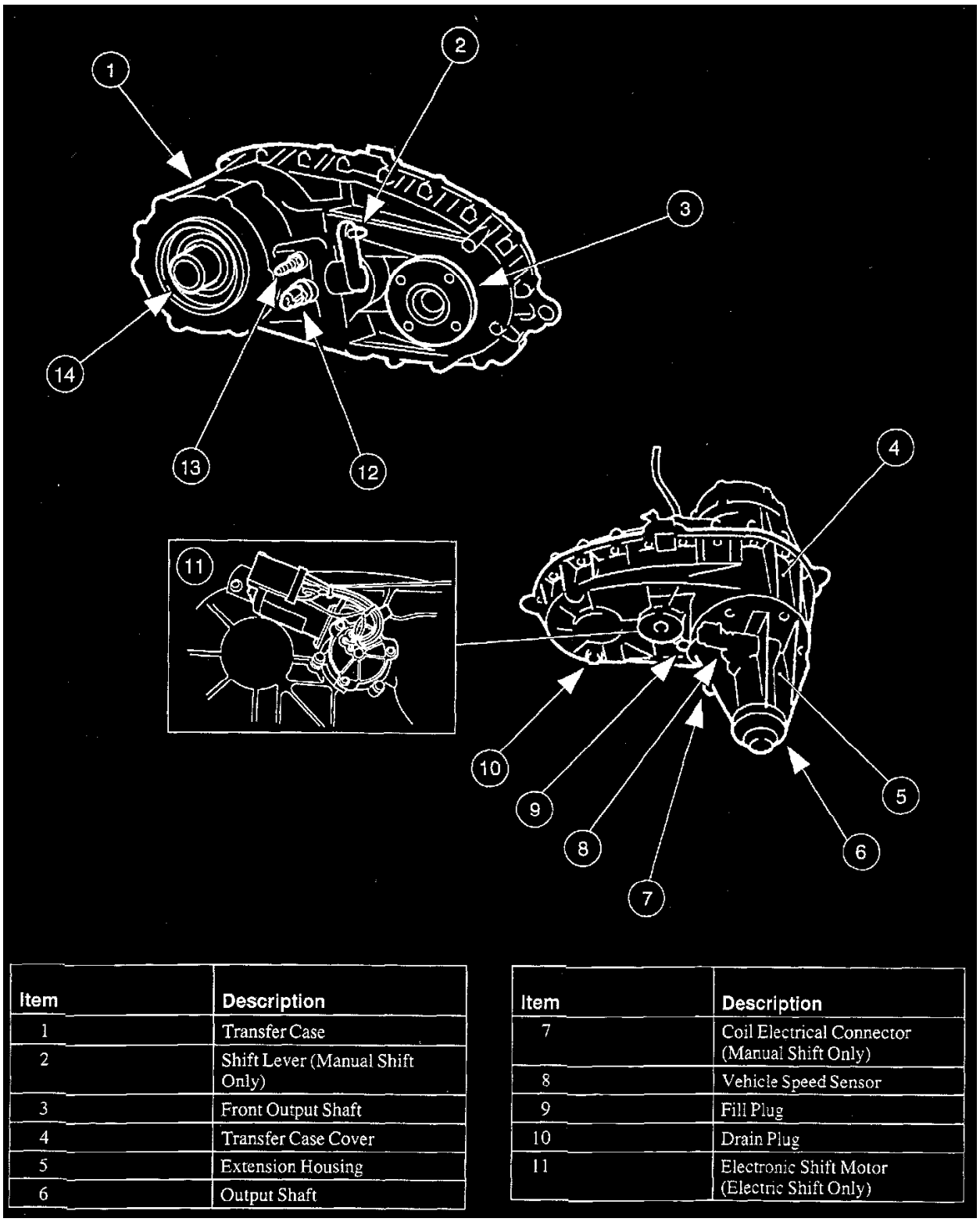
Transfer Case: Description and Operation



Item	Description
1	Transfer Case
2	Shift Lever (Manual Shift Only)
3	Front Output Shaft
4	Transfer Case Cover
5	Extension Housing
6	Output Shaft

Item	Description
7	Coil Electrical Connector (Manual Shift Only)
8	Vehicle Speed Sensor
9	Fill Plug
10	Drain Plug
11	Electronic Shift Motor (Electric Shift Only)

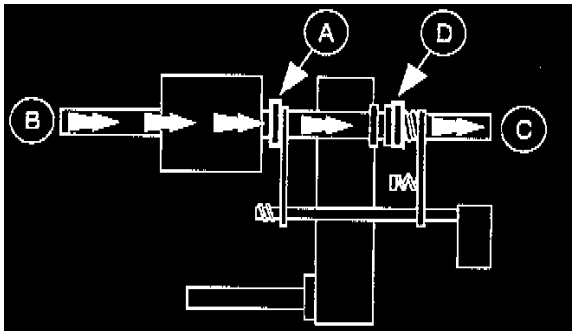
DESCRIPTION

The Borg-Warner 44-06 manual shift and electrical shift transfer cases are a three-piece magnesium design. The unit transfers engine power from the transmission to the front and rear axles. Under normal driving conditions the unit is in 2-wheel drive high (2H) but when desired, the operator may shift into 4-wheel drive high (4H) or 4-wheel drive low (4L). The operator may shift from 2H to 4H or from 4H to 2H at any speed. The vehicle must be stopped to shift into 4L. The transfer case is shifted either manually or electronically. The unit is lubricated by a positive displacement fluid pump that channels fluid flow through drilled holes in the rear output shaft.

POWERFLOW

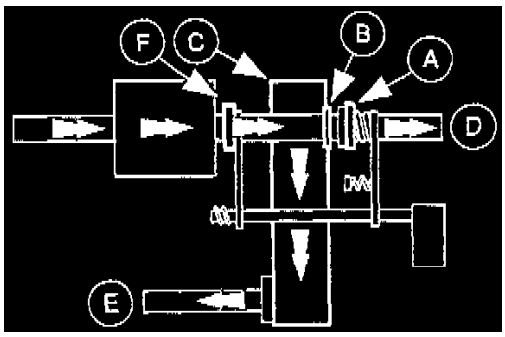
Neutral

In the neutral position, no power is transmitted to the front or rear drivetrain.



2-Wheel Drive-High Range

When the driver selects 2H, the (A) reduction hub is in the forward position and puts the transfer case into direct drive. The (B) input shaft and (C) rear output shaft are locked together. The (D) 4-wheel drive lockup hub is in the forward position disengaging the front driveline.



4-Wheel Drive-High Range

In 4-wheel drive-high range (4H), the (A) 4-wheel drive lockup hub moves rearward and locks the (B) chain sprocket and (C) chain to the (D) rear output shaft. Both the (D) rear output shaft and (E) front output shaft are being driven in high range. The (F) reduction hub is in the forward position.

4-Wheel Drive-Low Range

In 4-wheel drive-low range (4L), the (A) reduction hub moves rearward and the (B) low range gearset is engaged to the (C) rear output shaft. The ring gear is locked and results in the (B) front planet turning slower than the (D) input shaft. This in turn makes the (C) rear output shaft and (E) front output shaft turn at a slower speed than the (D) input shaft. This action increases the pulling power available to the wheels.

ELECTRONIC SHIFT ON THE FLY (ESOF) OPERATION

The ESOF system is an electronic shift 4x4 system that allows the operator to choose between two different 4x4 modes as well as 2-wheel drive. The operator can switch between 2WD and 4WD HIGH mode at speed. To engage or disengage LOW Range, the vehicle speed must be less than 5 kph' the brake depressed, and the transmission must be in NEUTRAL.

The transfer case is equipped with an electromagnetic clutch which is located inside the case. This clutch is used to spin up the front driveline when shifting from 2WD to 4x4 High mode at speed. When the control switch on the instrument panel is turned, the Generic Electronic Module **(GEM)** recognizes that a shift has been requested and activates the electromagnetic clutch and the relays which power the transfer case shift motor. When the shift motor reaches the desired position as determined by the contact plate position inputs to the GEM, power to the shift relays and motors will be removed. When the transfer case front and rear output shafts are synchronized, the spring loaded lockup collar mechanically engages the mainshaft hub to the drive sprocket. Finally, the front axle collar is engaged and the electromagnetic clutch is deactivated.

Shift Between 2WD and 4x4 HIGH:

Shifts between 2WD and 4x4 HIGH can be made at speed. Listed below are the inputs and outputs needed by the GEM to execute a change between any of these modes.

Feature Inputs:

- 4WD Mode Switch (Various resistances; See Table 1).
- Contact Plate Position Inputs A, B. C, D (grounded when closed, open circuit when open; See Table 4).

Feature Outputs:

- 4x4 Shift Motor Relay Outputs (See Table 2).
- Transfer Case Clutch Relay (grounded when relay is on, open circuit when relay is off).
- 4x2/4x4 Vacuum Solenoid (grounded when activated, open circuit when deactivated).
- Cluster Indicators (ground when activated, open circuit when deactivated).

Shifting Into/Out of 4WD LOW:

When shifting into or out of 4WD LOW, the GEM requires that the vehicle speed be less than 5 kph, the brake is applied, and the transmission is in NEUTRAL.

Feature Inputs:

- 4WD Mode Switch (Various resistances; See Table 1).
- Contact Plate Position Inputs A, B. C, D (grounded when closed, open circuit when open; See Table 4).
- VSS Sensor (Sinusoid Signal: 0.7V-20V, 2.2 Hz/mph).
- Brake Input (battery voltage when brake is depress, open circuit when not activated).
- Transmission Range Sensor (grounded when transmission is in NEUTRAL, open circuit otherwise).
- Start/Clutch Depressed Input (See Table 3).

Feature Outputs:

- 4x4 Shift Motor Relay Outputs (See Table 2).
- 4x2/4x4 Vacuum Solenoid (grounded when activated, open circuit when deactivated).
- Cluster Indicators (grounded when activated, open circuit when deactivated).