

TECHNICAL INFORMATION

RECALL ACE System Pipe Leak



No: D203
Ref:
Issue: 2
Date: 02/29/00

AFFECTED VEHICLE RANGE:

Discovery Series II (LT)

YA228484 to YA258264



NOTE: The vehicle VIN range includes vehicles that are *not* equipped with ACE and vehicles that may have been repaired prior to the campaign.

SITUATION:

RECALL - LEAKING HIGH-PRESSURE ACE SYSTEM PIPE

The high-pressure hydraulic pipe that runs from the ACE pump (fixed to the left-hand side of the engine) to the ACE valve block may fracture at its union with the pump. This will result in a loss of hydraulic fluid. Depending upon the severity of the hydraulic fluid leak, the ACE warning lamp in the instrument cluster will illuminate either AMBER, without audible warning, or RED, accompanied by an audible warning. This is to indicate that the vehicle should be stopped as soon as possible and the engine switched off.

RESOLUTION:

REPLACE ACE HIGH PRESSURE PIPE

All Discovery Series II vehicles equipped with ACE within the affected VIN range are to be inspected and where indicated the vehicle is to have the high-pressure pipe replaced with new piping built to a different specification.

All affected vehicles currently held in retailer inventory as new or used vehicles must be repaired prior to sale.

PARTS INFORMATION:

LRN0002LABEL	Campaign Label	Qty 1 (Note: 100 pack when ordering)
RQB100250K	High pressure pipe – Front	Qty 1
RQB100260K	High pressure pipe - Rear	Qty 1
ANR6703K	Isolator 4 way	Qty 1
ANR6704K	Isolator 2 way	Qty 1
ANR6700K	Collet	Qty 1
RYF100420	Sealing washers – pump	Qty 2
LRN2261	Cold climate PAS fluid	Quantity as required (Note: 12 pack) 1 pint included in Material Allowance

Locally Sourced:

- Super Glue
- Included in Material Allowance.

WARRANTY CLAIMS:



NOTE: The vehicle VIN range includes vehicles that are *not* equipped with ACE and vehicles that may have been repaired prior to the campaign. In order to determine if a specific vehicle is affected by this campaign, it will be necessary to utilize the Vehicle Warranty/Recall Search function of the Land Rover Link OnLine DCS and to inspect the vehicle for correct repair components. Based on the response of the system and the inspection, perform either the corrective action and apply the campaign label or apply the campaign label to the vehicle and take no further action.

TIB	CIRCULATE:	Service Mgr	Warranty	Workshop	Body Shop	Parts
D203	TO	X	X	X	X	X



D203 Option 1 Time 0.15 hrs.

Inspect vehicle to determine if correct specification ACE high-pressure line is installed and apply campaign label.

Material allowance for campaign label \$0.50

D203 Option 2 Time 2.00 hrs.

Inspect and replace ACE high-pressure line between pump and distribution block on ACE-equipped vehicles. Apply campaign label.

Material allowance for fluid, supplies and campaign label \$8.00

Normal warranty policy and procedures apply

REPAIR PROCEDURE

INSPECT VEHICLE

1. Open the hood and inspect for the presence of ACE pump and associated components.

2. **Inspect ACE system for the following:**

- Refer to Figure 1. If an attenuator is installed a few inches downstream of the pump banjo fitting of the high-pressure pipe and a second attenuator is located under the foam protection sleeve, go to Step 3 below.

- Refer to Figure 1. If only a single attenuator is installed downstream of the pump banjo fitting of the high-pressure pipe, **the incorrect pipe configuration is installed and must be replaced following the repair steps below.**

- If any "temporary" or "emergency" repairs have been performed on the high-pressure pipe, **the piping must be replaced** following the repair steps below.

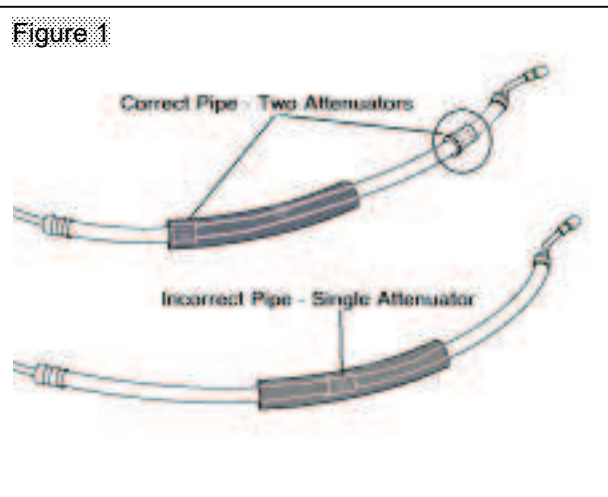
3. **If the vehicle is equipped with the correct ACE system high-pressure pipe, apply the campaign label and Claim Option 1. No further action is required**

REMOVE FACTORY INSTALLED OR "REPAIRED" PIPE



CAUTION: The ACE system is extremely sensitive to dirt and debris.

- **All surfaces and components must be thoroughly cleaned before opening the system. Use a pressure washer to clean the entire length of the lines. Wait for the vehicle to dry before starting the repair.**
 - **To avoid system contamination when installing the new pipes the protective end caps must remain in place at all times until the connection is made.**
1. Drive the vehicle onto a lift. Place the transmission in Park, set the handbrake and ensure that the ignition is off.
 2. Raise the vehicle on the lift.
 3. Remove the right front wheel.
 4. Lower the chassis onto a support, allowing the right front hub to travel down to the full rebound position.





5. Remove the radiator under belly tray by removing the 5 screws.
6. Remove the front mud flap for ease of access.

NOTE: The forward splash shield screw cannot be accessed unless the suspension is fully extended.

7. Remove the splash shield in the right front wheel housing by removing the three screws, and removing it from the engine bay. (Figure 2)

CAUTION: Pipe mounting brackets must be marked for orientation to permit installation in the same position at the completion of the repair.

8. Remove the 2 way isolator and bracket from the chassis cross member below the radiator.
9. Remove the two 13mm keeper-plate-securing nuts from the front of the valve block located on the right chassis side member.

CAUTION: It is very important that the four pipes remain in the valve block while the keeper plate is loosened and moved back along the pipes.

NOTE: If the pipe identification sleeve is positioned behind the tangs, you will not be able to squeeze the collet tangs together.

10. If any of the identification sleeves are found behind the tangs, slide them along the pipes away from the valve block.
11. Using needle-nosed pliers squeeze the collet tangs on all four pipes (Figure 3) and gently pry the keeper plate 5mm (3/16 in.) away from the valve block.

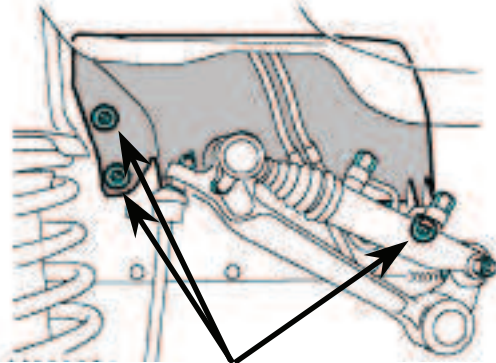
NOTE: The bottom pipe in the keeper plate is identified with the letter "P" on the identification sleeve. The letter "P" is also stamped on the face of the keeper plate in the bottom location.

12. Slide the keeper plate away from the valve block.

NOTE: With the collet removed from the "P" pipe, that pipe can later be removed from the valve block without further disassembly.

13. Remove and discard the collet on the "P" labeled pipe. (Figure 4)

Figure 2



Splash Shield Fasteners

Figure 3

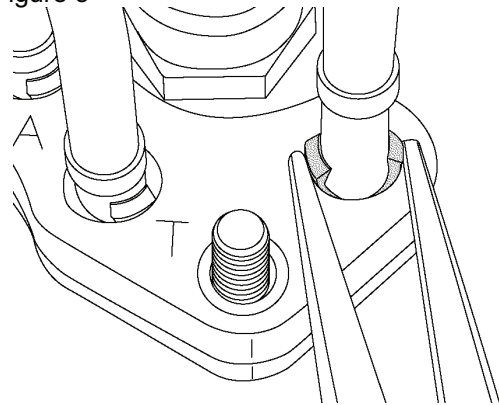
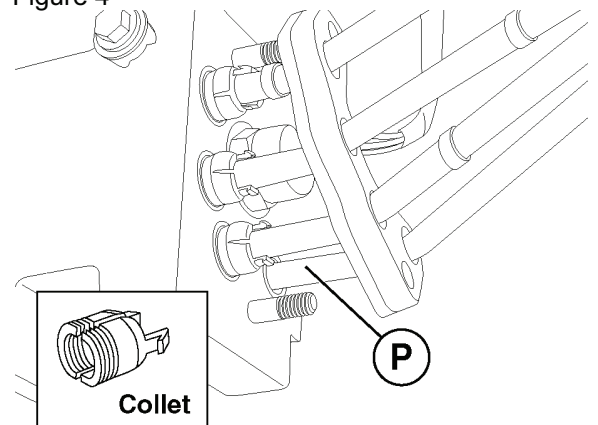


Figure 4





CAUTION: It is important to temporarily secure the keeper plate during pipe removal to avoid leakage and to remove the possibility that a pipe might disengage from the valve block.

14. Reposition the keeper plate onto the valve block and secure finger tight with the two 13mm nuts previously removed.
15. Cut away the glued 2-way isolator supporting the rigid pipes in front of the shock tower and discard.



NOTE: All removed brackets must be marked for orientation to ensure that they are installed in the same position during assembly.

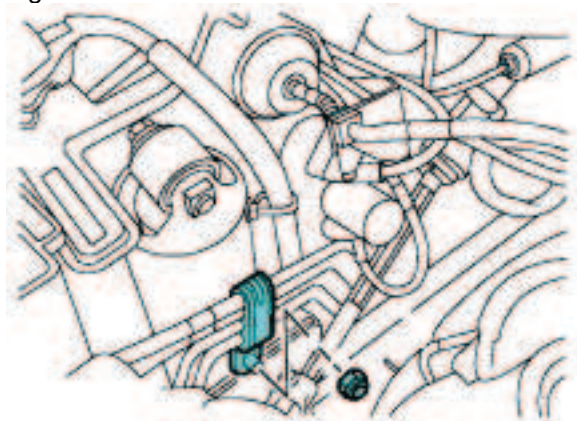
16. From inside the engine compartment remove the 4-way isolator and bracket from the shock absorber tower. (Figure 5)
17. Locate and remove the 4-way isolator inside the right front wheel housing. (Figure 6)
18. Locate the 4-way isolator above the chassis outrigger. (Figure 7)



NOTE: The outrigger isolator is glued to the pipes.

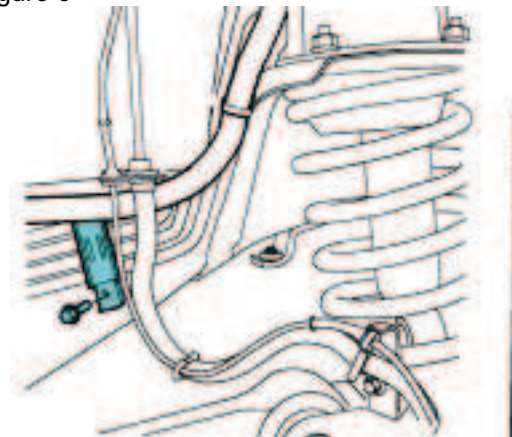
- Only the "P" pipe is to be cut free from the 4-way isolator.
 - The "P" pipe is the second pipe in from the outside of the vehicle.
 - Cutting the isolator as described will permit removal of the "P" pipe in a following step.
19. Using a razor blade knife, make two cuts completely through the outrigger isolator, one on each side of the "P" pipe. (Figure 7)

Figure 5



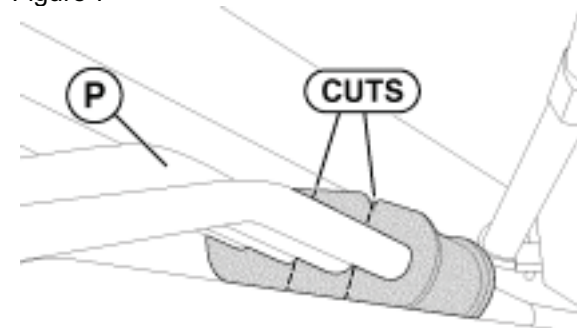
Engine Compartment 4-way

Figure 6



Wheel Housing 4-way

Figure 7





20. Insure that the correct pipe, labeled "P" at the valve block and second from **the bottom** at the shock tower, is selected for the next step.



CAUTION: An appropriate cutting tool must be used to cut the high-pressure pipe. Care must be taken to ensure that no -contamination enters the system and that no damage is done to any surrounding component.

21. Cut the high-pressure "P" pipe behind the shock tower. (Figure 8)
22. Promptly bend the cut pipes downward to prevent debris from flowing into the system.
23. Cut the "P" pipe a second time in front of the shock tower (Figure 9).
24. Remove and discard the section of pipe between the two cuts.



CAUTION: Care must be exercised to ensure that the "A" "B" and "T" pipes remain engaged in the valve block. The keeper plate on the valve block must remain in position. It should not be loosened to aid in the removal of the "P" pipe.



NOTE: The "P" pipe will need to be pulled and twisted in order to free it from the cut 4-way isolator above the chassis outrigger.

25. Remove and discard the section of "P" pipe that is still connected to the valve block.
26. Remove the 19mm banjo bolt and disconnect the pipe from the pump. (Figure 10)
27. Discard the two seals from the banjo bolt.
28. Remove the flexible section of pipe from the vehicle and discard.

Figure 8

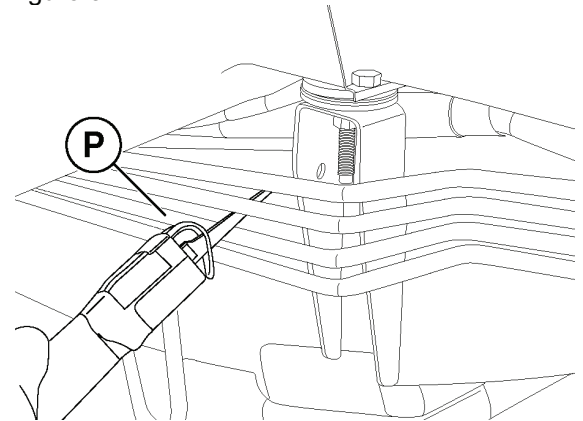


Figure 9

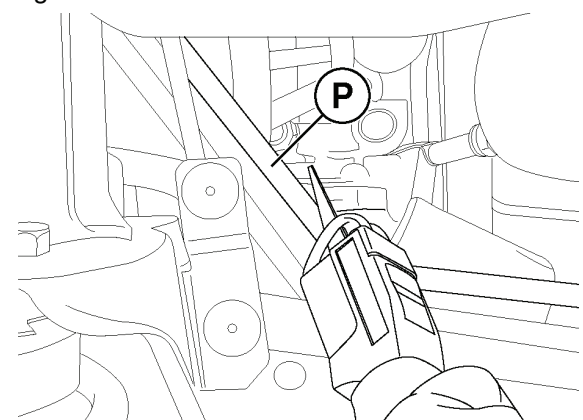
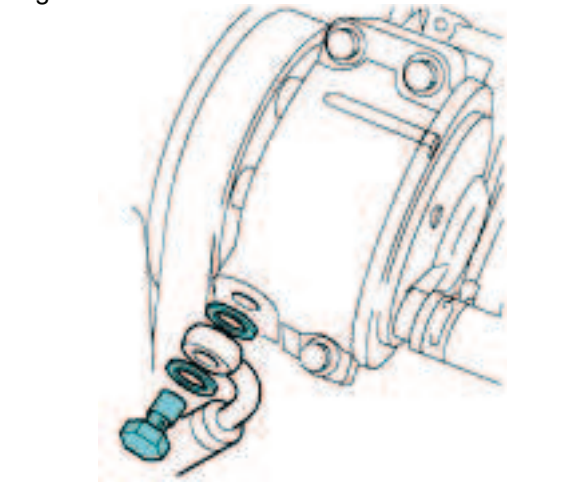


Figure 10





NEW TWO-PART PIPE INSTALLATION PROCEDURE



CAUTION: The ACE system is extremely sensitive to dirt and debris. To avoid system contamination when fitting the new pipes the protective end caps must remain in place at all times until the connection is made.

1. Feed the new flexible pipe (RBQ100250K) through the inner fender until the banjo fitting is in place next to the pump.
2. Install the banjo bolt as follows: (Figure 11)
 - Remove the protective cap on the fitting
 - Install a new washer under the banjo bolt head
 - Insert banjo bolt through the fitting and install the second new washer
 - Thread the bolt into the pump and torque bolt to **27 to 30 Nm (20 to 22 lbf.ft.)**
3. Continue to feed the pipe through the inner fender until the capped end of the rigid pipe is located in front of the shock tower.
4. Gently bend the inner fender away from the chassis in the area behind the shock tower where the flexible brake pipes are attached.



CAUTION: When fitting the new rigid pipe section (RQB100260K), care must be exercised to avoid dislodging the accelerometer wiring harness.

5. Move aside the electrical harness from the shock tower to ease fitting of the rigid pipe (RQB100260K).
6. Refer to Figure 12 and position the new rigid rear pipe section as follows:
 - Orient the pipe with the fitting end toward the front of the vehicle.
 - Insert the rear pipe end into position, starting from the front wheel arch and locating it above the outrigger and inboard of the body mount.
 - Slide the pipe under the 4-way isolator that was previously cut. (Figure 13)
 - Continue to slide the pipe end beyond the valve block.

Figure 11

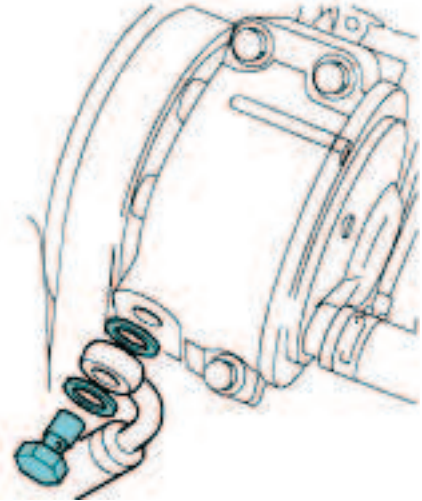


Figure 12

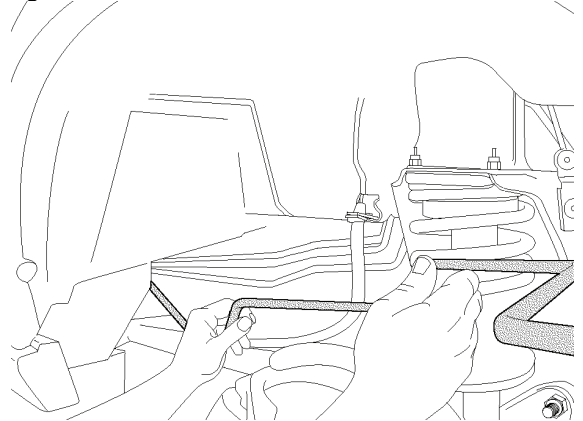
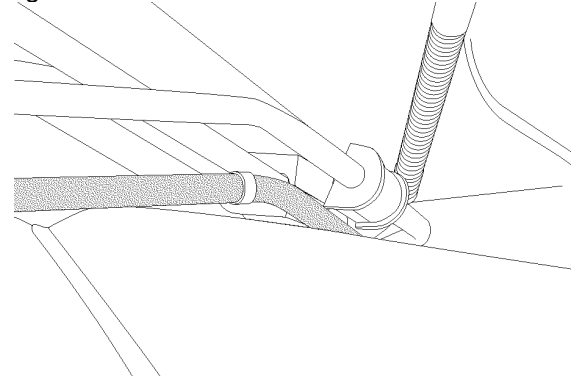


Figure 13





7. Route the front end of the pipe inside the inner fender and inboard of the shock tower.



CAUTION: The three pipes not under repair must remain engaged in the valve block. Care must be exercised to ensure that no dirt or debris enters the valve block or pipes.

8. Remove the two nuts securing the valve block keeper and slide the keeper back along the pipes.
9. Insert new pipe "P" through the keeper plate and into the valve block. (Figure 14)
10. Slide the new collet (ANR6700K) over the ridge on the "P" pipe with the 'ears' of the collet facing the front of the vehicle.
11. Close the collet over the pipe.
12. Slide the keeper plate down the pipes and over all four collets ensuring that all the 'ears' on the four collets are latched in the keeper plate.
13. Install the keeper plate nuts and tighten to **19 to 25 Nm (14 to 18.5 lbf.ft.)**.
14. Remove the two protective caps from each side of the rigid pipe union.
15. Tighten the high-pressure pipe union finger tight. (Figure 15)



CAUTION: To ensure that noise levels from the ACE system are kept to the lowest possible levels, careful installation of the isolator rubbers and brackets is required.



NOTE: A wire-tie can be used to hold the two halves of the isolators together during the super glue cure time.

16. Refer to Figure 16 and install a 4-way isolator above the chassis outrigger as follows:
 - Install the new 4-way isolator directly behind the previously cut 4-way isolator.
 - Glue the isolator into position using super glue.
 - Hold the isolator together for approximately 15 seconds to permit the glue to cure.

Figure 14

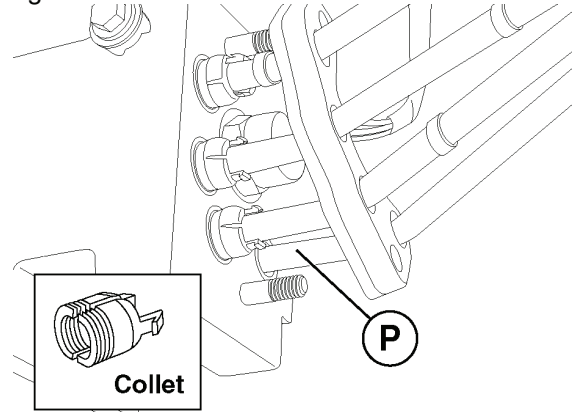


Figure 15

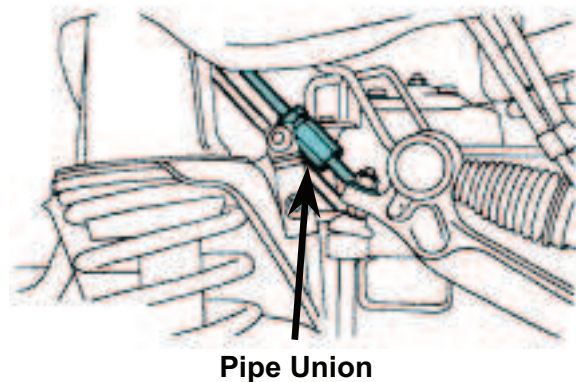
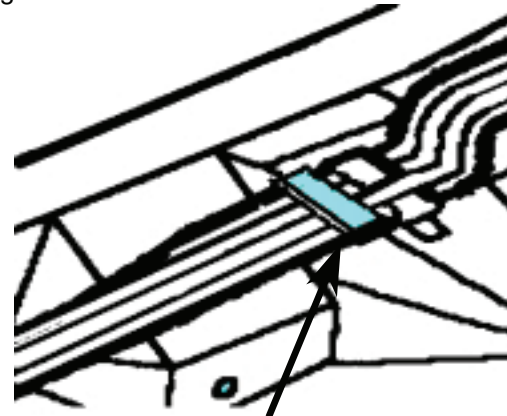


Figure 16





17. Refer to Figure 17 and install a new 2-way isolator to the two pipes above the chassis rail forward of the shock tower as follows:

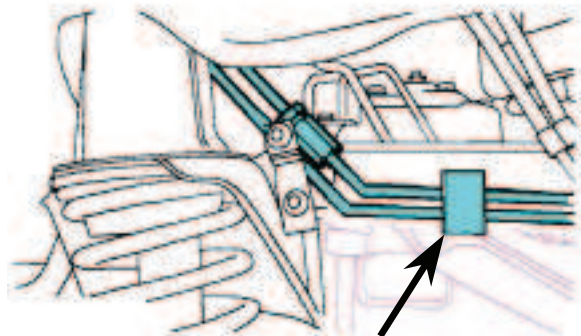
- Position the 2-way isolator.
- Glue the two halves together using super glue.
- Hold the isolator together for approximately 15 seconds to permit the glue to cure.



CAUTION: Pipe mounting brackets must be installed in the same orientation as the original assembly position.

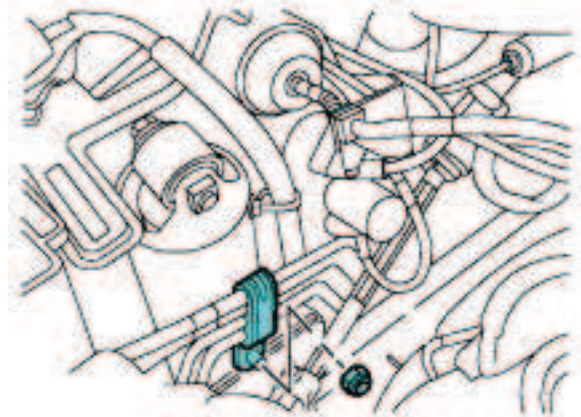
18. Install the 2-way isolator and bracket on the front cross member under the radiator.
19. Torque the cross member bracket fastener to **7 to 10 Nm (62 to 88.5 lbf.in.)**.
20. Install the 4-way isolator and bracket on the shock tower ensuring that all four pipes are properly placed in the isolator recesses. (Figure 18)
21. Torque the shock tower bracket fastener to **7 to 10 Nm (62 to 88.5 lbf.in.)**.
22. Install the 4-way isolator on the chassis side member ensuring that all four pipes are properly placed in the isolator recesses. (Figure 19)
23. Torque the chassis side member bracket fastener to **7 to 10 Nm (62 to 88.5 lbf.in.)**.
24. Push the inner fender section back into position and reposition the electrical harness to ensure there is no contact with the ACE piping.
25. Torque the high-pressure pipe union to **23 to 27Nm (17 to 20 lbf.ft.)**.
26. Remove any tie-wraps used to hold super-glued isolators.
27. Top up the ACE reservoir with approved cold climate PAS fluid (LRN2261).
28. Perform a final ACE system visual check to ensure that no piping is in contact with chassis or body components.
29. Start the engine and allow the vehicle to idle for one minute.
30. Check the ACE system piping for leaks with particular attention paid to the new connections made at the pump, the pipe union and at the valve block.

Figure 17



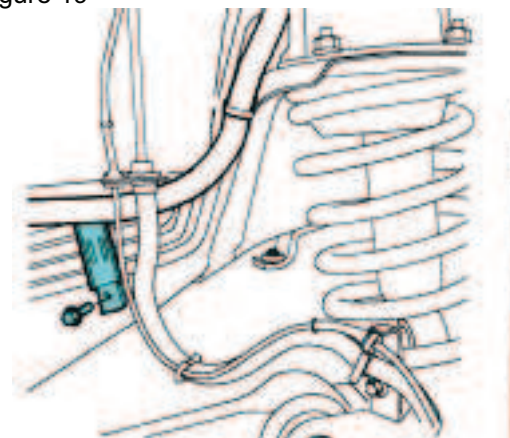
2-way above chassis rail

Figure 18



Engine Compartment 4-way

Figure 19



Wheel Housing 4-way



31. Install the mud flap and under radiator cover
32. Install the plastic splash shield in the right front wheel housing and secure using the three screws removed previously.
33. Install the right front wheel and lower the vehicle back down onto it's front suspension.
34. Check and top up the ACE system reservoir with cold climate PAS fluid (LRN2261).

RECALL CAMPAIGN LABEL INSTALLATION



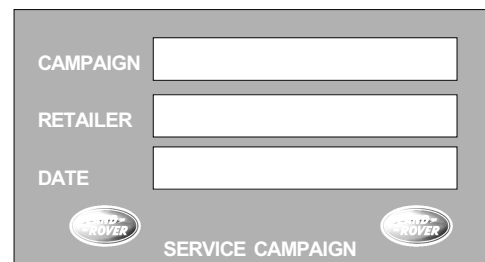
NOTE: Campaign labels may have multiple Campaign numbers written on them if multiple campaigns are performed at the same time.



1. Obtain a Recall label (LRN0002LABEL) and prepare as follows:
 - a) Place the label on a hard surface.
 - b) Use a ballpoint pen and neatly write in the bare aluminum areas of the label the following information:
 - Recall campaign code "D203"
 - Your retailer code
 - Date of repair



CAUTION: Do *not* touch the exposed label adhesive with your fingers. The bond will be diminished if contaminated prior to application.

Figure 20



CAMPAIGN	<input type="text"/>
RETAILER	<input type="text"/>
DATE	<input type="text"/>
 SERVICE CAMPAIGN 	

2. Clean all grease and dirt from the radiator support member in the area shown.
3. Peel the completed campaign label from the backing paper and position it on the cleaned area of the cross member.
4. Roll the label with the special roller tool to ensure that the adhesive makes continuous contact with the cross member surface.