FOUR-WHEEL AND ALL-WHEEL DRIVE CHALLENGES

Service Tips for Common Customer Complaints

Four-Wheel and All-Wheel Drive vehicles have flooded the market. Look around your neighborhood, parking lots, daily traffic routes, etc. They come in the form of trucks and SUVs, many of which will never encounter off-road or inclement weather conditions that would require a four-wheel drive application. With these additional driveline components come some challenges for the vehicle owner and the technician servicing the vehicle. While a seasoned four-wheel drive operator is familiar with some of the service requirements, quirks and symptoms, a first-time operator of one of these vehicles may have concerns with some of the normal operating characteristics of these vehicles. Service procedures for these applications differ when compared to a two-wheel drive vehicle.

TIRE CIRCUMFERENCE VARIATIONS

Tire rotation is imperative on 4x4 and AWD vehicles. Unequal variations in the circumference when comparing front to rear tires can create some major drivability and mechanical issues with these applications. They can result in a technician missing the diagnosis and needlessly replacing some expensive components in a futile effort to correct a symptom that should be considered a normal characteristic.

A common scenario is the vehicle owner fails to have the tires rotated, resulting in premature wear of two tires, which is usually the front tires. It is imperative that the tires be replaced in sets of four. Unequal front to rear circumference variations subjects the driveline components to extreme pressure and binding. The symptoms involve a jerking or binding while operating in four-wheel drive and turning, especially on a hard road surface such as blacktop. Most vehicle manufacturers caution against operating in four-wheel drive mode on a dry hard surface. Off-road operation on a slippery surface will allow slippage, reducing any transfer case pressure.

LOCKED IN FOUR-WHEEL DRIVE

Often, we hear complaints of a vehicle locked in 4x4 and will not disengage. These symptoms are especially pronounced on those transfer cases that shift with an electric motor. The manual shift applications may require extreme pressure to overcome the resistance to disengage the transfer case. When these symptoms occur, place the vehicle on a lift or jackstands with the wheels suspended. With the engine running, shift the transfer case into 4x4 position and lightly accelerate. Slowly bring the wheels to a stop and disengage the transfer case. If the system will disengage with the wheels suspended, this confirms the binding transfer case was due to tire circumference variations. Replacing a tire or tires with a different brand can promote the same condition, as tire brands vary in circumference even though they may be stamped as the same size. When these symptoms occur, measure the outer circumference of the tires and compare, as this may save you a lot of diagnostic time and the customer some unnecessary expense. Low air pressure can promote the same symptom. The recommended tire inflation pressure is listed on the vehicle's placard, located on the driver's side door edge or the rear compartment lid. Do not inflate the tires to the pressure posted on the tire itself. Inspect and adjust the tire pressure when the tires are cold. A variance in tire pressure as minimal as 2-3 pounds of pressure can affect the life and performance of the tires and 4x4/AWD driveline components.

CHRYSLER ALL-WHEEL DRIVE

Transfer case warranties cost Chrysler a bundle on some early applications equipped with All-Wheel Drive. Vehicles affected include Town & Country, Caravan and Voyager. Chrysler suspected a design problem with their power transfer unit (PTU) as the failures had been extreme. Later, the engineers determined that the culprit had been lack of tire maintenance. Failure to rotate the

tires and maintain an even front to rear wear pattern had been the reason for the PTU failures. The variation in tire circumference from front to rear results in an extreme heat build-up in the PTU. The condition occurs due to the variation in rotational speeds and torque transfer between the front and rear drive components. A variance in the circumference as minimal as 0.5% can result in an overheated and damaged PTU. Chrysler recommends a tire rotation every 7,500 miles, or less. At a cost of $1200 for a transfer unit, the vehicle owner should pay closer attention to the recommended service intervals and have the tires rotated on time. Maintain the proper air pressure, and when a tire replacement is necessary, replace all four tires with a matched set.

TRANSFER CASE FAILURE

Nissan Murano, Altima, Pathfinder and Rogue vehicles equipped with All-Wheel Drive (AWD) are fitted with a transfer case that applies power to the rear wheels on-demand. With this system a minor leak from the transfer case can result in a catastrophic failure of the unit. The capacity of the transfer case is only 5/8 pt. (0.31L) of 80/90 gear lube (non-synthetic). That is approximately a coffee cup of lubricant to protect the gears and bearings. A minor loss of lubricant can result in some major expensive repairs at a cost of approximately $3000 to replace the power transfer unit (PTU). Any evidence of leakage should be treated as a major concern. The failure can be worse than the cost to replace the PTU, as a total front wheel lock-up symptom can occur due to loss of lubricant, resulting in bearing and gear failure. Imagine traveling at 60 mph and experiencing a wheel lock-up.

Some vehicle owners continue to operate their vehicle when leakage is present, due to the cost of the repairs. Labor time to pull the transfer case for seal replacement is 10.8 hours. A transfer case rebuild calls for 15.7 labor hours. The seals on the right-hand side (passenger side) can be replaced without pulling the transfer case. The seal that is viewed where the right-hand axle enters the transfer case is only a dust seal. The seal promoting the leakage is positioned beyond the mentioned dust seal and is referred to as the driveshaft oil seal/ring gear shaft oil seal. Nissan has some specialty tools to remove the seals on the right-hand side without removing the transfer case. Seal leakage next to the transmission will require pulling the transfer case for seal replacement. Leakage from the transfer case should receive immediate attention.

NISSAN AWD COMPLAINTS

For symptoms involving abnormal noise, vibration or binding from the Rear Final Drive Assembly, Nissan recommends following their diagnostic flow chart illustrated in Service Bulletin NTB10-0291 to determine if the noise or related symptoms are the result of issues with the Electric Controlled Coupling or the Rear Final Drive Assembly. Vehicles affected include the following applications equipped with AWD:

- 2019-2023 Altima (L34)
- 2003-2023 Murano (Z50, Z51, Z52)
- 2011-2014 Murano Cross Cabriolet (Z51)
- 2016 Murano Hybrid (Z52H)
- 2013-2020 Pathfinder (R52)
- 2022-2023 Pathfinder (R53)
- 2014-2015 Pathfinder Hybrid (R52H)
- 2008-2013 Rogue (S35)
- 2014-2015 Rogue Select (S35)
- 2014-2020 Rogue (T32)
- 2021-2023 Rogue (T33)
- 2017-2018 Rogue Hybrid (T32H)
- 2017 Rogue Sport (J11)

If there is an abnormal noise, vibration and/or binding feeling from the rear differential area of the vehicle, Nissan cautions the following:

1) For vehicles equipped with a Drive Mode Selector: "SNOW" and "OFF-ROAD" modes will increase engagement of the AWD coupler, which increases traction. This may be described as a binding feeling and/or vibration in sharp corners when on dry roads. This is a normal characteristic. Confirm the drive mode prior to any repair.

2) Tire size, brand or tread pattern mismatches can cause similar symptoms. To avoid tire-related mismatch vibration, it is recommended that when tires need to be replaced, all tires are to be replaced at the same time with tires of the proper size, same brand and pattern.

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