Using The Allison World Transmission Shift Selector

The touch pad commonly found in motorhomes equipped with this transmission is more than just a gear selector. It serves as a communication link between the transmission and the operator.

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Allison introduced its World Transmission to the motorhome marketplace several years ago. The MD version used in motorhomes was followed by the HD version, which is used in conjunction with engines having horsepower ratings in excess of 300, primarily heavier bus conversions. Although minor programming differences exist to accommodate the extra work load encountered by the HD version both versions of the
World Transmission are six-speed units with electronic controls that function in a similar fashion. This sophisticated, electronically controlled transmission provides more functions and features than automatic transmissions of the past.

Transmission functions and features. The Allison World Transmission can adapt its shift schedule to accommodate driving habits. It “learns” to shift according to the acceleration pattern and will adapt to a different driver within a short period of time. It is programmed with an alternate shift schedule, or (secondary mode) function, which will be discussed later in the article. It can automatically downshift as many as two gears, within rpm limits, during engine braking to provide maximum brake horsepower. In addition, it will automatically upshift or prevent downshifts to eliminate an engine over-rev condition. Original equipment manufacturer (OEM) specified downshift schedules can be made available for use with exhaust brakes. This causes the transmission to downshift to a lower gear to enhance engine brake performance, provided that this does not exceed maximum engine rpm.

The World Transmission has a shallow oil pan option, which increases ground clearance in pusher applications. It has an oil sensor option to detect transmission oil level, a feature that is now supplied automatically with the shallow oil pan option.

The transmission can detect malfunctions and protects itself by illuminating a dash-mounted “DO NOT SHIFT” warning light. It will then shift hydraulically to a default gear in “Converter Mode” and release the lock-up clutch. This protects the transmission and allows travel with a restricted gear range to obtain service.

As expected, a sophisticated transmission needs an equally sophisticated shift selector. Allison supplies either a touch pad or lever-type shift selector. Most motorhomes with the MD-3060 transmission have the touch pads so we will focus on that type.

Shift Selector Functions:

- To select gears.
- To indicate the status of the transmission.
- To select a secondary mode of operation.
- To electronically check oil level (if so equipped).
- To clear a temporary “DO NOT SHIFT” light.
- To indicate the fault causing the “DO NOT SHIFT” status.
- To record, store, and play back the last five diagnostic codes.

The pad has six push buttons, labeled “R,” “N,” “D,” “↑” “↓” and “Mode.” The first three buttons are used to choose “reverse,” “neutral,” or “drive.” The up and down arrows are used to move through the range of six forward gears in “drive.” This is very similar to any other automatic transmission, but the touch pad is much more than just a conventional gear selector. It is the communication link between the transmission and the operator.

The “Mode” button is used to invoke a special function that has been programmed into the electronic control unit (ECU). In motorhomes, this special function is almost always the economy shift schedule that shifts gears at lower rpm to provide better fuel economy. This is an appropriate choice when traveling on flat terrain. In situations where maximum power is required, such as climbing grades and utilizing maximum engine braking capabilities, the standard shift schedule is preferred.

The touch pad has two digital displays: “Select,” which shows the gear or range of gears chosen by the operator, and “Monitor” which indicates the current gear of transmission operation. In addition, a “Mode On” light indicates that the secondary mode has been chosen.

When the ignition is turned on the “DO NOT SHIFT” light, usually located on the dash, illuminates momentarily, accompanied by audible tones (short beeps) coming from the shift selector. This tells the operator that the indicator light is functioning. The “Select” digital display will read “N.” When the engine is started, the operator may choose “reverse,” “drive,” or, using the up and down arrows, a range of forward gears. After the operator selects “drive,” pushing the down arrow will change the “Select” display incrementally from 6.
through 1. For example, you may want to limit the range of forward gears to 1 through 4 when driving in heavy traffic. (Additional operating tips are provided with this article.)

Holding the up or down arrow will scroll the numbers until the button is released or the highest or lowest number is displayed. Every selection change will be accompanied by a "beep" sound, and a visual change in the "Select" display. The "Monitor" display will indicate the gear currently operating.

In the event of a transmission malfunction, the "DO NOT SHIFT" light may illuminate. This will be accompanied by 8 seconds of short beeps from the shift selector and indicates that shifts are being restricted. The "Select" display will not be lit, and transmission operation, may be restricted. If the failure allows limited operation, you can proceed to find service assistance. During this time upshifts and downshifts may be restricted. Anytime the "DO NOT SHIFT" lamp is lit, a diagnostic code will be recorded. To clear a temporary "DO NOT SHIFT" light and restore operation, take the following steps: 1. Bring the vehicle to a stop at a safe location and apply the parking brake. 2. Simultaneously press the up and the down arrows once. On the lever-type selector, push the "Display Mode" button once to gain access to the diagnostic code information. 3. Press and hold the "Mode" button until a tone is heard, and then release the button.

The transmission may return to normal operation. If the condition is temporary, the "DO NOT SHIFT" light may come back on. The type of operation permitted by the CPU will depend on the type of condition. Under certain circumstances, a shift from neutral to an operating range may not be permitted. This situation will require immediate attention.

The up and down arrows are also used to gain access to the oil level sensor, if present, and to enter the diagnostic display mode. Please note that the selector is capable of displaying two characters at one time. One character will be shown on the "Select" display, and the other will appear on the "Monitor" display. For example, the fact that the oil level is low will be displayed as follows:

<table>
<thead>
<tr>
<th>Message</th>
<th>Select Display</th>
<th>Monitor Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Level</td>
<td>0</td>
<td>L</td>
</tr>
<tr>
<td>Pause</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Okay</td>
<td>0</td>
<td>K</td>
</tr>
</tbody>
</table>

The troubleshooting guide included with this article outlines the procedure for gaining access to and interpreting the display codes. You may benefit from having this guide on hand while you explore the functions of the shift selector.

For additional information, contact your local Allison distributor or dealer. Check the Yellow Pages for the location nearest you.

OEM TROUBLESHOOTING GUIDE FOR ALLISON WT TROUBLE CODES

OIL LEVEL SENSOR INFORMATION

If the transmission you are troubleshooting has an oil level sensor, oil level information is obtained using the following procedure: (If an oil level sensor is not present, skip to CLEARING CODES section below.)

For a push button selector:
1. Press the up and down arrow buttons once simultaneously. Oil level information is displayed in two minutes (display will flash and 8.7 seconds count will occur during the two minutes) once the following parameters are met:
   a. Engine at idle
   b. Sump temperature normal
   c. Transmission in neutral
   d. Transmission output shaft stopped
   e. Oil level sensor present and working
2. After two minutes, the display will flash one of the codes shown below.

   CODE | CAUSE OF CODE
   GPS | Oil level is correct
   L0-01 | One quart low
   L0-02 | Two quarts low
   H0-01 | One quart high
   H0-02 | Two quarts high

   NOTE: Failure to meet any of the above parameters will stop the two-minute countdown. One of the codes shown below will be displayed to show the reason that the countdown was interrupted. Once all parameters are met, the countdown will continue from where it left off.

   CODE | CAUSE OF CODE
   OLS-01 | Engine speed (rpm) too low
   OLS-02 | Engine speed (rpm) too high
   OLS-05 | Neutral must be selected
   OLS-70 | Sump oil temperature too low
   OLS-79 | Sump oil temperature too high
   OLS-90 | Output shaft rotation
   OLS-95 | Sensor failure

   NOTE: Sensor failure display should be reported to a distributor or dealer in your area (check your telephone directory for an Allison Transmission distributor or dealer nearest you).

For a lever selector:
1. Follow same procedure as push button, except press display mode button instead of up and down arrows.

EXITING THE OIL LEVEL DISPLAY MODE

To exit the oil level display mode, press any range button on the pushbutton shift selector or press the display mode button once on the lever shift selector.

CLEARING CODES

If after vehicle assembly, the "DO NOT SHIFT" light is illuminated, first clear all trouble codes by the following procedure:

For a push button selector:
1. Press the up and down arrow buttons at the same time on a push button shift selector or momentarily press the display mode button on a lever shifter.
2. Press any range button, D, N or R, on a push button selector (the shift will be commanded if it is not inhibited by an active code) or move the shift lever to any position other than the one it was in when the diagnostic display mode was activated if the shift is inhibited, the ECU will continue to command the current range and sound the tone continuously until the lever is returned to its original position.
3. Do nothing and wait until the calibrated time has passed and the system automatically returns to the normal operating mode.

If a DO NOT SHIFT condition is present at this time, the lever should be in the same position as it was when the code was detected.

If the lever has been moved, the shift lever will emit a continuous tone. Moving the shift lever to its original position will stop the continuous tone.

To view the third, fourth and fifth positions, d3, d4, and d5, momentarily press the MODE button as explained above.

The troubleshooting guide included with this article outlines the procedure for gaining access to and interpreting the display codes. You may benefit from having this guide on hand while you explore the functions of the shift selector.

For additional information, contact your local Allison distributor or dealer. Check the Yellow Pages for the location nearest you.
TROUBLESHOOTING
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With the trouble codes recorded, follow the troubleshooting procedures given.

CODE LISTINGS AND PROCEDURES

IF CODES READ

<table>
<thead>
<tr>
<th>Code</th>
<th>Sub Code</th>
<th>RECOMMENDED PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12</td>
<td>ECU Input voltage low</td>
</tr>
<tr>
<td>21</td>
<td>12, 23</td>
<td>Throttle Sensor</td>
</tr>
<tr>
<td>22</td>
<td>16, 18</td>
<td>Speed Sensors</td>
</tr>
<tr>
<td>23</td>
<td>14, 15, 23, 24</td>
<td>Shift Selectors</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>Sump Oil Temperature Code</td>
</tr>
<tr>
<td>25</td>
<td>16</td>
<td>Output Speed Sensor and Reading</td>
</tr>
<tr>
<td>32</td>
<td>33</td>
<td>C2 Pressure Switch Open</td>
</tr>
<tr>
<td>33</td>
<td>12, 23, 14, 15, 16</td>
<td>EEPROM</td>
</tr>
<tr>
<td>35</td>
<td>00, 16</td>
<td>Power Interruption EEPROM</td>
</tr>
<tr>
<td>36</td>
<td>00</td>
<td>Hardware Software not Compatible</td>
</tr>
</tbody>
</table>

1. Check:
   a. Battery direct ground and power is connected, right, and clean.
   b. Vehicle battery is charged.
   c. Battery charging system is not over or under charged.
   d. Heater free of short, shorts, between wires, shorts to ground.

2. If all points check, call distributor.

Solent Circuit Open or Short

1. Check:
   a. Interior sensor connector is properly connected.
   b. Exterior sensor connector is properly connected.
   c. Sensor wires for open, shorts between wires, shorts to ground.

2. If all points check, call distributor.

Short to Battery in Solenoid circuit

1. Check:
   a. Interior sensor connector is properly connected.
   b. Exterior sensor connector is properly connected.
   c. Sensor wires for open, shorts between wires, shorts to ground.

2. If all points check, call distributor.

ECU Circuitry

1. Check:
   a. Power and ground sensor are connected, terminals, undamaged.
   b. Sensor wire for open, shorts between wires, shorts to ground.

2. If all points check, call distributor.

Offending Ratio Test (during shift)

1. Follow procedures in Code 51.

2. Check sensor wire for open, shorts between wires, shorts to ground.

3. If all points check, call distributor.

Offending C3 Pressure Switch (during shift)

1. Follow procedures in Code 51.

2. Check sensor wire for open, shorts between wires, shorts to ground.

3. If all points check, call distributor.

Offending Speed Test (during shift)

1. Follow procedures in Code 51.

2. Check sensor wire for open, shorts between wires, shorts to ground.

3. If all points check, call distributor.

Oncoming Ratio Test (after shift)

1. Follow Code 51, steps 1, 2.

2. Check C2 pressure switch wire for open, shorts between wires, shorts to ground.

3. Check:
   a. Interior sensor connector is properly connected.
   b. Exterior sensor connector is properly connected.
   c. Sensor wires for open, shorts between wires, shorts to ground.

4. If all points check, call distributor.

Oncoming C3 Pressure Switch (after shift)

1. Follow procedures in Code 51.

2. Check:
   a. Exterior sensor connector is properly connected.
   b. Sensor wire for open, shorts between wires, shorts to ground.

3. If all points check, call distributor.

Range Verification Test

1. Follow procedures in Code 55.

2. Check:
   a. Exterior sensor connector is properly connected.
   b. Sensor wire for open, shorts between wires, shorts to ground.

3. If all points check, call distributor.

Range Verification Test (C3)

1. Follow procedures in Code 55.

2. Check:
   a. Exterior sensor connector is properly connected.
   b. Sensor wire for open, shorts between wires, shorts to ground.

3. If all points check, call distributor.

Serial Communications Interface

1. Check:
   a. Serial connection to engine computer is connected, clean, undamaged.
   b. ECU wire for open, shorts to ground.

2. If all points check, call distributor.

ECU Failure

1. Check:
   a. ECU wire for open, shorts to ground.
   b. ECU wire for open, shorts to ground.
   c. ECU wire for open, shorts to ground.
   d. ECU wire for open, shorts to ground.

2. If all points check, call distributor.