

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

General Description

The American Axle Manufacturing (AAM) transfer cases, with broadcast codes – NQV is a 2-speed, part-time 4WD, electric-shift design. A 6-pinion or 3-pinion planetary carrier assembly provides high and low operating ranges. The planetary sun gear and annulus gear arrangement creates a 2.62-to-1 low-range gear reduction ratio. When in 4WD mode, torque is distributed front-to-rear based on vehicle conditions. Refer to New Product Information for additional information on the 6-pinion to 3-pinion planetary design change.

The case halves are a die-cast aluminum design. A double-row ball bearing supports the input shaft. Single row ball bearings support the front and rear output shafts. A needle roller bearing is located internal to the input shaft gear and supports the front of the rear output shaft. A gerotor type oil pump transfers fluid from the sump through the rear output shaft oil galleries to the gears and the bearings. The transfer case requires DEXRON®VI fluid, which is red in color. Refer to Adhesives, Fluids, Lubricants, and Sealers.

The transfer case features a 4 mode shift control rotary switch located on either the center floor shift console or instrument panel. When the ignition is in the RUN position, the transfer case shift control module monitors the transfer case shift control switch to determine if the driver desires a new mode/range position. At a turn of the transfer case shift control switch, the lamp of the new desired position will begin flashing to inform the driver that the transfer case shift control module has received the request for a new mode/range position. The lamp continues to flash until all shifting criteria has been met and the new mode/range position has been engaged. Once the new mode/range position is fully active, the switch indicator for the new position will remain ON constantly. In the event that the transfer case shift control module cannot or will not complete the shift, the indicator switch light flashes and returns the transfer case to the previously selected position.

The transfer case provides the driver with 4 manual mode/range positions:

- 2H - 2 Wheel Drive high range
- 4H - 4 Wheel Drive high range
- 4L - 4 Wheel Drive low range with a 2.62:1 gear ratio reduction
- NEUTRAL

2H to 4H

Turn the knob to the Four-Wheel High position. This can be done at any speed up to 120 km/h (75 mph), and the front axle will lock automatically. The transfer case will then change from 2H mode to 4H mode. The front and rear propeller shafts will then be mechanically coupled together and the front axle shafts coupled to the front propeller shaft.

2H or 4H to 4L

To shift from Two-Wheel High or Four-Wheel High to Four-Wheel Low, the vehicle must be stopped or moving less than 5 km/h (3 mph) with the transmission in N (Neutral) for an automatic transmission or the clutch pedal fully depressed for a manual transmission. The preferred method for shifting into Four-Wheel Low is to have your vehicle moving 1.6 to 3.2 km/h (1 to 2 mph). Rotate the shift control switch to the Four-Wheel Low position. You must wait for the Four-Wheel Low indicator light to stop flashing and stay on before shifting the transmission into gear or releasing the clutch pedal. If the Four-Wheel Low position is selected when the vehicle is in gear and/or moving faster than 5 km/h (3 mph), the Four-Wheel Low indicator light will flash for 30 seconds and will not complete the shift.

4H to 2H

Rotate the shift control switch to the Two-Wheel High position. This can be done at any speed up to 120 km/h (75 mph), and the front axle will unlock automatically. It is normal to hear and feel the vehicle's transfer case shift into Two-Wheel High. If you shift with the vehicle stopped, the indicator light may still flash. It may be necessary to shift the transmission momentarily into R (Reverse) and D (Drive), for an automatic transmission, or R (Reverse) and 1 (First) for a manual transmission to have the light stop flashing.

4L to 2H or 4H

To shift from Four-Wheel Low to Two-Wheel High or Four-Wheel High, the vehicle must be stopped or moving less than 5 km/h (3 mph) with the transmission in N (Neutral) for an automatic transmission or the clutch pedal pressed for a manual transmission. The preferred method for shifting out of Four-Wheel Low is to have your vehicle moving 1.6 to 3.2 km/h (1 to 2 mph). Rotate the shift control switch to the Two-Wheel High or Four-Wheel High position. You must wait for the Two-Wheel High or Four-Wheel High indicator light to stop flashing and stay on before shifting the transmission into gear or releasing the clutch pedal. If the Two-Wheel High or Four-Wheel High position is selected when the vehicle is in gear and/or moving faster than 5 km/h (3 mph), the Two-Wheel High or Four-Wheel High indicator light will flash for 30 seconds and will not complete the shift.

2H, 4H, or 4L to Neutral

Use N (Neutral) when you plan to tow the vehicle. To shift the transfer case into N (Neutral) do the following:

1. Set the parking brake.
2. Start the vehicle.
3. Press the regular brake pedal and shift the transmission in N (Neutral), or press in the clutch pedal for vehicles with a manual transmission.
4. Shift the transfer case to Two-Wheel High.
5. Rotate the shift control switch clockwise past Four-Wheel Low to N (Neutral). Hold the switch in the neutral setting for at least 20 seconds or wait until the red neutral indicator light illuminates. The neutral red indicator light will come on when the transfer case shift to neutral is complete. Upon releasing the shift control switch from the neutral setting, the switch will rotate to the Four-Wheel Low setting. The transfer case will remain in neutral with the red neutral Indicator light illuminated until a new setting is selected.
6. Press and hold the regular brake pedal and shift the transmission to R (Reverse) for one second, then shift the transmission to D (Drive) for one second, or 1 (First) for vehicles with manual transmission and let out the clutch to insure the transfer case is in Neutral. If the transfer case is not in Neutral, repeat this procedure starting at Step 3.
7. Turn the engine off by turning the key to ACC/ACCESSORY.
8. Place the transmission shift lever in P (Park), or 1 (First) for vehicles that have a manual transmission
9. Turn the ignition to LOCK/OFF.

Note: This neutral setting is a 2WD neutral, meaning the front and rear outputs of the transfer case are not engaged and should be treated as though in 2H. With a disengaged front axle, there is no power flow to the front wheels, thus allowing towing with the front wheels off the ground or flat towing without driveline binding.

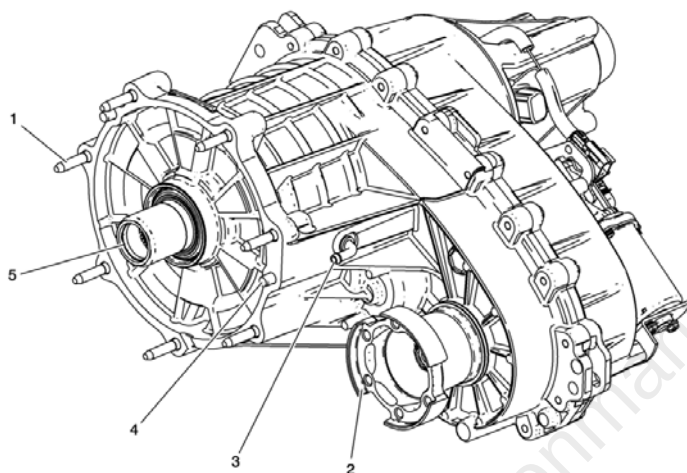
Once these conditions have been met, rotate the rotary switch clockwise past 4L to N (Neutral) and hold for 20 seconds. When the system completes the shift to neutral, the red neutral amp will illuminate. A shift to the neutral position allows the vehicle to be towed without rotating the transmission output shaft. In the neutral position, the rear propeller shaft rotates the transfer case rear output shaft, in turn rotating the oil pump, thus providing constant lubrication during towing. This

neutral position is a 2WD Neutral, meaning the front and rear outputs of the transfer case are not engaged as though in 2HI. With a disengaged front axle, there is no power flow to the front wheels, thus allowing towing with the front wheels off the ground or flat towing without driveline binding

Build Variations

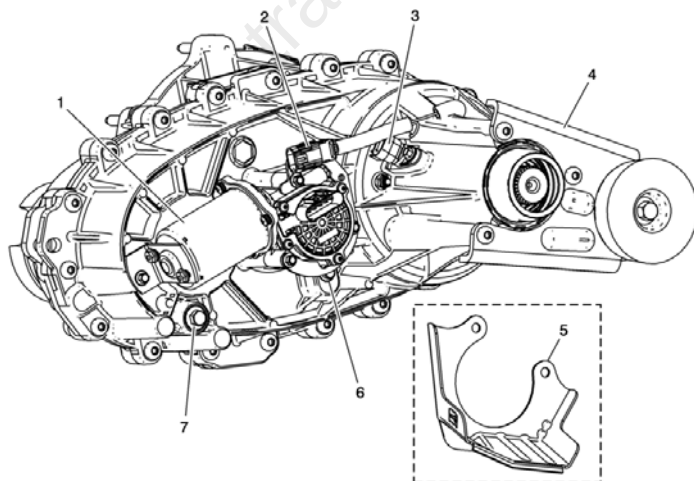
Broadcast Code	Other	Engine	Transmission	Axle Ratio
NQV	w/damper	LWH (2.8L Diesel)	MYB (6 speed AT)	3.42
NQV	—	LY7 (3.6L Gasoline)	MYB (6 speed AT)	3.42
NQV	w/damper	LWH (2.8L Diesel)	MYN (5 speed MT)	3.73
NQV	—	LY7 (3.6L Gasoline)	MYF (5 speed MT)	3.73
NQV	w/damper	LVN (2.5L Diesel)	MYL (5 speed MT)	4.10
NQV	w/rear shield	LE6 (2.4L Family II Gasoline)	MYG (5 speed MT)	4.56

External Components



- (1) Transfer Case-to-Transmission Adapter Studs
- (2) Front Output Flange
- (3) Vent Hose Connector
- (4) Transfer Case-to-Adapter Locating Pins
- (5) Input shaft

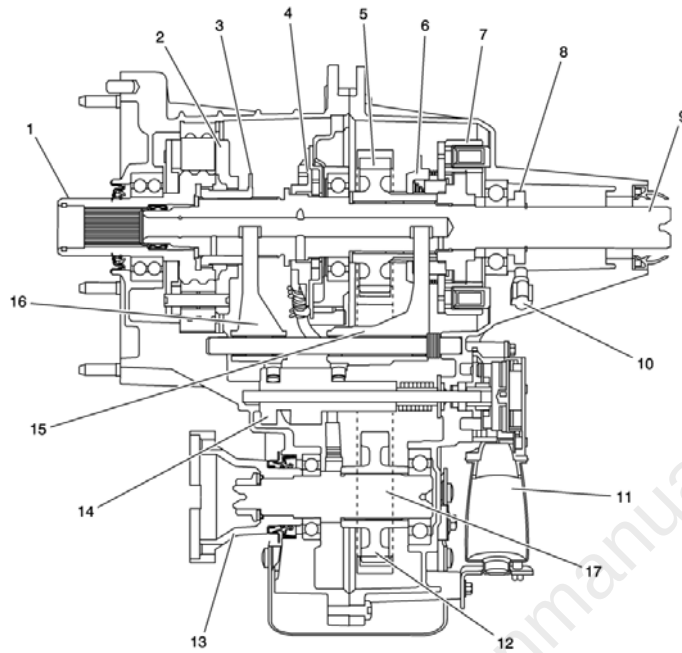
External Components



- (1) Actuator Motor
- (2) Synchronizer Coil Electrical Harness Connector
- (3) Vehicle Speed Sensor
- (4) Damper (LVN/LWH Diesel engines – MYB/MYL/MYN transmission applications)
- (5) Shield (LE6 engine – MYG transmission applications)
- (6) Oil Fill Plug

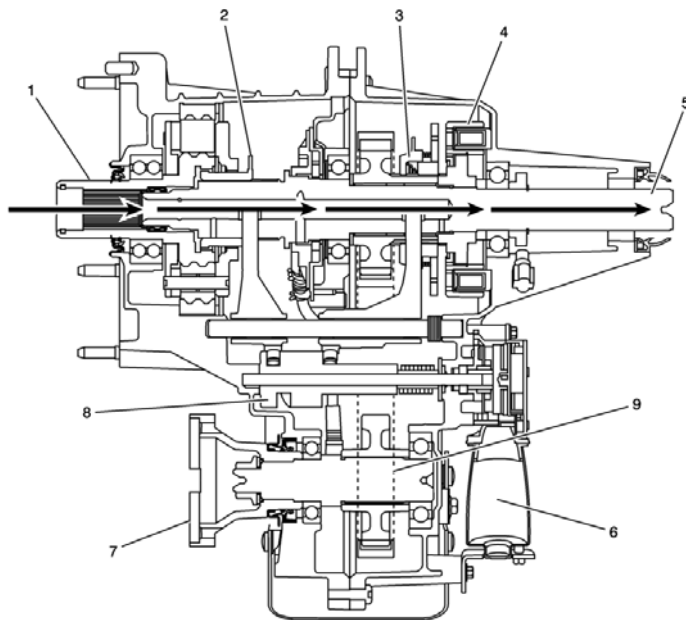
(7) Oil Drain Plug

[Internal Components](#)



- (1) Input Shaft
- (2) Planetary Assembly
- (3) H/L Range Shift Sleeve
- (4) Oil Pump
- (5) Drive Sprocket
- (6) 2/4 Lock-up Collar Assembly
- (7) Synchronizer Coil
- (8) Reluctor Wheel
- (9) Rear Output Shaft
- (10) Vehicle Speed Sensor
- (11) Actuator Motor
- (12) Driven Sprocket
- (13) Front Output Flange
- (14) Shift Cam
- (15) 2/4 Shift Fork
- (16) H/L Shift Fork
- (17) Drive Chain

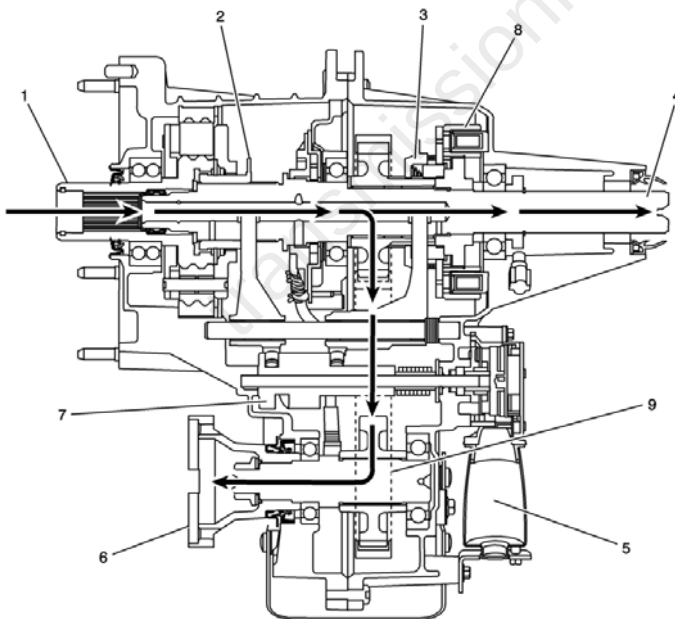
[2H Power Flow](#)



With the transfer case in the 2H mode:

- The input shaft (1) is rotating.
- The actuator motor (6) has rotated the shift cam (8) to the 2H position
- The H/L shift fork and range shift sleeve (2) are in the 2H position with the teeth of the range shift sleeve engaged into the teeth of the input shaft.
- The 2/4 shift fork and lockup collar assembly (3) are in the 2H position with the splines of the collar assembly engaged to the splines of the drive sprocket.
- The synchronizer coil (4) is not energized.
- The rear output shaft (5) is rotating.
- The front output shaft (7) and chain (9) are not rotating.

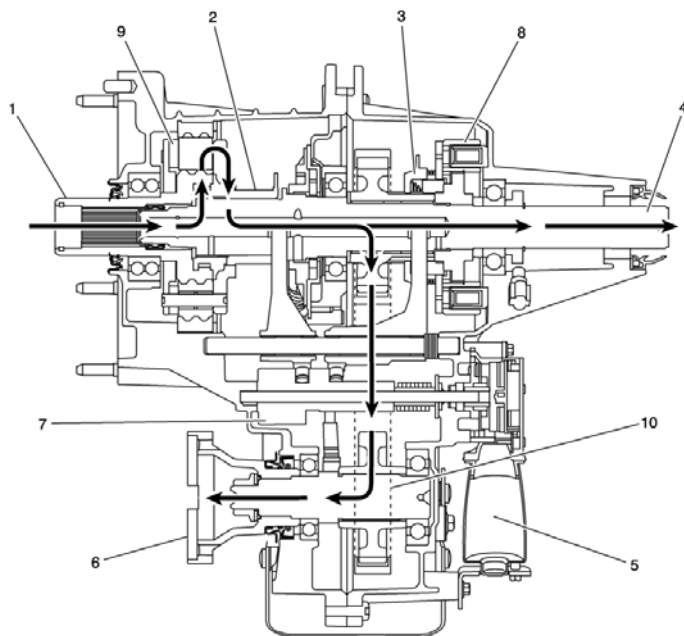
[4H Power Flow](#)



With the transfer case in the 4H mode:

- The input shaft (1) is rotating.
- The actuator motor (5) has rotated the shift cam (7) to the 4H position.
- The H/L shift fork and range shift sleeve (2) are in the 4H position with the teeth of the range shift sleeve engaged into the input shaft.
- The 2/4 shift fork and lockup collar assembly (3) are in the 4H position with the splines of the collar engaged to the splines of the lockup hub.
- The synchronizer coil (8) is energized only until the shift has been completed.
- The rear output shaft (4), chain (9), and front output shaft (6) are rotating.

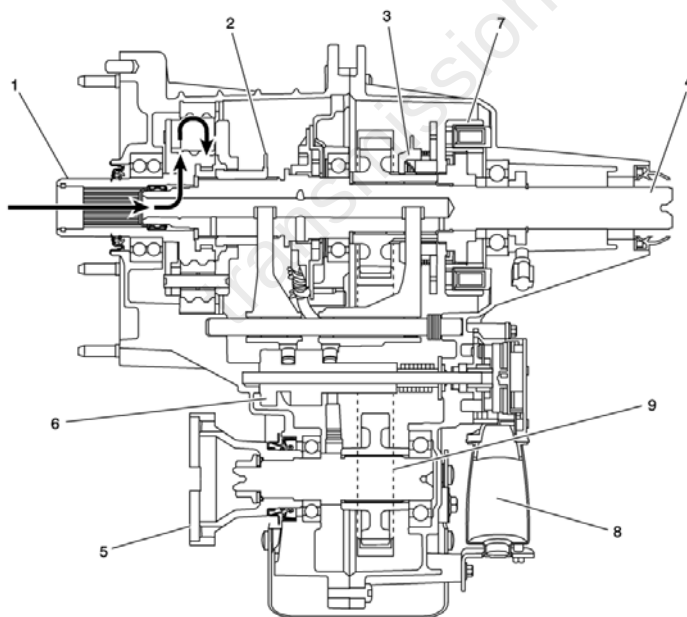
[4L Power Flow](#)



With the transfer case in the 4H mode:

- The input shaft (1) is rotating.
- The actuator motor (5) has rotated the shift cam (7) to the 4L position.
- The H/L shift fork and range shift sleeve (2) are in the 4L position with the teeth of the range shift sleeve engaged into the planetary assembly (9).
- The 2/4 shift fork and lockup collar assembly (3) are in the 2H position with the splines of the collar engaged to the splines of the lockup hub.
- The synchronizer coil (8) is energized only until the shift has been completed.
- The rear output shaft (4), planetary (9), chain (10), and front output shaft (6) are rotating.

NEUTRAL Power Flow



With the transfer case in the Neutral mode:

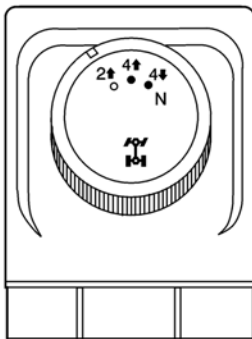
- The input shaft (1) is rotating.
- The actuator motor (6) has rotated the shift cam (8) to the neutral position.
- The H/L shift fork and range shift sleeve (2) are in the neutral position with the teeth of the range shift sleeve not engaged into the planetary or to the input shaft.
- The 2/4 shift fork and lockup collar assembly (3) are in a 2H position with the splines of the collar assembly engaged to the splines of the drive sprocket.
- The synchronizer coil (4) is not energized.
- The rear output shaft (5), chain (9) and front output shaft (7) are not rotating.

View the list of major electrical components that make up the four wheel drive (4WD) transfer case system below.

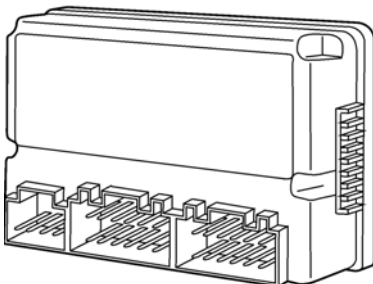


Service 4WD

The Service 4WD message is a display within the drivers information center (DIC). This message is used to inform the driver that a transfer case system condition has occurred. The Service 4WD message is controlled by the transfer case shift control module via GM LAN.

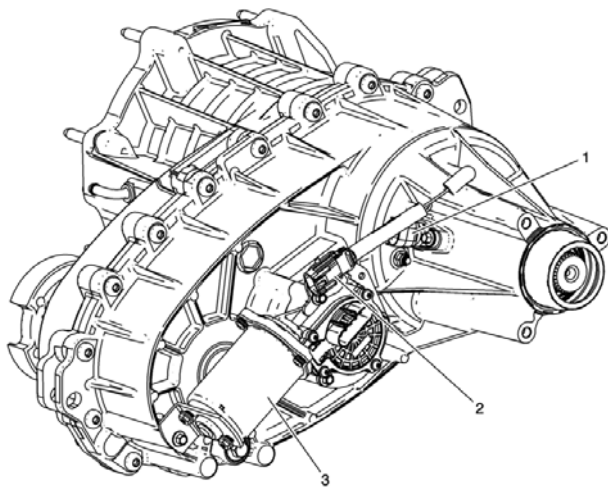


The 4WD system features a position shift control switch located on either the center floor shift console or instrument panel. When the ignition key is in the RUN position, the TCCM monitors the transfer case shift control switch to determine if the driver desires a new mode/range position. When either 2HI, 4HI, or 4L position is requested by rotating the switch, the corresponding LED of the new desired position will begin flashing to inform the driver that the TCCM has received a request for a new mode/range position. The LED continues to flash until all shifting criteria have been met and the new mode/range position is engaged. Once the new mode/range position is fully active, the switch indicator LED for the new position will remain ON constantly. To request the neutral position, the transfer case shift control switch is designed to be manually held in the neutral position for at least 10 seconds. If the switch is not manually held in the neutral position, the internal spring will return the switch to the 4L position when released. There is no flashing LED for the neutral position. When the criteria is met for a shift to neutral and the shift has been completed, the letter "N" will be illuminated red in color.



The transfer case is controlled by a GM LAN compliant transfer case control module (TCCM). The TCCM monitors various vehicle sensors and the driver's input, and controls the transfer case motor/actuator and front axle actuator accordingly. Refer to Control Module References and Transfer Case Shift Control Module Scan Tool Information

The vehicle speed sensor (VSS) is digital frequency voltage input to the Engine Control Module (ECM). The ECM sends this information to the transfer case control module (TCCM) via the GM LAN serial data bus. Refer to cell link TBD.

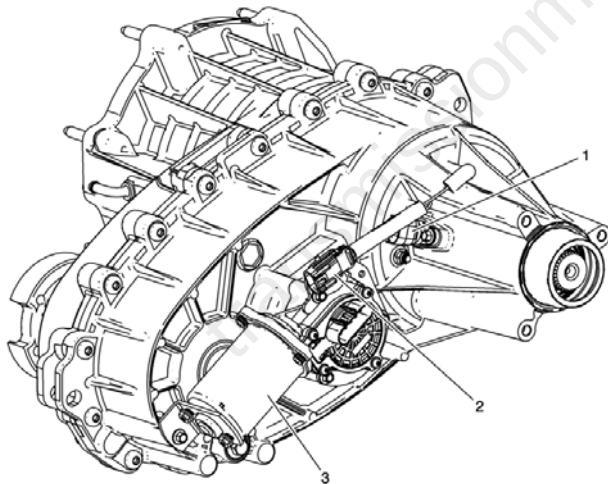


The transfer case two/four wheel drive actuator motor (3) is a bi-directional, permanent magnet, DC motor. The motor is commanded when either control motor circuit A or control motor circuit B is energized. The circuit ground is provided through the transfer case control module (TCCM) via the opposing control motor circuit. The actuator motor, through a series of gears, rotates the transfer case shift detent lever shaft, which moves the transfer case shift cam and transfer case high/low shift forks to shift the transfer case to the following modes or ranges:

- 2H
- 4H
- 4L
- Neutral

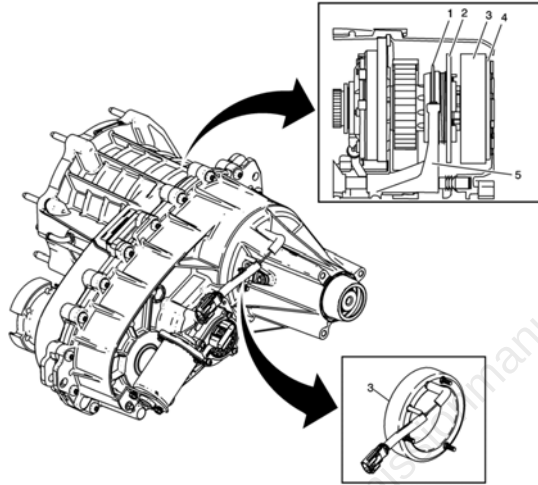
The actuator motor incremental sensor is a voltage input to the TCCM. The incremental sensor is an integral part of the transfer case actuator motor and cannot be replaced independently.

[Vehicle Speed Sensor](#)



There is a Vehicle Speed Sensor (VSS) (1) is mounted to the transfer case on the rear output shaft. The VSS is a pulse modulated (PM) generator. The PM generator produces a digital voltage between 0-5 volts. The digital voltage signal frequency increases as vehicle speed increases. The VSS is an input to the Engine Control Module (ECM). The ECM sends this information to the TCCM via the GM LAN serial data bus. The VSS is external to the transfer case and can be serviced separately.

[Synchronizer Coil](#)



When either 4HI or 4LO mode is requested, the TCCM sends a 12-volt signal to the two/four wheel drive clutch coil (4) via the clutch coil control circuit. The clutch coil is energized creating a magnetic field. The electro-magnetic field causes the armature plate (2) of the two/four wheel drive lockup assembly (1) to be drawn towards the two/four wheel drive synchronizer hub (3). As the two parts move closer to each other, the lockup assembly (1) begins to rotate. Once the rotational speeds of the lockup assembly and the synchronizer hub are equal, the two/four wheel drive shift fork (5) continues to move until the components are mechanically coupled in 4WD. When the coupling of the lockup assembly and synchronizer hub are complete, the TCCM will then command the front axle actuator to engage. With the vehicle in either the 4HI or 4LO mode, the front axle actuator remains in 4WD position until a new range is selected. At that point, the 12 volt signal to the two/four wheel drive clutch coil is turned off. The clutch coil circuit is controlled by the TCCM high and low side drivers. Both circuits must be activated to engage the system.

Front Drive Axle

The front axle actuator is commanded by the TCCM to engage (4WD) or disengage (2WD) the front axle. With the vehicle in 4HI or 4LO mode, the front axle actuator remains in the 4WD position until a new range is selected. Refer to Transfer Case Control Schematics and Front Drive Axle Description and Operation.