

GEAR SELECTION AND FUNCTION

- **P** Locks drive wheels; engine should start; no torque transmitted to transmission
- **R** Allows vehicle to back up; engine should not start
- **N** Wheels free to turn; engine should start; no torque transmitted to transmission
- **D** Transmission automatically selects best available gear based on speed and load; engine no start
- **2** Two speed auto transmission, starts in 1st, mild engine braking in 2nd only; engine no start
- **L** Locked in low gear, strong engine braking, diagnostic gear position; engine no start

- Lesson Objectives:**
1. Identify the function for each of the following gear selector positions:
 - Park
 - Reverse
 - Neutral
 - Drive
 - Manual 2
 - Manual Low
 2. Identify the gear selector positions in which engine braking occurs.
 3. Identify the gear selector positions in which the engine can be started.
 4. Identify the only gear selector position in which the transmission is entirely automatic.
 5. Identify the gear selector positions which can be used to diagnose a fault in drive range.

The shift lever quadrant has six positions to indicate selected gear position. These gear positions determine different combinations of holding devices. Understanding what the transmission is required to do in each position will aid us in diagnosing system malfunctions.

Park (P) This gear position is a safety feature in that it locks the output shaft to the transmission housing. This, in effect, locks the drive wheels, preventing the vehicle from rolling forward or backward. This gear position should not be selected unless the vehicle is at a complete stop as the parking lock pawl mechanically engages with the output shaft and may damage the transmission. The engine can be started and performance tested in the park position.

Reverse (R) Reverse gear position allows the vehicle to back up. Can test for maximum oil pump pressure during a stall test.

NOTE: The engine should not start in this gear position.

Neutral (N) Neutral gear position allows the engine to start and operate without driving the vehicle. The vehicle is able to be moved with or without the engine running. The engine can be restarted while the vehicle is moving.

Manual Low (L) This gear can be selected at any vehicle speed; however, it will not downshift directly into first gear until approximately 29 to 39 mph depending on the model. This gear range provides for maximum engine braking and inhibits an upshift to third and second gear while in manual low.

NOTE: The engine should not start in this gear position.

Manual Second (2) This gear can be selected at any vehicle speed and will downshift to second gear; however, in Electronic Control Transmissions and on A40 and A340 series transmissions with a D-2 Downshift Timing Valve, the transmission downshifts from OD to third gear and then to second gear. This gear range provides for strong engine braking and inhibits an upshift to overdrive and third gear while in manual second; however, there are exceptions to the third gear upshift. At higher vehicle speeds of approximately 64 mph, the A340 will upshift to third gear while the selector is in manual second. While the selector is in manual second, the transmission will start in first gear and upshift to second and remain in second until the selector is moved again.

NOTE: The engine should not start in this gear position.

Drive (D) Each gear position which has been discussed requires a manual selection by the driver. The automatic transmission cannot select these positions automatically on its own. The next selector position is the only position from which the transmission is fully automatic.

In drive, the transmission has three gear ratios forward. First and second gear are gear reduction ratios which provide for greater torque

in bringing the vehicle up to speed. Third gear is direct drive, and if the transmission has overdrive, it provides the fourth forward gear.

The drive position is the only position in which the transmission is automatic; that is, it upshifts and downshifts based on vehicle speed and load. Increased load is sensed through an increased opening of the throttle, and the transmission downshifts to a lower gear. With a decrease in throttle opening, load is decreased and the transmission upshifts to a higher gear.

We mentioned that in manual low gear and manual second gear, engine braking occurred while the vehicle was decelerating. The contrast to this characteristic in manual gears is that in "drive first" and "drive second" gears there is no engine braking. In other words, the vehicle coasts during deceleration.

NOTE The engine should not start in this gear position.

Instructions: Complete the area to the right of the gear selector positions (P, R, N, D, 2 and L) with your notes as your instructor presents them.

***Gear Selector
Positions***

- P
- R
- N
- D
- 2
- L