



# Installation Instructions

## Shift Improver Kit

### for

# 1988 and Later TurboHydramatic 400

## TH-400/TH-475 (3L80/3L80-HD)

Part No. 20261

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**IMPORTANT MANUFACTURING DATE CHECK:** Hydramatic introduced a revised transmission case just after the beginning of the 1988 model year. If you are installing the **B&M TH-400 Shift Improver Kit** in a 1988 vehicle you must check the Julian date stamped on the transmissions I.D. tag (**See Fig. 1**) before attempting to install this kit. Do not use this kit (**#20261**) in transmissions built **before** November 23, 1987 (Julian date 327), use instead our **#20260 Shift Improver Kit** which is designed to be used with the earlier style case. If the I.D. tag is unreadable or missing you will have to remove the oil pan and valve body from the transmission to determine if your transmission has an early or late style case (**See Fig. 2**). The manufacturing date check applies only to 1988 transmissions, this kit (**#20261**) will work correctly in all subsequent application years specified in the heading of these instructions.

**We recommend that you read through the instructions completely before beginning the installation so you can familiarize yourself with the installation procedure and tools required.**

**Check the tool list at the rear of the instructions to make sure no**

**parts are missing and you have the tools required to install your B&M TH-400 Shift Improver Kit.**

Installation of the **B&M TH-400 Shift Improver Kit** can be accomplished by anyone with minimum mechanical experience. It is however, important to closely follow the instructions. Read each step carefully before proceeding, if you do not understand, go back and read the step again. Installation of the kit can be accomplished in several hours.

**NOTICE:** The **B&M TH-400 Shift Improver Kit** is not a cure-all for an ailing transmission. If your transmission is slipping, chatters or is in poor general shape, the installation of this Transpak may worsen the condition. However on a properly operating transmission in average condition, the **B&M TH-400 Shift Improver Kit** will provide the kind of transmission performance you are looking for.

When installing your **B&M TH-400 Shift Improver Kit** there are several other **B&M** performance products you may wish to consider:

**TRANSMISSION OIL COOLER** We feel that it is very important that every vehicle used in heavy duty and hi performance applications (racing, towing, RV, etc.) should have an oil cooler.

Heat is the major cause of transmission failures, and an oil cooler is an inexpensive safeguard against overheating and transmission failure. **B&M** offers a wide variety of transmission coolers to suit every application.

**TRICK SHIFT PERFORMANCE ATF #80259** Trick Shift performance automatic transmission fluid is the industry's only real performance **ATF**. A specially blended oil with foam inhibitors, extreme pressure agents and shift improvers, this fluid assures protection while delivering the fastest possible shifts. You literally "Pour in performance."

**DRAIN PLUG KIT #80250** The TH-400 transmission is not factory equipped with a drain plug. The **B&M** Drain plug kit is inexpensive and easy to install. It eliminates the mess of pan removal and gasket replacement normally required when changing fluid.

**DEEP PAN #20289** **B&M** offers deep pans for the TH-400 transmission that provide 3 to 4 quarts additional oil capacity which significantly contributes to the cooling ability of the oil. No modifications to the dip stick are necessary and a fluid pickup extension is provided.

**TORQUE CONVERTERS** **B&M** offers a wide range of street torque convert-

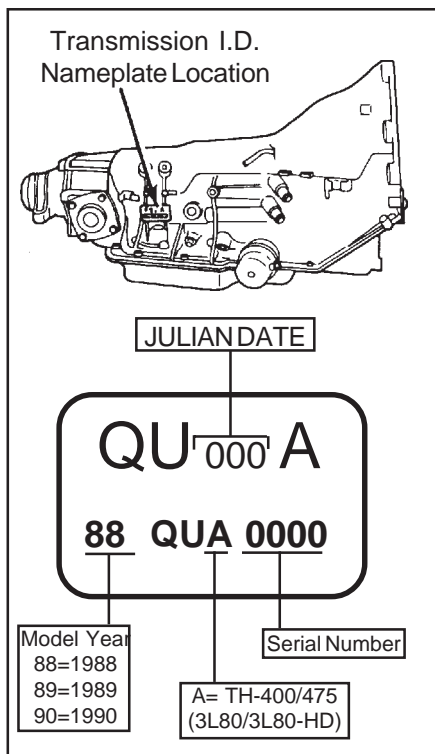


Figure 1

ers for the TH-400 transmission. See your B&M dealer for details of the correct torque converter for your vehicle.

**ADJUSTABLE VACUUM MODULATOR #20234** This replacement vacuum modulator for the TH-400 has the added feature of being adjustable. The adjustable feature allows you to tailor your shift points within a range of 2-4 mph.

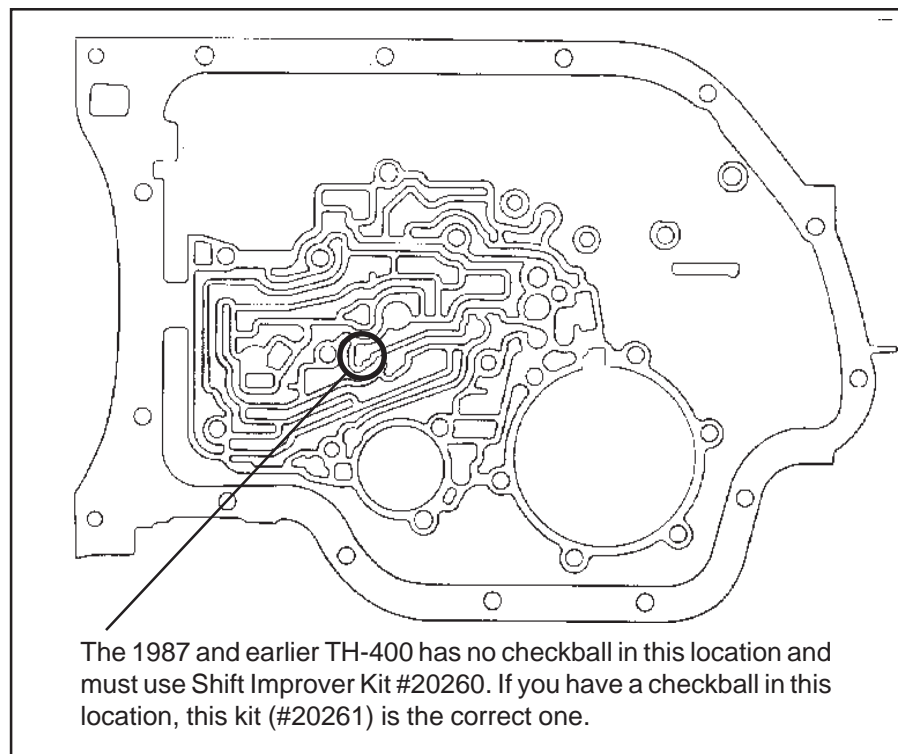


Figure 2

**FILTER SERVICE KIT #20287** The filter service kit replaces the stock factory filter with a special filter that uses a much finer felt micronic element which also has more total filter area so that the finer filtering element does not cut down on oil flow. This kit includes a special heavy duty oil pickup tube that is seated to the case with a double O-ring seal and is spring loaded

to eliminate air leakage.

**TEMPERATURE GAUGE KIT #80212**

Most transmission and converter failures can be traced directly to excessive heat. The B&M transmission temperature gage can save you a costly repair bill by warning you ahead of time of an overheated transmission. The B&M temperature gage is extremely accurate and dependable, it comes with all necessary hardware and is easy to install.

**B&M SHIFTERS; B&M** manufactures a complete line of automatic transmission shifters ideally suited for use with the TH-400. These shifters provide you with positive transmission control as well as stylish appearance for your vehicles interior.

**TH-400 KICKDOWN SWITCH #20297**

When installing a TH-400 transmission in a custom installation in place of a TH-350 or a TH-700 this kit provides a kickdown switch that will fit into the TH-350 or TH-700 throttle cable bracket.

**INTRODUCTION**

Transmission components are precision fit, work slowly and do not force any parts. Burrs and dirt are the number one enemies of an automatic transmission. Cleanliness is very important, so a clean work surface is necessary.

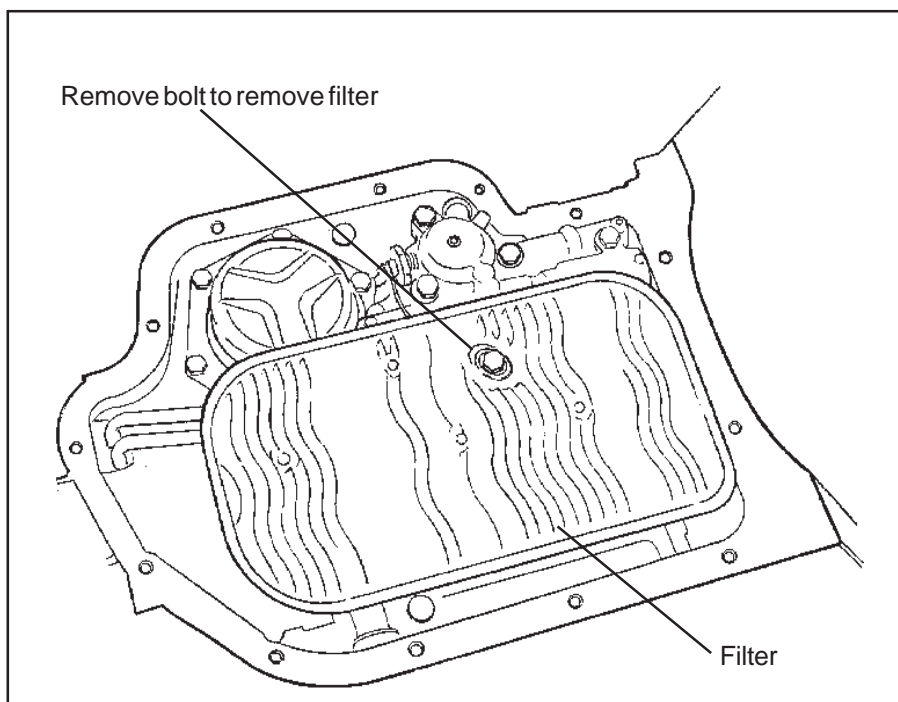


Figure 3

We suggest a clean work bench from which oil can be easily cleaned or a large clean piece of cardboard could also work.

This kit contains all the parts necessary to obtain two different levels of performance, depending on the vehicles intended use:

1. **Heavy Duty**; Towing, campers, motor homes and 4-wheel drive vehicles. Heavy Duty level is a good starting place for light weight, high powered vehicles such as street rods. Heavy duty level produces firm noticeable shifts.

2. **Street**; Dual purpose performance vehicles, street and strip performance cars and, off road vehicles. Street level produces very firm, positive shifts.

### DISASSEMBLY

Automatic transmissions operate at temperatures between 180°F and 240°F. We recommend that the vehicle be allowed to cool for several hours before attempting disassembly to avoid serious burns from hot oil and parts. The vehicle should be raised so there is at least 2 feet ground clearance for ease of installation and safety.

**MAKE SURE THE VEHICLE IS RIGIDLY AND SECURELY SUPPORTED, JACK STANDS, WHEEL RAMPs OR A HOIST WORK BEST, DO NOT USE JACKS ALONE.**

**STEP 1.** Have an oil drain pan ready to catch oil and a clean tray on which to put small parts so they won't get lost or dirty. Drain the oil by removing the rear pan bolts and work towards the front leaving the two front bolts in place. If the pan is stuck to the case pry the pan loose with a screw driver. Slowly remove the remaining two front bolts allowing the rest of the fluid to drain.

**STEP 2.** Oil filter removal (See Fig. 3): Remove the shoulder bolt holding the filter then pull the filter straight down. Some models also use a spacer between the filter and valve body. Watch out for oil splatter. If the oil pick-up tube did not come out with the filter, pull it out. Remove the O-ring from the bore in the case if it did not come out with the oil pick-up tube. Be careful not to scratch the case bore when removing the O-ring.

**STEP 3.** Observe the location of the

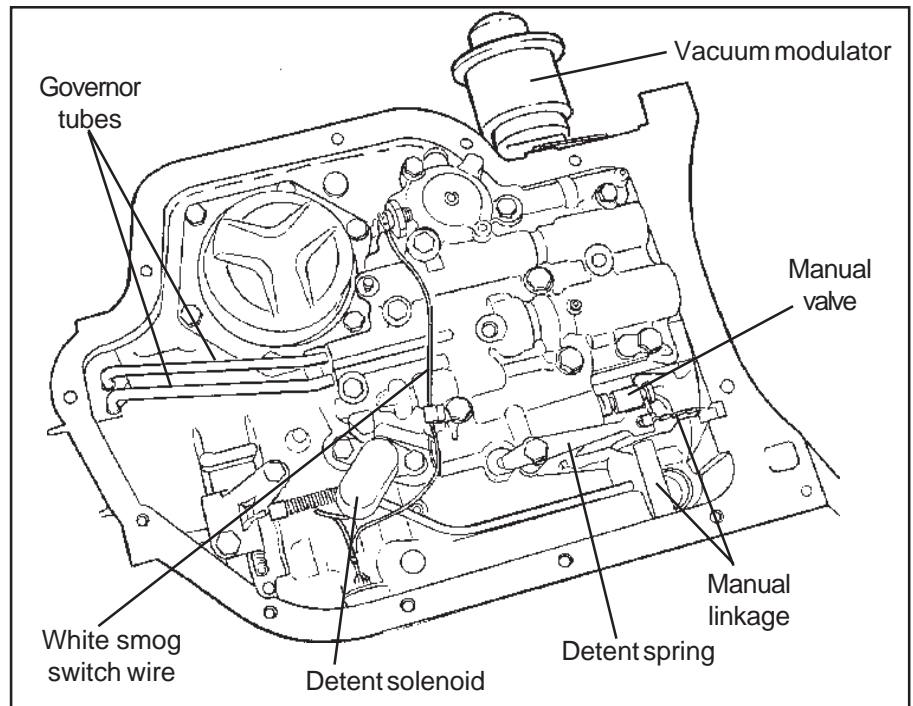


Figure 4

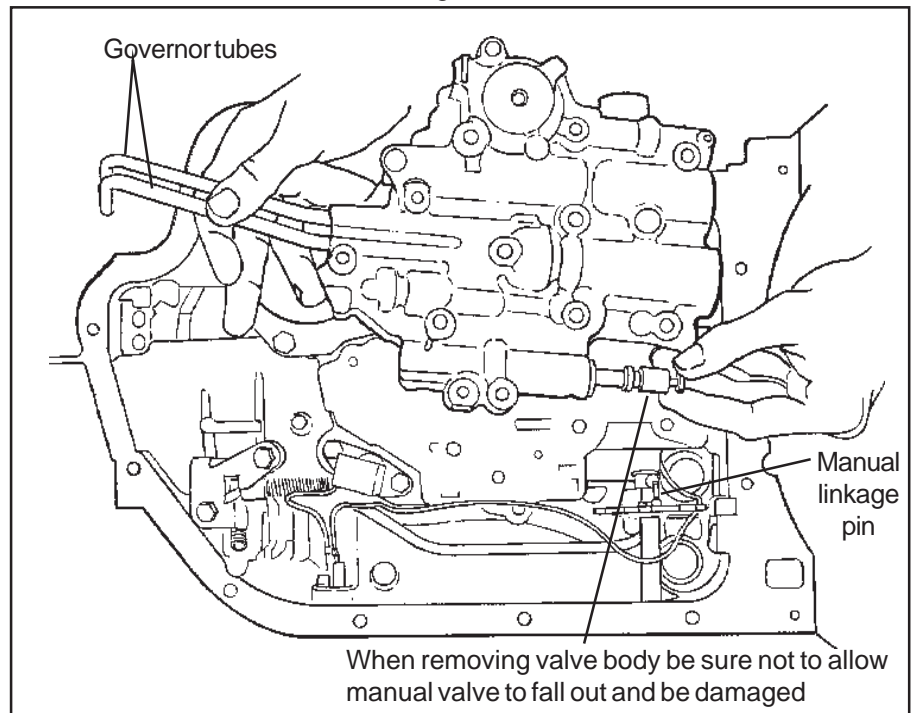


Figure 5

following (See Fig. 4) Manual linkage, detent spring with roller and the way the internal shift lever pin engages the manual valve in the valve body, governor tubes and their routing, detent solenoid (oval or square can) and its wire connector, white spark control switch wire and routing of the wire.

**STEP 4.** There are (3) 1/4-20 and (8) 5/16-18 bolts holding the valve body. Remove all but one valve body bolt and

disconnect the spark control switch wire if present. Hold the valve body in place and remove the last bolt. Lower the valve body while at the same time pulling straight down on the governor tubes (See Fig. 5). Place the valve body in the oil pan to avoid contamination. **NOTE:** The front servo may fall out of the case, if it does see Figure 6 for reassembly order. Use grease or petroleum jelly to hold the servo compo-

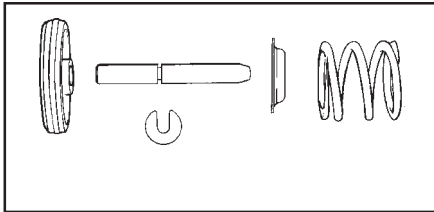


Figure 6

nents in place.

**STEP 5.** Use one (1) pan bolt to hold the separator plate in place while removing the solenoid. Remove the two bolts holding the detent solenoid (**See Fig. 7**) and allow the solenoid to hang by its wire. Remove the pan bolt and carefully lower the separator plate. Be careful not to loose the seven (7) 1/4" steel check balls that are on top of the separator plate. The check balls will be reused. Carefully remove all gasket material from valve body and oil pan surfaces of the case and valve body. All old gasket material must be removed before the valve body is reinstalled.

**MODIFICATIONS**

**STEP 6.** 2-3 Accumulator:

**Heavy Duty:** No modification required for this level.

**Street:** Very carefully clamp the valve body in a vise and compress the accumulator enough to remove the E-ring (**See Fig. 8**). Open the vise slowly and remove the valve body. Remove the accumulator spring and reinstall the piston without the spring. Install the E-ring.

**STEP 7. Street level only:** Drill the **B&M** Separator Plate orifice indicated in **Figure 9** using the 5/32" (.156") drill supplied in kit. After drilling remove burrs from around hole with a flat file or sand paper.

**STEP 8.** Thoroughly clean the valve body and separator plate in clean solvent to remove any contamination. Remove any old gasket material stuck on the valve body channel surface.

**REASSEMBLY**

**STEP 9.** Check Ball Placement: Install check balls in the locations shown in **Figure 10** as follows:

**Heavy Duty:** Seven check balls, one each, in locations 1-7.

**Street:** Six check balls, one each, in locations 1,2,3,5,6,7 (**do not install check ball #4**).

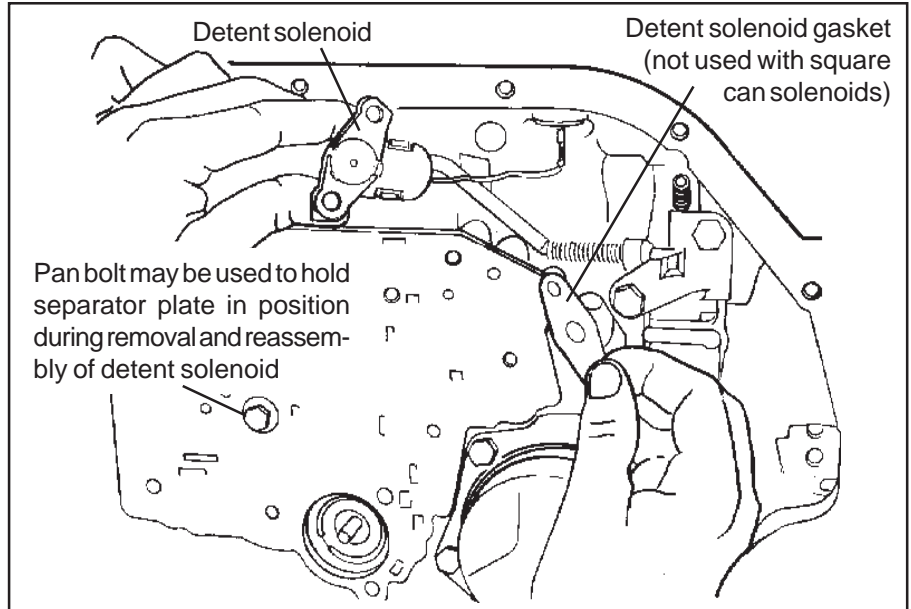


Figure 7

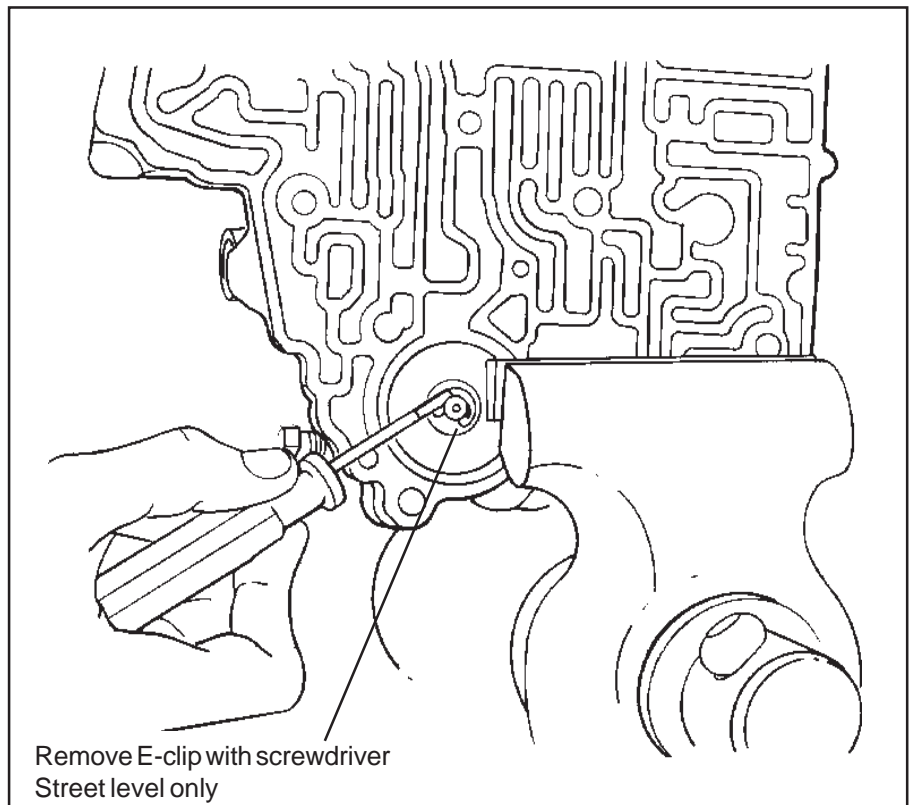


Figure 8

**Note:** Transmissions used in vehicles over 10,000 GVW do not have a factory installed check ball in position #7. If your vehicle is of this type (over 10,000 GVW) **do not** install a check ball in position #7 for Heavy Duty or Street levels.

**STEP 10.** Place upper valve body gasket (has "C" punched in it) on to the **B&M** separator plate (use grease or petroleum jelly to hold it in place).

Install the plate and gasket against the case and use a clean pan bolt to hold it in position for now (**See Fig. 7**).

**STEP 11.** Carefully examine Detent Solenoid. Make sure the rubber seal is in good condition and has no nicks or cuts (**See Fig. 11**). If the seal is damaged, you will have to replace the solenoid. If the seal leaks the transmission will be in passing gear all the time. Install the solenoid with two (2) 1/



4-20 bolts. Tighten bolts **FINGER TIGHT** for now. Remove the pan bolt you used to hold the plate and gasket in place.

**STEP 12.** Insert the governor tubes into the valve body (**See Fig. 5**). Lay the lower valve body gasket (has "VB" punched in it) into position on valve body (use grease or petroleum jelly to hold it in place). Make sure the manual valve is in its bore. Install valve body onto transmission guiding the governor tubes into their holes at the rear of case. Push up on valve body and tubes and engage the manual valve on the internal shift linkage pin. Install one bolt to hold valve body in place.

**STEP 13.** Install all the valve body bolts **finger tight**. Make sure the detent spring is in position and riding on the internal shift lever (**See fig. 4**). Make sure the manual valve is engaged with the internal shift lever pin. Tighten all valve body and solenoid bolts to 8-10 lb.ft. (11-13.6 Nm). Route the white spark control wire and connect to pressure switch on valve body. Check operation of manual valve by running range selector through all gear positions.

**STEP 14.** Inspect your filter for damage or clogging. If it has more than 20,000 miles on it we recommend it be replaced. For longer transmission life and improved pump operation install **B&M Filter Service Kit No. 20287**.

**STEP 15.** Install **two (2)** filter O-rings on filter pick-up tube (**See Fig. 12**). Lubricate O-rings with clean ATF then push pick-up tube and filter assembly up into transmission, install spacer (if present) and shoulder bolt then torque to 8-10 lb.ft. (11-13.6 Nm).

**STEP 16.** Clean oil pan and scrape off any old gasket material from pan and case. You may want to install a **B&M Drain Plug kit** before installing the pan. The drain plug kit will help eliminate the mess when changing transmission oil. Install pan and new gasket and torque bolts 8-10 lb.ft (11-13.6 Nm).

**STEP 17.** Add 4 quarts of fresh ATF. Dexron II is fine for **Heavy Duty Level** applications, however we recommend **B&M Trick Shift for Street Level** for firm positive shifts and improved transmission life. With the vehicles wheels still off the ground, start the engine and

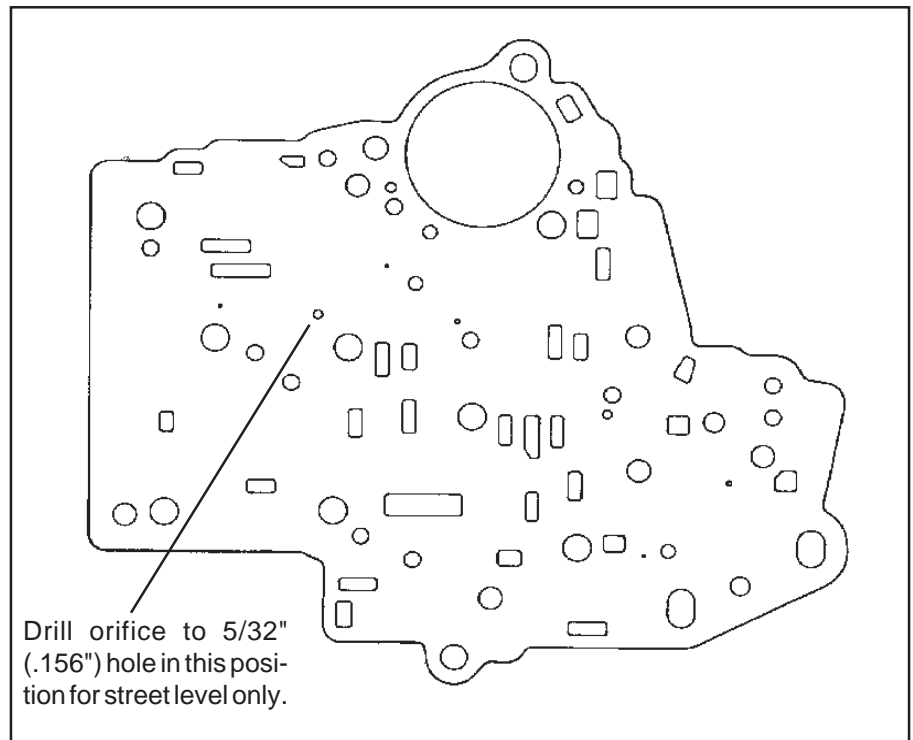


Figure 9

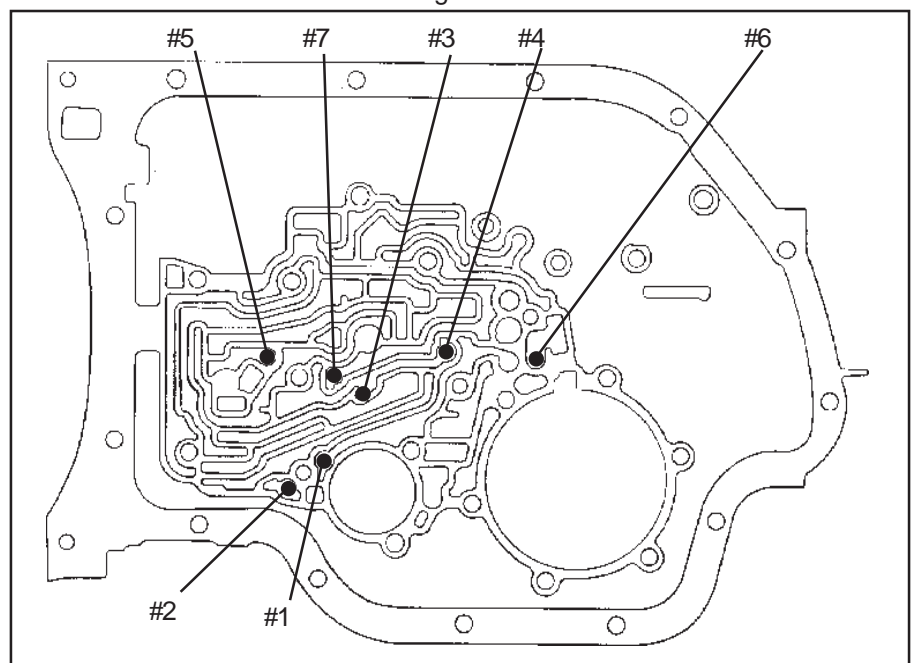


Figure 10

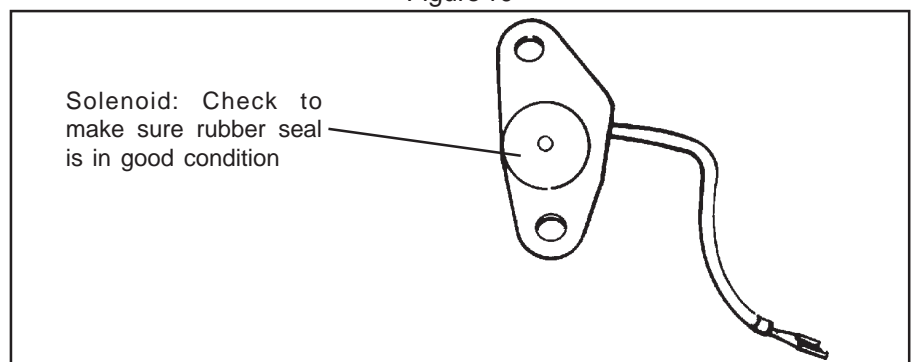


Figure 11

shift transmission through all gears. Place selector in neutral and check the fluid level. It should be between the **Add** and **Full** marks. **Do not overfill !!** This can cause foaming and overheating. Turn off engine and lower vehicle. **STEP 18.** Drive vehicle several miles to warm up the transmission. Park on level surface and check ATF level. It should be between **Add** and **Full**.

### TOOL LIST

- 1 3/8" drive ratchet or speed handle
- 1 1/2" socket, 3/8" drive
- 1 7/16" socket, 3/8" drive
- 1 Small flat screwdriver
- 1 Small Internal Snap Ring Pliers
- 1 Small Hammer
- 1 Torque Wrench 0-10 lb.ft. (0-13.6 Nm)
- 1 1/4" Drill Motor
- 1 Vise

### TH-400/TH-475 (3L80/3L80-HD) SHIFT IMPROVER KIT PARTS LIST

Inspect the contents of your Shift Improver Kit carefully. If you are missing any of the parts shown below, do not proceed. Contact your **B&M** dealer. Don't forget to purchase about 5 quarts of ATF (**See Step 17**).

- 1 20261 Instructions
- 1 Separator Plate
- 1 Oil Pan Gasket
- 1 5/32" Drill
- 1 Separator Plate/Case Gasket
- 1 Valve Body/Case Gasket
- 2 Filter Pick Up Tube O-Ring

Install two furnished O-rings on pickup tube. Lubricate thoroughly with oil before installation.

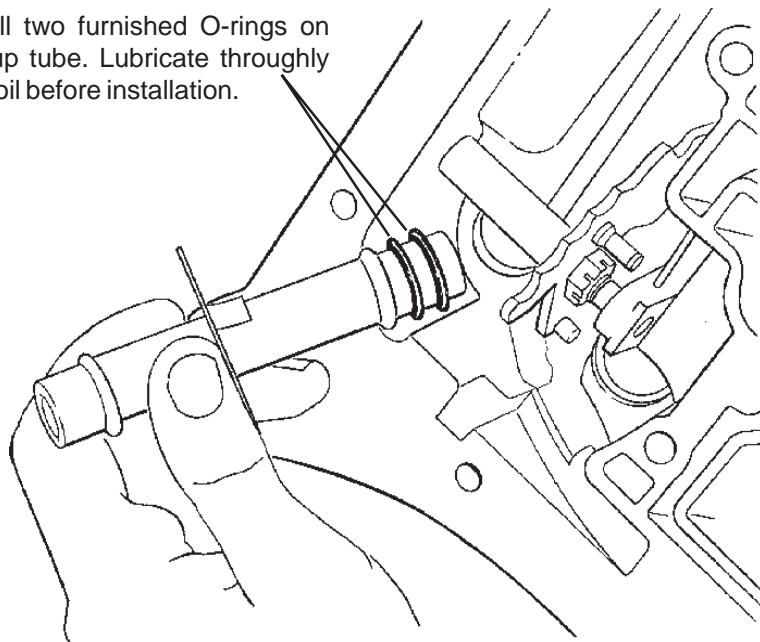


Figure 12

### TROUBLE SHOOTING GUIDE

| Malfunction                         | Probable Cause  |
|-------------------------------------|---|
| Slips                               | Valve body bolts loose.<br>Low fluid level.   |
| Overheating                         | Insufficient cooler capacity<br>clogged lines or cooler.  |
| Foaming oil at dipstick or breather | Fluid level too high.<br>Clogged lines or cooler.   |
| Erratic shifting                    | Vacuum line cracked or leaking.<br>Shifter not properly adjusted.<br>Kickdown switch not properly adjusted.<br>Low fluid level.<br>High fluid level.<br>Valve body bolts loose.<br>Kickdown solenoid loose. |
| Late hard shifts                    | Vacuum line cracked or leaking.<br>Kickdown solenoid loose or damaged.<br>Kickdown solenoid gasket damaged.   |
| Will not shift                      | Kickdown solenoid loose or damaged.<br>Governor tubes not properly installed.   |
| Pump buzz or whine                  | Low fluid level.<br>High fluid level.<br>Cut, damaged or missing pick-up tube O-rings.  |