

## SUB-SECTION M2

### CHASSIS FRAME ALIGNMENT

#### PROCEDURE

1. With the vehicle assembled, a check for chassis 'squareness' can be made as follows:

- (1) Place the vehicle on a level floor.

#### NOTE

The measuring points referred to below are the fixed spring shackle locations.

- (2) Hold a plumb line against one of the measuring points.
- (3) Mark the floor directly beneath the plum bob.
- (4) Carry out steps (2) and (3) for the three other measuring points.
- (5) Move the vehicle and measure diagonally between the front and rear marks. The chassis is square if the two measurements agree to within 9,5 mm.

- (6) Using a suitable trammel, make comparative side-to-side checks between the front suspension front shackle pin and the rear wheel hub centre.

- (7) With the vehicle upper structure removed, comparative side-to-side checks for chassis frame malalignment can be made, using as datums the 9,5 mm diameter holes provided in the No. 2 and in the rearmost cross-members.

#### NOTE

The vehicle front bumper is regarded as the No. 1 cross-member.

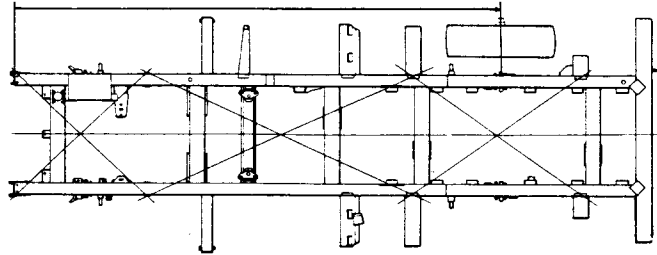


Fig M2.1

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### SUB-SECTION M3

#### REMOVAL AND REPLACEMENT PROCEDURES

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## SUB-SECTION M3

### CHAPTER 1

#### BONNET - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the bonnet:
  - (1) Remove the spare wheel if this is fitted to the bonnet.

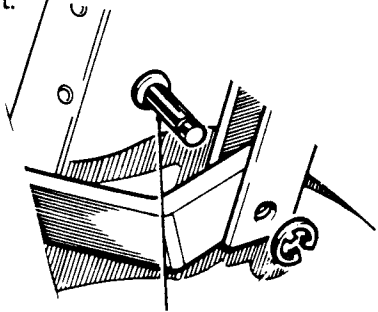


Fig M3.1

- (2) Refer to Fig M3.1. Disconnect the prop rod.
- (3) Raise the bonnet to the vertical position.

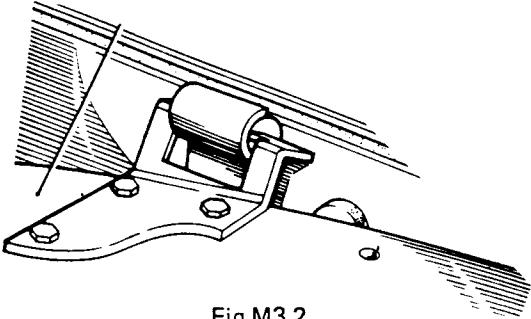


Fig M3.2

- (4) Refer to Fig M3.2. Lift the bonnet clear from the hinges.

##### REPLACEMENT

2. Replace the bonnet as follows:
  - (1) With the bonnet in the vertical position engage it with the hinges.
  - (2) Lower the bonnet sufficiently to reconnect the prop rod.
  - (3) Lower the bonnet fully and ensure that it engages with the lock.

## SUB-SECTION M3

### CHAPTER 2

#### DOORS - REMOVAL AND REPLACEMENT

##### REMOVAL

1. Remove a side door as follows:

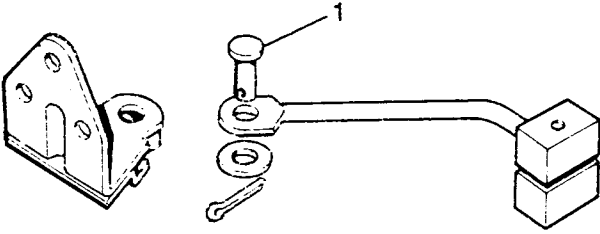


Fig M3.3

- (1) Refer to Fig M3.3. Disconnect the door check strap (1).

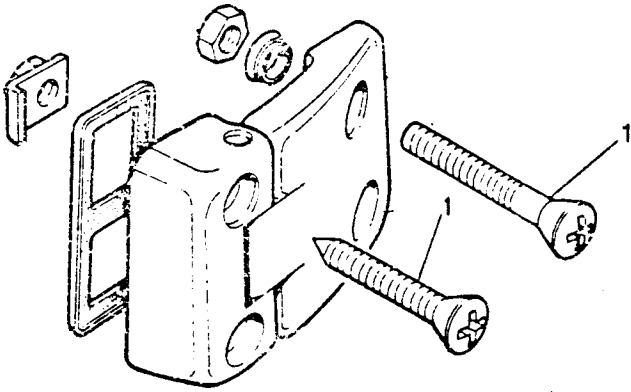


Fig M3.4

- (2) Refer to Fig M3.4. Remove the fixings (1) securing the hinges.
- (3) Withdraw the door.

##### REPLACEMENT

2. To replace the door:

- (1) Examine the weather seals for deterioration or damage. Replace if necessary.
- (2) Place the door into position. Swing the hinges into position and secure with the fixings.
- (3) Reconnect the door check strap.

## SUB-SECTION M3

### CHAPTER 3

#### DOOR GLASS - REMOVAL AND REPLACEMENT

##### REMOVAL

###### Sliding Glass

1. The sliding glass must be removed before the fixed glass can be taken out. Proceed as follows:
  - (1) Move the sliding window to allow access to the screws securing glass run channel, top and bottom.
  - (2) Remove the screws from inside the channel.
  - (3) Withdraw the top run channel and sliding window.
  - (4) Remove the bottom run channel if necessary.

###### Fixed Glass

2. Once the sliding glass is removed the fixed glass may be taken out as follows:
  - (1) Remove the screws securing the front retainer.
  - (2) Ease the fixed glass clear of the frame.

##### REPLACEMENT

3. First replace the fixed glass:
  - (1) Apply new Prestik sealing strip to the window frame.
  - (2) Fit the glass into the frame.
  - (3) Replace the screw securing the front retainer.
4. The sliding glass may now be replaced:
  - (1) Replace the bottom run channel if this has been removed.
  - (2) Place the top run channel onto the sliding glass top and fit both into the frame.
  - (3) Replace and tighten the securing screws inside the channel.
  - (4) Check that the sliding glass moves freely in the channels.

## SUB-SECTION M3

### CHAPTER 4

#### DOOR LOCK - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove a door lock:

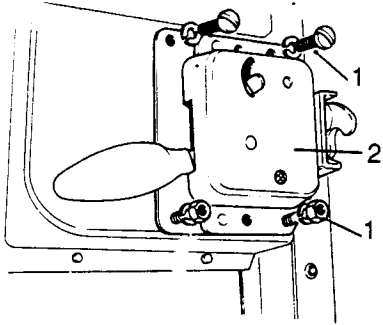


Fig M3.5

- (1) Refer to Fig M3.5. Remove the fixings (1).
- (2) Withdraw the door lock (2).
- (3) If required, remove the striker plate from its support bracket (2 screws).

##### REPLACEMENT

2. Replace the door lock as follows:

- (1) Fit the lock into position, engaging the square rod of the outer door handle into the square hole in the lock.
- (2) Secure the lock with the fixings.
- (3) Check movement of the catch.
- (4) Replace the striker plate if this has been removed.
- (5) Adjust the striker plate so that the door draught excluders are slightly compressed with the door closed.

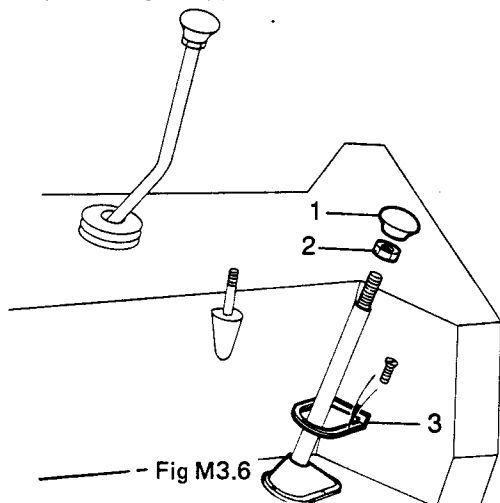
## SUB-SECTION M3

### CHAPTER 5

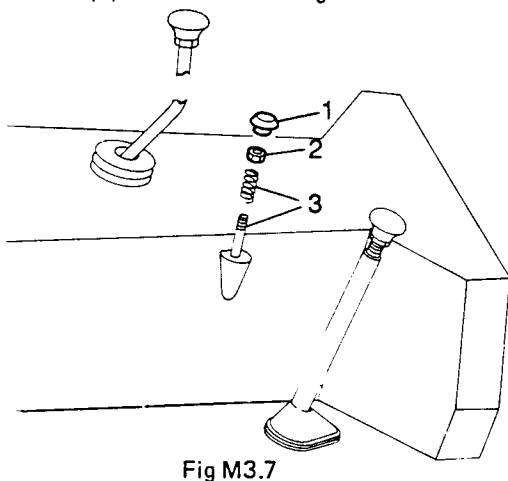
#### FRONT FLOOR - REMOVAL AND REPLACEMENT

##### REMOVAL

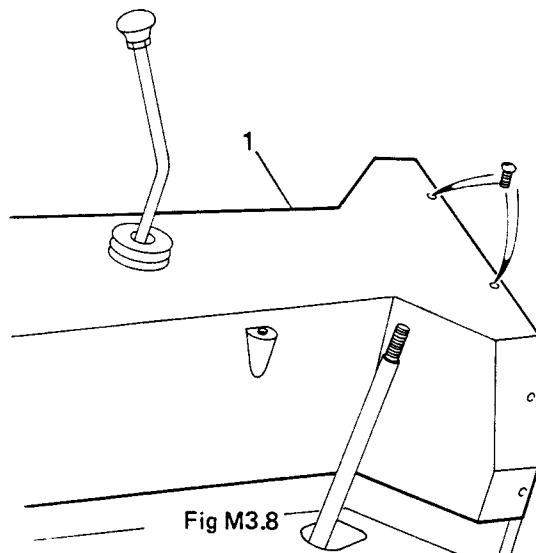
1. To remove the front floor:



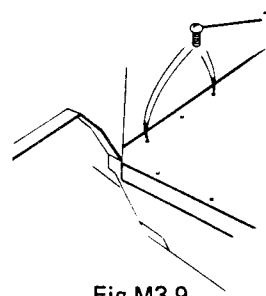
- (1) Refer to Fig M3.6. Unscrew the knob (1) and locknut (2) from the transfer gear lever.
- (2) Remove the fixings and withdraw the dust cover (3) from the transfer gear lever.



- (3) Refer to Fig M3.7. Unscrew the knob (1) and locknut (2) from the four-wheel drive lever.
- (4) Withdraw the spring and ferrule (3).
- (5) Remove the floor mats.



- (6) Refer to Fig M3.8. Unscrew the 17 speed screws and remove the gearbox tunnel cover (1).



- (7) Refer to Fig M3.9. Remove the securing bolts in the floor (1) and remove both halves of the floor.

##### REPLACEMENT

2. To replace the floor:

- (1) Using a waterproof sealant between the joint flanges (a suitable sealant is Sealastrip), fit the floor halves and secure with the fixing bolts.
- (2) Replace the gearbox tunnel cover, again using a waterproof sealant, and secure with the 17 speed screws.
- (3) Fit the ferrule, spring and locknut to the four-wheel drive lever. Depress the lever and adjust the locknut until the compressed spring length is 58 mm. Fit the knob and tighten the locknut.
- (4) Replace the dust cover over the transfer gear lever.
- (5) Replace the knob and locknut on the lever.

## SUB-SECTION M3

### CHAPTER 6

#### RADIATOR GRILLE AND GRILLE PANEL - REMOVAL AND REPLACEMENT

##### REMOVAL

1. Two grilles are fitted to the Land Rover: a fine mesh grille at the front secured by wing nuts and behind this, a coarse mesh grille. To remove both grilles and the grille panel:

- (1) Remove the bonnet (see Sub-section M3, Chapter 1).
- (2) Disconnect the battery earth lead.
- (3) Unscrew the wing nuts and lift off the fine mesh grille.

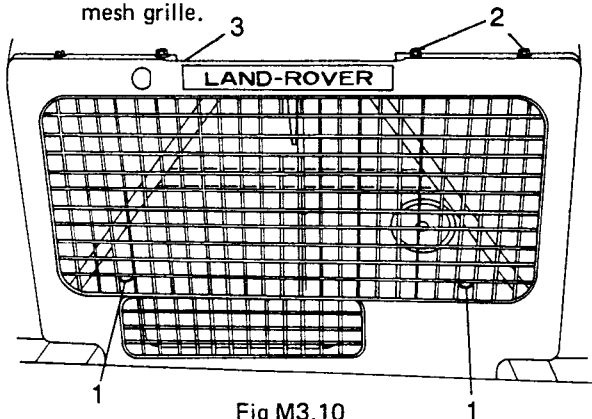


Fig M3.10

- (4) Refer to Fig M3.10. Remove the two screws (1) securing the coarse mesh grille and lift off the grille.
- (5) Remove the four screws (2) holding the grille panel (3) and lift off the panel.

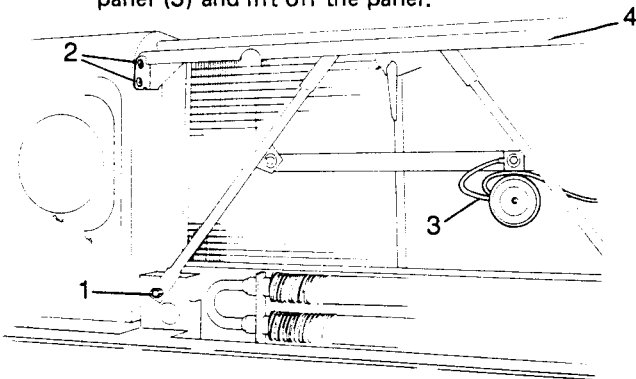


Fig M3.11

- (6) Refer to Fig M3.11. Remove the two bolts (1) at the bottom of the support tubes.
- (7) Remove the four screws (2) securing the grill panel frame to the wings. These screws have loose nuts inside the wings.
- (8) Disconnect the electrical connector (3) from the horn.

- (9) Lift off the complete grille panel framework (4).

##### REPLACEMENT

2. To replace the grille and grille panel:

- (1) Fig M3.11 still applies. Fit the grille panel framework into position and secure with the screws (2), nuts and washers through the wings.
- (2) Refit the two bolts (1) to the bottom of the support tubes.
- (3) Remake the electrical connection to the horn.

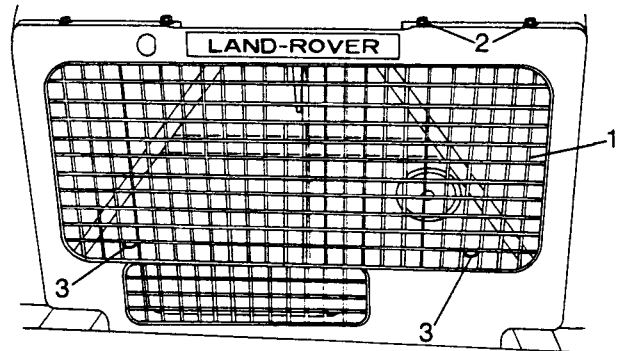


Fig M3.12

- (4) Refer to Fig M3.12. Place the grille panel (1) into position and secure with the four screws (2) at the top.
- (5) Fit the coarse mesh grille and replace the two screws (3) securing this to the grille panel.
- (6) Replace the fine mesh grille and secure with the wing nuts.



## SUB-SECTION M3

### CHAPTER 7

#### WINDSCREEN - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the windscreen:
  - (1) Remove the bolts securing the roof to the windscreen.
  - (2) Slacken or remove the remaining roof fixings.
  - (3) Remove the windscreen wiper arms and blades.

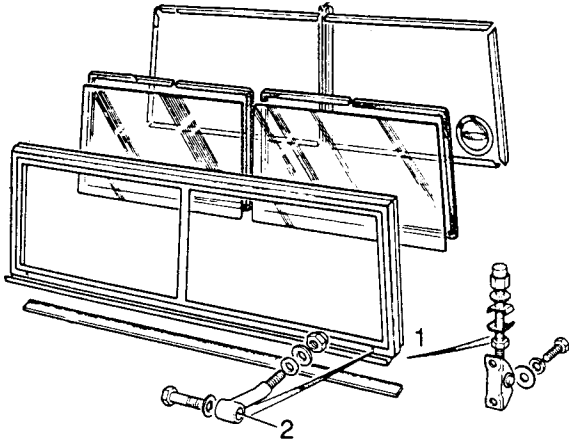


Fig M3.13

- (4) Refer to Fig M3.13. Slacken the nuts on the windscreen clamp bolts (1). Swing the clamp bolts clear of the windscreen.
- (5) Disconnect the wiper motor earth lead from the windscreen frame.
- (6) Remove the bolts securing the windscreen to the hinges (2).
- (7) Remove the windscreen.

##### REPLACEMENT

2. Replace the windscreen as follows:
  - (1) Refit the windscreen.
  - (2) Replace the bolts securing the windscreen to the hinges.
  - (3) Reconnect the wiper motor earth lead to the windscreen frame.
  - (4) Refit the clamp bolts to the windscreen and tighten the nuts.
  - (5) Replace the windscreen wiper arms.
  - (6) Ensure that the windscreen top and bottom sealing strips are in good condition. Replace and tighten the roof fixings.

## SUB-SECTION M3

### CHAPTER 8

#### WINDSCREEN GLASS - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the windscreen glass:
  - (1) Remove the windscreen wiper arms and blades.
  - (2) Remove the sun visors and the rear view mirror from the interior of the cab.
  - (3) Remove the headlining strip from above the windscreen.
  - (4) Remove the fascia top rail.

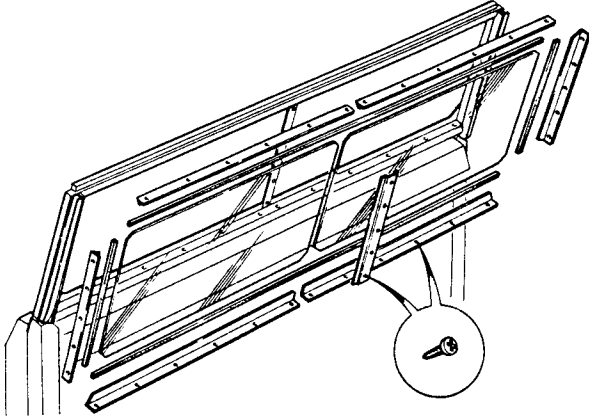


Fig M3.14

- (5) Refer to Fig M3.14. Remove the screws securing the glass retaining angle strips.
- (6) Carefully ease the glass clear of the screen.
- (7) Remove all traces of sealant from the windscreen frame and glass retaining strips.

##### REPLACEMENT

2. To replace the glass:
  - (1) Line the interior of the windscreen frame with 'Sealastrip'.
  - (2) Locate the glass in the windscreen frame and press firmly into the Sealastrip.
  - (3) Place Sealastrip round the edges of the glass to seal the angle strips when fitted.
  - (4) Fit the angle strips to retain the glass and secure with the retaining screws.
  - (5) Remove surplus Sealastrip.
  - (6) Fit the fascia top rail.
  - (7) Fit the headlining strip.
  - (8) Fit the sun visors and rear view mirror.
  - (9) Refit windscreen wiper arms and blades.

## SUB-SECTION M4

### BODY REPAIRS

#### INTRODUCTION

1. Land Rover body panels are manufactured from a special aluminium alloy known as 'Birmabright'.
2. 'Birmabright' melts at a slightly lower temperature than pure aluminium and will not rust nor corrode under normal circumstances. It is work-hardening, but is easily annealed. Exposed to the atmosphere, a hard oxide skin forms on the surface.
3. 'Birmabright' panels and wings can be beaten out after accidental damage, then must be annealed by the application of heat, followed by slow air-cooling. As the melting point is low, heat must be applied slowly and carefully.
4. A practical temperature control is to apply oil to the cleaned surface to be annealed. Play the welding torch on the underside of the cleaned surface and watch for the oil to clear, leaving the surface clean and unmarked; then allow to cool naturally in the air when the area so treated will again be soft and workable. Do not quench with oil or water.
5. Another method is to clean the surface to be annealed and then rub it with a piece of soap. Apply heat beneath the area, as described above, and watch for the soap stain to clear. Then allow to cool, as for the oil method.
6. When applying the heat for annealing, always hold the torch some little distance from the metal, and move it about, so as to avoid any risk of melting it locally.

#### GAS WELDING BIRMABRIGHT

##### General

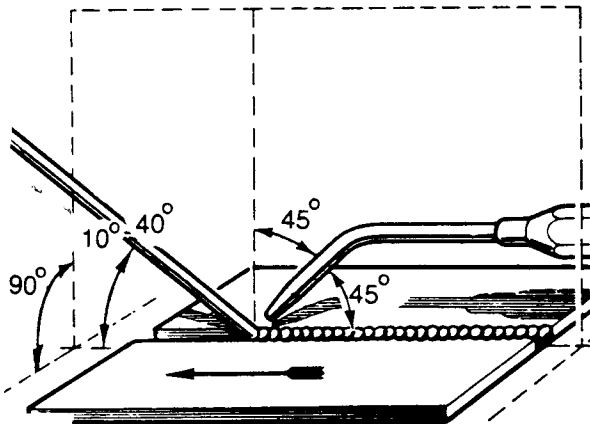


Fig M4.1

7. Refer to Fig M4.1. A small jet must be used, one or two sizes smaller than would be used for welding sheet steel of comparable thickness. For instance, use a No. 2 nozzle for welding 18 SWG sheet, and a No. 3 for 16 SWG sheet.

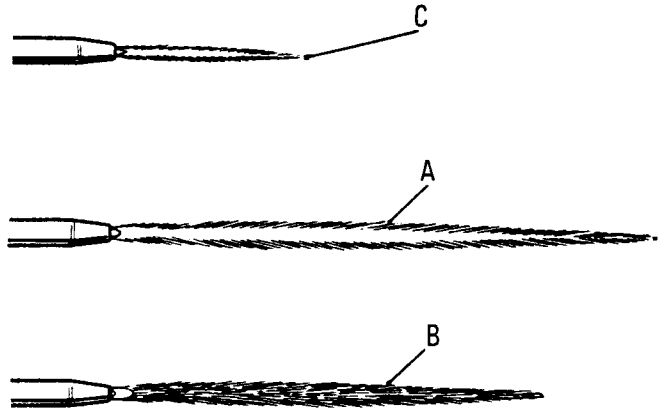


Fig M4.2

8. The flame should be smooth, quiet and neutral and have a brilliant inner core with a well-defined, rounded end as in (A). The hottest point of the flame is close to the jet, and the flame should have a blue to orange envelope becoming nearly colourless at the end.
9. A slightly reducing flame (B) may also be used, that is, there may be a slight excess of acetylene. Such a flame will have a brilliant inner core with a feathery white flame and a blue or orange envelope.
10. Do not use an oxydising flame (C) which has a short pointed inner core bluish white with a bluish envelope.
11. Use only 5 percent magnesium/aluminium welding rod (5Mg/A). Sifalumin No. 27 (MG.5 Alloy) (Use Sifbronze Special flux with this rod) or a 'Birmabright' offcut sheet. Do not use too wide or thick an offcut or trouble may be experienced in making it melt before the material which is being welded.
12. Clean off all grease and paint, dry thoroughly then clean the edges to be welded and an area at least 12,5 mm on either side of the weld with a stiff wire scratch brush or wire wool. Cleanliness is essential. Also clean the welding rod or strip with wire wool.
13. A special acid flux must be used, and we recommend 'Hari-Kari' which is obtainable from Afrox (South Africa).
14. A small quantity of 'Hari-Kari' may be made into a paste with water, following the directions on the tin, and the paste must be applied to both surfaces to be welded and also to the rod. In case of Sifbronze Special Flux, use in powder form as directed.

15. Remember that aluminium and its alloys do not show 'red-hot' before melting, and so there is nothing about the appearance of the metal to indicate that it has reached welding temperature. A little experience will enable the operator to gauge this point, but a useful guide is to sprinkle a little sawdust over the work; this will sparkle and char when the right temperature is approached; a piece of dry wood rubbed over the hot metal will sparkle at the point of contact.

16. As the flux used is highly acid, it is essential to wash it off thoroughly immediately after a weld is completed. The hottest possible water should be used, with wire wool or a scratch brush. Very hot soapy water is good, because of the alkaline nature of the soap, which will tend to 'kill' the acid.

17. It is strongly recommended that a few welds are made on scrap metal before the actual repair is undertaken if the operator is not already experienced in welding aluminium and its alloys.

18. The heat of welding will have softened the metal in the area of the repair, and it may be hardened again by peening with a light hammer. Many light blows are preferable to fewer heavy ones. Use a 'dolly' or anvil behind the work to avoid denting and deformation, and to make the hammering more effective. Filing of surplus metal from the weld will also help to harden the work again.

#### **Welding Tears and Patches**

19. If a tear extends to the edge of a panel, start the weld from the end away from the edge and also at this point drill a small hole to prevent the crack spreading, then work towards the edge.

20. When welding a long tear, or making a long welded joint, tack the edges to be welded at intervals of from 50 to 100 mm with spots. This is done by melting the metal at the starting end and fusing into it a small amount of the filler rod, repeating the process at the suggested intervals. After this, weld continuously along the joint from right to left, increasing the speed of the weld as the material heats up.

21. After the work has cooled, wash off all traces of flux as described previously, and file off any excess of build-up metal.

22. When patching, cut the patch to the correct shape for the hole to be filled, but of such size as to leave a gap of 0,8 mm between it and the panel, and then weld as described above. Never apply an 'overlay' patch.

23. For all body repairs work the gas welding method is sufficient and quite satisfactory.

#### **ELECTRIC WELDING**

##### **CAUTION**

*The battery earth lead must be disconnected before commencing electric welding, otherwise the alternator will be damaged.*

24. At the Rover factory the 'Argon-Arc' process is used, all atmospheric oxygen being excluded from the weld by the Argon gas shield.

#### **SPOT WELDING**

25. Spot-welding is largely used in the manufacture of Land Rover bodies, but this is a process which can only be carried out satisfactorily by the use of the proper apparatus.

26. Aluminium and its alloys are very good conductors of heat and electricity, and thus it is most important to maintain the right conditions for successful spot-welding. The correct current density must be maintained, and so must the 'dwell' of the electrodes. Special spot-welding machines have been developed, but they are expensive, and though the actual work can be carried out by comparatively unskilled labour, supervision and machine maintenance must be in the hands of properly qualified persons.

#### **RIVETING**

27. Where both sides of the metal are accessible and it is possible to use an anvil or dolly, solid aluminium rivets may be used, with a suitable punch or pop to ensure clean, rounded heads on the work. For riveting blind holes, pop-rivets must be used. These are inserted and closed by special 'Lazy-Tong' pop-rivet pliers.

## SUB-SECTION M5

### PAINTING THE BODY

#### GENERAL

1. Land Rover body panels are manufactured from a special aluminium-alloy known as 'Birmabright' and the following paintwork procedure should be followed on these panels.

#### PREPARATION

2. The area to be painted must be flatted to remove the hard oxide skin which forms on the surface of the alloy when exposed to the atmosphere. Degrease and dry the area, then apply a suitable etch-primer.
3. Unless an etch-primer is used, paint is liable to come away as it cannot 'key' into the hard oxide of an untreated alloy surface. The use of AECI Dulux Corrocote Twin Pack base and catalyst (reference 193-0821 and 115-0895) is recommended. It is quick and easy to apply, and it prolongs the life of the paint film by ensuring excellent adhesion.
4. The activated Etching Primer has a limited pot-life of about 8 hours at normal temperatures and should not be used after this time, as it may have inferior adhesion and corrosion resistance. Any Etching Primer which has been mixed for more than 8 hours must be thrown away, and not returned to the can.

#### APPLICATION

5. Apply Etching Primer as soon as possible after cleaning, and paint as soon as the pre-treatment is completed. Undue delay may cause the surface to be contaminated again and thus nullify the treatment. Do not leave pre-treated work overnight before it is painted.

6. Etching Primer, when followed by a suitable paint system, gives a film which is very resistant to moisture, but the Etching Primer itself is water sensitive. It should therefore be coated with paint as soon as possible when it is dry.

7. Activate the Etching Primer by mixing it with an equal volume of Activator P273-5021 and allow to stand for 10 minutes.

8. Adjust the spraying viscosity of the mixture if necessary to 22-25 sec. BSB4 Cup by adding small quantities of Thinner 851-565; never add more Activator.

9. Apply by spray to clean, dry surface in a thin uniform coat, rather than a thick heavy one which may impair adhesion.

10. Air dry for at least 15 minutes before applying undercoat by spray or for 2 hours before brush application. If required, these times can be shortened by force drying, this also gives increased hardness to the film.

11. Subsequent painting follows normal paintshop practice.

12. When wet flatting the subsequent paint layers take care not to rub through to the Etching Primer. If this does occur allow to dry out thoroughly, dry flat the area and spot in with Etching Primer.

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**SECTION N**

**HEATING AND VENTILATION**

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N3	REMOVAL AND REPLACEMENT PROCEDURES	N3.1
N4	MAINTENANCE	N4.1

## SUB-SECTION N1

### DESCRIPTION OF THE HEATING AND VENTILATION SYSTEM

1. Fresh air is drawn through a grille on the left hand wing by an electrically driven fan. The fan feeds a heat exchanger through which engine coolant is fed when heating is required or is shut off when heating is not selected.
2. The air from the heat exchanger is ducted to the cab for demisting purposes or to foot level vents under the control of a selector lever in the cab.
3. A separate lever in the cab controls a valve in the engine coolant system. Progressively opening the valve regulates the quantity of hot coolant fed to the heat exchanger.
4. Two hand operated vents under the windscreen are provided. Either or both of these may be opened to allow a direct flow of air into the cab.

## SUB-SECTION N2

### FAULT DIAGNOSIS AND CORRECTIVE ACTION

#### INTRODUCTION

1. This Sub-section deals with fault diagnosis and corrective action for the heating and ventilation system. Table N2.1 lists symptoms, probable causes and suggested remedial action in the event of a system fault developing. The Table is not exhaustive and should a fault occur which is not listed, the suspected component should be removed for closer examination.

TABLE N2.1 - HEATING AND VENTILATION FAULT DIAGNOSIS CHART

SYMPTOM	POSSIBLE CAUSE	REMEDY
Inefficient or no heating or demisting	Water valve cable broken. Water valve inoperative. Hot water pipes blocked.	Replace cable. Replace valve. Replace pipes.
Fan not turning	Electrical fault. Fan faulty.	Check circuit and repair. Replace fan.
System will not switch on (or off)	Cable disconnected or broken.	Reconnect or replace cable.



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### SUB-SECTION N3

#### REMOVAL AND REPLACEMENT PROCEDURES

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## SUB-SECTION N3

### CHAPTER 1

#### HEATER CONTROLS - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the heater controls in the cab:

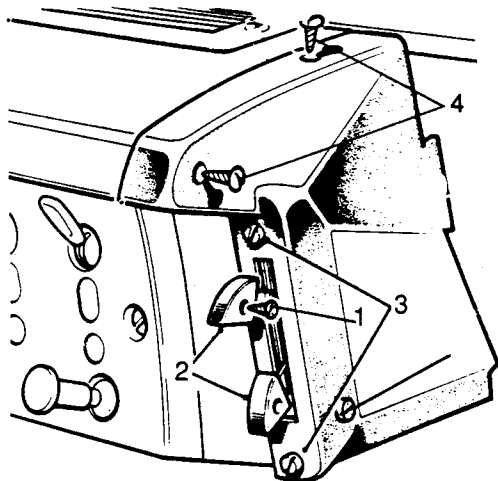


Fig N3.1

- (1) Refer to Fig N3.1. Remove the fixings (1) and withdraw the finger grips (2).
- (2) Remove the fixings, control lever assembly to end panel (3).
- (3) Withdraw the instrument panel clear of the dash (see Sub-section O5, Chapter 27).
- (4) Remove the end panel fixings (4). The lower screw at the side has a loose nut behind the instrument panel.

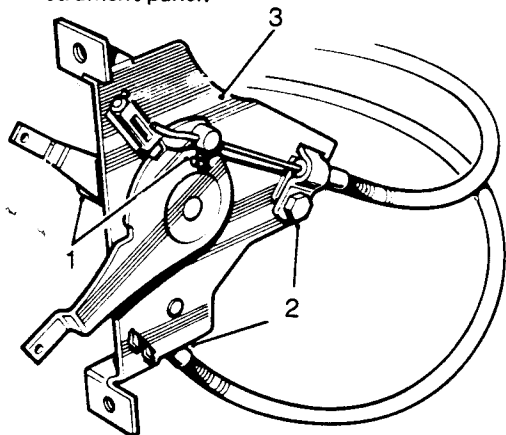


Fig N3.2

- (5) Refer to Fig N3.2. Slacken the inner cables grub screws (1).
- (6) Slacken the outer cables clamp screws (2).
- (7) Withdraw the heater control assembly (3).

##### REPLACEMENT

2. To replace the heater controls:

- (1) Refit the control cables outers under the clamps and tighten the clamp screws. Note that the cable from the left hand lever is connected to the water valve in the engine compartment.
- (2) Fit the cable inners to the levers and temporarily tighten the grub screws.
- (3) Operate each lever and check that the left hand lever causes the water valve push rod to operate over the full range. The right hand lever should operate the air distribution flaps from fully open to fully closed.

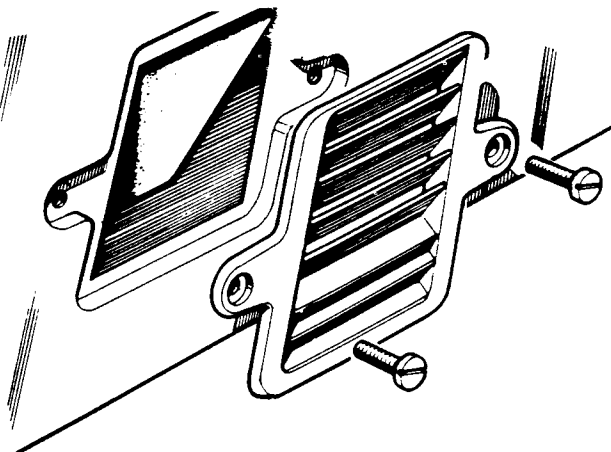


Fig N3.3

##### NOTE

Refer to Fig N3.3. The operation of the flaps can be checked by removing the air outlet grilles in the lower facia.

- (4) Slacken the grub screws and adjust the cable inners if necessary until the water valve and flaps operate over the correct range. Tighten the grub screws.
- (5) Offer up the control assembly to the end plate and secure with the two fixing screws ((3) on Fig N3.1).
- (6) Replace the end panel and secure with the three screws. The lower screw has a loose nut behind the dash.
- (7) Replace the finger grips: HOT/COLD to the left hand lever and DEF/CAR to the right hand lever.
- (8) Refit the instrument panel into the dash.

## SUB-SECTION N3

### CHAPTER 2

#### AIRFLOW CONTROL CABLE - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the heater/ventilator air flow control cable:
  - (1) Remove the heater controls up to step (4) in Sub-section N3, Chapter 1.
  - (2) Remove the lower fascia.

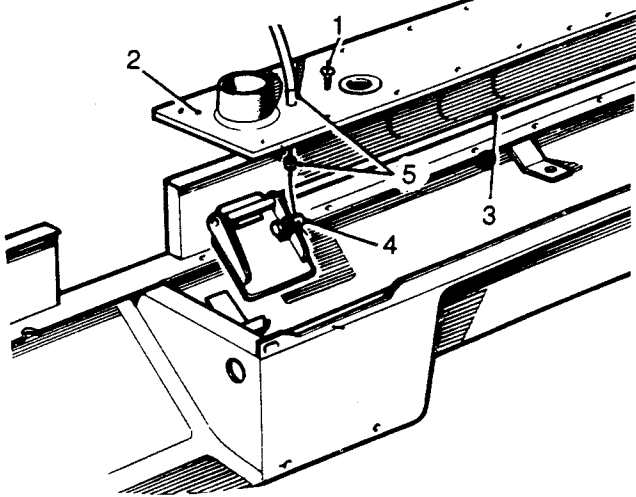


Fig N3.4

- (3) Refer to Fig N3.4. Remove the heater ducting cover fixings (1).
- (4) Withdraw the ducting cover (2) to gain access to the air distribution flaps.

- (5) Withdraw the distribution flaps from the fascia (3).
- (6) Disconnect the inner cable at the flaps (4).
- (7) Withdraw the outer cable (5) retained at the ducting cover by a tubular clip.

##### REPLACEMENT

2. Replace the air flow control cable as follows:
  - (1) Refit the outer cable (5) and secure.
  - (2) Connect the inner cable to the flaps (4).
  - (3) Fit the distribution flaps to the fascia (3).
  - (4) Replace the ducting cover (2) and secure with the fixings (1).
  - (5) Replace the lower fascia.
  - (6) Refit the heater controls (see Sub-section N3, Chapter 1).

## SUB-SECTION N3

### CHAPTER 3

#### HEATER WATER VALVE CONTROL CABLES - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the cable:
  - (1) Remove the heater controls (see Sub-section N3, Chapter 1).

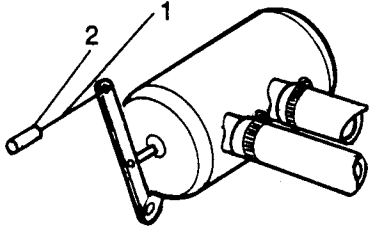


Fig N3.5

- (2) Refer to Fig N3.5. Disconnect the inner (1) and outer (2) cables at the water valve control lever (3).
- (3) Withdraw the cable through the dash grommet.

##### REPLACEMENT

2. Replace the cable as follows:
  - (1) Feed the cable end through the grommet in the dash.
  - (2) Connect the inner and outer of the cable to the water valve control lever. Do not tighten the inner fixing at this stage.
  - (3) Replace the heater controls (see Sub-section N3, Chapter 1).
  - (4) Set the water valve in the closed position (push rod fully in).
  - (5) Set the cable control lever in the fully up 'cold' position.
  - (6) Take up all slack in the inner cable then tighten the inner cable fixing at the water control valve lever.

## SUB-SECTION N3

### CHAPTER 4

#### HEATER WATER VALVE - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the water valve:

- (1) Partially drain the coolant from the radiator.

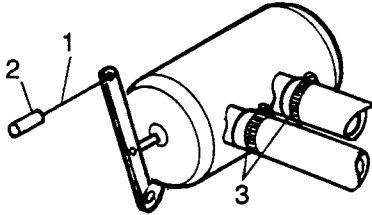


Fig N3.6

- (2) Refer to Fig N3.6. Slacken the inner (1) and outer (2) cable fixings.
- (3) Free the inner cable and withdraw from the valve.
- (4) Release the heater hose clips (3) and slide the hoses away from the valve.
- (5) Remove the fixings and lift out the valve.

##### REPLACEMENT

2. Replace the valve as follows:

- (1) Fit the valve into position and secure with the fixings.
- (2) Slide the heater hose out the valve and tighten the hose clips.
- (3) Replace the inner and outer cables and tighten the outer cable clamp. Do not tighten the inner cable fixing at this stage.
- (4) Set the water valve in the closed position (push rod fully in).
- (5) Set the control lever in the cab to cold (up).
- (6) Take up all the slack in the inner cable and tighten the fixing.
- (7) Refill the radiator.

## SUB-SECTION N3

### CHAPTER 5

#### HEATER FAN SWITCH - REMOVAL AND REPLACEMENT

##### REMOVAL

1. Remove the switch as follows:

- (1) Disconnect the battery earth lead.

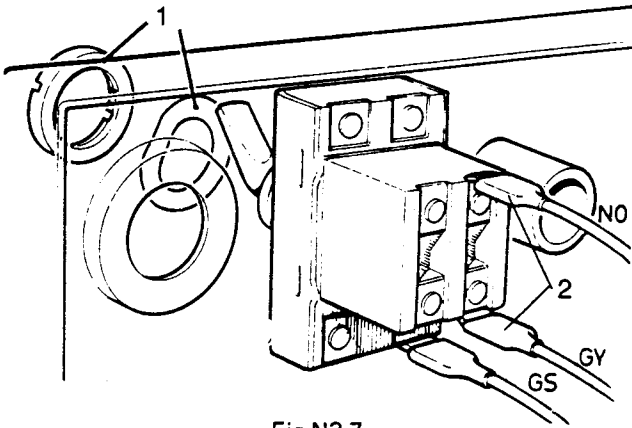


Fig N3.7

- (2) Refer to Fig N3.7. Unscrew the lockring (1) and withdraw the wave washer from the switch knob.
- (3) Withdraw the instrument panel from the dash (see Sub-section O5, Chapter 27).
- (4) Disconnect the leads from the switch.
- (5) Withdraw the switch.

##### REPLACEMENT

2. To replace the switch:

- (1) Fit the switch into the instrument panel. Orientate with the two inner terminals (2) on the right looking at the back of the switch.
- (2) Secure the switch with the wave washer and lockring.
- (3) Reconnect the leads to the switch terminals as shown in the illustration above.
- (4) Replace the instrument panel into the dash.
- (5) Reconnect the battery earth lead.

##### Lead colours:

N - Brown  
O - Orange  
G - Green  
Y - Yellow  
S - Slate

DEMISTER HOSE - REMOVAL AND REPLACEMENT

REMOVAL

Passenger's Side Hose

1. To remove the hose on the passenger side:

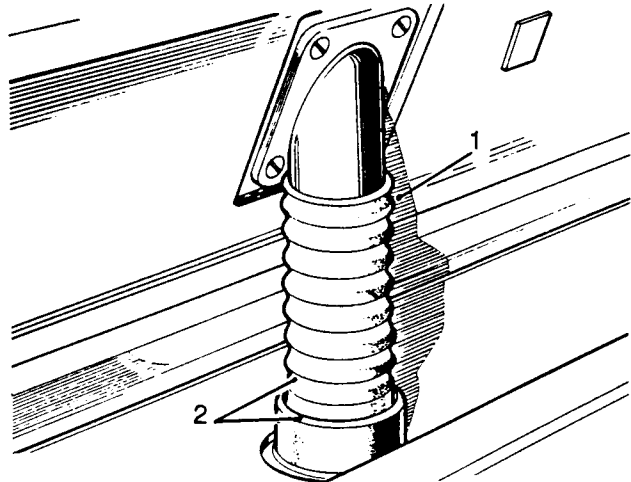


Fig N3.8

- (1) Refer to Fig N3.8. Pull the hose upper end (1) off the nozzle adaptor.
- (2) Withdraw the hose from the rubber connector (2).

Driver's Side Hose

2. To remove the hose on the driver's side:

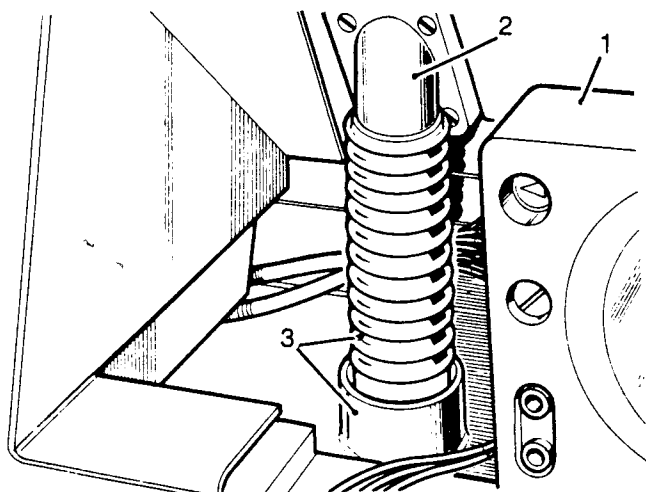


Fig N3.9

- (1) Refer to Fig N3.9. Withdraw the instrument panel (1) sufficiently to gain access to the hose (see Sub-section O5, Chapter 27).
- (2) Pull the upper end of the hose downwards off the nozzle adaptor (2).

- (3) Withdraw the hose from the rubber connector (3).

REPLACEMENT

Passenger Side Hose

3. To replace the passenger side hose:

- (1) Fit the hose, either way up, into the rubber connector.
- (2) Slide the upper end of the hose over the nozzle adaptor.

Driver's Side Hose

4. Replace the hose as follows:

- (1) Fit the hose, either way up, into the rubber connector.
- (2) Slide the upper end of the hose over the nozzle adaptor.
- (3) Replace the instrument panel.

## SUB-SECTION N3

### CHAPTER 7

#### DEMISTER NOZZLES - REMOVAL AND REPLACEMENT

##### REMOVAL

###### Passenger's Side Nozzle

1. To remove the nozzle:

- (1) Remove the demister hose (see Sub-section N3, Chapter 6).

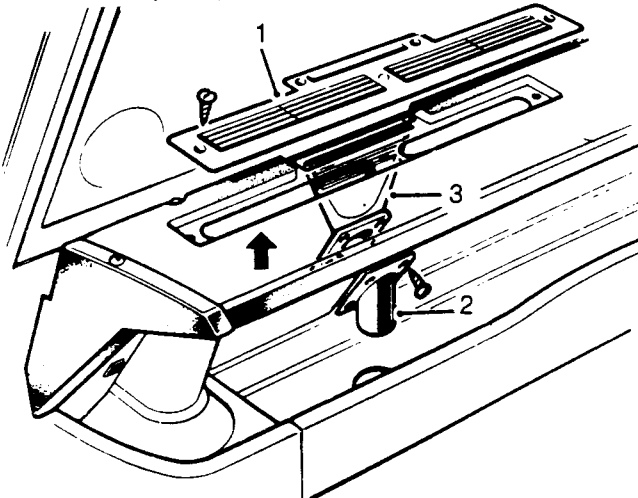


Fig N3.10

- (2) Refer to Fig N3.10. Remove the fresh air grille (1) (two screws).
- (3) Remove the nozzle adaptor fixings and withdraw the adaptor (2).
- (4) Manoeuvre the nozzle (3) out through the fresh air grille aperture.

###### Driver's Side Nozzle

2. Remove the nozzle as follows:

- (1) Disconnect the battery earth lead.
- (2) Remove the upper and lower shrouds from the steering column (6 screws). Note that the large screws in the bottom shroud holds the fuse box. Do not remove these screws.

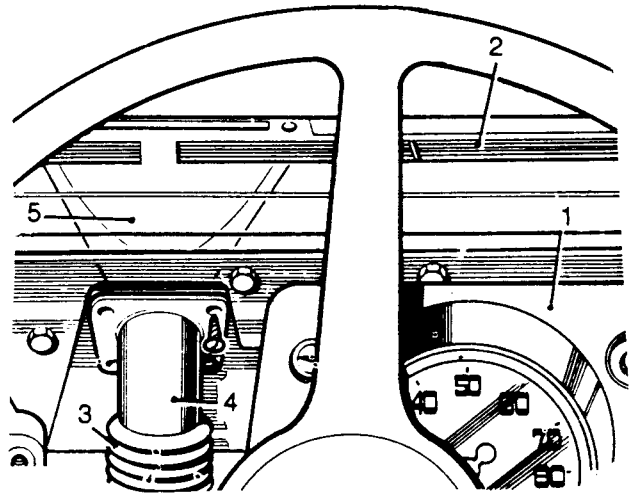


Fig N3.11

- (3) Refer to Fig N3.11. Withdraw the instrument panel (1) clear of the dash (see Sub-section O5, Chapter 27).
- (4) Remove the fresh air grille (2) (two screws).
- (5) Withdraw the demister hose (3) (see Sub-section N3, Chapter 6).
- (6) Remove the fixings from the nozzle adaptor (4) and remove the adaptor.
- (7) Manoeuvre the nozzle (5) out through the fresh air grille aperture.

##### REPLACEMENT

###### Passenger's Side Nozzle

3. To replace the nozzle:

- (1) Manoeuvre the nozzle in through the fresh air grille aperture.
- (2) Fit the nozzle adaptor and secure with the four screws.
- (3) Replace the fresh air grille.
- (4) Replace the demister hose (see Sub-section N3, Chapter 6).



#### **Driver's Side Nozzle**

4. Replace the driver's side nozzle as follows:

- (1) Manoeuvre the nozzle into position through the fresh air grille aperture.
- (2) Fit the nozzle adaptor and secure with the four screws.
- (3) Replace the demister hose (see Sub-section N3, Chapter 6).
- (4) Refit the fresh air grille (two screws).
- (5) Replace the instrument panel in the dash.
- (6) Refit the upper and lower shrouds to the steering column.
- (7) Reconnect the battery earth lead.

## SUB-SECTION N3

### CHAPTER 8

#### VENTILATOR GRILLE PANEL AND QUADRANT ASSEMBLY - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the grille panel and quadrant assembly:

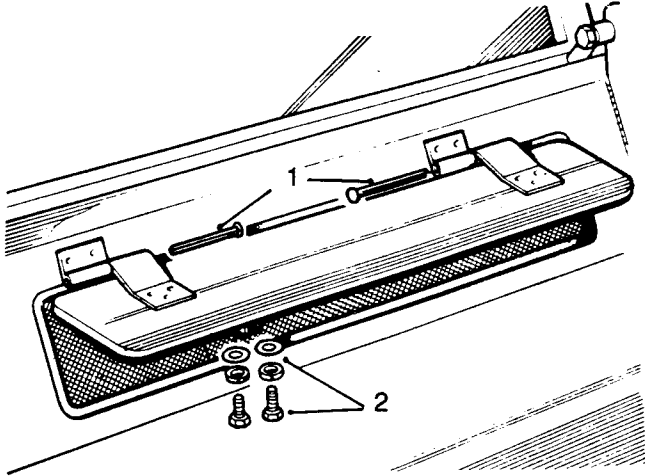


Fig N3.12

- (1) Refer to Fig N3.12. Remove the hinge pins (1) and grille panel.
- (2) Remove the control lever fixings (2).

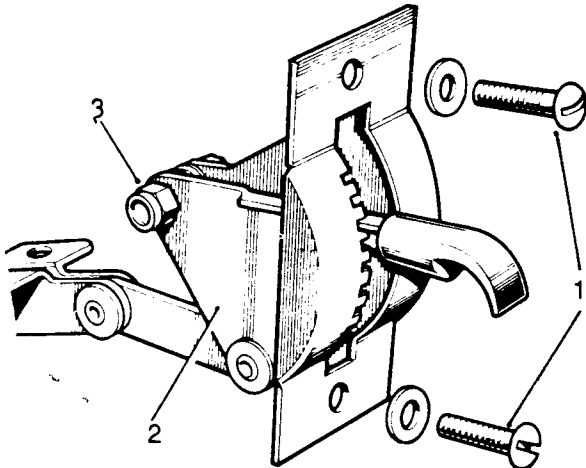


Fig N3.13

- (3) Refer to Fig N3.13. Remove the ventilator to dash fixings (1) and withdraw the ventilator control and quadrant assembly (2).

##### REPLACEMENT

2. Replace the grille panel and quadrant as follows:
  - (1) Check lever operation in the quadrant. If required adjust the special locknut (3) to alter the spring loading on the lever.
  - (2) Replace the ventilator control and quadrant assembly and secure with the ventilator to dash fixings.
  - (3) Refit the control lever fixings.
  - (4) Replace the grille and hinge pins.

## SUB-SECTION N3

### CHAPTER 9

#### FRESH AIR INTAKE - REMOVAL AND REPLACEMENT

##### REMOVAL

1. Remove the fresh air intake on the left hand side fender just in front of the passenger door as follows:

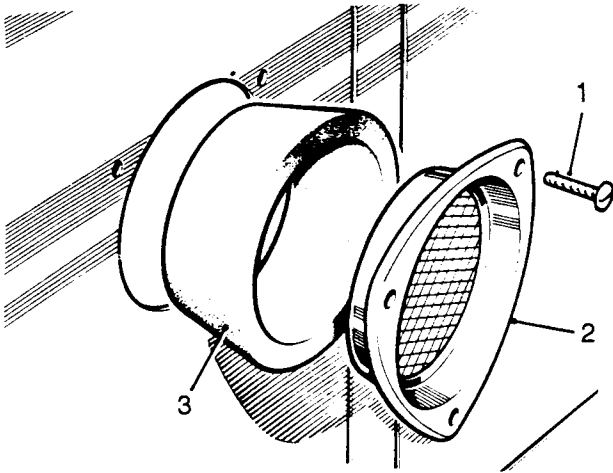


Fig N3.14

- (1) Refer to Fig N3.14. Remove the fixings (1).

- (2) Withdraw the intake grille assembly (2).

- (3) If required, withdraw the air inlet seal (3).

##### REPLACEMENT

2. To replace the fresh air intake:

- (1) Refit the air inlet seal (3).

- (2) Replace the intake grille assembly (2) and secure with the fixings (1).

## SUB-SECTION N3

### CHAPTER 10

#### HEATER BOX COMPLETE - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the heater box:

- (1) From inside the cab remove the trim stuck to the bulkhead panel.

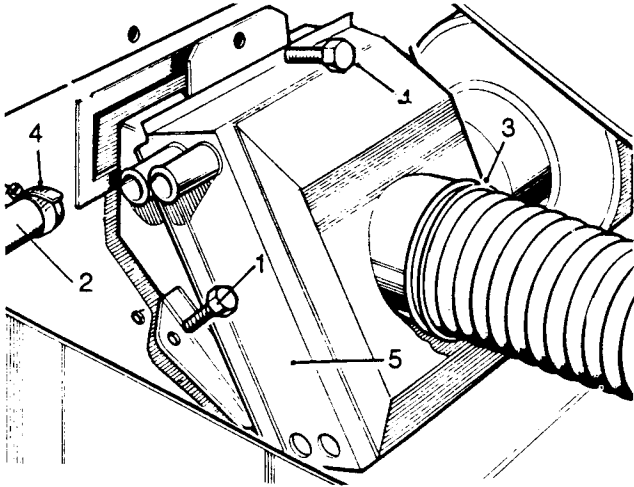


Fig N3.15

- (2) Refer to Fig N3.15. Open the bonnet and remove the heater box lower fixings (1).
- (3) Disconnect the heater water hoses (2).
- (4) Disconnect the air inlet hose (3).
- (5) Remove the heater box upper fixing (4).
- (6) Withdraw the heater box (5).

2. If radiator removal is required for inspection purposes, continue as follows:

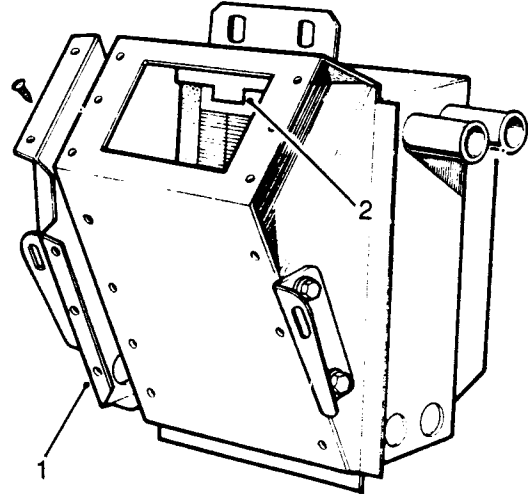


Fig N3.16

- (1) Refer to Fig N3.16. Remove the fixings and withdraw the detachable side panel (1).
- (2) Withdraw the radiator and pipes assembly. (2)

##### REPLACEMENT

3. Fit the radiator if it has been removed:

- (1) Replace the radiator and pipes assembly.
- (2) Refit the side panel and secure with the fixings.

4. Replace the heater box:

- (1) Fit the heater box into position and secure with the upper and lower fixings.
- (2) Refit the air inlet hose.
- (3) Restick the trim to the bulkhead panel.

## SUB-SECTION N3

### CHAPTER 11

#### HEATER/BLOWER FAN MOTOR - REMOVAL AND REPLACEMENT

##### REMOVAL

1. To remove the motor:

- (1) Disconnect the battery earth lead.
- (2) Disconnect the blower motor leads ((1) on Fig N3.18).
- (3) From inside the cab, remove the trim stuck to the bulkhead panel.

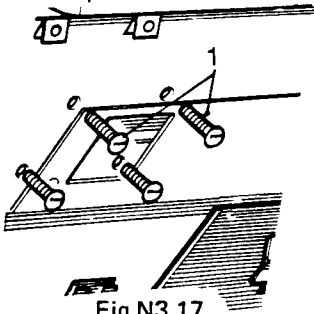


Fig N3.17

- (4) Refer to Fig N3.17. Still inside the cab, remove the blower motor fixings (1).

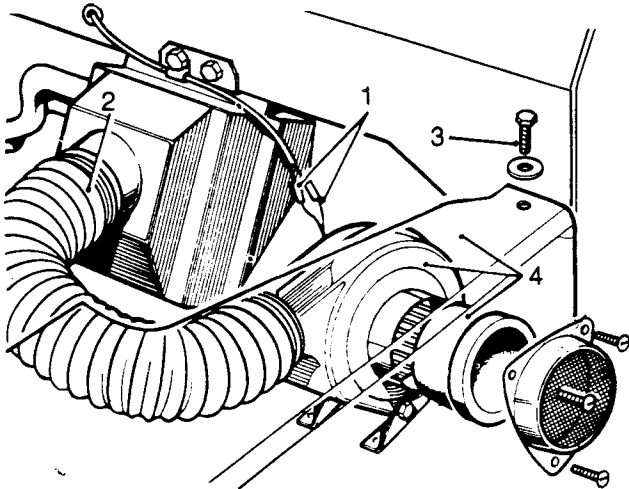


Fig N3.18

- (5) Refer to Fig N3.18. Lift the bonnet and disconnect the air hose at the matrix inlet (2).
- (6) Remove the wing panel rear top fixing bolt (3).

(7) Manoeuvre the blower motor assembly clear, lifting the wing panel sufficiently to allow passage. (4)

(8) Remove the air inlet seal (see Sub-section N3, Chapter 9).

##### REPLACEMENT

2. To replace the blower motor:

- (1) Place the motor in position.
- (2) Fit the air inlet seal and replace the intake grille (see Sub-section N3, Chapter 9).
- (3) Replace the wing panel rear top fixing bolt.
- (4) Reconnect the air hose to the matrix inlet.
- (5) In the cab, replace the blower motor fixings ((1) on Fig N3.17).
- (6) Restick the trim to the bulkhead panel.
- (7) Back in the engine compartment, reconnect the blower motor leads: The brown lead with the green marker band connects to the green/slate lead. The green lead connects to the green/yellow lead.
- (8) Reconnect the battery earth lead.

## SUB-SECTION N4

### MAINTENANCE

1. The heating and ventilating system is relatively trouble free, requiring only periodic inspection for obvious defects.
2. At intervals, check for water leaks from the joints in the hoses to the water valve. Check for smooth operation of the water valve rod and cable.
3. Keep the electrical leads to the blower motor clean and ensure that the connections are tight. Wipe off accumulated dust and dirt with a clean, dry cloth and clean the air inlet grille occasionally.