Installation Instructions
Converter Lock-Up Control
Part No. 70244
©B&M Automotive Products 1999

NOTE: This kit is designed for transmissions equipped with a mechanically driven speedometer cable. Use kit P/N 70248 with transmissions equipped with electronic speed sensor.

INTRODUCTION
Please read the instruction sheet thoroughly before attempting to install your B&M Converter Lock-Up control.

B&M's Converter Lock-Up Control provides driver control of the speed where converter clutch lock-up takes place. The dash mounted electronic control module has a slide type variable potentiometer to adjust lock-up speed and two LED's that indicate the lock-up clutch status (on/off). The Converter Lock-Up Control module receives a variable voltage signal from a speedometer cable mounted sensor. This voltage signal along with the potentiometer setting determines the precise speed at which to activate the lock-up clutch solenoid. In operation the position of the Converter Lock-Up Control slide potentiometer is adjusted so that the lock-up solenoid is activated at the desired speed. Whenever the ignition switch is on and the vehicle is stopped or moving slowly the RED (lock-up clutch off) LED is lit. When the vehicle reaches the speed preset in the Converter Lock-Up Control module the GREEN light is lit and power is available to the lock-up clutch solenoid. This will activate the solenoid and cause the converter clutch to lock-up. Once the transmission has shifted beyond first gear and the solenoid is activated, lock-up will occur at any speed within the range of the Lock-Up Control. B&M's Converter Lock-Up Control will not cure a defective converter clutch, however if the clutch is not defective the B&M Converter Lock-Up Control will lock it at the preset speed.

WARNING: When using B&M's Converter Lock-Up Control with any four speed overdrive transmission, we recommend that lock-up speed not be set higher than 45 MPH. Operation in fourth gear (Overdrive) without the converter clutch locked-up can result in transmission and engine overheating.

CONTENTS
The B&M Converter Lock-Up Control kit contains the following components:
- Lock-up Speed Control electronic module
- Master wire harness with connectors for transmission and pulse generator
- Speed sensor and speedometer cable adapter
- Wire splices, connectors and plastic wire ties
- In some custom installations additional components may be required, such as a 5A fuse and holder and possibly wire terminals to fit your particular installation.

PREINSTALLATION
Before installing your B&M Converter Lock-Up Control we recommend that you perform a few simple transmission performance checks and make sure you have certain tools and equipment on hand to assist in the installation.

LOCK-UP CLUTCH OPERATION
Operate vehicle with range selector in third gear (Drive) position. Choose an area where you will not exceed the local speed limit. Verify proper operation of lock-up clutch and transmission. Accelerate the vehicle at low speed until it shifts into third gear. Lock-up clutch operation (in stock vehicles) can usually be checked by operating the vehicle at a steady speed and lightly depressing the brake pedal just enough to activate the brake light switch. Alternatively depress the throttle a small amount but rapidly, this should cause the lock-up clutch to disengage, then rapidly return throttle to steady speed position and lock-up clutch should reengage. When the lock-up clutch engages and disengages you should notice a 200-500 RPM change in engine speed. If the lock-up clutch is defective replace the torque converter.

TRANSMISSION PERFORMANCE
Check overall transmission performance for shift quality and timing. If performance seems sluggish or shift timing is occurring too early or late check vacuum lines and transmission throttle valve or detent cable adjustment. Check transmission oil pressures and compare them to the appropriate service manual for your vehicle. If the problems persist B&M has a complete line of products for rebuilding and enhancing the performance of General Motors Transmissions.

Printed in U.S.A. Not legal for sale or use on pollution controlled motor vehicles. 9500475-05
TOOLS
Besides the normal electrical repair tools, i.e., wire cutters, stripper and terminal crimper, a VOM (Volt Ohm Meter, or at the very least a 12V test light) is required to check voltage polarity and circuit continuity. Incorrect polarity connections or short circuits will damage the Converter Lock-Up Control electronic module and void the warranty. A drill motor, 1/8" bit and a common screwdriver are required to install the Converter Lock-Up Control module.

Installation of B&M’s Converter Lock-Up Control requires clear access to the underside of the vehicle in order to properly route wires and install speed sensor. Raise the vehicle so there is 2 feet or more ground clearance. MAKE SURE THE VEHICLE IS RIGIDLY AND SECURELY SUPPORTED, JACK STANDS, WHEEL RAMPS OR A HOIST WORKS BEST, DO NOT USE JACKS ALONE.

WIRING REQUIREMENT
The B&M Converter Lock-Up Control is relatively simple to hook up. There are five wires connected to the Converter Lock-Up Control module which are color coded and have the following functions:

<table>
<thead>
<tr>
<th>COLOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>+12V, 5A-10A fused, ignition key controlled source.</td>
</tr>
<tr>
<td>BLACK</td>
<td>Chassis ground.</td>
</tr>
<tr>
<td>YELLOW</td>
<td>Supplies +12V to transmission lock-up clutch solenoid.</td>
</tr>
<tr>
<td>BLUE</td>
<td>Speed sensor.</td>
</tr>
<tr>
<td>GREEN</td>
<td>Speed sensor.</td>
</tr>
</tbody>
</table>

Installation of the B&M Converter Lock-Up Control requires hooking up only the RED, BLACK and YELLOW wires, the BLUE and GREEN wires are already connected to the speed sensor unit.

STANDARD INSTALLATION
STEP 1. Choose an accessible location under the dash to mount the Converter Lock-Up Control module. Using the mounting tab holes mark the location where to drill. Before drilling check opposite side of dash for obstructions. Drill two 1/8" holes and install Converter Lock-Up Control module using self-tapping screws provided. Do not over tighten screws! Use shims or carefully bend tabs to orient module as desired.

STEP 2. Locate ignition key controlled 5A-10A fused source of +12V and a good chassis ground connection. Most GM fuse panels have an instrument section that can be tapped to supply the Converter Lock-Up Control module. Use a VOM (Volt-Ohm Meter) or a test light to check the continuity and voltage between the proposed power source and ground.

STEP 3. Connect RED wire to +12V power source and BLACK wire to ground connection located in STEP 2. Reversing the polarity of these two wires will damage the Converter Lock-Up Control module and VOID THE WARRANTY. Route wires so they cannot become tangled in any mechanisms (brake pedals, A/C, heater controls).

STEP 4. Route remaining wires from the Converter Lock-Up Control module to the transmission. Make sure wires passing through the fire wall or floor pan are adequately protected against abrasion with the sheet metal. Also take care not to route wires near...
hot exhaust pipes and high tension ignition wires. The heat will melt insulation from wires and the ignition pulses can cause unpredictable Converter Lock-Up Control operation.

STEP 5. Disconnect speedometer cable at transmission end. Install short speedometer cable supplied with kit on transmission making sure cable core is engaged in transmission fitting. Next install speed sensor and connect speedometer cable to both ends. Rotate sensor so that wires do not hang down and are out of the way of any moving mechanism or hot pipes.

STEP 6. For most applications connect the YELLOW wire as shown in Figure 1 which shows the proper wiring hookup for B&M's Converter Lock-Up Control. In custom applications (or if you wish to bypass the brake switch) you can (in most cases) plug the supplied transmission connector directly into the transmission and ground the short BLACK lead from pin D. We recommend that you wire the Converter Lock-Up Control through the brake switch as a safety precaution. The brake switch disengages the lock-up clutch upon brake application in the unlikely event of an electrical malfunction. Route wires next to members where they can be secured. Once again remember to avoid mechanisms and hot pipes which can fray or melt the insulation and cause a short circuit.

OPERATION
Operation of your B&M Converter Lock-Up Control is automatic once it has been preset to the desired lock-up speed. When properly connected the RED LED on the front of the Converter Lock-Up Control should light when the ignition key is turned on. Lock-up engagement speed is adjusted while operating the vehicle. Operate the vehicle at the speed where you want the lock-up to be engaged continuously. Move the slide knob until the GREEN LED lights and the converter clutch lock-up occurs. The lock-up engagement speed can be changed at any time to suit driving conditions by moving the slide knob left or right as desired.

CUSTOM TRANSMISSION INSTALLATION
B&M's Converter Lock-Up Control is especially suited for controlling the lock-up clutch in vehicles with custom transmission installations which were not originally manufactured with a torque converter clutch equipped transmission. Custom transmission installations utilizing early model transmissions with valve body controlled lock-up (TH-200-4R, TH-700-R4) speed may require some modification to operate correctly. In these cases consult the appropriate factory service manual to locate the converter clutch shift valve train in the valve body. Deactivate the converter clutch shift valve by removing the spring holding the valve train in the OFF position. This will allow the converter clutch shift valve to move to the ON position and ensure that control pressure is always available at the converter clutch apply valve after the first gear shift. A TH-700 converter clutch shift valve train is shown in Figure 2 as an example. It may also be necessary to remove the oil pan and identify which kind of solenoid and wiring scheme is used on your particular unit. A prewired four pin transmission connector (attached to the Converter Lock-Up Control module) is provided for these applications.

LOCK-UP CLUTCH AND SOLENOID BASICS
The lock-up clutch is located inside the torque converter and is designed to eliminate torque converter slip for improved efficiency. In GM vehicle's the speed at which lock-up clutch engagement occurs is controlled either by hydraulic circuits inside the transmission or by the vehicles Electronic
Control Unit (ECU). Lock-up clutch engagement occurs when the Converter Clutch Apply Valve changes position and vents the area behind the lock-up clutch piston. The converter clutch apply valve’s position (on/off) is determined by the converter clutch solenoid and the availability of control pressure. In most early applications the solenoid is always energized and control pressure is supplied by a shift valve in the valve body which determined at what speed lock-up occurred. Later applications eliminated the shift valve altogether and supply control pressure continuously. In the later units the ECU is used to energize the solenoid at the appropriate speed by providing an external ground to the solenoid. In all of the above cases control pressure becomes available only after the transmission shifts out of first gear. Hence the torque converter clutch will never lock-up in first gear. The converter clutch solenoid is located inside the transmission, as are the converter clutch apply valve and, if equipped, Converter Clutch Shift Valve. Access to these components requires oil pan removal. Some applications may require inspection or modification of these components. The lock-up solenoid is connected to a four pin (some early units have two pins) connector located on the transmission case. The pins on these connectors are identified by the letters A, B, C and D.

Lock-up solenoids come with either one or two wires. The one wire style is internally grounded and requires only a +12V connection to energize. One wire solenoids are generally hooked up to connector pin A, see Figure 3. Two wire solenoids require both +12V and ground connections to operate. Two wire solenoids are usually hooked up to pins A and D, where A is +12V and D is ground, see Figure 4. Depending on the application one or both of the solenoid wires may also be connected to pressure switches on the valve body either before, or instead of, going to pin D. Reversing the polarity on a two wire solenoid can damage an internal diode which protects the electrical system from voltage spikes.