Technical Service Bulletin

No.LTB00123v4
29 October 2009

Reissue

Please replace the previous edition of this bulletin.

This bulletin supersedes TSB LTB00123v3/2009 dated 10 March , which should either be destroyed or clearly marked to show it is no longer valid (e.g. with a line across the page).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 :	Front Suspension Knock Diagnosis

Models :		
Discovery 3 / LR3		VIN- range : 000360-513325
Discovery 4/LR4 (LA)		VIN- range : 513326 Onwards
Range Rover Sport (LS)	Vehicles Without Dynamic Response Only	Vehicles Without Dynamic Response Only VIN- range : 900290 Onwards

Markets : All

Section : 204-01

Summary :

This Technical Bulletin is for information only to aid in diagnosing a audible knock heard from inside the vehicle when driving along a poorly maintained uneven road surface, e.g. with one wheel driving over a drain cover, with the vehicle driven straight ahead.

This version has been issued for a change in Model, Summary and Diagnostic Procedure.

For vehicles fitted with Dynamic Response, refer to LTB00204v4.

For suspension squeak/creak, refer to LS204-002.

NOTE : This TSB is written in a specific order, the most likely causes of this issue are dealt with first. The most likely causes will also give the biggest benefit if addressed. It is therefore imperative that the steps are followed in order.

Cause : Various; refer to the steps outlined below. **Suggested Customer Concern Code N50.**

Action : If a customer reports a concern of a 'knock' from the front suspension when driving over rough surfaces, refer to the steps outlined in the Diagnostic Procedure below in order.

Repair/Claim Coding :	
Causal Part :	RBK500300
ACES Condition Code :	33
Defect Code :	

Diagnostic Procedure

NOTE : This TSB is written in a specific order, the most likely causes of this issue are dealt with first. The most likely causes will also give the biggest benefit if addressed. It is therefore imperative that the steps are followed in order.

NOTE : Refer to GTR for all torques and ride heights.

NOTE : Replacement of any suspension component which affects suspension geometry must be followed by conducting a four-wheel alignment check following the procedure highlighted in the vehicle workshop manual. (Suspension geometry has been found to contribute to knock).

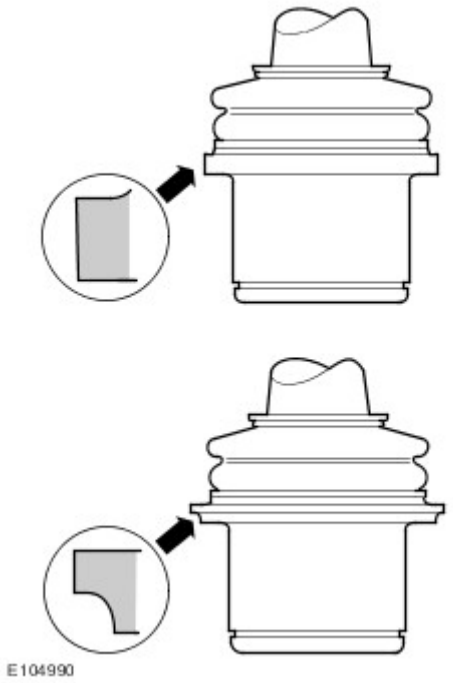
NOTE : VEHICLE TESTING: It is important to identify a test route that highlights the customer concern of suspension knock and re-test the vehicle over the same test route when identified in the following procedure. The test route should include roads that have a broken road surface or drain covers that allows one wheel inputs etc. The vehicle speed that highlights the issue should be noted during the initial appraisal of the customer concern and then replicated on subsequent test drives.

Front Upper and Lower Suspension Arm Ball Joints

1. **NOTE :** If replaced and the new type ball joint is found to be loose within its location in the lower suspension arm, then replacement of the lower suspension arm is required.

   Check that the latest lower suspension arm ball joint design is fitted to the vehicle. The new type of joint has a radius on the edge of the mating face. See bottom image on Fig. E104990.

   1. If the earlier type of ball joint is fitted replace with the new type. If the new type is fitted continue to step 2.



Non Air Suspension Vehicles Only

2. **NOTE :** If free play is found and the lower ball joint has been changed for the new style then replace the upper suspension arm ball joint only.

   NOTE : If the lower suspension arm ball joint has been replaced and on fitment it is found to be loose within its location in the lower suspension arm, then replacement of the lower suspension arm assembly is required.

   Check for ball joint free play.

1 . Lift the vehicle so that front wheels are clear of the ground/ramp to enable. Check the lower ball joints for free play by holding the tyre at the 12 and 6 o'clock positions and apply a rocking motion whilst feeling for any small knocking movements through the tire.

2 . If any free play is noted in the ball joints, replacement is required. Changing in pairs is not required.

Air Suspension Vehicles Only

3 . Lower air suspension to 'Access' height.

4 . Raise vehicle on a suitable two poster ramp (see Global Technical Reference GTR Workshop Manual, section 100-02 - Lifting).

5 . Remove road wheel assembly.

1 . For raod wheel nut tightning torque (see Global Technical Reference GTR Workshop Manual, section 204-04 - Specifications).

6 . Remove suspension spring/damper lower mounting bolt completely.

7 . **NOTE :** This puts the balljoint ballpin in the same attitude and orientation as when the car is levelled. Raising the lower arm lifts the balljoint and the mass of the hub and knuckle etc extends the balljoint fully.

Using a hydraulic telescopic jack (for example, a transmission stand), raise the lower arm until the distance from the centre of the wheel hub to the wheelarch is 455mm.

8 . Locate a suitable bar on the top of the hydraulic stand and bring to bear against the bottom of the ball joint ballpin thread.
   1 . It is now possible to lift the bar and any axial play present in the ball joint will be immediately apparent.
   2 . It may be necessary to lift/lower the ballpin several times to displace grease present inside the ball joint.

9 . If free play is found in the lower ball joint, replace the lower ball joint and carry on from step 10. If no play in the lower ball joint, carry on from step 10.

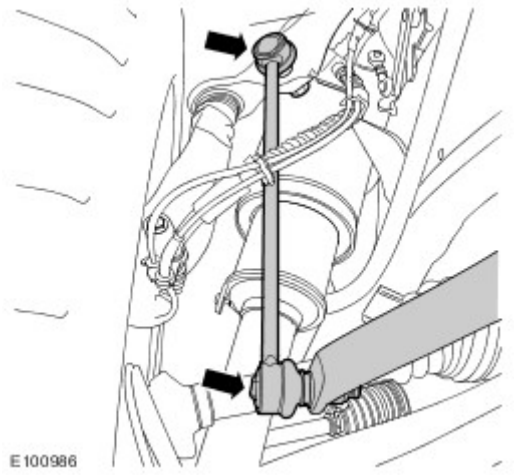
10 . To install the suspension spring / damper lower mounting bolt, reverse removal procedure

All Vehicles

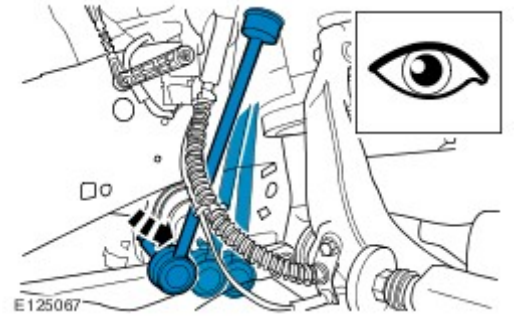
11 . If the front upper and lower suspension arm ball joints or lower suspension arm assemblies have been replaced, retest the vehicle on the identified rough road test route to check for other knocks. If knocks are still evident continue to step 12.

Stabilizer Links

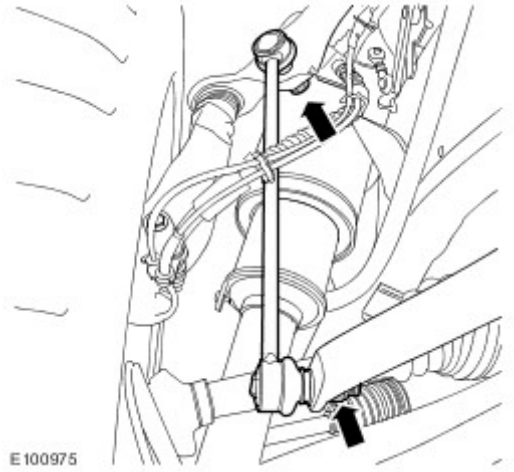
12 . Undo the lower fixings of the stabilizer links and detach the joints from the ends of the stabilizer bar. With the lower joints detached, check the stabilizer bar link joints.



13 . The lower detached end joint should be checked for free play by hand, the upper joint should be checked by raising the link and letting go, if the link falls under its own weight then the upper joint may have free play. Replace if required keeping the lower joint detached, continue to step 14.



14 . Undo the stabilizer bar link upper fixing by one complete turn and then re-tighten to the correct torque. Conduct check to other side of the vehicle.



15 . Check the clamping face of the lower link on stabilizer bar for surface flatness or weld spatter and remove these if necessary. Repeat on the other side of the vehicle.

16 . Re-fit the lower stabilizer links fixings and tighten to the correct torque.

17 . **NOTE :** The engine under shield is structural and must be fitted prior to road testing the vehicle.

Install engine under shield (see Global Technical Reference GTR Workshop Manual, section 501-02).

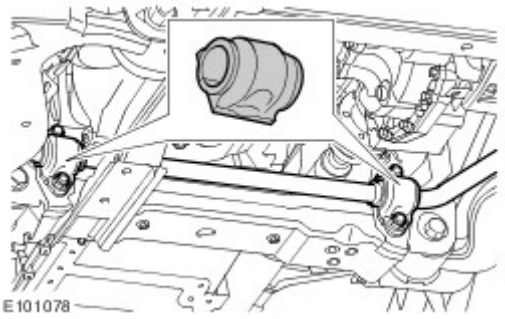
18 . Retest the vehicle on the identified rough road test route to check for other knocks. If knocks are still evident continue to step 19.

19 . Remove engine undershield (see Global Technical Reference GTR Workshop Manual, section 501-02).

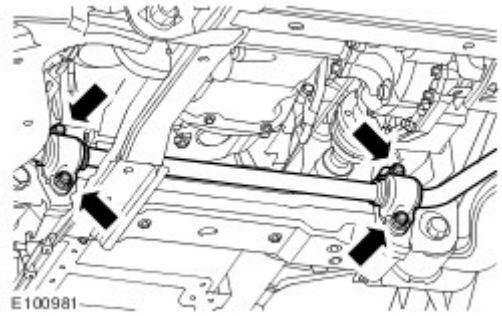
20 . Visually check stabilizer bar bushings for cracks/splits and any free play whilst in position.

1 . If bushes are OK then continue to step 21.

2 . If bush replacement is required or any free play is noticed then refer to bulletin LTB00167 for fitment rules, then continue to step 22.

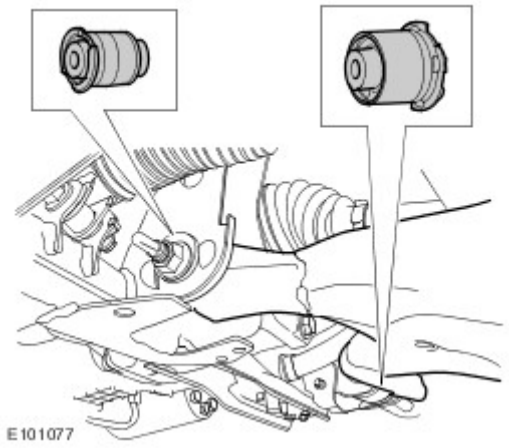


21 . Undo the stabilizer bar clamp fixings by one complete turn and then re-tighten to the correct torque.

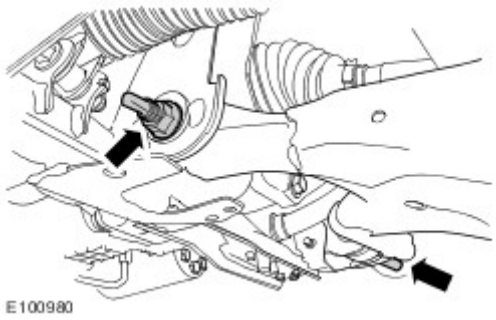


Front lower control arm bushes

22 . Check the front lower wishbone bushings for cracks/splits or evidence of fluid leakage from the hydro-bush. Replace as necessary.

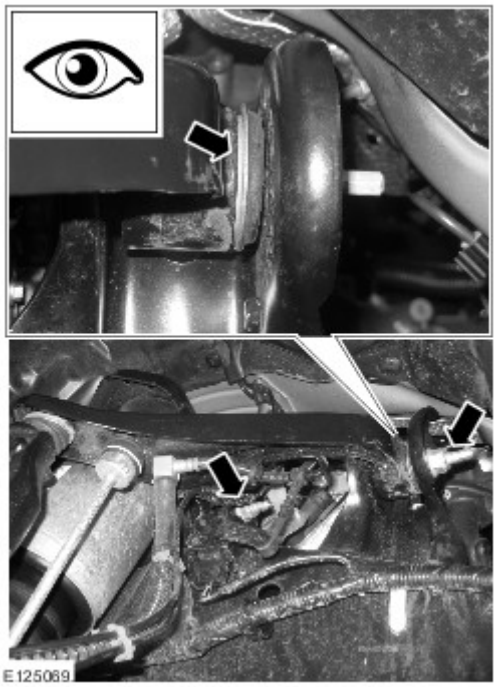


23 . Check torque of front lower wishbone forward and rear bushing fixings (if torque-tightening is necessary this must be carried out at the correct ride height to prevent pre-loading of bushings).

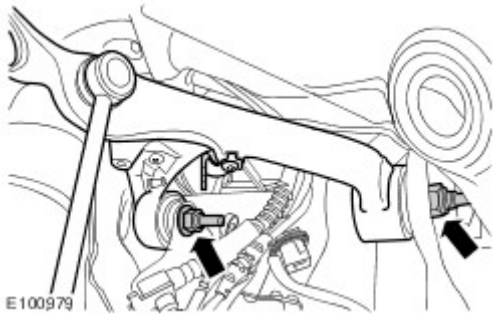


Front upper control arm bushes.

24 . Check the front upper suspension arm bushings for cracks/splits. Replace as necessary.

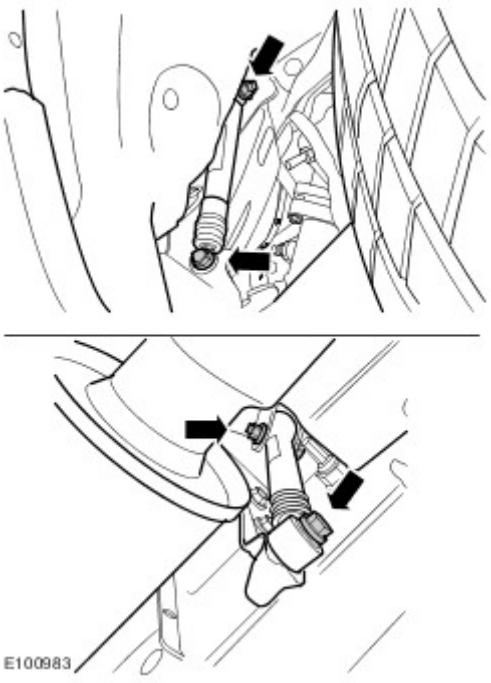


25 . Check torque of front upper suspension arm forward and rear bushing fixings (if torque-tightening is necessary this must be carried out at the correct ride height to prevent pre-loading of bushings).



Body Mount Dampers (Range Rover Sport)

26 . On Range Rover Sport, check torque of front and rear body mount damper fixings.



27 . **NOTE :** The engine under shield is structural and must be fitted prior to road testing the vehicle.

Install engine under shield (see Global Technical Reference GTR Workshop Manual, section 501-02).

28 . If any bushings have required replacement or a re-torque has been required then retest the vehicle on the identified rough road test route to check for other knocks. If knocks are still evident continue to step 29.

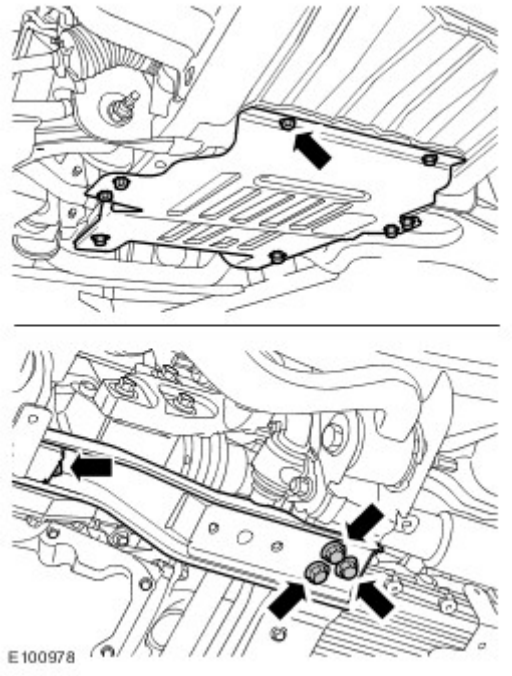
29 . Remove both rear body mount dampers and retest vehicle to check if noise is eliminated. If so, replace dampers as appropriate. Remove both front body mount dampers and retest vehicle to check if noise is eliminated. If so, replace dampers as appropriate.

General Ramp Check - Front Suspension

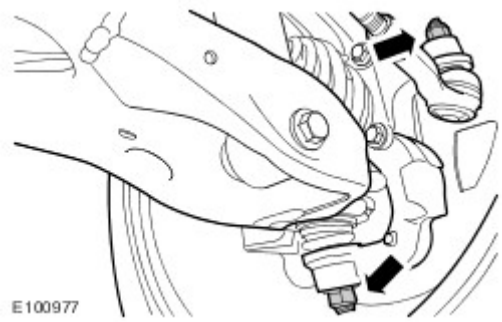
30 . Remove engine undershield (see Global Technical Reference GTR Workshop Manual, section 501-02).

31 . **NOTE :** Check the Torque of the four arrowed fixings in the lower part of E100978 only.

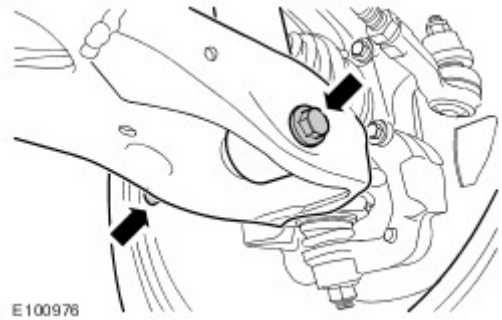
Check torque of front differential cross member fixings.



32 . Check torques of control lower arm ball joint nuts and steering gear tie rod end nuts.



33 . Check torque of damper lower fixing on vehicles without air suspension and bushings on all derivatives.



34 . **NOTE :** The engine under shield is structural and must be fitted prior to road testing the vehicle.

Install engine under shield (see Global Technical Reference GTR Workshop Manual, section 501-02).

35 . If any torque-tightening is necessary from steps 30, 31 and 32, retest the vehicle

on a rough road to check for other knocks. If knocks are still evident continue to step 36.

36 . If the noise is still evident, and all previous checks described are verified, this suggests another failure mode; contact Dealer Technical Support.