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2020.0 DEFENDER (LE), 303-04E

FUEL CHARGING AND CONTROLS - INGENIUM I6 3.0 L PETROL (G2400960)

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PRINCIPLES OF OPERATION

For a detailed description of the Fuel Charging and Controls, refer to the relevant Description and Operation section in the workshop manual. REFER to: [Fuel Charging and Controls](#) (303-04E Fuel Charging and Controls - INGENIUM I6 3.0L Petrol, Description and Operation).

INSPECTION AND VERIFICATION

 CAUTIONS:

- Always complete the cleaning process before carrying out any repairs to the fuel injection system components. Failure to follow these instructions may result in foreign matter ingress to the fuel injection system.
- 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:

- If a control module or a component is at fault or may be at fault and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval program is in operation, prior to the installation of a new module/component.
- 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 1 mV or 2 kΩ range can measure 1 Ω. 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 damage and system integrity

Visual Inspection

MECHANICAL	ELECTRICAL
■ Fuel leaks ■ Fuel pipes ■ Fuel contamination/grade/quality ■ High pressure fuel pump	■ Fuses ■ Wiring harnesses and connectors ■ Powertrain control module ■ Fuel injectors

MECHANICAL	ELECTRICAL
Fuel injectors	

- If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
- If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index
- Check 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
Engine cranks but does not fire	- Positive crankcase ventilation system blocked/leaking - Engine management system fault	- Inspect the integrity of the positive crankcase ventilation system. Rectify as necessary - Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index
Engine cranks and fires but will not start	- Evaporative emissions system fault - Engine management system fault	- Refer to the relevant section of the workshop manual and inspect the evaporative emissions system. Rectify as necessary - Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index
Difficult cold start	- Engine coolant level and specific gravity - Battery/charging system fault - Engine management system fault - Evaporative emissions system fault	- Inspect the coolant level and specific gravity. Rectify as necessary - Refer to the relevant section of the workshop manual and inspect the battery and charging system. Rectify as necessary - Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index - Refer to the relevant section of the workshop manual and inspect the evaporative emissions system. Rectify as necessary
Difficult hot start	Fuel injector leaking	Inspect the fuel injectors for leaks. Rectify as necessary

SYMPTOM	POSSIBLE CAUSES	ACTION
	■ Engine management system fault ■ Evaporative emissions system fault	■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Refer to the relevant section of the workshop manual and inspect the evaporative emissions system. Rectify as necessary
Difficult to start after hot soak (vehicle standing, engine off, after engine has reached operating temperature)	■ Fuel injector leaking ■ Engine management system fault ■ Evaporative emissions system fault	■ Inspect the fuel injectors for leaks. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Refer to the relevant section of the workshop manual and inspect the evaporative emissions system. Rectify as necessary
Engine stalls soon after start	■ Positive crankcase ventilation system blocked/leaking ■ Engine management system fault ■ Intake air system leaking/restricted	■ Inspect the integrity of the positive crankcase ventilation system. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Inspect the intake air system for leaks and restrictions. Rectify as necessary
Engine hesitates / poor acceleration	■ Fuel injector leaking ■ Engine management system fault ■ Transmission system fault ■ Intake air system leaking/restricted ■ Accelerator pedal movement restricted (carpet, mats, etc)	■ Inspect the fuel injectors for leaks. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Using the Jaguar Land Rover approved diagnostic equipment, check the transmission control module for related DTCs and refer to the relevant DTC index ■ Inspect the intake air system for leaks and restrictions. Rectify as necessary ■ Check that the accelerator pedal is free from restriction. Rectify as necessary
Engine backfires	■ Intake air system leaking/restricted ■ Engine management system fault	■ Inspect the intake air system for leaks and restrictions. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index
Engine surges	■ Engine management system fault	■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index

Engine detonates/knocks	■ Intake air system leaking/restricted ■ Engine management system fault	■ Inspect the intake air system for leaks and restrictions. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index
No accelerator response	■ Engine management system fault	■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index
Poor accelerator response	■ Positive crankcase ventilation system blocked/leaking ■ Engine management system fault ■ Transmission system fault ■ Intake air system leaking/restricted	■ Inspect the integrity of the positive crankcase ventilation system. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Using the Jaguar Land Rover approved diagnostic equipment, check the transmission control module for related DTCs and refer to the relevant DTC index ■ Inspect the intake air system for leaks and restrictions. Rectify as necessary

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be set on this vehicle, please refer to Section 100-00.
 REFER to: [Diagnostic Trouble Code Index - INGENIUM I6 3.0L Petrol, Vehicles With: MHEV, DTC: Powertrain Control Module \(PCM\) B1087-88 to P0634-00](#) (100-00 General Information, Description and Operation).