

# ***BD VALVE BODY***

For 1991-2004 Dodge 5.9L 24V Cummins Trucks

**-- Installation Instructions --**

<b>1030410</b>	1991-1993 Dodge (4 Spd)	618
<b>1030415</b>	1994-1995 Dodge 12V	47RH
<b>1030416</b>	1996-1998 Dodge 12V	47RE
<b>1030417</b>	1998½-1999 Dodge 24V	47RE
<b>1030418</b>	2000-2002 Dodge 24V	47RE
<b>1030419</b>	2003-2004 Dodge 24V	47RE/48RE

**PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLATION**

BD Engine Brake, Inc.

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

U.S. Shipping Address: 88-446 Harrison St, Sumas, WA 98295 U.S. Mailing Address: P.O. Box 231, Sumas, WA 98295

Phone: 604-853-6096 Fax: 604-853-8749 Internet: [www.bd-power.com](http://www.bd-power.com)

## Tools Required

- Inch Pound Torque Wrench
- 3/8" or 1/2" drive socket sets including 11mm & 13mm sockets
- #25 Torx Bit
- Combination Wrench Set including 7/16" & 3/4"
- 3/16" Allen wrench
- High quality pressure gauge (0-160psi)
- Voltmeter

## Additional Parts Required (Not included)

- ATF+4 Transmission Fluid
- 2 Bottles of Red Lube Guard (recommended)

## Installation Notes

All Diesel Rams should be tested prior to engine or transmission performance tuning. Check transmission oil level prior to all work. Pressure testing will produce test results that can help to determine the ability of the transmission to prevent the clutch surfaces from slipping. Slippage will result in premature converter and transmission wearing characteristics (soft or severe shifting, high transmission temperature).

2800-3000RPM (Wide Open Throttle)	With the transmission at operating temperature, ensure that the shift points are correct before recording pressures.
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## 47RE Transmissions

Transmission Line Pressure	OEM Pressure	BD Pressure	Test #1	Test #2
Transmission in DRIVE w/Engine at idle	55-65psi	90-100psi		
Transmission in DRIVE w/Convertor Locked up @ WOT	110-120psi	170-180psi		

## 48RE Transmissions

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## Transmission Shift Points

Transmission Shift Point (RPM)	Before	After
2 <sup>nd</sup> – 3 <sup>rd</sup> Shift point (Normal Driving)		
2 <sup>nd</sup> – 3 <sup>rd</sup> Shift point (Wide Open Throttle)		

**IMPORTANT** – IF PRESSURES AND/OR SHIFT POINTS ARE **NOT** TO SPECS, THE TRANSMISSION **MUST** BE REPAIRED OR SERVICED **BEFORE** MODIFICATIONS.

### *Pressure Testing*

1. Pressure testing is accomplished by inserting a fitting and hose assembly with a good quality gauge into the center 1/8" port on the passenger side of the transmission. Leave the gauge attached for testing later.
2. **VERY IMPORTANT** – Road test with the pressure gauge in place and record pressures and shift point RPM's **BEFORE** modifications are carried out to determine the condition of the transmission prior to installing this valve body. ***Pressure will only be indicated with the transmission in "Drive".***
3. Secure the vehicle with wheel chocks and place the transmission in Neutral.
4. Ensure the valve body has not been damaged in shipping and it is the proper part number for your vehicle.
5. Starting at the transmission, remove the kick down lever and spring.
6. Rotate the shift lever to the rear of the vehicle to place the transmission in the PARK position.



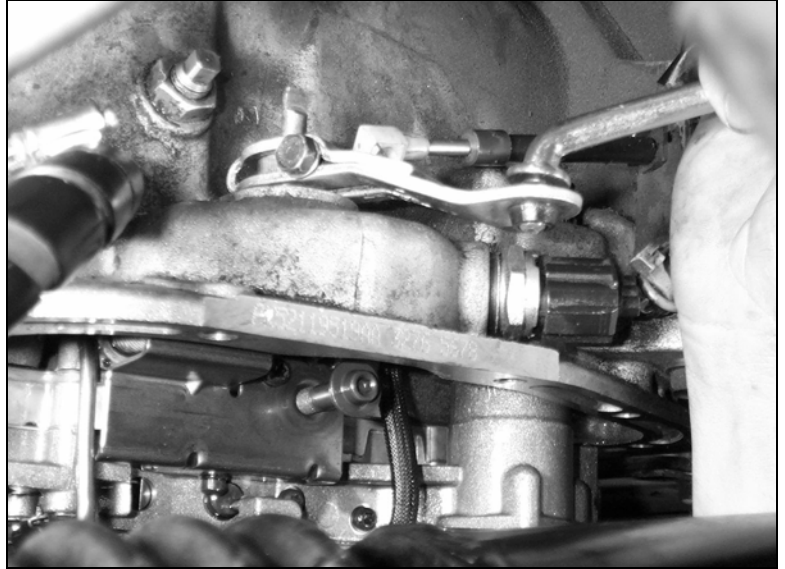
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7. Loosen the shift lever bolt then rotate the lever towards the front of the truck shifting the transmission into 1<sup>st</sup> / LOW position. This allows for the removal of the Park Rod E-clip without dropping the valve body. Remove shift lever.



8. Disconnect the wiring connectors from the Neutral Safety switch and Valve Body then remove the Neutral Safety switch from the transmission.

9. Install a large drain pan under the transmission, remove the oil pan, drain the transmission oil and remove the filter.

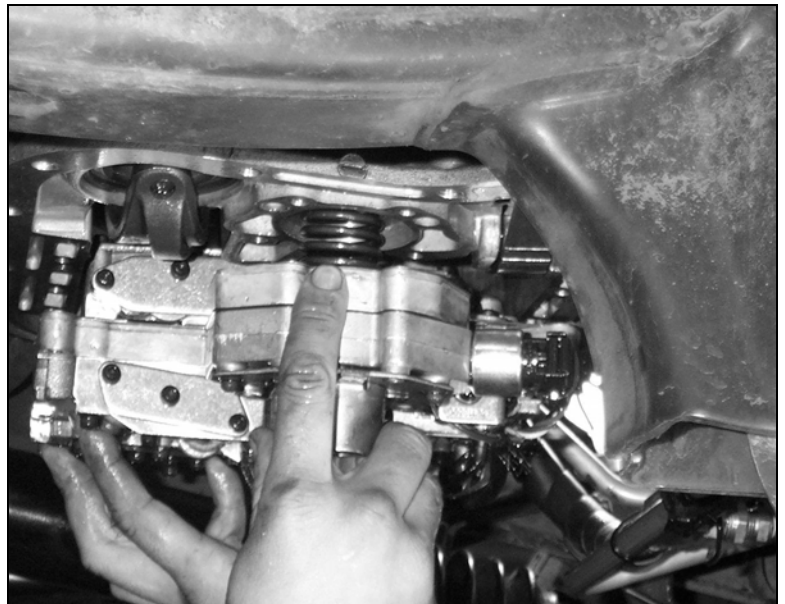
10. Carefully remove the E-clip from the park rod, leaving the park rod in the transmission.

11. Remove the 10 valve body bolts, remembering the location of the different bolts.

**The bolts are different lengths and MUST be re-installed in the proper location.**

12. When lowering the valve body, gently work it around so that the park rod lever is left in the transmission and ensure that the electrical plug is not damaged in the removal process.

13. **CAUTION** - As you lower the valve body, watch for the accumulator piston and spring falling out.

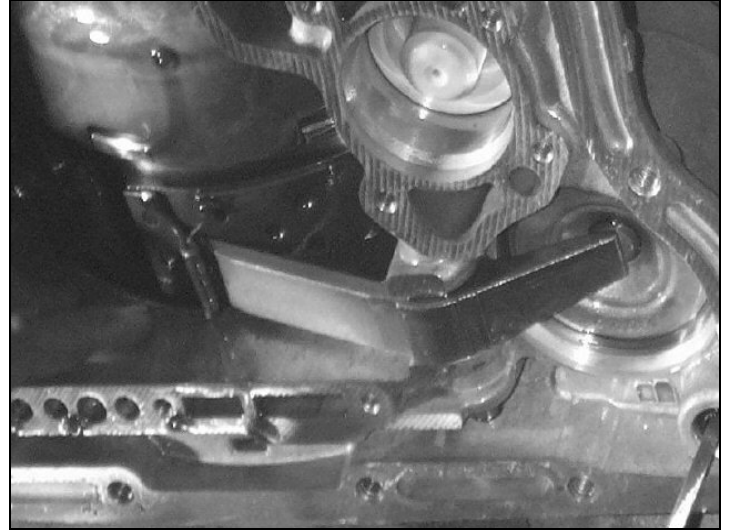




14. This is the time to change the 2<sup>nd</sup> gear band strut to the heavy duty one we supply. First loosen the band adjusting screw lock nut with a  $\frac{3}{4}$ " wrench, and then unscrew the adjuster until the stock strut can be removed.



**Stock Band Strut in place**

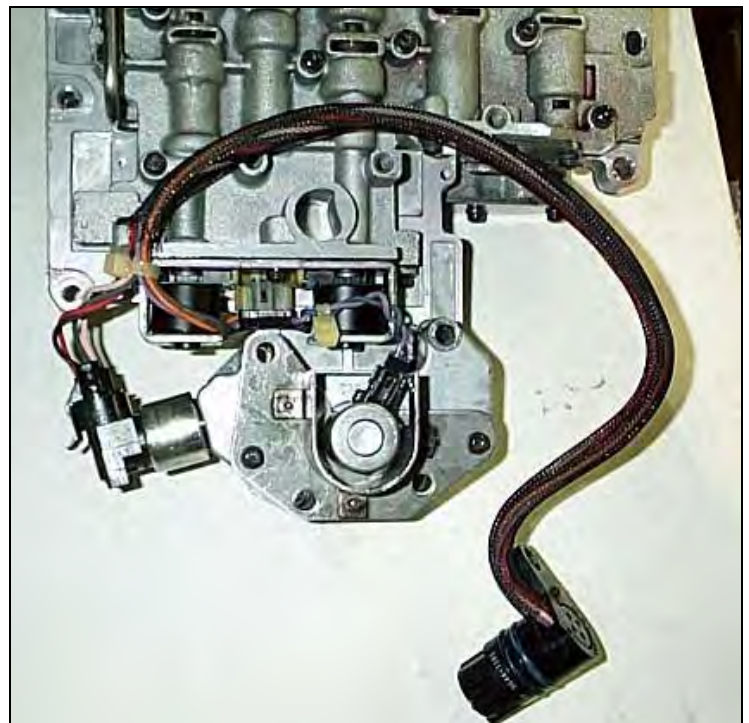


**New BD Band Strut in place**

15. Install the new BD strut with tapered side down, towards the pan, and center in the guides. Torque the band adjustment to 72 lbs-in., then back out 2 1/4 turns and tighten lock nut. The measurement for the air gap between the band lever and servo piston is 5/16".

16. From the old valve body, remove the electrical solenoid and sensor and install them on the new BD Valve Body.

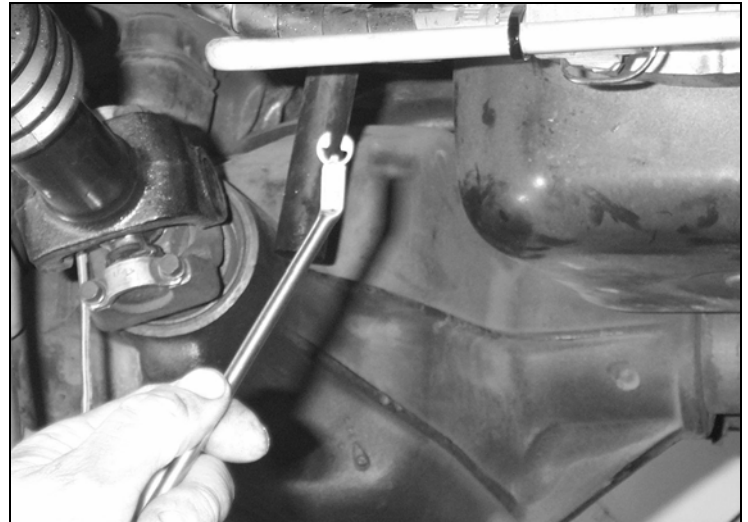
17. **IMPORTANT** - Before installing the BD Valve Body, lubricate the manual-shifting shaft and the O-ring on the electrical connector that fits into the transmission case. Rotate the shift lever all the way forward to place the valve body into 1<sup>st</sup> / Low gear position so that the park rod and E-clip can be attached later.



18. Place the accumulator piston and spring into the BD Valve Body. If you cannot balance these parts on the valve body, hold them in place with a supporting tool or wire until the Valve Body is installed.
19. Once the valve body is in position, insert the park rod into the manual shift lever and hold the valve body in place with a couple of bolts.



20. Install the E-clip on the park rod using the flat, slotted end of the Canadian micro-hockey stick.



***“Hockey Stick” Tool***

21. Install the valve body mounting bolts, ensuring that the varying length bolts are installed into the proper positions, and then torque evenly to 10 lbs-ft.
22. Install the manual lever on the outside of the transmission and check for full movement of the detent shift. There must be 5 distinct positions that are felt from Low (1<sup>st</sup>) to Park. Leave the transmission in the neutral position and tighten the retaining bolt. Re-install the kick lever and spring.
23. Install the neutral safety switch and adjust as required, and then tighten. The reverse lights at the rear of vehicle should illuminate when the shift lever is in the reverse position (key on).

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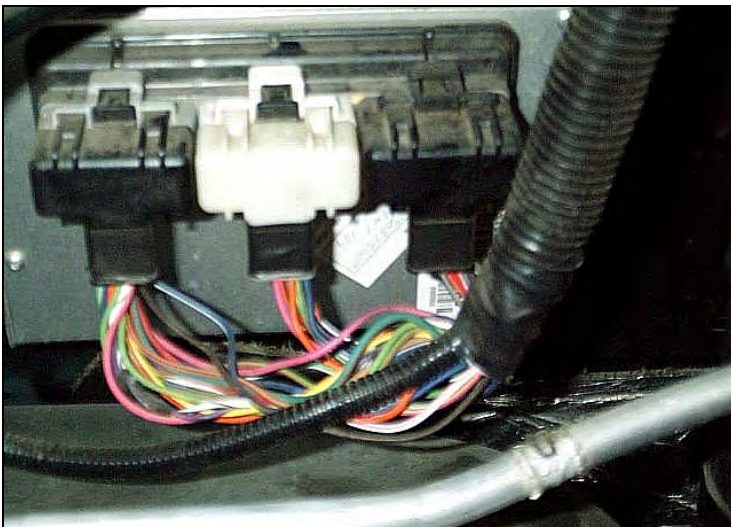


24. Install the new filter on the valve body using 3 screws, instead of the 2 that the OEM filter was attached with (stock on the 97-00 trucks).
25. We suggest that you install either a drain plug in the original oil pan or, even better, install a BD HD oil pan, which has extra oil capacity, cooling fins, a magnetic drain plug, and adds strength to the transmission case to prevent flexing.
26. Install the shift linkage to the manual lever on the transmission using the wave washer and hitch pin. Tighten the nut securely and install the kick-down linkage and return spring. The kick-down cable can now be attached to the ball socket. Ensure that the wiring harness has some dielectric grease on it and connect it. Ensure not to bend the pins when attaching the plug.
27. When just the valve body is being replaced, the transmission will need ~8-9 quarts of ATF+4. When both the valve body and torque converter are being replaced, ~15-17 quarts are required.

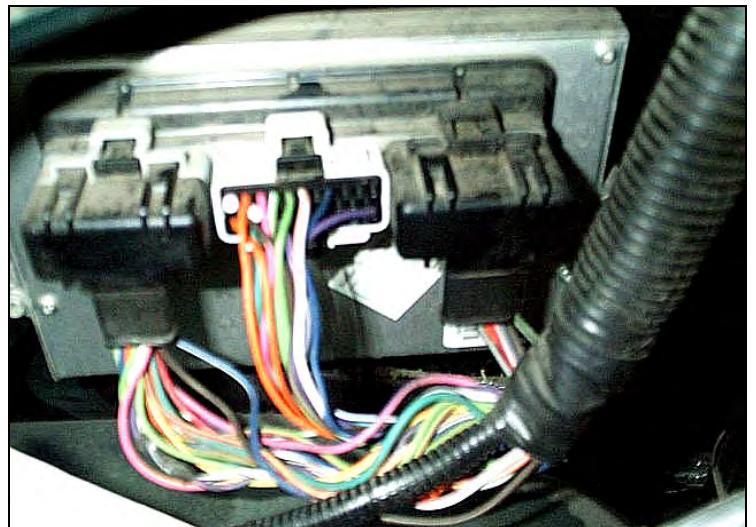
**IMPORTANT:** After 8 quarts have been added, start the engine and shift through all gears, and then check the transmission oil level with the shifter in neutral. Top up and check as required. **DO NOT OVERFILL!**

### *Governor Pressure Out Of Limit Trouble Code*

You will need to install a resistor to eliminate the "**GOV PRESSURE OUT OF LIMIT**" code which causes LIMP MODE (stuck in 3<sup>rd</sup> gear). On the passenger's side of the engine bay locate the PCM, then Connector 2 (White). Then locate the ORANGE wire at PIN #31. Cut this wire with enough slack to solder inline the 150 Ohm ¼ watt resistor. Use the supplied heat shrink to seal the connection.



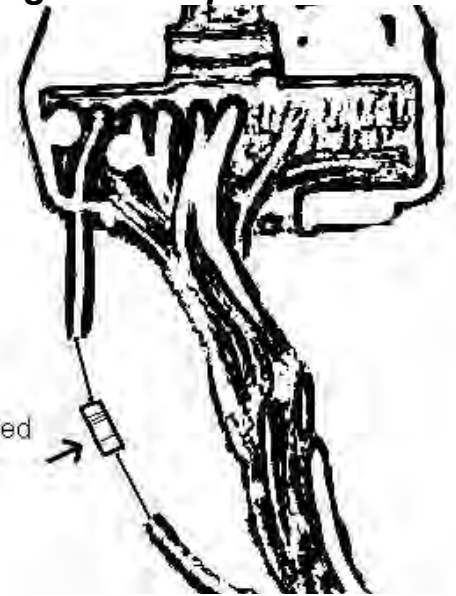
**PCM Connectors: Under hood on fire**



**Remove middle cover and locate**

**wall. Remove air box for easy access.**

**Orange wire at pin #31.**



**Isolate wire and install resistor.**

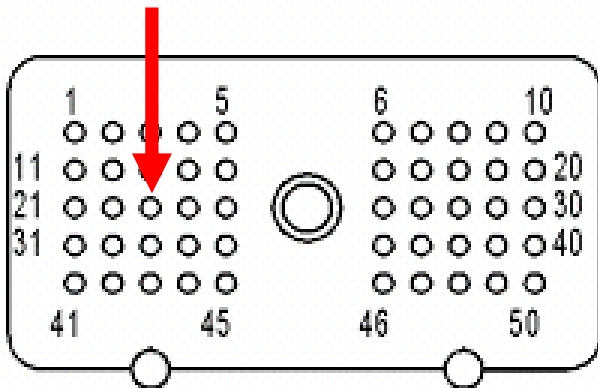
**Resistor can be installed either way.**

**Solder and use shrink tubing.**

**IMPORTANT** - Dodge requires that Pin 31 on the PCM connector has a signal of ~+5.0 V. Because some vehicles produced have a signal voltage higher than this (5.1 – 5.3V), this modification allows the voltage to remain below @ 5.0 V as required to ensure a trouble code of “Gov Pressure Out Of Limit” causing limp mode (stuck in 3<sup>rd</sup> gear).

**2004 Vehicles**

Due to the single ECM in 2004 vehicles, the location of the 5 Volt supply wire has changed. It is now located at Pin 23 (Connector 2, rear connector) which is a Yellow wire with a Pink tracer.



**ENGINE CONTROL  
MODULE C2  
(DIESEL)**



28. After your test drive, check the oil levels again. Air locks are common in this transmission.
29. Road test the vehicle to verify pressures and to check for the wide-open shift points to ensure that they are correct.

These pressures will vary according to the position of the kick down cable adjustment and the lock-up boost valve. Engine RPM DOES NOT affect line pressure.

**CAUTION – PRESSURE SETTINGS THAT ARE TOO HIGH CAN RESULT IN SEVERE SHIFTS, LIMP MODE, or 2<sup>ND</sup> OR 3<sup>RD</sup> GEAR STARTS.**

**ATTENTION – HARD 2-3 SHIFT**

**THIS VALVE BODY IS DESIGNED FOR STOCK TRANSMISSION CLEARANCES; IF YOU HAVE TIGHTER CLEARANCES THAN STOCK YOU WILL NOTICE A HARD 2-3 SHIFT. DO NOT ADJUST THE BAND TO TRY TO FIX THIS, CALL BD @ 1-800-887-5030.**

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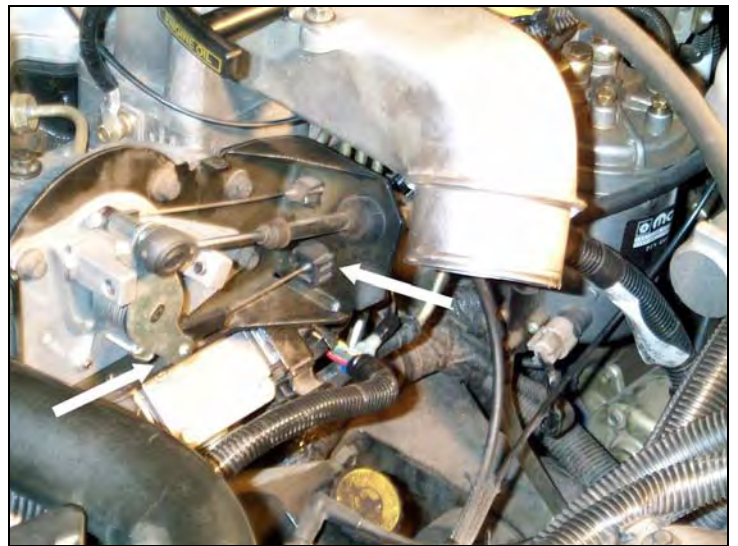
## *Kick Down Cable Adjustment*

The adjustment of the kick down cable is one of the most critical adjustments that affect the operation of the transmission.

The BD Performance Valve Body is not stock, therefore the factory specifications for this adjustment are used only as a guide.

Your drivability and performance demands will determine your shift points and pressure adjustments.

Kick down cable adjustments are for Full Throttle shift points & passing gear only. Light throttle shift points should be adjusted on the valve body throttle valve stop.



The kick down cable is located underneath the plastic cover as indicated above.

The plastic cover is held in place by 2 plastic Phillips head screws. Only light pressure is required to remove them. Do not lose the screws or washers when you remove them.

Full throttle shifts between 2<sup>nd</sup> and 3<sup>rd</sup> should occur between 2800 - 3000 rpm (OEM) at operating temperature.

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Locate the kick down cable and remove it from the throttle linkage and support bracket.

**IMPORTANT** – Before any adjustments are made, **MARK THE CABLE** at its original setting.



Remove the white colored locking clip.

**\*\*CAUTION\*\* DO NOT USE A SCREWDRIVER TO PERFORM THIS FUNCTION. IF THE CLIP BREAKS, THE CABLE WILL HAVE TO BE REPLACED.**



Adjust the cable forward (towards the radiator), to make the transmission shift earlier.

Adjust the cable back to the rear (towards the firewall), to make the transmission shift later.

**1/8" movement = ~75RPM**



Re-install the white locking clip and re-install the cable through the support bracket and then onto the throttle lever. Install the plastic cover when complete.

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## *Gear Shift Cable Adjustment – Very Important 48re*

### **ADJUSTMENTS - GEARSHIFT CABLE THIS MUST BE DONE!!**

Check adjustment by starting the engine in PARK and NEUTRAL. Adjustment is CORRECT if the engine starts only in these positions. Adjustment is INCORRECT if the engine starts in one but not both positions. If the engine starts in any position other than PARK or NEUTRAL, or if the engine will not start at all, the transmission range sensor may be faulty.

#### **Gearshift Adjustment Procedure**

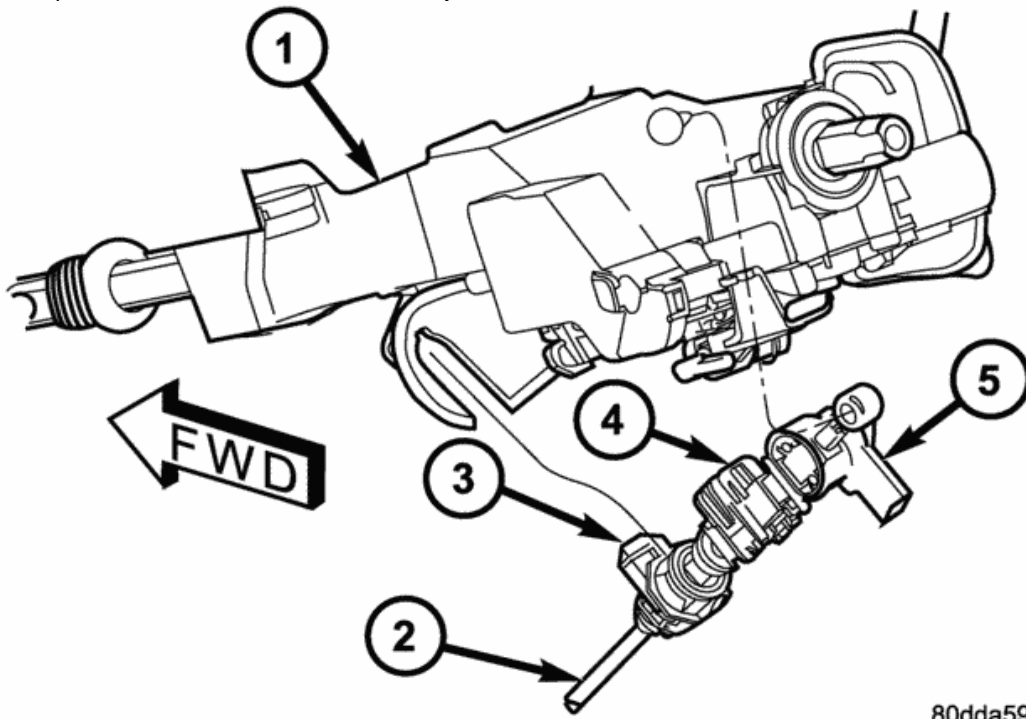
1. Shift transmission into PARK.
2. Release cable adjuster lock tab (3) (underneath the steering column) to unlock cable.
3. Raise vehicle.
4. Disengage the cable eyelet from the transmission manual shift lever.
5. Verify transmission shift lever is in PARK detent by moving lever fully rearward. Last rearward detent is PARK position.
6. Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
7. Snap the cable eyelet onto the transmission manual shift lever.
8. Lower vehicle.
9. Lock shift cable by pressing cable adjuster lock tab (3) downward until it snaps into place.
10. Check engine starting. Engine should start only in PARK and NEUTRAL.

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80dda591

1 - STEERING COLUMN
2 - GEARSHIFT CABLE
3 - GEARSHIFT CABLE LOCK TAB
4 - BTSI SOLENOID LOCK TAB
5 - BTSI CONNECTOR

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## Questions?

If you require assistance with this kit, please call our Transmission Technical Support Line at (800) 887-5030, Monday to Friday from 8:00-4:00pm Pacific Standard Time (PST). As an alternative, you can post a support question on our technical forum, located at <http://www.bd-power.com/forum/> .



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**LIMITED WARRANTY STATEMENT**

BD Engine Brake, Inc., Valley Fuel Injection Ltd., BD Diesel Performance, Turbocharger.net (the "Seller") warrants the following product(s):

All products manufactured or rebuilt by the Seller are to be free from defects in material or workmanship which includes but is not limited to Turbochargers, Exhaust and Intake manifolds, Exhaust brakes, Intercoolers, Flex Plates, Transmissions, Torque Converters, Oil pans, Fuel pumps and systems, Electronic monitors and control systems. The Seller warrants to the original buyer of the product (the "Buyer") that it will repair or replace, free of charge, any product which has a defect in material or workmanship within the warranty period described below. Copy of original invoice is required to qualify for warranty.

A defect is defined as a condition within the product that would render the product inoperable under normal conditions of use and service. The Seller's responsibility under this Warranty is limited to the repair or replacement, at the Seller's option, of any warrantable product returned prepaid with a complete service history and proof of purchase. A valid proof of purchase is a dated bill of sale or receipt.

A Return Material Authorization (RMA) number, obtained in advance from a customer service representative of the Seller and the dated bill of sale or receipt, must accompany any product returned by the Buyer for warranty determination. The Seller will be the final authority on the approval of all warranty claims hereunder. The issuance of a RMA number does not represent an approval of a warranty claim. All repaired or replaced products will be returned to the Buyer freight collect. Accepted warranty products, which have been replaced, will become the sole property of the Seller.

Until the Seller has approved a warranty claim, the Buyer will be responsible for all costs. Replacement parts and the labor costs incurred by the removal and replacement of the product while performing warranty work will be the responsibility of the Buyer. In no case does the obligation of the Seller exceed the original purchase price of the product as indicated on the original bill of sale or receipt. Under no circumstances will the Seller be liable for any travel time incurred in diagnosis for defects, or any other contingent expenses.

Once the claim is approved and within a 1 year period of original purchase Labor costs incurred will be considered for the removal and replacement of an eligible part while performing warranty work, at a rate of 55.00 per hour at authorized centers with prior approval of the Seller. Freight is FOB Abbotsford, B.C. Canada.

To the extent permitted by law, the Buyer hereby waives all rights other than those expressly set out herein and acknowledges that this warranty sets out the Buyer's exclusive remedies with respect to products covered by it. This warranty shall not be extended, amended or varied except by written instrument signed by the Seller and the Buyer.

The Seller will administer warranty requests on products sold by the Seller and not manufactured by the Seller by forwarding claims made by a Buyer under the manufacturer's warranty to the manufacturer. The final disposition of such claims will be made by the manufacturer and ruled by the laws of British Columbia, Canada.

Customer assumes risk in purchasing product with in 30 days may return the product for exchange of other BD products or services only. No cash refunds are available.

**Please refer to Warranty time limitation per product.**

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**NOT COVERED UNDER THIS WARRANTY**

This warranty is limited to the original purchaser of the product and is not transferable to subsequent owners. Specifically excluded from this warranty are failures of products caused by misuse, misapplication, negligence of the Buyer, accidents, modification, abuse, improper storage, installation, repair or operation, use of unauthorized parts or other mistreatment of the Buyer or his agent. Any competitive use, sled pulling, drag racing will void warranty on product. A sheared or twisted shaft, broken planetary gear sets, burned clutches, broken drive hubs, sun gear damage, cracked housings is not covered. Fluids and filters or damage caused from fuel or air contamination, BioDiesel, low fluid levels. This warranty does not cover deterioration of plating, paint or any other coating, linings or parts that are subject to normal wear and tear, such as light bulbs, fuses, bearing wear, seal wear, etc.

If product is not installed by a trained and authorized BD dealer, installation facility must prove it is properly tooled and has certified training to have installed or to carry out repair of product.

The Seller also disclaims any liability for incidental or consequential damages including but not limited to, repair labor, rental vehicles, hotel cost or any other inconvenience cost. To the extent permitted by law, this warranty is in lieu of all other warranties or guaranties, either expressed or implied, included the implied warranties of merchantability and fitness for a particular purpose and shall not extend to any Buyer or to any person other than the original purchaser residing within the boundaries of the continental U.S. or Canada. As well the seller is not responsible or obligated to update previously manufactured parts that are currently under the above warranty.

NOTE THAT THIS GUARANTEE WILL BE VOID IF THE USER BREACHES THE CONDITIONS IN THE SECTION LABELED "NOT COVERED UNDER THIS WARRANTY" AND IS ONLY APPLICABLE ON THE PRODUCTS THE SELLER MANUFACTURES.

**DISCLAIMER OF LIABILITY**

Other than as expressly set forth herein, the Seller, together with its distributors, jobbers and dealers shall in no way be responsible for the product's proper use and service. In no event shall the Seller be liable for any special, incidental, indirect or consequential damages of any kind or nature, whether or not the Buyer was advised of the possibility of damage, arising or resulting from the use or performance of the product, and the Buyer hereby waives any and all such claims.

The Buyer acknowledges that he/she/it is not relying on the Seller's skill or judgment to select or furnish goods suitable for any particular purpose and that the Seller has no liability that will extend beyond the scope of the limited warranty contained herein, and the Buyer hereby waives all remedies or liabilities, expressed or implied, arising by operation of law or otherwise, (including, without limitation, any obligations of the Seller with respect to fitness for any particular purpose; merchantability; and special, incidental, indirect or consequential damages) or whether or not occasioned by the Seller's negligence.

The Seller disclaims any warranty and expressly disclaims any liability for personal injury or damages related to the Buyer's use of the product. The Buyer acknowledges and agrees that the disclaimer of any liability for personal injury is a material term for this Agreement and the Buyer agrees to indemnify the Seller and hold the Seller harmless from any claim related to the product and its use or performance. Under no circumstances will the Seller be liable for any damages, liabilities, costs or expenses incurred as a result of by reason of the use, performance or sale of the product, including without limitation, any damages, liabilities, costs or expenses incurred by reason of the Buyer's negligence related to those uses of the product as a result of the removal of the speed limiter.

The Seller assumes no liability regarding the improper installation or misapplication of the product. It is the installer's responsibility to check for proper installation, and, if in doubt, contact the manufacturer.

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<b>Limited Warranty Details</b>			
<b>Product Name</b>	<b>Parts</b>	<b>Labour</b>	<b>Notes</b>
	<b>(Months/Miles)<sup>1</sup></b>	<b>(Months/Miles)<sup>1, 2</sup></b>	
Torque Converters (Dodge)	36/ 150,000	12/12,000	No Race abuse covered
Torque Converters (Ford & Allison)	36/ 150,000	12/ 12,000	No Race abuse covered
Transmissions	36/ 150,000	12/ 24,000	No Race abuse covered
Race Transmissions	12/ 24,000	Not Eligible	
Valve / Accumulators Bodies	12/ 24,000	12/ 24,000	
Transmission Pans	36/ 150,000	Not Eligible	
Auto / Torq / Towloc's	12 / 24,000	Not Eligible	
Flex Plates	36/ 150,000	Not Eligible	
Injectors & Injection Pumps	12 / 24,000	12/ 24,000	Race Pumps 90 days parts/No labour
Tuners and Chips	Manufacturer <sup>3</sup>	Not Eligible	
X-Monitor / Cool Down Timers	12/ 24,000	Not Eligible	
Intake / Exhaust Manifolds	36/ 75,000	Not Eligible	
Exhaust Kits	24 Months	Not Eligible	Surface rust not eligible
Turbo Guards / Boost Builders / Waste Gate Kits	12/ 24,000	Not Eligible	
Intercoolers / Hoses / Clamps	12/ 24,000	Not Eligible	
Transmission Coolers	Manufacturer <sup>3</sup>	Manufacturer <sup>3</sup>	
Manual Transmission Clutches	Manufacturer <sup>3</sup>	Manufacturer <sup>3</sup>	
Short Shifters	12/ 24,000	Not Eligible	
Engine / Head Stud kits	Manufacturer <sup>3</sup>	Manufacturer <sup>3</sup>	
Engine Brakes	24/ 24,000	12/ 24,000	
Steering Stabilizers / Sway bars	12/ 24,000	Not Eligible	
Boost Coolers	Manufacturer <sup>3</sup>	Manufacturer <sup>3</sup>	
Gauges and Mounts	Manufacturer <sup>3</sup>	Manufacturer <sup>3</sup>	
Performance Turbos	12/ 12,000	Not Eligible	
FlowMAX Fuel Pumps	60/ 75,000	Not Eligible	
Auxiliary Fuel Pumps	12/ 12,000	Not Eligible	

A Return Material Authorization (RMA) number, obtained in advance from a customer service representative of the Seller and the dated bill of sale or receipt, must accompany any product returned by the Buyer for warranty determination.

<sup>1</sup> Warranty is based on whichever occurs first (Months or Mileage).

<sup>2</sup> Prior approvals must be given to qualify for labour reimbursement.

<sup>3</sup> As per Manufacturer's warranty

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