

# HEATING AND WINDSCREEN WASHING EQUIPMENT

## SECTION O

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# HEATING AND WINDSCREEN WASHING EQUIPMENT

## CAR HEATING AND VENTILATING SYSTEM

### DESCRIPTION

The car heating and ventilating system consists basically of a heating element and two two-speed electrically driven fans.

Air from the heating and ventilating system is directed via ducts to:—

- The front of the car through variable outlets (one on the driver's side and one on the passenger's side).
- The variable facia outlets.
- To the rear of the car through directional controlled outlets situated on the propeller shaft tunnel cover between the front seats. (Not 2.8 litre standard equipment model).
- Two vents at the base of the windscreen to provide demisting and defrosting.

The facia outlets will provide fresh air at ambient temperatures only.

When air conditioning equipment is fitted, but is not in operation, fresh air at ambient temperature will not be available at the adjustable facia outlet when the fans are switched on. In this condition these will deliver heated air, at the selected temperature only.

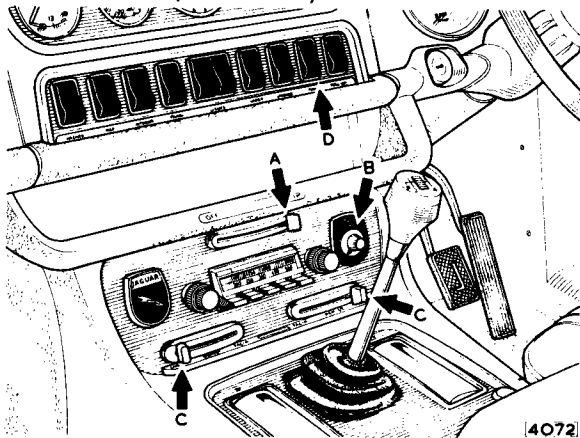


Fig. 1 The front heating and ventilating controls

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| A Fresh air intake control quadrant | C Demist/defrost control quadrant |
| B Heat control                      | D Fan switch                      |

### HEATER CONTROLS (Fig. 1)

#### Heat

The control marked 'HOT' on the right-hand side of the panel located in the console regulates the temperature available from the car heat ducts.

Progressive movement of the knob clockwise will adjust the control to give the required temperature.

#### Air

Operation of the lever in the quadrant, mounted in the console panel centrally above the radio aperture, from left to right will progressively open the flap in the scuttle vent box and will as a result vary the amount of cold fresh air admitted to the car.

### THE FAN SWITCH

The heater fans for the car heating and ventilating system considerably increase the flow of air through the system and are controlled by a three position switch (marked 'FAN' on the indicator strip) on the instrument panel.

Press the switch rocker to the central position for slow speed and the lower position for maximum speed whichever is required.

Operation of the fan is required mainly when the car is stationary or running at slow speed. At higher road speeds it will be found possible to dispense with the fan as air will be forced through the system due to the passage of the car through the air.

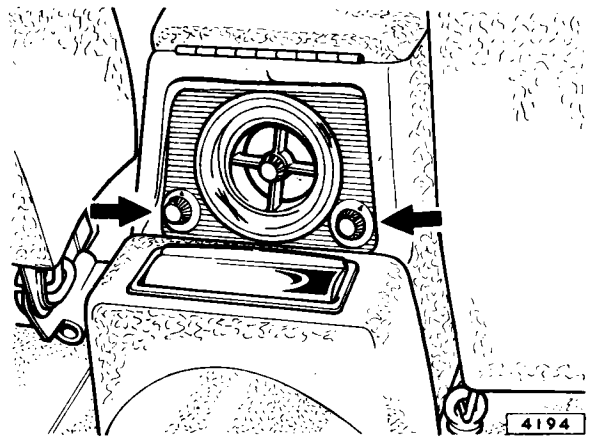


Fig. 2 The rear outlet controls

### AIR DISTRIBUTION

The system incorporates two adjustable facia outlets for the ducting of fresh air at ambient temperatures.

Under all conditions, with the heater operational, these outlets will deliver fresh air taken from the high pressure side of the blower fan.

The maximum volume of air obtainable will be dependent on the speed of the car (ram air) or the speed of the fans (slow/fast).

Turning the centre knob of the outlet clockwise will open the outlet shutter, directional air flow being adjusted by pivoting in the spherical mounting.

The two front and rear outlets and also the demisting outlets at the base of the windscreen operate whenever the system is working.

To obtain the maximum amount of air at the windscreen, both front and rear outlets should be closed. Moving the quadrant levers mounted below the radio aperture in the console panel towards 'FACIA' or 'DEMIST' will close the front outlets and deflect the air to the base of the screen. The movement of the lever to 'FACIA' will give full defrost.

The rear outlets (right and left-hand side) can be controlled by movement of individual levers to direct the air from the side to the centre apertures.

Pivoting the centre outlets on the spherical mountings will direct the air in an upward direction.

Turning the knobs anti-clockwise will shut off the air supply.

# HEATING AND WINDSCREEN WASHING EQUIPMENT

## OPERATION

### COLD WEATHER

#### To obtain heating and demisting

- (a) Adjust the 'HOT' control to give the desired temperature and allow a short period to elapse to permit the heater matrix to warm up.
- (b) Adjust the central facia quadrant to give the required fresh air intake.
- (c) Switch on the fans at the desired speeds.
- (d) Open the rear outlets if required.
- (e) Adjust the two lower facia controls to give the desired degree of car heat or demist.

#### To obtain rapid demisting or defrosting

- (a) Adjust the 'HOT' control to the maximum and allow a short period to elapse to permit the heater matrix to warm up.
- (b) Adjust the central facia quadrant to give the required fresh air intake.
- (c) Switch on the fans at the fast speeds.
- (d) Close the rear outlets.
- (e) Adjust the two lower facia controls to 'DEMIST' or 'FACIA.'

### HOT WEATHER

#### To obtain ventilation and demisting

- (a) Adjust the 'HOT' control to minimum (first position).
- (b) Adjust the central facia quadrant to give required fresh air intake.
- (c) Switch on the fans at the desired speed.
- (d) Open the rear outlets if required.
- (e) Adjust the two lower facia controls to give the desired degree of car ventilation or demist.

#### To obtain rapid demisting

- (a) Adjust the 'HOT' control to minimum (first position).
- (b) Adjust the central quadrant to give the required fresh air intake.
- (c) Switch on the fans at the desired speed.
- (d) Close the rear outlets.
- (e) Adjust the two lower facia controls to 'DEMIST'.

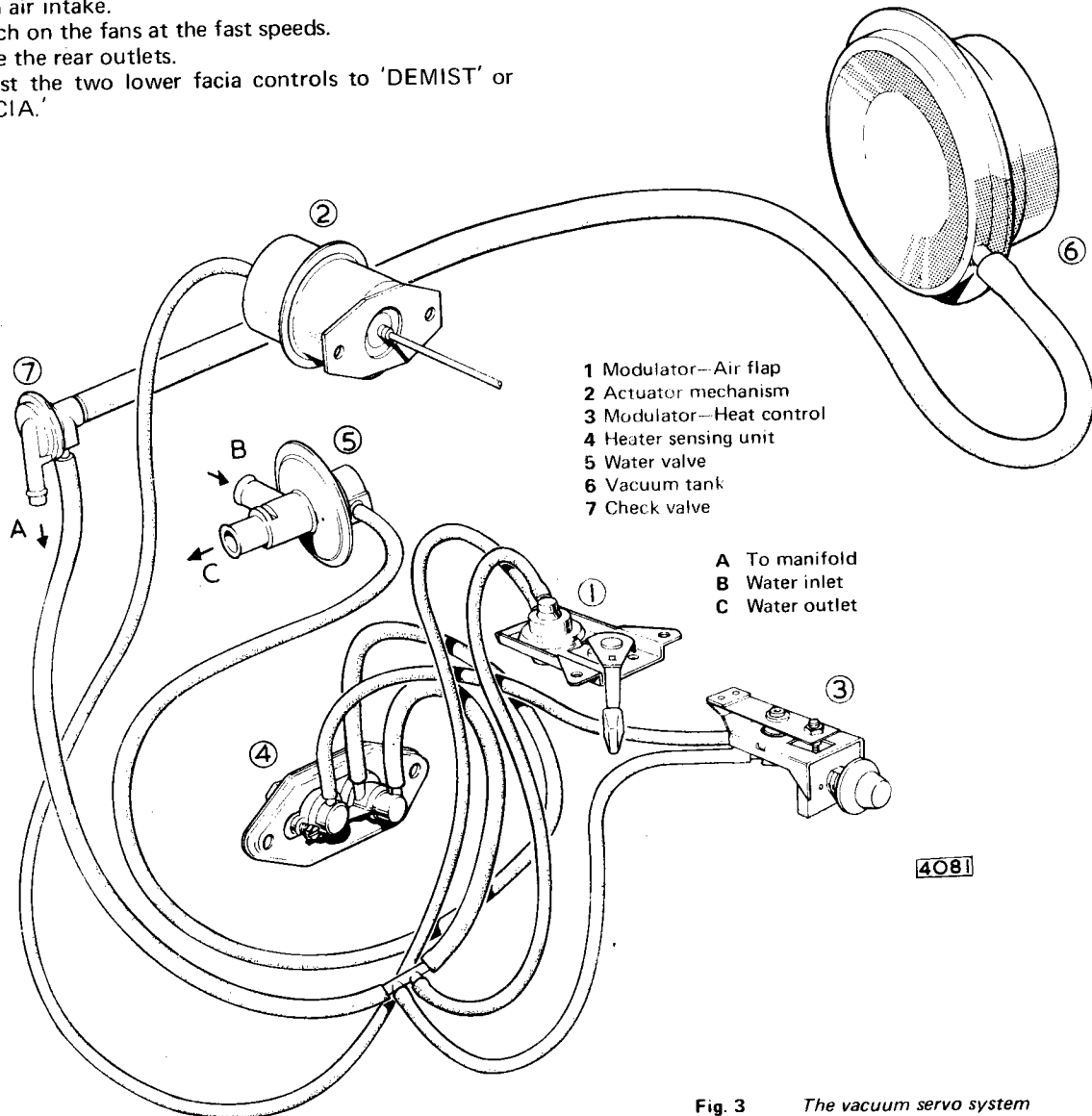


Fig. 3 The vacuum servo system

## HEATING AND WINDSCREEN WASHING EQUIPMENT

### VACUUM SERVO SYSTEM

#### Description (Fig. 3)

The vacuum servo system consists of the following components:—

- Flap control quadrant modulator (1)
- Flap actuator (2)
- Heat control rotary modulator (3)
- Heat sensing unit (4)
- Water valve (5)
- Vacuum supply tank with non-return valve (6)

The flap actuator (2) and the water valve (5) are sealed vacuum servo units.

The vacuum supply tank will provide approximately six complete operations with the ignition switched off.

Plastic tubing is used to provide the line connections between the various units.

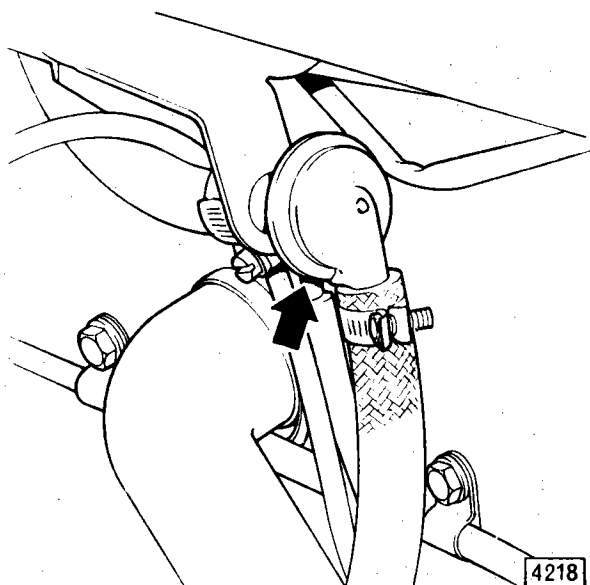


Fig. 4 Location of non-return valve

### THE FLAP ACTUATOR (2)

The flap actuator is a sealed vacuum unit and must be replaced if faulty.

Depression from the vacuum tank via the modulator causes movement of the diaphragm in the actuator, which is then transmitted by the coupling rod to the flap in the plenum chamber.

The opening of this flap will allow fresh air at ambient temperature to be drawn into the heating system.

#### Removal

Prise off the air intake grille from the scuttle by inserting two small screwdrivers or similar tools at opposite points of the surround.

Care must be taken not to damage the paintwork.

The grille is retained at two points by captive nylon bushes. Raise the bonnet and detach the vacuum pipe from the unit.

Remove two nuts, accessible inside the plenum chamber, and withdraw the securing bolts.

Disconnect the coupling rod from the flap and remove the actuator.

#### Refitting

Refitting is the reverse of the removal procedure.

Care must be taken to ensure that no pre-load is placed on the diaphragm when connecting the coupling rod to the flap.

Adjust the rod length by screwing in or out as necessary.

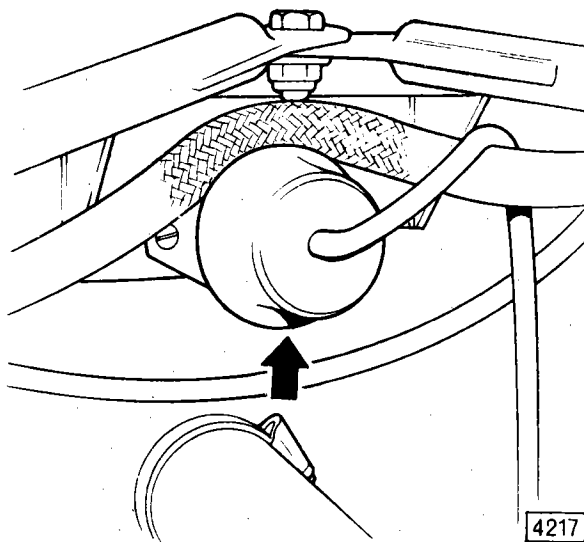


Fig. 5 Location of flap actuator

### FLAP CONTROL QUADRANT MODULATOR

The control modulator, mounted centrally in the panel above the radio aperture, is a lever operated control valve. Movement of the lever opens or closes a conical valve, thus allowing a greater or smaller degree of vacuum to exist between the vacuum tank and the flap actuator which, in turn, will control the movement of the diaphragm, attached coupling and the flap.

Moving the lever from right to left opens the valve.

The modulator is a sealed unit, no adjustment or repair is permissible.

Replace as a complete assembly if faulty.

#### Removal

Withdraw the knobs from the three control levers.

Remove the knobs from the heat control rotary modulator and the radio console (if fitted).

Insert a small screwdriver or similar tool behind the lever escutcheons and lever away from the nylon bush retainers. Care must be taken that the panel facia is not scratched.

Detach the panel facia.

Remove four pan-headed screws and withdraw the panel rearwards to gain access to the modulator securing screws.

Disconnect the vacuum pipes, remove the two pan-headed screws and nuts, and detach the modulator unit.

Note the location of the vacuum pipes for reference when refitting.

#### Refitting

Refitting is the reverse of the removal procedure.

## HEATING AND WINDSCREEN WASHING EQUIPMENT

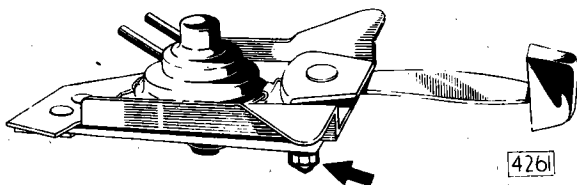


Fig. 6 The flap control modulator

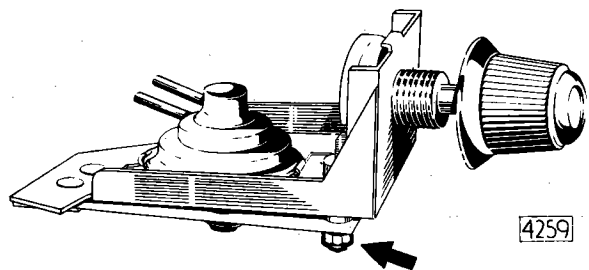


Fig. 8 The heat control modulator

### WATER VALVE SERVO UNIT

The water valve is sealed during manufacture and must be replaced if faulty.

Depression from the vacuum tank via the heat control rotary modulator and the heat sensing unit causes movement of the diaphragm in the valve which regulates the flow of water through the matrix.

#### Removal

Drain the coolant from the cooling system by opening the radiator drain tap.

Conserve the coolant if an anti-freeze is in use.

Release the hose clips and withdraw the hose from the unit. Remove the small vacuum tube from the connecting nipple and detach the unit.

#### Refitting

Refitting is the reverse of the removal procedure.

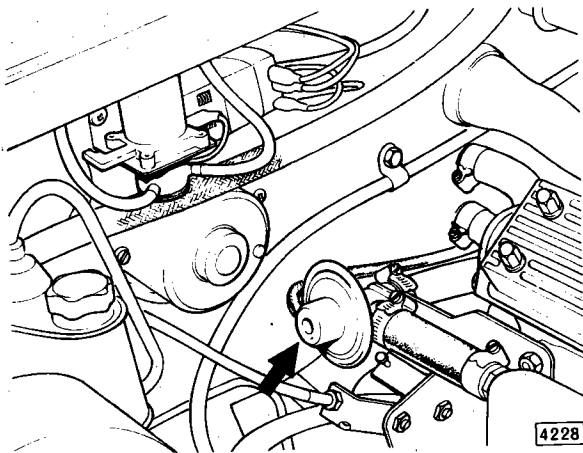


Fig. 7 The water valve servo unit

### HEAT CONTROL ROTARY MODULATOR

Operation of the modulator is basically the same as the flap control unit, movement of the valve being controlled by a cam attached to the rotary valve knob.

Access to the unit for removal and refitting purposes is identical to that described under 'FLAP CONTROL QUADRANT,' page O.5.

The modulator is a sealed unit and no adjustment or repair is permissible. Replace if faulty.

### HEAT SENSING UNIT

The heat sensing unit, located in the air ducts below the instrument panel, is a vacuum operated valve installed in the system to automatically control the coolant flow through the water valve irrespective of the engine water pump speed in order to maintain the temperature of the heater to that selected by the rotary modulator.

The heat sensing unit consists of two valves interconnected by a bi-metal strip.

Referring to the heater control circuit diagram (Fig. 3) it will be seen that the manifold depression (vacuum) operates through the heat control modulator to a valve connection at one end of the sensing unit.

This valve applies a bias on the bi-metal strip which acts on the second valve in the unit.

This, in turn, provides a direct connection from the vacuum tank to the water valve, thus regulating the diaphragm movement to the selected temperature.

Heat loss due to reduced engine water pump flow speed will be sensed by the bi-metal strip which will then react and open the water valve further, allowing a greater volume of water to pass through the matrix and so automatically maintain the heat requirements.

#### Removal

Remove the heater control panel as detailed under 'FLAP CONTROL QUADRANT MODULATOR.'

Disconnect the three vacuum pipe connections, withdraw two screws and remove the sensing unit.

Note the location of the pipes for reference when refitting. **Note:** The sensing unit is sealed during manufacture and no adjustment or repair is permissible. Faulty units must be replaced as complete assembly.

#### Refitting

Refitting is the reverse of the removal procedure.

Check the condition of the joint between the sensing unit and the heater duct and renew if necessary.

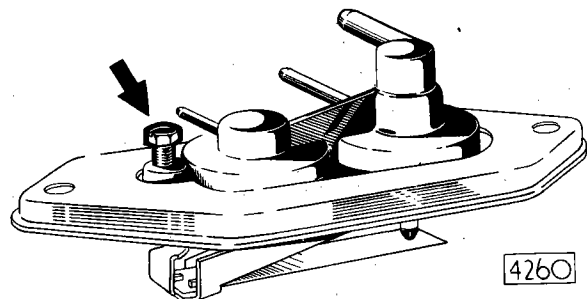


Fig. 9 The heat sensing unit

## HEATING AND WINDSCREEN WASHING EQUIPMENT

### HEATER FANS

The heater fans are heavy duty motors with attached nylon impellers. Speed variation is controlled by resistance units wired in series.

The circuit diagram is shown in Fig. 10.

#### Removal

Disconnect the motor cables from the resistance units on the bulkhead.

Remove three self-tapping screws securing the motor mounting plates to the bulkhead.

Remove the cables from the clips and withdraw the motor(s) with attached mounting plate. Note the sealing gasket.

Detach the impeller(s), withdraw three screws and remove the mounting plate from the motor.

No servicing is possible with the units, if faulty, replacements must be fitted.

#### Refitting

Refitting is the reverse of the removal procedure.

Renew sealing gasket(s) if damaged.

The fan units are handed for right and left-hand rotation. Care must be taken to ensure that the units are not reversed when refitted.

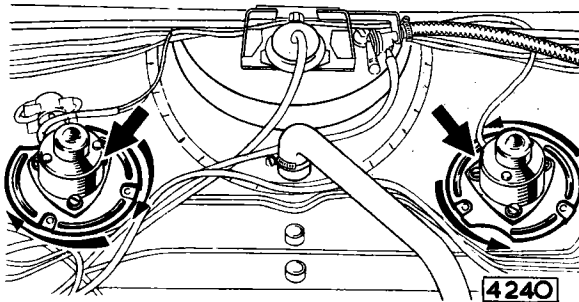


Fig. 10 The fan location showing direction of rotation

### HEATER MATRIX

The heater matrix is located on brackets attached to the bulkhead and is retained in position by the compression of foam rubber pads when the heater air-duct assembly is fitted.

#### Removal

Drain the cooling system, conserve the coolant if an anti-freeze is in use.

Disconnect the battery.

Release the clips and detach the two rubber hoses from the matrix connections.

Remove the radio/heater control panel as detailed on page P.76.

Disconnect the radio (if fitted) and the heater control pipe connections. Note the location of the individual control unit connections for reference when refitting.

Remove the side facia panels and the centre instrument panel as detailed in Section N – Body and Exhaust System, page N.5.

Remove the gearbox console cover as detailed on page N.5.

Remove four nuts, bolts and lockwashers and detach the two struts supporting the facia assembly.

Withdraw four drive screws and detach the right and left hand air duct assemblies.

Extract eight retaining screws and remove the plenum chamber from the bulkhead.

Withdraw the heater matrix.

#### Refitting

Refitting is the reverse of the removal procedure. Renew all plastic foam pads and joints as necessary.

## WINDSCREEN WASHER

#### Description

The windscreen washer equipment consists of a high density polythene water container, a separate flange mounted electric motor, a centrally mounted twin jet spray unit, and the operating switch. The units are inter-connected by plastic tubing.

#### Operation

The windscreen washer should be used in conjunction with the windscreen wipers to remove foreign matter that settles on the screen.

Press the rocker switch (marked 'Washer' on the indicator switch) when the washer should operate immediately; release the switch when sufficient water has been delivered to the windscreen.

The washer should not be used under freezing conditions as the water spread over the windscreen by the blades will tend to freeze up.

In the summer, the washer should be used freely to remove insects before they dry and harden on the glass.

Proprietary brands of windscreen washer fluid may be added to assist removal and dissolve greasy smears from the glass.

In cold weather the water container can be given a safe degree of protection from frost damage down to  $-28$  deg. F ( $-33$  deg. C) by the use of proprietary anti-freeze solvents as marketed by 'TRICO' or 'HOLTS.'

Instructions regarding the use of the solvent will be found on the container.

Denatured alcohol (methylated spirits) must NOT be used. The use of this chemical will discolour the paintwork.

#### Filling Up

Remove the plastic tube from the container outlet nozzle and unscrew the filler cover.

The correct water level is to the bottom of the filler neck.

Do not overfill or unnecessary splashing may result.

Replace the filler cover correctly after filling.

The water should be absolutely CLEAN. If possible, use SOFT water for filling the container but, if this is not obtainable and hard water must be used, frequent operation and occasional attention to the nozzle outlet holes will be amply repaid in preventing the formation of unwelcome deposits.

Keep the container free from sediment and the filter clean.

## HEATING AND WINDSCREEN WASHING EQUIPMENT

### Servicing

#### Motor

Check that current is available at the motor contact (cable colour – green) with the switch depressed and the ignition 'ON.'

Check the motor earth cable.

Check the motor by substitution. The motor is a sealed unit and must be replaced if faulty.

To remove the motor, disconnect the pipe lines, note location for reference when refitting, withdraw the cables, remove two screws and detach the motor.

Check the external pipe line connections, pipe lines and nozzles.

If the motor operates but little or no water is delivered to the screen, the tubes or nozzles may be blocked.

Remove the pipe line from the motor outlet, operate the motor and check that water is available from the nozzle.

If water delivery is correct, check and clean the jet nozzles.

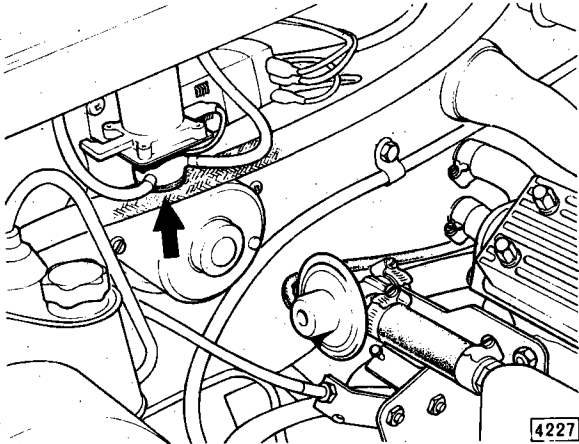


Fig. 11 The windscreen washer motor location

#### Cleaning the Jet Nozzles

To clear a blocked jet, completely unscrew the nozzle from the jet holder. Clear the small orifices with a piece of thin wire or blow out with compressed air; operate the washer with the nozzle removed. Allow the water to flush through the jet holder and then replace the nozzle.

#### Adjusting the Jets

With a screwdriver, turn the jet nozzle in the holder until the jets of water strike the windscreen in the area swept by the wiper blades. It may be necessary to adjust the nozzle slightly after a trial on the road due to the jets of water being deflected by the airstream.

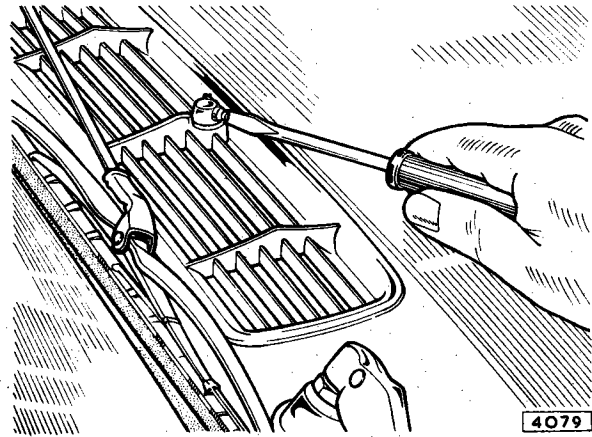


Fig. 12 Adjusting the jets

## HEATING AND WINDSCREEN WASHING EQUIPMENT

### FRESH AIR VENTILATION SYSTEM

An additional fresh air supply is available to driver and front seat passenger commencing at the undermentioned chassis numbers.

2.8 Litre Cars	<b>R.H. Drive</b>	<b>L.H. Drive</b>
4.2 Litre Cars	1G.8936	1G.55060
	1L.1530F	1L.60507

A grille, located in the outer headlamp embellisher (1) admits fresh air which is transmitted through a duct under each front wing (2) to a ventilation outlet (3) situated beneath the parcel tray in the scuttle side panel. The outlet is controlled by a three-position knob marked 'PULL AIR' (4).

With the control knob pushed fully inwards, no air will be delivered. Pulling the knob outwards progressively increases the amount of fresh air supplied to the driver/passenger compartment although air flow depends upon the speed at which the car is travelling.

The ventilation outlet has a louvred air direction control ring which, when rotated, directs the air flow where required.

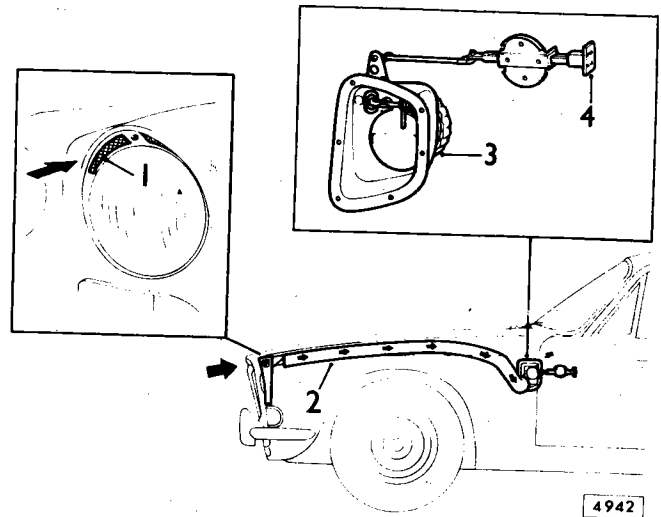


Fig. 13 *Fresh air ventilation system*