

PLEASE READ INSTRUCTIONS BEFORE
SETTING UP TO INSTALL KIT



Installation Instructions

Transpak

for 1965 to 1987

Turbo Hydramatic 400

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

Part Number 20228

(see www.bmracing.com for the latest application and fitment information)

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IMPORTANT NOTICE: Hydramatic introduced a revised transmission case just after the beginning of the 1988 model year. If you are installing the **B&M TH-400 Transpak** in a late model vehicle which has had the transmission replaced after 1988 you must check the Julian date stamped on the transmission's I.D. tag (**See Fig. 1**) before attempting to install this kit. **Do not** use this kit (**# 20228**) in transmissions built **on or after** November 23, 1987 (Julian date 327). 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**). This kit (**#20228**) will work correctly in all 1965 through 1987 TH-400 transmissions.

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 end of these instructions for the tools required to install your B&M TH-400 Transpak.

Installation of the **B&M TH-400 Transpak** 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.

NOTICE: The **B&M TH-400 Transpak** 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 Transpak** will provide the kind of transmission performance you are looking for.

When installing your **B&M TH-400 Transpak** 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 a transmission 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 converters 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

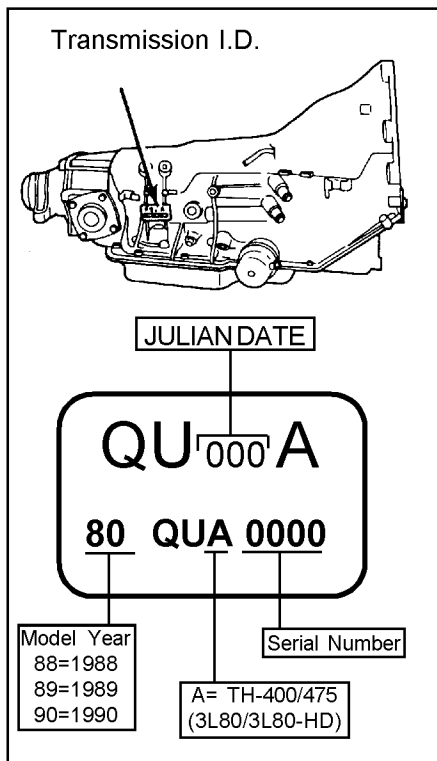


Figure 1

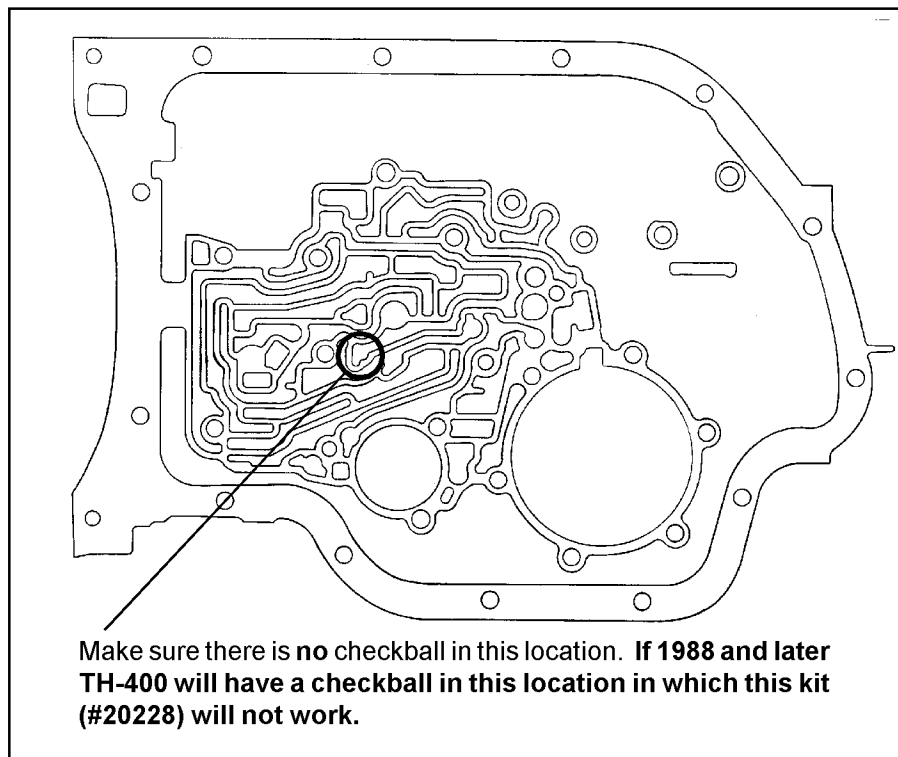


Figure 2

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.

TRANS TEMPERATURE GAUGE KIT #80212/80226/80330

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 gauge 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

vehicle's 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 in place of the TH-350 or TH-700 throttle cable bracket.

INTRODUCTION

The **B&M TH-400 Transpak** can be installed in a few hours by carefully following the instructions. Transmission components are precision fit, work slowly and do not force any parts. Burs and dirt are the number one enemies of an automatic transmission. Cleanliness is very important, so a clean work surface from which oil can easily be removed is necessary.

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.

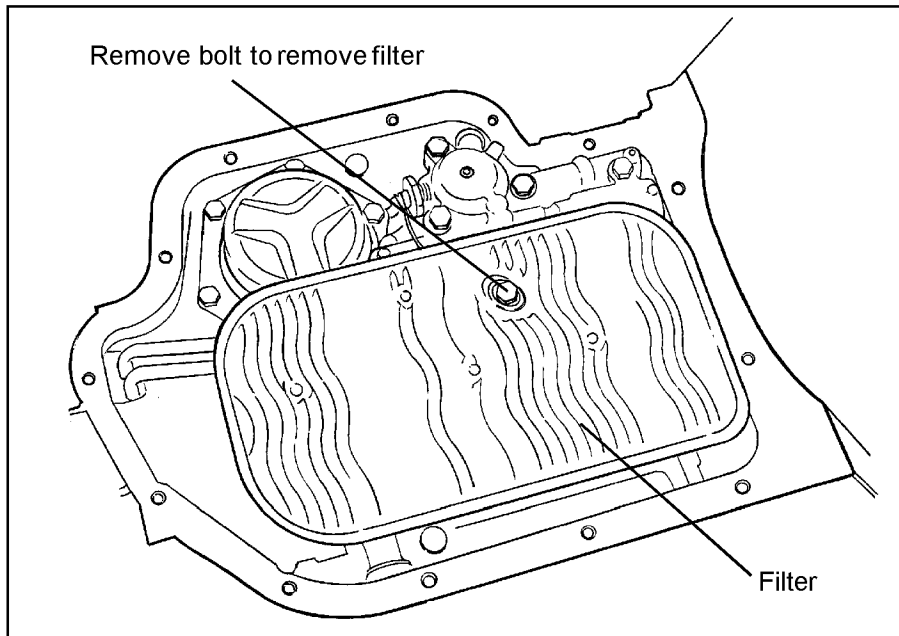


Figure 3

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

One of the main features of the **B&M TH-400 Transpak** is that it gives you the ability to downshift into low gear at any speed and you can also hold the transmission in low gear up to any speed you want.

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 and pull the filter straight down. Some models also use a spacer between the filter and valve body. 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 following (See Fig. 4) Manual linkage, detent spring with roller and the way linkage engages the manual valve in the valve body, governor tubes and their outing, detent solenoid and its wire onnector, 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

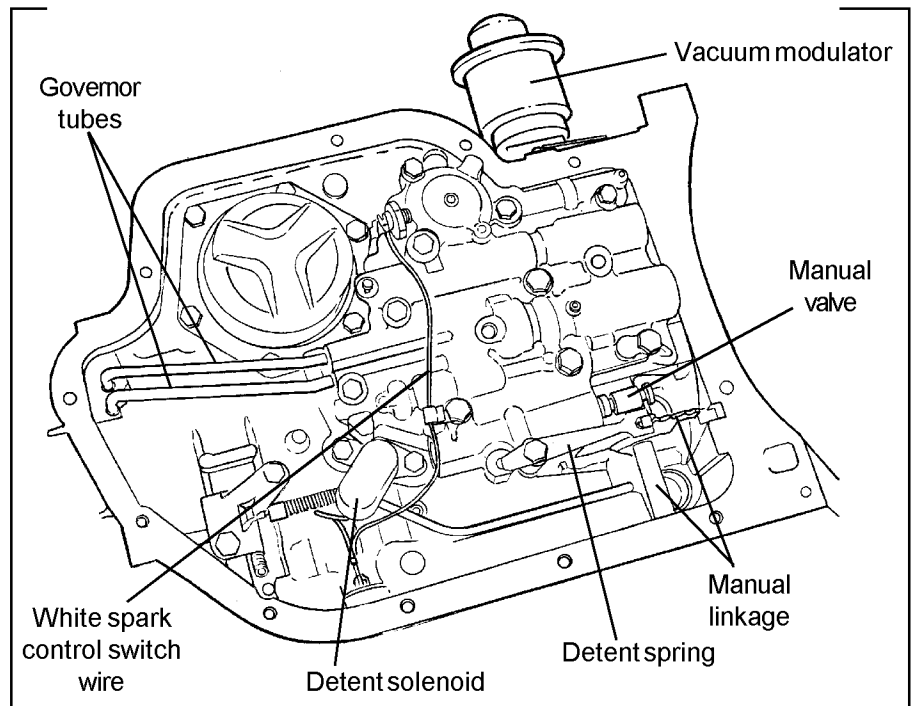


Figure 4

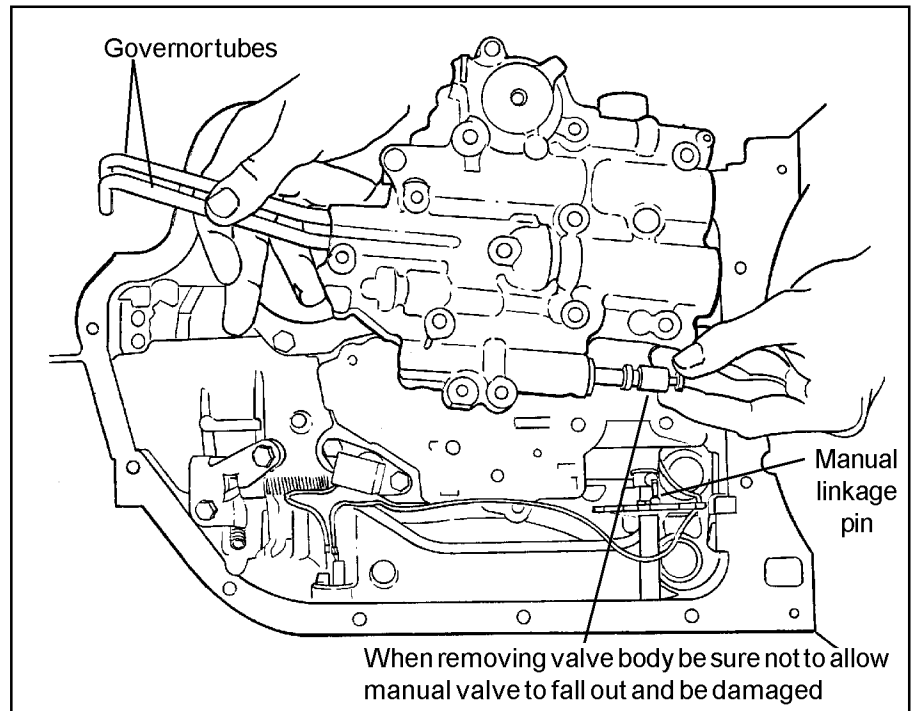


Figure 5

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 components

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 six (6) 1/4" steel check balls that are on top of the separator plate. The check balls will be

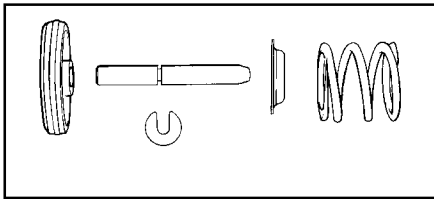


Figure 6

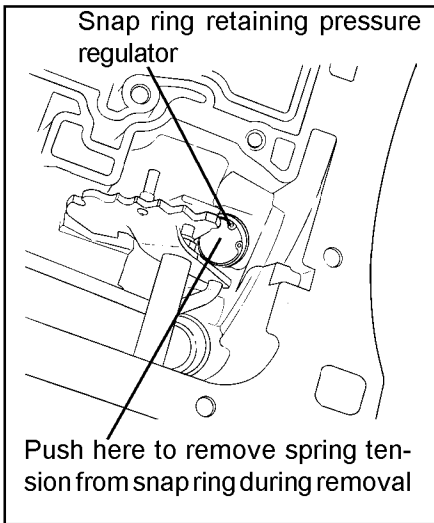


Figure 8

used over again. 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. Pressure Regulator:

Locate the pressure regulator bore near the selector lever linkage (See Fig. 8). Push up and hold the boost valve sleeve with a slender rod or screw driver, then remove the pressure regulator retaining ring. Slowly lower the boost valve assembly being careful not to let the spring loaded parts fly out. You may have to tap the boost valve sleeve to free it. Remove the boost valve sleeve and valve, pressure regulator spring, pressure regulator valve, spring retainer and one (or possibly two) "C" shaped shims (See Fig. 9). Replace the stock regulator spring with the spring supplied in the kit. To install the assembly place one shim on the pressure regulator valve followed by the spring retainer with its tangs facing towards the spring. Use a dab of grease or petroleum jelly to hold the shim and retainer in place. Slip the spring over the valve so it is centered on the retainer. Push the entire valve and spring assembly up into

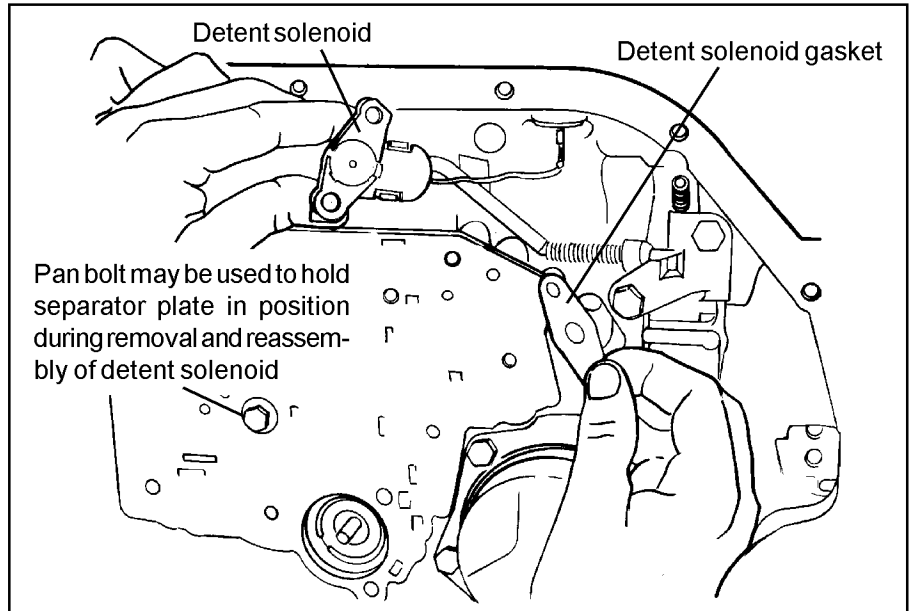


Figure 7

the bore. Make sure the boost valve is in the sleeve then install the sleeve up into the bore. Push the boost valve sleeve up in the bore and install the new retaining ring supplied in the kit. Double check the ring to make sure it is fully seated in its groove.

STEP 7. Valve Body:

Place the valve body on a clean work bench with the channel side up. Remove the roll pin holding the 1-2 shift valve train in place (See Fig. 10). Carefully remove the 1-2 shift modulator sleeve and 1-2 shift valve from the bore. You may have to use a small screwdriver to pry the sleeve out. Try not to raise any burrs on the sleeve during removal.

Compare your stock 1-2 Shift valve with the valve supplied in the kit. If your valve is the same diameter as the valve supplied, use the B&M valve. If your valve is smaller in diameter, you will need to modify the stock valve.

Modification to stock valve: Grind two 1/2" wide flats onto the land nearest the 1-2 spring. (See fig. 10A)

Install the 1-2 shift valve into the bore with the smallest diameter pointing out. (See fig. 10) Reinstall the 1-2 shift modulator valve assembly as removed and replace the roll pin. Using a small screwdriver check to make sure the 1-2 Shift valve slides back and forth freely. Turn the valve body over and install the special cup plug in the hole shown in Figure 11 and then tap it down until it is flush with the surface. Do not use

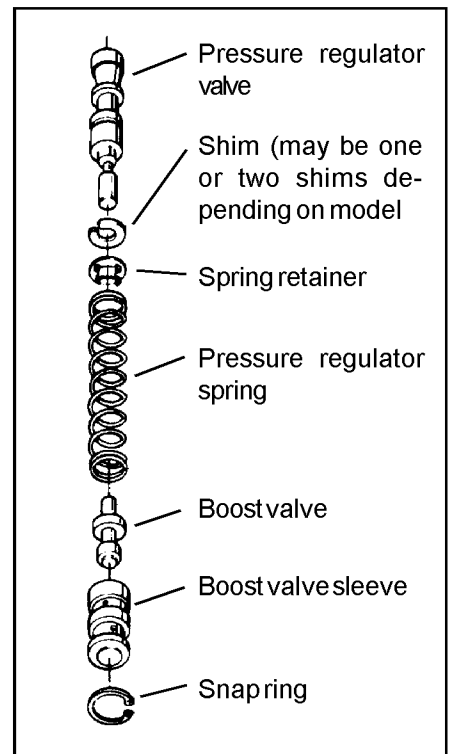


Figure 9

excessive force when tapping the plug, it may distort the casting.

STEP 8. Street level only: Drill the B&M Separator Plate orifice indicated in Figure 12 using the 5/32" (.156") drill supplied in kit.

STEP 9. 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.

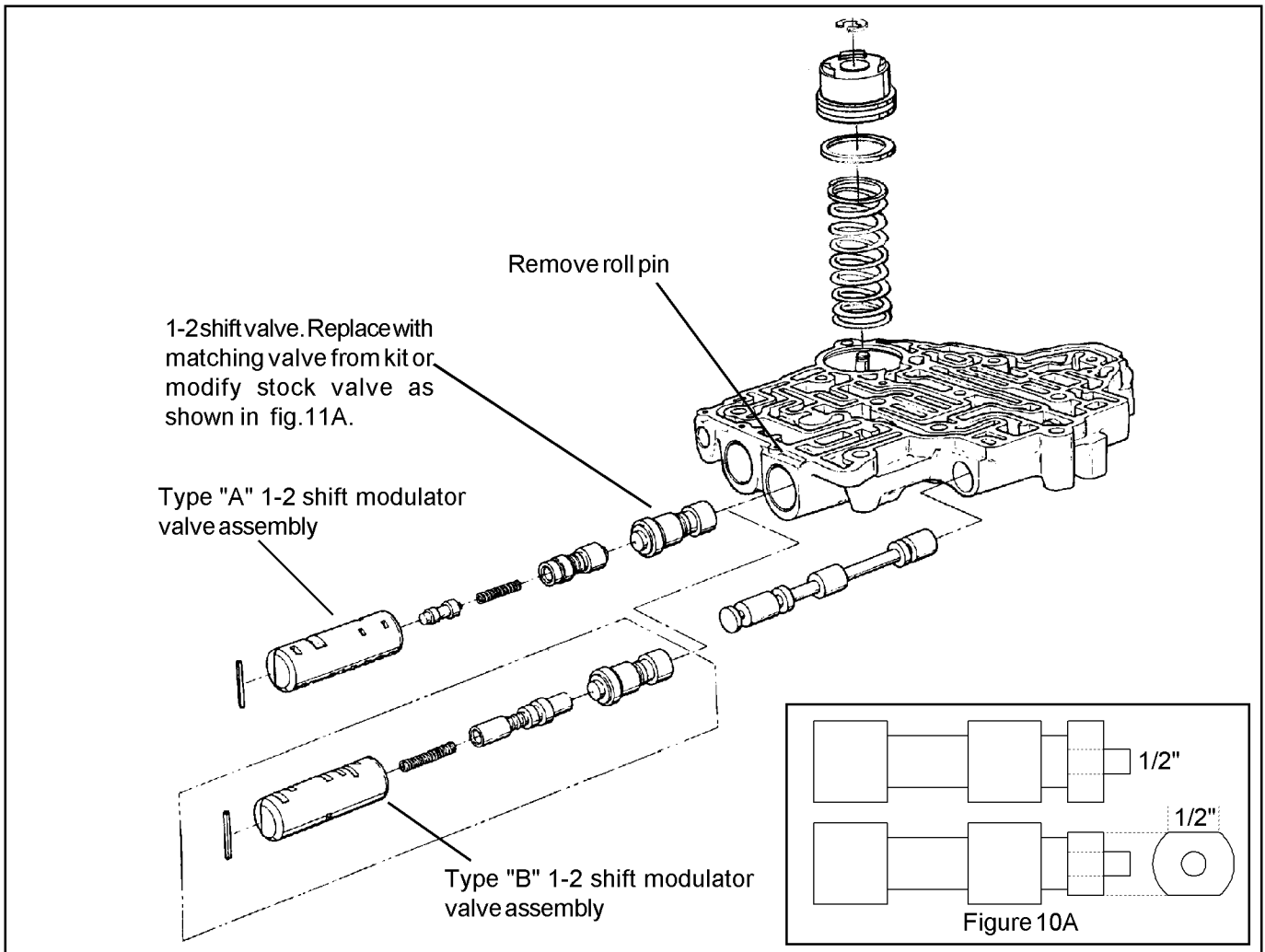


Figure 10

REASSEMBLY

STEP 10. Check Ball Placement: Install check balls in the locations shown in **Figure 13** as follows:

Street: Three check balls, one each, in locations **4, 5, & 6** (do not install check balls **1, 2, & 3**).

Heavy Duty: Six check balls, one each, in locations **1, 2, 3, 4, 5, & 6**.

STEP 11. 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 12. Carefully examine Detent Solenoid.

Oval can solenoid: Make sure orifice disc is present and properly seated in the casting (See **Fig 14**). If the disc is missing the transmission will be in passing gear all the time. Install solenoid into position along with the new

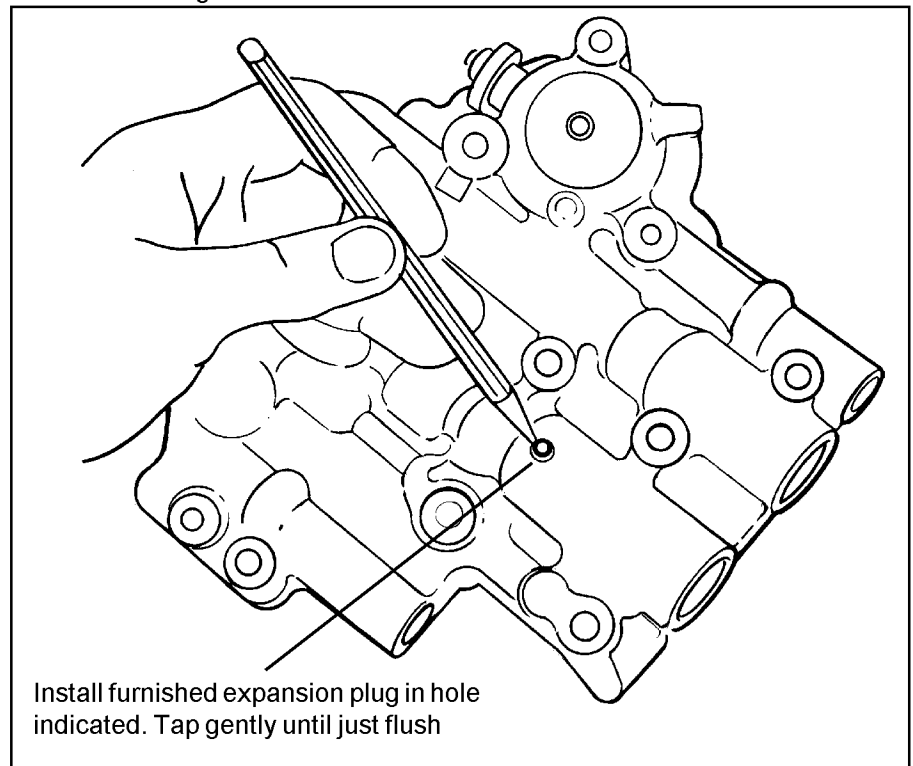


Figure 11

metal gasket supplied with the kit. Install the two (2) 1/4-20 bolts **FINGER TIGHT**. Remove the pan bolt you used to hold the plate and gasket in place.

Square can solenoid: Make sure the rubber seal is in good condition and has no nicks or cuts (**See Fig. 15**). 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 into position, **DO NOT** use the metal gasket supplied in the kit. Install the two (2) 1/4-20 bolts **FINGER TIGHT**. Remove the pan bolt you used to hold the plate and gasket in place.

STEP 13. 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 shift linkage. Install one bolt to hold valve body in place.

STEP 14. 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 pin on the internal shift lever. 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 15. Inspect your filter for damage or clogging. If it has more than 20,000 miles on it we recommend it be replaced.

STEP 16. Install two (2) filter O-rings on filter pick-up tube (**See Fig. 16**). Lubricate O-rings with clean ATF then push pick-up tube and filter assembly up into transmission. On 1968 and later models install filter spacer (if present) and shoulder bolt then torque to 8 - 10 lb.ft (11 - 13.6 Nm).

STEP 17. 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

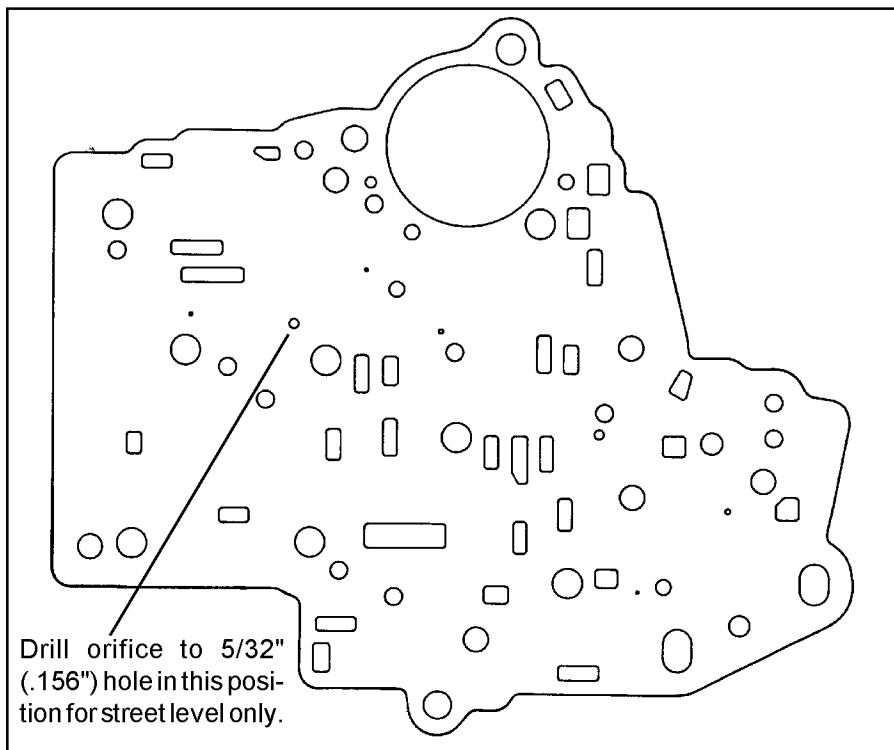


Figure 12

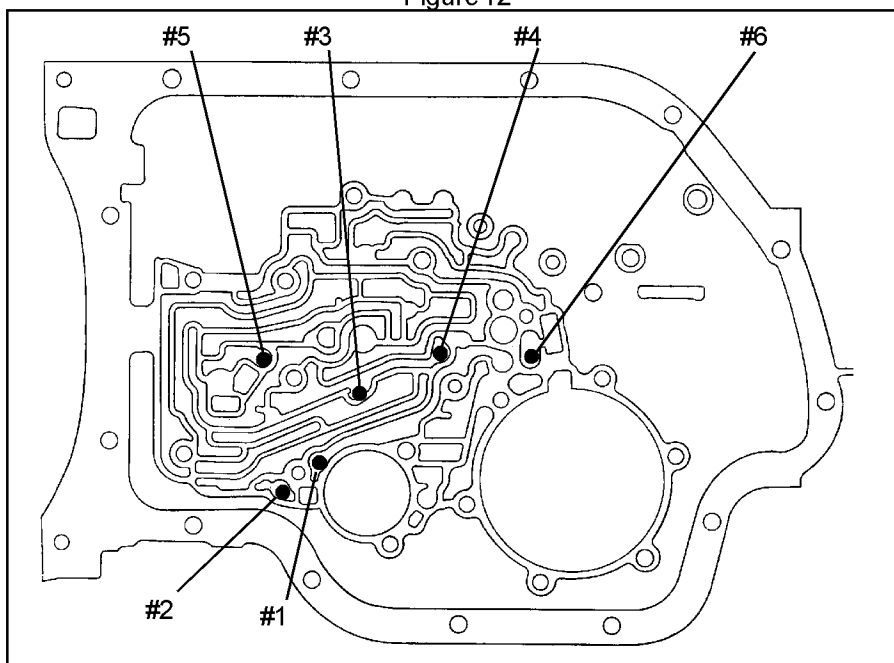


Figure 13

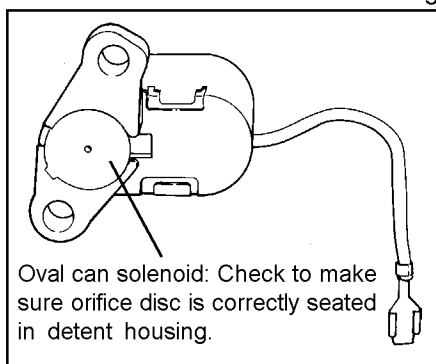


Figure 14

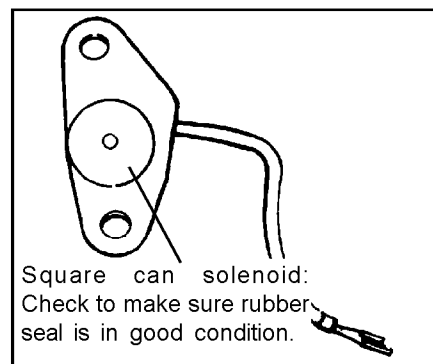


Figure 15

mess when changing transmission oil. Install pan and new gasket and torque bolts 8-10 lb.ft (11-13.6 Nm). Do not over tighten pan bolts.

STEP 18.Add 4 quarts of fresh ATF. Dexron II is fine for **Heavy Duty Level** applications, however we recommend **B&M Trick Shift ATF** for **Street** for firm positive shifts and improved transmission life. With the vehicles wheels still off the ground, start the engine and 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. Stop engine and then lower vehicle.

STEP 19.Drive the 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)

TRANSPAK PARTS LIST

Inspect the contents of your Transpak 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 18**).

- 1 20228 Instructions
- 1 Solenoid Gasket
- 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
- 1 Pressure Regulator Spring
- 1 Retaining Ring
- 1 Small Brass Plug
- 1 Large 1-2 Shift Valve

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

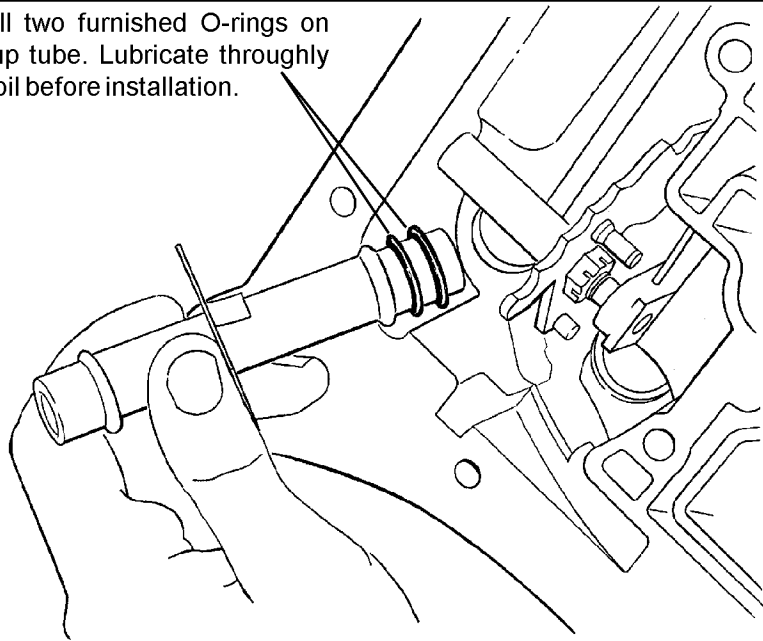


Figure 16

TROUBLE SHOOTING GUIDE

Malfunction	Probable Cause
Slips	Valve body bolts loose. Low fluid level. Boost valve in Pressure regulator improperly installed.
Overheating	Insufficient cooler capacity clogged lines or cooler.
Foaming oil at dipstick or breather	Fluid level too high. Clogged lines or cooler.
Erratic shifting	Vacuum line cracked or leaking. Shifter not properly adjusted. Kickdown switch not properly adjusted. Low fluid level. High fluid level. Valve body bolts loose. Kickdown solenoid loose.
Late hard shifts	Vacuum line cracked or leaking. Kickdown solenoid loose or damaged. Kickdown solenoid gasket damaged.
Will not shift	Kickdown solenoid loose or damaged. Governor tubes not properly installed. 1-2 Shift valve sticking. Cup plug installed too deep.
Pump buzz or whine	Low fluid level. High fluid level. Cut, damaged or missing pick-up tube O-rings.