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2012 FORD Fusion North American OEM Service and Repair Workshop Manual

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Pinpoint Tests

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#)

(100-00 General Information, Description and Operation).

PINPOINT TEST A : VIBRATION WHEN BRAKES ARE APPLIED

Normal Operation and Fault Conditions

During moderate to heavy braking, noise from the HCU (hydraulic control unit) and pulsation in the brake pedal can be observed. Pedal pulsation coupled with noise during heavy braking or on loose gravel, bumps, wet or snowy surfaces is acceptable and indicates correct functioning of the ABS (anti-lock brake system). Pedal pulsation or steering wheel nibble when the brakes are applied (frequency is proportioned to the vehicle speed) indicates a concern with a brake or suspension component.

Possible Sources

- Brake disc(s)
- Suspension components
- Brake pads

A1 ROAD TEST THE VEHICLE - LIGHT BRAKING

- Road test the vehicle. Warm the brakes by slowing the vehicle from 80 to 32 km/h (50 to 20 mph) using light brake force. At highway speeds of 89-97 km/h (55-60 mph), apply the brake using light pedal force.

Is there a vibration/shudder felt in the steering wheel, seat or brake pedal?

Yes	GO to A6
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No	GO to A2
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A2 ROAD TEST THE VEHICLE - MODERATE TO HEAVY BRAKING

- Road test the vehicle. At highway speeds of 89-97 km/h (55-60 mph), apply the brake using a moderate to heavy pedal force.

Is there a vibration/shudder?

Yes	GO to A3
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- Road test the vehicle.

Is the vibration/shudder present?

Yes	GO to A6
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No	The concern has been repaired.
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A6 CHECK THE REAR SUSPENSION

- Check the rear suspension.

Are all the suspension components in satisfactory condition?

Yes	<p>INSPECT the rear brake discs. REFER to: Specifications (206-00 Brake System - General Information, Specifications).</p> <p>MACHINE or INSTALL new brake discs as necessary. REFER to: Brake Disc (206-04 Rear Disc Brake, Removal and Installation).</p> <p>REFER to: Rear Suspension (204-02 Rear Suspension, Diagnosis and Testing).</p>
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No	REPAIR or INSTALL new components as necessary. TEST the system for normal operation.
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PINPOINT TEST B : VEHICLE PULLS OR DRIFTS DURING BRAKING

Normal Operation and Fault Conditions

During braking, the vehicle should stop quickly from an initial pedal press and in a straight line. Sometimes, the vehicle pulls to one side or the other while braking. This indicates there is a concern with a brake or suspension component.

Possible Sources

- Brake calipers and/or guide pins
- Brake flexible hose
- Brake pads
- Brake discs
- Tires

PINPOINT TEST C : BRAKE PEDAL GOES DOWN FAST OR EASES DOWN SLOWLY

Normal Operation and Fault Conditions

The brake pedal is connected to the power brake booster, which is connected to the brake master cylinder. When the brake pedal is pressed, brake fluid is pushed through the double-walled steel tubes and flexible hoses to the front and rear disc brake calipers. The brake fluid enters the disc brake calipers, forcing the caliper pistons and brake pads outward against the brake disc friction surface, slowing or stopping rotation. When the brake pedal is released, brake fluid pressure is relieved, returning the front and rear disc brake caliper pistons and brake pads to the unapplied position. If the brake pedal goes down fast or eases down slowly, it indicates there is a concern with the brake system.

Possible Sources

- Brake fluid leaks and/or air in the system
- ABS (anti-lock brake system) / HCU (hydraulic control unit)

C1 INSPECT THE BRAKE SYSTEM COMPONENTS

- Verify that there are no loose or damaged components.

Are there any loose or damaged components?

Yes	INSPECT the brake system components and TIGHTEN to specification. INSTALL new components as necessary.
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No	GO to C2
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C2 INSPECT THE SYSTEM FOR LEAKS AND AIR IN THE SYSTEM

- Inspect the system for leaks. Bleed the brake system.

Is there any leaks in system?

Yes	REFER to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).
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No	The repair is complete. The system is operating correctly at this time.
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PINPOINT TEST D : BRAKES LOCK UP UNDER LIGHT BRAKE PEDAL FORCE

PINPOINT TEST E : EXCESSIVE BRAKE PEDAL TRAVEL (LOW/SPONGY PEDAL)

Normal Operation and Fault Conditions

.The brake pedal is connected to the power brake booster, which is connected to the brake master cylinder. When the brake pedal is pressed, brake fluid is pushed through the double-walled steel tubes and flexible hoses to the front and rear disc brake calipers. The brake fluid enters the disc brake calipers, forcing the caliper pistons and brake pads outward against the brake disc friction surface, slowing or stopping rotation. When the brake pedal is released, brake fluid pressure is relieved, returning the front and rear disc brake caliper pistons and brake pads to the unapplied position. Leaks and/or air in the system can cause a spongy brake pedal and loss of braking in the vehicle. This condition indicates there is a concern with the brake system.

Possible Sources

- Brake fluid leaks and/or air in the system
- ABS (anti-lock brake system) / HCU (hydraulic control unit)
- Brake calipers and/or guide pins
- Brake flexible hose

E1 INSPECT THE SYSTEM FOR LEAKS AND AIR IN THE SYSTEM

- Inspect the system for leaks.

Is there any leaks in system?

Yes	BLEED the brake system. REFER to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).
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No	GO to E2
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E2 CHECK THE BRAKE DISCS AND BRAKE PADS

- Inspect the front and rear brake discs and brake pads.
 - REFER to: [Specifications](#)(206-00 Brake System - General Information, Specifications).
 - Install new front brake pads as necessary,
REFER to: [Brake Pads](#)(206-03 Front Disc Brake, Removal and Installation).
 - Install new rear brake pads as necessary,
REFER to: [Brake Pads](#)(206-04 Rear Disc Brake, Removal and Installation).

Are the brake discs and brake pads in satisfactory condition ?

PINPOINT TEST F : ERRATIC BRAKE PEDAL TRAVEL

Normal Operation and Fault Conditions

The brake pedal is connected to the power brake booster, which is connected to the brake master cylinder. When the brake pedal is pressed, brake fluid is pushed through the double-walled steel tubes and flexible hoses to the front and rear disc brake calipers. The brake fluid enters the disc brake calipers, forcing the caliper pistons and brake pads outward against the brake disc friction surface, slowing or stopping rotation. When the brake pedal is released, brake fluid pressure is relieved, returning the front and rear disc brake caliper pistons and brake pads to the unapplied position. If the brake pedal goes down fast or eases down slowly, it indicates there is a concern with the brake system.

Possible Sources

- Brake pedal
- ABS (anti-lock brake system) / HCU (hydraulic control unit)

F1 INSPECT THE BRAKE PEDAL

- Inspect the brake pedal for binding, obstructions and correct interface to booster rod.

Are the brake pedal components attached correctly? Are there any loose or damaged components?

Yes	REPAIR as necessary. CHECK the brake pedal fasteners for correct torque. REFER to: Brake System Pressure Bleeding (206-00 Brake System - General Information, General Procedures).
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No	The system is operating correctly at this time.
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PINPOINT TEST G : BRAKE DRAG

Normal Operation and Fault Conditions

The brake pedal is connected to the power brake booster, which is connected to the brake master cylinder. When the brake pedal is pressed, brake fluid is pushed through the double-walled steel tubes and flexible hoses to the front and rear disc brake calipers. The brake fluid enters the disc brake calipers, forcing the caliper pistons and brake pads outward against the brake disc friction surface, slowing or stopping rotation. When the brake pedal is released, brake fluid pressure is relieved, returning the front and rear disc brake caliper pistons and brake pads to the unapplied position. The vehicle will experience dragging if the brake fluid pressure is not relieved or the brake pads do not return to the unapplied condition. This condition indicates there is a concern with the brake system.

Possible Sources

- Brake pads
- ABS (anti-lock brake system) / HCU (hydraulic control unit)

H1 INSPECT ABS (ANTI-LOCK BRAKE SYSTEM) AND HCU (HYDRAULIC CONTROL UNIT)

- Ignition ON.
- Using a diagnostic scan tool, perform the ABS (anti-lock brake system) self-test.

Is any DTC present?

Yes	REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
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No	GO to H2
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H2 CHECK BRAKE PADS

- Inspect the brake pads.

Is any concern present?

Yes	<p>INSTALL new components as necessary.</p> <p>REFER to: Brake Pads (206-03 Front Disc Brake, Removal and Installation).</p> <p>REFER to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation).</p>
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No	The repair is complete. The system is operating correctly at this time.
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PINPOINT TEST I : RATTLING NOISE

Normal Operation and Fault Conditions

Some squealing noise from the brake system is acceptable under certain conditions such as cold start or low speed brake application. Under all other general driving conditions, the vehicle must come to a stop on brake application and the brake system operation must not create noise. A rattling noise from the brakes indicate a concern with the brake system.

Possible Sources

- Inspect brake disc shield and bolts.

Is any concern present?

Yes	TIGHTEN the brake disc shield bolts to specification. REFER to: Brake Disc Shield (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Disc Shield (206-04 Rear Disc Brake, Removal and Installation).
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No	The repair is complete. The system is operating correctly at this time.
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PINPOINT TEST J : SQUEALING NOISE

Normal Operation and Fault Conditions

During driving, there should not be any squealing noise except while cold start, low speed and intermittent. A continuous squealing noise from the brakes indicates a concern with the brake system.

Possible Sources

- Brake pads

J1 CHECK SQUEALING NOISE

- Perform a road test and confirm the concern.
- Is the squealing noise:
 - upon cold start
 - at low speeds
 - intermittent

Is the squealing noise after cold start, at low speeds or intermittent?

Yes	This condition is acceptable. Caused by humidity, cold, low brake pad temperature, snow, mud and etc.
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No	GO to J2
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PINPOINT TEST L : GRINDING/MOANING NOISE - CONTINUOUS

Normal Operation and Fault Conditions

Some squealing noise from the brake system is acceptable under certain conditions such as cold start or low speed brake application. Under all other general driving conditions, the vehicle must come to a stop on brake application and the brake system operation must not create noise. A continuous grinding or moaning noise from the brake system on application of the brakes indicates a concern with the brake system.

Possible Sources

- Brake pads
- Brake disc

L1 CHECK GROANING NOISE

- Ignition ON.
- Perform a road test, apply brake and check groaning noise.

Is any groaning noise occurs continuously?

Yes	INSPECT the brake pads, brake discs and attaching hardware for damage. VERIFY brake components are within specifications. INSTALL new components as necessary. REFER to: Front Disc Brake (206-03 Front Disc Brake, Diagnosis and Testing). REFER to: Rear Disc Brake (206-04 Rear Disc Brake, Diagnosis and Testing).
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No	The repair is complete. The system is operating correctly at this time.
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- Scoring of the brake disc surface.

1. Activate brake maintenance mode, formerly known as EPB (electric parking brake) service mode.

Refer to: [Brake Service Mode Activation and Deactivation](#)(206-00 Brake System - General Information, General Procedures).

NOTE

On-Vehicle Brake Lathe Training Videos

NOTE

Brake disc machining is not allowed for the discs with cross drilling holes on friction surface.

2. Vehicle preparation.

Video version of this procedure:

(https://www.fordservicecontent.com/Ford_Content/videos/WorkShopManual/F1925.mp4)

3. Mounting the machine.

Video version of this procedure:

(https://www.fordservicecontent.com/Ford_Content/videos/WorkShopManual/F1927.mp4)

4. Lateral runout adjustment.

Video version of this procedure:

(https://www.fordservicecontent.com/Ford_Content/videos/WorkShopManual/F1926.mp4)

5. Making the cut.

Video version of this procedure:

(https://www.fordservicecontent.com/Ford_Content/videos/WorkShopManual/F1928.mp4)

6. Cutting the opposite side.

Video version of this procedure:

(https://www.fordservicecontent.com/Ford_Content/videos/WorkShopManual/F1929.mp4)

7. Lathe maintenance.

Video version of this procedure:

(https://www.fordservicecontent.com/Ford_Content/videos/WorkShopManual/F1930.mp4)

Repair