2. To check the shift delay pressures and throttle boost, decrease the vacuum at the vacuum diaphragm to 0-2 inches. Make a 1-2 shift test. If the shift point raises to specification, the throttle boost and shift delay systems are functioning.

   NOTE: After each test, move the selector lever to Neutral, run the engine at 1000 rpm to cool the transmission.

3. To check downshift valve action, leave the vacuum to the vacuum diaphragm at 0-2 inches. Position the downshift linkage in the wide open throttle position (through the detent) and repeat the 1-2 shift test. The speed at the shift point should be higher.

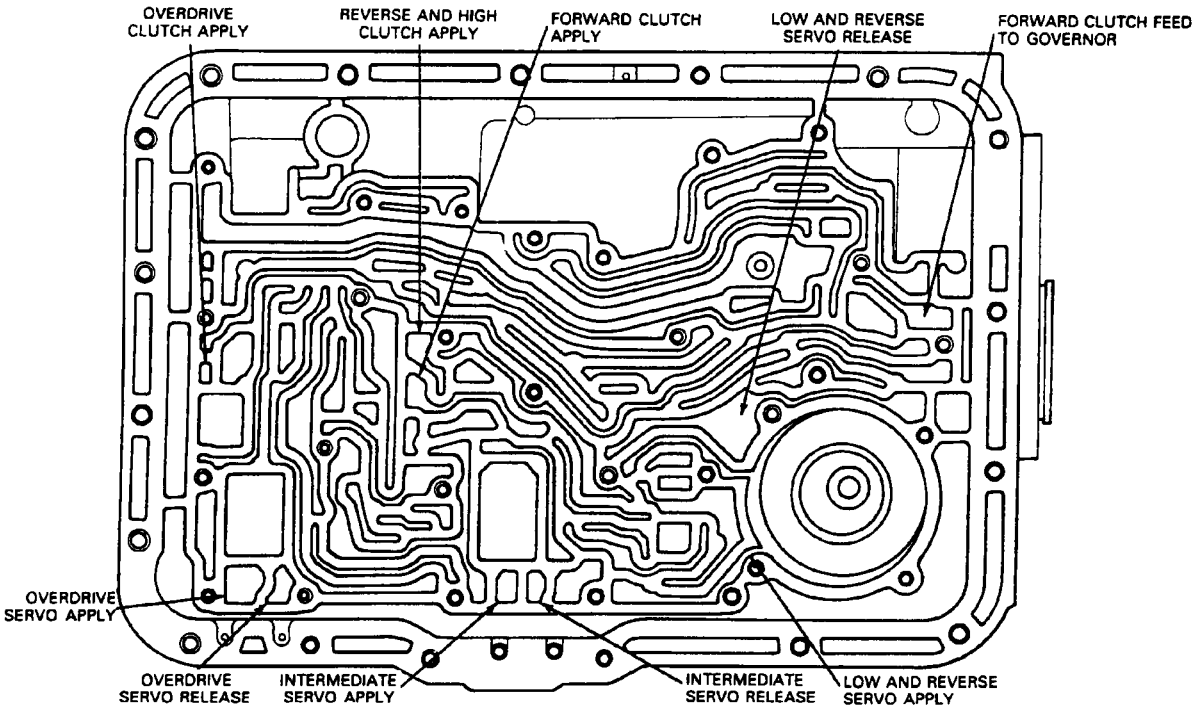
Shift speed specifications can be found in the Performance Specifications Book, or the Special Specifications Issue of the Technical Service Bulletin.

Air Pressure Checks

A NO DRIVE condition can exist, even with correct transmission fluid pressure, because of inoperative clutches or bands. On automatic transmissions, an erratic shift can be caused by a stuck governor valve. The inoperative units can be located through a series of checks by substituting air pressure for fluid pressure to determine the locations of the malfunction.

When the selector lever is at 2 (Second) a NO DRIVE condition may be caused by an inoperative forward clutch. A NO DRIVE condition at D (Drive) may be caused by an inoperative forward clutch or one-way clutch. When there is no drive in 1 (Low) the difficulty could be caused by improper functioning of the forward clutch or simultaneous malfunction of the low-reverse band and the one-way clutch. Failure to drive in R (Reverse) could be caused by a malfunction of the reverse-high clutch or low-reverse band.

To make the air pressure checks, loosen the oil pan bolts and lower one edge to drain the transmission fluid. Remove the oil pan and the control valve body assembly. The inoperative clutches or bands can be located by introducing air pressure into the various transmission case passages.



Forward Clutch

Apply air pressure to the transmission case forward clutch passages. A dull thud can be heard when the clutch piston is applied. If no noise is heard, place the finger tips on the input shell and again apply air pressure to the forward or front clutch passage. Movement of the piston can be felt as the clutch is applied.

Governor

Apply air pressure to the forward clutch feed to governor passage and listen for a sharp clicking or whistling noise. The noise indicates governor valve movement.

Overdrive Servo

Hold the air nozzle in the overdrive servo apply passage. Operation of the servo is indicated by a tightening of the overdrive band around the overdrive drum. Continue to apply air pressure to the servo apply passage and introduce air pressure into the overdrive servo release passage. The overdrive servo should stroke off releasing the overdrive band.

Overdrive Clutch

(Applied in D, 2, 1 and R ranges.) Apply air pressure to the overdrive clutch feed passage. A dull thud indicates that the overdrive clutch piston has moved to the applied position.

Reverse-High Clutch

Apply air pressure to the reverse-high clutch. A dull thud indicates that the reverse-high clutch piston has moved to the applied position. If no noise is heard, place the finger tips on the clutch drum and again apply air pressure to detect movement of the piston.

Intermediate Servo

Hold the air nozzle in the intermediate servo apply passages. Operation of the servo is indicated by a tightening of the intermediate band around the drum. Continue to apply air pressure to the servo apply passage, and introduce air pressure into the intermediate servo release passage. The intermediate servo should release the band against the apply pressure.

Low-Reverse Servo

Apply air pressure to the low-reverse servo. The low-reverse band should tighten around the drum if the servo is operating properly.

Air Pressure Check Diagnosis

If the servos do not operate, disassemble, clean, and inspect them to locate the source of the trouble.

If air pressure applied to either of the clutch passages fails to operate a clutch or operates both clutches at once, remove, and with air pressure, check the fluid passages in the case and front pump to detect obstructions.

Converter Clutch Operation

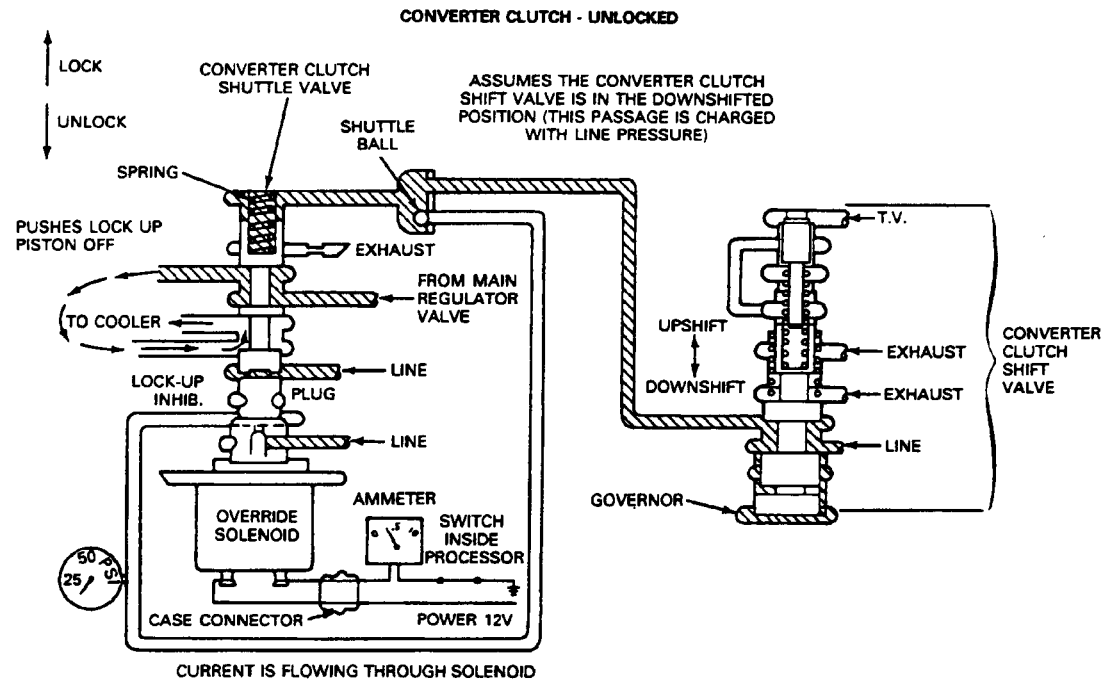
In the A4LD transmission, converter clutch upshifts and downshifts are scheduled hydraulically, but can be overridden electronically. The converter clutch is inhibited from engaging during the following driving modes:

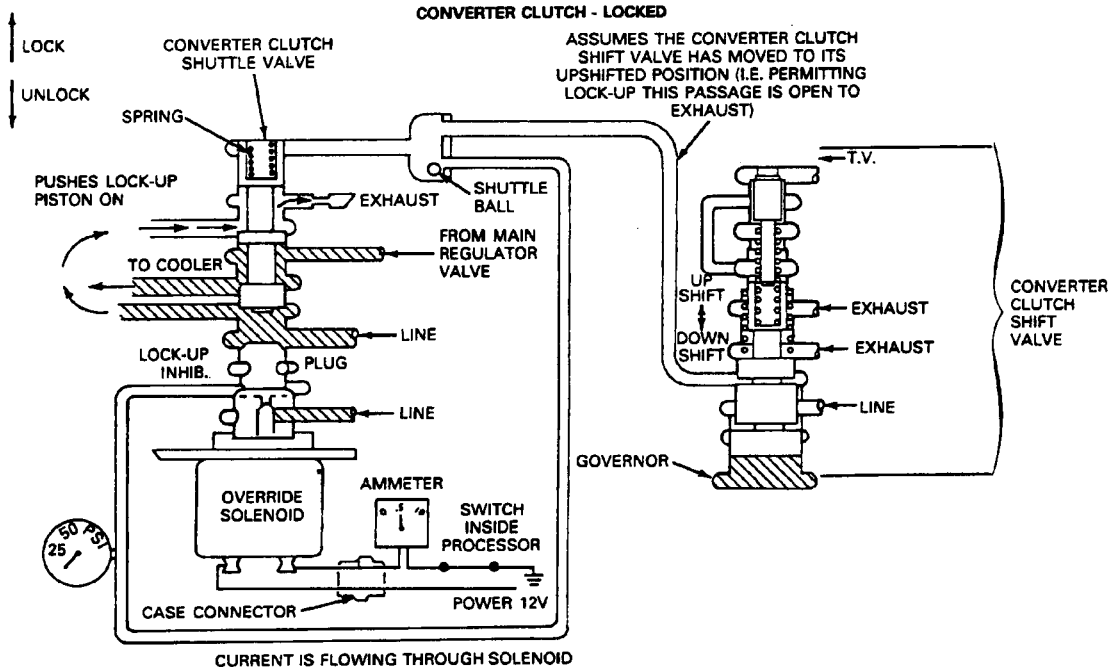
- Engine coolant below 60°C (128°F) or above 115°C (240°F)
- Application of brakes
- Closed throttle
- Heavy or WOT acceleration
- Quick tip-ins
- Quick tip-outs
- When actual engine speed is below a certain value at lower vacuums (this insures all 4-3 torque demands will be made on an unlocked converter)

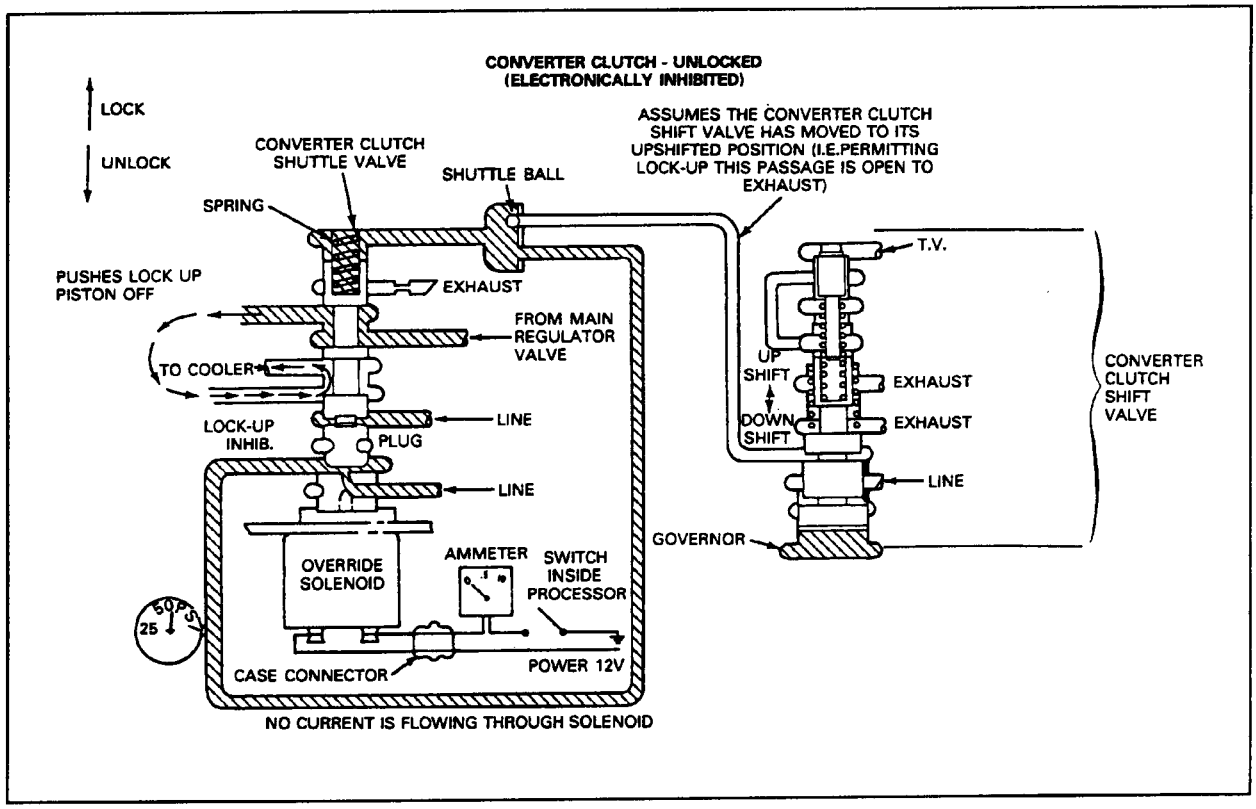
During the above driving modes no current flows through the solenoid. To illustrate the operation of the system refer to the following illustrations. When the converter clutch shuttle valve is resting on the plug, line pressure is directed through the shuttle valve and to the torque converter in a flow path that pushes the lockup piston off. Refer to Converter Clutch Unlocked schematic. When line pressure on the spring end of the converter clutch shuttle valve is exhausted, line pressure on the plug end of the valve forces the valve to move and compress the spring. Line pressure is now directed through the shuttle valve to the converter in a flow path that pushes the piston on. Refer to Converter Clutch Locked schematic.

In CONVERTER CLUTCH LOCKED position, lockup is permitted electronically because the vehicle is not operating in any of the above driving modes. (The processor energizes the solenoid by grounding the signal line.) In CONVERTER CLUTCH UNLOCKED position, governor pressure acting on the converter clutch shift valve has not yet moved the valve to the upshifted position. Line pressure is therefore acting on the spring end of the converter clutch shuttle valve. The torque converter is therefore unlocked. As vehicle speed increases, governor pressure increases and the converter clutch shift valve moves to the upshifted position. Oil on the spring end of the converter clutch shuttle valve now drains to exhaust at the converter clutch shift valve. The shuttle valve takes the position as shown in the CONVERTER CLUTCH LOCKED position and the torque converter locks up. If the brakes are applied or the vehicle is operated in any of the other inhibit modes, current will not flow through the solenoid. With no current to the solenoid, line pressure can flow through the solenoid valving and enter the lockup inhibition passage. See CONVERTER CLUTCH UNLOCKED (ELECTRONICALLY INHIBITED). Line pressure in the inhibition passage forces the shuttle ball to take the position as shown. The shuttle valve moves up against the plug and the converter unlocks.

Since this is a hybrid system in many cases it will be necessary to check both the electronic and hydraulic portions of the system.


CONVERTER CLUTCH - UNLOCKED
LOCK
UNLOCK
CONVERTER CLUTCH SHUTTLE VALVE
SHUTTLE BALL
ASSUMES THE CONVERTER CLUTCH SHIFT VALVE IS IN THE DOWNSHIFTED POSITION (THIS PASSAGE IS CHARGED WITH LINE PRESSURE)
SPRING
PUSHES LOCK UP PISTON OFF
EXHAUST
FROM MAIN REGULATOR VALVE
TO COOLER
LOCK-UP INHIB.
PLUG
LINE
LINE
AMMETER
OVERRIDE SOLENOID
SWITCH INSIDE PROCESSOR
50 PSI
25
CASE CONNECTOR
POWER 12V
T.V.
UPSHIFT
DOWNSHIFT
EXHAUST
EXHAUST
LINE
CONVERTER CLUTCH SHIFT VALVE
GOVERNOR
CURRENT IS FLOWING THROUGH SOLENOID


CONVERTER CLUTCH - LOCKED
LOCK
UNLOCK
CONVERTER CLUTCH SHUTTLE VALVE
ASSUMES THE CONVERTER CLUTCH SHIFT VALVE HAS MOVED TO ITS UPSHIFTED POSITION (I.E. PERMITTING LOCK-UP THIS PASSAGE IS OPEN TO EXHAUST)
SPRING
PUSHES LOCK-UP PISTON ON
EXHAUST
SHUTTLE BALL
FROM MAIN REGULATOR VALVE
TO COOLER
LINE
LOCK-UP INHIB.
PLUG
LINE
AMMETER
OVERRIDE SOLENOID
SWITCH INSIDE PROCESSOR
50 PSI
25
CASE CONNECTOR
POWER 12V
T.V.
UP SHIFT
DOWN SHIFT
EXHAUST
EXHAUST
LINE
CONVERTER CLUTCH SHIFT VALVE
GOVERNOR
CURRENT IS FLOWING THROUGH SOLENOID


CONVERTER CLUTCH - UNLOCKED
(ELECTRONICALLY INHIBITED)
LOCK
UNLOCK
CONVERTER CLUTCH SHUTTLE VALVE
SHUTTLE BALL
ASSUMES THE CONVERTER CLUTCH SHIFT VALVE HAS MOVED TO ITS UPSHIFTED POSITION (I.E.PERMITTING LOCK-UP THIS PASSAGE IS OPEN TO EXHAUST)
SPRING
T.V.
PUSHES LOCK UP PISTON OFF
EXHAUST
FROM MAIN REGULATOR VALVE
TO COOLER
UP SHIFT
EXHAUST
DOWN SHIFT
EXHAUST
CONVERTER CLUTCH SHIFT VALVE
LOCK-UP INHIB.
PLUG
LINE
LINE
LINE
GOVERNOR
OVERRIDE SOLENOID
AMMETER
SWITCH INSIDE PROCESSOR
50PSI
25
CASE CONNECTOR
POWER 12V
NO CURRENT IS FLOWING THROUGH SOLENOID