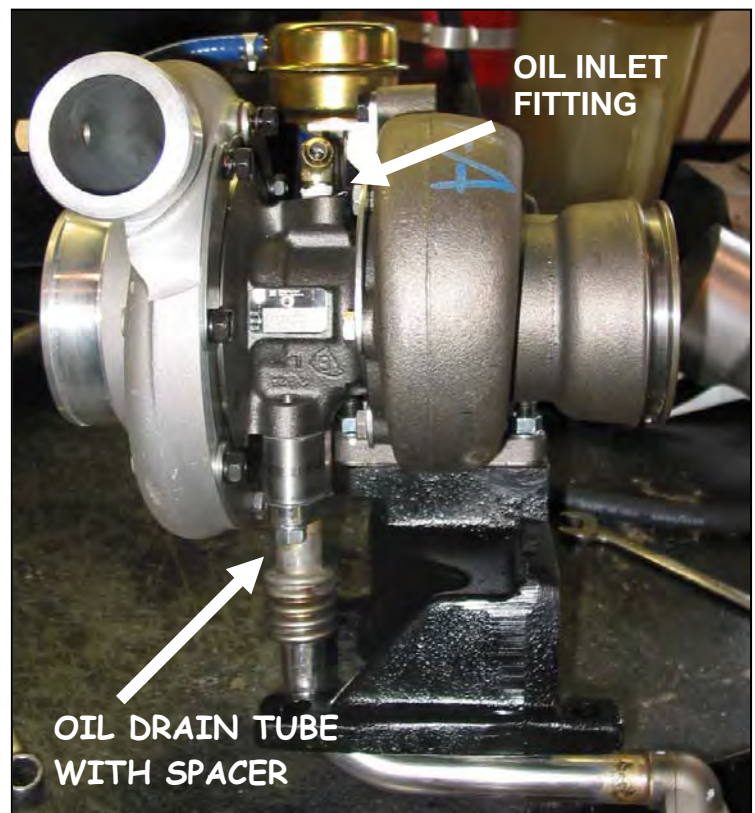
There are three paper oil drain gaskets: two are the same for the upper spacer adapter and one that is different for the tube to engine block connection.

Before installing, you must pre-oil the turbo using 15W40 Oil. ~50-250ml will suffice.

Install the turbo with drain tube assembly to the cast pedestal adapter. This is far easier to do out of the truck.

Tighten the four nuts securing the turbo the pedestal by way of the studs.

Lift the whole assembly into the truck. Use the three factory bolts to secure the assembly to the engine. Leave the bolts loose until tightening the feed tubes.



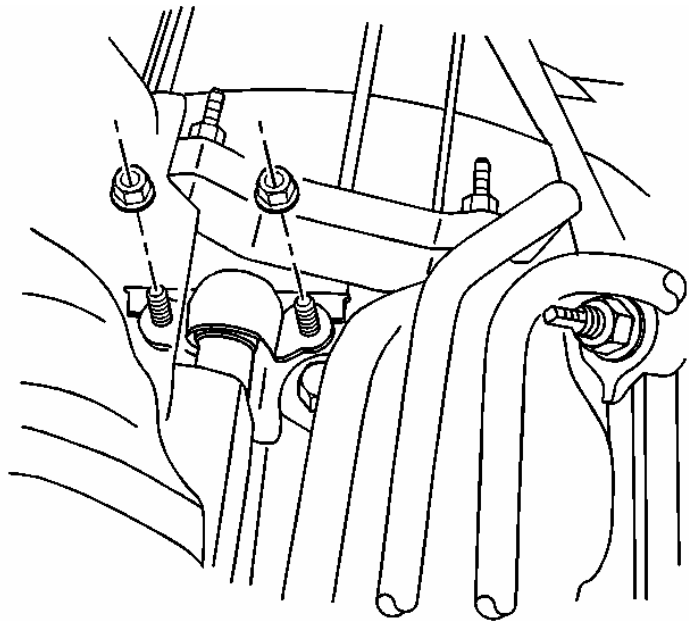
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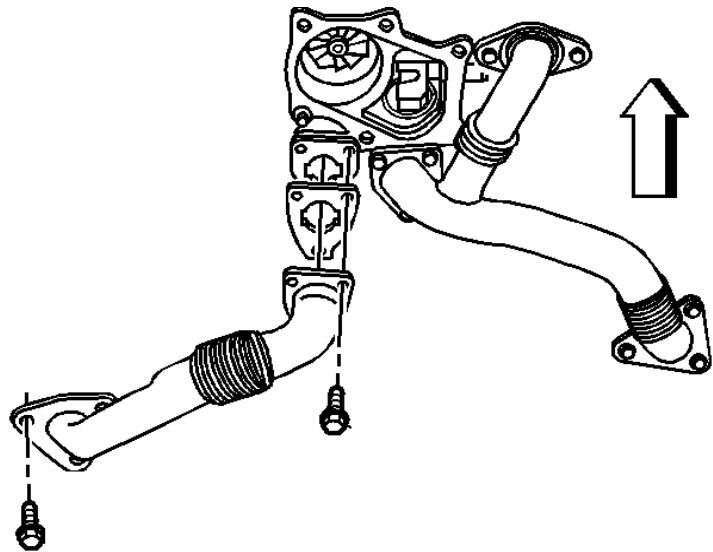
Install the oil drain gasket on the two studs on the block. Pay attention to the proper orientation of the gasket. Remove the old gasket residue first before applying the new gasket.



IF YOU HAVE BD'S NEW HIGH FLOW DURAMAX MANIFOLD, YOU SHOULD INSTALL IT NOW. AT THIS POINT MAKE SURE THAT ALL BOLTS HAVE BEEN TIGHTENED, ALL BOLTS THAT WERE SNUGGED UP WERE TO AID IN FITMENT ADJUSTABILITY.

Re-install the feed pipes with the newly supplied gaskets. You will need to re-use the old bolts. Make sure to use an anti-seize grease before assembling. Tighten to **39 lbs-ft** of torque.

Once tight, you can fully secure the three pedestal bolts to **80 lbs-ft** of torque.



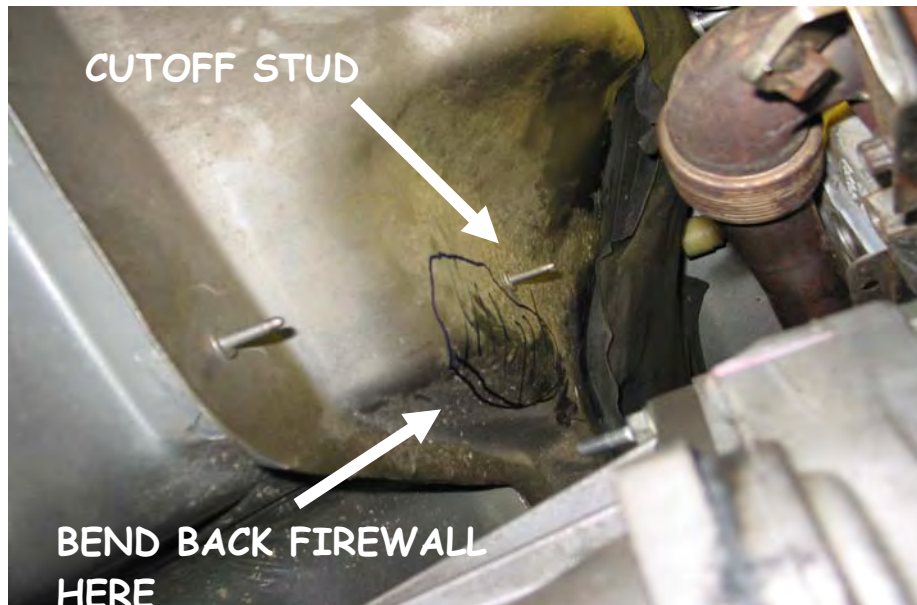
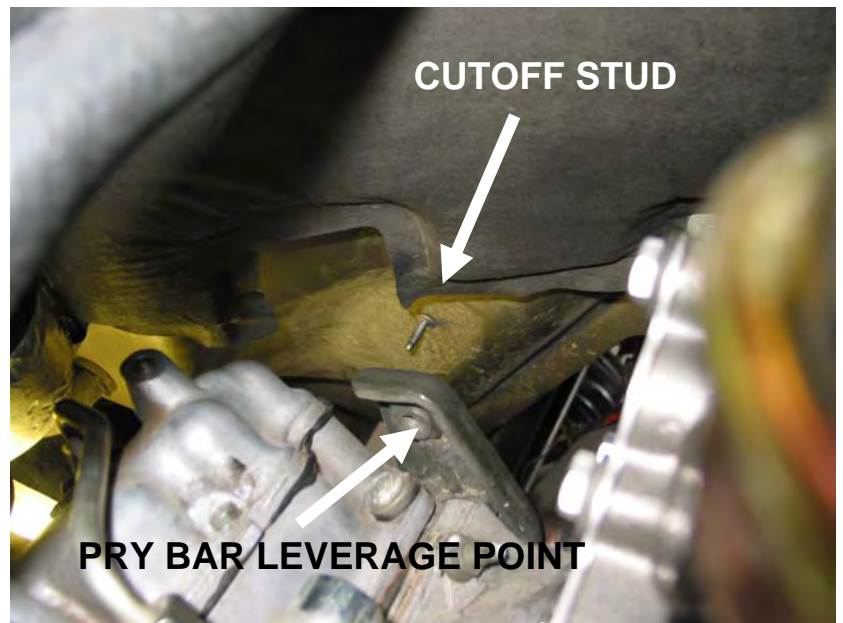
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Using a cutoff wheel, remove the upper stud protruding from the firewall for the heat shield on the passenger side of the engine compartment.



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Using a larger pry bar, 'massage' the firewall in the area shown, being careful not to pry against anything that will break. There is an engine-lifting bracket on the back of the passenger side head that works well as a leverage point. **This is necessary to accommodate the larger down pipe.**



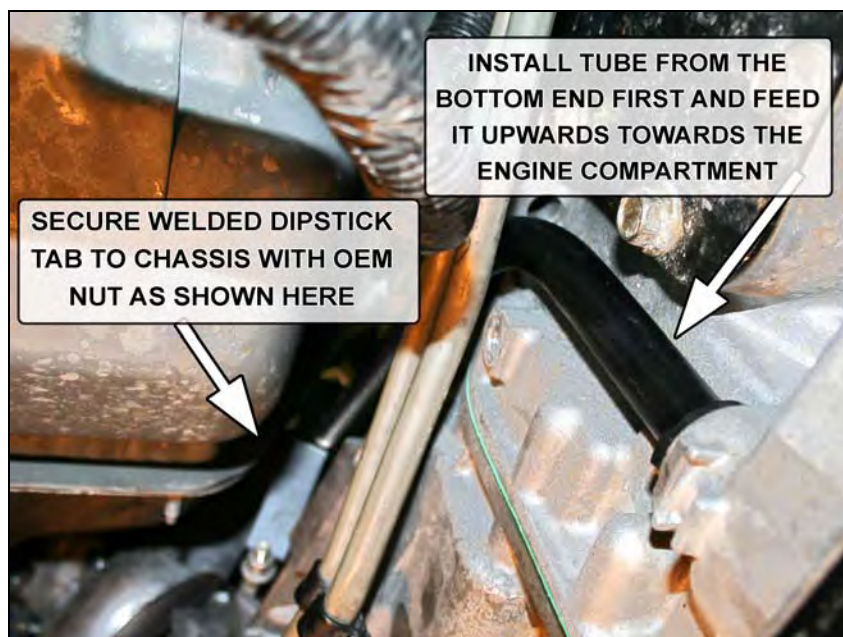
If a long pry bar does not work, you can use a small hydraulic bottle jack to adjust the firewall.

Cleanup loose paint and repaint the firewall to protect it from rust.

PLEASE NOTE THAT IT IS CRITICAL THAT SUFFICIENT ROOM IS MADE AVAILABLE FOR THE EXHAUST DOWN PIPE. FAILURE TO DO SO WILL CAUSE THE EXHAUST PIPES TO VIBRATE AGAINST THE FIREWALL.

Install the **NEW DRIVER'S SIDE** dipstick tube into the transmission. It is easiest if you feed it up from the bottom of the vehicle and down into the transmission.

Loosen the bolt on the transmission bell housing, once the tube is in place secure it by retightening the bell housing bolt. Be sure dip stick tube is firmly seated. As well you can loosen the brackets that secure the fuel lines in place, in order to get



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clearance.

The dipstick tube may need slight tweaking as every truck is slightly different.

You will need to remove the plug from the alternate dipstick location on the Allison. This plug should be swapped over to the driver's side vacant hole.

See new location.



Wrap the down pipe as shown. If you pre-moisten the exhaust wrap it will shrink much tighter.

You will need to slip it up from underneath the vehicle.

Be sure not to wrap the flange area of the down pipe where the clamp is placed.

Use the provided V-band clamp to secure it to the back of the turbo.



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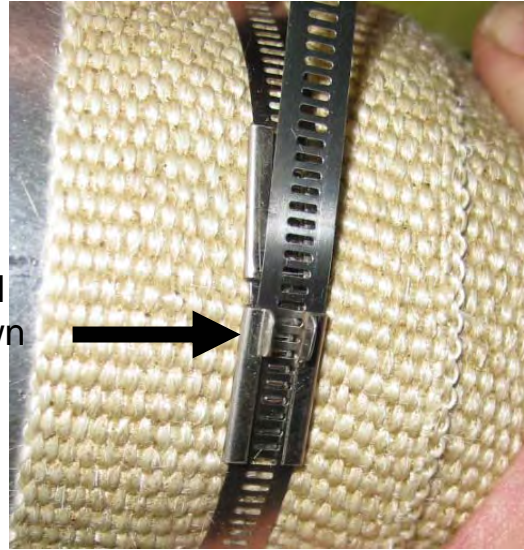
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Insert the S/S header clamp into the locking clip all the way until the clamp material presses against the stop.

Wrap the clamp material around the pipe and insert it into the opposite end. Pull tight and hammer down the locking tabs.

Pull tight and hammer down locking tabs.



Install the two pieces of silver heat shield to further insulate the down pipe from the firewall; hold it in place with the stainless wire provided.

Modify and Re-install your exhaust to fit to the new down pipe.

Note if you have an exhaust brake installed you will need to weld the down-pipe to the exhaust connection. The stainless clamp will not hold enough back pressure.



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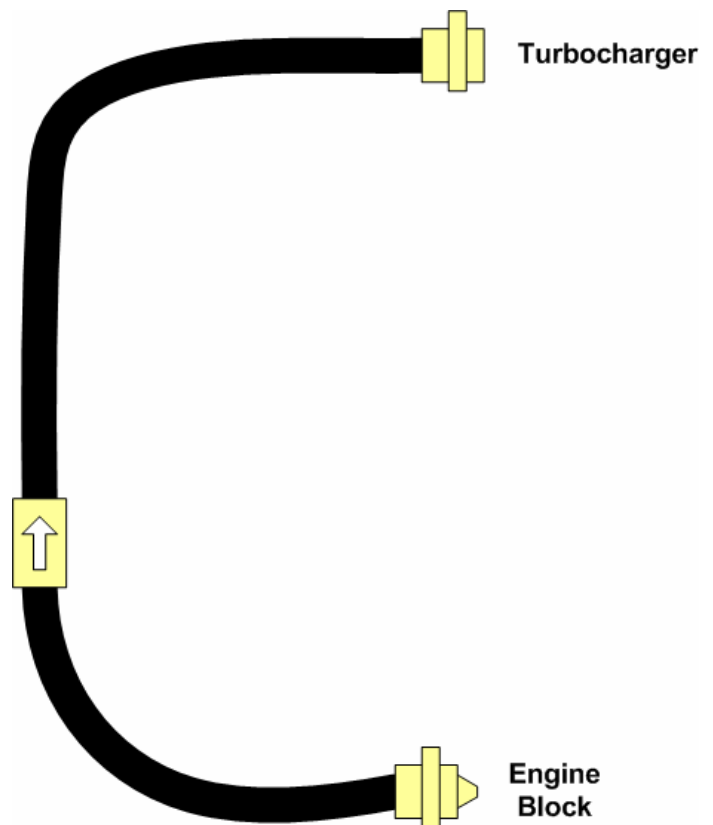
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Install the new BD Turbo heat shield with two flange head bolts removed from the stock heat shield.



Thread the upper oil line into the exit/output of the check valve. Thread the lower oil line into the entry/input of the oil line. Both these threads are pipe threads, so do not use Teflon tape. A very small amount of liquid pipe dope may be used.

With the line assembled, oil should be able to flow to the turbocharger but should not be able to drain back.



With the vehicle on the hoist, locate the oil filter/cooler assembly. Just to the right of the assembly on the block you will be able to see a 19mm bolt that leads to the engine oil rail. You will need to remove this bolt.

Once the bolt is removed, clean the taper area and thread in the M14x1.5 adapter. Be sure to remove the outer washer that holds the O-ring in place. Also, lubricate the O-ring before tightening.

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US Shipping Address: 88-446 Harrison St, Sumas, WA 98295 US Mailing Address: PO Box 231, Sumas, WA 98295

Phone: 604-853-6096 Fax: 604-853-8749 Internet: www.bd-power.com

You can now thread the feed line onto the adapter and route the complete auxiliary line up towards the top of the engine. Route the line away from the exhaust manifold, charge pipe and the steering shaft.



Secure the line just above the frame rail to the hard fuel line. Ensure that everything is secure and will not vibrate.

This line should be pre-filled with oil prior to starting the truck.

Before connecting the turbo oil feed line, pre-fill the line with oil.

Once you have filled the line with oil you can connect the line to the turbo.

The upper heat shield support bracket comes pre-installed as it has been integrated into the turbo clamp.



Install the new turbo boot with two clamps. Making sure to properly align the ridge on the inside of the boot with the valley of the charge air cooler piping. Clamps are tight when the springs are bottomed out (fully compressed).

Note that the boot is offset to one side; this is to eliminate the pipe from rattling on the master cylinder.



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Install the stock air intake plenum to the turbo using the stock air intake V band clamp.

Re-Install the air box piping and clamps.



You will now need to re-install the factory PCV hose.

Insert the provided O-Ring (1462108) onto the provided PCV adapter (1462107). Install the assembly into the driver's side valve cover.

You can now secure the PCV hose to its center location on the air inlet piping. Followed up by securing the passenger's side with the factory bolt.



Finally secure the driver's side tube to adapter connection with the provided 1462109 bolt.

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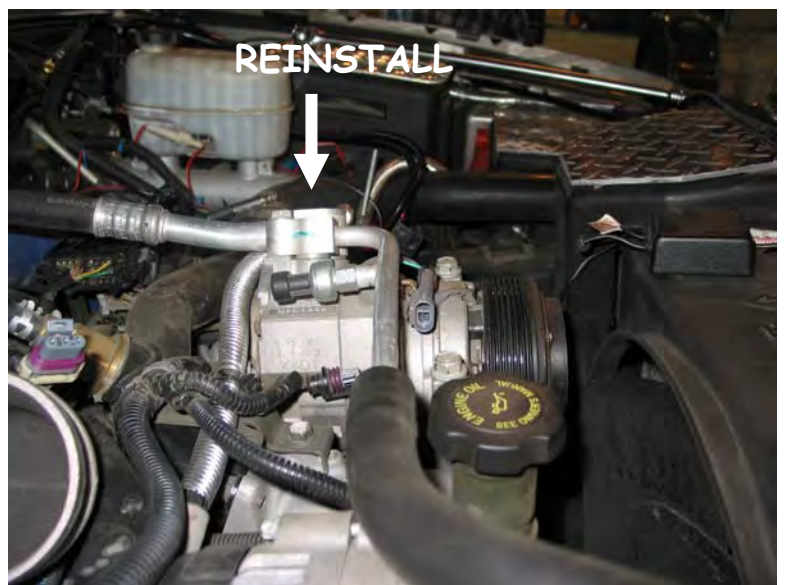
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Using a 15mm socket, reinstall the four A/C compressor mounting bolts.



Using a 1/2" breaker bar, relax the belt tensioner and reinstall the belt.



Reconnect the Air Conditioning clutch and high-pressure cutout electrical connectors.

Re-Install the factory plastic engine cover or intake plenum. You can also reinstall the intake tube.

Make sure the petcock on the bottom of the radiator is closed and reuse the radiator fluid that you saved.

Due to the new orientation of the turbo you will need to install a silencer spacer to support the silencer.



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You can use an extra piece of reflective heat shielding to protect the A/C line that runs over top of the turbo. Re-install the belt and refill the cooling system. Re-install the intake silencer plenum.

Stand back and admire the job you just finished. If this is your first time installing an aftermarket turbo, Congratulations!



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Road Test

Before performing a road test, be sure that all clamps are tight and that nothing is rubbing against the engine.

You will need to check for sufficient room between the down pipe and the firewall. To do this, accelerate the vehicle in reverse turning both left and right. Then accelerate the vehicle forward while turning left and right. If any unusual noise is heard, you may have to re-adjust the down pipe and firewall.

On the test drive, ensure that there are no boost leaks, or worse, any exhaust leaks.

Once the test drive has been successful, you will need to re-tighten all of the exhaust and intake bolts.

Please note the turbocharger should not exceed 40psi of boost pressure. If you are experiencing low boost, you can adjust the wastegate (shortening the rod) to increase the waste gate opening pressure. Stock fueling will produce stock levels of boost. An open wastegate leads to higher exhaust gas temperatures, if fueling greater than stock, and EGT's rise you may need to adjust your wastegate to keep the wastegate closed longer. To do this you will need to shorten the wastegate rod.

SHORTENING THE WASTEGATE (INCREASE BOOST)

1. Remove the boost reference line from the turbo boost elbow.
2. Use this line to apply *REGULATED AIR PRESSURE*, just enough to remove the pressure holding the wastegate closed.
3. Remove the c-clip holding the wastegate rod in place, and slide off the wastegate rod.
4. Tightening (shortening) the wastegate rod increases the amount of air required to install the wastegate rod and therefore the wastegate cracking pressure as these are related. The wastegate operates by applying an initial counterforce against the wastegate which must be overcome by the boost pressure to allow the wastegate to open. So the shorter the wastegate rod the greater the initial force placed on the wastegate, the higher boost pressure you could potentially reach with correct fueling.
5. Re-install is the reverse of removal.

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EFI LIVE & HP TUNERS

At the present time this turbo kit does not come with electronics to make the kit functional as a standalone kit. Because of this you will the need to purchase EFI Live or HP Tuners to allow the kit to be functional.

Please note that BD Power does not sell these items and that they are available in the aftermarket from a number of dealers. Please see the respect web pages for details. As well BD Power does not offer tuning support other than the below recommendations. The tuning software is quite complex and is not recommended for the faint of heart.

Web Pages

www.hptuners.com

www.efilive.com

DTC's that will need to be disabled for this kit are,

P003A
P0045
P0234
P0299
P0401
P0402
P2563
P2564
P2565
P0108

These codes must be disabled.

Please note by doing this modification your vehicle is not CARB certified and is illegal on highway.

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