

PUBLISHED: 20-MAR-2020
2020.0 DEFENDER (LE), 206-08

BRAKE CONTROLS AND ACTUATION

INTEGRATED POWER BRAKE SYSTEM [G2415756]

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PRINCIPLES OF OPERATION

For a detailed description of the Integrated Power Brake System, refer to the relevant Description and Operation section in the workshop manual. REFER to: [Integrated Power Brake System](#) (206-08 Brake Controls and Actuation, Diagnosis and Testing).

INSPECTION AND VERIFICATION

 CAUTION:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 NOTES:

- When performing voltage or resistance tests, always use a digital multimeter that has the resolution ability to view 3 decimal places. For example, on the 2 volts range can measure 1mV or 2 K Ohm range can measure 1 Ohm. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern
2. Visually inspect for obvious signs of mechanical or electrical damage

Visual Inspection

MECHANICAL

ELECTRICAL

HYDRAULIC

MECHANICAL	ELECTRICAL	HYDRAULIC
■ Mounting plate and studs/nuts ■ Reluctor ring ■ Brake pedal ■ Brake pedal input rod ■ Wheels and tires ■ Brake calipers ■ Brake pads ■ Brake discs ■ Hydraulic unit ■ Integrated power brake	■ Fuses ■ Warning indicator ■ Wiring harnesses and electrical connectors ■ Wheel speed sensors ■ Steering angle sensor ■ Integrated power brake control module ■ Restraints control module ■ Powertrain control module ■ Brake fluid level sensor ■ Brake pad wear sensors	■ Brake fluid reservoir cap ■ Brake fluid reservoir ■ Brake pipes ■ Brake fluid ■ Hydraulic control unit

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart
5. Check the Jaguar Land Rover (JLR) claims submission system for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and complete the recommendations as required

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
■ Clicking noise noticeable during brake pedal apply /release during normal driving (louder than expected)	■ Valve comfort pulse calibration routine not completed in manufacturing or in service after installing a new integrated power brake	■ Using the Jaguar Land Rover approved diagnostic equipment, check datalogger signal - Valve Comfort Pulse Calibration State (0x211C). This will indicate the modules calibration status ■ Using the Jaguar Land Rover approved diagnostic equipment, perform routine - Calibrate Valve Comfort Pulse (0x3075)

SYMPTOM	POSSIBLE CAUSES	ACTION
Noises from the integrated power brake controller after switching the vehicle off (valve clicks and motor activation)	System self checks may be active within 5 seconds of switching the vehicle off. This energises the brake system to check for correct function and presence of air or brake fluid leaks	No fault, this is normal integrated power brake behavior and can continue for up to approximately 30 seconds after switching the vehicle off
Brake pedal feel is different to normal after switching the vehicle off	System self checks may be active within 5 seconds after switching the car off. This energises the brake system to check for correct function and presence of air or leaks and may lead to modified pedal feel. While the tests are active, pedal feel may change when pressing of the brake pedal is detected (which cancels the tests). After tests are complete, Integrated Power Brake controller may be passive (in Mechanical Backup) and give a different feel to when active	No fault, this is normal behavior and can continue for up to approximately 30 seconds. Pedal feel resumes when system is powered back on. For example, opening/closing door or pressing the ignition switch
Clicking noise heard after holding the car stationary using the brake pedal for extended time	The brake system has a strategy to conserve energy and reduce component wear by holding pressure in the system during near-constant pressure demands above 25 bar for more than 3 minutes. This is achieved by deactivating some valves and the plunger motor. System is reactivated if brake demand increases or decreases	No fault, this is expected system behavior but should not be triggered by the majority of customers
Brake pedal travel is longer than normal	- Air trapped within the hydraulic brake system, or hydraulic brake system fluid leak - Integrated power brake exceeded internal temperature upper threshold and has switched to mechanical back-up mode - Integrated power brake system issues	- Check the brake hydraulic system for leaks and repair as required. Refer to the relevant section of the workshop manual and bleed the hydraulic brake system - Allow the integrated power brake to cool and check for overheating issues, repair as required - Using the Jaguar Land Rover approved diagnostic equipment, check the anti-lock brake system control module for related Diagnostic Trouble Codes and refer to the relevant Diagnostic Trouble Code(s) (DTC) index

SYMPTOM	POSSIBLE CAUSES	ACTION
■ Brake pedal travel is short/firm	■ Brake pedal assembly seized ■ Brake calipers/pads seized ■ Integrated power brake system issues	■ Check for seized brake pedal assembly and repair as required ■ Check for seized brake calipers/pads, repair as required ■ Using the Jaguar Land Rover approved diagnostic equipment, check the anti-lock brake system control module for related Diagnostic Trouble Codes and refer to the relevant DTC index
■ Excessive brake pedal effort required and stability features disabled (Anti-Lock Brake System Control Module (ABS), Dynamic Stability Control (DSC))	■ Integrated power brake in mechanical backup mode	■ Using the Jaguar Land Rover approved diagnostic equipment, check the anti-lock brake system control module for related Diagnostic Trouble Codes and refer to the relevant DTC index

