Technical Service Bulletin

No.LTB00078
13 August 2007

This bulletin supersedes TSB LD206-002/2005 dated 13 August, which should either be destroyed or clearly marked to show it is no longer valid (e.g. with a line across the page).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:	Defender - ABS/TC Warning Lamps Illuminated. (Updated to include ABS Modulator Lower-Level Repair)

Models:		
Defender (LD)	1999 on, with ABS	1999 on, with ABS VIN- range: 159810 Onwards

Markets: All

Section: 206-06

Section: 70

Summary:

A customer may report a concern that the anti-lock braking system (ABS) and traction control (TC) warning lamps are illuminated.

NOTE: The ABS Modulator must not be replaced for shuttle valve concerns.

This version has been issued to inform Authorized Repairers that the ABS modulator shuttle valve switches (SVS) and solenoid pack is now available as a serviceable part.

Cause: This bulletin should be used if any of the following diagnostic trouble codes (DTCs) are found to be logged when the ABS control module is interrogated using diagnostic equipment:

- 1.6 - Shuttle valve switch (SVS) long term supervision failure.
- 11.4 - SVS electrical supervision failure

The cause of an SVS failure does not necessarily lie within the modulator. Consequently, the procedure below should be used to diagnose the problem further and ensure that the correct action is taken.

Action: Should a customer express concern regarding the above, refer to the diagnostic and repair procedures detailed in this bulletin.

Parts Required:

Description	Part Number	Quantity
Harness Repair Kit Phase 2	LRT-86-010/1	1
Shuttle valve switch repair kit	SWO500040	1

Labour Time:

Operation Description	Operation No.	Time
Modulator shuttle valve - ABS – renew RHD	70.65.62	4.20 hours
Modulator shuttle valve - ABS – renew LHD	70.65.62	1.10 hours
Shuttle valve switch failure logged - diagnosis procedure	70.90.89/27	0.30 hours

Repair/Claim Coding:

Causal Part:	SRB101552
ACES Condition Code:	42
Defect Code:	

Diagnostic Procedure

A Service optimisation procedure has been introduced for ABS modulators. This procedure enables new shuttle valve switches (SVS) and solenoid pack to be installed to the modulator.

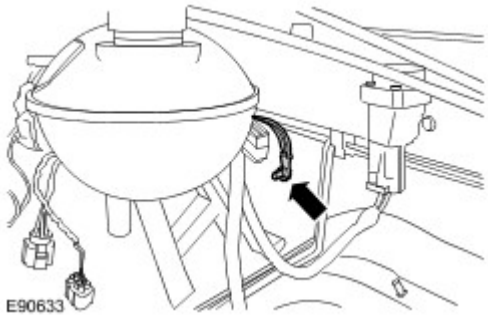
Use this diagnostic procedure to determine whether installing new SVS and solenoid pack is the appropriate remedial action to take. ABS Modulators should not be renewed unnecessarily.

Wiring defects external to the ABS modulator may cause SVS defect codes. Use this diagnostic procedure to determine whether an external wiring defect is the root cause of the problem. Wiring defects may be intermittent due to hidden breaks and poor connections. When checking for wiring defects, always try to provoke intermittent defects by flexing wires while checking. Faulty wires should be repaired and the ABS modulator should not be renewed if the root cause of the problem is a wiring defect.

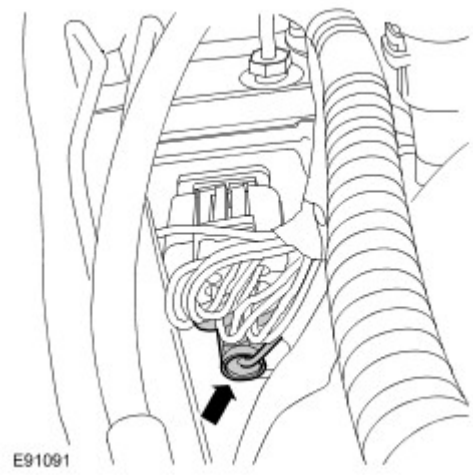
For connector views not detailed in this bulletin, refer to the appropriate Electrical Library.

NOTE: If a defect is confirmed and a rectification carried out, the step/rectification must be retested and then the remainder of the diagnostic procedure should be completed.

1. With the ignition off:
    1. Check that the ground stud connection (C0434 – Illustration E90633) located on the bulkhead is undamaged and free of corrosion.
    2. Ensure that the ground wire eyelet is clamped on to the ground stud.
    3. Check for continuity between the ground stud (C0434) and the connector on the ABS modulator body (C0500 right-hand drive / C1592 left-hand drive – see Illustration E91091 below). If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary.



2. Referenced illustration (see above).

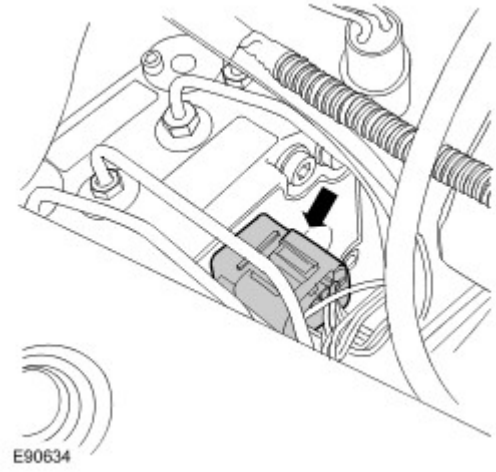


3 .

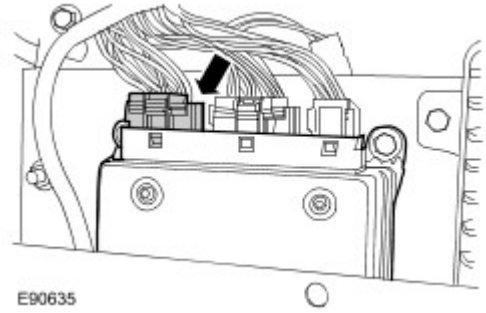
CAUTION: Connector pins must only be removed individually to ensure the pins are returned to their correct position

Disconnect the 13 pin connector at the ABS modulator (right-hand drive = C0501, left-hand drive = C1591 – Graphic E90634) and the 15 pin connector at the ABS control module (C0506 – see Illustration E90635 below) and check for moisture.

1 . If moisture or corrosion is present, clean, dry and repair connectors as necessary.



4 . Referenced illustration (see above).

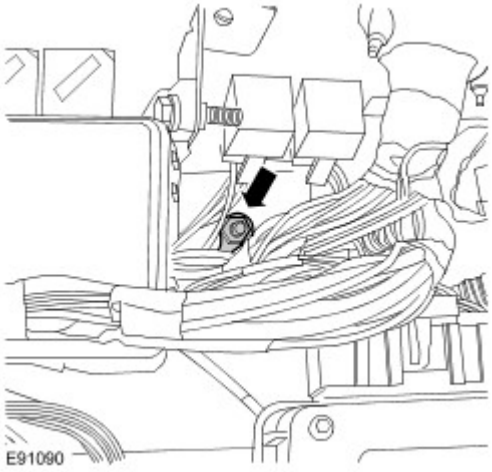


5 . With connectors C1591/C0501 and C0506 disconnected:

1 . Check for continuity between pin 6 of the 15 pin control module connector (C0506), and pin 9 of the 13 pin modulator connector (C0501 or C1591). If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary

2 . Check for continuity between pin 3 of the 15 pin control module connector (C0506) and pin 8 of the 13 pin modulator connector (C0501 or C1591). If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary.

6 . Disconnect the 18 pin control module connector (C0504) and check for continuity between pin 12 and the ground wire connector (C0362 – Graphic E91090)
    1 . If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary.



7 . Reconnect the connectors to the ABS control module and modulator.
8 . If no problem was found, continue to the Service Instruction.
9 . If repairs were completed, clear all logged diagnostic trouble codes, and road test the vehicle.
    1 . If no DTCs return, no further action is required.

Service Instruction

CAUTION: The safety precautions detailed in the Workshop Manual relating to braking systems must be adhered to.

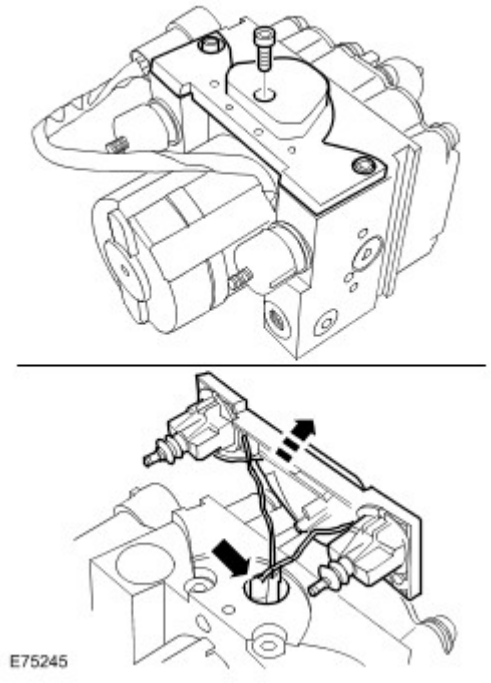
1 . Remove the ABS modulator from the vehicle. For additional information, refer to Global Technical Reference (GTR) Defender Workshop Manual Section 70, Brakes – Modulator Unit – ABS (70.65.49).
    1 . Plug the ABS Modulator hydraulic ports to limit fluid escape and to prevent dirt ingress into the modulator.

CAUTION: This procedure should be carried out in a clean working environment.

NOTE: Before removing the black plastic shuttle valve switches, inspect to see if brake fluid has been dripping from the switch. A small amount of fluid seepage past the hydraulic shuttles is normal, but there should be no fluid dripping from the cover. When the shuttle valve switches are removed there may be a light covering of brake fluid over its inner surface. This is no cause for concern. DO NOT REPLACE THE ABS MODULATOR FOR FLUID LEAKAGE UNLESS THERE IS EVIDENCE THAT FLUID HAS BEEN DRIPPING, OR THE VEHICLE IS IN FOR A FLUID LEAKAGE ISSUE AND THE MODULATOR IS CONFIRMED AS THE SOURCE OF THE LEAKAGE.

2 . The shuttle valve switches are located behind the black plastic cover opposite the hydraulic ports. Remove the black plastic cover:
    1 . Remove the three cap-head bolts holding the cover in place.
    2 . Carefully pull the cover away from the modulator in order to gain access to the SVS connector behind the cover.
    3 . Pull the connector apart and remove the shuttle valve switches and black plastic

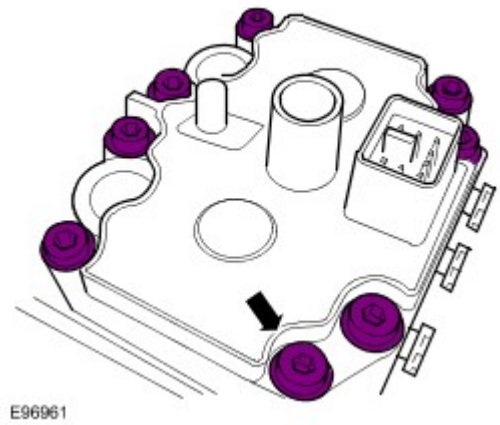
cover as an assembly.



3 .

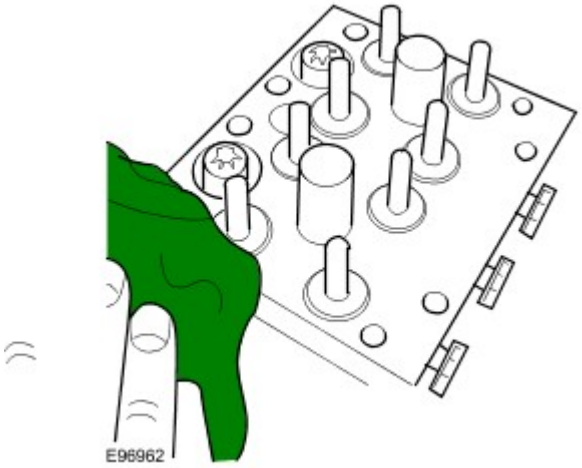
CAUTION: Do not twist the HCU shuttle valve solenoid pack when removing it from HCU.

Remove the eight cap-head bolts holding the electrical module in place. **Do not discard the bolts. They will be needed for reassembly**

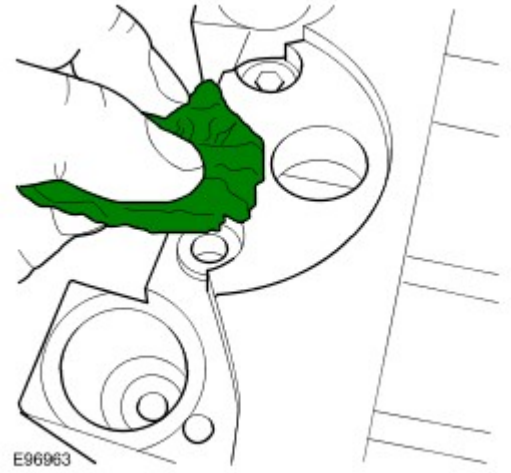


4 . Remove the electrical module by pulling simultaneously on all sides. Keep the electrical module square as it is pulled away from the hydraulic block in order to avoid damage to the underlying solenoid valves.

5 . Carefully wipe clean the area exposed by the removal of the electrical module.



6 . Carefully wipe clean the area exposed by the shuttle valve switch unit. Clean any excess residual thread locking compound from the SVS mounting bolt holes.



7 . **CAUTION: Follow this procedure step by step. The electrical module must be installed before the shuttle valve switches.**

Installation of the electrical module and shuttle valve switches.

1 . Carefully push the electrical module onto the modulator hydraulic block. Take care to keep it square as it is pushed on.

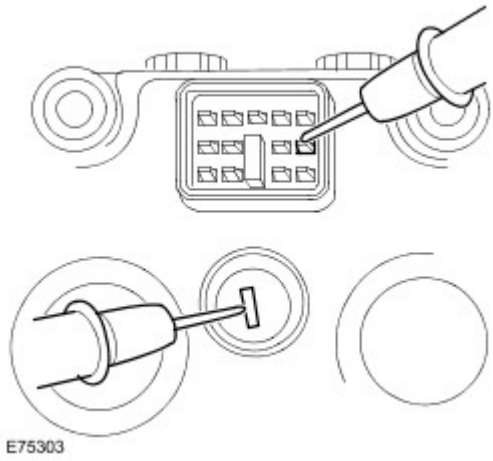
2 . Using a 6mm hexagon torque spanner, secure the electrical module with the original eight cap-head bolts. Tighten these to a torque of 44 Nm (32 lbf/ft).

3 . Install the new shuttle valve switch pack from the service kit. Carefully push the cover into the modulator ensuring that the connector and wires are correctly clipped into the black plastic cover.

4 . Install the three cap-head bolts from the service kit and tighten to 4Nm. (3 lbf/ft)

8 . Confirm the electrical connection between the shuttle valve switches and the electrical module.

1 . Measure the resistance between pin 9 on the 13-pin modulator connector (C0501-9) and the single adjacent modulator ground pin (C0500-1). The resistance value should be 3020 Ohms +/- 30 Ohms.



9 . Install the ABS modulator to the vehicle. For additional information, refer to Global Technical Reference (GTR) Defender Workshop Manual Section 70, Brakes – Modulator Unit – ABS (70.65.49).

10 . Using the Land Rover approved diagnostic system, clear the DTCs and internal memory data from the ABS ECU.