

# TECHNICAL BULLETIN



**MODEL/DERIVATIVE:**  
Discovery Series II (LT)  
Defender (LD)

**Bulletin N°:** 0026  
**CDS. ref:** L8590bu  
**Issue:** 2  
**Date:** 21.08.03

**AFFECTED RANGE:**  
All Td5 diesel derivatives

**RE - ISSUE INFORMATION:**  
**ACTION AND PARTS INFORMATION** amended.

Issue 2 of this bulletin has become necessary due to continuing reports of incorrectly replaced fuel injectors.

***Please destroy your existing copy and replace with this Issue 2.***

**PROBLEM:**  
ENGINE MISFIRE - FUEL INJECTOR DIAGNOSIS

**CAUSE:**  
The need to accurately define the causes of engine misfire so that effective corrective action can be taken and unnecessary replacement of components avoided.

**ACTION:**  
Should a customer express concern regarding the above, follow the procedures detailed to identify the cause of the misfire before replacing the injectors.

## Initial assessment

Run the vehicle to identify a misfire and listen for any unusual sounds from the top end of the engine:

- Engine misfire with no unusual sounds from the top end of the engine; refer to procedure 1 for TestBook/T4 diagnosis.
- Engine misfire with unusual sounds (knock or rattle) from the top end of the engine; refer to procedure 4 for visual mechanical inspection.

### 1. TestBook/T4 diagnosis

a. Connect TestBook/T4 to the vehicle and load disc DRG\*019 or a later version.

**NOTE:** \* Identifier denotes the language qualifier for the local market.

b. Select 'Diesel Engine Diagnostics Td5' (Defender) or 'Diesel Engine' (Discovery II).

- c. Interrogate the Engine Control Module (ECM) for misfire fault codes using 'Fault Code Diagnostics'.
  - If a fault code is identified, carry out checks as prompted by TestBook/T4 to resolve. If an injector fault code is stored or no fault codes are stored, proceed to next step.
- d. Carry out the cylinder balance check under 'Real Time Display, Engine Roughness'. A cylinder displaying a figure greater than  $\pm 15$  rpm on any cylinder indicates a problem with that cylinder. Refer to procedure 2.
  - If the rpm is within specification, there is not an injector or electrical connection fault, further investigation will be required. DO NOT replace the injector.

## **2. Electrical and internal diagnosis with engine acoustic cover and camshaft cover removed**

- a. Remove the camshaft cover. Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Engine - Td5, Gasket - cover - camshaft, repair number 12.29.40.
- b. Using TestBook/T4, carry out a solenoid click test found in 'Sub System Tests' to test fire each injector.
  - If an injector passes the 'click test', refer to procedure 5.
  - If an injector fails the 'click test', disconnect the injector harness connector from the injector. Examine the connector for backed out terminals and ensure that it latches securely to the injector.
  - If the condition of the injector connector is satisfactory, disconnect the injector harness from the engine harness multiplug at the front of the cylinder head. Examine the injector harness connector for evidence of oil migration through the connector pins into the engine harness. If the presence of oil is confirmed, replace the injector harness. Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Harnesses, Harness - Injectors - Diesel, repair number 86.70.22 for repair details.
- c. Carry out a solenoid 'click test'.
  - If the injector now passes the click test carry out the cylinder balance test to confirm any electrical fault has been rectified. Refer to procedure 1.
  - If an injector fails the 'click test', swap over the failed injector with an injector that passed the click test. Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Engine Management System - Td5, Injectors, repair Number 19.60.12. Ensure that the injector grade code is programmed correctly.

**NOTE: Ensure the 'O' ring and washer are retained when removing injector.**

- d. Carry out a solenoid click test.
  - If the injector that originally failed the 'click test' still fails the click test, replace the injector. Refer to procedure 3.
  - If the injector that originally passed the 'click test' now fails the 'click test' further investigation on the electrical system is required. DO NOT replace the injector.

## **3. Replacing single injectors**

- a. Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Engine Management System - Td5, Injectors, repair Number 19.60.12 for injector replacement details. Ensure that the injector grade code is programmed correctly.

**NOTE: Ensure the 'O' ring and washer are retained when removing injector.**

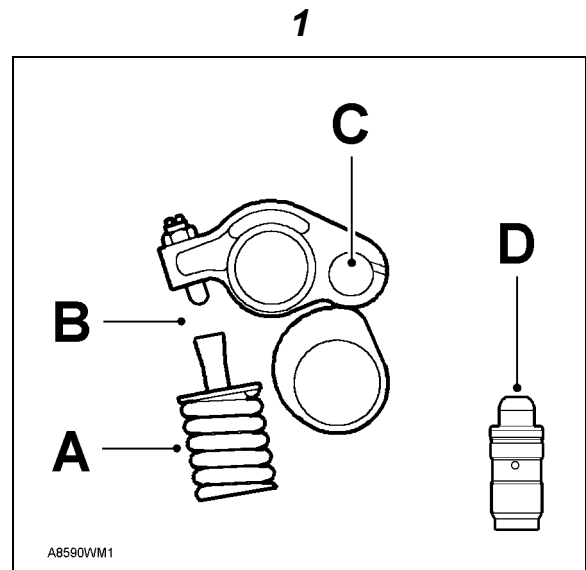
- New injectors are supplied complete with 'O' ring and washer.
- b. Locate new injector with care, ensuring that retainer is located on its dowel. Tighten Torx bolt to 32Nm.

**CAUTION: Ensure the injector unit, mating faces and bores are clean as the fuel system is highly sensitive to contamination.**

- c. Ensure that the new injector grade code is programmed into the ECU using TestBook/T4 under 'Vehicle Maintenance', 'Read / Set Injector grades'.
- d. Carry out a cylinder balance test. Refer to procedure 1.

#### 4. Visual inspection of injector mechanical components

- Examine injectors for broken springs ('A' in illustration 1), or seized injector plungers, i.e., injector plunger seized resulting in a clearance between the rocker arm adjusting screw and the injector plunger ('B' in illustration 1). If there is clearance, ensure the rocker arm adjustment is correct. Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Engine Td5, Rocker Shaft Assembly, repair number 12.29.29 for adjustment details.
- Broken or displaced rocker arm roller pin ('C' in illustration 1).
- Displaced or broken valve follower lash adjusters ('D' in illustration 1).
- Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Td5 Overhaul, repair number 12.29.19.01 for repair details.



#### 5. Injector diagnosis

- a. Swap over the failed injector with an injector that passed the cylinder balance test. Refer to Workshop Manual, part number VDR100090 (8<sup>th</sup> edition), Engine Management System - Td5, Injectors, repair Number 19.60.12. Ensure that the injector grade code is programmed correctly.
- b. Carry out the cylinder balance test. Refer to step 2.
- c. If the injector that originally failed the cylinder balance test still fails the cylinder balance test, replace the injector. Refer to step 4.
- d. If the injector that originally passed the cylinder balance test now fails the cylinder balance test a mechanical fault exists elsewhere. Further investigation is required. **DO NOT** replace the injector.

**NOTE: Ensure the 'O' ring and washer are retained when removing injector.**

**PARTS INFORMATION:**

<b>Part number</b>	<b>Description</b>	<b>VIN applicability</b>
<b>ERR7094</b>	<b>Gasket - camshaft cover</b>	<b>up to 1A736339</b>
<b>LVP000020</b>	<b>Gasket - camshaft cover</b>	<b>from 2A736340</b>
<b>ERR7266</b>	<b>Grommet - sealing</b>	
<b>MSC000030</b>	<b>Fuel injector</b>	
<b>MSC000040</b>	<b>Fuel injector</b>	
<b>MSC100670</b>	<b>Fuel injector</b>	

**NOTE: All five Injectors on the vehicle MUST have the same part number and colour.**

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**WARRANTY CLAIMS:**

**Use Complaint Code: 2P2Z**

**Procedure 1**

**Use S.R.O.: 18.90.89/32 - TestBook/T4 diagnosis - Engine balance check**

**Time allowance: 0.20 Hrs**

**Procedure 1 & 2**

**Use S.R.O.: 18.90.89/33 - TestBook/T4 diagnosis - Engine balance check and click test - includes removing camshaft cover**

**Time allowance: 0.70 Hrs**

**Procedures 1, 2 & 3**

**Use S.R.O.: 18.90.89/34 - TestBook/T4 diagnosis - Engine balance check and click test - includes removing camshaft cover and swapping injectors**

**Discovery Series II**

**Time allowance: 2.00 Hrs**

**Defender**

**Time allowance: 2.20 Hrs**

**Procedure 4**

**Use S.R.O.: 19.60.89/27 - Visual inspection of injector mechanical components - includes removing camshaft cover and adjusting injectors**

**Time allowance: 0.60 Hrs**

**Procedures 1, 2, 3 & 5**

**Use S.R.O.: 19.60.89/28 - TestBook/T4 diagnosis - Engine balance checks and click test - includes removing camshaft cover and swapping injectors**

**Discovery Series II**

**Time allowance: 2.50 Hrs**

**Defender**

**Time allowance: 2.70**

**NOTE: SRO 18.90.89/34 and 19.60.89/28 includes time for renewing an injector, claim SRO 19.60.10/01 - extra each - renew, for every injector changed thereafter.**

**Refer to the Repair Operation Times Manual for the model in question for individual repair times.**

**Any additional work carried out as the result of problems identified during the diagnostic procedure should be claimed in the usual way, referring to the Repair Operation Times Manual for relevant SRO details.**

**Please return discarded parts to Land Rover - UK market only.**

**NOTE: Warranty may be refused on injectors returned with no fault.**

**Direct Dealer Warranty (DDW) 2**

**All DDW 2 users must replace the complaint code with a causal part number until otherwise stated. Labour only claims must show a causal part number with a quantity of zero.**