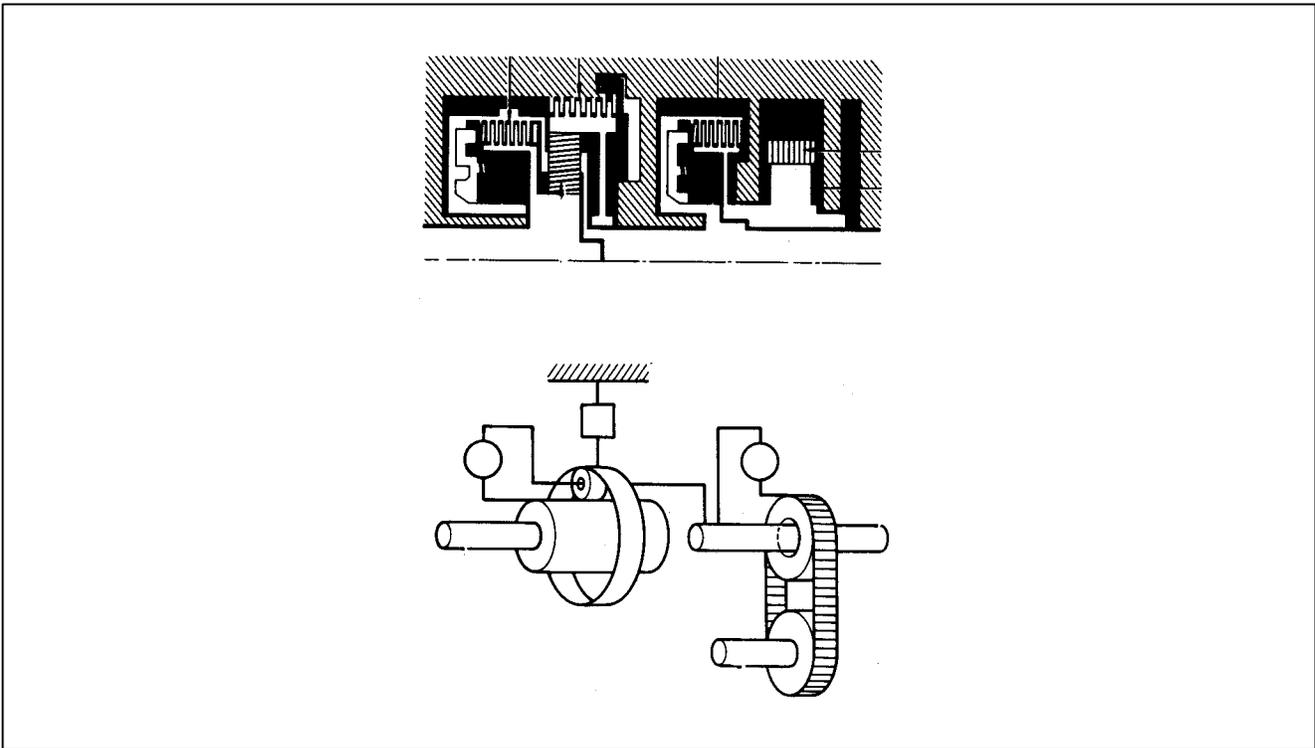


Section 9

A340H TRANSFER



- Lesson Objectives:**
1. Given the clutch application chart for the A340H Transfer Unit, identify the holding devices applied in the following gear positions:
 - High gear two-wheel drive
 - High gear four-wheel drive
 - Low gear four-wheel drive
 2. Describe the operation of the sprocket and drive chain in transferring torque to the front axle.

The A340H automatic transfer unit is bolted to the rear of the transmission housing and provides a means of selecting between 2-wheel drive (H2), 4-wheel drive (H4) and low 4-wheel drive (L4), while the vehicle is moving. There is no restriction on vehicle speed while shifting between H2 and H4. There is, however, a speed requirement when shifting between H4 and L4, and that speed is less than 19 mph.

CAUTION

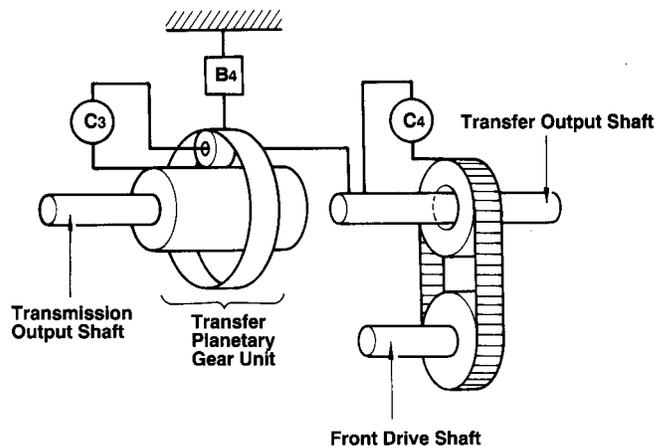
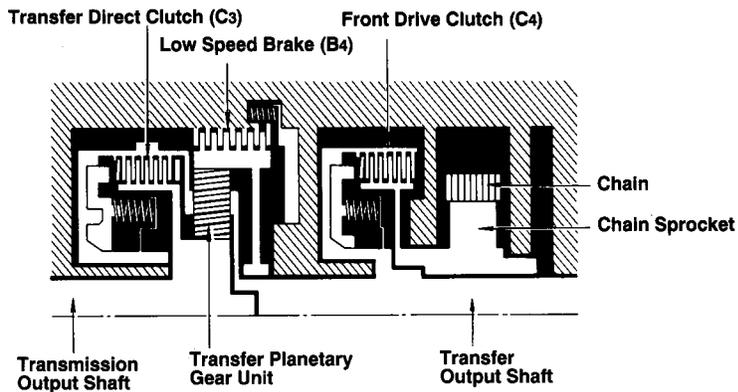
Never move the front drive control lever if the wheels are slipping.

Components

The transfer unit uses a simple planetary gear assembly to accomplish high and low gear ratios. High gear is a direct drive through the planetary gear set. Low gear is a reduced gear ratio when increased torque is required.

Transfer Planetary Gear

Provides direct drive in two-wheel and four-wheel drive as well as low-gear four-wheel drive.



The transfer unit has three shafts:

- The transmission output shaft
- The transfer output shaft
- The front drive shaft

The transmission output shaft is connected to the planetary sun gear, and the transfer output shaft is connected to the planetary carrier. The ring gear is connected to the transfer housing through a holding device. A chain sprocket idles around the transfer output shaft, and a drive chain transfers driving torque from the chain sprocket to the front drive shaft.

Holding Devices

Three holding devices are used to control the planetary gear set; they are:

- Transfer Direct Clutch (C3)
- Low Speed Brake (B4)
- Front Drive Clutch (C4)

The *transfer direct clutch (C3)* locks the sun gear to the carrier, and the planetary gear set rotates as a unit. The carrier is connected to the transfer output shaft.

The *low speed brake (B4)* locks the ring gear to the transfer case. The sun gear is the drive gear. With the ring gear locked, the pinion gears walk around the ring and the carrier turns the transfer output shaft at a gear reduction.

The *front drive clutch (C4)* locks the transfer output shaft to the chain sprocket which in turn drives the front drive shaft with the drive chain.

Hydraulic Control

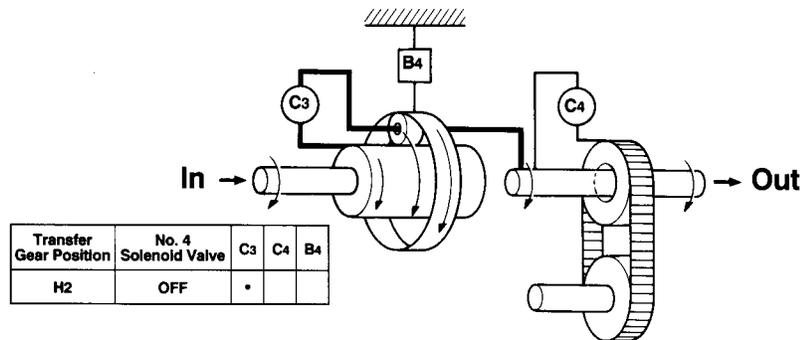
A separate valve body, electric solenoid and manual valve operate the transfer hydraulic circuit. The manual valve has three positions for "high 2-wheel drive" (H2), "high 4-wheel drive" (H4) and "low 4-wheel drives" (L4). The manual valve alone controls the high 2- and 4-wheel drives; however, when shifted to the low 4-wheel drive position, the number four solenoid prevents the low speed brake from being applied until it is energized.

The number four solenoid is energized only for low 4-wheel drive (L4). The solenoid is controlled by the TCCS/ECT ECU which monitors throttle angle, transfer position switch and vehicle speed. When the transfer position switch is placed in the L4 position and the ECU senses light throttle and vehicle speed below 19 mph, it energizes the solenoid.

Power Flow

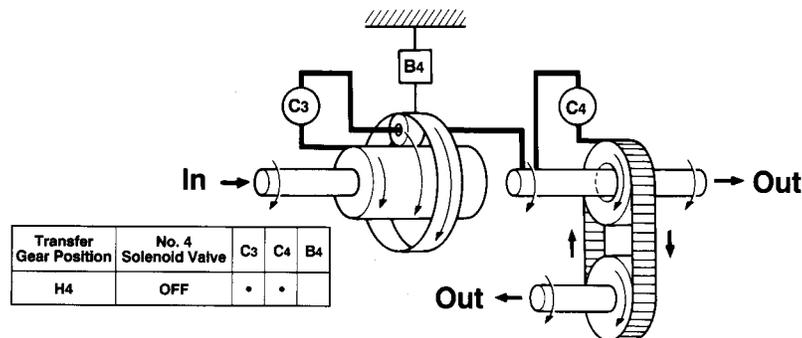
High 2-Wheel Drive (H2) In high 2-wheel drive, the *transfer direct clutch (C3)* is applied which locks the sun gear to the carrier. Since the input torque is on the sun gear and two members of the planetary gear set are locked together, we have direct drive to the output shaft.

Shift Position H2



High 4-Wheel Drive (H4) In high 4-wheel drive, the *transfer direct clutch (C3)* and the *front drive clutch (C4)* are applied. Power flow through the *transfer direct clutch (C3)* is described in the previous paragraph. When the *front drive clutch (C4)* is applied, it locks the chain sprocket to the transfer output shaft. Torque is transferred to the front drive shaft through the chain. The transfer front drive shaft drives the front propeller shaft, front differential and wheels.

Shift Position H4



Low 4-Wheel Drive (H4)

In low 4-wheel drive, not only is torque available to all wheels but a speed reduction and torque increase is also provided through the transfer case. The *transfer direct clutch (C3)* is released and the *low speed brake (B4)* is applied, locking the ring gear to the transfer case. Input torque is on the sun gear, which causes the planetary gears to walk around the ring gear and drive the transfer output shaft at a reduced speed. With the *front drive clutch (C4)* applied, torque is transferred to the transfer front drive shaft and all four wheels are driven.

Shift Position L4

