



# TECHNICAL BULLETIN

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<b>CIRCULATE: TO</b>	<b>Service Mgr</b>	<b>Warranty</b>	<b>Workshop</b>	<b>Body Shop</b>	<b>Parts</b>
	X	X	X	X	X

**THIS BULLETIN REPLACES 70/01/06/NAS. NEW SPARE PARTS AND REPAIR PROCEDURES ARE INCORPORATED. NEW INFORMATION IS HIGHLIGHTED.**

**SECTION: 206-06**

## Shuttle Valve Switch Related ABS/TC/HDC Warning Lamp Illumination Troubleshooting

### AFFECTED VEHICLE RANGE:

Discovery Series II (LT)                      VIN: ALL

### CONDITION SUMMARY:

#### WARNING LAMP ILLUMINATION

**Situation:** A customer may report that the anti-lock braking system (ABS), traction control (TC) and hill descent control (HDC) warning lamps are illuminated. This bulletin has been issued to replace 70/01/06/NAS. It includes additional repair options and fault diagnosis information relating to the following Diagnostic Trouble Codes (DTC) if logged when the ABS ECU is interrogated by IDS diagnostic CD "Archive 24":

- 1.6 - Shuttle valve switch (SVS) long term supervision failure
- 11.1 - One sticking SVS
- 11.4 - SVS electrical supervision failure


**Action:** Should a customer express concern regarding illuminated ABS, TC and HDC warning lights, refer to the Diagnostic and Repair Procedure detailed in this bulletin. The cause of an SVS failure warning does not necessarily come from the Modulator. The troubleshooting procedure in this bulletin should be used to diagnose the problem further and ensure that the correct action is taken.

A **service optimization procedure** has been introduced for ABS Modulators that enables new shuttle valve switches and solenoid pack to be installed to the modulator. The Diagnostic Procedure will determine if installing a new SVS is the appropriate repair. ABS Modulators should not be replaced unnecessarily.

 **NOTE: The ABS modulator should not be replaced to address this concern.**

**Wiring faults** external to the ABS modulator may also cause SVS fault codes. The diagnostic procedure will determine if an external wiring problem is the root cause of the symptoms. Wiring faults may be intermittent due to hidden breaks and poor connections. Always try to provoke intermittent faults by flexing wires while checking. Faulty wires should be repaired.

### PARTS:

 **NOTE: This bulletin has been issued to inform Retailers that the ABS Modulator Shuttle Valve Switches (SVS) and Solenoid Pack is now available as a serviceable part.**

**SWO500040 .....Shuttle Valve Switch Service Kit            Qty 1**

### TOOLS:

**LRT-86-010/1.....Harness Repair Kit Phase 2**

### WARRANTY:

**NOTE: The information in Technical Bulletins is intended for use by trained, professional technicians with the knowledge, tools, and equipment required to do the job properly and safely. It informs these technicians of conditions that may occur on some vehicles, or provides information that could assist in proper vehicle service. The procedures should not be performed by "do-it-yourselfers." If you are not a Retailer, do not assume that a condition described affects your vehicle. Contact an authorized Land Rover service facility to determine whether the bulletin applies to a specific vehicle.**

**NOTE:** Repair procedures are under constant review, and therefore times are subject to change; those quoted here must be taken as guidance only. Always refer to DDW to obtain the latest repair time.

DDW requires the use of causal part numbers. Labor only claims must show the causal part number with a quantity of zero.

Description	SRO	Time (Hours)	Condition Code	Causal Part
Diagnostic procedure for logged shuttle valve switch failure	70.90.89/27	0.50	N1	SRB101203
Replace modulator shuttle valve switch and solenoid pack	70.65.62	0.50	N1	SRB101203

*Normal warranty policy and procedures apply.*

## INVESTIGATE FAULT CODES AND REPAIR WIRING AS INDICATED

**NOTE:** Wiring faults may be intermittent due to hidden breaks and poor connections.

- When checking for wiring faults, always try to provoke intermittent faults by flexing wires while checking.
- For connector views not detailed in this bulletin, refer to the appropriate Electrical Library.
- For all electrical repairs refer to the guidelines shown in the Discovery 1999MY Electrical Library LRL0529 (Introduction, Harness Repairs).

**NOTE:** If a fault 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. Position the ignition to the OFF position and perform the following:

- Inspect the ground stud connection C0561 for damage and corrosion. (Figure 1)
- If the ground stud is damaged or corroded clean the eyelet and stud and tighten the nut to 10 Nm (7.5 lbf-ft).
- Check for continuity between the ground stud C0561 and the black wire on the ABS modulator body connector C0500. (Figure 2)
- If there is no continuity, or intermittent continuity when the wire is flexed, repair the damaged wire and ensure the splice is correctly crimped and sealed.

Figure 1

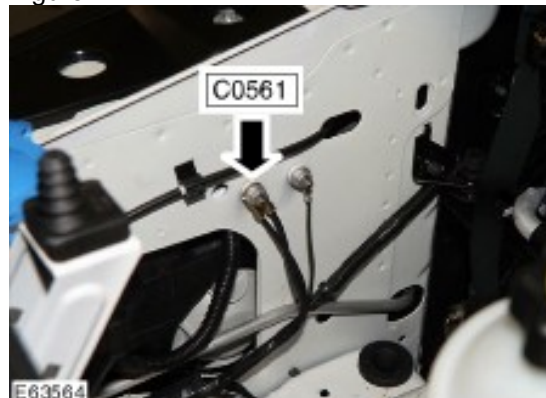


Figure 2



**⚠ CAUTION: Connector pins must only be renewed one at a time to ensure the pins are returned to the correct position.**

2. Disconnect and check the 13-pin connector at the ABS modulator (C0501). (Figure 3)
3. Disconnect the 15-pin connector C0506 at the Self Leveling and Anti-lock Braking (SLABS) ECU. (Figure 4)
4. Inspect both connectors for moisture ingress or corrosion and correct as follows:
  - If moisture or corrosion is present, dry and clean the connectors.
  - Repair corroded connectors as necessary.
5. With connectors C0501 and C0506 disconnected perform the following:
  - Check for continuity between pin 6 of the 15-pin SLABS ECU connector (C0506) and pin 9 of the 13-pin ABS modulator connector (C0501) yellow/green wire.
  - If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary and ensure the wire is correctly crimped and soldered.
  - Check for continuity between pin 3 of the 15-pin SLABS ECU connector (C0506) and pin 8 of the 13-pin ABS modulator connector (C0501) black/slate wire.
  - If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary and ensure the wire is correctly crimped and soldered.
6. Disconnect the 18-pin SLABS ECU connector (C0504).
7. Check for continuity between pin-12 of C0504 and the ground connection located under the left-hand side of the fascia (C0362 – black wire). (Figure 5)
8. If there is no continuity (or intermittent continuity when the wire is flexed), repair as necessary and ensure the wire is correctly crimped and soldered.
9. Connect the connectors to the SLABS ECU and ABS Modulator.
10. If repairs were completed, clear all logged codes using IDS and perform the following:
  - Road test the vehicle.
  - Using IDS, check for fault codes
11. If DTCs have NOT returned, no further action is required.
12. If DTCs are present, perform Modulator Shuttle Valve and Solenoid Pack Replacement section below.

Figure 3



Figure 4



Figure 5



## MODULATOR SHUTTLE VALVE AND SOLENOID PACK REPLACEMENT (NEW INFORMATION)

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

1. If fitted: Release and reposition air intake hose. (Figure 6)
2. Release the brake pipes from the clips on the bulkhead. (Figure 7)
3. Disconnect the two electrical connectors from the ABS modulator. (Figure 8)
4. Remove the three nuts securing the ABS modulator to the mounting bracket. (Figure 9)
5. Reposition the ABS modulator.

**NOTE:** Before removing the black plastic shuttle valve switches an inspection should be made to see if brake fluid has been dripping from the switch.

- A small amount of fluid seepage past the hydraulic shuttles is normal.
- 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.
- **THE ABS MODULATOR SHOULD NOT BE REPLACED FOR FLUID LEAKAGE UNLESS THERE IS EVIDENCE THAT FLUID HAS BEEN DRIPPING, OR THE VEHICLE IS DIAGNOSED FOR A FLUID LEAKAGE ISSUE AND THE MODULATOR IS CONFIRMED AS THE SOURCE OF THE LEAKAGE.**

Figure 6

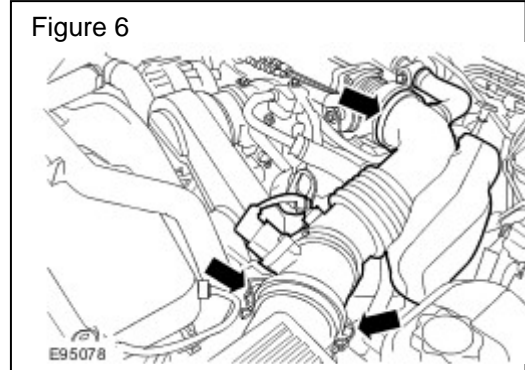


Figure 7

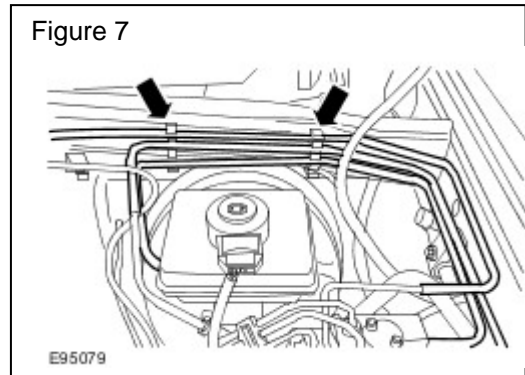


Figure 8

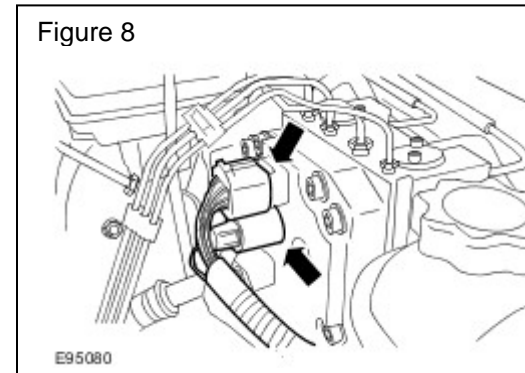
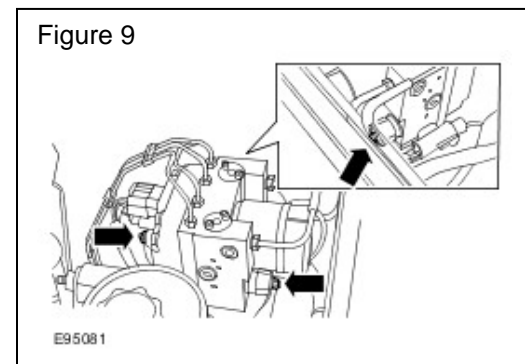


Figure 9





6. With assistance, remove and discard the three bolts securing the ABS modulator shuttle valve switches. (Figure 10)
7. Disconnect the shuttle valve switch electrical connector and remove the shuttle valve switches. (Figure 11)
8. Remove the eight bolts securing the ABS modulator shuttle valve solenoid pack. (Figure 12)

**⚠ CAUTION: The ABS modulator solenoid pack may NOT BE TWISTED when removing from the ABS modulator.**

9. Remove the ABS modulator shuttle valve solenoid pack.
10. Remove rubber mounting from the ABS modulator shuttle valve solenoid pack.

### ABS MODULATOR AND SHUTTLE VALVE PACK INSTALLATION (NEW INFORMATION)

1. Install new rubber mounting to the ABS modulator shuttle valve solenoid pack.
2. Clean the mating faces of the ABS modulator and shuttle valve solenoid pack.
3. Install the new ABS modulator shuttle valve solenoid pack.
4. With assistance, tighten the eight securing bolts to **44 Nm (32 lb.ft)**.

**⚠ NOTE: The wires inside the black plastic shuttle valve switch cover must all be located in the clips provided.**

5. Position shuttle valve switches and connect the electrical connector.
6. Install and tighten the three bolts securing the switches to **4 Nm (3 lbf.ft)**.
7. Position modulator to the mounting bracket, tighten nuts to **9 Nm (7 lbf.ft)**.
8. Connect electrical connectors to the modulator.
9. Secure brake pipes in the clips on the bulkhead.
10. If installed, secure air intake hose.
11. Using the IDS/T4 diagnostic system, clear the DTCs and internal memory data from the ABS ECU.

Figure 10

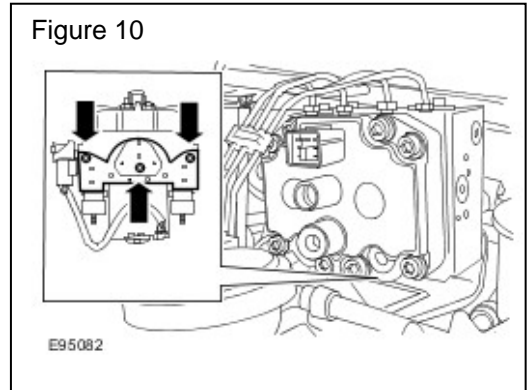


Figure 11

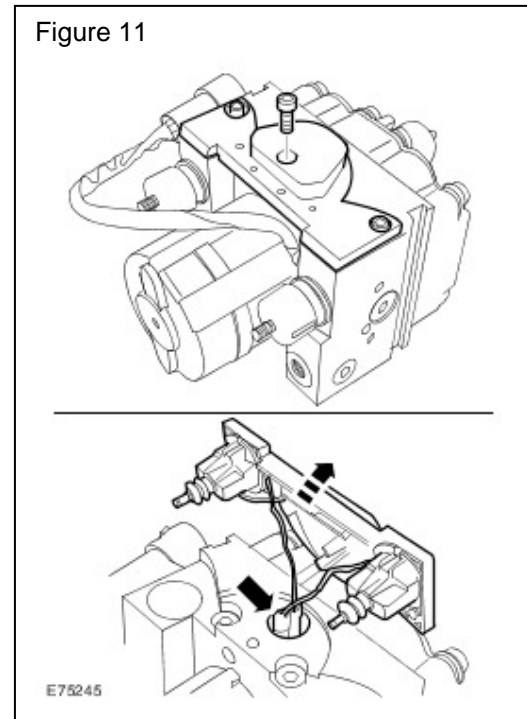


Figure 12

