Technical Service Bulletin

No.JTB00054v2
21 July 2008

Reissue **Please replace the previous edition of this bulletin.**

This bulletin supersedes TSB JTB00054/2007 dated 18 July, which should either be destroyed or clearly marked to show it is no longer valid (e.g. with a line across the page).

Subject/Concern:	Diesel Fuel Pumps Diagnostics

Models:			
X-TYPE			

Markets: All

Section: 310-00

Summary:

This Technical Bulletin has been issued for information only to help diagnose fuel system concerns.**This version has been issued for a change in the diagnostic procedure from step 31 to 35.**

Cause: A high number of incorrectly diagnosed fuel pumps returned under Warranty with no fault found.

Action: Follow the Diagnostic Procedure below to help diagnose fuel system concerns.

Diagnostic Procedure

Procedure 1

1 . Check and make a note (on job card) of all recorded Diagnostic Trouble Codes (DTCs).

CHECK FOR AIR INGRESS IN LOW PRESSURE FUEL SYSTEM

Procedure 2

2 . Remove the engine cover.

1 Remove the oil level indicator and oil filler cap.

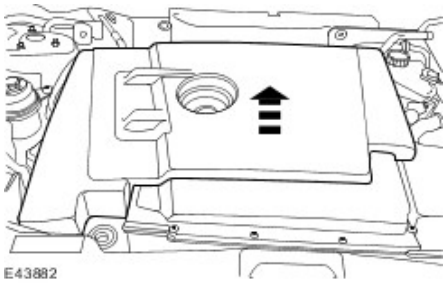
.

2 Remove the engine cover.

.

3 Refit the oil filler cap and oil level indicator.

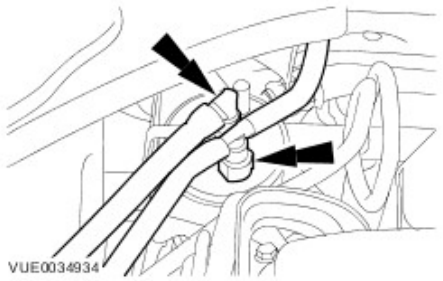
.



3 . Position an absorbent cloth over the generator to collect any diesel spillage.

4 . **CAUTION: Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.**

Disconnect the high-pressure fuel pump supply and return lines from the fuel filter.

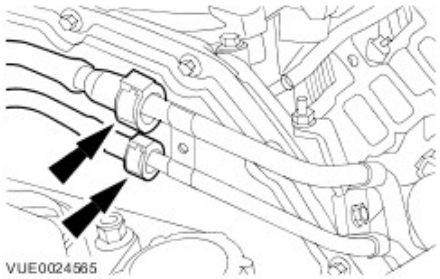


Right-hand side of engine

5 .

CAUTION: Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

Disconnect the high-pressure fuel pump supply and return lines from the high-pressure fuel pump pipes.



6 .

CAUTION: Make sure that the pipe and connections are clean.

NOTE: Make sure that the connections form an air tight seal to prevent inaccurate results.

Connect a suitable length of clear plastic pipe between the fuel filter outlet connection and the high pressure fuel pump inlet pipe.

7 .

CAUTION: Make sure that the pipe and connections are clean.

NOTE: Make sure that the connections form an air tight seal to prevent inaccurate results.

Connect a suitable length of clear plastic pipe between the fuel filter return connection and the high pressure fuel pump return pipe.

8 . Remove the absorbent cloth from the generator.

9 . Start the engine and allow it to idle for two minutes.

10 . With the engine running, inspect the clear plastic pipes for signs of excessive air ingress from the low pressure fuel system.

11 . Stop engine.

12 . Are there signs of excessive air ingress from the low pressure fuel system?

1 Yes: Investigate the low pressure fuel system further i.e. fuel tank and lines.
.

2 No: Complete this procedure and go to procedure 3.
.

13 . Position an absorbent cloth over the generator to collect any diesel spillage.

14 . Remove the clear plastic pipes from between the fuel filter and high pressure fuel pump.

15 . Connect the high-pressure fuel pump return line.

1 Remove the blanking caps.
.

2 Connect the return line to the high-pressure fuel pump return pipe.
.

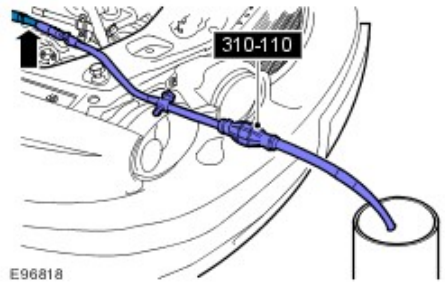
3 Connect the return line to the fuel filter return connection.
.

16 . Connect the high-pressure fuel pump supply line to the fuel filter.
17 . Remove the absorbent cloth from the generator.

CHECK FOR A BLOCKED FUEL FILTER

Procedure 3

18 . Connect the hand primer pump special tool 310-110 to the free end of the high pressure fuel pump supply line.



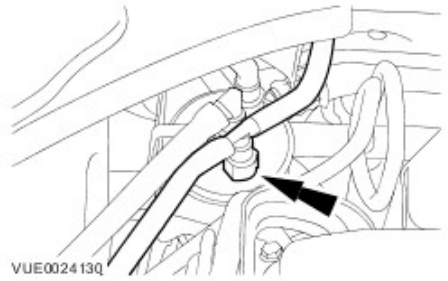
19 . Place the free end of the hand primer pump special tool 310-110 into a suitable clean transparent container.
20 . Operate the hand primer pump special tool 310-110 and monitor the flow of fuel through the filter.
21 . Is there unrestricted fuel flow through the filter?
1 Yes: Complete this procedure and go to procedure 4.
.
2 No: Install a new fuel filter.
.
22 . Disconnect the hand primer pump special tool 310-110 from high pressure fuel pump supply line.
23 . Connect the high-pressure fuel pump supply line to the high-pressure fuel pump supply pipe.
24 . Bleed the fuel system.
1 Start the engine and allow it to idle for one minute.
.
25 . Stop engine.

CHECK FOR CONTAMINATION RESULTING FROM CAM ROLLER/SHOE FAILURE (HP FUEL PUMP)

Procedure 4

26 . Position an absorbent cloth over the generator to collect any diesel spillage.
27 . **CAUTION: Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.**

Disconnect the high-pressure fuel pump return line from the fuel filter.
1 Depress the quick release connector.
.
2 Install a blanking cap to the open port of the fuel filter.
.



28 . Position a clean transparent container under the open union of the high pressure fuel pump return line (at least 0.25 litre capacity).
29 . **NOTE:** If the vehicle is of a non-start condition, this step can be carried out by cranking the engine.

Start the engine and allow it to idle until a fuel sample of approximately 0.25 of a litre has been collected.

30 . Stop engine.

31 . Use a magnet on the underside of the container to draw any magnetic particles into a single deposit.

1 Record the diameter of the deposit :_____ mm.
.

2 Record the colour of the particles collected:_____.
.

32 . **NOTE:** SRO 19.50.10 must be used for the repair time when replacing the high pressure fuel pump, fuel injectors, fuel rail and fuel filter in a combined replacement procedure, which can be referenced in DDW.

Are there any black metallic particles present in the fuel sample from the high pressure pump return line with a deposit diameter of more than 5mm?

1 Yes: Clean the fuel tank and all associating pipe work. Replace the high pressure fuel pump, fuel
. injectors, fuel rail and fuel filter.

2 No: Complete this procedure and go to procedure 5.
.

33 . Remove the blanking cap from the fuel filter return port.

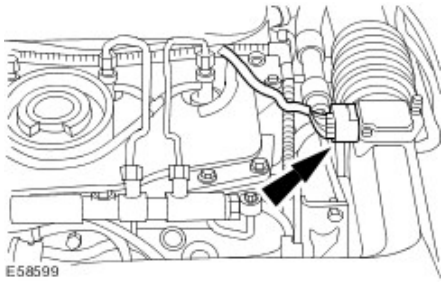
34 . Connect the high-pressure fuel pump return line to the fuel filter.

35 . Remove the absorbent cloth from the generator.

FUEL SYSTEM PRESSURE TEST

Procedure 5

36 . Disconnect the mass air flow (MAF) sensor electrical connector.



37 . Disconnect the intake air temperature (IAT) sensor electrical connectors.

38 . Release the air cleaner cover.

39 . Remove the air cleaner element.

40 . Release the air cleaner housing.

1 Release the two rear grommets.
.

2 Release the two mounting feet.
.

41 . **CAUTION: Take extra care not to damage the intake pipe clipping points on the air cleaner housing.**

NOTE: By rolling the air cleaner housing out, the intake pipe can be released at the bottom and unhooked from the top clipping points.

Roll the air cleaner housing out at the back and disconnect the air cleaner intake pipe.

42 . Release the air cleaner mounting bracket.

1 Remove the three bolts.

.

43 . Disconnect the fuel metering valve electrical connector from the high pressure fuel pump.

44 . **CAUTION: Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.**

NOTE: One fuel return line shown, other fuel return lines are similar.

Disconnect the four fuel injector return lines.

1 Install blanking plugs to the open fuel return lines.

.

45 . **NOTE:** One fuel injector electrical connector shown, other fuel injector electrical connectors are similar.

Disconnect the four fuel injector electrical connectors.

46 . **CAUTION: Leak-back containers / pipes should be clean and empty of fuel.**

Connect special tool 310-129 to the fuel injector return ports.

47 . Using the Jaguar approved diagnostic equipment, monitor the fuel rail pressure.

48 . **CAUTION: Do not crank the engine for more than five seconds or repeat the process more than twice without first bleeding the fuel system. Failure to follow this instruction may result in damage to the fuel pump.**

NOTE: This test is time critical. Use a stopwatch or similar timing device to time this operation, failure to follow this instruction may result in inaccurate readings.

Crank the engine for five seconds.

1 Record the maximum fuel rail pressure:_____Bar.

.

49 . Is the maximum fuel rail pressure greater than 1050 bar?

1 Yes: Go to procedure 6 and check for low leak back values.

.

2 No: Go to procedure 6 and check for high leak back values.

.

CHECK THE INJECTOR RETURN QUANTITIES AFTER THE HIGH PRESSURE TEST

Procedure 6

50 . Raise and invert the leak-back containers above the engine and allow fuel to drain into the clear plastic pipes.

51 . State the length (cm) of fuel in each pipe:

1 Cyl 1:_____cm.

.

2 Cyl 2:_____cm.

.

3 Cyl 3:_____cm.

.

4 Cyl 4:_____cm.

.

52. 1 If any of the pipes contain more than 20cm of fuel replace the corresponding injector and repeat the test.
    2 If any of the pipes contain no fuel and the pump pressure is above 1050 bar replace the corresponding injector and repeat the test.
    3 If the pipes contain up to 20cm of fuel, complete this procedure and go to procedure 6.
53. Disconnect special tool 310-129 from the fuel injector return ports.
54. **CAUTION: Make sure that the electrical connections are clean and free of diesel fuel.**

    Connect the fuel injector electrical connectors.
55. Connect the fuel metering valve electrical connector to the high pressure fuel pump.
56. Secure the air cleaner mounting bracket.
    1 Install the three bolts.
57. **CAUTION: Take extra care not to damage the intake pipe clipping points on the air cleaner housing.**

    Install the air cleaner housing.
    1 Roll the air cleaner housing into place and attach the intake pipe.
    2 Secure the two mounting feet in the grommets.
    3 Secure the two rear grommets.
58. Install the air cleaner element.
59. Install and secure the air cleaner cover.
    1 Connect the vacuum pipe.
60. Connect the intake air temperature (IAT) and mass air flow (MAF) sensor electrical connectors.
61. Turn the ignition key to the 'off' position.

CHECK THE INJECTOR RETURNS QUANTITIES FOR DISCREPANCY AFTER FOUR MINUTES

Procedure 7

62. **CAUTION: Leak-back containers/pipes should be clean and empty of fuel.**

    Empty the leak-back containers from special tool 310-129.
63. Connect special tool 310-129 to the fuel injector return ports.
64. **NOTE:** This test is time critical. Use a stopwatch or similar timing device to time this operation, failure to follow this instruction may result in inaccurate readings.

    Start the engine and allow it to idle for four minutes.
65. Stop engine.
66. Disconnect special tool 310-129 from the fuel injector return ports and allow the fuel to drain into the leak-back containers.
67. State the leak-back volume of fuel for each cylinder:
    1 Cyl 1:_____ml.
    2 Cyl 2:_____ml.
    3 Cyl 3:_____ml.
    4 Cyl 4:_____ml.

.

68 . **NOTE:** Maximum permissible value: The Lowest quantity x 1.4. For example if the lowest measure in a sample was 10ml, (10 x 1.4 =14ml). 14ml would be the maximum permissible value.

Multiply the lowest value by 1.4 and check that none of the other values are greater than this calculated amount (maximum permissible value).

69 . If one or more value is greater than the maximum permissible, use the Jaguar approved diagnostic equipment to input the fuel injector correction values – Test system for normal operation.

70 . Only replace the high pressure fuel pump if the below statements are true:

1 The fuel system pressure test gives a rail pressure of less than 1050 bar after five seconds cranking
. with the fuel metering valve and injectors disconnected.

2 **NOTE:** Only if this statement is true should the high pressure fuel pump, fuel filter, fuel rail and fuel
. injectors be renewed. The fuel tank and all associating pipe work must also be cleaned thoroughly.

There are black metallic particles in the fuel sample from the high pressure fuel pump return line with a deposit diameter greater than 5mm.

3 The fuel injector leak off volumes are not excessive.
.

71 . Connect the four fuel injector return lines to the fuel injectors.

1 Remove the blanking plugs.
.

72 . Install the engine cover.

1 Install the oil filler cap.
.

2 Install the oil level indicator.
.

73 . Clear all stored DTCs.

74 . Disconnect the Jaguar approved diagnostic equipment from the vehicle.