

2016.0 RANGE ROVER (LG), 303-14

ELECTRONIC ENGINE CONTROLS - TDV6 3.0L DIESEL

DIAGNOSIS AND TESTING

PRINCIPLES OF OPERATION

For a detailed description of the electronic engine control system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: [Electronic Engine Controls](#) (303-14A Electronic Engine Controls - TDV6 3.0L Diesel, Description and Operation).

INSPECTION AND VERIFICATION

WARNINGS:

- Wait at least 30 seconds after the engine stops before commencing any repair to the high-pressure fuel injection system. Failure to follow this instruction may result in personal injury
- Place the vehicle in a well ventilated, quarantined, area and arrange "No Smoking/Fuel Fumes" signs about the vehicle
- Before any work is carried out on the fuel system, ground the vehicle to earth and maintain the ground connection until the work is complete
- Do not carry out any repairs to the fuel injection system with the engine running. The fuel pressure within the system can be as high as 2000 bar. Failure to follow this instruction may result in personal injury
- Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel related components. Highly flammable vapours are always present and may ignite. Failure to follow these instructions may result in personal injury
- If taken internally do not induce vomiting, seek immediate medical attention. Failure to follow these instructions may result in personal injury
- If fuel contacts the eyes, flush the eyes with cold water or eyewash solution and seek medical attention
- Wash hands thoroughly after handling fuel, as prolonged contact may cause irritation. Should irritation develop, seek medical attention
- This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury

CAUTIONS:

- Diesel fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is therefore essential that absolute cleanliness is observed when working with these components. Always fit blanking plugs to any open orifices or lines
- Always carry out 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
- Do not disconnect an injector wiring connector when the engine is running. The fuel injectors are operated by piezo elements controlled by an electrical signal, they can latch open if disconnected when the engine is running. Failure to observe this caution may result in severe engine damage
- The low pressure fuel system bleeding procedure must be carried out before this procedure is carried out, or the engine is attempted to be started, following removal or replacement of any low pressure fuel system component. Failure to follow this instruction may result in damage to the fuel injection pump
- 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 checked and/or the donor vehicle

NOTES:

- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests
- If the module or a component is suspect and the vehicle remains under the Manufacturer's warranty, refer to the Warranty Policy and Procedure manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component

1. Verify the customer concern.

2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none">▪ Engine oil level▪ Cooling system coolant level▪ Fuel level▪ Fuel contamination/grade/quality▪ Fuel leaks▪ Air ingress into fuel system▪ Fuel filter▪ Front end accessory drive belt▪ Air filter and induction hoses▪ Boost air circuit and intercooler▪ Exhaust system including oxidation catalyst and particulate filter▪ Primary turbocharger vane control linkage	<ul style="list-style-type: none">▪ Battery charge and condition▪ Fuses▪ Wiring harness▪ Electrical connector(s)▪ Sensor(s)▪ Actuator(s)▪ Engine control module▪ Transmission control module

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, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Engine does not crank	<ul style="list-style-type: none"> ▪ Battery discharged/charging fault ▪ Starting system fault/power distribution fault ▪ Security system/immobilizer engaged ▪ Engine control module relay ▪ Transmission control switch ▪ Pedal switch fault ▪ Engine seized/hydraulically locked 	Refer to the owner literature and ensure that the correct start up procedure is being adhered to. Refer to the battery care manual, ensure the vehicle battery is in fully charged and serviceable condition. Check battery cables are correctly connected. Check high current power distribution fusible links are in serviceable condition. Check for DTCs and refer to the relevant DTC index. Check that the security system/immobilizer is disarmed. Check transmission control switch and pedal switches to ensure starter operation is not being inhibited. Check the engine is not seized or hydraulically locked
Engine cranks, but does not start	<ul style="list-style-type: none"> ▪ The common 5 volt sensor power to both crankshaft position sensor and camshaft position sensor is missing ▪ Battery discharged, starter circuit or motor fault ▪ Low/contaminated fuel ▪ Air leakage ▪ Fuel system low pressure circuit fault ▪ Fuel pump module fault 	Check the 5 volt sensor power is present at both crankshaft position sensor and camshaft position sensor. Refer to the battery care manual and the workshop manual, check that the battery is fully charged and serviceable. Check that the cranking speed is within specification. Investigate and repair start and charge faults as required. Check that the fuel level is sufficient and that the fuel is not contaminated. Check the fuel pump module operation, check the fuel system low pressure circuit for leaks/damage/air ingress. Check the fuel filter for water, blockage. Check the fuel volume control valve and fuel pressure control valve. Check the fuel injection high pressure pump. Check the integrity of the air intake system and boost air circuit for correct installation. Check the crankshaft position sensor and circuits. In cold conditions with no

	<ul style="list-style-type: none"> ▪ Blocked fuel filter ▪ Fuel volume control valve blocked/contaminated ▪ Fuel pressure control valve blocked/contaminated ▪ Fuel injection pump failure ▪ Crankshaft position sensor ▪ Engine control module fault 	<p>indications of combustion when cranking, check the glow plug circuits. Refer to the new module/component installation note at the top of the document if an engine control module is suspect</p>
<p>Engine stops, will crank, but will not start, no DTCs logged in the engine control module</p>	<ul style="list-style-type: none"> ▪ The common 5 volt sensor power to both crankshaft position sensor and camshaft position sensor is missing 	<p>Check the 5 volt sensor power is present at both crankshaft position sensor and camshaft position sensor</p>
<p>Difficult to start</p>	<ul style="list-style-type: none"> ▪ Glow plug system fault (cold engine start) ▪ Low/contaminated fuel ▪ Air leakage ▪ Fuel pump module fault ▪ Fuel system low-pressure circuit delivery fault ▪ Blocked fuel filter ▪ Fuel volume control valve blocked/contaminated ▪ Fuel pressure control valve blocked/contaminated ▪ Exhaust gas recirculation valve(s) fault 	<p>If the fault is related to cold starts only, check the glow plugs and associated circuits first. Check the fuel level/possibility of contamination. Check the integrity of the air intake system and for correct installation. Check the fuel pump module operation, check the fuel system low pressure circuit for leaks/damage. Check the fuel filter, fuel volume control valve and fuel pressure control valve. Check the exhaust gas recirculation system valves/actuators</p>

<p>Rough idle</p>	<ul style="list-style-type: none"> ▪ Intake air system fault ▪ Glow plug system fault (cold engine start) ▪ Low/contaminated fuel ▪ Air ingress into fuel system low pressure circuit ▪ Fuel system low-pressure circuit delivery fault ▪ Blocked fuel filter ▪ Fuel volume control valve blocked/contaminated ▪ Fuel pressure control valve blocked/contaminated ▪ Exhaust gas recirculation valve(s) fault ▪ Exhaust gas recirculation electric throttle valve fault 	<p>Check the intake air system for leaks. If the rough idle is from cold, and improves as the engine warms up, check the glow plug system is operating correctly on all cylinders. Check the fuel level/condition. Check the fuel system low pressure circuit for leaks/damage. Check the fuel filter, Fuel volume control valve and fuel pressure control valve. Check the integrity of the air intake system and for correct installation. Check the exhaust gas recirculation system valves/actuators</p>
<p>Lack of power when accelerating</p>	<ul style="list-style-type: none"> ▪ Low fuel level (simulated misfire mode) ▪ Fuel level sender fault ▪ Blocked fuel filter ▪ Low fuel pressure ▪ Blocked air filter ▪ Air intake system fault ▪ Boost air circuit leak or blockage ▪ Restricted exhaust system ▪ Diesel particulate filter blocked/restricted ▪ Exhaust gas 	<p>Check the fuel system for level/contamination/drain water from filter. Validate fuel level sender reading against actual tank contents. Check fuel filter for blockage. Check the fuel pressure. Check the integrity of the air intake system and for correct installation. Check for a blocked diesel particulate filter or catalytic converter, Check the exhaust gas recirculation system. Check the turbochargers for operation including all valves/actuators used to control mono-turbo and bi-turbo mode transitions</p>

	<ul style="list-style-type: none"> recirculation valve(s) fault ▪ Exhaust gas recirculation electric throttle valve fault ▪ Primary fixed geometry turbocharger fault ▪ Secondary variable geometry turbocharger fault ▪ Turbine shut off valve fault ▪ Compressor recirculation valve fault ▪ Compressor shut off valve fault 	
Engine stops/stalls	<ul style="list-style-type: none"> ▪ Fuel level low (in run dry mode) ▪ Fuel level sender fault ▪ Contaminated fuel ▪ Air ingress into fuel system ▪ Fuel system low pressure circuit fault ▪ Fuel volume control valve blocked/contaminated ▪ Fuel pressure control valve blocked/contaminated ▪ High pressure fuel leak ▪ Exhaust gas recirculation valve(s) fault ▪ Exhaust gas recirculation electric throttle valve fault 	<p>Check the fuel level/condition/drain water from filter. Validate fuel level sender reading against actual tank contents. Check the fuel system low pressure circuit for leaks/damage. Check for fuel system leaks, fuel volume control valve and fuel pressure control Valve. Check the exhaust gas recirculation system</p>
Engine	<ul style="list-style-type: none"> ▪ Low fuel level (in 	<p>Check the fuel level/condition/drain water</p>

judders	<p>torque derate mode)</p> <ul style="list-style-type: none"> ▪ Fuel level sender fault ▪ Contaminated fuel ▪ Fuel filter blocked ▪ Air ingress into fuel system ▪ Fuel system low pressure circuit fault ▪ Fuel volume control valve blocked/contaminated ▪ Fuel pressure control valve blocked/contaminated ▪ High pressure fuel leak ▪ Fuel injection pump fault ▪ Injector fault 	<p>from filter and check for blockage. Validate fuel level sender reading against actual tank contents. Check the fuel system low pressure circuit for leaks/damage. Check for fuel system leaks, fuel volume control valve and fuel pressure control valve. Check the fuel injection high pressure pump. Check fuel injector(s)</p>
Excessive fuel consumption	<ul style="list-style-type: none"> ▪ Tire pressures are incorrect ▪ Vehicle brakes are binding/not releasing ▪ Fuel system leak ▪ Fuel system low pressure circuit fault ▪ Fuel volume control valve blocked/contaminated ▪ Fuel pressure control valve blocked/contaminated ▪ Fuel temperature sensor leak ▪ High pressure fuel leak ▪ Injector(s) failure ▪ Exhaust gas recirculation valve(s) fault 	<p>Check and adjust tire pressures. Check brakes are releasing correctly and do not cause excessive drag. Check the fuel system for obvious leaks/damage. Check the fuel volume control valve and fuel pressure control valve. Check for injector DTCs. Check for restricted induction system and air filter. Check the exhaust gas recirculation system including electric throttle plate. Check boost air circuit and intercooler for ineffective cooling or partial blockage. Check for restricted exhaust flow including catalytic converter and diesel particulate filter</p>

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| | <ul style="list-style-type: none">▪ Exhaust gas recirculation electric throttle valve fault | |
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DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.

REFER to: [Diagnostic Trouble Code Index - TDV6 3.0L Diesel - Gen 1.5, DTC: Engine Control Module \(ECM\)](#) (100-00 General Information, Description and Operation).