INSTALLATION INSTRUCTIONS FOR B&M AUTOMATIC TRANSMISSIONS REPLACING GM TH350, TH400, and TH700R4 / 4L60 (not including 4L60E / electronic shift models)

B&M part numbers: 102002 - 103005 - 107101 - 107104 107105 - 107106 - 112002 - 112003 - 112004 112006 - 113001 - 117101 - 117103

INTRODUCTION

Your B&M automatic transmission is a precision component built to exacting standards. Handle it with care, and take the time to read and understand these instructions before starting.

Replacing a transmission requires better-than-average mechanical knowledge and skills. If this job is beyond your abilities, seek the services of a qualified technician.

TRANSMISSION REMOVAL

1. **Disconnect the negative battery cable.**

2. **Raise the vehicle.**

   WARNING: AVOID SERIOUS INJURY OR DEATH BY CRUSHING! Securely support the vehicle on a lift or jack stands. NEVER work under a vehicle that is supported only by jacks.

   Use a lift, or jack and jack stands, to raise the vehicle to the height necessary to remove the transmission.

3. **Drain the transmission fluid.**

   WARNING: AVOID BURNS FROM HOT COMPONENTS AND FLUIDS! Automatic transmissions typically operate at 150–200°F. Allow the vehicle to cool sufficiently (1–2 hours) before starting transmission removal.

   If the transmission pan does not have a drain plug, loosen a few bolts at one end of the pan, remove the rest of the pan bolts, and carefully lower one end of the pan so the fluid can drain. Then remove the remaining bolts, and lower the pan to drain the remaining fluid. When the fluid has finished draining, reinstall the drain plug or pan.

4. **Remove the driveshaft.** Handle it with care, and store it in a safe location.

   NOTE: Tie a quart freezer bag over the tailshaft housing with a cable tie, to catch any fluid that my leak as the transmission is removed.

5. **Disconnect** all of the following from the transmission:
   - electrical connectors
   - wire loom clamps
   - vacuum hoses
   - transmission cooler lines
   - gear selector linkage
   - throttle (or kickdown) wiring, cables or linkage
   - speedometer cable

   … and any other similar items. (Label all connections for ease of reassembly.)

6. **Remove the transmission dipstick** and fill tube.

7. **Remove the starter.** Although not strictly necessary on many GM transmissions, removing the starter will provide more working clearance around the transmission.

8. **Remove the flexplate-torque converter fasteners.** First remove the applicable dust or inspection cover. Then rotate the crankshaft slowly to access each fastener.

9. **Remove the crossmember.** Place a jack (and wide block of wood, if necessary) under the pan, and transfer some of the transmission's weight to the jack. Remove the transmission mount fasteners, and the crossmember-frame fasteners. Then remove the crossmember.

10. **Remove the exhaust crossover pipe,** and any other exhaust components that may interfere with the removal and lowering of the transmission.

11. **Remove the transmission bell housing bolts, except one at the bottom.** To gain access to the upper bell-housing bolts, slightly lower the transmission.

    CAUTION: To avoid damaging the engine mounts, do not lower the jack so much that it no longer supports the transmission. Some of the transmission's weight must always be supported by the jack.

12. **Before removing the last bell housing bolt, perform a final check** to verify that:
    - all flexplate-torque converter fasteners have been removed;
    - all mechanical, electrical and fluid connections have been removed; and
    - the area surrounding the transmission is clear of anything that will interfere with its removal and lowering.

13. **If the engine is mounted only at the front end, support its rear end** with a separate jack or jack stand.

14. **Separate the transmission from the engine.**

    CAUTION: The torque converter is heavy! Once the transmission is separated from the engine, there is nothing holding the torque converter to the transmission. To avoid injury or parts damage, take care not to allow the torque converter to slide off the input shaft and fall out of the bell housing. Keep the transmission level or tilted slightly rear-down, and hold the torque converter in place, while lowering the transmission to the ground.

    Remove the last bell housing bolt. Carefully separate the transmission from the engine and lower it to the ground.

15. **Pull the torque converter off of the transmission input shaft** and out of the bell housing. Keep the pump drive hub tilted slightly upward, to prevent transmission fluid from sloshing out.

    B&M recommends that you replace the torque converter. But whether you are replacing or re-using the torque converter, drain the transmission fluid from it, then stuff a clean rag in the pump drive hub to keep debris out.

PRE-INSTALL INSPECTION AND PREP

1. **In order to remove any debris left in the system from the previous transmission, B&M recommends that you a) hot flush and flow check the radiator and cooling system lines; b) replace the torque converter; and c) replace any auxiliary transmission cooler(s) (if applicable).**

   Torque converters and transmission coolers can trap debris, which may then contaminate your new B&M transmission.

2. **Whether you replace the torque converter or not, inspect the sealing surface of its pump drive hub for excessive wear, scoring, or other damage.** A worn or damaged hub can result in a damaged transmission pump seal and lead to leaks.

3. **Inspect the mating surface on the engine block** for nicks, dirt, etc. Use a mill file to carefully remove any raised metal.

   CAUTION: Do not remove metal below the mating surface.

4. **Inspect the engine crank pilot hole and the torque converter pilot hub** for dirt, rust, paint, etc. Clean as required with emery cloth.

5. **Inspect the flexplate** for cracks around the crankshaft and torque converter mounting holes. Inspect the ring gear for damaged or broken teeth. If the flexplate was removed, check the crankshaft flange for nicks or burrs that may keep the flexplate from bolting up flush to the crankshaft. Torque the crankshaft-flexplate bolts per factory specification.

   NOTE: B&M recommends replacing the flexplate when replacing the transmission.

6. **Inspect the alignment pins in the engine block.** They must be secure and in good condition. Replace the pins if they are loose or damaged.

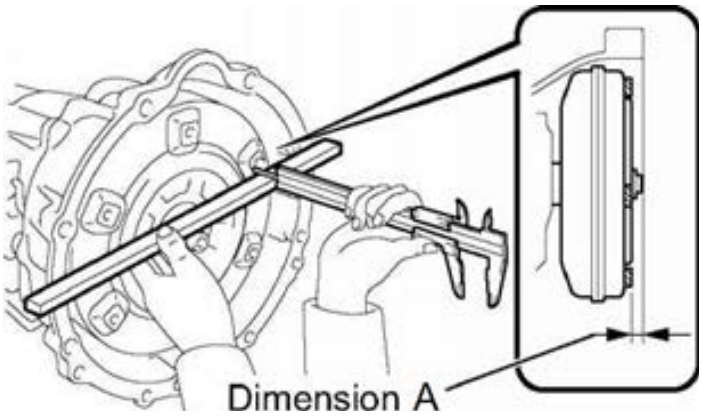
7. **Verify that the flexplate and torque converter fastener patterns and hole sizes match.** Replacing the original torque converter with an upgrade / performance unit may require enlargement of the fastener holes on the flexplate.

8. **Lubricate the sealing surface of the torque converter's pump drive hub** with a film of automatic transmission fluid.

9. **Mate the torque converter to the new transmission.** Pour 1 quart of automatic transmission fluid into the torque converter, then carefully slip it over the

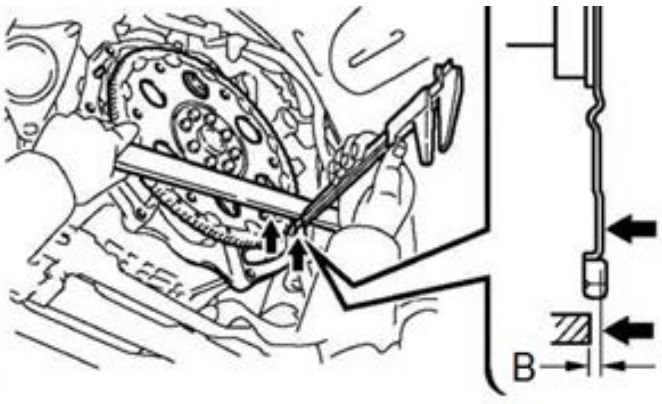
transmission's two splined (input and stator) shafts, supporting its weight to avoid damaging the pump lip seal. **Rotate the torque converter as you push it toward the transmission, and listen and feel for three distinct "clicks" as the torque converter engages the input shaft, stator support, and pump lugs.**

10. **Measure to verify the torque converter is fully seated on the transmission:**

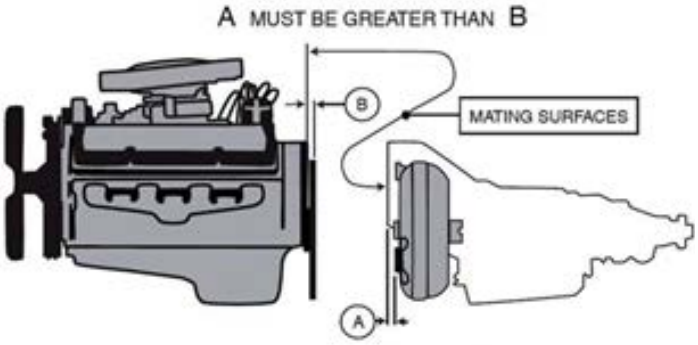


A. Measure Dimension A: While holding the torque converter in place against the transmission, use a straightedge to measure the distance between the bell housing mating surface and the torque converter mounting pads.

TYPICAL TORQUE CONVERTER DEPTHS Dimension A–Bell Housing to Mount Pads (±0.050")	
Turbo-Hydramatic 350 / 700R4 / 4L60	1-1/8"
Turbo-Hydramatic 400	1-3/16"



B. Measure Dimension B: On the engine, measure the distance between the engine block mating surface and the torque converter mating pads (the raised surfaces on the flexplate at each torque converter fastener hole).



C. Verify that Dimension A is greater than Dimension B. If it is not, the torque converter is not fully seated. Pull it off slightly, then, while rotating it, push it back on. Continue to do this until you feel the torque converter move inward and make the proper engagement. Then repeat and compare Dimensions A and B. **Do not proceed further until the torque converter is fully seated.**

INSTALLATION

1. **Raise the transmission and mate it to the engine.** Keep the unit level or tilted slightly rear-down, and hold the torque converter in place, while raising the transmission.
   - **A. Install the bell housing over the engine's dowel pins.** Do not place the transmission's full weight on the dowel pins. The transmission must be supported by the jack until at least 2 bolts have been installed and tightened.
   - **B. Align the transmission and engine mating surfaces** so that they are flush all the way around.

   CAUTION: Do not use bolts to draw the transmission up to engine.

2. **Install the engine-transmission bolts,** and torque them per factory specification. The torque converter must be free to rotate, and have end-play (back-and-forth movement on the shaft), after the transmission is bolted to the engine.

   CAUTION: If there is no end-play, the torque converter is not properly engaged with the transmission; remove the transmission and correct the problem.

3. **Fasten the torque converter to the flexplate.** After verifying torque-converter end-play, install the torque converter-flexplate fasteners (use of a medium-strength thread-locking fluid is recommended), and torque them per factory specification.

4. **Reinstall the crossmember.** Inspect the transmission mount for damage, and repair / replace as required. Then reinstall the crossmember on the vehicle frame, and secure the transmission to the mount and crossmember.

5. **Install the drive shaft.** Inspect the drive shaft yoke for excessive wear. If serviceable, apply a thin film of transmission fluid to the sealing surface of the yoke before installation.

   Whether re-using your driveshaft or fabricating a new one, verify 3/4" of slip clearance for street use, or 1" of slip clearance for competition. The driveshaft must not be able to crash into the transmission when the suspension is compressed, or severe transmission damage will result. Likewise, the driveshaft must not be so short that it falls out of the transmission when the suspension extends fully.

6. **Reconnect shifter linkage.** Attach shifter linkage to shift arm on transmission. If installing an aftermarket shifter, skip this step and follow the manufacturer's instructions for shifter adjustment. Otherwise, put the transmission and shifter in neutral, install cable / linkage to transmission, and check for proper movement in each gear. There should be no tension on the shift lever when in any gear and the cable end should slide in and out of the lever with no resistance.

7. **Connect the vacuum modulator and manifold vacuum source.** (Applies only to TH-350 and TH-400 with automatic valve bodies. Manual valve body units do not require a connection to manifold vacuum.)

   Some transmissions include a B&M vacuum modulator, which is adjustable with a small screwdriver. Turn the screw clockwise to raise the transmission's shift points; turn it counter-clockwise to lower them.

8. **Connect the kickdown control.** (Applies to automatic valve body units only. Manual valve body units do not use kickdown control.)
   - **TH-400:** Make the electrical connection from the kickdown switch. (B&M offers a kickdown switch if you do not have the factory switch; see our website for details.)
   - **TH-350:** Connect the kickdown control cable and adjust to factory specs.
   - **TH-700R4 and 4L60:** Connect the throttle valve (TV) control cable and adjust to factory specs.

     CAUTION: Failure to adjust the TV cable to factory specs can result in transmission damage. Such damage is not covered under warranty.

9. **Reconnect any remaining electrical and mechanical connections,** such as:
   - electrical connectors / wire loom clamps
   - vacuum hoses
   - throttle linkage / cables
   - speedometer gear / cable

   … and any other similar items.

10. **Reinstall:**
    - any exhaust components that were removed;
    - the starter; and
    - the transmission fill tube and dipstick.

11. **Reconnect the cooling lines.** In addition to the typical radiator heat exchanger, the use of an auxiliary, oil-to-air transmission cooler is strongly recommended.

    CAUTION: B&M'S PRODUCT WARRANTY DOES NOT COVER TRANSMISSIONS THAT HAVE BEEN DAMAGED DUE TO OVERHEATING.

    NOTE: The transmission can be run briefly without a cooler, provided that its discharge (to cooler) port is plumbed back to its return (from cooler) port with 5/16" copper or steel tubing. **CAUTION: DO NOT attempt to run the unit with these ports blocked, as this will prohibit the vital flow of transmission fluid throughout the unit.**

12. **Lower the vehicle and fill the transmission with fluid.**

    CAUTION: Over-filling can cause fluid foaming, shifting problems, fluid leakage from the case vent, and transmission damage.

    Fill as follows to avoid over-filling:

    A. Fill initially with 5 quarts of automatic transmission fluid. (Use either a GM-specified ATF, or **B&M Trick Shift performance ATF,** a scientific blend of foam inhibitors, pressure agents and shift modifiers that will dramatically improve shift feel and extend the life of your transmission.)
    B. Start the engine, and run the shifter through the entire gear range and back, pausing briefly in each shifter position. With the engine still running, check the fluid level (in PARK or NEUTRAL).
    C. Each time you add fluid, run the shifter slowly through the entire gear range and back before re-checking the fluid level.
    D. Add fluid as necessary to bring the level up to the LOW mark on the dipstick.
    E. Take the vehicle for a short drive (3–5 minutes). The transmission is now at operating temperature.

F. Park the vehicle, and run the shifter slowly through the entire gear range and back.
G. Fluid level should be at the FULL mark with the transmission at operating temperature, the shifter in PARK or NEUTRAL, and the vehicle on a level surface.
H. If not, gradually add fluid, then run the shifter slowly through its range and back, until the fluid level reaches the FULL mark.

B&M Performance & Off-Road