

TECHNICAL INFORMATION

RECALL ACE System Pipe Leak



No: D231
Ref:
Issue: 1
Date: 01/12/01

AFFECTED VEHICLE RANGE:

Discovery Series II (LT)

YA261114 to YA263118

SITUATION:

ACE HIGH-PRESSURE PIPE MISBUILD

Some ACE high pressure supply pipes may have been manufactured missing the first of two inline attenuators located inside the hose section near the pump. A missing attenuator will induce high strain levels on the rigid connection between the hose and the pump. These vibrations could in turn lead to fatigue at the connector and leakage of ACE fluid from the pipe.

RESOLUTION:

INSPECT HIGH PRESSURE ACE HOSE AND REPLACE IF INDICATED

All Discovery Series II models fitted with ACE within the affected VIN range above, will require inspection of the high pressure hose to determine if the attenuator is installed. Replacement of the high pressure supply pipe assembly will be required if the inspection reveals a missing attenuator.

PARTS INFORMATION:

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	Qty as required (Note: Order 1 = 12-pack) 1 pint included in Material Allowance

Locally sourced:

- Super glueIncluded in material allowance.

TOOLS

RAQ000040K.....Attenuator sensing tool	Qty 1
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NOTE: The special sensing tool (RAQ000040K) will be forwarded to the Retailers servicing the very limited number of vehicles covered by this Recall. It will NOT be available for purchase. Should you encounter a vehicle requiring this Recall and your facility does not have the tool available, replace the high pressure tubing as described in this procedure.

WARRANTY CLAIMS:

D231 Option 1.....Time 0.20 hrs.

Inspect ACE high pressure line to determine presence of attenuator
Material Allowance for label: \$0.50

D231 Option 2.....Time 2.00 hrs.

Inspect for attenuator and replace ACE high pressure line
Material Allowance for fluid, supplies and label: \$8.00

Normal warranty policy and procedures apply

TIB	CIRCULATE:	Service Mgr	Warranty	Workshop	Body Shop	Parts
D231	TO	X	X	X	X	X

REPAIR PROCEDURE

INSPECT FOR ATTENUATOR

1. Place vehicle on ramp and open the hood
2. Remove the battery box cover.
3. Connect the attenuator sensing tool as follows:
 - Connect brown lead crocodile clip to positive battery terminal.
 - Connect blue lead clip to negative terminal
 - Position tester against a metal object and verify that the LED illuminates.
4. Feed the detector down between the radiator cowl and ACE pump until it clears the underside of the vehicle.
5. Raise the ramp and retrieve the detector.
6. From the underside of the vehicle feed the detector upwards between the underbelly tray and chassis side member in the direction of the high pressure ACE pipe.
7. Place the detector on the hose just below the crimp (Figure 1, D) securing the hose portion to the pump end of the high pressure pipe.


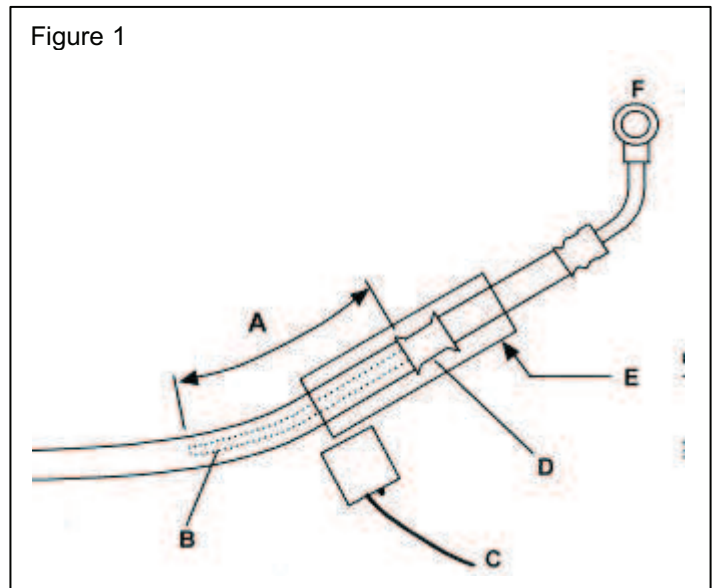
 **NOTE: The LED on the sensing tool will illuminate when it detects metal within the high pressure hose (the attenuator). The attenuator is approximately 100 mm (4 in.) long. (Figure 1 A and B)**

Figure 1



8. If the LED illuminates, move the tool (Figure 1, C) along the hose away from the crimp.
9. Verify that the LED remains illuminated for at least 100 mm (4 in.) signifying that an attenuator is present.
10. If the LED illuminates for the 100 mm travel, go to the Campaign label application section of this TIB and claim Option 1.
11. If the LED does not illuminate, the attenuator is not present and the high-pressure pipe must be replaced.
12. If the detector is not available to conduct the inspection, install a replacement pipe.

REMOVE FACTORY INSTALLED 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 underbelly 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 two-way isolator and bracket from the chassis cross member below the radiator.
9. Remove the two 13 mm 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.

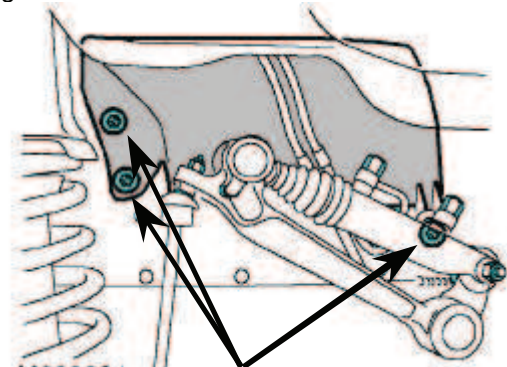
10. If any of the identification sleeves are found behind the tangs, slide them along the pipes away from the valve block.
11. Using needle-nosed pliers squeeze the collet tangs on all four pipes (Figure 3) and gently pry the keeper plate 5 mm (3/16 in.) away from the valve block.



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.

Figure 2



Splash Shield Fasteners

Figure 3

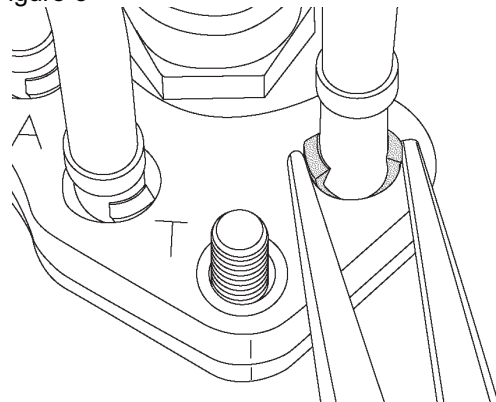
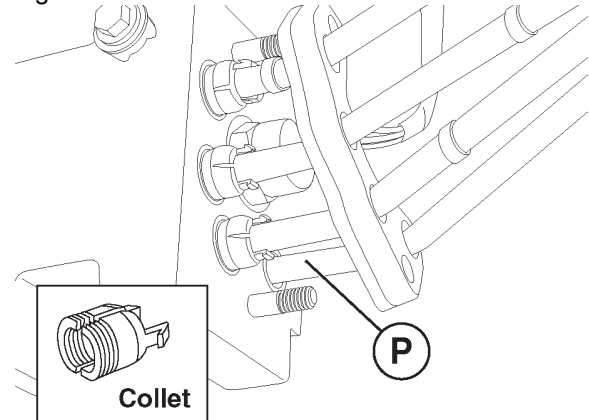


Figure 4



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 pipe labeled “P.” (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 13 mm nuts previously removed.
15. Cut away the glued two-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.

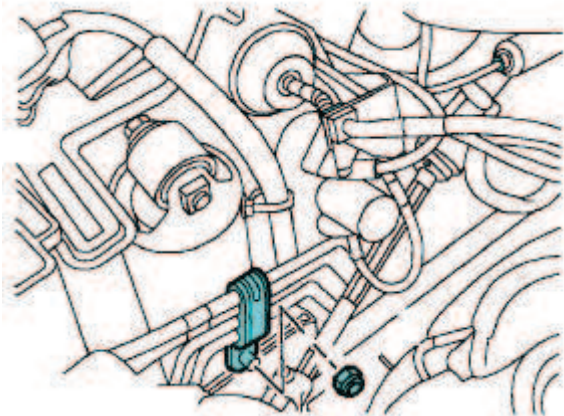
16. From inside the engine compartment remove the four-way isolator and bracket from the shock absorber tower. (Figure 5)
17. Locate and remove the four-way isolator inside the right front wheel housing. (Figure 6)
18. Locate the four-way isolator above the chassis outrigger. (Figure 7)

NOTE: The outrigger isolator is glued to the pipes.

- Only the “P” pipe is to be cut free from the four-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.

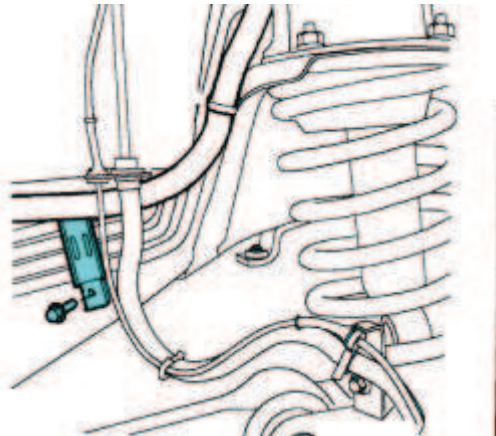
19. Using a razor blade knife, make two cuts completely through the outrigger isolator, one on each side of the “P” pipe. (Figure 7)

Figure 5



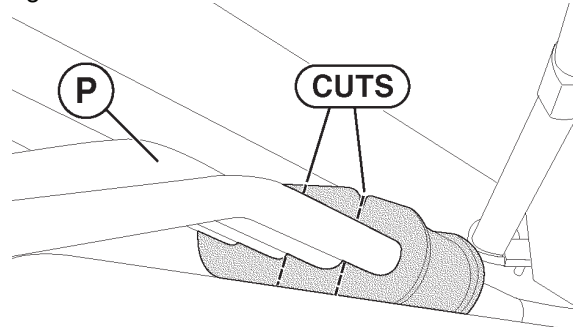
Engine Compartment Four-way

Figure 6



Wheel Housing 4-way

Figure 7



20. Ensure 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 components.

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 four-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 19 mm 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

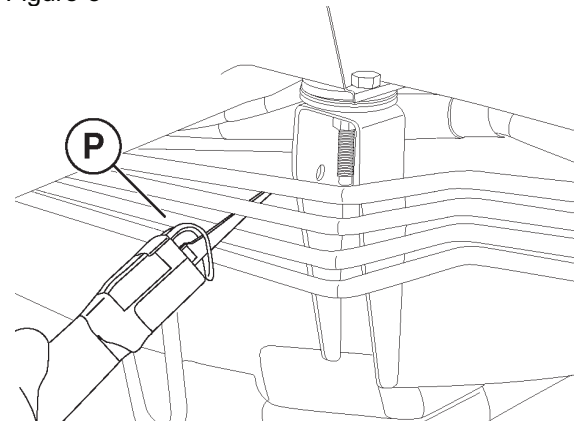


Figure 9

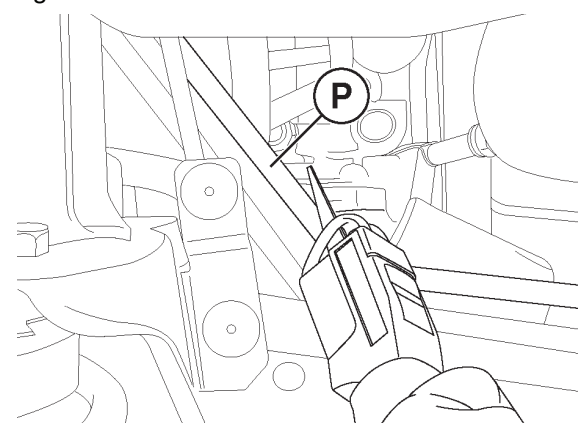
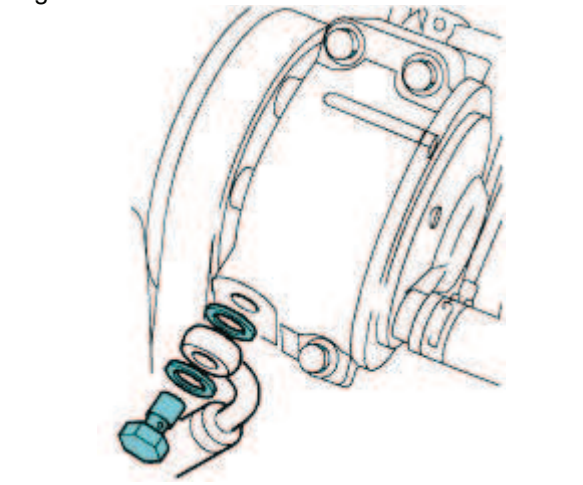


Figure 10



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 - 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 four-way isolator that was previously cut. (Figure 13)
 - Continue to slide the pipe end beyond the valve block.

Figure 11

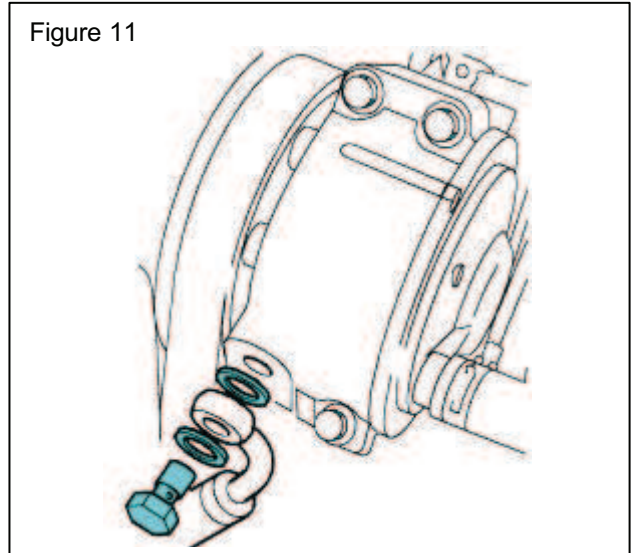


Figure 12

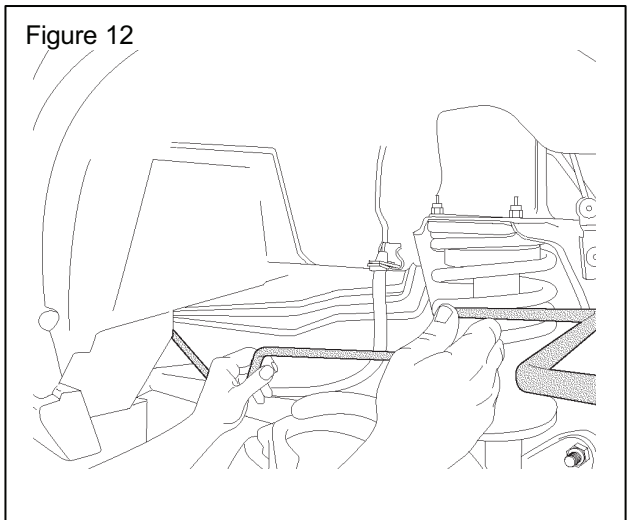
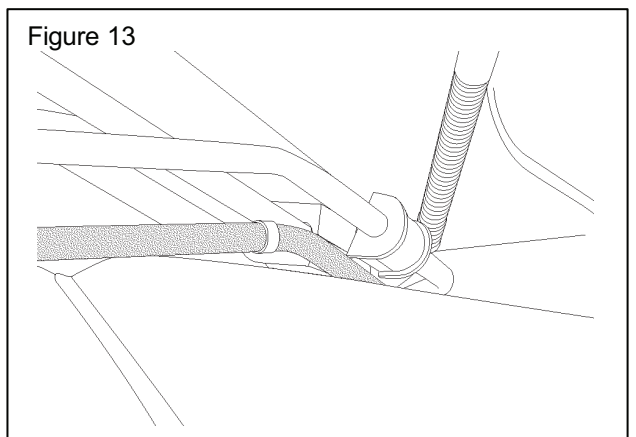


Figure 13



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 - 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 four-way isolator above the chassis outrigger as follows:
 - Install the new four-way isolator directly behind the previously cut four-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

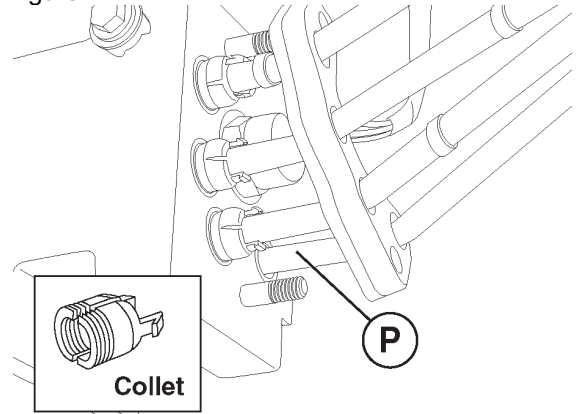


Figure 15

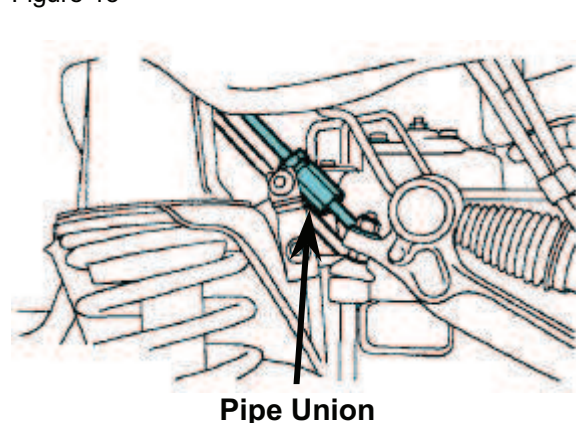
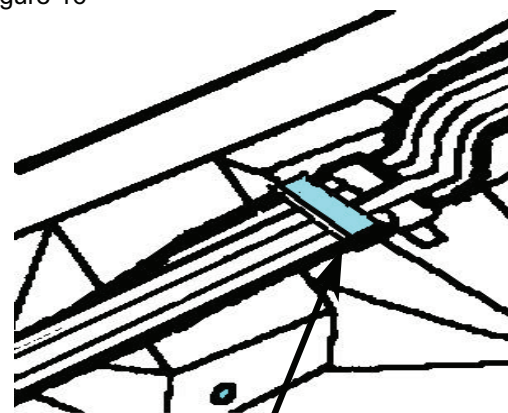


Figure 16



Second 4-way isolator

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 two-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 two-way isolator and bracket on the front cross member under the radiator.
19. Torque the cross member bracket fastener to **7 - 10 Nm (62 to 88.5 lbf.in.)**.
20. Install the four-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 - 10 Nm (62 to 88.5 lbf.in.)**.
22. Install the four-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 - 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 - 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

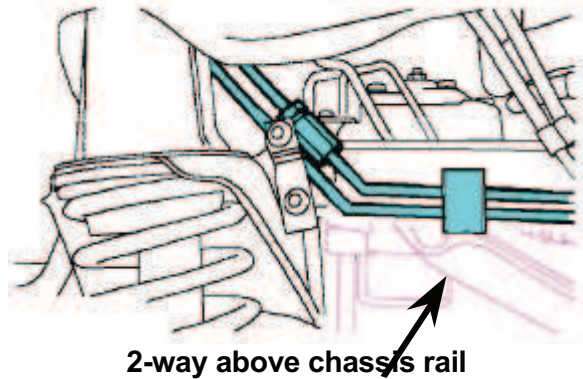


Figure 18

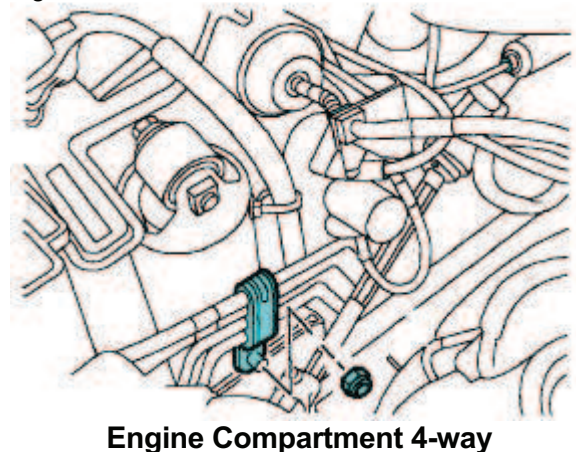
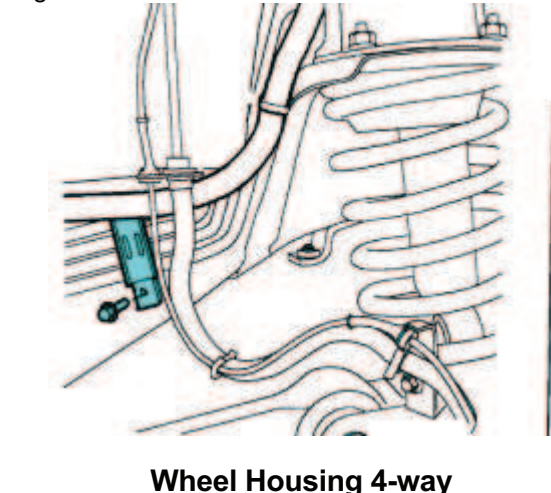


Figure 19





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 its 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 "D231"
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

The diagram shows a rectangular label with three horizontal input fields. The first field is labeled 'CAMPAIGN', the second 'RETAILER', and the third 'DATE'. Below the fields, there are two Land Rover logos on either side of the 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.