

DESCRIPTION
PAN GASKET
GASKET "C" - CASE SIDE, 1993-2000
GASKET "V" - VALVE BODY SIDE, 1993-2000
GASKET "CA" - CASE SIDE, 2001-2006
GASKET "VB" - VALVE BODY SIDE, 2001-2006
ALUMINUM PLUG, 1/4" DIA x 1/8"
SOLENOID FILTER SCREENS: 1 LARGE + 1 SMALL
SNAP RING, PRESSURE REGULATOR
SPRING, PRESSURE REGULATOR (GREEN)

DESCRIPTION
3/8" SPACER - RED
3/8" SPACER - WHITE
1/2" SPACER - GREEN
19/32" SPACER - VIOLET
5/8" SPACER - YELLOW
3/4" SPACER - BLUE
3/32" (0.094) DRILL BIT
1/8" (0.125) DRILL BIT
ANVIL PLATE

INTRODUCTION

This Shift Improver Kit mechanically recalibrates 1993-2006 GM 4L60E transmissions to produce firmer, more positive shifts, reduce clutch pack heat build-up, and improve transmission life.

This kit does not modify or alter shift point RPM in any range. All shift point RPM and pressure control functions are still controlled by the Powertrain Control Module (PCM).

The B&M Shift Improver Kit is not a cure-all for ailing transmissions. If your transmission is in poor general shape (slipping, overheating, shifting irregularly, etc.), you should have your transmission repaired before (or at the same time as) installing this kit. Installing the kit in a poorly performing transmission may make things worse.

However, on a properly operating transmission in good condition, the Shift Improver Kit will provide the enhanced performance you're looking for.

This kit is designed for transmissions in stock vehicle setups, or vehicles with moderate engine power enhancements. **It is not designed for all-out racing applications.**

The 4L60E transmission is fully controlled by the PCM. All parameters that control fluid pressure, shift point RPM, and torque converter clutch lock-up speed are preprogrammed in the PCM by the manufacturer.

This kit is designed to eliminate the less desirable features of the factory-calibrated shifts. You can configure your transmission to one of two levels of performance, depending on intended use:

Heavy Duty: Passenger cars, street rods, towing, campers, motor homes, police, and taxis. Improved transmission performance without harsh shift feel.

Street / Strip: Dual-purpose performance vehicles — both street, and track/off-road. Firmer, more positive shift feel, yet still suitable for daily driving.

Before starting, take the time to read and understand these instructions.

Also, use the parts list to verify your kit's contents. In the unlikely event that any parts are missing, please contact **B&M Technical Support** for replacements.

In addition to these instructions, use of a shop service manual for your vehicle is also advised.

We recommend that you retain all factory parts.

NOTES

- Installation requires intermediate mechanical skill. If this job is beyond your abilities, seek the services of a qualified technician.
- Transmission components and valves are precision-fit parts. Burrs and dirt are your biggest concern, so a clean work area is absolutely necessary.
- This kit can be installed with the transmission in the vehicle, and these instructions are written assuming that is the case. But note that **most of the photos show a transmission inverted on a work stand, not installed in a vehicle.** Be aware of this when removing the valve body, separator plate, and check balls.
- A transmission-compatible assembly grease (such as Trans-Jel™) will help hold parts in place during assembly.
- When disassembling the valve body, note the following:
 - A. The **lengths and location of all fasteners.**
 - B. The **location of all check balls** in the valve body (7 balls) and transfer plate (1 ball).

Use a digital camera or notebook to capture these details for reassembly later. Immediately place all removed parts into suitable separate containers (plastic trays, bottles, reclosable bags, etc.) to avoid losing or mixing them up.

- If you do not understand any part of these instructions, please call **B&M Technical Support** for assistance.

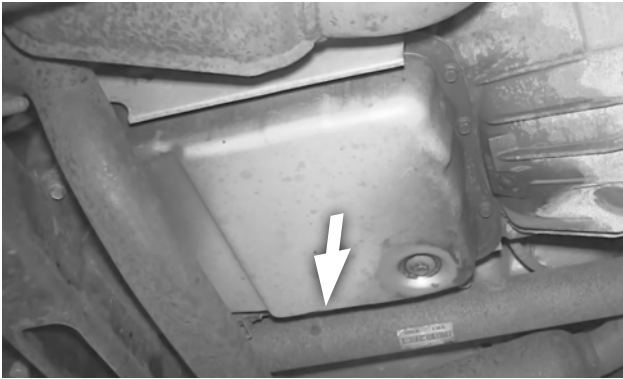
SAFETY

- **WORK SAFELY! Park the vehicle on a clean, level surface.**
- **AVOID SERIOUS INJURY OR DEATH BY CRUSHING! Securely support the vehicle on a lift or jack stands. Use a lift, or jack and jack stands, to raise the vehicle to the height necessary to remove the transmission.**

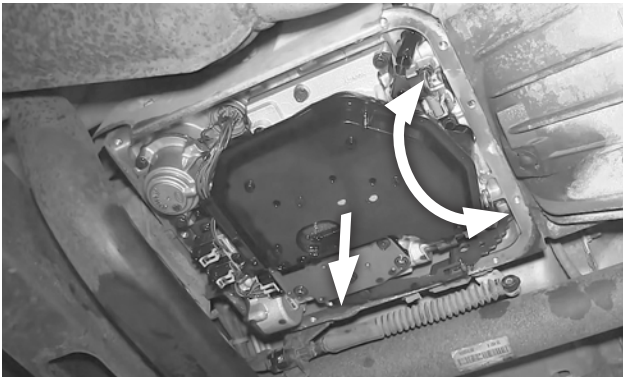
WARNING: NEVER work under a vehicle that is supported only by jacks!

- **AVOID BURNS! Automatic transmissions typically operate at 150–200°F. Allow the transmission to cool down sufficiently before starting work.**

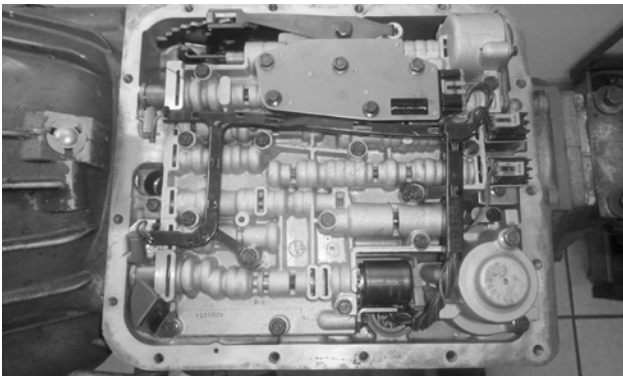
REMOVE THE VALVE BODY



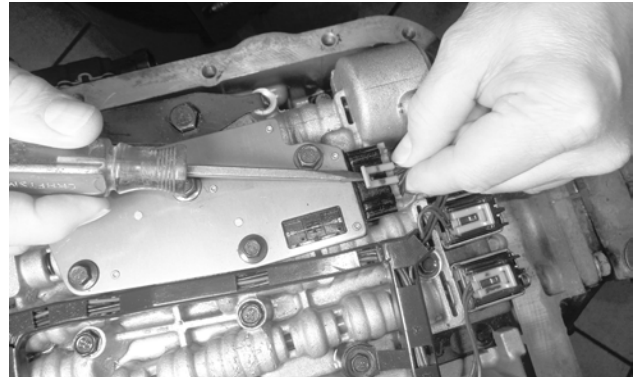
1. **Drain and remove the oil pan.** If your transmission has a drain plug, remove it and allow the fluid to drain. If not, loosen all 16 oil pan screws, then remove them, working front-to-rear. If the pan sticks to the gasket, gently break the seal with a screwdriver before loosening the last two screws. Remove the screws slowly, allowing the pan to tilt down to drain the remaining fluid. After the pan is removed, set it aside. (If your oil pan does not have a drain plug, consider installing **B&M Drain Plug Kit 80250**.)



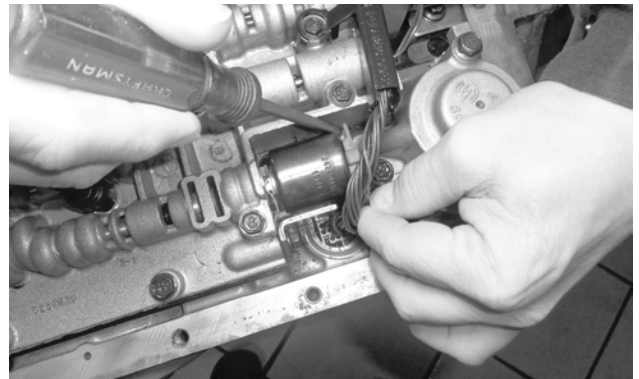
2. **Remove the oil filter** by gently twisting it back and forth while pulling straight down. Inspect the filter. If it is clogged, or if the transmission has 25,000 to 30,000 miles since its last service, replace the filter.



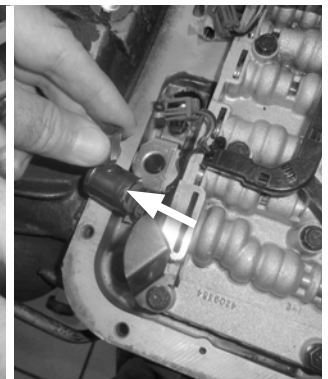
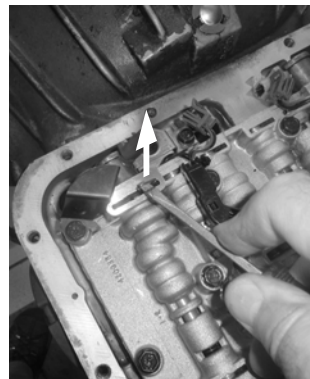
3. **There are various harness configurations for the 4L60E.** Take some photos of your harness layout and connections, or make a sketch and some notes, for ease of re-assembly.



4. **Release the electrical connector latches**, and remove the connectors, using a small, flat-tip screwdriver as shown.

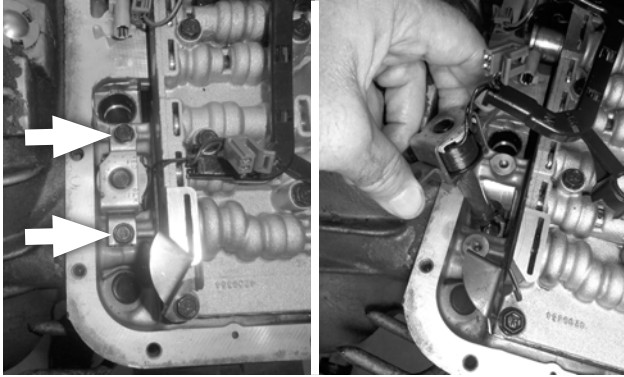


5. **If the EPC solenoid connector is different from the others**, note that its latch is in the center of the connector on the edge facing the valve body. Release the latch with a flat-tip screwdriver and remove the connector.

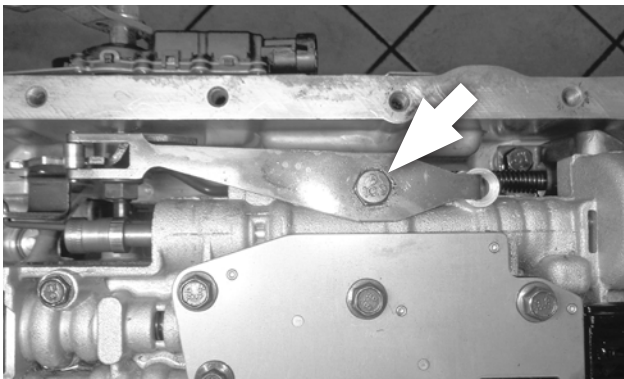


6. **On 1995+ models, the PWM solenoid must be removed** to access the TCC solenoid screws (**Step 7**). Rotate the PWM solenoid until the flat section of the retaining clip is visible at the slot. Use a flat-tip screwdriver to remove the clip, then remove the solenoid from the valve body.

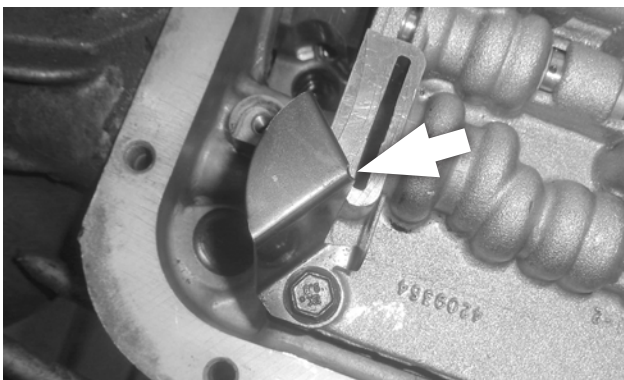
NOTE: For ease of re-assembly, note the length and location of all screws when removing the valve body and surrounding items.



7. Remove the 2 TCC solenoid screws (10mm head; 1/2" long), then remove the solenoid by gently twisting it back and forth while pulling straight down. Move the solenoid and harness aside, and secure them out of the way.

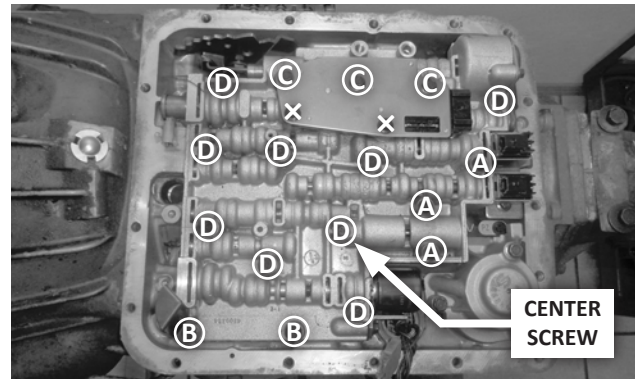


8. Remove the detent spring screw (13mm head; 3/4" long) and detent spring.

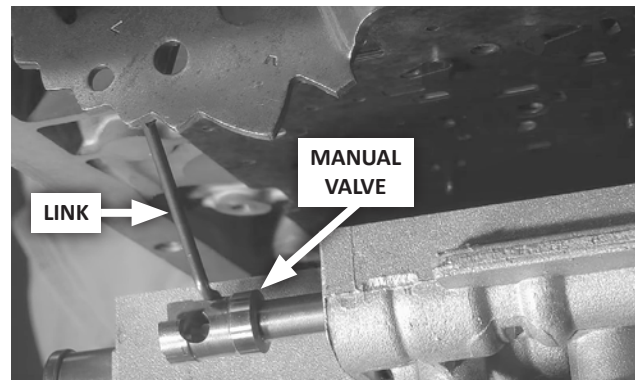


9. Before removing the valve body screws, note the alignment of the dipstick shield on the valve body (varies between models) for reassembly later.

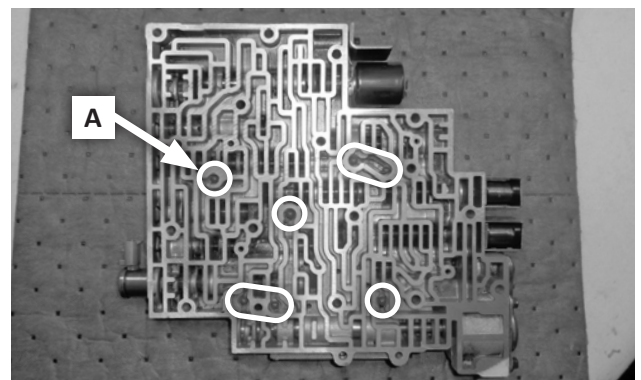
CAUTION: At Step 10, do not remove the 2 screws marked "X" (8mm head), as they only secure the manifold pressure switch to the valve body.



10. Remove 16 (of 17) valve body screws. Leave the center screw in place until the valve body is removed at Step 11.
- 3 screws "A" (8mm head; 2-1/8" long)
 - 2 screws "B" (10mm head; 1-3/8" long) + dipstick shield
 - 3 screws "C" (10mm head; 2-1/2" long)
 - 8 (of 9) screws "D" (10mm head; 1-7/8" long)

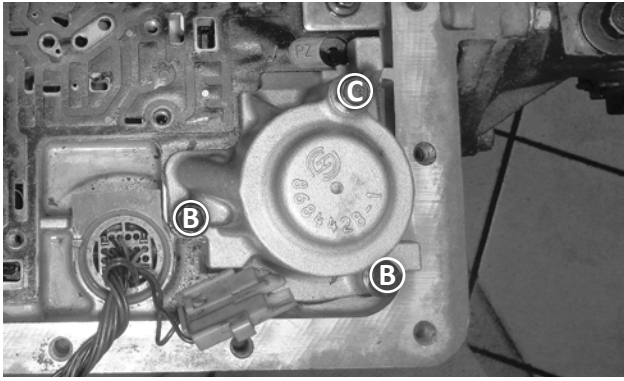


11. While supporting the valve body with one hand, remove the last screw. Lower the valve body carefully, keeping it level to avoid losing any check balls. Let the manual link fall out of the end of the manual valve.



12. Lay the valve body flat on a clean work surface. Remove the 7 check balls from the locations shown, and place them in a suitable container (small bottle or reclosable bag) to avoid losing them.

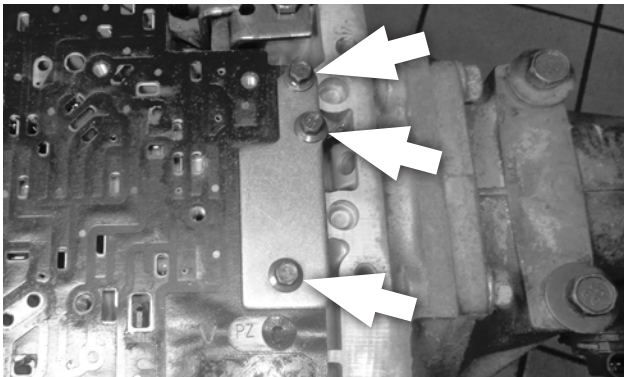
CAUTION: Check ball "A" may be stuck in the separator plate due to repeated impact over time. If it is stuck, it will be removed at Step 15.



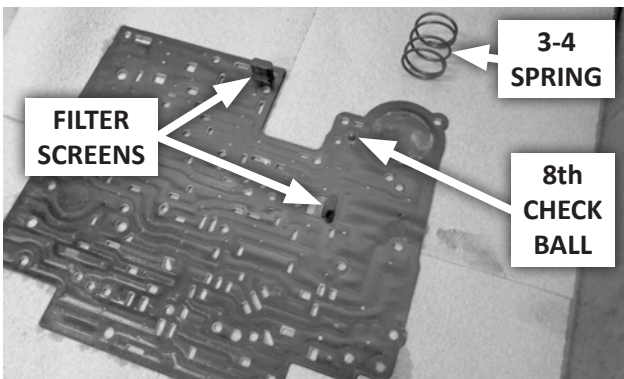
13. Remove the 3 screws, the accumulator housing, and the 1-2 spring.

- 2 screws "B" (10mm head; 1-3/8" long)
- 1 screw "C" (10mm head; 2-1/2" long)

NOTE: On 1993 transmissions, the 1-2 spring sits between the 1-2 piston and the separator plate. On 1994+ models, it sits inside the accumulator housing (i.e., between the piston and the housing). See the drawings at Step 27 for reference.

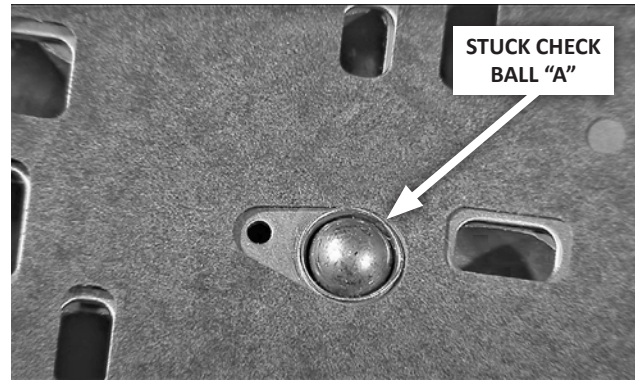


14. Remove 2 (of 3) stiffener plate screws (8mm head; 3/4" long). While supporting the separator plate with one hand, remove the last stiffener plate screw.



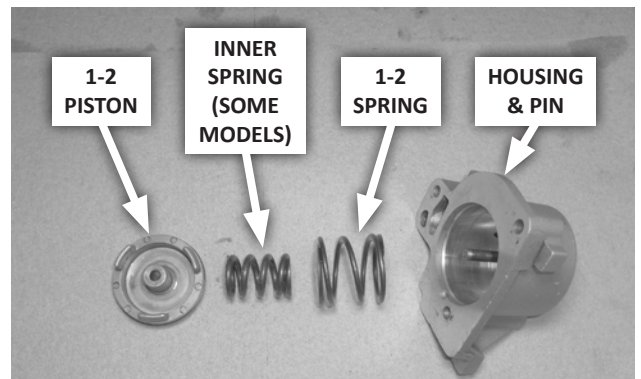
15. Lower the separator plate carefully, keeping it level to avoid losing the 8th check ball and the 3-4 accumulator spring. Remove the 8th check ball (and check ball "A", if it's stuck in the separator plate), and place it with the others.

NOTE: If check ball "A" is stuck in the separator plate, it should push out easily from the top side.

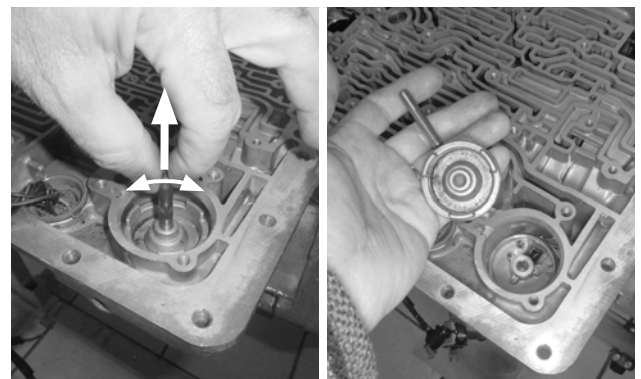


CAUTION: If check ball "A" is stuck in the hole so badly that it requires tools to remove it, see a qualified transmission technician. You will need to replace the separator plate, and your transmission may have a damaged band and 3-4 clutch pack.

Set the 3-4 accumulator spring aside. Push the 2 solenoid filter screens out of the separator plate and discard.

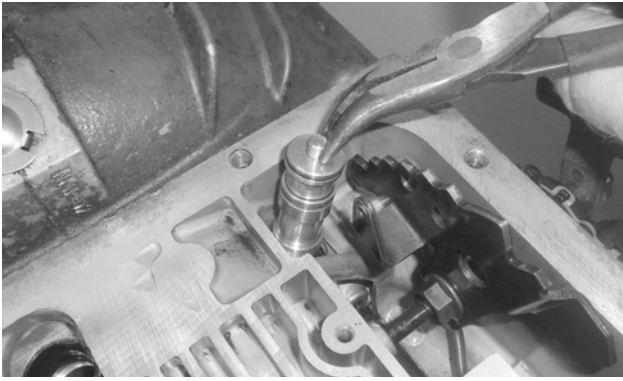


16. Hold the accumulator housing in your open hand (piston down), and tap the housing vigorously with a plastic hammer or large screwdriver handle. This will dislodge the piston (and spring(s), for 1994+ models) into your hand.

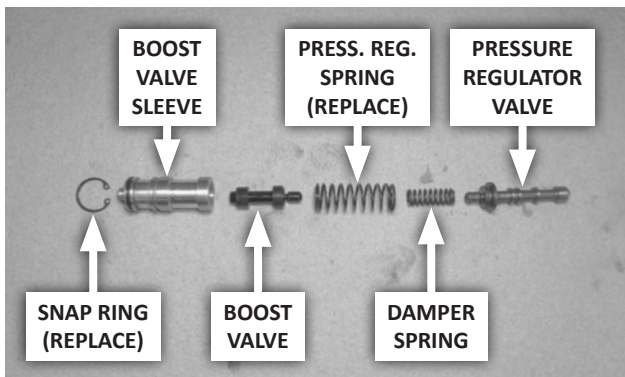


17. Remove the 3-4 pin and 3-4 piston from the case. It helps to remove the piston by pulling the pin most of the way out, then wiggling it from side to side to "walk" the piston out of its bore.

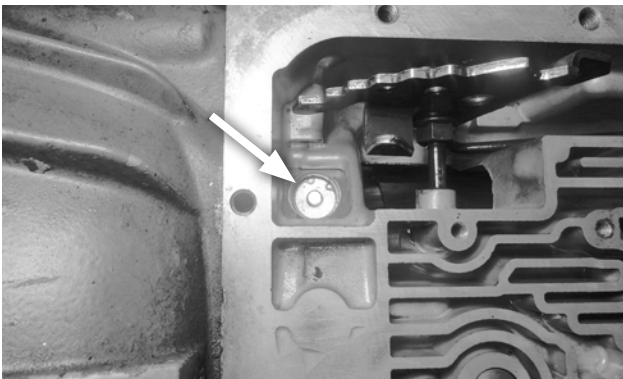
MODIFY THE PRESSURE REGULATOR



18. Remove the pressure regulator snap ring, followed by the boost valve sleeve, boost valve, pressure regulator spring, and damper spring (see photo at Step 19). The pressure regulator valve may fall out of the case, but it does not need to be removed.



19. Reassemble the pressure regulator as shown, using the **B&M pressure regulator spring (green)**.

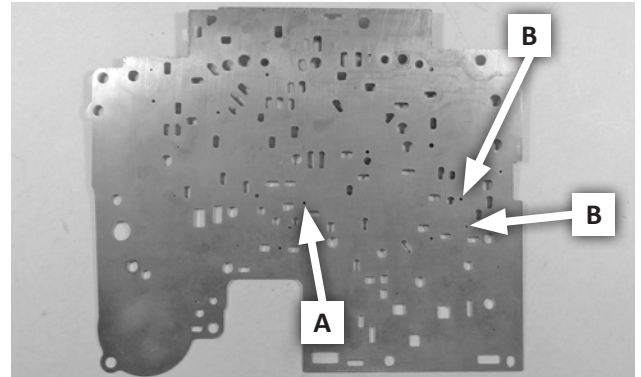


20. Reinstall the pressure regulator assembly in the case, using the **B&M snap ring**.

CAUTION: The retaining ring must be fully seated in its groove. If it isn't, the pressure regulator assembly will blow out of its bore, and there will be no line pressure.

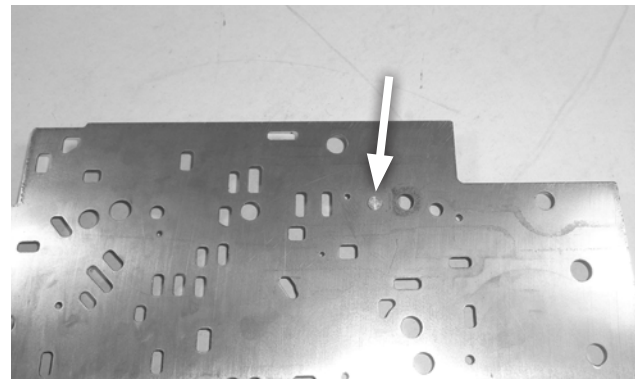
MODIFY THE SEPARATOR PLATE

21. Remove the gaskets from the separator plate. Use a razor blade to remove any gasket material that sticks to the plate. Then clean the separator plate with a suitable solvent.
22. Inspect the separator plate for any deformed check ball holes — for example, if you found check ball “A” stuck in its hole at Step 12. If you find a deformed hole, place it on an anvil, and reform the hole with many light hammer blows.

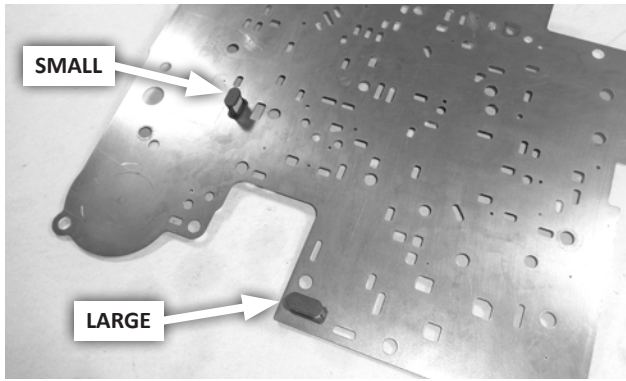


HEAVY DUTY	STREET / STRIP
A: 3/32"	A: 3/32"
B: 3/32"	B: 1/8"

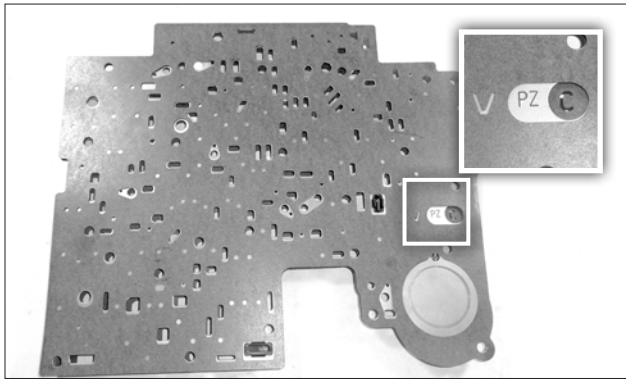
23. Drill the separator plate as shown, according to the desired performance level, using the supplied **drill bits**. Deburr the drilled holes, and wipe the plate clean with a suitable solvent.



24. Insert the **aluminum plug** in the hole shown. Support the separator plate and plug on the supplied **anvil plate** (or another hard, flat surface), and strike the small end of the plug squarely with a hammer topeen it into place.



25. Snap the 2 solenoid filter screens into their respective holes as shown.



26. Stack the 2 gaskets and the separator plate as shown. Select the proper gaskets based on the model year of your transmission.

- Gaskets "C" and "V" are for 1993-2000
- Gaskets "CA" and "VB" are for 2001-2006

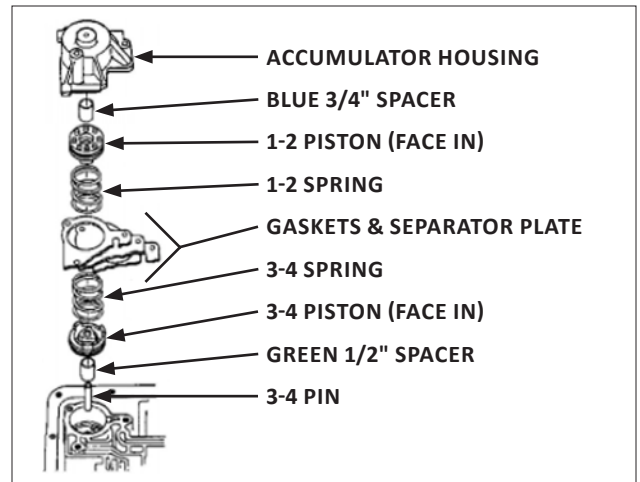
NOTE: When the gaskets and separator plate are stacked correctly, the stamped codes on all 3 pieces will be visible from the valve body side.

Use a transmission-compatible assembly grease (such as Trans-Jel) to hold gaskets and separator plate together during installation.

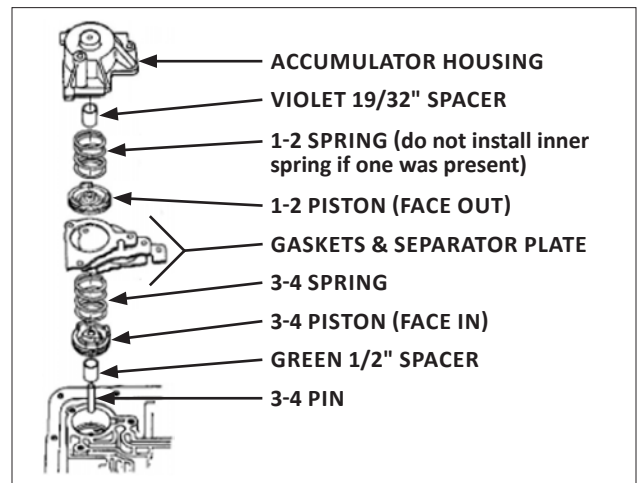
MODIFY THE ACCUMULATORS

27. FOR HEAVY DUTY APPLICATIONS:

AT THE CASE (both drawings below): Insert the 3-4 accumulator pin, followed by the **green 1/2" spacer** and 3-4 piston (face in). (The 3-4 spring will be installed at **Step 30.**) Use transmission-compatible assembly grease to hold the components in place, if required.



IN THE 1993 ACCUMULATOR HOUSING: Install the **blue 3/4" spacer** over the center pin, followed by the 1-2 piston (face in, as shown), and spring.

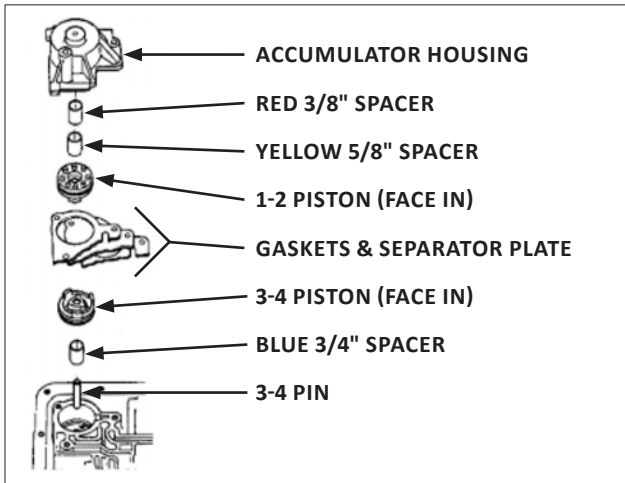


IN THE 1994-2006 ACCUMULATOR HOUSING: Install the **violet 19/32" spacer** over the center pin, followed by the 1-2 spring, and piston (face out, as shown).

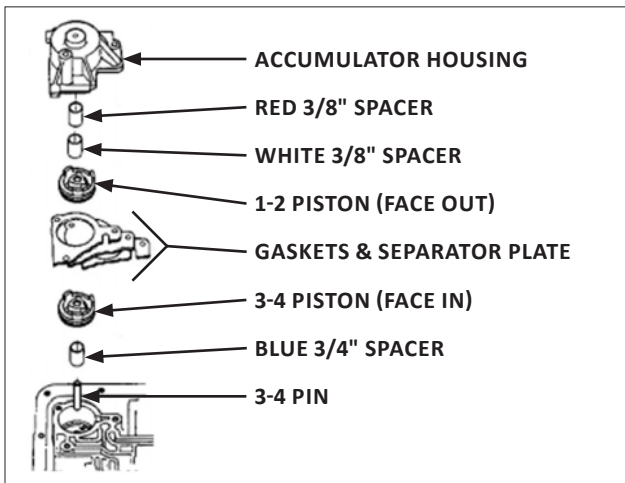
28. FOR STREET / STRIP APPLICATIONS:

NOTE: The 1-2 and 3-4 accumulator springs are not used for the Street / Strip configuration.

AT THE CASE (both drawings below): Insert the 3-4 accumulator pin, followed by the **blue 3/4" spacer** and 3-4 piston (face in).



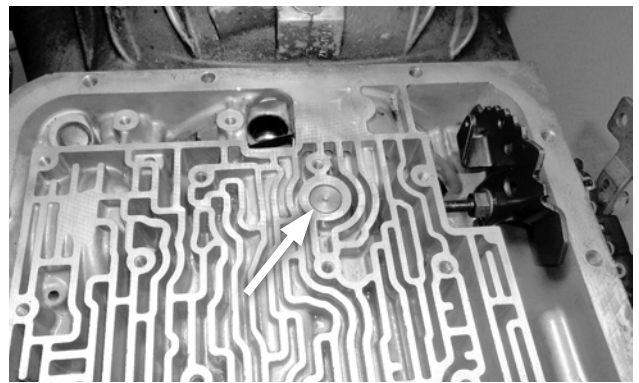
IN THE 1993 ACCUMULATOR HOUSING: Install both the **red 3/8"** and **yellow 5/8" spacers** over the center pin, followed by the 1-2 piston (face in, as shown).



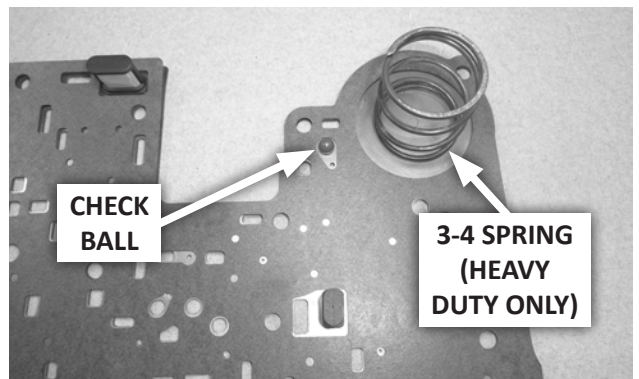
IN THE 1994-2006 ACCUMULATOR HOUSING: Install both the **red 3/8"** and **white 3/8" spacers** over the center pin, followed by the 1-2 piston (face out, as shown).

CHECK THE PISTON-SPACER STACKUP (STREET / STRIP CONFIGURATION ONLY): With the pistons and spacers installed in their respective bores (3-4 piston in the case; 1-2 piston in the accumulator housing), gently drag a straightedge across each bore to verify that its piston does not sit above the surface. If the straightedge contacts either piston, shorten its spacer with a file until the straightedge just clears the piston.

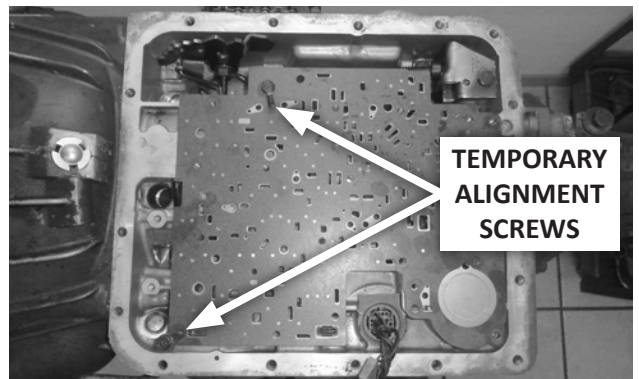
REASSEMBLE THE TRANSMISSION



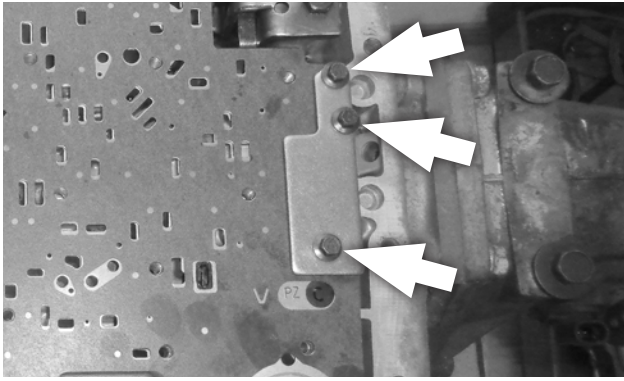
29. Verify that the 2-4 band anchor is still in place in the transmission case, and that it sits below the case's machined surface.



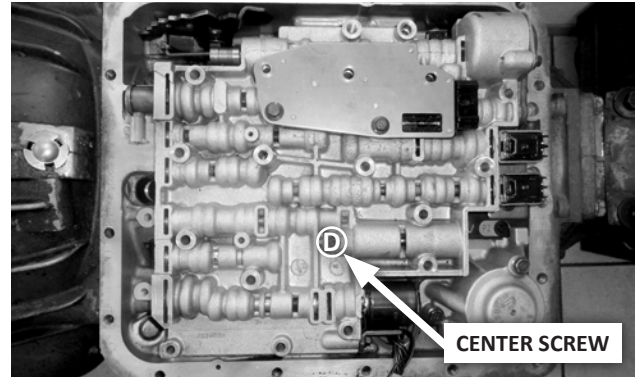
30. Place a check ball (and 3-4 spring, for HEAVY DUTY APPLICATIONS ONLY) on the separator plate as shown. Use transmission-compatible assembly grease to hold the check ball in place during installation



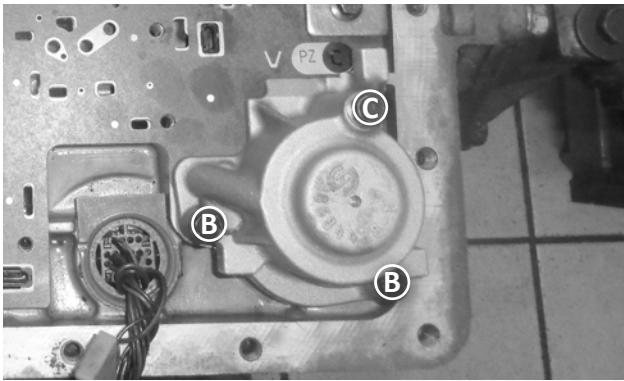
31. Carefully move the stacked plate-and-gasket, with the check ball (and 3-4 spring, if applicable) into place against the transmission case. Align the gaskets and separator plate to the case by temporarily threading 2 valve body screws (of any length **except the three 3/4" stiffener plate screws, which will be used in **Step 32**) into the 2 holes as shown.**



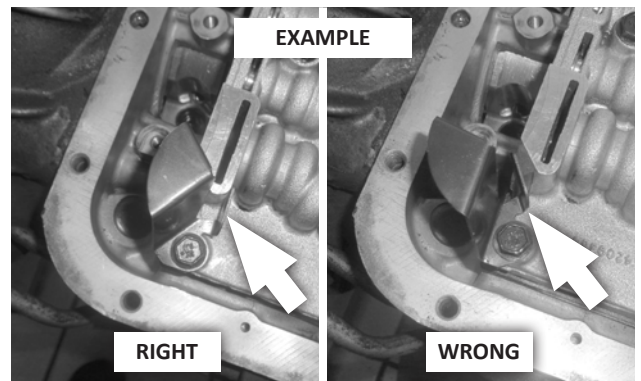
32. Install the stiffener plate with the three 3/4" screws (finger-tight only).



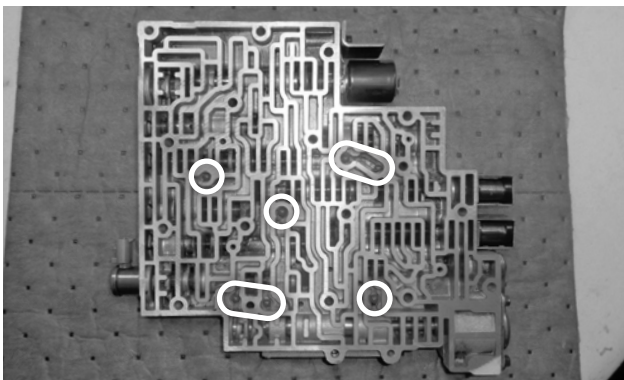
35. Raise the valve body into position at the transmission case, and insert the manual link fully into the end of the manual valve. Then hold the valve body against the case, and install the center "D" screw (10mm head; 1-7/8") finger-tight only.



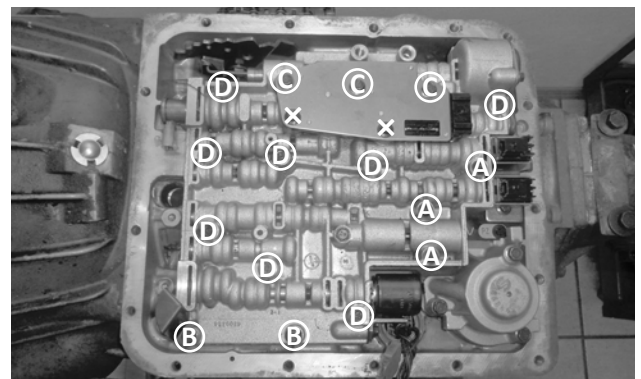
33. Install the accumulator housing (and ON 1993 HEAVY DUTY APPLICATIONS ONLY, the 1-2 accumulator spring) with 2 screws "B" (10mm head; 1-3/8") and 1 screw "C" (10mm head; 2-1/2"). Tighten the accumulator housing screws and stiffener plate screws to 120 in-lbs. Then remove the 2 temporary aligning screws installed at Step 31.



NOTE: When installing the dipstick shield at Step 36, be sure that it is aligned on the valve body as originally noted at Step 9 (varies by model).



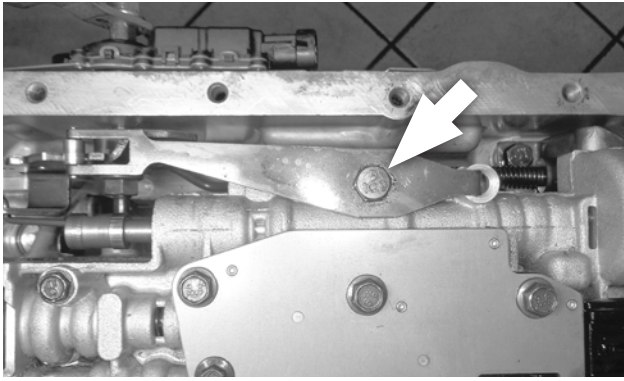
34. Install the 7 remaining check balls in the valve body at the locations shown. Use transmission-compatible assembly grease to hold the check balls in place during valve body installation.



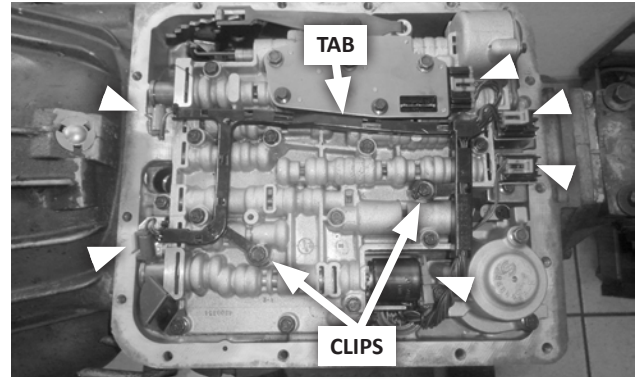
36. Install the remaining 16 valve body screws (finger-tight only) and dipstick shield as shown.

- 3 screws "A" (8mm head; 2-1/8")
- 2 screws "B" (10mm head; 1-3/8")
- 3 screws "C" (10mm head; 2-1/2")
- 8 screws "D" (10mm head; 1-7/8")

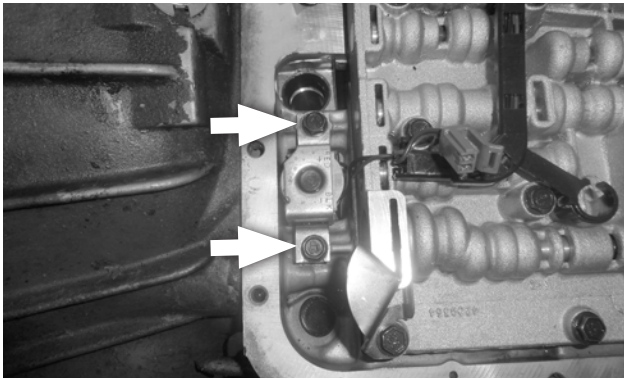
Tighten the 17 valve body screws to 120 in-lbs.



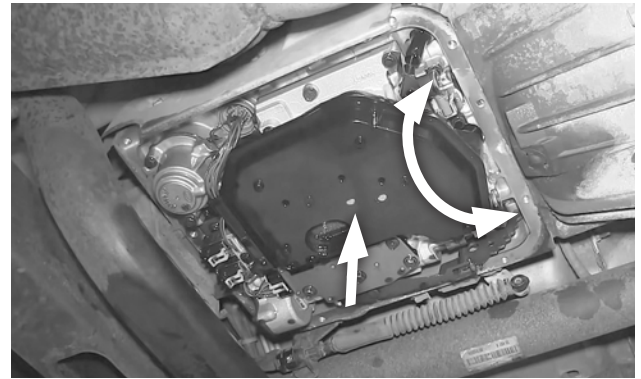
37. Install the detent spring and screw (13mm head; 3/4" long), and tighten the screw to 200 in-lbs.



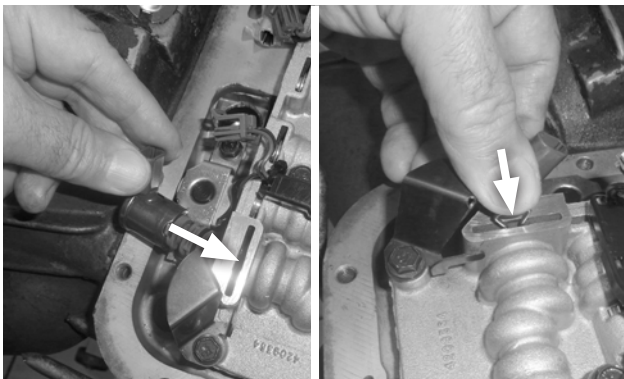
40. Install all electrical connectors, and press the plastic electrical harness frame into place on the valve body.



38. Install the TCC solenoid and 2 screws (10mm head; 1/2" long). Tighten the screws to 120 in-lbs.



41. Install the oil filter by gently twisting it back and forth while pushing it into its bore.



39. Install the PWM solenoid in its bore, then install its retaining clip.



42. Install the oil pan and new gasket with 16 pan screws. Tighten screws in an alternating pattern to 120 in-lbs.

CAUTION: Prevent oil pan leaks! Do not over-tighten the pan screws.

SERVICE TRANSMISSION WITH FLUID

CAUTION: Do not overfill! This will cause foaming and overheating.

1. With the vehicle sitting on level ground, add 5 quarts of transmission fluid.
2. Start the engine, and run the shifter slowly through the entire gear range and back. With the engine still running and the shifter in NEUTRAL, check the fluid level.
3. Each time you add fluid, run the shifter slowly through the entire gear range, then recheck the fluid level in NEUTRAL.
4. Add fluid as needed to bring the level to the COLD LOW mark on the dipstick.
5. Take the vehicle for a short drive (5-10 mins.) to bring it up to operating temperature.
6. Stop the vehicle on level ground, and run the shifter slowly through the entire gear range.
7. Fluid level should be between the HOT LOW and HOT FULL marks with the transmission at operating temperature, the vehicle on level ground, and the shifter in NEUTRAL.
8. If not, gradually add fluid, run the shifter through its range, and recheck until the fluid level is between the HOT LOW and HOT FULL marks.

Minor adjustments in shift points can be made once filling is complete. Shortening the throttle pressure rod will lower the shift points; lengthening the rod will raise them.

TROUBLESHOOTING GUIDE

1. HIGH OR LOW OIL PRESSURE

Oil Pump:

- Pressure regulator valve stuck
- Pressure regulator snap ring not fully seated in groove
- Orifice in pressure regulator boost valve sleeve plugged

Oil Filter:

- Filter intake tube cracked
- Intake tube seal damaged
- Incompatible assembly grease used (clogging filter)

Valve Body Assembly:

- Gaskets and separator plate misassembled or damaged
- Check ball(s) omitted or mislocated
- Incompatible assembly grease used (clogging solenoid filter)

2. HARSH SHIFTS

Valve Body Assembly:

- Wrong holes drilled
- Gaskets and separator plate misassembled or damaged
- Check ball(s) omitted or mislocated

3. INCONSISTENT SHIFT POINTS

Valve Body Assembly:

- Gaskets and separator plate misassembled or damaged

External linkage:

- Manual shift lever linkage misadjusted

4. NO or SLIPPING 1st GEAR

1-2 Accumulator:

- Damaged or missing piston seal
- Spacer(s) holding piston(s) above case surface

Low Oil Pressure:

- (see 1 above)

Valve Body Assembly:

- Gaskets and separator plate misassembled or damaged
- Check ball(s) omitted or mislocated
- Solenoid disconnected or damaged
- 2-4 band anchor missing

5. NO or SLIPPING 2-3 SHIFT

Valve Body Assembly:

- Gaskets and separator plate misassembled or damaged
- Solenoid disconnected or damaged

6. NO or SLIPPING 3-4 SHIFT

Valve Body Assembly:

- Gaskets and separator plate misassembled or damaged
- Solenoid disconnected or damaged

3-4 Accumulator:

- Damaged or missing piston seal

7. NO or SLIPPING REVERSE

Valve Body Assembly:

- Gaskets and separator plate misassembled or damaged

Oil Pump:

- Pressure regulator snap ring not fully seated in groove

8. NO TCC APPLY

TCC Solenoid:

- Solenoid disconnected or wiring damaged

Congratulations, your B&M Shift Improver Kit is now installed and ready to enjoy!

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

B&M Performance maintains a highly-trained technical service department to answer your technical questions, provide additional product information and offer various recommendations.

B&M TECHNICAL SUPPORT: (866) 464-6553

