

BD VALVE BODY

For 1994-1998 Dodge 5.9L 12/24V Cummins Trucks
-- Installation Instructions --

	1030416	1996-1998 Dodge 12V	47RE
	1030417	1998½-1999 Dodge 24V	47RE

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

Tools Required

- Inch Pound Torque Wrench
- 3/8" or 1/2" Dr Socket sets including 11mm & 13mm socket
- #25 Torx Bit
- Combination Wrench Set including 7/16" & 3/4"
- 3/16" Allen wrench
- High Quality Pressure Gauge (0 - 160 psi)
- Voltmeter

Additional Parts Required (Not Included)

- 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).

12 Valve	2400-2500 rpm (wide open throttle)	Ensure shift points are correct before recording pressures (transmission at operating temperature).
24 Valve	2800-3000 rpm (wide open throttle)	

47RE Transmissions

Transmission Line Pressure	OEM Pressure	BD Pressure	Test #1	Test #2
Transmission in DRIVE w/Engine at idle	55-65psi	70-85psi		
Transmission in DRIVE w/Convertor Locked up @ 1800 - 1900 rpm	64-72psi	85-90psi		

48RE Transmissions

Transmission Line Pressure	OEM Pressure	BD Pressure	Test #1	Test #2
Transmission in DRIVE w/Engine at idle	55-65psi	70-75psi		
Transmission in DRIVE w/Convertor Locked up at 1800 - 1900 rpm	85-95psi	95-105psi		

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Transmission Shift Points

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

Installation Notes

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

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.

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.

Secure the vehicle with wheel chocks and place the transmission in Neutral.

Ensure the valve body has not been damaged in shipping and it is the proper part number for your vehicle.

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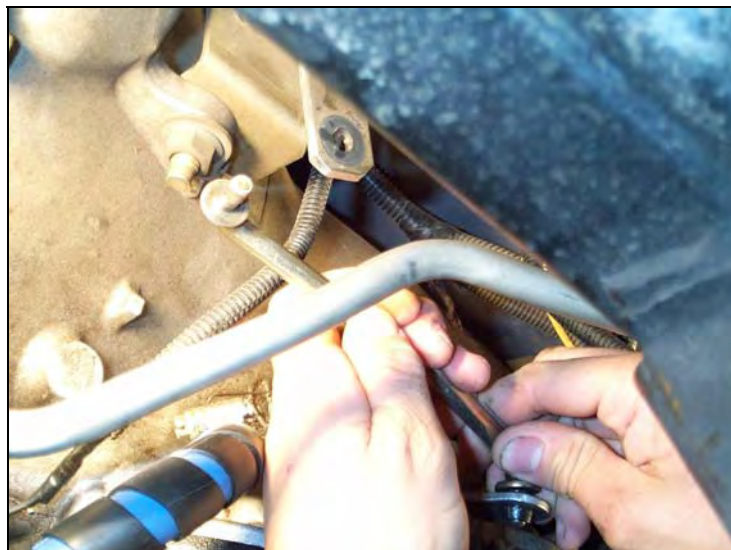
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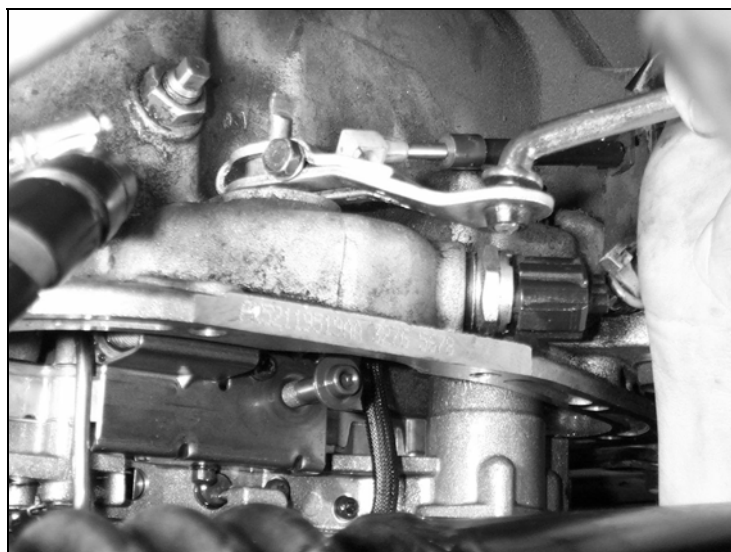
Installation

1. Starting at the transmission, remove the kick down lever and spring as well as the hitch/clevis pin from the shifter rod. **DO NOT lose the wave washer.**

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



3. 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. Remove the shift lever.



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

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

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

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

The valve body mounting bolts are different lengths and MUST be reinstalled in the proper location.

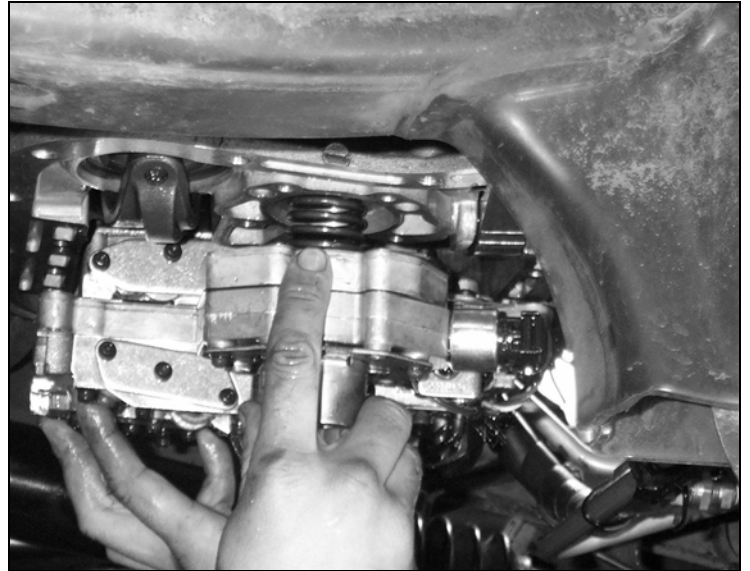
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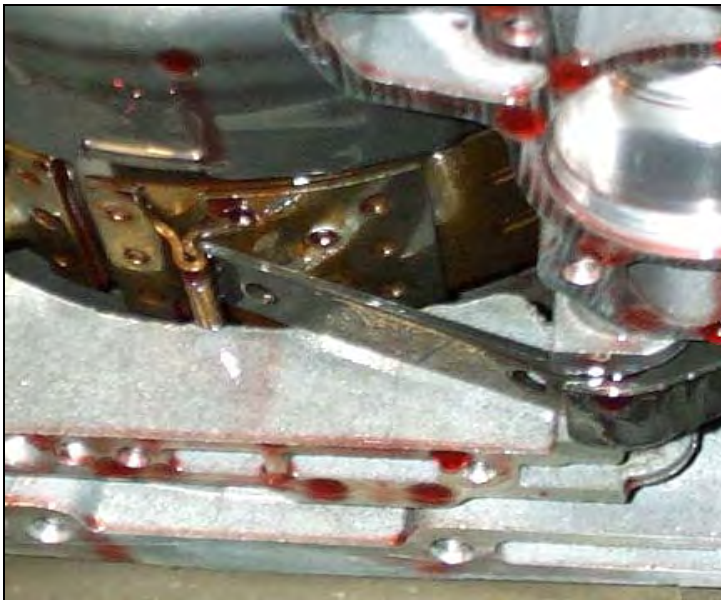
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8. When lowering the valve body, gently work it around so that the park rod lever is left in the transmission, and ensure the electrical plug is not damaged in the removal process.
9. **CAUTION** - As you lower the valve body, watch for the accumulator piston and spring falling out.



10. This is the time to change the 2nd gear band strut to the heavy duty one we supply. Loosen the band adjusting screw lock nut with a 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

11. Install the new BD strut with the tapered side down, towards the pan, and center into the guides. Torque the band adjustment to 72 lbs-in., then back out 1 7/8" turns and tighten the 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.
12. **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.

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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.

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.

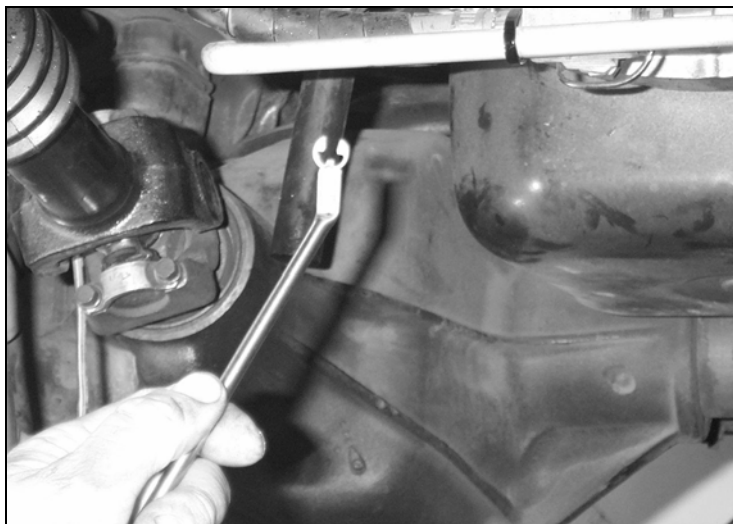
13. Once the valve body is in position, insert the park rod into the manual shift lever and hold the valve body in place with a couple of bolts.



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



"Hockey Stick" Tool



15. Install the valve body mounting bolts, ensuring the different length bolts are installed in the proper positions, and torque evenly to **10 lbs-ft.**

16. 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 to Park. Leave in the neutral position and tighten the retaining bolt.

17. Install the neutral start switch and tighten.

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18. Install the new filter on the valve body using 3 screws, instead of the 2 that the OEM filter was attached with (stock on 97-00 trucks).
19. We suggest 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.
20. 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.

21. 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, seen below.



BD Check Valve Hose



Stock Check Valve Hose

22. When removing the 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 converter.

P/N **1400127** Heat Exchange Fitting (X2)

P/N **1400099** Transmission Line Fitting (X2)



New Fitting



Teflon Fitting

23. When just the valve body is replaced, the transmission will need approximately 8-9 quarts of ATF+3. When both the valve body and torque converter are being replaced, approximately 15-17 quarts are required.

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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!**

24. After a test drive, check the oil levels again. Air locks are common in this transmission.
25. Road test the 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 YOUR 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 CHRYSLER OEM PART # 3515996 WHICH WILL ENSURE THE MODIFIED VALVE BODY DOES NOT LEAK PAST THE FILTER SEAL.

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Kick Down Cable Adjustment

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 a performance product and not stock, therefore the factory specifications for this adjustment are used only as a guide.

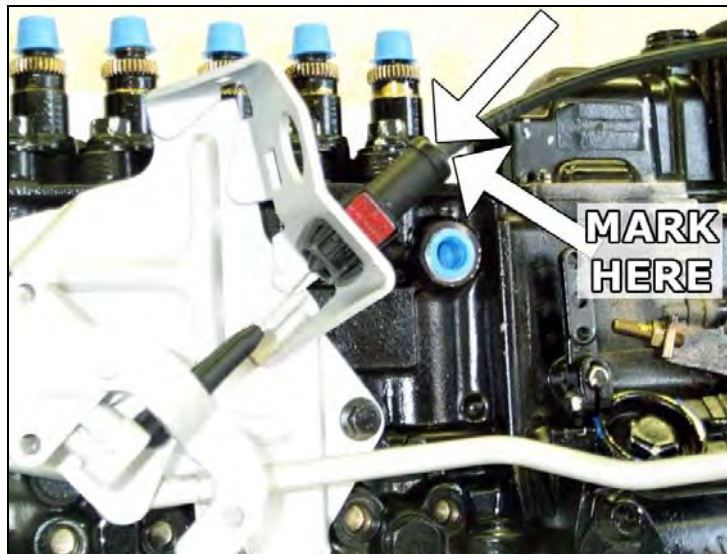
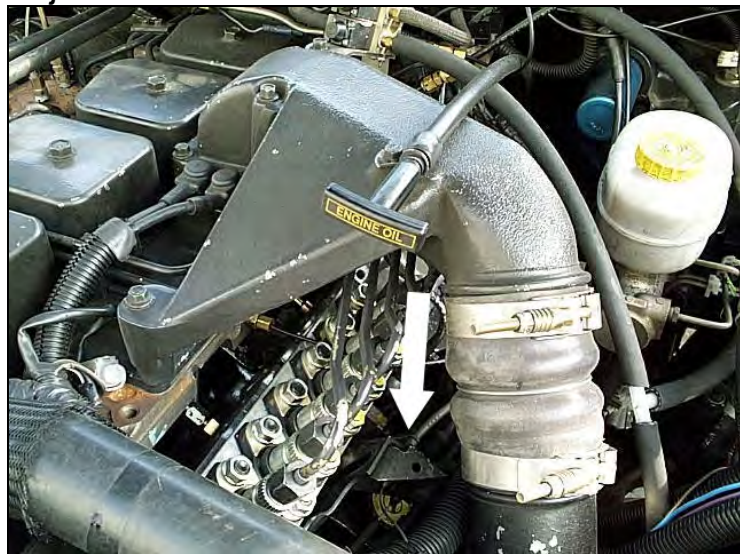
Your drivability and performance demands will determine your shift points and pressure adjustments.

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 Cummins engine (1994-98 12 valve), full throttle shifts between 2nd-3rd gear should occur between 2400–2500RPM (OEM) with the transmission at operating temperature.

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 it without removing the cable.

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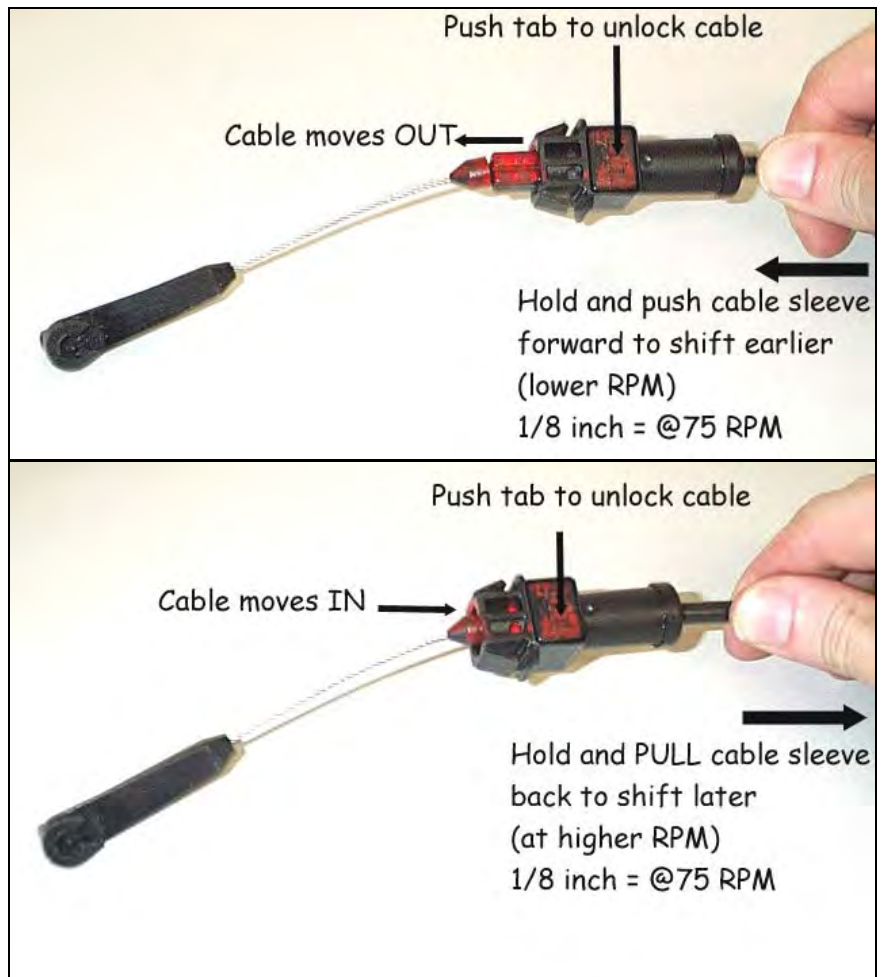
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Press the lock tab (this will take considerable force) to release the locking mechanism.

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

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



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24 VALVE ADJUSTMENTS

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



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.

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.



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Remove the white colored locking clip.

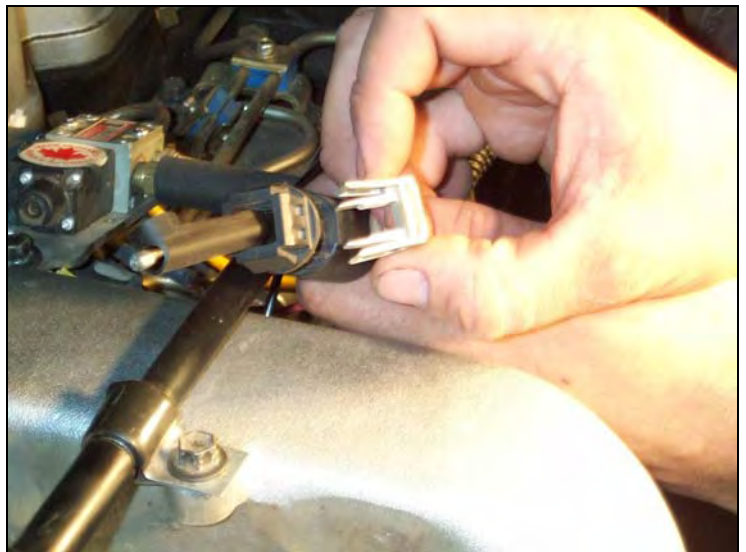
****CAUTION** DO NOT USE A SCREWDRIVER TO PERFORM THIS FUNCTION. IF THE CLIP BREAKS, THE CABLE WILL HAVE TO BE REPLACED.**



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



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

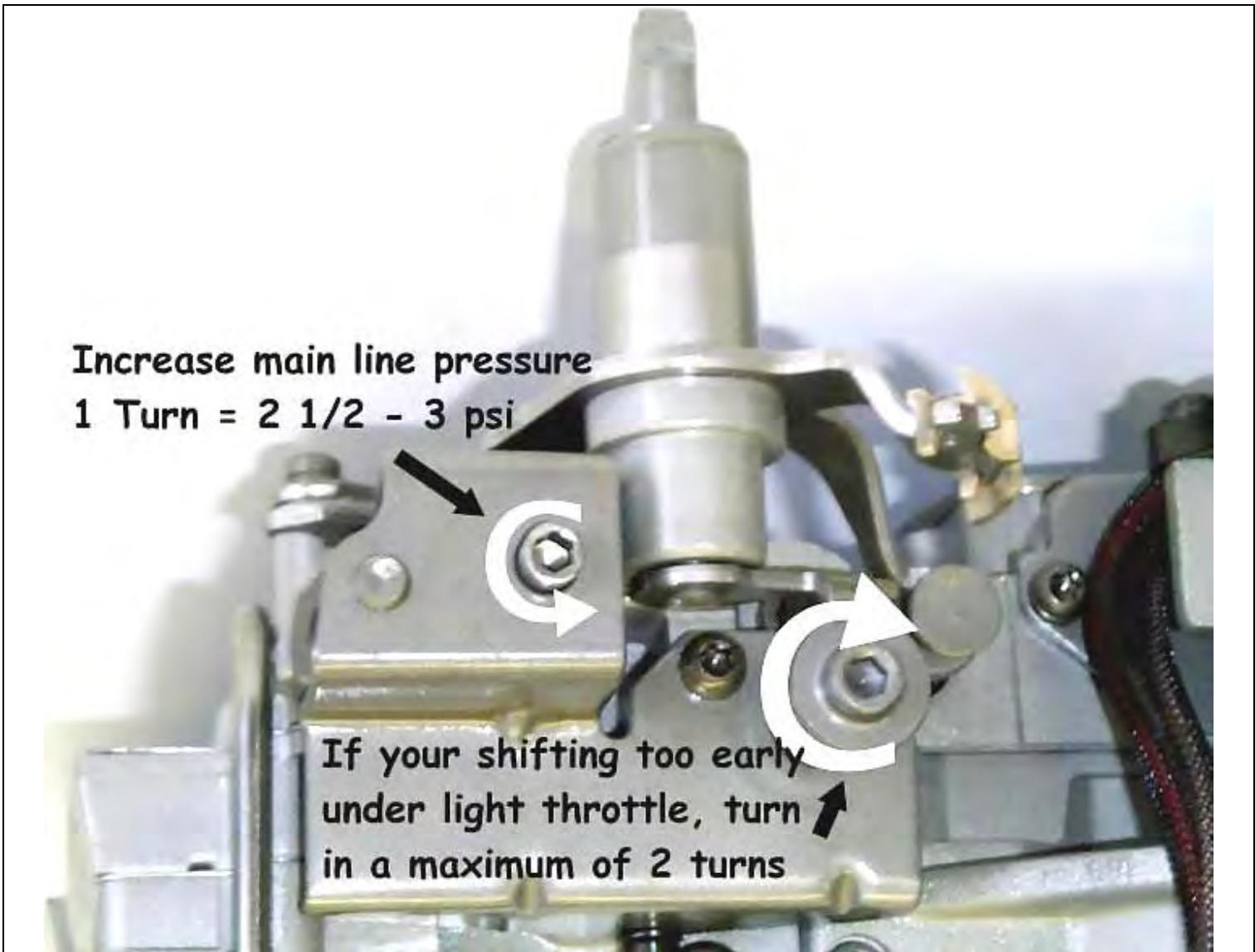
Install plastic cover when job is complete.

Pressure Adjustments

Valve Body pressure adjustments and throttle valve cable adjustments affect each other. For example, if you raise pressure, the transmission may shift sooner and vice versa).

TAKE YOUR TIME WHEN MAKING THESE ADJUSTMENTS TO ENSURE THAT THE 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.



Increase main line pressure
1 Turn = 2 1/2 - 3 psi

If your shifting too early under light throttle, turn in a maximum of 2 turns

1 full turn = ~75 rpm

HARD SHIFTING / 2nd or 3rd GEAR STARTS	DECREASE PRESSURE
LIGHT SHIFTING / STACK SHIFTS	INCREASE PRESSURE

BD ENGINE BRAKE, INC. WARRANTY STATEMENT

BD Engine Brake, Inc. (BD) warrants to the original purchaser that any products purchased shall be free from defective parts and workmanship. A defect is defined as a condition that would render the product inoperable. BD limits the liability to the repair or replacement, at BD's option, of any warrantable product returned with a complete service history and proof of purchase. A valid proof of purchase is a dated bill of sale. Repaired or replaced products shall be returned to the customer freight collect. Accepted warranty units, which have been replaced, become the sole property of BD.

A Return Material Authorization (RMA) number obtained in advance from a BD customer service representative must accompany product returned, with shipping prepaid by the purchaser, for warranty determination. BD will be the final authority on all warranty decisions.

Labor costs incurred by the removal and replacement of a BD product, while performing warranty work, will be covered for 6 months at authorized service centers. Until the product has been approved at the original installing dealer or at one of our distributors, the consumer shall be responsible for these costs.

NOT COVERED UNDER THIS WARRANTY

This warranty shall not apply to any product that has been improperly stored or installed; or to misapplication, improper operation conditions, accidents, or neglect, or which has been improperly repaired or altered or otherwise mistreated by the owner or his agent. This product warranty shall terminate at the end of 12 months or 24,000 miles of service which ever comes first, with the original purchaser.

The nature of this product is PERFORMANCE and is designed to perform above OEM specifications. This product was designed with this in mind and should NOT be used in RACING and/or HIGH HORSEPOWER applications and will only be considered for warranty on vehicles with a maximum of 300 REAR WHEEL HORSEPOWER. Using this product on vehicles with a higher rating will cause premature failure and therefore BD will not consider such claims.

Except as set forth in our product outline, BD disclaims any implied warranties of merchantability and fitness for a particular purpose. BD also disclaims any liability for incidental or consequential damages including but not limited to, repair labor, rental vehicles, hotel cost or any other inconvenience costs. 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.

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