

BD Twin Turbo Kit

2003-2007 Dodge HPCR ISBe

Installation Instructions

Part# 1045330(P)



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.

K I T C O N T E N T S :







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






DODGE 2003-2007 TWIN TURBO KIT (BD# 1045330(P))			
1405230	1405228(P)	1453109	1452985
Primary Turbo (Non-wastegated)	Secondary Turbo (Wastegated)	Primary Turbo Oil Drain	Secondary Turbo Oil Drain
Qty: 1	Qty: 1	Qty: 1	Qty: 1
1453128	1453600	1100740	
Primary Turbo Support Bracket	Primary Exhaust Outlet Pipe	4" Stainless Steel Down Pipe Clamp	
Qty: 1	Qty: 1		
1452226	1453405P	1453305P	
Turbo Outlet Cast Elbow	Primary Air Outlet Pipe	Secondary Air Inlet Pipe	
Qty: 1	Qty: 1	Qty: 1	
1453710PR	1453502	1453265P	
Air Filter to Primary Turbo Pipe	Primary to Sec. Pipe	Intercooler Pipe	
Qty: 1	Qty: 1	Qty: 1	


1045985	1045986
	
<i>HD 3-piece Exhaust Manifold</i>	<i>Exhaust Manifold Gasket Set</i>
Qty: 1	Qty: 1

TURBO HARDWARE KIT (BD# 1453093)				
1453930	1453931	1453933	1453934	1452225
				
<i>Upper Rec. Dryer Spacer (1" x 1"ID x 5/16"ID)</i>	<i>Lower Rec. Dryer Spacer (1"OD x 1 1/4" x 5/16"ID)</i>	<i>Receiver Dryer Fender Washer</i>	<i>Receiver Dryer Bolt (M8x1.25x45)</i>	<i>Secondary Turbo Compressor Outlet V Band Clamp (Smallest)</i>
Qty: 1	Qty: 1	Qty: 2	Qty: 2	Qty: 1
1453137	1453126	1453127	1453251	1453135
				
<i>10mm O-Ring</i>	<i>Support Bolt (M10)</i>	<i>M10 Support Washer</i>	<i>Elbow O-Ring</i>	<i>ORB-JIC Fitting</i>
Qty: 1	Qty: 2	Qty: 2	Qty: 1	Qty: 2
1453602	1453136	1453923	1453110	1453240
				
<i>Primary Turbo Exhaust Down Pipe V-Band Clamp</i>	<i>Sealing Washer</i>	<i>Heater Tube Coupler</i>	<i>Primary Turbo Drain</i>	<i>Wastegate Footer</i>
Qty: 1	Qty: 1	Qty: 1	Qty: 1	Qty: 1
	1462430	1453150		
				
	<i>Manifold Studs M10 x 1.5 x 030</i>	<i>Oil Drain Adapter</i>		









Qty: 2 **Qty: 1**



PRIMARY TURBO HARDWARE KIT (BD# 1453193)					
1453111	1120031	1453121	1453122	1453113	1453115
					
<i>Upper Oil Drain Bolt 3/8NC</i>	<i>Oil Drain Washer (3/8)</i>	<i>Pri. Support Bolt (M12x1.75x25)</i>	<i>Pri. Support Washer (M12)</i>	<i>Oil Drain Hose Clamps</i>	<i>1/8MPT-6JIC Oil Feed Adapter</i>
Qty: 2	Qty: 2	Qty: 1	Qty: 1	Qty: 2	Qty: 1

1462430	1453504	1462440	1453503	1405926 (0406)
				
<i>Adapter Stud M10 x 1.5</i>	<i>Stainless Zip Tie</i>	<i>Adapter Nut</i>	<i>Heat Shield</i>	<i>Cast Hot Pipe V-Band Clamp Labeled 406</i>
Qty: 4	Qty: 3	Qty: 4	Qty: 1	Qty: 1

SECONDARY TURBO HARDWARE KIT (BD# 1453293)					
1453980	1453982	1453983	1604102	1604103	1453113
					
<i>Turbo Mnt. Bolt (3/8NFx1.25")</i>	<i>Turbo Mnt. Nut (3/8NF Gold)</i>	<i>Turbo Mnt. Washer (3/8 Gold)</i>	<i>Lock Washer (M8)</i>	<i>Bolt (M8x1x25)</i>	<i>Oil Drain Clamps</i>
Qty: 2	Qty: 2	Qty: 4	Qty: 2	Qty: 2	Qty: 2

TURBO HEAT SHIELD KIT (BD# 1459110)		
1459111	1459112	1459113
		
<i>Heater Wrap</i>	<i>Inner Wrap</i>	<i>S/S Wire</i>
Qty: 1	Qty: 1	Qty: 48"

HOSE & CLAMP KIT (BD# 1453493)		
1405222	1405221	1405213
		
<i>4"i.d. Hose (4" long/ea)</i> Qty: 2	<i>3"i.d. Hose (4" long/ea)</i> Qty: 2	<i>Clamp (4.11")</i> Qty: 2
1405211	1453701	1453112
		
<i>Clamp (3.00-3.38")</i> Qty: 4	<i>Clamp (4")</i> Qty: 2	<i>Oil Drain Hose (4")</i> Qty: 2
1453130-B	1453162	
		
<i>Primary Turbo Oil Feed Hose (-6 JICM 90° x -6 JICF)</i> Qty: 2	<i>Primary Turbo Oil Inlet Adapter (1/4MPTx-6JIC)</i> Qty: 1	

AIR BOX KIT (BD# 1453893)	
1453815T	2924
	
Powder Coated Air Box Qty: 1	Air Box Filter Qty: 1

If you believe you are missing any parts that are displayed here, please contact BD Power at (800) 887-5030 for replacements.

Pre-Installation

For the purpose of the instruction manual, the term “primary turbo” refers to the larger non-wastegated turbo and the term “secondary turbo” refers to the smaller wastegated turbo.

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

The BD twin turbo system is recommended for trucks with 375-525 RWHP. We do have other kits available for higher horsepower. Please call us to discuss your options.

Also note that a stock transmission will not handle this power and torque, transmission modifications are a must.

Options

Description	Part #
BD 'X' Torque Converter	1070217X
BD HD Transmission	CALL
BD Auxiliary Lift Pump Kit	1050226
BD X-Monitor Digital Gauge Package	1085220
BD High Pressure Hose/Boot Kit	1045215
BD r700 High HP Twins	1045430
BD r850 Race Twins	1045450
Head Studs	CALL

WHEN EITHER UPGRADING OR INSTALLING THE TWIN TURBO KIT THE WASTEGATE WILL NEED TO BE ADJUSTED. THIS WASTEGATE IS ADJUSTABLE BY TURNING THE ACTUATOR ROD. SEE THE SECTION AT THE END OF THE INSTRUCTION MANUAL FOR COMPLETE DETAILS.

YOU SHOULD RUN AS MUCH BOOST AS POSSIBLE TO KEEP YOUR EGTS IN CONTROL. IF THIS MEANS RUNNING 65PSI OF BOOST PRESSURE, THAT IS FINE, JUST KEEP YOUR EGTS AS LOW AS POSSIBLE. THE KIT WILL PERFORM BEST WHEN THE WASTEGATE IS CLOSED AS LONG AS POSSIBLE.

USE YOUR FUELING (ELECTRONIC OR MECHANICAL) TO CONTROL YOUR BOOST LEVEL NOT THE WASTEGATE. THIS WILL RESULT IN LOWER EGTS, BETTER FUEL ECONOMY AND A QUICKER SPOOLING TURBOCHARGER.

BD Engine Brake Inc.

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Battery Disconnect

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

Installation - Preparation

1. Record your radio settings and disconnect **both** battery terminals on **both** batteries.
2. **Layout all parts, ensure all parts are present and read the instruction manual completely before installation of this product.**

3. Lay a protective cover over the passenger side fender to eliminate any scratches or grease marks.

4. Remove the passenger side (right) fender liner with a 5/16" socket.



5. Remove the factory air box and intake tube with a 13mm socket and slot screwdriver. Before discarding the air box, remove the airflow sensor from the harness and re-mount it to your new powder coated intake tube (#1453710P) in the same orientation to the airflow as before.

You will need to set aside the wiring harness for the airflow sensor for a later installation.



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6. Remove the intercooler charge air tube with a 7/16" deep socket. Be sure to save the hose clamps from the intercooler end for later installation.

7. On the factory turbocharger you will need to remove the upper oil supply line with 3/4" and 13/16" wrenches. You can discard this oil line if you wish.

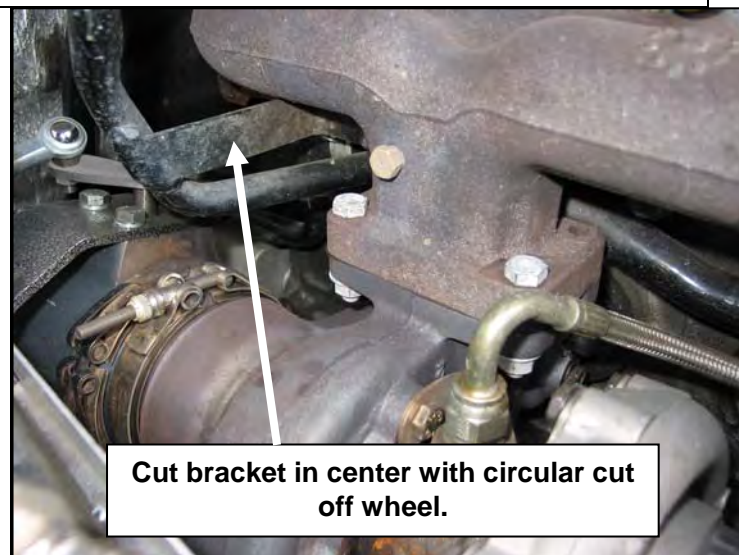


8. Remove the exhaust cast turn down elbow and clamps with a 7/16" deep socket and discard.

9. On 2004½ and newer trucks, you will need to unplug the electronic wastegate control solenoid and insert the supplied wastegate fooler (#1453240).

10. Remove the turbo oil drain flange bolts with a 10mm wrench and discard.

11. Cut the coolant hose bracket in the center with a cut off wheel. This will allow easier removal of turbocharger and manifold.



12. Remove the engine oil filter to gain access to additional installation space.

Don't forget to re-install it before you secure the primary turbo air inlet pipe.

13. If you have the two-piece oil drain tube you may leave the oil drain block adapter in its place and just remove the oil drain tube. However, if you have the accordion one-piece oil drain assembly, you will need to remove the complete assembly from the block. Once removed, you can install the provided primary turbo oil drain adapter (#1453110).

14. You will now need to drain about 10 quarts of engine coolant into a clean container for re-use later on. Either use the lower radiator hose or you can use the water heater core tubing to do this.

15. Remove the nut retainers, the 15mm nuts and the 13mm bolts to remove the exhaust manifold. Lift the exhaust manifold and turbo together as one unit. Be careful this is very heavy, an engine hoist is recommended.

16. Remove the turbocharger from the manifold now that it is on the bench. Save the four nuts as you will use them later on.

17. Remove two of the four turbo studs from the manifold and install into the supplied HD manifold.

18. Remove the steel heater core supply tube and save for re-installation later on. This tube runs directly underneath the exhaust manifold.

19. Install the new heavy-duty manifold (#1045985) in an inverted manner, so that the turbo mounting face is pointed up rather than down. Torque the socket cap screws to 45 ft-lbs. **These cap screws should be re-tightened after a number of heat cycles.** You will also need to re-install two of the factory studs into this manifold. Do not forget to install the gaskets.

NOTE: FOR ASSEMBLY OF THE HEAVY DUTY MANIFOLD PLEASE SEE INSTRUCTIONS INCLUDED IN THE MANIFOLD KIT.



Install the manifold in an inverted manner so that the turbo-mounting

20. You will need to locate the frost plug behind the oil filter and remove it. This can be done by drilling a hole into it and prying it out; be careful not to contaminate the oil. You can coat the drill bit with grease to contain a lot of the metal shavings.



Drill and remove frost plug. Install new curved oil drain adapter.

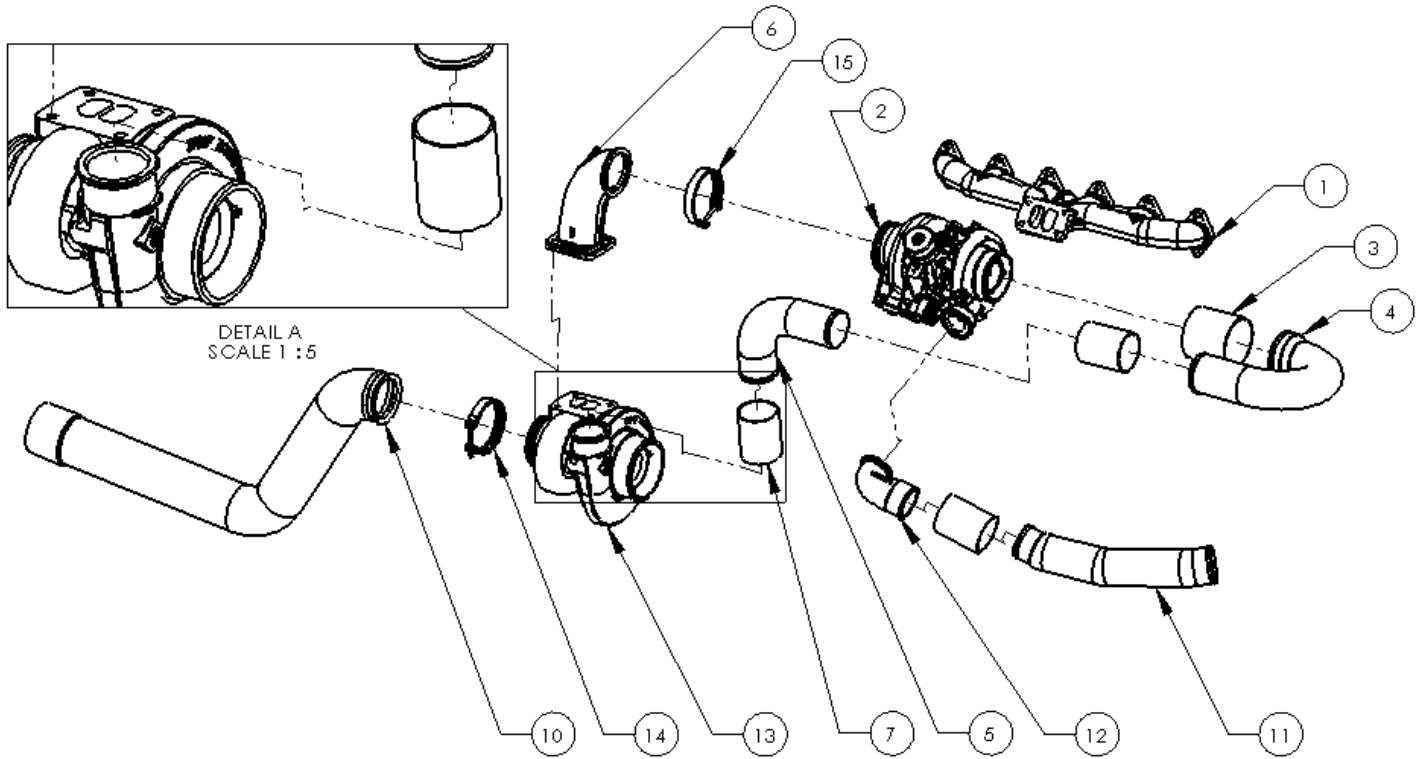
21. Install the provided long, curved secondary turbo oil drain adapter (#1453150) into the front oil return port in the engine block behind the oil filter. The installation is a press fit and will require tapping it in with a punch on all sides until the flange is firmly seated up against the block.



22. You will need to remove the two receiver dryer mounting bolts holding the A/C system in place and discard. Be sure not to discharge the A/C system.

23. You will need to bend the receiver dryer and supply tubes towards the passenger side of the vehicle. Once the dryer has been repositioned, the receiver dryer spacers (#1453930, 1453931) should fit between the dryer and bracket, the longer spacer (#1453931) should fit on the bottom, while the shorter one (#1453930) will fit on the top. We have supplied bolts (#1453934) and fender washers (#1453933) to complete this installation.





ITEM NO.	DESCRIPTION
1	DODGE 24V EXHAUST MANIFOLD
2	SECONDARY TURBO (WASTEGATED)
3	4" ID HOSE (4" LONG/EA)
4	SECONDARY AIR INLET PIPE
5	PRIMARY AIR OUTLET PIPE
6	PRIMARY TO SEC. EXHAUST PIPE
7	3" ID HOSE (4" LONG)
10	DOWN PIPE
11	INTERCOOLER PIPE
12	TURBO OUTLET CAST ELBOW
13	PRIMARY TURBO
14	PRIMARY TURBO EXHAUST DOWN PIPE V-BAND CLAMP
15	CAST HOT PIPE V-BAND CLAMP LABELED 406

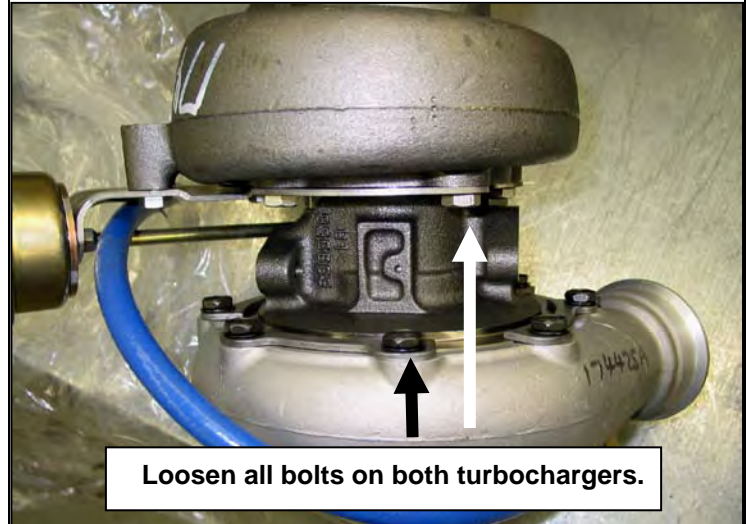
Turbocharger Installation

24. Loosen the turbine and compressor housings on both the primary (larger non-wastegated #14051230) turbo and the secondary (small wastegated #1405228P) turbo.

The bolts should be loosened only to the point that you can easily clock or turn the housings.



CAUTION: DO NOT TO LOOSEN THE COMPRESSOR AND EXHAUST HOUSINGS TO THE POINT THAT THEY WILL CONTACT THE COMPRESSOR OR EXHAUST WHEELS. THIS WILL DAMAGE THE WHEEL AND VOID THE WARRANTY.



25. Align the oil inlet, exhaust turbine inlet, and compressor housing outlet all in an upward direction on the primary turbo (#1405230).

On the larger primary turbo non wastegated (#1405230) remove the brass 90° flare fitting from the oil inlet. Locate the supplied 1/4MPT x -6JICM fitting (1453162), apply a very small amount of pipe sealant on the threads (DO NOT USE TEFLON TAPE). Now thread the fitting into the oil inlet, hand tighten then using a wrench turn the fitting ½ turn. DO NOT OVER TIGHTEN.

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26. Locate the casted flanged turbine adapter (#1453502), and wrap the supplied heat shielding (#1453503) around the adapter. The heat shield has been formed in a specific pattern to completely wrap around the elbow.

Use the 3 supplied stainless steel zip ties (#1453504) to secure the heat shield. One at the bottom, one at the middle and one at the top. Be sure that neither the heat shield or zip tie will interfere with the circular Marmon flange when the band clamp is applied to the top of the unit.

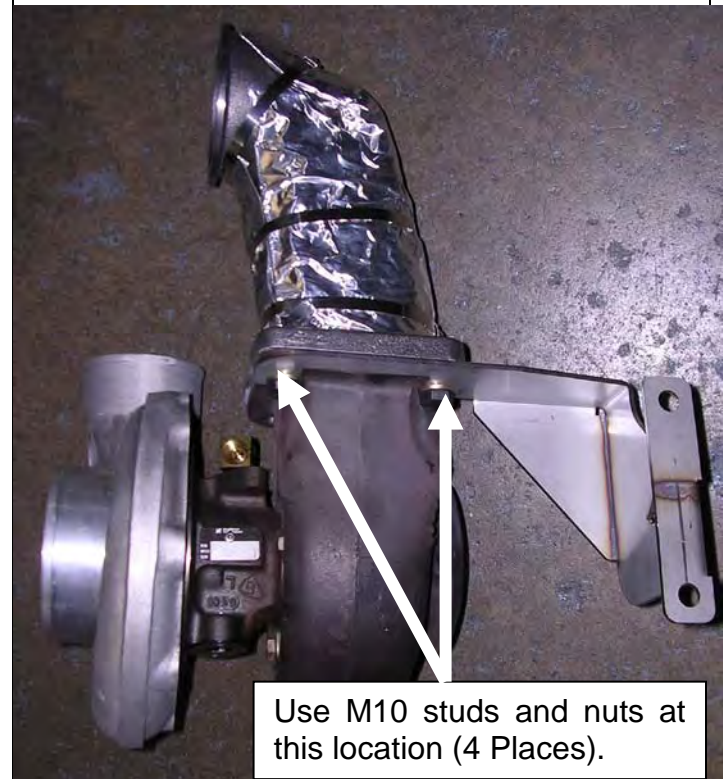


27. You can now bolt the flanged turbine adapter to the primary turbo (#1405230). Use the four M10 x 1.5" (#1462430) adapter elbow studs and serrated nuts (#1462440) to secure the adapter pipe to the turbo.

At the same time, mount the S/S primary turbo support bracket (#1453128) to the assembly.

Note that the support bracket bolts on the bottom side of the turbine housing.

Before mounting the turbo assembly into the truck, also installed the primary oil feed line (#1453130-B). The oil line should be route facing the engine block.



28. Place the turbo and turbine adapter assembly onto the frame rail. Be sure that it does not fall.

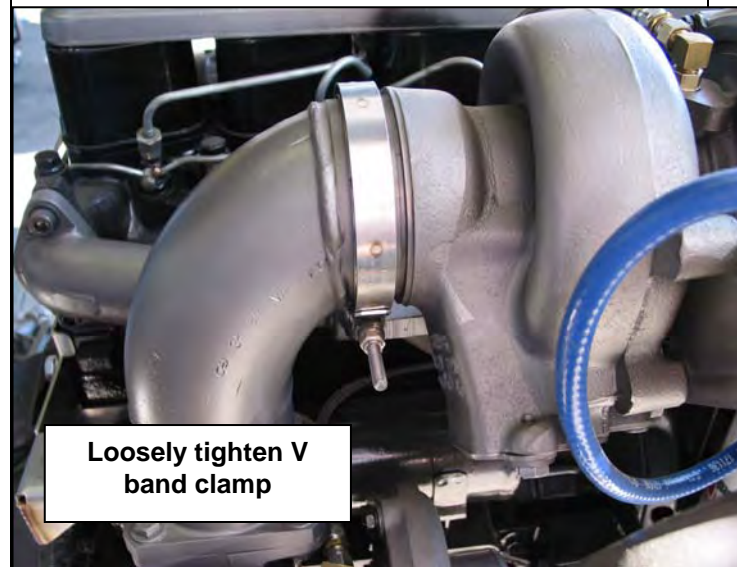


29. With the secondary turbo (#1405228P), bolt it loosely to the manifold and align the oil inlet straight up and the compressor outlet towards the bottom of the passenger battery.

TO ALLEVIATE ANY FITMENT PROBLEMS, ALL TURBOCHARGER SUPPORT BOLTS, HOUSING BOLTS AND CLAMPS MUST BE LEFT LOOSE. ONCE EVERYTHING HAS BEEN FIT TOGETHER, THEN TIGHTEN ALL BOLTS AND NUTS.

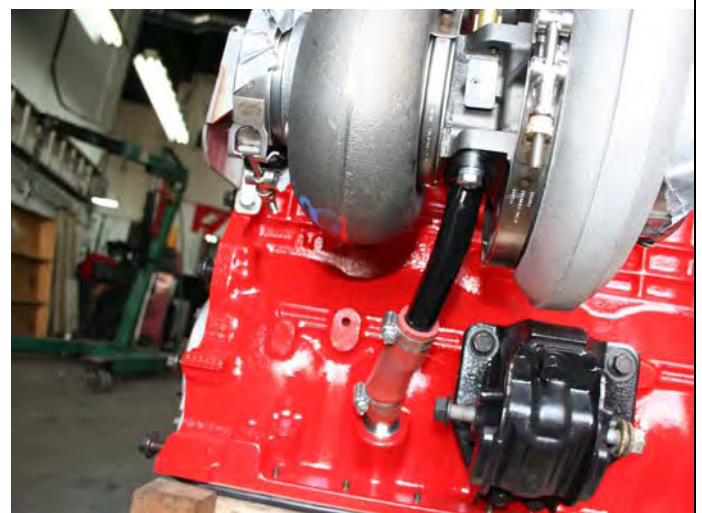
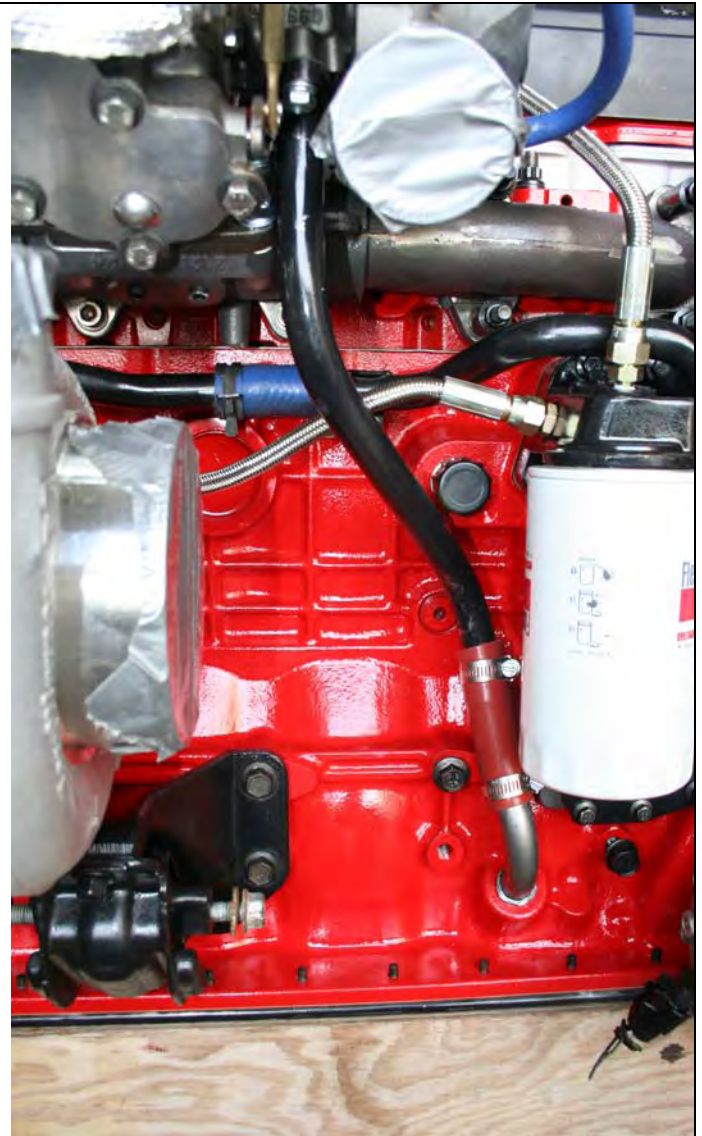
30. Using the supplied V-Band clamp (#1405926 - clamp will be labeled 995L2-0406) tighten the secondary exhaust housing to the primary turbo-turbine adapter assembly.

Make sure that heat shield or stainless zip tie does not interfere with the band clamp. Tighten the v-band clamp just enough so that you can still rotate the exhaust elbow



31. Install the oil drain adapters and gaskets onto both turbochargers. The shorter adapter (#1453109) belongs to the primary turbocharger, while the longer tube belongs to the secondary turbocharger (#1452985).

Align the tubes before final tightening of any bolts, and you may need to pry them lightly for proper alignment. You will need to utilize the two 4" pieces (#1453112) of oil drain tubing and hose clamps (#1453113) to connect the drain adapters to the block adapters. Make sure that the hoses are securely clamped and that no kinks exist.



YOU MAY NEED TO TRIM THE TURBOCHARGER OIL DRAIN LINES IN LENGTH AS EVERY INSTALLATION IS SLIGHTLY DIFFERENT.

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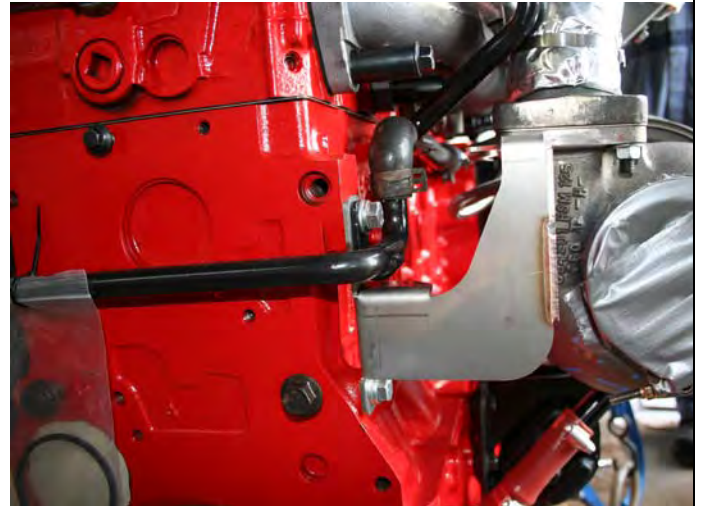
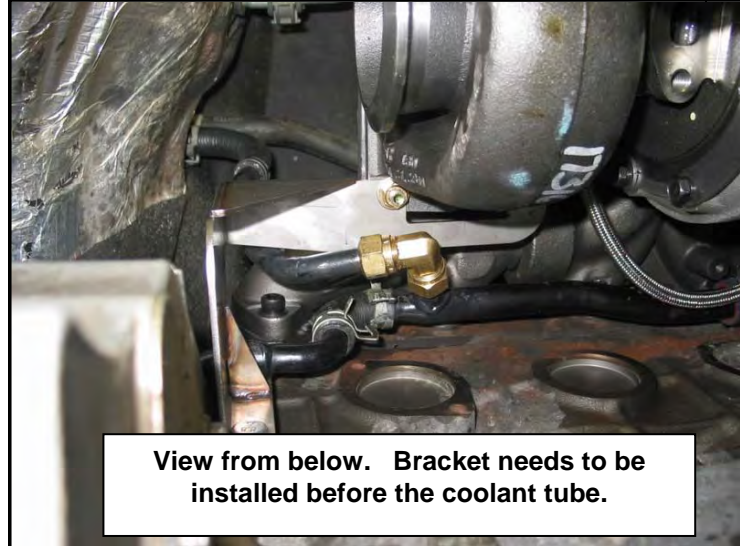
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32. Cut the heater coolant tube as shown (1.5" from the big tube). You will need to clean off the paint and install the 90° brass fitting (#1453923). On standard transmission equipped vehicles, you will not need to install this fitting. Just bend the coolant line enough to be able to install the turbo support bracket.

Note: 2006 models may not have to cut the coolant hose.



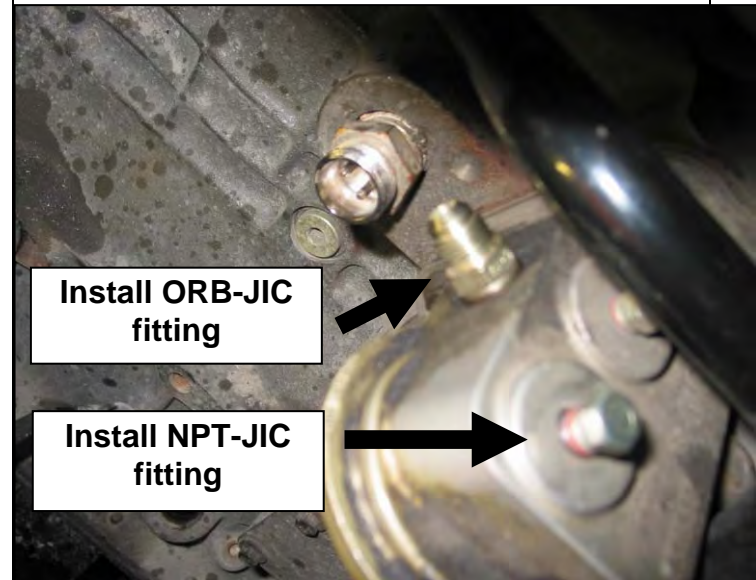
33. You can now re-install your modified heater coolant supply tube. When installing, make sure that everything is secure and no leaks are present, and you will need to remove the coolant heater hose from heater core and cut 2.5" off of the longer end.



34. Now is a good time to pre-oil your turbochargers with clean 15W40 turbo diesel rated oil. Pour roughly half a cup down each turbocharger oil inlet, while turning the compressor to distribute the oil evenly.



35. Install the 1/8MPT-6 JIC conversion fitting (#1453115) into the NPT port of the oil filter housing. Then you can install the ORB-6 JIC conversion fitting (#1453135) into the threaded port on the side of the filter housing.



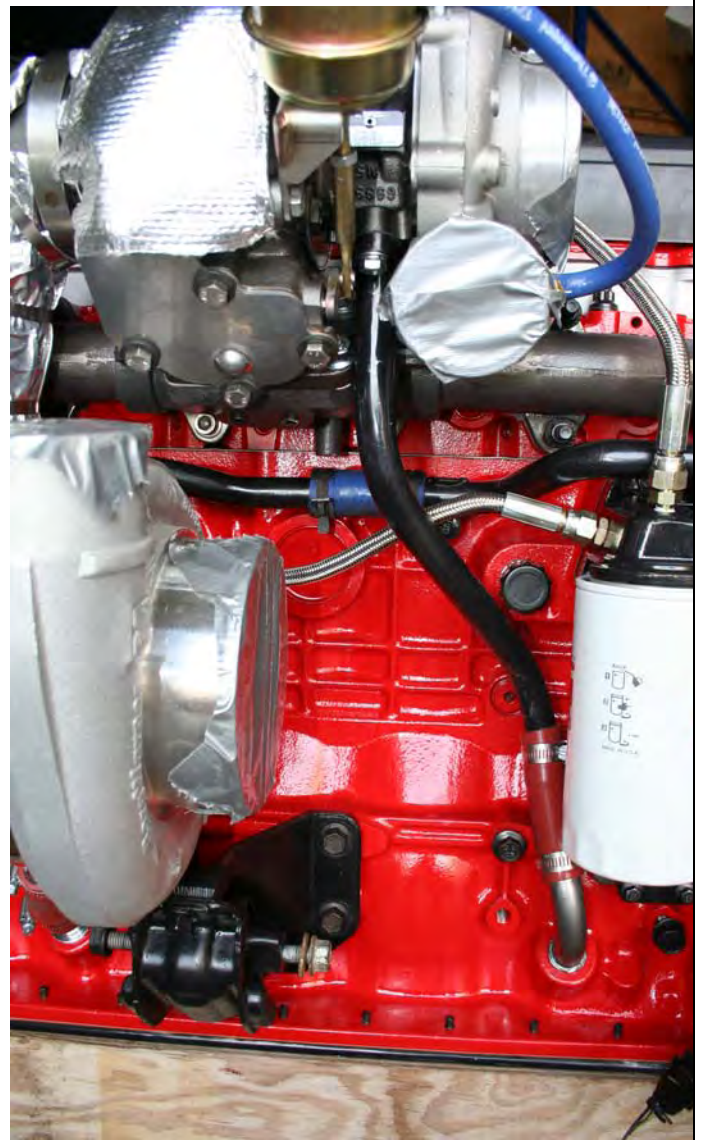
36. Install the second ORB-JIC conversion fitting (#1453135) into the top of the secondary turbo.

Insert the 10mm O-ring (#1453137) over the 12mm threaded section. Tighten the fitting so that the O-ring is compressed into the chamfer on the turbo oil inlet.

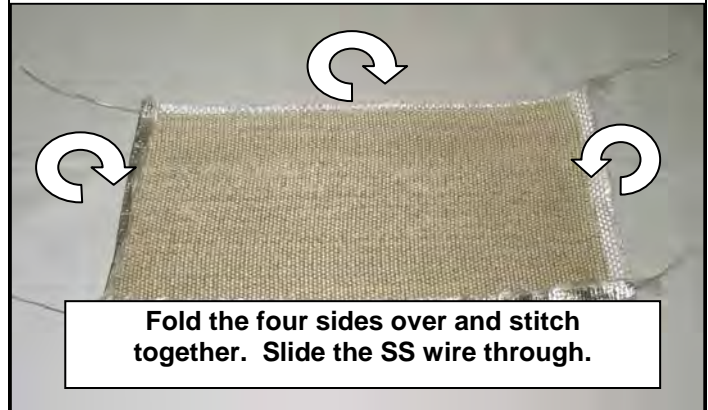


37. Install both new oil feed lines to both the primary (#1453130-B) and secondary (#1453130-B) oil feed supplies. Make sure that the oil lines are routed away from any moving parts, obstructions or hot surfaces

Reinstall your engine oil filter.



38. Wrap the secondary turbocharger in the exhaust wrap we have provided. Lay the brown wrap (#1459112) inside the silver wrap (#1459111) and use the supplied stainless wire (#1459113) to stitch the two together. Wrap the blanket around the secondary exhaust housing, using the stainless wire to hold it tight.



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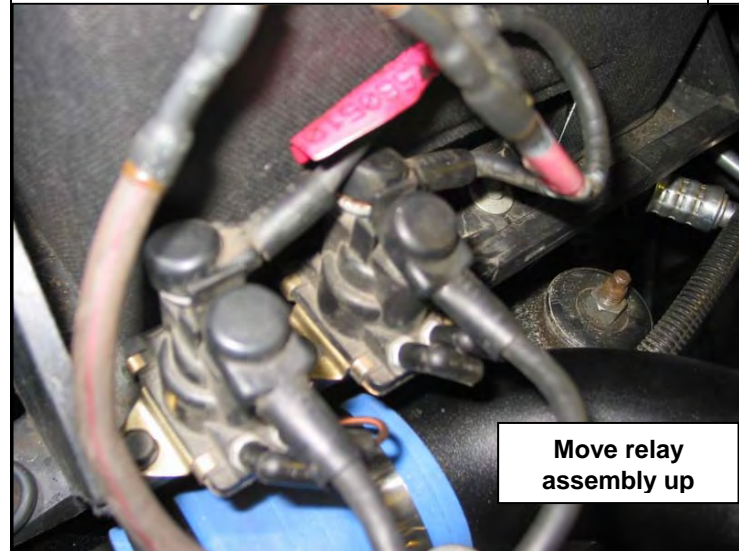
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39. Remove the pre-heat relay assembly from the battery tray, discard the bracket and re-mount the relays directly to the battery tray. You will need to drill three 3/16" mounting holes. You will reuse the original mounting screws.

2006 model years will have a single relay which can be mounted on the two holes on the side of the supplied air box.

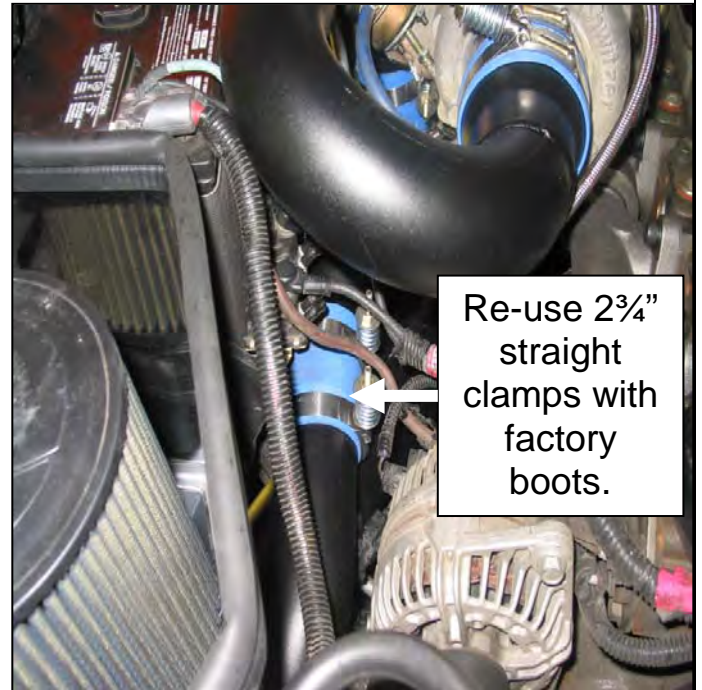


40. Install the primary intake tube (#1453710P) with the 4" x 4" silicone hose (#1405222) and the two light duty hose clamps (#1453701). Be sure that this pipe is securely mounted to the primary turbocharger. Connect the wiring harness to the airflow sensor you mounted in the pipe earlier.



41. Install the cast secondary compressor outlet elbow (#1452226) with the v-band clamp (#1452225) and o-ring provided (#1453251).

You can then connect the new charge air intercooler pipe (#1453265P with the factory 2 3/4" brown ribbed straight boot. Utilize the stock 2-3/4" clamps to secure this connection. The other end of the charge air intercooler pipe should be connected to the intercooler utilizing the stock boot and stock clamps you saved earlier on.



42. Install the short 90° intermediate pipe (#1453405P) to primary compressor outlet using the two HD band clamps (#1405211) and a 3" x 4" piece (#1405221) of silicone hose. Connect the 'U' shaped intermediate pipe (#1453305P) to the newly installed 90° compressor outlet pipe using two heavy-duty hose clamps (#1405211) and another 3" x 4" piece of silicone hose (#1405221).

Connect the last end of the intermediate 'U' pipe (#1453305P) to the 4" inlet of the secondary turbocharger using the two larger heavy-duty band clamps (#1405213) and the 4" x 4" piece of silicone hose (#1405222).



43. You can now finalize the installation of the primary down pipe (#1453600) to the vehicles exhaust. Loosely clamp the down-pipe to the turbo using the supplied V-band clamp (#1453602) and tighten once everything is aligned.



DO NOT ADJUST THE DOWN-PIPE ONCE THE V-BAND CLAMP HAS BEEN TIGHTENED. FAILURE TO ADHERE TO THIS WILL DESTROY THE V-BAND CLAMP AND ITS ABILITY TO SEAL.

44. Tighten both primary and secondary turbocharger compressor and exhaust housings, elbow bolts, support brackets and anything else that was kept loose for fitting reasons.

45. Install the X-Intake air box (#1453815) with the air filter (#2452) over top of the primary turbo intake pipe.

The air box has two mounting points, one by the battery, and the other by the radiator support. You will have to un-screw the factory bolts to mount the brackets at these locations. Be sure to tighten the air filter to primary intake tube. Point the hose clamp end towards to the front of the vehicle for easier access



DO NOT INSTALL AN AIR FILTER SOCK OR PRE FILTER OVER THE AIR FILTER

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46. Re-fill your coolant system with the coolant you saved earlier. If you need to add coolant, be sure that it correlates with the correct specification for the vehicle.

BE SURE TO PURGE THE AIR FROM THE COOLANT SYSTEM BEFORE RUNNING THE VEHICLE.

47. Re-connect the vehicles batteries and reset radio stations.

48. Idle the engine for a period of time and check for any leaks before road testing.

49. Road test the vehicle and be sure to check for any boost, exhaust, oil or coolant leaks. As well, you will need to monitor for peak EGT's and boost levels.

50. Again, you should re-check **all** bolts after a number of heat cycles in a week or so, this will help prevent any leaks.

IMPORTANT When idled for any length of time some oil may leak from the turbo. If the performance/boost is satisfactory and the wheel is not touching the housing (There will be some small movement), the excess oil is not a concern. Simply wipe with a clean cotton cloth and continue use.

Wastegate Adjustments

YOU WILL NEED TO ADJUST THE WASTEGATE!!!

The wastegate should be set to the maximum boost pressure possible. Close the wastegate and use the fueling box to control maximum boost. This combination will produce better fuel efficiency and cooler EGTs. If you still cannot control your boost you may need to look to a bigger set of twin turbos. Use the wastegate as a last resort.

It is better to have the wastegate closed as much as possible rather than open. If you are producing too high of boost pressure you will need to adjust your fueling to control the boost (either mechanically or electronically). Use the waste gate as a last resort.

DO NOT SET THE WASTEGATE TO OPEN AT 40PSI AND WHILE RUNNING 55PSI MANIFOLD PRESSURE (EXAMPLE ONLY). THIS WILL OVERLOAD THE PRIMARY CHARGER AND HURT YOUR TOTAL ACHIEVABLE HORSEPOWER. ONCE AGAIN CLOSE THE WASTEGATE, THE TURBOCHARGERS WILL RUN MORE EFFICIENT.

The wastegate is adjustable by turning the actuator rod. For more boost pressure you will need to tighten/shorten (clockwise) the waste gate rod for less boost pressure you can loosen the rod/lengthen (counter clockwise). The turning effect preloads the wastegate actuator spring. This adjustment is very finicky, be very careful, as you should not have to adjust the rod all that much. Make sure you are running enough boost for your horsepower requirements. If you have any questions or concerns call us.

**BD WILL NOT BE RESPONSIBLE FOR ANY FAILURES OF THE VEHICLE'S
HEAD GASKET.**

BD Engine Brake Inc.

Plant Address: 33541 MacLure Rd. Abbotsford, BC, Canada V2S 7W2

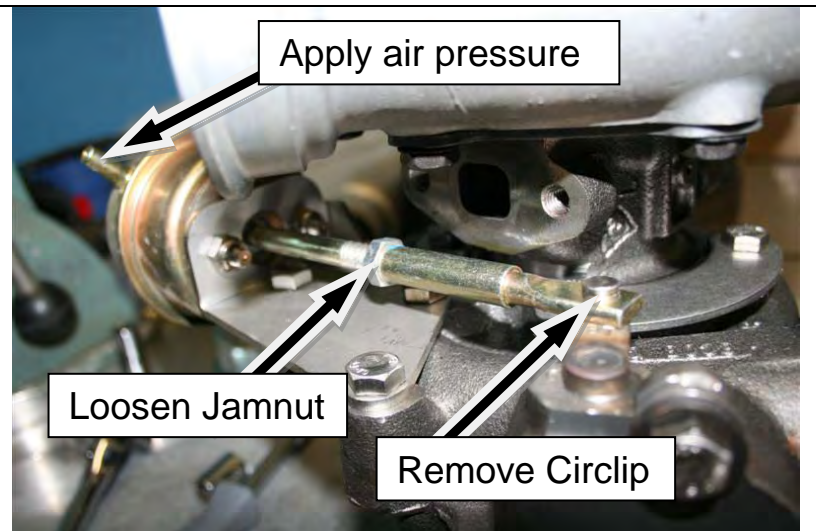
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To adjust the wastegate you will need to remove the rod end circlip first.

Then loosen the jam nut.

Apply air pressure to diaphragm. The actuator will then stroke, at this time lift up on the rod end and it will release from wastegate lever cylinder.



Shorter Rod = Higher Opening Pressure = Higher Boost

Longer Rod = Lower Opening Pressure = Lower Boost

Turn rod end to adjust wastegate opening pressure.

Shorter Rod = Higher Opening Pressure

Longer Rod = Lower Opening Pressure

We recommend the wastegate be almost closed off completely. Again use your fueling to control your boost level not your wastegate.

To re-install do the reverse of step 1.



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