

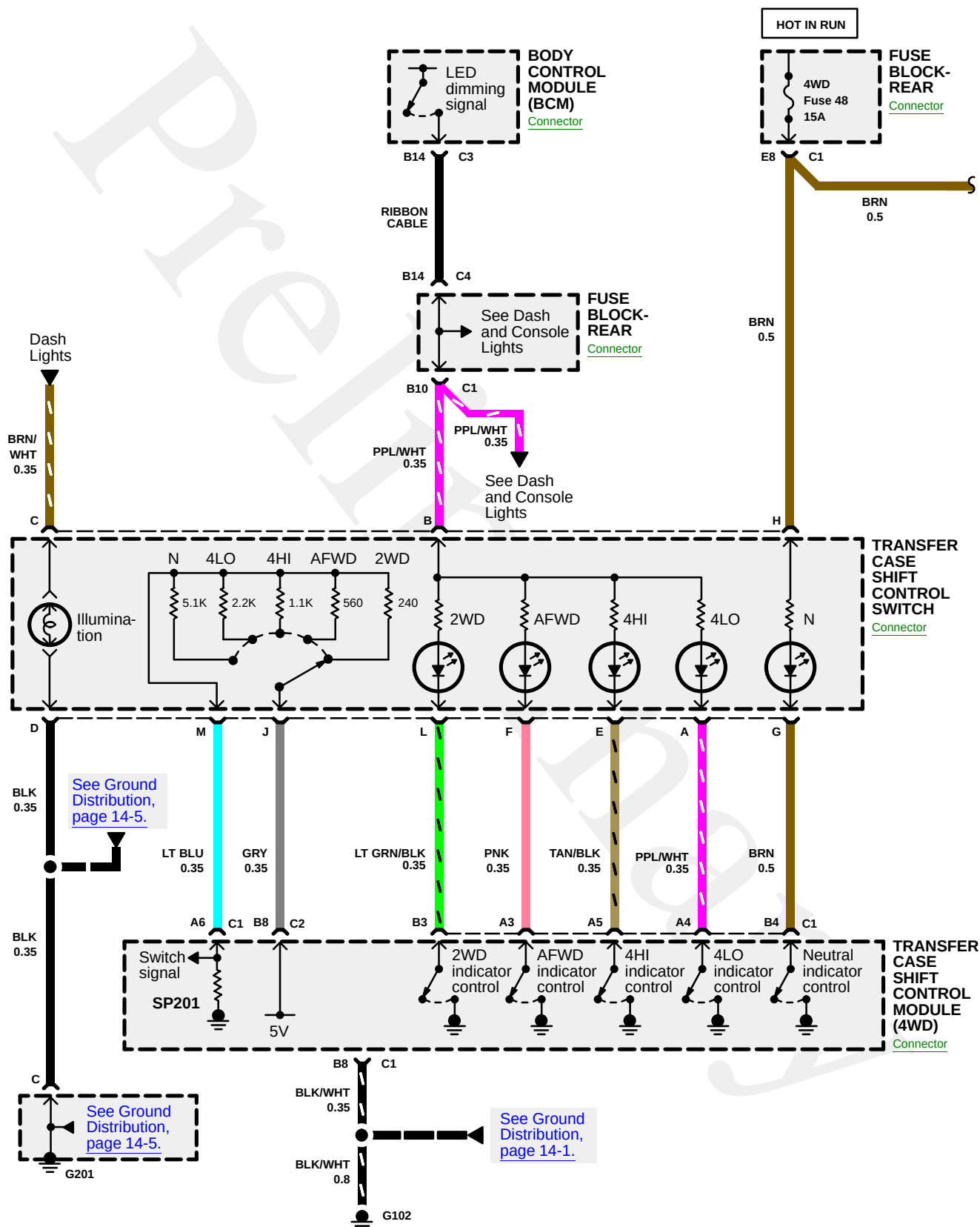
TRANSFER CASE CONTROL

Component Index

- Body Control Module (BCM)
- Front Axle Actuator
- Fuse Block-Rear
- Fuse Block-Underhood
- Instrument Panel Cluster (IPC)
- Powertrain Control Module (PCM) (4.2L)
- Powertrain Control Module (PCM) (5.3L)
- Propshaft Speed Sensor-Front Transfer Case
- Propshaft Speed Sensor-Rear Transfer Case
- SP201
- Transfer Case
- Transfer Case Shift Control Module (4WD)
- Transfer Case Shift Control Switch

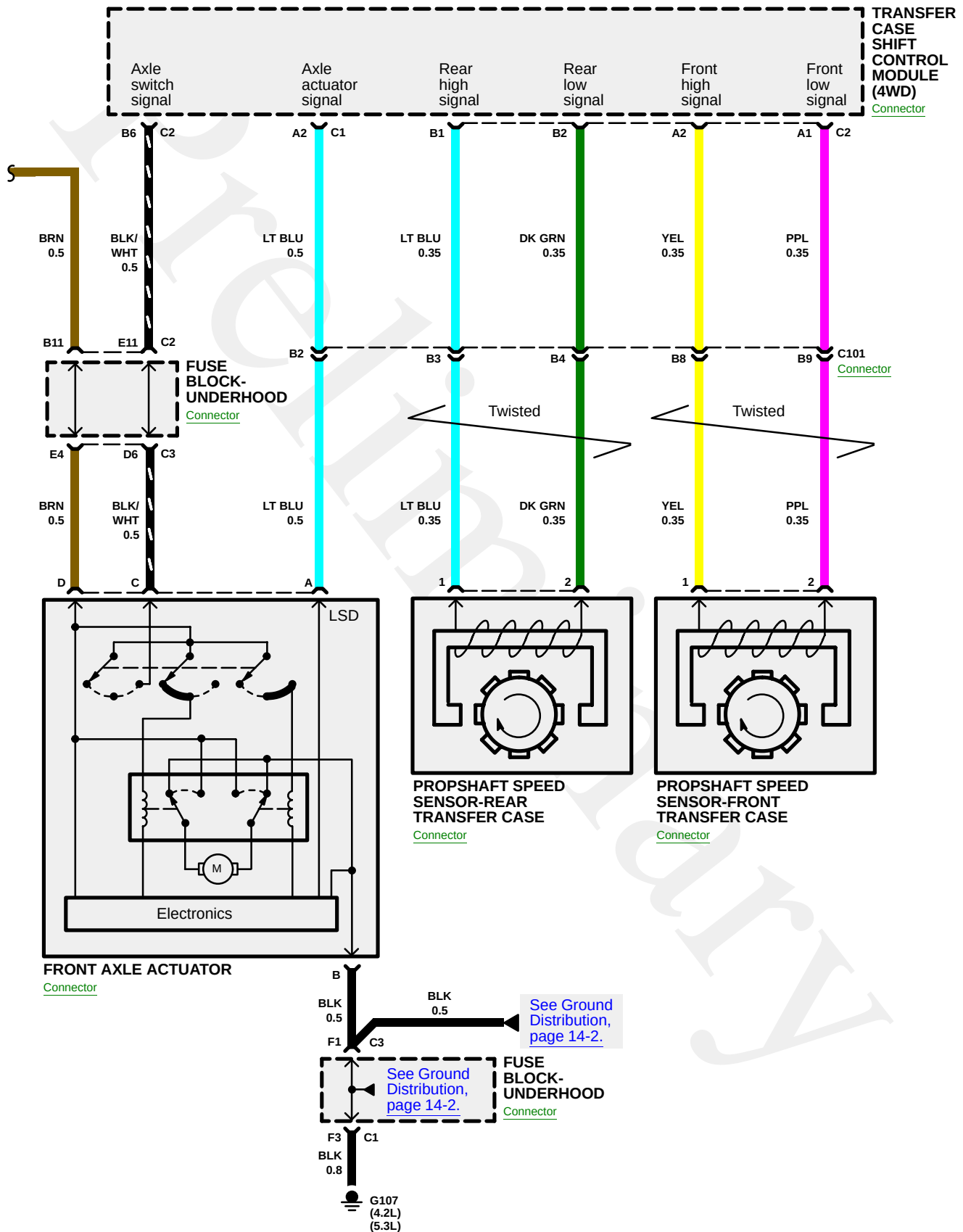
TRANSFER CASE CONTROL

Circuit Schematic



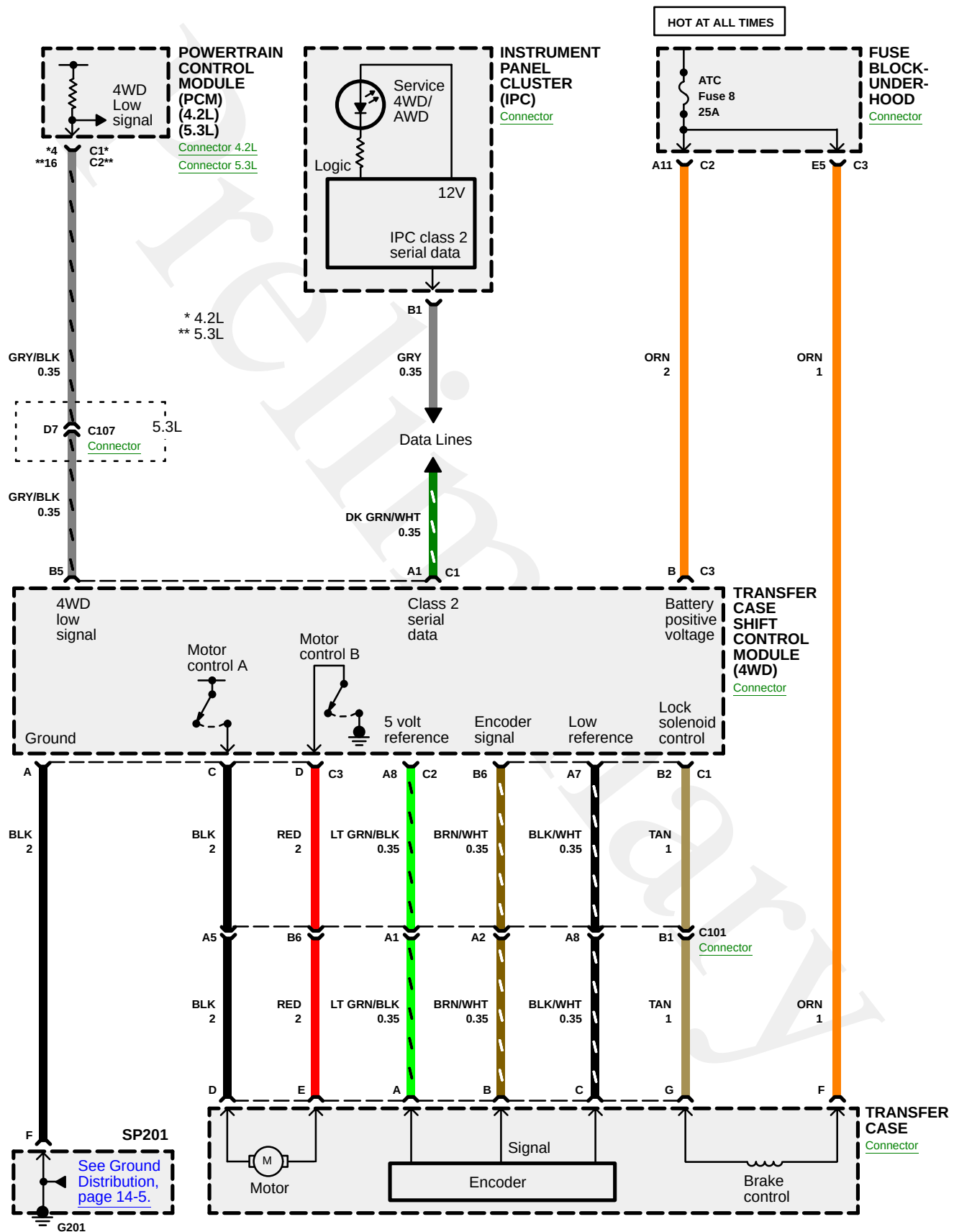
TRANSFER CASE CONTROL

Circuit Schematic



TRANSFER CASE CONTROL

Circuit Schematic



TRANSFER CASE CONTROL

Circuit Operation

Transfer Case Shift Control Module

The transfer case shift control module uses the VIN information for calculations that are required for the different calibrations used based on axle ratio, transmission, tire size, and engine. The system does not know which calibration to use without this information. When the vehicle is in the AWD mode, the transfer case shift control module monitors the speed of the front and rear propshafts in order to detect wheel slippage. When wheel slippage is detected, the module applies a clutch pack contained in side the transfer case. This clutch pack is used to lock-in and apply the front propshaft, transferring torque to the front wheels. The clutch pack is applied by a motor/encoder assembly. When slip is no longer detected by the transfer case shift control module, the clutch is no longer applied.

Transfer Case Motor/Encoder

The transfer case Motor/Encoder consists of a permanent magnet (PM) DC motor and gear reduction assembly. It is located on the left hand side (drivers side) of the transfer case. When activated it turns the sector shaft of the transfer case (clockwise or counter clockwise) to shift the transfer case. The Motor/Encoder is controlled with a pulse width modulated (PWM) signal by the transfer case shift control module. This circuit consists of a driver on both the Motor A and Motor B circuits. The encoder motor is bi-directional to allow the motor to shift the transfer case from 2HI or 4HI to NEUTRAL and 4LO positions.

Transfer Case Encoder

The encoder is mounted to the transfer case motor/encoder assembly and is replaced as an assembly. The encoder converts the sector shaft position (representing a mode or range) into an electrical signal input to the transfer case shift control module. The module can detect what position the transfer case is in by monitoring the voltage returned on the encoder signal circuit. This voltage translates into AUTO, 2H, 4H, NEUTRAL, and 4L or in transition between gears.

Transfer Case Motor Lock

The transfer case motor lock is used to provide a 2H, 4H, and 4L lock-up feature. When the lock circuit is energized, the transfer case encoder motor is allowed to turn. When the transfer case is placed 2H, 4H, or 4L the motor lock circuit is de-energized and the lock is applied. This assures that the transfer case remains in the current gear position until a new gear position is

requested. When AUTO is selected the motor lock remains applied until an adaptive mode (torque is applied to the front propshaft) is required. During an adaptive mode the motor lock circuit is energized and the motor lock is released, enabling the encoder motor to turn and apply or release torque at the front propshaft.

Transfer Case Speed Sensors

There are three speed sensors on the automatic transfer case (ATC), two on the rear output shaft and one on the front output shaft. Each speed sensor is a permanent magnet (PM) generator. The PM generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as speed increases.

Vehicle Speed Sensor

One of the two on the rear output shaft is the vehicle speed sensor (VSS) input to the powertrain control module (PCM). The PCM sends this information to the transfer case shift control module via the Class 2 Serial Data bus.

Rear Propshaft Speed Sensor

The transfer case shift control module converts the pulsating AC voltage from the rear transfer case speed sensor to a rear propshaft speed in RPM to be used for calculations. The rear propshaft speed can be displayed with a scan tool.

Front Propshaft Speed Sensor

The transfer case shift control module converts the pulsating AC voltage from the front transfer case speed sensor to front propshaft speed in RPM to be used for calculations, and to monitor the difference between the front and rear sensor speed. It is also used in the AUTO (Adapt) mode of operation to determine the amount of slip and the percent of torque to apply to the front axle. The front propshaft speed can be displayed with a scan tool.

SERVICE 4WD indicator

The SERVICE 4WD indicator is an integral part of the cluster and cannot be serviced separately. This lamp is used to inform the driver of the vehicle that a transfer case system malfunction. The SERVICE 4WD indicator is controlled by the transfer case shift control module via Class 2.

TRANSFER CASE CONTROL

Component Location Index

(Refer to Section 201 for photographs.)

Component	Photo No.
Body Control Module	
(BCM)	On Rear Fuse Block, under left rear seat 53
Front Axle Actuator	Lower right front of engine (on oil pan) 39
Fuse Block-Rear	Under the left rear seat 52
Fuse Block-Underhood	Left side of engine compartment 3
Instrument Panel Cluster	
(IPC)	On the left side of the IP, above the steering column 59
Powertrain Control Module	
(PCM) (4.2L)	Left front of engine 5
Powertrain Control Module	
(PCM) (5.3L)	Left front of engine compartment 25
Propshaft Speed Sensor-	
Front Transfer Case	Left rear of transfer case 44
Propshaft Speed Sensor-	
Rear Transfer Case	Right rear of transfer case 43
SP201	Near right front of lower console 80
Transfer Case	On the rear of the transmission 44
Transfer Case Shift Control	
Module (4WD)	Behind the left lower I/P 58
Transfer Case Shift Control	
Switch	In lower center of the I/P 73
Connector	
C101 (38-BLK)	Left side of engine compartment 3
C107 (5.3L) (38-BLK)	Left rear of engine compartment 18
Ground	
G102	Left side of engine compartment 4
G107 (4.2L)	Lower left side of engine 37
G107 (5.3L)	Lower left side of engine 38
G201	Near right front of lower console 80