



Installation Instructions

Non-Lockup HoleShot 3000 Torque Converter for TH-700-R4 (4L60) Transmission

Part Number 70421

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Congratulations! You have just purchased the best performing and highest quality Non-Lockup torque converter available for the TH-700 transmission. We have endeavored to make these instructions as clear and complete as possible. Anyone with a minimum of mechanical experience should be capable of installing a torque converter using proper tools and following the instructions.

IMPORTANT: Read through the instructions completely before beginning the installation so you can familiarize yourself with the procedures and which special tools are required.

NOTICE: Unlike most torque converter swaps the B&M 70421 Non-Lockup HoleShot 3000 torque converter requires some transmission modification for proper operation. The TH-700's converter oil feed and transmission lube circuit must be modified to operate properly with a Non-Lockup torque converter. Parts and gaskets are provided with the torque converter for those modifications. You will need approximately 10 quarts of ATF, a new transmission oil filter and pan gasket.

The B&M 70421 Non-Lockup torque converter has both higher stall speed and torque ratio when compared to your original equipment 298mm converter. Both these new features allow your engine and vehicle to operate at higher performance levels. As a result, your TH-700 will now operate at higher input

torque and heat levels than before. To insure maximum life and performance from your TH-700 under these conditions, we strongly recommend the following additional modifications.

Installing an auxiliary oil cooler is strongly advised to reduce the additional heat produced by a higher stall speed converter. We recommend our 70255 or 70268 cooler for high performance passenger car applications. An oil cooler is cheap insurance against premature transmission failure.

Recalibrate your TH-700 so it can better handle the input torque load produced by your B&M Non-Lockup converter. B&M's 70235 TransPak recalibration kit is specially developed for high performance applications of the TH-700 and comes complete with a new transmission oil filter and pan gasket. In addition to a complete line of transmission oil coolers, B&M also features Trick Shift high Performance ATF formulated with special friction modifiers for improved shift quality.

NOTICE: The TH-700 is a **METRIC** transmission requiring **METRIC** tools.

INTRODUCTION

There are two different input shaft sizes used on the TH-700. One has a 27 tooth spline and the other has 30 teeth. The B&M #70421 converter is for use with the 30 tooth spline input shaft only (see fig. 1).

If you have a 27 tooth spline input shaft you can upgrade your TH-700

to the larger 30 tooth spline input shaft by changing the input shaft housing and oil pump. B&M's 70230 Super TransKit explains in detail (including GM part numbers) how to upgrade 1982-86 TH-700s for maximum performance.

Use of a Non-Lockup converter with the TH-700 requires removal of front pump assembly and input shaft to perform special modifications to these components. Failure to perform these simple modifications will most likely result in serious transmission damage. The required parts, gaskets and seals are supplied with the B&M #70421 converter.

IMPORTANT: If this converter is being installed in a transmission that had previously failed, make sure to back flush both the stock oil cooler and lines. If there was an auxiliary cooler installed you should remove and discard it before flushing the stock system. Because of its construction, it is practically impossible to flush out an auxiliary cooler. Any debris left in the lines or oil coolers will damage the transmission or torque converter.

TRANSMISSION REMOVAL

Because of variations between different vehicle models we cannot cover each in detail. Instead we will outline a basic removal and installation procedure. The sequence of the following procedures may have to be changed to suit different vehicle installations. We recommend you change the transmis-

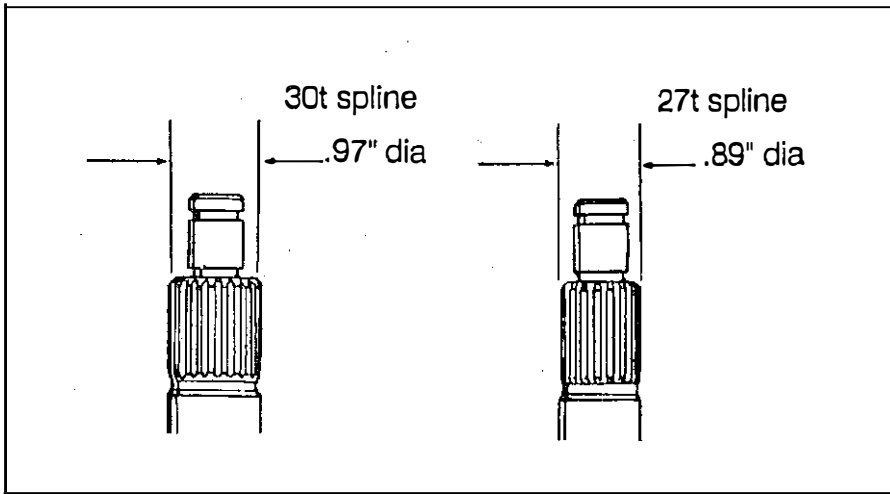


Figure 1

recommend you change the transmission fluid and filter when installing your **B&M** torque converter.

WARNING: Automatic transmissions normally operate between 150 F and 250 F. It is recommended that the transmission be allowed to cool thoroughly to avoid burns from hot oil and parts. The vehicle must be off the ground for ease of transmission removal. A vehicle hoist is best, however jack stands or wheel ramps will work fine. **MAKE SURE THE VEHICLE IS FIRMLY AND SECURELY SUPPORTED!!** A transmission jack should be used to prevent personal injury and or transmission damage during removal and installation. Have a small box handy to put nuts and bolts in so they don't get lost. A drain pan to catch oil is also required.

STEP 1. Place drain pan under the transmission to catch the oil. Drain the oil pan by first removing the front bolts then working from the front loosening all the remaining pan bolts. If the pan

sticks use a screwdriver to pry the pan loose. Again working from front to rear allow the pan to tilt down in the front and drain as the remaining bolts are removed. Once drained replace the oil pan and hold in place with one bolt at each corner. To avoid all this mess next time you service your transmission, you may want to consider installing a **B&M** Drain Plug Kit, #80250 while the oil pan is off the transmission.

STEP 2. Remove the drive shaft (and torque arm if equipped) being careful not to drop the U-joint bearings. It's a good idea to tape the bearings in place and wrap the smooth seal diameter of the slip yoke to prevent damage. It may be necessary to remove or disconnect the exhaust pipes during transmission removal. Remove transfer case if equipped.

STEP 3. Disconnect the cooler lines.

Use a fitting wrench to avoid damaging the tube compression nuts. A Throttle Valve (T.V.) cable runs from the transmission up to the throttle linkage on the engine. Disconnect the T.V. cable at the engine end and feed the cable down so it hangs freely from the transmission. Disconnect the electrical connector from the left side of the case. Disconnect the transmission shifter cable from the shift lever. Disconnect the speedometer cable (or speed sensor plug) at rear of transmission.

STEP 4. Remove the bellhousing dust cover to expose the torque converter. Remove the three converter bolts. The converter should now rotate freely. If it does not, pry the converter back slightly and free it from the crankshaft.

STEP 5. Place transmission jack under transmission and take the load off the cross member. It is advisable at this point to remove the distributor cap so it will not be damaged as the engine and transmission are lowered. Remove the cross member assembly.

STEP 6. Remove the bellhousing bolts. It may be necessary to lower the transmission slightly to gain clear access to the bolts. Finish lowering the transmission until engine is balanced on it's mounts then pull the transmission slightly away from the engine. Make sure the converter stays with the transmission and does not fall out. It may be necessary to remove the dipstick tube at this point to continue lowering the transmission. Remove transmission and converter assembly from

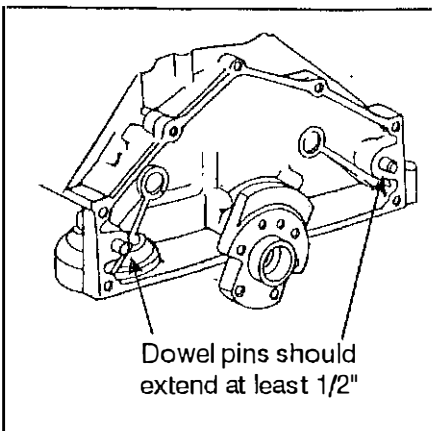


Figure 2

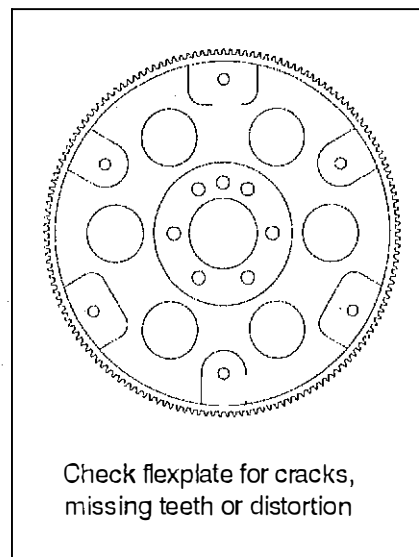


Figure 3

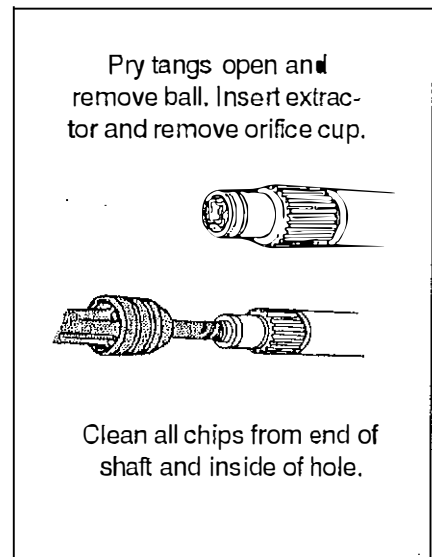


Figure 4

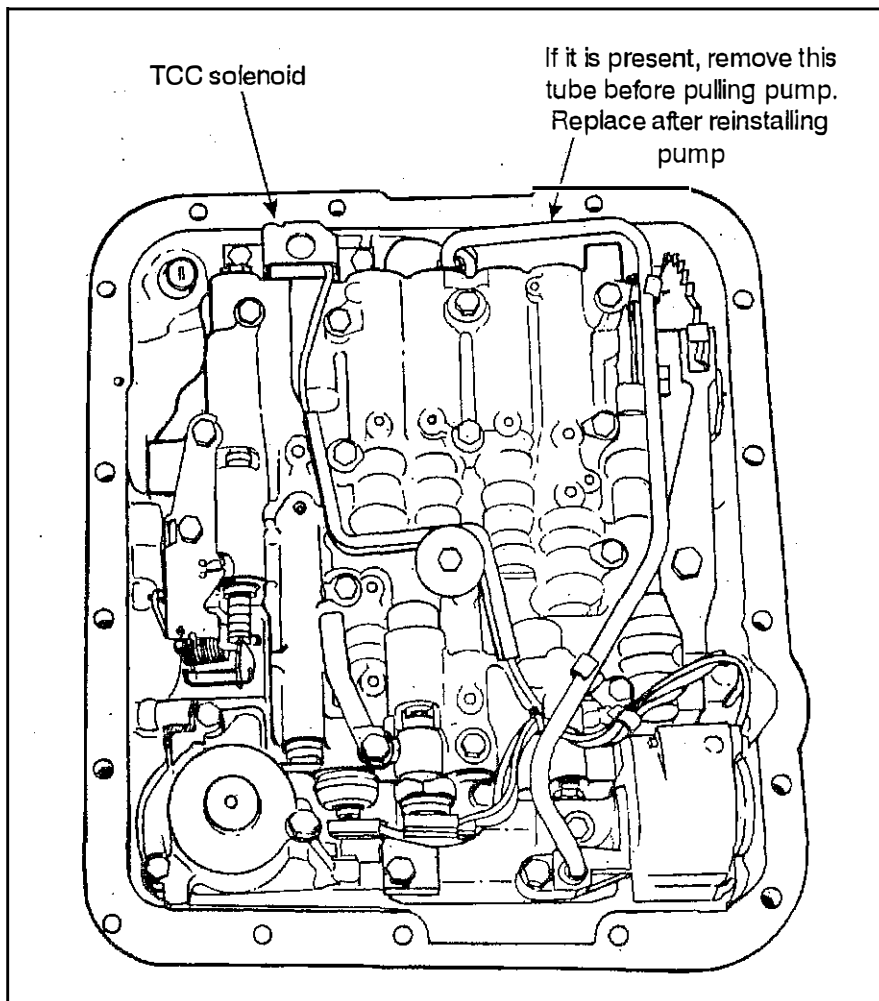


Figure 5

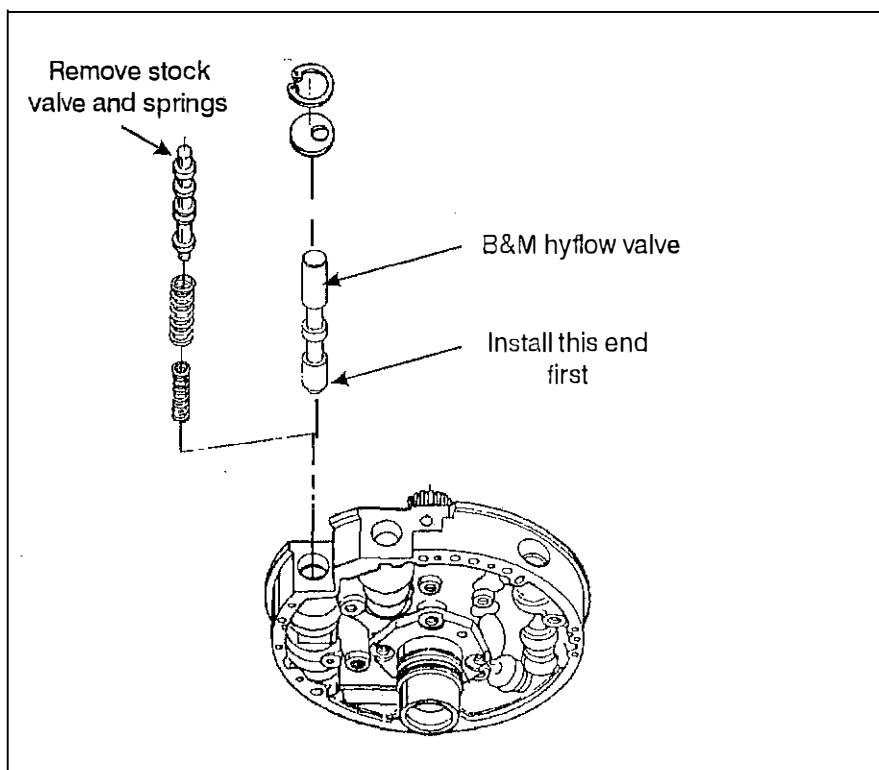


Figure 6

vehicle.

With the transmission completely out of the vehicle the torque converter can easily be removed by pulling it straight off the front. Drain the torque converter as completely as possible then cover the hub to keep out dirt.

STEP 7. Inspect the engine block's transmission mounting face to make sure it is free of any dirt or burrs. Make sure both dowel pins are installed and stick out of the block at least 1/2" to insure proper transmission alignment, see (Fig. 2).

STEP 8. Remove and inspect the flexplate for distortion, cracks or damaged ring gear teeth, see (Fig. 3). If the flexplate shows any damage it should be replaced. Do not attempt to repair a damaged flexplate.

STEP 9. Assemble the flexplate to crankshaft and align all holes before installing the bolts. When properly installed the raised lip on the flexplate should face away from the crankshaft flange, see (Fig 3). Torque the bolts to 81 Nm (60 lb.ft.)

MODIFICATIONS

STEP 10. Remove ball and retainer cup from front end of input shaft as follows, see (Fig 4). Straighten four tangs on retainer and remove check ball. Remove retainer cup from shaft using the #4 Screw Extractor (Easyout) provided. This will allow the maximum flow of oil through converter. Remove O-ring from end of input shaft. Make sure no metallic debris remains in shaft pocket.

STEP 11. Place transmission on bench valve body side up. Remove two bolts holding TCC (Torque Converter Clutch) solenoid then remove solenoid from pump bore see (Fig 5). Remove auxiliary valve body crossover tube if present.

NOTE: If you have a long pair of internal snap ring pliers available you may be able to Skip **STEP 12** and perform **STEP 13** without removing the pump from case.

STEP 12. Remove 7 bolts holding oil pump to case. Carefully pry between reverse input housing and oil pump body to remove pump from case. Remove pump to case gasket as carefully as possible so it can be used for match-

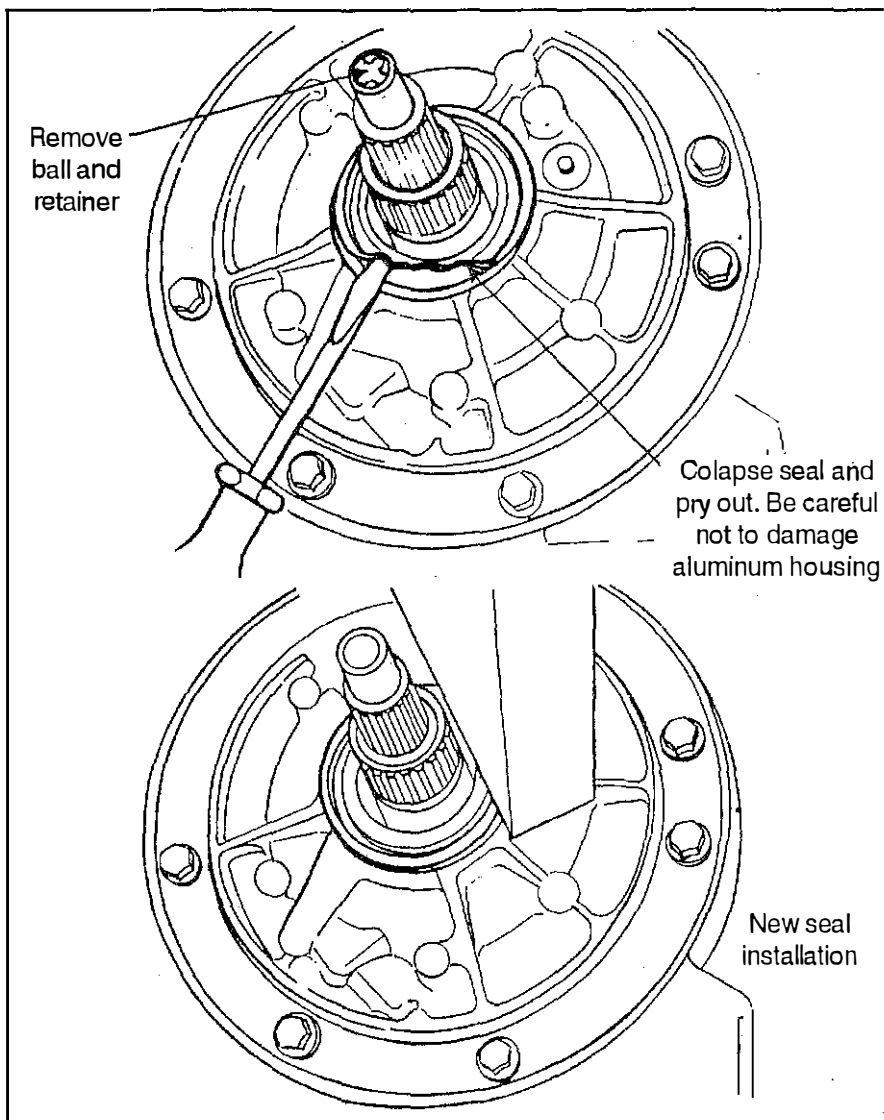


Figure 7

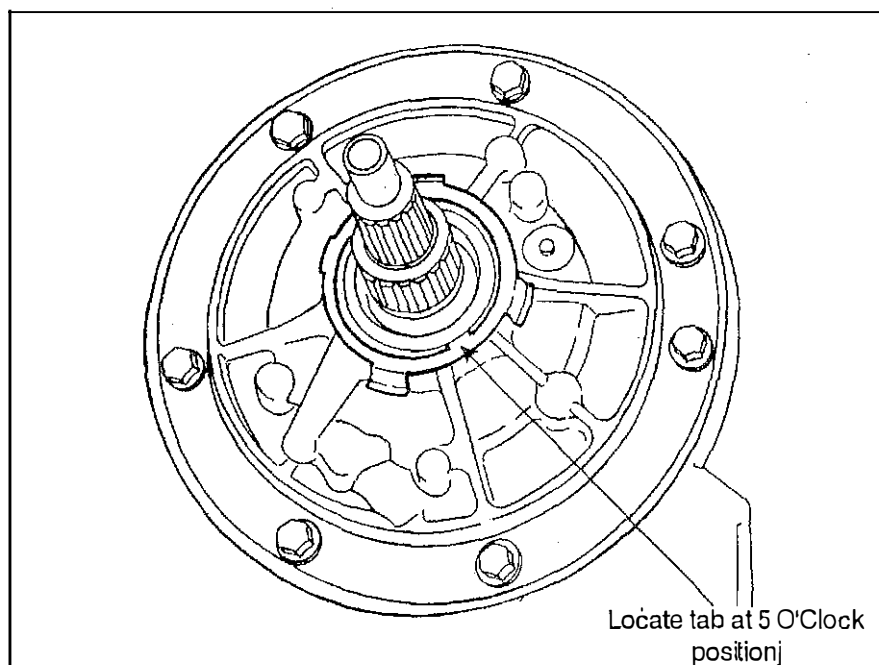


Figure 8

ing with those supplied in kit. Remove large pump to case seal ring from outer diameter of pump body.

STEP 13. Remove retaining ring, washer, valve and springs from TCC valve bore see (Fig. 6). Install B&M Hyflo converter/lube valve, washer and retaining ring as shown (large chamfered goes into bore first). Springs are not used with the B&M Hyflo valve. Use the new retaining ring supplied with kit when installing valve.

STEP 14. Coat new pump to case seal ring with clean ATF and install on pump body. Match pump to case gasket provided with converter to the one removed. Place gasket in case cavity holding it in place with petroleum jelly. Apply a coat of clean ATF to input shaft seal rings, pump hub seal rings, and pump bore in case. Make sure pump to reverse input drum thrust washer is in place, apply petroleum jelly if required. Lower pump into case aligning all holes properly.

STEP 15. Install pump to case bolts with new seals provided in kit. Torque bolts to 22 Nm (18 lb.ft.). Install TCC solenoid and torque bolts to 11 Nm (8 lb.ft.).

STEP 16. Carefully remove the front seal from the oil pump housing. **CAUTION:** The oil pump housing used in this transmission is made of aluminum alloy and can be easily damaged during seal removal. We recommend the following seal removal procedure to minimize the chance of damaging the pump housing, see (Fig. 7).

1. Using a common (flat) screwdriver collapse the seals outer flange as shown. Be careful not to damage Pump housing with the screwdriver.
2. With the outer flange collapsed the seal should pry out easily. Again take care not to damage or gouge the housing. Once the seal is removed use a lint free rag wrapped around a thin piece of wood or other soft material (to avoid scratching the seal bore) and clean the seal bore thoroughly.

STEP 17. Coat the outer diameter of the new oil seal with cylindrical retaining compound provided in kit. Then holding a small block of wood against the seal, carefully tap the seal evenly into the Pump housing until fully seated. Next install the seal retainer onto the

housing with tab aligned as shown, see (Fig. 8).

STEP 18. Remove the oil pan and filter. The filter suction tube seal (or O-ring) may stick in the pump body, if it does make sure to get it out. Install a new oil filter (not supplied with converter) making sure the suction tube seal is in place. Lubricate the suction tube seal with clean transmission fluid before installing filter into the transmission.

STEP 19. Remove all old gasket material from the pan and case flange. Install a new pan gasket (not supplied with converter) then assemble pan to the transmission. Install ALL of the pan bolts (install shifter cable bracket if equipped) finger tight, then torque to 11 Nm (8 lb.ft.). **DO NOT** use a sealant on the pan gasket and don't overtorque the pan bolts unless you want oil leaks. Sealant can clog the servo vent and cause transmission damage.

CONVERTER INSTALLATION

STEP 20. Hold your B&M torque converter against the crankshaft and flexplate to check the pilot hub fit. The converter pilot hub should fit in the crankshaft snugly with no excessive slop. A tight fit indicates burrs or debris in the crankshaft pilot diameter. The

burrs or debris can be removed with sand paper.

STEP 21. Pour 1 quart of fresh transmission Fluid into the B&M torque converter so there will be some lubrication on initial start up. Lubricate the converter's pump drive hub with clean transmission fluid.

STEP 22. Install the B&M torque converter onto the transmission. Push the converter in while rotating it to engage the input shaft, reaction shaft and pump drive tangs. Place a straight edge across the bellhousing face and measure the distance to the torque converter's drive lug face. The drive lug must be at least 1" inside the bellhousing, see (Fig. 9). A measurement of less than 1" indicates the torque converter is not fully engaged in the transmission. Continue to push in and rotate the converter until you obtain full engagement.

Warning: If you install the transmission without full converter engagement, you will damage both the oil pump and converter.

STEP 23. Place the transmission in position on transmission jack. Make sure the jack supports the transmission on a wide area so the oil pan is not crushed. Install the transmission onto engine. The transmission should en-

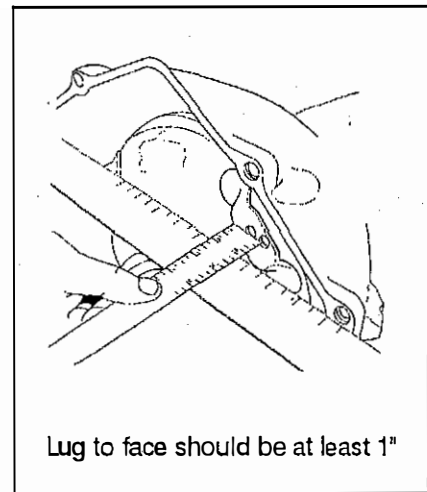


Figure 9

gage both dowel pins and sit flat against the block with hand pressure only. If the transmission does not sit flat against the engine, the converter is not fully engaged in the transmission or some other interference problem exists. **Do not attempt to pull the transmission up to the engine with the bellhousing bolts as this can cause transmission or torque converter damage.**

STEP 24. Once the transmission is in position against the engine, install dipstick and bellhousing bolts. Torque bolts to 47 Nm (35 lb.ft.). At this point the torque converter should turn freely. A tight converter indicates improper en-

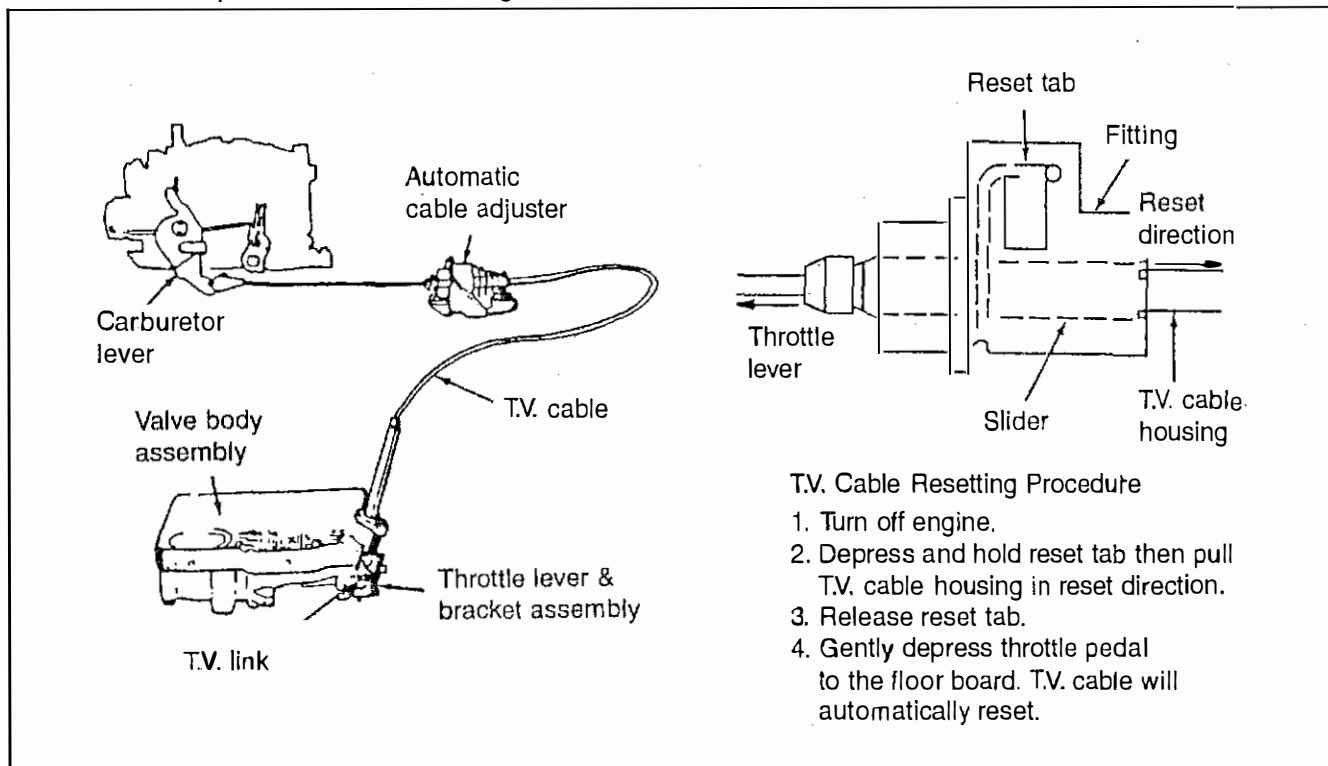


Figure 10

ing pilot hub. This condition must be corrected before going any further.

STEP 25. Inspect transmission mount. Worn, cracked or broken transmission and/or engine mounts should be replaced. Raise transmission and install cross member assembly, then tighten all bolts. Install three (3/8-24 x 1/2) flexplate to converter bolts and nuts. Install the first bolt finger tight, then use the starter to 'bump' each drive lug into position. When all three bolts are installed, torque them to 47 Nm (35 lb. ft.).

STEP 26. Reconnect and adjust the TV cable (see fig. 10).

IMPORTANT: You must reset the TV cable before operating the transmission. Failure to reset the TV cable will result in poor shift quality and early transmission failure.

STEP 27. Reconnect speedometer cable, electrical connector and shifter cable. Before connecting cooling lines to transmission, make sure the entire cooling system is clean (flush if necessary). Insure the tube connector fittings are tight in transmission case, then connect cooler lines and tighten the tube compression nuts with a fitting wrench to avoid damaging the nuts.

STEP 28. Install drive shaft (and torque arm, if used). Make sure the

U-joint cups (bearings) are properly positioned in their seats. Tighten U-joint nuts or bolts securely.

STEP 29. Lower vehicle but keep the rear wheels off the ground if possible. Add seven quarts of transmission fluid to the transmission. Place transmission in NEUTRAL and start the engine and let it idle. Add fluid to transmission until the fluid level is between the FULL and ADD marks. Shift the transmission through all gear positions. If the wheels are off the ground, allow the transmission to shift through the gears several times. Place selector in NEUTRAL and check the fluid level again. **DO NOT OVERFILL.** Check for leaks around the oil pan, cooler lines, etc. Turn off engine, then lower vehicle and test drive.

MAINTENANCE

Heavy Duty and High Performance use: Change fluid and filter every 15,000 miles. It's a good idea to check the torque converter bolts at the same time.

OTHER B&M PRODUCTS

B&M manufactures several other transmission products ideally suited for performance applications of the TH-700-R4 transmission.

1. TH-700-R4 Special Deep Pan (#70289) adds approximately 3 quarts extra oil capacity. This attrac-

tive chrome pan also incorporates a built in drain plug to help simplify the more frequent oil changes required of high performance transmissions. The larger surface area and fluid volume of this pan helps to reduce the transmission oil temperature, thereby promoting longer transmission life.

2. TH-700-R4 Kickdown Kit (#70237) The TH-700 has a hydraulic circuit that causes a forced 4-3 downshift whenever the throttle is opened past two-thirds travel. In some applications a forced 4-3 downshift is undesirable. B&M has developed an easily installed kit that will eliminate the part throttle 4-3 downshift feature. This kit is best installed along with B&M's 70235 TransPak. It can also be installed independent of other modifications and valve body removal is not required.

3. Temperature Gauge (#80212) Most transmission and converter failures are traced directly to excessive heat. The B&M transmission temperature gauge can save you a costly repair bill by warning you ahead of time of an overheating transmission. The B&M temperature gauge is extremely accurate and dependable, it comes with all the necessary hardware and is easy to install.