Body Repairs - Water Leaks - Water Leak

Diagnosis and Testing

Inspection and Verification

1. **1.** Verify the customer concern.
2. **2.** Visually inspect for obvious signs of mechanical or electrical damage.
3. **3.** If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. **4.** If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Water Leak Diagnostic Procedure

Introduction

This procedure has been developed to aid diagnosis and rectification of water ingress on Defender vehicles with the aim of providing a **right first time fix**.

The procedure provides suggested points of water ingress and guidelines for a recommended fix.

Prerequisites

It is assumed the technician working on the vehicle will be at least **level 3 trained** and normal vehicle service protection equipment will be used where appropriate i.e. seat covers, wing covers etc.

Water Leak Diagnosis

There are certain basic tools required for effective water leak detection the following are a few recommendations.

Basic tools
Hosepipe
Water supply
Pressure Washer
Watering Can
Torch
Mirror (telescopic type)
Air supply
Boning tool (Nylon shaped block for trim removal)

There are several adaptations of tools that can be used, for example a watering can rose attached to a hosepipe to create a spray, or a new sealant tube nozzle attached to a hosepipe can be very effective to direct water into awkward corners, there are also several ready made hosepipe nozzles available from DIY stores which can be switched through several different water patterns, and finally not forgetting a normal car wash. With the exception of a car wash initial diagnosis is more accurate if carried out by **two people**, one inside and one outside the vehicle, the person outside can direct the water onto the areas where the leak is suspected to be entering, and the person inside can inspect with a 12 volt hand lamp to confirm the entry point.

It is worth bearing in mind that the location that the water appears in the interior of the vehicle, may not be the leak source, **for example water lying in the passenger footwell could be entering on the drivers side and running across, behind the fascia**. In order to find the water entry point, trim or components may have to be removed.

Staining

Often when water has been entering over a period of time, the water entry point can be located visually by following the stains or tracks left by the leak.

Sealing Water Leaks

There are different substances that can be used to seal water leaks, putty type sealant and wet/paste sealant. Examples of these are bostic (dum-dum) "303 glasticon" and "betafill 10210" which is a white paste and "terostat 33" which is clear.

• NOTE: Do not use silicon based sealers as these will cause problems if any subsequent paint operations are required.

Careful consideration needs be given as to the substance used to seal a water leak, for example an external seam on a white vehicle would require white or clear sealant, dum-dum is best used in concealed places to fill larger gaps. The sealant should be applied in a manner that it does not look unsightly when finished, if used in a box section or under a carpet, applying and smoothing over should be ok, but on the external panels or visible areas the sealant should be "wiped" into the gap and any excess removed with a suitable spirit that will not harm the vehicles paintwork

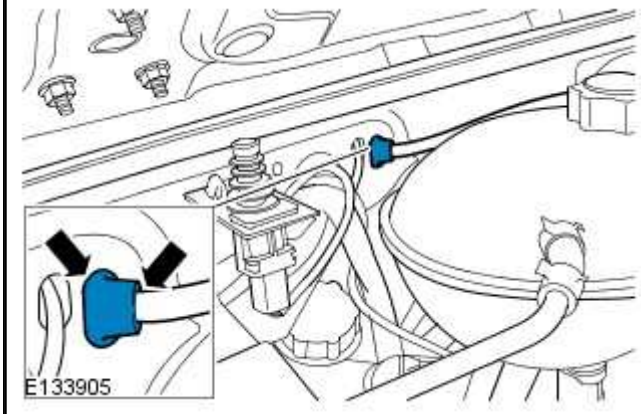
Once the water entry point has been confirmed, the suspect area must be sufficiently dried prior to the application of any sealing compound the use of a compressed air will assist

Symptom Chart

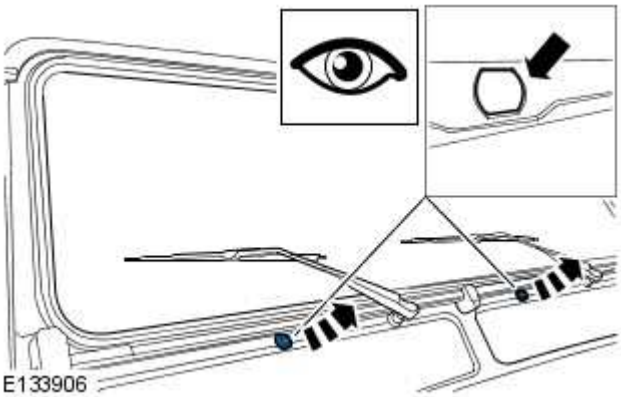
Water Ingress Paths And Recommended Repair Procedure
• NOTE: Carry out a water leak test and visual inspection of any suspect or wet areas once the water entry point has been determined refer to the symptom chart below.

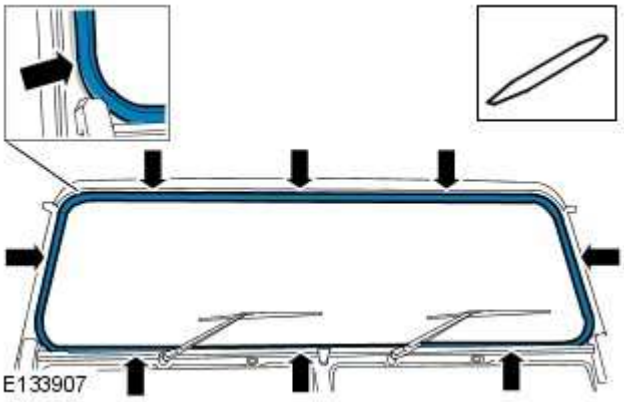
Symptom - Water Collecting	Possible Water Entry Points	Action - To Be Carried Out Once The Water Entry Point Has Been Confirmed
In footwell **(entry point - front area)**	• Heater cable grommet • Wiper grommet • Windscreen seal • Footwell seams • Floor seams • Hood release grommet • Pedal box grommet • Blower box • Air intake duct to blower join • Air intake • Clutch/brake pedal box • Windscreen surround frame	• For heater cable grommet GO to Pinpoint Test A. • For wiper grommet GO to Pinpoint Test B. • For windscreen seal GO to Pinpoint Test C. • For footwell seams GO to Pinpoint Test D. • For floor seams GO to Pinpoint Test E. • For hood release grommet GO to Pinpoint Test F. • For pedal box grommet GO to Pinpoint Test G. • For blower box GO to Pinpoint Test I. • Air intake duct to blower join GO to Pinpoint Test H. • For air intake GO to Pinpoint Test J. • For clutch/brake pedal box GO to Pinpoint Test K. • For windscreen surround frame GO to Pinpoint Test L.
In footwell **(entry point - front door area)**	• Door seal • Water shedder • Door latch/door edge • Rear tub capping • Upper to lower body joint (waist side) • Roof to "A" post joint	• For door seal GO to Pinpoint Test M. • For water shedder GO to Pinpoint Test N. • For door latch/door edge GO to Pinpoint Test O. • For rear tub capping GO to Pinpoint Test P. • For upper to lower body joint (waist side) GO to Pinpoint Test Q. • For roof to "A" post joint GO to Pinpoint Test R.
In footwell **(entry point - rear door area)**	• Door seal • Water shedder • Door latch/door edge • Rear tub capping • Upper to lower body joint (waist side) • Roof to upper body side joint	• For door seal GO to Pinpoint Test M. • For water shedder GO to Pinpoint Test N. • For door latch/door edge GO to Pinpoint Test O. • For rear tub capping GO to Pinpoint Test P. • For upper to lower body joint (waist side)GO to Pinpoint Test Q. • For roof to upper body side joint GO to Pinpoint Test S.
In footwell **(entry point - A post area)**	• Door seal	• For door seal GO to Pinpoint Test M.

	• Windscreen hinge • Main harness grommet • Air-con pipe grommet	• For windscreen hinge GO to Pinpoint Test T. • For main harness grommet GO to Pinpoint Test U. • For air-con pipe grommet GO to Pinpoint Test V.
In rear luggage compartment/seating area **(entry point - lower body side/rear)**	• Rivets in body side • Tail lights/rear end capping	• For rivets in body side GO to Pinpoint Test W. • For tail lights/rear end capping GO to Pinpoint Test X.
In rear luggage compartment/seating area **(entry point - upper body side/rear)**	• Corners of upper body quarter panels • Upper to lower body joint (waist rear)	• Corners of upper body quarter panels GO to Pinpoint Test Y. • For waist seal rear (waist rear)GO to Pinpoint Test Z.
In rear luggage compartment/seating area **(entry point - tail door)**	• Rear end door • Upper to lower body joint • Roof to upper body joint	• Rear end doorGO to Pinpoint Test AA. • For upper to lower body joint GO to Pinpoint Test Q. • For roof to upper body joint GO to Pinpoint Test S.
In rear luggage compartment/seating area **(entry point - roof)**	• Roof seam • Alpine light's (if installed) • Front corner seams • Drain channel crack	• For roof seam GO to Pinpoint Test AB. • For alpine light's (if installed) GO to Pinpoint Test AC. • For front corner seams GO to Pinpoint Test AD. • For drain channel crack GO to Pinpoint Test AE.

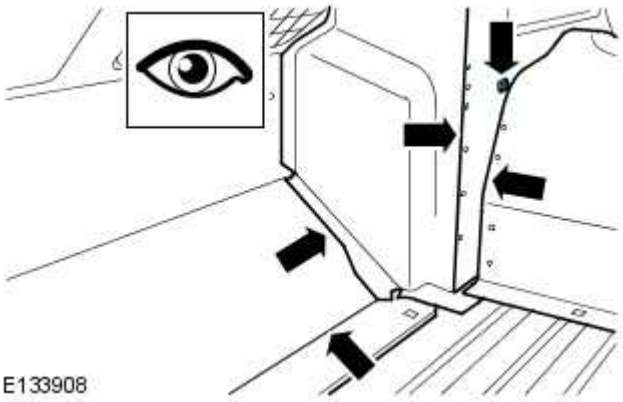
PINPOINT TEST A : HEATER CABLE GROMMET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
A1: HEATER CABLE GROMMET	
	1 Apply sealant around the outer edge of the grommet and onto the grommet to cable joint
	2 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	3 Remove excess sealant from the body area
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST B : WINDSCREEN WIPER GROMMET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
B1: WINDSCREEN WIPER GROMMET	
	1 Remove the grommets, check the grommet and hole

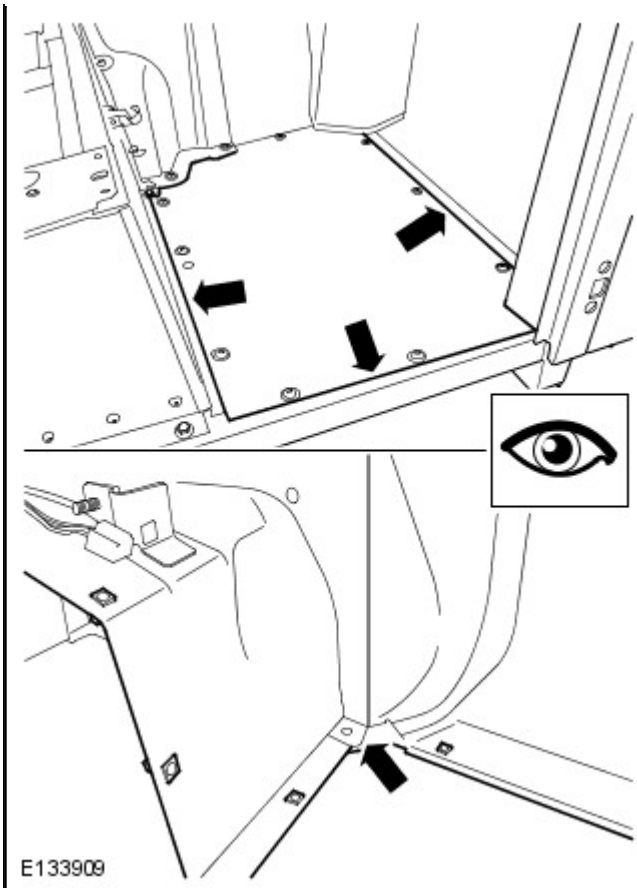
	apertures for abnormalities/distortion. Apply sealant to the outer edge of the grommet and reinstall
	2 Remove excess sealant from the body area
	3 Materials required: sealant (clear or black), gloves, spirit wipe, cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST C : WINDSCREEN SEAL	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
C1: WINDSCREEN SEAL	
	1 Using a "boning" tool, lift the edge of windscreen seal and insert the sealant gun nozzle, apply a bead of sealant between the seal and outer frame
	2 Remove excess sealant from the body area
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth, "Boning" tool
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST D : FOOTWELL SEAMS

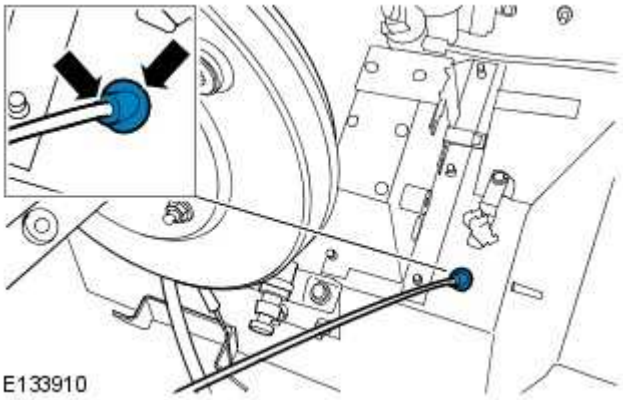
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: FOOTWELL SEAMS	
	• NOTE: A 12 volt hand lamp shone underneath the vehicle and viewed form the interior may assist in tracing leak paths 1 Lift or remove floor mats/carpets. With the hood open carefully direct water from the top, down the scuttle panel and under the vehicle. There are several seams within the footwell, water entry may be from any or all of these, also visually check and seal, the grommets and apertures in the front of the tunnel area as required
	2 Run sealant along the seams and wipe into joint with a gloved hand. Grommets can be removed and sealant applied around the outer edge before reinstalling
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

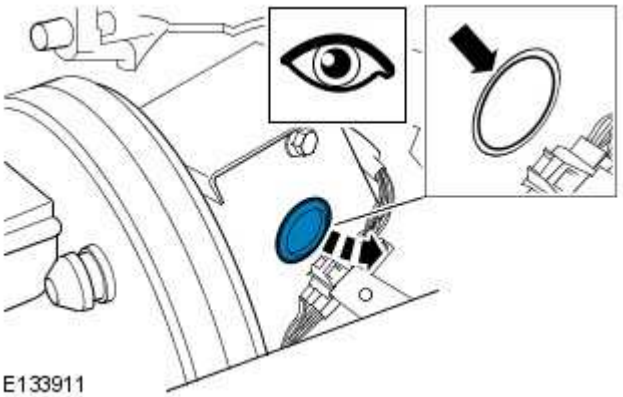
PINPOINT TEST E : FLOOR SEAMS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
E1: FLOOR SEAMS	
• NOTE: The floor plate is secured using screws and a foam construction gasket	
	1 Lift or remove floor mats/carpets. With the hood open carefully direct water from the top, down the scuttle panel and under the vehicle



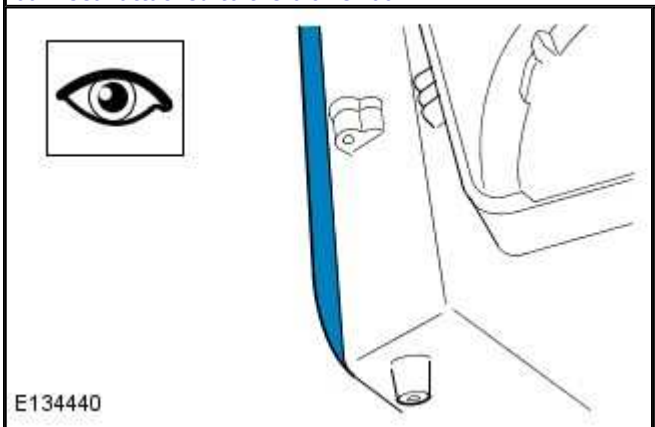
	2 **Pay particular attention to the corners of the floor panel** as there is an overlap condition where multiple panels meet, apply sealant and wipe it into the overlapping panel edges and corners this should prevent further water entry. Sealant can be added to the gasket of the removable floor plate as required
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST F : HOOD RELEASE GROMMET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
F1: HOOD RELEASE GROMMET	
	1 Apply sealant around the outer edge of the grommet and onto the grommet to cable joint

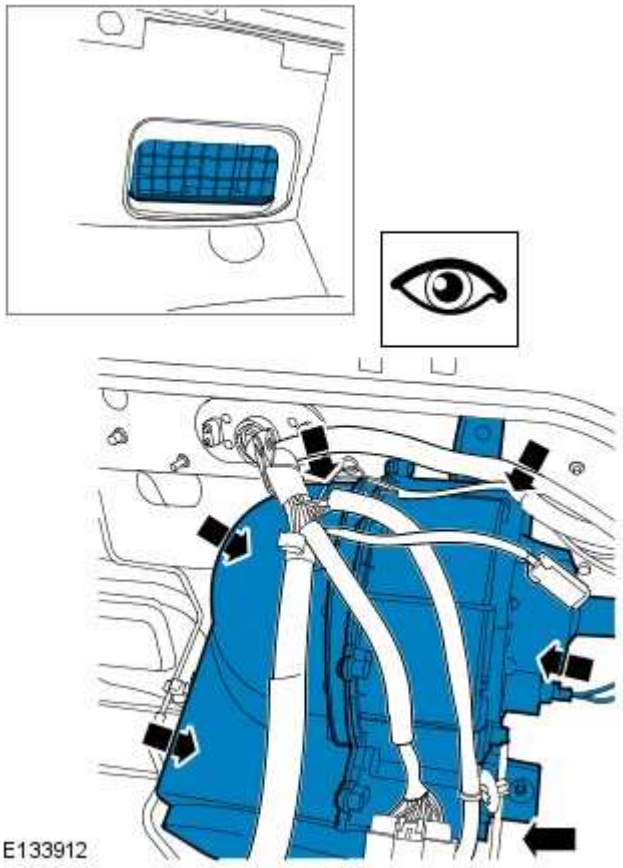
	
	2 Remove excess sealant from the body area
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST G : PEDAL BOX GROMMET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
G1: PEDAL BOX GROMMET	
	1 Remove the grommet and check both the grommet and hole aperture for abnormalities/distortion, apply sealant to the outer edge of the grommet and reinstall
	2 Remove excess sealant from the body area
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST H : AIR INTAKE DUCT TO BLOWER

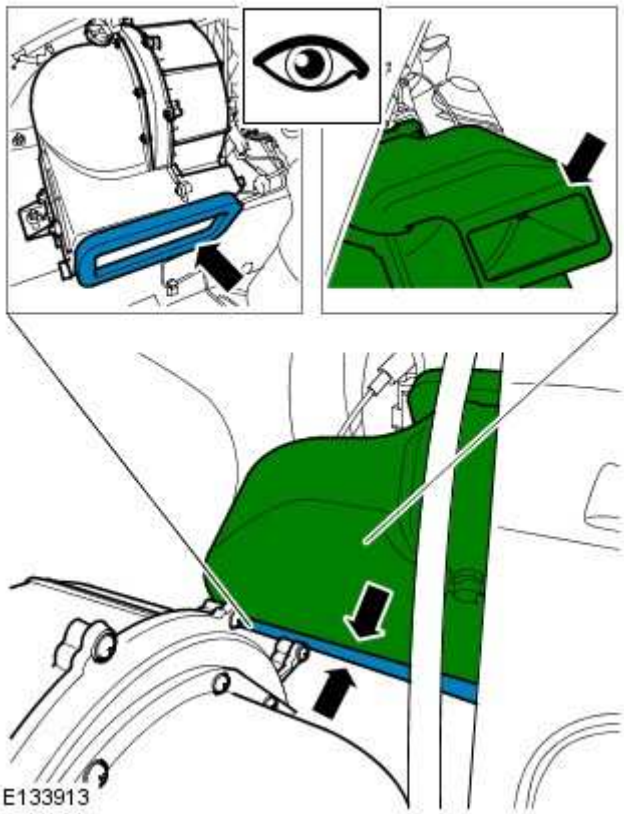
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
H1: AIR INTAKE DUCT TO BLOWER	
• NOTE: The wing install process is to lower the wing into place along the face of the scuttle panel, this can displace the foam seal attached to the blower box	
 E134440	1 Check the condition and location of the foam gasket joint between the air intake duct, and the blower box installed to the scuttle panel
	2 If possible apply sealant to the aperture with the wing installed
	3 If it is not possible to seal the aperture with the wing installed, remove the wing to complete the repair
	4 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	5 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST I : BLOWER BOX	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
I1: BLOWER BOX	
	1 Direct water around the blower box, if a leak is found and it is possible to identify the particular area of the leak then sealant can be applied to the seam where the blower box sits on the bulkhead and wiped in if possible

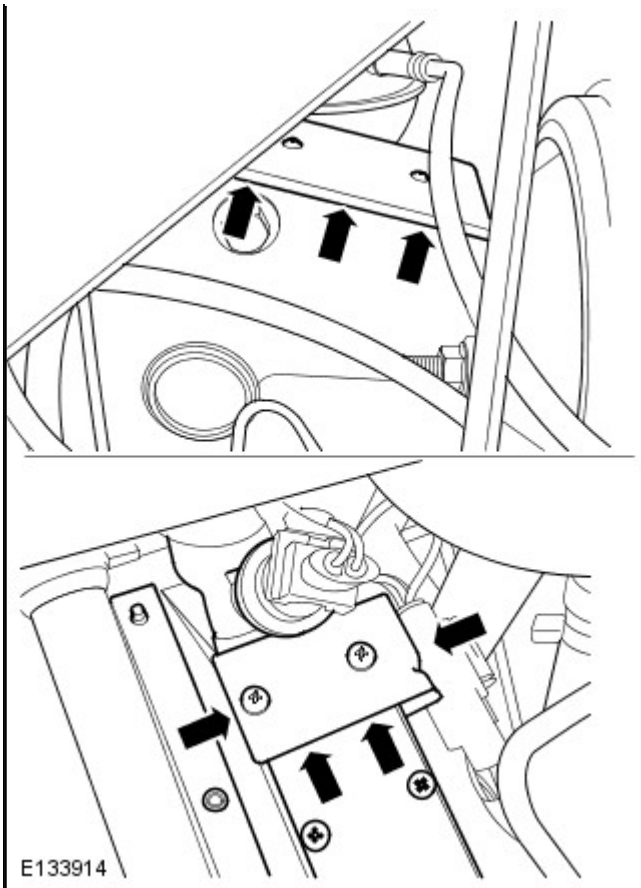


	2 If it is not possible to highlight the actual area of the ingress the remove the blower box and check the integrity of the foam gasket, replace gasket as required, adding a fine bead of sealant to the gasket before carefully reinstalling to ensure a good seal
	3 On some 07 model year vehicles there may be water actually dripping through the blower box grille in the passenger footwell, this is caused by a problem with the sealing of the two halves of the blower box itself, and replacement of the blower box is recommended
	4 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth, replacement gasket, blower box
	5 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST J : AIR INTAKE	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
J1: AIR INTAKE	
	1 Ensure that the interfaces shown in Fig 1 and Fig 2 are correctly made, no ripples or damage. Fig 3 indicates the 2 faces when installed

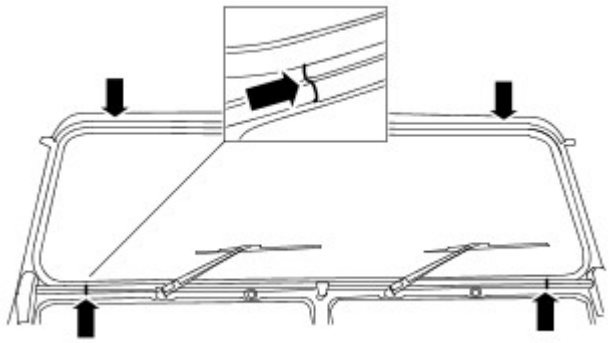
	
	2 For repairs to a minor water ingress issue, it may be possible to apply a bead of sealant to affected area and smooth in
	3 For removal and installation of the wing air duct (fig 1). Care must be taken to ensure a good mating interface between the duct and foam gasket on the blower
	4 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	5 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST K : CLUTCH/BRAKE PEDAL BOX	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
K1: CLUTCH/BRAKE PEDAL BOX	
	1 Apply sealant around the pedal box seams, wipe sealant into seams

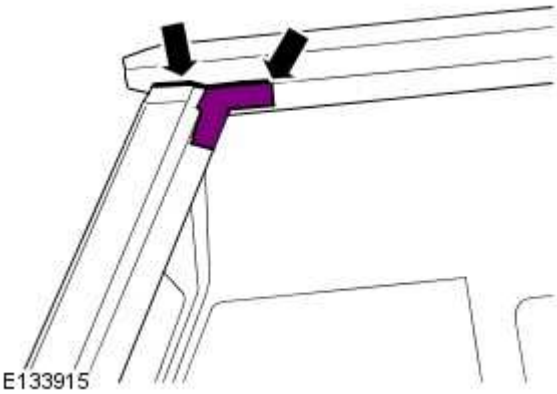


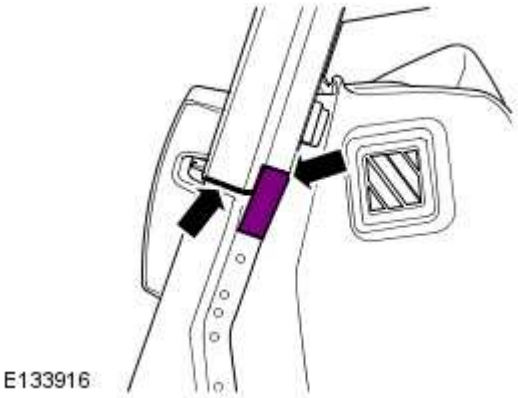
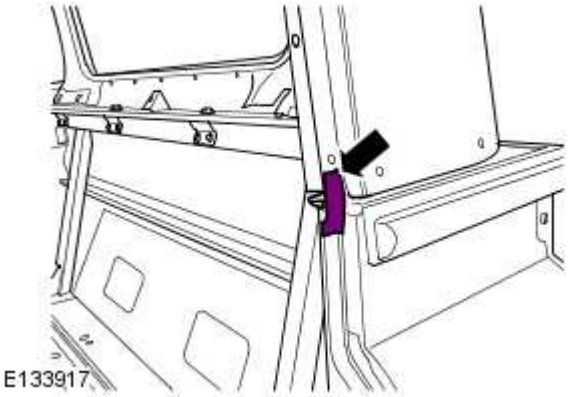
	2 Remove excess sealant from the body area
	3 Materials required: sealant (clear or black), gloves, spirit wipe, cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST L : WINDSCREEN SURROUND FRAME	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
L1: WINDSCREEN SURROUND FRAME	
	1 Visually inspect the joint condition between the side casting and the centre extrusion for pinholes and cracks at the top and bottom on both sides

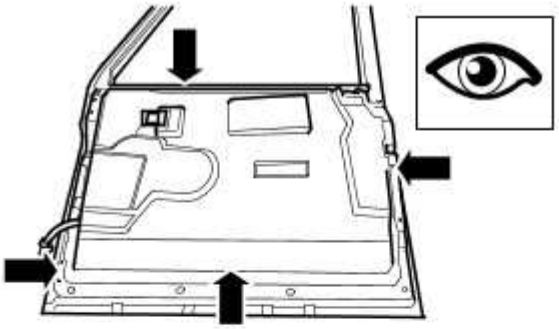

E134933

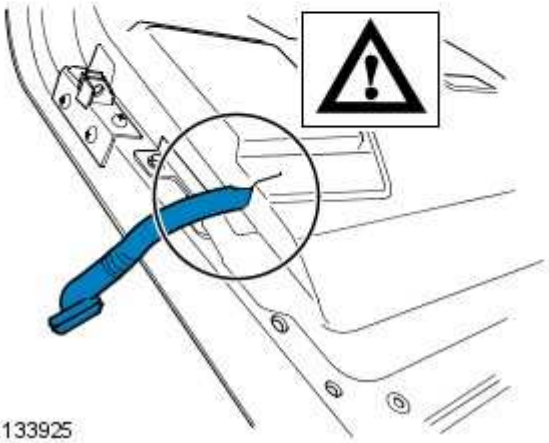
	2 Apply sealant to the joint if pinholes and cracks
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	4 Remove excess sealant from the body area
	5 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST M : DOOR APERTURE SEAL (PATCH'S)	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
M1: DOOR APERTURE SEAL (PATCH'S)	
 E133915	1 Install the "L" shaped door joint patch ensuring the apex of the patch is aligned with the apex of the roof/A post joint. Once installed the patch should be free from creases/bubbles. Apply a thin bead of sealant approx 30 - 50mm long between roof and A post flange. Smooth sealant into flange area
	2 Install the door joint patch ensuring the patch is aligned with the flange. Patch should be free from creases/bubbles. Apply a thin bead of sealant approx 20 - 40mm long across the windscreen casting and scuttle panel joint flange. Apply sealant to the scuttle panel to windscreen casting joint to ensure a water tight seal. Smooth sealant into flange area

 E133916	
 E133917	3 Attach the door joint patch ensuring the patch is aligned with the flange. The patch should be free from creases/bubbles. Apply a thin bead of sealant approx 20 - 40mm long across the body side and lower body flange. Smooth sealant into flange area. Ensure there is no gap between the waist seal and the newly applied sealant
	4 Remove excess sealant from the body area
	5 Materials required: sealant (clear/body coloured) door joint patch(s)
	6 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

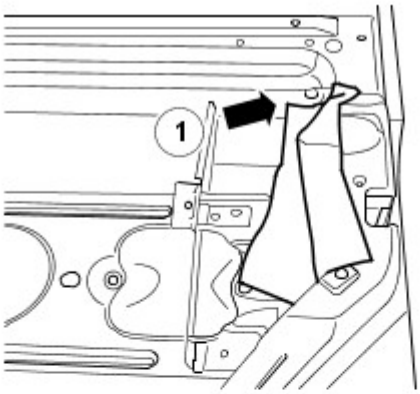
PINPOINT TEST N : WATER SHEDDER	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
N1: WATER SHEDDER	
	• NOTE: Care Point – check that the drainage holes in the bottom of the door are not blocked with sealant/dirt or debris (if vehicle has been off road) 1 Visual check all around edge of shedder, looking for areas of poor adhesion of the butyl sealant between the shedder and the door panel. Due to the complexity of the convoluted tube joint (circled) this is an area for careful inspection, as it a typical leak path. Repairs can be made by rolling or pressing the butyl seal to improve adhesion or by additional sealant / dum-dum in the localized area

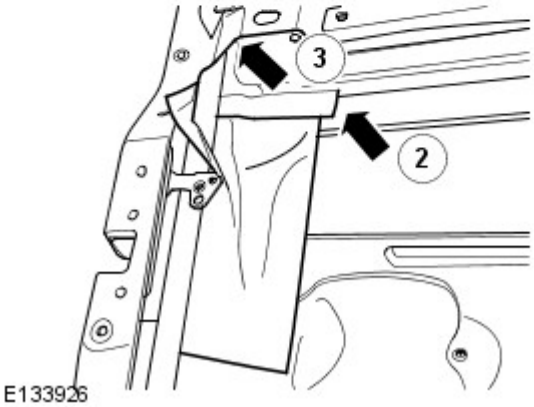




	2 Check the condition of the flip seal at the bottom of the door if damaged or misaligned may allow water ingress
	3 Materials required: "paint" roller, sealant, dum-dum
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST O : DOOR LATCH/DOOR EDGE	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
O1: DOOR LATCH/DOOR EDGE	
• NOTE: Water leak path is visible down the edge of the door and into the A post/footwell/sill area of the vehicle	
	• NOTE: Use of a mirror and torch will assist 1 Remove the door casing. Remove the door shedder to gain access to the latch mechanism. Check along the top of the latch shedder for damage/poor adhesion (Fig 1)

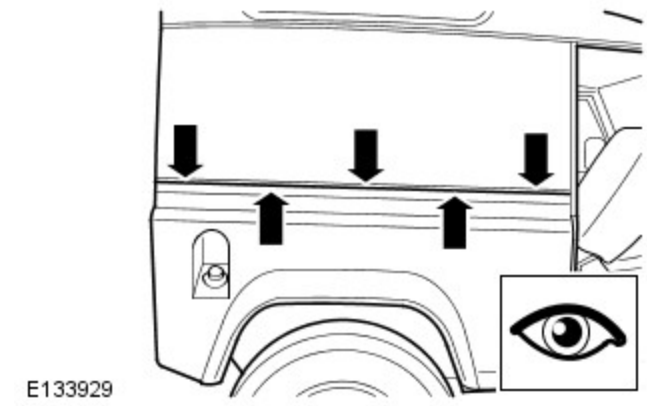




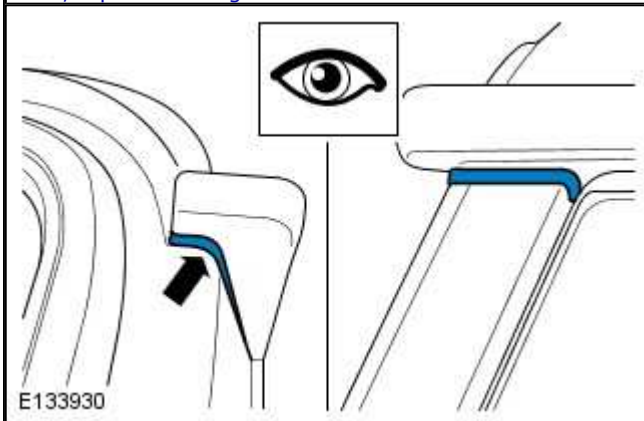
	2 Apply sealant / dum-dum along the top of the latch shedder (fig 2)
	3 Apply sealant to the panel joints above the latch shedder but underneath the glass run channel (Fig 3)
	4 Materials required: sealant, dum-dum, tools (for door casing removal), **door shedder – must be replaced**
	5 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST P : REAR TUB CAPPING	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
P1: REAR TUB CAPPING	
• NOTE: Whilst it is not necessary to remove the door aperture seal to complete this repair, care must be taken to ensure the repair seals any gaps up to and including the joint seal	
	1 Apply small bead of sealant or dum-dum into the capping to body side joint (as arrow indicates)

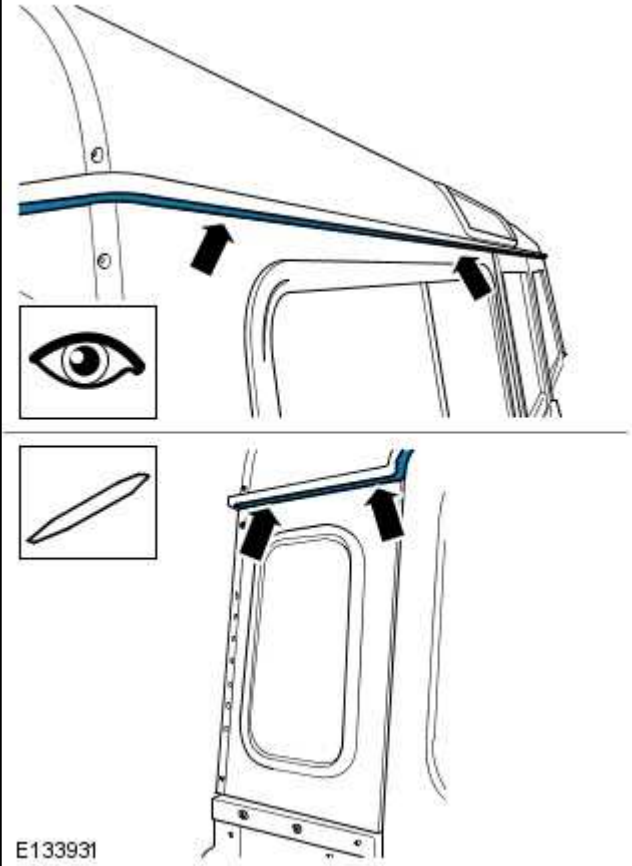
	2 **Critical visual area = high quality of sealant finish required**
	3 Materials required: sealant, dum-dum
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST Q : UPPER TO LOWER BODY JOINT (WAIST SIDE)	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
Q1: UPPER TO LOWER BODY JOINT (WAIST SIDE)	
• NOTE: The seal between the upper and lower body (waist seal) is made from a type of memory foam, the latest seal is in three sections which lock together, the seal is stuck to the upper body side but is not stuck to the rear tub	
• NOTE: A key area to inspect is the welded joint of the lower body capping. Sometimes the seal can be slightly inboard of the joint leaving a small cavity, by slackening off all the fixings of the body side it is possible with a plastic tool to push the seal back outwards closing the cavity. If it is a small cavity it is possible to seal the cavity with a small amount of sealant wiped into the cavity and any excess cleaned off, if the vehicle is a model that is trimmed inside then the cavity can also be sealed from the inside, a larger amount of sealant may be used if it will be hidden in normal usage by the interior trim	
• NOTE: Should the seal itself require replacement the upper body side can be removed without removing the roof panel itself by removing the upper and lower fixings and slackening the front and rear fixings, the roof panel can then be supported using a temporary support whilst the upper body side is removed to facilitate the seal change	
	**1** Care must be taken to ensure that the seal between the roof an upper body side is not compromised, and the seal across the front between the windscreen surround and the roof is still correct after installation
	2 Materials required: sealant (clear or black), gloves, spirit wipe, cloth, tools, seals as required
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes**

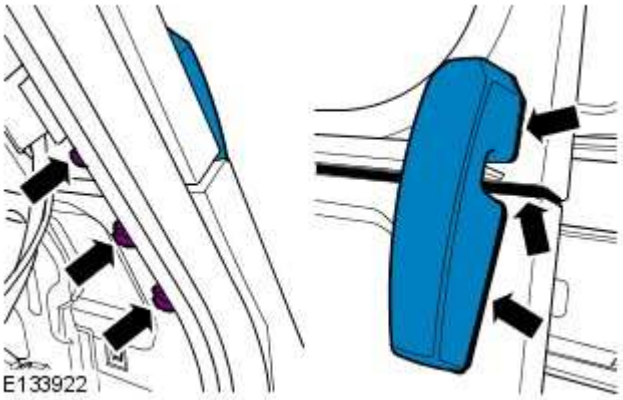
	Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST R : ROOF TO "A" POST JOINT	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
R1: ROOF TO "A" POST JOINT	
• NOTE: On some vehicles the gap at the top of the roof is filled with "dum-dum" on later vehicles this was changed to black, repair with original material	
	1 Fill any gaps with sealant or dum-dum and wipe off excess
	2 For leaks above this area refer to (front corner seams) GO to Pinpoint Test AD. or (Drain Channel Seal) GO to Pinpoint Test AE.
	3 Materials required: sealant (black or white as appropriate) or dum-dum (black), gloves
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

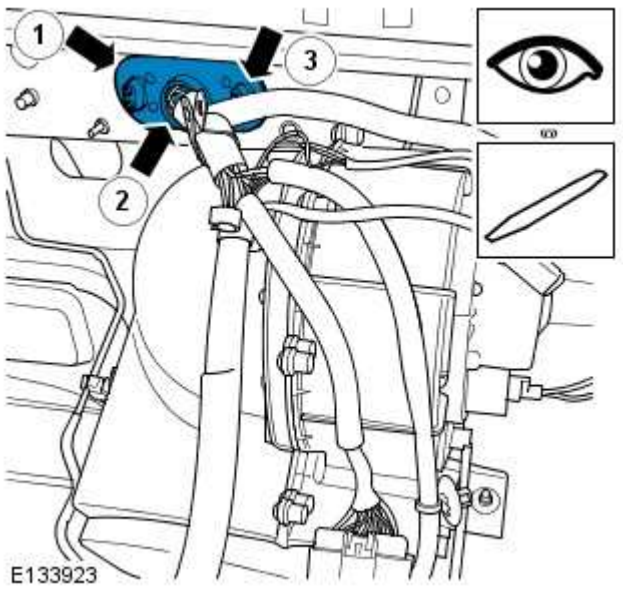
PINPOINT TEST S : ROOF TO UPPER BODY GASKET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
S1: ROOF TO UPPER BODY GASKET	
• NOTE: Visually inspect the roof area to ensure that the gasket is installed / seated correctly. Check for lumps / ripples or trapped conditions, as these are the probable cause of the water ingress	
	1 Undo/slacken the fixing bolts on the inside of the roof (as required lower the headlining to access the fixings on some derivatives). Working outside of the vehicle, using a non metallic tool (boning tool) prize out the gasket to ensure correct fit. Re-tighten the roof

	
	2 It is not usually necessary to use sealant in this repair however if the gasket appears to require additional sealing medium, a small run of sealant is acceptable. Care should be taken not to distort the gasket when applying the sealant
	3 Materials required: boning tool, tools, sealant
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

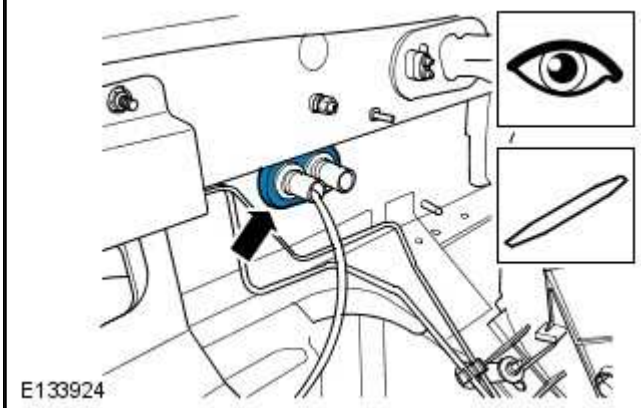
PINPOINT TEST T : WINDSCREEN HINGE	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
T1: WINDSCREEN HINGE	
• NOTE: For pre-2009MY vehicles or if there was a significant leak around this area, it may be pertinent to apply sealant along the scuttle panel to windscreen casting join prior to reinstalling the hinge	
• NOTE: **Critical visual area = high quality of sealant finish required**	
	1 From inside the vehicle undo the 3 fixings that hold the windscreen hinge in place. Remove the hinge from the vehicle. Remove the existing gasket and any residue of adhesives or sealant. Re-fit the hinge gasket. Apply a small amount of sealant around each fixing hole



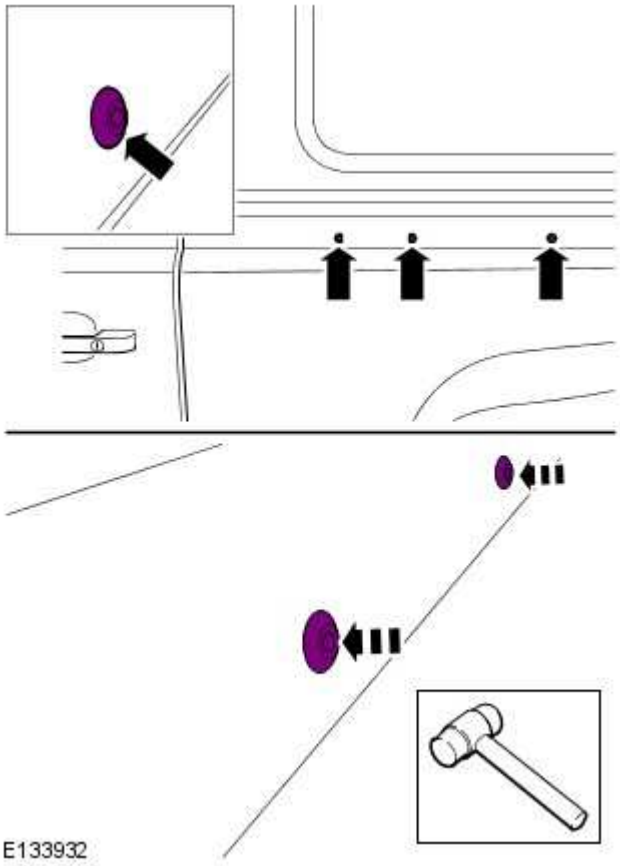
	2 Materials required: sealant, windscreen hinge gasket
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST U : MAIN HARNESS GROMMET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
U1: MAIN HARNESS GROMMET	
• NOTE: Visually inspect the grommet looking for areas of poor seating	
• NOTE: Inspect the "U" channel to skuttle panel for distortion between spot welds allowing water to seep onto the grommet	
	1 Use a boning tool to re-seat the grommet. Additional sealant should be applied around the outer edges of the grommet and the body panel
	2 On occasions it maybe necessary to seal the main harness collar in addition to outer grommet. This will be evident during re-test
	3 Materials required: sealant, boning tool
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes**

	Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

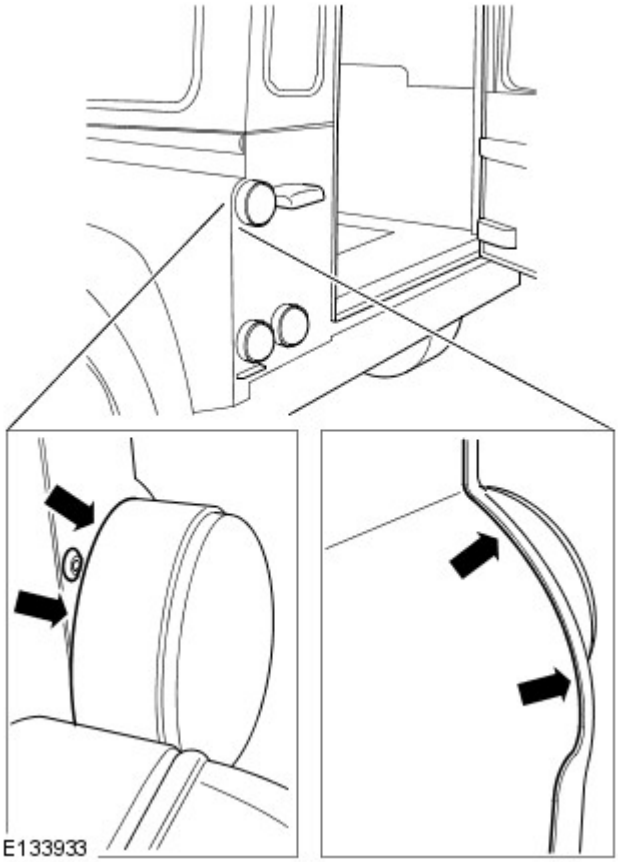
PINPOINT TEST V : AIR CONDITIONING PIPE GROMMET	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
V1: AIR CONDITIONING PIPE GROMMET	
• NOTE: Visual inspect around grommet looking for areas of poor seating	
	1 Use a boning tool to re-seat the grommet. Additional sealant should be applied around the outer edges of the grommet and the body panel
	2 Materials required: sealant, boning tool
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST W : RIVETS IN BODY SIDE	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
W1: RIVETS IN BODY SIDE	
	1 Apply sealant around the rivet and wipe excess away with spirit wipe, the rivet can also be tightened by tapping lightly with a mallet and a nylon block



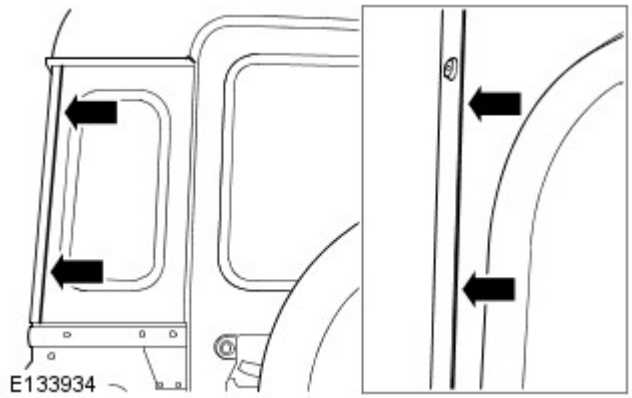
	2 If leak is still present the rivet should be drilled and replaced, and then painted with a touch up stick
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth, hammer, nylon block, rivet, rivet gun, touch up stick
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST X : TAIL LIGHTS/REAR END CAPPING	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
X1: TAIL LIGHTS/REAR END CAPPING	
	1 To seal the rear seam, squeeze sealant into the seam then smooth into the gap, wipe sealant into the joint then clean away an excess sealant with a spirit dampened cloth

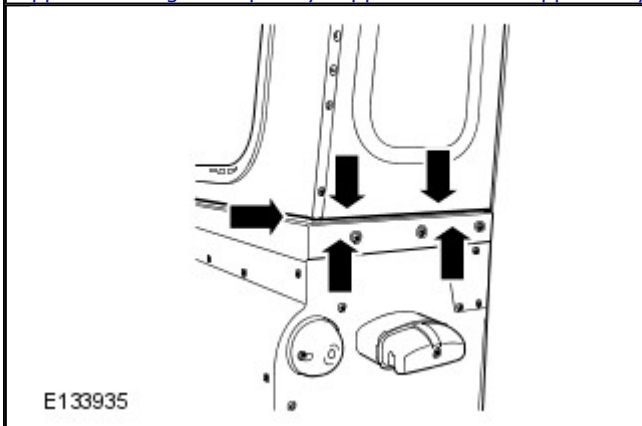


	2 To seal the rear lamp remove rear lamp and apply sealant around circumference of lamp base, re fit and wipe away any excess sealant
	3 Materials required: sealant (clear/body coloured), gloves, spirit wipe cloth
	4 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

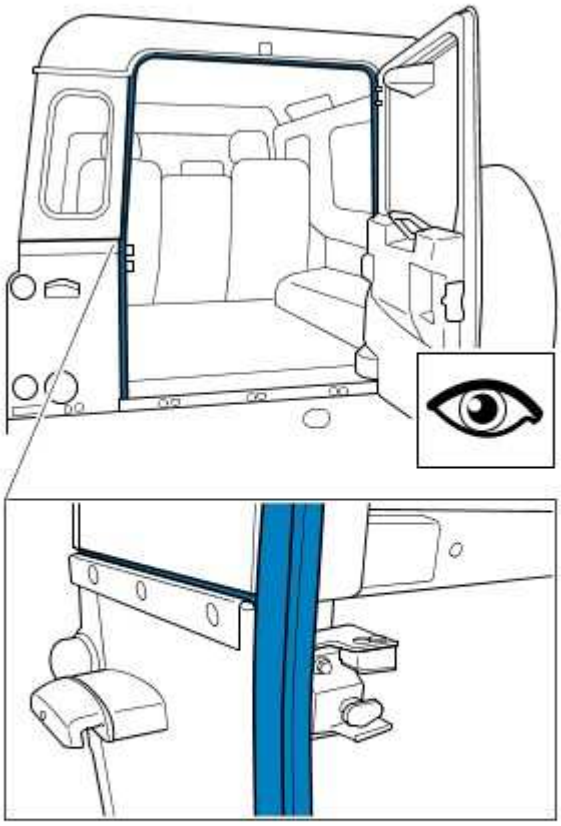
PINPOINT TEST Y : CORNERS OF UPPER BODY QUARTER PANELS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
Y1: CORNERS OF UPPER BODY QUARTER PANELS	
	1 Squeeze sealant into seam then smooth into gap, wipe away an excess sealant



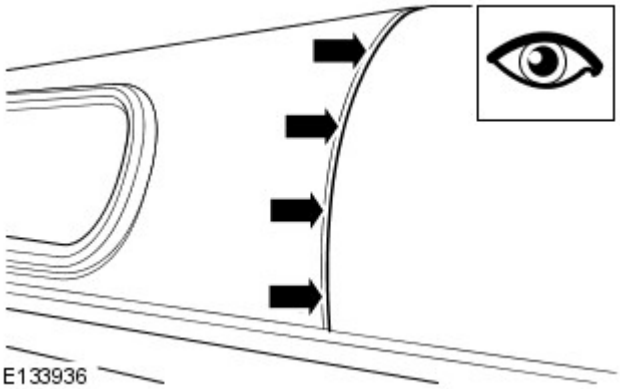
	2 Materials required: sealant (clear/body coloured), gloves, spirit wipe, cloth
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

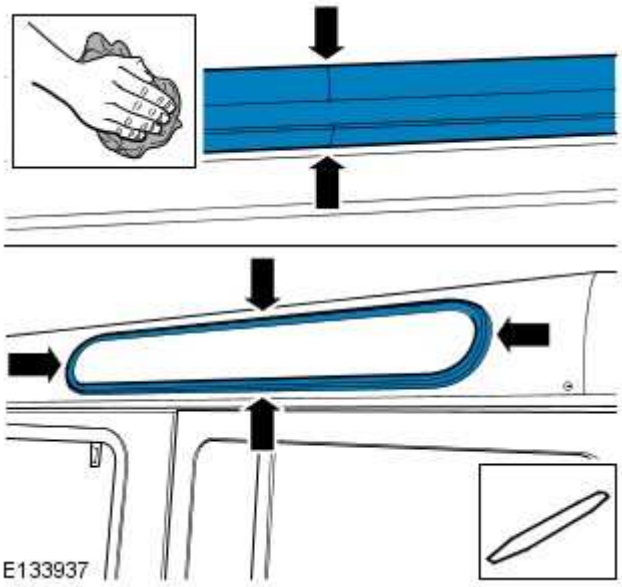
PINPOINT TEST Z : UPPER TO LOWER BODY JOINT (WAIST REAR)	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
Z1: UPPER TO LOWER BODY JOINT (WAIST REAR)	
• NOTE: The seal between the upper and lower body (waist seal) is made from a type of memory foam, the latest seal is in three sections which lock together, the seal is stuck to the upper body side but is not stuck to the rear tub	
• NOTE: Sometimes the seal can be slightly inboard of the joint leaving a small cavity, by slackening off all the fixings of the body side it is possible with a plastic tool to push the seal back outwards closing the cavity. If it is a small cavity it is possible to seal the cavity with a small amount of sealant wiped into the cavity and any excess cleaned off, if the vehicle is a model that is trimmed inside then the cavity can also be sealed from the inside, a larger amount of sealant may be used if it will be hidden in normal usage by the interior trim	
• NOTE: Should the seal itself require replacement the upper body side can be removed without removing the roof panel itself by removing the upper and lower fixings and slackening the front and rear fixings, the roof panel can then be supported using a temporary support whilst the upper body side is removed to facilitate the seal change	
	1 Care must be taken to ensure that the seal between the roof an upper body side is not compromised, and the seal across the front between the windscreen surround and the roof is still correctly located
	2 Materials required: sealant (clear or black), gloves, spirit wipe cloth, tools for removal as required, seals as required
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes**

	Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

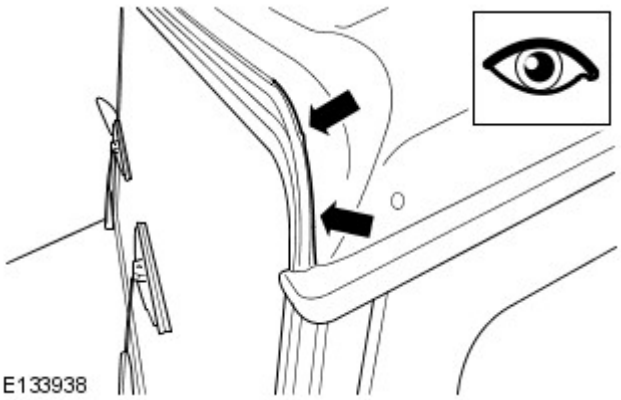
PINPOINT TEST AA : REAR END DOOR	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
AA1: REAR END DOOR	
 E134439	• NOTE: Due to the location of the spare wheel, the rear end door may become miss-aligned to the body due to fixing torque relaxation. Check/set the torque of the fixing to 22 newton metres (plus or minus 3 newton metres) 1 Check the profile and set/alignment of rear end door, adjust as required
	2 Check the aperture seal bubble section for splits due to door misalignment
	3 Check condition, location and security of aperture seal replace as required
	4 At the waist join, check for patches and sealant quality (See waist seal instructions above)
	5 Materials required: Aperture seal (replace as required), sealant (clear/body coloured), gloves, spirit wipe cloth, touch up stick
	6 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No**

	Reinstall any trim/panels or component that have been displaced

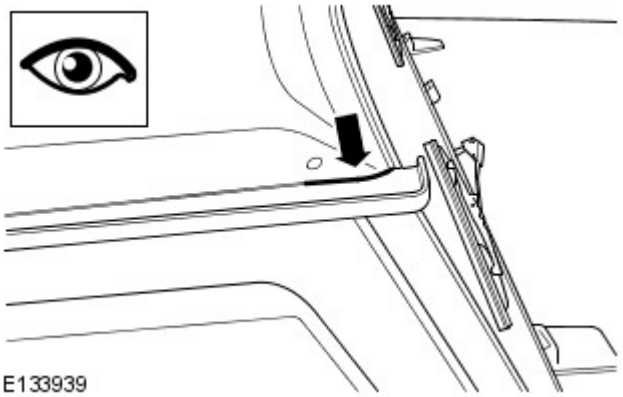
PINPOINT TEST AB : ROOF SEAM	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
AB1: ROOF SEAM	
• NOTE: High visibility area excess sealant must be wiped away leaving no residue or evidence of repair	
	1 Visual inspect the entire roof seam looking for irregularities in the flange edge condition. Check for gaps between the panels and panel joint conditions. Apply sealant as required
	2 Materials required: sealant (body coloured preferred or clear), cloth, spirit wipe, gloves
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST AC : ALPINE LIGHTS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
AC1: ALPINE LIGHTS	
• NOTE: High visibility area excess sealant must be wiped away leaving no residue or evidence of repair	
	1 **Gasket joint leaks** - Using black sealant, seal between the joint edges of the gasket
	2 **Gasket to roof leaks** - Due to the design of the gasket

	seal this is a very rare leak path. The leak is probably caused by deformation to the gasket which should be evident by visual check. The gasket should be re-seated and re-tested prior to completing this repair. Using the boning tool carefully lift the outer edge of the gasket seal. Working around the alpine light, lift and apply sealant between the gasket and the roof panel. Care **must** be taken to ensure that the roof is not damaged or scratched whilst sealing the alpine light
	3 For leaks through the centre (lace section) apply sealant between the joint and wipe away an excess sealant
	4 Materials required: sealant (clear/black), boning tool, cloths, spirit wipe, gloves
	5 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST AD : FRONT CORNER SEAMS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
AD1: FRONT CORNER SEAMS	
• NOTE: Arrow indicates the usual area for front roof cracks (wisp cracks)	
• NOTE: Care point – it may be necessary to touch up the paint work using a paint touch up stick	
	1 Apply sealant into the cracked area then remove excess sealant
	2 Materials required: sealant (clear/body coloured) cloth, spirit wipe, gloves, paint
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced

PINPOINT TEST AE : DRAIN CHANNEL SEAL	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
AE1: DRAIN CHANNEL SEAL	
• NOTE: Before any repairs take place ensure that the issue is not caused by an incorrectly installed or non approved roof rack	



	1 If the crack is minor it can be repaired by applying clear/body coloured sealant and then wiping it into the crack with a gloved hand. If the crack is larger the vehicle may require a body shop repair which will require the body sealant scraping out of the channel, replacing with new body sealant and repaint
	2 Materials required: sealant (clear/body coloured), cloth, spirit wipe, gloves
	3 Allow the sealant to cure, and retest suspect area for water entry
	Is water still entering the vehicle? **Yes** Carry out a water leak test and visual inspection of any suspect or wet areas, once the water entry point has been determined refer to the "Water Ingress Paths And Recommended Repair Procedure" above **No** Reinstall any trim/panels or component that have been displaced