RAM 618, 47RH, 47RE TRANSMISSION

BD VALVE BODY INSTALLATION MANUAL

READ ALL INSTRUCTIONS BEFORE INSTALLATION
1994-1999 Dodge Ram

**TOOL LIST:**
- Inch Pound Torque Wrench
- 3/8" or ½" Dr Socket sets including 11mm & 13mm socket
- #25 Torx Bit
- Combination Wrench Set including 7/16" & ¾"
- 3/16” Allen wrench
- High Quality Pressure Gauge (0 - 160 psi)
- Voltmeter

**Additional Parts (not included in kit):**
- Transmission pan gasket
- Type PLUS 3 ATF (recommended)
- 2 Bottles of Red Lubeguard (recommended)

All Diesel Rams must 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 convertor and transmission wearing characteristics (soft or severe shifting, high transmission temperature).

<table>
<thead>
<tr>
<th>Valve</th>
<th>RPM Range</th>
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<td>12 Valve</td>
<td>2400-2500 rpm (wide open throttle)</td>
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<tr>
<td>24 Valve</td>
<td>2800-3000 rpm (wide open throttle)</td>
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Ensure shift points are correct before recording pressures (transmission hot)

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<th>Transmission Line Pressure</th>
<th>OEM Pressure</th>
<th>Before</th>
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<th>BD Pressure</th>
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<tr>
<td>Transmission in DRIVE w/Engine at idle</td>
<td>55-65 psi</td>
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<td>70 - 75 psi</td>
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<tr>
<td>Transmission in DRIVE w/Convertor Locked up at 1800 - 1900 rpm</td>
<td>64-72 psi</td>
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<td>85 - 90 psi</td>
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<table>
<thead>
<tr>
<th>Transmission Shift Point (RPM)</th>
<th>Before</th>
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<tbody>
<tr>
<td>2nd - 3rd Shift point (Normal driving)</td>
<td></td>
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<tr>
<td>2nd - 3rd Shift point (Wide Open Throttle)</td>
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**IMPORTANT** - IF PRESSURES AND/OR SHIFT POINTS ARE NOT TO SPECS THE TRANSMISSION MUST BE REPAIRED OR SERVICED BEFORE MODIFICATIONS.
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 later testing.

2. **VERY IMPORTANT** - Road test with 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. 
   Pressures will only be indicated with transmission in Drive position.

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 as well as the hitch/clevis pin from the shifter rod. 
   **NOTE:** DO NOT lose the wave washer.

6. Rotate the shift lever to the rear of the vehicle to place the transmission in the PARK position.

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

8. Disconnect the wiring connectors from the Neutral Safety switch and valve body then remove the Neutral Safety switch.

9. Install a large drain pan under transmission, remove oil pan, drain 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. **NOTE** Attaching bolts are different lengths and MUST be reinstalled 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 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 to 2nd gear band strut to the heavy duty one we supply. First loosen the band adjusting screw lock nut with a ¾" wrench, and then unscrew adjuster until the stock strut can be removed.

15. Install the new BD strut with taper side down, towards the pan, and centered in the guides. Torque the band adjustment to 72 inch pounds, then back out 2 ¼ turns and tighten lock nut. The round end of the enclosed micro-hockey stick tool can also be used as a feeler gauge to set the front band adjustment.

16. **IMPORTANT** - Before installing the BD valve body, lubricate the manual-shifting shaft and the O-ring on the electrical connector that fit into the transmission case. Rotate the shift lever all the way forward to place the valve body in the 1st / Low gear position for later attaching of the park rod and E-clip.
17. Place the accumulator piston and spring in 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.

18. 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.

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

20. Install the valve body mounting bolts, ensuring the different length bolts are installed in the proper positions, and torque evenly to 100 inch pounds.

21. Install the manual lever on the outside of the transmission, check for full movement of the detent shift. There must be 5 distinct positions that are felt from Low to Park. Leave in the Neutral position and tighten the retaining bolt.

22. Install neutral start switch and tighten.

23. 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).

24. We suggest you install either a drain plug in the original oil pan or, even better, install a MAG HY-TEC cast aluminum oil pan, which has extra oil capacity, cooling fins, a magnetic drain plug, and adds strength to the transmission case to prevent flexing.
25. Install the shift linkage to the manual lever on the transmission using the wave washer and hitch pin. Tighten nut securely and install kick-down linkage and return spring. The kick-down cable can now be attached to the ball socket. Ensure the wiring harness has some dielectric grease on it and connect. Ensure not to bend the pins when attaching the plug.

26. 1996-1998 trucks with 12-valve engines have a one way check valve in the hose located under the heat exchanger under the turbo. This check valve was used with the stock valve body to prevent the oil from draining back from the cooler line. This can stick restricting oil flow, it is suggested that you replace it with a free flowing line such as BD part # 1300007.

27. When removing oil flow lines on newer vehicles, you will note that some of these have quick-disconnect, Teflon type fittings. These fittings are prone to premature failure and should be replaced to prevent them from blowing off. This would cause all fluid to be lost and subsequent damage to the transmission and torque convertor.

28. When just the valve body is replaced, fill the transmission with 8 - 9 quarts of ATF. When both the valve body and torque convertor are replaced, 15 - 17 quarts are required. **IMPORTANT:** After 8 quarts have been added, start engine and shift thru all gears, then check transmission oil level with shifter in Neutral. Then top up and check as required. **DO NOT OVERFILL!**

29. After test drive, check oil levels again. Air locks are common in this transmission.

30. Road test vehicle and check for the wide-open shift points to ensure they are correct and to verify pressures. 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.

**Note** Different specifications (shift points/pressure) for the ISB engine.

**CAUTION** - PRESSURE SETTINGS TOO HIGH CAN RESULT IN A SEVERE SHIFT, LIMP MODE, or 2ND OR 3RD GEAR STARTS.

**WARNING**
WHEN TRANSMISSION IS SERVICED AT A DEALER OR SERVICE CENTRE IT IS IMPERATIVE THAT THE BD FILTER BE REPLACED WITH THE SAME TYPE. THE PROPER FILTER IS THE CHRYSLER OEM PART # 3515996 WHICH WILL ENSURE THE MODIFIED VALVE BODY DOES NOT LEAK PAST FILTER SEAL.

Kick down cable Adjustment

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

The BD Performance Valve Body is a performance product and 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.
12 VALVE ADJUSTMENTS

On trucks equipped with the 12-valve 5.9 6BTA, full throttle shift between 2\textsuperscript{nd} and 3\textsuperscript{rd} should occur between 2400 – 2500 (OEM) engine rpm with transmission at operating temperature.

**IMPORTANT** - Locate the kick down cable and MARK THE CABLE at the original setting before any adjustments are made.

**NOTE:** Disconnecting the cable from the support bracket and the throttle lever is a difficult task, it may be easier to adjust without removing cable.

Press the lock tab (this will take considerable force) to release the locking mechanism.

Adjusting the cable forward, towards the radiator, will make transmission shift sooner.

Adjusting the cable rearward, towards the firewall, will make transmission shift later.
24 VALVE ADJUSTMENTS

On trucks equipped with Cummins ISB engines, full throttle shift between 2nd and 3rd should occur between 2800 – 3000 rpm (OEM) with transmission at operating temp.

The kick down cable will be located underneath the plastic cover as indicated below.

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 removed.

Remove the cable from the throttle linkage and support bracket.

**IMPORTANT - MARK THE CABLE** at the original setting before any adjustments are made.

Remove the white colored locking clip from the cable.
** CAUTION ** DO NOT USE A SCREWDRIVER TO REMOVE CLIP, IF THE CLIP BREAKS THE CABLE WILL HAVE TO BE REPLACED

Adjust the cable forward, towards the radiator, to make transmission shift sooner.

Adjust the cable rearwards, towards the firewall, to make transmission shift later.

(Adjustment spec - 1/8 inch movement = @75 rpm)

Install white locking clip and then re-install the cable thru the support bracket and then on to the throttle lever.

Install plastic cover when job is complete.
**Pressure adjustments**

Valve Body pressure adjustment and Throttle valve cable adjustment affect each other, (ie: if you raise pressure, the transmission may shift sooner and vise versa).

TAKE YOUR TIME WHEN MAKING ADJUSTMENTS TO ENSURE TRANSMISSION PERFORMS TO YOUR PREFERRED DRIVING STYLE.

If the pressures are not according to specifications, please call our Transmission Technical department for assistance. The valve body is designed and tested with a specified pump volume. Different pressures are due to non-standard pump characteristics. Which is why you must check the pressures before performing this modification.

1 full turn = 75 rpm

**HARD SHIFTING/ 2nd or 3rd GEAR STARTS** - DECREASE LINE PRESSURE

**LIGHT SHIFTING / STACK SHIFTS** - INCREASE THROTTLE PRESSURE
BD ENGINE BRAKE, INC.
LIMITED WARRANTY STATEMENT

THE INSTALLATION OF THIS PRODUCT INDICATES THAT THE BUYER HAS READ AND UNDERSTANDS THIS AGREEMENT AND ACCEPTS ITS TERMS AND CONDITIONS.

DISCLAIMER OF LIABILITY

BD Engine Brake Inc., its successors, distributors, jobbers, and dealers (hereafter “BD”) shall in no way be responsible for the product's proper use and service. THE BUYER HEREBY WAIVES ALL LIABILITY CLAIMS.

BD disclaims any warranty and expressly disclaims any liability for personal injury or damages. BD also disclaims any liability for incidental or consequential damages including, but not limited to, repair labor, rental vehicles, hotel costs, or any other inconvenience costs by reason of use or sale of any such equipment. 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 BD and to hold BD harmless from any claim related to the item of any equipment purchased.

This warranty shall not apply to any unit that has been improperly stored or installed, or to misapplication, improper operation conditions, accidents, neglect, or which has been improperly repaired or altered or otherwise mistreated by the BUYER or his agent. BD also assumes no liability regarding the improper installation or misapplication of its products. It is the installer's responsibility to check for proper installation and if in doubt, contact the manufacturer.

LIMITATION OF WARRANTY

BD Engine Brake Inc. (hereafter “BD”) warrants to the BUYER that any parts purchased shall be free from defects in material workmanship. A defect is defined as a condition within the product that would render the product inoperable. BD gives Limited Warranty as to description, quality, merchantability, fitness for any product’s purpose, productiveness, or any other matter of BD’s product sold herewith. BD shall be in no way responsible for the product’s open use and service and the BUYER hereby waives all rights other than those expressly written herein. This Warranty shall not be extended or varied except by a written instrument signed by BD and the BUYER.

The Warranty is Limited to one (1) year from the date of sale and labor costs incurred by the removal and replacement of the BD product, while performing warranty work, will be covered for 1 (one) year, payable at BD rates, at authorized centers and with prior approval. Until BD has approved the claim, the consumer may be responsible for these costs.

A Return Authorization (WA) number, obtained in advance from BD, must accompany all products returned for warranty consideration. All products must be returned, shipping prepaid, to BD and must be accompanied by a dated proof of purchase receipt. All Warranty claims are subject to approval by BD and repaired or replaced product will be returned to the customer freight collect. Accepted warranty units, which have been replaced, become the sole property of BD.

This warranty is in lieu of all other warranties or guaranties, either expressed or implied, and shall not extend to any consumer or to any person other than the original purchaser residing within the boundaries of the continental U.S. or Canada.

IN THE EVENT THAT THE BUYER DOES NOT AGREE WITH THIS AGREEMENT, THE BUYER MAY PROMPTLY RETURN THIS PRODUCT, IN A NEW AND UNUSED CONDITION, WITH A DATED PROOF OF PURCHASE, TO THE PLACE OF PURCHASE WITHIN THIRTY (30) DAYS FROM DATE OF PURCHASE FOR A FULL REFUND.