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2002 FORD Focus 3 Doors OEM Service and Repair Workshop Manual

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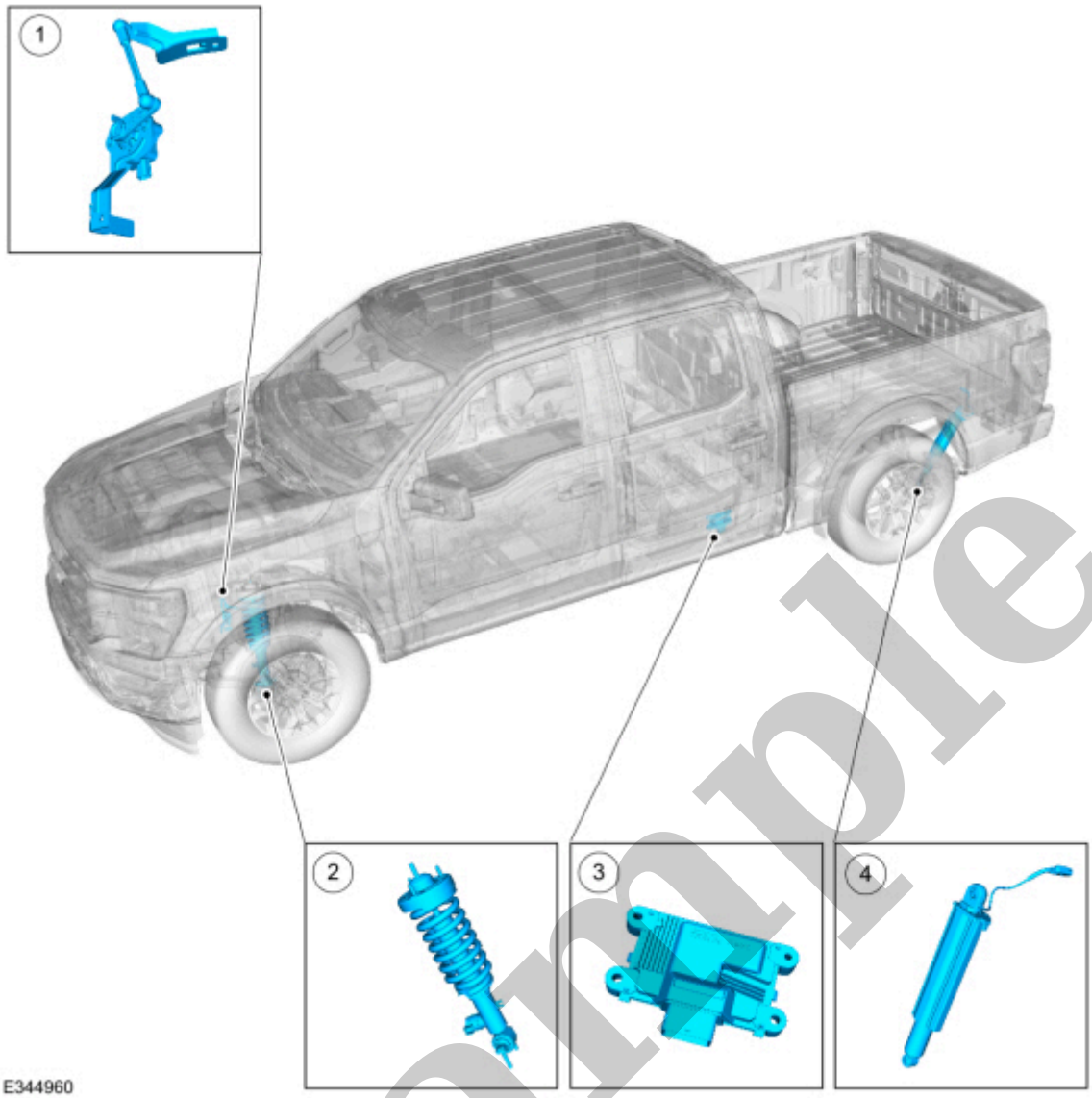
The Tire Pressure Monitoring System (TPMS) sensor cannot be installed without disassembly of the wheel and tire.

Assemble the wheel and tire.

Refer to: Wheel and Tire(204-04A Wheels and Tires, Removal and Installation).



Item	Description
1	Front height sensor (2 required)
2	Front strut assembly (2 required)
3	VDM (vehicle dynamics control module)
4	Rear shock absorber (2 required)

Vehicle Dynamic Suspension - System Operation and Component Description

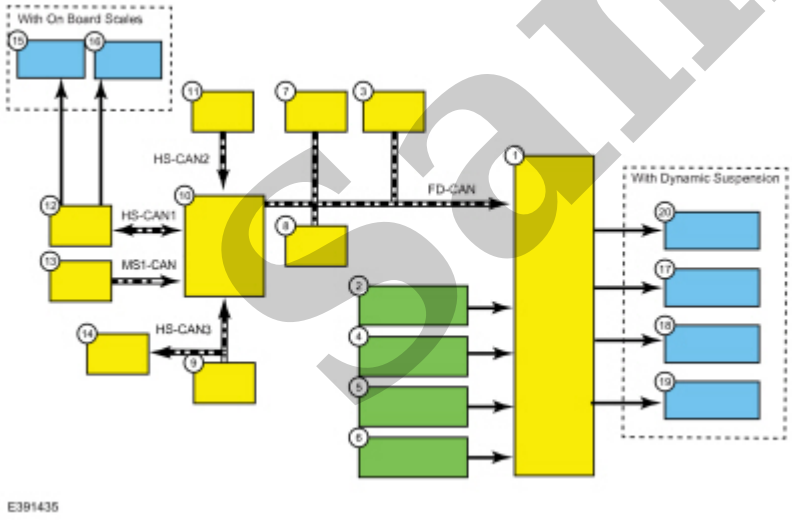
204-05 Vehicle Dynamic Suspension	***2022 F-150***
Description and Operation	***Procedure revision date: 09/15/2022***

Vehicle Dynamic Suspension - System Operation and Component Description

System Operation

Vehicle Dynamic Suspension

System Diagram



Item	Description
1	VDM (vehicle dynamics control module)
2	LH (left-hand) Front Height Sensor

ABS (anti-lock brake system) active	ABS (anti-lock brake system) module	Indicates the current ABS (anti-lock brake system) activity, on or off.
Accelerator pedal position	PCM (powertrain control module)	Indicates the current accelerator pedal position in percentage of travel with 0% at rest and 100% at full throttle.
Ambient air temperature	HVAC (heating, ventilation and air conditioning) module	Indicates the current ambient air temperature in degrees Celsius.
Brake torque request	ABS (anti-lock brake system) module	This message indicates the total amount of braking, in newton meters, requested by the driver (via the brake pedal), the adaptive cruise control system or the collision avoidance system. The VDM (vehicle dynamics control module) adjusts the valve solenoids to help stabilize the vehicle during the operation of those systems.
Driven wheel torque request	PCM (powertrain control module)	Torque at the wheels (sum of all wheels) desired from the propulsion system. This includes the effects of the driver's accelerator pedal input and the effects of the virual driver functions, cruise control, adaptive cruise control.
Fuel level	IPC (instrument panel cluster)	This message is sent to the GWM (gateway module A) and then to the VDM (vehicle dynamics control module) . Indicates the fuel level at time of ride height calibration in fractions of the fuel tank. The VDM (vehicle dynamics control module) uses fuel level when calculating suspension settings and uses a default setting when the information is not available.
Gear lever position	PCM (powertrain control module)	Indicates the current transmission gear status.
Gross train weight estimate	PCM (powertrain control module)	Rough estimate of the combined mass of a road vehicle, the passengers and cargo in the tow vehicle, plus the mass of the trailer and cargo in the trailer.
Ignition status	BCM (body control module)	This message is sent to the GWM (gateway module A) and then to the VDM (vehicle dynamics control module) . Indicates the current ignition status; off, accessory, run, start, invalid or unknown.

Vehicle lateral acceleration	ABS (anti-lock brake system) module	Indicates the current lateral acceleration of the vehicle in meters per second squared as measured by the sensors in the RCM (restraints control module) and relayed by the ABS (anti-lock brake system) module.
Vehicle lateral acceleration	RCM (restraints control module)	Indicates the current lateral acceleration of the vehicle in meters per second squared as measured by the sensors in the RCM (restraints control module) .
Vehicle longitudinal acceleration	ABS (anti-lock brake system) module	Indicates the current longitudinal acceleration of the vehicle in meters per second squared as measured by the sensors in the RCM (restraints control module) and relayed by the ABS (anti-lock brake system) module.
Vehicle longitudinal acceleration	RCM (restraints control module)	Indicates the current longitudinal acceleration of the vehicle in meters per second squared as measured by the sensors in the RCM (restraints control module) .
Vehicle roll rate	ABS (anti-lock brake system) module	Indicates the current roll rate of the vehicle in radians per second squared as measured by the sensors in the RCM (restraints control module) and relayed by the ABS (anti-lock brake system) module.
Vehicle roll rate	RCM (restraints control module)	Indicates the current roll rate of the vehicle in radians per second squared as measured by the sensors in the RCM (restraints control module) .
Vehicle speed	PCM (powertrain control module)	Indicates the current vehicle speed in kilometers per hour.
Vehicle yaw stability index	ABS (anti-lock brake system) module	Indicates the current stability (oversteer or understeer) of the vehicle.
Vehicle yaw rate	ABS (anti-lock brake system) module	Indicates the current yaw rate of the vehicle in radians per second squared as measured by the sensors in the RCM (restraints control module) .
Vehicle vertical acceleration	ABS (anti-lock brake system) module	Indicates the current vertical acceleration of the vehicle in meters per second squared as measured by the sensors in the RCM (restraints control module) and relayed by the ABS (anti-lock brake system) module.

Vehicle lateral acceleration	ABS (anti-lock brake system) module	Indicates the current lateral acceleration of the vehicle in meters per second squared as measured by the sensors in the RCM (restraints control module) and relayed by the ABS (anti-lock brake system) module.

Vehicle Dynamic Suspension

The VDM (vehicle dynamics control module) is connected to the FD-CAN (Flexible Data Rate Controller Area Network) to communicate with other modules. The VDM (vehicle dynamics control module) also gathers suspension height information from the height sensors. With the information received, the VDM (vehicle dynamics control module) monitors the heave, roll, pitch, cornering, braking and acceleration of the vehicle. Based on this information the VDM (vehicle dynamics control module) calculates the best action for each valve solenoid.

Once the valve solenoid is energized, the damping increases with the PWM (pulse width modulation) duty cycle. At maximum current the damping is less than when minimum current is applied. The damper and valve solenoid have been designed so failure leads to a firm ride. The fail-safe level of damping is at a level equivalent to what is produced at the minimum current.

When the VDM (vehicle dynamics control module) is initialized (ignition ON), the module carries out a preliminary electrical check of the height sensors, height sensor circuits, valve solenoids and valve solenoid circuits. It also checks for battery voltage above or below acceptable thresholds. Any malfunction detected in the above hardware of the system causes the VDM (vehicle dynamics control module) to set a DTC (diagnostic trouble code) and send a message over the CAN to the IPC (instrument panel cluster) . The IPC (instrument panel cluster) responds by displaying a message in the message center and the VDM (vehicle dynamics control module) will deactivate the dynamic suspension system resulting in a firm suspension feel.

Selectable Drive Modes (SDM)

The driver can select system modes using the (SDM) rotary dial. F-150 Raptor customers can also set the suspension mode independent of the drive mode via the suspension button on the steering wheel. When a mode is selected, the VDM (vehicle dynamics control module) regulates the PWM (pulse width modulation) signal to the valve solenoids to keep the suspension "feel" realtional to the selected mode.

On Board Scales

The On Board Scale feature uses the VDM (vehicle dynamics control module) input information from the suspension height sensors. Based on this information the VDM (vehicle dynamics control module) calculates an estimated payload and sends information on the FD-CAN (Flexible Data Rate Controller Area Network) to the GWM (gateway module A) then to the APIM (SYNC module) on the HS-CAN (high-speed controller area network) for display. Also this information is sent to the BCM (body control module) over the HS-CAN1 (high-speed controller area network 1) then to the Smart Tail Lamps (If equipped)

Refer to: Exterior Lighting - System Operation and Component Description

- Rear leaf spring (Base F-150)
- Rear shock (Base F-150)

The calibration procedure is carried out using the diagnostic scan tool and required for the system to learn the zero-position of the vehicle.

Before performing the calibration procedure:

- Be sure the vehicle is on a level surface.
- The vehicle must not be moving.
- No occupants in the vehicle.
- Make sure the suspension is in a neutral position if it was recently lowered. To neutralize the suspension, drive the vehicle a short distance, such as around a parking lot.

For the Raptor only (Activate the **Engineering Test** mode for dynamic suspension which will power the shocks and allow the vehicle to settle by following the procedure below:

- Put the vehicle into Neutral
- Turn the vehicle ON with engine OFF
- Depress the gas pedal fully 3 times within 10 seconds, letting it fully return between each depression
- If the above sequence is correctly executed, a small

  ET

  for

  Engineering Test

  will display in the bottom right of the cluster and the shocks will power on (truck may also drop slightly).

VDM (vehicle dynamics control module)	C110C:64	Left Front Damper Solenoid: Signal Plausibility Failure	GO to Pinpoint Test D
VDM (vehicle dynamics control module)	C110D:11	Right Front Damper Solenoid: Circuit Short to Ground	GO to Pinpoint Test E
VDM (vehicle dynamics control module)	C110D:12	Right Front Damper Solenoid: Circuit Short to Battery	GO to Pinpoint Test E
VDM (vehicle dynamics control module)	C110D:13	Right Front Damper Solenoid: Circuit Open	GO to Pinpoint Test E
VDM (vehicle dynamics control module)	C110D:64	Right Front Damper Solenoid: Signal Plausibility Failure	GO to Pinpoint Test E
VDM (vehicle dynamics control module)	C110E:11	Left Rear Damper Solenoid: Circuit Short to Ground	GO to Pinpoint Test F
VDM (vehicle dynamics control module)	C110E:12	Left Rear Damper Solenoid: Circuit Short to Battery	GO to Pinpoint Test F
VDM (vehicle dynamics control module)	C110E:13	Left Rear Damper Solenoid: Circuit Open	GO to Pinpoint Test F
VDM (vehicle dynamics control module)	C110E:64	Left Rear Damper Solenoid: Signal Plausibility Failure	GO to Pinpoint Test F
VDM (vehicle dynamics control module)	C110F:11	Right Rear Damper Solenoid: Circuit Short To Ground	GO to Pinpoint Test G

VDM (vehicle dynamics control module)	C1A04:64	Right Front Height Sensor: Signal Plausibility Failure	GO to Pinpoint Test U
VDM (vehicle dynamics control module)	C1A05:11	Left Rear Height Sensor: Circuit Short to Ground	GO to Pinpoint Test J
VDM (vehicle dynamics control module)	C1A05:12	Left Rear Height Sensor: Circuit Short to Battery	GO to Pinpoint Test J
VDM (vehicle dynamics control module)	C1A05:64	Left Rear Height Sensor: Signal Plausibility Failure	GO to Pinpoint Test U
VDM (vehicle dynamics control module)	C1A06:11	Right Rear Height Sensor: Circuit Short to Ground	GO to Pinpoint Test K
VDM (vehicle dynamics control module)	C1A06:12	Right Rear Height Sensor: Circuit Short to Battery	GO to Pinpoint Test K
VDM (vehicle dynamics control module)	C1A06:64	Right Rear Height Sensor: Signal Plausibility Failure	GO to Pinpoint Test U
VDM (vehicle dynamics control module)	P0608:11	Control Module VSS Output "A": Circuit Short To Ground	GO to Pinpoint Test D
VDM (vehicle dynamics control module)	P0608:11	Control Module VSS Output "A": Circuit Short To Ground	GO to Pinpoint Test E
VDM (vehicle dynamics control module)	P0608:11	Control Module VSS Output "A": Circuit Short To Ground	GO to Pinpoint Test F