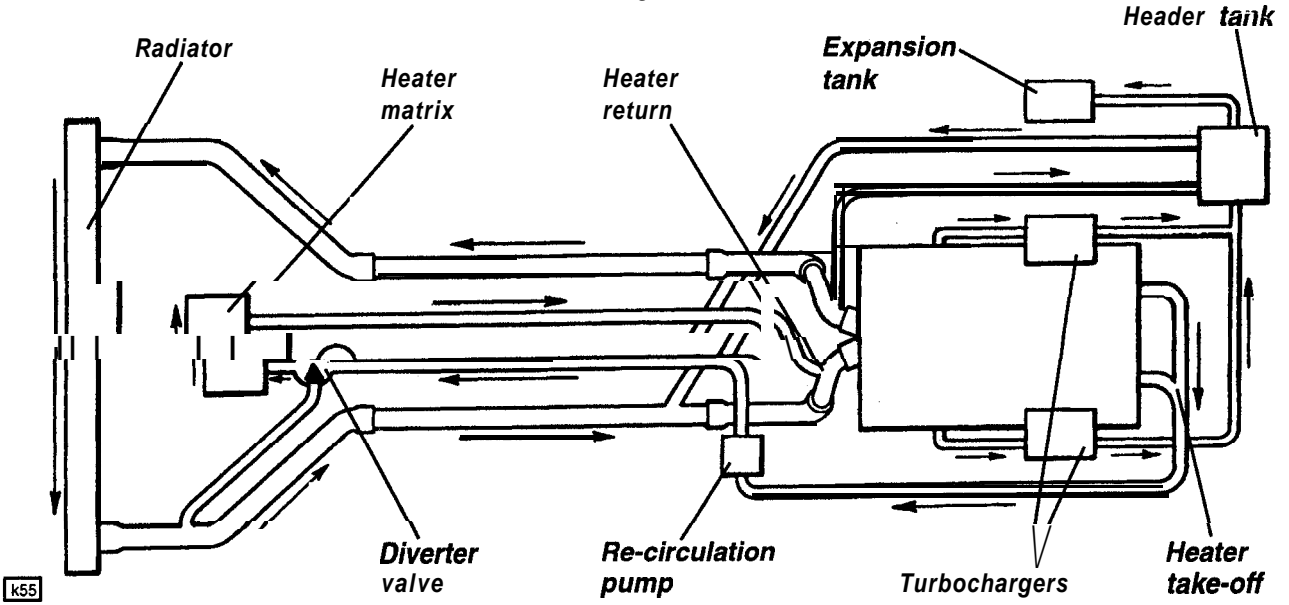
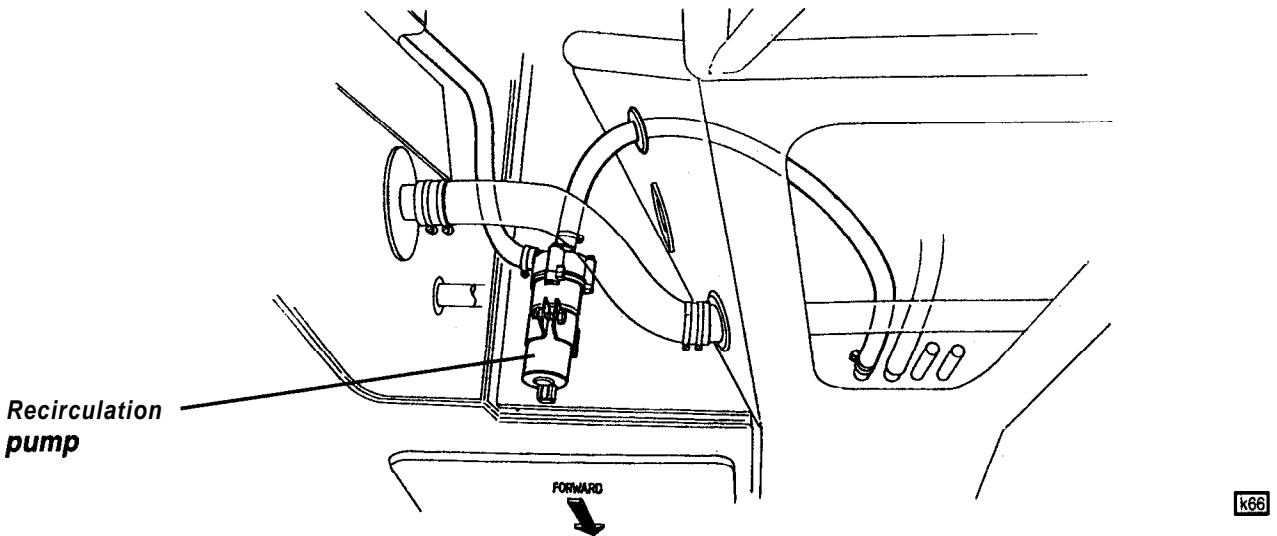
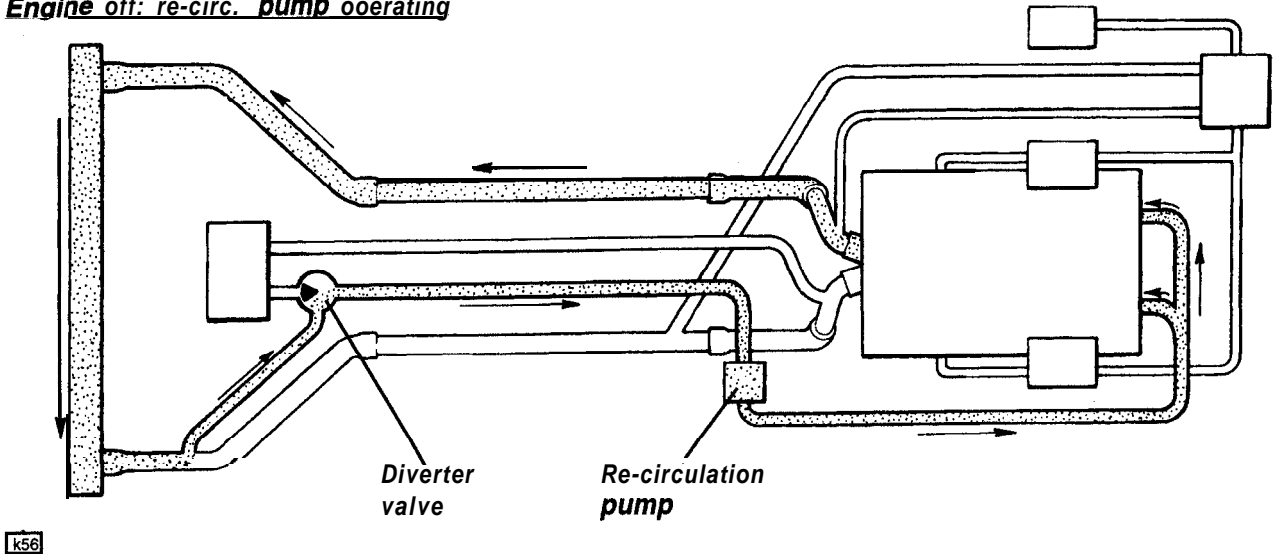




Engine running; thermostat open; heater operating



Engine off: re-circ. pump operating



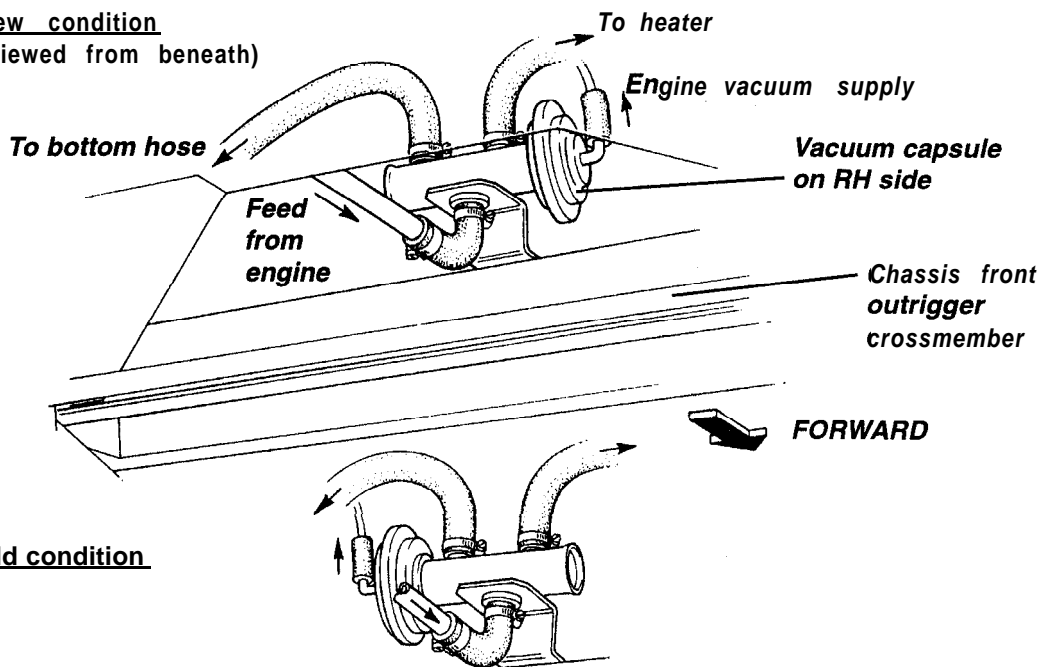


Diverter Valve Plumbing & Control Logic Revision

In September 1996, the plumbing and control logic of the diverter valve was revised. On early Esprit V8 models, built before September '96, it is possible that continued high speed cruising may allow the water pressure in the heater circuit to overcome the spring pressure on the diverter valve, resulting in water flow to the heater matrix bleeding off to the bottom hose, and cold air being supplied to the interior. On later cars, the control logic and plumbing of the diverter valve is changed, so that the valve is held in the heater supply state by engine vacuum rather than by spring pressure, and is unaffected by pressure differential forces on the valve.

New condition

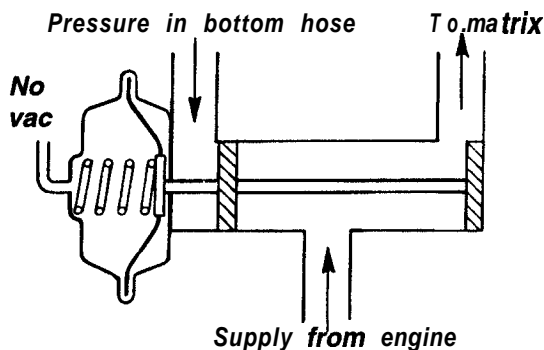
(Viewed from beneath)



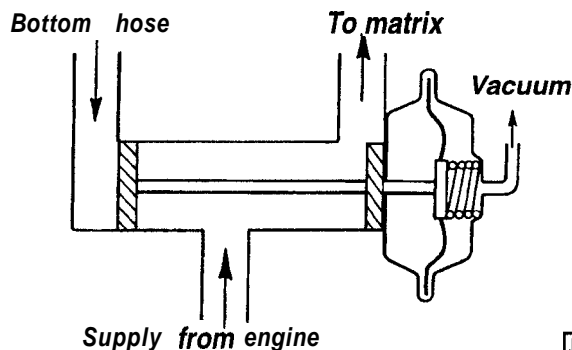
Old condition

p57

Old condition



New condition



p58

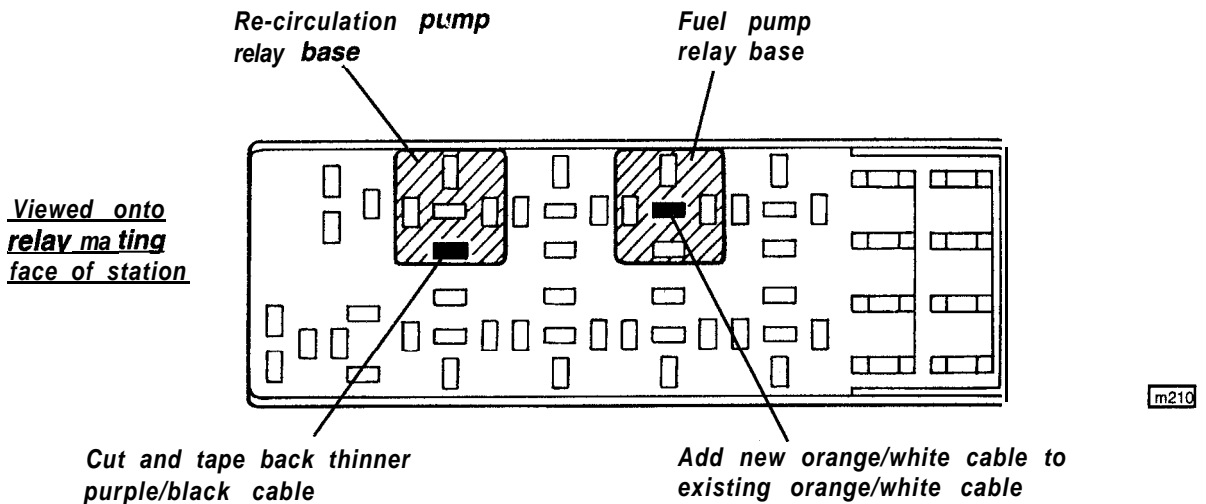
if an Esprit V8 prior to approx. VIN T 5178 (September 1996) is found to exhibit the symptoms described above, the following modification may be carried out to effect a cure:

Parts Required

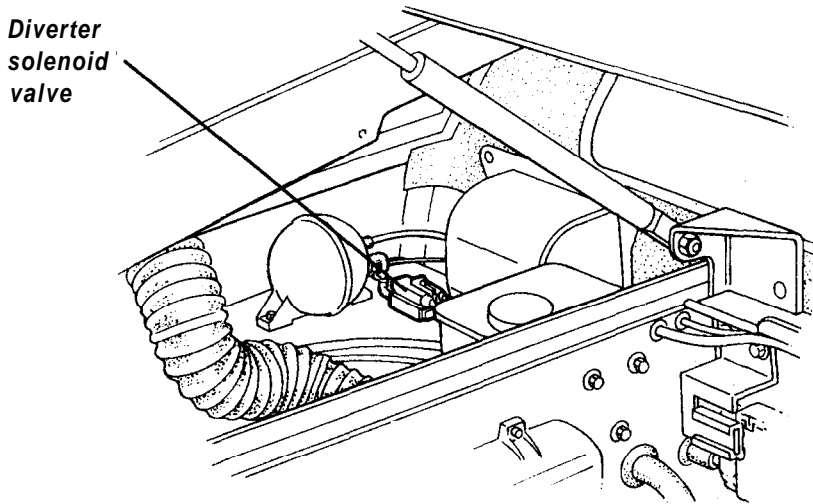
Description	Part Number	Qty
Kit, diverter valve electrical re-work comprising:	A082M5039S	1
Cable, orange/white, 0.5 mm ² x 4.5m	A082M5038S	1
Terminal, solenoid valve connector	A082M6635S	1
Seal, solenoid valve connector	A082M6636S	1
Terminal, fuel pump relay base	A082M6637S	1



1. Check the orientation of the diverter valve beneath the front of the car. If the vacuum capsule is towards the LH side of the valve, continue with this modification procedure: If the capsule is on the RH side of the valve, the car is already built to the later condition; check the integrity of the vacuum supply system.
2. Disconnect battery.
3. From beneath the front of the car, clamp off the three hoses at the diverter valve to minimise coolant loss. Disconnect the vacuum pipe to the capsule, slacken the centre hose connection, and release the remaining two hoses.
4. Rotate the valve 180° in its mounting bracket grommet, and reconnect the hoses to the opposite ends of the valve. Reconnect the vacuum pipe and tighten all hose connections. Remove the hose clamps. If necessary, top up cooling system.
5. Release the relay station from its mounting bracket at the RH rear of the rear luggage compartment. Unclip the baseplate from the station. At the recirculation pump relay base, identify the **thinner** of the two purple/pink cables into terminal 1, and cut this cable (the feed to the recirc. solenoid valve) as close to the terminal as possible. Insulate and tape back the free end of the cable.
Note: On some early cars, terminal 1 may be found to house only the thick purple/pink. In this case, the solenoid valve feed is picked up via a purple cable from the recirc. pump connector plug. Cut and tape back this cable.



6. At the primary fuel pump/injectors relay base, remove the centre terminal with its orange/white cable, and cut off the terminal. Join this cable with new orange/white cable **A082M5038** and terminate with the larger of the two new terminals, **A082M6637**. Refit the terminal into the relay base. Refit the relay station baseplate and secure the station to its mounting bracket.
7. Remove the LH rear quarter window trim panel. At the diverter solenoid valve on the LH fuel tank board, release the electrical connector, prise off the blue keeper, and use a jeweller's screwdriver or terminal tool to release the purple/pink cable from the solenoid connector. Insulate the terminal and tape back to the harness.
8. Route and space tape the new orange/white cable around the luggage bay following existing harness routing where possible, to the diverter valve solenoid valve. Slide the terminal seal **A082M6636** onto the cable before terminating with the smaller new terminal **A082M6635**. Fit the terminal back into the solenoid valve connector, and secure with the blue keeper. Plug onto the valve, and refit the quarter window trim.



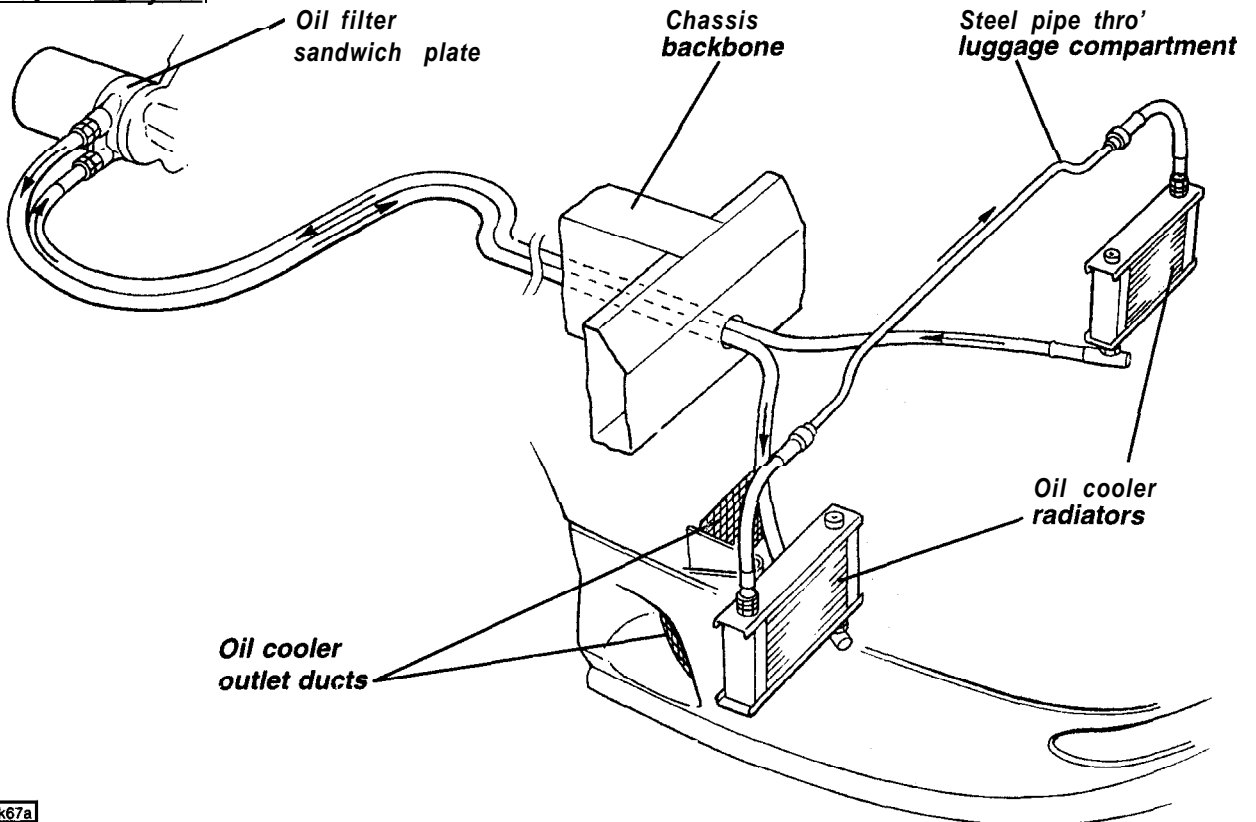
p56

- 9. Verify correct vacuum switching by disconnecting the vacuum hose at the diverter valve, and checking: vacuum is supplied when the engine is running; the line is ventilated when the engine is stopped.

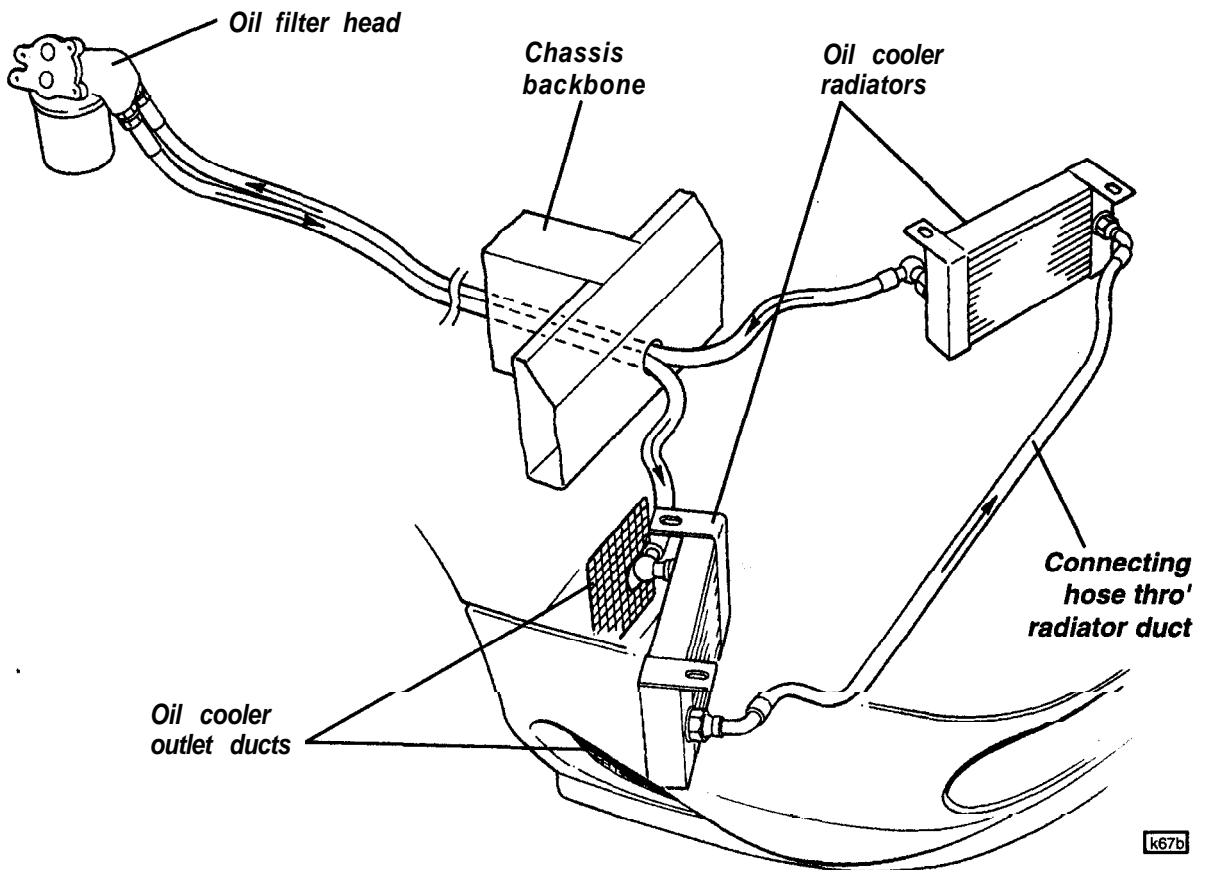
KE.5 • OIL COOLING SYSTEM

Pressurised oil from the oil pump is cooled before flowing through the oil filter and into the engine, by being directed through high pressure rubber hoses to a pair of oil cooler radiators mounted one each side of the main radiator duct. On four cylinder engines, a sandwich plate is used between the oil filter and auxiliary housing, to connect with the oil cooler feed and return hoses.

4-cylinder layout



k67a

V8 oil cooler layout

On V8 engines the oil filter head incorporates feed and return unions. The hoses are routed through the chassis backbone to the front of the car, then into one of the side mounted radiators (inboard bottom connection on 4-cylinder, outboard rear on V8), across to the second radiator, and then back to the engine. On 4-cylinder cars, the link between the two radiators uses a steel pipe routed through the front luggage compartment, beneath the front edge of the lid aperture, whereas V8 models use a hose running through the main radiator duct ahead of the air conditioning condenser. Each oil cooler radiator is mounted in its own duct, receiving air from an intake in the front spoiler, and exhausting through a divided duct to both an outlet in the wrapped around rear end of the spoiler, and directly into the front wheelarch.

Ensure that the oil cooling hoses are always re-connected to the engine in the original orientation in order to maintain the direction of oil flow. Due to the significant volume of oil held in the oil cooler circuit, it is recommended to purge the cooling system when changing the engine oil.

KE.6 - CHARGE AIR COOLING SYSTEM (4-cylinder models)

Four cylinder models use an air/water heat exchanger (chargecooler) to reduce the temperature and increase the density of air leaving the turbocharger compressor before it enters the intake plenum chamber. The chargecooler is flexibly mounted to the engine, and uses flexible high temperature hoses to connect the intake and outlet to the compressor and plenum respectively. Air passing through the chargecooler flows past a matrix of tubes through which water is circulated in a closed system by an engine driven pump. Heat is transferred from the intake charge air to the water which is pumped via alloy pipes routed through the chassis backbone, to a chargecooler radiator mounted ahead of both the air conditioning condenser and the engine cooling radiator.

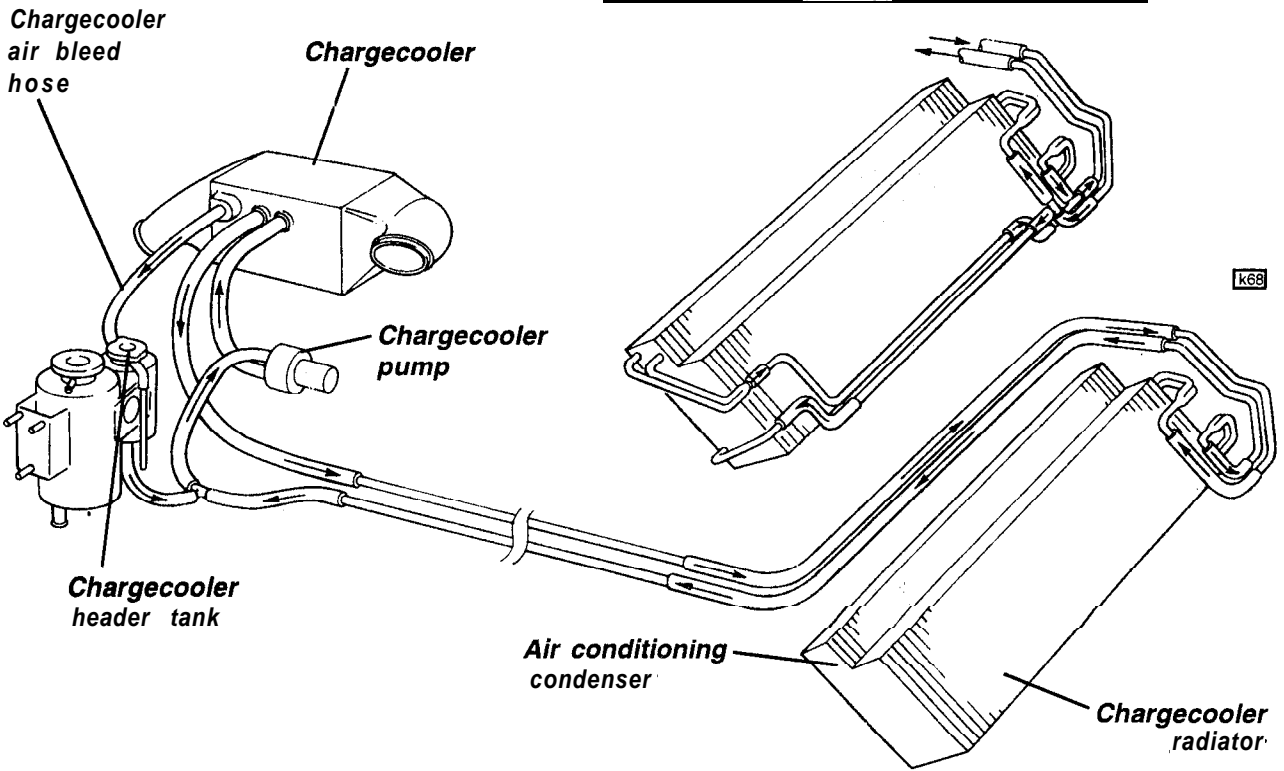
On air conditioned cars prior to March '95 using refrigerant R12, the a.c. condenser and chargecooler radiator are constructed as one unit with integral side frames. Later cars using refrigerant R134a use a pair of 'side by side' condensers, and a separate chargecooler radiator.



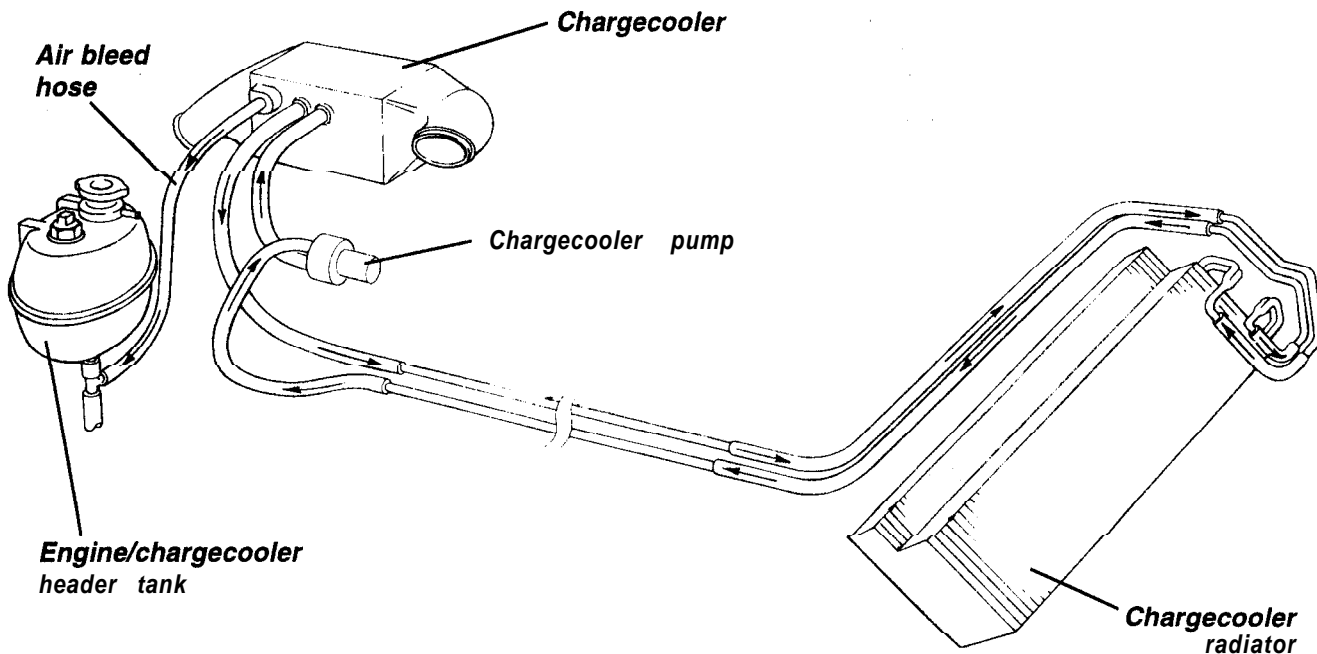
On Sport 300 models without air conditioning, the R12 type of integrated a.c. condenser is adapted to become a second chargecooler radiator in addition to the standard item ahead of it, with the plumbing arranged to provide parallel water flow through the two radiators.

'Twin tan&' independent chargecooler system

Sport 300 with parallel flow double radiator



Single tank infeed chargecooler system





Prior to December '93, the chargecooler system is entirely separate from the engine cooling system, and is equipped with its own header tank mounted adjacent to the engine header tank at the left hand rear corner of the engine bay. The tank, which should be filled (cold) to a level 25mm below the filler neck, is connected into the chargecooler pump inlet hose, and is fitted with a 48 kPa (7 psi) pressure cap. From December '93, the chargecooler system, whilst continuing to function in a largely independent manner, is linked with the engine cooling system by a connection between the chargecooler air bleed spigot and the engine coolant header tank, thus dispensing with the need for a separate chargecooler tank.

Testina the Chargecooler Pumo

The chargecooler pump is driven off the rear end of the auxiliary shaft in the position occupied on some earlier engine variants by the ignition distributor, and uses an impellor with flexible vanes mounted in an eccentric chamber. The output of the chargecooler pump may be checked as follows:

- Disconnect and plug the outlet hose from the pump.
- Fit a slave hose to the pump outlet spigot, and place the other end of the hose in a graduated jug of at least 2 litres capacity.

Remove the chargecooler header tank cap, or the combined header tank cap as applicable, and prepare at least 2 litres of coolant with which to keep the tank topped up.

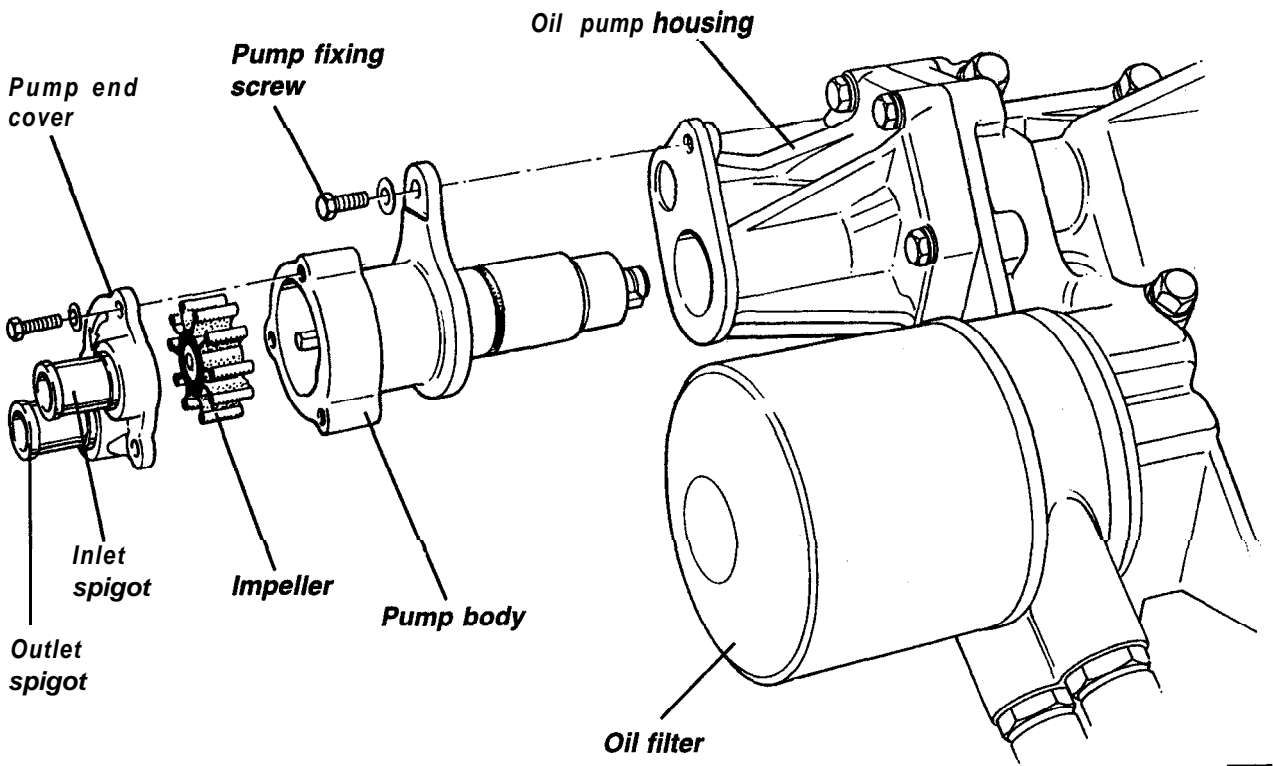
Start the engine and run at 3,000 rpm, adding coolant as necessary to keep the header tank filled.

Time the delivery of 1 litre of coolant into the graduated jug. Specification = 9 - 12 seconds.

Servicing the Charae cooler Pump

The rubber impeller of the chargecooler pump may be inspected and/or replaced as follows:

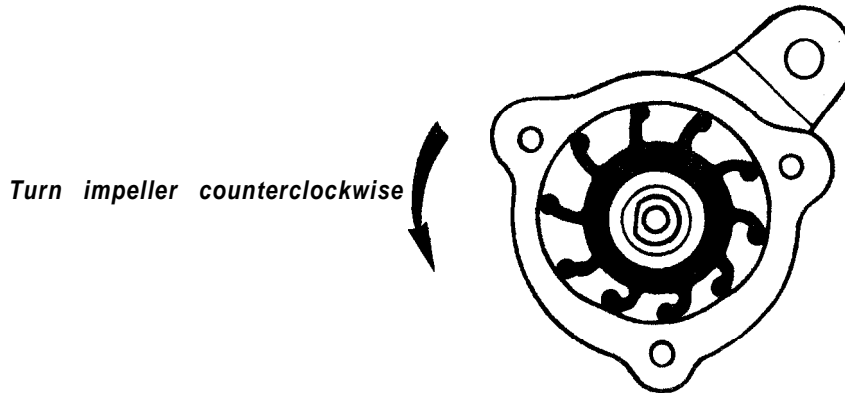
1. Drain the chargecooler system of coolant.
2. Remove the single screw securing the chargecooler pump to the oil pump housing, and withdraw the pump with the hoses attached.



e176

3. Release the three screws and remove the pump end cover.
4. If necessary, use long nose pliers to withdraw the impeller from the spindle taking care not to damage the housing inner surface or end face.

5. Clean the mating faces of the pump body and end cover, removing all traces of the old gasket, and ensure that the inside of the housing is thoroughly cleaned. Smear some petroleum jelly around the inside of the pump housing and on the shaft.
6. Carefully fit the new impeller **B910E6992F** (either way round) onto the 'D' of the shaft and introduce into the housing whilst turning in a counterclockwise direction, so that the vanes of the impeller are **trailing** when the pump shaft rotates counterclockwise as viewed onto the impeller. See diagram.



e175

CAUTION: Once the impeller has been installed, take care not to reverse the direction of shaft rotation, or damage to the impeller vanes may occur.

7. Apply a thread locking compound to the three end cover fixing screws, smear some petroleum jelly around the end mating face of the pump body, and using a new gasket A91 OE701 OF, fit the end cover, tightening the screws to 2.4 - 2.7 Nm. **DO NOT OVERTIGHTEN.**
8. Smear the chargecooler pump spigot 'O' ring with engine oil. Ensure that the oil pump end thrust spring is fitted into the end of the auxiliary shaft before inserting the pump into the housing and engaging the offset dog drive mechanism. If necessary, align the drive dog by turning the pump shaft only in the direction of the arrow on the end cover. Retain with the single fixing screw.
9. Refill the system with the recommended coolant mix.

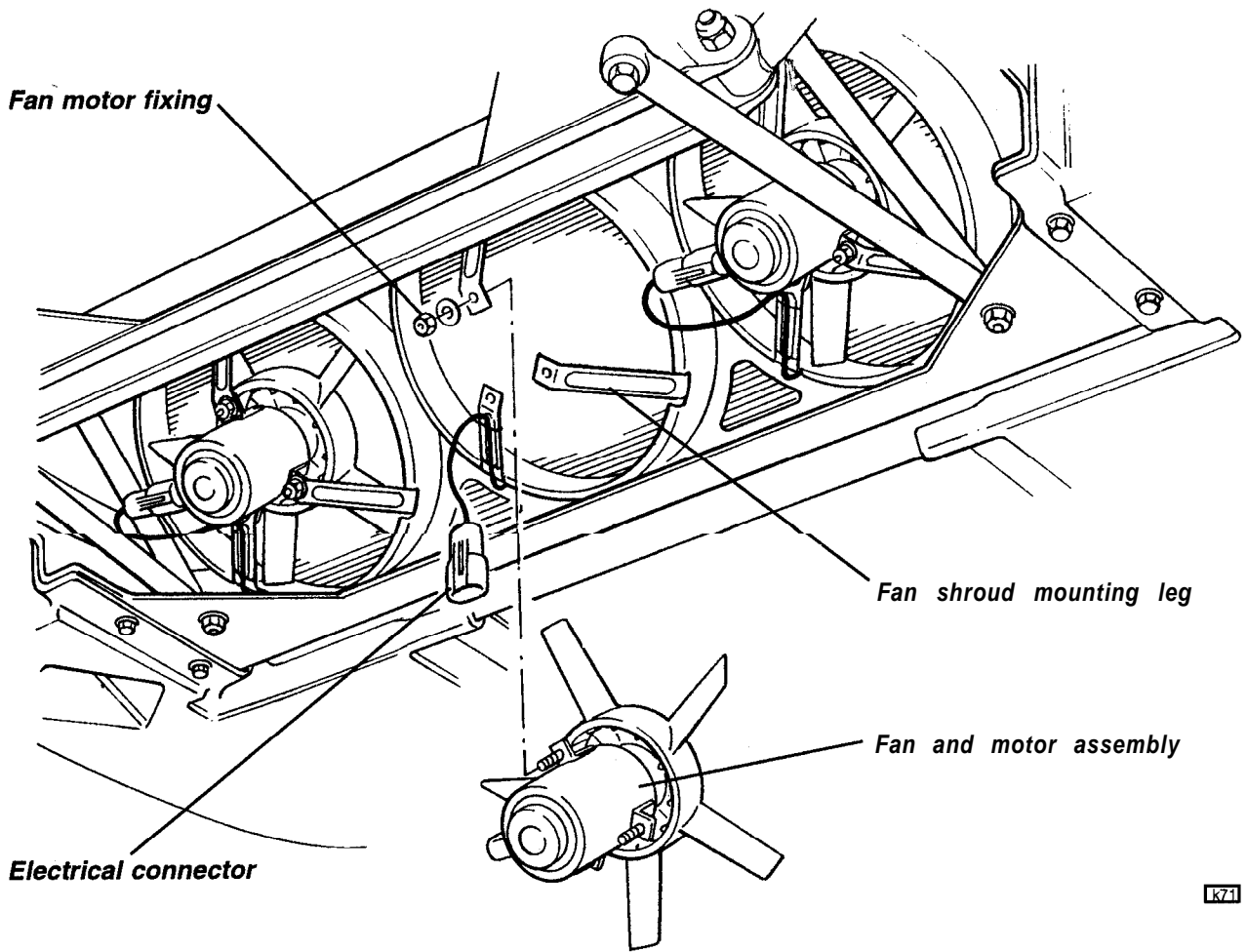
CAUTION: Never run the engine when the chargecooler system is drained. The pump impeller will be damaged if run dry.

KE.7 - RADIATOR COOLING FANS

Three cooling fans are mounted in a cowl on the back of the radiator, and draw air through the radiator stack of chargecooler radiator (4-cylinder), a.c. condenser, and engine radiator. All three fans are controlled as a unit by the engine management ECM, which energises the fans at approx. 90°C (4-cylinder) or 100°C (V8) as sensed by the engine coolant temperature sensor. The fans will also run when the a.c. compressor is operating and road speed is low, in order to provide sufficient cooling of the condenser. If any fault codes are set which indicate a type of fault which could result in engine overheating, the fans will be energised as an engine safeguard. The fans will not operate if the battery voltage is detected as being too low.

On V8 models, the fans will also run in conjunction with the coolant re-circulation pump during a 20 minute period following engine switch off, if coolant temperatures over 105°C are sensed.

Each fan motor assembly is mounted via three fixings and may be removed from beneath without disturbing the radiator duct.



K71

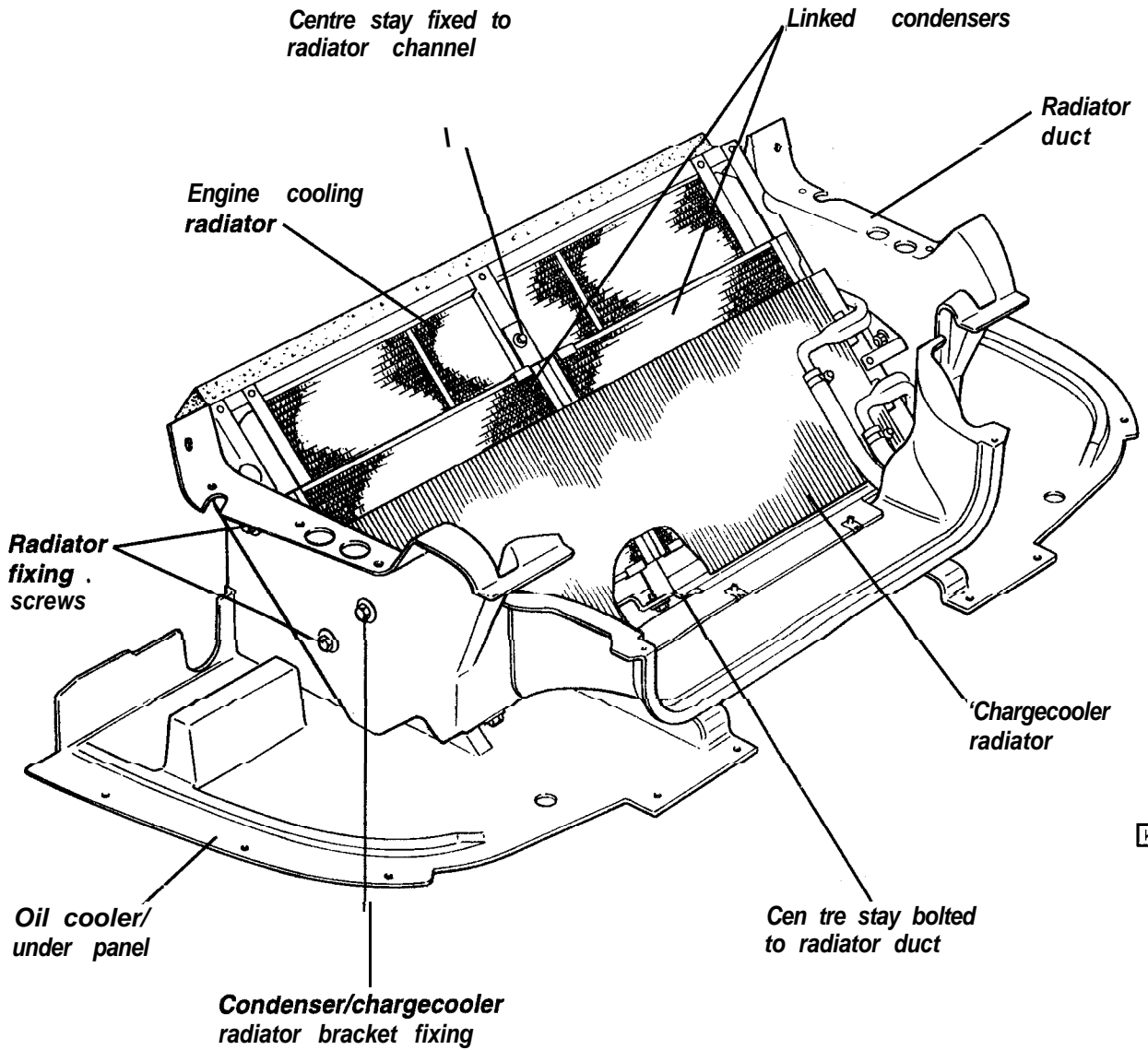
KE.8 • RADIATOR DUCT

A composite duct is used to house the radiator stack, and is bolted to the underside of the front luggage compartment floor. The engine cooling radiator is fixed to each side of the duct via two fixings in the side members of the radiator support frame. Cars using R12 refrigerant and a unitary **condenser/chargecooler** radiator, retain the assembly via a fixing through the bottom of the radiator duct into a captive nut on a flange at each end of the condenser, and use edge clips to secure the top of the condenser to the engine cooling radiator. Later cars using **R134a** refrigerant, use two condensers mounted side by side, and a separate chargecooler radiator. A **rivetted** bracket at each side joins the chargecooler radiator to a condenser, and is fixed with a screw through the side of the radiator duct. A central stay joins the inboard ends of the two condensers, and is bolted at its bottom end to the radiator duct, and at its top end to the centre of the engine cooling radiator.

To remove a radiator or condenser, the complete radiator duct assembly must be dropped from beneath after removing the various under panels. The oil coolers can remain in position. The engine and chargecooler systems must be drained, although the a.c. system should remain intact if possible to avoid the requirement for the use of recovery/recharging equipment. The duct is mounted via three fixings at each side to the luggage compartment floor, with two tubular stays bracing the duct rear end to the chassis front frame.



Radiator Duct: 4-cylinder, R134a refrigerant type



k70

Electrical
SECTION ML - ESPRIT S4 & Sport 300

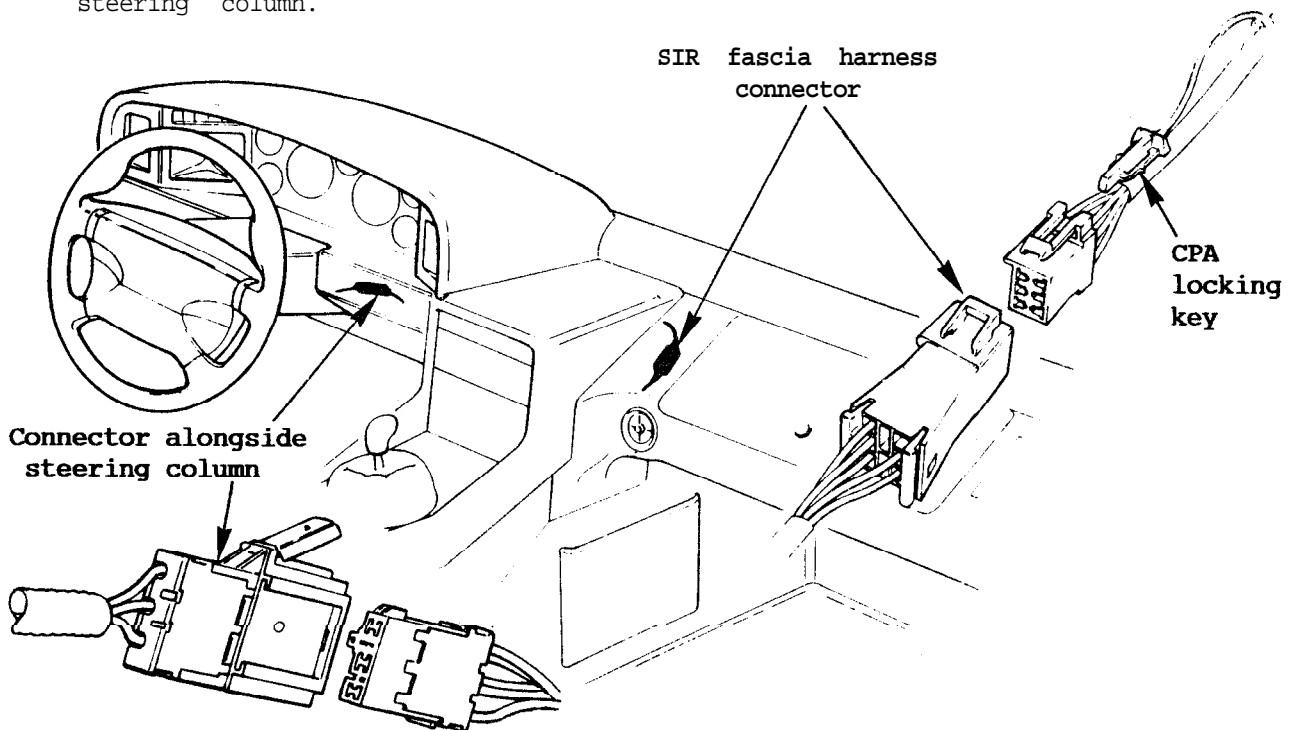
	<u>Sub -Section</u>	<u>Page</u>
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Introduction of Revised Wiring Harness	ML.2	4
Switch & Tell Tale Lamp Operation	ML.3	5
Central Door Locking	ML.4	15
Vehicle Alarm System	ML.5	16
Electronic Module Operation	ML.6	25
Radio Wiring & Suppression	ML.7	30
Battery, Battery Cables & Earthing Points	ML.8	31
Heated Rear Screen & High Mounted Stop Lamp Wiring	ML.9	34
Component Location & Fuse Ratings	ML.10	35
Harness Routing Diagram	ML.11	43
Circuit Diagrams - Early Cars (white pages)	ML.12	44
Circuit Diagrams - 'Revised Harness' Cars (cream pages)	ML.13	-
Esprit V8 (prior '98 M.Y.) Supplement & Circuit Diagrams	ML.14	-
'98 M.Y. Supplement & Circuit Diagrams (gray pages)	ML.15	-

ML.1 - SAFETY PRECAUTIONS FOR SUPPLEMENTARY INFLATABLE RESTRAINT (S.I.R.) MODELS

On SIR equipped cars, safety precautions should be taken to guard against accidental deployment of an airbag when working on the electrical system. The Diagnostic Energy Reserve Module (DERM), a key component in the SIR system, can maintain sufficient voltage to cause air bag deployment for up to 10 minutes after the ignition is turned off and the battery is disconnected. Before carrying out ANY electrical maintenance or diagnostic work, the following procedure MUST be adopted in order to disable the SIR system:

Cars With Driver Only S.I.R.

1. Turn off the ignition.
2. From beneath the passenger side fascia, locate the six way SIR fascia harness connector block, pull out the Connector Positive Assurance (CPA) locking key, and unplug the connector.
3. Unplug the orange 3-way connector to the inflator module alongside the steering column.



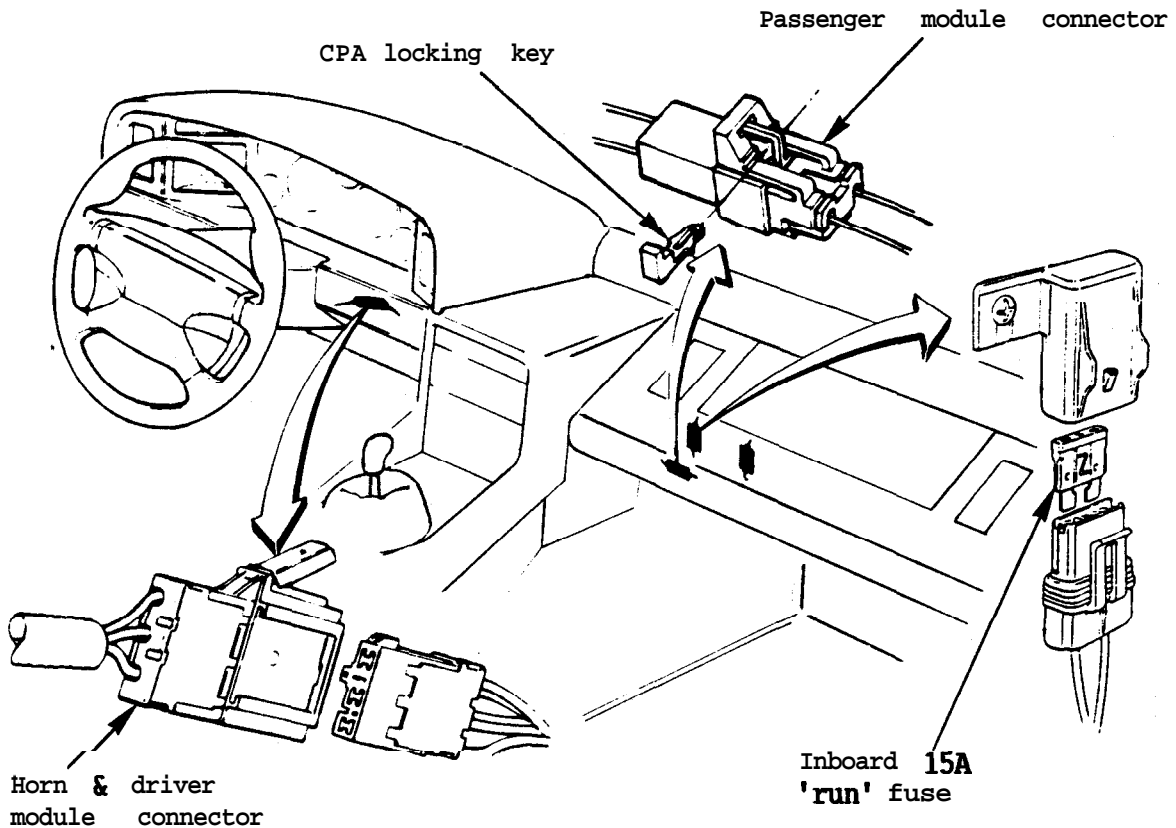
When all service work is completed, ensure the SIR system is reconnected:

1. Reconnect the orange 3-way connector between SIR harness and steering column.
2. Plug in the 6-way SIR fascia harness connector block, and refit the CPA locking key.
3. Conduct 'SIR Diagnostic System Check' as follows:
 - Turn on the ignition and observe the SIR tell tale; it should flash seven to nine times and then go out. When the engine is cranked, the lamp should come on steady, and then flash for another seven to nine times after the engine has started.

WARNING: If the SIR tell tale lamp does not come on with the ignition, and follow the sequence detailed above, or if it lights at any other time, a fault in the SIR system is indicated which should be investigated without delay (see section WA.4 of the SIR Service Notes) as the SIR may not function correctly.

Cars With Driver & Passenger S.I.R. (Dual S.I.R.)

1. Turn off the ignition.
2. From beneath the passenger side fascia, locate the two S.I.R. fuse holders secured to the back of the scuttle beam. Withdraw the INBOARD fuse from its holder, and remove the 15A 'run' fuse (the outboard 'crank' fuse is 5A).
3. Unplug the orange 3-way connector to the driver's inflator module alongside the steering column.
4. Locate the yellow 2-way connector to the passenger's inflator module beneath the passenger side knee bolster, withdraw the locking key, and unplug the connector.



When all service work is completed, ensure the SIR **system** is reconnected:

1. Reconnect the orange 3-way and yellow 2-way connectors to the driver and passenger inflator **modu'es**. Ensure that the locking key is used to secure the 2-way connector.
2. Refit the **15A** run fuse and insert into the fuse holder beneath the fascia.
3. Conduct 'SIR Diagnostic **System** Check' as follows:
 - Turn on the ignition and observe the SIR tell tale; it should flash seven to nine **times** and then go out. When the engine is cranked, the lamp should **come** on steady, and then flash for another seven to nine **times** after the engine has started.

WARNING: If the SIR tell tale **lamp** does not come on with the ignition, and follow the **sequence** detailed above, or if it lights at any other time, a fault in the SIR system is indicated which should be investigated without delay (see section UC.4 of the SIR Service Notes) as the SIR may not function correctly.

ML.2 - INTRODUCTION OF REVISED WIRING HARNESS

A revised wiring harness was introduced as a running change on Esprit S4 and Sport 300 models in December '93, and features simplified and rationalised circuitry. Change point:

VIN R 1242 (LHD S4 December '93)

R 1250 (RHD S4 December '93)

R 8030 (Sport 300 December '93)

Engine no. 28394

The principal changes associated with the revised harness are as follows:

1. Wiring Harnesses

- Centre console harness incorporated into fascia harness.
- Engine bay relay box components revised and resited to relay station on rear of right hand rear wheelarch.
- MAP and **BARO** sensors and the boost gauge transducer relocated over the RH fuel tank.
- Vacuum pump resited to former engine bay relay box.
- Fuel rail harness incorporated into engine management harness.
- Handbrake switch, rheostat, and rear speaker harnesses incorporated into fascia harness.
- **Licence** plate lamps harness incorporated into rear lighting harness.
- **Commonised** front harness (was RHD/LHD)
- Radiator fan harness becomes handed RHD/LHD (was common).

2. Vehicle Alarm

Sensing switches added to the tailgate and front bonnet.

3. Front Luggage Compartment Lamp

Lamp added into the front underside of the front bonnet, operated via a new bonnet sensing switch (also alarm function) whenever the bonnet is raised. Note that as the interior lights are also switched on via the bonnet switch, leaving the vehicle with the bonnet raised should be avoided.

4. Lights-on Buzzer (non-USA)

Lights-on warning buzzer added to non-USA cars, and mounted on the scuttle beam outboard of the steering column. With ignition off, if the driver's door is opened when the lights are on, a continuous buzzer will sound.

5. Tell Tale Lamps

- Fan fail tell tale and tell tale check module deleted.
- Catalyst overheat tell tale added, connected only on Japanese market cars.
- Low oil pressure tell tale (warns only at engine speeds in excess of 1600 rpm) linked to the battery non-charging tell tale in order to provide a lamp test function on initial switch on.

6. Inertia Switch

New type inertia switch fitted at the right hand front corner of engine bay.

7. Headlamp Switching Logic

Headlamp main/dip switching changed so that the dip beams **remain lit** when main beam is selected.

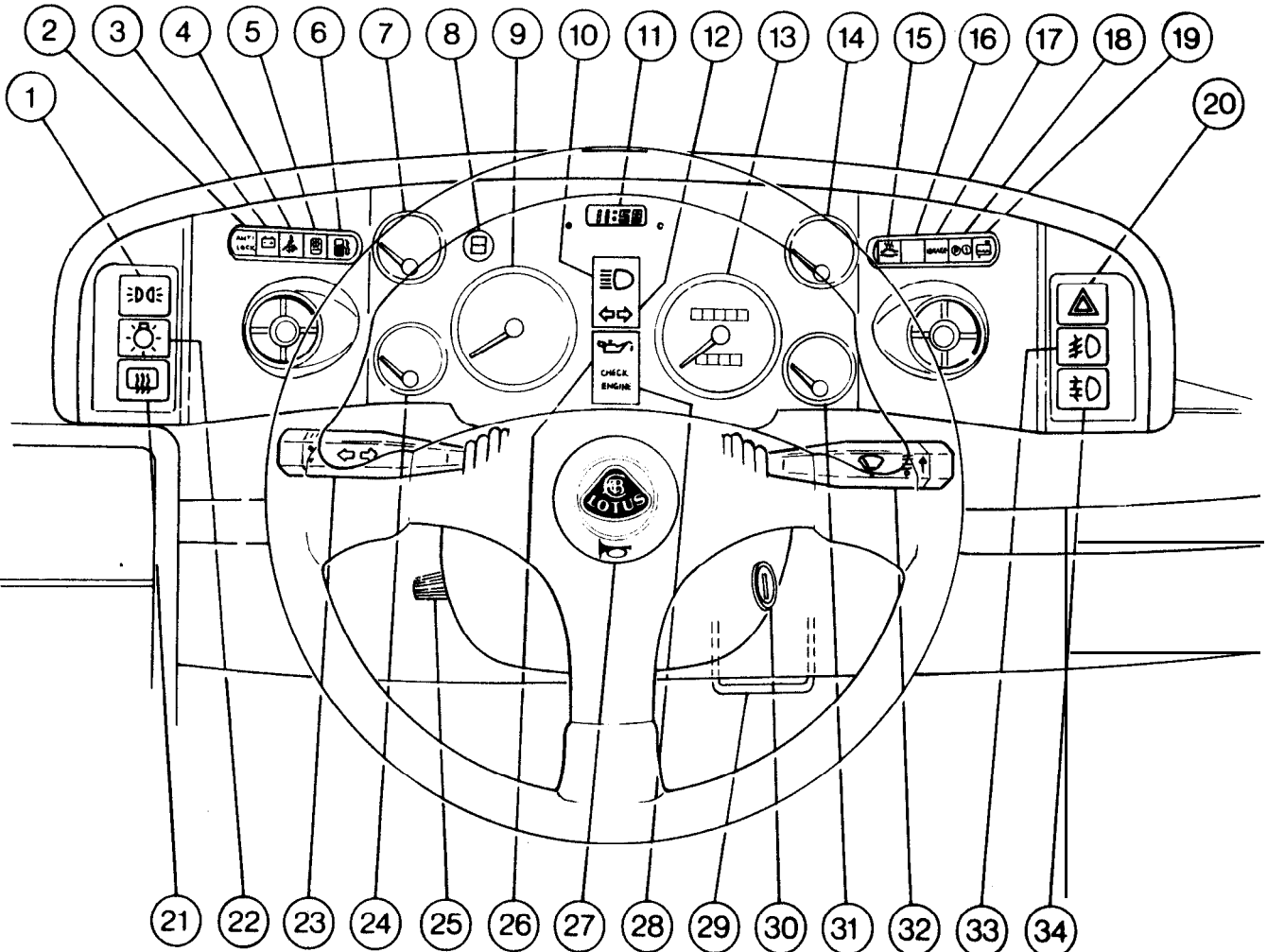
8. Radio Aerial

Electric aerial fitted for some markets, in the left hand rear quarter.



ML.3 - SWITCH & TELL TALE OPERATION

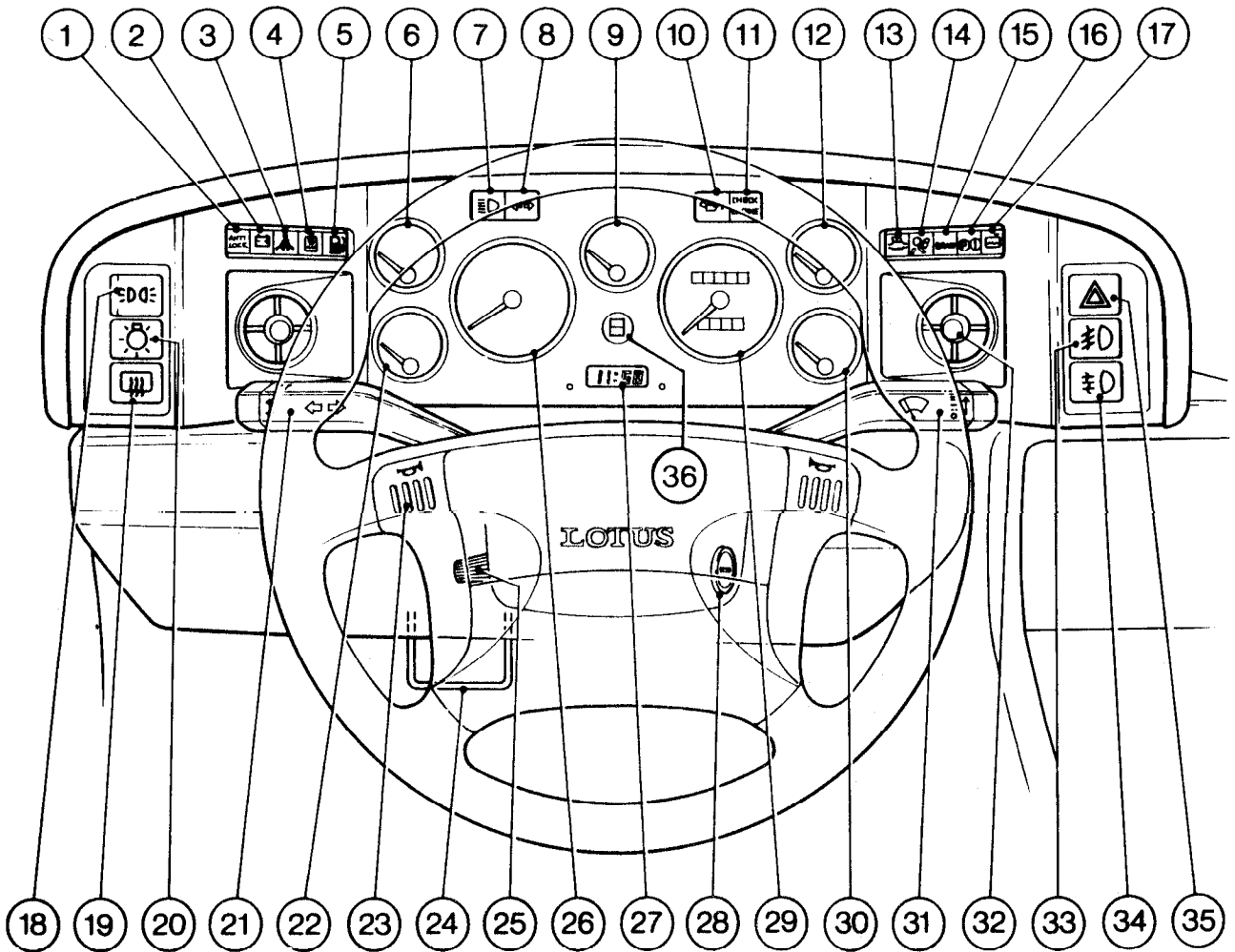
Fascia Layout - Cars without S.I.R.



- | | | | |
|----|---|----|--------------------------------------|
| 1 | Parking lamps switch | 1a | Brakes/parking brake tell tale |
| 2 | Anti-lock brakes tell tale | | (EEC type) |
| 3 | Battery non-charging tell tale | 19 | Engine coolant tell tale |
| 4 | Seat belt tell tale | 20 | Hazard warning lamp switch |
| 5 | Low screenwash level tell tale | 21 | Heated tailgate/mirror glass switch |
| 6 | Low fuel level tell tale | 22 | Headlamp switch |
| 7 | Oil temperature gauge | 23 | Dipswitch/flasher/turn indicators |
| a | Ice warning display | 24 | Oil pressure gauge |
| 9 | Tachometer | 25 | Panel lamps rheostat |
| 10 | Main beam tell tale | 26 | Low oil pressure tell tale |
| 11 | Digital time clock | 27 | Horn button |
| 12 | Turn indicator tell tale | 28 | Check engine tell tale |
| 13 | Speedometer | 29 | Front bonnet release handle |
| 14 | Fuel gauge | 30 | Ignition switch/steering column lock |
| 15 | Early cars: Fan fail tell tale | 31 | Water temperature gauge |
| | Later cars: Catalyst overheat tell tale (Japan) | 32 | Windscreen wiper/washer control |
| 16 | Not used | 33 | Front fog lamps switch |
| 17 | Brakes/parking brake tell tale (USA type) | 34 | Rear fog lamps switch (if fitted) |



Fascia Layout - Cars with S.I.R.



- | | | | |
|----|---|----|--------------------------------------|
| 1 | Anti-lock brakes tell tale | 17 | Engine coolant tell tale |
| 2 | Battery non-charging tell tale | 1a | Parking lamps switch |
| 3 | Seat belt tell tale | 19 | Heated tailgate/mirror glass switch |
| 4 | Low screenwash level tell tale | 20 | Headlamps switch |
| 5 | Low fuel level tell tale | 21 | Dipswitch/flasher/turn indicators |
| 6 | Oil temperature gauge | 22 | Oil pressure gauge |
| 7 | Main beam tell tale | 23 | Horn button |
| a | Turn indicator tell tale | 24 | Front bonnet release handle |
| 9 | Boost gauge | 25 | Panel lamps rheostat |
| 10 | Low oil pressure tell tale | 26 | Tachometer |
| 11 | Check engine tell tale | 27 | Digital time clock |
| 12 | Fuel gauge | 28 | Ignition switch/steering column lock |
| 13 | Early cars: Fan fail tell tale
Later cars: Catalyst overheat tell tale (Japan) | 29 | Speedometer |
| 14 | Supplementary Inflatable Restraint (S.I.R.) tell tale | 30 | Water temperature gauge |
| 15 | Brakes/parking brake tell tale (USA type) | 31 | Windscreen wiper/washer control |
| 16 | Brakes/parking brake tell tale (EEC type) | 32 | Face level vent |
| | | 33 | Front fog lamps switch |
| | | 34 | Rear fog lamps switch (if fitted) |
| | | 35 | Hazard lamps switch |
| | | 36 | Ice warning display |



TELL TALE LAMPS

ABS Tell Tale

This amber tell tale should light for the ABS three second initialisation phase when the ignition is turned on. The lamp will also light when cranking the engine. If the lamp lights at any other time:

- a flashing light indicates that the ABS computer has detected an anomaly in the anti-lock system, but is still allowing full ABS operation. Diagnosis and rectification should be carried out without delay. Refer to Service Notes Section JF.

CAUTION: Prolonged vehicle operation with a flashing ABS tell tale may cause damage to the ABS and result in the anti-lock facility being switched out.

- a continuous light indicates that the ABS computer has detected a fault and has switched out the anti-lock system. The base brake system will operate as normal unless the 'Brakes/Parking Brake' tell tale is also lit (see later). The fault should be diagnosed and rectified without delay. Refer to Service Notes Section JF.

Battery Non-Charging Tell Tale

This will glow red when the ignition is switched on and will normally go out when the engine is started.

Although the lamp may glow when the engine is idling, if it lights at engine speeds above idle, a fault in the charging circuit, or a broken alternator belt is indicated.

Seatbelt Tell Tale

Non-USA cars:

This will glow red when the ignition is switched on, and go out when the driver's seatbelt is fastened.

USA market cars:

After engine cranking, this red tell tale will flash for approximately eight seconds. If the driver's seat belt is not fastened, this light will be accompanied by a warning chime. The controlling logic/chime module is located on the driver's side of the scuttle beam.

Low Screenwash Level Tell Tale

A positive is supplied to the tell tale only when the screenwash switch is operated, and a level switch in the screenwash reservoir supplies an earth signal when the level is low.

Low Fuel Level Tell Tale

When the tank level drops to 10 litres (2.2 imp. gal; 2.6 US gal), a normally open switch incorporated in the fuel gauge sender unit, closes and supplies an earth signal, via a delay module (mounted on the front luggage compartment relay bracket), to the tell tale.

Fan Fail Tell Tale (not fitted on 'revised harness' cars)

The three electric cooling fans are energised by the engine management ECM at approximately 92°C coolant temperature (opens at 87°C on fall) as sensed by the coolant temperature sensor (CTS) in the inlet manifold water jacket. The fans are also switched on when the a.c. compressor is operating in order to cool the condenser (on later cars only below 35 mph), and as an engine safety precaution,



whenever the 'check engine' lamp is lit.

One side of the fan fail tell tale is connected to the switching input at the radiator fan relay, and the other side to the output side of the three fan fuses. The lamp will light only when a voltage imbalance occurs, the most likely cause of which would be a faulty relay or blown rad. fan fuse.

Catalyst Overheat Tell Tale (Japan only)

This tell tale is fitted only for the Japanese market, and consists of a temperature sensor in the catalytic convertor linked to a control module mounted beneath the fascia, to the left of the steering column. If an engine fault occurs which results in the temperature of the catalytic converter rising to a level liable to cause damage to the converter, the tell tale will light, indicating that the vehicle should be stopped in an area free of combustible materials (dry grass, leaves etc.) and the converter allowed to cool for several minutes before proceeding with caution. Refer to Section EMH for diagnosis.

As a lamp test function, the lamp will light when the ignition is first switched on.

Supplementary Inflatable Restraint (S.I.R.) Tell Tale (if fitted)

The S.I.R. system has a self-diagnostic facility which lights the red tell tale if a fault is detected.

As a bulb and circuit check, the tell tale should flash for about eight seconds when the ignition is switched on, and then go out. When the engine is cranked, the lamp will come on steady, and then flash for another eight seconds after cranking.

WARNING: If the S.I.R. tell tale lamp does not come on with the ignition, and follow the sequence detailed above (bulb and circuit check), or if it lights at any other time, a fault in the S.I.R. system is indicated. Refer to Section WA.4 (Driver only S.I.R.) or WC.4 (Dual S.I.R.).

Brakes/Parking Brake Tell Tale

This tell tale will glow red with the ignition switched on when any of the following conditions apply:

- i) parking brake applied; sensed via a micro switch on the parking brake lever mechanism.
- ii) brake fluid level low; sensed via a level sensor in the fluid reservoir.
- iii) ABS hydraulic pressure low. If the brake pedal has been pressed several times with the ignition off, stored hydraulic pressure for the anti-lock brake system may fall sufficiently to close the pressure switch fitted in the pump/accumulator base. The electric pump should start up when the ignition is switched on, and the lamp should go out within 40 seconds.

Under normal circumstances, with the engine idling, the tell tale should light when the parking brake is applied, and go out when released. If the lamp fails to go out when the parking brake is released, or comes on whilst driving, the brake fluid level or ABS hydraulic pressure may be dangerously low. The rear brakes may not function, with non power assisted non-ABS braking remaining only on the front wheels. Refer to Section JF.

Engine Coolant Tell Tale

This dual-function tell tale warns of:

- i) Low coolant level in via a probe or level sensor in the cooling system header tank. On cars with twin header tanks, a level probe is fitted near the bottom of each tank and is linked to a low coolant module in the engine bay



relay box. On later 'revised harness' cars, the combined plastic header tank incorporates a level sensor.

- ii) excessive engine coolant temperature (over **110°C** on rise, **105°C** on fall) via the coolant temperature sensor in the inlet manifold. Operation of the tell tale is controlled by the engine management ECM, and on twin header tank cars, a relay in the engine bay relay box.

Main Beam Tell Tale

This lamp is wired in parallel with the main beam circuit and glows blue whenever the headlamp main beams are operating.

Turn Tell Tale

When the left hand or right hand turn indicators are operating, this green tell tale flashes in unison. If the tell tale fails to light, or flashes at an unusual rate, the operation of the turn indicator lamps should be checked.

Oil Pressure Tell Tale

This red tell tale is provided to warn of dangerously low engine oil pressure. To prevent unnecessary concern at idle, an engine speed relay is used to enable the circuit only at engine speeds above 1600 rpm. If the oil pressure falls below 1.4 bar (20 psi) at any time above this engine speed, the tell tale will light.

On **early** cars, the tell tale is linked to the warning lamp check module such that the tell tale will light when the ignition is switched on, and should go out when the engine is cranked. On later 'revised harness' cars, no check module is fitted, and as a lamp test function, the tell tale is linked to the battery non-charging tell tale and should glow when the ignition is switched on. On these cars, if the lamp lights together with the battery tell tale at engine speeds above idle, it is likely that the fault lies in the charging system.

Check Engine Tell Tale

The check engine tell tale is provided to:

- i) Inform the driver that the engine management self diagnostic system has detected a fault;
- ii) Assist the technician with fault diagnosis.

As a bulb and system check, the lamp will light with the ignition on, and should go out when the engine is started. If, however, the lamp remains lit, or comes on whilst driving, this indicates that the self diagnostic system has detected a problem, information on which is stored in the system memory. If the fault corrects itself, or is no longer detected, the lamp will go out in most cases after about 10 seconds, but information on the fault will remain stored in the memory for the next 50 engine start ups to indicate to the technician that an intermittent fault has been detected. If no recurrence is recorded during this period, the stored information will be erased from the memory.

Certain types of detected fault will result in the system limiting engine speed to 4,000 rpm in order to protect the engine from damage.

For further information see Section EMH.

Ice Warning

Green and red LED tell tale indicators are provided on the main instrument panel to warn of very low ambient temperatures and the possibility of ice formation. The lamps operate as follows:

Green Only - The green tell tale will light for 3 to 5 seconds when the ignition is first switched on, as a systems check.



CAUTION: The above test function should be observed at the start of every journey in cold weather, and if the lamp does not light, be aware that the system is not functioning, and will give no warning of potentially icy conditions. Note however, that after initial switch on, a period of one to two minutes must elapse before the check system will reset, during which time subsequent switch ons will not initiate a system check.

If the ambient temperature is between +2°C and +5°C, the lamp will remain on after the check period, or in the case of falling temperature, come on whilst driving. This is an initial warning that the outside temperature is approaching that at which ice can form.

Green & Red - **CAUTION** If both green and red tell tale lamps light, the ambient air temperature is between 0°C and +2°C. Since under certain conditions, the ground temperature can be up to 2°C colder than the air temperature, be aware that **there** is a possibility of ice on the road.

Red Only - **DANGER** Air temperature is at or below 0°C. Icy conditions are likely.

The ice warning feature is provided as an aid to the driver's own judgement of road conditions; the lack of a tell tale should not be regarded as meaning 'all clear'. Icy patches are always a possibility.

Note: It is most important that the detection probe, located beneath the left hand end of the front bumper, is cleaned regularly, as any build up of dirt will adversely affect the sensitivity of the unit.

Fault Diagnosis

If the ice detection system should fail to operate:

- i) Check fuse no 21 (instruments & tell tales).
- ii) If the red LED lights at temperatures above +2°C, a faulty probe or open circuit to the probe is indicated. Check feed to probe and if OK, replace probe.
- iii) The LED lamps operate on 5V only, and must only be tested accordingly.
- iv) Check feed and earth connections at module, and if OK, replace module.

INSTRUMENTS

Speedometer

This instrument displays road speed in either MPH or km/h according to market, and incorporates a total distance recorder and a trip recorder. The trip recorder may be zeroed by turning clockwise the small knob protruding through the instrument glass.

On S4 models, the **speedo** is mechanically driven via cable from the transmission final drive. Sport 300 models use an electric **speedo** operated via the ECM from the vehicle speed sensor on the RHR hub.

Tachometer

The tachometer indicates engine speed in revolutions per minute. Maximum safe engine speed is 7,400 rpm at which point the ECM cuts off the fuel pump and injectors to safeguard the engine from overspeeding. Sport 300 models use an amplifier fixed to the rear of the **tacho** to enhance the signal from the ECM. Engine speed input to the ECM derives from the flywheel sensor mounted in the top of the clutch housing.



Oil Pressure Gauge

This gauge is calibrated in bar units and registers oil pressure as detected by the sender unit in the oil gallery cover at the rear of the RH side of the block. Under normal running conditions when the engine is warm, the gauge should register not less than:

0.35 at idle;

2.4 at 3,500 rpm;

3.1 at 6,500 rpm.

Readings will increase when the engine oil is cold, and there is no cause for alarm if very high readings are indicated after start up in cold weather.

See also 'Oil Pressure Tell Tale'.

Fuel Gauge

The fuel gauge is operative with the ignition switched on, and indicates the proportion of fuel remaining in the interconnected twin tanks, which have a combined capacity of 73 litre (16 imp-gall; 19.3 US gall). A low fuel tell tale glows when the tank level drops to approximately 10 litres (2.2 imp.gall; 2.6 US gall). The sender unit is mounted in the top face of the LH tank, and incorporates the low fuel level switch. An open circuit between gauge and sender will result in full scale deflection.

Note that the gauge needle movement is damped to reduce the effects of fuel surge, and consequently a few moments must be allowed after switching on the ignition before a true reading will be obtained.

Oil Temperature Gauge

This instrument indicates engine oil temperature in degrees Centigrade as detected by a sensor in the oil gallery cover at the rear of the RH side of the block. If oil temperature rises into the red sector (above 115°C) a fault is indicated, and the engine should be stopped immediately to prevent serious damage. Check oil level, and for blockages of the two oil cooler ducts in the front spoiler.

Water Temperature Gauge

This instrument registers engine coolant temperature as sensed by a sender unit in the water pump body. Coolant temperature will fluctuate a certain amount as the operating conditions change, and during periods of idling or in heavy traffic, the temperature may rise to over 100°C. Note, however, that the pressurised system (110 kPa {15 psi}) has a coolant boiling point of over 120°C.

If a system malfunction should occur, and the temperature **rises** to a dangerously high level (over 120°C), the engine coolant tell tale will light.

Boost Gauge (if fitted)

This gauge is marked in bar units, and indicates turbocharger boost pressure. The amount of boost developed by the engine is dependent on engine speed and throttle opening but is limited by a mechanically operated wastegate to prevent excessive boost pressure causing engine damage. Additional electronic controls permit higher boost levels to be developed under certain conditions.

Maximum boost pressure readings will be seen with wide throttle openings at normal running temperature and will be up to 0.84 bar (0.97 bar on 2 litre engines). The system allows a controlled amount of overboost for short periods **only**, following rapid accelerator pedal movement. The gauge indications will rise with increasing altitude or where the atmospheric pressure is lower than normal, although the actual pressures applied to the engine are unaffected.

Boost pressure is sensed from the rear end of the intake plenum, and is piped to a transducer mounted either above the RH rear wheelarch on early cars, or on 'revised harness' cars, on top of the RH fuel tank board.



Digital Time Clock

The digital LCD time clock is fitted in the centre of the instrument panel, and displays at all times. The display is illuminated for greater clarity when the ignition is turned on, and is dimmed to prevent distraction when the lights are selected.

Two buttons are provided to adjust the time setting; the left hand button for hours, and the right hand button for minutes. Use the push key provided on the key ring to gently depress each button in turn. If the **battery** is disconnected for any reason, the display will flash on re-connection to indicate that re-setting is required.

FASCIA SWITCHES

Sidelamps/Parking Lamps Switch

This push switch operates with or without the ignition on, and switches the front and rear side/parking lamps, side marker lamps (USA models) and instrument panel illumination. The switch motif is backlit green when the ignition is switched on, and lights up when the circuit is activated. Press a second time to switch off.

With the ignition switched off; if the driver's door is opened when the lights are switched on, an audible warning will sound:

Non-USA early cars - no warning.

Non-USA 'revised harness' cars - continuous buzzer:

USA cars - chime for about five seconds.

The non-USA type buzzer unit is fixed to the scuttle beam outboard of the steering column, and the USA type logic/buzzer module inboard of the column.

Headlamp Switch

Pressing this switch, with or without ignition, causes the headlamp pods to rise with the headlamps lit. In addition, the side/parking lamps and side marker lamps (USA) are switched on regardless of the side/park lamp switch position. The switch motif is backlit green when the ignition is switched on, and lights up when the circuit is activated. Press a second time to switch off.

If the headlamp main beams are operating at the time of headlamp switch off, the dropping of the pods will be delayed for a moment.

Note that on non-USA cars, the outer pair of headlamps provide the dip beams, and go out when main beam, provided by the inner pair of headlamps, is selected. If the headlamp main beam single contact relay is replaced by a double contact relay **B082M6182F**, all four headlamp main beams will light, and ECE lighting regulations will be contravened.

USA specification vehicles use sealed beam headlamp units, with the outer headlamps providing the dip beams, and all four headlamps the main beams.

Heated Rear Screen Switch

This push switch operates only with ignition, and energises the heating elements in the tailgate window, and the two door mirror glasses. The switch motif is backlit amber when the lights are switched on, and lights up when the circuit is operating. Press a second time to switch off. No timer is used on this circuit, and as the heated glass elements place a high demand on the electrical supply, the heating should be used only for as long as is necessary.

Hazard Warning Lamps Switch

This push switch, which is operative at all times, causes all the turn indicators to flash in unison. The switch motif is backlit amber when the lights are switched on, and lights up when the switch is pressed. The hazard flasher unit is combined with the turn indicator flasher, and is located within the



instrument binnacle.

Front Fog Lamps Switch

Two fog lamps are mounted in the front spoiler, and are controlled by a 'push' switch in the right hand side of the binnacle. The lamps are operative only in conjunction with the side/parking lamps or headlamps. The switch motif is backlit green when the lights are switched on, and lights up when the circuit is operating. Press a second time to switch off.

To adjust the foglamps, remove the grommet in the undershield beneath each **foglamp**, and use a flat blade screwdriver to turn the adjuster and raise or lower the fog lamp beam as desired. Note that a plastic guide tube is provided to aid location of the adjuster screw.

Rear Fog Lamps Switch (if fitted)

Rear fog lamps, on cars so equipped, are incorporated into the rear lamp clusters, and are controlled by a 'push' switch in the right hand side of the binnacle. The lamps are operative only in conjunction with the headlamps. The switch motif is backlit red when the lights are switched on, and lights up when the circuit is operating. Press a second time to switch off.

Cigarette Lighter

A cigarette lighter is fitted alongside the oddments recess at the base of the centre console, and is operative at all times. To use the lighter, press the centre button of the knob to activate the heating circuit. When the element has been sufficiently heated, which takes only a few moments, the button will spring back out. The lighter may then be withdrawn for use. Care should be taken when handling the hot lighter to avoid contact other than with its target.

An illumination ring around the lighter is backlit red when the lights are switched on.

Panel Lights Rheostat

The brightness of the instrument and switch illumination is controlled by a rheostat knob on the left hand side of the steering column shroud. Turn the knob clockwise to increase the brightness, and counterclockwise to decrease illumination. The rheostat module on early cars is fitted on the driver's side of the scuttle beam, and on later 'revised harness' cars, on the relay bracket in the front luggage compartment.

COLUMN SWITCHES & HORN

Headlamp Dipswitch/Flasher/Turn Indicators

The steering column left hand lever switch controls the headlamp dipswitch, headlamp flasher and turn indicators.

Headlamp Dipswitch: The headlamps must be selected via the headlamp push switch before the pods will rise with the headlamps lit. The left hand lever switch is then used to select main or dip beam. Main beam is obtained with the lever furthest forward, away from the steering wheel, and dip beam with the lever moved back towards the wheel. The main beam tell tale lamp in the instrument panel lights when main beam is operating.

Headlamp Flasher: The headlamp flasher is operative at all times. If the lever is pulled towards the steering wheel against spring pressure, the headlamp pods will rise with the main beams lit. The headlamps go out when the lever is released, but the pods remain raised for a few seconds in order to avoid unnecessary oscillations if the lights are repeatedly flashed.



Turn Indicators: The turn indicators operate only with the ignition switched on. Move the lever down to indicate a left hand turn, and up for a right hand turn. The switch will be cancelled when the steering wheel is returned to the straight ahead position.

If the switch is pressed up or down only lightly, the switch will return under spring pressure for convenience when signalling a lane change.

Windscreen Wiper/Washers

The steering column right hand lever switch controls the windscreen wiper and washers, and is operative only with the ignition switched on.

Windscreen Wiper: The wiper is controlled by the up/down position of the lever switch, which operates as follows:

- ⊙ Moved fully down, the wiper is switched off.
- ☐ Move up to the first position for intermittent wipe. The wiper will make one sweep about every five seconds.
- ▢ Move to the next position to select normal wiper operation.
- ≡ Move fully upwards for high speed wipe, for use only in heavy rain.

Windscreen Washers: Pulling the lever towards the steering wheel will operate both the washers and the wiper. When the switch is released, the wiper will continue for a further four sweeps.

The wash/wipe delay module is located on the relay bracket in the front luggage compartment.

Horn

The dual pitch electric horns, which function at all times, are operated on cars without driver's S.I.R. by a central button in the steering wheel boss. On S.I.R. equipped cars, two horn buttons are provided on the the steering wheel spokes.

The horns are located beneath the LH side of the front spoiler, fixed to the oil cooler duct, and are protected by an undershield. The horn relay is fitted on the relay bracket in the front luggage compartment, as is the fuse on early cars. On 'revised harness' cars, the fuse is located on the scuttle beam, beneath the fascia, outboard of the steering column.

Audio Equipment (if fitted)

The audio equipment is operative only with the key inserted into the ignition switch, but at all key positions. Note that with the key inserted, a small battery drain occurs through the radio feed relay even when the set is switched off.

Some audio equipment uses a four digit security code (Computer Anti-Theft System - CATS) as a theft deterrent, such that if the power supply to the set is interrupted, the unit cannot be used again until the 4-digit code is entered. The code may be customer chosen or factory allocated, but in either case, the number should be recorded on the radio ID card and kept safely off board by the customer. If the vehicle battery is disconnected, the code will need to be entered after reconnection. Refer to the audio equipment manufacturer's separate booklet for further details of this system.

Electric Window Control

The different legislative requirements of the USA, have resulted in no 'one touch' or obstruction sensing features being provided on USA or Canadian specification vehicles.



Raising and lowering of the electrically operated door windows is controlled by two switches on the centre tunnel, to the rear of the gearchange lever. To help locate the switches in the dark, a white dot marker in each switch is illuminated whenever the switch is operative.

To lower a window, switch on the ignition, and press the rear (dished) end of the right or left hand switch. To raise a window, press the front (domed) end of the switch. Non-USA market cars feature a 'one touch' facility: Tap the switch to move the window in increments, or press for a moment longer for continuous operation to fully open or close the window. To stop the glass movement at any point, press again either end of the switch.

The windows are operative under any of the following conditions:

Non-USA cars;

- whenever the ignition is switched on;
- during the period between switching off the ignition and a door being opened and closed;
- when either door is open;
- when using the key to lock the car, if the key is turned and held at the locking position for a moment, both door windows will close automatically.

USA specification cars;

- whenever the ignition is switched on.

Obstruction Sensing: On non-USA cars, a safety feature is incorporated into the window closing mechanism, such that if an obstruction is sensed (increased resistance) during the last third of the travel, the motor stops automatically and reverses window glass movement for a moment. This feature may be manually overridden to cope with frosty conditions and the stiffer window action which may result. An override button is provided in the front of the tunnel top tray, and must be pressed together with the window switch. On Sport 300 models, the override button is located between the two window switches.

WARNING: - On non-USA cars, if the battery becomes discharged or the power supply interrupted (e.g. battery disconnected), the window system must be **re-programmed** after power re-instatement or neither the obstruction sensing or 'one touch' features will operate.

To **re-programme** each window: Lower the window fully and keep the switch pressed for 5 to 10 seconds until a 'click' is heard. Then raise the window fully and keep the switch pressed until a 'click' is heard. Repeat the procedure for the opposite window.

ML.4 - CENTRAL DOOR LOCKING

The central door locking (CDL) system operates only on the two doors, and functions as follows:

To unlock either door from outside, turn the key clockwise (RH door) or counterclockwise (LH door) as appropriate. The central door locking will operate automatically to unlock the opposite door. Turn the key in the opposite direction to lock, and note that on non-USA cars, if the key is held at the locking position in the driver's door for a moment, both door windows will close automatically.

From inside the car, locking the driver's door will automatically lock the passenger's door, but locking the passenger's door will **NOT** lock the driver's door. Unlocking either door via the interior flap handles will automatically