

Engine Ignition - V8 5.0L Petrol -

Item		Specification		
Firing order		1:2:7:3:4:5:6:8		
Spark plug type		ILKAR6C-10		
Description		Nm	lb-ft	lb-in
Spark plugs		20	15	-
Ignition coil-on-plug retaining bolts		7	-	62

Engine Ignition - V8 5.0L Petrol - Engine Ignition

Description and Operation

COMPONENT LOCATION



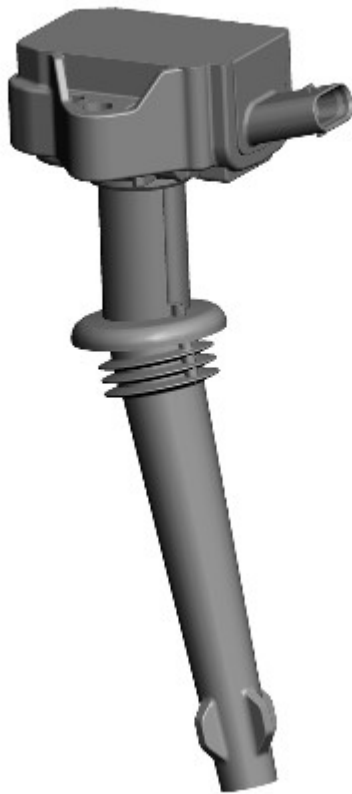
E122131

Item	Part Number	Description
1	-	RFI (radio frequency interference) suppressor
2	-	ECM (engine control module)
3	-	Spark plug (8 off)
4	-	Ignition coil (8 off)

INTRODUCTION

The engine ignition system is a coil-on-plug, single spark system controlled by the [ECM \(engine control module\)](#). An iridium tipped spark plug is installed in each combustion chamber, between the inlet and exhaust valves, and an ignition coil is installed on each spark plug. A RFI (radio frequency interference) suppressor is connected to the power feed to the ignition coils.

IGNITION COILS

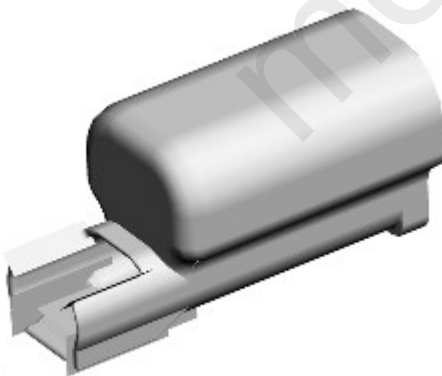


E116147

The ignition coils are installed in the cylinder head covers, under the **NVH (noise, vibration and harshness)** covers. Each ignition coil locates on a spark plug and is secured to the related cylinder head cover with a single screw. Each ignition coil incorporates a three pin electrical connector for connection to the engine harness.

Each ignition coil contains a primary and a secondary winding. The primary winding receives electrical power from the ignition relay in the power distribution box. A power stage in the primary winding allows the **ECM** to interrupt the power supply, to induce a voltage in the secondary winding and thus the spark plug. A diode in the ground side of the secondary winding reduces any undesirable switch-on voltage, to prevent misfiring into the intake manifold. The power stage limits the maximum voltage and current in the primary winding, to protect the power stage and limit the voltage in the secondary winding.

RFI SUPPRESSOR

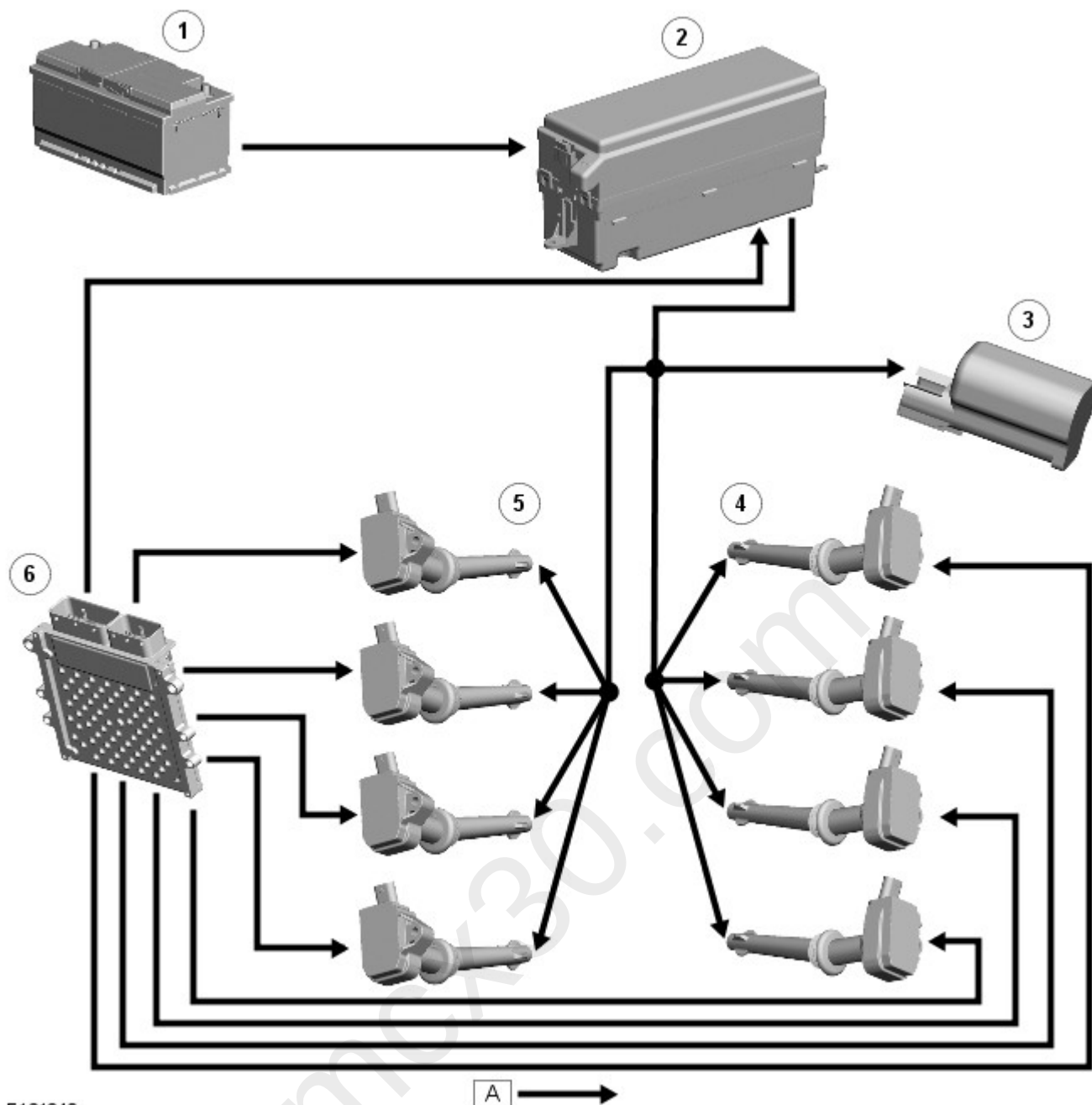


E108416

The RFI (radio frequency interference) suppressor is installed on the engine harness carrier at the rear of the engine.

CONTROL DIAGRAM

- NOTE: A = Hardwired



E121340

Item	Part Number	Description
1	-	Battery
2	-	EJB (engine junction box) (ECM relay)
3	-	RFI suppressor
4	-	LH (left hand) cylinder bank ignition coil (4 off)
5	-	RH (right hand) cylinder bank ignition coil (4 off)
6	-	ECM

OPERATION

The ignition coils are supplied with electrical power from the battery via the [ECM](#) relay in the [EJB](#) (engine junction box). The [ECM](#) controls the operation of the [ECM](#) relay.

The [ECM](#) sends a separate signal to each ignition coil to trigger the power stage switching. The [ECM](#) calculates the dwell time from the battery voltage and engine speed, to ensure a constant energy level is produced in the secondary coil each time the power stage is switched. This ensures sufficient spark energy is available without excessive primary current flow, which avoids overheating and damage to the ignition coils.

The [ECM](#) calculates the ignition timing for individual cylinders from:

- Engine speed
- Camshaft position
- Engine load
- Engine temperature
- The knock control function
- The shift control function
- The idle speed control function.

Engine Ignition - V8 5.0L Petrol - Engine Ignition

Diagnosis and Testing

Principles of Operation

For a detailed description of the engine ignition system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: [Engine Ignition](#) (303-07B Engine Ignition - V8 5.0L Petrol, Description and Operation).

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 checked and/or the donor vehicle.

- **NOTE:** 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 and electrical damage.

Visual Inspection

Mechanical	Electrical
• Engine oil level • Cooling system coolant level • Fuel level • Fuel contamination/grade/quality • Exhaust gas recirculation (EGR) valves	• Fuses • Wiring harness • Loose or corroded electrical connectors • Ignition coils • Sensor(s) • Engine Control Module (ECM) • Transmission Control Module (TCM)

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 cranks, but does not fire	• Engine breather system disconnected/restricted • Ignition system • Fuel system • Electronic engine control	Ensure the engine breather system is free from restriction and is correctly installed. Check for ignition system, fuel system and electronic engine control DTCs and refer to the relevant DTC Index
Engine cranks and fires, but will not start	• Evaporative emissions purge valve • Fuel pump • Spark plugs • HT short to ground (tracking) check rubber boots for cracks/damage • Ignition system	Check for evaporative emissions, fuel system and ignition system related DTCs and refer to the relevant DTC Index
Difficult cold start	• Engine coolant level/anti-freeze content • Battery • Electronic engine controls • Exhaust Gas Recirculation (EGR) valve stuck open • Fuel pump • Purge valve	Check the engine coolant level and condition. Ensure the battery is in a fully charged and serviceable condition. Check for electronic engine controls, engine emissions, fuel system and evaporative emissions system related DTCs and refer to the relevant DTC Index
Difficult hot start	• Injector leak • Electronic engine control • Purge valve • Fuel pump • Ignition system • EGR valve stuck open	Check for injector leak, install new injector as required. Check for electronic engine controls, evaporative emissions, fuel system, ignition system and engine emission system related DTCs and refer to the relevant DTC Index
Difficult to start after hot soak (vehicle standing, engine off, after engine has reached operating temperature)	• Injector leak • Electronic engine control • Purge valve • Fuel pump • Ignition system • EGR valve stuck open	Check for injector leak, install new injector as required. Check for electronic engine controls, evaporative emissions, fuel system, ignition system and engine emission system related DTCs and refer to the relevant DTC Index

Symptom	Possible Causes	Action
Engine stalls soon after start	- Breather system disconnected/restricted - ECM relay - Electronic engine control - Ignition system - Air intake system restricted - Air leakage - Fuel lines	Ensure the engine breather system is free from restriction and is correctly installed. Check for electronic engine control, ignition system and fuel system related DTCs and refer to the relevant DTC Index. Check for blockage in air filter element and air intake system. Check for air leakage in air intake system
Engine hesitates/poor acceleration	- Fuel pressure, fuel pump, fuel lines - Injector leak - Air leakage - Electronic engine control - Throttle motor - Restricted accelerator pedal travel (carpet, etc) - Ignition system - EGR valve stuck open - Transmission malfunction	Check for fuel system related DTCs and refer to the relevant DTC Index. Check for injector leak, install new injector as required. Check for air leakage in air intake system. Ensure accelerator pedal is free from restriction. Check for electronic engine controls, ignition, engine emission system and transmission related DTCs and refer to the relevant DTC Index
Engine backfires	- Fuel pump/lines - Air leakage - Electronic engine controls - Ignition system - Sticking variable camshaft timing (VCT) hub	Check for fuel system failures. Check for air leakage in intake air system. Check for electronic engine controls, ignition system and VCT system related DTCs and refer to the relevant DTC Index
Engine surges	- Fuel pump/lines - Electronic engine controls - Throttle motor - Ignition system	Check for fuel system failures. Check for electronic engine controls, throttle system and ignition system related DTCs and refer to the relevant DTC Index
Engine detonates/knocks	- Fuel pump/lines - Air leakage - Electronic engine controls - Sticking VCT hub	Check for fuel system failures. Check for air leakage in intake air system. Check for electronic engine controls and VCT system related DTCs and refer to the relevant DTC Index
No throttle response	- Electronic engine controls - Throttle motor	Check for electronic engine controls and throttle system related DTCs and refer to the relevant DTC Index
Poor throttle response	- Breather system disconnected/restricted - Electronic engine control - Transmission malfunction - Traction control event - Air leakage	Ensure the engine breather system is free from restriction and is correctly installed. Check for electronic engine controls, transmission and traction control related DTCs and refer to the related DTC Index. Check for air leakage in intake air system

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 \(DTC\) Index - V8 5.0L Petrol, DTC: Engine Control Module \(PCM\)](#) (100-00 General Information, Description and Operation).

Engine Ignition - V8 5.0L Petrol - Ignition Coil-On-Plug

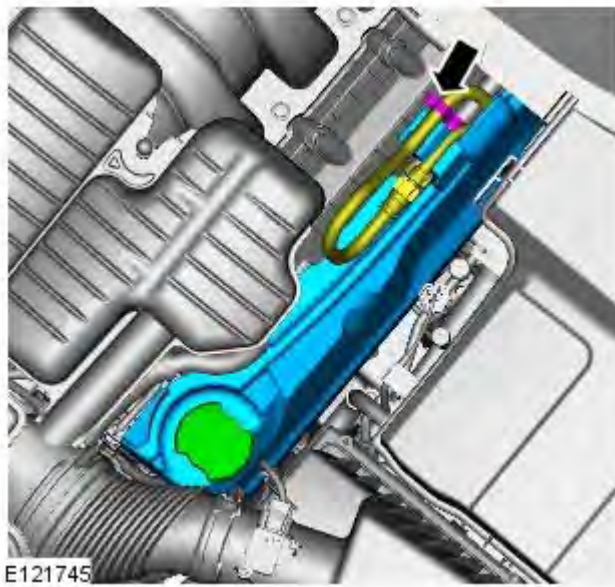
Removal and Installation

Removal

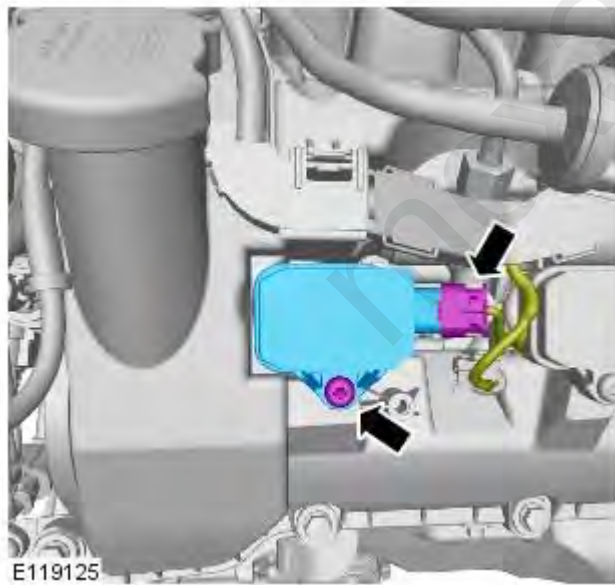
- NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: [Engine Cover - V8 5.0L Petrol](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

2.



3. Torque: 7 Nm



Installation

1. To install, reverse the removal procedure.

Engine Ignition - V8 5.0L Petrol - Spark Plugs

Removal and Installation

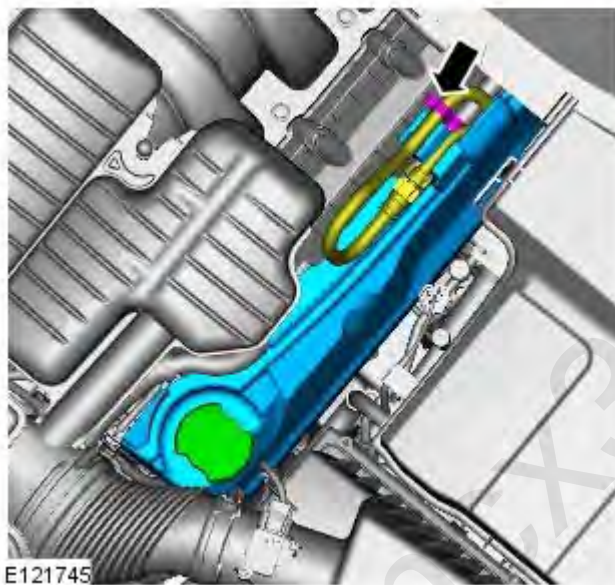
Special Tool(s)

 E115268	303-1450 Spark Plug Remover/Installer
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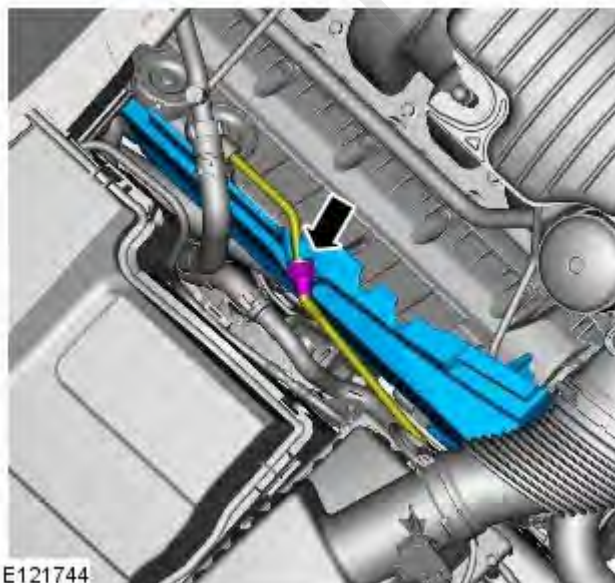
Removal

- NOTE: Removal steps in this procedure may contain installation details.

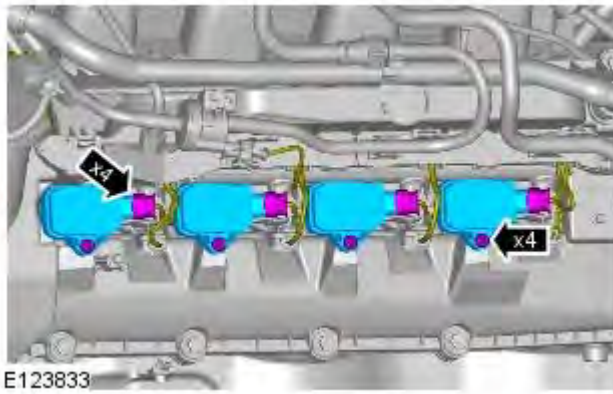
1. Refer to: [Engine Cover - V8 5.0L Petrol](#) (501-05 Interior Trim and Ornammentation, Removal and Installation).



2.

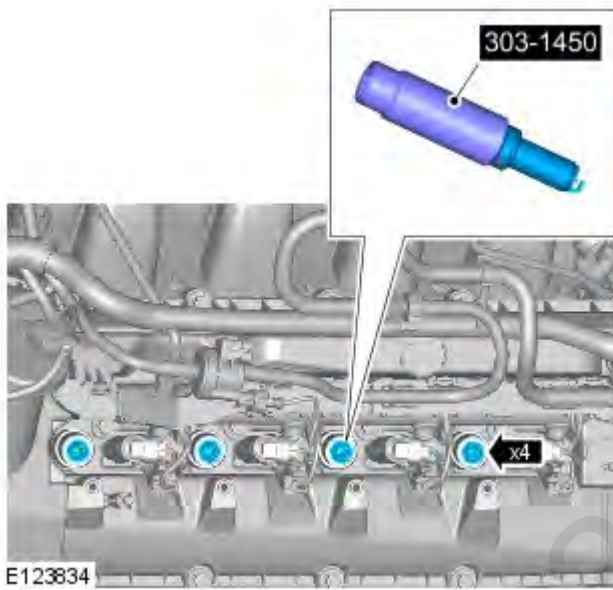


3.



4. **4.** NOTE: Left-hand shown, right-hand similar.

Torque: 7 Nm



5. *Special Tool(s):* [303-1450](#)

Torque: 20 Nm

Installation

1. To install, reverse the removal procedure.