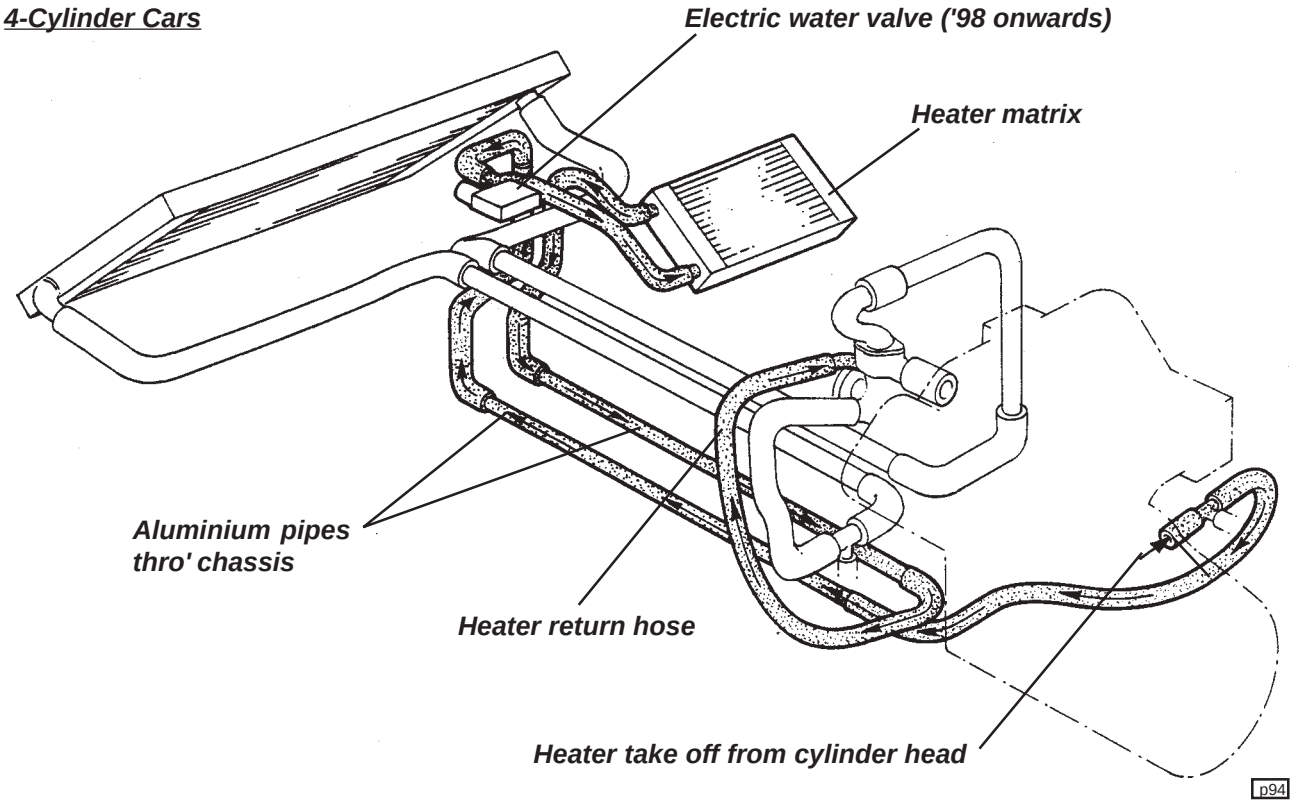
AIR CONDITIONING, HEATING & VENTILATION

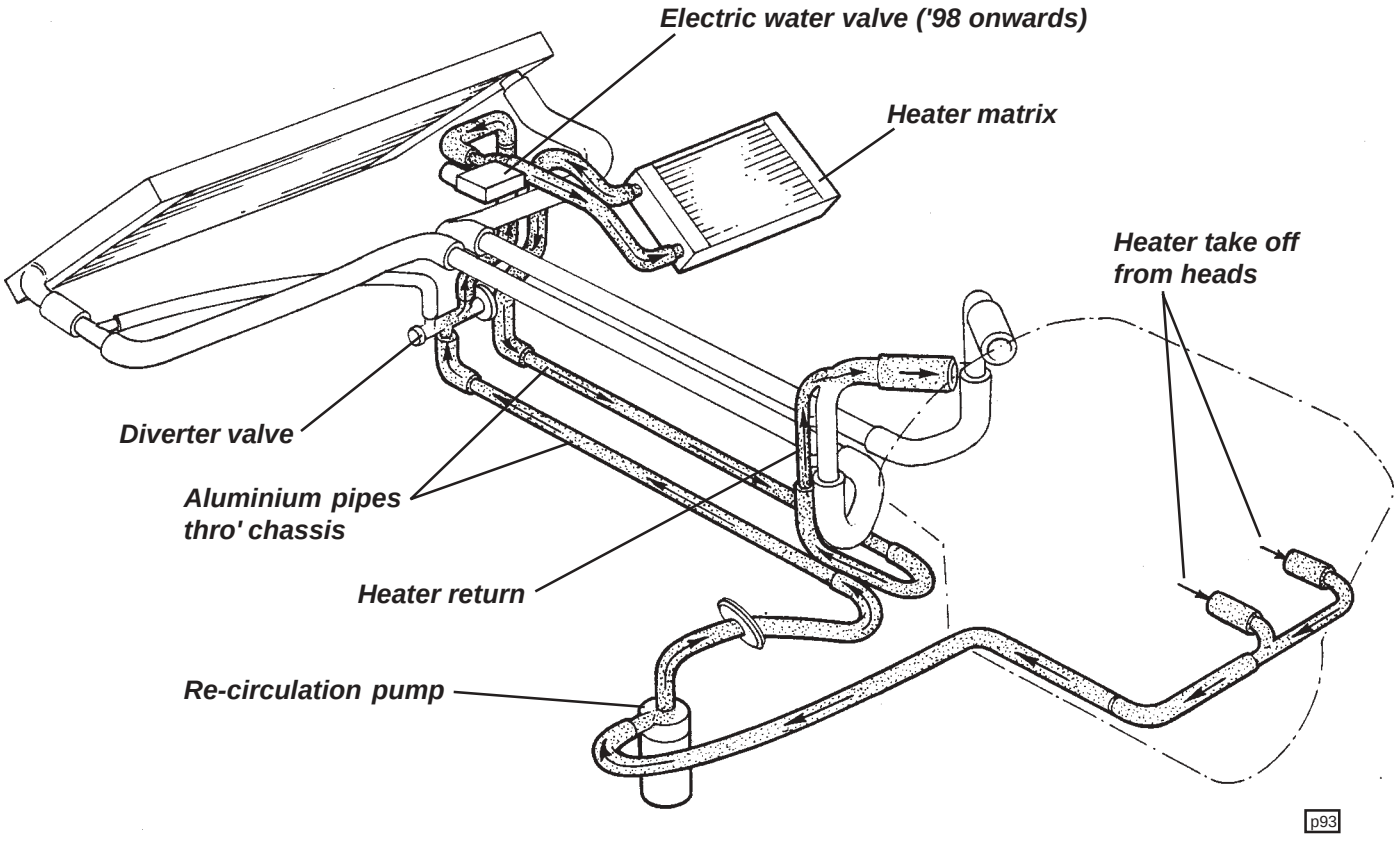
SECTION PJ - ESPRIT '93 M.Y. Onwards

Heater Circuit

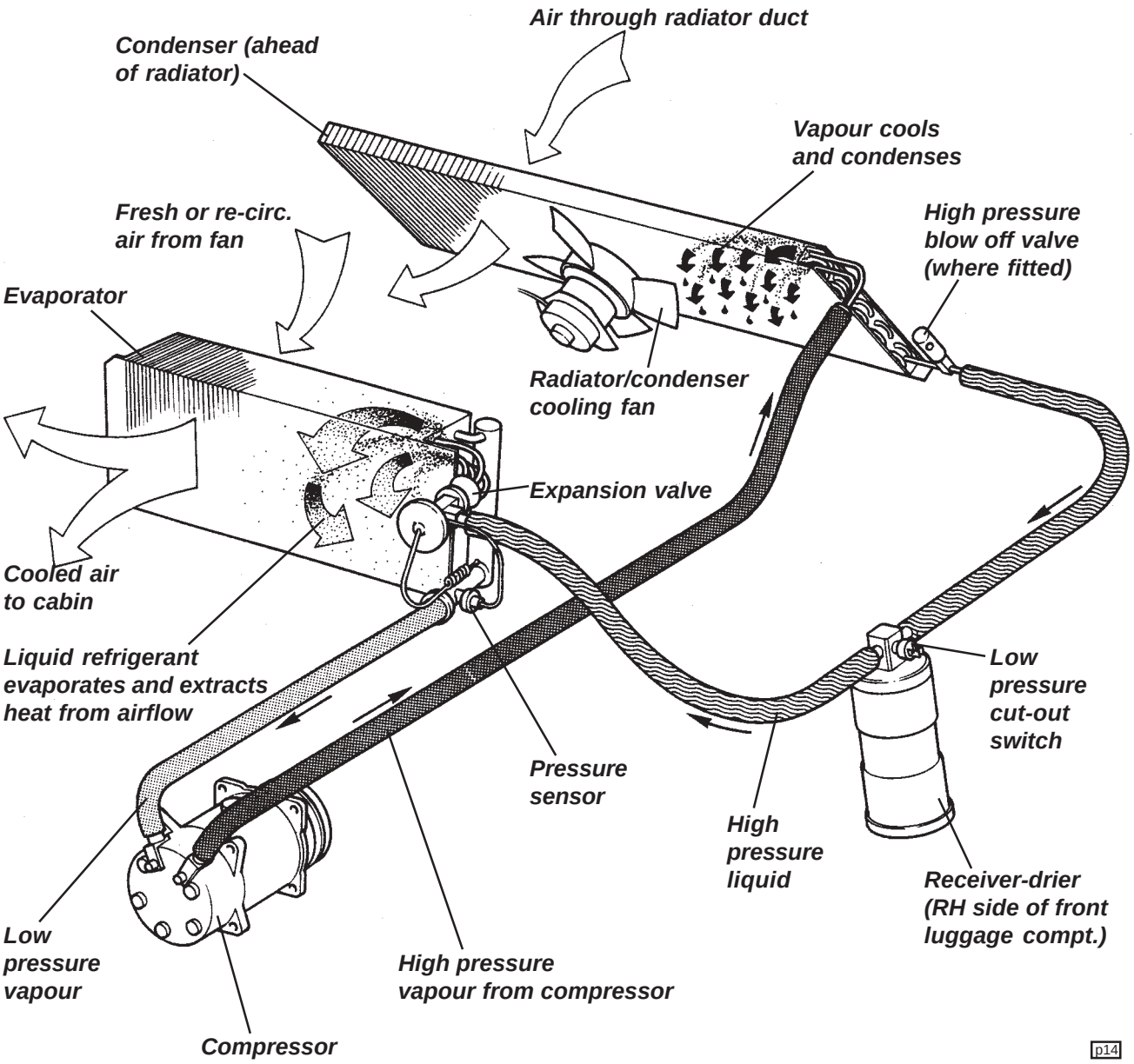
4-Cylinder Cars



V8 models



Refrigerant Circuit Schematic (early type shown)



PJ.1 - GENERAL DESCRIPTION

This section covers Esprit models '93 model year onwards, fitted with heater only, or with heater and air conditioning. The basic heater system is common to all models and years, but the V8 model incorporates a water re-circulation pump to mitigate the effects of 'hot soak', and an associated diverter valve, and for '98 model year, an electrically operated water valve and stepper motor mode flap were introduced. Major changes to the air conditioning system comprise those associated with the adoption of CFC free refrigerant in 1995, and the variable displacement compressor introduced on the V8 model.

Heater System

The heater system uses engine coolant to provide a heat source, transferred to the interior airstream via a heat exchanger matrix mounted in a housing beneath the fascia. A water feed taken from the rear of the cylinder head is piped through the chassis 'backbone' and via a water valve into a heater matrix (heat exchanger) located within the distribution unit beneath the fascia. Water is returned from the unit through a second chassis backbone pipe to the engine at the water pump. On V8 models, a water diverter valve is fitted in the heater return circuit and located ahead of the chassis front crossmember. The valve is used to provide for reversed coolant flow in conjunction with an electric re-circulation pump, programmed to operate at high coolant temperatures after engine switch off. For details of this system, refer to Service Notes Section KE.4.

Heat production by the heater matrix is controlled by the volume of water flow as determined by the water valve at the inlet connection. On cars other than '98 onwards V8 models, this valve is mechanically operated via a control cable from the driver's rotary selector. A temperature sensor bulb, secured to the output side of the matix core, and connected by capillary line to the water valve, senses heater output air temperature and thermostatically adjusts the valve opening to control output temperature relative to selector knob position. V8 models '98 M.Y. onwards, use a stepper motor operated water valve with input from a driver's rheostat selector.

Air Conditioning - Basic Principles

The air conditioning system comprises:

- a closed circuit containing refrigerant R12 (prior to early '95) or R134a (early '95 onwards);
- a compressor mounted on the front side of the engine, driven by multi-vee belt from the front end of the crankshaft. 4-cylinder cars use an electromagnetic clutch for cyclical temperature control; V8 models use a variable displacement compressor.
- a condenser, or linked pair of condensers, mounted ahead of the engine cooling radiator;
- a receiver-drier unit mounted at the right hand side of the front luggage compartment;
- an evaporator unit (cooler) fitted in the climate control housing beneath the fascia;
- a thermostatic expansion valve fitted at the inlet connection to the evaporator;

Closed Circuit

The closed refrigerant circuit should not be opened unless absolutely necessary, and only then using appropriate refrigeratant recovery equipment. Never allow the refrigerant to vent to atmosphere. Refer to subsection PJ.5. Failure to observe these precautions may result in personal injury.

Compressor

When the engine is running, and the refrigeration controls demand it, the electromagnetic clutch incorporated in the compressor pulley is energised, which then locks the pulley to the shaft and drives the compressor. The fixed (4-cylinder engines) or variable (V8 engines) displacement compressor operates to discharge refrigerant vapour at high pressure and temperature into the condenser. The compressor is lubricated by a quantity of special refrigerant oil, most of which is retained in the compressor, with the remainder being circulated with the refrigerant. R12 type compressors are equipped with service Schraeder valves on the rear cover ports. R134a systems use snap connectors in the refrigerant hoses, and include a high pressure relief valve on the compressor rear cover.

In order to avoid engine stalling and to maintain idle speed when the additional load is placed on the engine, a compressor engagement command is preceeded by a signal to the engine management ECM to open the idle air control valve accordingly.

Condenser

For R12 systems, a finned tube condenser is built in unit with the chargecooler radiator, and fitted ahead of the engine radiator. R134a circuits use a pair of square shaped parallel flow condensers mounted side by

side and plumbed in parallel. The condensers are sandwiched, as with R12 systems, between the engine radiator and a separate chargecooler radiator.

Hot vapour received by the condenser from the compressor, releases heat to the surrounding air via the condenser finning, with airflow boosted by three, rear mounted, electric fans, and ram air flow caused by vehicle movement.

Receiver-Drier

The receiver-drier unit, mounted on the right hand side of the radiator duct, houses a screen sack filled with desiccant to absorb traces of moisture and other contaminants from the refrigerant. A sight glass built into the top of the receiver-drier enables a quick check of the refrigerant charge in the system. If the refrigerant charge is low, a stream of bubbles will be visible at the sight glass. Note: A clear sight glass, may indicate that the system is correctly charged, or completely empty, although the latter situation is usually accompanied by oil streaks.

A transducer on the receiver-drier senses the pressure of refrigerant and allows system operation only within a pressure range of 2 to 27 (R12) or 32 (R134a) bar in order to prevent damage from too high a pressure, or from compressor oil starvation caused by too low a pressure. On V8 models, a third pressure threshold is used to energise the cooling fans if these are not already operating due to coolant temperature.

Expansion Valve

The expansion valve is fitted into the inlet line at the evaporator, and provides a restriction to the flow of high pressure liquid into the evaporator, such that the consequent pressure drop causes a change of state from a high temperature, high pressure liquid, to a low pressure, low temperature atomised liquid. In order to provide optimum cooling performance, the flow of refrigerant through the evaporator is thermostatically controlled by the expansion valve which, prior to '98 M.Y. uses two capillary lines to sense both evaporator outlet pressure and temperature, and on cars '98 M.Y. onwards, routes both supply and return refrigerant streams through the valve.

Evaporator

The evaporator is a tube and fin type heat exchanger mounted in a plastic housing fitted beneath the fascia. All incoming airflow is directed through the evaporator, before feeding the face level vents, and/or being directed through the heater matrix, to the screen or footwell vents.

The low pressure liquid refrigerant fed into the evaporator from the expansion valve, begins to boil (evaporate) and in so doing, draws the necessary heat for this process from the airstream passing over the evaporator surface. This airstream is consequently cooled, and is directed through the various outlet vents to the passenger compartment.

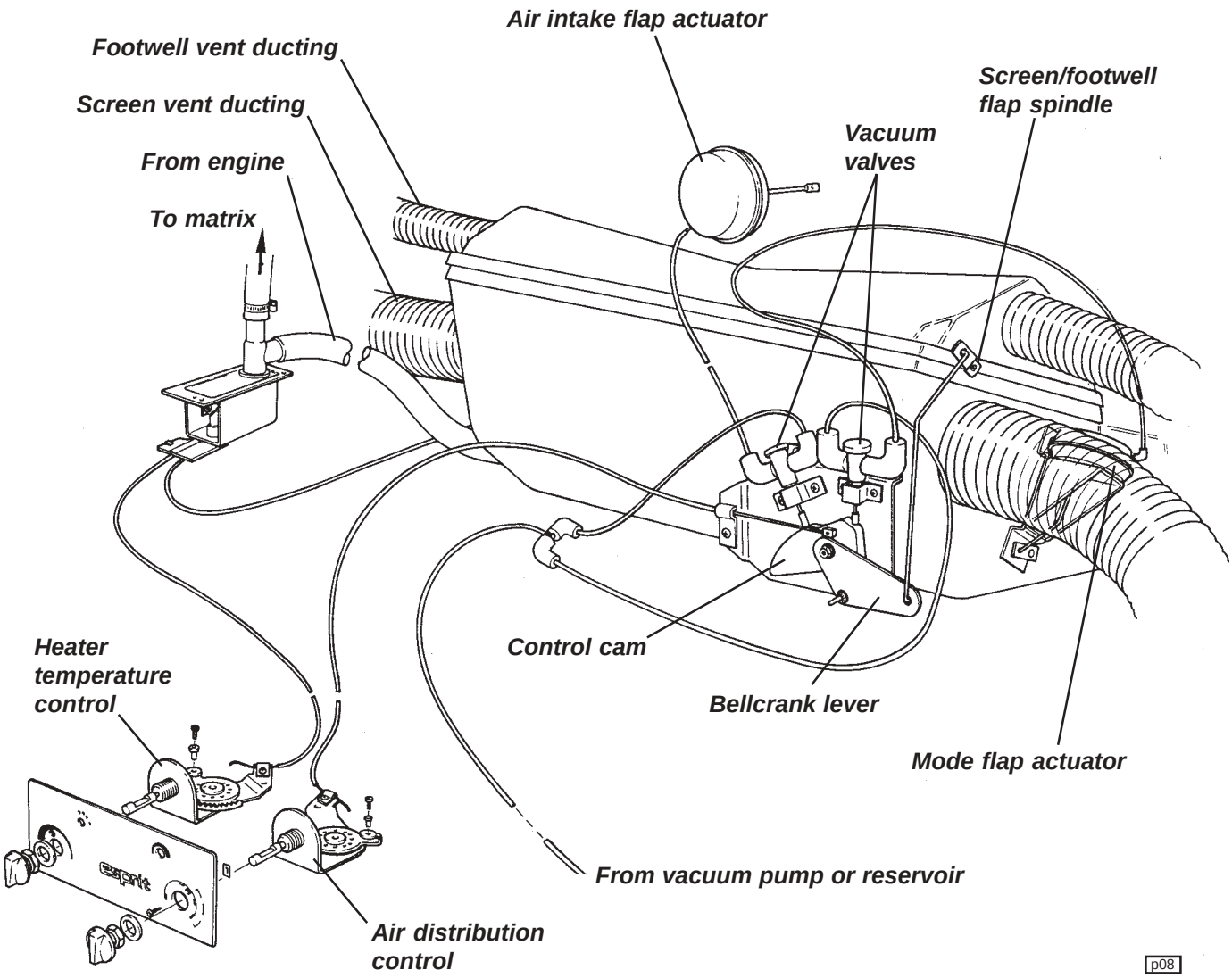
When the a.c. switch is pressed by the driver, and other parameters allow it (i.e. ignition on, blower fan speed selected, a.c. pressure switch closed), the a.c. circuit is activated and the compressor clutch is engaged. When full cold is selected on the cockpit temperature control, the a.c. system runs at full performance, with the output air temperature from the evaporator monitored by a thermistor sensor. On four cylinder cars, the amplified signal from the thermistor is used to cycle the compressor clutch on and off to control the evaporator air output temperature to the minimum consistent with freedom from evaporator icing. On the V8 model, the variable displacement compressor will run continuously, with the refrigerant output volume (and hence evaporator air outlet temperature) modulated by a control valve in the compressor inlet which reacts to pressure in the evaporator outlet line. If the cockpit temperature control is turned up, both types of compressor will cycle on/off under the action of the amplified thermistor signal, in order to maintain evaporator air outlet temperature to that selected.

PJ.2 - CONTROLS OPERATION & AIRFLOW DISTRIBUTION

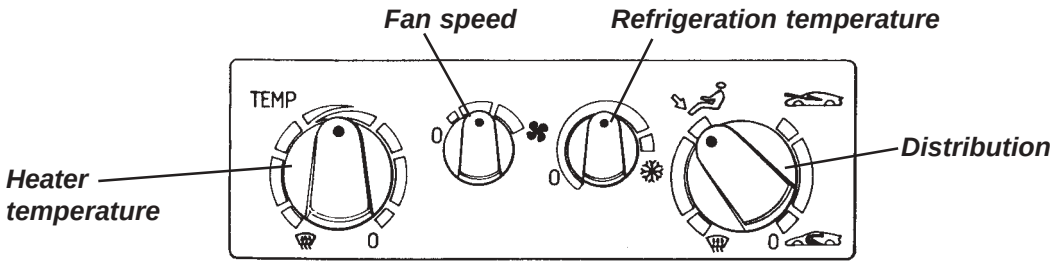
The distribution unit is located beneath the fascia and is similar for heater and heater/a.c. cars, comprising a casing containing a heater matrix and (on a.c. cars) evaporator, and two airflow distribution flaps. The single multi-speed fan motor and air intake flap are mounted on a filler panel on the front side of the cabin bulkhead in the front luggage compartment, and are protected by a cover which serves as an intake duct connecting with a plenum chamber incorporated in the trailing edge of the bonnet.

Prior to '98 M.Y., the heater temperature and air distribution are controlled by two rotary knobs on the fascia, which are linked to the water valve and and distribution cam by control cable. The air intake and mode flap are both operated by vacuum valves actuated by the cam, with the screen/footwell flap using a relay bellcrank lever for graduated mechanical control.

Prior to '98 M.Y.

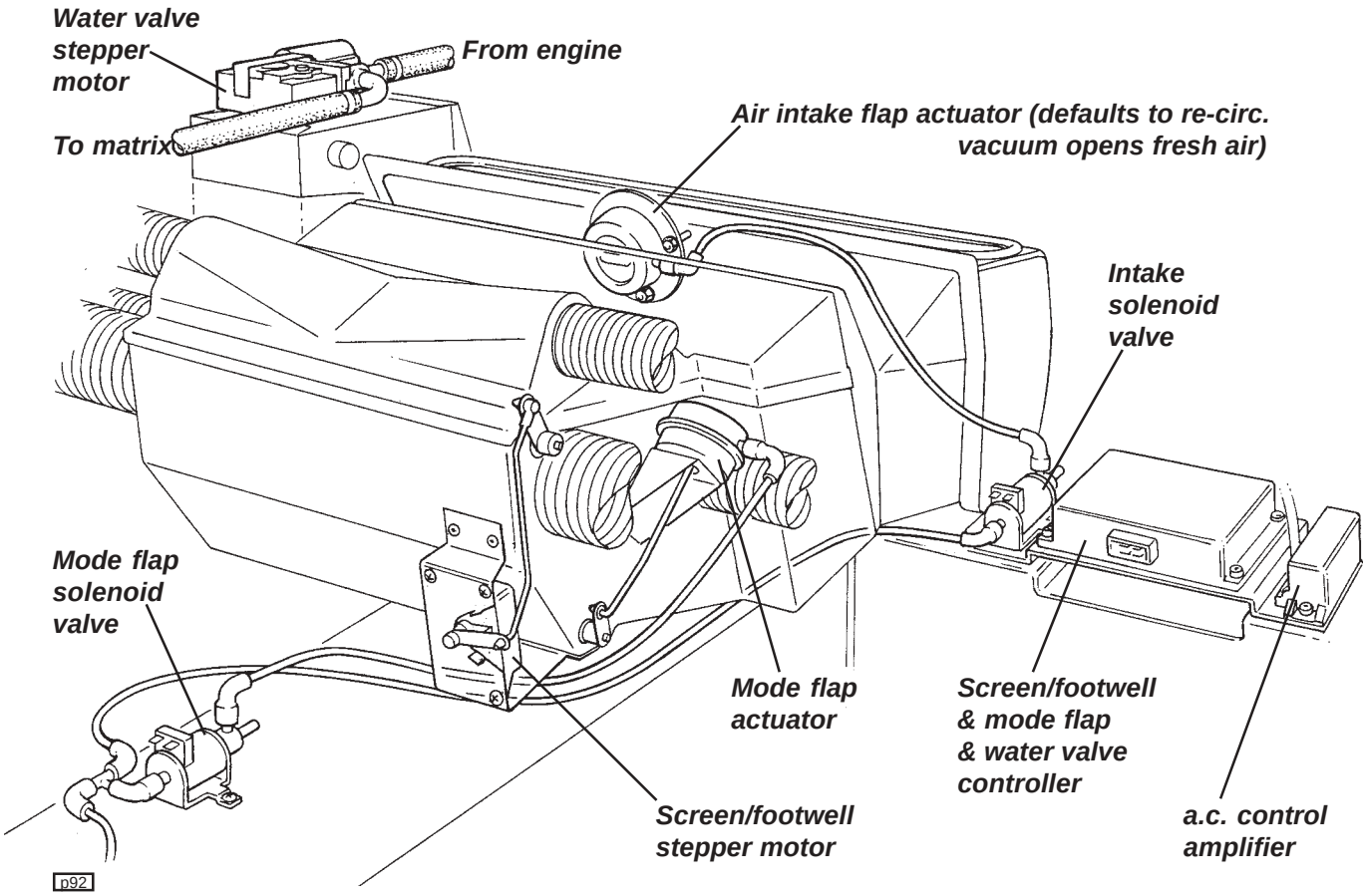


Cockpit Controls
Prior '98 M.Y.

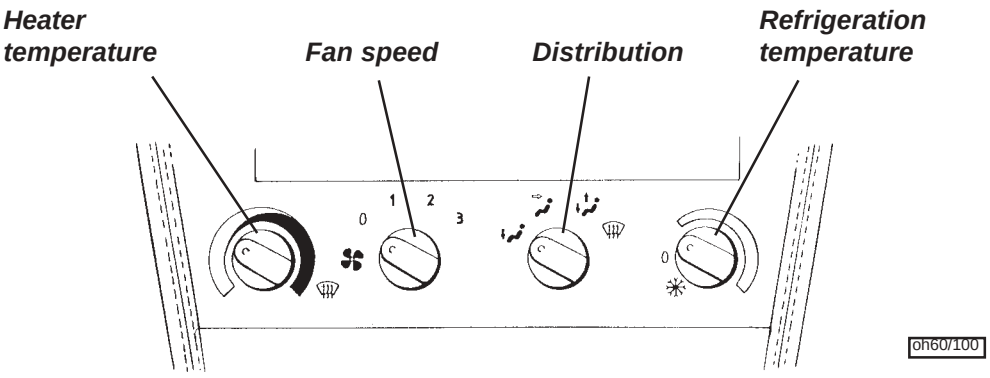


For '98 M.Y., the controls were updated to replace the cable operation with electrical switches and solenoid valves for the air intake and mode flaps. The water valve and screen/footwell flap are both stepper motor controlled.

'98 M.Y. Onwards

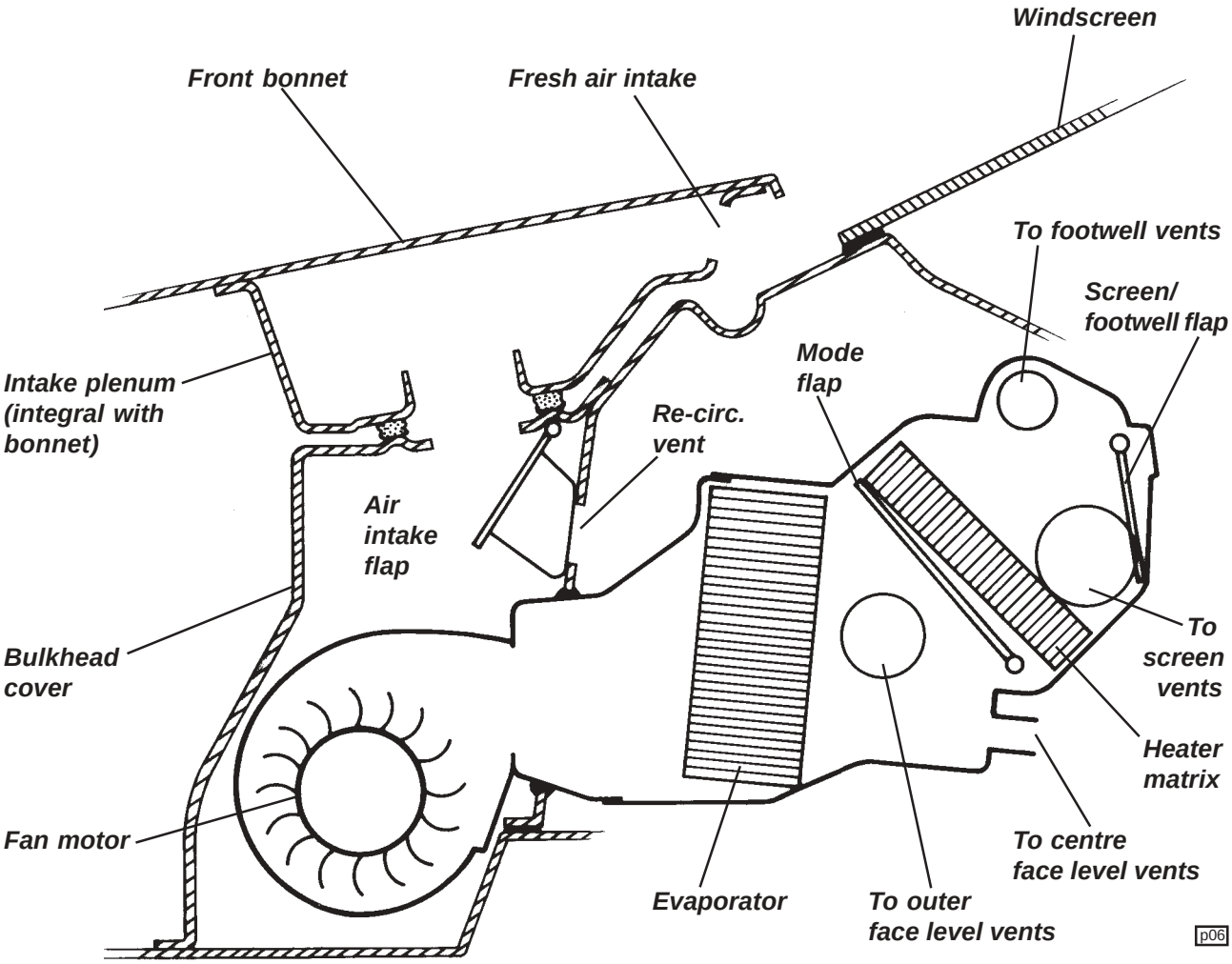


Cockpit Controls
'98 M.Y. Onwards



Re-circulation Switch - '98 M.Y. Onwards

In order to close the fresh air intake and open the re-circulation port, so that air within the cabin is continuously recycled through the climate control unit, a 're-circulation' position is included on the pre '98 type distribution control, and is provided on post '98 cars via a separate push button switch located below the climate control panel.



Vacuum supply

4-cylinder cars: Prior to '98 M.Y., the vacuum supply for the distribution controls is derived from a small electric pump mounted on the RH rear wheelarch, with the supply pipe routed along the RH cant rail. With the introduction of Kelsey Hayes ABS for '98 M.Y., and the requirement for brake servo vacuum, a high output electric vacuum pump with integral reservoir was mounted on the LH rear wheelarch.

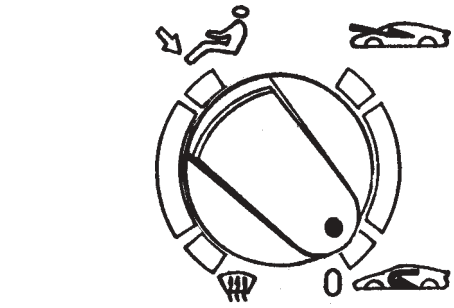
V8 models: Vacuum for the distribution controls is tapped from the front of the engine intake plenum, and is aided by a reservoir with integral non-return valve, mounted on the LH fuel tank board. The vacuum supply pipe is routed along the LH sill.

Prior to '98 M.Y.

Off/Re-circulation

In the 'Off/Re-circulation' position, the fresh air intake is closed, and the recirculation vent open. All heater functions are off.

This position should be used in heavy traffic to reduce the induction of fumes into the car. With the air conditioning operating, this position provides maximum cooling, with air being drawn from the cabin via the re-circulation vent, and repeatedly cycled through the a.c. unit. Air is output from only the face level vents.



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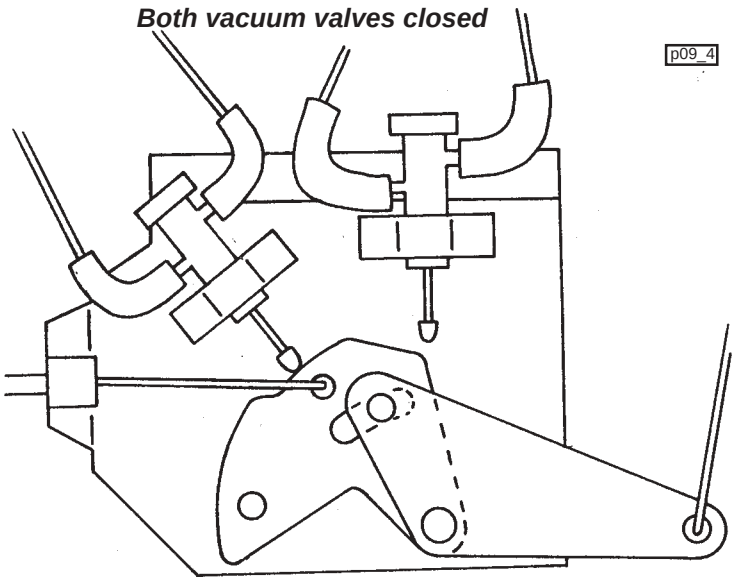

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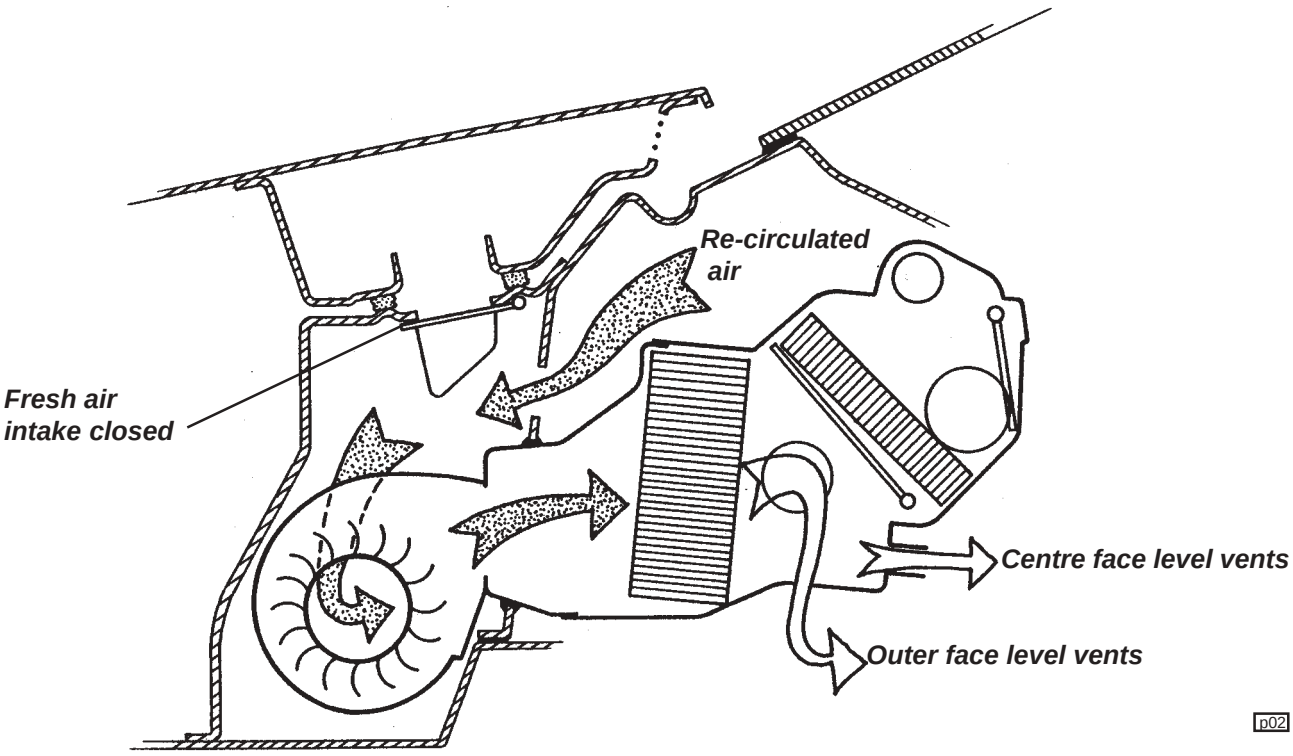


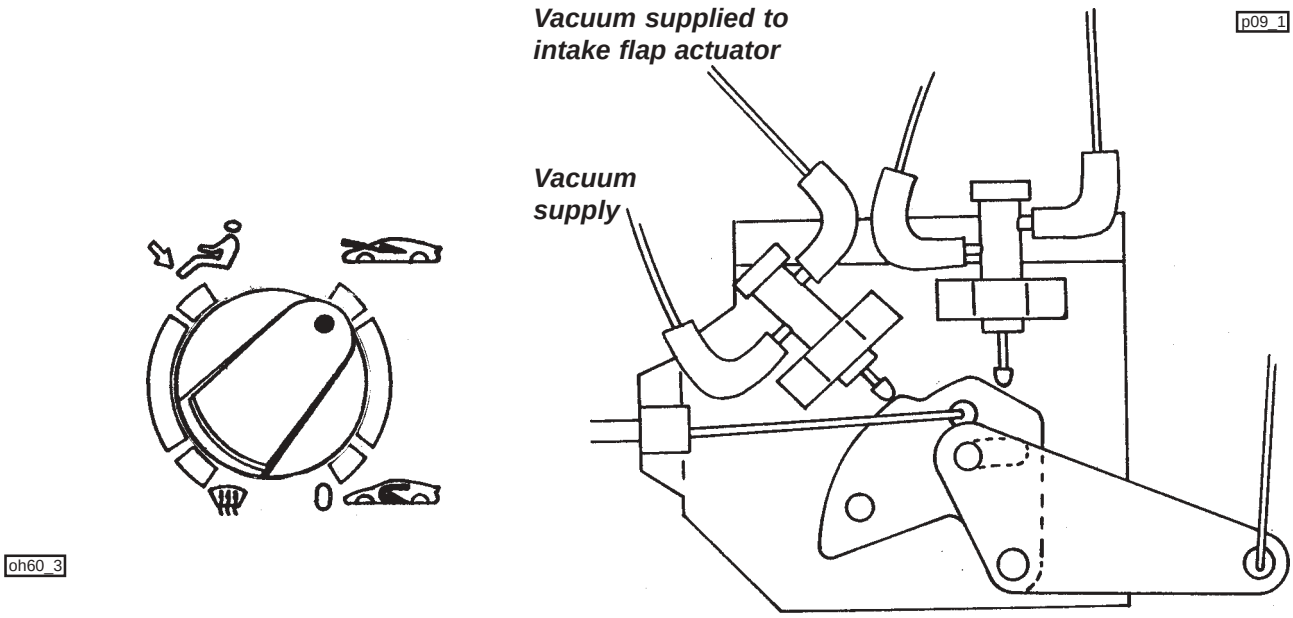
p02

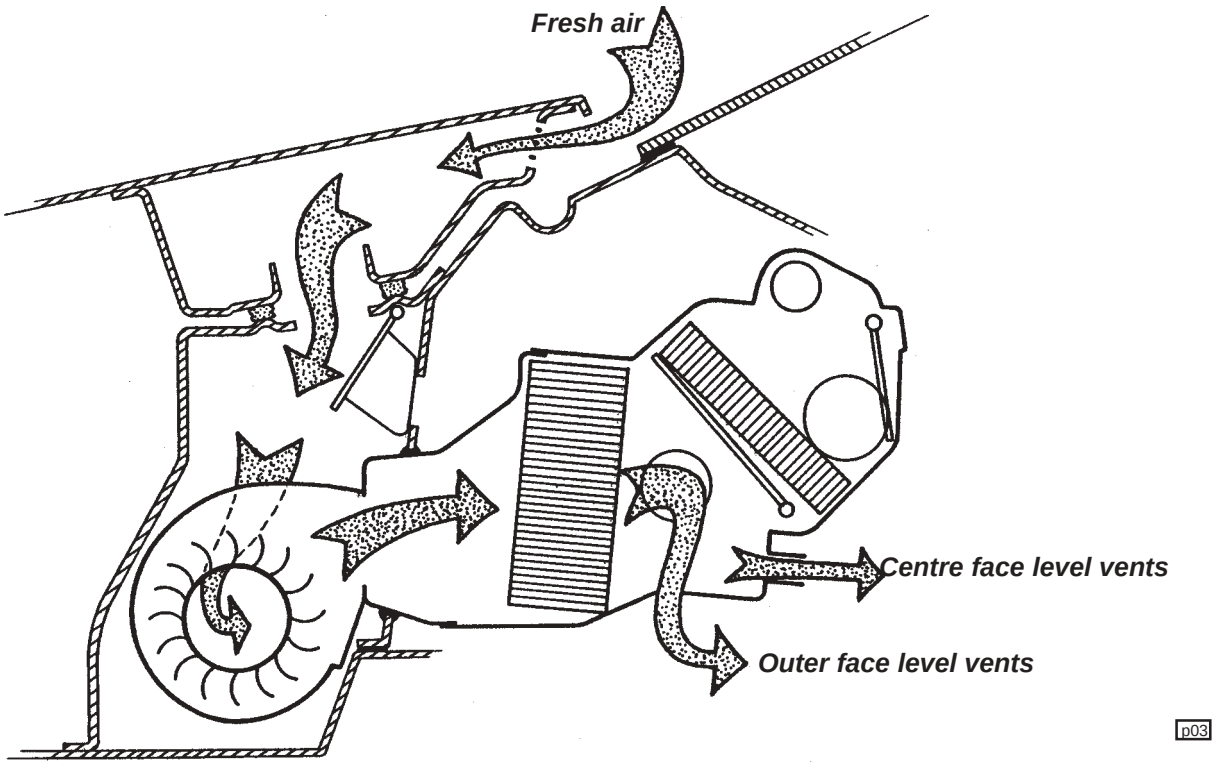
Prior to '98 M.Y.

Ventilation

The control cam is moved to open the fresh air/re-circulation flap valve, which supplies vacuum to the actuator, thus closing the re-circulation vent and opening the fresh air vent. All heater functions remain off.

Fresh air at ambient temperature is supplied to the outer and centre face level vents. With the air conditioning operating, this is the normal position for refrigerated air from the face level vents (note that a fan speed must also be selected).





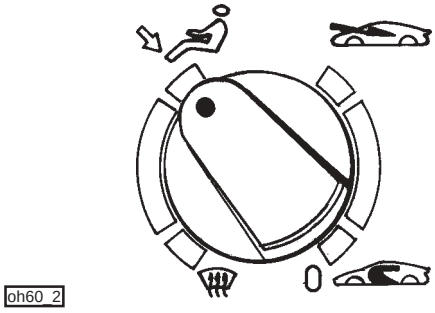
Prior to '98 M.Y.

Footwell

The control cam is moved to open the mode flap valve, and starts to move the screen flap link. The mode flap opens the heater matrix and shuts off the centre face level vents. The screen flap is moved half way.

This position is normally used with a warm temperature setting to supply heated fresh air by ram effect, or fan assisted, to the screen and footwell vents. Ambient air is still available from the outer face level vents.

Air conditioning may be used with this setting to produce de-humidified air. The outer face level vents should be closed off for optimum performance.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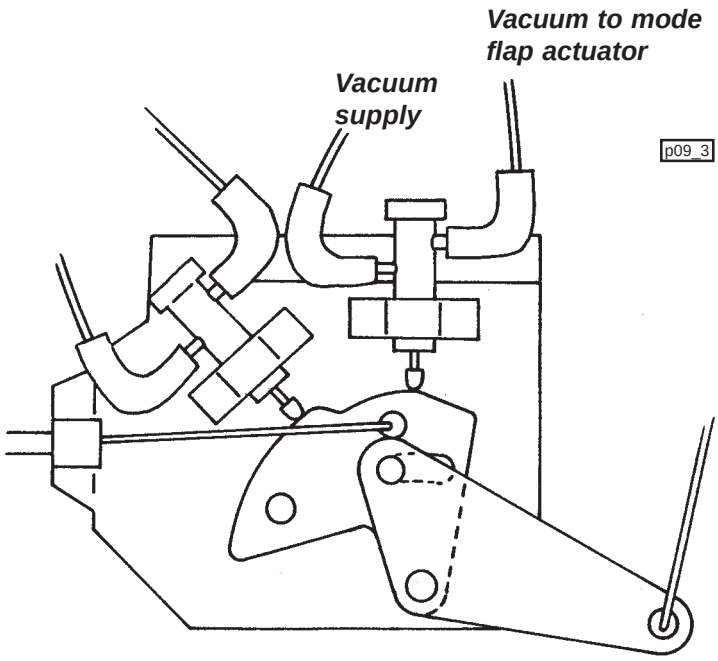

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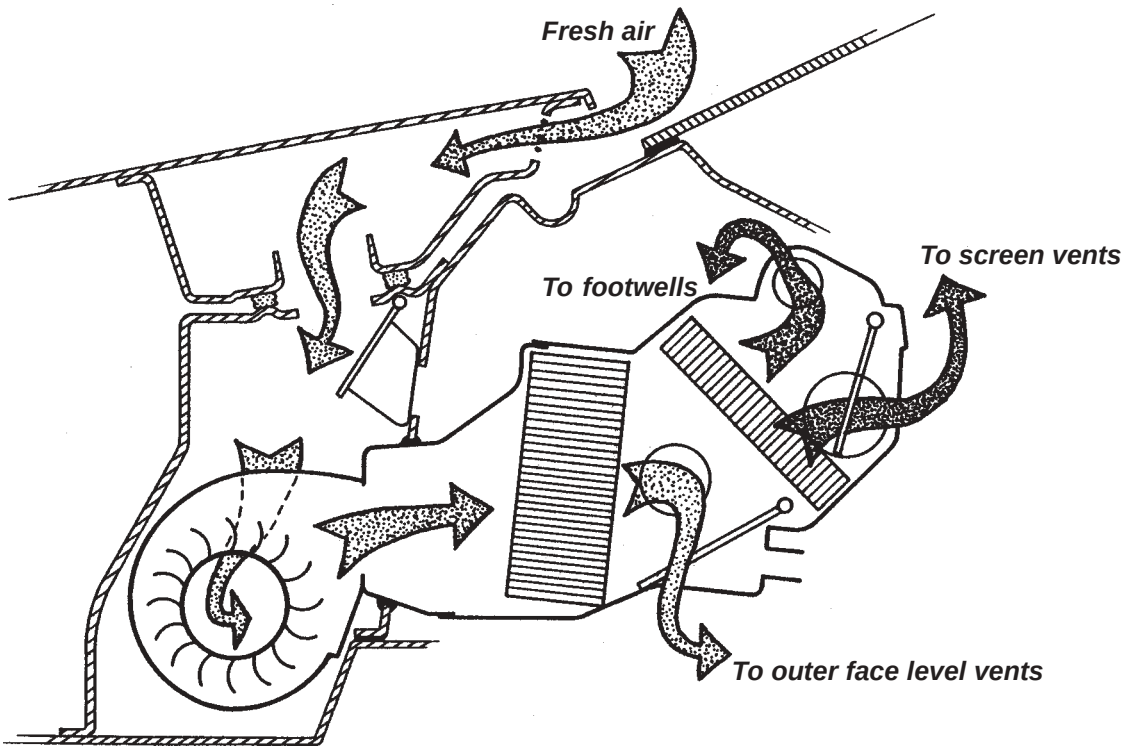


p04

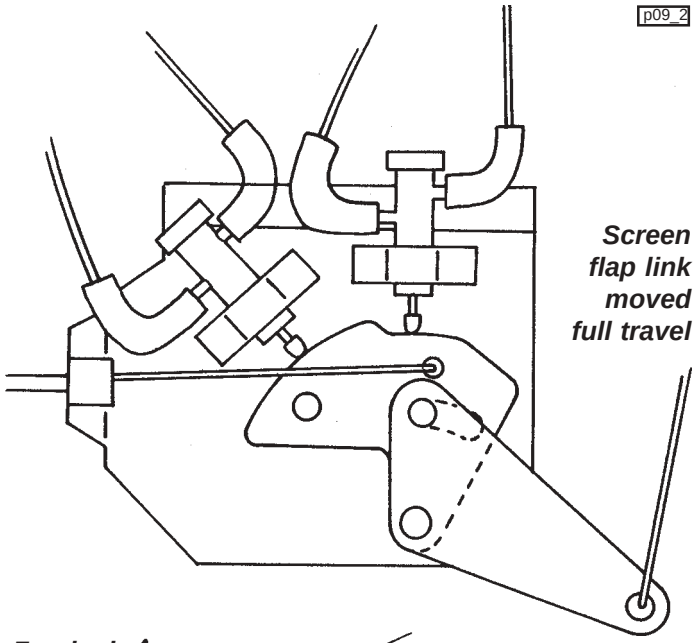
Prior to '98 M.Y.

Demist

As the control is turned from the footwell to the demist position, the screen flap is moved to direct a greater proportion of air to the windscreen vents.

For full defrost performance, maximum heat and fan speed should be selected, and the outer face level vents closed off.

p09_2



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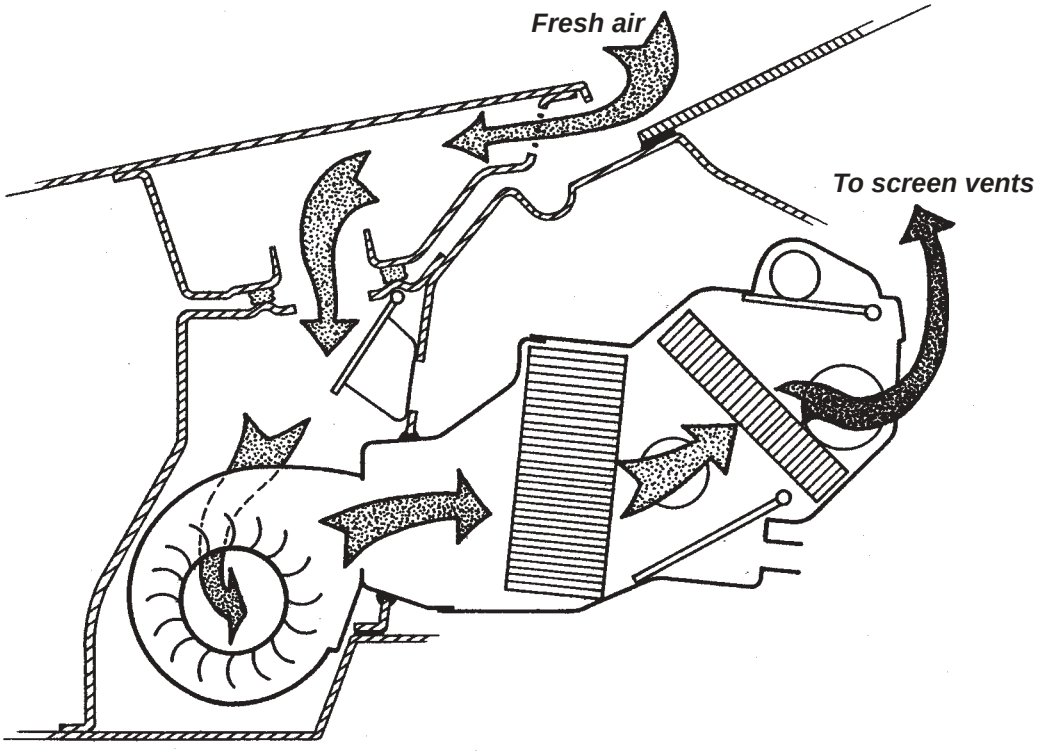


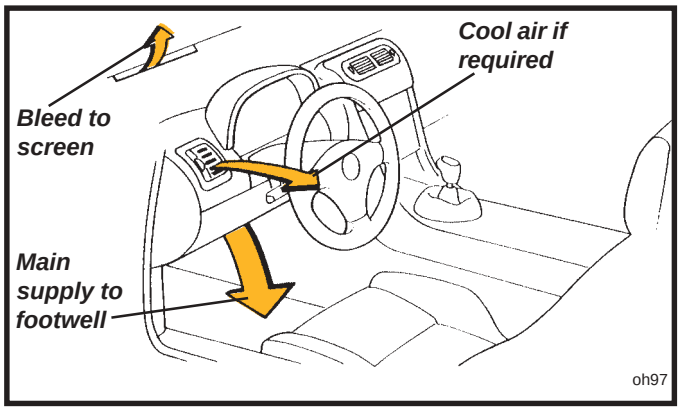
p05

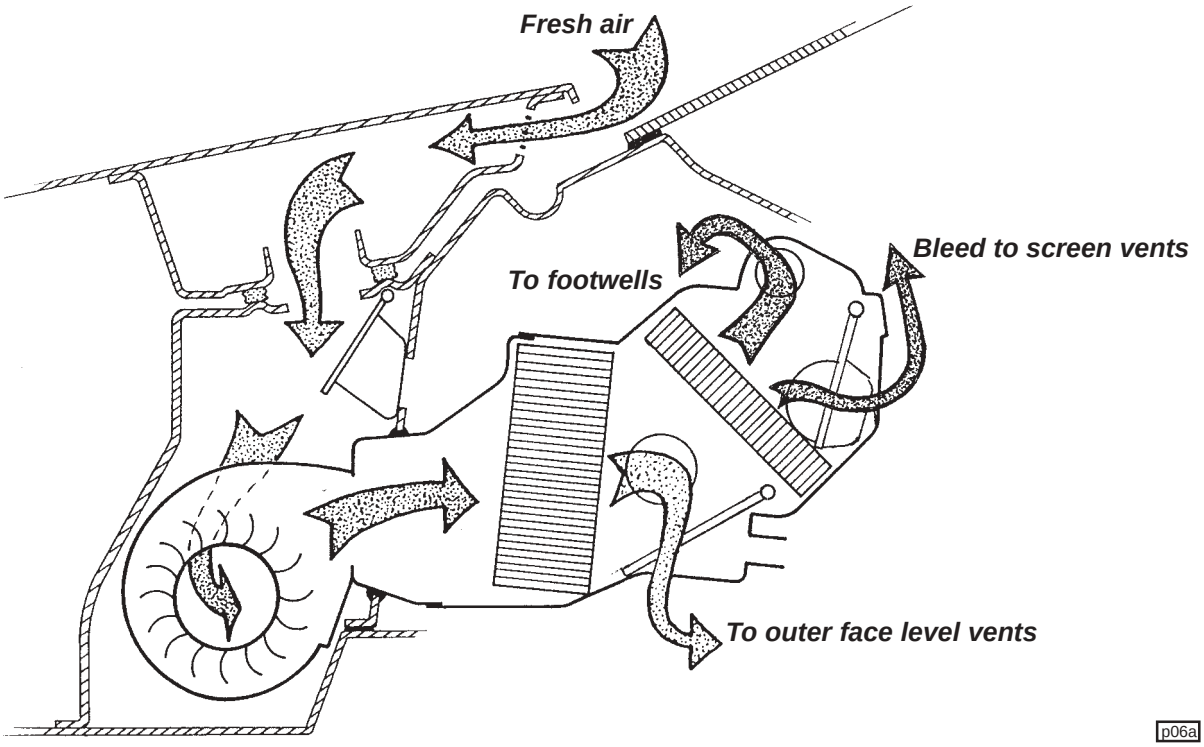
'98 M.Y. Onwards

Footwell:

With the distribution knob turned fully counterclockwise to the footwell symbol, the vacuum solenoid valves are energised to supply both the intake flap actuator and the mode flap actuator. Airflow is directed to the driver's and passenger's footwells, with a small bleed to the windscreen demist vents. This position is normally used with a warm temperature setting, but dependent on the position of the heater and (if fitted) a.c. controls, the air may be heated, ambient or refrigerated.

Ambient or refrigerated air is available from the outer face level vents if desired.



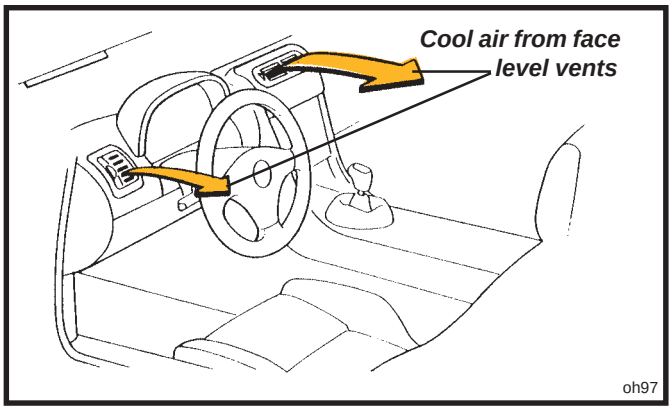


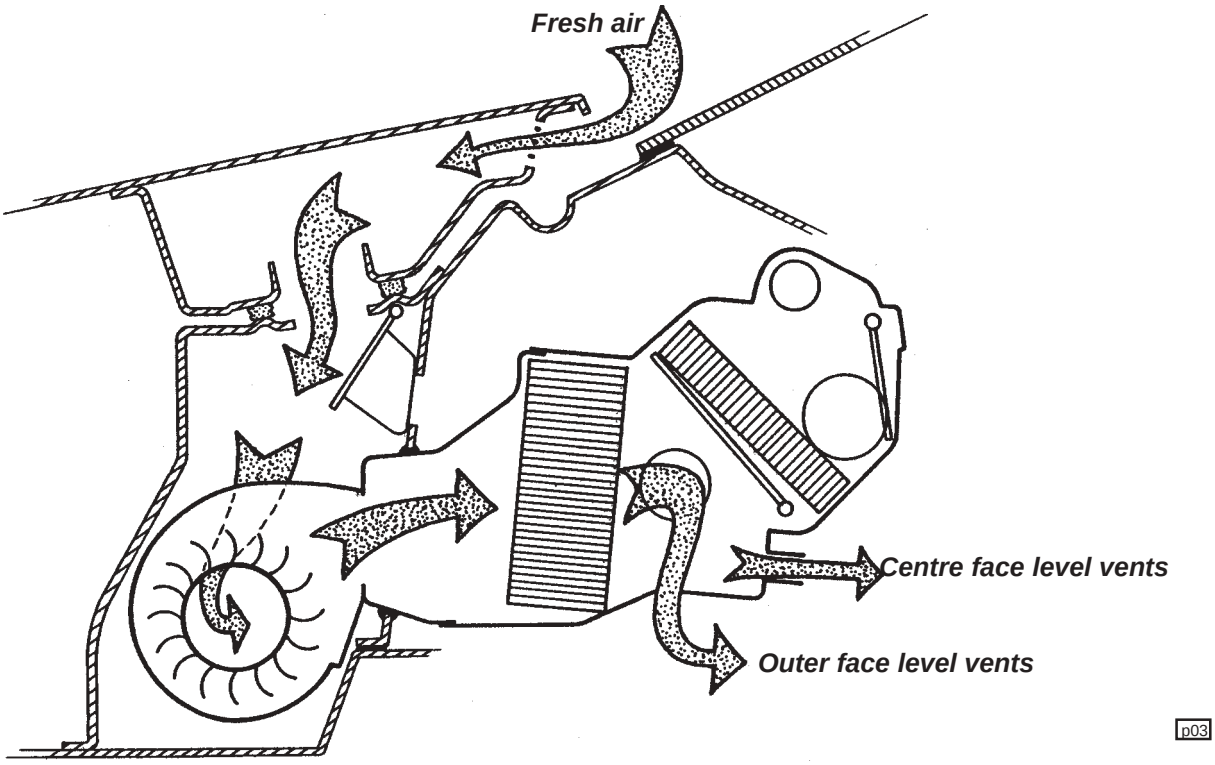
'98 M.Y. Onwards

Face Level

At this setting, the intake flap solenoid valve is energised, the fresh air flap opens, and all airflow is directed to the four face level vent outlets. This airflow may be ambient, or cooled by switching on the air conditioning (see later), but is unaffected by the heater temperature control.

Each of the face level vents may be individually adjusted for airflow volume and direction (see earlier).





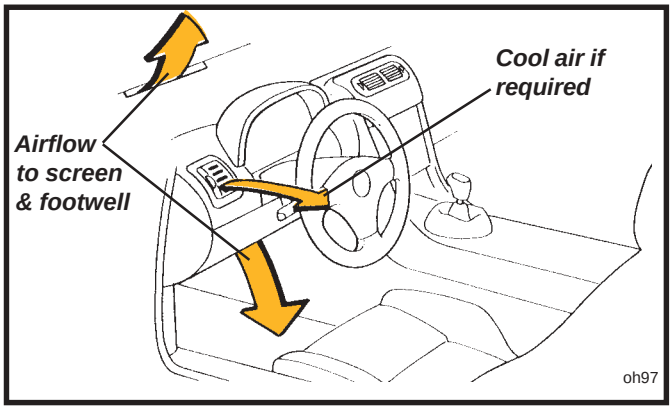
'98 M.Y. Onwards

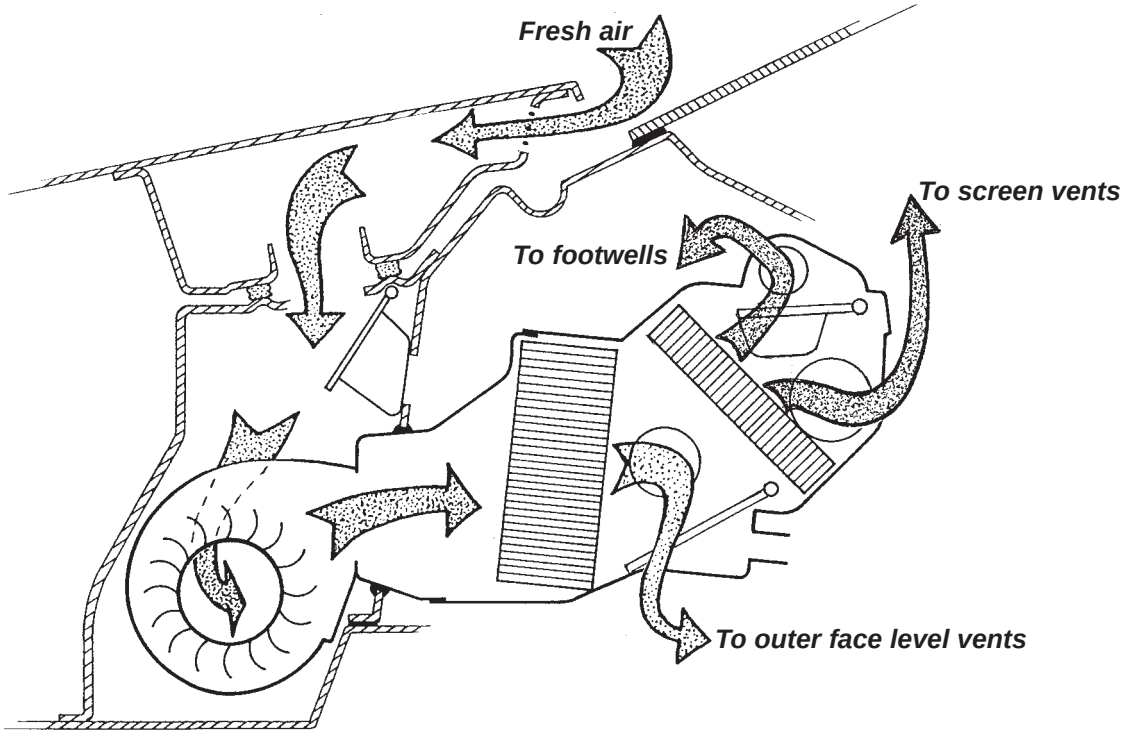
Screen & Footwell

With the distribution knob at this position, the intake flap solenoid and mode flap solenoids are energised, the fresh air flap and mode flap open, and airflow is directed through the heater matrix to the windscreen and footwell vents. The screen/footwell stepper motor is switched to its mid position to open both the windscreen and footwell outlets.

This position is normally used with a warm temperature selection. Ambient air is available from the outer face level vents if desired.

On a.c. cars, this setting may by used to provide dehumidified air by selecting both refrigeration and a warm temperature setting.



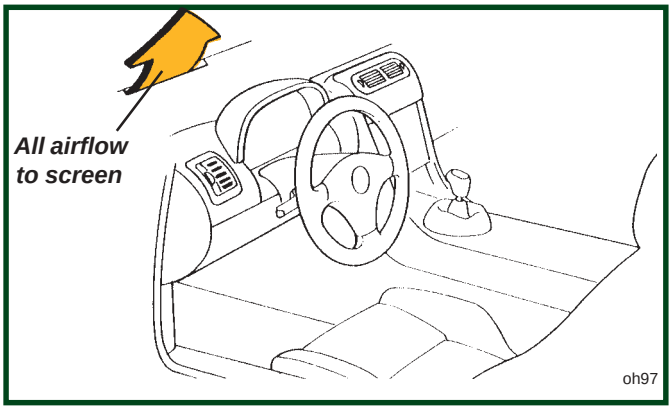


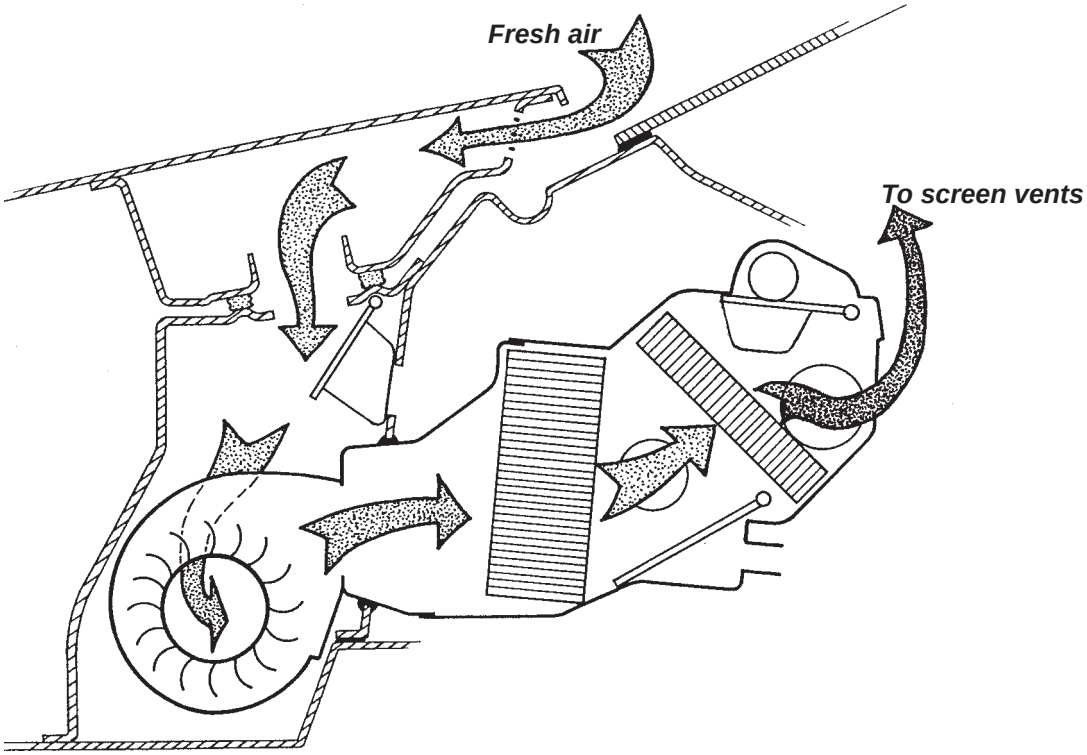
'98 M.Y. Onwards

Defrost

At this setting, the intake flap solenoid and mode flap solenoids are energised, the fresh air flap and mode flap open, and airflow is directed through the heater matrix to the windscreen and footwell vents. The screen/footwell stepper motor is switched to the windscreen position to close off the footwell outlet.

For maximum defrost performance, select full hot heater temperature with fan speed 3, and close the outer face level vents.



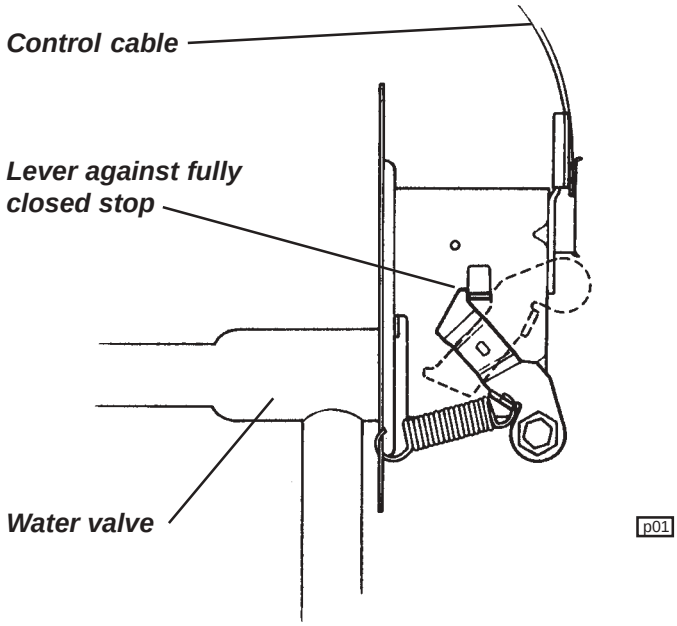


PJ.3 - WATER VALVE ADJUSTMENT (Prior '98 M.Y.)

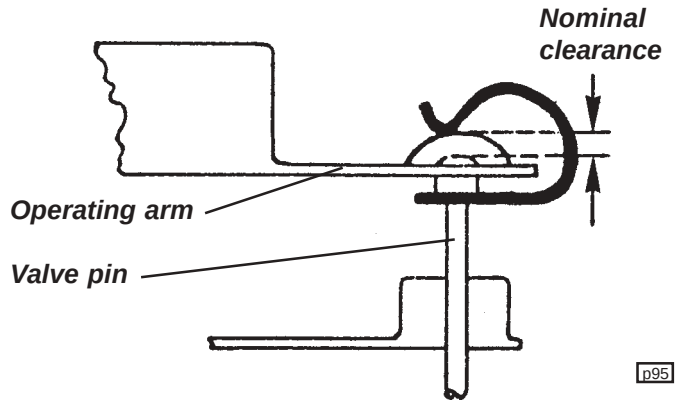
On cars prior to '98 M.Y., which use a cable operated heater water valve, it is important to ensure that the valve is allowed to seat fully in the 'cold' control position. The water valve is secured to the top of the pedal box by a bracket using a single stud. Improved access to the valve may be obtained via the bulkhead fusebox aperture after releasing the two fusebox fixing screws. If necessary, release the single nut securing the valve mounting bracket to allow a closer examination to be made.

1. With the temperature control turned to full cold, check that the valve control arm (to which the cable is connected on the water valve) is hard against its stop. If not, adjust the cable at the valve or rotary control until this is achieved.

2. In this position, check that there is clearance between the end of the valve pin an its operating lever. If necessary, remove the spring clip and bend the end of the lever to achieve clearance.



Note that since the valve pin is contacted by a cup in the operating lever, this clearance is not easily viewed, but if the valve is slowly closed, it should be possible to observe the valve pin reaching the end of its travel just before the lever does so.



PJ.4 - INTRODUCTION OF 'CFC FREE' REFRIGERANT (4 cylinder models)

International legislation banning the use of refrigerants containing ChloroFlouroCarbons (CFCs) resulted in a change from refrigerant R-12 to R134a occurring in mid 1995 at the following change points:

S4	approx. S 2017
S4S	approx. S 4002
USA S4S	approx. S 3012
Sport 300	approx. S 8058

(Note that all V8 models use R134a)

Identification

For ready identification fo the refrigerant type, refer to the label on the compressor body:

R-12	Gold label SD-508 SANDEN
R134a	Green label SD7H15 SANDEN

Component Changes

Compressor: The R134a type compressor incorporates a high pressure relief valve on the rear cover, with the service Shraeder valves formerly located there replaced by snap connectors in the suction and discharge hoses accessible from beneath the vehicle.

Condenser: For R-12 systems, the finned tube condenser is built in unit with the chargecooler radiator, and fitted ahead of the engine radiator. R134a cars use a pair of square shaped parallel flow condensers mounted side by side and plumbed in paralles. The condensers are sandwiched, as previously, between the engine radiator and a new, separate chargecooler radiator.

Receiver-Drier: Different molecular sieve materials are used for the two refrigerant types. Refer to the label on the unit. The binary switch on R-12 cars should be 27 kgf/cm², and on R134a cars, either this switch or a higher pressure 32 kgf/cm² (3.14 Mpa) version.

Hoses: Hoses for use with R134a differ in their construction from R-12 type due to the increased permeability of the newer gas.

Refrigerant & Oil: Refrigerant quantities are as follows:

R-12		1.4 kg
R134a	- 4 cylinder	1.0 kg
	- V8	1.2 kg

Refrigerant oils are different for the two refrigerant types - refer to your local refrigeration specialist. If major components are being renewed, suitable oil should be added to the system in the following quantities:

Receiver-drier; 28cc (1 fluid oz.)
Condenser; 28cc (1 fluid oz.)
Evaporator; 85cc (3 fluid oz.)
Compressor; 60cc (2 fluid oz.)

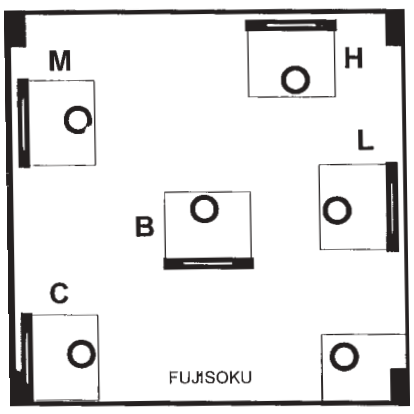
Replacement of Refrigerant: Refrigerant should never be released to the atmosphere - refrigerant recovery/ recycling equipment should always be used. If servicing of an R-12 system is required, refrigeration specialist advice should be sought. It is not possible simply to substitute R-12 with R134a, but some specialists may offer conversions which include replacement compressor seals and oil, with special additives to coat the inside of hoses and to keep the old oil in permanent suspension.

PJ.5 - FAN SPEED & AIR DISTRIBUTION SWITCH ('98 M.Y. onwards)

Cars from '98 M.Y. onwards use an electric distribution control switch, and an electronic controller for the water valve, screen/footwell and mode flaps. The air distribution and fan speed switches are identical, and have the following functionality:

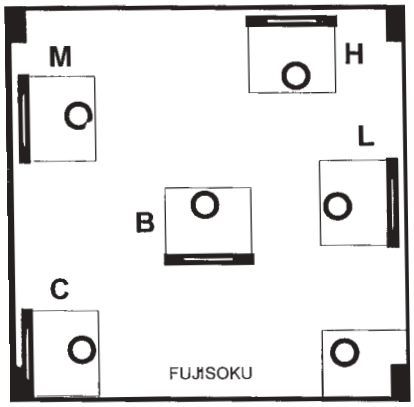
Fan speed switch

Switch terminal	*Cable colour*	*Function*	*Fed at switch position*
C	Yellow/ light green	Ignition supply	0,1,2,3
L	Green/blue Black	Fan low speed	1
M	Green/slate	Fan medium speed	2
H	Green/Yellow	Fan high speed	3
B	Light green/ blue	Feed to a.c. control module	1,2,3



Air distribution switch

Switch terminal	*Cable colour*	*Function*	*Fed at switch position*
C	Yellow/red	Supply	0,1,2,3
L	Black/blue	HVAC module 11	1
M	White/blue	HVAC module 12	2
H	White/black	Ground signal to HVAC 9	3
B	-		1,2,3



PJ.6 - REFRIGERANT HANDLING

The following precautions MUST ALWAYS BE OBSERVED.

1. On no account should refrigerant ever be discharged to atmosphere - use a refrigerant recovery/recycling station in accordance with the manufacturer's instructions. Service valves on both 4 cylinder and V8 models are accessible from beneath the front of the engine bay.

2. Heavy concentrations of refrigerant vapour can produce toxic gas if exposed to a naked flame. The gas can also attack metal.

3. Refrigerant drums must never be left open - always ensure the caps are securely fitted.

4. Never transport drums of refrigerant in the passenger compartment of a car.

5. Never expose refrigerant drums to high temperature.

6. Never weld or use a steam cleaner in close proximity to any part of the air conditioning system.

7. Never expose the eyes to vapourised or liquid refrigerant - ALWAYS wear safety goggles and gloves when handling refrigerant.

PJ.7 - REFRIGERANT PIPEWORK PRECAUTIONS

The following precautions must be observed when carrying out any work on the refrigerant pipework: Before disconnecting any refrigerant pipework, the refrigerant must first be recovered using suitable equipment connected to the service valves at the right hand front of the engine bay. Ensure that the equipment is suitable for the type of refrigerant used.

1. All replacement components and flexible end connections are sealed when new, and should only be opened IMMEDIATELY PRIOR TO FITTING, AND AT ROOM TEMPERATURE, to prevent condensation of any moisture which may enter when the sealing is removed.

2. Pipes, flexible end connections and components, must be capped immediately they are opened to prevent the ingress of moisture and/or dirt.

3. The receiver-drier should be the LAST component to be connected, to ensure optimum dehydration and maximum moisture protection of the system.

4. All joints should be coated with refrigeration oil before making any connections, to aid seating.

5. Great care must be taken to prevent damage to the pipe fittings and connections, since due to the high pressures involved, a leak can be caused by the slightest imperfection. Always use two spanners of the correct size when releasing or tightening any pipe joint so that the fixed part of the union may be prevented from twisting and damaging the component. This is especially important with the aluminium condenser.

6. All pipes and hoses must be free from any kinking. The efficiency of the system can be impaired by a single kink, or restriction. Flexible hoses should not be bent to a radius which is less than ten times the diameter of the hose.

PJ.8 - REFRIGERANT OIL

The internal working parts of the compressor are lubricated by refrigerant oil. This is a special type of oil which has an affinity with the refrigerant, such that a proportion of the oil circulates with the refrigerant, around the whole system. Under normal operating conditions, the oil never needs changing or replenishing, and if the correct procedure for system depressurisation and re-charging is followed, minimal oil will be lost from the system during these operations. If, however, the system suffers a major leak or sudden de-pressurisation, most of the oil held in suspension will be lost as the refrigerant escapes, necessitating the addition of a specified quantity of oil to the compressor on re-assembly (see section PJ.4). If a refrigeration component is to be replaced, the removed item will contain a certain amount of oil, and a corresponding amount of new oil must be added to the system on re-assembly (see section PJ.4)

Approved Oils
R12 system:
Frigidair 525
Shell Clavus Oil 33
Texaco Capella E (waxfree)
Sunisco 5
BP Energol LPT500

R134a system:
PAG oil equivalent to GM 12345923, or AC Delco 15-118.

Refrigerant oil absorbs water and should not be exposed to the atmosphere for any longer than is strictly necessary to perform the operation. Never return decanted oil back into the storage container.

PJ.9 - COMPRESSOR

Drive Belt
4-cylinder cars:

The compressor is mounted on the left hand side of the cylinder block, and is driven from the crankshaft pulley by a dedicated single 'V' belt. A tensioner pulley is mounted on a slotted bracket to allow the belt tension to be adjusted. Correct tension allows moderate finger pressure to produce a one way deflection of 9mm.

V8 models:

A single multi-rib type belt is used to transmit drive from the crankshaft nose to the water pump, alternator, power steering pump and a.c. compressor. A spring loaded temperature compensated automatic tensioner is mounted on the front cover, and operates between the crankshaft and alternator pulleys. The belt requires no periodic maintenance other than a visual check of its condition. If the belt exhibits any evidence of physical damage, cracking, fraying, perishing, abrasion or contamination, it should be replaced. In the case of oil contamination, each of the pulleys must be thoroughly degreased before the new belt is fitted.

For belt replacement, refer to section ED.

Compressor Replacement

4-cylinder cars:

The compressor is mounted on the right hand side of the cylinder block, and is driven by a dedicated single 'V' belt using a tensioner pulley. Replacement compressors are factory filled with 175 cc of 500 viscosity refrigerant oil. To remove the compressor:

1. Depressurise and recover refrigerant via the service valves in the a.c. hoses to and from the compressor. Disconnect the two hoses from the compressor and immediately cap all joints to prevent contamination.

2. Slacken the 'V' belt tensioner pulley, and remove the belt. Disconnect the cable to the compressor clutch.

3. Remove the three nuts and bolts securing the compressor to the front mounting plate, and the single nut and bolt fixing the rear of the compressor to a block mounted bracket.

4. If a new compressor is to be fitted and there is no evidence of oil having escaped from the system:
   - drain the oil from the new compressor;
   - drain and measure the oil from the old compressor;
   - refill the new compressor with an amount of new oil equal to that drained from the old compressor, plus an additional 30 cc.

   After a major failure involving total loss of fluid and a replacement compressor, it is necessary to add an additional 80 cc of specified oil to the 175 cc supplied in the new compressor.

5. Refit the compressor in reverse order to removal.

V8 models:

On V8 Esprit models, the compressor is mounted low down on the left hand side of the cylinder block, driven by the single multi-rib auxiliary belt. Because of the confined engine bay space, the a.c. hoses are connected to the compressor ports via a steel manifold pipe assembly. The compressor and manifold pipe may be removed from the engine as an assembly after raising the left hand side of the engine.

1. Depressurise and recover refrigerant via the service valves in the a.c. hoses at the bottom front of the engine bay, accessible from below. Disconnect the compressor discharge hose from the manifold pipe at the front of the sump, and the suction hose from its connection near the fuel tank well. Immediately cap all joints to prevent contamination.

2. Release the bolt securing the LH engine mounting leg to the flexible mount. Leave the bolt in position to retain alignment, and raise the engine approx. 50 mm.

3. Disconnect the two oil cooler hoses from the engine adaptor, and cap the hoses.

4. Release the auxiliary drive belt from the compressor pulley.

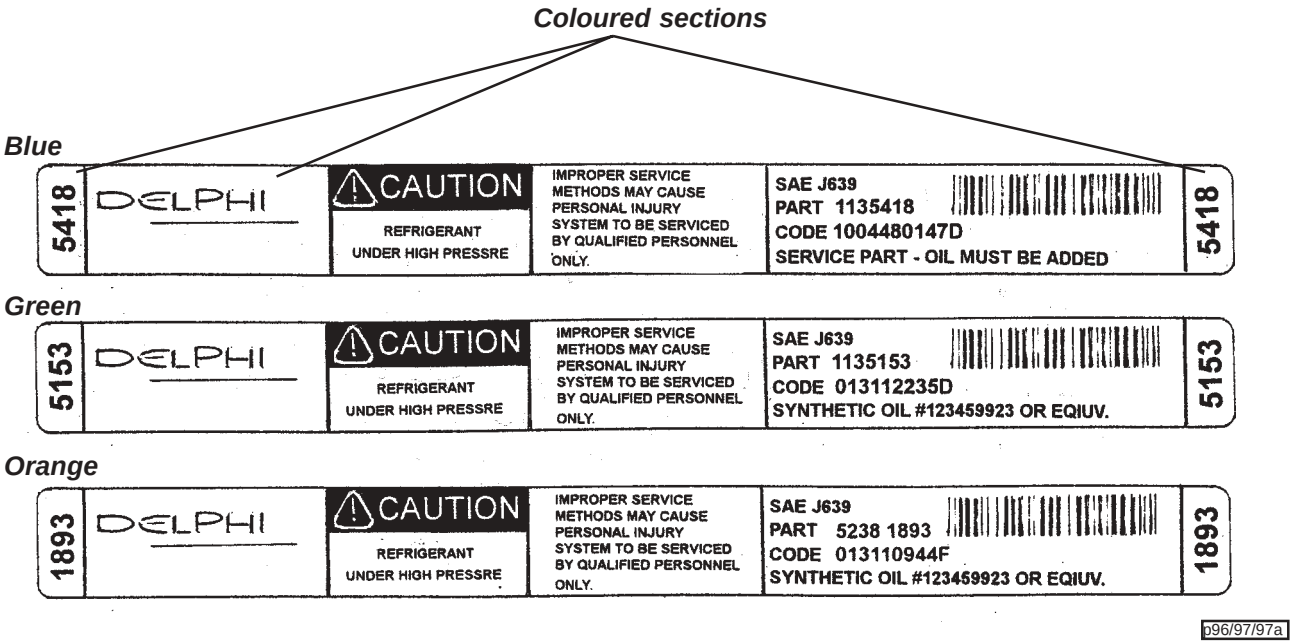
5. Spring both retaining barbs, and unplug the harness connector from the compressor clutch.

6. Release the M6 bolt securing the compressor manifold to the front of the sump.

7. Remove the three bolts securing the compressor to the block, and remove the compressor and manifold assembly.

8. Compressors may be supplied with or without oil. Compressors with white/yellow/**blue**, or white/yellow/**green** labels are pre-filled with 265cc of refrigerant oil, specified for fitting to a totally new a.c. system containing no oil. Compressors with white/yellow/**orange** labels contain only a preservative only a corrosion protection oil quantity.

   If fitting to a correctly oil charged a.c. system, the compressor should be drained of oil, and then 60cc of suitable refrigerant oil added.



9. Fit the manifold pipe assembly to the compressor and tighten the clamp bolt.

10. Fit the compressor to the block, locating first with the upper front bolt, noting the bolt lengths:
    Upper front; M10 x 110
    Upper rear; M10 x 120
    Lower; M10 x 90

11. Continue re-assembly in reverse order to removal.

12. Recharge the system with 1.2 kg of R134a refrigerant.

PJ.10 - HEATER/A.C. ASSEMBLY

The heater/a.c. housing and air distribution unit is mounted beneath the fascia on top of the body centre tunnel. The blower motor and air intake flap is contained within the front service compartment bulkhead cover. Access to the heater matrix or a.c. evaporator requires that the complete unit be removed:

1. Disconnect battery, drain cooling system and recover refrigerant.

   From inside the front service compartment;
2. Remove the bulkhead cover.

3. Disconnect the harness, release the two retaining screws and remove the blower motor.

4. Cut around the Silastic sealant between the bulkhead filler panel and blower motor adaptor casing.

   From inside the car;
5. Remove the instrument binnacle, centre console and main fascia.

6. Remove front bonnet release bar, and, for improved access, remove the scuttle beam.

7. Disconnect all airflow trunking and remove the passenger side demist duct.

8. Disconnect the heater matrix feed and return hoses and cap all ports. On cars prior to '98, release the water valve from the pedal box.

9. Disconnect the refrigerant pipes from the evaporator and expansion valve and cap all ports.

10. Label and release the vacuum pipes and stepper motor connections as necessary.

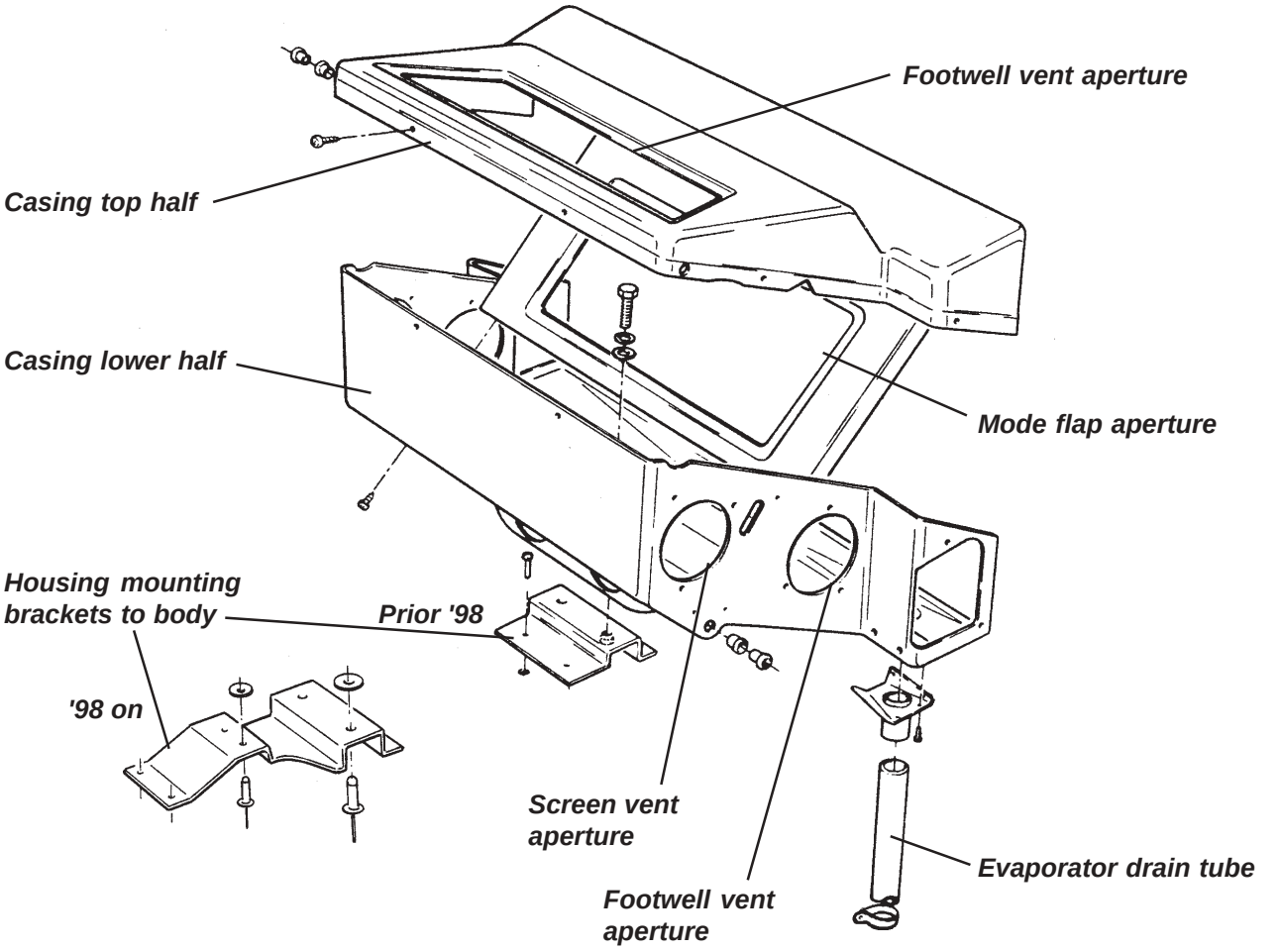
11. Release the evaporator drain pipe.

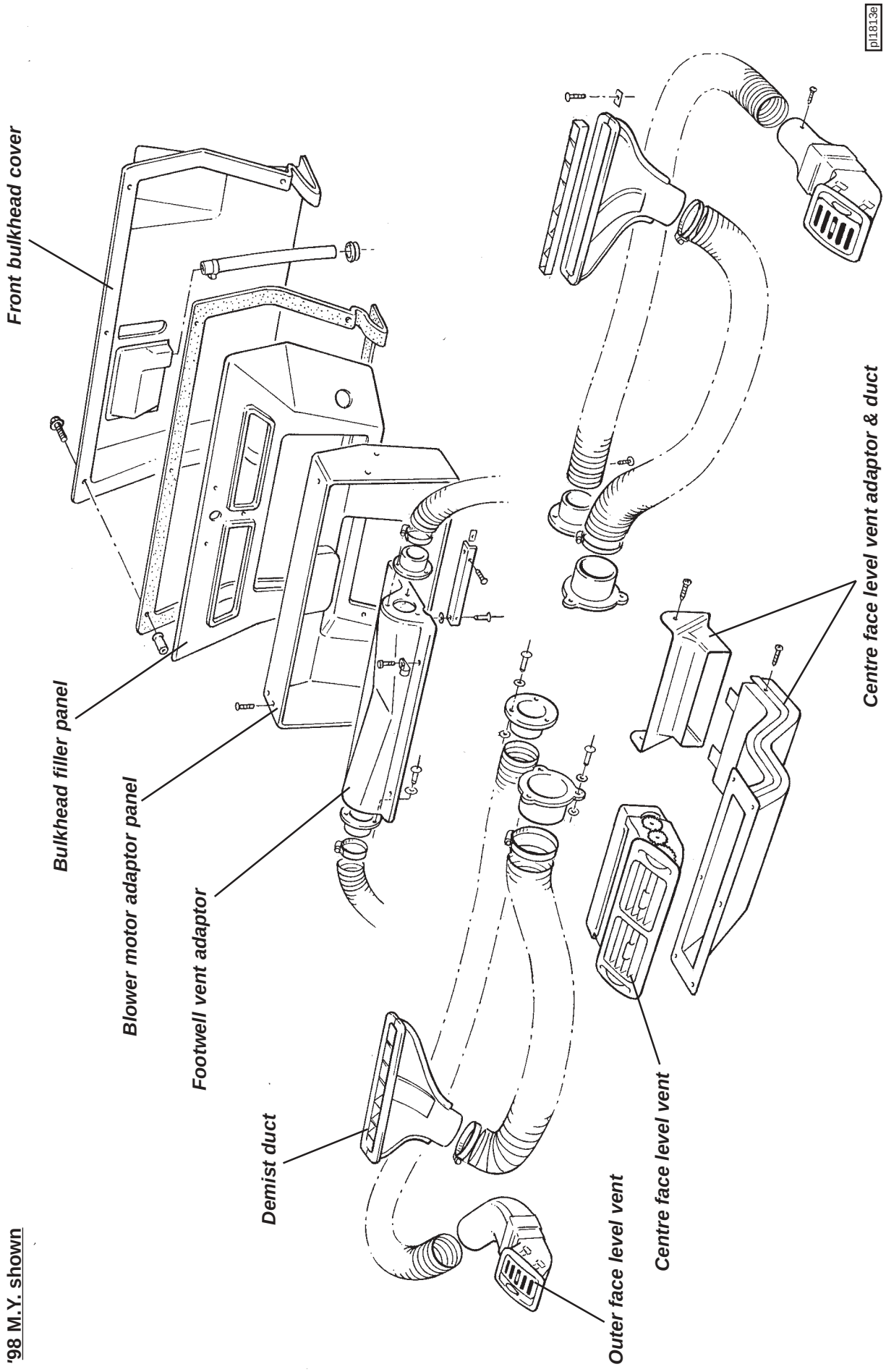
12. Remove the centre face level vent adaptor, and from within the casing apertures release the two screws securing the unit to the centre tunnel bracket. If necessary, for improved access, remove the bracket from the body.

13. Withdraw the unit rearwards and manoeuvre into the passenger footwell, taking care not to damage the water valve capillary line (if applicable).

Refit the unit in reverse order to disassembly, but if mounting references have been lost, the unit should be positioned 13mm offset to the passenger side using centreline datum through the bulkhead aperture and casing inlet aperture. The mounting face for the blower motor should be 13mm ahead of the bulkhead surface.

Heater/evaporator housing




Front bulkhead cover
Bulkhead filler panel
Blower motor adaptor panel
Footwell vent adaptor
Demist duct
Outer face level vent
Centre face level vent
Centre face level vent adaptor & duct
p11813e

'98 M.Y. shown