

Four-Wheel Drive Systems - Raptor - Overview

2-Speed Torque On Demand with 4HI-LOC

2-Speed Torque On Demand with 4HI-LOC system consists of the following components:

- 4X4 Switch Module (Located in the instrument panel)
- TCCM (located near the passenger kick panel)
- IWE solenoid
- IWEs
- 4WD mode indicators and messages in the IPC message center
- Transfer case assembly
- Wheel speed signals from the ABS via HS-CAN

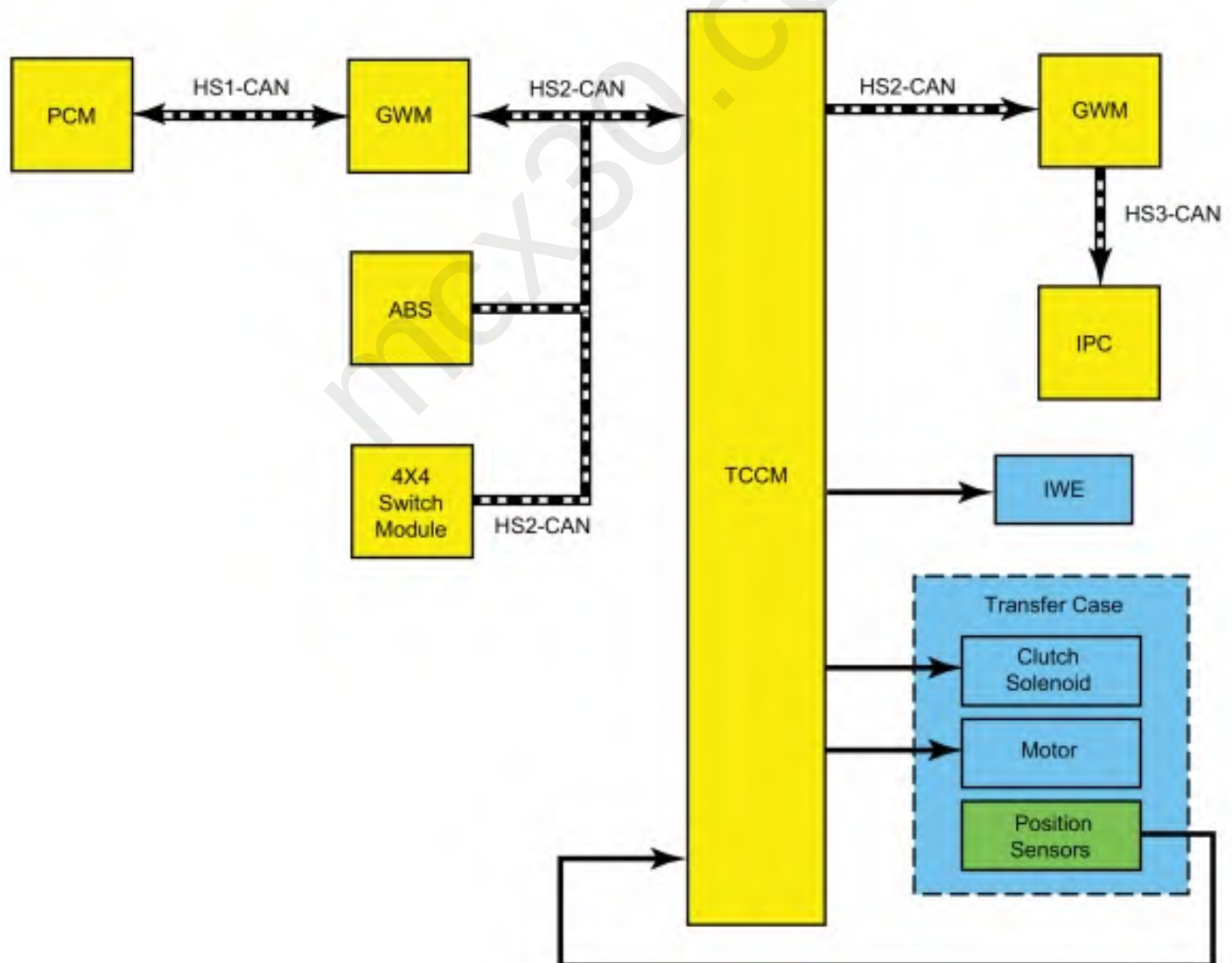
Vehicles equipped with the 2-speed torque-on-demand with 4HI-LOC system allow the operator to choose between 2WD and 3 different 4WD modes. The transfer case is shifted electronically based on the 4X4 Switch Module position. Under normal driving conditions, the unit is in 2WD (2H), but when desired, the operator may shift into 4WD AUTO (4A), 4WD high (4H), or 4WD low (4L). When shifting into or out of 4WD (4L) range, the TCCM requires that the vehicle speed is less than 5 km/h (3 mph) and the transmission is in NEUTRAL.

The transfer case is equipped with an electronically controlled clutch which is located inside the transfer case. The clutch provides torque to the front driveline in (4A) mode only.

Four-Wheel Drive Systems - Raptor - System Operation and Component Description

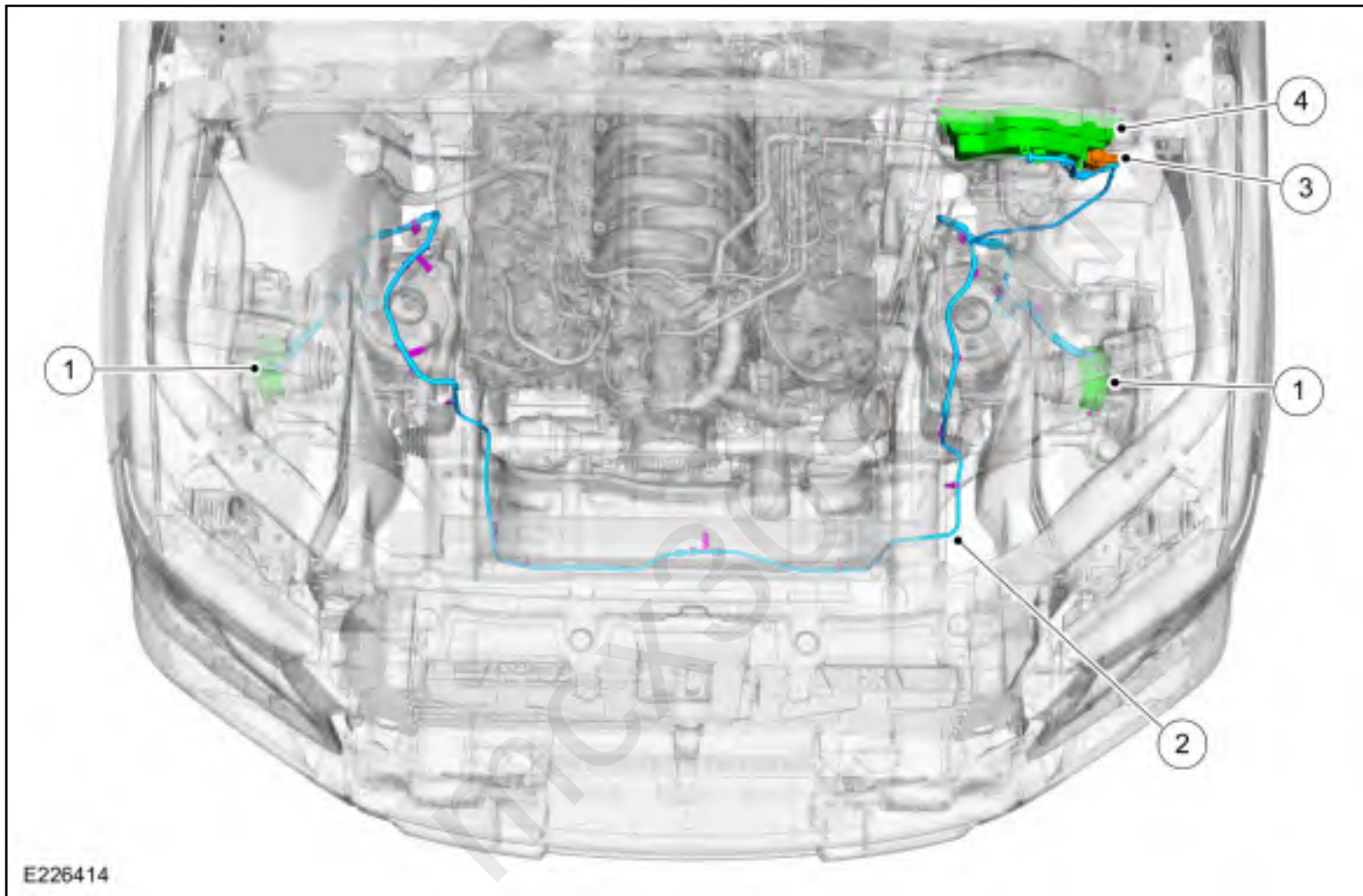
System Operation

System Diagram



IWE System

The IWE system consists of the following:



1	IWEs (spring-loaded vacuum hubs)
2	Vacuum hoses
3	IWE solenoid
4	Vacuum reservoir

The IWE system, used on 2-Speed Torque On Demand with 4HI-LOC equipped vehicles, uses vacuum hubs that engage or disengage the front wheel hubs from the front halfshafts.

The IWE solenoid receives engine vacuum from the vacuum reservoir. When the 4WD system is in 2H mode, the

TCCM supplies a ground path to the IWE solenoid to apply vacuum to the IWEs (disengaging the front hubs from the front halfshafts). When operating in any 4x4 mode, the TCCM does not supply the ground path to the IWE solenoid, vacuum is not applied to the IWEs and an internal spring keeps the front hubs engaged to the front halfshafts. As a first step in service, eliminate obvious items such as loose wiring connections, loose vacuum connections or damaged vacuum lines.

Electronic Locking Differential (ELD) System

The Electronic Locking Differential (ELD) system consists of the following components:

- ELD field coil, located at the rear differential
- Rear differential
- 4X4 switch module (unique for ELD equipped vehicles, the ELD switch is integrated with the 4X4 switch module), located on the instrument panel.

Neutral Flat Tow

NOTE: 2WD vehicles cannot be towed with any wheels on the ground as vehicle or transmission damage may occur.

NOTE: Failing to put the transfer case into the NEUTRAL position damages vehicle components.

Vehicles equipped with a 4WD system have neutral flat tow software in the TCCM. Following the neutral flat tow activation procedure commands the transfer case shift motor into a neutral position. Locking the transfer case in neutral prevents damage to the transmission while towing a 4WD vehicle on all 4 wheels (such as when being towed behind a motorhome).

Terrain Management System

The Terrain Management System optimizes drivability and comfort as well as maximizing traction while operating on different types of terrain. The Terrain Management System automatically tailors your vehicle configuration for each mode selected. This is accomplished by changing the functionality of the several systems to enhance the traction and handling capabilities of the vehicle. It is recommended that terrain management modes that enable the ELD not be used on dry, hard surfaced roads. Doing so produces excessive noise, vibration and increase tire wear. Terrain Management modes are selected by using the buttons mounted on the steering wheel and selecting and changing Terrain Management modes through the message center.

Component Description

For mechanical component information,

Refer to: [Four-Wheel Drive Systems - Raptor, Vehicles With: 4HI-LOC Torque on Demand Transfer Case](#) (308-07A Four-Wheel Drive Systems, Diagnosis and Testing).