



Torque Converter

Installation Instructions for

General Motors TH700-R4 (4L60), 4L60E, TH200-4R and TH200C

Part Nos. 70415, 70416, 70417, 70418, 70419, 70420, 70422, 70425, 70426, 70440 & 70441

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Congratulations! You have just purchased the best performing and highest quality torque converter available. We have endeavored to make these installation 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 the instructions completely **before** beginning the installation so you can familiarize

yourself with the procedures.

APPLICATIONS

These GM lockup clutch style (TCC) torque converters are made in versions for several automatic transmissions, three different input shaft spline tooth numbers and a range of stall speeds. The chart below shows the applications.

The new **B&M** torque converter can be used as either a lockup or non lockup unit. If the vehicle currently has an operational TCC it will continue to operate if no

other changes are made to the vehicle. Optionally the TCC can be bypassed (except on 4L60E transmissions) if desired as covered in **STEP 22** below.

If the torque converter is being installed into a vehicle that was not originally equipped with a transmission with lockup torque converter the TCC will not operate and the converter will be a non-lockup converter. The TCC in a TH700-R4, 4L60, TH200-4R or TH350C can be made to operate in this type of applica-

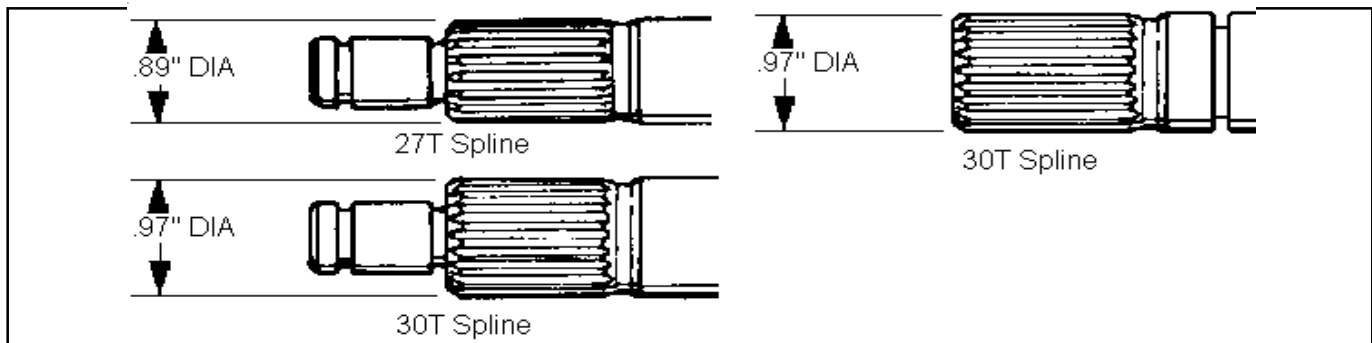


Fig. 1

Transmission	Input Shaft	Type	Part No.
TH200-C	27 Tooth	HoleShot 2400	70415
TH200-4R	27 Tooth	HoleShot 2400	70415
TH700-R4 1982-84	27 Tooth	HoleShot 2400	70415
TH200-C	27 Tooth	HoleShot 2000	70416
TH200-4R	27 Tooth	HoleShot 2000	70416
TH700-R4 1982-84	27 Tooth	HoleShot 2000	70416
TH700-R4 1984-93 (4L60) & 1993-96 4L60E	30 Tooth	HoleShot 2000	70417
TH700-R4 1984-93 (4L60) & 1993-96 4L60E	30 Tooth	HoleShot 2400	70419
TH700-R4 1984-93 (4L60) & 1993-96 4L60E	30 Tooth	Tork Master 2000	70420
TH700-R4 1984-93 (4L60) & 1993-96 4L60E	30 Tooth	Tork Master 2400	70418
TH700-R4 1984-93 (4L60) & 1993-96 4L60E	30 Tooth	Traveler	70422
TH700-R4 1984-93 (4L60) & 1993-96 4L60E	30 Tooth	HoleShot 3000	70425
TH200-C	27 Tooth	HoleShot 3000	70426
TH200-4R	27 Tooth	HoleShot 3000	70426
TH700-R4 1982-84	27 Tooth	HoleShot 3000	70426
4L60E 1998-04 & 2000-04 4L65E	30 Tooth	HoleShot 2000	70440
4L60E 1998-04 & 2000-04 4L65E	30 Tooth	HoleShot 2400	70441

Torque Converter Applications

tion by using the **B&M** Converter Lockup Control (#70244 for mechanical drive speedometers, #70248 for GM electronic speed sensor applications).

These torque converters can be used on the GM 4L60E electronically controlled transmission used on 1993 - 96 Chevrolet and GMC trucks and 1994-97 Camaros and Firebirds. On later model vehicles equipped with an LS1 type engine, the input shaft is longer and can only use the 70440 and 70441 converters. For this transmission (4L60E) you must not make any electrical connection changes. Using it as a non lockup unit will cause error codes to be generated and the "Check Engine" light will be illuminated.

TRANSMISSION REMOVAL

The TH200C, TH200-4R, TH700-R4 and 4L60E are METRIC dimensioned and have METRIC fasteners.

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 transmission fluid and filter when installing your **B&M** torque converter.

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 loosen 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 driveshaft (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 any exhaust pipes and/or hangers 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. Some models are equipped with a T.V. cable that 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 any electrical connectors from the sides of the case. Be sure to note or label the position of each corresponding connector. Disconnect the transmission shifter cable from the shift lever. Disconnect the speedometer cable or electrical Vehicle Speed Sensor connector at rear of transmission.

STEP 4. Remove the bell housing 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 crossmember. If the vehicle is equipped with a rear mounted distributor on the engine, it is advisable at this point to remove the distributor cap so it will not be damaged as the transmission is lowered. Remove the crossmember assembly.

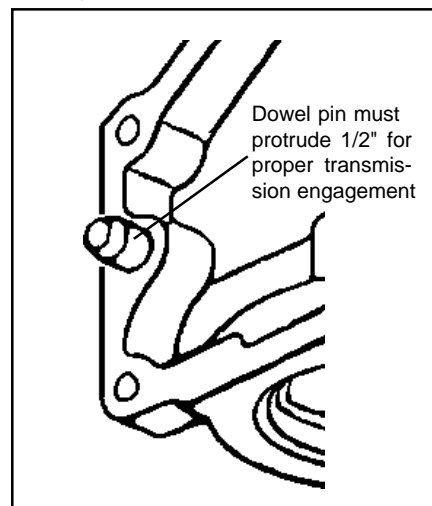


Fig. 2

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

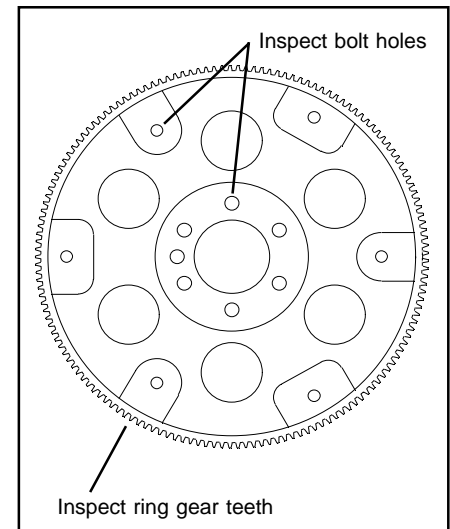


Fig. 3

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 vehicle.

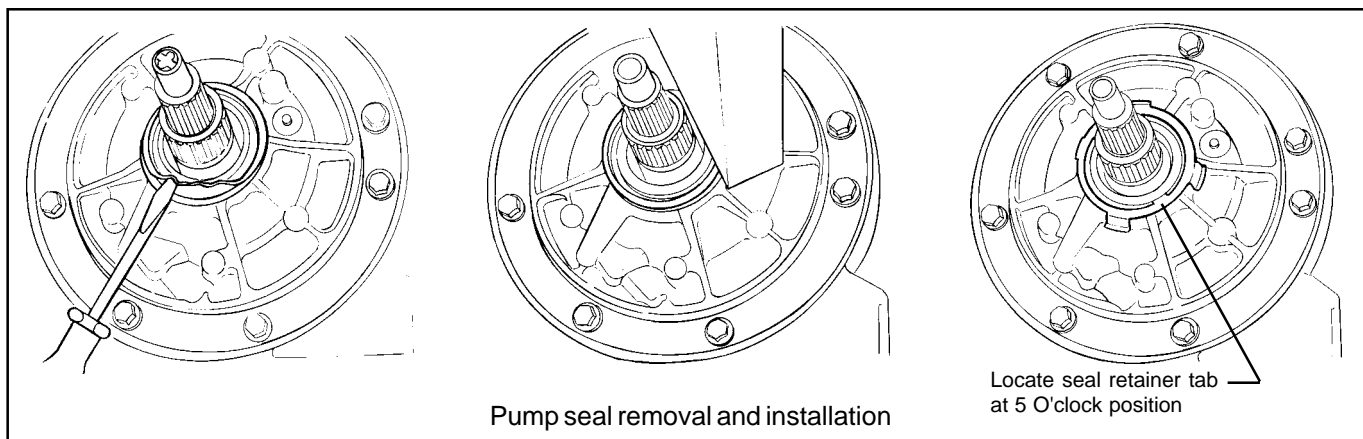
With the transmission completely out of the vehicle the torque converter can easily be removed by pulling it straight off the front. Drain the torque converter as completely as possible then cover the hub to keep out dirt.

STEP 7. Inspect the engine block's transmission mounting face to be 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 inner lip on the flexplate should face away from the crankshaft flange. Torque the bolts to 60 ft.lbs.

STEP 10. Carefully remove the front seal from the oil pump housing. **CAUTION:** The oil pump housing used in these transmissions is made of an aluminum



Pump seal removal and installation

Fig. 4

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. 4).

1. Raise the transmission (or place on bench) so that the seal is accessible from the lower side of the transmission.
2. Using a common (flat) screwdriver collapse the seals outer flange as shown. Be careful not to damage the housing with the screwdriver.
3. 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) to clean the seal bore thoroughly.

STEP 11. Coat the outer diameter of the new oil seal with "Loctite, 609" or "Permatex, Secures Gears" cylindrical retaining compound. Then using a small block of wood between the seal and hammer, carefully tap the seal evenly into the housing until fully seated. If the transmission was equipped with a seal retainer, install the retainer onto the housing as shown, see (Fig. 4).

STEP 12. 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 13. Pour 1 quart of transmission Fluid into the **B&M** torque converter so there will be some lubrication on initial startup. Lubricate the converter's pump drive hub with clean transmission fluid.

STEP 14. 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. 5). 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. **If you install the transmission without full converter engagement, you will damage the oil pump.**

STEP 15. 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 / converter against the engine. The transmission should engage the 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.

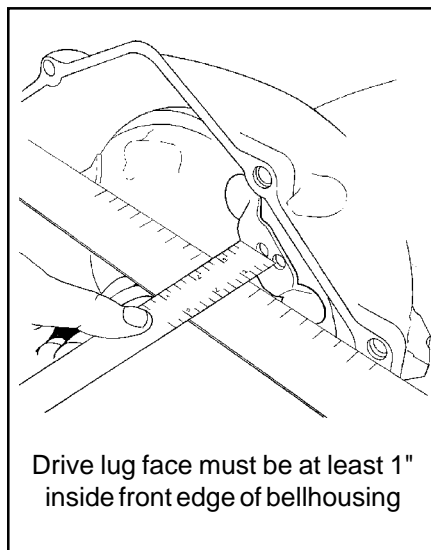


Fig. 5

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 16. Once the transmission is in position against the engine, install the bellhousing bolts and torque to 35 lb.ft. At this point the torque converter should turn freely. A tight converter indicates improper engagement, distorted flexplate or binding pilot hub. **This condition must be corrected before going any further.**

STEP 17. Inspect transmission mount. Worn, cracked or broken transmission and/or engine mounts should be replaced. Raise transmission and install crossmember assembly then tighten all bolts. Install three (M10 x 1.5) flexplate to converter bolts. Install the first bolt finger tight then use the starter motor to "bump" each drive lug into position. When all three bolts are installed torque them to 47 Nm (35 lb.ft.).

STEP 18. Remove the oil pan and filter. The filter suction tube O-ring may stick in the pump body, if it does make sure to get it out. Assemble two (2) O-rings on a new oil filter. Some filters have a preassembled seal on the suction tube, if the filter you are using has a preassembled seal do not use the O-rings. Lubricate the suction tube seal with clean transmission fluid and install filter into the transmission.

STEP 19. Remove all old gasket material from the pan and case flange. Install a new pan gasket then assemble pan to the transmission. Install ALL of the pan bolts (install shifter cable bracket if equipped) finger tight first then torque to 8 lb.ft. **DO NOT** use a sealant on the pan gasket and don't over torque the pan bolts, this will damage the gasket and cause the pan to leak transmission fluid.

STEP 20. If your transmission is

equipped with a TV cable, reconnect and adjust the TV cable, see (Fig. 6). **IMPORTANT:** You must reset the TV cable before operating the transmission. Failure to reset the TV cable may result in poor shift quality and early transmission failure.

STEP 21. Reconnect speedometer cable or VSS connector, any electrical connectors and shifter cable. Make sure the cooler tube connector fittings are tight in transmission case, then either connect cooler lines and tighten tube compression nuts with a fitting wrench (to avoid damaging the nuts) or reinstall the retaining clips.

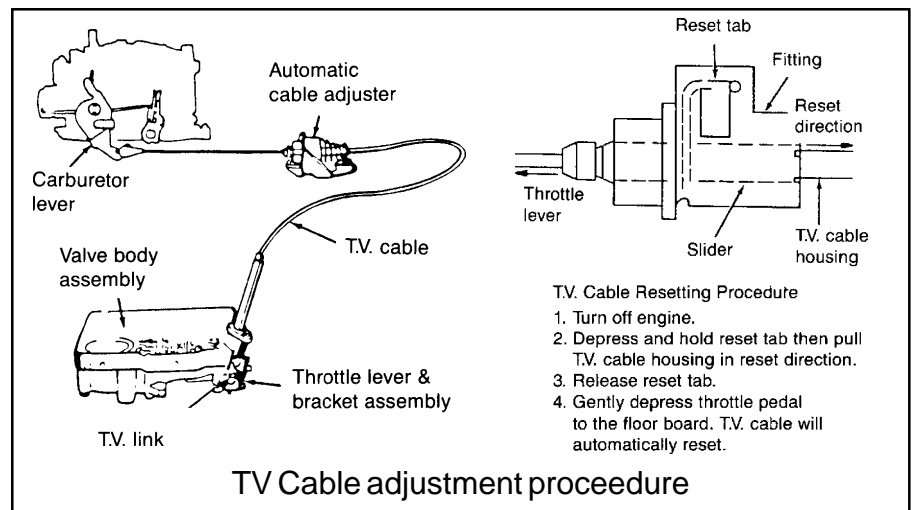
STEP 22. If the vehicle originally had a TCC and transmission installed, plug in the electrical connector on the left side of the case (See Fig. 7) and the TCC in the new converter will operate. If you do not want the TCC to operate, cut the wire going to pin marked "A" on the TCC plug going into the electrical connector on the left side of the case. Tape the ends of the wire to prevent shorts.

If the transmission is installed in a vehicle that did not originally have a TCC and transmission the TCC will not operate. The lockup clutch can be made to operate in this type of application by using the **B&M Converter Lockup Control** (#70244 for mechanical drive speedometers, #70248 for GM electronic speed sensor applications). This unit connects to the speedometer drive cable or to the plug for the electronic speed sensor and lets the driver set the speed at which the TCC will lock and unlock to any speed between 30 and 90 mph.

STEP 23. Install driveshaft (and torque arm if used). Make sure the U-joint bearings are properly positioned in their seats. Tighten U-joint nuts or bolts securely.

STEP 24. Lower vehicle but keep the rear wheels off the ground if possible. Add five quarts of transmission fluid to the transmission. Place transmission in **NEUTRAL** and start the engine. Add fluid to transmission (as per the manufacturers' fluid check recommendation) 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 all 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.

OTHER B&M PRODUCTS



TV Cable Resetting Procedure

1. Turn off engine.
2. Depress and hold reset tab then pull TV. cable housing in reset direction.
3. Release reset tab.
4. Gently depress throttle pedal to the floor board. TV. cable will automatically reset.

Fig. 6

B&M Manufactures several other transmission products ideally suited for 4L60E, TH700-R4 and TH200-4R transmissions.

1. **TH700-R4 (#70235) & 4L60E (#70265) TRANSPAK** The Transpak kits are designed to increase the torque capacity and significantly improve the shift feel in addition to promoting longer transmission life. All of the necessary parts and instructions, including gaskets and a new oil filter are supplied with the kit.

2. **TH200-4R TRANSPAK (#35229)** The TH200-4R Transpak is designed to increase the torque capacity and significantly improve the shift feel in addition to promoting longer transmission life. All of the necessary parts and instructions, including gaskets and a new oil filter are supplied with the kit.

3. **POWER SWITCH KIT (#80217)** The **B&M Power Switch Kit** allows the lock-up portion of the converter to be temporarily eliminated and the converter reverted to a standard type converter. This gives the ability to operate the vehicle with a standard type torque converter when it is more desirable than the lock-up type.

4. **TH700-R4 Special Deep Pan (#70289)** adds approximately 3 quarts extra oil capacity. This attractive 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 reduce the transmissions oil temperature thereby promoting longer transmission life.

5. **TRANSMISSION OIL COOLERS.** Design features of the new "High Tech" transmissions cause them to run hotter than earlier transmissions. We recommend that every vehicle using an automatic transmission in heavy duty applications (racing, towing, RV, commercial, off road, fleet) have an auxiliary transmission oil cooler. Addition of an auxiliary oil cooler will not only reduce transmission oil temperature but it will also significantly reduce the heat load on the radiator. Heat is a major cause of automatic transmission failure, an auxiliary oil cooler is an inexpensive guard against overheating and failure. **B&M** offers a complete range of transmission coolers to suit every application, available at your **B&M** dealer. **A non-lockup torque con-**

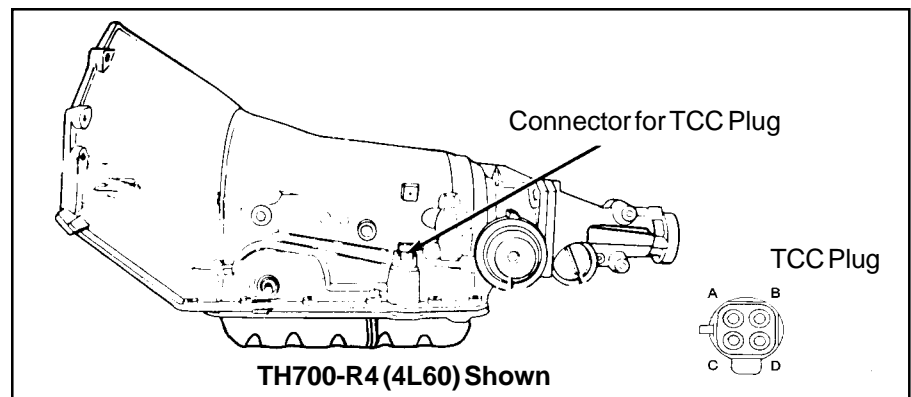


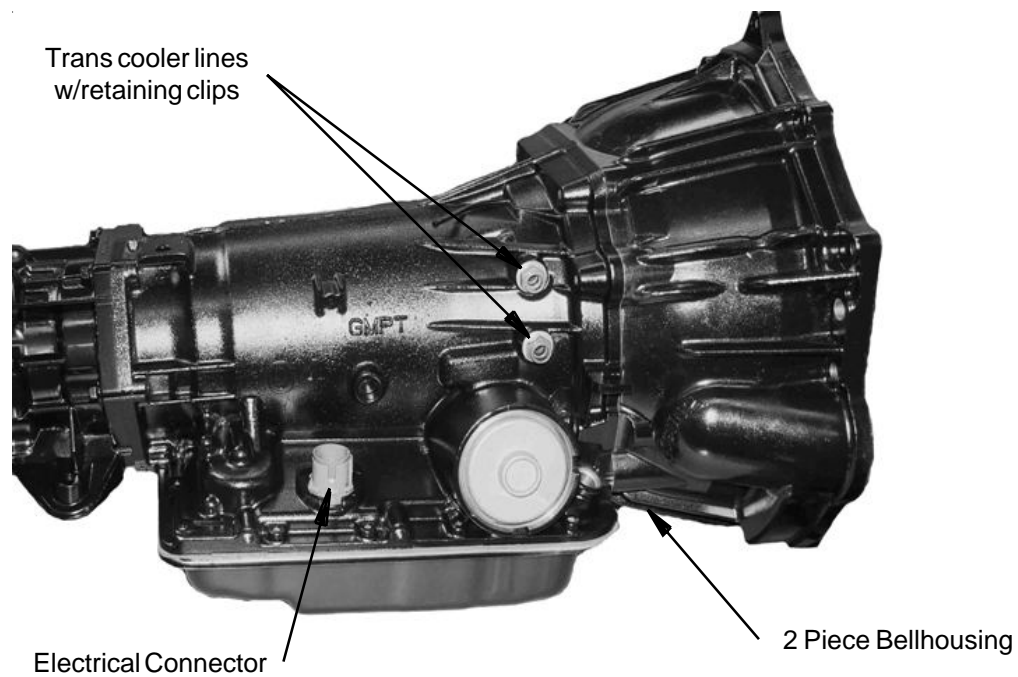
Fig 7

verter installation will run warmer than a lockup installation, and particularly needs a transmission cooler.

6. **TEMPERATURE GAGE (#80212)** Most transmission and converter failures are 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 overheating transmission. The B&M temperature gage is extremely accurate and dependable, it comes with all necessary hardware and is easy to install.

7. **TH700-R4 KICKDOWN KIT (70237)** The TH-700 has a hydraulic circuit that causes a forced 4-3 down shift whenever the throttle is opened past two thirds travel. In some applications a forced 4-3 down shift is undesirable. After many customer requests B&M has developed an easily installed kit that will eliminate the part throttle 4-3 down shift feature. This kit does not alter normal shift speeds or affect detent operation. 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.

8. **4L60E SHIFTPPLUS (#70380)** For those of you who have a 1993-1998 electronically controlled 4L60E, the SHIFTPPLUS is a great addition to firming up those soft feeling factory shifts. With in a few minutes for installation, you can quickly and simply increase your transmission line pressure with just a flip of a switch. There is no need to remove the transmission pan to install the SHIFTPPLUS. You transmission will benefit from reduced wear and slippage, which causes excessive heat and can lead transmission life failure. You only need simple tools to install and can easily go back to stock by simply flipping a switch.



4L65E shown
Fig. 8