



Workshop Manual
(Issue II - Volume 2)



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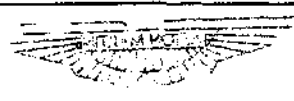
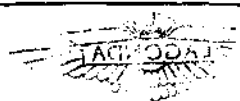
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ASTON MARTIN LAGONDA LIMITED

Introduction



Workshop Manual Sections

The DB7 Workshop Manual is divided into 9 sections as follows:

1. Engine
2. Fuel, Emission Control and Exhaust
3. Transmission
4. Suspension and Steering
5. Brakes, Wheels and Tyres
6. Electrics
7. Chassis and Body
8. Air Conditioning
9. Aston Martin Diagnostic System

Procedure Numbering

The workshop manual procedures are numbered using the parts list numbers as a key. The first two digits of a workshop manual procedure number are also the parts list number (e.g. 1.5.01 Sump Removal relates to PL 1.5 Oil Pump and Sump). Thus when carrying out a procedure, you can quickly locate the relevant parts illustration and spare parts list.

To avoid excessive repetition, each procedure will be fully detailed once in its appropriate place in the manual. In any other location where this procedure is required, it will be referenced only by its title and its procedure number.

Special Tools

Where special service tools are required to perform an operation, the tool number is recorded at the point of use within the procedure. An index and illustrated list is provided in this section for the purpose of identifying special tools.

References

References to the left, right, front or rear of the vehicle or of a component are always made as if sitting in the drivers seat facing forward. Any such references to assemblies removed from the vehicle are to the normal orientation of the assembly when fitted in the vehicle.

Repairs and Replacements

Where replacement parts are required, it is essential that only genuine Aston Martin parts are used. Your attention is drawn to the following points concerning repairs and the fitting of genuine Aston Martin parts and accessories:

- Safety features embodied in the vehicle may be impaired if other than genuine Aston Martin parts are fitted. In certain territories, legislation prohibits the fitting of parts which are not produced to the manufacturers specification.
- Adhere to torque wrench settings given in this manual.
- Locking devices, where specified, must be fitted. If the efficiency of a locking device is impaired during removal, it must be renewed.
- The vehicle warranty may be invalidated by the fitting of other than genuine Aston Martin parts.

Safety Precautions

All service workshops are a source of potential danger and repair work should only be performed by technically trained staff following the procedures in this manual. A safety conscious approach to the performance of all service procedures must be observed at all times. Statutory requirements governing all aspects of health and safety at work including directives for the proper use of materials and equipment must be implemented.

The following contains a list of particular safety precautions which should be observed; it is not intended to be exhaustive.

Air Conditioning System

Do not disconnect any air conditioning refrigerant system pipes unless trained and instructed to do so. The refrigerant used can cause blindness if allowed to contact your eyes.

Chemical Handling and Storage

Chemicals used in the servicing of motor vehicles include acids, adhesives, antifreeze, brake fluids, coolants, grease, oil, paint, resin and solvents. Exposure to certain chemicals through direct contact or inhalation can be fatal.

Potential hazards may also be present through the incorrect use, storage and handling of chemicals causing a fire risk. The following precautions should be observed.

1. Strictly adhere to handling and safety information found on containers and labels.
2. Do not store chemicals in unlabelled or incorrectly labelled containers.
3. Containers used for storing chemicals should not be left open; there is a risk of spilling, or evaporation of fumes which may be inflammable or toxic.
4. Do not mix chemicals unless instructed to do so following manufacturers guidelines.
5. Do not inhale chemical materials to determine identity, they may be toxic.
6. Do not use petrol, kerosene, diesel fuel, gas oil, thinners or solvents for washing skin.
7. Containers whose capacity is over 25 litres (5 gallons) require a bund wall in order to contain spillages.
8. Chemicals based on solvents such as paint should not be sprayed in a confined space; work areas used for such operations should be well ventilated and fume extraction equipment should be utilised.
9. Ensure that adequate ventilation is provided when volatile de-greasing agents are being used.

WARNING: *Fume extraction equipment must be in operation when solvents are used e.g. trichloroethane, white spirit, SBP3, methylene chloride, perchlorethylene.*

WARNING: *Do not smoke in the vicinity of volatile de-greasing agents.*

10. Avoid splashing the skin, eyes and clothing.
11. Clean chemicals from the skin and clothing as soon as possible after soiling.
12. Wear protective clothing such as goggles, non porous gloves and apron when handling battery acid and other corrosive and toxic substances.

Safety Precautions (continued)**Electrical Equipment**

1. Ensure that electrical equipment is in safe working order before use.
2. Inspect power leads of all mains electrical equipment for damage and security, and check that it is properly earthed.
3. Ensure that electrical equipment is protected by a fuse of the correct current rating.
4. Disconnect the battery before commencing repair operations to the electrical system, fuel system and engine or when working beneath the vehicle.

Exhaust Fumes

Engines should not be run in confined spaces, exhaust fumes contain harmful and toxic substances including carbon monoxide which can prove fatal if inhaled. Engines must only be run where there is fume extraction equipment in operation or where there is adequate ventilation.

Fire Precautions

1. Ensure that a suitable form of fire extinguisher is conveniently located near the work area.
2. Keep oils, solvents and combustible materials away from naked flames and other sources of ignition.
3. Ensure that NO SMOKING signs are posted around areas where combustible materials and vapour may be present and ensure that the warnings are strictly observed.
4. Ensure that dry sand is available to soak up any spillage of fuel or other flammable solutions.
5. Fume extraction equipment must be available and in full working order to remove combustible and toxic vapours.
6. All personnel should be aware of the fire drill procedures and precautions.

Jacking and Lifting

1. The recommended procedures for lifting, jacking and towing are included later in this section and must be strictly observed to ensure personal safety.
2. Always use a vehicle hoist, ramp or pit for working beneath the car in preference to jacking.
3. Never rely on a jack to support a car independently, use axle stands or blocks carefully placed at the jacking points to provide rigid support.
4. When working beneath a vehicle, chock the wheels as well as applying the handbrake.
5. Ensure that the vehicle is standing on firm level ground before jacking or lifting.
6. Check any lifting equipment used has adequate capacity for the load being lifted and is in full working order.

Tools and Equipment

1. Do not leave tools, equipment, spilt oil, etc. around or on the work area.
2. Ensure that tools and equipment used are in good condition; do not use damaged or defective tools or equipment.
3. Do not apply heat in an attempt to free stiff nuts or fittings; as well as causing damage to protective coatings, there is a risk of damage to electronic equipment and brake lines from stray heat.
4. Use the recommended service tool where instructed to do so.

Safety Precautions (continued)

Used Engine Oil

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities should be provided.

Health protection precautions:

1. Avoid prolonged and repeated contact with oils, particularly used engine oil.
2. Wear protective clothing, including impervious gloves where practicable.
3. Do not put oily rags in pockets.
4. Avoid contaminating clothes with oil.
5. Overalls must be cleaned regularly. Discard unwashable clothes and oil impregnated footwear.
6. First aid treatment should be obtained immediately for open cuts or wounds.
7. Use barrier creams, apply before each work period to help the removal of oil from the skin.
8. Wash with soap and water to ensure all oil is removed. Preparations containing lanolin replace the natural skin oils which have been removed.
9. Do not use petrol, kerosene, diesel fuel, gas oil, thinners or solvents for washing skin.
10. If skin disorders develop, obtain medical advice.
11. Where practicable, degrease components prior to handling.
12. Where there is a risk of eye contact, eye protection should be worn. In addition, an eye wash facility should be provided.

Environmental Protection

It is illegal to pour used oil on the ground, down sewers or drains, or into water courses. The burning of used engine oil in small space heaters or boilers is not recommended unless emission control equipment is fitted; in case of doubt, contact the Local Authority for advice on disposal facilities.

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Electrical Component Location and Wiring Information - 97 MY

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6.1.01 Headlamp Unit

Procedure

1. Remove the front apron undertray and remove the complete nose assembly.
2. Release the headlamp plug from the body clip and disconnect the plug.

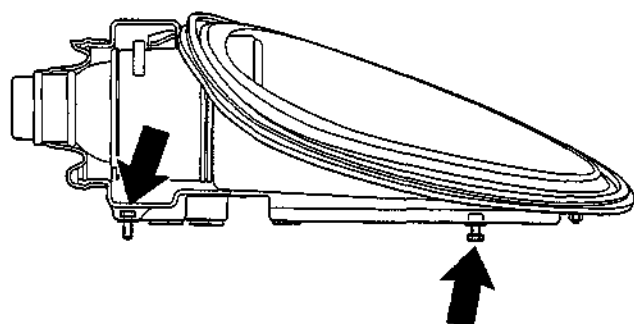


Figure 1. Headlamp Removal

3. Remove 1 bolt from the front headlamp mounting.
4. Remove the main beam lamp access cover and loosen the rear headlamp mounting bolt.
5. Lift off the headlamp assembly.
6. On refitting the headlamp assembly, carry out the headlamp alignment procedure.

6.1.02 Headlamp Alignment

Data

Main Beam Alignment	1.5° down
Dipped Beam Alignment	1.5° down

Tools

Headlamp Alignment Gauge

Procedure

1. Lift the bonnet and remove the main beam access cover from the headlamp unit.
2. Using the large hex adjusters, align the outer dipped beams to the correct pattern in a headlamp alignment gauge

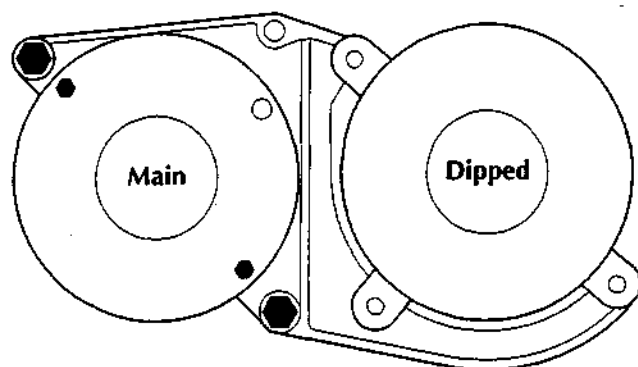


Figure 1. Headlamp Alignment

3. Using the small hex adjusters, set the inner main beam alignments so that the bright spot is centralised and 1.5° down in the alignment gauge. If necessary, fine tune the adjustment to suit average vehicle loading and driver requirements.

Dipped Beam Conversion - UK-Europe-UK

1. Access the dipped beam lamps through the panels in the wheel arch liners.
2. Cut the tie strap securing the rubber gaiter and pull back the gaiter.
3. Slacken 3 screws securing the lamp backplate (Figure 2) and rotate the plate to the right for UK or to the left for Europe to the limit of the bolt slots.

1. For European (RH) Use (Beam Pattern )
2. For UK (LH) Use (Beam Pattern )

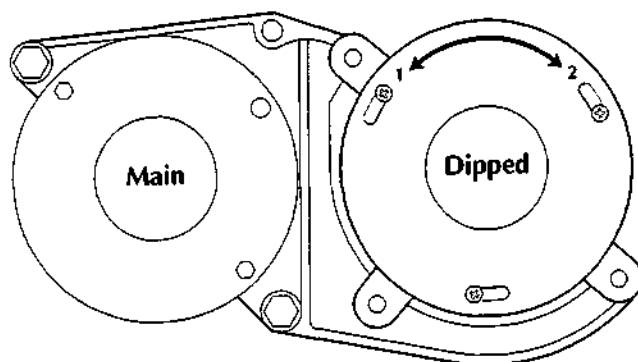


Figure 2. Dipped Beam Conversion UK-Europe

4. Tighten the three screws, replace the gaiter and secure it with a new tie strap.

6.1.03 Front Indicator/Parking Lamp Unit**Procedure**

1. Release the single captive screw at the outboard end of the assembly and remove the assembly from the front apron.

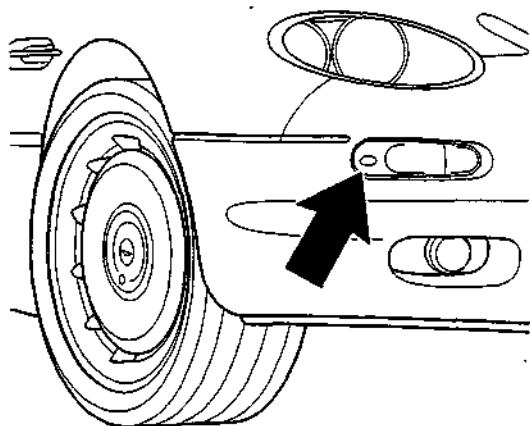


Figure 1. Indicator/Parking Lamp Removal

2. Disconnect the 2 electrical plugs at the rear of the assembly and remove the lamp unit.

6.1.04 Front Fog Lamp Assembly**Procedure**

1. Remove the front apron undertray. Access the rear of the fog light assembly

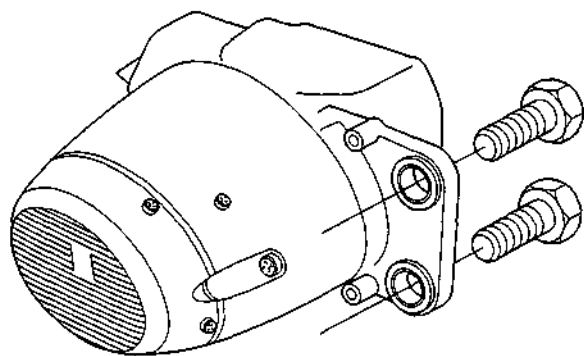


Figure 1. Front Fog Lamp Removal

2. Remove two bolts and lower the lamp assembly from its bracket.
3. Disconnect the lamp loom and remove the fog lamp assembly.

6.1.05 Side Repeater Lamps**Procedure**

1. Protect the surrounding paintwork and use a screwdriver to lever the assembly from the front wing.

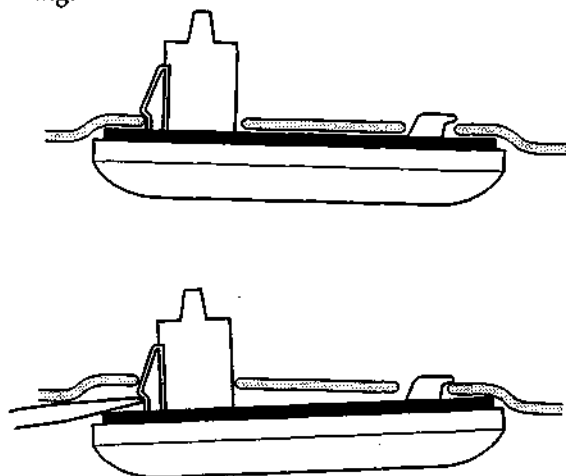


Figure 1. Side Repeater Lamp Removal

2. Disconnect the wiring at the rear of the lamp and remove the assembly.

6.2.01 Windscreen Wiper Motor

Procedure

1. Disconnect the battery.
2. Disconnect the wiper motor multi-plug.
3. Remove the nut and lockplate (Fig 1-1) from the motor gearbox shaft and release the drive bracket from the shaft.

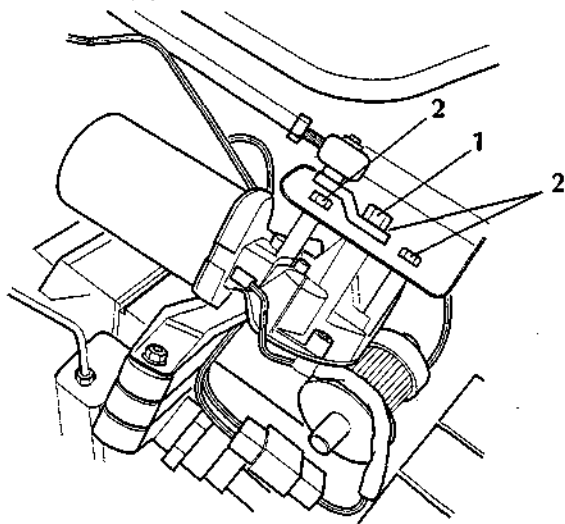


Figure 1. Windscreen Wiper Motor

4. Remove three nuts (Fig 1-2) and remove the motor from its mounting bracket.

6.3.01 Alternator

Procedure

1. Disconnect the battery earth lead.
2. Using a 3/8" ratchet handle, release the drive belt tension. Slip the belt from the water pump drive pulley and from the alternator drive pulley.
3. Release the ignition leads from the support on the alternator top mounting.
4. Remove the alternator output lead cover, remove the nut and washers and disconnect the alternator output lead.
5. Disconnect the electrical plug on the rear of the alternator.
6. Remove the alternator lower mounting bolt.

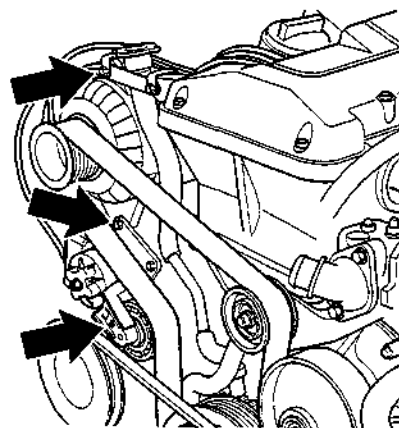


Figure 1. Alternator Mountings

7. Loosen the alternator upper mounting bolt, support the alternator, remove the upper bolt and the alternator.

Replacement is the reverse of the removal procedure. The drive belt is tensioned automatically by the spring loaded idler on refitting the main drive belt.

6.3.02 Starter Motor

Procedure

1. Disconnect the battery.
2. Remove the inlet air trunking.

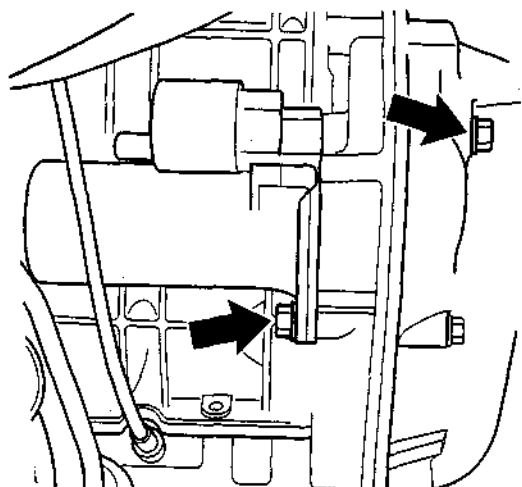


Figure 1. Starter Motor Mountings

3. Disconnect the starter solenoid connector and the starter motor power lead at the solenoid.
4. Remove the top starter motor securing bolt.

Note: The top bolt is from the engine side on auto cars and from the gearbox side on manual cars.

5. Raise the car on a hoist and whilst supporting the motor, remove the lower starter motor securing bolt.
6. Lift the motor from the bell housing and remove it from the vehicle by positioning it vertically and lowering it down in front of the oil filter.

6.5.01 Steering Wheel and Horn Switches

Procedure

1. Remove the steering wheel centre pad.

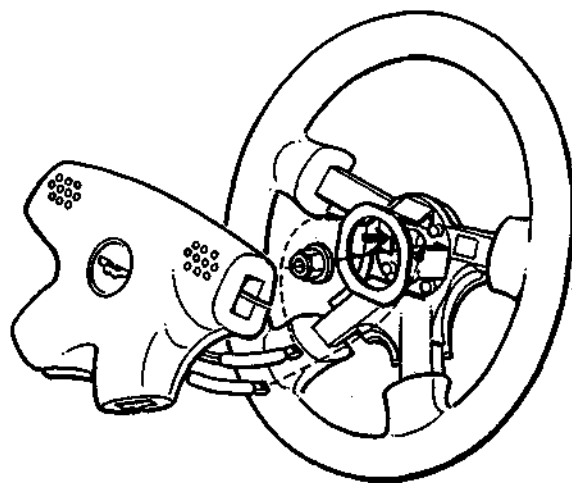


Figure 1. Steering Wheel and Horn

2. Mark the position of the steering wheel relative to the steering column to ensure correct replacement.
3. Remove the steering wheel securing nut and remove the steering wheel.

6.5.02 Column Switches

Procedure

1. Remove the steering wheel.
2. Remove three screws and the column switch cover.

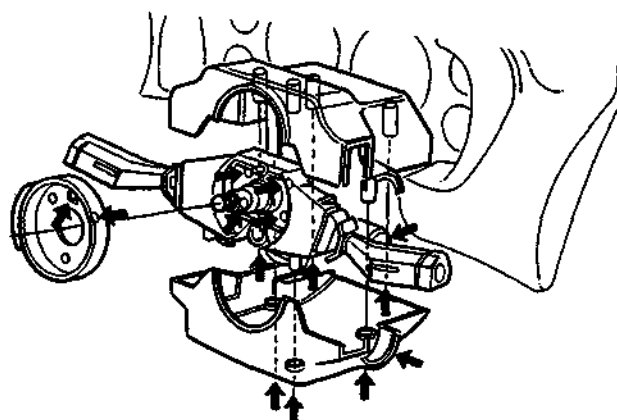


Figure 1. Column Mounted Switches

3. Cut the tywraps securing the switch loom to the steering column. Disconnect the loom plugs.
4. Release 4 screws and lift the switch assembly off the steering column.

6.5.03 Ignition Switch

Procedure

1. Disconnect the battery.
2. Remove three screws and the steering column lower cover.

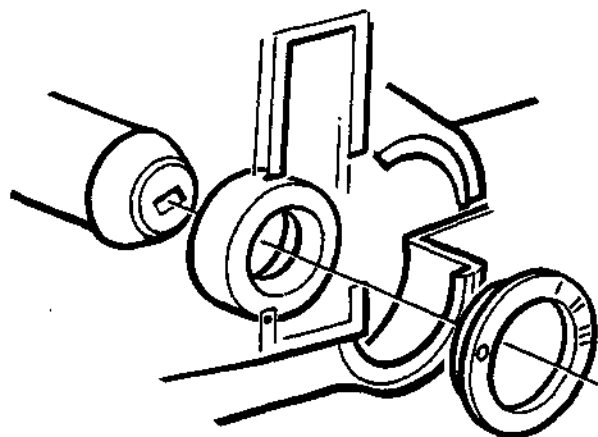


Figure 1. Ignition Switch

3. Loosen the grub screw securing the switch and ease the switch from its location.
4. Disconnect the switch multi-plug and remove the switch.

6.5.04 Instrument Panel

Procedure

1. Disconnect the battery.
2. Remove the four screws from the instrument panel surround and remove the surround.

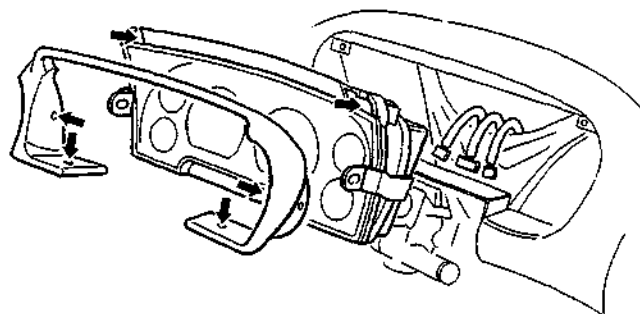


Figure 1. Instrument Panel Removal

3. Remove two screws from the top edge of the instrument panel and withdraw the panel.
4. Detach the three electrical connectors and remove the instrument panel.
5. Panel warning lamps are 1.2W bayonet fit. The larger panel illumination lamps are also 1.2W bayonet fit.

6.5.05 Radio

Procedure

1. Press the release button and remove the radio front control panel.

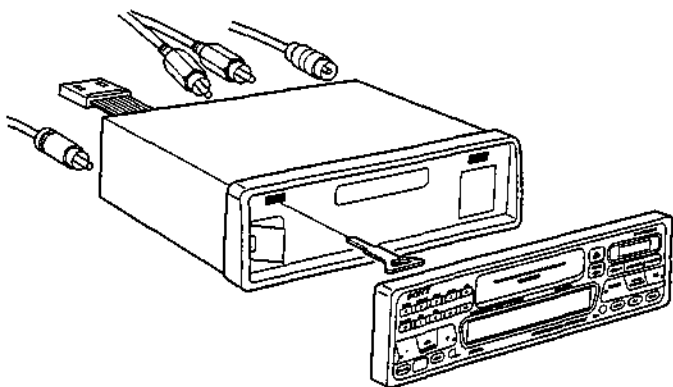


Figure 1. Radio Removal

2. Insert the radio removal tool into the slots in the top edge of the radio body to release the catches. Pull forward on the radio and remove it from the centre console.
3. Disconnect the speaker, CD, aerial, power and earth connectors.

6.5.06 Air Conditioning and Switch Panel

Procedure

1. Remove the radio.
2. Pull off the air conditioning control knobs.
3. Lift of the console controls finisher panel.

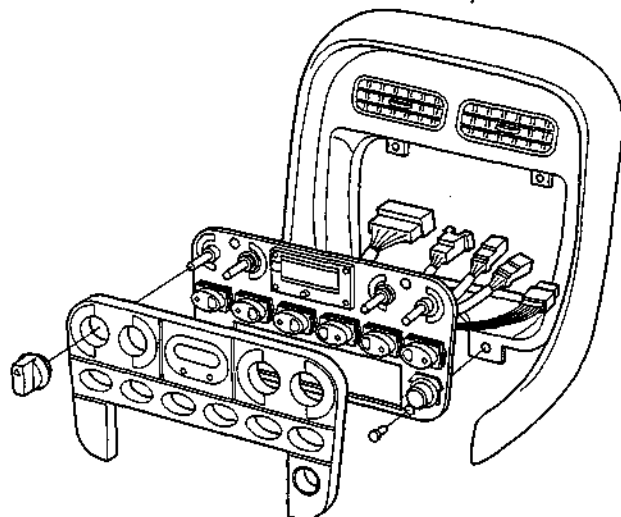


Figure 1. Air Conditioning Panel Removal

4. Remove four screws and pull forward the centre console control panel.
5. Disconnect the five connectors in the centre console wiring and remove the centre console control panel.

6.5.07 Cruise Control, Window and Gearshift Switches

Procedure

1. Protect the wood finisher around the switches.

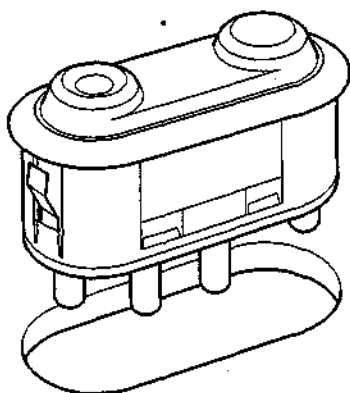


Figure 1. Switch Removal

2. Using a suitable lever, raise each end of the switch to release the spring clips.
3. Pull the switch clear of the wood finisher and disconnect the switch wiring.

6.5.08 Seat Control Switch Panels

Procedure

1. Remove the wood trim above the passenger side dash.
2. Remove the ashtray (Fig 1-1).

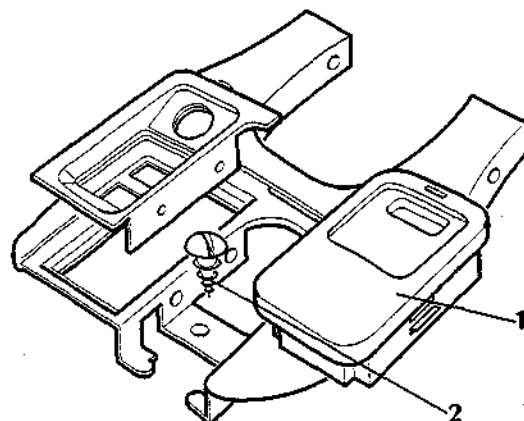


Figure 1. Ashtray and Ashtray Well

3. Remove the gear selector knob.
4. Release the screw in the ashtray well (Fig 1-2) securing the gearshift and centre console surround.
5. Raise the console surround and support it to gain access to the seat control panel.
6. Disconnect the multi-plug in the seat switch loom.
7. Remove 2 screws (Fig 2-1) and the seat control switches.

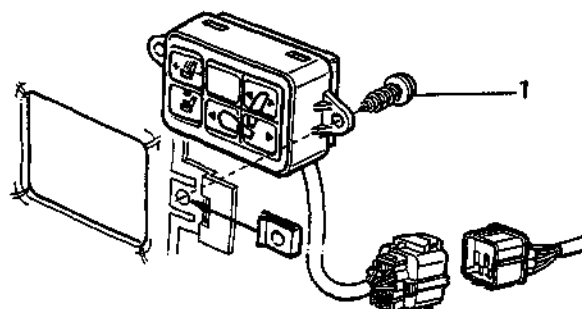


Figure 2. Seat Control Switch Panel Removal

6.6.01 Front Interior Lamps

Procedure

1. Release the quarter turn fastener on the front interior light assembly and lower the assembly from the roof liner.

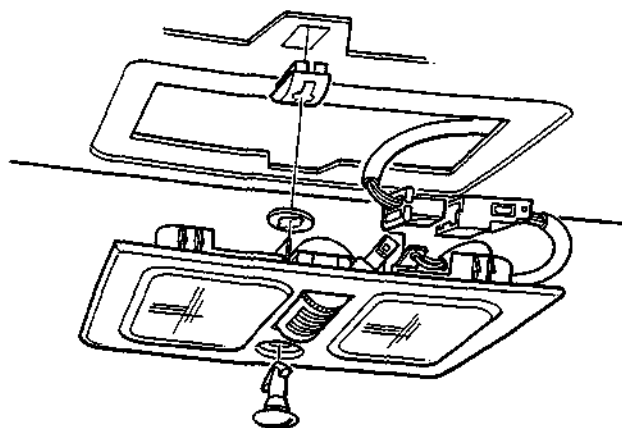


Figure 1. Front Interior Lamp

2. Disconnect the interior lamp plug and remove the interior lamp assembly.

6.6.02 Rear Interior Lamps

Procedure

1. Release the rear upper trim panel.
2. Remove two spire washers and the rear interior lamp assembly.

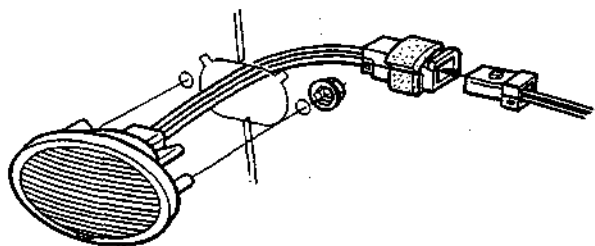


Figure 1. Rear Interior Lamps

3. Disconnect the lamp wiring and remove the lamp assembly.

6.6.03 Front Seat Removal

Procedure

1. Motor the front seat forward and remove the rear securing bolts for the seat rails.
2. Motor the seat to the rear and remove the front seat rail securing bolts.

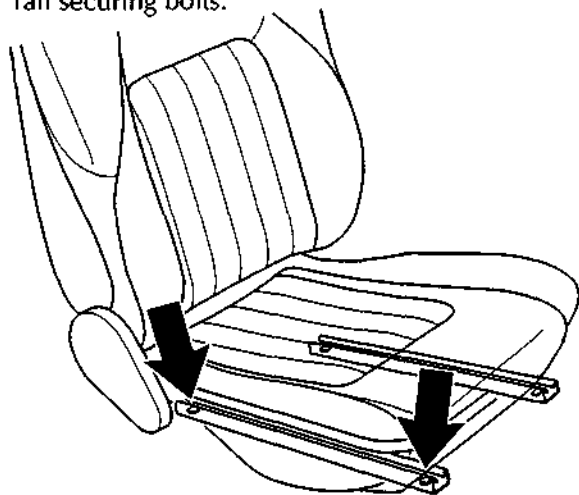


Figure 1. Front Seat Removal

3. Lift the footwell carpet, release the access plate securing screws and remove the plate to gain access to the seat control unit.
4. Cut and remove the tywraps securing the seat loom.
5. Disconnect the seat harness connectors at the control unit.
6. Remove the seat assembly.

6.6.04 Front Seat Runner Assembly

Procedure

1. Remove the seat from the car.

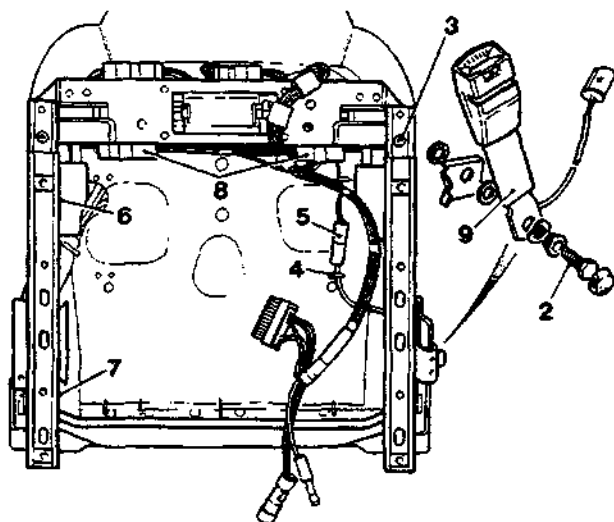


Figure 1. Front Seat Runner Removal

2. Cut the tywraps (Fig 1-4) securing the seat belt buckle harness and disconnect the buckle harness plug (Fig 1-5).
3. Position the runner as required and release the bolts (Fig 1-3) securing the front and rear of the seat frame.
4. Release the front harness from its retaining clips and disconnect the multi-plugs (Fig 1-8).
5. Remove the complete seat runner assembly (Fig 1-6).
6. Remove the seat belt bolt trim cover and remove the seat belt bolt (Fig 1-2), buckle and buckle bracket (Fig 1-9).
7. Fit and secure the seat belt buckle to the replacement seat runner assembly.

6.6.05 Front Seat Rail Motor

Procedure

1. Remove the seat from the vehicle.
2. Remove the front seat runner assembly from the seat.
3. Remove the seat harness clamp (Fig 1-1).
4. Disconnect the seat rail motor plug (Fig 1-10).

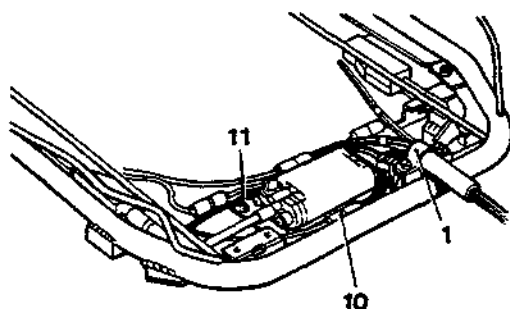


Figure 1. Front Seat Rail Motor Removal

5. Loosen the motor securing screws (Fig 1-11) and remove the motor/drive assembly.

6.6.06 Lumbar Support Motor

Procedure

1. Remove the seat from the car and remove the seat back finisher panel.
2. Disconnect the lumbar motor plug and the lumbar diaphragm air line (Fig 1) and remove the motor.

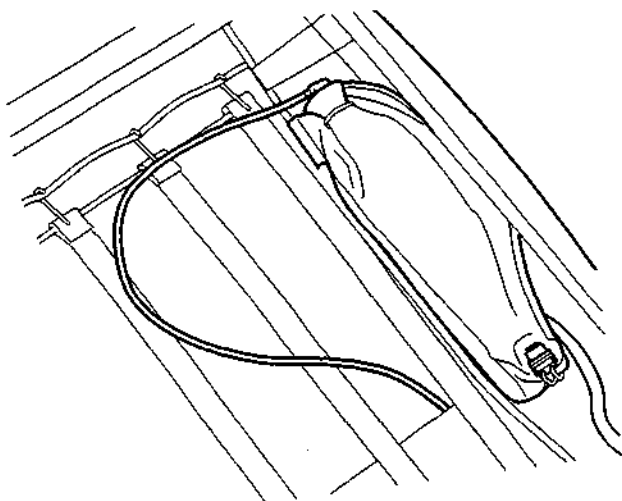


Figure 1. Lumbar Support Motor Removal

6.6.07 Seat Recline Motor

Procedure

1. Remove the seat from the car and remove the seat back finisher panel.
2. Disconnect the recline motor connector.

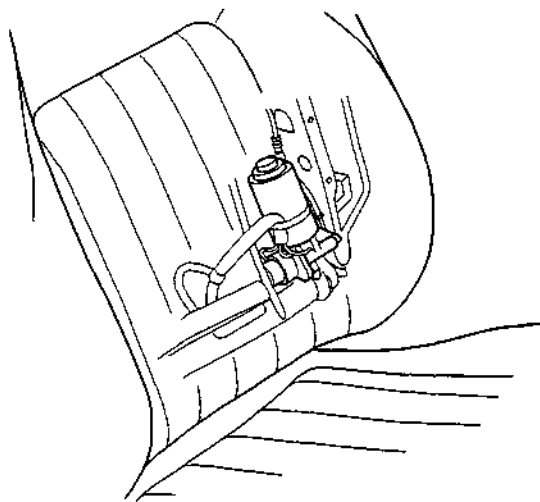


Figure 1. Seat Recline Motor Removal

3. Disconnect the trigger cable from the motor.
4. Loosen two screws and remove the recline motor from its bracket.

6.6.08 Seat Control Unit

Procedure

1. Lift the footwell carpet, release the access plate securing screws and remove the plate to gain access to the seat control unit.

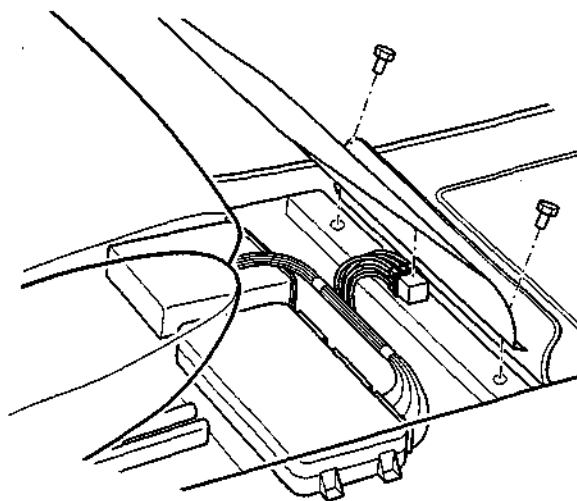


Figure 1. Seat Control Unit Removal

2. Disconnect the multiplug from the control unit.
3. Release the securing screws and remove the seat control unit.

6.7.01 Door Edge Lamps

Procedure

1. Lever the lamp assembly from the door edge, taking precautions to protect the door paintwork.

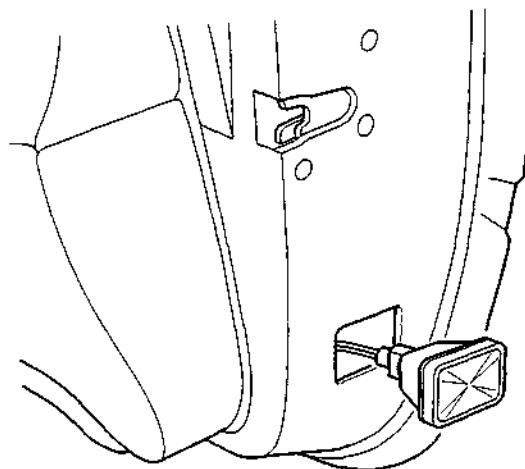


Figure 1. Door Edge Lamp Removal

2. Disconnect the lamp wiring and remove the door edge lamp assembly.

6.7.02 Rear Lamp Cluster

Procedure

1. Remove the rear lamp cluster inner cover.
2. Release the boot rear liner
3. Release the two nuts and one screw securing the rear lamp surround and remove the surround.

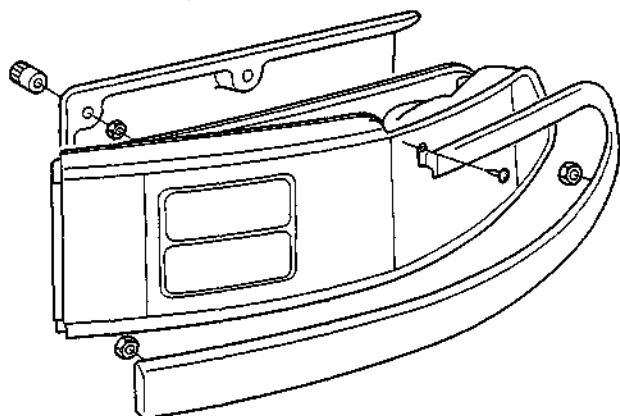


Figure 1. Rear Lamp Cluster

4. Disconnect the rear lamp cluster multi-plug.
5. Remove six nuts from the rear of the assembly and lift out the lamp cluster.

Door Mounted Components

Central Locking System

Description

The central locking system consists of motor operated lock actuators in both doors, the boot and the fuel flap mechanism. The central locking control module is located inside the drivers side 'A' post.

Each motor driven lock actuator incorporates a microswitch which will signal a change of state when any motor runs to drive the actuator. The microswitches are of the changeover type and provide an earth for the lock or unlock signals to the control unit.

The two door lock inputs to the control unit are connected together so that operation of either door lock with the ignition key will simultaneously operate the other door lock. Similarly, the unlock inputs to the control unit are also connected together for simultaneous operation.

The boot will remain locked or will be unlocked simultaneously with the doors dependant on the boot lock position. With the boot key turned clockwise, the boot lock operates in unison with the doors. With the boot key turned anticlockwise, the boot lock cannot be unlocked using the central locking system.

The boot can be opened at any time using the ignition key irrespective of the central locking status.

6.7.03 Door Central Locking Motors

Procedure

1. Remove the door inner panel.
2. Disconnect two plugs on the central locking motor unit and one plug on the door closed switch.
3. Release the interior door catch operating rod from its guide clips and detach it from the lock mechanism.
4. Disconnect the outer lock operating rod.
5. Remove three lock securing screws from the door rear edge.
6. Remove the motor and lock through the access hole.
7. Remove the motor securing screws and remove the motor from the lock assembly.

Electric Windows

Description

Power to the window wind circuits is available when the ignition switch is on and is supplied through a thermal cut-out to the left and right window switches. The switches are double pole plus earth so that the current through a window motor may be switched in either direction to raise or lower the window.

DB7 uses frameless door windows which seal against rubber strips around the body shell door opening. To avoid damaging these seals during door opening, the door glass must be lowered before the door can be opened. This function is controlled by the window control units. The units are mounted on the inside of each door frame and will sense if a door handle is pulled to open the door. Before releasing the door lock, the control unit will drive the window wind motor briefly to lower the door window glass down until it clears the window seals. Similarly, after closing a door, the window motor will be run to raise the door glass to seat the glass against the body seals.

Fault Analysis Procedure

- a) If a window fails to operate, check for fuse failure and the connectors for poor or open contacts.
- b) Check the thermal cut-out by shorting across it and operating either window. If the windows operate with the short circuit but not without, the cut-out is faulty.
- c) With the ignition on, battery voltage should be available between the input terminals of the switches and chassis. Operate each switch and ensure that battery voltage is available between the switch output terminals and chassis.
- d) Measure voltage from each switch input terminal to the switch earth return terminal. If no voltage is measured, the earth return line is open circuit.
- e) Measure continuity through the wiring from the switches to each motor. If continuity is correct, remove the motor for bench testing.

6.7.04 Door Window Motor

Procedure

1. Remove the door trim panel and the glass inner sealing trim.

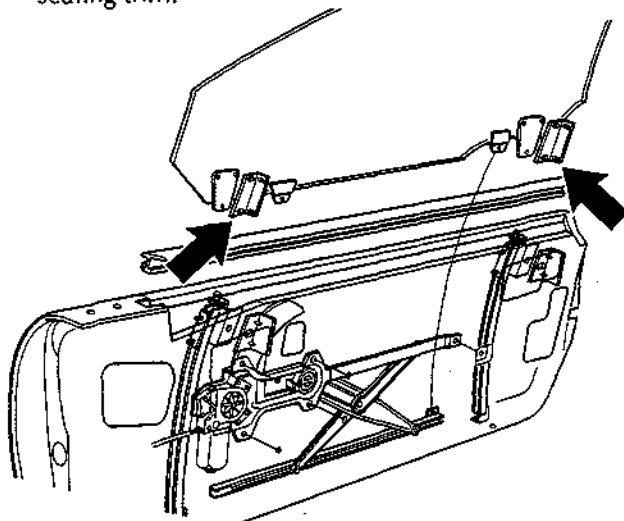


Figure 1. Window Securing Screws

2. Position the window to gain access to the slider bracket and glass securing screws.
3. Disconnect the battery earth lead.
4. Remove two screws securing the glass to each of the two slider brackets. Loosen the two screws securing the glass to the elevator rail.
6. Slide the elevator rail forwards until the glass securing screws are opposite the wide opening of the rail keyhole slots and remove the glass from the top of the door.
7. Disconnect the window motor multiplug.

8. Remove four bolts from the motor bracket and one from the forward end of the lower elevator rail.

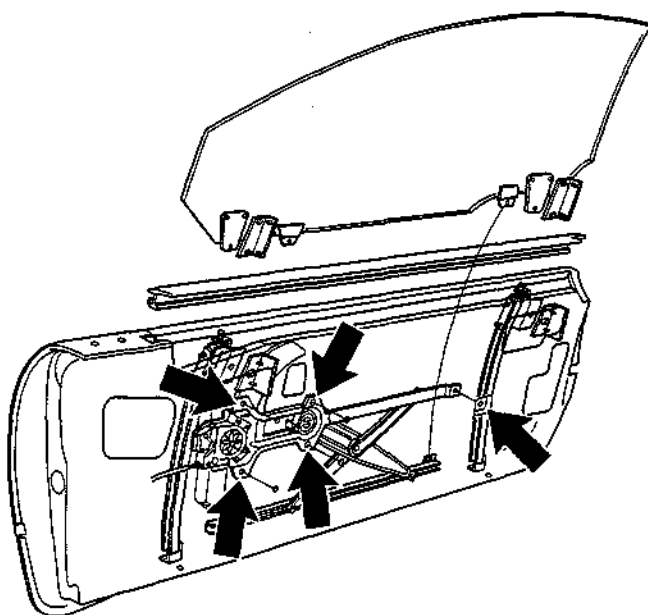


Figure 2. Motor and Elevator Securing Screws

9. Lift out the elevator assembly through the door top.

6.7.05 Door Mirror Assembly

Procedure

1. Remove the door interior trim panel and disconnect the door mirror switch.
2. Disconnect the door mirror harness plug, noting the correct connection. Release the door mirror loom from its clips.

Note: Two plugs are fitted in the door loom, one for left and one for right hand doors. Ensure that the correct plug is connected on reassembly.

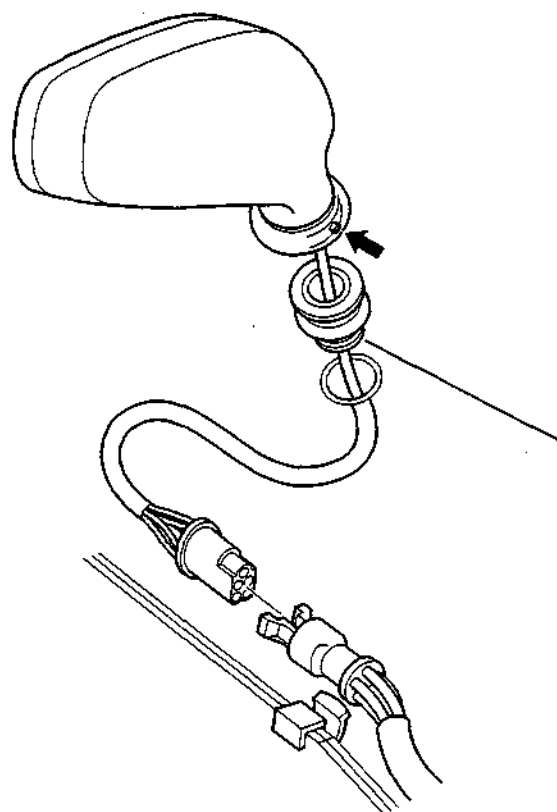


Figure 1. Door Mirror Assembly

3. On the outside of the door, lift the sealing ring on the mirror mount and release one grub screw securing the mirror.
4. Remove the mirror from the door.
5. Remove the door mirror adaptor ring from the door to permit the mirror wiring socket to pass through the mounting hole and then remove the mirror.

6.7.06 Transmission Control Module - Renew (TCM)

Data

Torque Figures

Nut TCM to mounting bracket 2-3 Nm

Procedure

1. Disconnect the battery.
2. Remove the rear seat squab. Remove the rear quarter trim and the rear quarter lower trim pad.
3. Remove the TCM to mounting bracket securing nuts (Fig. 1-2) and remove one bracket.

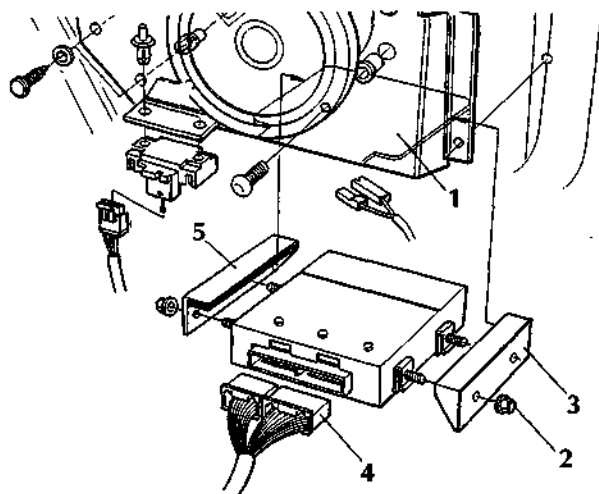


Figure 1

4. Remove the TCM and mounting bracket assembly from the body mounting bracket (Fig. 1-1).

5. Disconnect the TCM multi plug (Fig. 1-4) and remove the TCM.
6. Fit and align the left mounting bracket (Fig. 1-5) to the new TCM, and secure with two nuts. Connect the harness multi plug (Fig. 1-4) to the TCM. Fit the TCM and left mounting bracket assembly to the body mounting bracket (Fig. 1-1), ensure the left bracket slot is fully seated.
7. Fit the right mounting bracket (Fig. 1-3) to the TCM and to the body mounting bracket. Secure with two nuts.
8. Refit the rear quarter lower trim pad.
9. Refit the rear quarter trim panel.
10. Refit the rear seat squab.
11. Reconnect the battery.

6.7.07 Barometric Pressure Sensor - Renew

Data

Torque Figures

Sensor mounting nut 2-3 Nm

Procedure

1. Disconnect the battery.
2. Remove the left rear quarter trim panel to access the TCM and barometric pressure sensor.

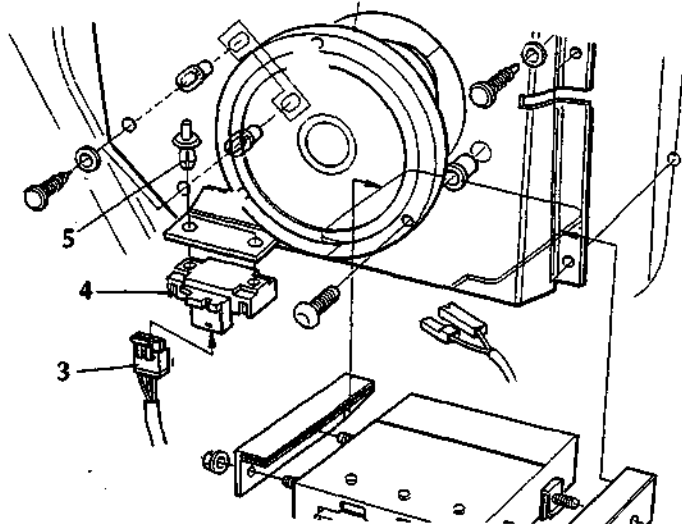


Figure 1

3. Disconnect the harness multi plug (Fig. 1-3) from the barometric pressure sensor (Fig. 1-4).
4. Release the two securing clips (Fig. 1-5) and remove the sensor).
5. Fit the new sensor into position, and secure with the two clips.
6. Connect the multi plug.
7. Refit the interior trim.
8. Reconnect the battery.

DB7 Electrical Component Location and Wiring Information

The following pages contain electrical component location and electrical wiring diagrams.

Component Index

The following list details all of the functional electrical components of the DB7. The list is given in alphabetical order with component location and wiring diagram references for each component.

Component Location on the vehicle

To locate a component on the vehicle, find its name in the component index and note the component location reference.

The component location reference gives the figure number and item number for each component so that you can find the component on the following location diagrams and in the car.

Component Location on the Wiring Diagrams

The wiring diagram reference gives the wiring diagram number and the location coordinates so that you can locate the component and its wiring on the wiring diagrams.

Wiring Diagrams

Each diagram covers a complete loom or section of a major loom.

Continuations of a loom on another sheet and connections to other looms are indicated by the continuation arrow ➡ and the Sheet Number and Co-Ordinates where the continuation or connection is located.

Each connector is illustrated with an end view of the mating face of the connector. A table beside each connector gives the pin number, wire colour and destination of each wire.

Wire Colours

The following key is used to denote wire colours in the connector wiring tables

B = Black	P = Purple	G = Green
K = Pink	S = Slate	LG = Light Green
N = Brown	W = White	O = Orange
R = Red	U = Blue	Y = Yellow

Wire Splices

Many wire runs are spliced within the loom wrapping and additional information is required to aid in fault analysis. All splices are noted on the wiring diagrams (e.g. SPL1 = Splice 1). On the facing page for each wiring diagram, a splice list gives the splice number and the wire colours and destinations for each wire coming from the splice.

Component Name	Location Reference	Wiring Diag. Reference	Rep. Op. Reference	Notes
ABS ECU	15-1	28-A1	5.1.11.1	
Air Con Compressor Clutch	3-20	5-D2	8.1.07.3	
Air Con Fan Motor - LH	8-2	8-A5	8.2.09.1	
Air Con Fan Motor - RH	8-6	13-C4	8.2.08.1	
Air Conditioning Trinary Switch	10-6	5-D3	8.1.11.1	
Air Conditioning Unit	8-3	11-B2	8.2.01.1	
Air Pump	8-4	1-C2	2.3.01.2	
Air Temperature Sensor	3-13	5-C3	2.2.06.1	
Alarm Override Switch	1-8	1-C5	6.1.06.1	
Alarm Siren	11-7	1-B3	6.2.03.1	
Alternator	3-2	5-D3	6.3.01.1	
Ambient Temperature Sensor	1-12	1-A2	8.2.07.1	
Barometric Pressure Sensor	11-1	4-A4	3.3.08.2	
Boot Lamp	5-2	24-A5	6.9.04.1	
Boot Lamp	5-2	24-C4	6.9.04.1	
Boot Lock Actuator	13-8	27-A5	6.9.06.1	
Boot Release Switch	2-10	23-C3	6.5.09.1	
Brake Accumulator Pump	7-4/8	28-B4	5.1.08.1	
Bulb Fail Unit - Front Side Lights	4-6	9-C2	6.4.01.1	
Camshaft Sensor	3-10	6-C3	2.5.06.1	
Central Locking Unit	9-4	8-D1	6.7.03.1	
Cigar Lighter	8-1	19-D3	6.5.10.1	
Column Switchgear	13-3	12-C5	6.5.02.1	
Crankshaft Position Sensor	3-3	5-D2	2.5.06.3	
Cruise Control Brake Switch	11-8	12-B5	6.4.02.1	
Cruise Control Clutch Switch (LHD)	12-9	2-D4	6.1.08.1	Manual only
Cruise Control ECU	6-3	20-A2	6.6.09.1	
Cruise Control On/Off Switch	12-7	20-C3	6.5.07.1	
Cruise Control Pump	1-2	2-A3	6.1.09.2	
Cruise Control Set Switch	12-8	20-D3	6.5.07.2	
Cruise Control Inhibit Switch	10-8	21-D3	3.3.08.6	
Diagnostic Socket - Transmission	10-7	12-A4	6.4.03.1	
Dimmer Module	4-16	13-A4	6.4.04.1	
Door Lock Actuator	12-12	17/18-B1	6.7.10.1	
Door Mirror - LHD	2-4	17-A3	6.7.08.1	
Door Mirror - RHD	2-8	17-A5	6.8.01.1	
Door Mirror Switch LH	2-3	17-D5	6.7.08.2	
Door Mirror Switch RH	2-9	18-D5	6.8.01.2	
Door Speaker - LH	6-4	17-C5	6.7.09.1	
Door Speaker - RH	6-9	18-C5	6.8.02.1	
EDIS Coil Pack	3-1	5-D5	6.2.05.1	
EDIS Amplifier Module	1-10	6-B2	6.2.05.3	
Engine Diagnostic Socket	10-5	6-D4	6.4.05.1	
Engine ECU	7-3	6-C5	6.4.06.1	
Exhaust Temperature/Speed Warning	4-3	11-C5	6.4.07.1	Multi-function unit
Fan Fuses	1-21	3-A3	6.2.06.1	
Fan Motor 1	7-6	3-A2	1.7.17.1	
Fan Motor 2	7-7	3-B2	1.7.17.2	
Fan Run-on Switch	7-5	5-A2	1.7.16.4	
Flasher Module	4-13	13-C2	6.4.08.1	
Fog Lamp - RH Front	14-10	1-A1	6.1.04.1	
Fog Lamp - LH Front	14-9	1-C1	6.1.04.2	

Electrics

Electrical Component Location Index - Up to 97 MY



Component Name	Location Reference	Wiring Diag. Reference	Rep. Op. Reference	Notes
Fuel Filler Flap Solenoid	2-1	24-A3	6.9.07.1	
Fuel Pump 1	15-13	25-A1	2.6.02.1	
Fuel Pump 2	15-14	25-A2	2.6.02.1	
Fuel Tank Sender Unit	15-12	24-C5	2.6.06.1	
Gear Selector Illumination	9-3	19-D4	6.5.11.1	Auto only
Gear Shift Interlock Solenoid	13-6	21-C4	3.3.01.1	Auto only
Gearbox Connector (Auto)	7-11	7-B4		Auto only
Gearbox ECU	11-2	4-B3	6.6.10.1	Auto only
Gearshift Interlock Module	13-7	21-A2	6.5.12.1	Auto only
Handbrake Switch	8-8	24-A1		
Headlamp Control Module	1-3	2-A2	6.1.10.1	
Head/Side Lamp - LH Front	14-7	1-D2	6.1.01.1	
Head/Side Lamp - RH Front	14-12	1-A2	6.1.01.2	
Heated Front Screen Controller	11-4	9-A2	6.4.09.1	
Heated Front Screen Fuse - 40A	11-5	9-B2	6.4.09.2	
Heated Front Screen	7-10	8-B5	6.4.09.3	
Heated Front Screen	7-1	14-B2	6.4.09.3	
Heated Rear Screen	9-8	24-A2	6.6.11.1	
Heated Washer Jet	1-11	5-A3	6.4.10.1	
Heated Washer Jet	1-11	5-B3	6.4.10.1	
High Level Stop Lamp	9-1	24-B2	6.6.12.1	
Horn - LH	11-6	3-C1	6.1.11.1	
Horn - RH	11-6	3-B1	6.1.11.1	
Idle Speed Control Valve	3-17	5-C5	2.2.05.1	
Ignition Switch	8-7	12-D2	6.5.13.1	
Indicator/Side Lamp - LH Front	14-8	1-C1	6.1.03.1	
Indicator/Side Lamp - RH Front	14-11	1-A1	6.1.03.1	
Inertia Switch	7-2	8-D2	6.5.14.1	
Injector 1	3-6	5-A2	6.3.04.1	
Injector 2	3-7	5-C2	6.3.04.1	
Injector 3	3-8	5-A3	6.3.04.1	
Injector 4	3-9	5-C2	6.3.04.1	
Injector 5	3-11	5-A4	6.3.04.1	
Injector 6	3-12	5-C4	6.3.04.1	
Input Speed Sensor (Auto)	11-11	7-B2	3.4.02.1	Auto only
Instrument Panel Illumination Control	2-7	13-D5	6.5.04.2	
Instrument Panel	2-6	11-C5	6.5.04.1	
Interior Light - Rear LH	5-4	24-A2	6.6.02.1	
Interior Light - Rear RH	5-4	24-D2	6.6.02.1	
Key Solenoid	11-10	12-B2	6.5.14.1	
Key-In Warning Switch	11-9	12-B2		
Kickdown Switch	8-5	14-A5	5.4.01.1	Auto only
Lambda Sensor A	3-18	6-B5	6.3.05.1	
Lambda Sensor B	3-19	6-B5	6.3.05.1	
Logic Earth	9-2	10-D4	6.5.15.1	
Low Coolant Probe	13-5	8-C3	1.7.14.1	
Low Level Sensor	4-1	3-C1		
Lumbar Pump	9-5	22-D2		
Map Reading Light	5-1	13-C4	6.6.01.1	
Microswitch - Glass Drop LH	12-2	17-A2	6.1.13.1	
Microswitch - Glass Drop RH	12-2	18-A2	6.1.13.1	

Component Name	Location Reference	Wiring Diag. Reference	Rep. Op. Reference	Notes
Microwave Sensor	12-1	24-C2	6.6.14.2	
Mode Switch	7-9	4-A3	6.5.07.4	
Multifunction Module	4-2	8-C4	6.4.12.1	
Number Plate Lamp - LH	5-3	27-B4	6.9.03.1	
Number Plate Lamp - RH	5-3	27-B6	6.9.03.1	
Oil Pressure Warning Light Transducer	3-17	5-C5	1.5.08.1	
Output Speed Sensor (Auto)	11-12	7-B3	3.4.02.2	Auto only
Park Switch (Auto)	10-1	21-B1	6.5.13.1	Auto only
Purge Valve 1	10-3	5-A4	6.1.14.1	
Purge Valve 2	10-4	5-A5	6.1.14.2	
Radio Aerial	15-4	24-D2	6.9.08.1	
Radio Telephone Connector	15-3	25-B2	6.9.09.1	
Radio Tweeter	6-7	8-C3	6.5.17.1	
Radio Tweeter	6-5	14-C4	6.5.17.1	
Radio	6-6	10-A2	6.5.05.1	
Rear & Number Plate Bulb Fail Unit	15-11	25-C3	6.9.10.1	
Rear Fog Lamp LH	14-2	17-D2	6.7.02.1	
Rear Fog Lamp RH	14-5	18-D2		
Rear Lamp - LH	14-1	24-A5		
Rear Lamp - RH	14-6	24-C4		
Recline Motor Potentiometer	9-7	22-B1	6.6.07.1	
Relay - ABS Pump	4-8	9-C4	5.1.15.1	
Relay - Air conditioning clutch	1-17	3-A3	6.2.06.1	
Relay - Air Pump	4-14	13-A5	6.4.13.1	
Relay - Auxiliary Load	4-4	9-D1	6.4.14.1	
Relay - Boot Release	15-9	26-D3	6.9.11.1	
Relay - Courtesy Lights	4-11	13-A2	6.4.15.1	
Relay - Cruise Control On/Off	6-1	20-B1	6.5.18.1	
Relay - Drivers Seat Heater	12-3	16-D3	6.6.15.1	
Relay - Fan 1	1-20	3-B6	1.7.16.3	
Relay - Fan 2	1-19	3-B6	1.7.16.3	
Relay - Fan Run On	1-18	3-A5	1.7.16.4	
Relay - Front Fog Lamps	1-6	1-B5	6.1.04.3	
Relay - Fuel Pump 1	15-7	26-A2	6.9.12.1	
Relay - Fuel Pump 2	15-8	26-A3	6.9.12.1	
Relay - Gearbox Failure Warning	4-9	13-A1	6.4.16.1	Auto only
Relay - Headlamp Dipped Beam	1-5	1-B5	6.1.15.1	
Relay - Headlamps	1-7	1-B4	6.1.16.1	
Relay - Heated Rear Window	4-15	13-A4	6.4.17.1	
Relay - Horns	1-16	3-A4	6.2.07.1	
Relay - Ignition Load	4-10	13-A2	6.4.18.1	
Relay - Main	4-12	13-A3	6.4.19.1	
Relays - Drivers/Passengers Seat Heaters	12-3	15-D3	6.6.15.2	
Relay - Rear Fog Lamps	4-17	13-A5	6.4.20.1	
Relay - Reverse Lamps	15-6	25-A4	6.9.13.1	
Relay - Sidelamps	1-9	1-B4	6.1.17.1	
Relay - Starter Solenoid	1-15	3-A4	6.2.08.1	
Relay - Stop Lamps	15-5	25-A5	6.9.14.1	
Reversing Lamp Switch (Man)	11-3	7-C5	6.2.09.1	
Reversing Light Switch (Auto)	10-2	21-C2	6.2.09.2	
Screen Wash Pump	1-13	3-D1	6.3.06.1	

Component Name	Location Reference	Wiring Diag. Reference	Rep. Op. Reference	Notes
Seat Belt Switch	13-2	22-A3	6.6.16.1	
Seat ECU - Driver	6-2	16-A1	6.6.17.1	
Seat ECU - Passenger	6-2	15-A1	6.6.17.2	
Seat Heater - Cushion Element	12-5	22-A2	6.6.18.1	
Seat Heater - Squab Element	12-4	15/16-A4	6.6.18.2	
Seat Heater Control Module	6-3	22-A5	6.6.18.3	
Seat Motor Potentiometer	9-7	22-C2	6.6.19.1	
Seat Pressure Pad	12-6	22-D3	6.6.20.1	
Seat Switch Pack - Driver	6-8	16-B1	6.6.21.1	
Seat Switch Pack - Passenger	6-8	15-B1	6.6.21.1	
Security System Aerial	2-12	24-C2	6.6.22.1	
Security System ECU	15-2	26-B6	6.6.22.3	
Side Marker Lamp - LH Front	5-5	1-C2	6.1.18.1	
Side Marker Lamp - RH Front	5-5	1-A3	6.1.18.1	
Speaker - Rear LH	6-10	24-B2	6.6.23.1	
Speaker - Rear RH	6-10	24-C2	6.6.23.1	
Speed Control Dump Valve	1-4	2-A2	6.1.19.1	
Start Inhibit Switch	10-9	21-C3	6.1.20.1	
Starter Motor Solenoid	3-14	3-C2	6.3.02.2	
Stop Lamp Fail	15-10	25-A3	6.9.15.1	
Stop Lamp/Cruise Disable Switch	11-8	12-C5	6.4.02.1	
Thermal Breaker - Window Lift	4-7	9-C3	6.1.21.1	
Throttle Potentiometer	3-15	5-A3	2.5.02.2	
Water Temp Sensor - Engine ECU	3-5	5-C2	6.3.07.1	
Water Temp Sensor - Temp Gauge	3-4	5-C2	8.2.12.1	
Wheel Speed Sensor - Front RH	13-4	29-C3	5.1.12.1	
Wheel Speed Sensor - Front LH	13-4	28-D4	5.1.12.1	
Wheel Speed Sensor - Rear RH	13-1	28-D3	5.2.01.1	
Wheel Speed Sensor - Rear LH	13-1	28-D2	5.2.01.1	
Window ECU - LH	12-11	17-D3	6.1.22.1	
Window ECU - RH	12-11	18-D3	6.1.22.1	
Window Switch - RH	2-5	19-A2	6.5.03.1	
Window Switch LH	2-5	19-D2	6.5.03.1	
Wiper Logic Module	4-5	9-A3		
Wiper Motor	1-1	8-C3	6.2.01.1	
Window Lift Motor	12-10		6.1.21.3	

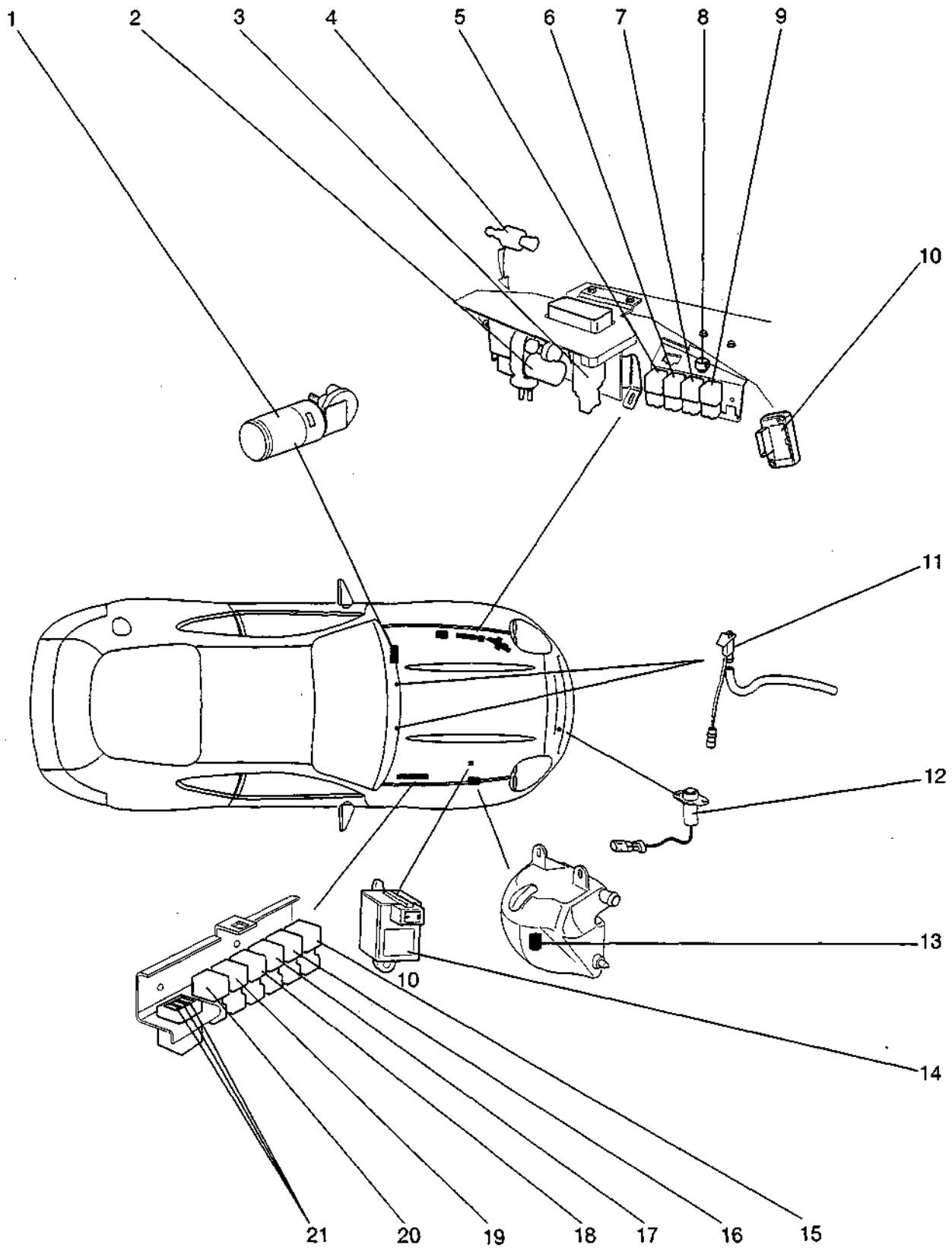


Figure 1

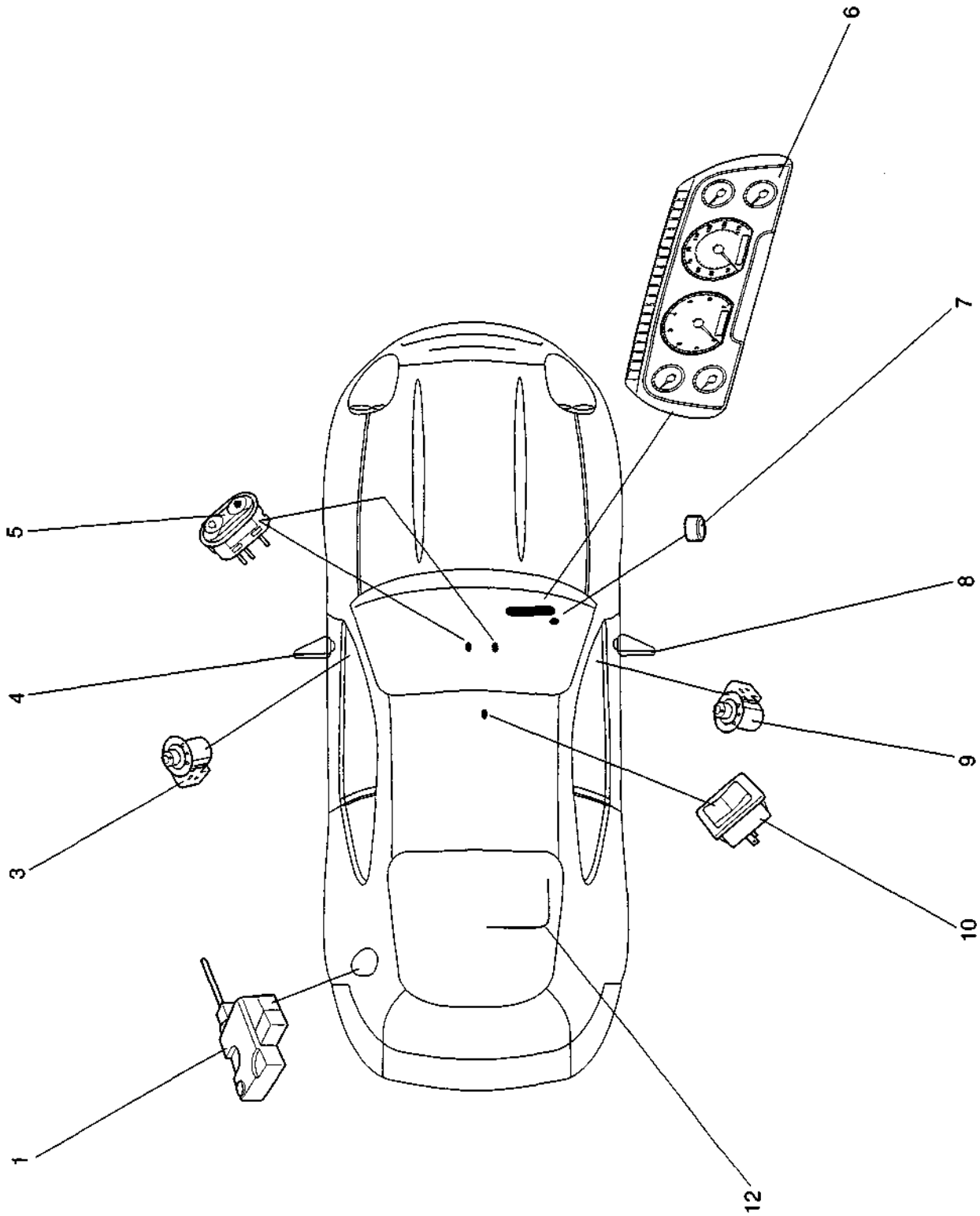


Figure 2

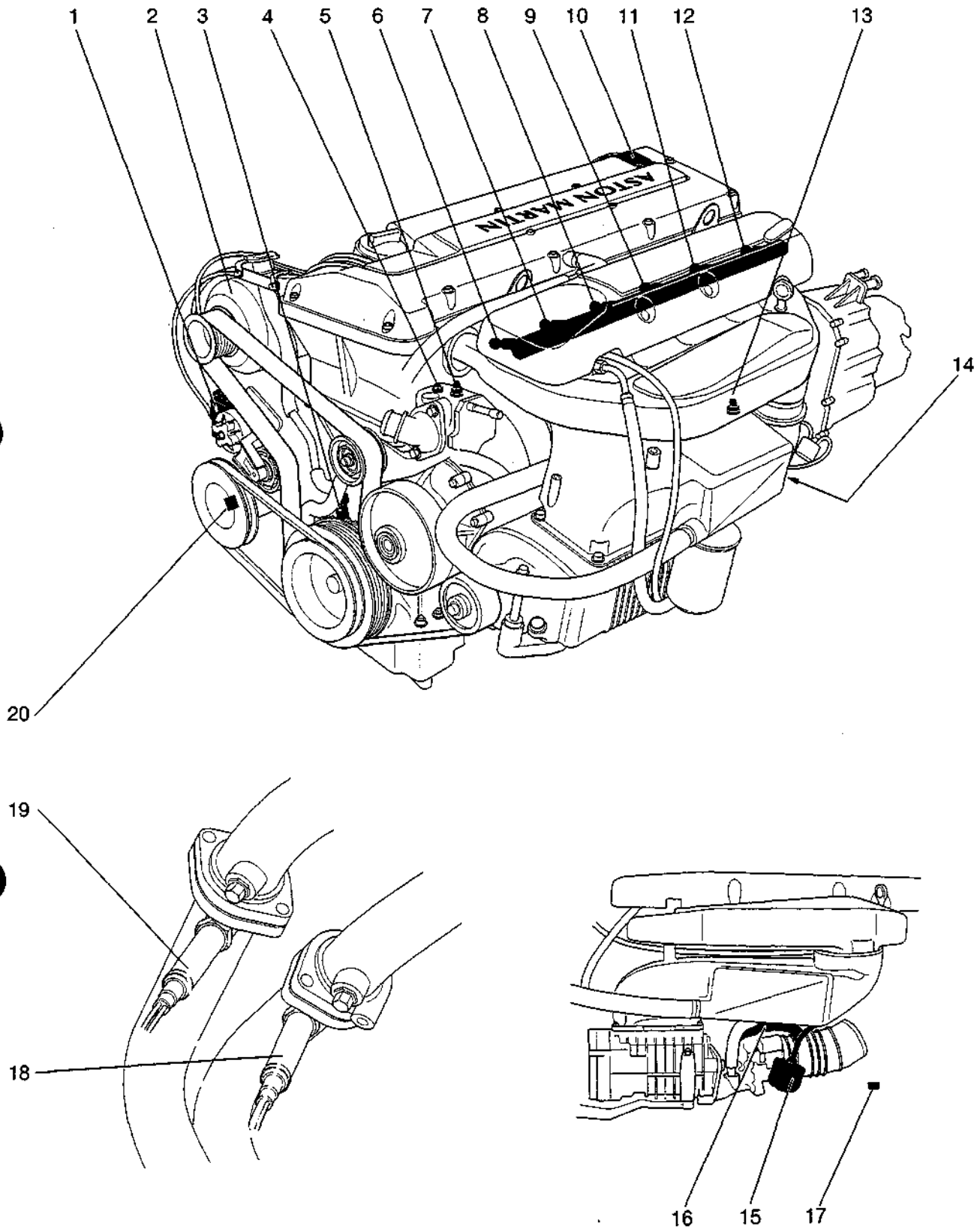


Figure 3

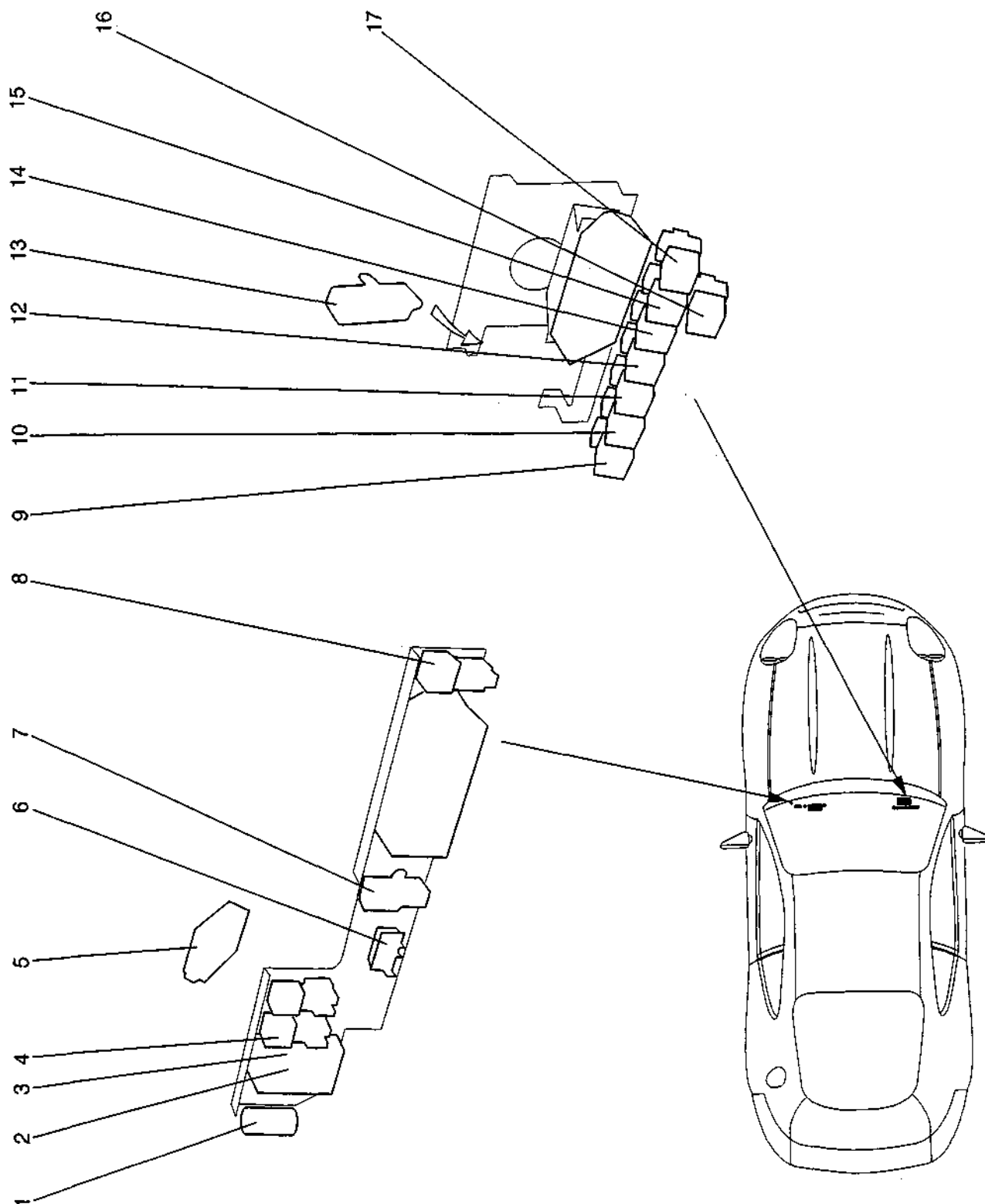


Figure 4

Figure 4

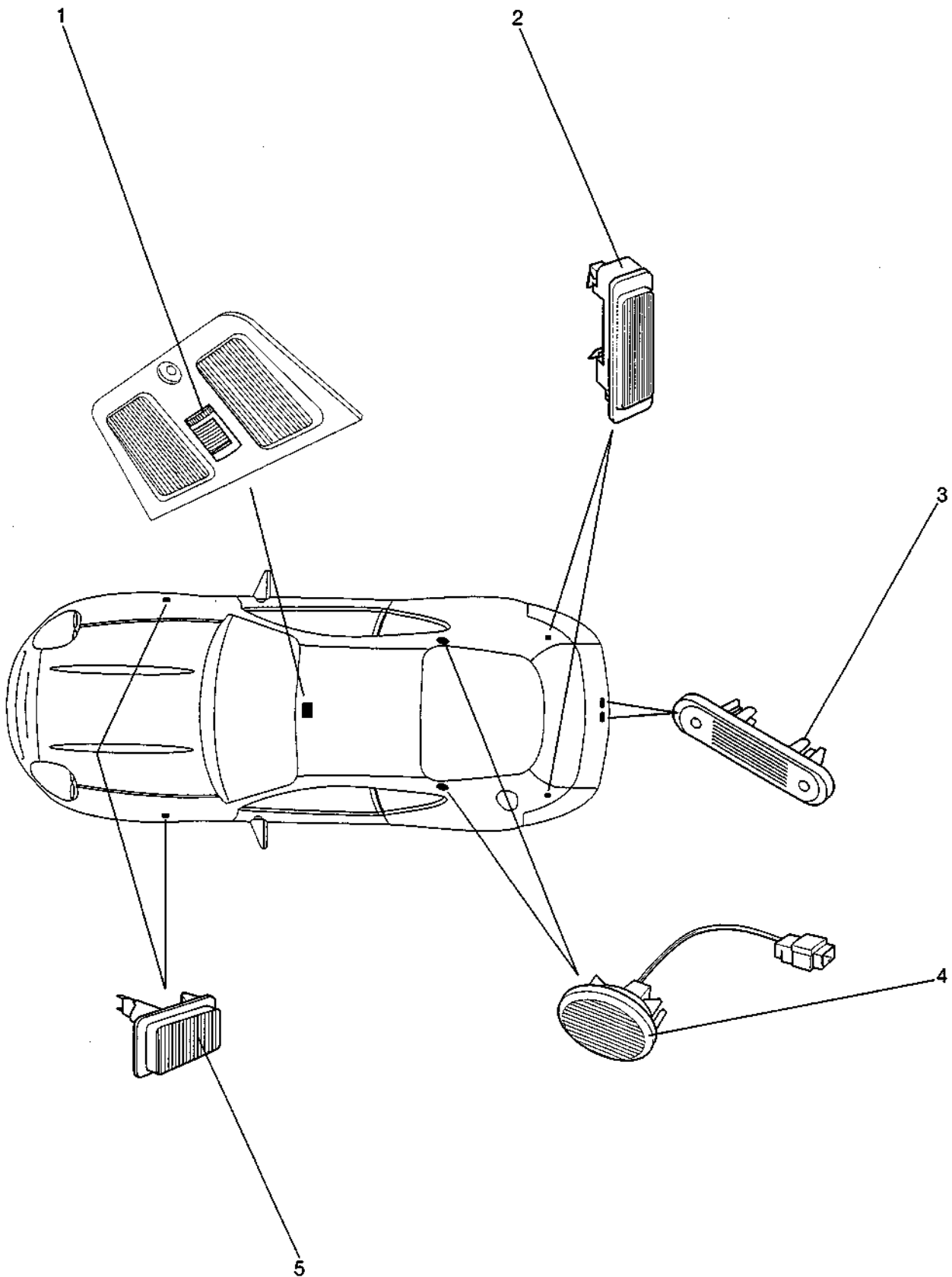


Figure 5

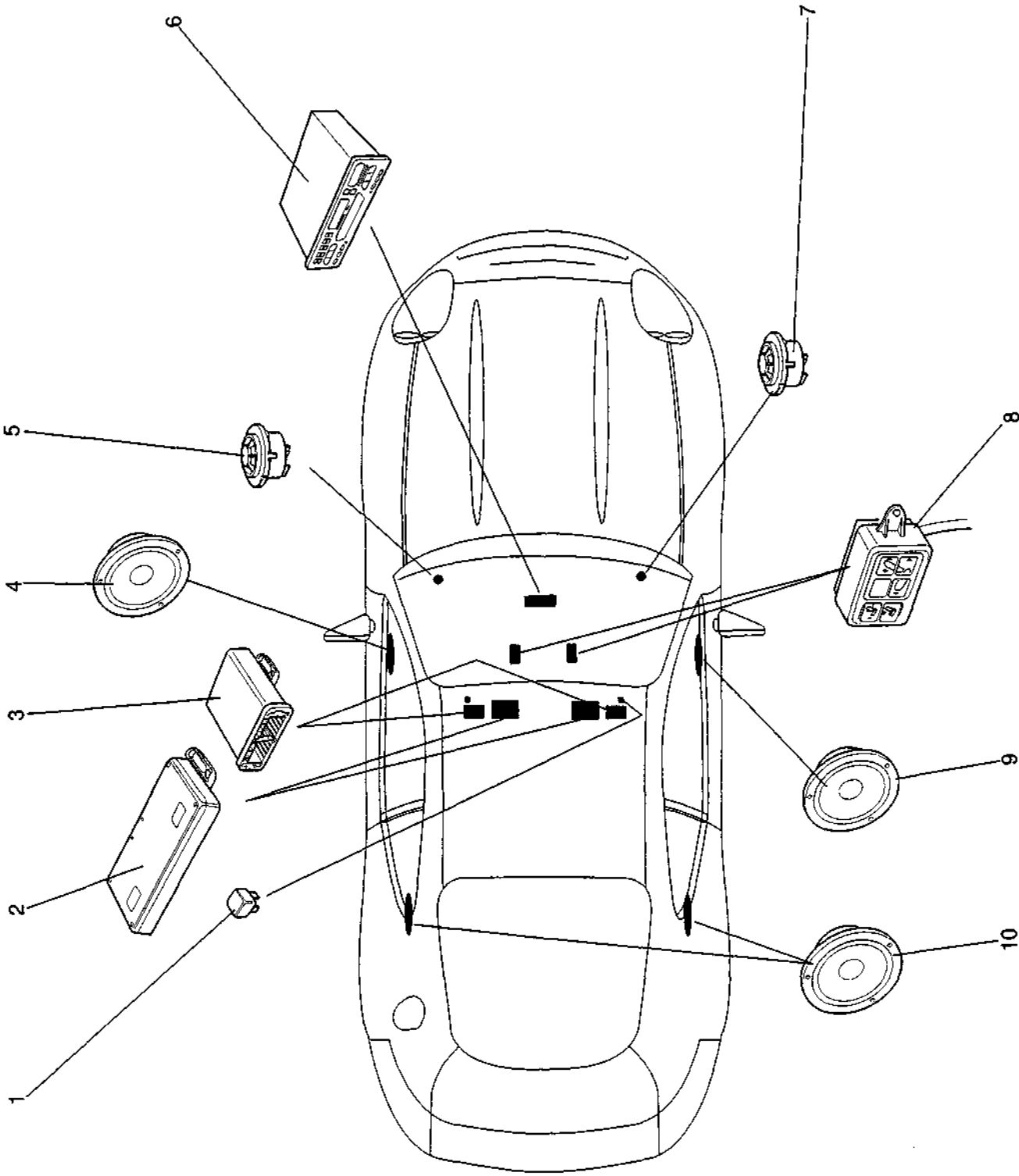


Figure 6

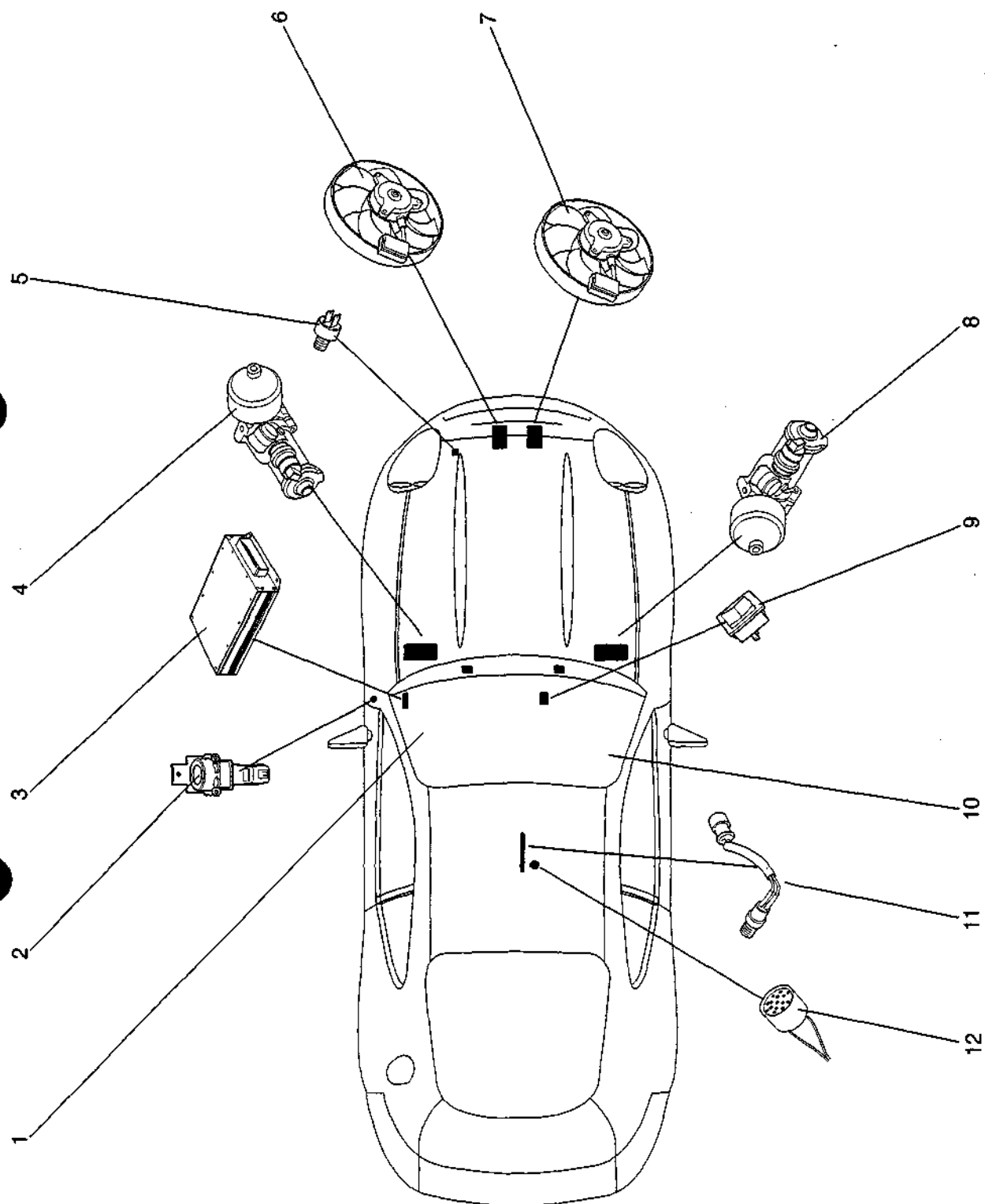


Figure 7

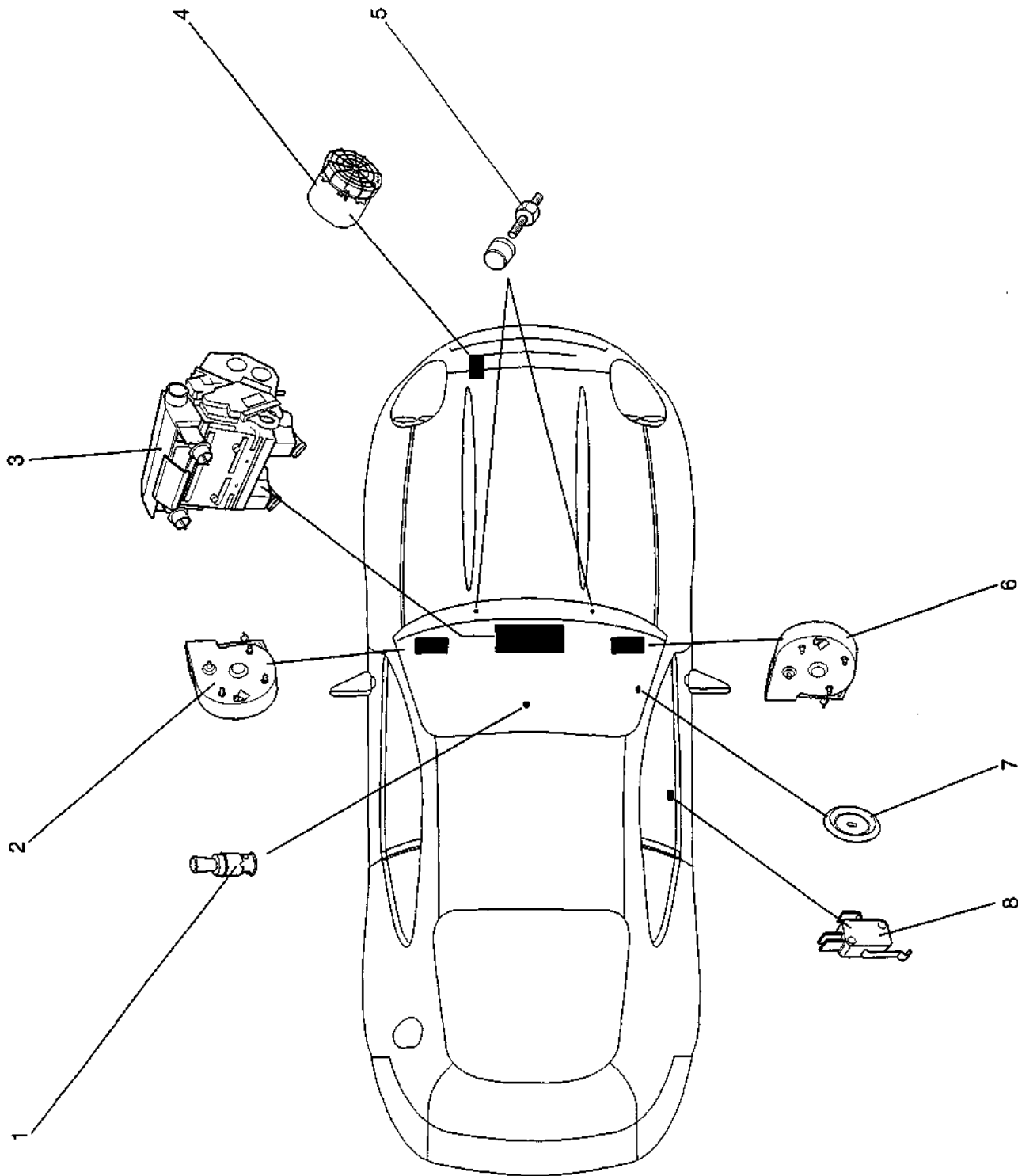


Figure 8

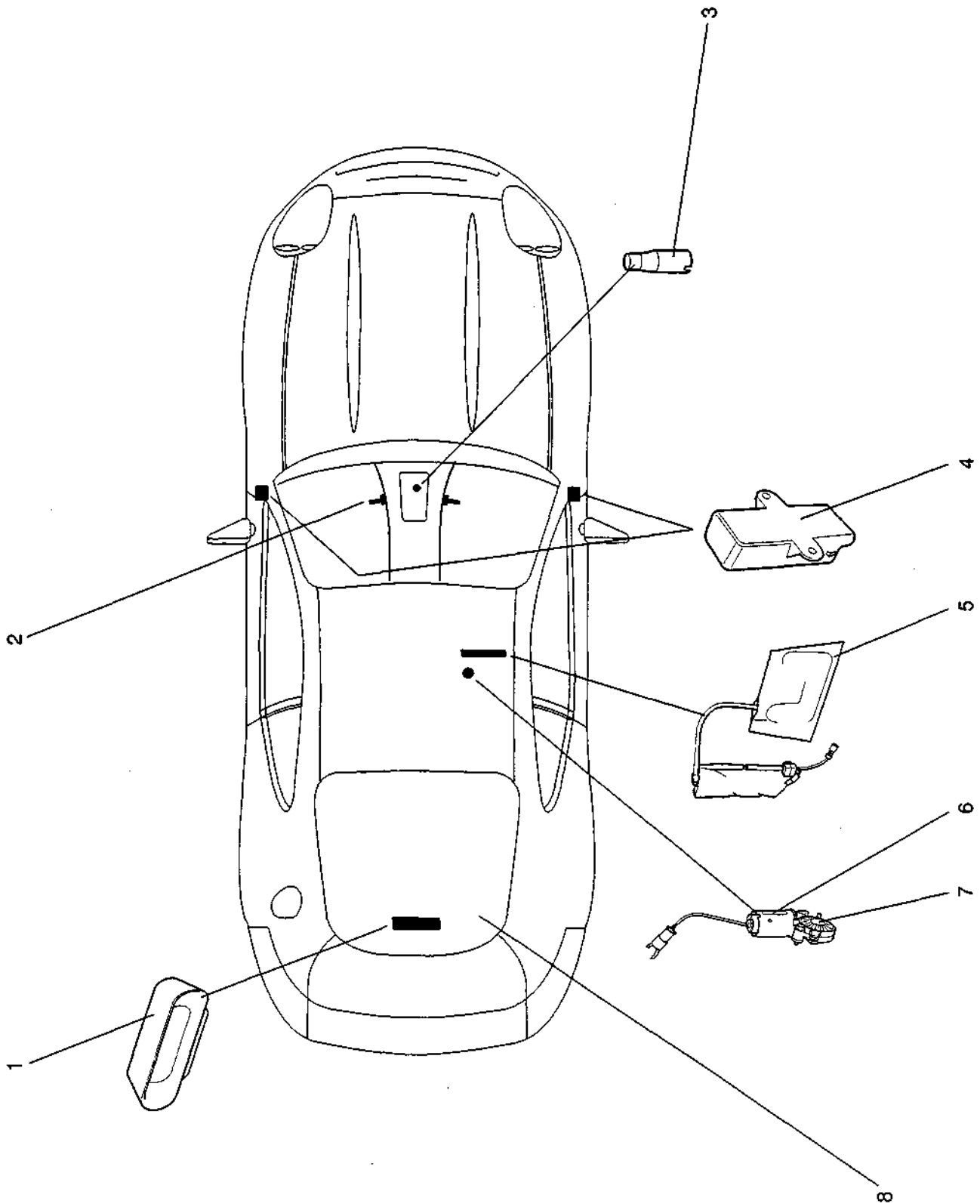


Figure 9

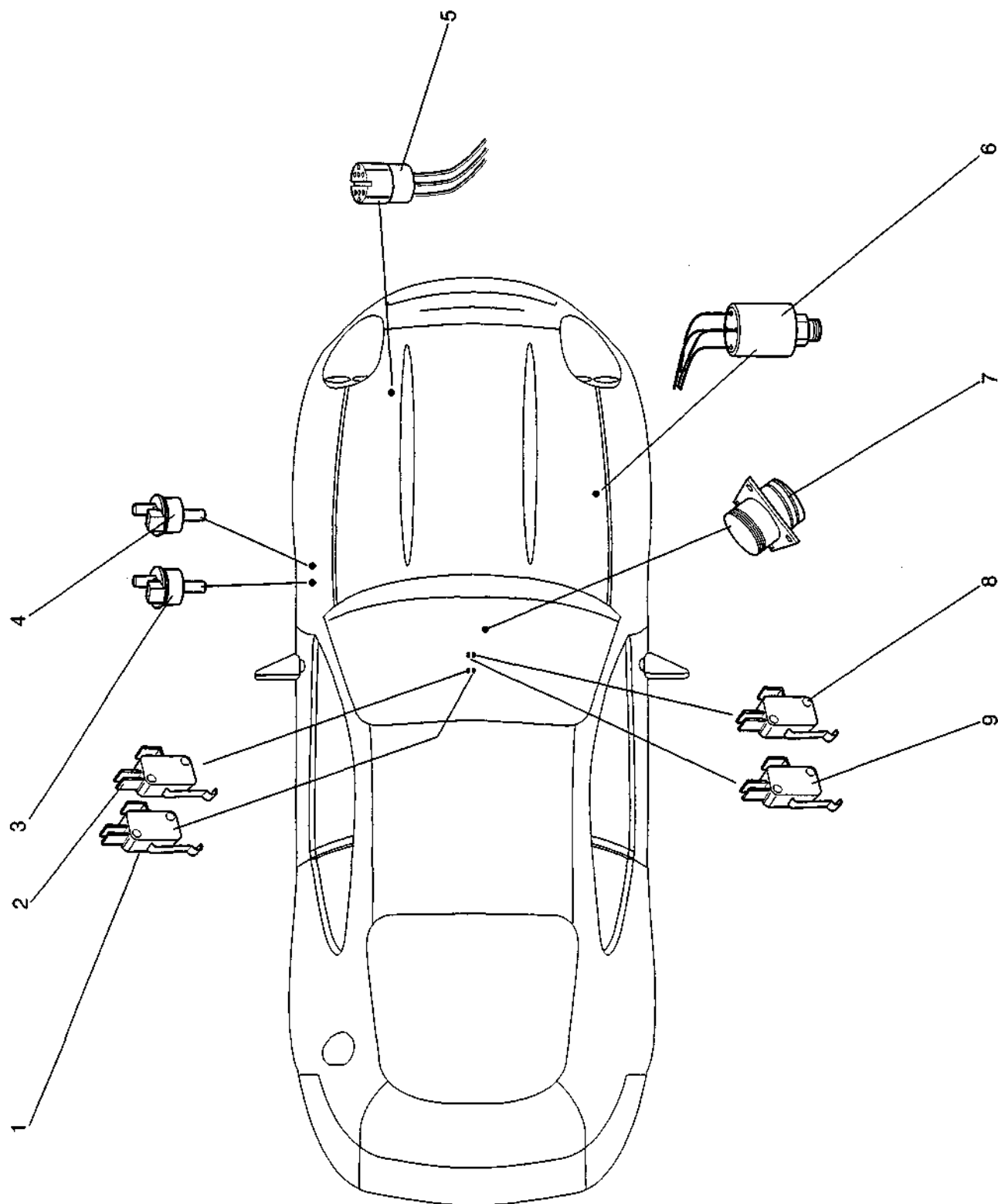


Figure 10

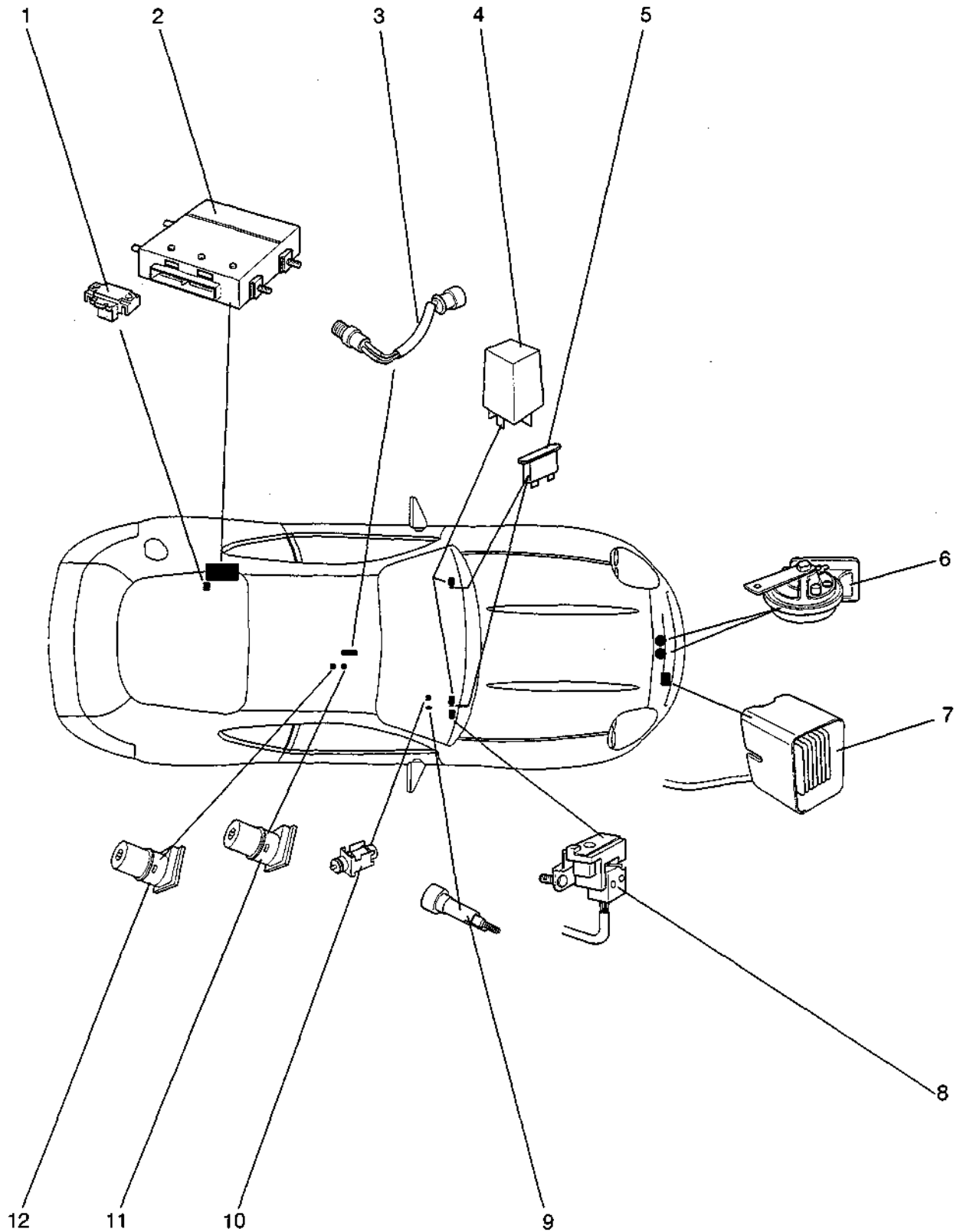


Figure 11

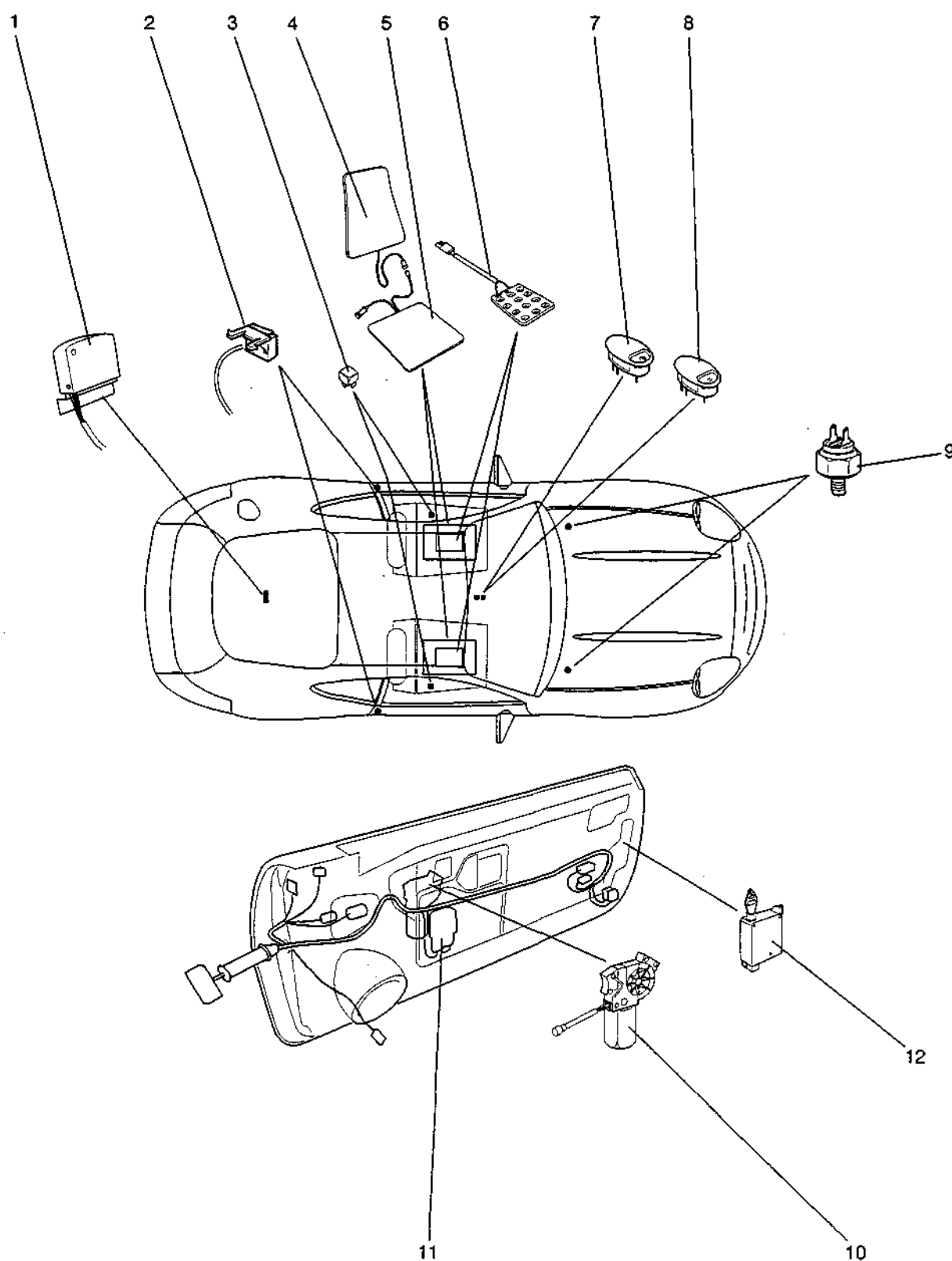


Figure 12

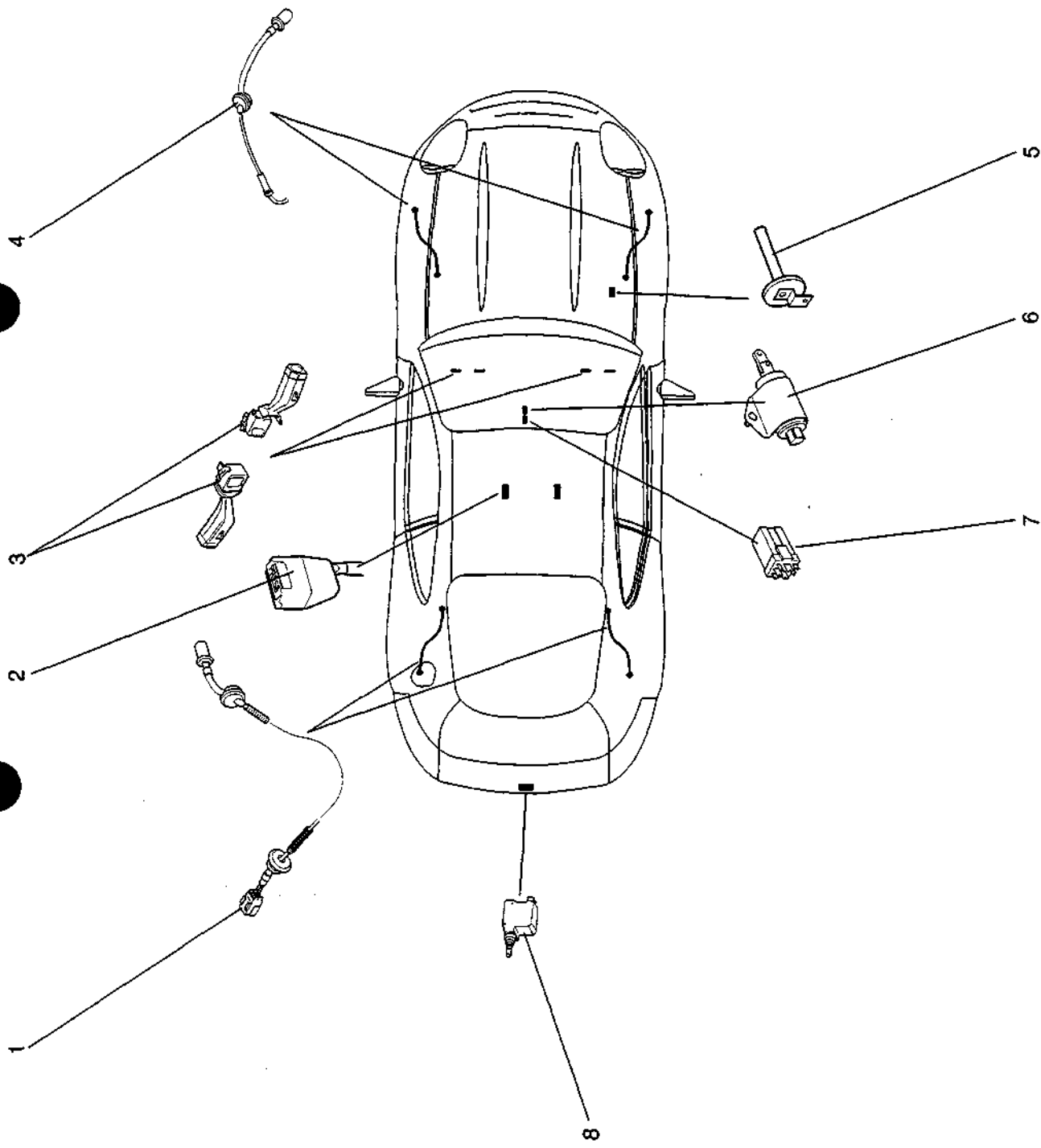


Figure 13

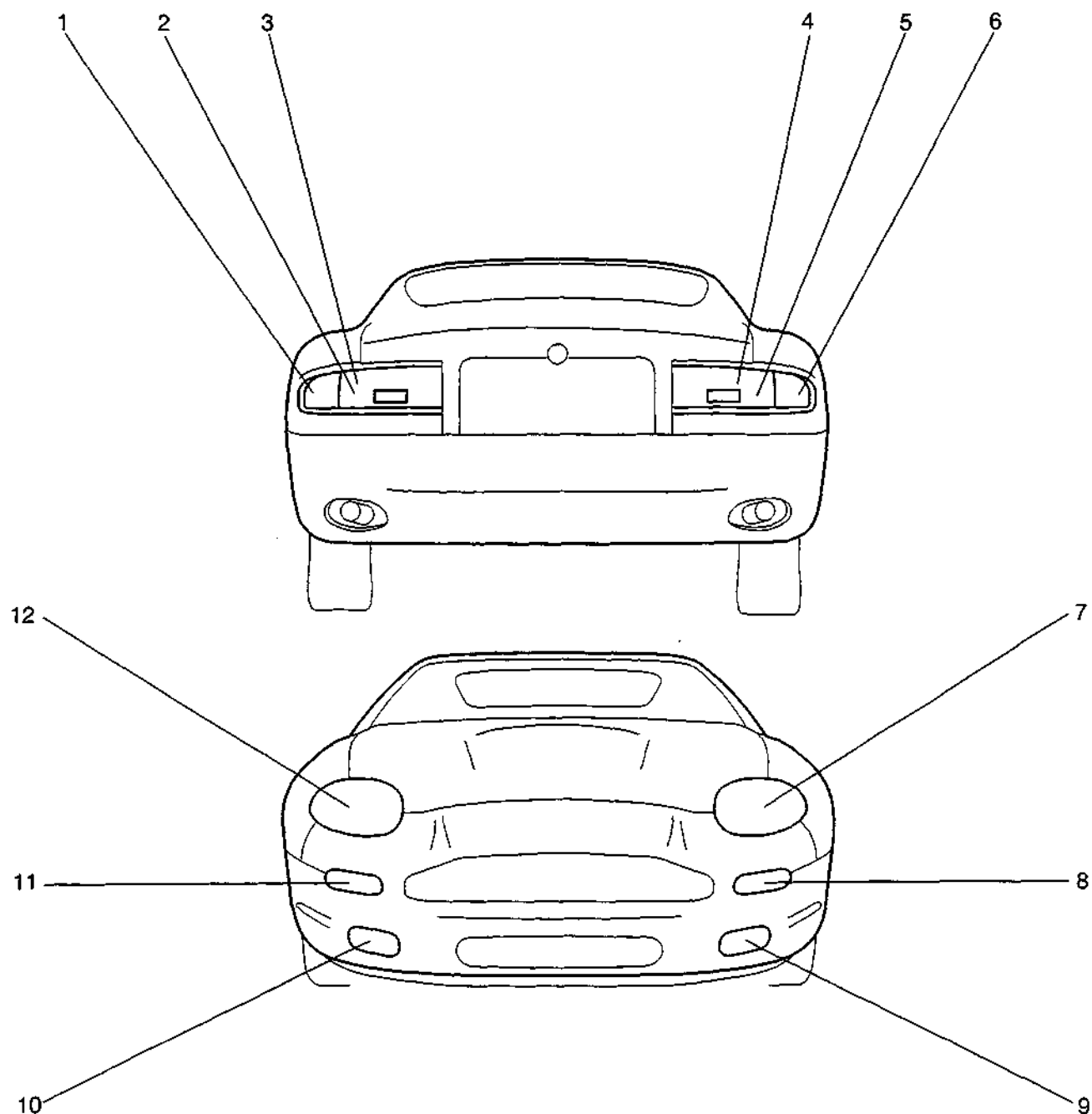


Figure 14

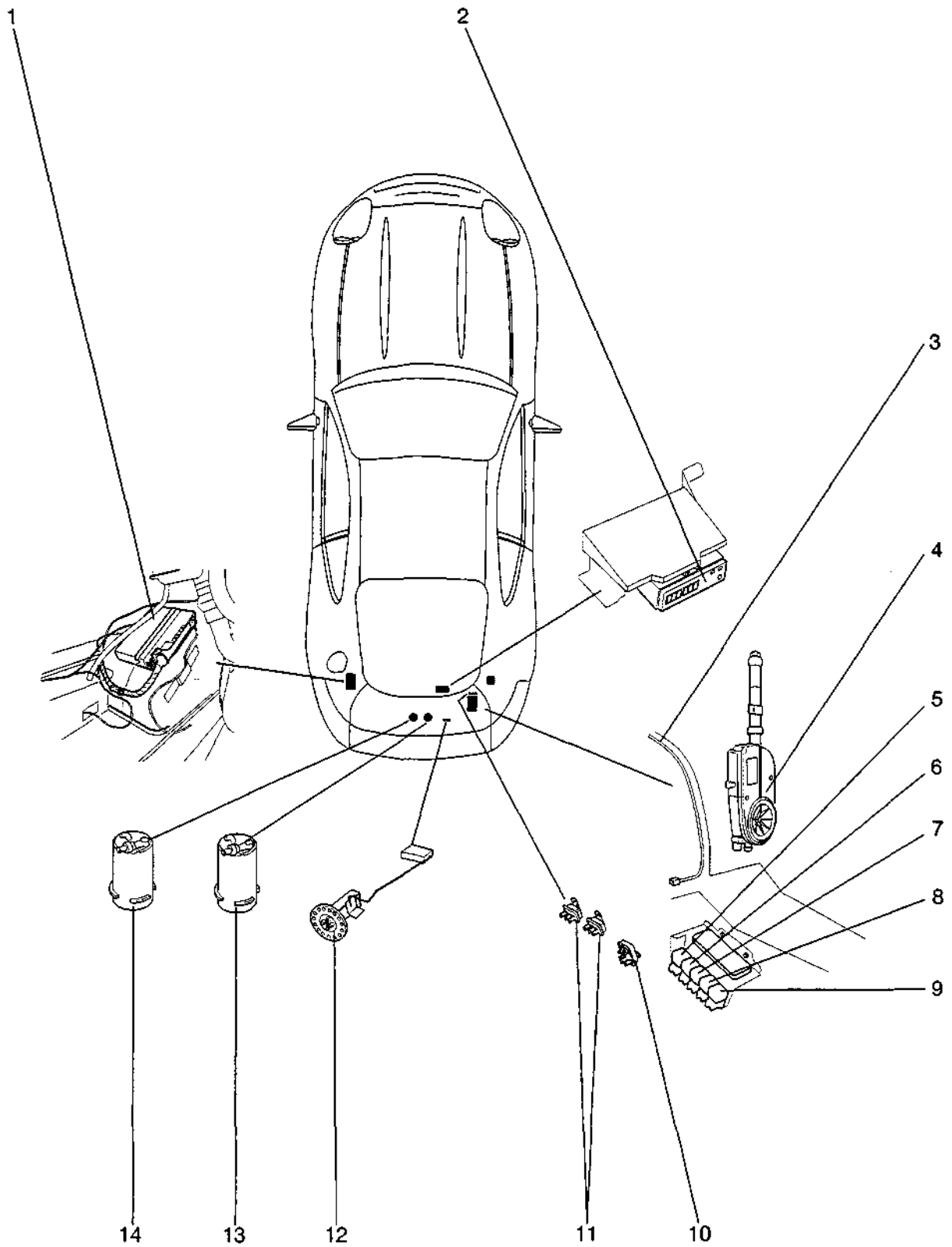


Figure 15

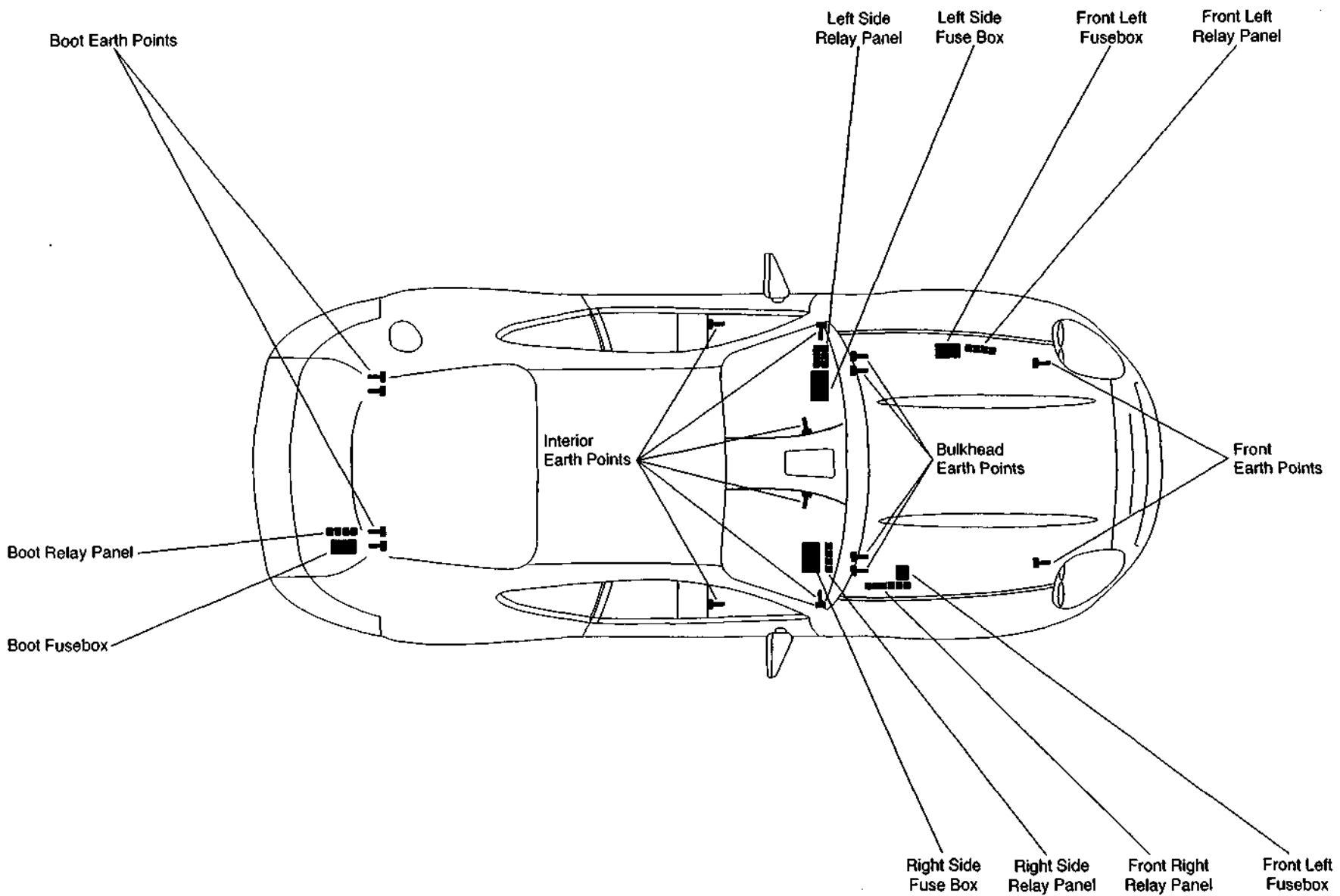


Figure 16

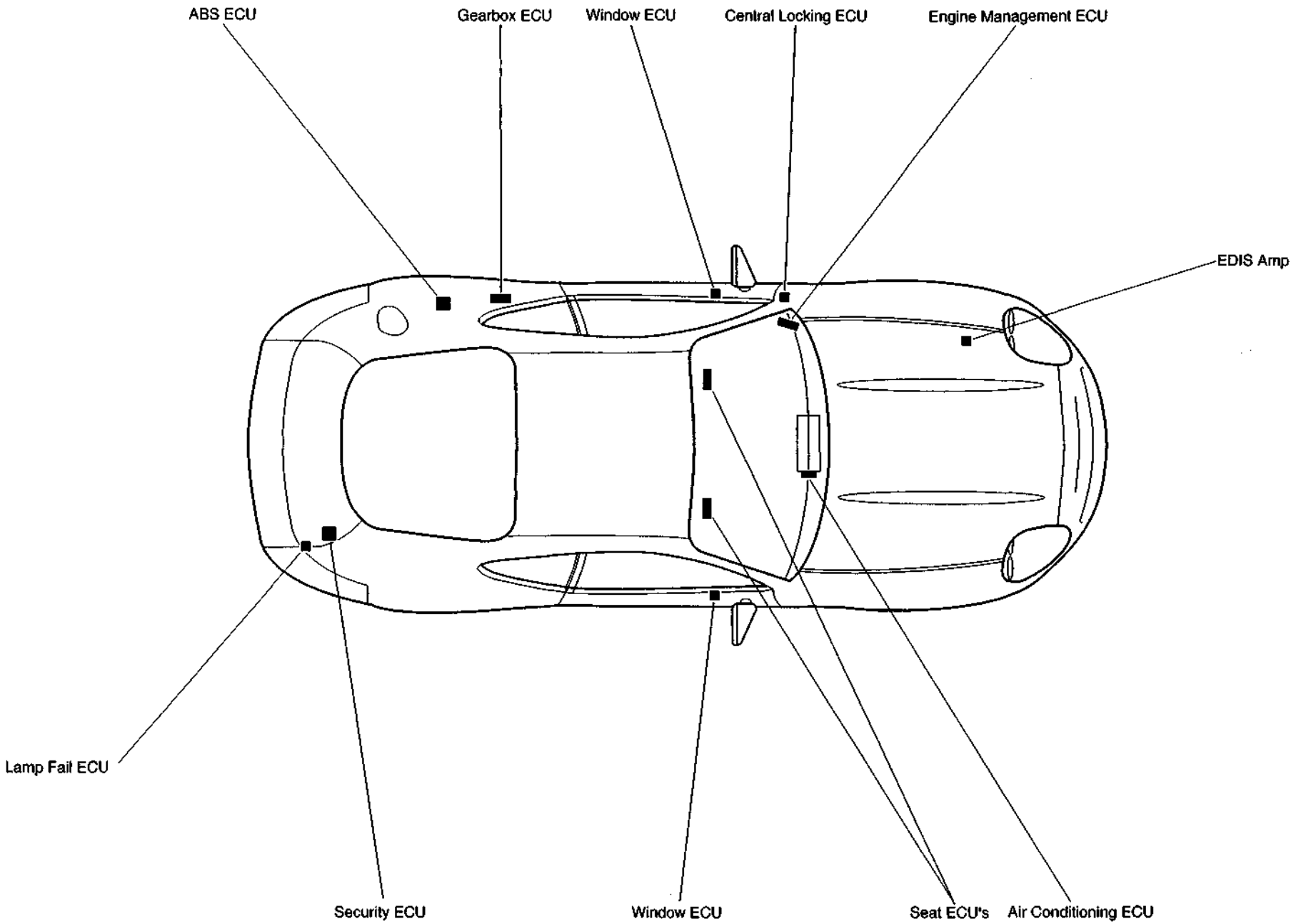


Figure 17

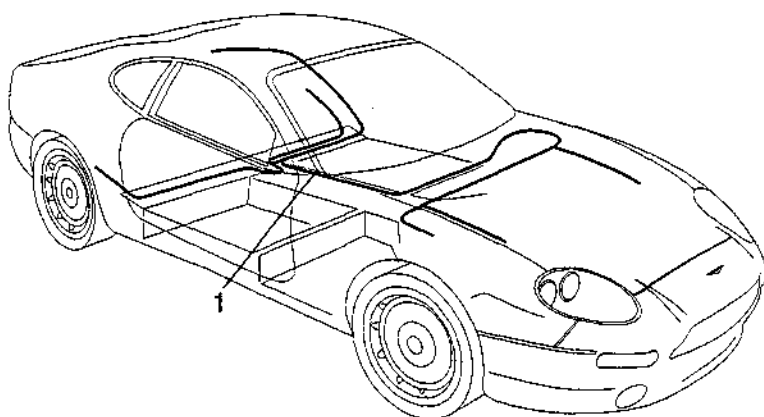


Fig 1.

1. Harness, A.B.S RHD

Fig 2.

1. Harness Bulkhead RHD/LHD
2. Harness Door
3. Harness Door Mirror

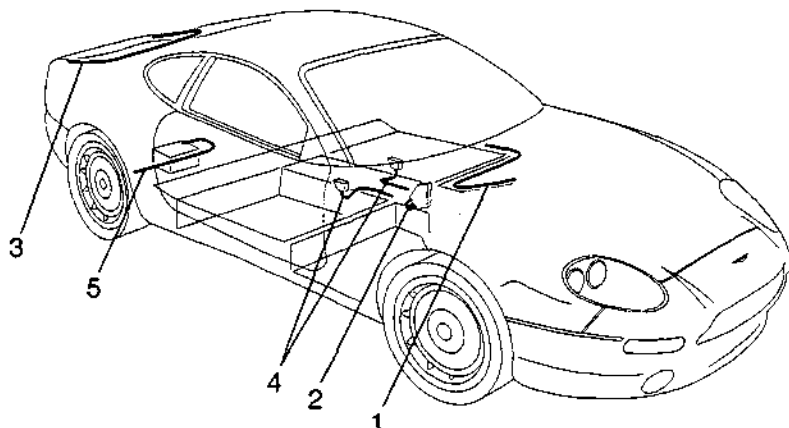
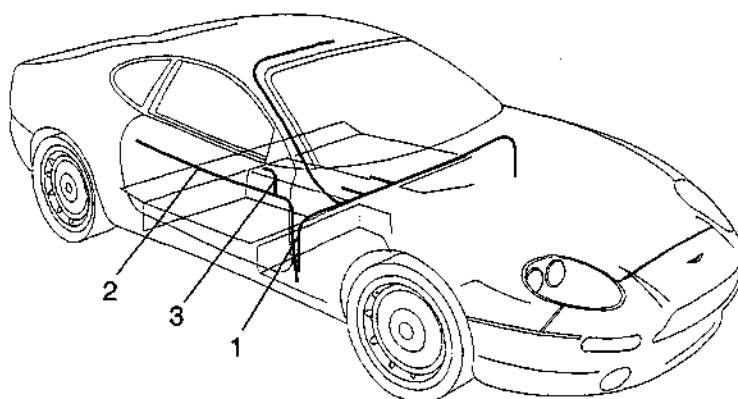
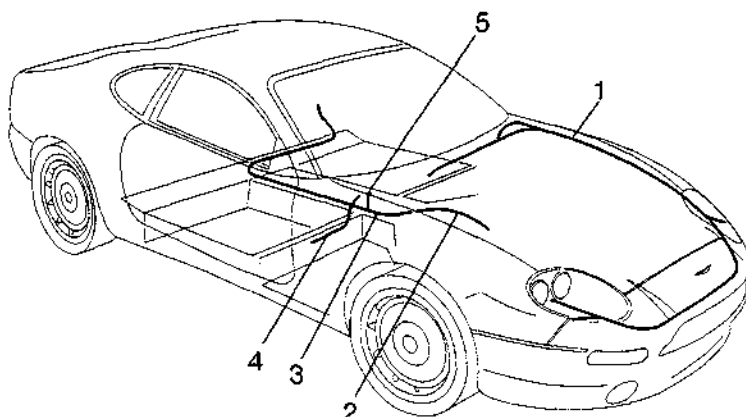


Fig 3.

1. Harness Cruise Control
2. Harness Air Conditioning
3. Harness Boot Lid
4. Harness Seat Belt
5. Earth Strap

Fig 4.

1. Harness Left Forward
2. Harness Auto Transmission
3. Harness Auto Transmission Link
4. Harness Gear Selector Illumination
5. Harness Gearshift interlock



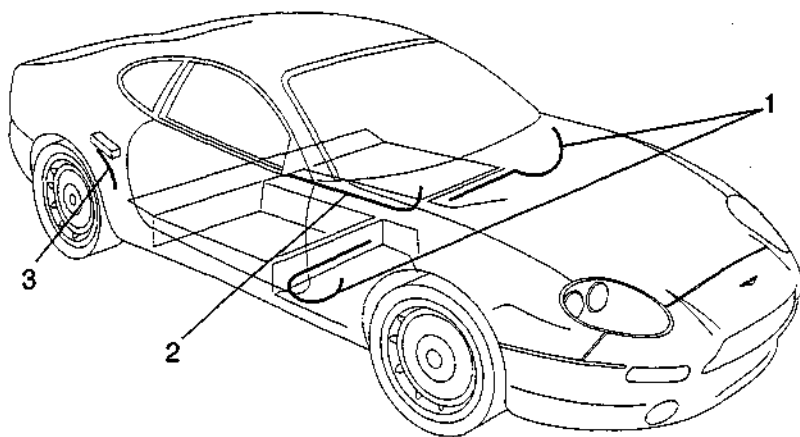


Fig 5.

1. Harness Sill
2. Harness Console
3. Harness Fuse Box

Fig 6.

1. Harness Engine
2. Earth Engine Body
3. Harness Foward Right
4. Rearward Harness
5. Harness Headlamp Link

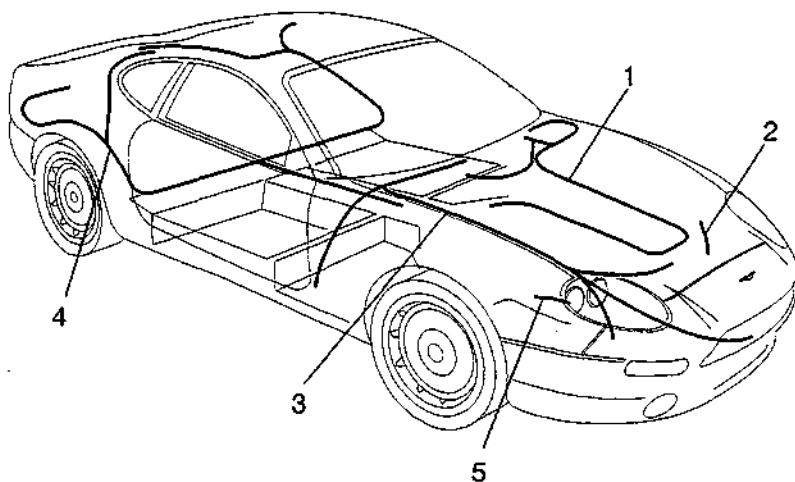
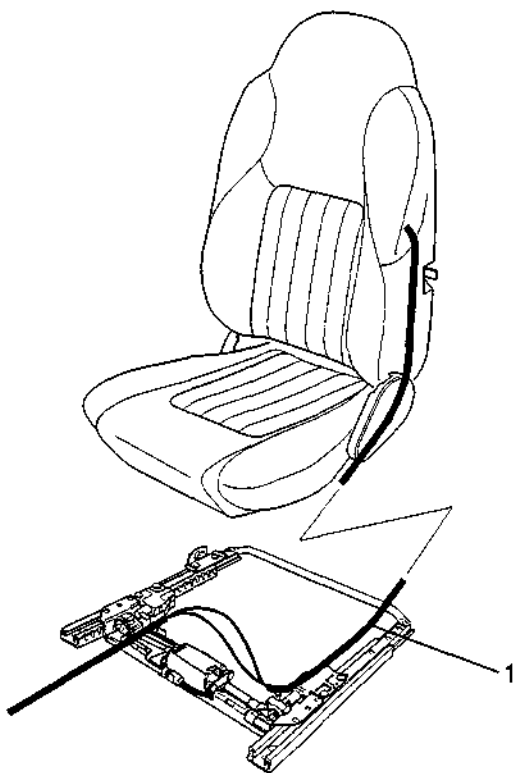
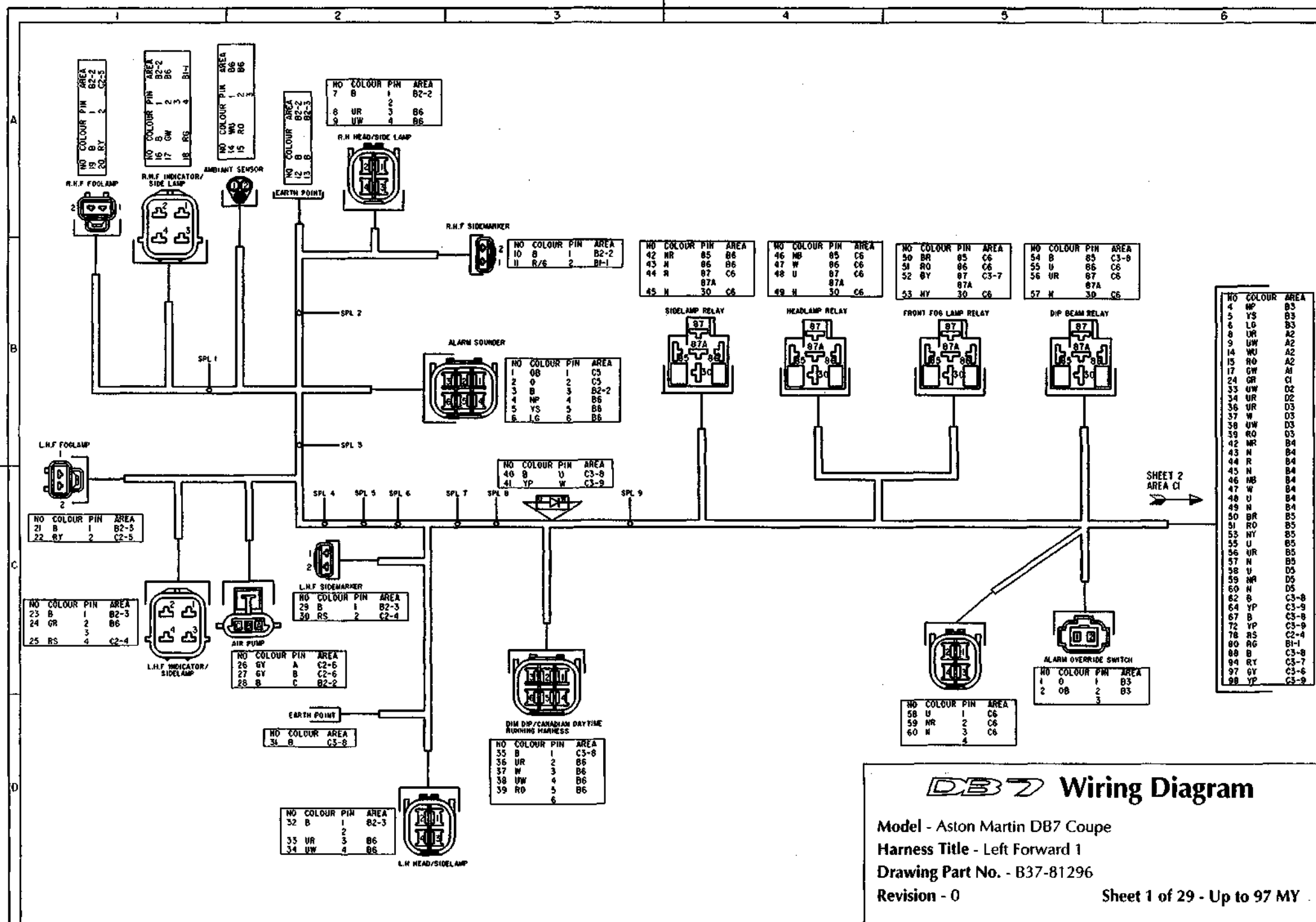


Fig 7.

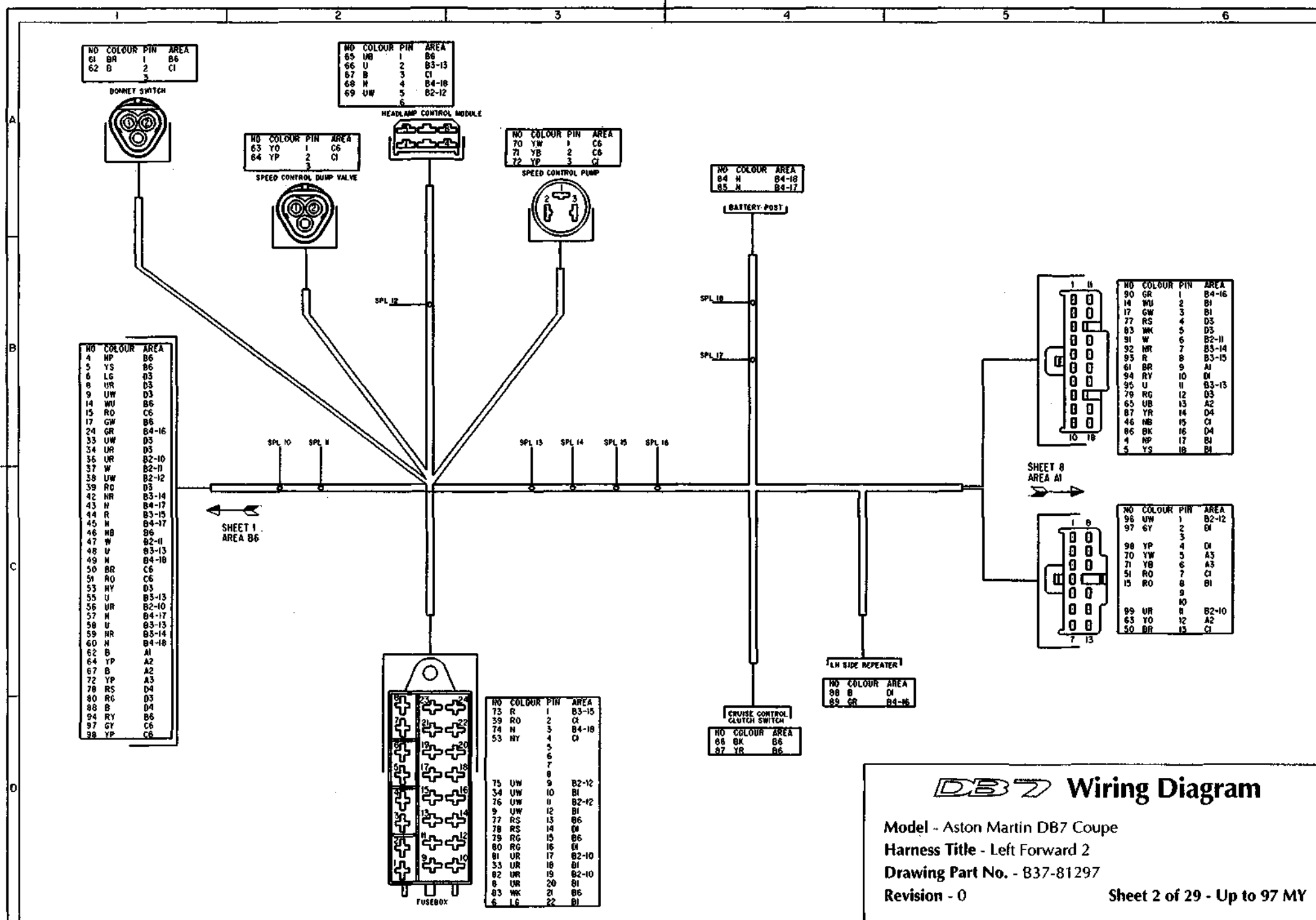
1. Harness Seat



Splice No. Pin No.	Colour Destination	SPL 7	Red/Yellow
		52	B5
		94	C6
SPL 1	Red/Green	100	C1-5
11	B3		
18	A1	SPL 8	Black
80	C6	31	D2
		35	D3
SPL 2	Black	40	C3
3	B2	54	B5
7	A2	62	C6
10	B3	67	C6
12	A2	88	C6
16	A1		
19	A1	SPL 9	Yellow/Purple
28	C2	41	C3
		64	C6
SPL 3	Black	72	C6
3	A2	98	C6
21	C1		
23	C1		
29	C2		
32	D2		
SPL 4	Red/Slate		
25	C1		
30	C2		
78	C6		
SPL 5	Red/Yellow		
20	A1		
22	C1		
100	C1-7		
SPL 6	Green/Yellow		
26	C2		
27	C2		
97	C6		



Splice No.	Colour		
Pin No.	Destination		
SPL 10	Blue/Red	SPL 16	Green/Red
36	B1	24	B1
56	C1	89	D4
81	D3	90	B6
82	D3	SPL 17	Brown
99	C6	43	C1
SPL 11	White	45	C1
37	C1	57	C1
47	C1	85	A4
91	B6	SPL 18	Brown
SPL 12	Blue/White	49	C1
38	C1	60	C1
69	A2	68	A2
75	D3	74	D3
76	D3	84	A4
96	C6		
SPL 13	Blue		
48	C1		
55	C1		
58	C1		
66	A2		
95	B6		
SPL 14	Brown/Red		
42	C1		
59	C1		
92	B6		
SPL 15	Red		
44	C1		
73	D3		
93	B6		



Splice No.	Colour
Pin No.	Destination

SPL 19	Purple/Yellow
101	B1
104	C1
142	A4

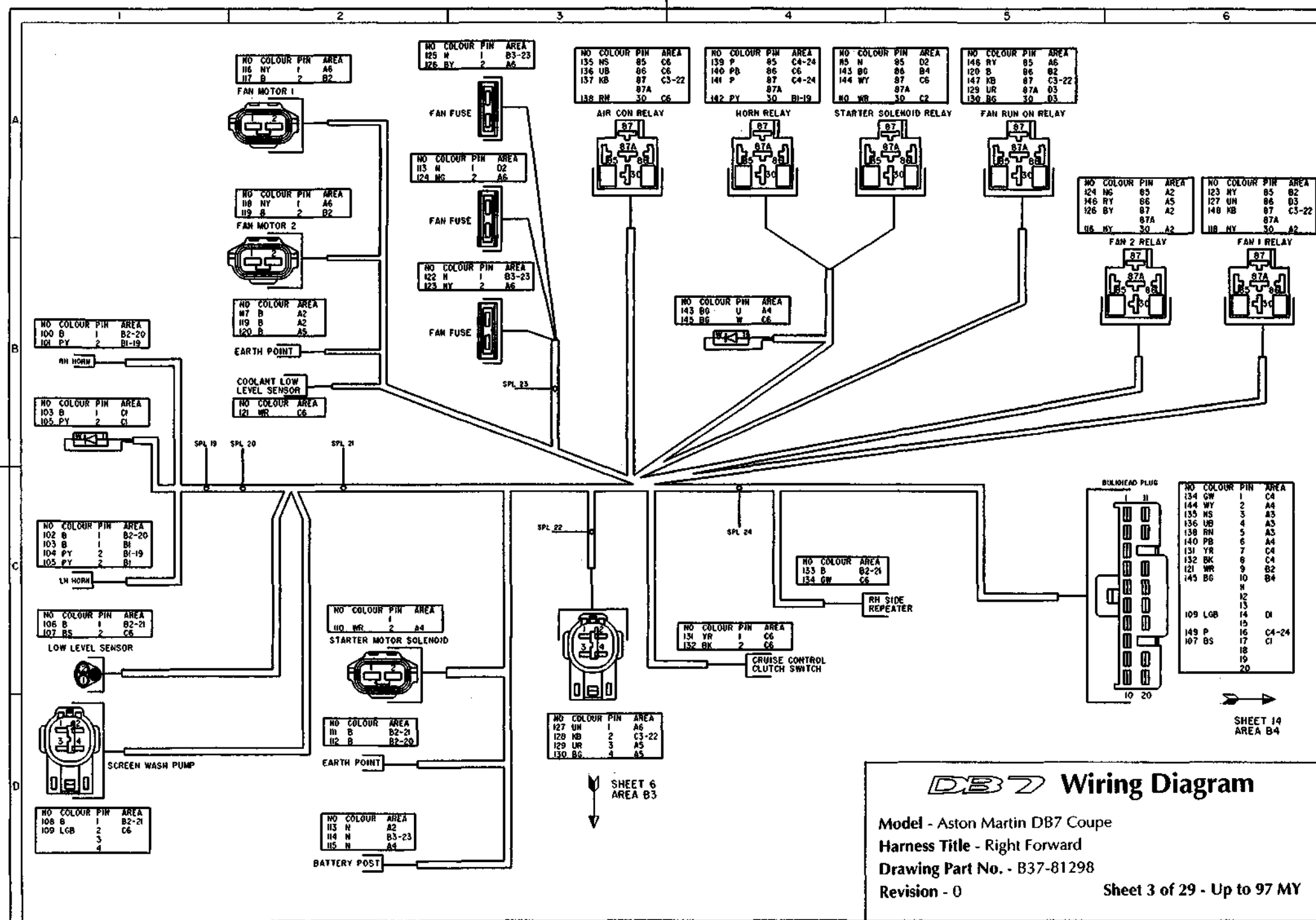
SPL 20	Black
100	B1
102	C1
112	D2

SPL 21	Black
106	C1
108	D1
111	D2
133	C4

SPL 22	Pink/Black
128	D3
137	A3
147	A5
148	A6

SPL 23	Brown
114	D2
122	B3
125	A3

SPL 24	Purple
139	A4
141	A4
149	C6



Splice No.	Colour
Pin No.	Destination

SPL 25 Black/Blue

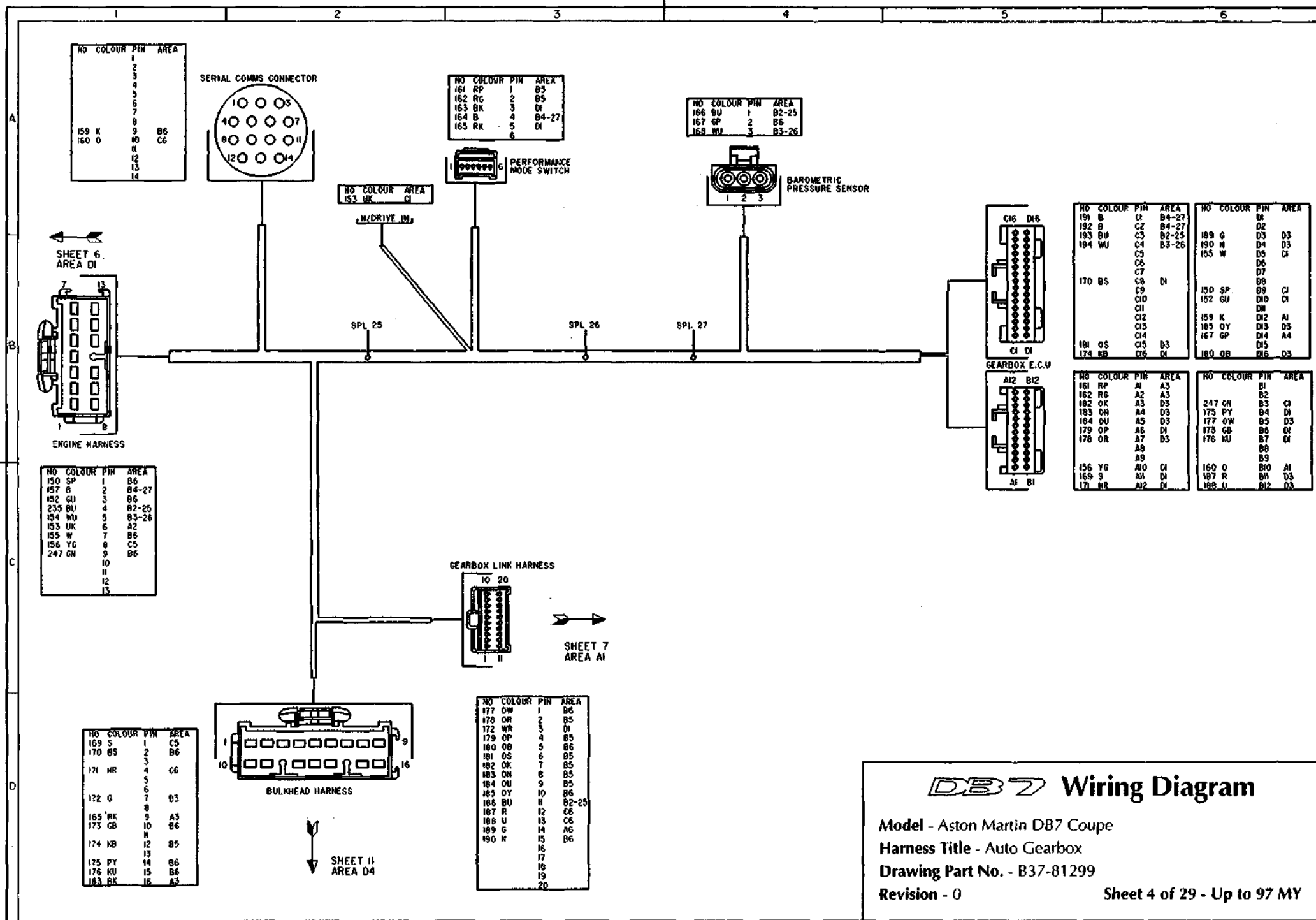
166	A4
186	D3
193	A5
235	C1

SPL 26 White/Blue

154	C1
168	A4
194	B5

SPL 27 Black

157	C1
164	A3
191	A5
192	A5



Splice No.	Colour
Pin No.	Destination

SPL 28 White/Red

202	D4
203	D5
208	C4
263	B6

SPL 29 Pink/Black

212	C2
228	A2
322	B6

SPL 30 Pink/Black

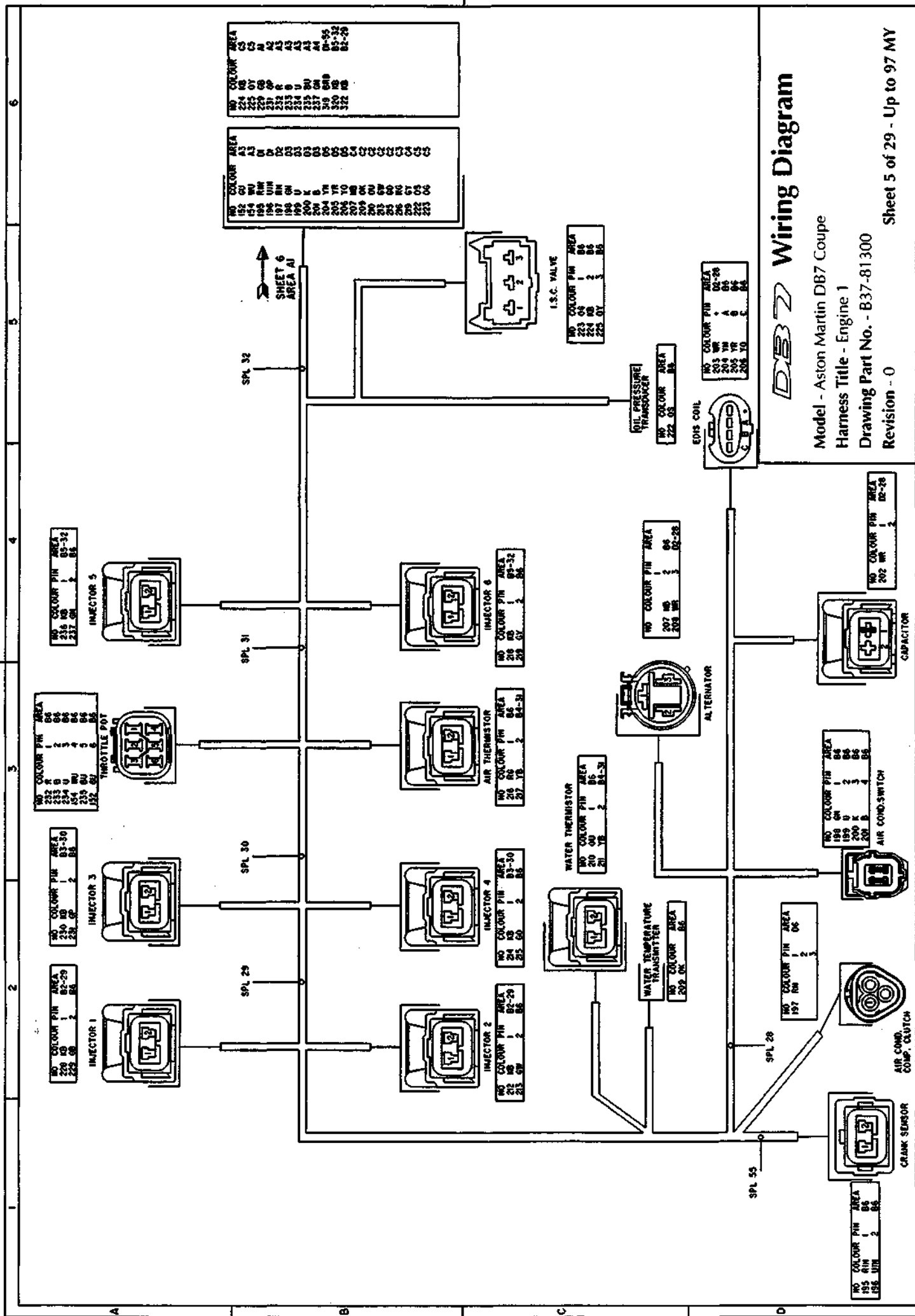
214	C2
230	A2
231	B6

SPL 31 Yellow/Black

211	C3
217	C3
301	B6

SPL 32 Pink/Black

218	C4
236	A4
320	B6



Splice No. Pin No.	Colour Destination				
SPL 33	Red/Orange	SPL 39	Black	SPL 47	White
15	D4	246	C1	242 BRD	C4-42
282	B3	264	D4	318	B4-49
284	B3	283	B3		
		285	B3	SPL 48	Brown/Slate
		344	D4	248	C2
				277	B5
		SPL 40	White	281	B5
SPL 34	Black	303	B5		
239	B1	316	C4-45	SPL 49	White/Black
304	B5	317	C4-43	275	B5
310	C5			279	B5
313	C6	SPL 41	White	318	B3-47
		311	D5		
SPL 35	Black	321 BRD	C3-46	SPL 50	Pink/Black
238	B1			257	D2
305	C5	SPL 42	White	286	A4
306	C5	242 BRD	B3-47	288	A5
307	C5	309	C5	290	A5
308	C5				
		SPL 43	White	SPL 51	White
SPL 36	Pink/Black	243 BRD	A2-52	294	A3
258	C1	317	C3-40	299	B2
312	C6			315 BRD	C4-44
320	A1	SPL 44	White		
322	A1	302	B5	SPL 52	
		315 BRD	A3-51	243 BRD	C4-43
SPL 37	Red/Brown				
197	A1	SPL 45	White	SPL 53	
247	D1	244 BRD	A2-53	244 BRD	C5-45
251	D2	314	A2-53		
		316	C3-40	SPL 54	White
SPL 38	Pink/Black			319 BRD	A1
224	A1	SPL 46	White	299	B2
256	D2	273	C4		
266	D4	321 BRD	C4-41	SPL 55	
300	B2			319 BRD	B6

Splice No.	Colour
Pin No.	Destination

SPL 204	White/Red
150	A5
151	A5
172	A1

NO	CLOUR	PIN	AREA
177	OW	1	A5
178	OR	2	A5
172	WR	3	A5
179	OP	4	A5
180	OB	5	A5
181	OS	6	A5
182	OK	7	A5
183	ON	8	A5
184	OU	9	A5
185	OY	10	A5
186	BU	11	A5
187	R	12	B3
188	U	13	B3
189	G	14	B2
190	H	15	B2
		16	
		17	
		18	
		19	
		20	

SHEET 4
AREA C3



SPL 204

GEARBOX CONNECTOR

NO	CLOUR	PIN	AREA
178	OR	1	A1
179	OP	2	A1
180	WR	3	A2-204
182	OK	4	A1
183	ON	5	A1
184	OU	6	A1
185	OY	7	A1
186	BU	8	A1
177	OW	9	A1
151	WR	10	A2-204
180	OB	11	A1
		12	
181	OS	13	A1
		14	

INPUT SPEED SENSOR

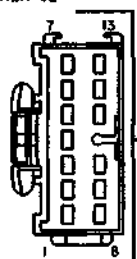
NO	CLOUR	PIN	AREA
190	N	1	A1
189	G	2	A1

OUTPUT SPEED SENSOR

NO	CLOUR	PIN	AREA
187	R	1	A1
188	U	2	A1

SHEET 11
AREA C2

NO	CLOUR	PIN	AREA
145	BG	1	C2
497	SLG	2	C5
521	YU	3	C2
541	YU	4	C2
		5	
		6	
		7	
		8	
		9	
547	B	10	C5
262	BG	11	C2
		12	
		13	



ENGINE HARNESS

145,521,541,262
TAPED IN LOOM

REVERSE LAMP
SWITCH



NO	CLOUR	PIN	AREA
497	SLG	1	C1
547	B	2	C1
		3	C1

DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

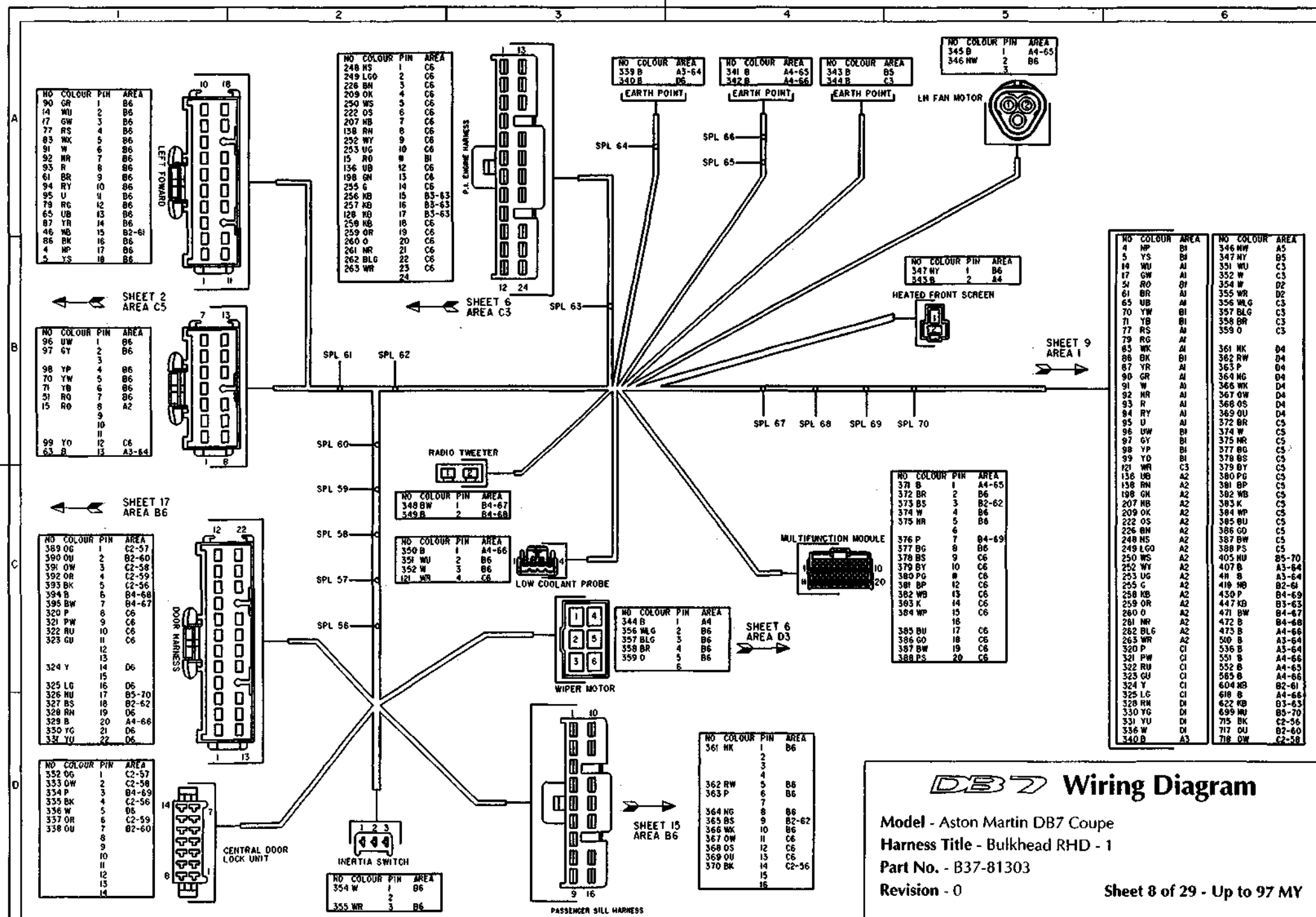
Harness Title - Auto/Manual Gearbox

Part No. - B37-81302

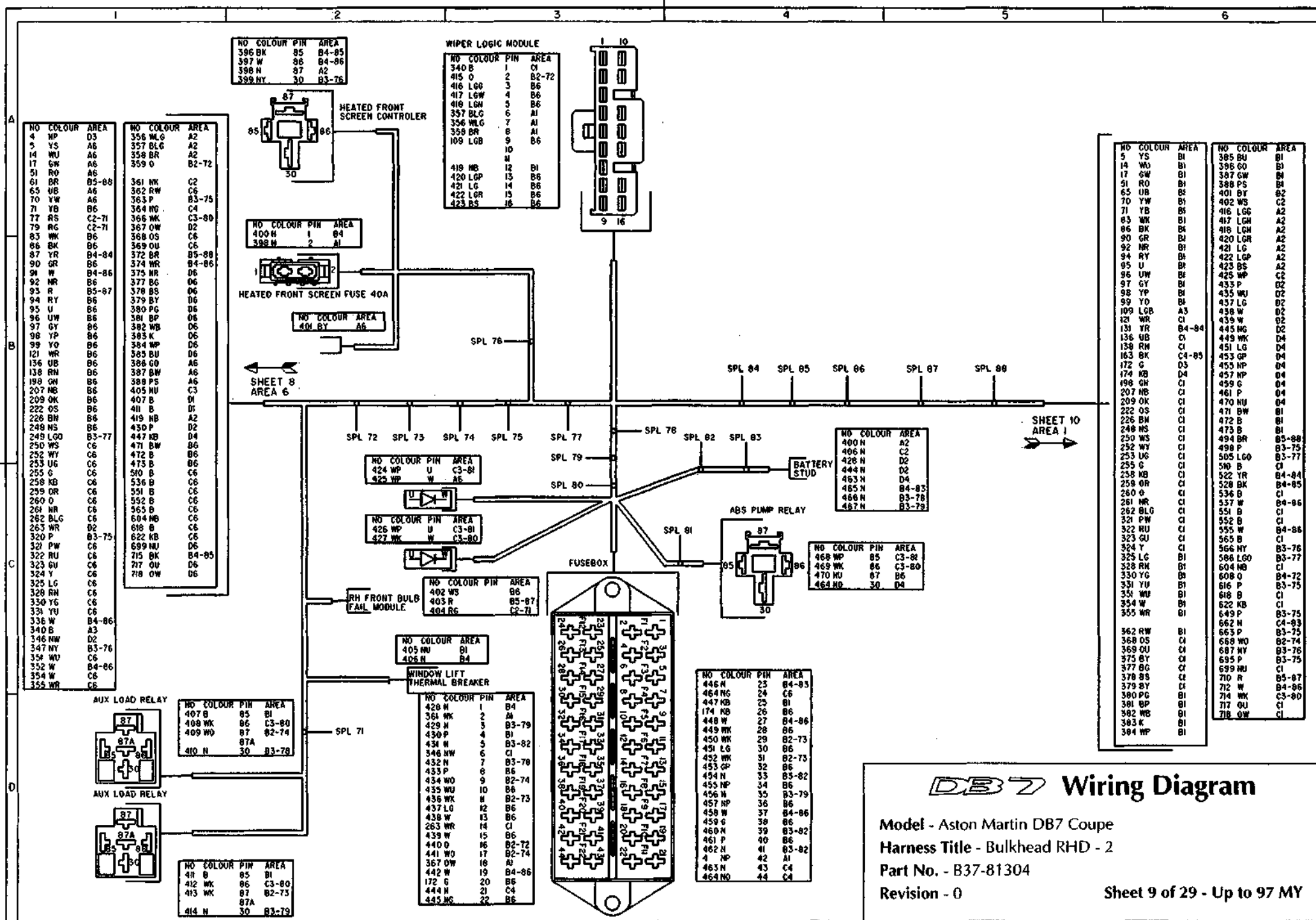
Revision - 0

Sheet 7 of 29 - Up to 97 MY

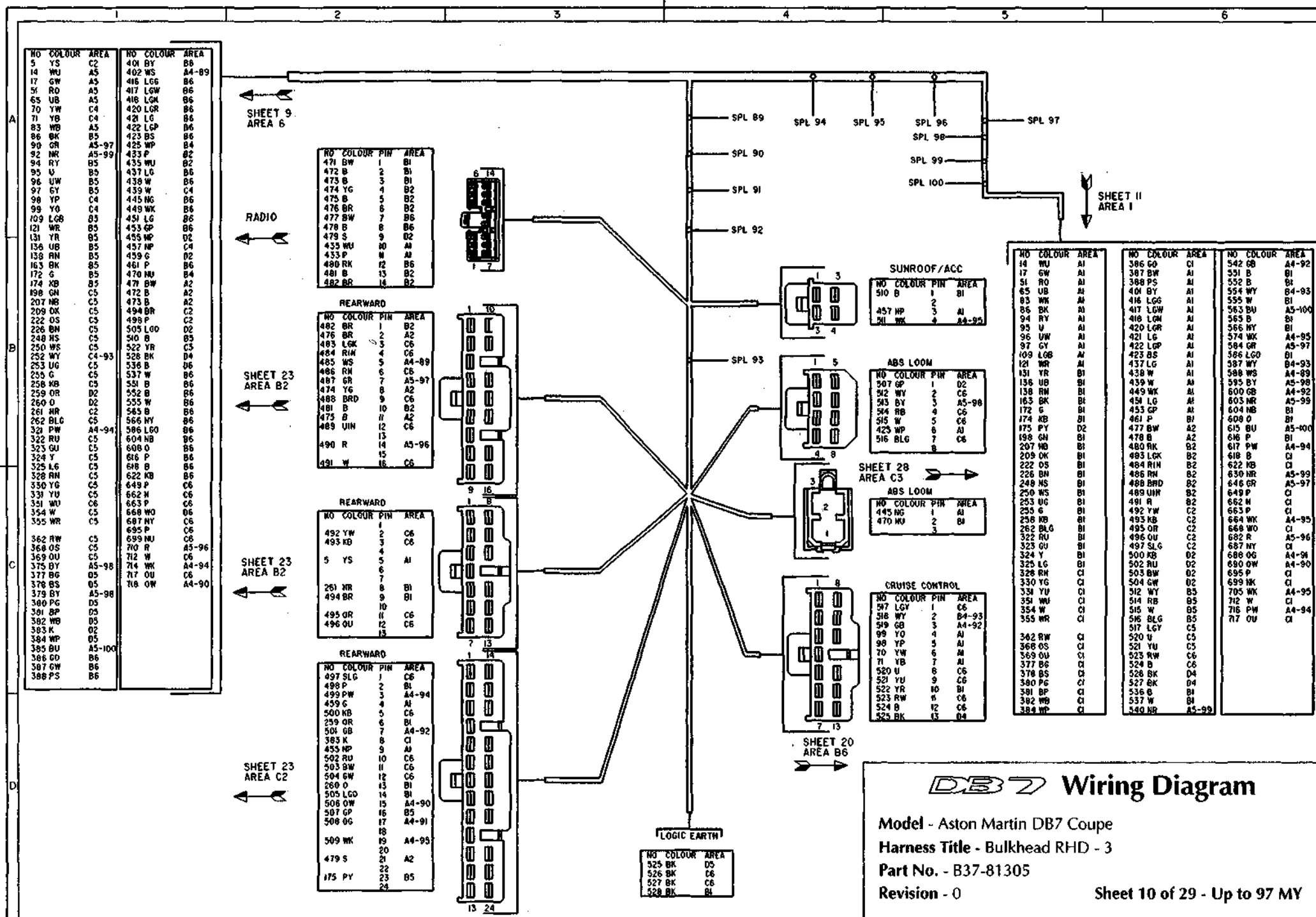
Splice No. Pin No.	Colour Destination	SPL 63	Pink/Black	SPL 68	Black
		128	A2	349	C3
		256	A2	394	B1
SPL 56	Black/Pink	257	A2	472	C6
335	D1	447	C6		
370	D4	622	D6	SPL 69	Purple
393	C1			334	D1
715	D6	SPL 64	Black	376	C5
		63	B1	430	C6
SPL 57	Orange/Green	339	A3		
332	C1	407	C6	SPL 70	Brown/Blue
389	D1	411	C6	326	D1
		510	C6	405	C6
SPL 58	Orange/White	536	C6	699	D6
333	D1				
391	C1	SPL 65	Black		
718	D6	341	A4		
		345	A5		
SPL 59	Orange/Red	371	C5		
337	D1	552	C6		
392	C1				
		SPL 66	Black		
SPL 60	Orange/Blue	329	D1		
338	D1	342	A4		
390	C1	350	C3		
717	D6	473	C6		
		551	C6		
SPL 61	Brown/Black	565	C6		
46	A1	618	C6		
419	C6				
604	C6	SPL 67	Black/White		
		348	C3		
SPL 62	Black/Slate	395	C1		
327	D1	471	C6		
365	D4				
373	C5				



Splice No. Pin No.	Colour Destination	SPL 76	Brown/Yellow	SPL 82	Brown	SPL 87	Red
SPL 71	Red/Slate						
77	A1	347	C1	431	D2	93	B1
79	A1	399	A2	451	D4	403	C3
404	C3	566	C6	454	D4	710	D6
		687	C6	460	D4		
SPL 77	LtGreen/ Orange			462	D4	SPL88	Black/Red
		249	B1			61	B1
SPL 72	Orange			SPL 83	Brown	372	B1
359	A1	505	B6	446	D4	494	B6
415	A2	586	C6	465	C4		
440	D2			662	C6		
608	C6						
SPL 78	Brown			SPL 84	Yellow/Red		
		410	D1	87	B1		
SPL 73	White/Pink			131	B6		
413	D1	432	D2	522	C6		
436	D3	466	C4				
450	D4			SPL 85	Black/Pink		
452	D4			163	B6		
SPL 74	White/Orange			396	A1		
409	D1	414	D1	528	C6		
434	D2	429	D2	715	C1		
441	D2	456	D4				
668	C6	467	C4				
SPL 80	White/Pink			SPL 86	White		
		366	A1	91	B1		
		408	D1	336	D1		
SPL 75	Purple			352	C1		
320	C1	412	D1	374	B1		
363	A1	427	C2	397	A1		
498	B6	469	C4	442	D2		
616	C6	714	D6	448	D4		
649	C6			458	D4		
663	C6	SPL 81	White/Purple	537	C6		
695	C6	424	C2	555	C6		
		426	C2	712	C6		
		468	C4				

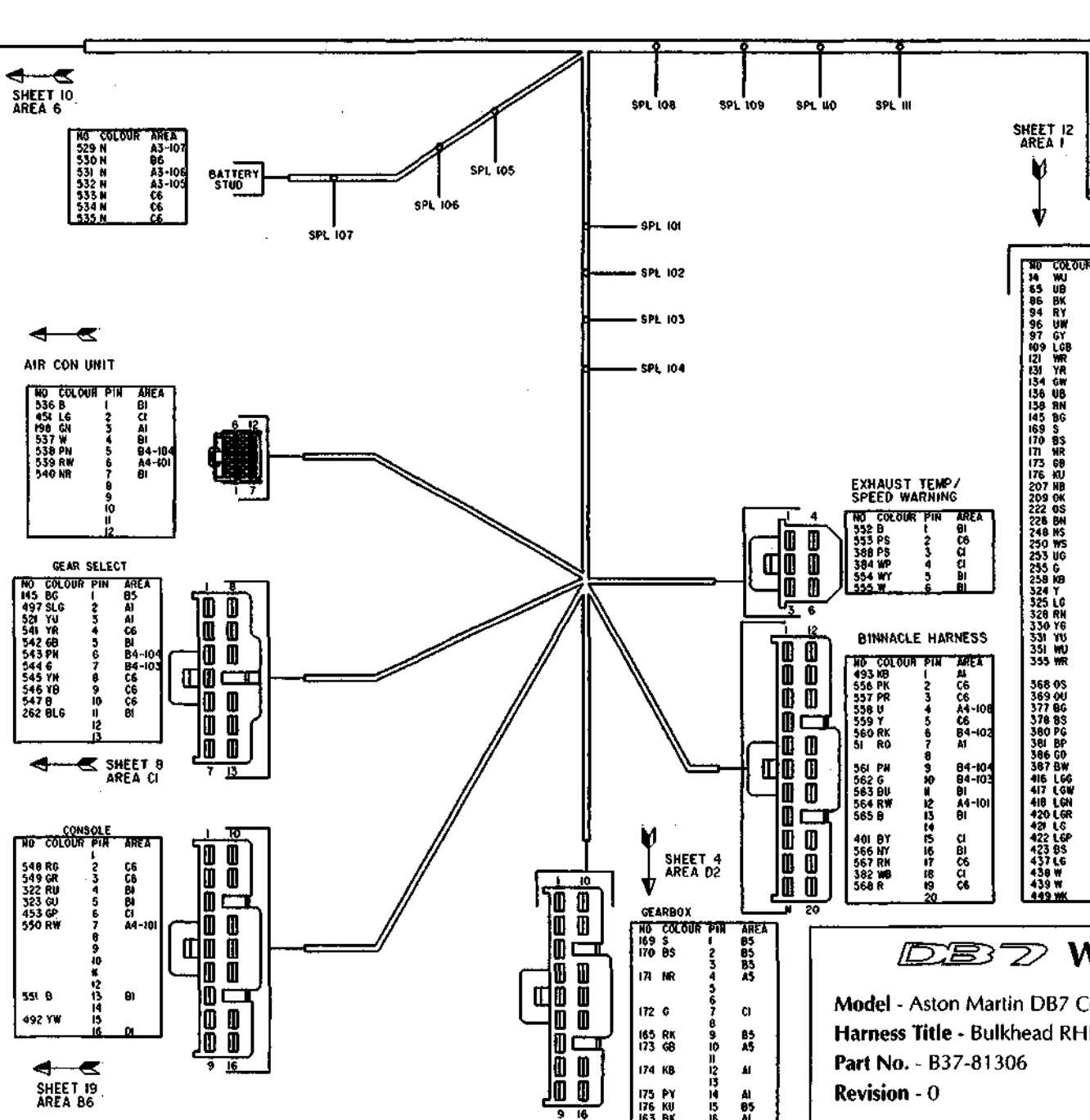


Splice No.	Colour	SPL 95	White/Pink
Pin No.	Destination	509	D2
		511	B4
SPL 89	White/Slate	574	B6
402	A1	594	
485	B2	664	C6
588	B6	705	C6
		714	C1
SPL 90	Orange/White		
506	D2	SPL 96	Red
690	C6	490	B2
718	C1	682	C6
		710	C1
SPL 91	Orange/Green		
508	D2	SPL 97	Green/Red
688	C6	90	A1
		487	B2
SPL 92	Green/Black	584	B6
501	D2	646	B6
542	B6		
519	C4	SPL 98	Black/Yellow
600	B6	375	C1
		379	C1
SPL 93	White/Yellow	513	B4
252	B1	595	B6
518	C4		
587	B6	SPL 99	Brown/Red
554	B6	92	A1
		540	C6
SPL 94	Purple/White	603	B6
321	A1	630	B6
499	C2		
617	B6		
716	C6		



Splice No. Pin No.	Colour Destination	SPL 106	Brown	SPL 111	Blue
SPL 100	Black/Blue				
385	C1	531	A2	95	A1
563	B6	670	B6	569	C6
615	B6	671	B6		
		681	C6		
SPL 107	Brown				
529	A2				
659	B6				
660	B6				
673	B6				
675	C6				
SPL 108	White/Pink				
83	A1				
558	C4				
570	C6				
572	C6				
SPL 109	Green/White				
17	A1				
134	B5				
504	A1				
593	D6				
643	B6				
SPL 110	White				
354	B1				
491	A1				
515	A1				
576	C6				
610	D6				
613	B6				
657	B6				
712	C1				
713	C6				
SPL 104	Purple/Brown				
538	B2				
543	C2				
561	C5				
674	C6				
SPL 105	Brown				
532	A2				
655	B6				
661	B6				

NO	CLOUR	AREA	NO	CLOUR	AREA
14	WU	B5	491 R	B5	A4-110
17	GW	A4-108	492 YW	B2	
54	RO	C5	493 NB	C5	
65	UB	C5	495 OR	B6	
83	WK	A4-108	496 OU	B6	
86	BK	C5	497 SLG	C2	
94	RY	B5	500 NB	B6	
95	U	A5-111	502 RU	B6	
96	UW	B5	503 GW	B6	
97	GY	B5	504 BW	B6	
109	LGB	B5	512 WY	B6	A3-109
121	WR	B5	514 RB	B6	
131	YR	B5	515 W	A4-110	
136	UB	B5	516 BLG	B6	
139	RN	B5	517 LGY	B6	
163	BK	D4	520 U	B6	
172	G	D4	521 YU	C2	
174	NB	D4	523 RW	B6	
175	PY	B5	524 B	B6	
198	GN	B2	526 BK	B6	
207	NB	B5	527 BK	B6	
209	OK	B5	536 D	B2	
222	OS	B5	537 W	B2	
226	BN	B5	540 NR	B2	
248	HS	C5	542 GB	B2	
250	WS	C5	551 B	B2	
253	UG	C5	552 D	B5	
255	G	C5	554 WY	C5	
258	NB	C5	555 W	C5	
262	BLG	C2	563 BU	C5	
322	RU	D2	565 B	C5	
323	GU	D2	566 NY	D5	
324	Y	C5	574 WK	C6	
325	LG	C5	584 GR	C6	
328	RN	C5	586 LGO	C6	
330	YU	C5	587 WY	C6	
334	YU	C5	588 WS	C6	
351	WU	C5	595 BY	D6	
354	W	A4-110	600 GB	D6	
355	WR	C5	603 NR	D6	
362	RW	A4-101	604 NB	D6	
368	OS	C5	608 O	D6	
369	OU	C5	615 BU	B6	
377	BU	C5	616 P	B6	
378	BS	C5	617 PW	B6	
380	PS	C5	618 B	B6	
381	BP	C5	622 NB	B6	
382	WB	C5	630 NR	B6	
384	WP	C5	646 GR	B6	
386	GO	C5	649 P	B6	
397	BW	C5	662 M	B6	
398	PS	C5	663 P	B6	
401	BY	C5	664 WK	B6	
416	LGO	C5	668 WD	B6	
417	LGN	C5	682 R	C6	
418	LGN	C5	687 NY	C6	
420	LGR	C5	688 OG	C6	
421	LG	C5	690 OW	C6	
422	LGP	C5	695 P	C6	
423	BS	D5	699 NK	C6	
437	LG	D5	705 WK	C6	
438	W	D5	712 W	A4-110	
439	W	D5	716 PW	C6	
449	WK	D5	717 OU	C6	
451	LG	B2			
453	GP	D2			
461	P	B6			
477	BW	B6			
478	BK	B6			
480	RK	B4-102			
483	LGN	B6			
484	RIN	B6			
486	RN	B6			
488	BRD	B6			
489	UIN	B6			

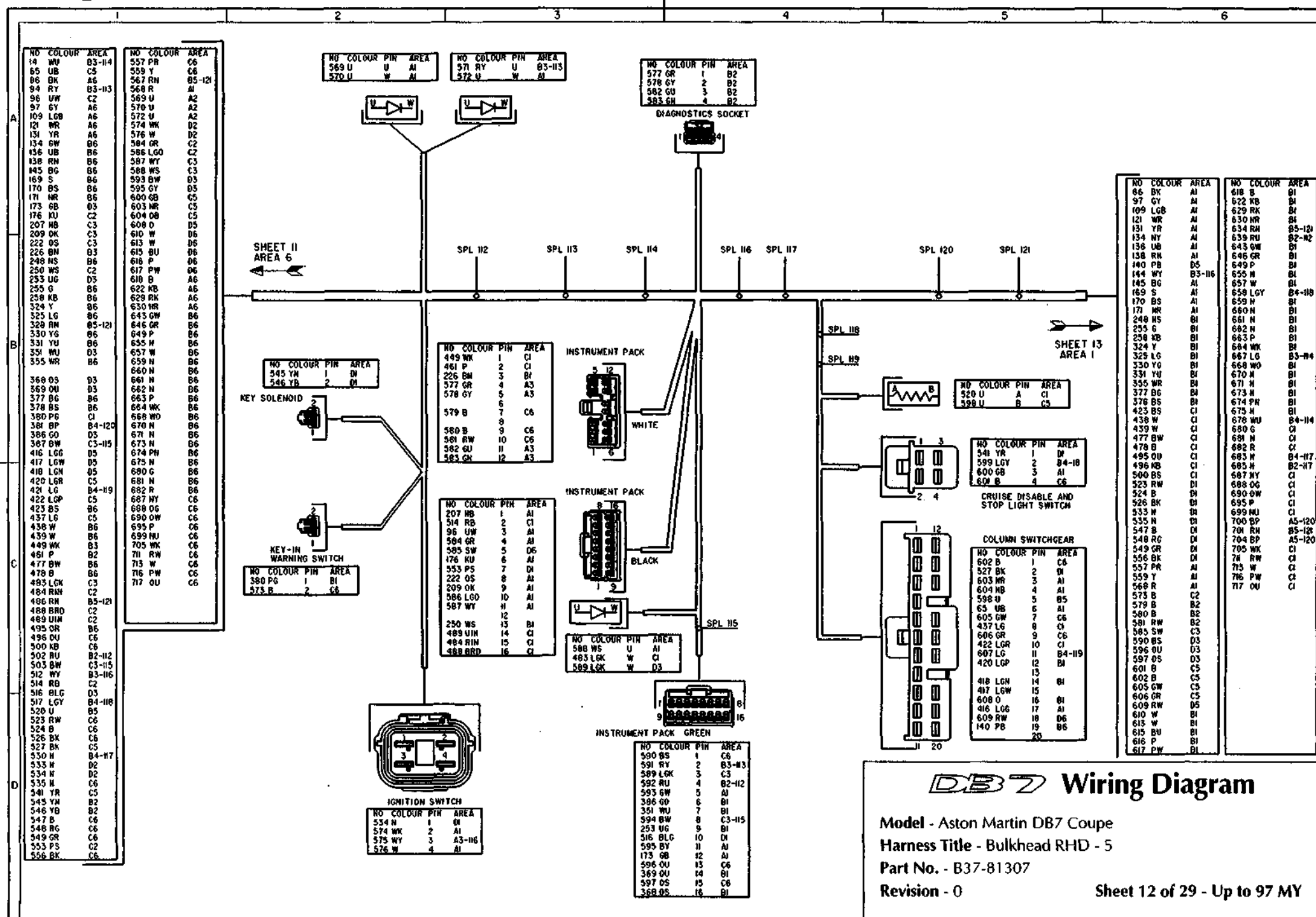


NO	CLOUR	AREA	NO	CLOUR	AREA	NO	CLOUR	AREA
34	WU	AI	461 P	CI		613 W	AI	A4-110
65	UB	AI	477 BW	CI		615 BU	BI	
86	BK	AI	478 B	CI		616 P	CI	
94	RY	AI	483 LGR	CI		617 PW	CI	
96	UW	AI	484 RIN	CI		618 B	CI	
97	GY	AI	486 RN	CI		622 KB	CI	
109	LGB	AI	488 BRD	CI		625 RK	B4-102	
121	WR	AI	489 UIN	CI		630 WR	CI	
131	YR	AI	495 OR	AI		643 GW	A4-109	
134	GW	A4-108	496 OU	AI		646 GR	CI	
136	UB	AI	500 NB	AI		649 P	CI	
139	RN	AI	502 RU	AI		655 N	A3-109	
145	BG	C2	503 BW	AI		657 W	A4-110	
169	S	D4	512 WY	AI		659 N	A3-107	
170	BS	D4	514 RB	AI		660 N	A3-107	
171	WR	D4	516 BLG	AI		661 N	A3-105	
173	GB	D4	517 LGY	AI		662 N	CI	
176	KU	D4	520 U	AI		663 P	CI	
207	NB	AI	523 RW	AI		664 WK	CI	
209	OK	BI	524 B	AI		666 WO	CI	
222	OS	BI	526 BK	AI		670 M	A3-106	
226	BN	BI	527 BK	AI		671 N	A3-107	
248	HS	B5	530 N	A2		673 W	A3-107	
250	WS	BI	534 N	A2		674 PW	B4-104	
253	UG	BI	535 N	A2		675 N	A3-107	
255	G	BI	538 N	A2		680 G	B4-103	
258	NB	BI	541 YR	C2		681 M	A3-106	
324	Y	BI	545 YN	C2		682 R	CI	
325	LG	BI	546 YB	C2		687 NY	CI	
328	RN	BI	547 B	CI		688 OG	CI	
330	YU	BI	548 RG	D2		690 OW	CI	
331	YU	BI	549 GR	D2		695 P	CI	
351	WU	BI	553 PS	B5		699 NK	CI	
355	WR	BI	556 BK	C3		705 WK	CI	
368	OS	BI	557 PR	C5		712 W	A4-110	
369	OU	BI	559 Y	C6		716 PW	C6	
377	BG	BI	560 RK	6	B4-102	717 OU	C6	
378	BS	CI	561 PW	9	B4-104			
380	PG	CI	562 G	10	B4-103			
381	BP	CI	563 BU	11	BI			
386	GO	CI	564 RW	12	A4-101			
387	BW	CI	565 B	13	BI			
416	LGO	CI	401 BY	15	CI			
417	LGN	CI	566 NY	16	BI			
418	LGN	CI	567 RN	17	CI			
420	LGR	CI	568 W	18	CI			
421	LG	CI	569 U	19	CI			
422	LGP	CI	570 U	20	CI			
423	BS	CI	571 U	21	CI			
437	LG	CI	572 U	22	CI			
438	W	CI	574 WK	23	BI			
439	W	CI	576 W	24	BI			
449	WK	CI	578 B	25	BI			
			584 GR	26	BI			
			586 LGO	27	BI			
			587 WY	28	BI			
			588 WS	29	BI			
			593 GW	30	BI			
			595 BY	31	BI			
			600 GB	32	BI			
			603 NR	33	BI			
			604 BK	34	BI			
			608 O	35	BI			
			610 W	36	BI			

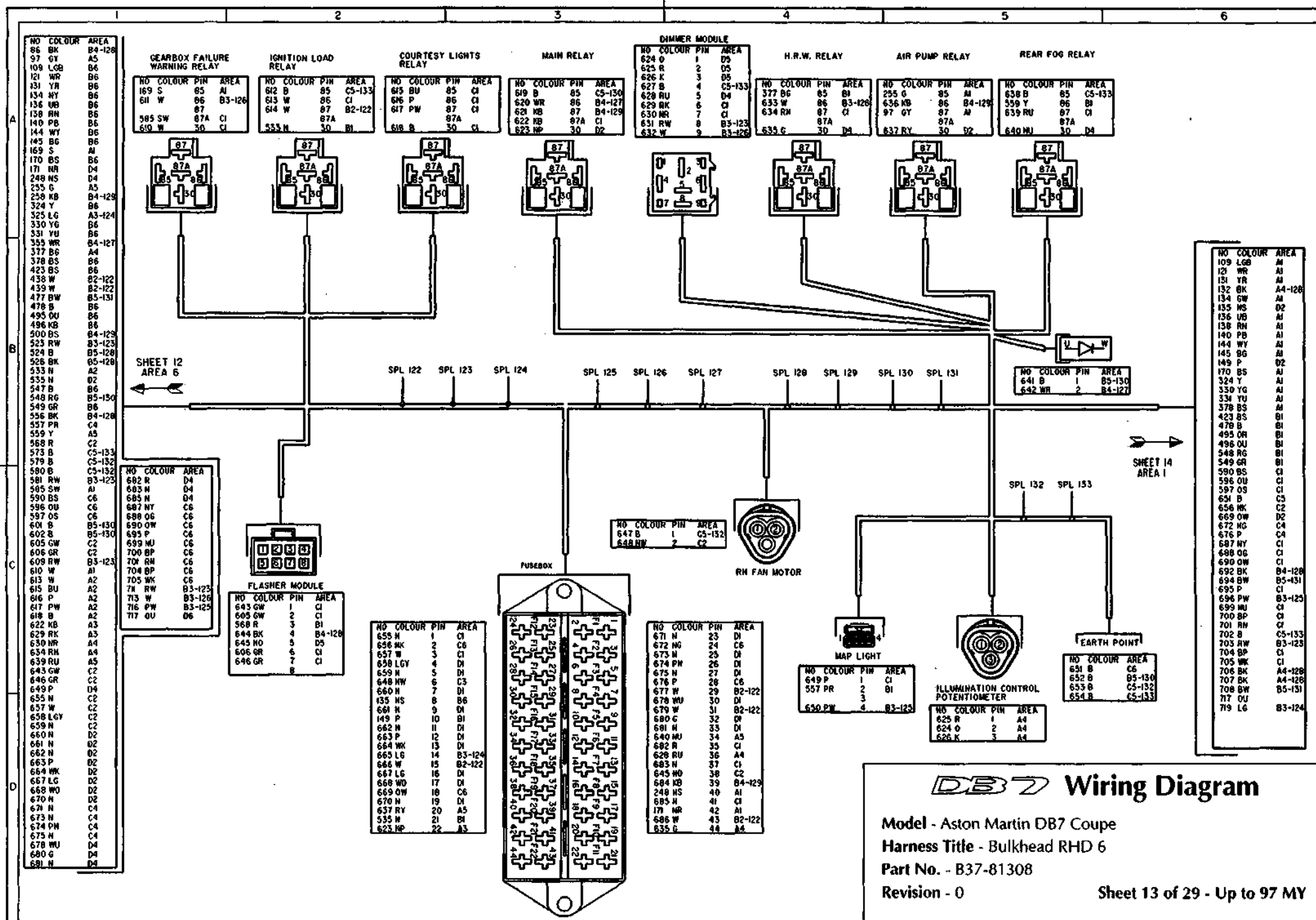
DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe
 Harness Title - Bulkhead RHD - 4
 Part No. - B37-81306
 Revision - 0

Splice No.	Colour	SPL 119	Lt Green
Pin No.	Destination		
		421	C1
		607	C4
		667	B6
SPL 112	Red/Blue		
502	C1		
592	D3	SPL 120	Black/Purple
639	B6	381	B1
		700	C6
		704	C6
SPL 113	Red/Yellow		
94	A1		
571	A2	SPL 121	Red/Brown
591	D3	328	B1
		486	C1
		567	A1
SPL 114	White/Blue	634	B6
14	A1	701	C6
667	B6		
678	B6		
		SPL 122	White
SPL 115	Black/White	438	B1
387	B1	439	B1
594	D3	614	A2
503	C1	666	D2
		677	C4
SPL 116	White/Yellow	679	D4
144	B6	686	D4
512	C1		
575	D2		
SPL 117	Brown		
530	D1		
683	B6		
685	B6		
SPL 118	LtGreen/Yellow		
517	D1		
599	C5		
658	B6		



Splice No.	Colour		
Pin No.	Destination		
		706	C6
		707	C6
SPL 123	Red/White	SPL 129	Pink/Black
523	B1	258	A1
581	C6	500	B1
609	C1	621	A3
631	A4	636	A5
703	C6	684	D4
711	C1		
SPL 124	Lt Green	SPL 130	Black
325	A1	547	B1
665	D2	601	C1
719	C6	602	C1
		619	A3
SPL 125	Purple/White	641	B5
650	D4	652	C5
696	C6	SPL 131	Black/White
716	C1	477	B1
		694	C6
SPL 126	White	708	C6
611	A1		
632	A4	SPL 132	Black
633	A4	554	C5
713	C1	579	B1
		580	C6
SPL 127	White/Red	647	C4
355	B1		
620	A3	SPL 133	Black
642	B5	573	B1
		612	A2
SPL 128	Black/Pink	627	A4
86	A1	628	A5
132	B6	654	C5
526	B1	702	C6
644	C2		
692	C6		



Splice No.	Colour
Pin No.	Destination

SPL 134 Black/Slate

107	C5
378	A1
423	A1
590	B1

SPL 135 Black

478	A1
693	C2
709	C5

SPL 136 Lt Green

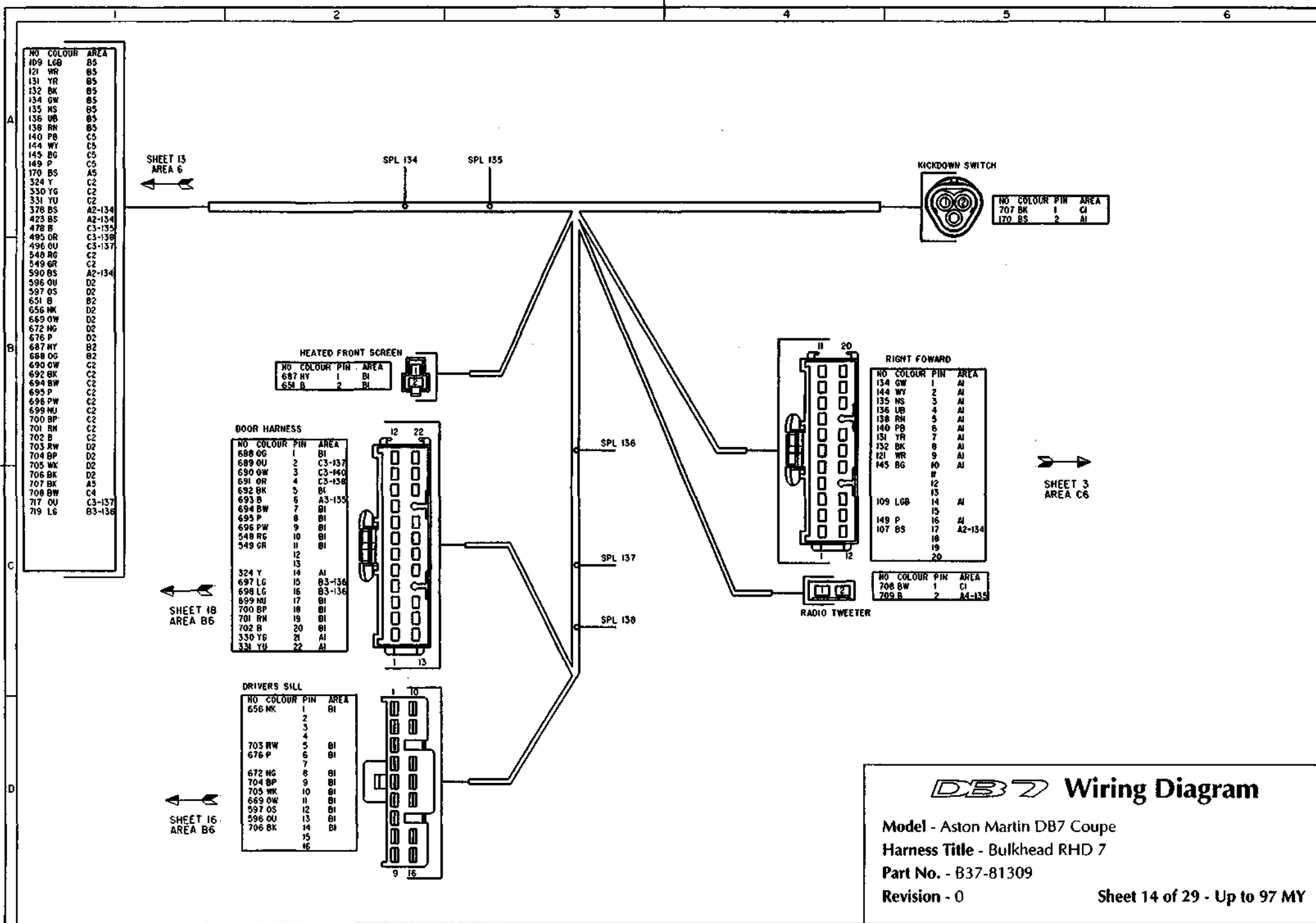
697	C2
698	C2
719	C1

SPL 137 Orange/Blue

496	B1
689	B2
717	C1

SPL 138 Orange/Red

495	B1
691	C2



DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

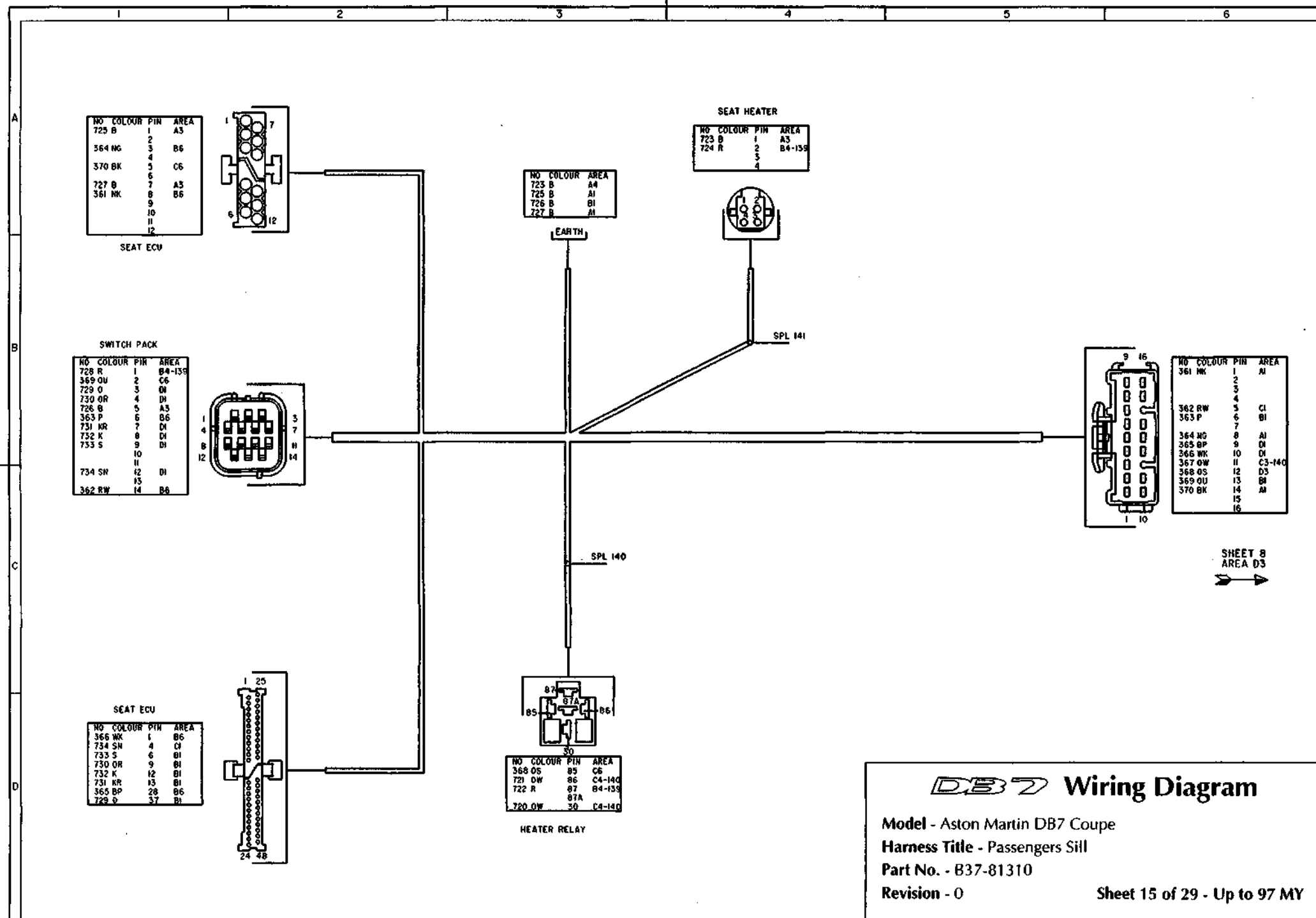
Harness Title - Bulkhead RHD 7

Part No. - B37-81309

Revision - 0

Sheet 14 of 29 - Up to 97 MY

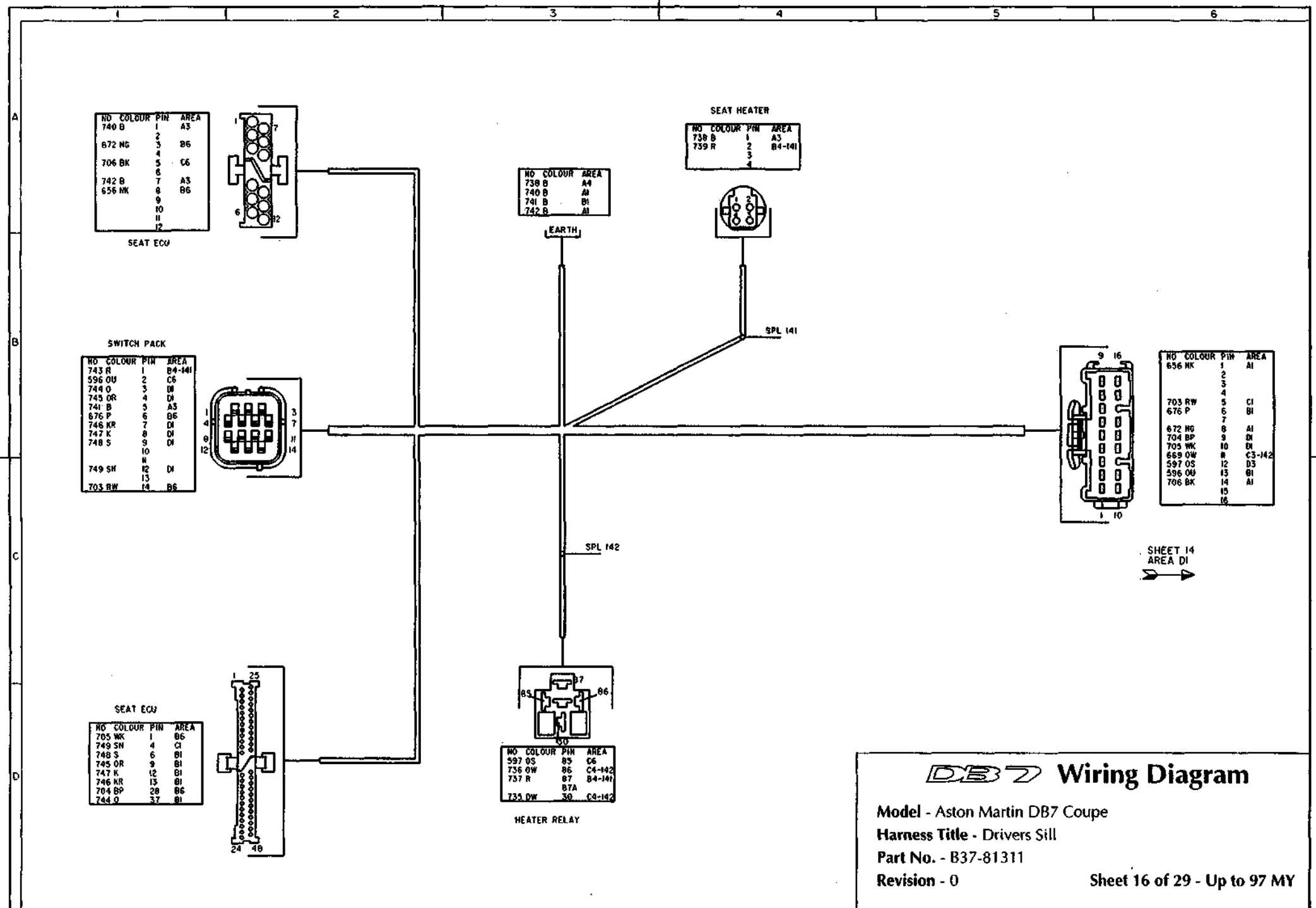
Splice No.	Colour
Pin No.	Destination
SPL 139	Red
722	D3
724	A4
728	B1
SPL 140	Orange/White
367	B6
720	D3
721	D3



Splice No.	Colour
Pin No.	Destination

SPL 141	Red
737	D3
739	A4
743	B1

SPL 142	Orange/White
669	B6
735	D3
736	D3



DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

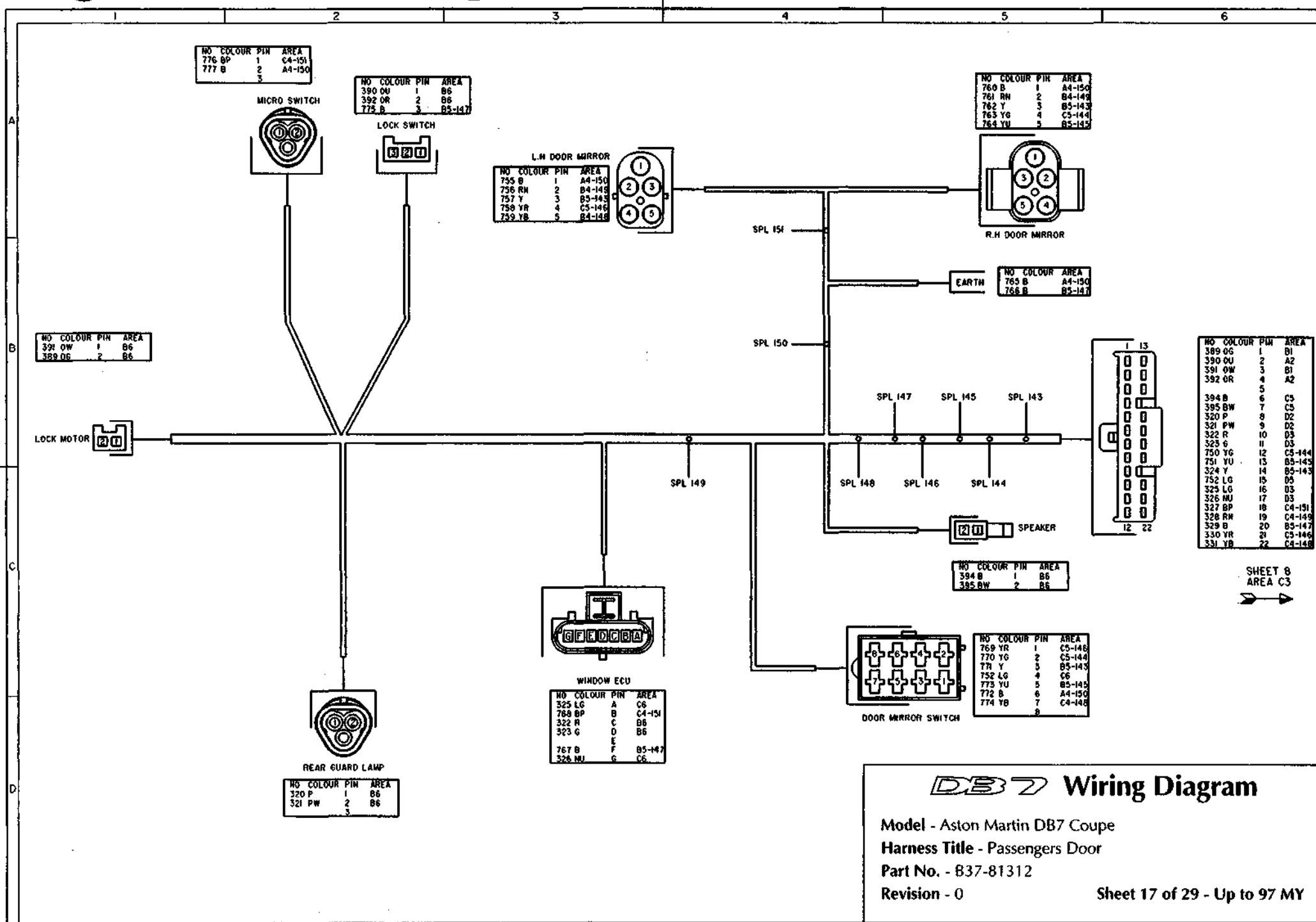
Harness Title - Drivers Sill

Part No. - B37-81311

Revision - 0

Sheet 16 of 29 - Up to 97 MY

Splice No.	Colour	SPL 149	Red/Brown
Pin No.	Destination	328	C6
		756	A3
		761	A5
SPL 143	Yellow		
324	C6		
757	A3	SPL 150	Black
762	A5	755	A3
771	C5	760	A5
		765	B5
SPL 144	Yellow/Green	772	C5
750	B6	777	A2
763	A5		
770	C5	SPL 151	Black/Purple
		327	C6
SPL 145	Yellow/Blue	768	D3
751	B6	776	A2
764	A5		
773	C5		
SPL 146	Yellow/Red		
330	C6		
758	A3		
769	C5		
SPL 147	Black		
329	C6		
766	B5		
767	D3		
775	A2		
SPL 148	Yellow/Black		
331	C6		
759	A3		
774	D3		



DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

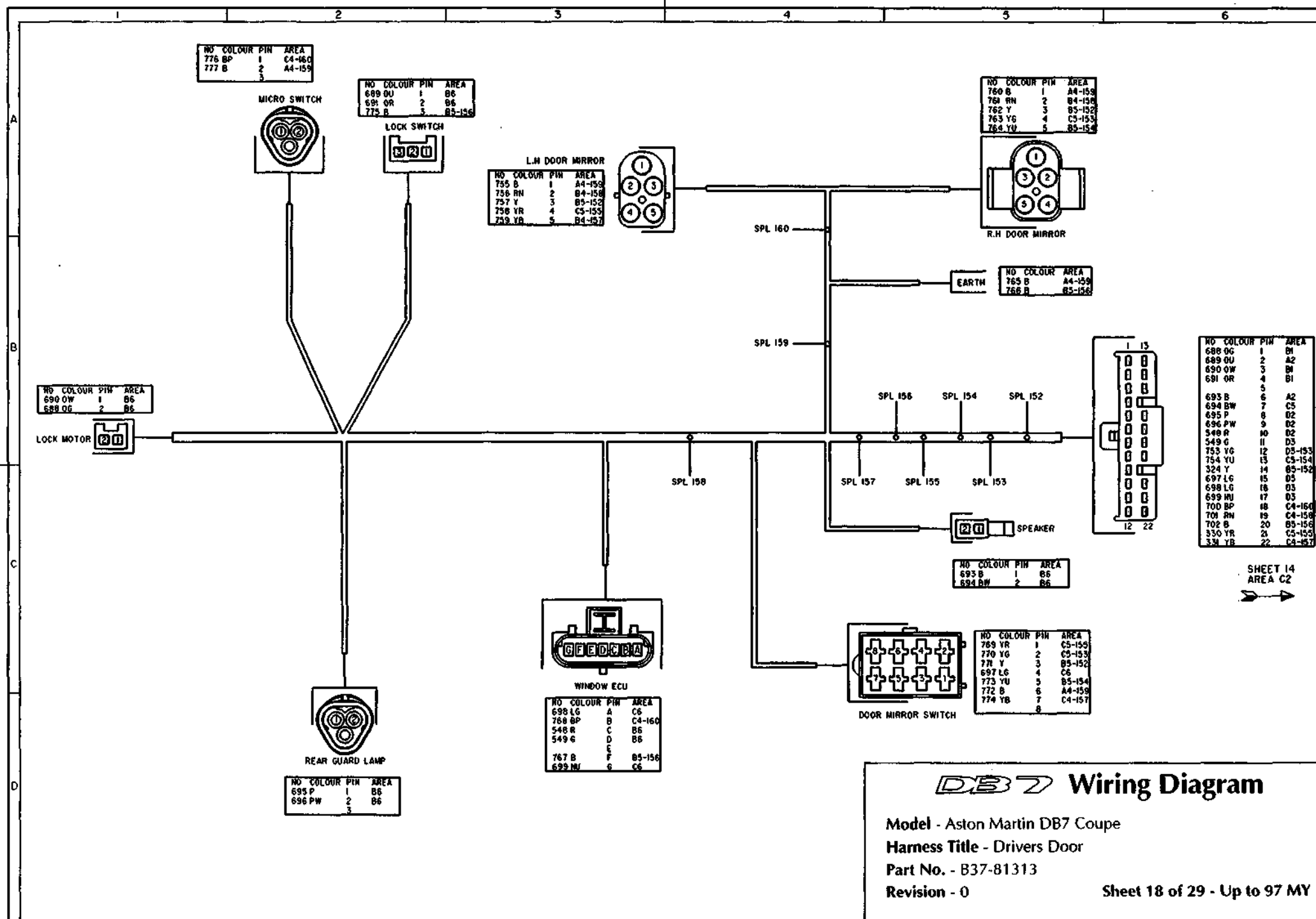
Harness Title - Passengers Door

Part No. - 837-81312

Revision - 0

Sheet 17 of 29 - Up to 97 MY

Splice No.	Colour	SPL 158	Red/Brown
Pin No.	Destination	701	C6
		756	A3
		761	A5
SPL 152	Yellow		
324	C6		
757	A3	SPL 159	Black
762	A5	755	A3
771	C5	760	A5
		765	B5
SPL 153	Yellow/Green	772	C5
753	B6	777	A2
763	A5		
770	C5	SPL 160	Black/Purple
		700	C6
SPL 154	Yellow/Blue	768	D3
754	B6	776	A2
764	A5		
773	C5		
SPL 155	Yellow/Red		
330	B6		
758	A3		
769	C5		
SPL 156	Black		
702	C6		
766	B5		
767	D3		
775	A2		
SPL 157	Yellow/Black		
331	B6		
759	A3		
774	D5		



DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

Harness Title - Drivers Door

Part No. - B37-81313

Revision - 0

Sheet 18 of 29 - Up to 97 MY

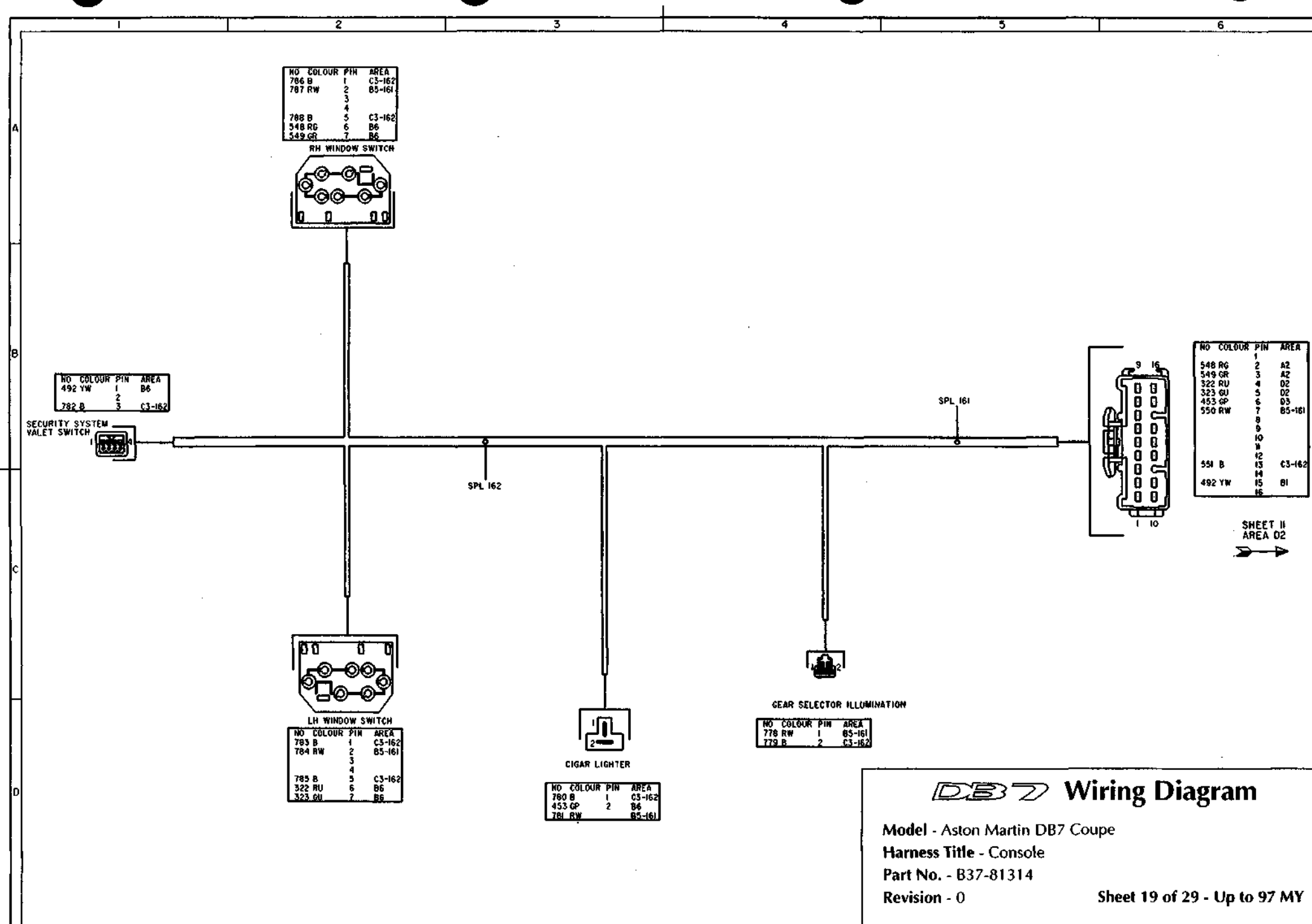
Splice No.	Colour
Pin No.	Destination

SPL 161 Red/White

550	B6
778	D4
781	D3
784	D2
787	A2

SPL 162 Black

551	B6
779	D4
780	D3
782	B1
783	D2
785	D2
786	A2
788	A2



DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

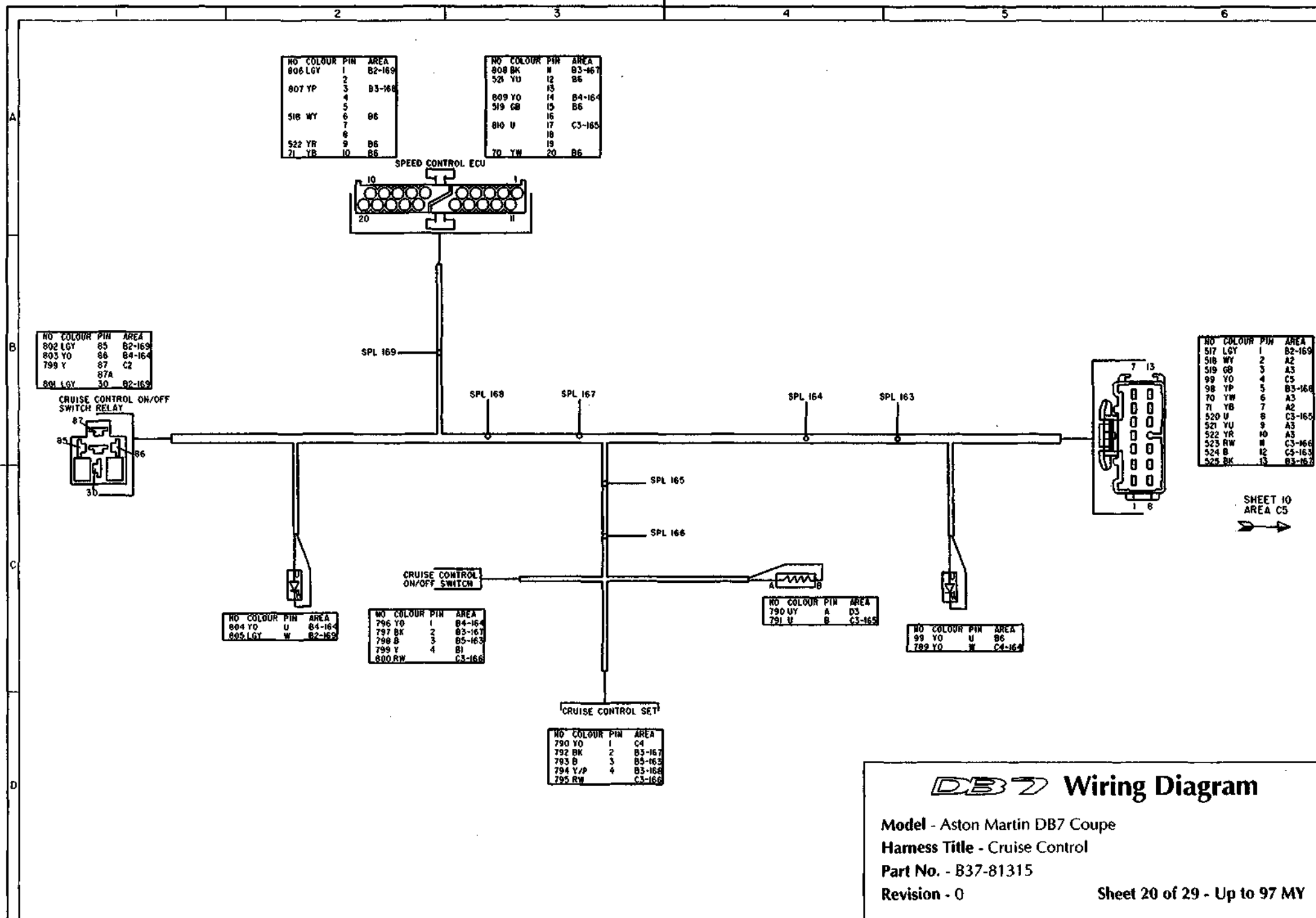
Harness Title - Console

Part No. - B37-81314

Revision - 0

Sheet 19 of 29 - Up to 97 MY

Splice No.	Colour	SPL 168	Yellow/Purple
Pin No.	Destination	98	B6
		794	D3
		807	A3
SPL 163	Black		
524	B6		
793	D3		
798	C2		
		SPL 169	LtGreen/Yellow
		517	B6
		801	B1
		802	B1
		805	C2
		806	A2
SPL 164	Yellow/Orange		
789	C5		
796	C2		
803	B1		
804	C2		
809	A3		
SPL 165	Blue		
520	B6		
791	C4		
810	A3		
SPL 166	Red/White		
523	B6		
795	D3		
800	C2		
SPL 167	Black/Pink		
525	B6		
792	D3		
797	C2		
808	A3		



SHEET 10
AREA C5
→

DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

Harness Title - Cruise Control

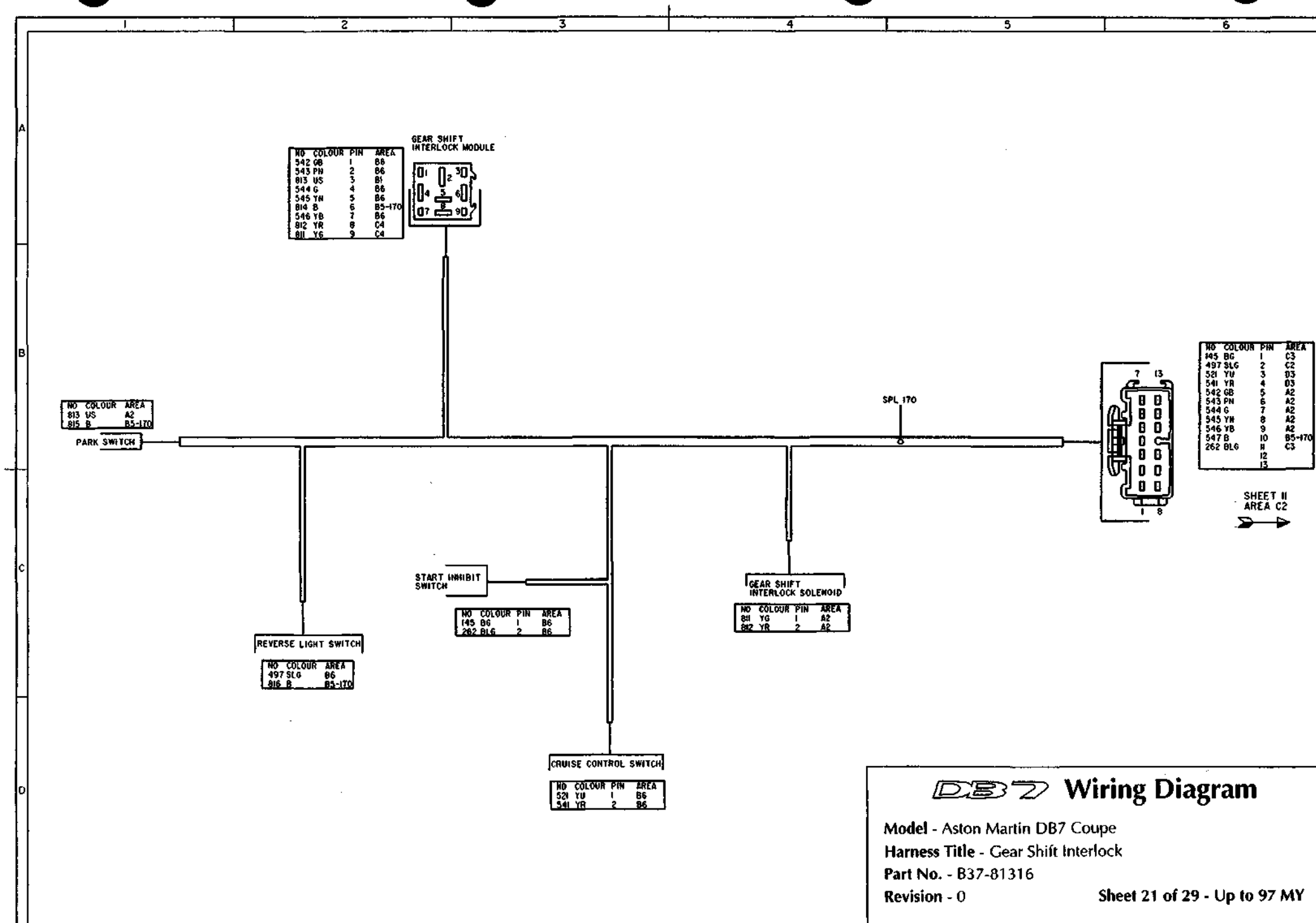
Part No. - B37-81315

Revision - 0

Sheet 20 of 29 - Up to 97 MY

Splice No.	Colour
Pin No.	Destination

SPL 170	Black
547	B6
814	A2
815	B1
816	C2



DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

Harness Title - Gear Shift Interlock

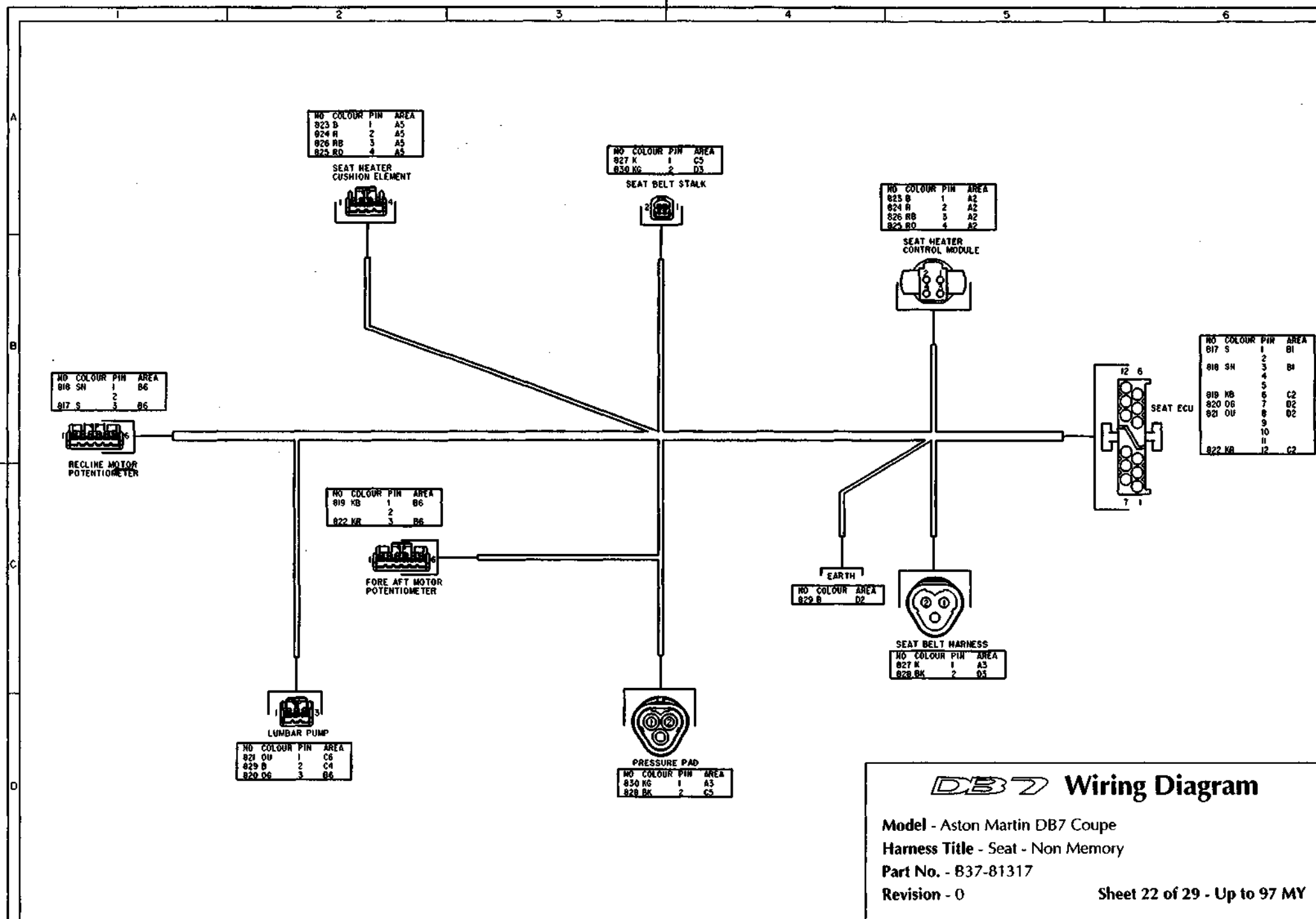
Part No. - B37-81316

Revision - 0

Sheet 21 of 29 - Up to 97 MY

Splice No. Colour
Pin No. Destination

No Splices on Sheet 22



Splice No.	Colour		
Pin No.	Destination		
SPL 171	Black	SPL 178	Brown/Purple
872 BRD	B6	455	C1
940	B3	855	B6
		873	B6
SPL 172	Black/Pink	SPL 179	White/Pink
830	B3	509	D1
831	A3	907	B6
940	C3	930	B6
SPL 173	White/Slate	SPL 180	Red/Blue
485	B1	502	C1
894	B6	858	B6
897	B6	875	B6
SPL 174	Red		
490	B1		
893	B6		
896	B6		
SPL 175	Green		
459	C1		
902	B6		
904	B6		
SPL 176	Purple		
498	C1		
832	C3		
841	B6		
850	B6		
SPL 177	Purple/Pink		
499	C1		
842	B6		
851	B6		

NO	COLOUR	PIN	AREA
383	K	1	C1
834	BK	2	C3-172
		3	

SEAT BELT HARNESS



NO	COLOUR	AREA
830	BK	C3-172

EARTH

SHEET 10
AREA B2

NO	COLOUR	PIN	AREA
482	BR	1	B6
476	BR	2	B6
483	LK	3	B6
484	RIM	4	B6
485	WS	5	B3-173
486	RN	6	B6
487	GR	7	B6
474	YG	8	B6
		9	
481	B	10	B6
475	B	11	B6
489	UIM	12	B6
		13	
490	R	14	C4-174
		15	B6
491	W	16	B6

SHEET 10
AREA C2

NO	COLOUR	PIN	AREA
492	YW	2	B6
493	KB	3	B6
		4	
5	YS	5	B6
		6	
829	NO	7	B6
261	NR	8	B6
494	BR	9	B6
		10	
495	DR	11	B6
496	DU	12	B6
		13	

SHEET 10
AREA D2

NO	COLOUR	PIN	AREA
497	SLG	1	B6
498	P	2	C4-176
499	PK	3	B5-177
459	G	4	B4-175
500	KB	5	B6
259	DR	6	B6
501	GB	7	C6
383	K	8	A3
455	MP	9	C5-178
502	RU	10	C5-180
503	BW	11	C6
504	GW	12	C6
260	O	13	B6
505	LGO	14	C6
506	OW	15	C6
507	GP	16	C6
508	OG	17	B6
		18	
509	WK	19	B5-179
		20	
479	S	21	B6
		22	
175	PY	23	B6
		24	

NO	COLOUR	AREA
832	P	C4-176
833	PS	B6

BOOT RELEASE
SWITCH

NO	COLOUR	PIN	AREA
834	NS	1	B6
835	MY	2	B6
836	U	3	B6



LEVEL SENSOR

NO	COLOUR	AREA
5	YS	B6
175	PY	B6
259	OR	C1
260	O	C1
261	NR	C1
474	YG	B6
475	B	B1
476	BR	A1
479	S	D1
481	B	B1
482	BR	A1
483	LK	A1
484	RIM	B1
486	RN	B1
487	GR	B1
489	UIM	B1
491	W	B1
492	YW	B1
493	KB	B1
494	BR	C1
495	OR	C1
496	DU	C1
497	SLG	C1
500	KB	C1
501	GB	C1
503	BW	C1
504	GW	C1
505	LGO	C1
506	OW	D1
507	GP	D1

NO	COLOUR	AREA
508	OG	D1
829	NO	C1
833	PS	C3
834	NS	B3
835	MY	B3
836	U	B3
841	P	C4-176
842	PK	B5-177
850	P	C4-176
851	PK	B5-177
855	MP	C5-178
858	RU	C5-180
872	BRD	B3-171
873	MP	C5-178
875	RU	C5-180
893	R	C4-174
894	WS	B3-173
896	R	C4-174
897	WS	B3-173
902	C	B4-175
904	G	B4-175
907	WK	B5-179
930	WK	B5-179

SHEET 24
AREA B1

DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

Harness Title - Rearward 1

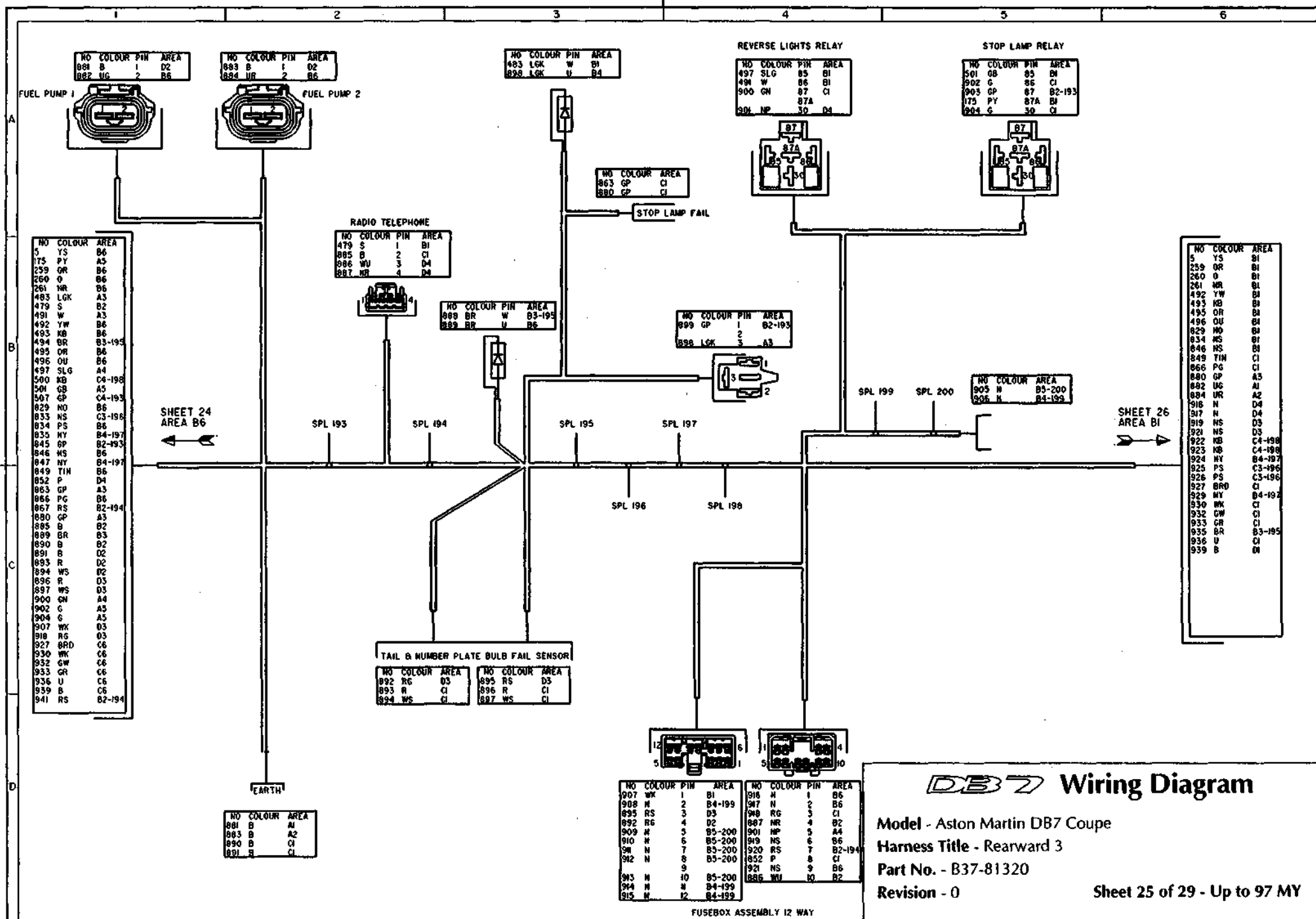
Part No. - B37-81318

Revision - 0

Sheet 23 of 29 - Up to 97 MY

Splice No. Pin No.	Colour Destination	SPL 188	Black
		853	D2
		857	D4
		861	D4
		891	B6
		869	C5
		939	B6
		SPL 189	Red/Green
		856	D4
		862	D4
		868	C5
		918	B6
		SPL 190	Green/Brown
		859	D4
		876	B5
		900	B6
		SPL 191	Black/Red
		854	C4
		865	C5
		874	A5
		889	B6
		SPL 192	Green/Purple
		864	C5
		885	B6
		890	B6
		SPL 186	BRD
		927	B6
		SPL 187	Green/White
		504	C1
		860	D4
		932	B6
		SPL 182	Black
		840	A2
		843	A2
		844	B2
		SPL 181	Green/Red
		487	B1
		877	B5
		933	B6
		SPL 183	Black
		839	A2
		871	B4
		878	B5
		SPL 184	Red/Slate
		870	B4
		879	B5
		941	B6
		SPL 185	Blue
		836	C1
		848	B2
		936	B6

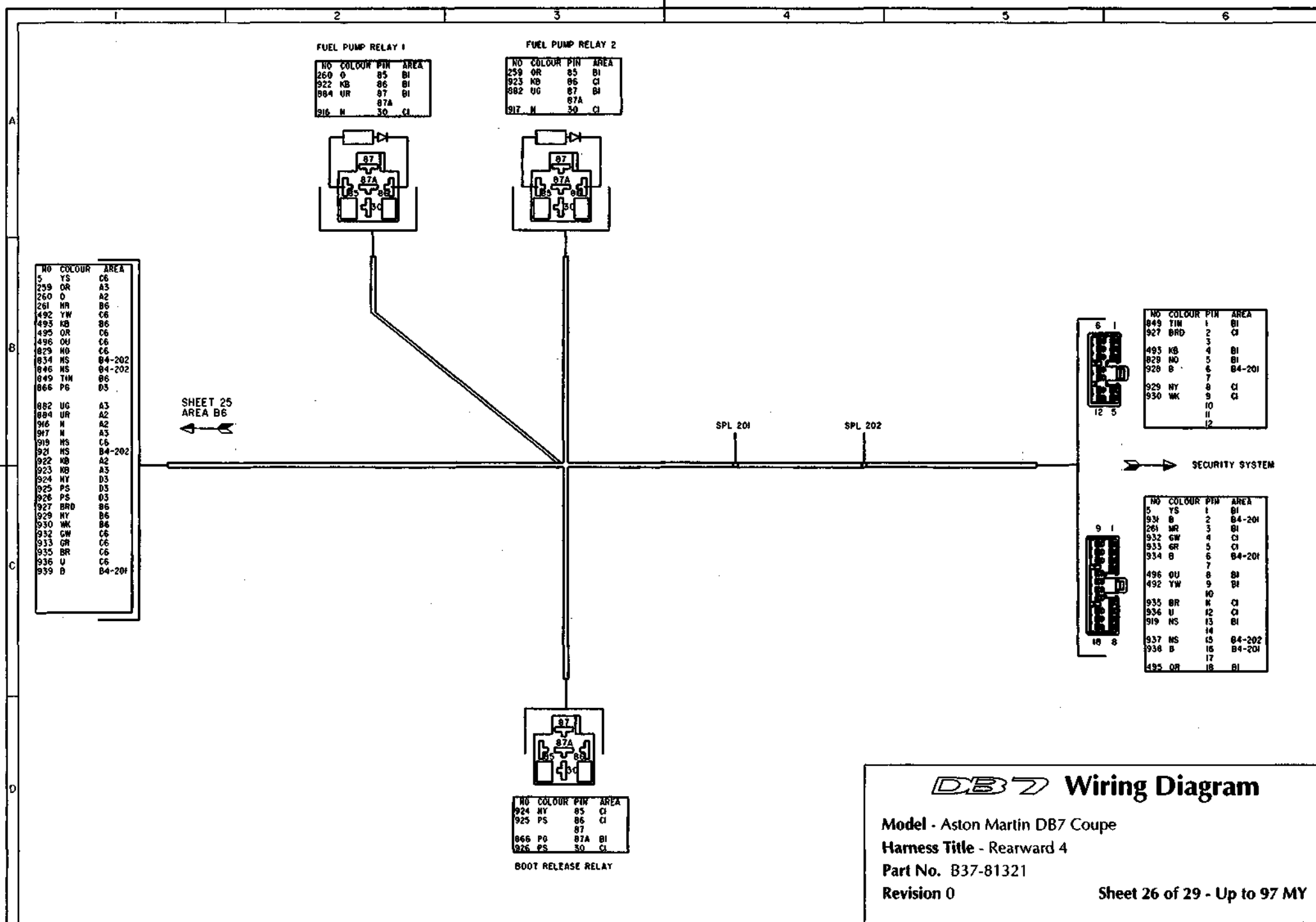
Splice No.	Colour	SPL 199	Brown
Pin No.	Destination	906	B5
		908	D3
SPL 193	Green/Purple	914	D3
507	B1	915	D3
845	B1		
899	B4	SPL 200	Brown
903	B5	905	B6
		909	D3
SPL 194	Red/Slate	910	D3
867	C1	911	D3
920	D4	912	D3
941	C1	913	D3
SPL 195	Black/Red		
494	B1		
888	B3		
935	C6		
SPL 196	Purple/Slate		
833	C3		
925	B6		
926	B6		
SPL 197	Brown/Yellow		
835	C1		
847	C1		
924	B6		
929	B6		
SPL 198	Pink/Black		
500	B1		
923	B6		
922	B6		



Splice No.	Colour
Pin No.	Destination

SPL 201	Black
928	B6
931	C6
934	C6
938	C6
939	C1

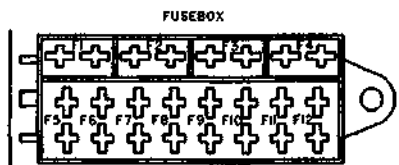
SPL 202	Brown/Slate
834	B1
846	B1
921	B1
937	C6



Splice No.	Colour
Pin No.	Destination

SPL 203	Black
869	C5
942	A4
943	A4
944	A4
945	A4

NO	COLOUR	PIN	AREA
907	WK	1	D1
886	WV	2	D2
908	N	3	D1
916	N	4	D2
895	RS	5	D1
920	RS	6	D2
892	RG	7	D1
918	RG	8	D2
909	N	9	D1
917	N	10	D2
910	N	11	D1
887	NR	12	D2



NO	COLOUR	PIN	AREA
911	N	13	D1
901	NP	14	D2
		15	
		16	
		17	
		18	
912	N	19	D1
852	P	20	D2
913	N	21	D1
921	NS	22	D2
919	N	23	D2
914	N	24	D1



NO	COLOUR	PIN	AREA
907	WK	1	A1
908	N	2	A1
895	RS	3	A1
892	RG	4	A1
909	N	5	A1
910	N	6	A1
911	N	7	A1
		8	
		9	
912	N	10	A3
913	N	11	A3
914	N	12	A3

SHEET 25
AREA D4



NO	COLOUR	PIN	AREA
916	N	1	A1
917	N	2	A1
918	RG	3	A1
887	NR	4	A1
901	NP	5	A3
919	N	6	A3
920	RS	7	A1
852	P	8	A3
921	NS	9	A3
886	WV	10	A1

BOOT LOCK ACTUATOR

NO	COLOUR	PIN	AREA
865	BS	1	C4
943	B	2	C5-203

NO	COLOUR	PIN	AREA
944	B	1	C5-203
886	OW	2	C4



NO	COLOUR	AREA
942	B	C5-203
867	RS	C4

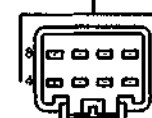
LH NUMBER PLATE LAMP

NO	COLOUR	AREA
945	B	C5-203
868	RG	C4

RH NUMBER PLATE LAMP

SPL 203

NO	COLOUR	PIN	AREA
865	BS	1	
866	OW	2	
867	RS	3	
		4	
		5	
		6	
868	RG	7	
869	B	8	



SHEET 24
AREA C5

DB7 Wiring Diagram

Model - Aston Martin DB7 Coupe

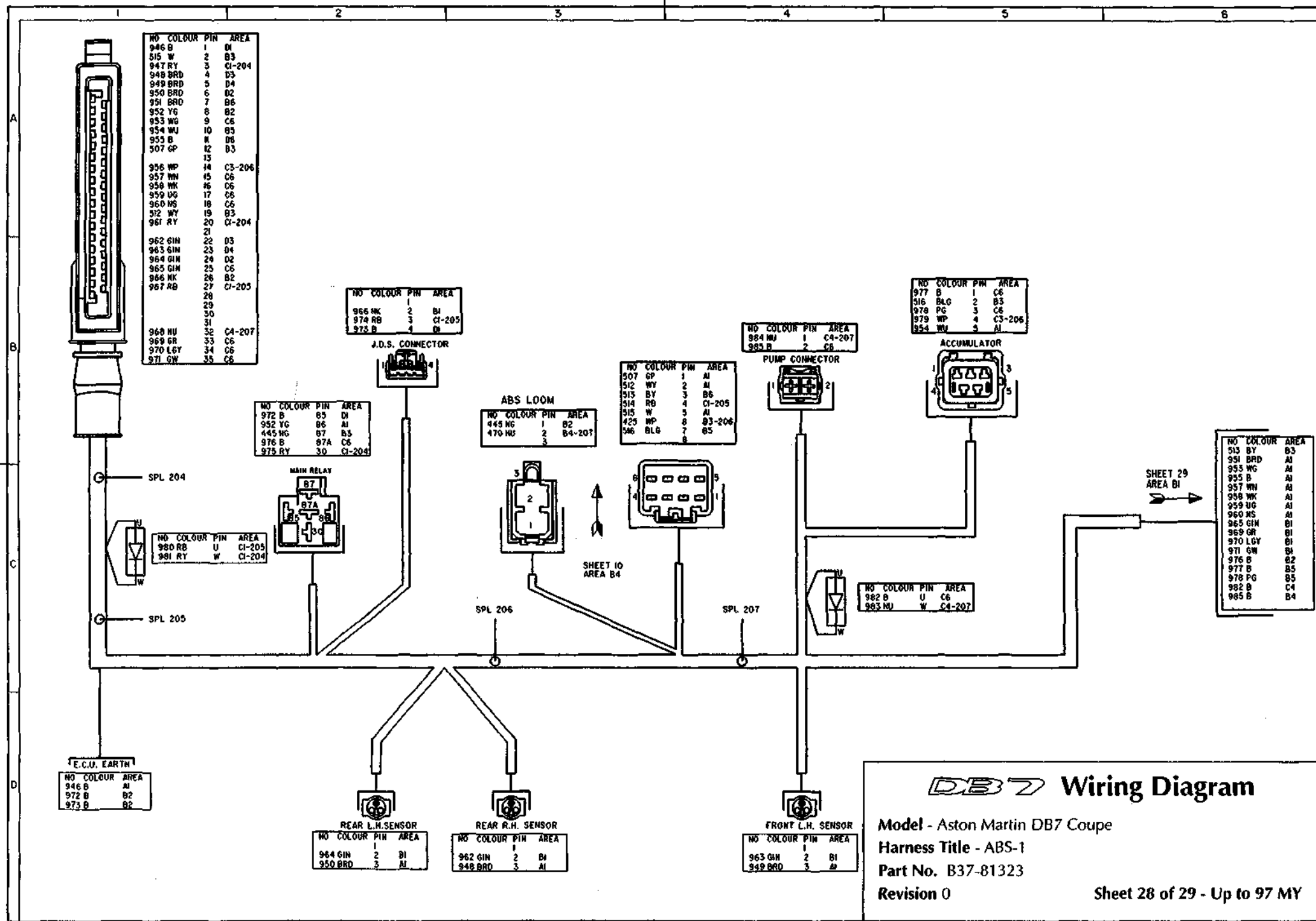
Harness Title - Fusebox and Boot Lid

Part No. - B37-81322

Revision - 0

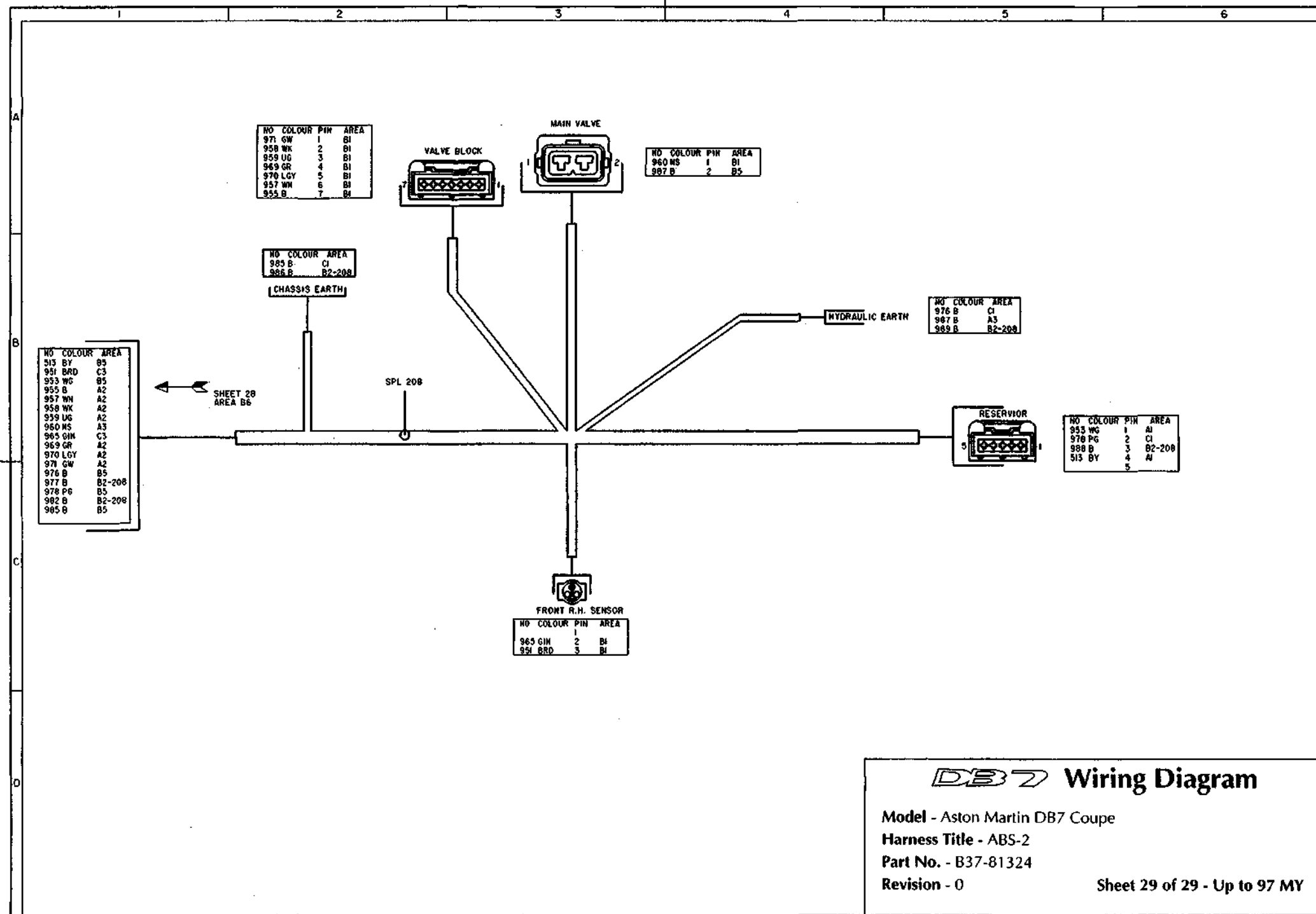
Sheet 27 of 29 - Up to 97 MY

Splice No.	Colour
Pin No.	Destination
SPL 204	Red/Yellow
947	A1
961	A1
975	B2
981	C1
SPL 205	Red/Black
514	B3
967	B1
974	B2
980	C1
SPL 205	White/Purple
425	B3
956	A1
979	B5
SPL 207	Brown/Blue
470	B3
968	B1
983	C4
984	B4



Splice No.	Colour
Pin No.	Destination

SPL 208	Black
977	C1
982	C1
986	B2
988	B5
989	B5



Component Name	Component Location (Figure No.-Item No.)	Circuit Reference (Sheet No.-Coordinates)	
ABS ECU	1-5	20-A1	
ABS Wheel Speed Sensor - Front RH	1-3	20-D2	
ABS Wheel Speed Sensor - Front LH	1-3	20-D3	
ABS Wheel Speed Sensor - Rear RH	8-1	20-B6	
ABS Wheel Speed Sensor - Rear LH	8-1	20-C6	
Airbag Crash Sensor RH	2-3	3-D1	
Airbag Crash Sensor LH	2-3	1-C3	
Airbag Diagnostic Monitor	4-2	11-C6	
Airbag (Drivers)	9-6	9-A3	
Airbag (Passengers)	9-1	11-C4	
Airbag Safing Sensor LHD	2-6	12-B4	
Air Conditioning Compressor Clutch	9-4	3-C1	
Air Conditioning Control	9-2	3-D3	
Air Conditioning Trinary Switch	9-5	3-D1	
Air Conditioning Unit	9-2	11-C1	
Air Pump	9-3	1-C2	
Air Temperature Sensor (IAT1)	3-7	5-C1	
Air Temperature Sensor (IAT2)	3-11	5-B3	
Alarm LED Inverter	7-8	14-B6	
Alarm Sounder	2-4	1-B2	
Alternator (Generator)	3-12	5-A6	
Ambient Temperature Sensor	1-1	1-A2	
Barometric Pressure Sensor	8-6	4-A4	
Blower Fan LH	10-10	8-A3	
Blower Fan RH	10-4	12-C3	
Bonnet Switch	2-2	1-C5	
Boot Lamp LH	10-8	15-A4	
Boot Lamp RH	10-6	16-D3	
Boot Lock Actuator	10-7	16-C6	
Brake Fluid Level Sensor	16-3	20-B3	
Camshaft Sensor (CMP)	3-2	5-C1	
Capacitor (Generator)	1-2	5-A5	
Catalyst Overtemperature/Speed Warning Module	4-8	11-C3	Japan Only Rear of Radio
CD Autochanger	5-5	10-B3	
Central Locking Unit	6-10	12-D4	
Cigar Lighter	6-5	13-A3	
Column Switchgear Assembly	10-5	9-A2	
Coolant Low Level Sensor	10-3	3-A3	
Coolant Temperature Sensor (ECT)	3-4	5-B1	
Coolant Temperature Sensor - Temp Gauge	3-3	5-C1	
Courtesy Light	10-9	9-B1	
Crankshaft Position Sensor (CKP)	3-1	5-A2	
Cruise Control Clutch Switch (RHD)	10-2	3-C5	
Cruise Control Disable and Stop Lamp Switch	1-4	9-A3	
Cruise Control On/Off Switch	6-6	13-A5	
Cruise Control Servo Unit	2-8	2-A6	
Cruise Control Set Switch	6-7	13-B5	
Diagnostic Socket - Lower	11-3	10-A6	
Diagnostic Socket - Upper	11-3	10-A5	
Door Closed Microswitch (Drivers)	7-6	21-A2	
Door Closed Microswitch (Passengers)	7-6	22-A2	
Door Lock Motor (Drivers)	11-6	21-B1	
Door Lock Motor (Passengers)	11-9	22-B1	
Door Lock Switch (Drivers)	11-5	21-A2	

Component Name	Component Location	Circuit Reference
Door Lock Switch (Passengers)	11-10	22-A2
Door Mirror - (Drivers)	11-4	21-A3
Door Mirror - (Passengers)	11-11	22-A5
Door Mirror Switch (LHD)	11-12	21-C5
Door Mirror Switch (RHD)	11-12	22-C5
Door Rear Guard Lamp (RH)	11-7	21-D2
Door Rear Guard Lamp (LH)	11-8	22-D2
DPFE Sensor	3-5	5-C4
EDIS Coil Pack	3-9	5-A5
EVR Valve	2-1	5-D2
Exhaust Temperature/Speed Warning	1-6	11-C3
Fan Control Module	2-7	3-D2
Fan Motor 1	11-1	3-B1
Fan Motor 2	11-2	3-C1
Foglamp - RH Front	12-3	1-A1
Foglamp - LH Front	12-2	1-C1
Fuel Filler Flap Solenoid	12-10	15-A2
Fuel Pump 1	12-7	16-A5
Fuel Pump 2	12-9	16-A6
Fuel Tank Pressure Sensor	12-8	15-C3
Fuel Tank Sender Unit	12-6	16-B4
Gear Selector Illumination	12-5	13-C4
Glass Break Sensor	7-8	14-C6
Handbrake Switch	7-5	14-C5
Head/Side Lamp - LH Front	12-1	1-D2
Head/Side Lamp - RH Front	12-4	1-A2
Heated Backlight (Volante)	12-11	15-D3
Heated Backlight (Volante)	12-11	16-A2
Heated Oxygen Sensor 1-1	2-5	6-D4
Heated Oxygen Sensor 1-2	2-5	14-A6
Heated Oxygen Sensor 2-1	8-2	6-D4
Heated Oxygen Sensor 2-2	8-2	14-A6
Heated Washer Jet LH	13-3	5-D3
Heated Washer Jet RH	13-3	5-D4
High Level Stop Lamp	13-7	15-B2
Hood Control Module (Volante Roof)	8-4	18-D4
Hood Motor (Volante Roof)	13-6	19-B6
Horn - LH	1-7	1-A3
Horn - RH	1-7	1-A3
Idle Speed Control Valve (Eng Sub-harness)	3-8	5-C3
Ignition Coil Pack (EDIS)	3-9	5-A5
Ignition Switch	14-5	9-D4
Indicator/Side Lamp - LH Front	14-2	1-C1
Indicator/Side Lamp - RH Front	14-2	1-A1
Inertia Switch	6-9	12-C5
Injector 1	13-2	5-B2
Injector 2	13-2	5-B2
Injector 3	13-2	5-B2
Injector 4	13-2	5-B3
Injector 5	13-2	5-B4
Injector 6	13-2	5-B4
Instrument Pack	13-5	9-A/B5/6
Instrument Panel Illumination Control	7-4	8-C5
Instrument Panel Illumination Dimmer Switch	13-8	9-C4
Interior Light - Rear LH	14-9	15-C3

Component Name	Component Location	Circuit Reference
Interior Light - Rear RH	14-6	16-A2
Key Solenoid	14-4	9-D3
Key-In Warning Switch	14-4	9-D3
Low Coolant Signal Transmitter	7-13	12-B2
Low Level Sensor (Screenwash)	14-3	3-A2
Map Reading Light	10-9	8-A4
Mass Airflow (MAF) Sensor	14-1	5-D2
Multifunction Module	6-1	12-B5
Number Plate Lamp - LH	14-8	16-D6
Number Plate Lamp - RH	14-7	16-C6
Oil Pressure Transducer (EOP)	15-3	5-C4
PATS Module	4-9	12-B1
PATS Transceiver	15-4	9-C2
Performance Mode Switch	6-8	4-A2
Powertrain Control Module (PCM)	4-1	6-B5
Purge Cannister Vent Valve	15-7	15-B3
Radiator Switch	15-2	5-D1
Radio	5-1	10-B3
Radio Aerial	5-4	16-C2
Radio Telephone Connector	8-3	16-B5
Radio Tweeter (LH)	5-2	8-A3
Radio Tweeter (RH)	5-2	12-C2
Rear Lamp - LH	15-8	15-B6
Rear Lamp - RH	15-6	16-D2
Relay - Air Conditioning	(see relay location chart)	3-A4
Relay - Air Conditioning W.O.T.	(" " " ")	3-A5
Relay - Air Pump	(" " " ")	1-A5
Relay - Auxiliary Load	(" " " ")	9-D1
Relay - Auxiliary Load	(" " " ")	12-D1
Relay - Courtesy Lights	(" " " ")	9-D1
Relay - Clutch	(" " " ")	1-B5
Relay - Day Time Running	(" " " ")	1-A6
Relay - Drivers Seat Heater	(" " " ")	23-D3
Relay - Fan Change-Over	(" " " ")	3-C4
Relay - Fan Run On	(" " " ")	3-A3
Relay - Front Fog Lamps	(" " " ")	1-B5
Relay - Fuel Pump 1	(" " " ")	17-A2
Relay - Fuel Pump 2	(" " " ")	17-A4
Relay - Gearbox Failure Warning	(" " " ")	9-D2
Relay - Glass Drop	(" " " ")	12-C1
Relay - Hazard Unit	(" " " ")	8-C3
Relay - Headlamp Dipped Beam	(" " " ")	2-A2
Relay - Headlamps	(" " " ")	2-B2
Relay - Heated Front Screen Control	(" " " ")	12-D3
Relay - Heated Rear Window	(" " " ")	8-C4
Relay - Hood Down (Roof Down)	(" " " ")	19-A2
Relay - Hood Up (Roof Up)	(" " " ")	19-A3
Relay - Horn	(" " " ")	1-B5
Relay - Indicator Unit (Flasher Unit)	(" " " ")	8-C3
Relay - Left Quarter Light Up	(" " " ")	18-A5
Relay - Left Quarter Light Down	(" " " ")	18-A5
Relay - Load	(" " " ")	12-D1
Relay - Main	(" " " ")	12-D2
Relay - Main Beam	(" " " ")	2-B3
Relay - Passenger Seat Heater	(" " " ")	24-D3

Component Name	Component Location	Circuit Reference
Relay - Rear Fog Lamps	(see relay location chart)	8-C4
Relay - Reverse Lamps	(" " " ")	17-A2
Relay - Right Quarter Light Up	(" " " ")	19-A4
Relay - Right Quarter Light Down	(" " " ")	19-A5
Relay - Sidelights	(" " " ")	2-A1
Relay - Starter Solenoid	(" " " ")	2-A3
Relay - Stop Lamps	(" " " ")	17-A1
Relay - Tilt Sensor	(" " " ")	17-A4
Reversing Light Switch	7-7	7-C5
Screen Wash Pump	15-1	3-A2
Seat Belt Stalk	15-9	26-A3
Seat Belt Pretensioner Control Module	4-4	14-A4
Seat Belt Pretensioner Squib	15-5	14-B4
Seat ECU - Driver	4-6	23-A1
Seat ECU - Passenger	4-6	24-A1
Seat Fore/Aft Motor Potentiometer	15-10	26-C2
Seat Heater Cushion Element	7-11	26-A2
Seat Heaters - Driver	7-11	23-A4
Seat Heaters - Passenger	7-11	24-A4
Seat Lumbar Support Pump	16-4	26-D2
Seat Pressure Pad	7-10	26-D3
Seat Recline Motor Potentiometer	15-10	26-B1
Seat Switch Pack - Driver	7-3	23-B1
Seat Switch Pack - Passenger	7-3	24-B1
Security System Aerial	16-10	16-B2
Security System ECU	4-5	17-B6
Side Marker Lamp - LH Front	16-1	1-C2
Side Marker Lamp - RH Front	16-2	1-B2
Side Marker Lamp - LH Rear	16-6	15-C4
Side Marker Lamp - RH Rear	16-8	24-D4
Side Repeater Lamp LH	13-1	2-C5
Side Repeater Lamp RH	13-4	3-D5
Speaker - Drivers Door	5-3	21-C5
Speaker - Passengers Door	5-3	22-C5
Speaker - Rear LH	5-6	15-C1
Speaker - Rear RH	5-6	16-B1
Starter Motor Solenoid	3-10	2-A5
Throttle Potentiometer (Eng Sub-harness)	3-7	5-C3
Tilt Sensor	7-9	14-C4
Transmission Connector	16-5	7-A4
Transmission Control Module (TCM)	4-7	4-B5
Transmission Input Speed Sensor	17-7	7-B2
Transmission Output Speed Sensor	17-7	7-B3
Tyre Compressor Socket	17-5	17-C5
Vapour Management Valve	15-7	16-A3
Vehicle Speed Sensor (VSS)	8-5	15-B3
Window ECU - Drivers Side	6-3	21-C3
Window ECU - Passengers Side	6-3	22-C3
Window Lift - Left Quarter Light (Volante)	17-4	15-A1
Window Lift Thermal Breaker	6-4	12-C1
Window Switch LH	17-1	13-C2
Window Switch RH	17-3	13-A2
Wiper Logic Module	7-2	11-B5
Wiper Motor	17-2	6-A1

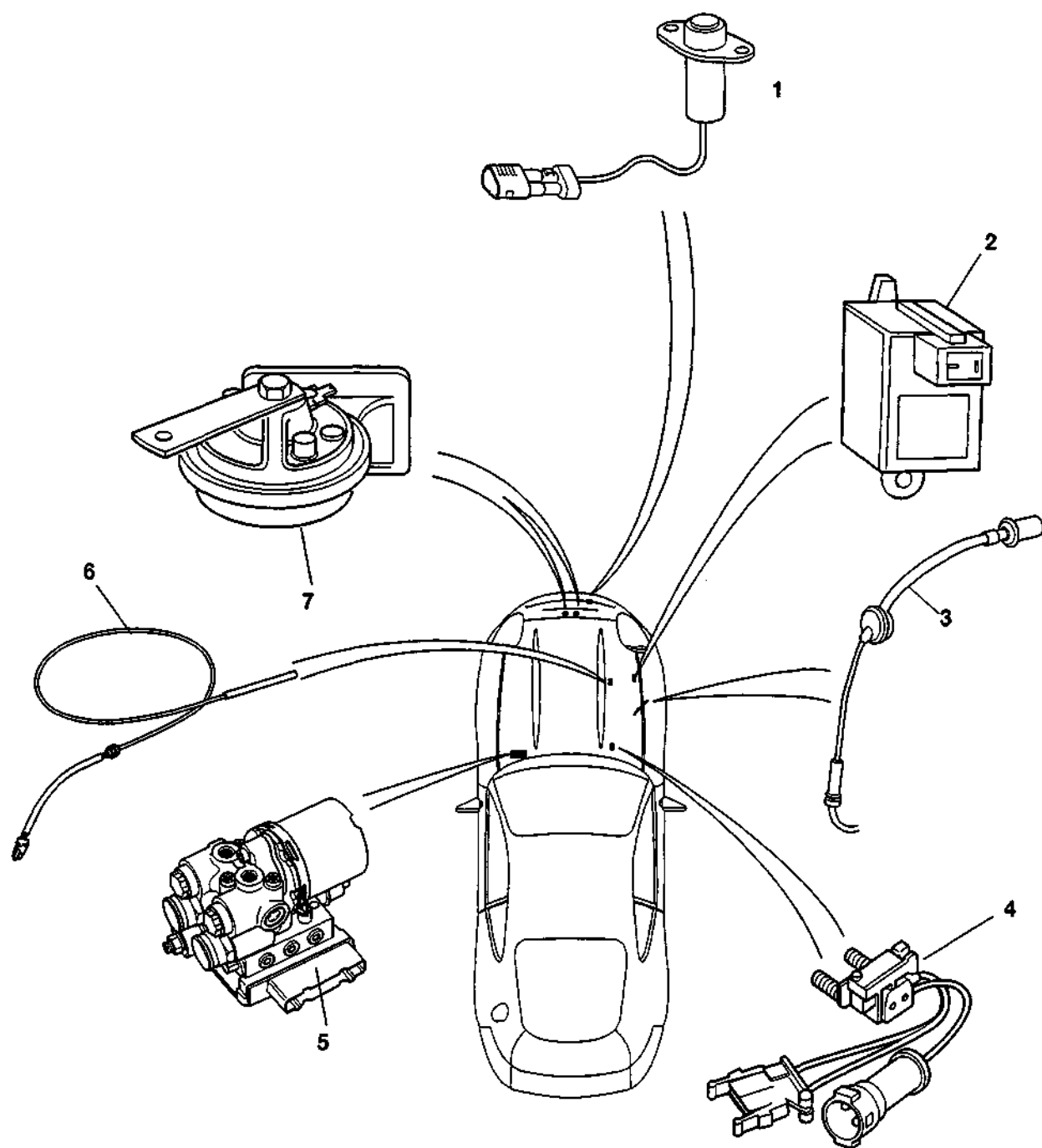


Figure 1

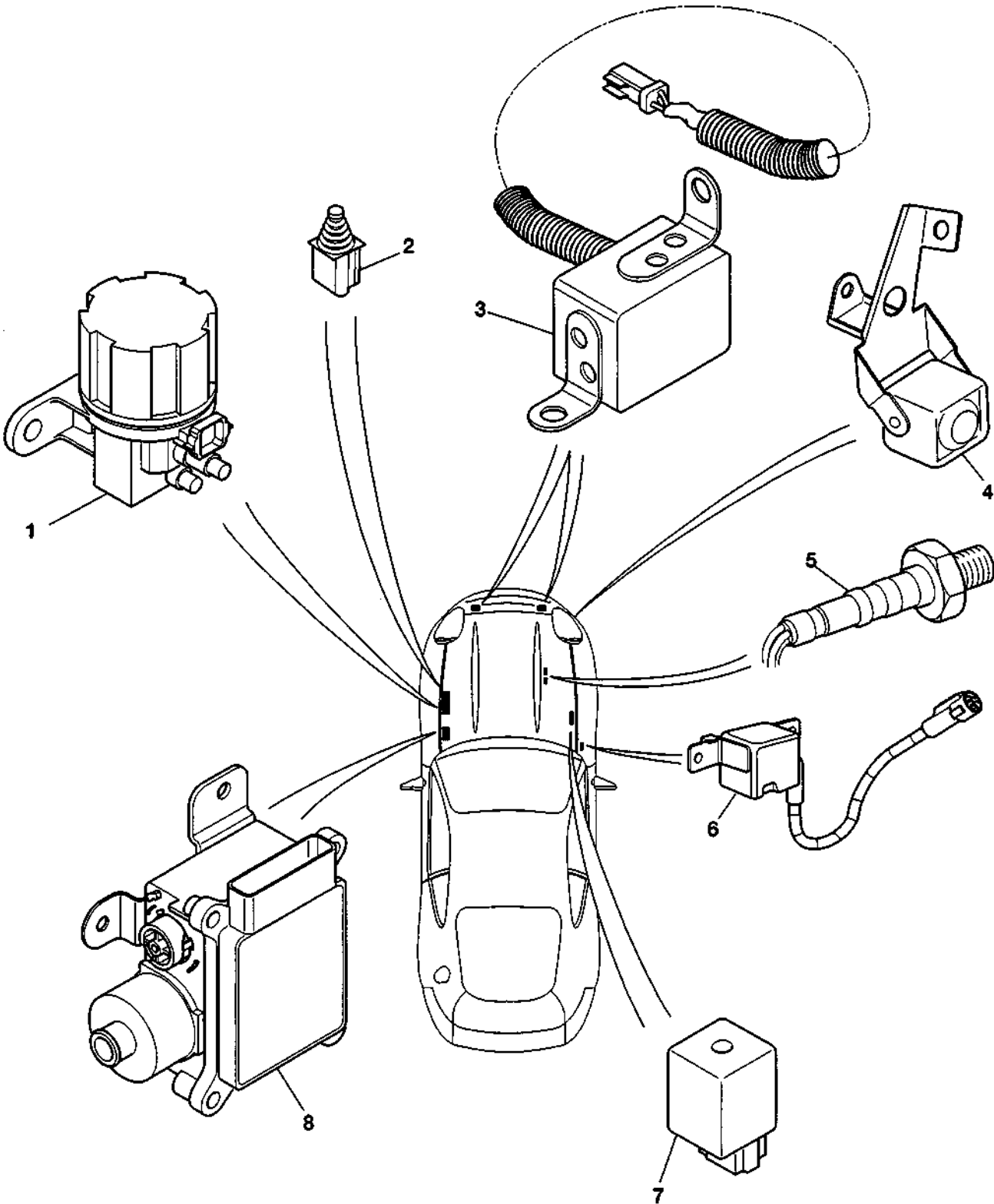


Figure 2

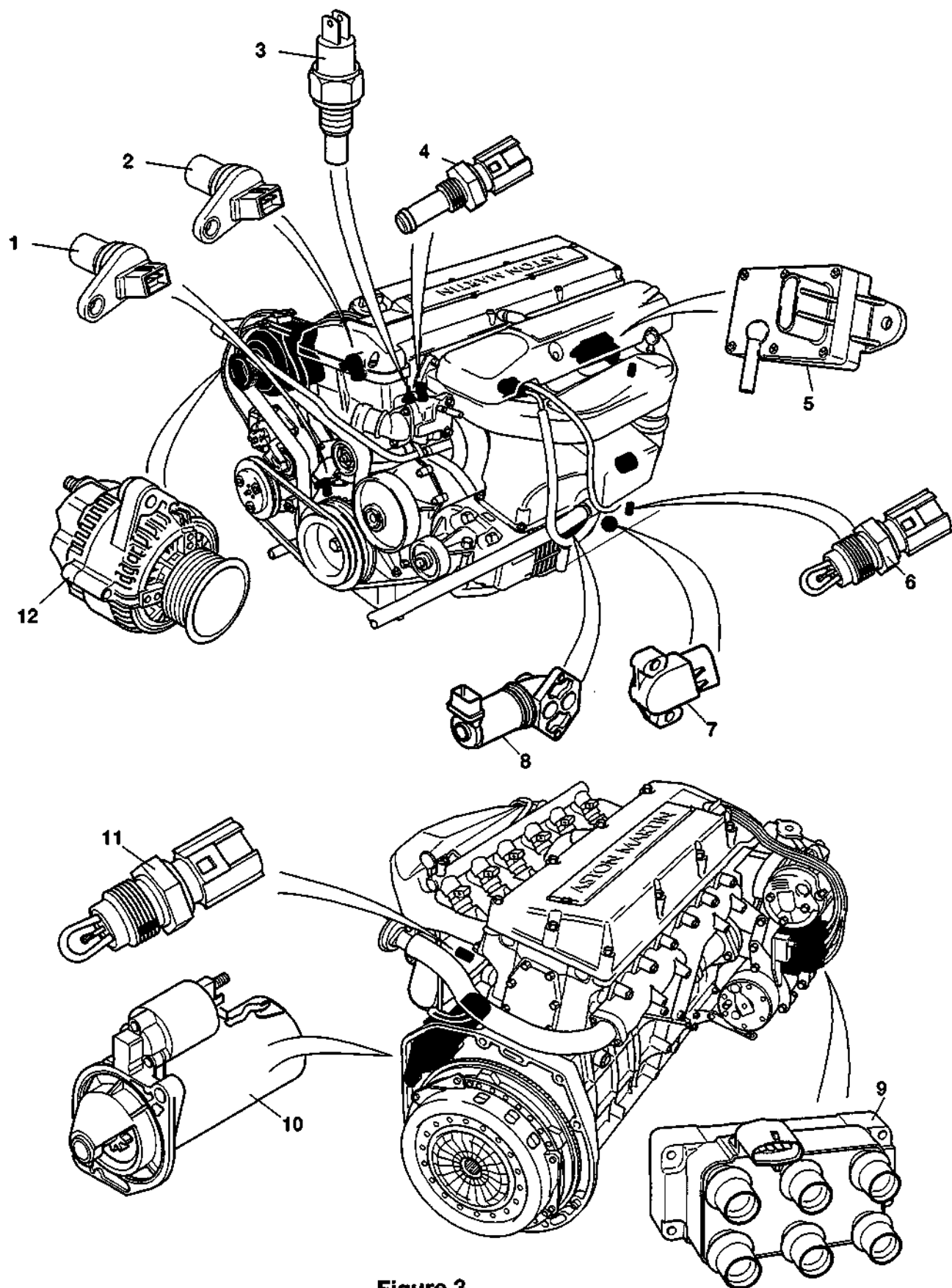


Figure 3

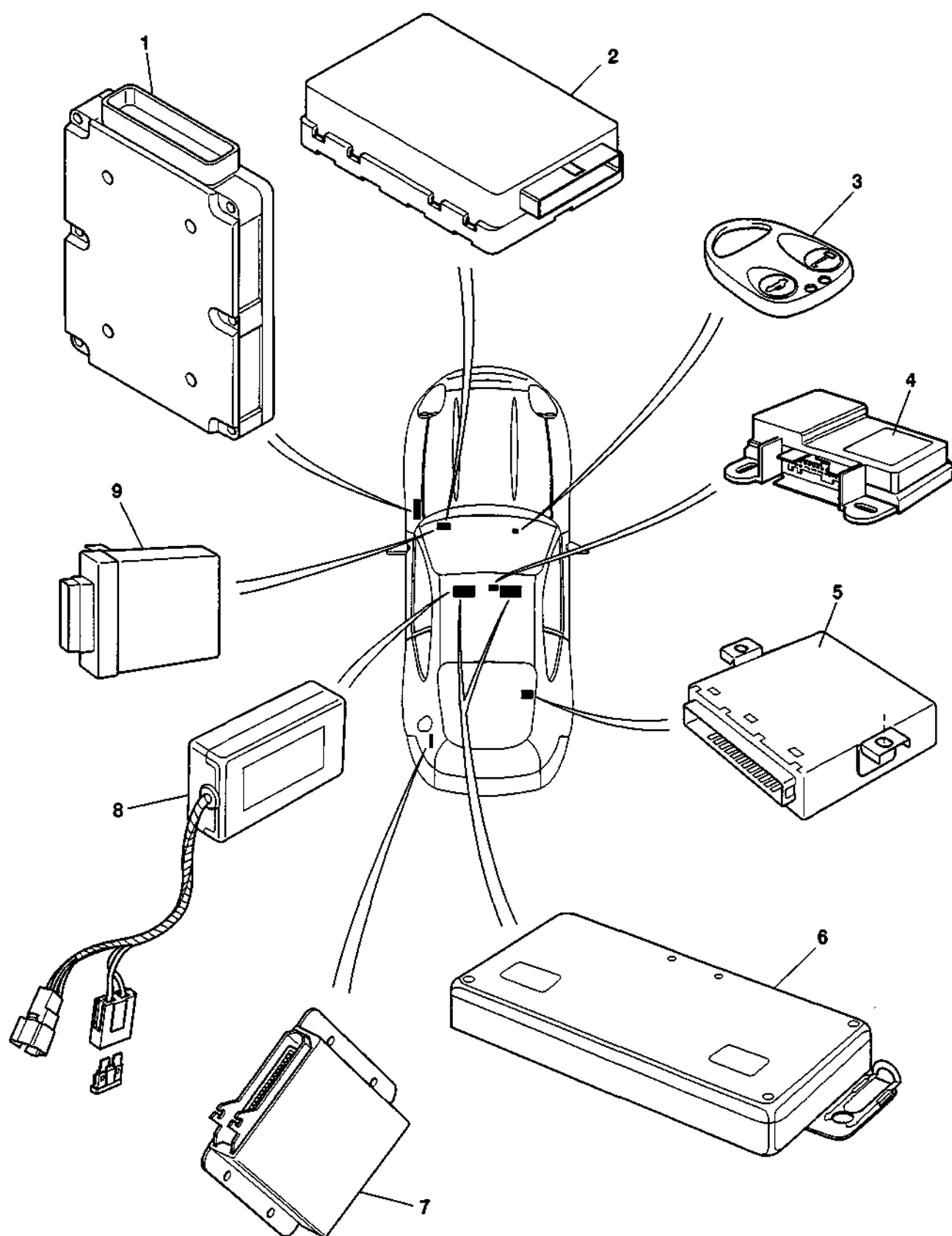


Figure 4

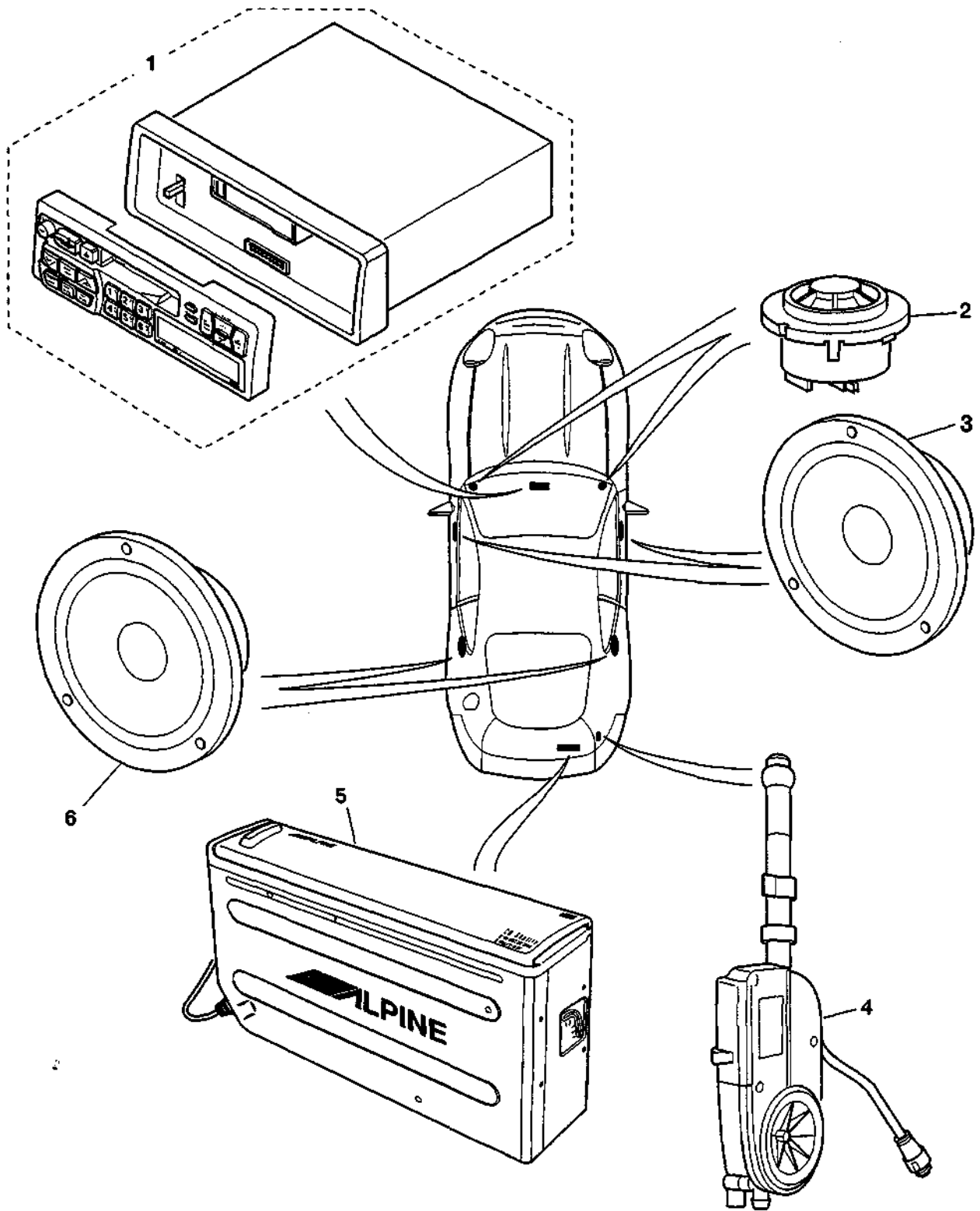


Figure 5

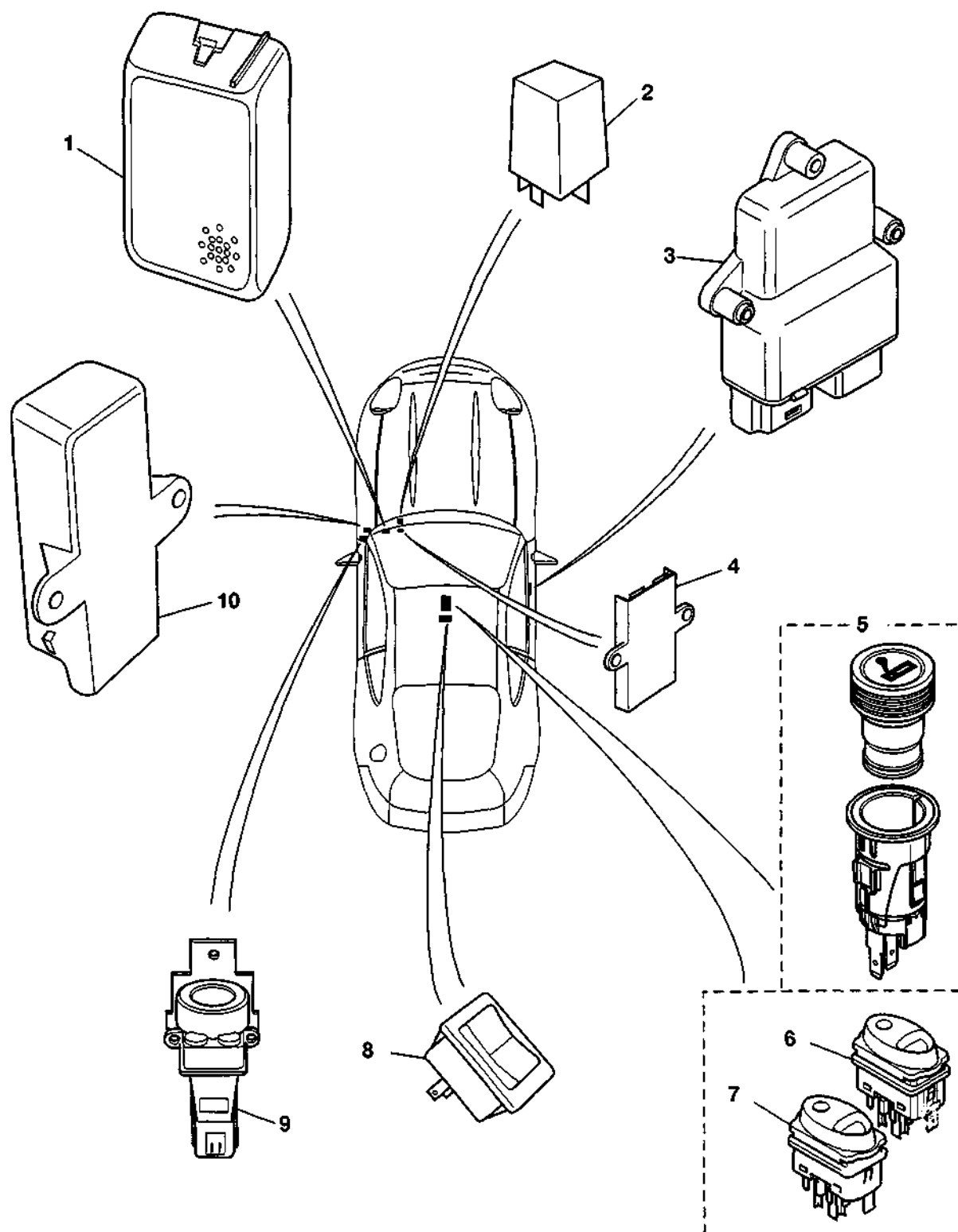


Figure 6

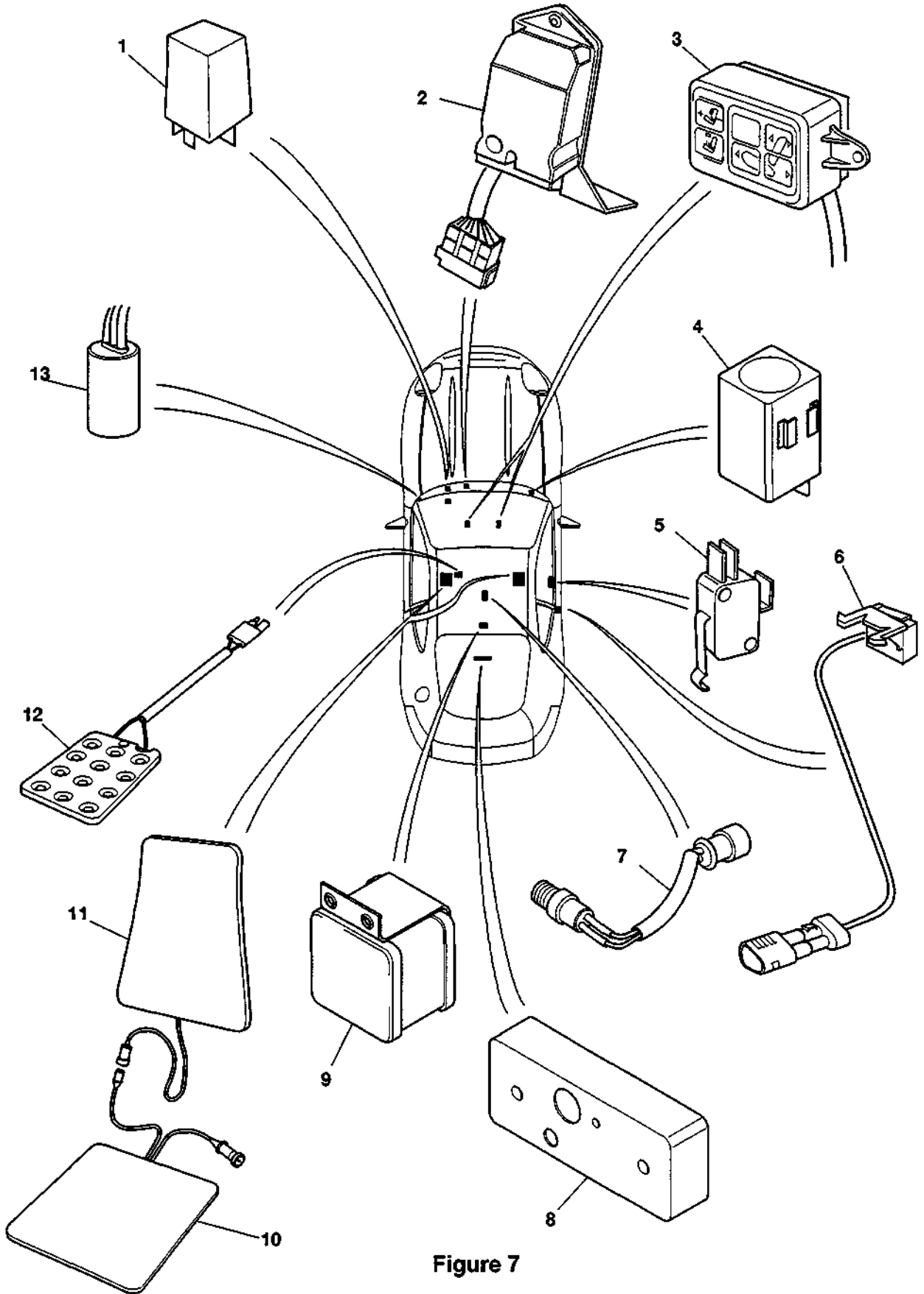


Figure 7

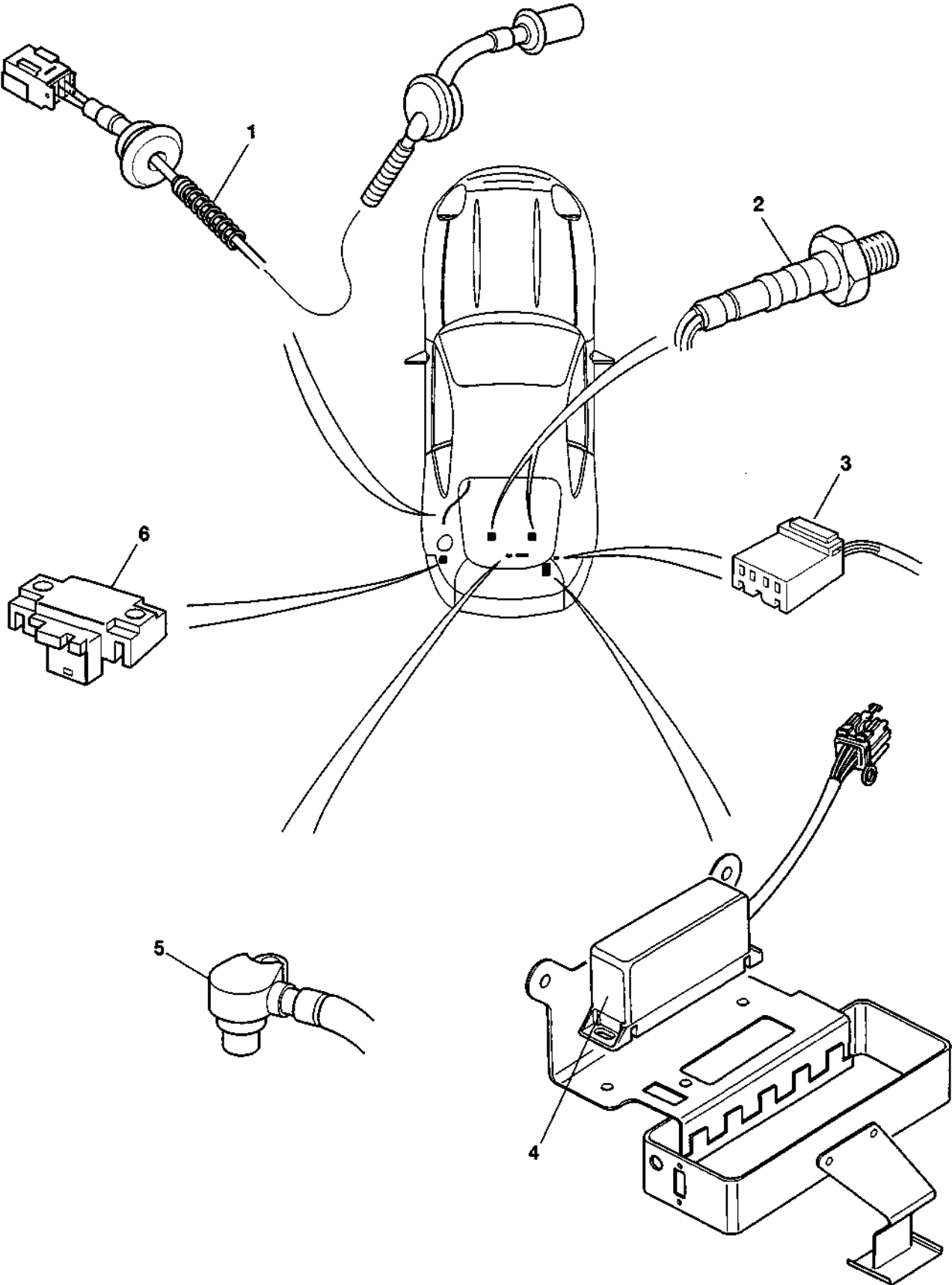


Figure 8

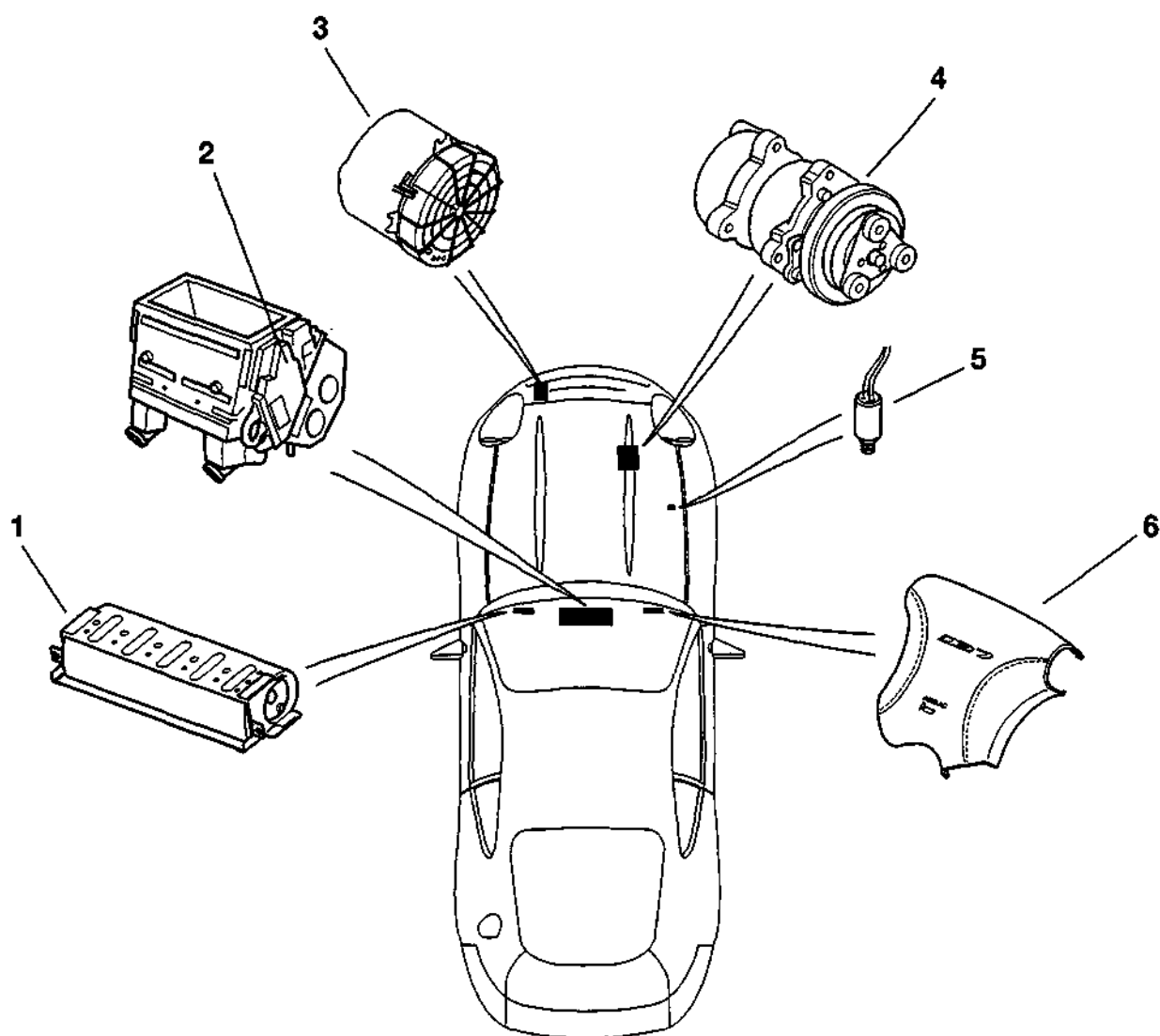


Figure 9

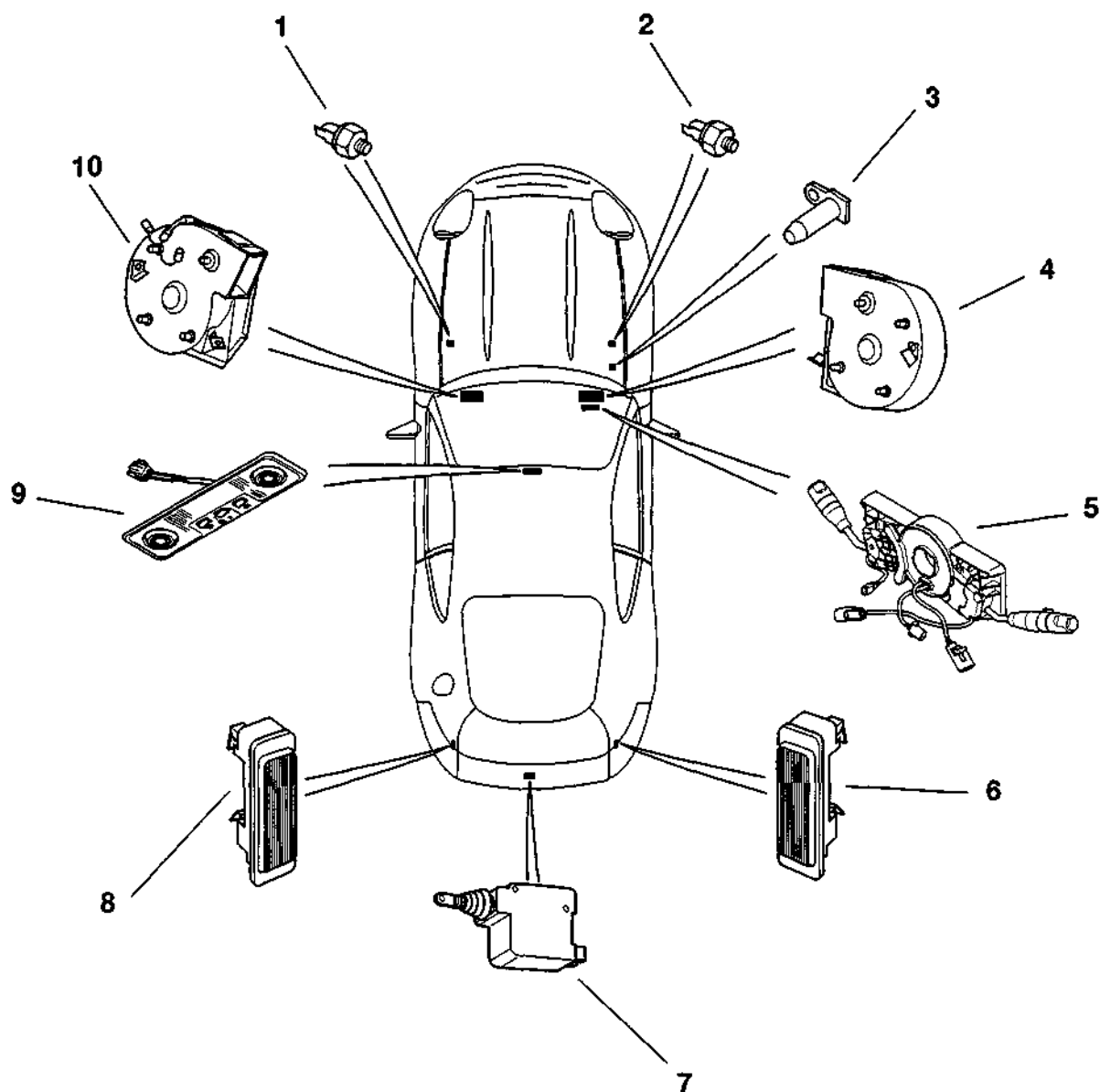


Figure 10

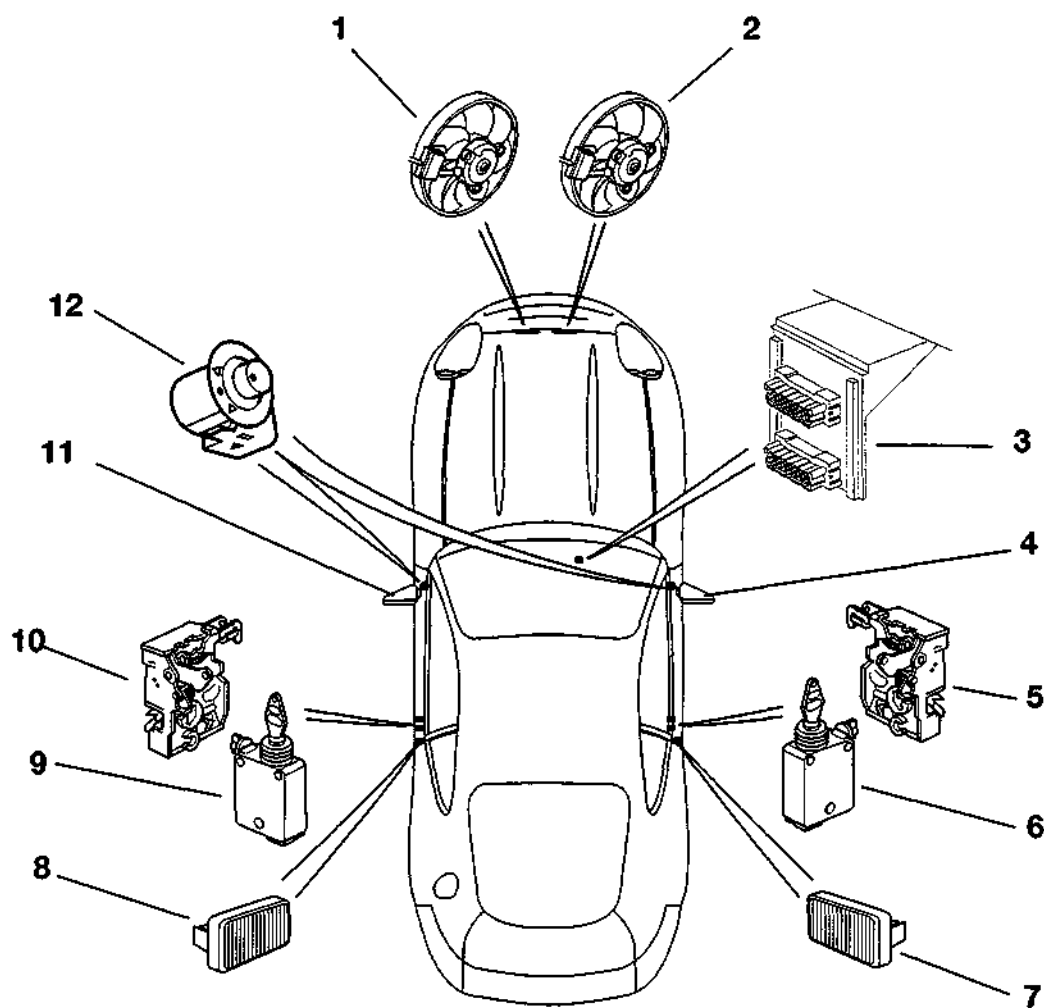


Figure 11

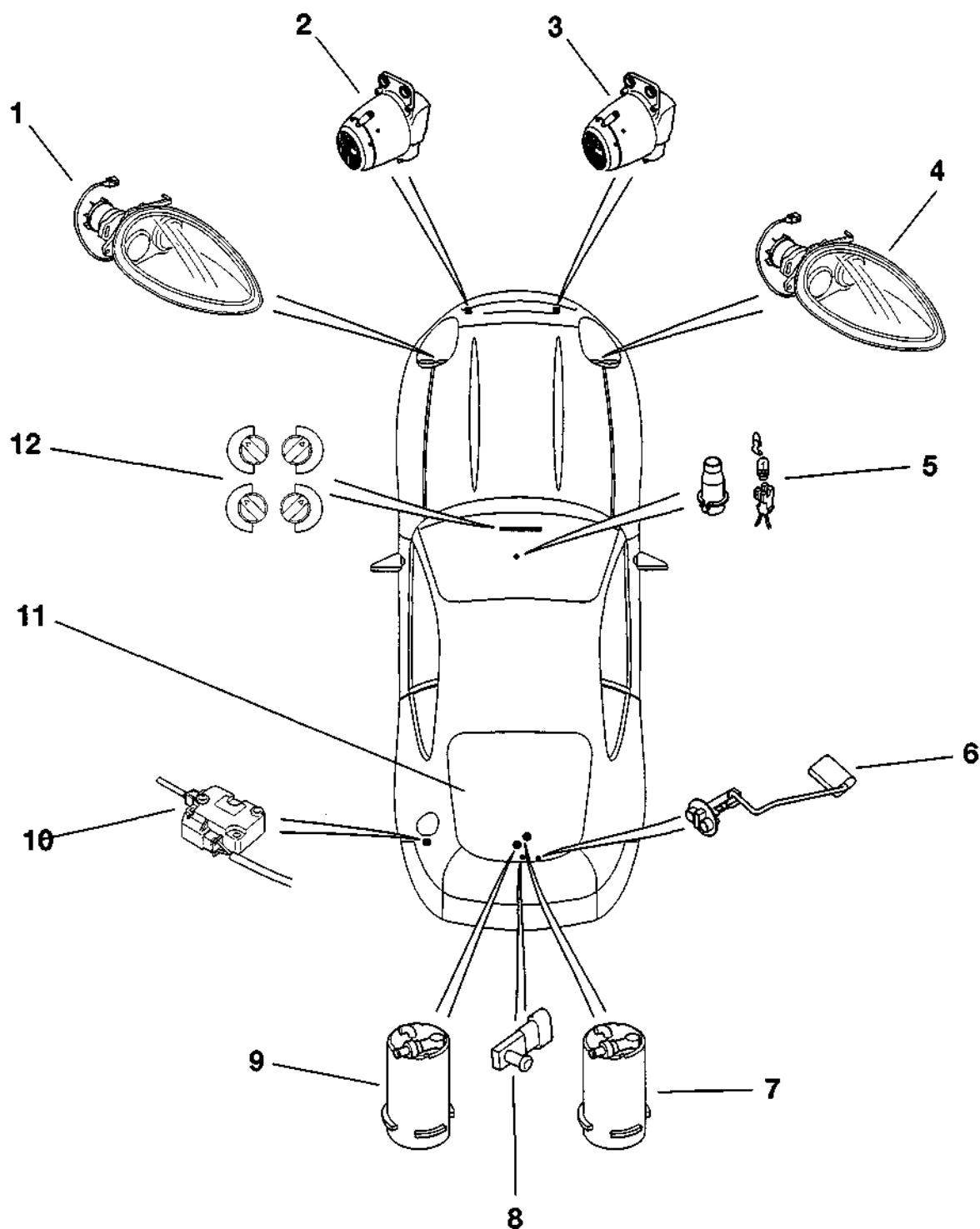
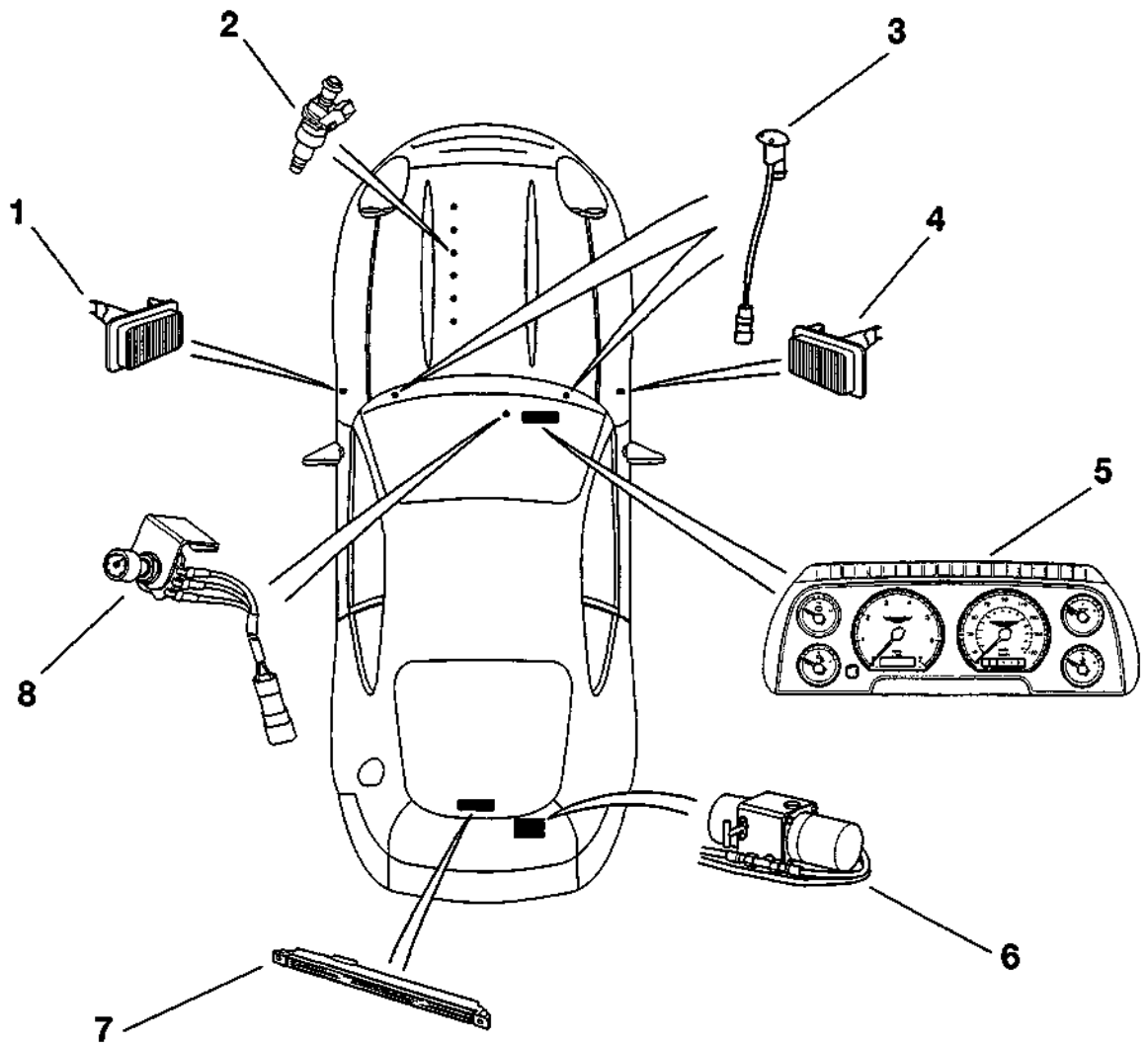


Figure 12

**Figure 13**

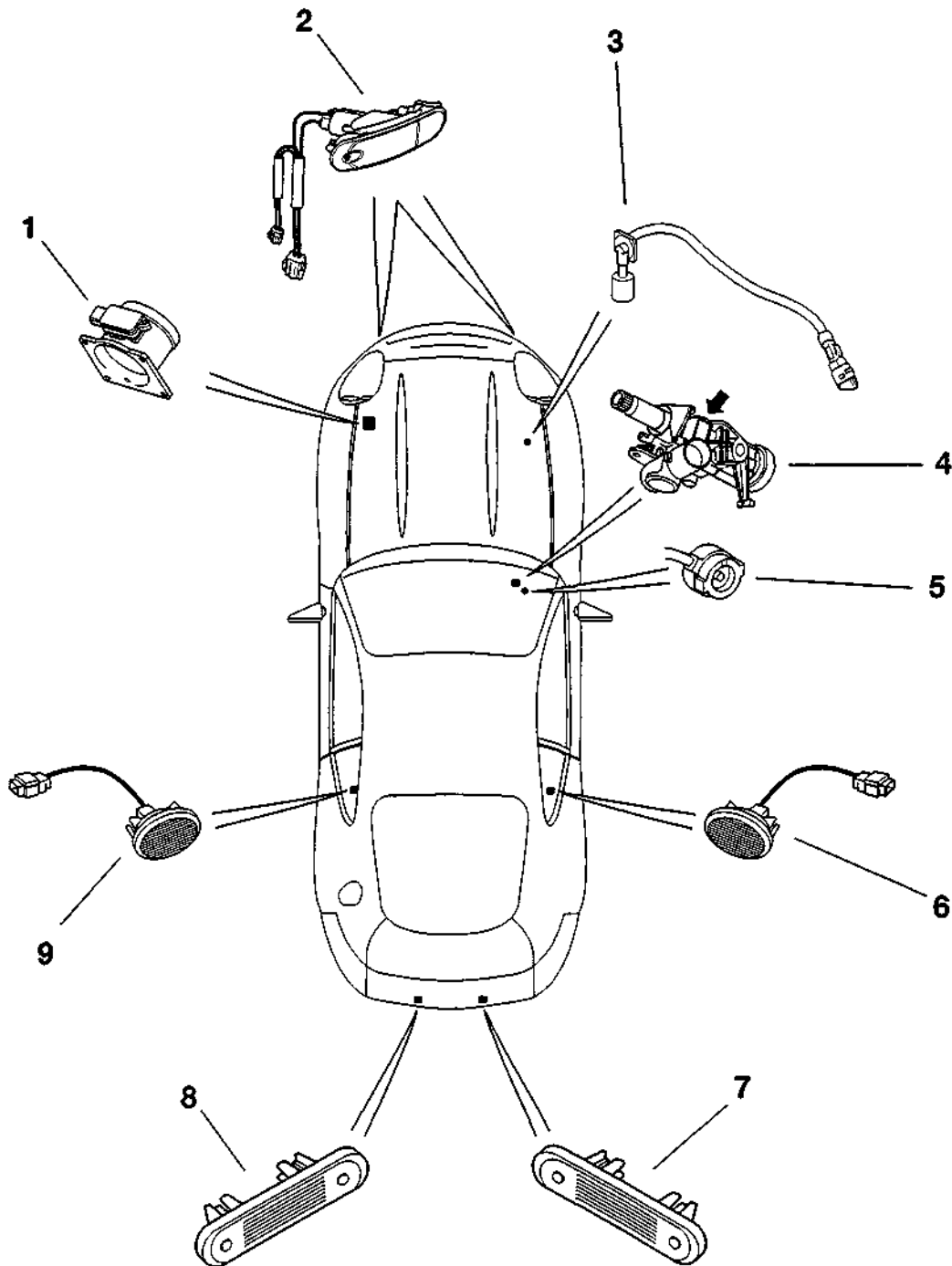


Figure 14

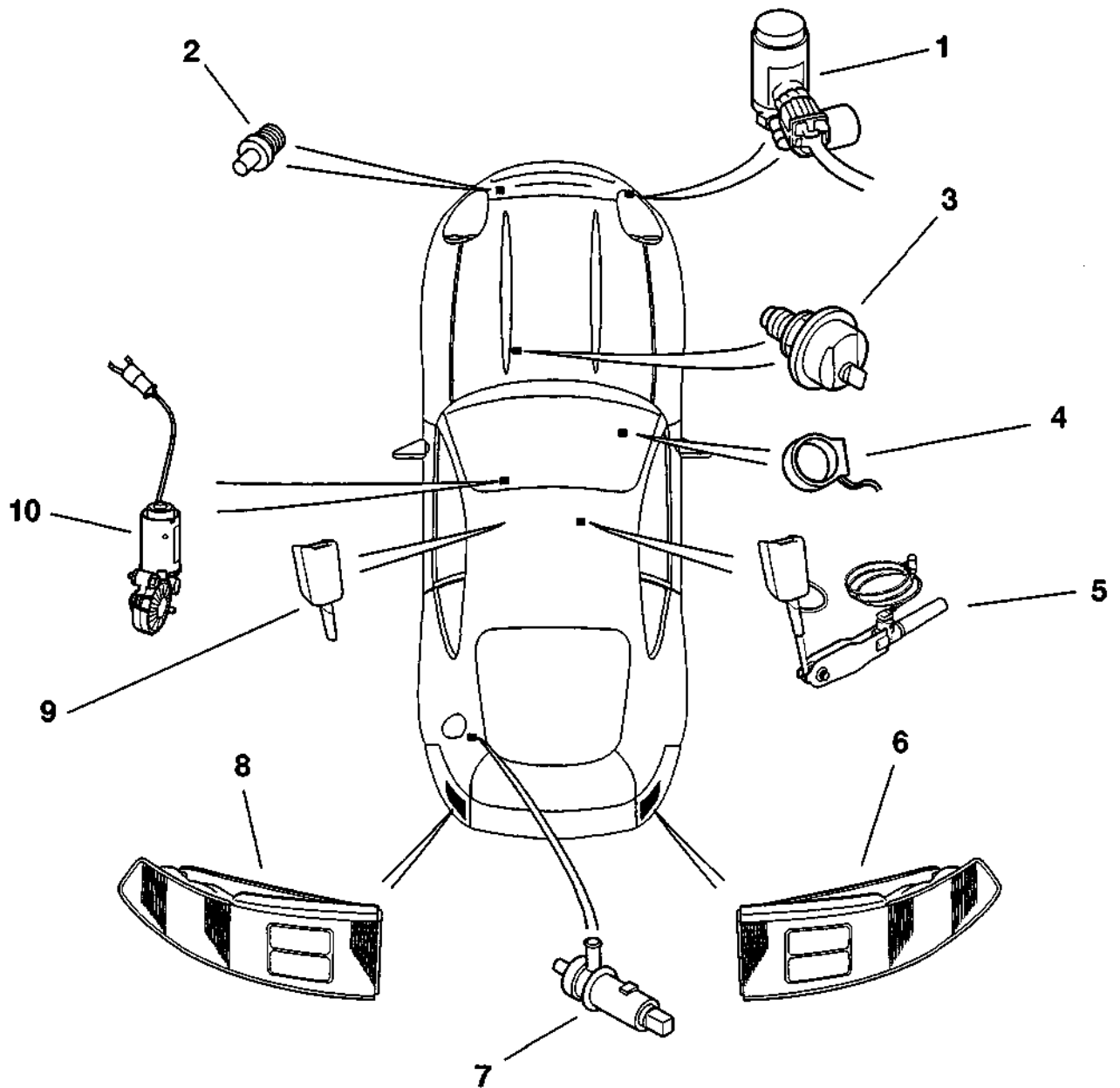


Figure 15

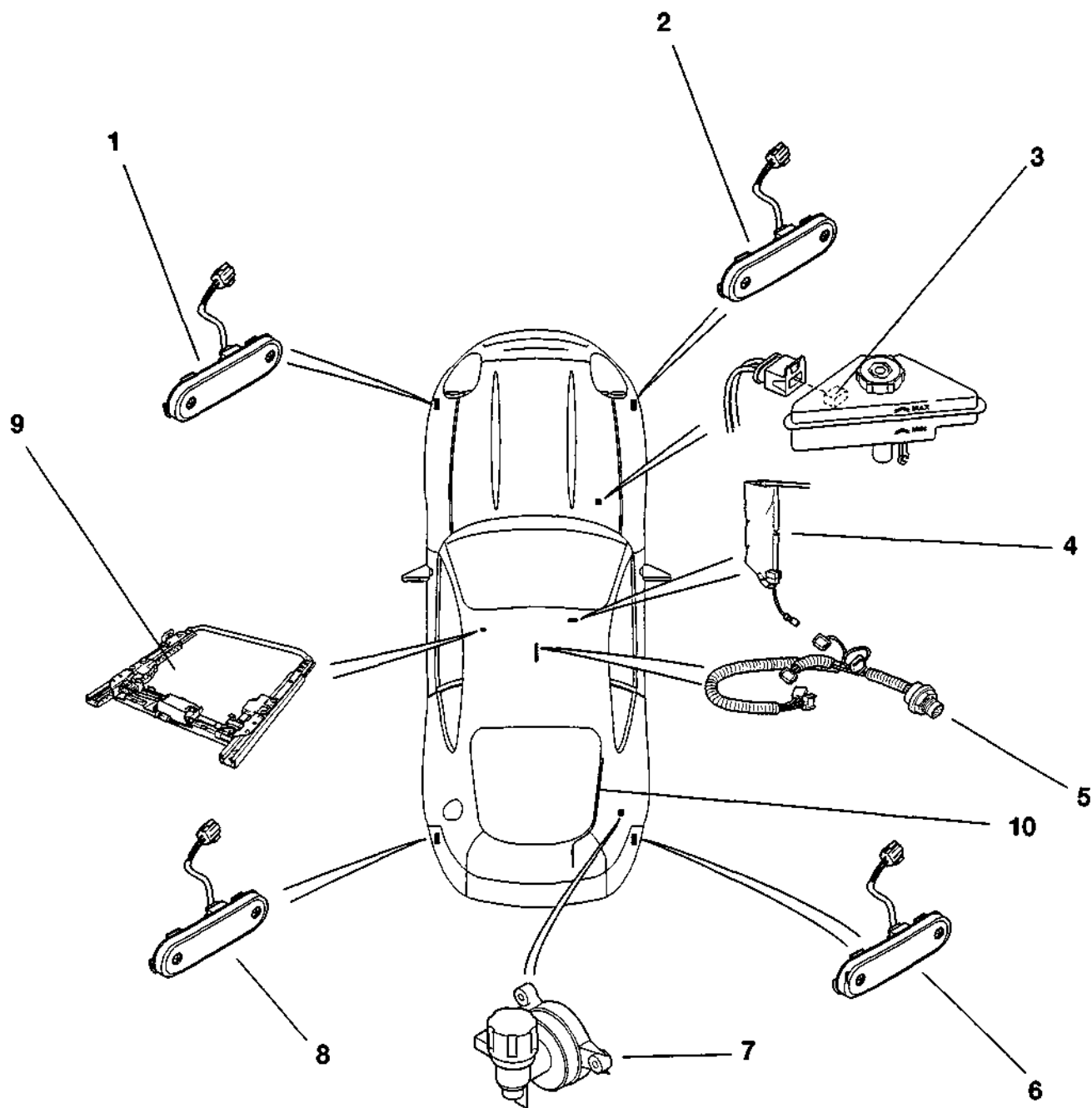
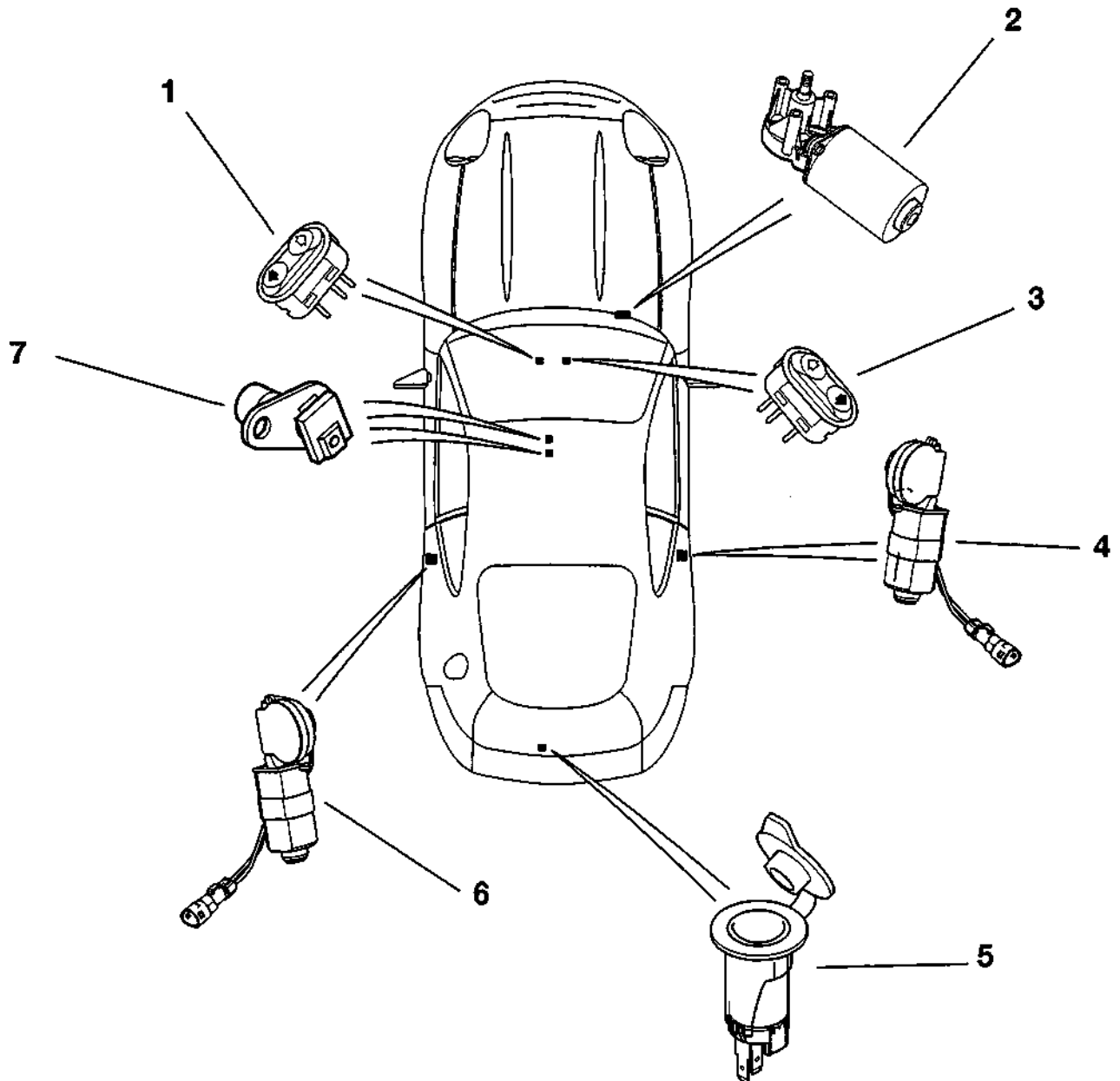


Figure 16

**Figure 17**

Relay Locations

Left Forward

Engine Bay LH Side (from front to rear)

Function	Base Colour	Relay/Module Cover.	Location
Front Fog Lights	Brown	Blue	1
Cruise Control Clutch Switch(Man)	Purple	Pink	2
Air Pump	Yellow	Blue	3
Horn	Red	Blue	4
Daytime Running Lights	Blue	Blue	5
Side Lights	Green	Pink	6
Headlamps	Blue	Blue	7
Dip Beam	Black	Blue	8
Main Beam	White	Blue	9
Starter	Yellow	Blue	10
Left Forward Fusebox			11

Right Forward

Engine Bay LH Side (from front to rear)

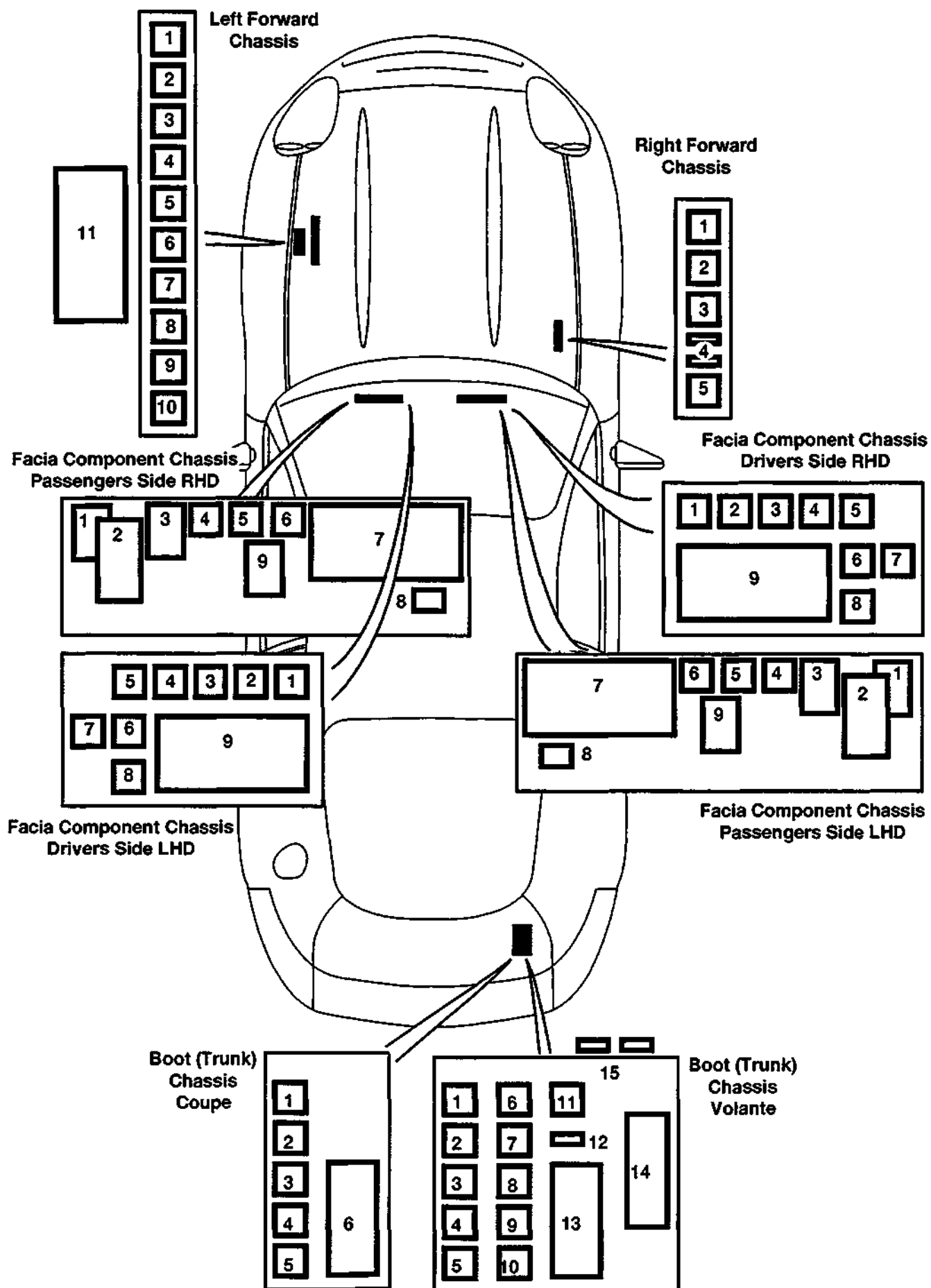
Function	Base Colour	Relay/Module Cover.	Location
Air Con (WOT)	Blue	Pink	1
Fan Run-On	Yellow	Pink	2
Air Con	Green	Blue	3
Cooling Fan Fuses (30A x 2)	Black	Green Maxi Fuse	4
Fan Timer Control Unit	Black	Cream	5

Facia Component Panel - RHD Passenger Side - Left to Right

Function	Base Colour	Relay/Module Cover.	Location
Heated Front Screen Timer Relay	Yellow	Grey	1
Multi-Function Module	Black	Black	2
Low Coolant Transmitter Module	Black	Black	3
Main Relay (Red Stripe)	Red	Silver	4
Auxiliary Load	White	Blue	5
Auxiliary Load	Black	Blue	6
Fusebox			7
Heated Front Screen Fuse 40A	Black	Orange Maxi Fuse	8
Door drop glass thermal cut-out	White	Black	9

Fascia Component Panel - RHD Drivers Side - Left to Right

Function	Base Colour	Relay/Module Cover.	Location
Gearbox Failure Warning	Black	Pink	1
Ignition Load	White	Blue	2
Courtesy Lights	Red	Blue	3
Indicator/Flasher Unit	Yellow	Black	4
Hazard Warning	Blue	Black	5
Heated Rear Window	Blue	Blue	6
Rear Fog Light	Brown	Blue	7
Dimmer Module	Black	Red	8
Fusebox		Black	9



Facia Component Panel - LHD Passenger Side - Right to Left

Function	Base Colour	Relay/Module Cover.	Location
Heated Front Screen Timer Relay	Yellow	Grey	1
Multi-Function Module	Black	Black	2
Low Coolant Transmitter Module	Black	Black	3
Main Relay (Red Stripe)	Red	Silver	4
Auxiliary Load	White	Blue	5
Auxiliary Load	Black	Blue	6
Fusebox			7
Heated Front Screen Fuse	Black	Orange Fuse	8
Otter Switch (door drop glass)	White	Black	9

Fascia Component Panel - LHD Drivers Side - Right to Left

Function	Base Colour	Relay/Module Cover.	Location
Gearbox Failure Warning	Black	Pink	1
Ignition Load	White	Blue	2
Courtesy Lights	Red	Blue	3
Indicator/Flasher Unit	Yellow	Black	4
Hazard Warning	Green	Black	5
Heated Rear Window	Blue	Blue	6
Rear Fog Light	Brown	Blue	7
Dimmer Module	Black	Red	8
Fusebox			9

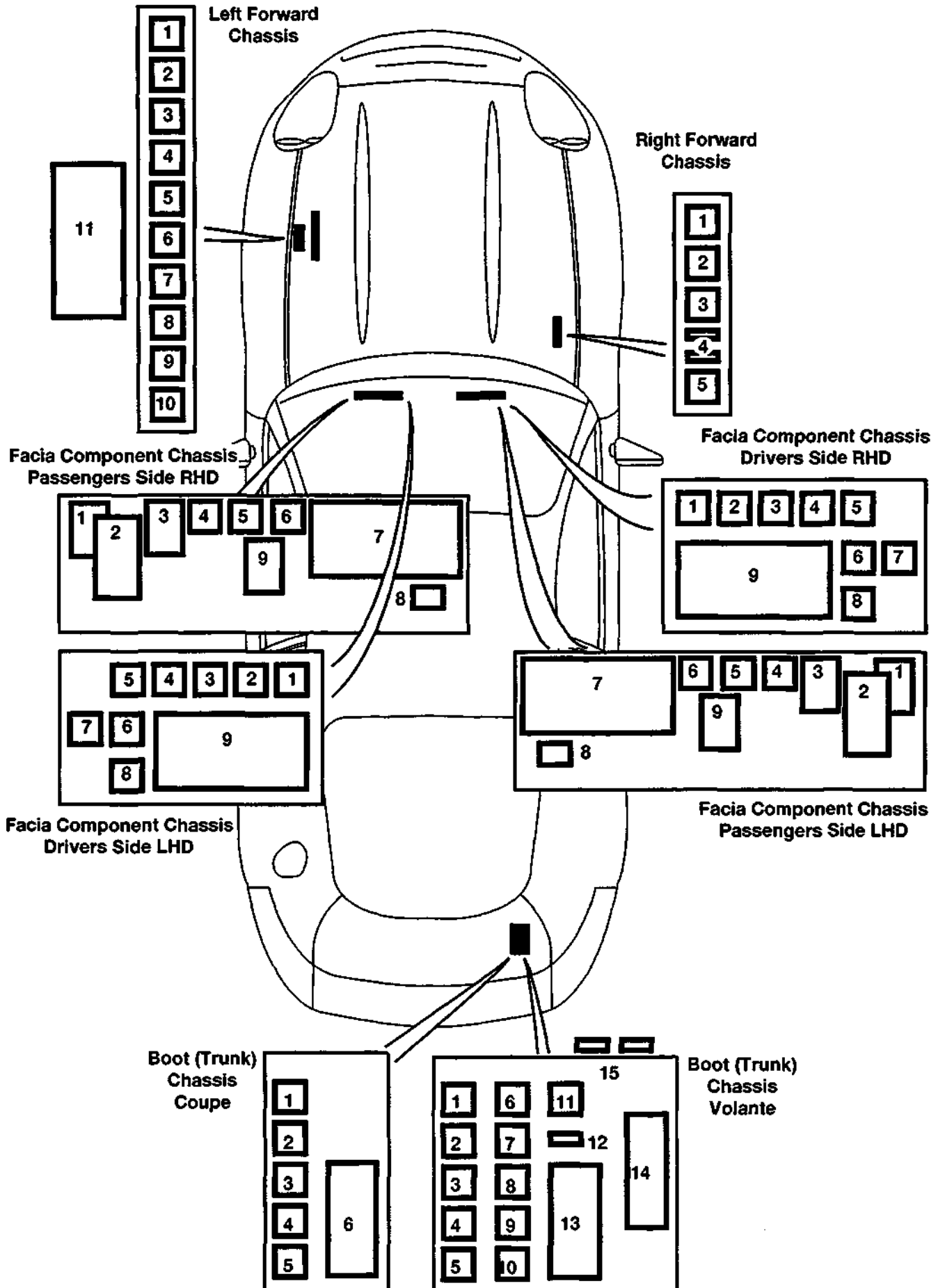
Seat Heater Relays - Beneath the Driver and Passenger Seats

Boot (Trunk) Relays Volante (Front To Rear)

Function	Base Colour	Relay/Module Cover.	Location
LH Quarter Up	White	Pink	1
LH Quarter Down	Yellow	Pink	2
Hood Down	Blue	Pink	3
Hood Up	Green	Pink	4
RH Quarter Down	Red	Pink	5
Reverse Lights	Yellow	Blue	6
Fuel Pump 1	Blue	Silver (Bosch)	7
Fuel Pump 2	Green	Silver (Bosch)	8
Tilt Sensor	White	Pink	9
RH Quarter Up	Black	Pink	10
Stop Lights	Brown	Blue	11
Hood Lift Fuse	Black	Green 30A	12
Fusebox			13
Hood (Roof) Control Module			14
Thermal Cut-Outs Quarter Glasses		Black	15

Boot (Trunk) Relays Coupe (Front To Rear)

Function	Base Colour	Relay/Module Cover.	Location
Stop Lights	Brown	Blue	1
Reverse Lights	Yellow	Blue	2
Fuel Pump 1	Blue	Silver (Bosch)	3
Fuel Pump 2	Green	Silver (Bosch)	4
Tilt Sensor	White	Pink	5
Fusebox			6



Sheet 1 Splices

Splice No **Wire Colour**
Wire No **Destination**

SPL 1 Red/Green

9 1 - B3
14 1 - A1
101 2 - C6

SPL 2 Black

4 1 - B3
5 1 - A2
8 1 - B3
10 1 - A2
15 1 - A1
17 1 - A1
26 1 - C2

SPL 3 Purple/Yellow

39 1 - A3
41 1 - A3
60 1 - B5

SPL 4 Black

11 1 - A2
19 1 - C1
22 1 - C1
27 1 - C2
31 1 - D2
40 1 - A3
42 1 - A4

SPL 5 Red/Slate

21 1 - C1
28 1 - C2
99 1 - C6

SPL 6

18 1 - A1
20 1 - C1
48 1 - A4
130 2 - C6

Red/Yellow

SPL 7

24 1 - C2
25 1 - C2
56 1 - A5
135 2 - C6

Green/Yellow

SPL 8

29 1 - D2
43 1 - C5
46 1 - A4
62 1 - A6
75 2 - C6
79 2 - C6
116 2 - C6

Black

Sheet 2 Splices

Splice No Wire Colour
Wire No Destination

SPL 9 White/Green

70 2 - B2
72 2 - B2
95 2 - D3
59 1 - B5

SPL 10 Blue/Red

77 2 - A2
102 2 - D3
103 2 - D3

SPL 11 Blue

76 2 - A2
87 2 - C2 White/Blue
89 2 - C3 White/Blue

SPL 12 White/Brown

63 1 - C1
69 2 - C1
91 2 - C3

SPL 13 Blue/White

81 2 - B2
96 2 - D3
97 2 - D3
134 2 - D6

SPL 14 Lt Green/Yellow

51 1 - C1
109 2 - D1
126 2 - A6
136 2 - D6

SPL 15 White/Blue

73 2 - B2
88 2 - C3
131 2 - C6 Blue
139 2 - D6

SPL 16 Brown/Blue

67 2 - A1
112 2 - D6
137 2 - A1

SPL 17 Red/Green

98 2 - D3
100 2 - D3
132 2 - C3 Red

SPL 18 White/Purple

90 2 - C3
94 2 - D3
108 2 - D1
110 2 - D1
133 2 - D6

SPL 19 Red

64 1 - C1
68 2 - A1
129 2 - B6
132 2 - C3

SPL 20 Brown

82 2 - A3
106 2 - C1
113 2 - D1
118 2 - B4

SPL 21 Brown

78 2 - A3
92 2 - C3
105 2 - C1
111 2 - D1
119 2 - B4

SPL 22 Brown

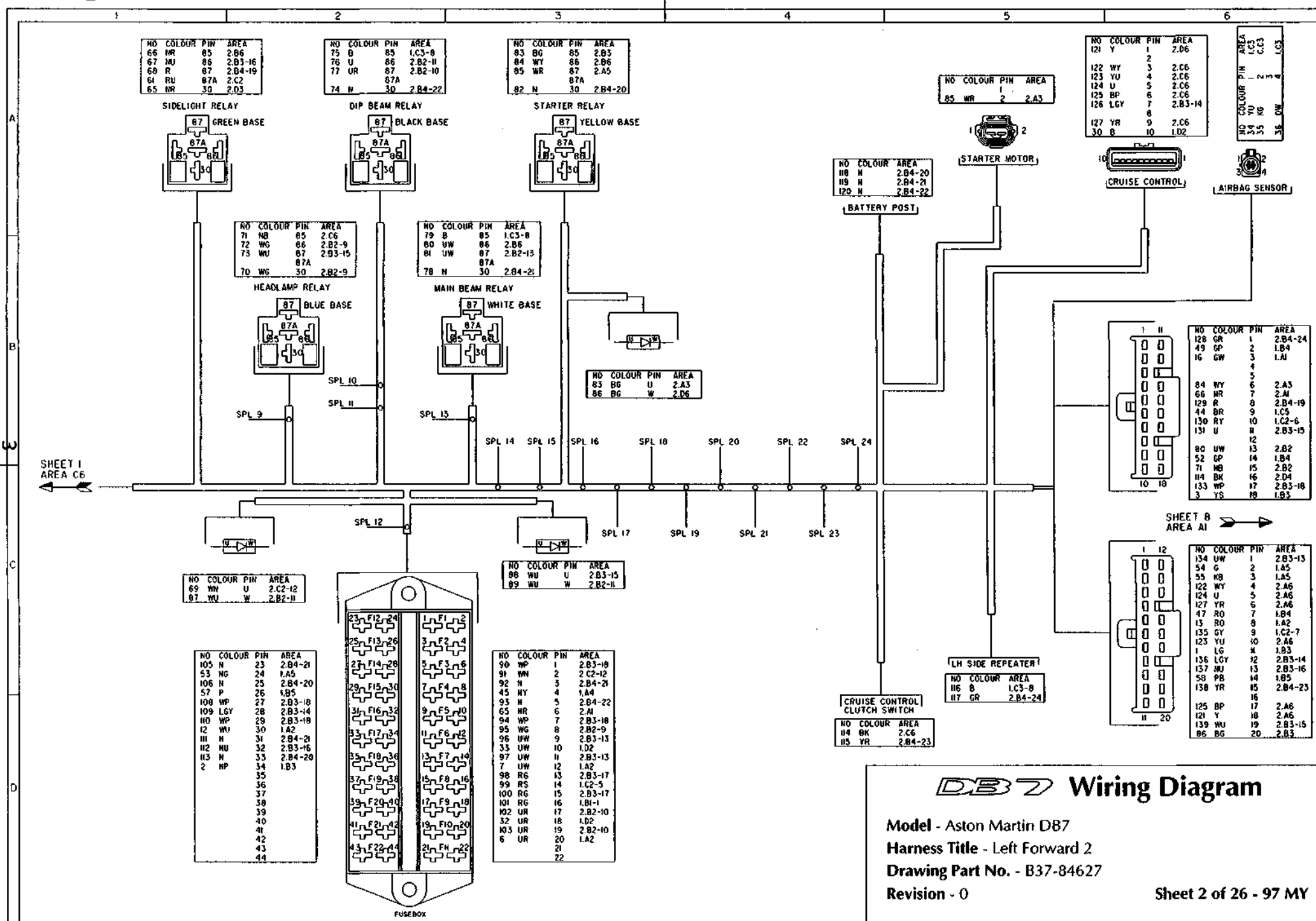
74 2 - A2
93 2 - C3
120 2 - B4

SPL 23 Yellow/Red

50 1 - C1
115 2 - D4
138 2 - B6

SPL 24 Green/Red

23 1 - B1
117 2 - D5
128 2 - B6



Sheet 3 Splices

Splice No Wire No	Wire Colour Destination
----------------------	----------------------------

SPL 25 Pink/Black

155	3 - A5
181	3 - D2
176	3 - D4
929	3 - A3

SPL 26 Blue

152	3 - A3
164	3 - D1
173	3 - D3

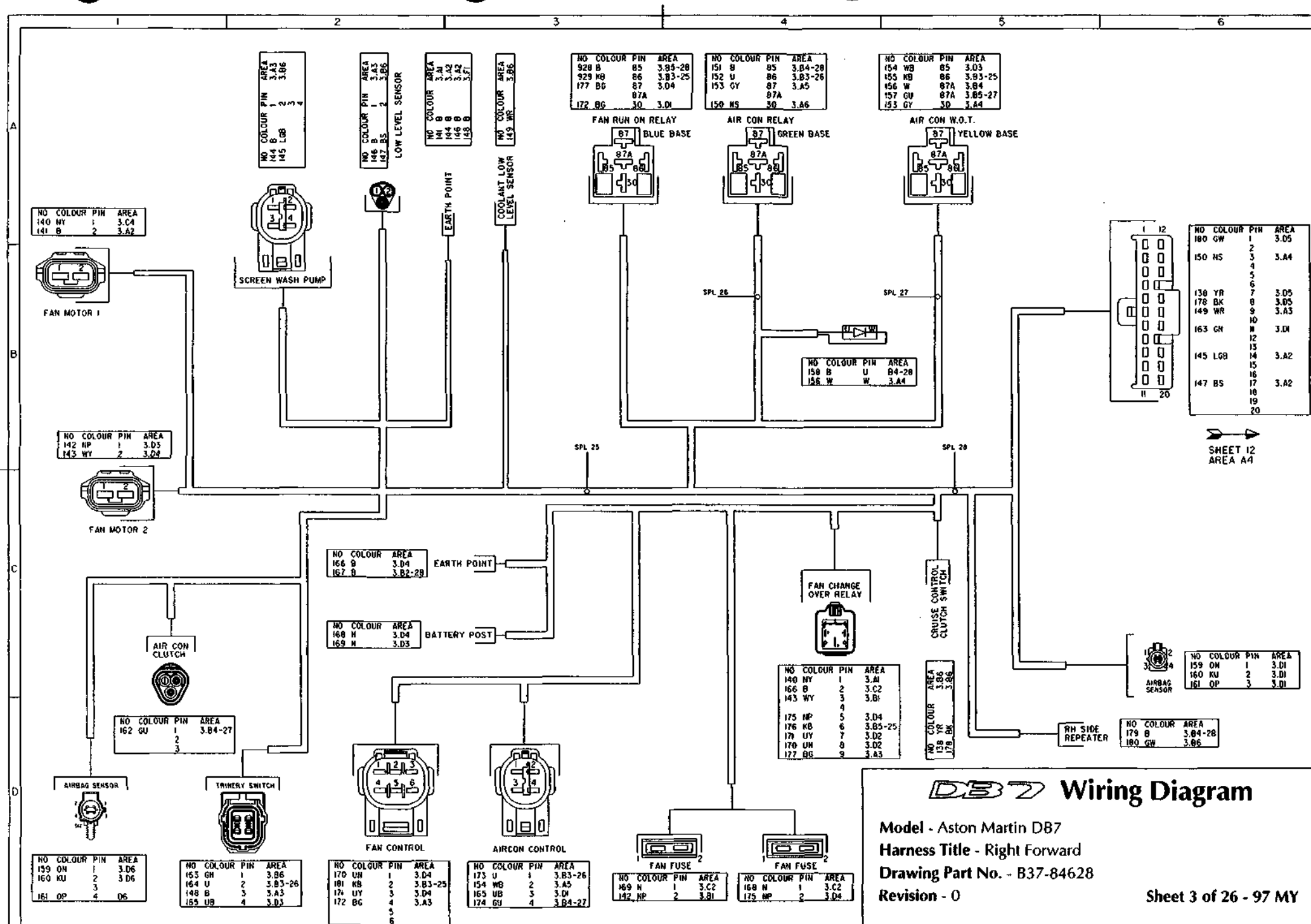
SPL 27 Green/Blue

157	3 - A4
162	3 - D1
174	3 - D3

SPL 28 Black

151	3 - A3
158	3 - B4
167	3 - C2
179	3 - D5
928	3 - A3

4



Sheet 4 Splices

Splice No	Wire Colour
Wire No	Destination

SPL 29 Green/Blue

203	4 - A4
215	4 - D2
221	4 - B5

SPL 30 Black

186	4 - B1
202	4 - A2
220	4 - C5
222	4 - B5

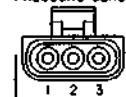
NO	COLOUR	PIN	AREA
200	RP	1	4.B6
201	RG	2	4.C5
197	BK	3	4.B1
202	B	4	4.B4-30
190	RK	5	BI
		6	

PERFORMANCE
MODE SWITCH



NO	COLOUR	PIN	AREA
203	GU	1	4.B3-29
204	GP	2	4.C5
205	WU	3	4.C5

BAROMETRIC
PRESSURE SENSOR



NO	COLOUR	PIN	AREA
207	OR	38	4.02
182	S	40	4.B1
191	GB	41	4.B1
206	DW	42	4.02
209	DP	43	4.02
196	KU	44	4.B1
184	O	45	4.B1
		46	

NO	COLOUR	PIN	AREA
210	OS	48	4.02
218	G	50	4.02
217	U	51	4.02
209	DB	52	4.02
193	KB	53	4.B1
222	B	54	4.B4-30
185	NR	55	4.B1

NO	COLOUR	PIN	AREA
212	OW	22	4.02
200	RP	23	4.A2
195	GP	24	4.B1
214	OY	25	4.02
		26	
		27	
		28	
192	W	29	4.B1
		30	
		31	
		32	
		33	
		34	
		35	
216	R	36	4.02
219	N	37	4.02

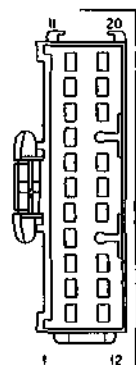


GEARBOX E.C.U.

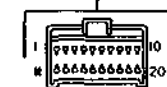
NO	COLOUR	PIN	AREA
198	RN	1	4.B1
21	OK	2	4.02
213	OU	4	4.02
201	RG	5	4.A2
220	B	6	4.B4-30
194	YG	7	4.B1
		8	
		9	
		10	

NO	COLOUR	PIN	AREA
187	BU	8	4.B1
189	SP	12	4.B1
		13	
221	GU	14	4.B3-29
204	GP	15	4.A4
199	K	16	4.B1
205	WU	17	4.A4
		18	
		19	

NO	COLOUR	PIN	AREA
182	S	1	4.B5
		2	
184	O	3	4.B5
185	NR	4	4.B5
186	B	5	4.B4-30
187	BU	6	4.B5
188	G	7	4.02
189	SP	8	4.B5
190	RK	9	4.A2
191	GB	10	4.B5
192	W	11	4.B6
193	KB	12	4.B5
194	YG	13	4.B5
195	GP	14	4.B6
196	KU	15	4.B5
197	BK	16	4.A2
198	RN	17	4.B5
199	K	18	4.B5
		19	
		20	



ENGINE HARNESS



GEARBOX LINK HARNESS

NO	COLOUR	PIN	AREA
206	OW	1	4.B5
207	OR	2	4.B5
188	G	3	4.B1
208	DP	4	4.B5
209	DB	5	4.B5
210	OS	6	4.B5
211	OK	7	4.B5
212	OW	8	4.B6
213	OU	9	4.B6
214	OY	10	4.B6
215	GU	11	4.B3-29
216	R	12	4.B6
217	U	13	4.B5
218	G	14	4.B5
219	N	15	4.B6
		16	
		17	
		18	
		19	
		20	

SHEET 7
AREA AI

DB7 Wiring Diagram

Model - Aston Martin DB7

Harness Title - Auto Transmission

Drawing Part No. - 837-84629

Revision - 0

Sheet 4 of 26 - 97 MY

Sheet 5 Splices

Splice No Wire Colour
Wire No Destination

SPL 31 Pink/Black
227 5 - D2
230 5 - D2
334 6 - C2

SPL 32 White/Blue
232 5 - D3
234 5 - D4
13 6 - C2

SPL 33 Black
223 5 - D1
233 5 - D3
235 5 - D4

SPL 34 Red
258 5 - C3
295 6 - A2
263 5 - C4

SPL 35 Pink/Black
251 5 - A4
253 5 - B5
259 5 - C3
293 6 - A2
365 5 - B3 - 37

SPL 36 Yellow/Black
240 5 - B1
250 5 - A3
260 5 - C3
262 5 - C4
305 6 - A2

SPL 37 Pink/Black
245 5 - A2
247 5 - A3
365 5 - B5 - 35
366 5 - B2 - 38

SPL 38 Pink/Black
241 5 - A1
243 5 - A2
366 5 - B3 - 37

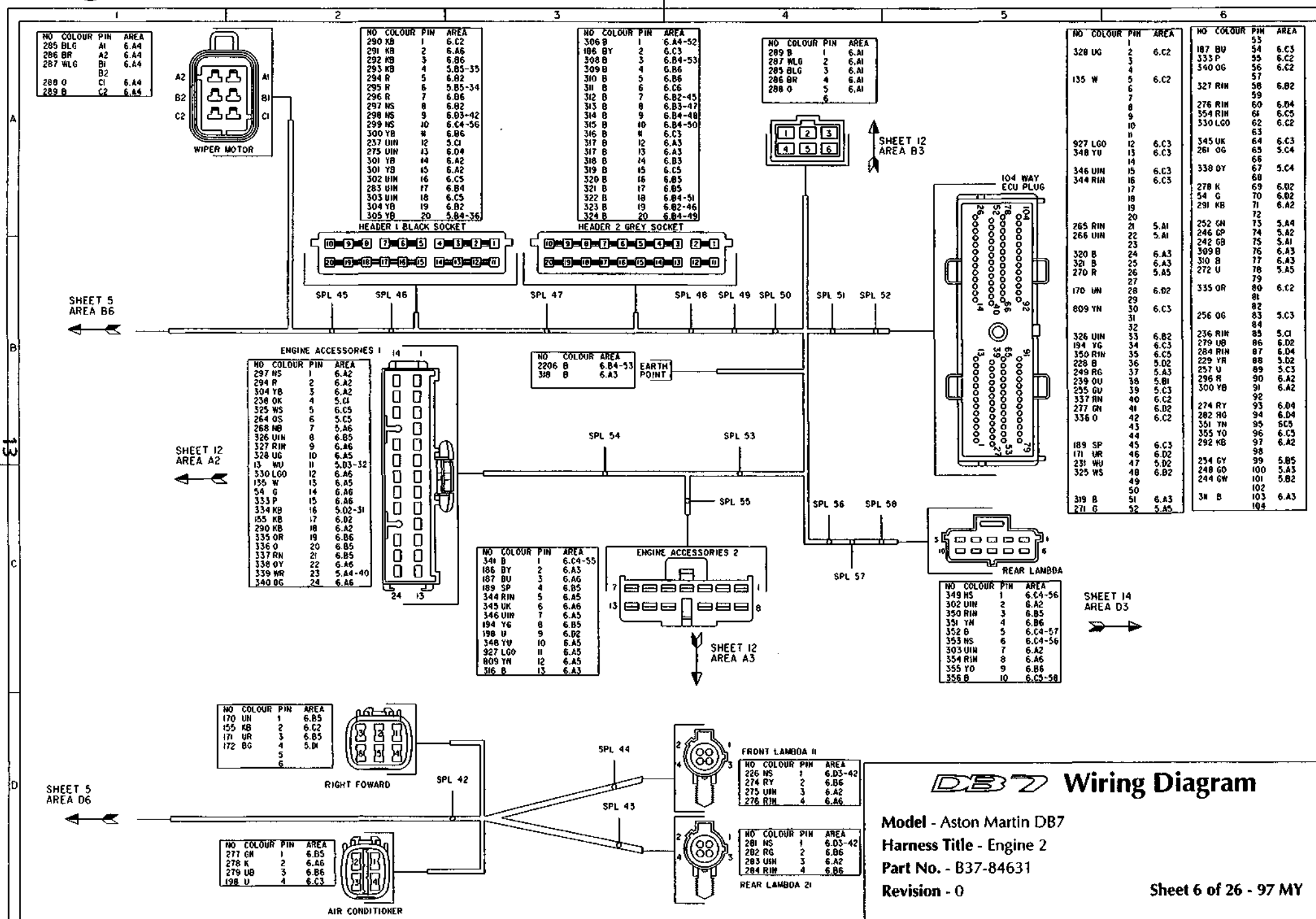
SPL 39 Braid
363 6 - B2 - 45

SPL 40 White/Red
267 5 - A5
269 5 - A6
273 5 - A6
339 6 - C2

SPL 41 Braid
357 6 - B4 - 48

Sheet 6 Splices

Splice No Wire No	Wire Colour Destination		
SPL 42	Brown/Slate	SPL 50	Black
226	6 - D4	315	6 - A3
281	6 - D4	361	6 - B4 - 58 Braid
298	6 - A2	SPL 51	Black
SPL 43	Braid	322	6 - A3
358	6 - B2 - 46	360	6 - B3 - 54 Braid
SPL 44	Braid	SPL 52	Black
359	6 - B3 - 47	306	6 - A3
SPL 45	Black	364	6 - C4 - 55 Braid
312	6 - A3	SPL 53	Black
363	5 - C1 - 39 Braid	2205	5 - C2
SPL 46	Black	308	6 - A3
323	6 - A3	2206	6 - B3
358	6 - D3 - 43 Braid	SPL 54	Braid
SPL 47	Black	360	6 - B4 - 51
313	6 - A3	SPL 55	Black
359	6 - D3 - 44 Braid	341	6 - C3
SPL 48	Black	364	6 - B5 - 52
314	6 - A3	SPL 56	Brown/Slate
357	5 - A2 - 41 Braid	299	6 - A2
SPL 49	Black	349	6 - C5
324	6 - A3	353	6 - C5
362	6 - C4 - 57 Braid	SPL 57	Black
		352	6 - C5
		362	6 - B4 - 49 Braid
		SPL 58	Black
		356	6 - C5
		361	6 - D4 - 50 Braid



Sheet 7 Splices

Splice No	Wire Colour
Wire No	Destination
SPL 220	Green
188	7 - A1
2187	7 - A5
2188	7 - A5

NO	COLOUR	PIN	AREA
206	OW	1	7.A5
207	OR	2	7.A5
208	OP	3	7.A2-220
210	OB	4	7.A5
210	OS	6	7.A5
211	OK	7	7.A5
212	ON	8	7.A5
213	OU	9	7.A5
214	OY	10	7.A5
215	BU	11	7.A5
216	R	12	7.A5
217	U	13	7.A5
218	C	14	7.A5
219	N	15	7.A5
		16	
		17	
		18	
		19	
		20	

SHEET 4
AREA C3



SPL 220

GEARBOX CONNECTOR

NO	COLOUR	PIN	AREA
207	OR	1	7.A1
208	OP	2	7.A1
2107	WR	3	7.A2-220
211	OK	4	7.A1
212	ON	5	7.A1
213	OU	6	7.A1
214	OY	7	7.A1
215	BU	8	7.A1
216	OW	9	7.A1
2188	WR	10	7.A2-220
219	OB	11	7.A1
		12	
210	OS	13	7.A1
		14	



INPUT SPEED SENSOR

NO	COLOUR	PIN	AREA
219	N	1	7.A1
218	G	2	7.A1



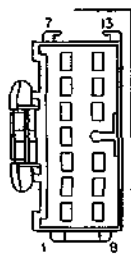
OUTPUT SPEED SENSOR

NO	COLOUR	PIN	AREA
216	R	1	7.A1
217	U	2	7.A1



SHEET 11
AREA C3

NO	COLOUR	PIN	AREA
830	BG	1	7.C2
803	SLG	2	7.C5
123	YU	3	7.C1
831	YR	4	7.C1
		5	
		6	
		7	
		8	
		9	
835	B	10	C5
836	OG	11	C2
831	YR	12	7.C1
123	YU	13	7.C1



123, 830, 831, 836
TAPED IN LOOM

REVERSE LAMP
SWITCH



NO	COLOUR	PIN	AREA
803	SLG	2	7.C1
835	B	3	7.C1

DB7 Wiring Diagram

Model - Aston Martin DB7

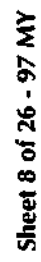
Harness Title - Auto/Manual Transmission

Part No. - B37-84632

Revision - 0

Sheet 7 of 26 - 97 MY

Sheet 8 Splices			
Splice No	Wire Colour	Wire No	Destination
SPL 59	Black/Pink		
114	8 - A1		
612	8 - D3		
1012	10 - B2 - 95		
SPL 60	Black/Purple		
387	8 - D1		
607	8 - D3		
940	12 - A5		
SPL 61	Purple/Green		
377	8 - D1		
684	9 - B1		
804	10 - D4		
988	12 - B6		
SPL 62	Black		
591	8 - A2		
595	8 - A3		
598	8 - A3		
630	8 - C5		
685	9 - B1		
701	9 - D1		
SPL 63	Black		
389	8 - D1		
590	8 - A2		
601	8 - A3		
619	8 - C4		
716	9 - D3		
756	9 - B6		
791	10 - B4		
SPL 64	Black		
375	8 - D1		
594	8 - A2		
790	10 - B4		
SPL 65	Purple/White		
378	8 - D1		
602	8 - A3		
700	9 - D1		
805	10 - D4		
989	12 - B6		
SPL 66	Black/White		
376	8 - D1		
593	8 - A2		
789	10 - B4		
SPL 67	Black		
592	8 - A2		
670	9 - A1		
693	9 - A2		
755	9 - B6		
762	10 - B1		
955	12 - D2		
1015	10 - B3 - 110		
SPL 68	Red/White		
604	8 - D3		
634	8 - C5		
757	9 - B6		
1001	11 - B2 - 114		
SPL 69	Light Green		
384	8 - D1		
385	8 - D1		
647	8 - A4		
847	11 - D3		
990	12 - C6		
SPL 70	Brown/Red		
66	8 - A1		
633	8 - C5		
672	9 - A1		
936	12 - A5		
SPL 71	Black		
599	8 - A2		
687	9 - A1		
699	9 - A2		
898	9 - B6		
SPL 72	White/Orange		
642	8 - A4		
650	8 - A4		
651	8 - A4		
653	8 - A4		
703	9 - D1		
SPL 73	White/Pink		
662	8 - A6		
706	9 - D2		
708	9 - D2		
751	9 - B6		
SPL 74	White		
624	8 - C4		
635	8 - C5		
644	8 - A4		
648	8 - A4		
661	8 - A6		
719	9 - D3		
948	12 - D1		
SPL 75	Brown		
637	8 - A4		
640	8 - A4		
665	8 - A6		
787	10 - A2		



Sheet 9 Splices

Splice No Wire Colour
Wire No Destination

SPL 76 **Blue**
131 8 - A1
688 9 - B2

SPL 77 **White/Pink**
608 8 - D3
646 8 - A4
659 8 - A6
702 9 - D1
718 9 - D3
1003 11 - B3 - 117

SPL 78 **Red/Yellow**
130 8 - A1
690 9 - B3

SPL 79 **Green/Red**
128 8 - A1
675 9 - A1
721 9 - B4
727 9 - A4
823 10 - C5

SPL 80 **Red/Brown**
388 8 - D1
625 8 - C4
829 10 - D5
1013 10 - B5 - 107

SPL 81 **Black/Purple**
125 8 - B1
679 9 - A1
825 11 - D1
856 11 - D3

SPL 82 **Lt Green/Yellow**
136 8 - B1
694 9 - A2
857 11 - D3
2200 11 - D1

SPL 83 **Blue**
124 8 - B1
692 9 - A2
731 11 - B1
855 11 - D3

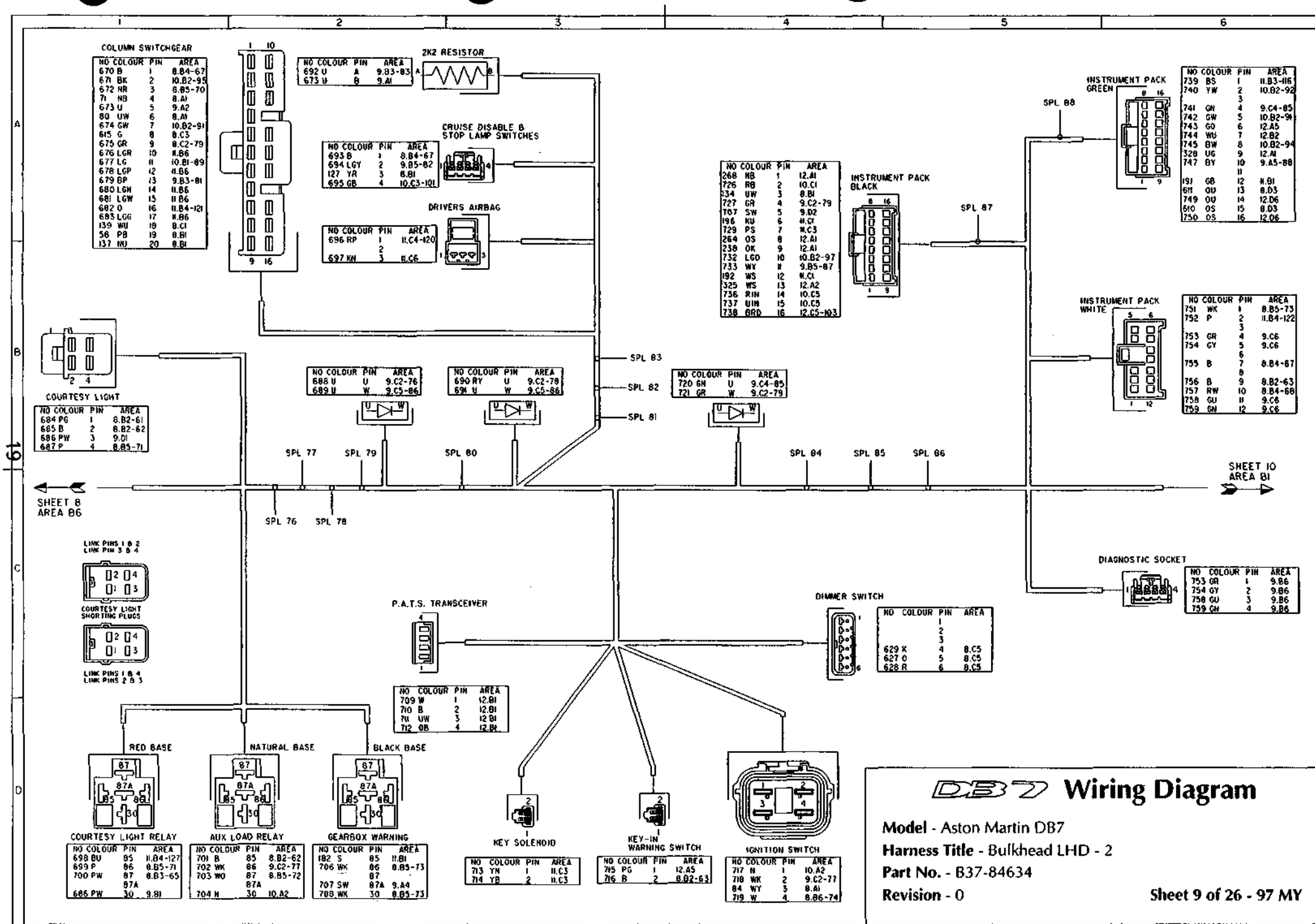
SPL 84 **Red**
129 8 - A1
664 8 - A6
827 10 - C5
784 11 - C1

SPL 85 **Green/Brown**
618 8 - C3
720 9 - B4
741 9 - A6
760 10 - A1

SPL 86 **Blue**
689 9 - B2
691 9 - B3
844 11 - D3

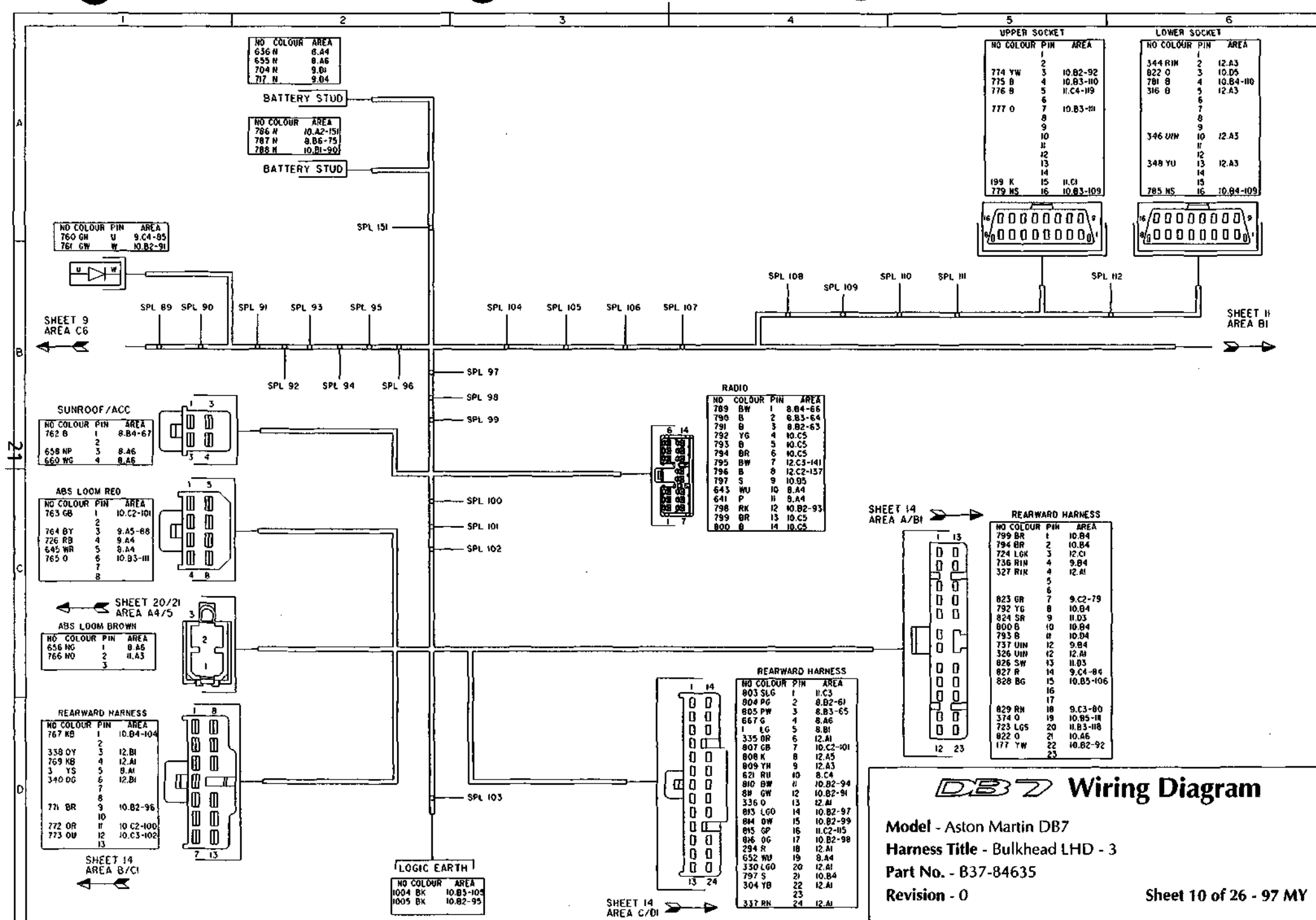
SPL 87 **White/Yellow**
122 8 - B1
840 11 - B3
733 9 - B4

SPL 88 **Black/Yellow**
747 9 - A6
764 10 - C1
939 12 - A5



Sheet 10 Splices

Splice No Wire No	Wire Colour Destination	SPL 94	Black/White	SPL 101	Green/Black	SPL 108	Red/Blue
		745	9 - A6	695	9 - A2	379	8 - D1
		810	10 - D4	763	10 - C1	993	11 - B3
		942	12 - A5	807	10 - D4	379	11 - D1
				832	11 - B3		
SPL 89	Light Green	SPL 95	Black/Pink			SPL 109	Brown/Slate
649	8 - A4	614	8 - C3	SPL 102	Orange/Blue	638	8 - A4
677	9 - A1	671	9 - A1	371	8 - D1	779	10 - A3
879	11 - B6	1005	10 - D2	773	10 - D1	785	10 - A4
		1012	8 - C2 - 59	1008	12 - C3 - 140		
SPL 90	Brown	SPL 96	Black/Red	SPL 103	Braid	SPL 110	Black
654	8 - A6	44	8 - A1	738	9 - B4	775	10 - A3
663	8 - A6	771	10 - D1			781	10 - A4
788	10 - A2	933	12 - A5	SPL 104	Pink/Black	1015	8 - B4 - 67
				55	8 - B1	SPL 111	Orange
SPL 91	Green/White	SPL 97	Lt Green Orange	767	10 - D1	765	10 - C1
16	8 - A1	732	9 - B4	958	12 - D2	777	10 - A5
180	12 - A4	813	10 - D4			184	11 - B1
674	9 - A1	927	12 - A3	SPL 105	Black/Pink	374	10 - D5
742	9 - A6			197	11 - C1		
761	10 - B1	SPL 98	Orange/Green	843	11 - D3	SPL 112	Braid
811	10 - D4	370	8 - D1	959	12 - D3	926	12 - A3
		816	10 - D4	1004	10 - D2		
		1011	12 - C4 - 149	1007	12 - C2 - 140	SPL 151	Brown
SPL 92	Yellow/White	SPL 99	Orange/White			639	8 - A4
740	9 - A6	372	8 - D1	SPL 106	Black/Green	657	8 - A6
774	10 - A3	814	10 - D4	86	8 - C1	669	8 - A6
868	11 - C6	1010	12 - C4 - 148	828	10 - D5	786	10 - A2
177	10 - D5			830	11 - B3		
				345	12 - A3		
SPL 93	Red/Pink	SPL 100	Orange/Red				
632	8 - C5	373	8 - D1	SPL 107	Red/Brown		
798	10 - C4	772	10 - D1	853	11 - D3		
190	11 - B1	1009	12 - C3 - 147	993	12 - C6		
845	11 - D3			1013	9 - C3 - 80		



Sheet 11 Splices

Splice No Wire Colour
Wire No Destination

SPL 113 Purple/Brown
605 8 - D3
782 11 - C1
833 11 - B3
846 11 - D3
907 11 - B1
996 12 - C6

SPL 114 Red/White
783 11 - C1
821 11 - D1
849 11 - D3
995 12 - C6
1001 8 - B5 - 68

SPL 115 Green/Purple
815 10 - D4
195 11 - C1
831 11 - B1

SPL 116 Black/Slate
147 12 - A4
739 9 - A6
880 11 - B6
938 12 - A5

SPL 117 White/Pink
952 12 - D1
998 12 - D6
1003 9 - C2 - 77

SPL 118 Lt Green/Slate
723 10 - D5
865 11 - D6

SPL 119 Black
867 11 - C6
869 11 - C6
1014 12 - C1 - 131
776 10 - A5

SPL 120 Red/Purple
696 9 - B2
858 11 - D4
860 11 - D6
861 11 - D6
943 12 - B5

SPL 121 Orange
682 9 - A1
875 11 - B6
902 11 - A1
288 12 - A3

SPL 122 Purple
752 9 - B6
333 12 - A1
918 11 - A3

SPL 123 Brown
887 11 - A6
915 11 - A3
925 12 - B1
954 12 - D1

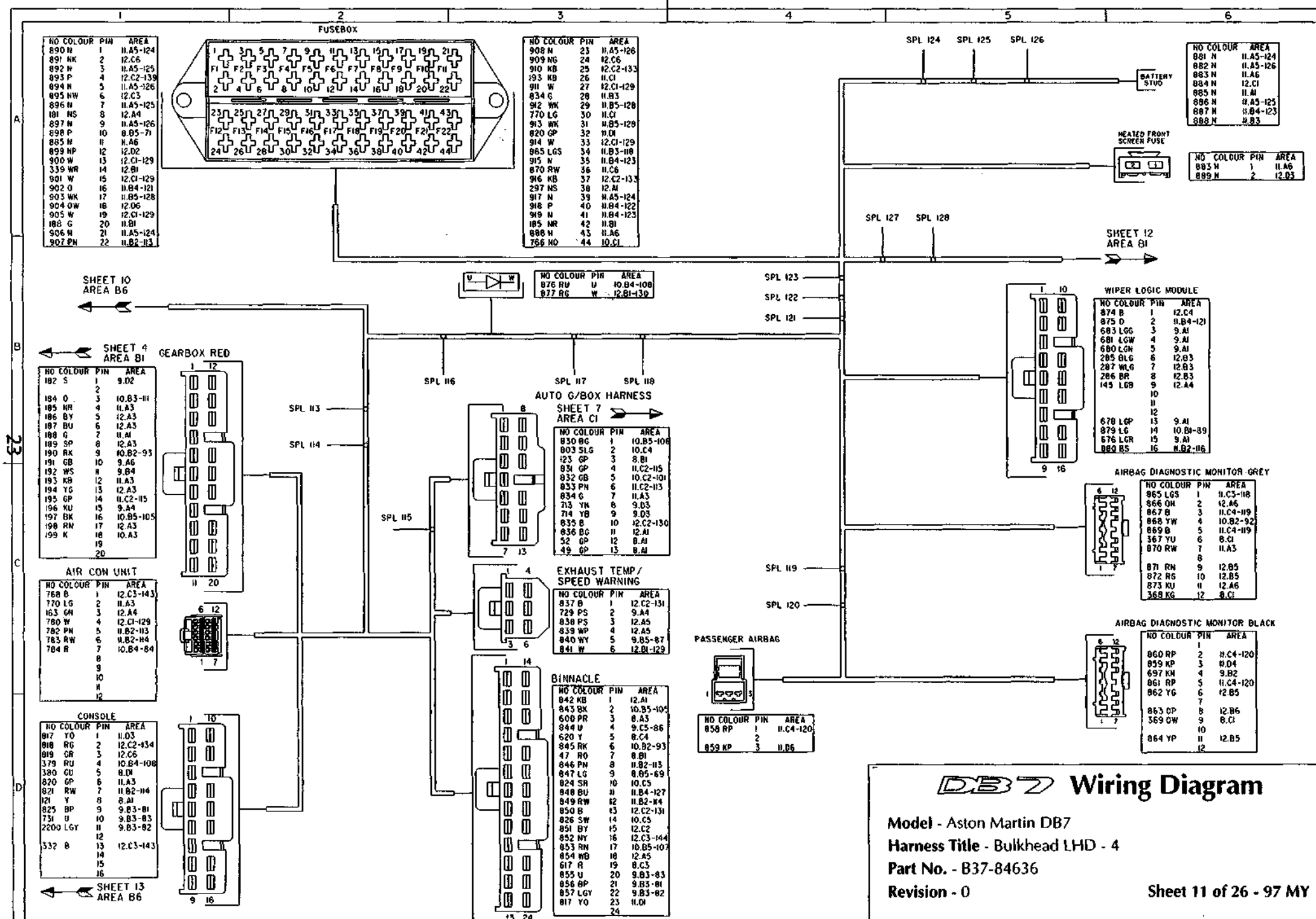
SPL 124 Brown
881 11 - A6
906 11 - A1
890 11 - A1
917 11 - A3

SPL 125 Brown
886 11 - A6
892 11 - A1
896 11 - A1
919 11 - A3
950 12 - D1

SPL 126 Brown
882 11 - A6
894 11 - A1
897 11 - A1
908 11 - A3

SPL 127 Black/Blue
698 9 - D1
941 12 - A5
848 11 - D3

SPL 128 White/Pink
903 11 - A1
912 11 - A3
913 11 - A3
953 12 - D1



Sheet 12 Splices

Splice No **Wire Colour**
Wire No **Destination**

SPL 129 **White**
780 11 - C1
841 11 - C3
900 11 - A1
901 11 - A1
911 11 - A3
914 11 - A3
949 12 - D1
960 12 - D3
1002 12 - C2 - 136
905 11 - A1

SPL 130 **Red/Green**
877 11 - B3
878 12 - B1
921 12 - C1

SPL 131 **Black**
835 11 - C3
709 12 - A1
837 11 - C3
850 11 - D3
920 12 - C1
874 12 - C3
922 12 - C1
1014 11 - C4 - 119
964 12 - C3

SPL 132 **Braid**
341 12 - A3

SPL 133 **Pink/Black**
910 11 - A3
916 11 - A3
957 12 - D1
155 12 - A1
290 12 - A1
334 12 - A1

SPL 134 **Red/Green**
818 11 - D1
801 12 - B1
818 12 - B6

SPL 135 **Brown/Blue**
386 8 - D1
991 12 - C6
944 12 - C1

SPL 136 **White**
920 12 - A1
931 12 - B2
935 12 - A3
976 12 - D4
979 12 - C5
1002 12 - C2 - 129

616 8 - A6
668 8 - A6
SPL 137 **Black**
796 10 - C4
969 12 - C2
986 12 - B6

SPL 138 **White/Red**
956 12 - D2
971 12 - C2
980 12 - C5

SPL 139 **Purple**
893 11 - A1
937 12 - A5
974 12 - D4

SPL 140 **Black/Pink**
178 12 - A4
975 12 - D4
999 12 - D6
1007 11 - B5 - 105

SPL 141 **Black/White**
795 10 - C4
968 12 - C2
987 12 - B6

SPL 142 **Black**
289 12 - A3
930 12 - B2
951 12 - D1
970 12 - C1
965 12 - C3
994 12 - C6

SPL 143 **Black**
768 11 - C1
332 11 - D1
932 12 - A5
947 12 - D1
966 12 - C3
967 12 - C3

SPL 144 **Brown/Yellow**
597 8 - A3
852 11 - D3
961 12 - D3
962 12 - C3

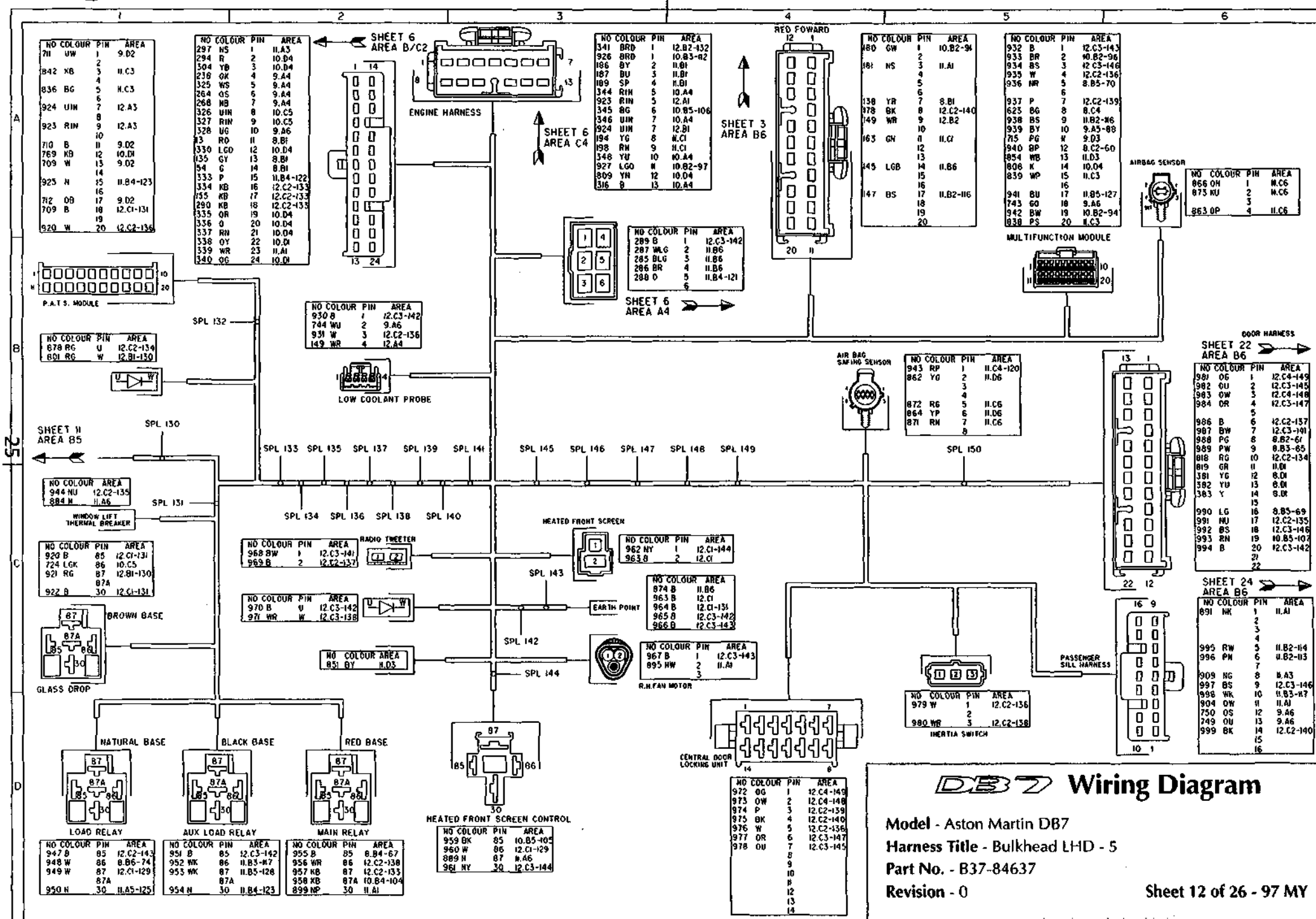
SPL 145 **Orange/Blue**
978 12 - D4
982 12 - B6
1008 10 - C2 - 105

SPL 146 **Black/Slate**
934 12 - A5
992 12 - C6
997 12 - D6

SPL 147 **Orange/Red**
977 12 - D4
984 12 - B6
1009 10 - C2 - 100

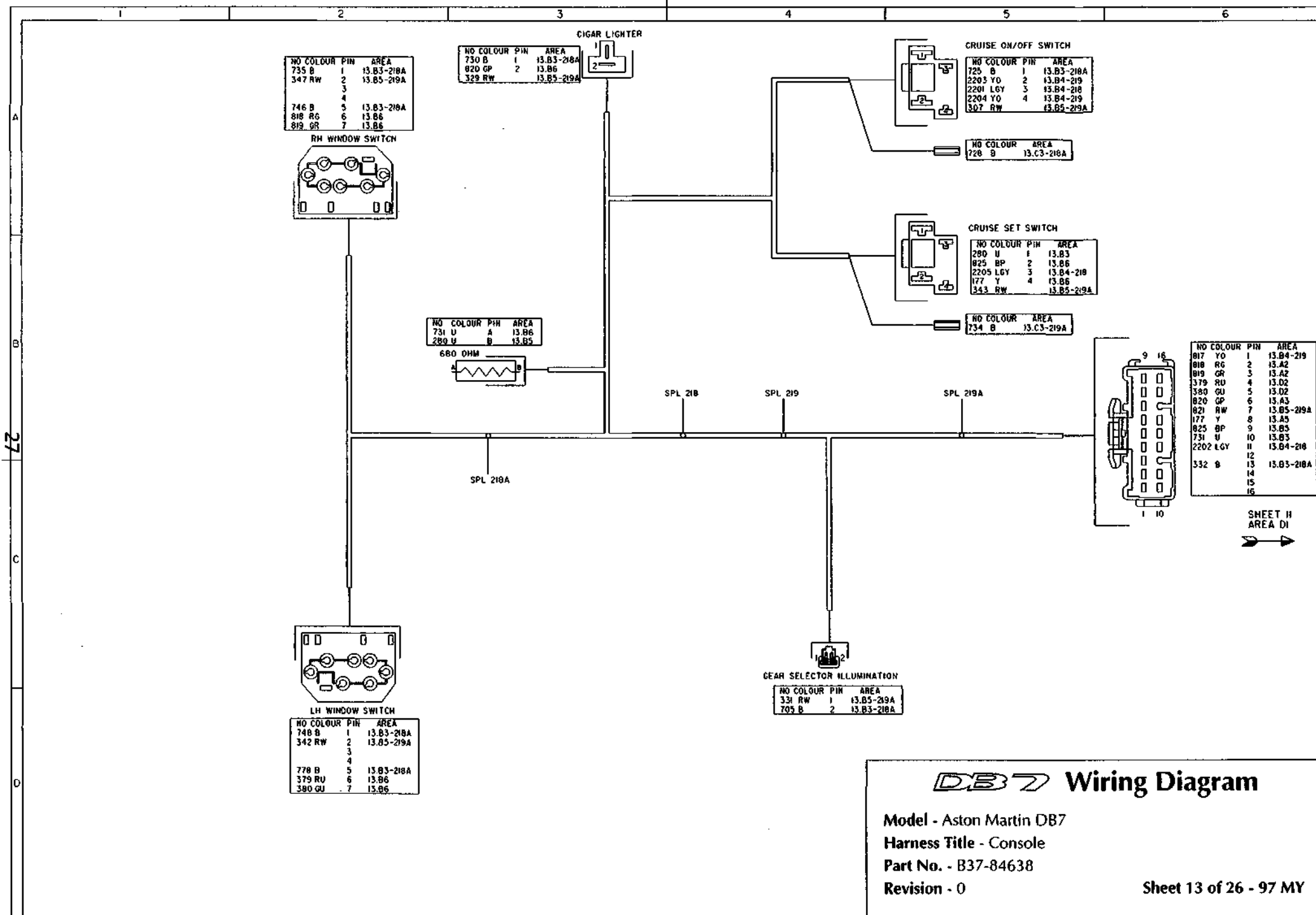
SPL 148 **Orange/White**
973 12 - D3
983 12 - B6
1010 10 - B2 - 99

SPL 149 **Orange/Green**
972 12 - D4
981 12 - B6
1011 10 - B2 - 98



Sheet 13 Splices

Splice No Wire No	Wire Colour Destination
SPL 218	Lt Green/Yellow
2202	13 - B6
2201	13 - A5
2205	13 - B5
SPL218A	Black
332	13 - B6
705	13 - D4
730	13 - A3
725	13 - A5
728	13 - A5
734	13 - B5
735	13 - A2
746	13 - A2
748	13 - D2
778	13 - D1
SPL 219	Yellow/Orange
817	13 - B6
2203	13 - A5
2204	13 - A5
SPL 219A	Red/White
821	13 - B6
331	13 - D4
329	13 - A3
307	13 - A5
343	13 - B5
347	13 - A2
342	13 - D2



Sheet 14 Splices

Splice No	Wire Colour	Splice No	Wire Colour
Wire No	Destination	Wire No	Destination
SPL 152	Black/Pink	SPL 156	Purple/Green
1034	14 - A3 Braid	804	14 - C1
1142	14 - B3 - 153	1035	15 - C3
		1056	16 - B2
SPL 153	Black/Pink	SPL 157	Purple/White
1017	14 - A3	805	14 - C1
1018	14 - A3	1036	15 - C3
1142	14 - B3 - 152	1057	16 - B2
SPL 154	Lt Green/Pink	SPL 158	Black/Orange
724	15 - A1	1023	14 - C4
1033	15 - C2	1024	14 - C4
1039	15 - C2	1111	17 - A4
SPL 154A	Green/White	SPL 159	Red/Blue
1031	15 - A1	621	14 - C1
1060	16 - A3	1047	15 - B5
1075	15 - C2	1066	16 - D1
SPL 154B	Green/Red	SPL 160	Black/White
1030	15 - A1	1019	14 - C3
1061	16 - A3	1020	14 - C5
1074	15 - C2	1096	16 - A4
SPL 154C	Green/Purple	SPL 161	Braid
1033	15 - A2	352	14 - D3
1060	16 - B5 - 174	SPL 162	Braid
1045	15 - A5	356	14 - D3

Sheet 15 Splices

Splice No Wire No	Wire Colour Destination
SPL 163	Green/Red
823	14 - A1
1050	15 - B6
1120	17 - B6
SPL 164	Black
1025	14 - B6
1032	15 - A2
1037	15 - D3
SPL 165	Black
1039	15 - D3
1044	15 - C4
1051	15 - B6
SPL 166	Red/Slate
1043	15 - C4
1052	15 - C6
1143	16 - B5 - 176

NO	CLOUR	PIN	AREA
B16	OC	1	14.D
B14	OW	2	14.D

FUEL FILLER FLAP



WINDOW LIFT

NO	CLOUR	PIN	AREA
1030	GR	1	15.B1-154B
1031	GR	2	15.B1-154B



NO	CLOUR	PIN	AREA
1032	B	1	15.D2-164
1033	OP	2	15.B1-154C



HIGH LEVEL STOP LAMP



SPEED INPUT

NO	CLOUR	PIN	AREA
1034	RD	1	14.B3-152
1035	RD	2	14.A
1036	RD	3	14.A

NO	CLOUR	PIN	AREA
1037	RD	1	14.B3-179
1038	RD	2	17.B3-179

PURGE CAN VENT



NO	CLOUR	PIN	AREA
1041	RD	1	16.B3-168
1042	RD	2	16.B3-172

BOOT LAMP

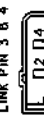


NO	CLOUR	PIN	AREA
1043	GP	1	15.B1-154C
1044	GP	2	15.C6
1045	RU	3	14.C3-159
1046	RD	4	15.B6



REAR LAMP SHORTING PLUG

LINK PINS 1 & 2



LINK PINS 3 & 4

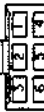


LINK PINS 1 & 4



NO	CLOUR	PIN	AREA
1048	RD	1	15.B5
1049	GR	2	16.B3-171
1050	GR	3	15.B1-165
1051	GR	4	15.B1-165
1052	RS	5	15.B4-166
1046	GP	6	15.B5

LH REAR LAMP



NO	CLOUR	PIN	AREA
1043	RS	1	14.B4-166
1044	B	2	14.B3-165

LH SIDE MARKER

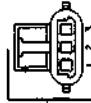


SPL 166

SPL 165

NO	CLOUR	PIN	AREA
1054	FB	1	14.D
1055	CO	2	14.D
1056	R	3	14.B

FUEL TANK PRESSURE



INTERIOR LIGHT



NO	CLOUR	PIN	AREA
1035	P	1	14.B4-156
1036	PW	2	14.C4-157

NO	CLOUR	PIN	AREA
1037	B	1	15.D2-164

HEATED BACKLIGHT

SPL 164

NO	CLOUR	PIN	AREA
1036	B	1	15.B4-165
1038	B	2	15.B2-163

EARTH

SHEET 14
AREA 16

DB7 Wiring Diagram

Model - Aston Martin DB7
 Harness Title - Rearward - 2
 Part No. - B37-84640
 Revision - 0

Sheet 16 Splices

Splice No Wire Colour
Wire No Destination

SPL 167 Green/White
811 14 - C1
1069 16 - D1
1123 17 - C1

SPL 167A Braid
1122 17 - B6

SPL 168 Brown/Purple
1041 15 - A4
1062 16 - C1
1078 16 - D3
1129 17 - D1

SPL 169 Black
1063 16 - C1
1070 16 - D1
1091 16 - B5

SPL 170 Red/Green
1071 16 - D1
1084 16 - C4
1132 17 - C2

SPL 171 Green/Brown
1068 16 - D1
1101 17 - A2
1049 15 - B6

SPL 172 Black/Red
1042 15 - A4
1079 16 - D3
1081 16 - C4
1095 16 - C6
1117 17 - B6

SPL 173 Black
1090 16 - B5
1092 16 - C5
1085 16 - C4
1041 17 - B4 - 183
1080 16 - B3

SPL 174 Green/Purple
815 14 - D1
1064 16 - D2
1060 15 - B1 - 154C
1098 17 - A1

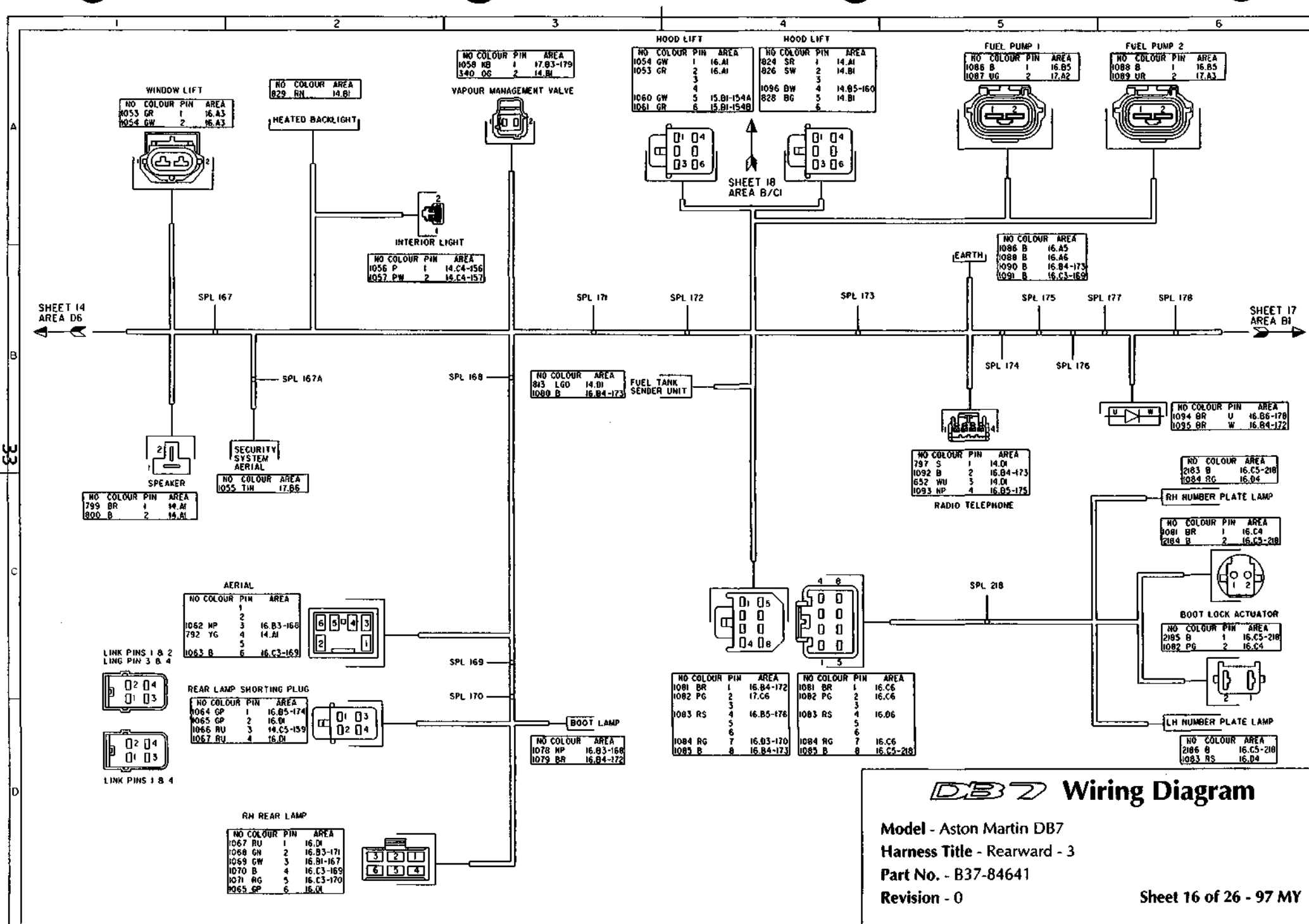
SPL 175 Brown/Purple
1093 16 - C5
1102 17 - A2
1139 17 - D1

SPL 176 Red/Slate
1083 16 - C4
1131 17 - D1
1143 15 - B4 - 166

SPL 177 Green
667 14 - C1
1126 17 - C1
1127 17 - C1
1137 17 - D2
1133 17 - C2

SPL 178 Black/Red
771 14 - C1
1094 16 - C6
1118 17 - B6

SPL 218 Black
1085 16 - D4
2183 16 - B6
2184 16 - C6
2185 16 - C6
2186 16 - C6



DB7 Wiring Diagram

Model - Aston Martin DB7
 Harness Title - Rearward - 3
 Part No. - B37-84641
 Revision - 0

Sheet 16 of 26 - 97 MY

Sheet 17 Splices

Splice No Wire Colour
Wire No Destination

SPL 179 Pink/Black

767 14 - B1
1040 15 - B4
1058 16 - A3
1103 17 - A2
1105 17 - A3

SPL 180 Brown

1130 17 - C1
1125 17 - D1
1135 17 - D2
1107 17 - B3

SPL 181 Brown

1128 17 - D1
1138 17 - D1
1140 17 - D1
1108 17 - B3

SPL 182

1110 White/Pink
17 - A4
1119 17 - B6
1134 17 - C2

SPL 183

Black
1109 17 - A4
1112 17 - A4
1116 17 - C4
1121 17 - B6
1041 16 - B4 - 173

SPL 184 Brown/Slate

1022 14 - C4
1029 14 - C6
1124 17 - C6
1136 17 - D2

STOP LAMP RELAY

NO COLOUR	PIN	AREA
1007	GB	85 14.C1
1097	G	86 17.02
1098	GP	87 16.85-174
	87A	
1099	G	30 17.C2

REVERSE LAMP RELAY

NO COLOUR	PIN	AREA
1003	SLG	85 14.C1
1100	W	86 17.02
1101	GN	87 16.83-171
	87A	
1102	NP	30 16.85-175

FUEL PUMP RELAY 1

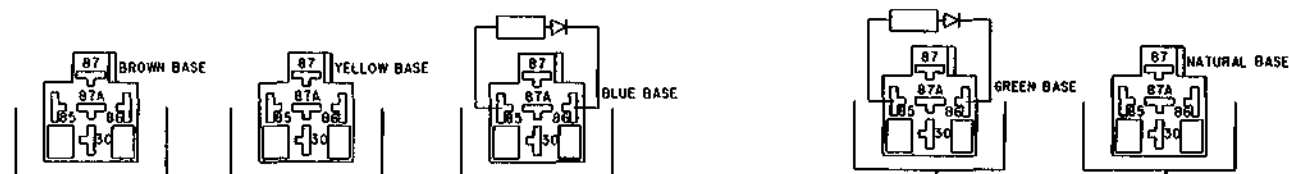
NO COLOUR	PIN	AREA
335	OR	85 14.C1
1103	KB	86 17.83-179
1108	UG	87 16.A6
337	RN	87A 14.D1
1104	NP	30 17.02

FUEL PUMP RELAY 2

NO COLOUR	PIN	AREA
336	O	85 14.C1
1105	KB	86 17.B3-179
1109	UR	87 16.A6
909	YN	87A 14.C1
1106	NP	30 17.C2

TILT SENSOR RELAY

NO COLOUR	PIN	AREA
1109	B	85 17.84-183
1110	WK	86 17.84-182
	87	
1111	BO	87A 14.B4-158
1112	R	30 17.84-183



NO COLOUR	AREA
1107	H 17.B3-180
1108	N 17.B3-181

NO COLOUR	PIN	AREA
1113	YS	A 17.B6
1114	NS	B 17.C6

SECURITY SYSTEM

NO COLOUR	PIN	AREA
1055	TIN	1 16.C2
1026	KB	2 14.B6
1117	BR	3 16.84-172
1118	BR	4 16.86-178
1028	WY	5 14.C6
772	OR	6 14.C1
1027	U	7 14.C6
	8	
	9	
1119	WY	10 17.84-182
3	YS	11 14.B4
1113	YS	11 17.85
1120	GR	12 15.81-163
1121	B	13 17.84-183
1122	BRD	14 16.82-167A
	15	
1021	UD	16 14.C4
773	OU	17 14.C1
374	O	19 15.81
	20	
	21	
	22	14.C1
1082	PG	23 16.C4
1123	GW	24 16.81-167
1114	NS	25 17.85
1124	NS	25 17.85-184

SHEET 16
AREA B6

NO COLOUR	PIN	AREA
1125	H	1 17.B3-180
1126	G	2 16.86-177
1127	G	3 16.86-177
1128	N	4 17.B3-181
1130	N	5 17.B3-180
1072	R	6 14.B4-155
1075	R	7 14.B4-155
1133	G	8 16.86-177
1135	N	9 17.B3-180
1137	G	10 16.86-177
1138	N	11 17.B3-181
1140	N	12 17.B3-181
	13	

SHEET 25
AREA B/C6
BOOT FUSEBOX HARNESS

NO COLOUR	PIN	AREA
1106	NP	1 17.A3
1099	G	2 17.A1
1097	G	3 17.A1
1129	NP	4 16.83-168
1115	NS	5 17.C4
1131	RS	6 16.85-176
1132	RG	7 16.C3-170
1134	WK	8 17.84-182
1136	NS	9 17.85-184
1100	W	10 17.A2
1139	NP	11 16.85-175
1104	NP	12 17.A2
	13	

NO COLOUR	AREA
1115	NS 17.D1
1116	B 17.84-183

DB7 Wiring Diagram

Model - Aston Martin DB7

Harness Title - Rearward - 4

Part No. - B37-84642

Revision - 0

Sheet 17 of 26 - 97 MY

Sheet 18 Splices

Splice No	Wire Colour
Wire No	Destination

SPL 185 Slate/Red

826	18 - C1
1152	18 - B3
1173	18 - A5
1181	19 - A3
1189	19 - A5

SPL 186 Slate/White

824	18 - C1
1154	18 - B3
1170	18 - A5
1177	19 - A2
1186	19 - A4

SPL 187 Slate

1153	18 - B3
1155	18 - B3
1162	18 - D4

SPL 188 Lt Green

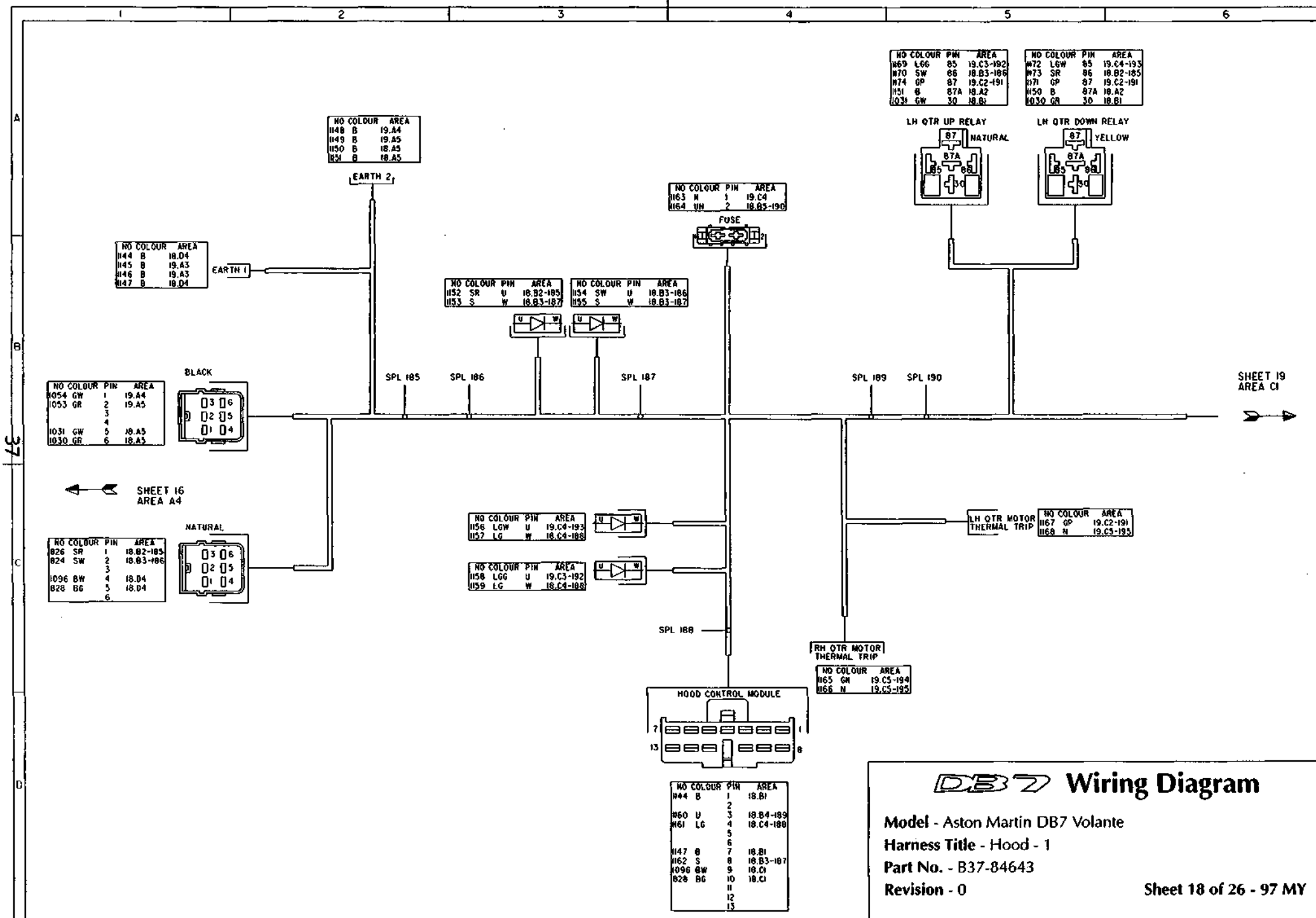
1157	18 - C3
1159	18 - C3
1161	18 - D4

SPL 189 Blue

1160	18 - D4
1176	19 - B1
1184	19 - B2

SPL 190 Blue/Brown

1164	18 - A4
1178	19 - A2
1182	19 - A3



DB7 Wiring Diagram

Model - Aston Martin DB7 Volante

Harness Title - Hood - 1

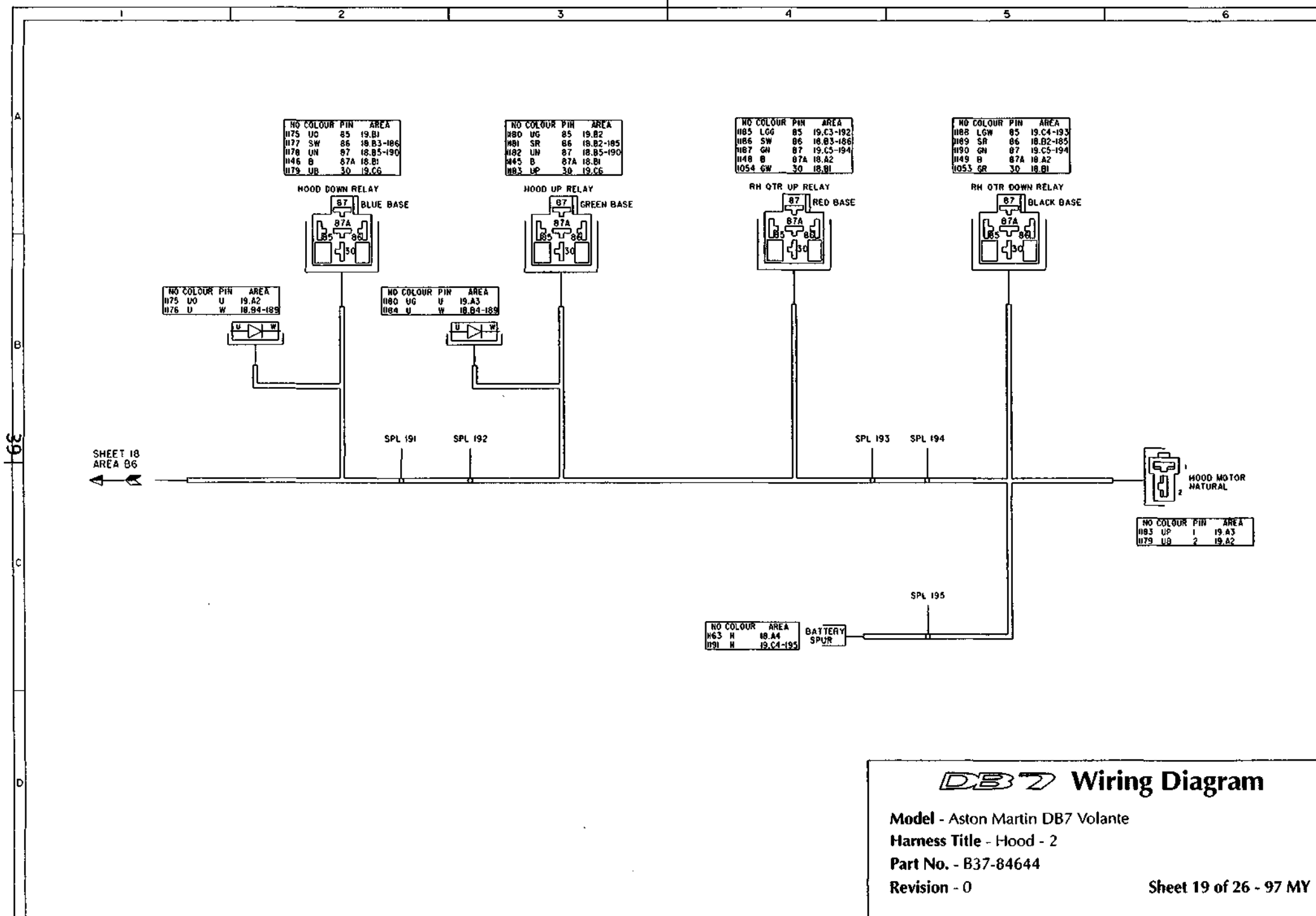
Part No. - B37-84643

Revision - 0

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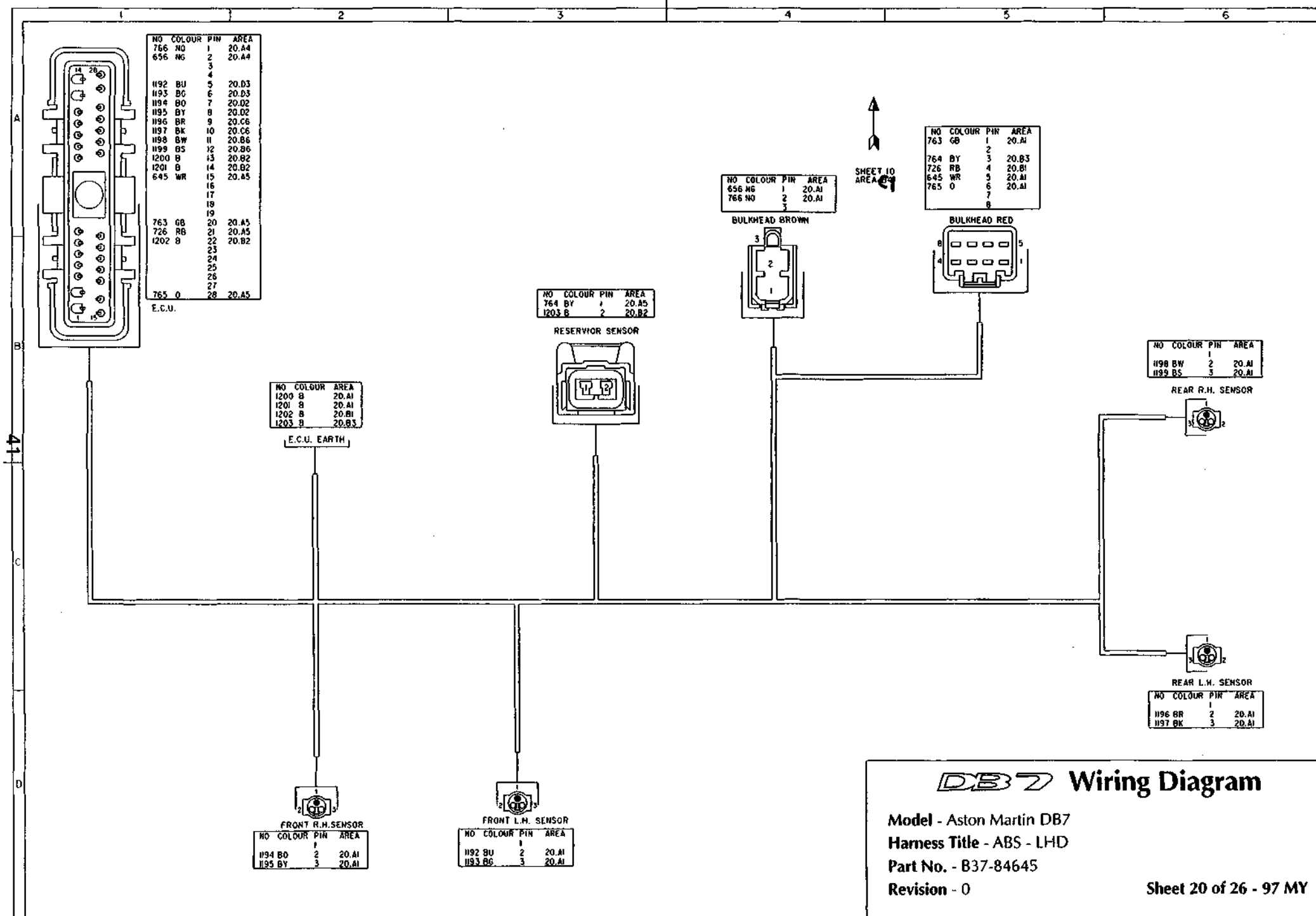
Sheet 19 Splices

Splice No	Wire Colour
Wire No	Destination
SPL 191	Green/Purple
1167	18 - C5
1171	18 - A5
1174	18 - A5
SPL 192	Lt Green/Green
1158	18 - C3
1169	18 - A5
1185	19 - A4
SPL 193	Lt Green/White
1156	18 - C3
1172	18 - A5
1188	19 - A5
SPL 194	Green/Brown
1165	18 - C4
1187	19 - A4
1190	19 - A5
SPL 195	Brown
1166	18 - C4
1168	18 - C5
1191	19 - C4



Sheet 20 Splices

No splices on sheet 20.



Sheet 21 Splices

Splice No Wire Colour
Wire No Destination

SPL 205

Yellow

383 21 - B6
1238 21 - A3
1252 21 - C5
1243 21 - A5

SPL 206

Yellow/Green

381 21 - B6
1251 21 - C5
1244 21 - A5

SPL 207

Yellow/Blue

382 21 - B6
1245 21 - A5
1254 21 - C5

SPL 208

Yellow/Red

1231 21 - C6
1239 21 - A3
1250 21 - C5

SPL 209

Black

389 21 - C6
1237 21 - B5
1235 21 - A2
1248 21 - D3

SPL 210

Yellow/Black

1232 21 - C6
1255 21 - D5
1240 21 - A3

SPL 211

Red/Brown

388 21 - C6
1242 21 - A5
1237 21 - A3

SPL 212

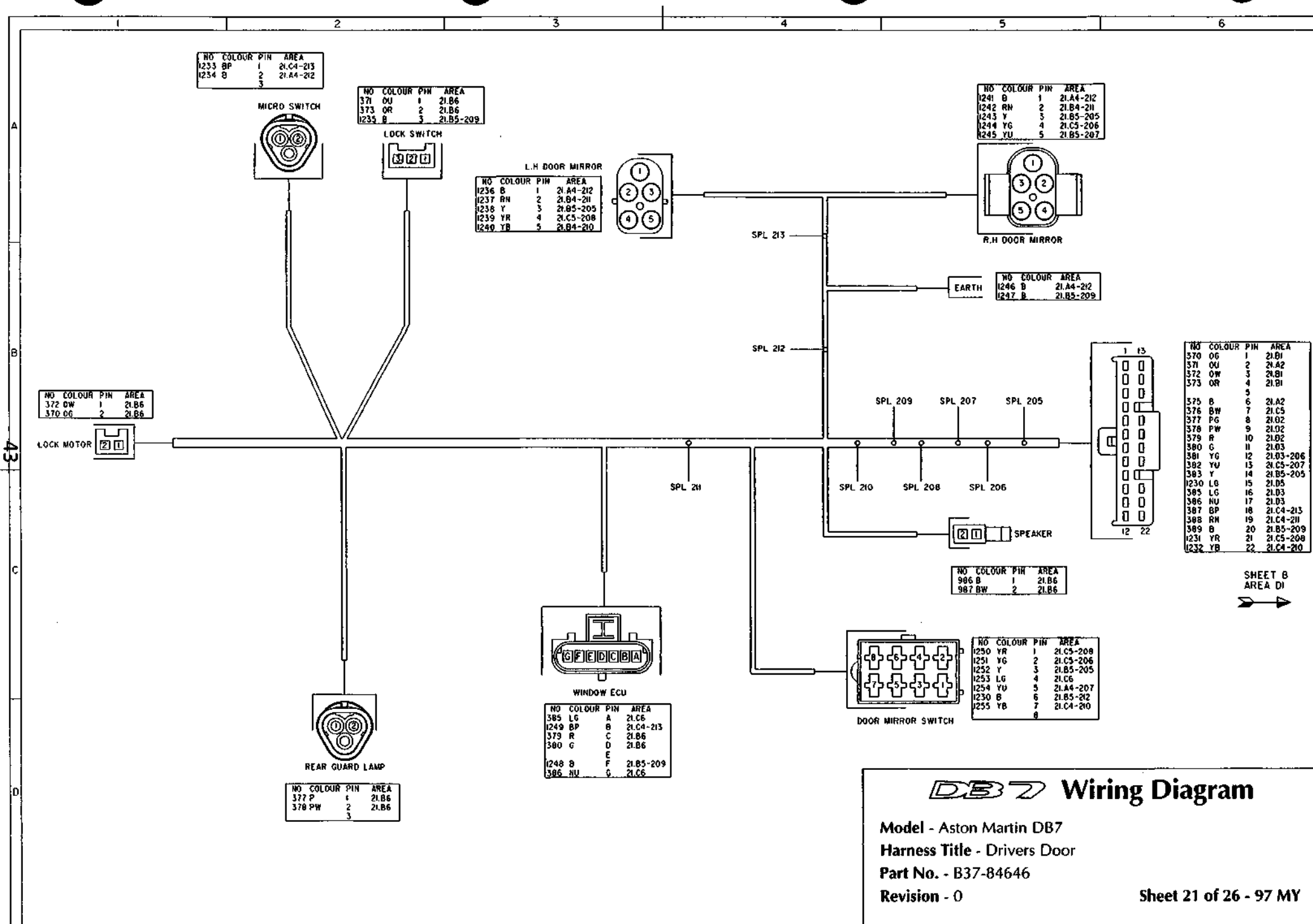
Black

1241 21 - A5
1246 21 - B5
1236 21 - A3
1234 21 - A1
1230 21 - D5

SPL 213

Black/Purple

387 21 - C6
1249 21 - D3
1233 21 - A1



Sheet 22 Splices

Splice No
Wire No

Wire Colour
Destination

SPL 196

Yellow
1209 22 - A5
1227 22 - A3
1216 22 - C5
383 22 - C6

SPL 197

Yellow/Green
1210 22 - A5
1215 22 - C5
381 22 - B6

SPL 198

Yellow/Blue
1211 22 - A5
1218 22 - C5
382 22 - B6

SPL 199

Yellow/Red
1204 22 - C6
1214 22 - C5
1228 22 - A3

SPL 200

Black
1224 22 - A2
1220 22 - D3
1213 22 - B5

SPL 201

Yellow/Black
1205 22 - C6
1219 22 - D5
1229 22 - A3

SPL 202

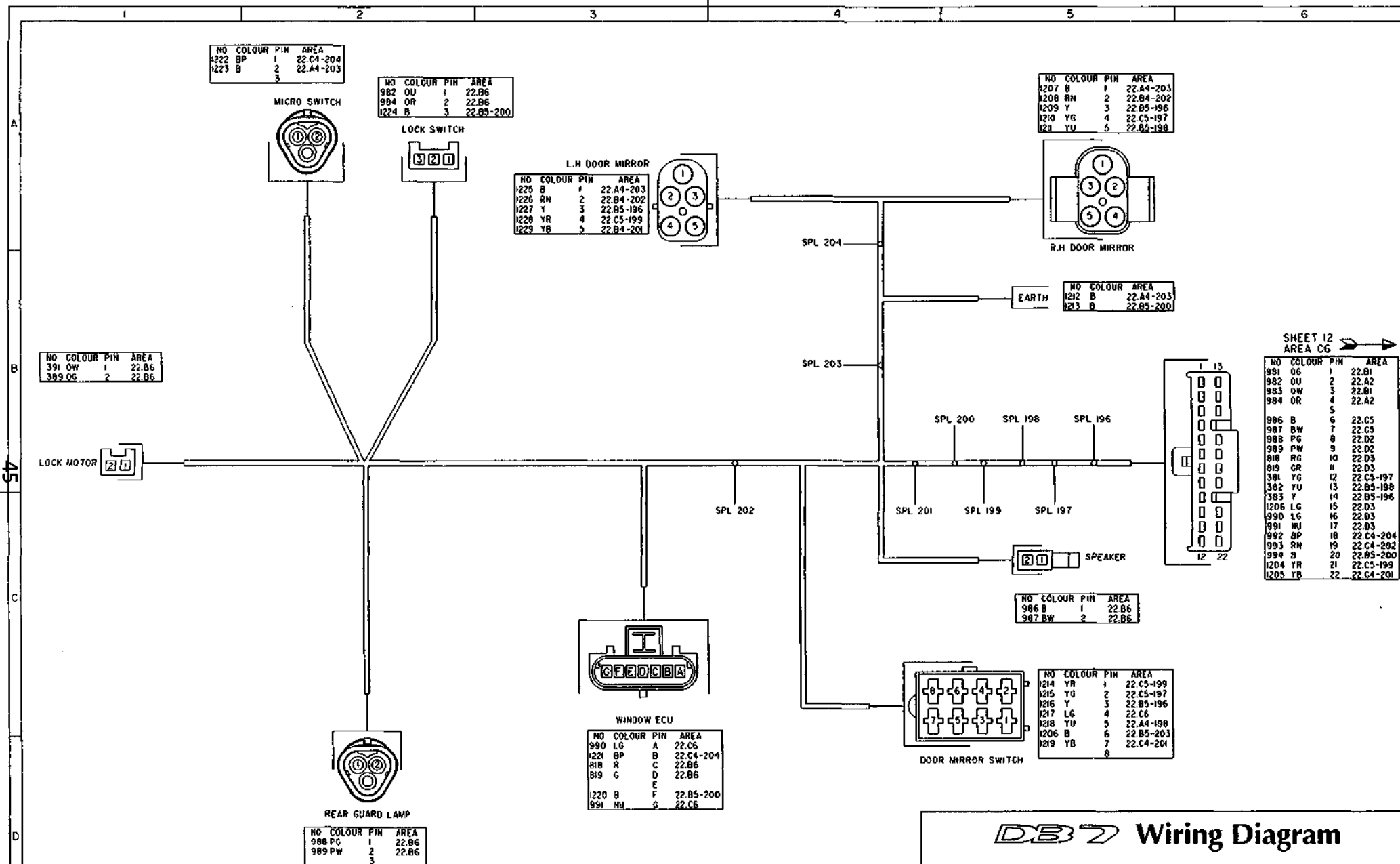
Red/Brown
1208 22 - A5
1226 22 - A3
993 22 - C6

SPL 203

Black
1207 22 - A5
1212 22 - B5
1206 22 - C5
1225 22 - A3
1223 22 - A1

SPL 204

Black/Purple
1222 22 - A1
1221 22 - D3
992 22 - C6



DB7 Wiring Diagram

Model - Aston Martin DB7

Harness Title - Passengers Door

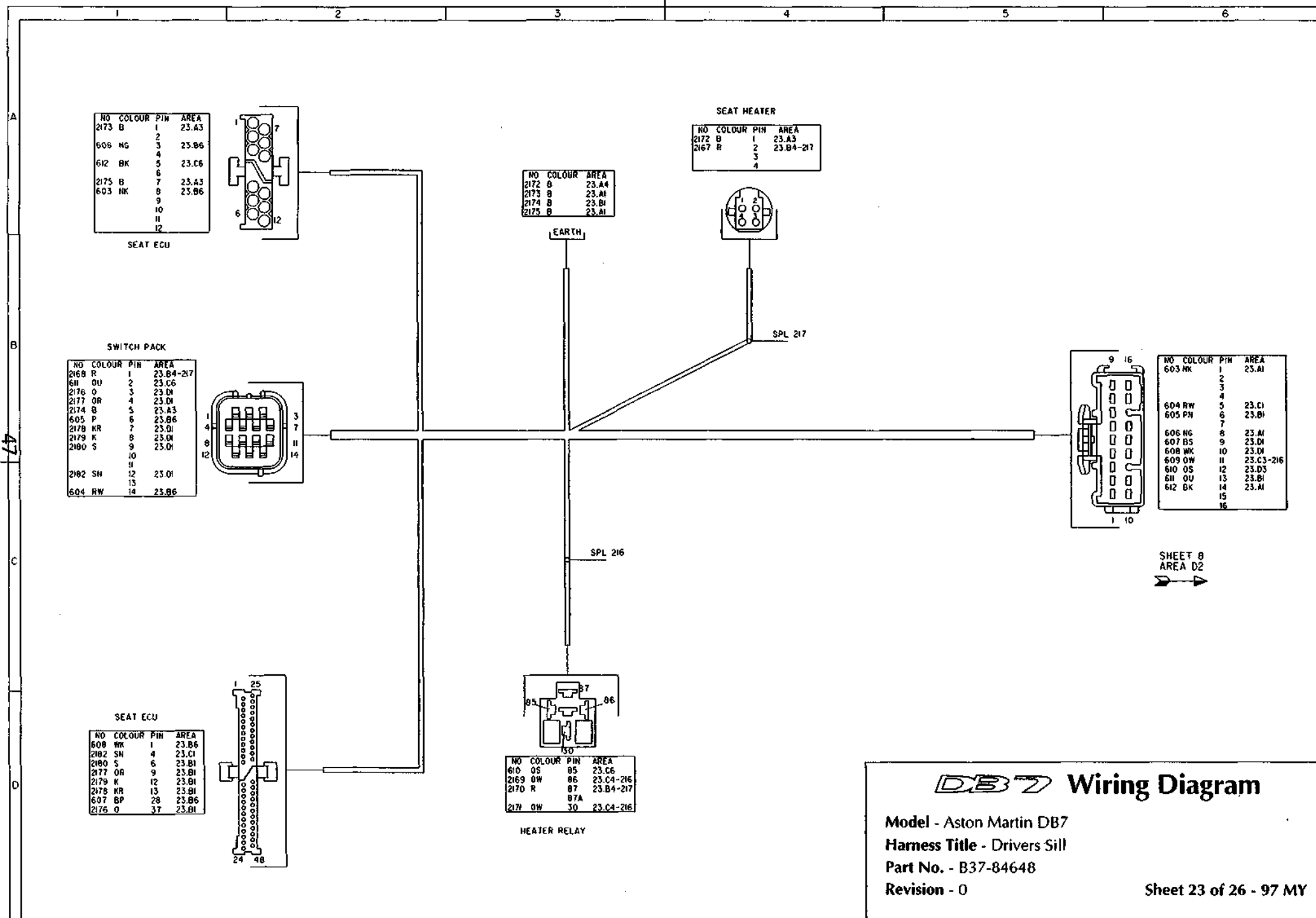
Part No. - B37-84647

Revision - 0

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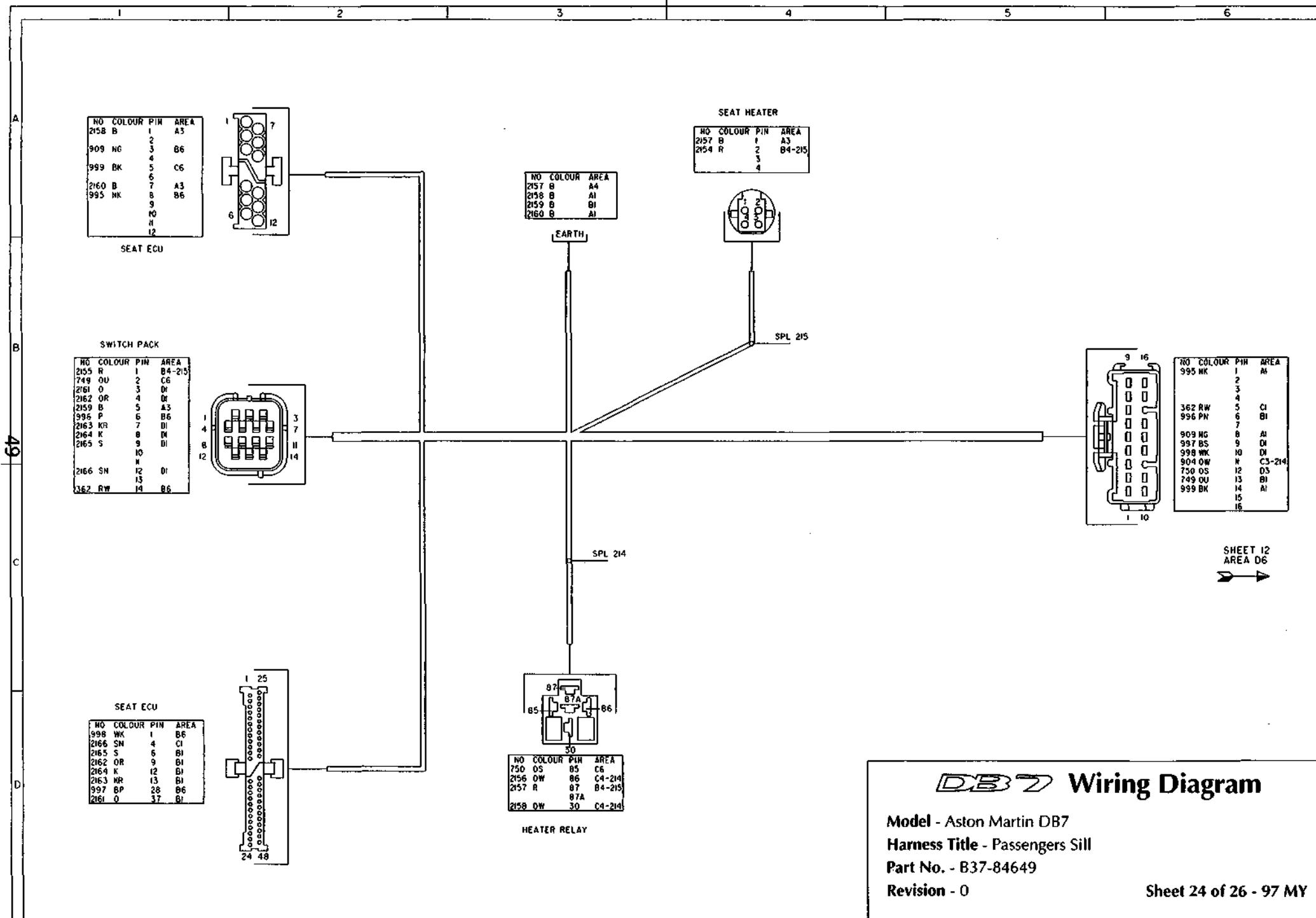
Sheet 23 Splices

Splice No Wire No	Wire Colour Destination
SPL 216	Orange/White
609	23 - B6
2169	23 - D3
2171	23 - D3
SPL 217	Red
2167	23 - A4
2168	23 - B1
2170	23 - B3



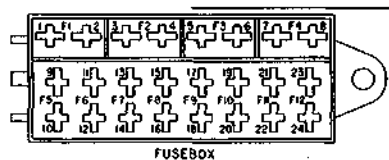
Sheet 24 Splices

Splice No Wire No	Wire Colour Destination
SPL 216	Orange/White
904	24 - B6
2156	24 - D3
2158	24 - D3
SPL 217	Red
2154	24 - A4
2155	24 - B1
2157	24 - D3



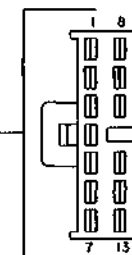
Sheet 25 Splices

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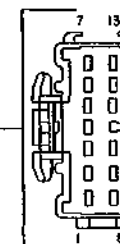
NO	COLOUR	PIN	AREA
U25	N	1	13.C6
U06	NP	2	13.B6
U26	G	3	13.C6
U09	G	4	13.B6
U27	G	5	13.C6
U07	G	6	13.B6
U28	N	7	13.C6
U29	NP	8	13.B6
U30	N	9	13.C6
U05	NS	10	13.B6
U072	RS	11	13.C6
U31	RS	12	13.B6

NO	COLOUR	PIN	AREA
U075	RG	13	13.C6
U32	RG	14	13.B6
U33	G	15	13.C6
U34	WK	16	13.B6
U35	N	17	13.C6
U36	NS	18	13.B6
U37	G	19	13.C6
U00	N	20	13.B6
U38	N	21	13.C6
U39	NP	22	13.B6
U40	N	23	13.C6
U04	NP	24	13.B6



NO	COLOUR	PIN	AREA
U06	NP	1	27.C1
U09	G	2	27.C1
U07	G	3	27.C1
U29	NP	4	27.C1
U05	NS	5	27.C1
U31	RS	6	27.C1
U32	RG	7	27.C2
U34	WK	8	27.C2
U36	NS	9	27.C2
U00	N	10	27.C2
U39	NP	11	27.C2
U04	NP	12	27.C2
		13	

SHEET 17
AREA DI
→



NO	COLOUR	PIN	AREA
U25	N	1	27.C1
U26	G	2	27.C1
U27	G	3	27.C1
U28	N	4	27.C1
U30	N	5	27.C1
U072	RS	6	27.C1
U075	RG	7	27.C2
U33	G	8	27.C2
U35	N	9	27.C2
U37	G	10	27.C2
U38	N	11	27.C2
U40	N	12	27.C2
		13	

DB7 Wiring Diagram

Model - Aston Martin DB7

Harness Title - Boot Fusebox

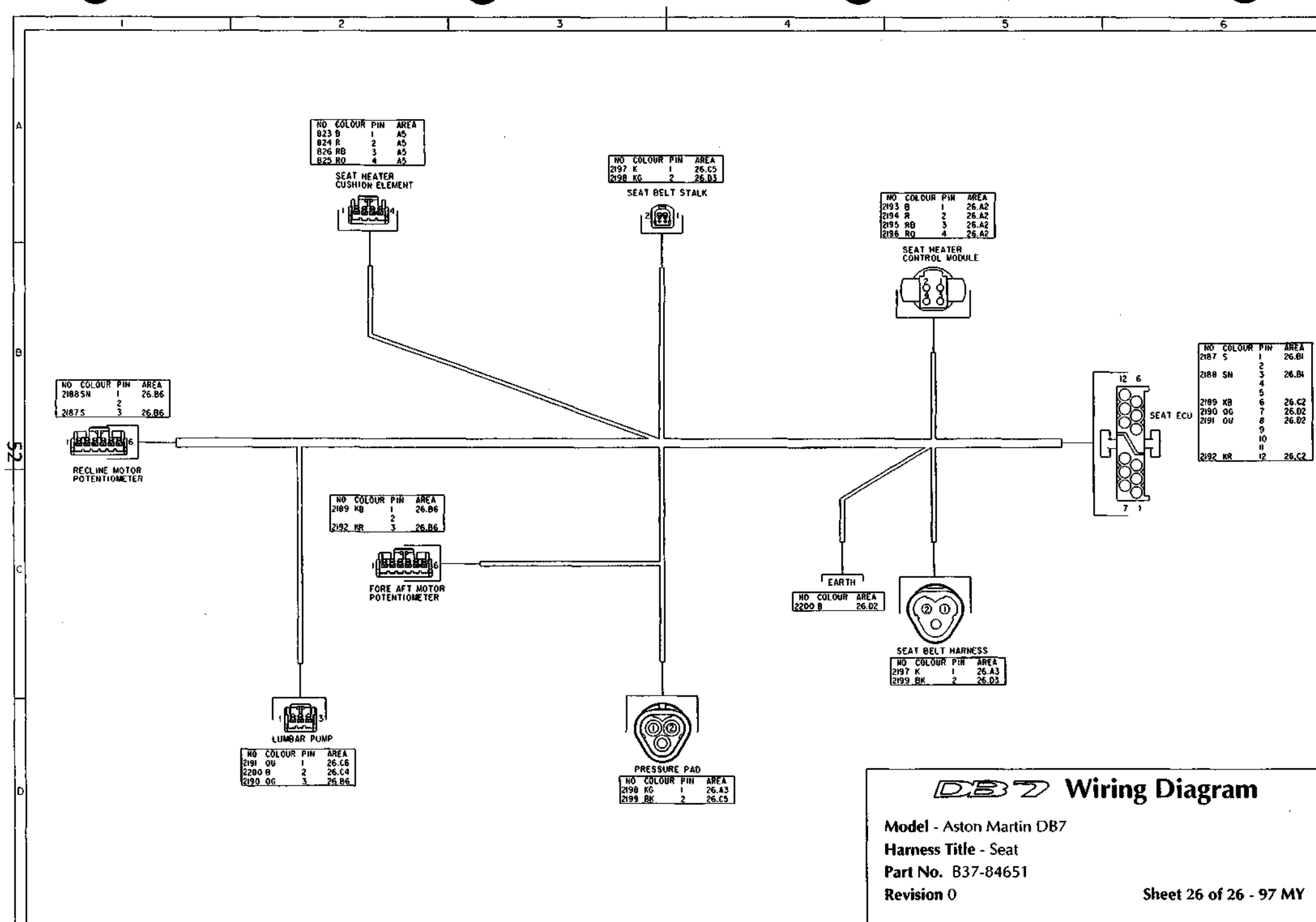
Part No. - B37-84650

Revision - 0

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Sheet 26 Splices

No splices on sheet 26.



DB7 Wiring Diagram

Model - Aston Martin DB7

Harness Title - Seat

Part No. B37-84651

Revision 0

Sheet 26 of 26 - 97 MY

Airbag (Supplementary Restraint System)

Repair Procedures

Description

Two airbags are fitted to the 97 model year DB7. The drivers airbag is located in the centre of the steering wheel (Fig 1-1), the passenger airbag is located behind the fascia panel (Fig 1-2).

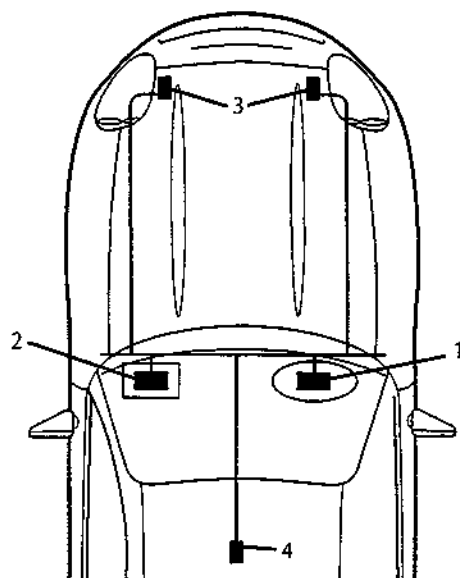


Figure 1. Airbag Locations

The following procedures and safety precautions must be adhered to while handling, installing and testing airbag modules. Failure to observe these precautions could cause the airbag to inadvertently deploy with the risk of personal injury.

The procedures and precautionary guidelines conform to the 'Handling and storage - The Explosives Act 1875 & 1923' and to the 'Health and Safety at Work Act - 1974' or local guidelines as appropriate.

Safety Precautions and Warnings

Handling Undeployed Airbags

The electrically actuated airbag module contains sodium azide and sodium nitrate which are poisonous and extremely flammable substances.

Their contact with acid, water or heavy metals may produce harmful, irritant gases or combustible compounds.

The airbag module is non-serviceable and must not be dismantled, punctured, incinerated or welded.

WARNING: Do not attempt any repairs or electrical measurements on the airbag module.

Never measure the resistance of the airbag module, as this may cause the airbag to deploy. Suspect modules must be returned to Aston Martin Lagonda Limited, or their importer for replacement.

Tampering or mishandling can result in personal injury.

Keep away from heat, sparks and open flames. Do not store at temperatures exceeding 93°C (200°F).

Keep away from electrical equipment as electrical contact may cause ignition.

Do not drop or impact the airbag module. Always position the module 'cover-up'.

Ensure that the module connector is protected to prevent damage. Never carry the airbag module by the wires or connector.

Store modules in a secure lockable cabinet.

Never position material over the undeployed module which could be projected and cause injury in the event of inadvertent deployment.

Do not wrap arms around the module when carrying and always carry the module with the cover and vents facing away from the body to avoid personal injury in the event of inadvertent deployment.

The chemical propellant mixture deploying the airbag is a solid and therefore inhalation exposure is unlikely even if the module is ruptured without deployment.

As far as practical, avoid skin contact with, or ingestion of, the materials present after combustion. Exposure to high concentrations of propellant mixture may cause headache, nausea, blurred vision, faintness, cyanosis, lowering of blood pressure, tachycardia and shortness of breath.

WARNING: Sodium azide has been listed as an 'Extraordinary Hazardous Substance or Carcinogen' by the state of Massachusetts, USA. Sodium azide has been listed on the 'Right to Know Hazardous Substance List' by the state of New Jersey and is also regarded as a 'Special Health Hazard Substance' by the state. The propellant mixture is sensitive to premature ignition by electrical sources if not properly protected and isolated.

Emergency First Aid Procedures

If the airbag is ruptured without deployment and exposure to the propellant mixture occurs, observe the following first-aid treatments:

- Ingestion - Do not induce vomiting and seek prompt medical attention.
- Skin contact - Immediately wash skin with soap and water and seek medical attention.
- Eyes - Immediately flush eyes with water for at least 20 minutes and seek prompt medical attention.
- Inhalation - Immediately move victim to fresh air and seek medical attention.
- Physical trauma, e.g. burns, abrasions, or impact due to premature ignition or deployment of the inflator assembly - Treat symptomatically and seek prompt medical attention.

Safety Procedures

Handling Deployed (Fired) Modules

See 'Emergency First Aid Procedures'

Prevent contact of the inflator with liquids, combustibles and flammable materials. Failure to follow these instructions could result in chemical burns and personal injury.

Ensure that the modules are cool before handling.

After deployment, the airbag surface contains small deposits of sodium hydroxide which can cause irritation to the skin and eyes.

When handling deployed airbags, always wear rubber gloves to BS 1651 grade 2 or equivalent, and chemical resistant goggles to BS 2092 grade 2 or equivalent.

After handling deployed airbags, immediately wash hands and exposed skin surface areas with mild soap and water.

Handling Undeployed Damaged Modules

The material inside the module is hermetically sealed and is completely consumed during deployment.

No attempt should be made to open the module as this leads to a risk of exposure to sodium azide.

In the unlikely event of a gas generator being damaged, it must be examined by trained personnel before any attempt is made to remove and/or deploy.

Full protective clothing must be worn when dealing with any spillage.

Ruptured units must be stored away from acids, halogens, heavy metals and metal salts. Damaged units may produce hydrazoic acid if exposed to liquids.

Failure to comply with these instructions may result in fire, noxious fumes and severe personal injury or death.

Fire Hazard Information

Thermal decomposition or combustion may produce dense smoke and other dangerous fumes which in fire situations form a highly toxic explosive.

In the event of a fire, the surrounding area must be evacuated and all personnel kept well upwind of the area.

Full fire fighting protective gear and a self contained breathing apparatus operating in positive pressure mode must be worn for combating fire. Material near the fire must be cooled with water spray to prevent ignition.

Fires should be allowed to burn themselves out if not threatening to life or property. If fire is threatening to life or property, use copious quantities of water to extinguish.

Ventilation

Local exhaust ventilation designed by a professional engineer should be provided if vapours, fumes or dusts are generated whilst working with the airbag module.

Respiratory Precautions

To prevent the inhalation of dangerous fumes and dusts, an approved mask should be worn.

Eye Protection

Chemical protective goggles are recommended where there is a possibility of eye contact with the propellant. Safety glasses with side shields are recommended for all other operations.

Protective Clothing

Approved protective gloves, overalls and shoes/boots should be worn.

Handling and Storage Precautions

Do not store airbag modules near live electrical equipment or circuitry. Store in a dry environment at ambient temperatures.

Good housekeeping and engineering practices should be employed to prevent the generation and accumulation of dusts. Store in compliance with all local state and federal regulations.

Driver and Passenger Airbag Modules**Assembly/Removal/Service Instructions**

WARNING: *In the event of a vehicle impact where the airbags and the seatbelt pretensioner (if fitted) are deployed, the following actions MUST be performed:*

Check the condition of the seatbelts, steering wheel, steering column, all connections to airbags, and the column switchgear connectors for integrity and damage. If in any doubt, replace suspected parts for new parts.

Replace both crash sensors, the safing sensor and the seatbelt pretensioner module (if fitted).

On completion of all repair procedures, switch on the ignition and check that the Airbag/SRS warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the airbag and pretensioner system self tests.

WARNING: *Before starting work, ensure that the ignition switch is in position 'O' and the ignition key is removed. Disconnect the battery negative lead within 12 seconds of switching off the ignition to prevent the alarm system triggering.*

As the airbag control module is equipped with a back-up power source and due to the risk of the airbag being inadvertently deployed, wait one minute or longer after disconnecting the battery before starting work on the airbag module.

- Disconnecting the battery negative cable cancels the memory for the 'one-touch' window down system and stops the vehicle clock. Reset the window memory and the clock when work is completed.
- Never use airbags from other vehicles, always use new parts.
- After work is completed, reconnect the battery and perform the airbag warning light check
- Never use electrical probes to check voltage or electrical resistance of the airbag modules.
- Disconnect the airbag before carrying out any work on, or in the vicinity of the module, or when using electric welding equipment.
- Always ensure that the battery negative lead has been disconnected for at least one minute before commencing any removal procedure.

Spillage and Leakage

If material is spilled or released, contact Aston Martin Technical Support for advice on clean-up procedures. All personnel must be kept away from the contaminated area.

Do not dispose of contaminated propellant or water into storm or sanitary sewers, ground water or soil.

Spills may be reportable to state and/or federal authorities.

Materials must be disposed of by incineration or chemical oxidation under carefully controlled conditions by specially trained individuals and in accordance with local state and federal regulations.

Scrapping Vehicles with Live Airbags

When scrapping a vehicle with live airbags, first deploy the airbags in accordance with the following procedure. This procedure assumes that the airbag wiring is undamaged

See Handling/Safety Information.

If the airbags are to be removed, see the airbag module assembly/removal/servicing instructions.

Equipment required:

Four insulation displacement connectors (scotchlocks).

Charged 'slave' battery.

Two 10 metre lengths of 1mm² wire fitted with crocodile clips on one end.

Procedure

WARNING: *The deployment procedure must be carried out outdoors away from other personnel.*

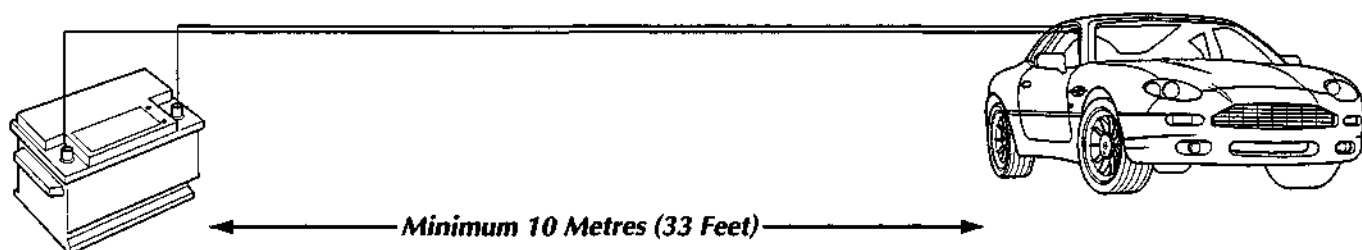
1. Remove any loose debris from around the airbag modules and ensure that no flammable liquids are present.
2. Disconnect the vehicle battery.

WARNING: *Always connect to the airbag first, as the bag will deploy immediately on connection to the battery.*

3. Remove the passenger side airbag deployment door and underscuttle panel.
4. Remove the drivers side underscuttle panel.
5. Disconnect the airbag connector for the spiral cassette under the fascia and at the wire (drivers side).
6. Locate the harness connectors and cut the wires leading from the airbag just above the mating plug (passengers side).

Note: The harness connected between the driver's airbag and the connector has one red feed wire and one grey/orange return wire. The harness connected between the passenger's airbag and the connector has one blue/orange feed wire and one pink/black return wire.

WARNING: Make the battery connections last.
The airbag will deploy as the battery connections are made.



7. Pass the cut ends of the two 10 metre (33ft) link wires through an open window and connect using two scotchlocks to the feed and return wires for one airbag.
8. Close the vehicle doors and leave the window with the link wires open.
9. Check that no personnel are in the car or in the area around the car. Warn personnel in adjacent areas of the impending airbag deployment.
10. Move back 10 metres (33ft) and connect the link harness crocodile clips to the positive and negative terminals of the slave battery; the airbag will deploy immediately.
11. Allow the deployed unit to cool for at least 20 minutes and monitor continuously to ensure that the heat generated during deployment does not create a fire with spilled liquids or other debris.
12. Using all appropriate safety precautions (see all warnings and precautions after the 'Safety Precautions and Warnings' Heading), enter the vehicle and cut the link harness wires from the deployed airbag.
13. Using two new scotchlocks, connect the link harness to the feed and return wires for the second airbag and deploy it by repeating steps 7 to 11 of this procedure.
14. The vehicle may now be scrapped in the normal manner with the deployed airbag modules installed.
15. In the event of any problems or queries, contact Aston Martin Lagonda Limited - Technical Services Department.

Scrapping Vehicles with Deployed Airbags

When scrapping a vehicle with a deployed airbag, first check that all installed airbags have been deployed or removed.

In the event that only one airbag has been deployed, it must be assumed that the second airbag is still live and therefore must be treated using the 'Scrapping Vehicles with Live Airbags' procedure.

When it is verified that both airbags have been deployed or removed, the vehicle may be scrapped in the normal manner.

Disposal of Live Airbags

Modules removed/renewed by Aston Martin dealers are to be deployed using the following procedure.

WARNING: Never use a customer's vehicle to deploy airbags.

Equipment Required:

Link harness
'Slave' battery
Safety goggles to BS 2092 grade 2 or equivalent
Rubber gloves to PrEN 374 class 2 or equivalent
Ear protectors
Particulate respirator to EN 149 grade FFP 25
Deployment cage

Note: If you do not have access to a deployment cage, please contact Aston Martin Lagonda Limited Technical Support Department for advice.

Procedure

This procedure must be performed outdoors, away from other personnel.

1. Remove any loose debris from around the airbag and ensure that no flammable liquids are present.
2. Assemble the disposal cabinet and fit the airbag as shown in figure 1 in line with the following procedures:
 - a) Remove the mesh guard from the rig frame.
 - b) Attach the guard to the frame by bolting the hinges to the frame.
 - c) Ensure the relevant plate is fitted and rotate into position.
 - d) Fit and secure the airbag module onto the plate.
 - e) Clamp the plate down using the two toggle clamps.
 - f) Close the mesh guard.

Note: The harness connected between the driver's airbag and the connector has one red feed wire and one grey/orange return wire. The harness connected between the passenger's airbag and the connector has one blue/orange feed wire and one pink/black return wire.

3. Connect the 10 metre (33ft) link harness to the airbag.
4. Ensure that no personnel are in the vicinity of the cabinet.

5. Move 10 metres (33ft) and connect the link harness crocodile clips to the 'slave' battery; the airbag will deploy immediately.
6. Allow the unit to cool for at least 20 minutes.
7. Open the mesh guard and remove the deployed airbag module.

Note: Should the design of your deployment cage differ from that described above, please contact the cage manufacturer for advice on mounting the airbag.
8. Seal the deployed module into a plastic bag ready for disposal.
9. In the event of any problems or queries, contact Aston Martin Lagonda Limited - Technical Services Department.

Disposal of Deployed Airbags

Deployed airbags are to be disposed of as special waste and disposal must comply with local environmental requirements. If in any doubt, contact the local authority for disposal instructions.

Note: The storage, transportation, disposal and/or recycling of airbag module components must be performed in accordance with all applicable federal, state and local regulations including, but not limited to, those governing building and fire codes, environmental protection, occupational health and safety and transportation.

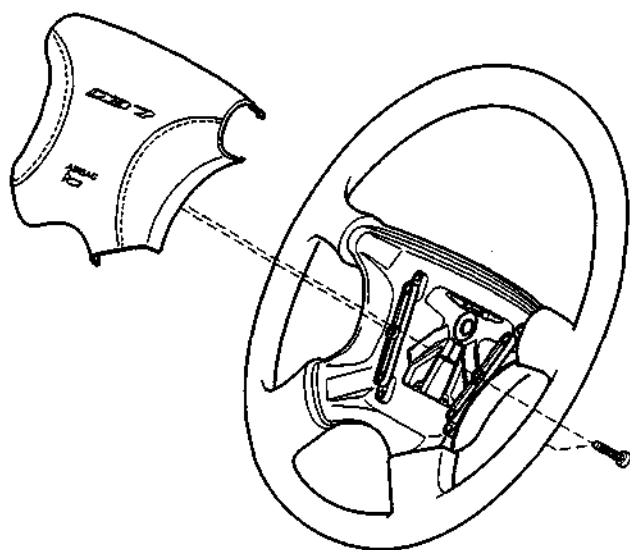
Modules removed and deployed by Aston Martin Dealers are to be returned to Aston Martin Lagonda Limited for disposal following prior consultation.

4.5.01.3 Driver's Airbag Module Renew

Read and adhere to all warnings and safety procedures quoted at the start of this section when working on airbag modules.

1. Ensure that the steering system is centralised and that the steering wheel is in the lowest tilt position.
2. Disconnect the vehicle battery and insulate the battery lead to avoid accidental reconnection. Wait for at least one minute before proceeding with work on the removal of the airbag.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.



3. Insert the ignition key and turn to position I. Turn the steering wheel to the left, 90° from its straight ahead position, and loosen the first module securing torx screw.
4. Turn the steering wheel 180° to the right and loosen the second module securing torx screw.
5. Carefully remove the module from the steering wheel and disconnect the airbag module multi-plug.
6. To ensure personal safety, double check that the battery is still disconnected and the battery lead safely insulated. Connect the new airbag module multi-plug. Fit and align the new module to the steering wheel and tighten the two securing torx screws. Return the steering to the straight ahead position.
7. Remove the battery lead insulation and reconnect the battery lead.

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

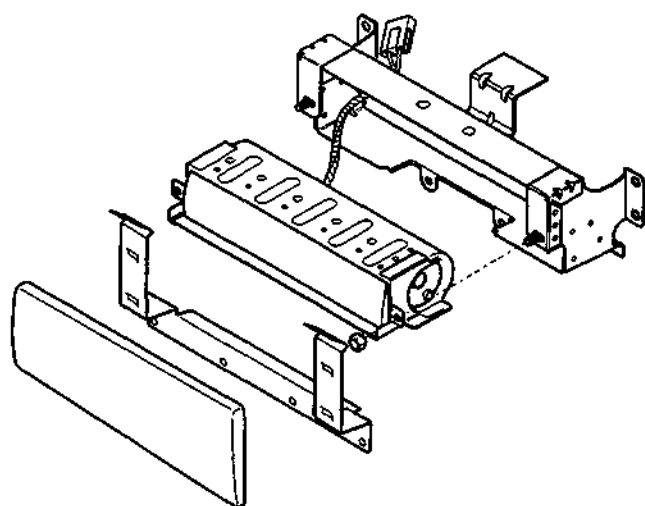
8. Switch on the ignition and check that the airbag warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the airbag system self tests.

7.8.02.6 Passenger's Airbag Module Renew

Read and adhere to all warnings and safety procedures quoted at the start of this section when working on airbag modules.

1. Disconnect the battery and wait for at least one minute before proceeding with the airbag removal.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.



2. Open the passenger airbag deployment door.
3. Release four nuts and remove the airbag module.
4. Disconnect the airbag harness multi-plug.
5. Connect and fit the new module and secure with four nuts.
6. Refit the airbag deployment door.

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

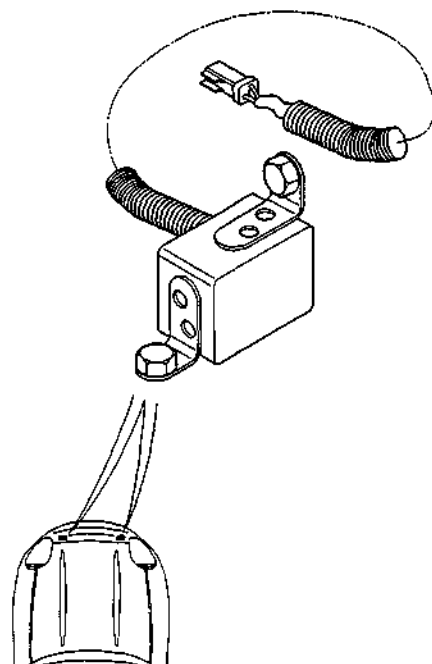
7. Reconnect the battery. Switch on the ignition and check that the airbag warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the airbag system self tests.

6.1.23.1/6.2.10.1 Airbag Crash Sensors Renew

Read and adhere to all warnings and safety procedures quoted at the start of this section when working on the airbag system.

1. Disconnect the battery and wait for at least one minute before working on the airbag system.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.



2. Raise the vehicle on a ramp and remove the relevant front roadwheel and wheel arch liner.
3. Disconnect the sensor connector and feed the protected loom forward through the body aperture.
4. Open the bonnet and release two bolts securing the crash sensor to the body.
5. Fit and secure the new sensor and feed the sensor loom back through the body aperture.
6. Reconnect the sensor. Refit the wheel arch liner and the roadwheel.

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

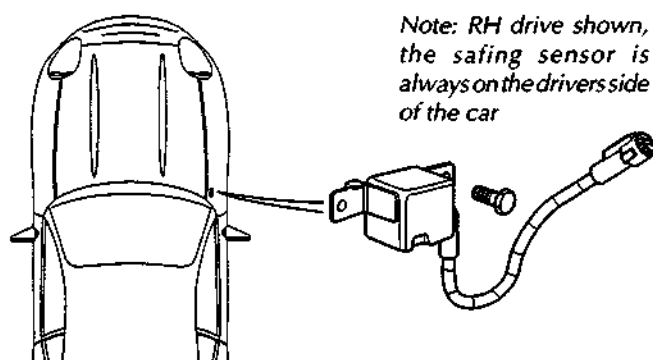
7. Reconnect the battery, switch on the ignition and check that the airbag warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the airbag system self tests.

6.4.21.2 Airbag 'Safing' Sensor Renew

Read and adhere to all warnings and safety procedures quoted at the start of this section when working on the airbag system.

1. Disconnect the battery and wait for at least one minute before working on the airbag system.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.



2. Open the drivers door and remove the lower 'A' post trim.
3. Release two screws retaining the airbag safing sensor.
4. Disconnect and remove the airbag safing sensor.
5. Connect and secure the replacement sensor. Replace the 'A' post trim.

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

6. Reconnect the battery, switch on the ignition and check that the airbag warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the airbag system self tests.

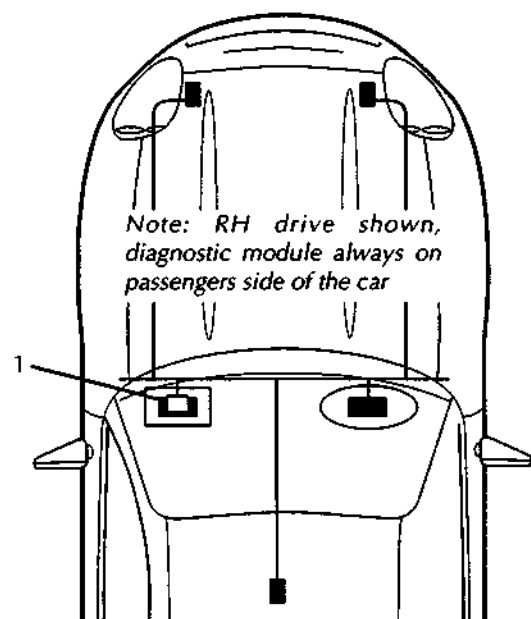
6.4.21.1 Airbag Diagnostic Module Renew

Read and adhere to all warnings and safety procedures quoted at the start of this section when working on the airbag system.

1. Disconnect the battery and wait for at least one minute before working on the airbag system.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.

2. Disarm the airbags (6.4.21.4).
3. Remove the facia assembly.



4. Disconnect the airbag control module (Fig 1-1). Release the module from the top of the airbag carrier assembly and remove the module.
5. Refit and secure the replacement airbag control module and connect the harness connector.
6. Refit the facia assembly.
7. Rearm the airbags (6.4.21.4).

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

Airbag System Diagnostics

System Description

The airbag system installation comprises:

- Airbag Diagnostic Module
- Driver and passenger airbag modules
- Two front impact (crash) sensors
- One 'safing' sensor
- Dedicated wiring harness
- SRS indicator/warning lamp

The system is designed to provide protection for both driver and front seat passenger by automatically deploying airbags in the event of a collision during forward travel.

In the event of a collision, the crash and safing sensors will operate, completing the firing circuit and causing the airbags to inflate within 32 milliseconds. At least one crash sensor and the safing sensor must operate to fire the airbags.

Any faults in system components, installation or wiring will be indicated by a flashing code on the SRS/AIRBAG warning lamp. Fault code information may also be monitored using the PDU or scan tool.

Component Descriptions

Airbag Diagnostic Module

The airbag diagnostic module is mounted on top of the passenger airbag mounting cage. The diagnostic module contains the microprocessor which is connected to the complete airbag system. The state of the three system sensors, the two airbag modules and the wiring harness is constantly monitored by the microprocessor for faults and for sensor activation (crash) conditions.

The diagnostic module also confirms correct supply voltage by comparing a direct battery voltage input with a similar input via the ignition switch.

The diagnostic module contains a reserve power supply, enabling the airbags to fire even if the supply voltage is lost due to collision damage. The reserve power charge will be retained for approximately one minute if the positive battery supply is lost in a collision. An auxiliary internal circuit known as the 'dwell enhancer' provides a temporary ground if normal system ground was lost in a collision.

Wiring Harness

A dedicated electrical wiring harness is used to connect all system components to the bulkhead harness. To allow free movement of the steering mechanism, a cable reel cassette is used to connect the drivers airbag in the steering wheel to the airbag harness on the steering column.

Airbag Modules

The two airbag modules contain a charge of sodium azide/copper oxide which will generate a sufficient volume of nitrogen gas to fully inflate the airbag when ignited by an electrical impulse. The volume of gas is greater in the passenger side airbag due to its larger size.

Both airbag modules, including the surrounding trim of the drivers airbag, are non-serviceable and once deployed, must be renewed as a complete assembly.

Crash and Safing Sensors

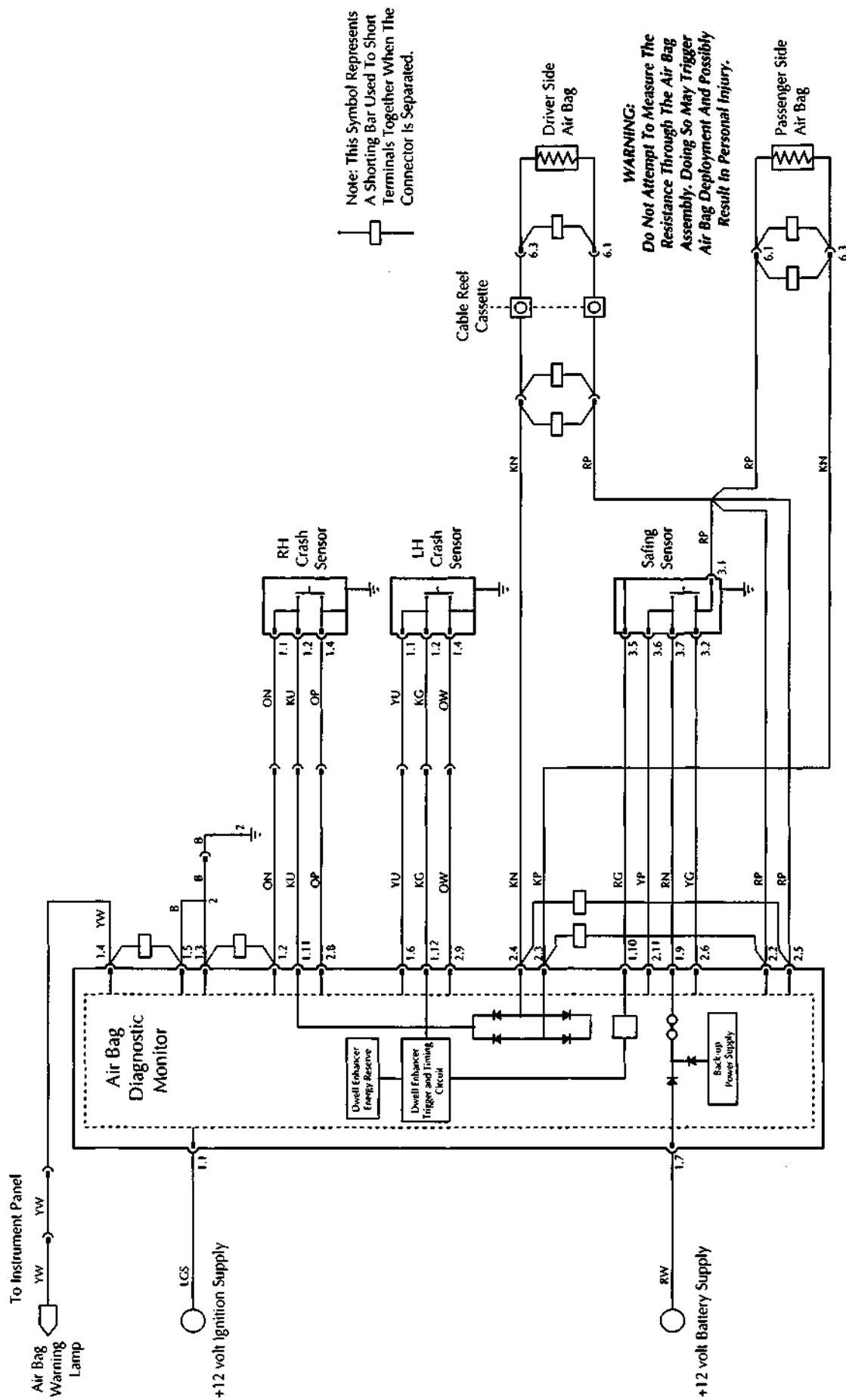
The two crash sensors are mounted one at either side of the bumper mounting cross member, outside of the bonnet hinges.

The safing sensor is mounted in the base of the drivers side 'A' post.

The two crash sensors and the safing sensor determine when airbag deployment is necessary in a crash condition.

The sensor contacts will only close when the vehicle suffers a forward impact of sufficient force. At least one crash sensor and the safing sensor contacts must close before the airbags will deploy. The double trigger strategy is used to prevent deployment during trivial impacts such as contacts during parking.

Air Bag System Wiring Diagram



6.4.21.4 Airbag Disarming/Arming Procedures

Disarming the Airbags

WARNINGS AND CAUTIONS:

WARNINGS:

Disarm the airbags by disconnecting the battery ground (black) lead, waiting one minute and then removing the airbag modules before servicing of any airbag or steering column component.

After disconnecting the battery ground lead, allow a minimum of one minute delay for the back-up power supply to discharge before servicing the airbag system.

The system components are non-serviceable, if faults are suspected, change components for new items only.

Failure to observe the above procedures may result in accidental deployment of the airbags.

Always wear safety glasses when working on airbag equipped vehicles.

Personnel carrying an airbag module must ensure that the module and trim cover are pointing away from the body. When positioning on a bench or work surface, ensure that the airbag module and trim cover face upwards to limit motion on accidental deployment.

Always wear gloves when handling deployed airbag modules. Deposits of sodium hydroxide may be present on the module surface. If sodium hydroxide contacts any area of the skin, wash the affected area immediately with mild soap and water. Dispose of the deployed airbag using the correct procedures referred to in this section.

Cautions:

When scrapping vehicles, ensure that the airbags have been deployed (see Scrapping Vehicles with Live Airbags).

If a component has been renewed and the fault does not clear, refit the original item and repeat the diagnostic procedure.

After servicing, repeat the diagnostic procedures to ensure correct system operation.

Renew the airbag module if the surrounding trim panels are damaged. Do not attempt to repaint trim covers as paint may damage cover material.

WARNING: Carry out the following disarming procedure before attempting any work on the vehicles electrical systems.

Note: The battery ground (black) lead must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.

1. Disconnect the battery ground lead. Allow a minimum of one minute delay for the back-up power supply to discharge.
2. Remove the drivers side airbag module and replace it with an airbag simulator from the simulator kit (Pt No. 43.27028).
3. Remove the passengers airbag module and replace it with an airbag simulator from the simulator kit.
4. Reconnect the battery ground.

Rearming the Airbags

WARNING: Carry out the following procedure to rearm and check the airbags after completing all work on the vehicles electrical systems.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.

1. Disconnect the battery ground lead. Allow a minimum of one minute delay for the back-up power supply to discharge.
2. Remove the drivers side airbag simulator and replace it with the drivers airbag module. Secure the airbag module with the two captive torx screws.
3. Remove the passengers side airbag simulator and replace it with the passenger side airbag module. Secure the module with four nuts and washers. Close the passenger side airbag door.
4. Reconnect the battery ground.
5. Switch on the ignition and check for correct indications from the SRS/AIRBAG warning light. The SRS/AIRBAG lamp should come on after a brief delay and remain on for approximately six seconds during the airbag system self check. The lamp will extinguish upon satisfactory completion of the self check, or will flash a diagnostic code if an airbag system fault is detected. Continuous illumination of the warning lamp may indicate a seatbelt pretensioner fault

Note: Reset the clock and window ECUs on completion.

Airbag Diagnostic Module Fault Codes

Fault codes may be extracted in one of two ways:

Through the upper diagnostics connector using the PDU, or as a series of flashes of the SRS/AIRBAG warning lamp.

Each series of flashes represents a two digit number, representing a fault code from the list below which is recorded in priority order (i.e. If two faults are present, the code nearest the top of the list will flash. Clear the first code, then the second code will flash). Fault analysis procedures for each code are included on the following pages.

- No Airbag warning lamp - Inoperative airbag warning lamp or no ignition voltage to the diagnostic module
- Continuous airbag warning lamp - Diagnostic module disconnected or inoperative, or a seatbelt pretensioner fault (see pretensioner diagnostics).
- 12 Low battery voltage
- 13 Airbag circuit shorted to ground
- 14 Front crash sensor circuit shorted to ground
- 21 Safing sensor incorrectly mounted in the vehicle
- 22 Safing sensor output circuit shorted to battery voltage
- 23 Safing sensor input feed/return open circuit
- 24 Safing sensor output feed/return open circuit
- 32 Drivers side airbag circuit high resistance or open circuit
- 33 Passengers side airbag circuit high resistance or open circuit
- 34 Drivers side airbag circuit low resistance or short circuit to ground
- 35 Passenger side airbag circuit low resistance or short circuit to ground
- 41 Front right crash sensor feed/return open circuit
- 42 Front left crash sensor feed/return open circuit
- 44 Front right crash sensor incorrectly mounted on the vehicle
- 45 Front left crash sensor incorrectly mounted on the vehicle
- 51 Diagnostic module internal fuse intermittent or short circuit to ground
- 52 Back-up power supply - overvoltage fault
- 53 Front crash sensor circuits resistance to ground or internal diagnostic module failure
- Rapid continuous flashing of the airbag lamp (no fault code)- all front crash sensors disconnected

Airbag Diagnostic Module Connector

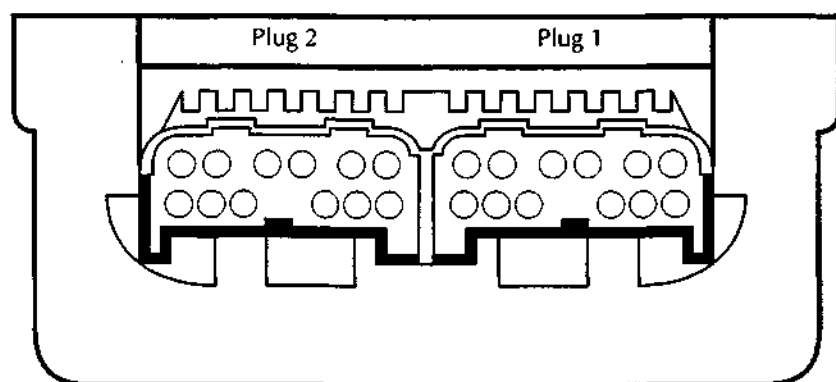
The wiring to the airbag diagnostic module passes through two plugs into a single socket. Plug 1 is grey coloured, plug 2 is black. To aid in fault analysis, the diagnostic module connector pins for plugs 1 and 2, and their functions are listed below:

Connector 1 - Grey Colour

Pin No.	Colour	Circuit
1-1	LGS	12V Ignition Supply
1-2	ON	RH Crash Sensor Monitor
1-3	B	Ground
1-4	YW	Airbag Warning Lamp Output
1-5	B	Ground
1-6	YU	LH Crash Sensor Monitor
1-7	RW	12V Battery Power
1-8	-	Not Used
1-9	RN	Safing Sensor Input
1-10	RG	Safing Sensor Ground Monitor
1-11	KU	RH Crash Sensor Feed
1-12	KG	LH Crash Sensor Feed

Connector 2 - Black

Pin No.	Colour	Circuit
2-1	-	Not Used
2-2	RP	Passenger Airbag Module Feed
2-3	KP	Passenger Airbag Module Return
2-4	KN	Drivers Airbag Module Return
2-5	RP	Drivers Airbag Module Feed
2-6	YG	Safing Sensor Output Monitor
2-7	-	Not Used
2-8	OP	LH Crash Sensor Ground Monitor
2-9	OW	RH Crash Sensor Ground Monitor
2-10	-	Not Used
2-11	YP	Safing Sensor Feed
2-12	-	Test Input

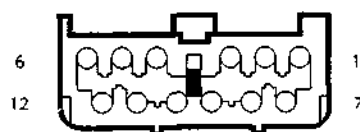


Connector 2/12-Way/Black

6	5	4	3	2	1
YG	RP	KN	KP	RP	-
12	11	10	9	8	7
-	YP	-	OW	OP	-

Connector 1/12-Way/Grey

6	5	4	3	2	1
YU	B	YW	B	ON	LGS
12	11	10	9	8	7
KG	KU	RG	RN	-	RW



No Airbag Warning Lamp

Inoperative lamp, lamp circuit or no ignition voltage to the diagnostics module

Normal Operation

The airbag warning lamp is designed to illuminate for approximately six seconds when the ignition is switched on. This period is allocated for satisfactory performance of the airbag system self test.

Note: The airbag warning lamp is driven by the instrument pack and not directly by the airbag diagnostic module.

The airbag diagnostic module requires an ignition supply to pin 1 to energise the airbag warning lamp circuit. If the warning lamp circuit is open, or the diagnostic module does not receive an ignition voltage at pin 1, the warning lamp will not illuminate.

Open circuit in the warning lamp supply, in conjunction with another system fault, will cause the diagnostic module to emit five tones every 30 minutes while the ignition is switched on. Repair the faulty circuit before further diagnosis.

Note: The diagnostic module will not emit the five tone signal if the warning lamp is open circuit and there is no system fault.

Possible Causes

Defective airbag warning lamp
Faulty wiring in the airbag warning lamp circuit
Loss of ignition voltage at diagnostic module pin 1.
Loss of ground at diagnostic module pin 3
Instrument pack fault

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Remove the instrument pack and check the airbag warning lamp.

If the lamp is good, go to step 2.

If the lamp is defective, replace it, switch on the ignition and check that the lamp is now on for approximately six seconds after ignition on.
2. Disarm the airbag system and fit airbag simulators (6.4.21.4).

3. Connect the PDU. Switch on the ignition. Measure the 12V ignition supply voltage from airbag diagnostic connector pin 1-1 (+) to chassis ground. If ignition voltage is present, go to step 6. If ignition voltage is not present, go to step 4.
4. Check fuse F15 passenger side fusebox RHD or F17 passenger side fusebox LHD (ignition supply to the diagnostic module pin 1-1). If the fuse is good, go to step 5. If the fuse is replaced, go to step 6.
5. Check for an open circuit on the YW wire from fuse F15 passenger side fusebox (F17 LHD) to diagnostic module pin 1-1. If continuity is good, isolate the fault in the 12V supply to fuse F15 (F17) and then go to step 9.
6. Measure the voltage from diagnostic module pin 1-1 to diagnostic module pin 1-3. If 12V is not present, isolate and service the open circuit in the diagnostic module ground to pin 1-3. Then go to step 7.
7. Switch the ignition off. Set up to measure the voltage from DM pin 1-4 to DM pin 1-5 during the first six seconds after ignition on.

Switch on the ignition, the warning light signal to the instrument pack should switch for six seconds after a brief delay.

If the signal does not switch, the diagnostic module is faulty. Replace the module, switch on the ignition and check that the airbag warning lamp does light for six seconds after ignition on.

If the signal does switch for approx. six seconds after ignition on, the fault is in the instrument pack or wiring. go to step 8.

8. Check continuity of the YW wire from diagnostic module pin 1-4 to instrument pack 16 way plug pin 2.

If continuity is good, service the instrument pack and then retest to ensure correct indication from the airbag warning lamp at ignition on.

If continuity is defective, service the wire and then retest to ensure correct indication from the airbag warning lamp at ignition on.
9. Disconnect the PDU, and rearm the airbags (6.4.21.4). Switch on the ignition and check for correct indications from the airbag warning lamp.

Continuous Airbag Warning Lamp

Inoperative lamp circuit or no ignition supply to the airbag diagnostic module.

Normal Operation

The airbag warning lamp is designed to illuminate for approximately six seconds when the ignition is switched on. This period is allocated for satisfactory performance of the airbag system self test. If after this period, the diagnostic module detects a fault within the system, the airbag warning lamp will begin to flash.

Note: The seat belt pretensioner system (if fitted) shares the airbag/SRS warning lamp with the airbag system. If a seat belt pretensioner fault is detected, the Airbag/SRS warning lamp will be permanently illuminated. Ensure that a permanently lit lamp is not the result of a pretensioner fault before carrying out fault analysis on the airbag system.

Poor connection or disconnection of the diagnostic module harness may cause a short circuit from DM pin 4 (warning lamp control) to pin 5 (ground) and cause permanent illumination of the warning lamp.

Faulty operation of the diagnostic module internal logic may fail to turn off the warning lamp control circuit and cause constant illumination of the warning lamp.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4). Reconnect the battery.
2. Inspect the instrument pack and diagnostic module connectors for damaged, pushed out pins, proper location etc.

If any defects are identified, service as necessary. Retest to ensure correct operation of the airbag warning light.

If the connector condition and security are good, reconnect the connectors and go to step 3.

3. Connect the PDU to the upper diagnostic socket and monitor the airbag warning lamp signal. Switch on the ignition.

If the signal is permanently low, suspect a short circuit to ground on the airbag warning lamp control line within the diagnostic module or from diagnostic module pin 1-4 to earth. Go to step 4.

If the signal switches low for six seconds after ignition on but the airbag warning lamp is permanently illuminated, suspect a fault in the output side of the instrument pack to the airbag warning lamp.

4. Disconnect diagnostic module plug 1 (slate) and withdraw the plastic locking wedge to prevent shorts to other circuits. Check continuity from pin 1-1 to ground.

If a short circuit to ground is detected, service the wiring as necessary. Replace the locking wedge, re-insert the connector. Switch on the ignition and check that the airbag warning lamp signal at pin 1-4 goes high six seconds after switching on the ignition and that the warning lamp extinguishes.

If no short circuit to ground is detected, the diagnostic module is faulty. Replace the diagnostic module. Switch on the ignition and check that the airbag warning lamp signal at pin 1-4 goes high six seconds after switching on the ignition and that the warning lamp extinguishes.

5. Switch off the ignition. Disconnect the battery. Rearm the airbags (6.4.21.4). Switch on the ignition and check for correct indications from the airbag warning lamp.

Airbag DM Fault Code 12

Low battery voltage

Normal Operation

The airbag diagnostic module (DM) monitors the voltage at pin 1-7 which should be equal to the battery voltage. If a voltage lower than 9 volts is detected at pin 1-7, the airbag warning lamp will be illuminated and fault code 12 will be flashed.

Possible Causes

Drop in battery voltage to DM pin 1-7 caused by:

- Open circuit to pin 1-7 from the battery
- Short circuit to ground on the battery feed circuit
- Safing sensor feed shorted to ground
- Safing sensor internal short to ground
- Faulty charge system draining the battery

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Complete a battery voltage test as follows:
 - a) Measure the battery voltage at the battery under KOEO and KOER conditions.
If the battery voltage is below 10.5 volts during KOEO or below 12.5 volts during the KOER tests, service the battery and charging system as necessary. Retest for airbag system fault code 12 and go to step 2 if the fault recurs.
2. Complete a 12 volts supply check at the diagnostic module:
 - a) Disarm the airbag system and fit airbag simulators (6.4.21.4)
 - b) Disconnect the airbag diagnostic module.
 - c) Switch on the ignition.
 - d) Measure the voltage between DM harness connector pin 1-7 (+) and harness connector pin 1-3 (-).
 - e) If battery voltage is not present, go to step 3.
If battery voltage is present at pin 1-7, renew the diagnostic module. Rearm and verify the airbag system.

3. Check the supply fuse as follows:
 - a) Check fuse F16 in the passenger side fusebox RHD (or F18 in passenger fusebox LHD).
If the fuse has not blown, check for an open circuit between battery positive and diagnostic module connector pin 1-7.
If the fuse has blown, Renew the fuse and/or repair the wiring and go to step 4.
4. Check for a short circuit as follows:
 - a) Switch off the ignition. With the airbag diagnostic module disconnected, measure the continuity to earth from diagnostic module connector pin 1-7 to ground.
If no short circuit is detected, go to step 5.
If a short to ground is detected, service the wiring as necessary. Reconnect the diagnostic module and retest to ensure that code 12 is cleared.
5. Check for a short circuit to ground on the safing sensor wiring as follows:
 - a) Check for a short circuit to ground at diagnostic module pin 1-9.
 - b) If a short is detected, disconnect the safing sensor and repeat the check at diagnostic module pin 1-9. If a short is still detected, service the wiring from diagnostic module pin 1-9 to safing sensor pin 7.
 - c) If no short circuit is detected, change the airbag diagnostic module. Reconnect the diagnostic module and retest to ensure that code 12 does not recur.
6. Rearm the airbags (6.4.21.4)

Airbag DM Fault Code 13

Airbag circuit short to ground

Normal Operation

The diagnostic module measures the voltage at pins 2-5 and 2-6. The voltage at these pins is dependant on charging system voltage as shown in the table below.

Pin 2-5	Pin 2-6	Charge Volts
2.3V	2.3V	9.0V
2.4V	2.4V	9.5V
2.5V	2.5V	10.0V
2.7V	2.7V	10.5V
2.8V	2.8V	11.0V
3.0V	3.0V	11.5V
3.1V	3.1V	12.0V
3.2V	3.2V	12.5V
3.4V	3.4V	13.0V
3.5V	3.5V	13.5V
3.7V	3.7V	14.0V
3.8V	3.8V	14.5V
4.0V	4.0V	15.0V
4.1V	4.1V	15.5V
4.3V	4.3V	16.0V

If the diagnostic monitor measures a voltage of 2.0 volts or less on pins 2-5 and 2-6, a fault code 13 will be generated and flashed to the instrument pack to be signalled on the airbag warning lamp. Voltages as low as 2.0 volts indicate a possible short to ground in these circuits.

When generating a code 13 the diagnostic module also generates a signal to blow its own internal thermal fuse. This action disables the airbag deployment circuit. The airbag diagnostic module fuse is non-repairable and the module must be replaced after repairing the short circuit. If the voltage at pins 2-5 and 2-6 returns to normal, fault code 51 (blown thermal fuse) will be stored in memory.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4)
2. Disconnect the airbag diagnostic module. Switch on the ignition.
3. Measure the continuity to ground at the following pins on the diagnostic module harness connector:
 - 2-2 Passenger airbag feed
 - 2-3 Passenger airbag return
 - 2-4 Drivers airbag return
 - 2-5 Drivers airbag feed
 - 2-11 Safing sensor feed

If no short circuit is detected, go to step 4.

If a short circuit is detected, disconnect the relevant airbag simulator or the safing sensor and repeat the continuity measurement to isolate the circuit fault. Service the wiring or replace the safing sensor as necessary. Fit a new airbag diagnostic module and rearm the airbags (6.4.21.4).

4. Check for intermittent short circuits in the cable reel cassette. Monitor the continuity to ground at pins 2-4 and 2-5 whilst rotating the steering from lock to lock in both directions.

If no short circuit is detected, go to step 5.

If a short circuit is detected, replace the column switchgear assembly. Fit a new airbag diagnostic module and rearm the airbags (6.4.21.4).

WARNING: Do not attempt to make any electrical measurements on the airbag modules. Any induced voltage can cause the airbag to deploy with the risk of personal injury.

5. Fit a replacement diagnostic module and replacement airbag modules.

Caution: Do not refit the old airbag modules. They may be faulty and would damage the new diagnostic module.

6. Rearm the airbag system (6.4.21.4).

Airbag DM Fault Code 14

Primary crash sensor circuit short to ground

Normal Operation

The diagnostic module measures the voltage at pins 1-2 and 1-6. The normal voltage at these pins is 10 volts (± 1 volt) with the ignition on, and battery voltage with the ignition off.

If the voltage at the airbag diagnostic module connector pins 1-2 or 1-6 drops below 5 volts, fault code 14 will be generated and the airbag warning lamp will be switched on. When generating a code 14 the diagnostic module also generates a signal to blow its own internal thermal fuse. This action disables the airbag deployment circuit. The airbag diagnostic module fuse is non-repairable and the module must be replaced after removing the short circuit. If the voltage at pins 1-2 and 1-6 returns to normal, fault code 51 (blown thermal fuse) will be logged.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4)
2. Disconnect the airbag diagnostic module and remove the plastic wedge from plug 1 (slate).

Note: The plastic wedge contains a shorting bar which would short together pins 1-3 (gnd), 1-11 and 1-2 when the plug is disconnected.

3. Measure the continuity to ground at the following pins on the diagnostic module harness connector:

- 1-2 RH crash sensor monitor
- 1-11 LH crash sensor feed
- 1-6 LH crash sensor monitor
- 1-12 RH crash sensor feed

If no short circuit is detected, go to step 4.

If a short circuit is detected, disconnect the relevant crash sensor and repeat the continuity measurement to isolate the circuit fault. Service the wiring or replace the crash sensor as necessary. Refit the plastic wedge to the diagnostic module connector. Fit a new airbag diagnostic module and rearm the airbags (6.4.21.4).

Airbag DM Fault Code 21

Safing sensor insecure mounting.

Normal Operation

The diagnostic module measures the resistance between pins 1-10 (safing sensor case ground) and 1-3 (monitor reference ground) at the diagnostic module connector. If the resistance is greater than 2Ω a fault code 21 will be generated and the airbag warning lamp will be switched on.

Note: a good ground connection is vital. The wire from pin 1-1 is riveted to the safing sensor case and the case must be securely grounded to the vehicle body.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic connector and check for continuity from pin 1-3 to chassis ground.

If continuity is good, go to step 3.

If the resistance reading is 2Ω or more, service the diagnostic module ground circuit to pin 1-3 as necessary. Confirm a good ground path between pins 1-10 and 1-3. Clear the code 21 and rearm the airbags (6.4.21.4).

3. Check for continuity between pins 1-10 and chassis ground at the safing sensor.

If the resistance is above 2Ω , check for continuity from the safing sensor connector pin 5 to chassis ground. Also check the safing sensor mounting for corrosion, dirt or loose fixings. Service the wiring and/or clean and secure the sensor mounting as necessary. If a satisfactory ground is not achieved, replace the safing sensor.

4. Make a final continuity test from diagnostic module connector pin 1-3 to 1-10 to ensure a satisfactory ground path. Reconnect the diagnostic module. Clear the code 21. Rearm the airbags (6.4.21.4).

Airbag DM Fault Code 22

Safing sensor output circuit shorted to battery voltage.

Normal Operation

The diagnostic module measures the voltage at pin 2-5 (airbag module feed) and 2-6 (safing sensor output monitor) at the diagnostic module connector. The voltage at these pins is dependant on charging system voltage as shown in the table below. If the voltage at either pin exceeds 5 volts, a fault code 22 will be generated.

Pin 2-5	Pin 2-6	Charge Volts
2.3V	2.3V	9.0V
2.4V	2.4V	9.5V
2.5V	2.5V	10.0V
2.7V	2.7V	10.5V
2.8V	2.8V	11.0V
3.0V	3.0V	11.5V
3.1V	3.1V	12.0V
3.2V	3.2V	12.5V
3.4V	3.4V	13.0V
3.5V	3.5V	13.5V
3.7V	3.7V	14.0V
3.8V	3.8V	14.5V
4.0V	4.0V	15.0V
4.1V	4.1V	15.5V
4.3V	4.3V	16.0V

Possible Causes

- A short between pins 2-5 or 2-6 and another wire. (The wiring to the safing sensor carries voltages above 5 volts).
- A short between the cable reel cassette circuit and other 12 volt circuits at the steering column head.
- A short across the normally open contacts of the safing sensor.
- Vehicle charging system voltage too high. If the generator output is greater than 17V, fault code 22 may be logged.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).

2. Check the voltage at the battery with the engine running at approximately 1500 rpm.

If the voltage is 14.8 ± 0.5 volts, the charging voltage is within specification, go to step 3.

If the voltage is significantly above 14.8 volts (the voltage regulator set point) service the charging system. Clear the code 22. Rearm the airbags (6.4.21.4)

3. Check in the area of the diagnostic module connector for harness damage which could cause a short circuit to 12 volts. (Note: The airbag system harness runs are sheathed in black plastic protection and harness damage is unlikely.)

If no harness damage is evident, go to step 4.

If harness damage is identified, service the wiring as necessary. Clear the code 22. Rearm the airbags (6.4.21.4).

4. Switch on the ignition. Monitor the voltage at pins 2-5 and 2-6 whilst rotating the steering from lock to lock in both directions.

If the voltage at both pins remains below 5.0 volts, go to step 5.

If the voltage rises to above 5.0 volts, service the cable reel cassette or wiring as necessary. Clear the code 22. Rearm the airbags (6.4.21.4).

5. With the ignition on, check the voltage at pins 2-5 and 2-6 whilst manipulating the bulkhead and safing sensor harnesses.

If the voltage rises above 5.0 volts, service the wiring fault in the harness area being manipulated at the time the voltage rise occurred.

If no voltage rise occurs, fit a new safing sensor as the most likely cause of the code 22. Clear the code 22 and rearm the airbags (6.4.21.4).

Airbag DM Fault Code 23

Safing sensor input - battery feed/return open circuit.

Normal Operation

The diagnostic module measures the voltage on diagnostic module pin 1-9 at all times. The voltage can be as high as 25 volts when the backup power supply is fully charged.

Pin 1-9 is connected to pin 2-11 inside the safing sensor and the voltage on both these pins should be the same. If the voltage on pin 2-11 falls below the voltage on pin 1-9, a code 23 is generated.

Possible Causes

- Open circuit in the wiring to diagnostic module pin 1-9.
- Open circuit in the wiring to diagnostic module pin 2-11.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic connector and the safing sensor connector. Check for continuity from DM pin 1-9 to safing sensor harness connector pin 7 and from DM pin 1-11 to safing sensor harness connector pin 6.

If the continuity of both leads is good, go to step 3.

If a continuity fault is detected, repair the wiring as necessary. Reconnect all components. Clear the code 23. Rearm the airbags (6.4.21.4).

3. Check the continuity between pins 6 and 7 of the safing sensor.

If the continuity is good, replace the diagnostic module. Rearm the airbags (6.4.21.4).

If a continuity fault is detected, replace the safing sensor. Reset the code 23. Rearm the airbags (6.4.21.4).

Airbag DM Fault Code 24

Safing sensor output - battery feed/return open circuit.

Normal Operation

The diagnostic module measures the voltage on diagnostic module pins 2-5 and 2-6 the voltage varies with the vehicle charge level as shown in the table below:

Pin 2-5	Pin 2-6	Charge Volts
2.3V	2.3V	9.0V
2.4V	2.4V	9.5V
2.5V	2.5V	10.0V
2.7V	2.7V	10.5V
2.8V	2.8V	11.0V
3.0V	3.0V	11.5V
3.1V	3.1V	12.0V
3.2V	3.2V	12.5V
3.4V	3.4V	13.0V
3.5V	3.5V	13.5V
3.7V	3.7V	14.0V
3.8V	3.8V	14.5V
4.0V	4.0V	15.0V
4.1V	4.1V	15.5V
4.3V	4.3V	16.0V

The diagnostic module also measures the voltage at pin 1-7 (battery input). Using the battery input voltage, the system can predict the expected voltage level on pins 2-5 and 2-6. If the voltage on pins 2-5 or 2-6 is higher or lower than expected, a fault code 24 will be declared.

Possible Causes

- Open circuit or high resistance in the wiring harness or safing sensor.
- Intermittent battery voltage on pin 1-7
- The resistance of the pin 2-5 to 2-6 circuit to ground. This circuit should be open to ground at all times.

Fault Analysis

WARNING: Read and adhere to all warnings and safety procedures at the start of this section when working on the airbag system.

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Probe the battery input voltage terminal 1-7. Start the engine and monitor the charge voltage level using a digital multimeter. Run the engine at idle speed and look for any instability in the voltage level. Run the engine at a constant medium speed and then at a constant high speed and repeat the observation for voltage instability.

If the voltage levels are stable, go to step 3.

If instability of the voltage level is observed, Investigate and rectify the problem in the charging circuit.

3. Switch off the ignition. Disconnect the diagnostic module and check for 0Ω continuity from pins 2-5 to 2-6.

If no resistance is detected, go to step 4.

If any resistance is detected between pins 2-5 and 2-6, service the wiring or safing sensor to achieve 0Ω continuity.

4. Measure the resistance to ground from pins 2-5 and 2-6.

If no short circuit is detected, replace the diagnostic monitor. Rearm the airbags (6.4.21.4).

If a short to ground is detected, service the wiring or safing sensor as necessary. Rearm the airbags (6.4.21.4).

Airbag DM Fault Code 32

Drivers airbag circuit high resistance or open circuit.

Normal Operation

The diagnostic module measures the resistance across pins 2-4 and 2-5 every time the ignition is switched on. The resistance should be 1.6 to 1.8Ω. This value is made up of the airbag 1.0Ω and the cable reel cassette windings 0.3-0.4Ω per winding. If the total resistance in the drivers airbag circuit exceeds 4.0Ω, fault code 32 will be declared and the airbag lamp will be illuminated.

Note: The resistance of the airbag simulator is 2.5Ω, therefore expect total resistance readings of 2.8 - 2.9Ω with the simulator fitted.

Caution: The drivers airbag and the cable reel cassette connectors contains shorting bars which short circuit pins 1 and 3 of the connectors when disconnected.

DO NOT REMOVE THE AIRBAG SHORTING BAR UNDER ANY CIRCUMSTANCES.

The harness shorting bars may be temporarily removed during the following resistance checks.

Possible Causes

- Excessive resistance in the cable reel cassette connections.
- Open circuit or high resistance in the cable reel cassette windings.
- Open circuit or high resistance in the wiring harness
- Open circuit or high resistance in the drivers airbag module.
- Defective diagnostic module.

WARNING: Do not attempt a direct resistance check on the airbag module. Accidental deployment can occur due to the induced voltage from the measuring equipment.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and remove the plastic wedge from connector 2 (black). Measure the resistance between pins 2-4 and 2-5. The resistance should be 2.8 - 2.9Ω.

If the resistance is 2.8 - 2.9Ω, go to step 3.

If the resistance is not in the range 2.8 - 2.9Ω, isolate the continuity problem noting the following:

- a) Pin 2-4 is shorted to pin 2-5 by a shorting link when plug 2 of the diagnostic connector is removed. Removal of the plastic wedge from the plug will remove the short circuit.
- b) Both halves of the cable reel connector have shorting links which will short pin 1 to pin 3 when the connection is removed. Removal of the plastic wedge from either half will remove the short circuit in that part of the wiring.
- c) A shorting link is fitted in the airbag module connector. **Do not attempt to remove this shorting link or the plastic wedge. Do not attempt to measure the resistance of the airbag module.**
- d) Carefully replace all plastic wedges on completion of the circuit checks.
3. The fault is therefore in either the airbag module or in the airbag diagnostic module.

Substitute a known good diagnostic module. If code 32 recurs with the airbag simulator fitted, there is a fault in the wiring.

If the fault code 32 does not recur, rearm the airbags (6.4.21.4) and retest.

If fault code 32 recurs with the airbag module fitted, the airbag module is faulty. Replace the drivers airbag module (4.5.01.3).

Airbag DM Fault Code 33

Passengers airbag circuit high resistance or open circuit.

Normal Operation

The diagnostic module measures the resistance across pins 2-2 and 2-3 every time the ignition is switched on. The resistance should be 0.9 to 1.1Ω. If the total resistance in the passengers airbag circuit exceeds 4.0Ω, fault code 33 will be declared and the airbag lamp will be illuminated.

Note: The nominal resistance of the airbag simulator is 2.5Ω, therefore expect a total circuit resistance reading of 2.4 - 2.6Ω with the simulator fitted.

Caution: The passenger airbag connector contains shorting bars which short circuit pins 1 and 3 of both sides of the connector when disconnected.

DO NOT REMOVE THE AIRBAG SHORTING BAR UNDER ANY CIRCUMSTANCES.

The harness shorting bar may be temporarily removed during the following resistance checks.

Possible Causes

- Open circuit or high resistance in the wiring harness
- Open circuit or high resistance in the passenger airbag module.
- Defective diagnostic module

WARNING: Do not attempt a direct resistance check on the airbag module. Accidental deployment can occur due to the induced voltage from the measuring equipment.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and remove the plastic wedge from connector 2 (black). Measure the resistance between pins 2-2 and 2-3. The resistance should be 2.4 - 2.6Ω.

If the resistance is 2.4 - 2.6Ω, go to step 3.

If the resistance is not in the range 2.4 - 2.6Ω, isolate the continuity problem noting the following:

- a) In the diagnostic module connector, pin 2-2 is shorted to pin 2-3 by a shorting link when plug 2 of the diagnostic connector is removed. Removal of the plastic wedge from the plug will remove this short circuit.
 - b) At the airbag module harness connector, pin 1 is shorted to pin 3 when the airbag is disconnected. Removal of the plastic wedge from the plug will remove this short circuit.
 - c) The shorting link fitted in the airbag module connector will short pin 1 to pin 3 when the airbag is disconnected. **Do not attempt to remove this shorting link or the plastic wedge. Do not attempt to measure the resistance of the airbag module.**
 - c) Carefully replace all plastic wedges on completion of the circuit checks.
3. The fault is therefore in either the airbag module or in the airbag diagnostic module.

Substitute a known good diagnostic module. If code 33 recurs with the airbag simulator fitted, there is still a fault in the wiring or the simulator.

If the fault code 33 does not recur, rearm the airbags (6.4.21.4) and retest.

If fault code 33 recurs with the airbag module fitted, the airbag module is faulty. Replace the passengers airbag module (7.8.02.6).

Airbag DM Fault Code 34

Drivers airbag circuit low resistance or short circuit.

Normal Operation

The diagnostic module measures the resistance across pins 2-5 and 2-4 every time the ignition is switched on. The resistance should be 1.6 to 1.8Ω. This value is made up of the airbag 1.0Ω and the cable reel cassette windings 0.3-0.4Ω per winding. If the total resistance in the passengers airbag circuit falls below 0.7Ω, fault code 34 will be declared and the airbag lamp will be illuminated.

Note: The nominal resistance of the airbag simulator is 2.5Ω, therefore expect a total circuit resistance reading of 3.1 - 3.3Ω with the simulator fitted.

Caution: The drivers airbag connector contains shorting bars which short circuit pins 1 and 3 of both sides of the connector when disconnected.

DO NOT REMOVE THE AIRBAG CONNECTOR SHORTING BAR UNDER ANY CIRCUMSTANCES.

The airbag harness shorting bar may be temporarily disabled during the following resistance checks.

Possible Causes

- Poorly mated cable reel cassette connector. If the connector is poorly mated, the shorting bars may not be fully retracted.
- Faulty shorting bar may short circuit 2-4 and 2-5 together.
- Short circuit in the cable reel cassette windings.
- A short across the airbag terminals in the airbag module.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and remove the plastic wedge from connector 2 (black). Measure the resistance between pins 2-5 and 2-4. The resistance should be 3.1 - 3.3Ω.

If the resistance is 3.1 to 3.3Ω, go to step 4.

If the resistance is below 3.1 - 3.3Ω, go to step 3.

3. Disconnect the cable reel cassette connector at the steering column and remove the plastic wedge. Measure the resistance from pins 2-4 and 2-5 at the diagnostic module connector.

If the resistance is infinity, check the cable reel cassette for short circuits. Replace the column switchgear assembly if necessary. Refit the plastic wedges. Reconnect the diagnostic module. Clear the code 34. Rearm the airbags (6.4.21.4).

If the resistance is less than infinity, replace the main airbag harness. Refit the plastic wedges. Reconnect the diagnostic module. Clear the code 34. Rearm the airbags (6.4.21.4).

4. Since the circuit resistance is in specification, the fault must lie in the diagnostic module or in the airbag module.

Substitute a known good diagnostic module. If code 34 recurs with the airbag simulator fitted, there is still a fault in the wiring or the simulator.

If the fault code 34 does not recur, rearm the airbags (6.4.21.4) and retest.

If fault code 34 recurs with the airbag module fitted, the airbag module is faulty. Replace the drivers airbag module (4.5.01.3).

Airbag DM Fault Code 35

Passengers airbag circuit low resistance or short circuit.

Normal Operation

The diagnostic module measures the resistance across pins 2-2 and 2-3 every time the ignition is switched on. The resistance should be 0.9 to 1.1Ω. If the total resistance in the passengers airbag circuit falls below 0.7Ω, fault code 35 will be declared and the airbag lamp will be illuminated.

Note: The nominal resistance of the airbag simulator is 2.5Ω, therefore expect a total circuit resistance reading of 2.4 - 2.6Ω with the simulator fitted.

Caution: The passengers airbag connector contains shorting bars which short circuit pins 1 and 3 of both sides of the connector when disconnected.

DO NOT REMOVE OR DISABLE THE AIRBAG CONNECTOR SHORTING BAR UNDER ANY CIRCUMSTANCES.

The airbag harness shorting bar may be temporarily disabled during the following resistance checks.

Possible Causes

- Poorly mated airbag harness connector. If the connector is poorly mated, the shorting bars may not be fully retracted.
- Faulty shorting bar may short circuit 2-2 and 2-3 together.
- A short across the airbag terminals in the passengers airbag module.

Fault Analysis

1. Disarm the airbag system and check the security of the passengers airbag module connector before disconnecting.

If the connector is secure, complete the disarming procedure, fit the airbag simulators (6.4.21.4). Go to step 2

If the connector is insecure, service as necessary, clear the code 35, rearm the airbags. Check that code 35 does not recur.

2. Disconnect the diagnostic module and remove the plastic wedge from connector 2 (black). Measure the resistance between pins 2-2 and 2-3. The resistance should be 2.4 - 2.6Ω.

If the resistance is 2.4 - 2.6Ω, go to step 4.

If the resistance is below 2.4 - 2.6Ω, go to step 3.

3. Disconnect the airbag simulator at the passengers airbag module and remove the plastic wedge from the harness connector. Measure the resistance between pins 2-2 and 2-3 at the diagnostic module connector.

If the resistance is infinity, the airbag harness is good at this time. Swap the airbag simulators at the drivers and passengers airbag connectors. Repeat the resistance check. If the resistance is less than infinity, there is a fault in the passengers airbag harness connector. Service the connector or replace the harness as necessary. Refit the plastic wedges. Reconnect the diagnostic module. Clear the code 35. Rearm the airbags.

If the resistance is less than infinity, service the bulkhead harness as necessary. Refit the plastic wedges. Reconnect the diagnostic module. Clear the code 35. Rearm the airbags (6.4.21.4).

4. Since the circuit resistance is in specification, the fault must lie in the diagnostic module or in the airbag module.

Substitute a known good diagnostic module. If code 35 recurs with the airbag simulator fitted, there is still a fault in the wiring or the simulator.

If the fault code 35 does not recur, rearm the airbags (6.4.21.4) and retest.

If fault code 35 recurs with the airbag module fitted, the airbag module is faulty. Replace the passengers airbag module (7.8.02.6).

Airbag DM Fault Code 41

Right hand crash sensor feed or return open circuit.

Normal Operation

The diagnostic module constantly measures the voltage at pins 1-2 and 1-11. The voltage should be 10 ± 1 volt. The two wires are connected together within the right hand crash sensor. If the voltage at 1-2 falls below that at 1-11, an open circuit has occurred. Fault code 41 will be declared and the airbag lamp will be illuminated.

Possible Causes

- Open circuit in the wires from diagnostic module pins 1-2 or 1-11 to the right hand crash sensor.
- An open circuit within the right hand crash sensor across pins 1 and 2 of the sensor connector.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and check continuity between pins 1-2 and 1-11.

If the resistance is significantly greater than 0Ω , go to step 3.

If the circuit resistance is 0Ω , the fault is intermittent. Manipulate the harness, particularly in the area of the sensor connector and the crash sensor harness to bulkhead harness connector, to identify the location of the open circuit. Service the circuit as necessary.

3. Check the right hand crash sensor connector for security and service the connector if necessary.

If the connector is secure, disconnect and check continuity from pin 1 to pin 2 of the sensor.

If the resistance is high or an open circuit is detected, replace the crash sensor.

If the sensor continuity is good (0Ω), service the crash sensor loom or bulkhead harness as necessary to remove the high resistance or open circuit.

4. With the airbag simulators in circuit and all connectors in place, clear the code 41. Switch off and then on again to check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds.
5. Switch off and rearm the airbags (6.4.21.4)

Airbag DM Fault Code 42

Left hand crash sensor feed or return open circuit.

Normal Operation

The diagnostic module constantly measures the voltage at pins 1-6 and 1-12. The voltage should be 10 ± 1 volt. The two wires are connected together within the left hand crash sensor. If the voltage at 1-6 falls below that at 1-12, an open circuit has occurred. Fault code 42 will be declared and the airbag lamp will be illuminated.

Possible Causes

- Open circuit in the wires from diagnostic module pins 1-6 or 1-12 to the left hand crash sensor.
- An open circuit within the left hand crash sensor across pins 1 and 2 of the sensor connector.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and check continuity between pins 1-6 and 1-12.

If the resistance is significantly greater than 0Ω , go to step 3.

If the circuit resistance is 0Ω , the fault is intermittent. Manipulate the harness, particularly in the area of the sensor connector and the crash sensor harness to bulkhead harness connector, to identify the location of the open circuit. Service the circuit as necessary.

3. Check the left hand crash sensor connector for security and service the connector if necessary.

If the connector is secure, disconnect and check continuity from pin 1 to pin 2 of the sensor.

If the resistance is high or an open circuit is detected, replace the crash sensor.

If the sensor continuity is good (0Ω), service the crash sensor harness or bulkhead harness as necessary to remove the high resistance or open circuit.

4. With the airbag simulators in circuit and all connectors in place, clear the code 42. Switch off and then on again to check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds.
5. Switch off and rearm the airbags (6.4.21.4).

Airbag DM Fault Code 44

Right hand crash sensor incorrectly mounted.

Normal Operation

The diagnostic module constantly measures the resistance between pins 2-8 (RH crash sensor ground) and 1-3 (airbag DM system ground). If the resistance rises above 2Ω , fault code 44 is declared and the airbag warning lamp is illuminated.

Possible Causes

- Loose sensor mounting or an accumulation of dirt or corrosion at the sensor mountings.
- An open circuit or loose wire from DM pin 2-8 to the sensor.
- An open circuit wire or loose rivet within the sensor.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and check continuity between pins 1-3 and 2-8.

If the resistance is significantly greater than 0Ω , go to step 3.

If the circuit resistance is 0Ω , the fault is intermittent. Manipulate the harness, particularly in the area of the sensor connector and the crash sensor harness to bulkhead harness connector, to identify the location of the open circuit. Service the circuit as necessary.

3. Check the right hand crash sensor mounting for security and corrosion.

If neither problem is evident, go to step 4.

If either problem is evident, remove, clean and resecure the sensor. Reconnect the diagnostic module. Switch on and clear the code 44. Switch off and then on again to check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds.

4. Check the right hand crash sensor connector for security and service the connector if necessary.

If the connector is secure, disconnect and check continuity from pin 1 to pin 2 of the sensor.

If the resistance is high or an open circuit is detected, replace the crash sensor. Go to step 5

If the sensor continuity is good (0Ω), service the crash sensor harness or bulkhead harness as necessary to remove the high resistance or open circuit. Go to step 5.

5. With the airbag simulators in circuit and all connectors in place, clear the code 44. Switch off and then on again to check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds.
6. Switch off and rearm the airbags (6.4.21.4)

Airbag DM Fault Code 45

Left hand crash sensor incorrectly mounted.

Normal Operation

The diagnostic module constantly measures the resistance between pins 2-9 (LH crash sensor ground) and 1-3 (airbag DM system ground). If the resistance rises above 2Ω , fault code 45 is declared and the airbag warning lamp is illuminated.

Possible Causes

- Loose sensor mounting or an accumulation of dirt or corrosion at the sensor mountings.
- An open circuit or loose wire from DM pin 2-9 to the sensor.
- An open circuit wire or loose rivet within the sensor.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module and check continuity between pins 1-3 and 2-9.

If the resistance is significantly greater than 0Ω , go to step 3.

If the circuit resistance is 0Ω , the fault is intermittent. Manipulate the harness, particularly in the area of the sensor connector and the crash sensor harness to bulkhead harness connector, to identify the location of the open circuit. Service the circuit as necessary.

3. Check the left hand crash sensor mounting for security and corrosion.

If neither problem is evident, go to step 4.

If either problem is evident, remove, clean and resecure the sensor. Reconnect the diagnostic module. Switch on and clear the code 45. Switch off and then on again to check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds.

4. Check the left hand crash sensor connector for security and service the connector if necessary.

If the connector is secure, disconnect and check continuity from pin 1 to pin 2 of the sensor.

If the resistance is high or an open circuit is detected, replace the crash sensor. Go to step 5

If the sensor continuity is good (0Ω), service the crash sensor harness or bulkhead harness as necessary to remove the high resistance or open circuit. Go to step 5.

5. With the airbag simulators in circuit and all connectors in place, clear the code 45. Switch off and then on again to check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds.
6. Switch off and rearm the airbags (6.4.21.4)

Airbag DM Fault Code 51

Airbag diagnostic module - thermal fuse blown.

WARNING: *The diagnostic module will blow the internal fuse whenever a short circuit to ground occurs in the deployment circuits. It does not blow because of excessive current flow. The thermal fuse is not a serviceable item. No attempt should be made to replace or bypass the fuse.*

WARNING: *Do not install a new diagnostic module until the short has been located and corrected. A short which goes away before corrective action has been taken must be regarded as an intermittent fault. Installing a new diagnostic module when there is an intermittent fault will result in repeated diagnostic module failures and repeated repairs.*

Normal Operation

In order to prevent airbag deployment in the event of a short circuit to ground, the diagnostic module blows its internal fuse as soon as a short to ground is detected. This action removes all battery and back-up power from the deployment circuits. The diagnostic module will flag the higher priority codes 13 or 14 while the short to ground exists. If the short is intermittent and temporarily corrects itself, the diagnostic module will flag code 51. If the short to ground returns, the diagnostic module will again flag the higher priority code 13 or 14 instead of code 51.

Code 51 after Airbag Deployment

The internal wiring may be shorted to the metal airbag housings after the airbags are deployed. The diagnostic module will see this as a short to ground in the deployment wiring. It will flag a code 14 and blow the internal fuse. As the deployed airbags cool, the short circuit may rectify itself. The diagnostic module will then flag a code 51. This intermittent fault must be investigated and corrected.

Possible Causes

A short circuit to ground in any of the following:
DM pins 2-2, 2-5 or 2-6 to the safing sensor
DM pins 2-2, 2-5 or 2-3 to the passenger airbag
DM pins 2-2, 2-4 or 2-5 to the drivers airbag
DM pins 1-2 or 1-11 to RH crash sensor
DM pins 1-6 or 1-12 to LH crash sensor

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Inspect the connectors and terminals for any foreign metal objects or damaged terminals which could be the cause of the short circuit.

Check each of the circuits in the possible causes list and isolate the intermittent short circuit. Rectify the fault.

See the warnings above about replacement of diagnostic modules when intermittent shorts are present.
3. Replace the diagnostic module.
4. Reconnect all components and rearm the airbags (6.4.21.4).

Airbag DM Fault Code 52

Back-up power supply - voltage boost fault.

Normal Operation

A back-up power supply consisting of a capacitor and voltage booster is contained within the diagnostic module. The voltage booster charges the capacitor to 24 ± 1 volt when the ignition is on. The back-up power supply is connected to diagnostic module pin 1-9 via a diode. Since the resistance of pin 1-9 to ground is infinite, the capacitor has no discharge path and the back-up supply is maintained at a high voltage. The diagnostic module monitors this voltage and will flag a code 52 if a minimum of 23V is not achieved within 45 seconds of switching on the ignition.

Possible Causes

Low back-up supply voltage may be caused by:

- Partial or total short circuit of pin 1-9 to ground.
- Boost circuit failure within the diagnostic module.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Disconnect the diagnostic module. Check for a partial or permanent short circuit to ground from diagnostic module harness connector pin 1-9.

If no short circuit is detected, go to step 3.

If a short circuit is detected, service the wiring as necessary. Reconnect the diagnostic module. Clear the code 52. Rearm the airbags.

3. Using a high resistance digital multimeter, set up to measure the voltage from diagnostic module pin 1-9 to ground. Switch on the ignition.

If the voltage is in the range 24 ± 1 volt, the back-up power supply is good. Suspect an intermittent short circuit to ground and recheck the output circuit from pin 1-9.

If the voltage is below the range 24 ± 1 volt, replace the diagnostic module.

4. Rearm the airbags (6.4.21.4).

Airbag DM Fault Code 53

Internal diagnostic module failure.

Normal Operation

The diagnostic module constantly measures the voltage on pins 1-2, 1-6, 1-11 and 1-12. It should be 10 ± 1 volt. The voltage is regulated by a resistor within the diagnostic module and the resistance to ground of pins 1-2, 6, 11 and 12 should be infinite. The resistance across the normally open contacts of the crash sensors should also be infinite. If the resistance of the pins to ground or across the crash sensors becomes measurable, the voltage will drop. At between 5V and 10V the diagnostic module will recognise an internal voltage regulation failure and flag a code 53 fault and the airbag warning light will be illuminated.

Notes: A dead short to ground in the crash sensor circuits will drop the voltage below 5V and the diagnostic module will flag a code 14 fault.

The diagnostic module performs several self-tests as the ignition is switched on. If it fails any test, fault code 53 will be flagged.

Possible Causes

- A decrease in resistance from infinity between the primary crash sensor circuits and ground.
- An internal diagnostic module self-test failure.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Check each of pins 1-2, 1-6, 1-11 and 1-12 for continuity to ground.

If resistance of all circuits is infinity, go to step 3.

If any resistance other than infinity is detected, service the circuit wiring as necessary. Reconnect all connectors and switch on and clear all fault codes.

Switch off the ignition and then switch on again. Check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds on satisfactory completion of the airbag system self-check.

3. Rearm the airbags (6.4.21.4).

Airbag DM Fault Code 99

Rapid continuous flashing of the airbag warning light - Both front crash sensors disconnected.

Normal Operation

Each crash sensor has three wires. Two deploy the airbag and monitor the sensors connection to the diagnostic monitor. The third wire monitors the mounting of the sensor to the vehicle bodywork. A code 99 is declared if both sensors are disconnected and not properly grounded.

Fault Analysis

1. Disarm the airbag system and fit airbag simulators (6.4.21.4).
2. Check continuity of all circuits listed below and service as necessary.

LH Crash Sensor

DM Pin	Sensor Pin
1-6	1
1-12	2
2-9	4

RH Crash Sensor

DM Pin	Sensor Pin
1-2	1
1-11	2
2-8	4

Also check for correct grounding of the diagnostic module and the sensor cases.

3. Reconnect all connectors, clear fault code 99. Switch off the ignition and then switch on again. Check that the airbag warning lamp comes on at 'ignition on' and extinguishes after approximately six seconds on satisfactory completion of the airbag system self-check.
4. Rearm the airbags (6.4.21.4).

The Seat Belt Pretensioner System (where fitted)

Description

The DB7 seat belt pretensioner system operates the drivers seat belt pretensioner in conjunction with the Airbag system. The seat belt pretensioner control module is located under the right hand seat, beside the right hand seat control module.

The pretensioner control module calculates changes in vehicle speed using an input signal from an accelerometer. When a collision is detected (Rapid reduction in vehicle speed) and the safing sensor in the airbag system is also activated, the pretensioner charge is fired using electrical energy stored in a capacitor within the pretensioner control module. Firing of the pretensioner charge applies additional tension to the drivers seat belt.

The airbag and seat belt pretensioner systems share the SRS (Airbag) warning lamp. Any fault detected by the pretensioner control module is indicated by constant illumination of the SRS (Airbag) warning lamp. Flashing of the SRS warning lamp indicates a fault in the airbag system.

Should both systems develop faults, the pretensioner system will permanently illuminate the warning lamp. This would mask the airbag system warning indication. Therefore, rectify the pretensioner fault and then retest for faults in the airbag system

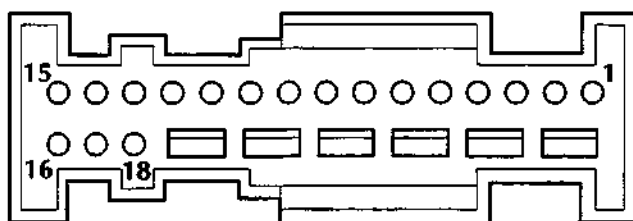
The pretensioner control module can log up to 10 diagnostic trouble codes together with a time since each fault was alerted to the driver. Each fault will be identified as 'Permanent' or 'Intermittent' on the PDU diagnostic trouble codes screen.

System Connections

DB7 is fitted with an Autoliv EC5 or RC5 Pretensioner Control Module. The Pretensioner Control Module has an 18 pin connector featuring six shorting bridges. The mating halves of the connector may be securely locked using a double mechanical locking system.

The following pins on the control module connector are used in the Aston Martin seat belt pretensioner system:

Pin 1	Ground
Pin 2	Airbag Warning Lamp
Pin 11	Drivers airbag positive
Pin 12	Drivers airbag negative
Pin 14	Serial communications
Pin 15	12 volt positive feed
Case	Ground



*Note: Pins 1 - 2, 3 - 4, 5 - 6, 7 - 8, 9 - 10 and 11 - 12 are shorted together by internal shorting links within the connector when it is disconnected. The short circuits may be temporarily overcome for fault analysis purposes by inserting a suitable **non-metallic** cheater (the same size as the pegs in the controller connector) into the rectangular hole opposite the relevant pair of pins.*

System Fault Strategy

No single fault may cause an unexpected deployment. The controller will supervise the pretensioner electrical system in order to warn the driver should a fault occur. Any fault detected by the self diagnostics shall cause the SRS/airbag warning lamp to be activated, and in some cases the pretensioner control module to enter shutdown mode. In shutdown mode, the energy of the reserve capacitors shall be discharged to avoid unintended deployment.

As the ignition is switched on, the pretensioner controller will directly discharge the energy capacitors. When the start up procedure is completed without detecting any faults, the DC/DC convertor will be activated allowing the capacitors to be charged. The system shall be fully active within 11 seconds after switching the ignition on providing that no faults are detected.

All system faults monitored by the controller are filtered in software to avoid fault warnings due to transient electrical disturbances.

If a fault which could lead to inadvertent deployment is detected by the microprocessor, a software shutdown will be generated. However, a leakage to an earth or positive potential in the pretensioner output circuit shall not cause the controller to enter shutdown mode.

If a permanent short of the ignition transistor occurs, a shutdown shall be generated by the hardware circuit. If a shutdown occurs, the system shall be unable to deploy the pretensioner after a period of 3 seconds (i.e. capacitors discharged to under minimum deployment voltage).

WARNING: *To avoid the possibility of personal injury caused by accidental deployment of the pretensioner, disconnect the vehicle battery and wait at least 10 minutes for all voltages to fully discharge before working on the pretensioner system. This covers the possibility of the normal capacitor discharge circuits being inoperative and failing to discharge the capacitor when instructed to do so.*

WARNING: *Do not make any electrical measurements on the pretensioner squib. Electrical measurement devices can induce sufficient voltage to cause unintentional firing of the pretensioner assembly*

If the module enters shutdown mode, all diagnostic functions are stopped, but the communications link remains active. A fault code corresponding to the cause of the problem may be read by the PDU.

Assembly/Removal/Service Instructions

WARNING: *In the event of a vehicle impact where the airbags and the seatbelt pretensioner (if fitted) are deployed, the following actions MUST be performed:*

Check the condition of the seatbelts, steering wheel, steering column, all connections to airbags, and the column switchgear connectors for integrity and damage. If in any doubt, replace suspected parts for new parts.

Replace both crash sensors, the safing sensor and the seatbelt pretensioner module (if fitted).

On completion of all repair procedures, switch on the ignition and check that the Airbag/SRS warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the airbag and pretensioner system self tests.

Vehicles for the North American, Australian and Japanese markets are fitted with drivers seat belt pretensioner systems and are fitted with a shorting plug in the yellow connector adjacent to the pretensioner control module. Vehicles for other markets do not have drivers seat belt pretensioners fitted but have a blanking plug in the yellow connector adjacent to the pretensioner control module.

6.6.26.1 Pretensioner Control Module - Renew

Read the warnings given in system fault strategy and service instructions on the previous page before starting the following procedure.

Procedure

1. Disconnect the battery ground (black) lead and wait at least 10 minutes for the pretensioner power supply to fully discharge before working on the pretensioner system.

Note: The vehicle battery must be disconnected within 12 seconds of switching off the ignition to avoid the alarm siren sounding.

2. Motor the right front seat to its rearmost position.
3. Remove the floor carpet and the ECU cover.
4. Disconnect the pretensioner control module connector (orange connector with black safety clip).
5. Remove 3 flange screws securing the module, noting the position of the earth strap.
6. Fit the new pretensioner control module with the connector facing to the rear and secure with 3 flange screws ensuring that the earth strap is secured with the outboard rear screw.
7. Connect the orange connector to the control module.
8. Refit and secure the ECU cover and the floor carpet.
9. Reconnect the battery ground (black) lead.

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

10. Switch on the ignition and check that the airbag warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the pretensioner and airbag system self tests.

6.6.24.1 Pretensioner Assembly Renew

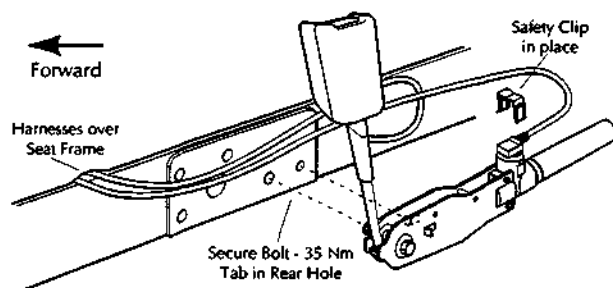
Read the warnings given in system fault strategy and service instructions on the previous page before starting the following procedure.

Procedure

1. Motor the drivers seat to its rearmost position. Disconnect the battery ground (black) lead and wait at least 10 minutes for the pretensioner power supply to fully discharge before working on the pretensioner system.

Note: Disconnect the battery within 12 seconds of switching off the ignition to avoid the alarm siren sounding.

2. Remove the pretensioner trim cover. Unbolt the drivers seat. Tip the seat rearwards and disconnect the seat and pretensioner squib connectors.
3. Release one bolt at the base of the seat belt stalk and remove the pretensioner assembly.
4. Ensure that the safety clip is fitted to the connector at the pretensioner squib. Fit the new assembly, locating the anti-rotation peg into the rear hole of the mounting bracket. Secure the assembly with one bolt. Torque the bolt to 35Nm.



5. Route the pretensioner lead between the seat and the frame. Reconnect the seat and pretensioner connectors. Ensure that the pretensioner connector safety clip is secured. Refit the drivers seat and loosely secure.

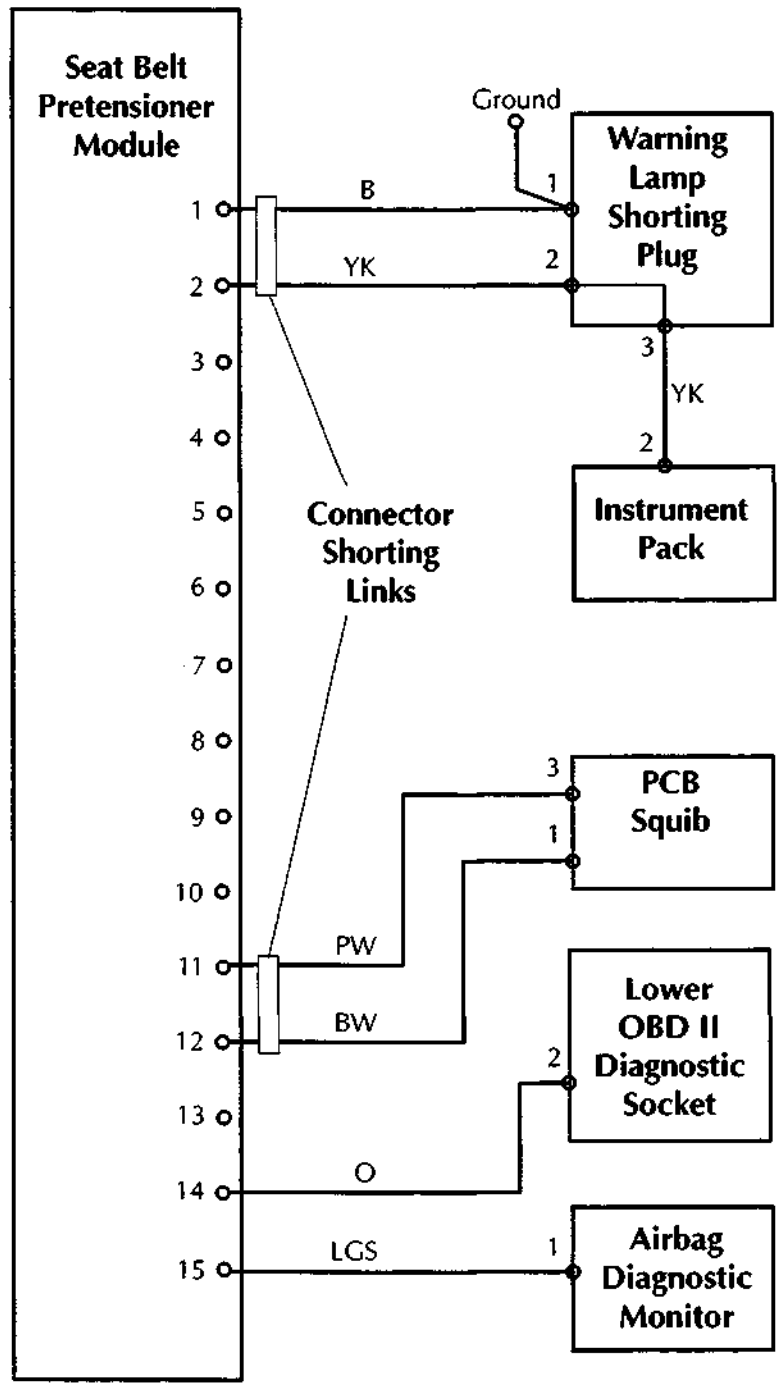
6. Reconnect the battery ground (black) lead.

Note: The vehicle clock and the window control unit will need resetting after completion of this procedure.

7. Switch on the ignition and check that the airbag warning light comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the pretensioner and airbag system self tests.

8. Fit the front screws ensuring a 1.2mm gap between screws and slide. Power the seat forward. Torque the rear screws to 25 Nm. Power the seat backward. Torque the front screws to 25 Nm.

Seat Belt Pretensioner Circuits



Diagnostic Trouble Codes

- 050A Pretensioner squib leak to battery positive
- 050B Pretensioner squib leak to ground
- 050C Pretensioner squib high resistance
- 050D Pretensioner squib low resistance
- 0D13 Capacitor voltage error
- 0D14 Capacitor capacitance
- 0D09 Energy reserve switch
- 0D1E Energy shutdown switch
- 050E Seatbelt pretensioner switch error
- 0109 Accelerometer function
- 010A Acceleration out of range
- 010B Accelerometer offset
- 0209 Safing sensor error
- 030A Temperature sensor error
- 060C Warning lamp short circuit
- 060D Warning lamp open circuit
- 060E Warning lamp driver error
- 0A0C Analogue voltage error
- 0A09 Communications error
- 090A EEPROM not programmed
- 0909 EEPROM checksum
- 0A0A External watchdog error
- 0A0B External watchdog time out
- 020A Safing sensor not closed
- 090C RAM check error

Seat Belt Pretensioner Diagnostics

WARNING: To avoid the possibility of personal injury caused by accidental deployment of the pretensioner, disconnect the vehicle battery and wait at least 10 minutes for all voltages to fully discharge before working on the pretensioner system. This covers the possibility of the normal capacitor discharge circuits being inoperative and failing to discharge the capacitor when instructed to do so.

WARNING: Do not make any electrical measurements on the pretensioner squib. Electrical measurement devices can induce sufficient voltage to cause unintentional firing of the pretensioner assembly

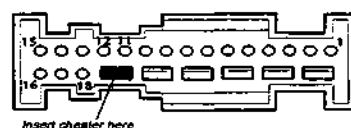
050A Pretensioner Squib Leak to Battery Positive

050A will be logged if the resistance of the pretensioner squib feed or return line to a positive potential falls below 1k Ω .

Procedure

1. Read the warnings given at the start of this pretensioner diagnostics section.
2. Connect the PDU to the lower diagnostic socket and access the pretensioner control module. Verify that an 050A code is logged and note if the fault is shown as intermittent. Note any other codes in the DTC log and then clear all codes.
3. Switch off the ignition and wait at least 10 minutes for the pretensioner squib firing capacitors to fully discharge before continuing with this procedure.
4. Disconnect the pretensioner squib connector at the rearward harness. Disconnect the pretensioner control module and temporarily cheat the squib shorting link.

*Note: The control module harness connector has a shorting link which short circuits the squib lines together when the connector is displaced. Carefully insert a suitable **non-metallic** cheater to remove the short circuit between pins 11 and 12 before continuing with fault diagnosis.*



5. Switch on the ignition and check for a positive potential on the squib feed or return lines at the two pins of the squib harness connector (activating circuits in the rearward harness in turn may assist in identifying the voltage source). If a positive potential is detected, switch off and repair the circuit fault.

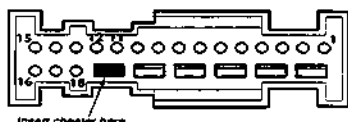
If no short circuit is detected in the rearward harness, go to step 6.

6. With the ignition switched off and the pretensioner squib disconnected, check the squib harness for physical damage.

If any damage is detected, replace the complete pretensioner squib assembly.

If no damage is detected, the fault is possibly in the pretensioner control module. Replace the control module.

7. Remove the cheater from the control module connector.



Reconnect all components. Switch on the ignition and test the vehicle to ensure that the problem is resolved.

050B Pretensioner Squib Leak to Ground

050B will be logged if the resistance of the pretensioner squib feed or return line to ground falls below 1k Ω .

Procedure

1. Read the warnings given at the start of this pretensioner diagnostics section.
2. Connect the PDU to the lower diagnostic socket and access the pretensioner control module. Verify that an 050B code is logged and note if the fault is shown as intermittent. Note any other codes in the DTC log and then clear all codes.
3. Switch off the ignition and wait at least 10 minutes for the pretensioner squib firing capacitors to fully discharge before continuing with this procedure.
4. Disconnect the pretensioner squib connector at the rearward harness. Disconnect the pretensioner control module and temporarily cheat the squib shorting link.

*Note: The control module harness connector has a shorting link which short circuits the squib lines together when the connector is displaced. Carefully insert a suitable **non-metallic** cheater to remove the short circuit between pins 11 and 12 before continuing with fault diagnosis.*



5. Check for a short circuit to vehicle ground on the squib feed or return lines at the two pins of the squib harness connector. If a short circuit is detected, switch off and repair the circuit fault.

If no short circuit is detected in the rearward harness, go to step 6.

6. With the ignition switched off and the pretensioner squib disconnected, check the squib harness for physical damage.

If any damage is detected, replace the complete pretensioner squib assembly.

If no damage is detected, the fault is possibly in the pretensioner control module. Replace the control module.

7. Remove the cheater from the control module connector. Reconnect all components. Switch on the ignition and test the vehicle to ensure that the problem is resolved.

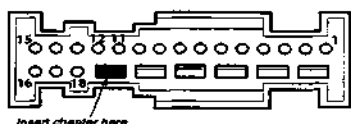
050C Pretensioner Squib High Resistance

050C will be logged if the resistance of the pretensioner squib circuit rises above $4.5 \pm 0.5\Omega$

Procedure

1. Read the warnings given at the start of this pretensioner diagnostics section.
2. Connect the PDU to the lower diagnostic socket and access the pretensioner control module. Verify that an 050C code is logged and note if the fault is shown as intermittent. Note any other codes in the DTC log and then clear all codes.
3. Switch off the ignition and wait at least 10 minutes for the pretensioner squib firing capacitors to fully discharge before continuing with this procedure.
4. Disconnect the pretensioner squib connector at the rearward harness. Disconnect the pretensioner control module and temporarily cheat the squib shorting link.

*Note: The control module harness connector has a shorting link which short circuits the squib lines together when the connector is displaced. Carefully insert a suitable **non-metallic** cheater to remove the short circuit between pins 11 and 12 before continuing with fault diagnosis.*



5. Check the continuity of the squib feed and return lines. If any significant resistance is measured, service the wiring as necessary.

Also check the condition of the connector pins for damage or lack of tension and service as necessary.

If the circuit resistance is acceptable and the connector pins are good, go to step 6.

If any defects are identified and serviced, go to step 7.

6. If the checks in step 4 are good, the high circuit resistance must be in the pretensioner squib or in the control module. Replace the pretensioner squib and reconnect all components.
7. Clear all logged DTCs from the pretensioner control module and then test the vehicle.

If the 050C code is logged again, replace the control module.

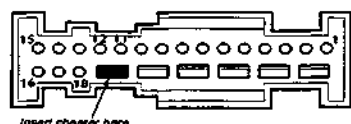
050D Pretensioner squib low resistance

050D will be logged if the resistance of the pretensioner squib circuit falls below $1.4 \pm 0.4\Omega$

Procedure

1. Read the warnings given at the start of this pretensioner diagnostics section.
2. Connect the PDU to the lower diagnostic socket and access the pretensioner control module. Verify that an 050D code is logged and note if the fault is shown as intermittent. Note any other codes in the DTC log and then clear all codes.
3. Switch off the ignition and wait at least 10 minutes for the pretensioner squib firing capacitors to fully discharge before continuing with this procedure.
4. Disconnect the pretensioner squib connector at the rearward harness. Disconnect the pretensioner control module and temporarily cheat the squib shorting link.

*Note: The control module harness connector has a shorting link which short circuits the squib lines together when the connector is displaced. Carefully insert a suitable **non-metallic** cheater to remove the short circuit between pins 11 and 12 before continuing with fault diagnosis.*



5. Check the continuity from the squib feed line to the squib return line. With the shorting link cheated, the resistance should be more than $10k\Omega$. If the resistance is less than $10k\Omega$, service the wiring as necessary.

Also check the connector pins for any damage which could cause an unintentional short circuit.

6. If the checks in step 5 are good, the low circuit resistance must be in the pretensioner squib or in the control module. Replace the pretensioner squib and reconnect all components.
7. Clear all logged DTCs from the pretensioner control module and then test the vehicle.

If the 050D code is logged again, replace the control module.

060C Warning Lamp Short Circuit

060C will be logged if the monitor current flow through the SRS/Airbag warning lamp is excessive.

The warning lamp circuit is normally at 12 volts and is switched to ground by the airbag control module or by the pretensioner control module when one of these control modules detects a fault.

If either control module connector is displaced and the ignition is switched on, the warning lamp will be illuminated via the ground shorting link between pins 1 and 2 of the pretensioner controller connector or pins 4 and 5 of the airbag controller connector. Both control modules must be checked for the appropriate DTC to isolate which circuit is at fault.

Procedure

1. Connect the PDU to the lower diagnostic socket and access the pretensioner control module. Verify that an 060C code is logged and note if the fault is shown as intermittent. Note any other codes in the DTC log and then clear all codes. Go to step 2.

If fault code 060C is not logged, go to the diagnostics section of the airbag system.

2. Check the security of the pretensioner control module connector.

If the connector is secure, go to step 3.

If the connector is displaced, resecure the connector. Clear all logged DTCs and retest the vehicle to ensure that the problem is resolved.

3. Access the SRS/Airbag warning lamp and check the lamp resistance.

If the resistance is approximately 120Ω, the lamp is good. Refit the lamp and go to step 4.

If the resistance of the lamp is significantly less than approximately 120Ω, fit a new lamp and refit the instrument panel. Clear the logged DTCs from the pretensioner control module and retest the vehicle to ensure that the problem is resolved.

4. If the checks in step 3 are good, the low circuit resistance must be in the instrument pack or in the control module. Replace the pretensioner control module and reconnect all components.

6. Switch on the ignition and then test the vehicle.

If the 060C code is logged again, replace the instrument pack.

060D Warning lamp open circuit

060D will be logged if the monitor current flow through the SRS/Airbag warning lamp is below the normal monitor level.

The warning lamp circuit is normally at 12 volts and is switched to ground by the airbag control module or by the pretensioner control module when one of these control modules detects a fault.

Procedure

1. Connect the PDU to the lower diagnostic socket and access the pretensioner control module. Verify that an 060D code is logged and note if the fault is shown as intermittent. Note any other codes in the DTC log and then clear all codes. Go to step 2.

If fault code 060D is not logged, go to the diagnostics section of the airbag system.

2. Switch off the ignition. Access the SRS/Airbag warning lamp and check the lamp resistance. The resistance should be approximately 120Ω.

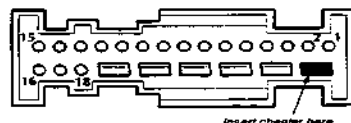
If the resistance is 120Ω, go to step 3.

If the lamp resistance is significantly lower than 120Ω, replace the lamp. Retest the vehicle to ensure that the problem is resolved.

3. Wait 10 minutes after switching off the ignition to ensure that the pretensioner firing capacitors have fully discharged.

Disconnect the pretensioner control module and temporarily cheat the warning lamp shorting link.

Note: The control module harness connector has a shorting link which short circuits the warning lamp line (pin 2) to ground (pin 1) when the connector is displaced. Carefully insert a suitable non-metallic cheater to remove the short circuit between pins 1 and 2 before continuing with fault diagnosis.



4. Check the continuity of the line from pretensioner control module pin 2 to instrument pack green connector pin 2.

If continuity is approximately 0Ω , go to step 5.

If the line resistance is significantly greater than 0Ω , service the wiring as necessary. Reconnect all components and test the vehicle to ensure that the problem is resolved.

5. If the lamp and wiring checks are good, the fault lies in the instrument pack or in the control module.

Replace the control module and retest. If the fault persists, replace the instrument pack. Reconnect all components and test the vehicle to ensure that the problem is resolved.

Pretensioner Control Module Internal Faults

The following codes indicate internal faults within the pretensioner control module.

0209 Safing sensor error
030A Temperature sensor error
0D13 Capacitor voltage error
0D14 Capacitor capacitance
0D09 Energy reserve switch
0D1E Energy shutdown switch
050E Seatbelt pretensioner switch error
0109 Accelerometer function
010A Acceleration out of range
010B Accelerometer offset
0A0C Analogue voltage error
090A EEPROM not programmed
0909 EEPROM checksum
090C RAM check error
060E Warning lamp driver error
0A09 Communications error
0A0A External watchdog error
0A0B External watchdog time out
020A Safing sensor not closed

If any of the above codes are logged, replace the pretensioner control module.

6.6.03 Seat Removal 97.5 MY

Description

The 97.5 MY front seats are common to the DB7 Coupe and Volante models. Seat switch assemblies are located on the outboard side of both driver and passenger seats. The front switch controls fore and aft movement and the seat height adjustment. The centre switch controls the recline adjustment. The rear switch controls the lumbar support adjustment.

The seat heater switches are mounted on the centre console, forward of the gear selector lever.

Only one of the slide, recline or height motors can be driven under manual control at any one time.

Each seat switch pack is hard wired to the relevant Seat Control Module beneath each seat. The module outputs are hard wired to the seat motors.

Removal

WARNING - Seat belt Pretensioners (if fitted):

To avoid the possibility of personal injury caused by accidental deployment of the seat belt pretensioner, disconnect the vehicle battery and wait at least 10 minutes for all voltages to fully discharge before working on the pretensioner system. This covers the possibility of the normal capacitor discharge circuits being inoperative and failing to discharge the detonator capacitor when instructed to do so.

Procedure

1. Motor the seat to its maximum forward position and remove the fixings at the rear of the slides.
2. Motor the seat to its maximum rearward position and remove the front seat slide fixings.
3. Disconnect the battery ground (black) lead. Wait at least 10 minutes for the pretensioner power supply to fully discharge before working on the seat if a pretensioner is fitted.
4. Disconnect the two harness connectors from the seat control module. Also disconnect the yellow connector from the pretensioner control module if a pretensioner is fitted.

Note: Disconnect the battery within 12 seconds of switching off the ignition to avoid the alarm siren sounding.

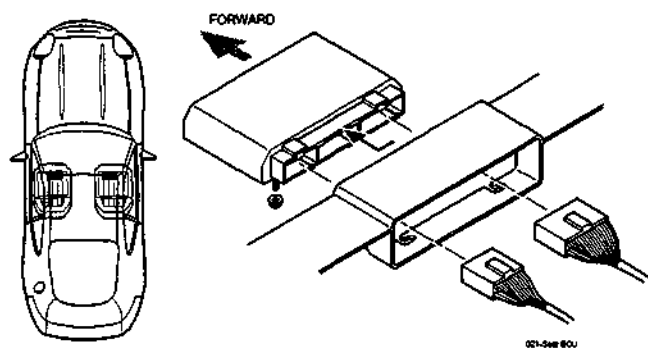


Figure 1. Control module connectors

5. Remove the tie straps and release the seat harness.
6. Remove the seat earth screw from the sill.
7. Tip the seat forwards and remove from the vehicle.

Steps 10-12 Seat Belt Pretensioner vehicles only.

8. Remove the seat belt pretensioner cover (if fitted)
9. Disconnect the buckle fly-lead from the pretensioner.
10. Release one bolt at the base of the seat belt stalk and remove the pretensioner assembly.

Reassembly and Replacement

Steps 1-3 Seat Belt Pretensioner vehicles only.

1. Ensure that the safety clip is fitted to the pretensioner connector at the squib.
 2. Fit the assembly to the seat, locating the anti-rotation peg into the rear hole of the mounting bracket. Secure the assembly with one bolt tightened to 35 Nm.
 3. Route the pretensioner lead between the seat and frame. Refit the pretensioner cover.
- #### **All vehicles**
4. Replace the seat in the vehicle. Reconnect and secure the harnesses with tiestraps.
 5. Reconnect the vehicle battery.

Note: The vehicle clock and the window control units will need resetting after completion of this procedure.

6. Switch on the ignition and check that the airbag warning lamp comes on when the ignition is switched on and extinguishes after approximately six seconds indicating satisfactory completion of the pretensioner and airbag system self tests.
7. Fit the front seat retaining screws ensuring a 1.2mm gap between the screw heads and the slides. Power the seat forward and refit the rear screws.

Caution: Centralise the rear fixing holes with the body weld nuts prior to inserting the bolts.

Torque the rear screws to 25 Nm. Power the seat backwards. Torque the front screws to 25 Nm.

8. Motor the seat through its full range of movement to ensure correct operation.

6.6.08 Seat Control Module 97.5 MY

Removal

WARNING - Seat belt Pretensioners (if fitted):

To avoid the possibility of personal injury caused by accidental deployment of the seat belt pretensioner, disconnect the vehicle battery and wait at least 10 minutes for all voltages to fully discharge before working near the pretensioner system. This covers the possibility of the normal capacitor discharge circuits being inoperative and failing to discharge the detonator capacitor when instructed to do so.

1. Lower the door window and open the relevant door. Disconnect the battery ground cable and wait for 10 minutes if a pretensioner is fitted. Otherwise, proceed immediately to step 2.

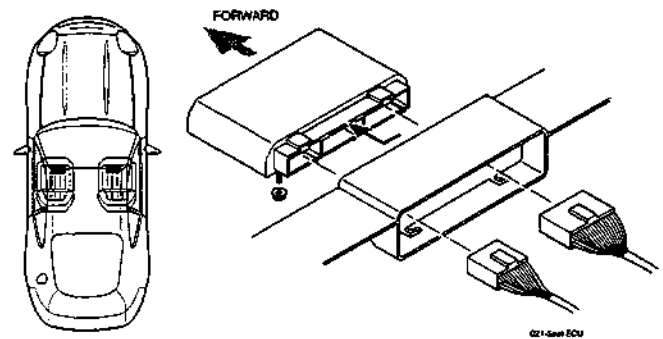


Figure 1. Seat ECU Removal

2. Loosen two nuts securing the seat ECU. Slide the ECU to the left and remove it from the front of the seat.
3. Disconnect two connectors from the ECU.

Replacement

1. Reconnect the two control module connectors. Fit the seat control module and tighten the two securing nuts.
3. Reconnect the battery ground and test for correct operation of the seat controls.

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Body Repair

Introduction

This section contains information for the body repair and rectification of the vehicle. Wherever possible the vehicle must be returned to its original manufactured condition. Following repair the vehicle must be fully checked and, if necessary, the braking system and steering must be fully reset.

Health and Safety

Ensure that the correct working practices are established before beginning work.

Observe that the correct working practices are followed whether they be legislative or common sense.

Be aware of the potential risks of using materials used in the manufacture and repair of vehicles and take the appropriate precautions.

Warning: *Make sure that the working practices for the air conditioning system are followed: do not vent the refrigerant directly into the atmosphere and always use the approved recovery/recycle /recharge equipment, always wear suitable protective garments to prevent injury to the eyes and the skin.*

Potential Risks

Paint

If the organic solvents, contained in paints, are inhaled for any length of time damage can be caused to the liver, kidneys, respiratory tract and the digestive system.

Prolonged exposure to isocyanates can cause lung sensitisation and asthma-like symptoms can develop with subsequent re-exposure to even low concentrations.

Solvent inhalation can cause dizziness or loss of consciousness.

Inhalation of spray dust and sanding debris can cause lung damage.

Paint activators and additives will damage the eyes or can cause dermatitis if allowed to splash and come into contact with these areas. Peroxide and acid catalysts can cause burns.

Applied heat

There is considerable risk of damage to the eyes and skin when welding or flame cutting.

Fire is a serious danger as many materials and fluids in the vehicle are inflammable.

Toxic and dangerous fumes can be liberated when the following are subjected to heat; expanded foam, corrosion protection, adhesive and sealing compounds, trim, seat material and paints that contain isocyanates.

When heated to a temperature of 300°C, polyurethane based compounds can liberate small quantities of isocyanate. Many types of nitrogen containing chemicals may be liberated as breakdown products, these chemicals can contain isocyanates, oxides of nitrogen and hydrogen cyanide.

Potentially toxic or asphyxiant fumes and gases are produced by welding, for example; zinc oxide with zinc coated panels and ozone gas from the MIG process.

Metal repair

There is considerable risk of damage to the eyes, ears and skin when metal cutting, forming and dressing is being carried out.

Soldering may be hazardous because of heat generated fumes and skin contact with the materials.

Precautions

Paint

Ensure that there is efficient ventilation at all times. Paint spraying should be confined to spray booths.

Anyone with a history asthma should not be engaged in any process which involves the use of isocyanates.

Any operator working inside a spray booth where isocyanates are present must use air-fed breathing equipment. Supplied air to the visor should be fed at the recommended pressure and filtered to remove oil, water and fumes.

Operators involved in handling, mixing or spraying should wear protective clothing, gloves and goggles to avoid skin and eye contact. A Particle mask or canister type respirator should be worn when sanding.

Applied heat

When welding, flame cutting or brazing and so on, goggles, a mask or fume extractor and flameproof protective clothing should be used always.

It is especially important when working with polyurethane compounds to use air-fed breathing equipment.

Ensure that at all times the appropriate fire fighting equipment is available and that personnel are trained in its use.

Metal repair

Wear appropriate eye and hand protection when sanding, drilling, cutting, chiselling, flattening or welding. Wear a face mask or air-fed visor when sanding or flattening either body solder or fillers. When a soldering operation has been completed, remove swarf from the work area and wash your hands thoroughly.

General Repair Notes

The following precautions should be noted before any work is carried out:

- disconnect the vehicle battery ground lead, taking note of the reconnection procedures
- Make sure that you have read and understood the safety related procedures in this section.

Caution: Electric arc welding must not be used on the vehicle as the high voltages produced by this process will cause irreparable damage to the electrical control and microprocessor systems.

All trim and electrical components in the locality of the repair must be removed or disconnected prior to panel removal or replacement.

Welding and Gas Process Special Notes

Resistance spot welding, MIG welding and all gas processes may only be carried out on bare, unpainted or unplated metal. The flanges of panels, which are to be welded together, must be clean, corrosion free and treated as appropriate with either weld-through or inter-weld sealer.

The resistance spot welding equipment used in vehicle repair does not always produce a weld of equivalent strength to that produced in manufacturing. This means that a single row of spot welds should be spaced on a pitch of 19-25 mm, which will usually result in more spot welds than found in the original factory joint.

Use a resistance spot weld cutter to remove resistance spot welds. Where a new joint is to be MIG welded, cut the old resistance spot welds from the panel that is to be retained; the resulting holes are then used for plug welding. Suitable holes may be drilled or punched as follows:

- 8.0 mm for sections up to 1.6 mm thickness
- 10.0 mm for thicker sections.

Always refer to the welding equipment manufacturers diagrams and tables for the relevant procedure.

Steel Body Parts - Repair, Remove and Replace

Removal

1. Expose the resistance spot weld. For those spot welds that are not obviously visible use a rotary wire brush fitted to an air drill or a hand held wire brush.

Caution: Do not burn off underseal, use a 'hot knife' or a suitable solvent.

2. Cut out the spot welds using a Zipcutter or roto-Bor. At this point it may be necessary to cut out the bulk of a panel using a pneumatic saw.

Note: On some panels, before removing the bulk of the panel, brazed areas and MIG welded seams should be removed.

3. Separate the spot welded joints and remove the panel remnants.

Preparing Old Surfaces

1. Remove the weld nuggets with a sander and 36 grit disc.
2. Clean all flanges to a bright smooth finish.
3. Straighten existing panel joint edges as required.

Preparing New Surfaces

1. Mark off the area of the new panel and cut to size leaving approximately two inches overlap on the existing panel
2. Offer up the new panel or section and align it with the associated parts.
3. Clamp the panel into position.
4. Where necessary, cut the new and original panels to form a butt joint.
5. Remove all clamps and the new panel.
6. If required, apply the inner panel protection and or sound insulation.

7. Prepare the new panel joint edges for welding by cleaning to bright metal, both interior and exterior edges.
8. Apply weld through primer or inter-weld sealer to all surfaces to be resistance spot welded.
9. Where appropriate, apply metal-to-metal adhesive or sealer in accordance with the manufacturer's instructions.

Panel Alignment

1. Align the replacement panel with the associated panel and clamp it in position.
2. With certain panels it may be necessary to tack weld or use PK screws.

Welding

1. MIG tack the butt joints.
2. Re-check the alignment and the panel contours as necessary.
3. Select the correct arms for resistance spot welding and ensure that the tips are correctly trimmed.

Note: It is recommended that the arms are not more than 12 in (300 mm) in length.

4. Test the equipment for satisfactory operation using test coupons.

In the absence of test equipment a satisfactory weld can be verified by pulling the test coupons apart and viewing the welded condition.

5. Resistance spot weld where required. Note the presence of zinc coated panels and treat as previously described.
6. Dress back all MIG tack welds.
7. MIG seam weld the butt joints.
8. Dress all welds as required.
9. Final braze and lead load as necessary prior to paint preparation.

RTM Body Parts

Certain exterior panels of the vehicle are manufactured from RTM as shown as shaded areas in Figure 1. The Front and rear bumpers are made from R-RIM

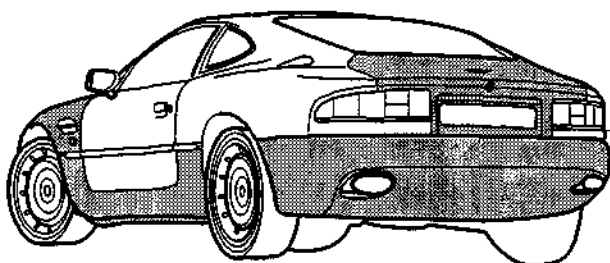
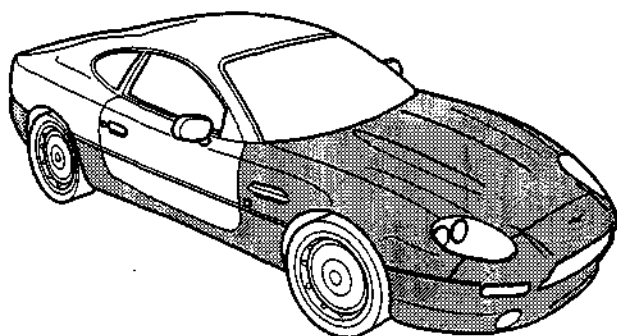


Figure 1.

Damage Recognition

Before any remedial action is carried out the damaged should be assessed. If the cover has been holed or torn it must be replaced. Repair should be attempted only if the damage falls into one of the following three categories.

Cosmetic	Abrasion to the surface paint finish
Substrate surface	Deep scratches, gouges or localised radial stress cracks.
Substrate penetration	Splits not exceeding 100 mm. Splits radiating from a gouge and accompanied by localised stress cracks.

Repair Procedures

Cosmetic Damage

Repair the paintwork using standard procedures.

Substrate surface

Where the defect does not affect the physical strength of the panel, fill and repaint using standard techniques.

Substrate Penetration

No reliable repair procedures are possible to correct major physical damage to RTM panels. Any small defect which do not affect the integrity or security of the panel may be filled and repainted at the owners risk.

Note: Because of the inherent flexibility of plastic panels, hard filler may crack. Such repairs cannot therefore be guaranteed.

Where the damage affects the security and or the integrity of the panel, it must be replaced.

Precautions during Paint Operations

When any repair operation is being completed on the DB7 paintwork, take particular care to protect the leather upholstery and trim from paint contamination.

Body Panel and Trim Removal

The following diagrams show the fixings for all removeable body and trim panels.

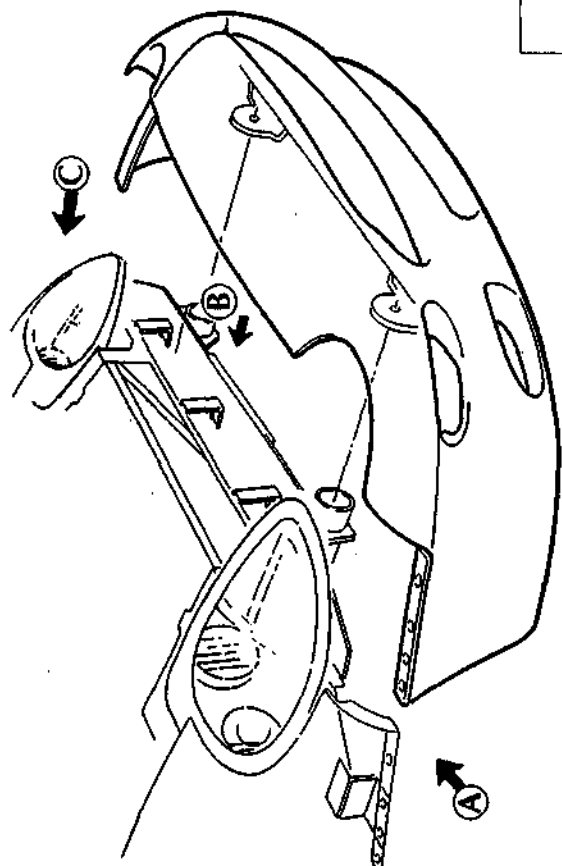
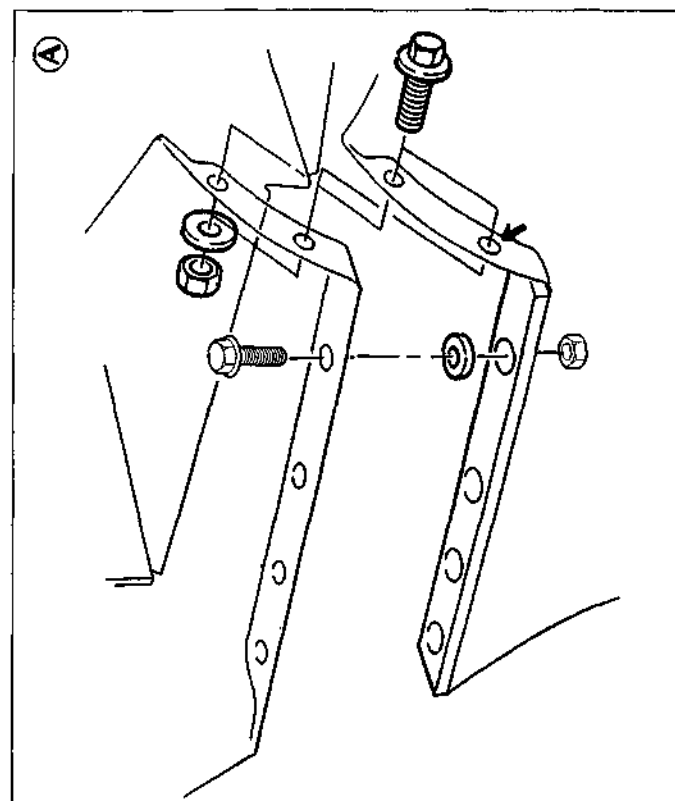
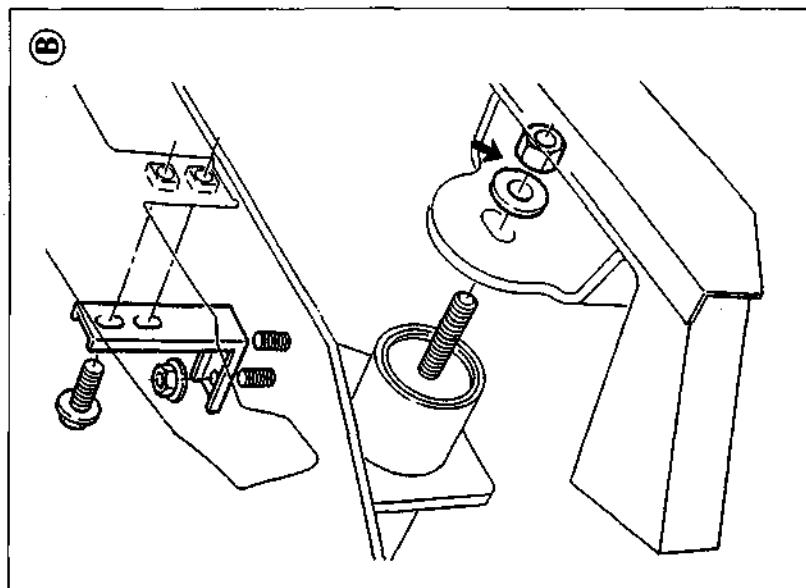
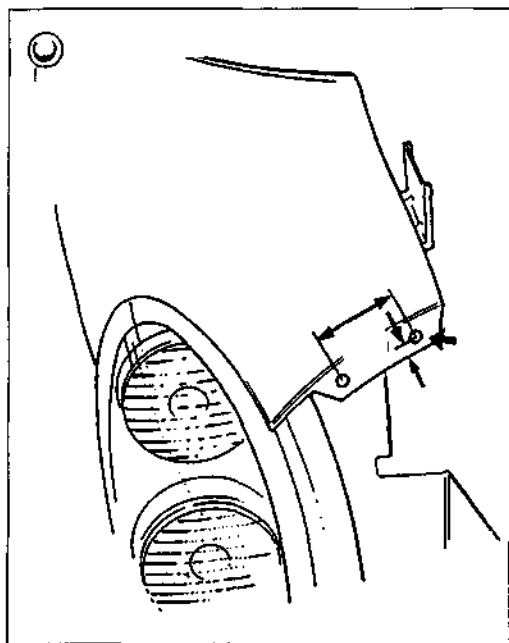
- Sheet 1. Front Apron
- Sheet 2. Front Undertray
- Sheet 3. Wheel Arch Liners
- Sheet 4. Side Sills (top fixings)
- Sheet 5. Side Sills (bottom fixings)
- Sheet 6. Rear Bumper
- Sheet 7. Doors
- Sheet 8. Door Liners
- Sheet 9. Door Liner (components)
- Sheet 10. Steering Wheel
- Sheet 11. Column Switches
- Sheet 12. Instrument Panel (surround)
- Sheet 13. Instrument Panel
- Sheet 14. Facia Underscuttles
- Sheet 15. Glove Box
- Sheet 16. Facia Mountings (1)
- Sheet 17. Facia Mountings (2)
- Sheet 18. Console Instruments
- Sheet 19. Radio
- Sheet 20. Front Seats
- Sheet 21. Ashtray
- Sheet 22. Centre Console
- Sheet 23. Seat ECU Covers
- Sheet 24. Rear Console
- Sheet 25. Rear Seats and C Post Trim
- Sheet 26. Quarter Panels, B Post Panels, Parcel Shelf
- Sheet 27. Headlining

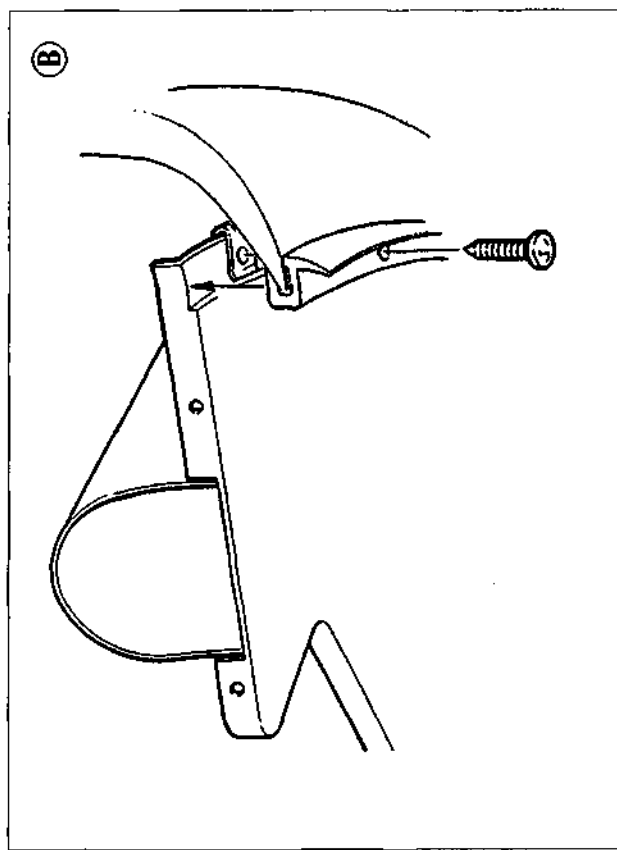
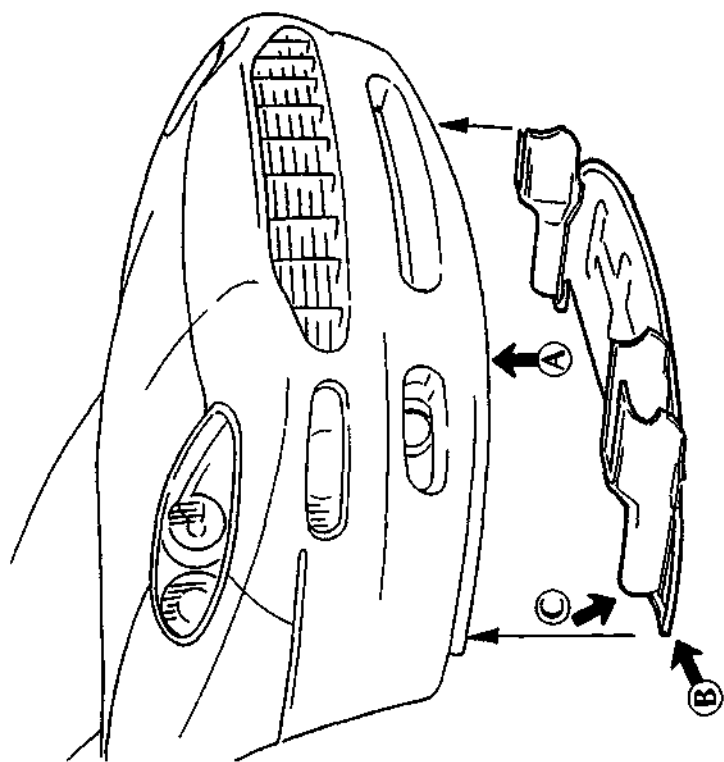
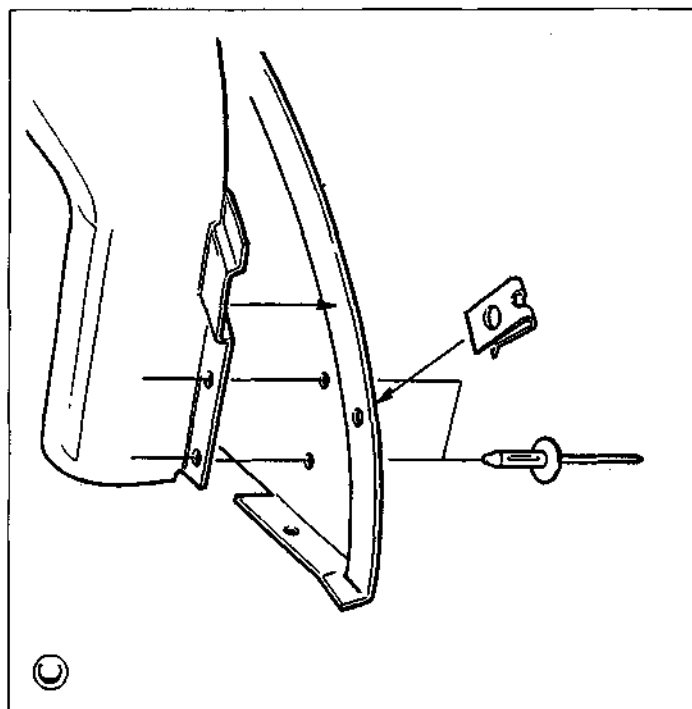
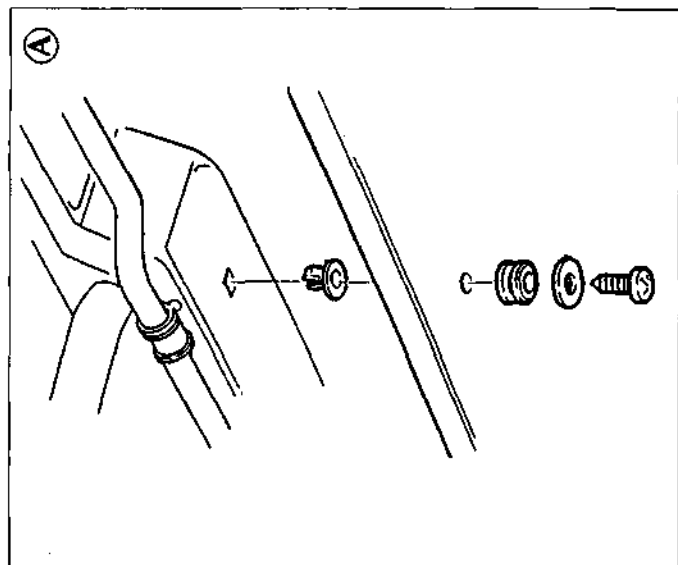
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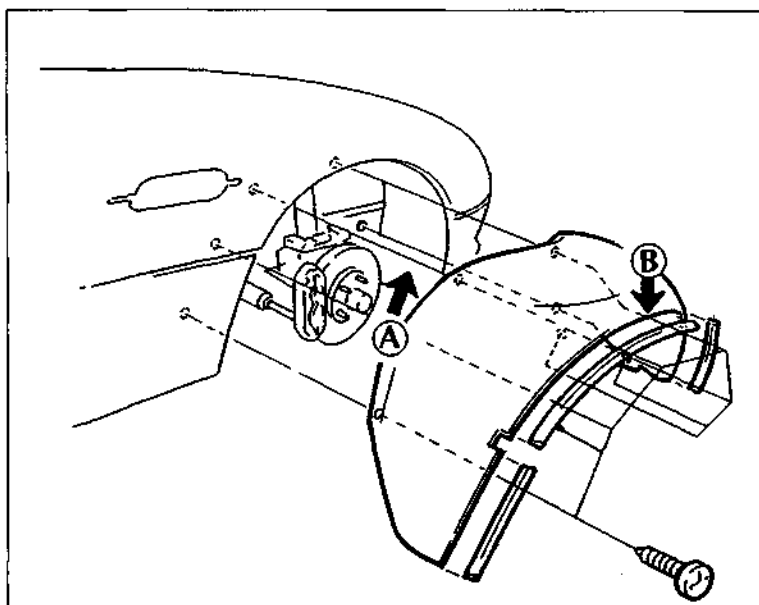
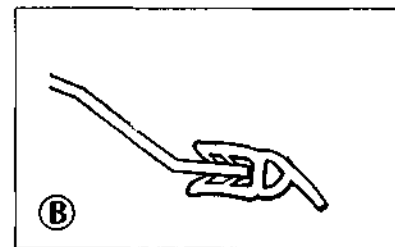
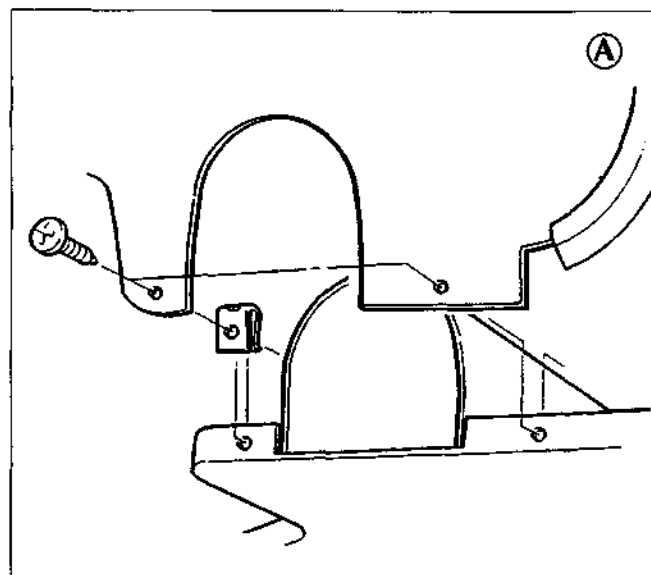
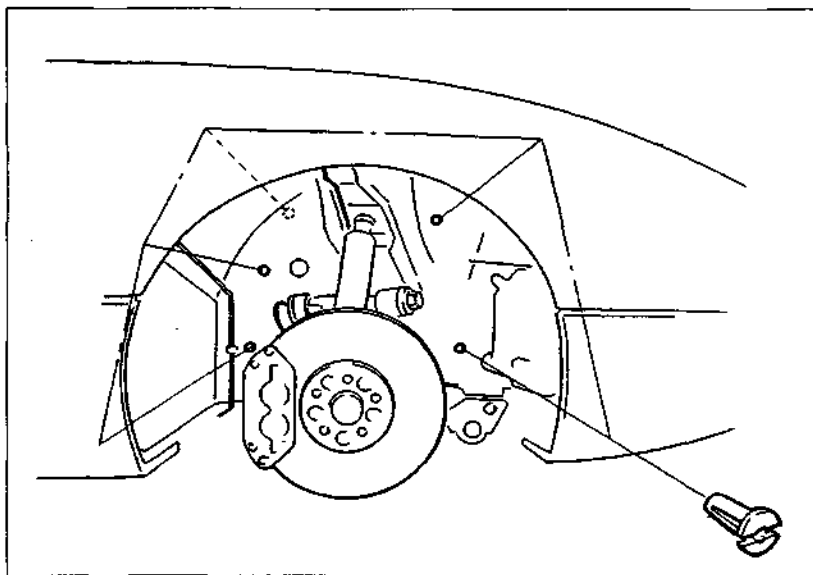
Body and Trim

Sheet 1

**Front
Apron**

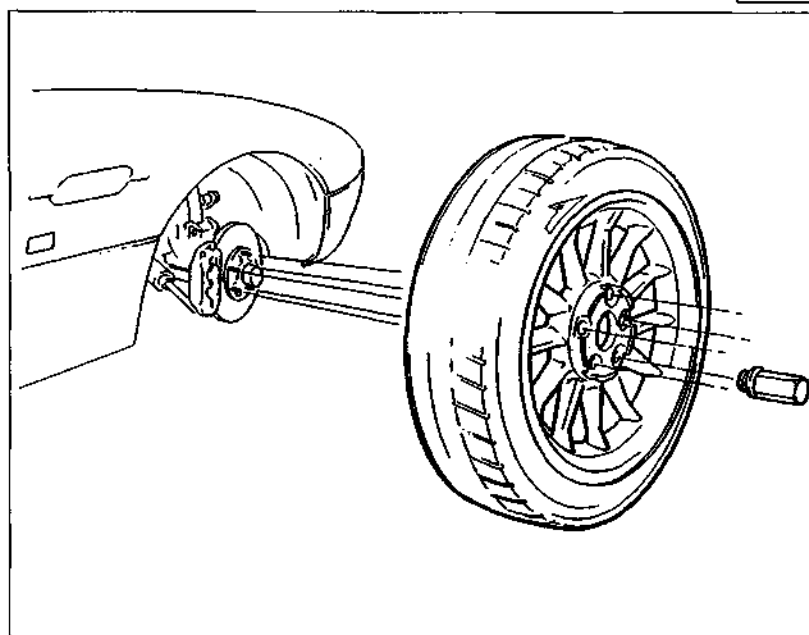






Caution: Take extreme care to avoid damaging the wing edge during liner removal.

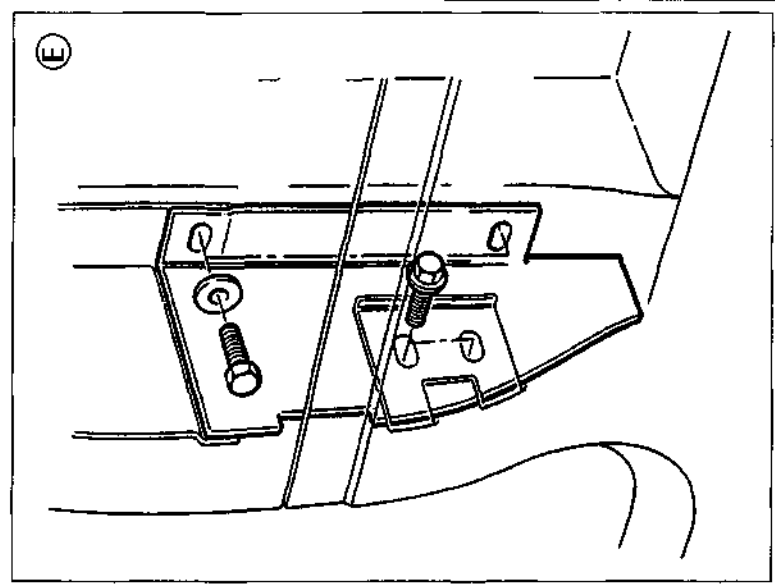
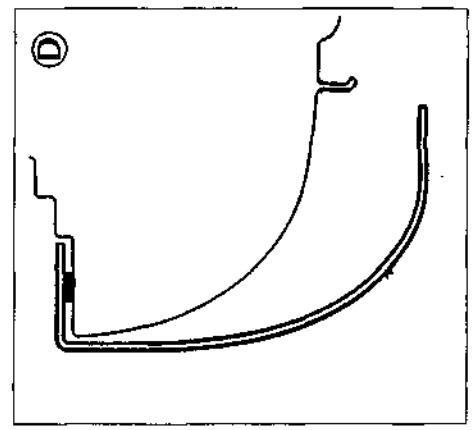
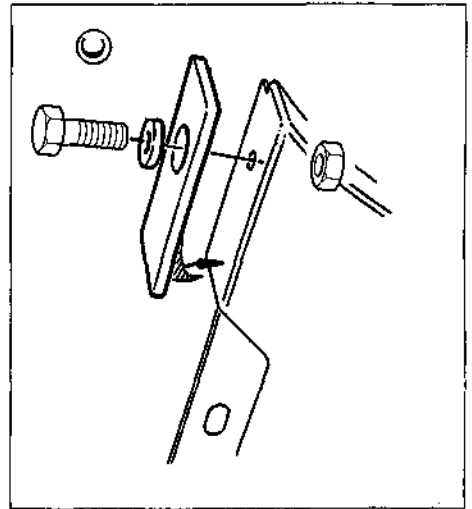
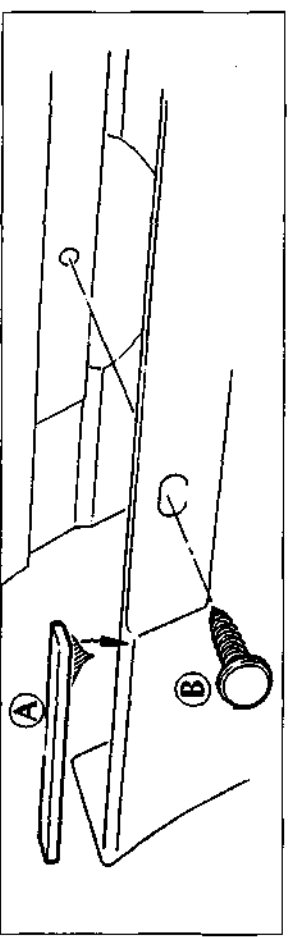
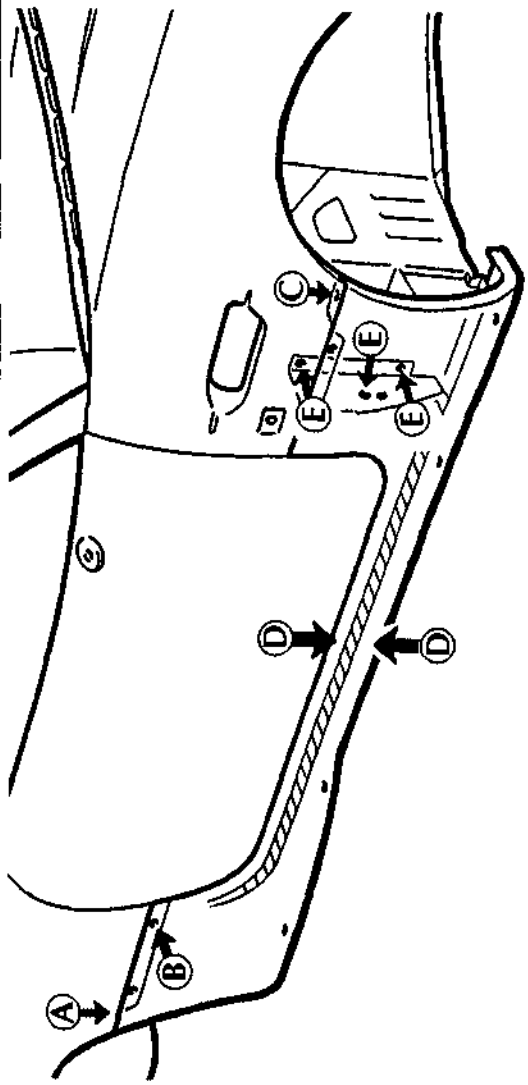
1. Remove the liner securing screws.
2. Pull down the inside of the liner and pull off the edge seals.
3. Pull the liner lower corners together and ease the liner down and out of the wheel arch.
4. Refit the edge seals to the liner before refitting.

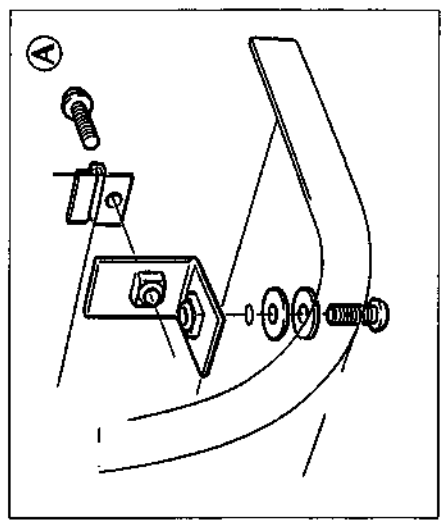
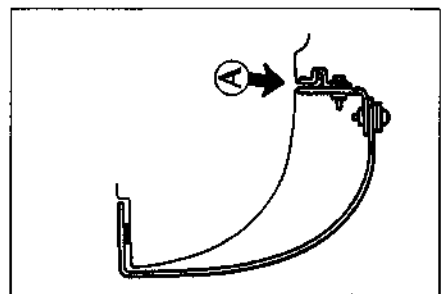
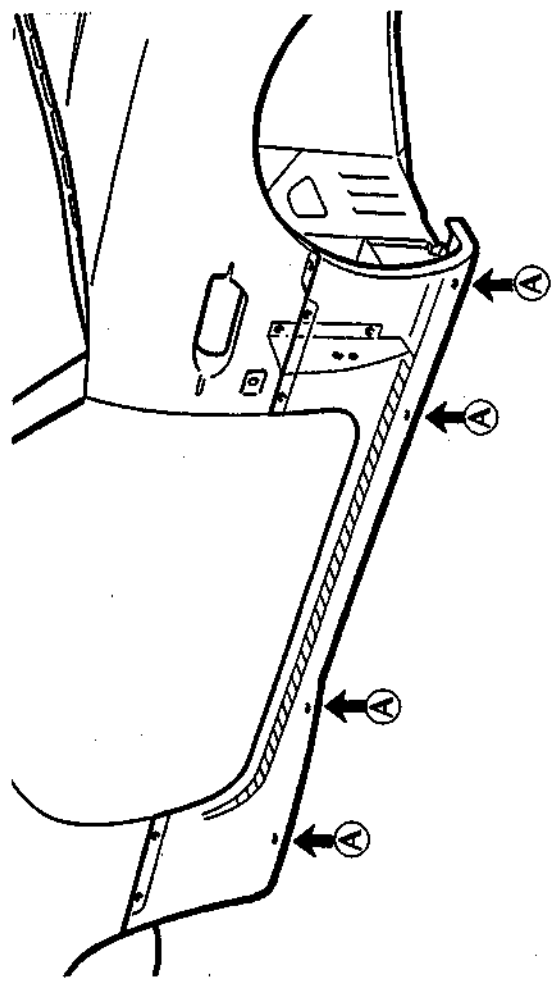


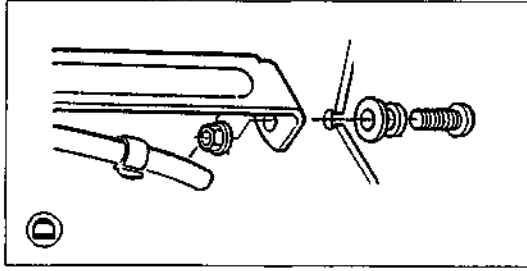
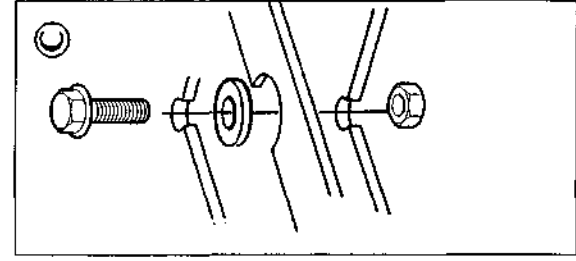
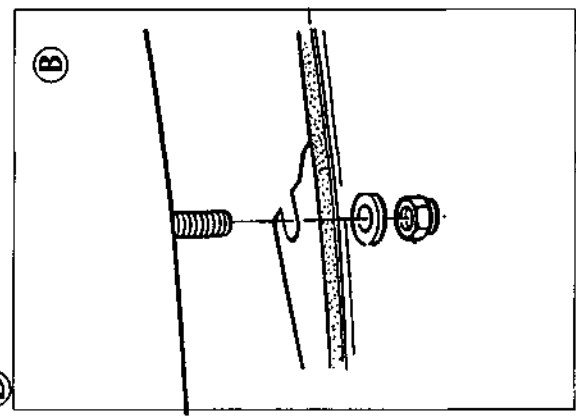
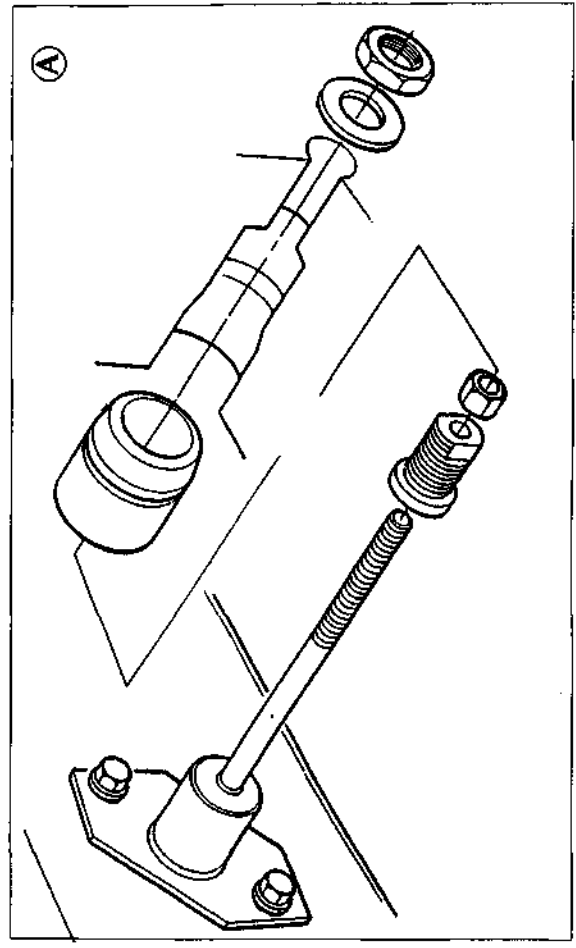
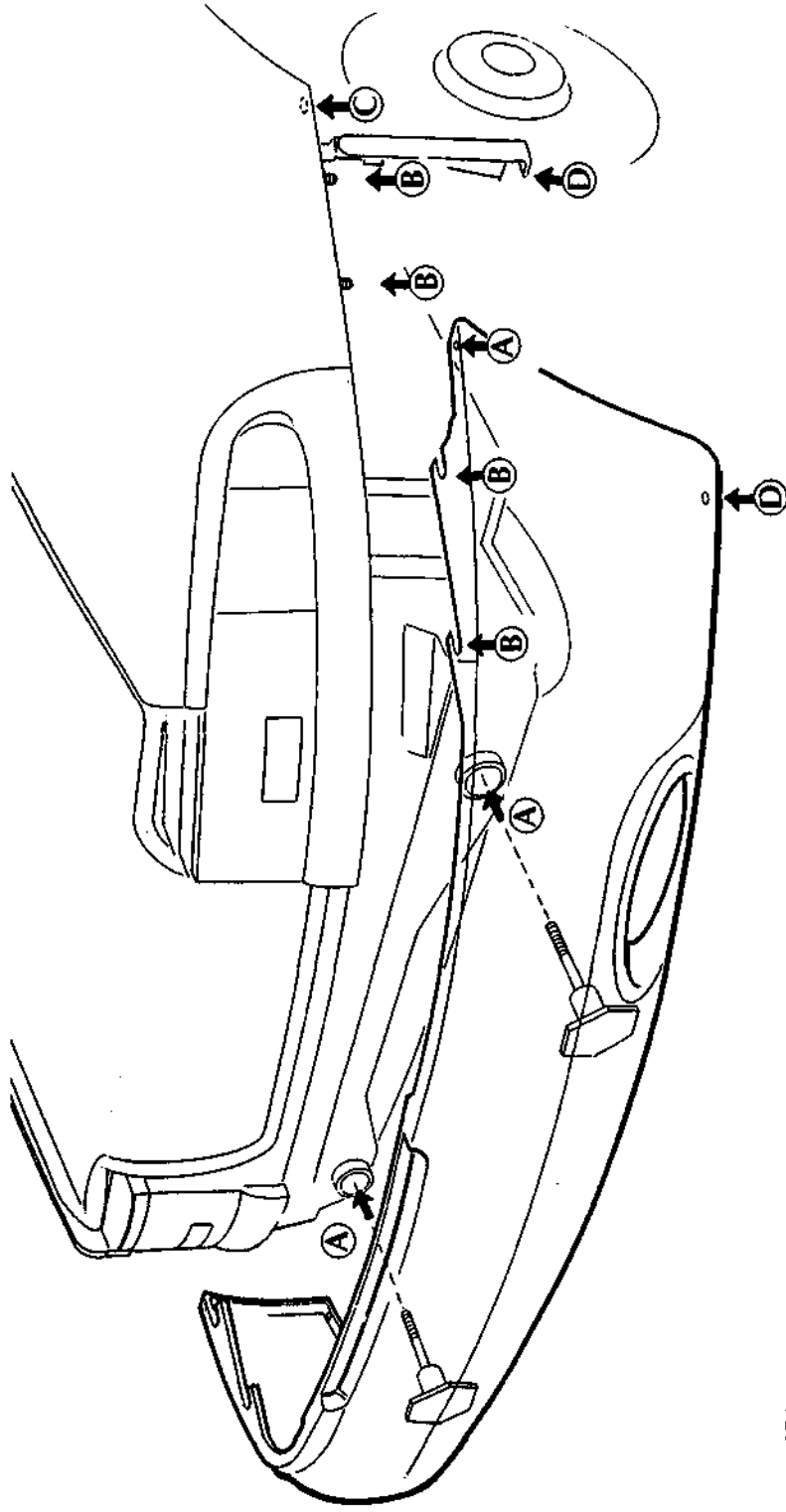
DB7
Body and Trim

Sheet 3

**Wheel Arch
Liners**





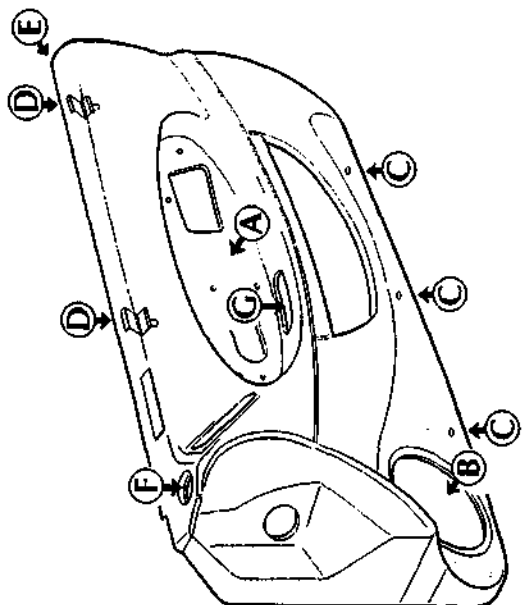
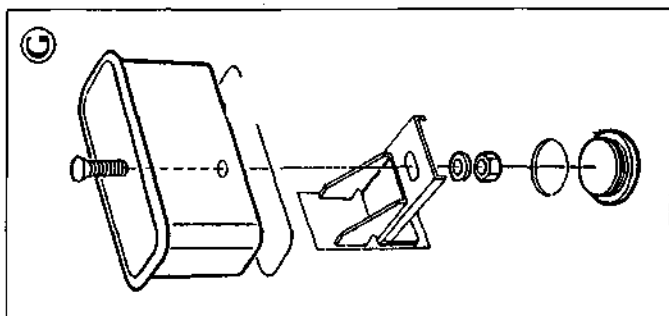
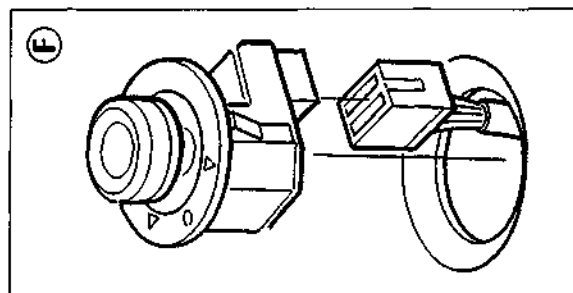
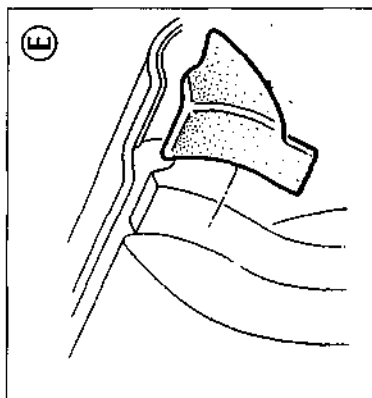
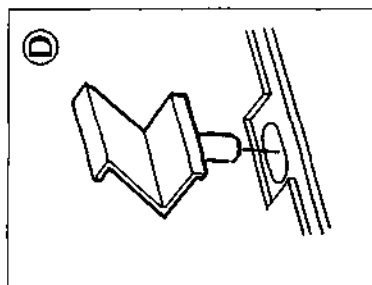
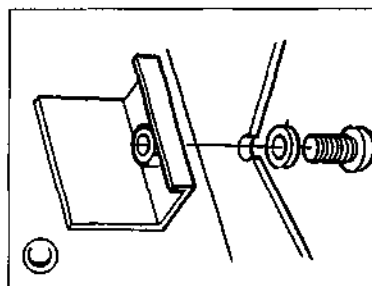
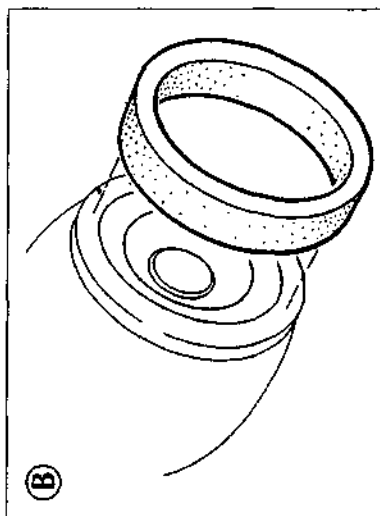
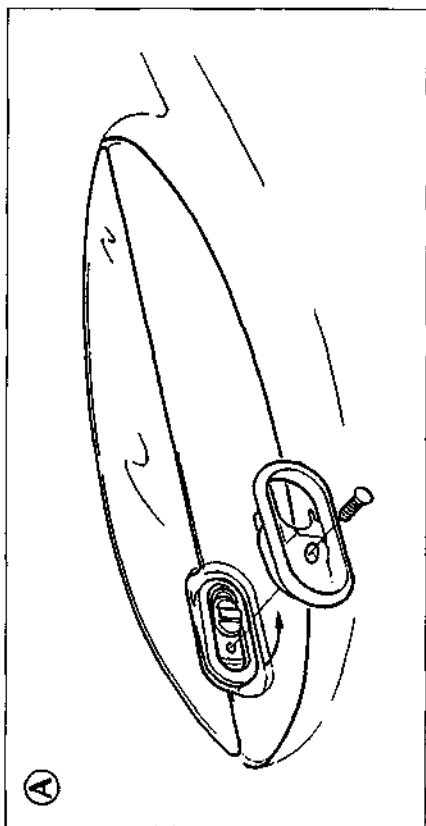


DB2

Body and Trim

Sheet 8

**Door
Liners**



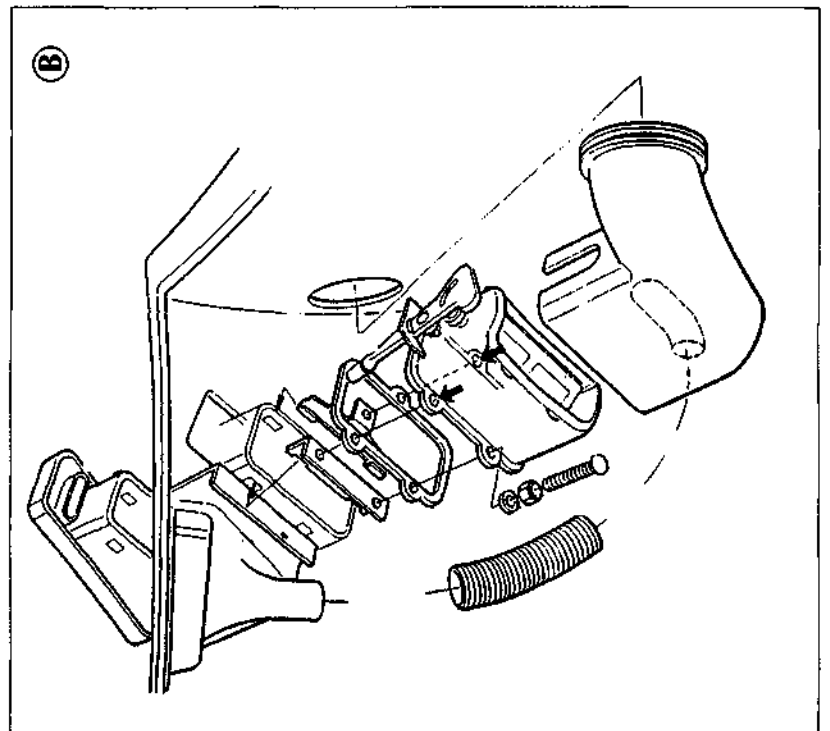
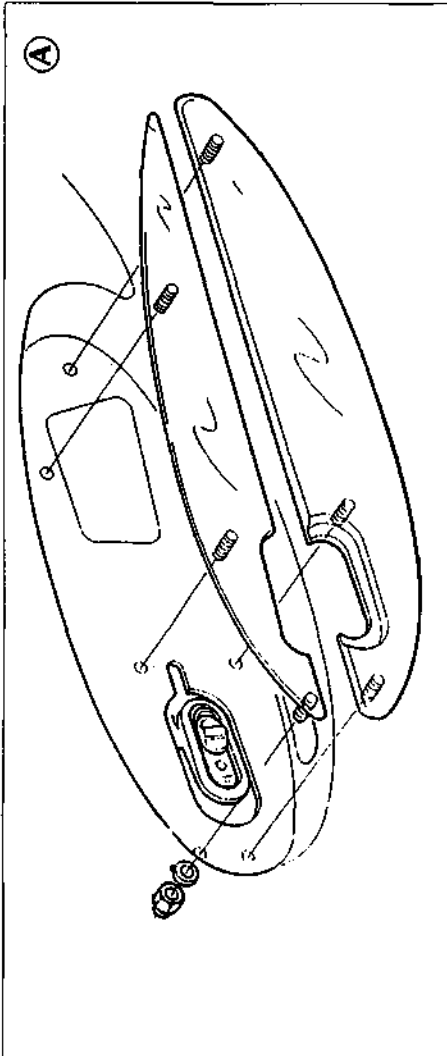
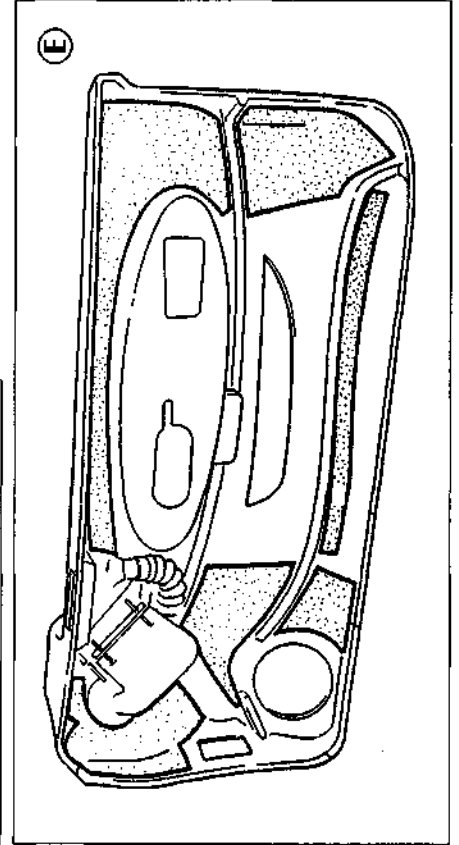
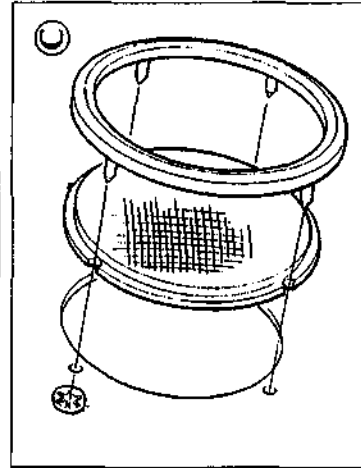
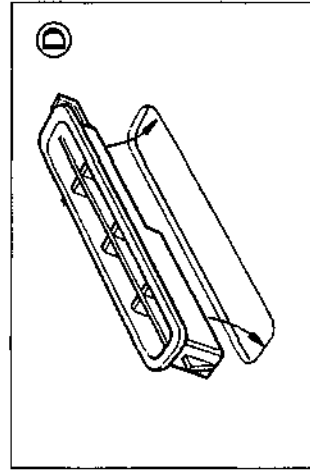
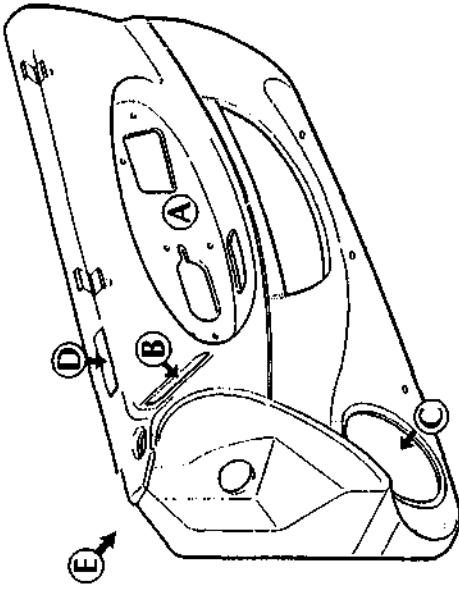
DB37

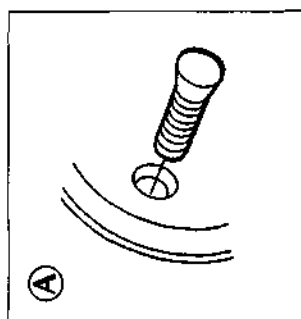
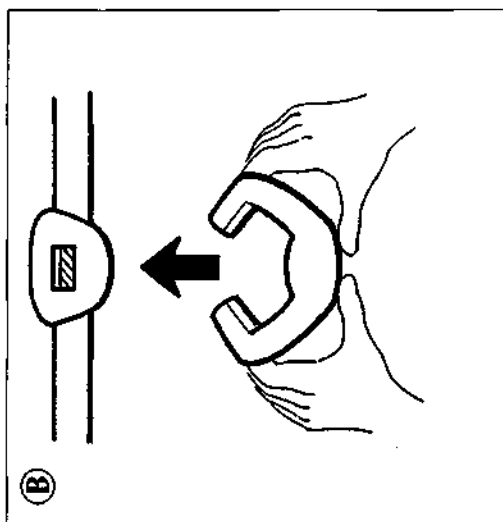
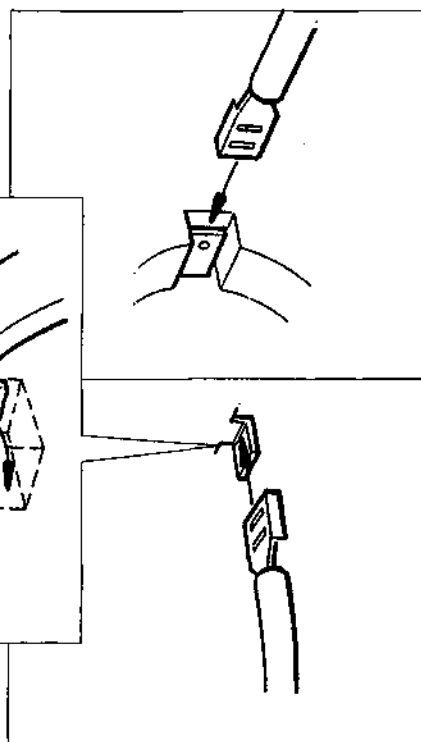
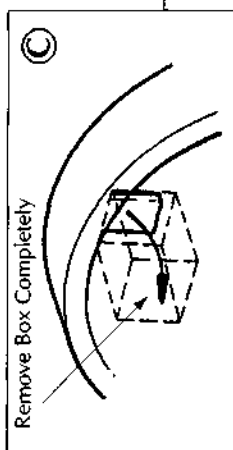
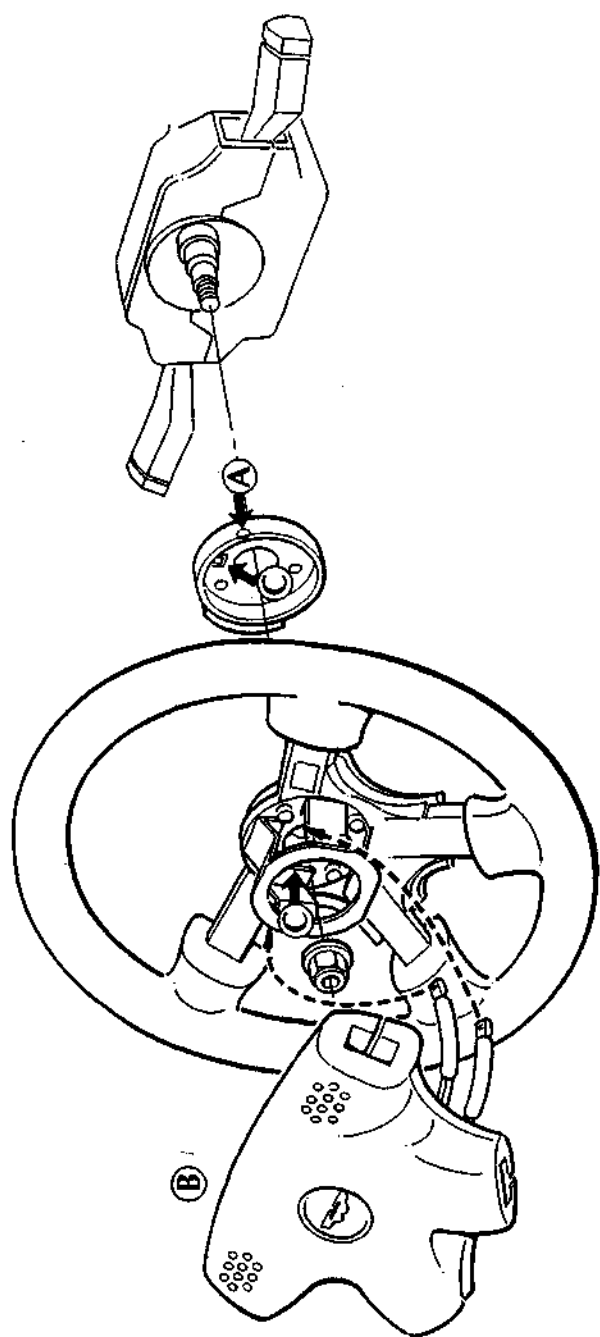
Body and Trim

Sheet 9

**Door
Liner**

(Components)





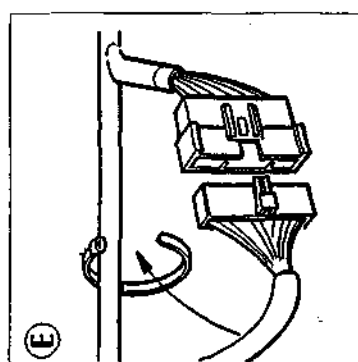
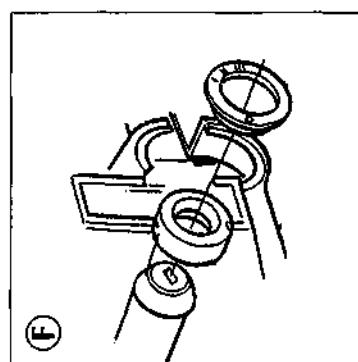
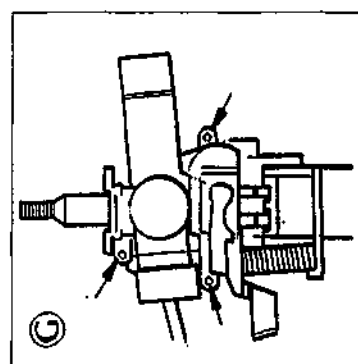
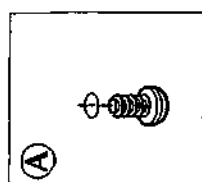
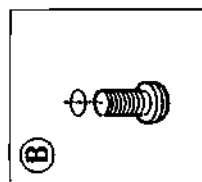
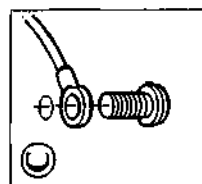
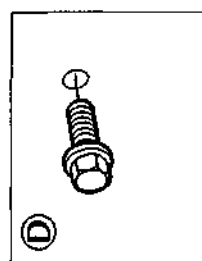
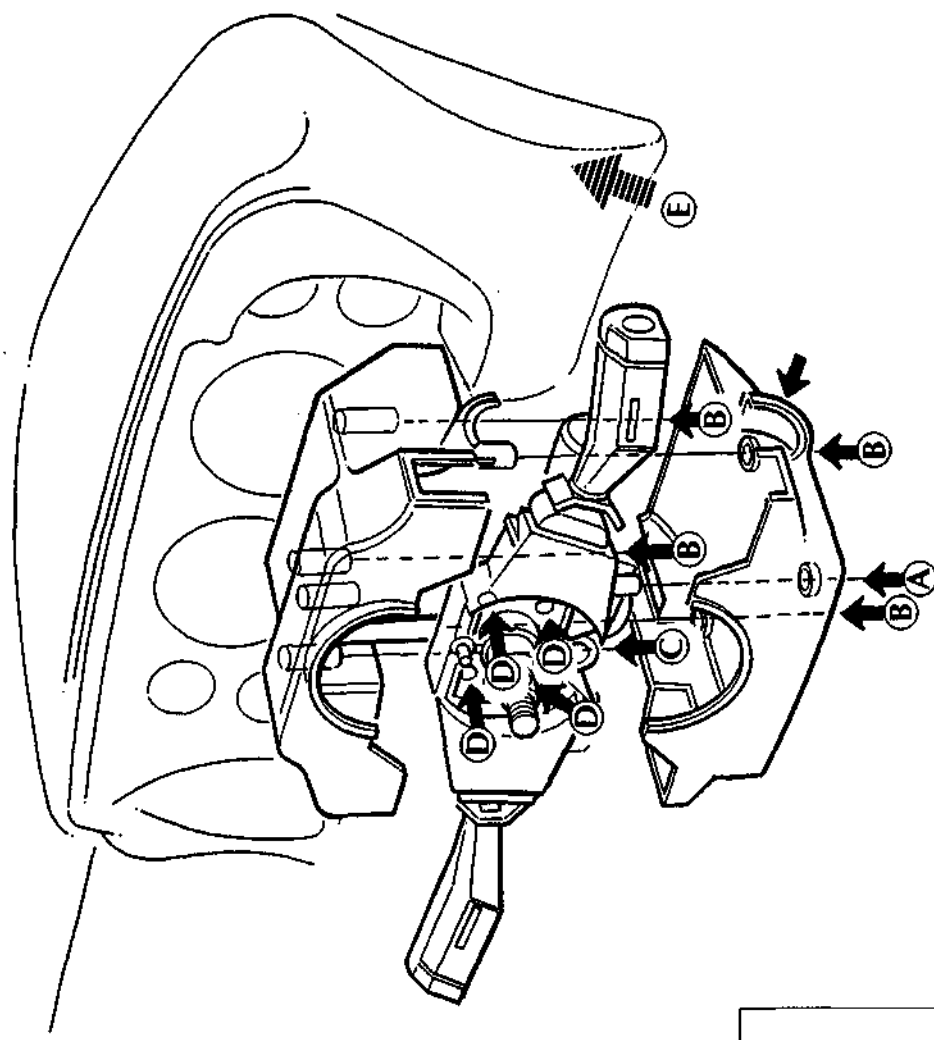
DB37

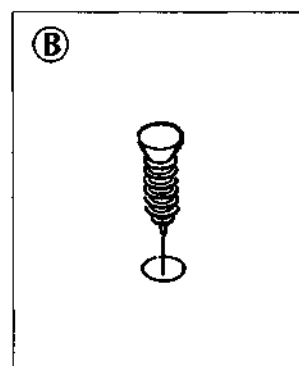
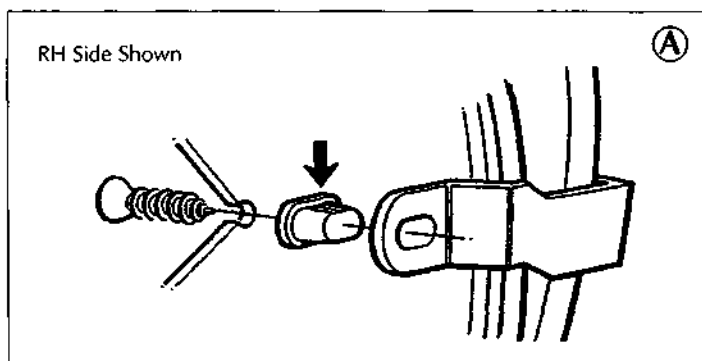
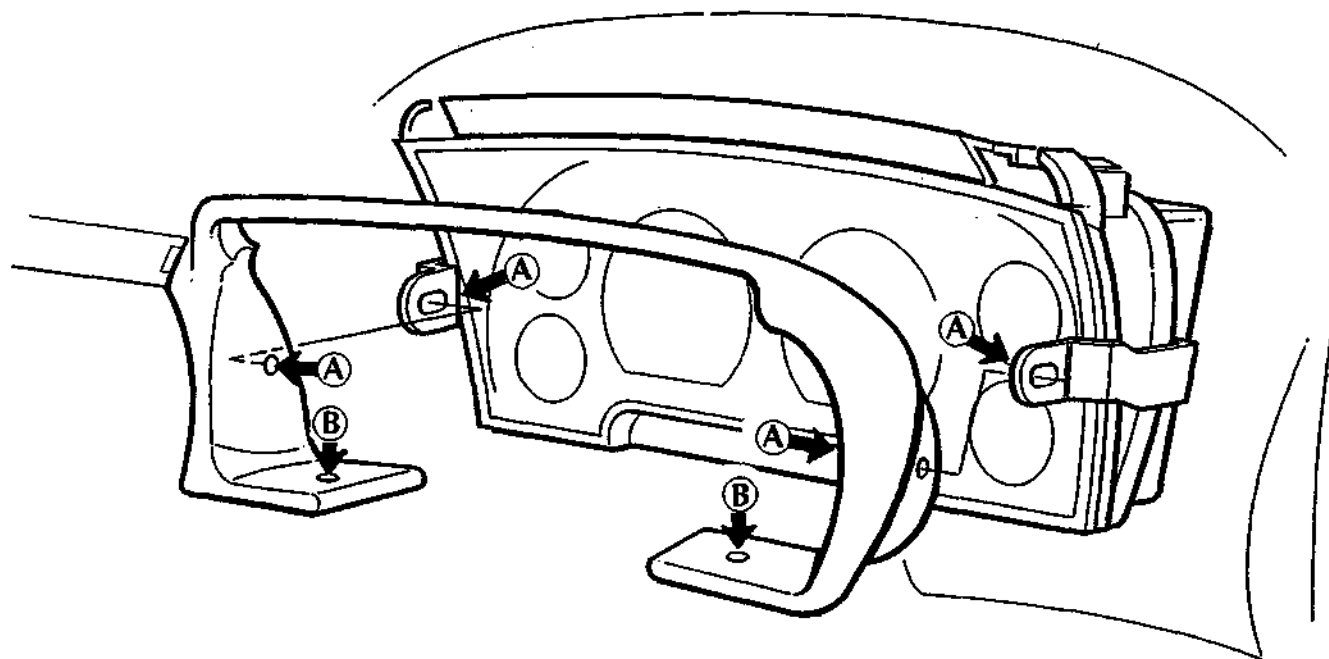
Body and Trim

Sheet 11

**Column
Switches**

Up to 97 MY





DB7
Body and Trim

Sheet 12

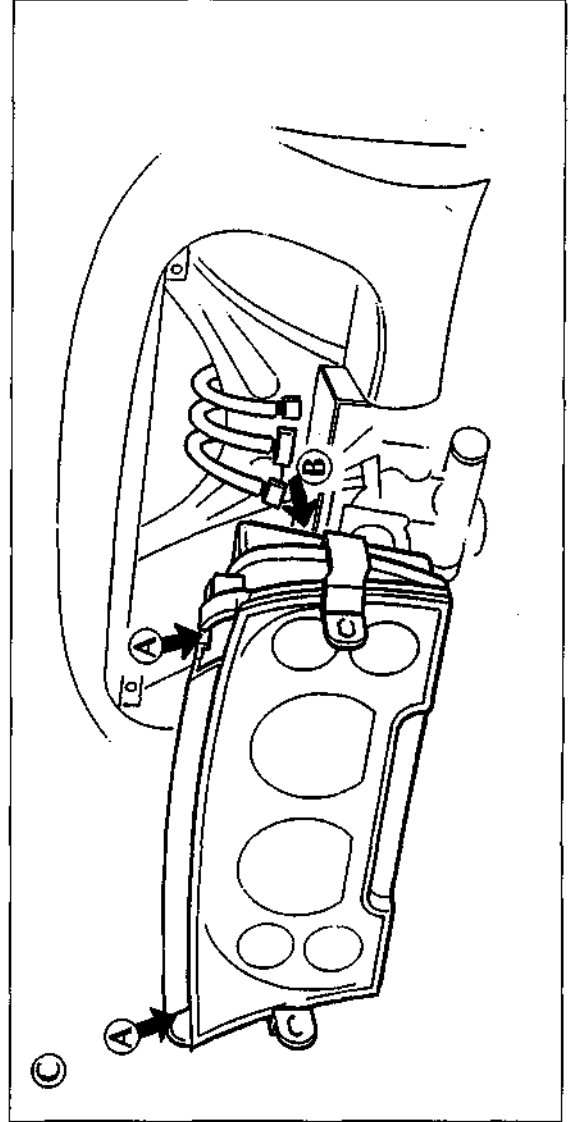
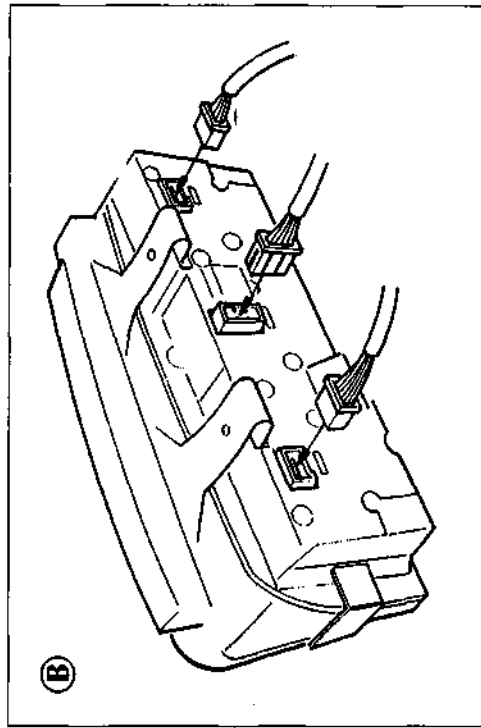
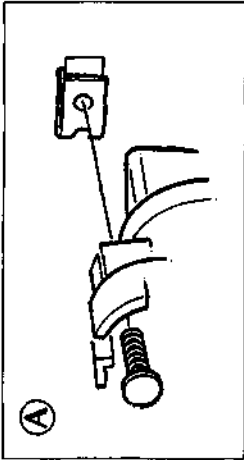
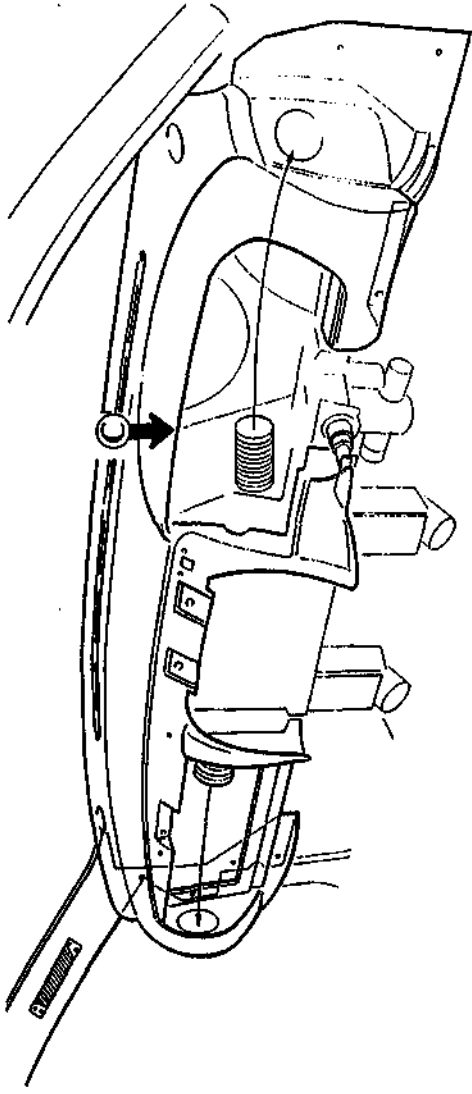
**Instrument
Panel**
(Surround)

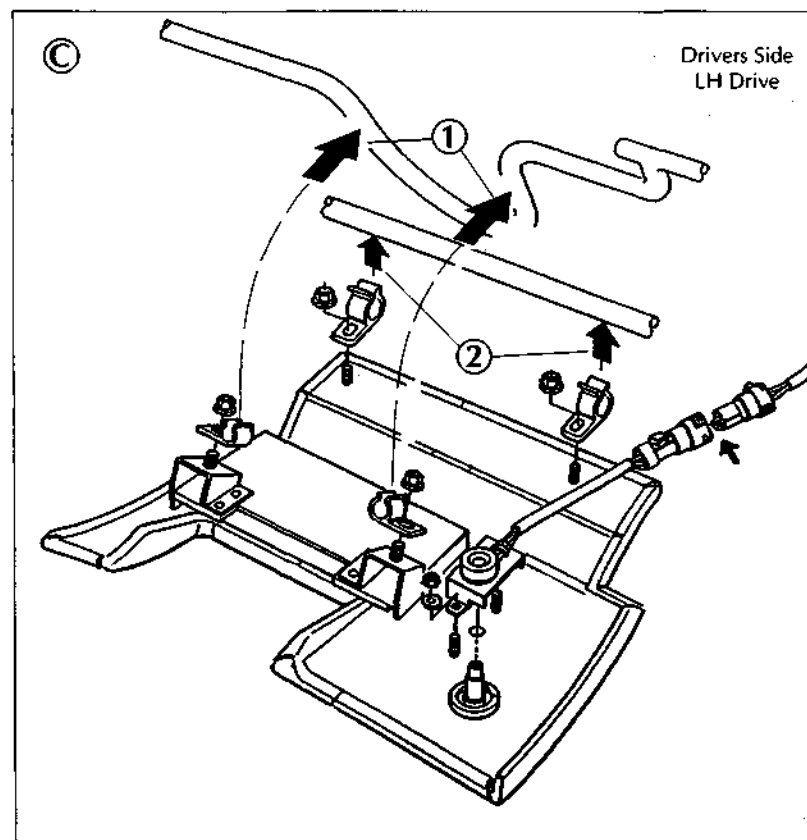
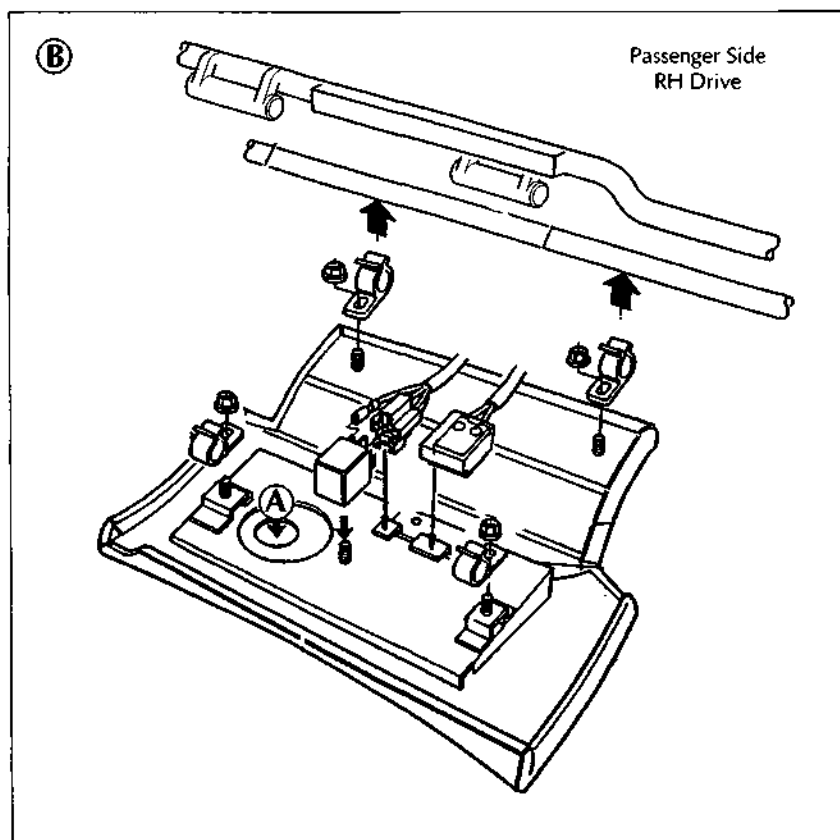
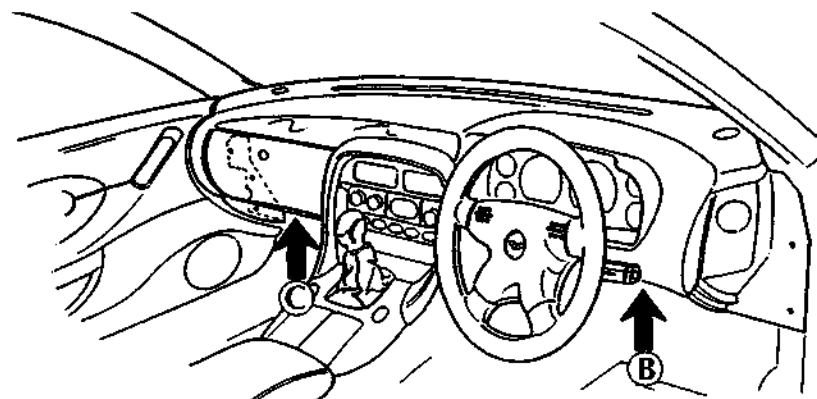
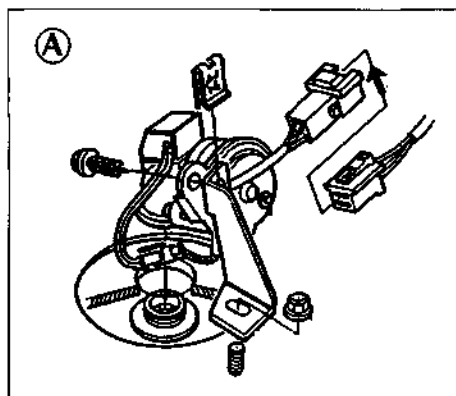
DB2

Body and Trim

Sheet 13

Instrument Panel



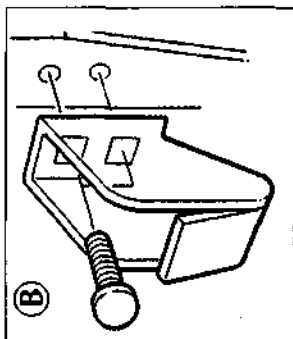
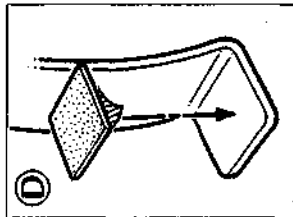
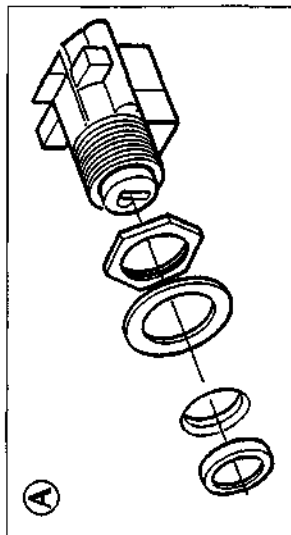
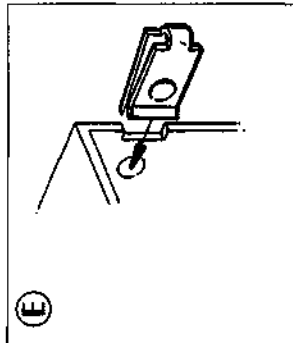
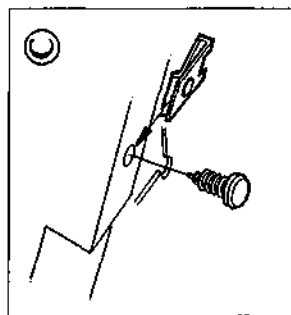
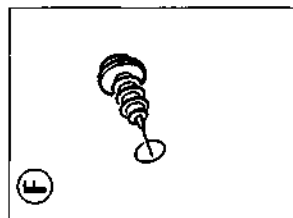
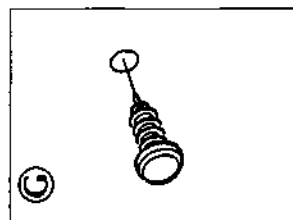
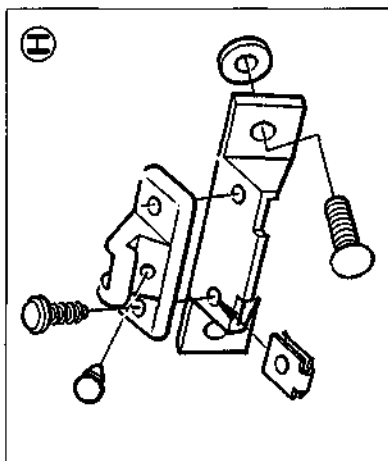
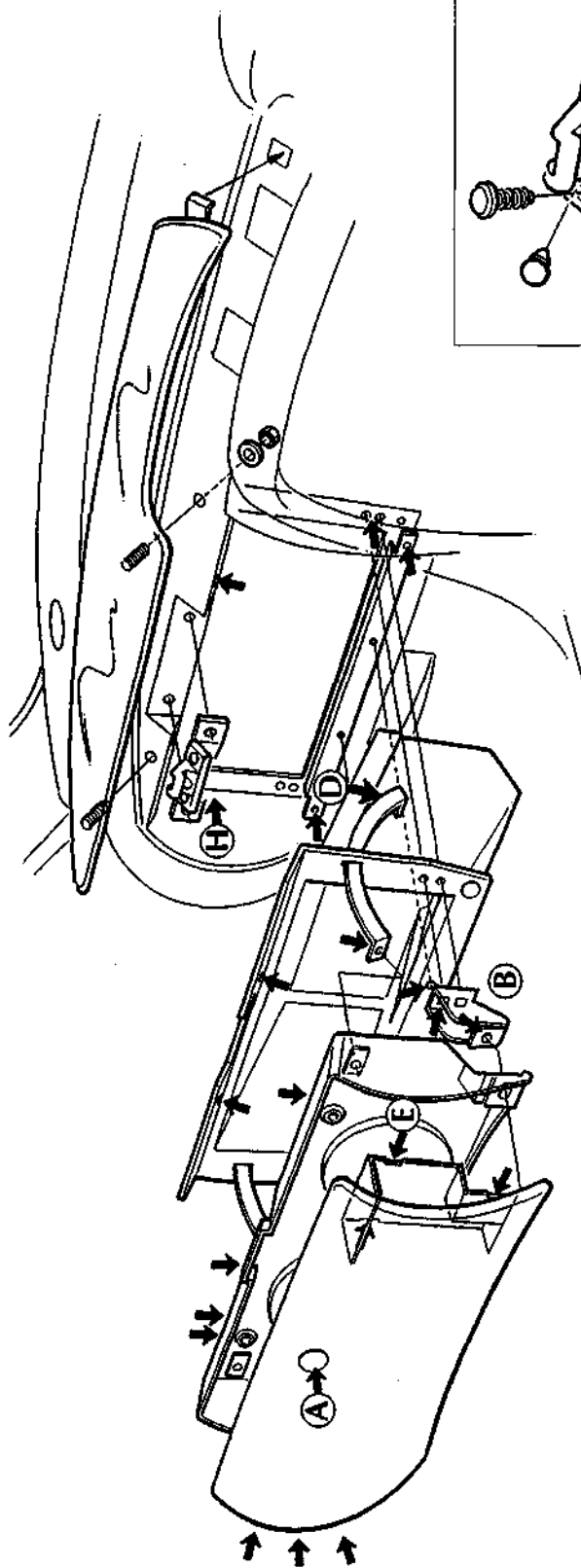


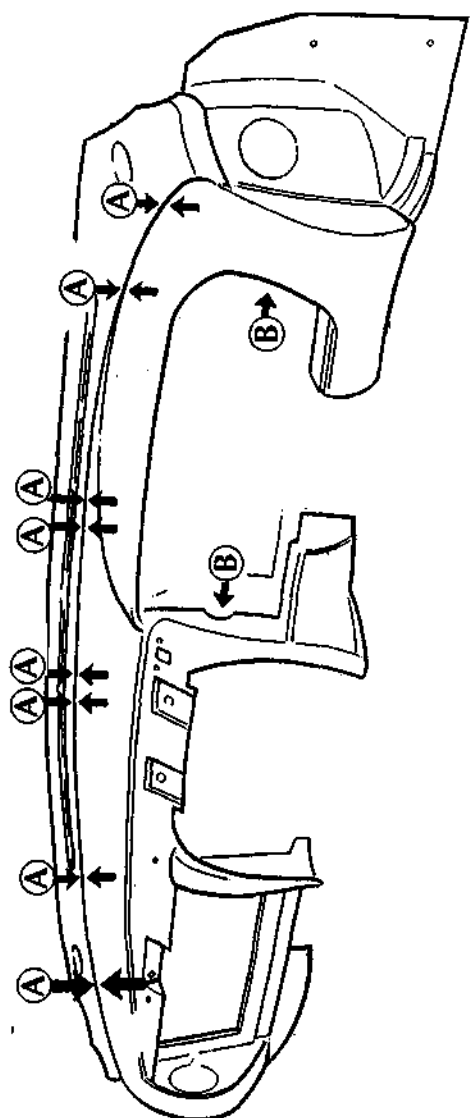
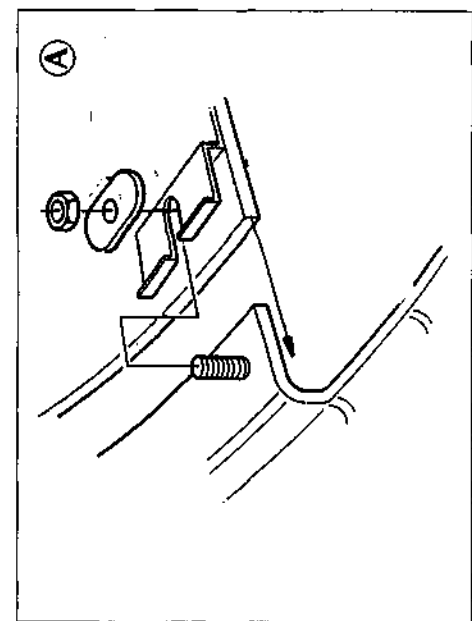
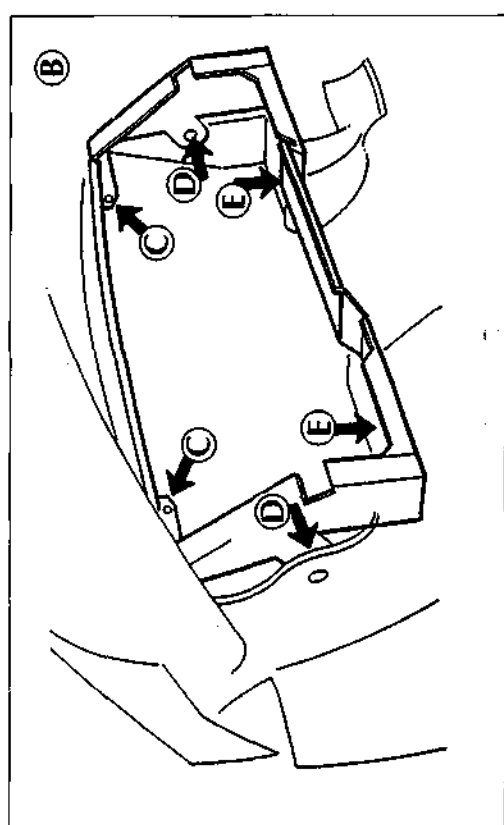
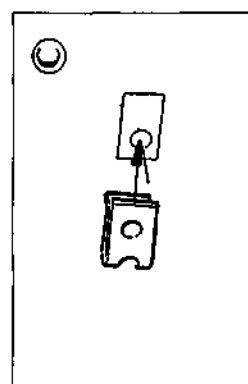
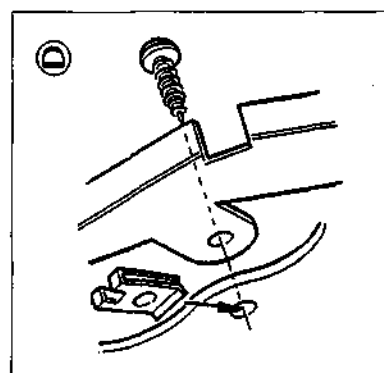
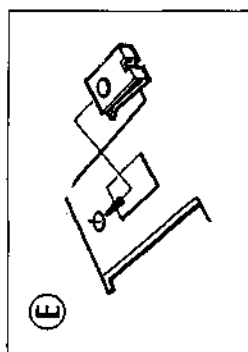
DB7
Body and Trim

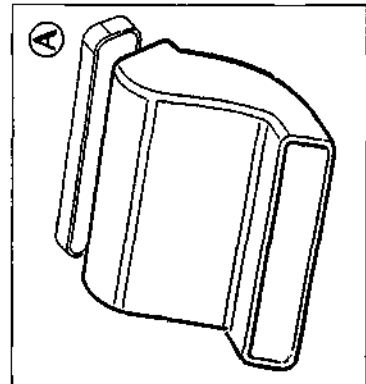
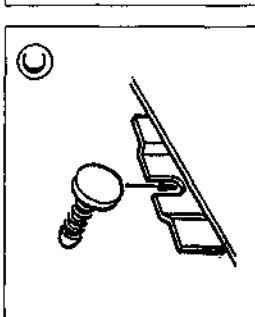
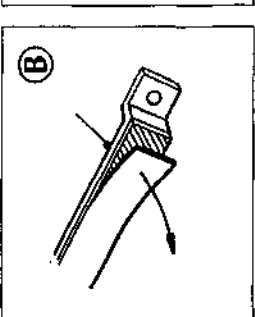
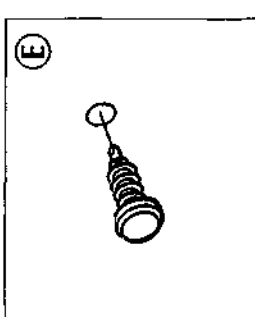
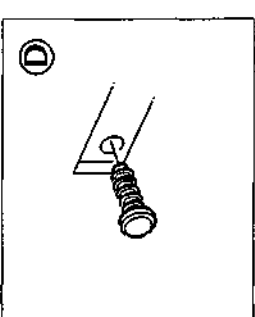
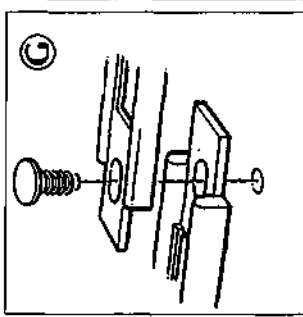
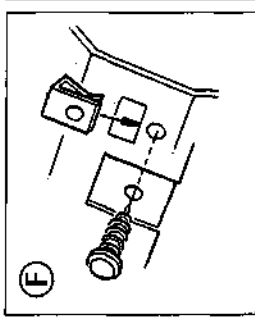
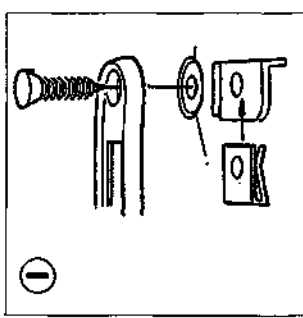
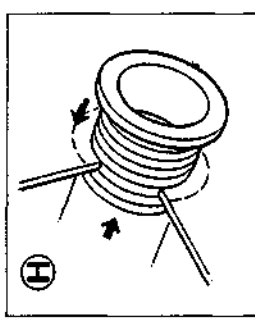
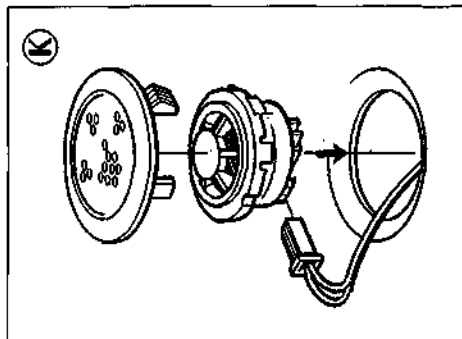
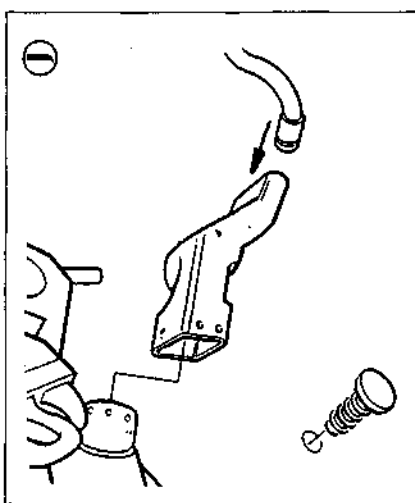
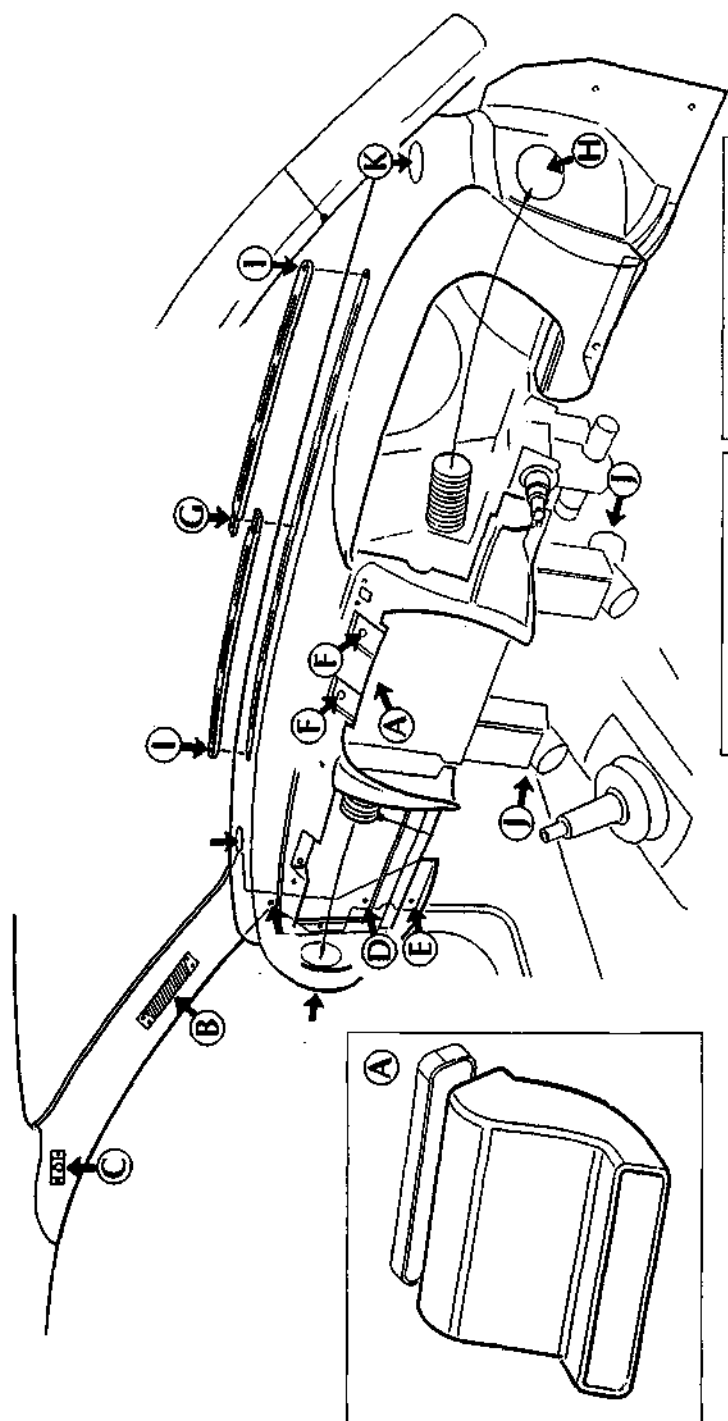
Sheet 14

**Facia
Underscuttles**

Up to 97 MY





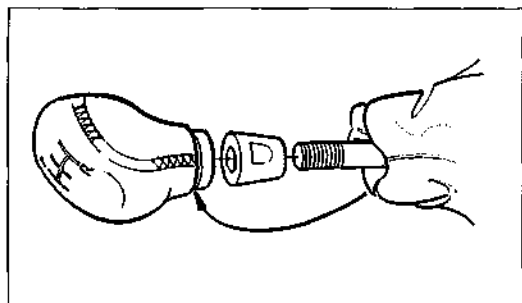
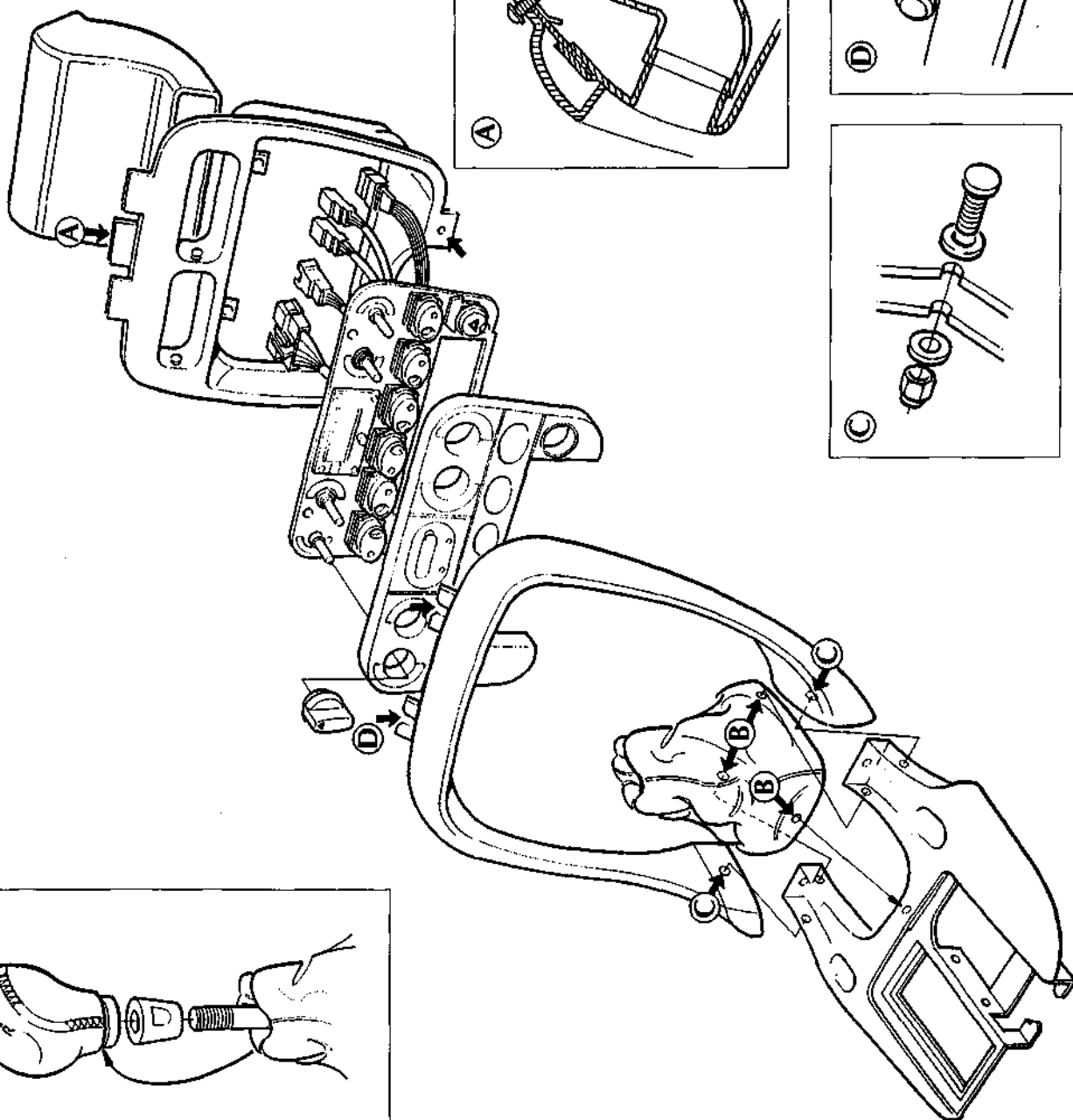
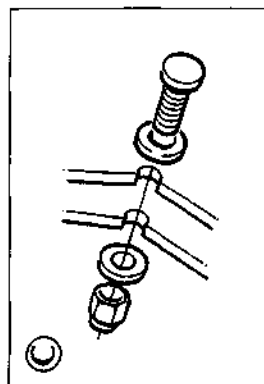
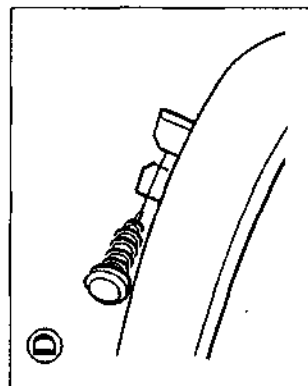
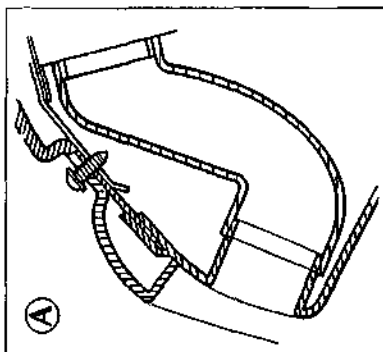
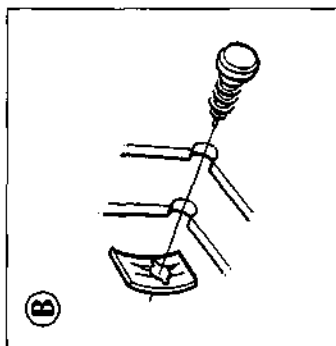


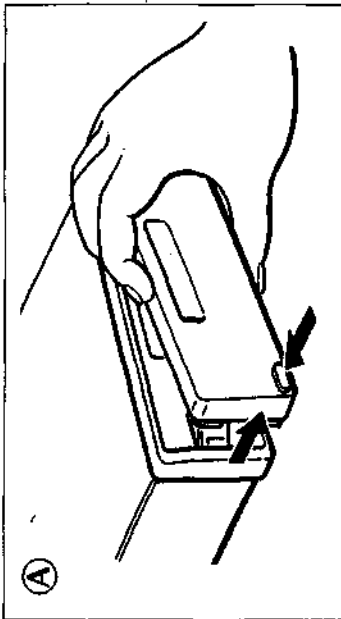
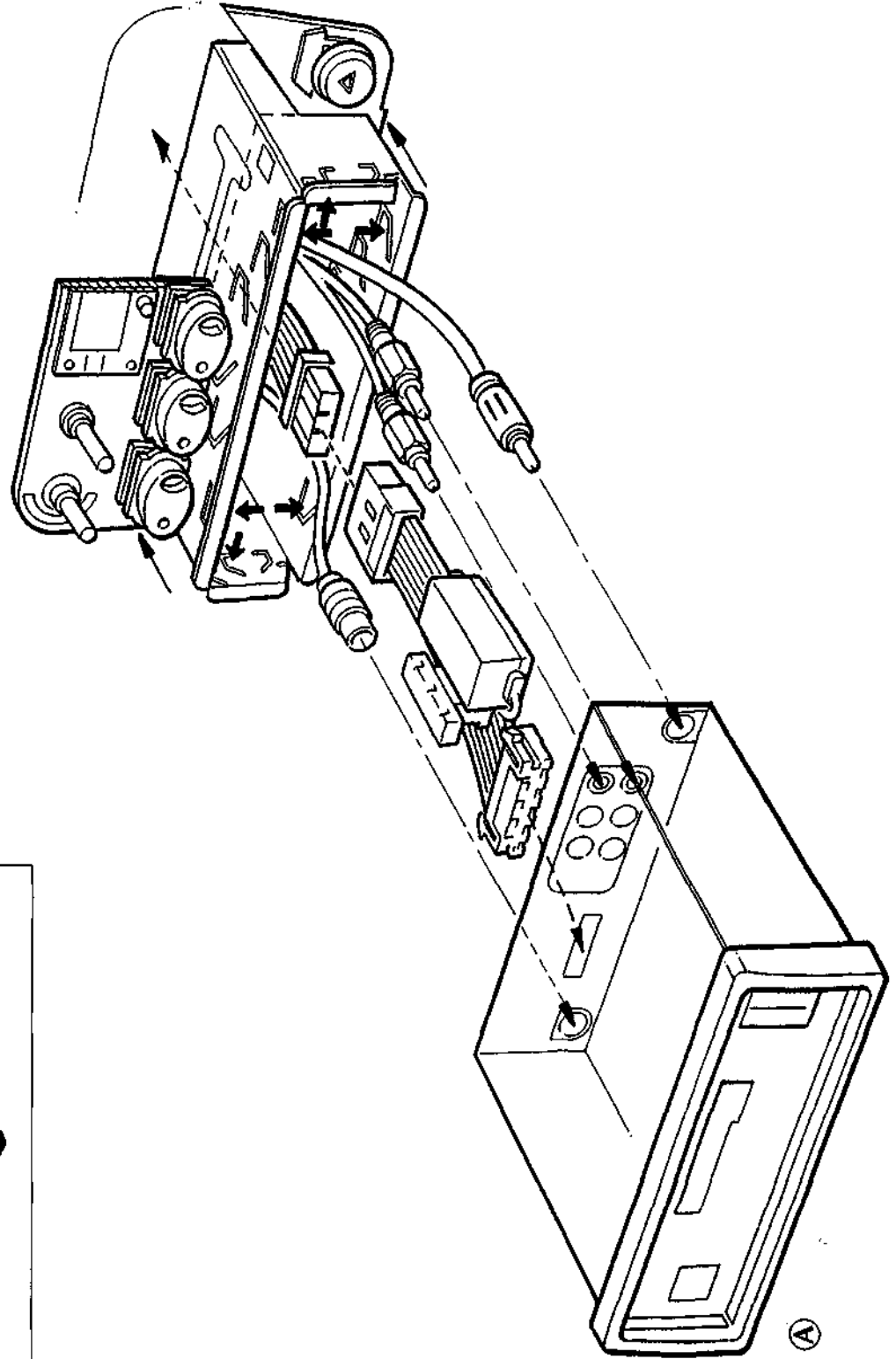
DB37

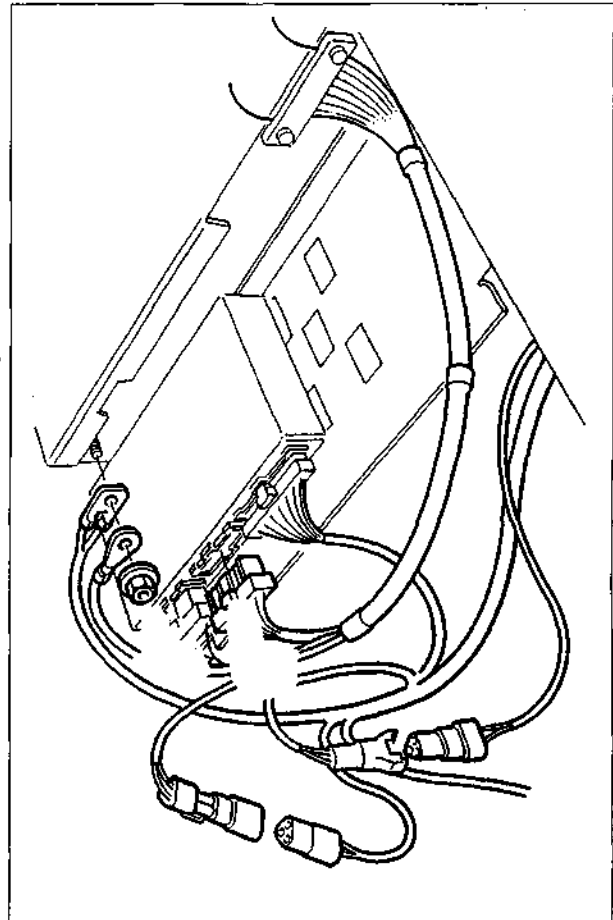
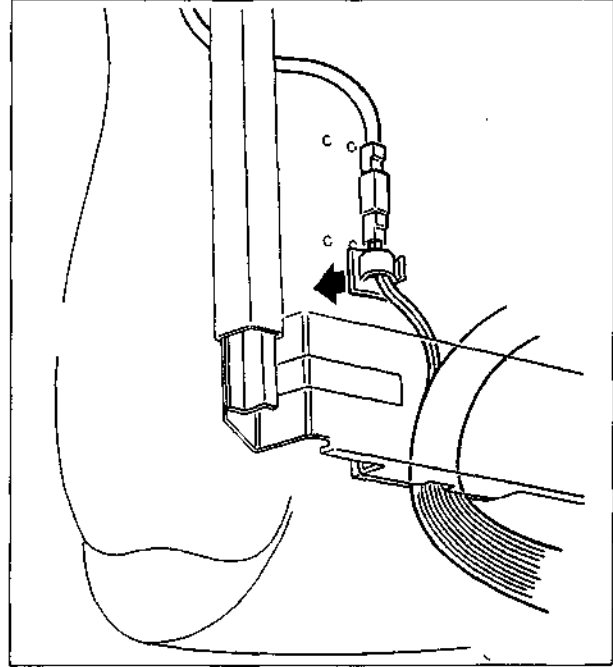
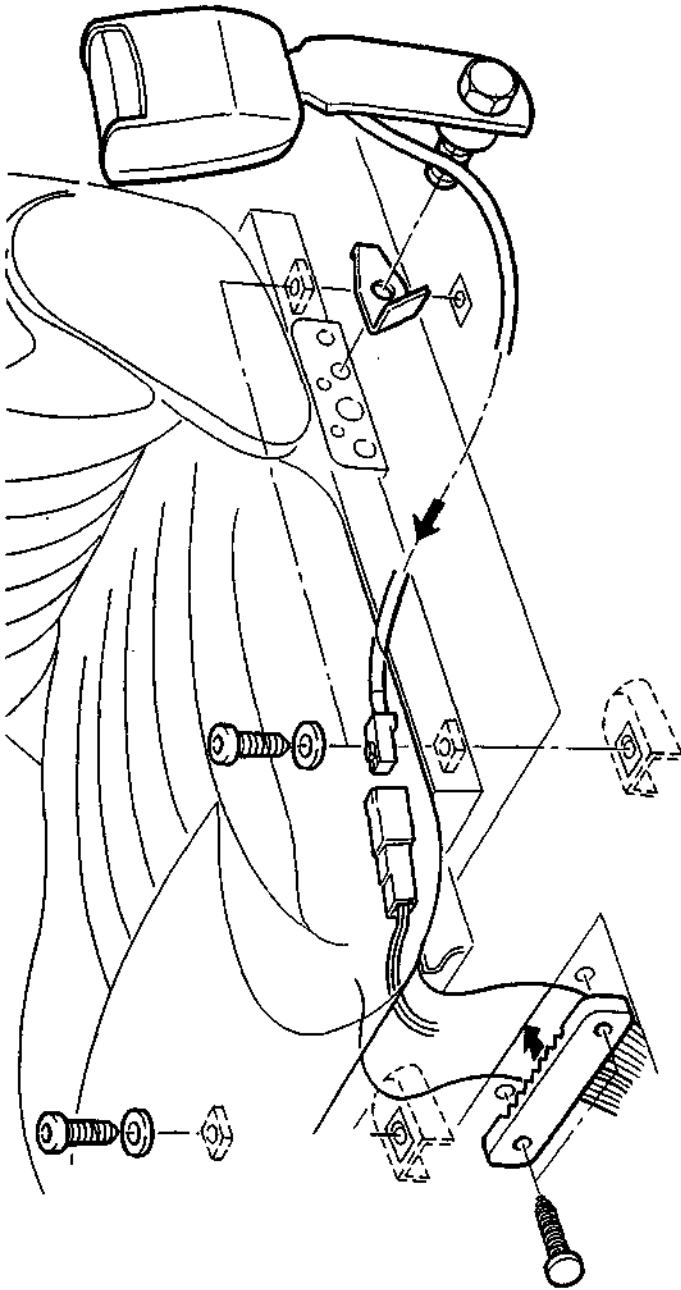
Body and Trim

Sheet 18

**Console
Instruments**





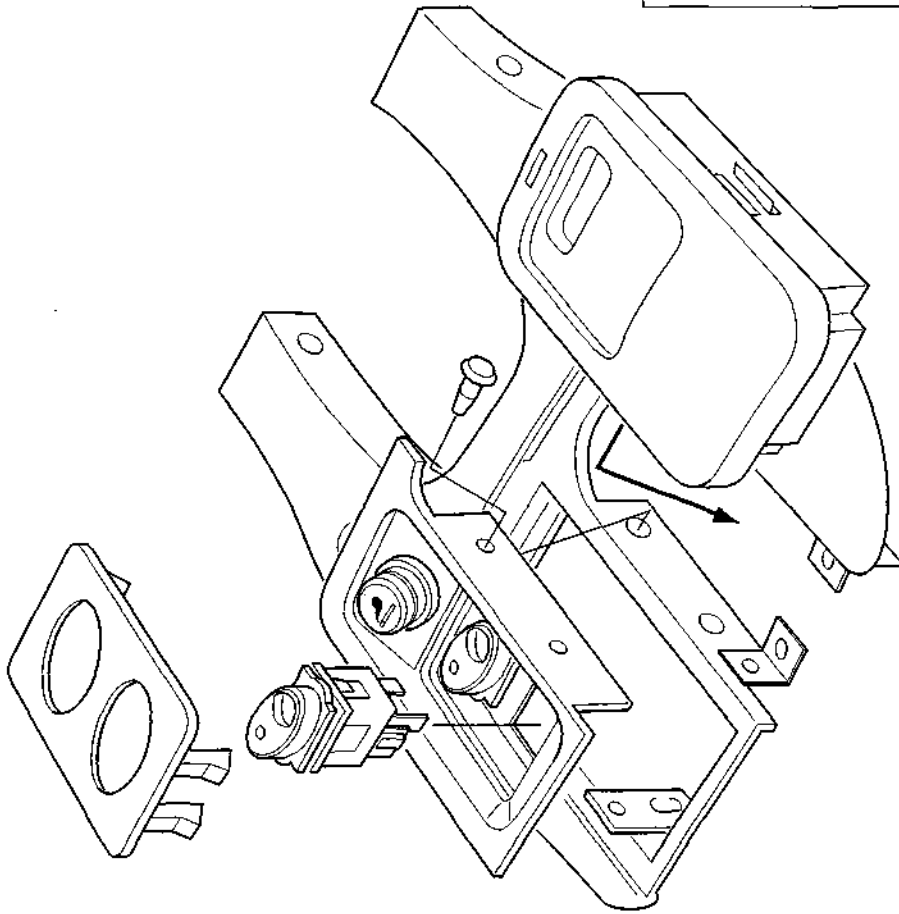
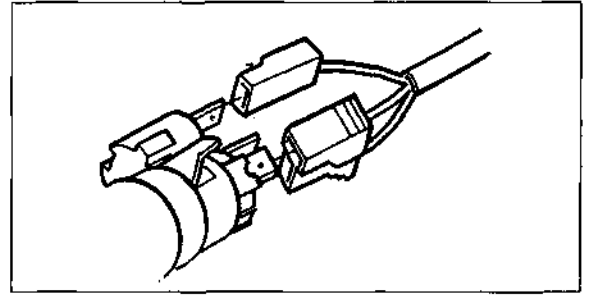
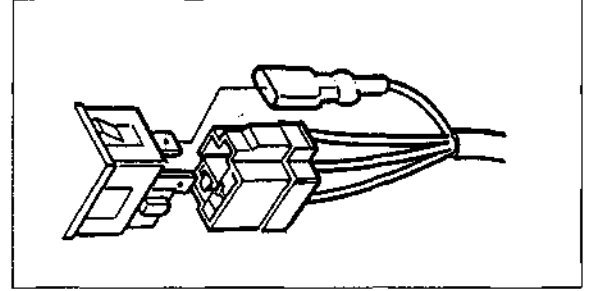


D132

Body and Trim

Sheet 21

Ashtray

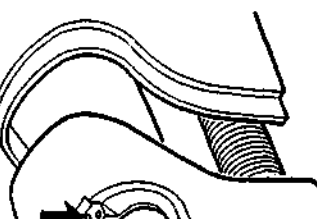
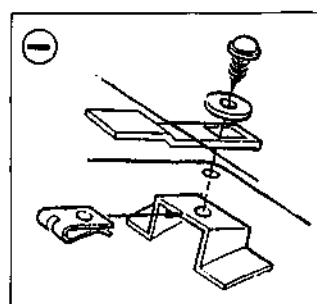
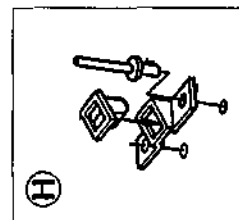
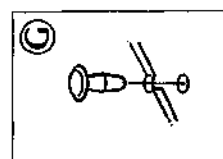
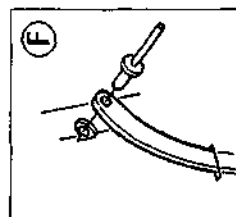
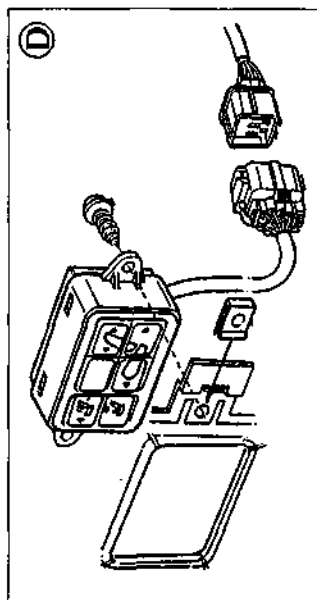
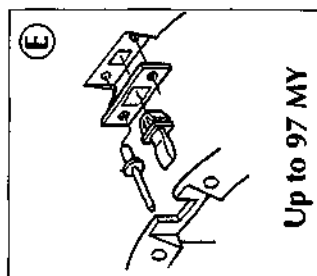
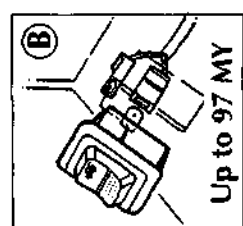
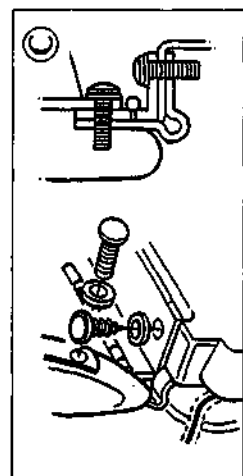
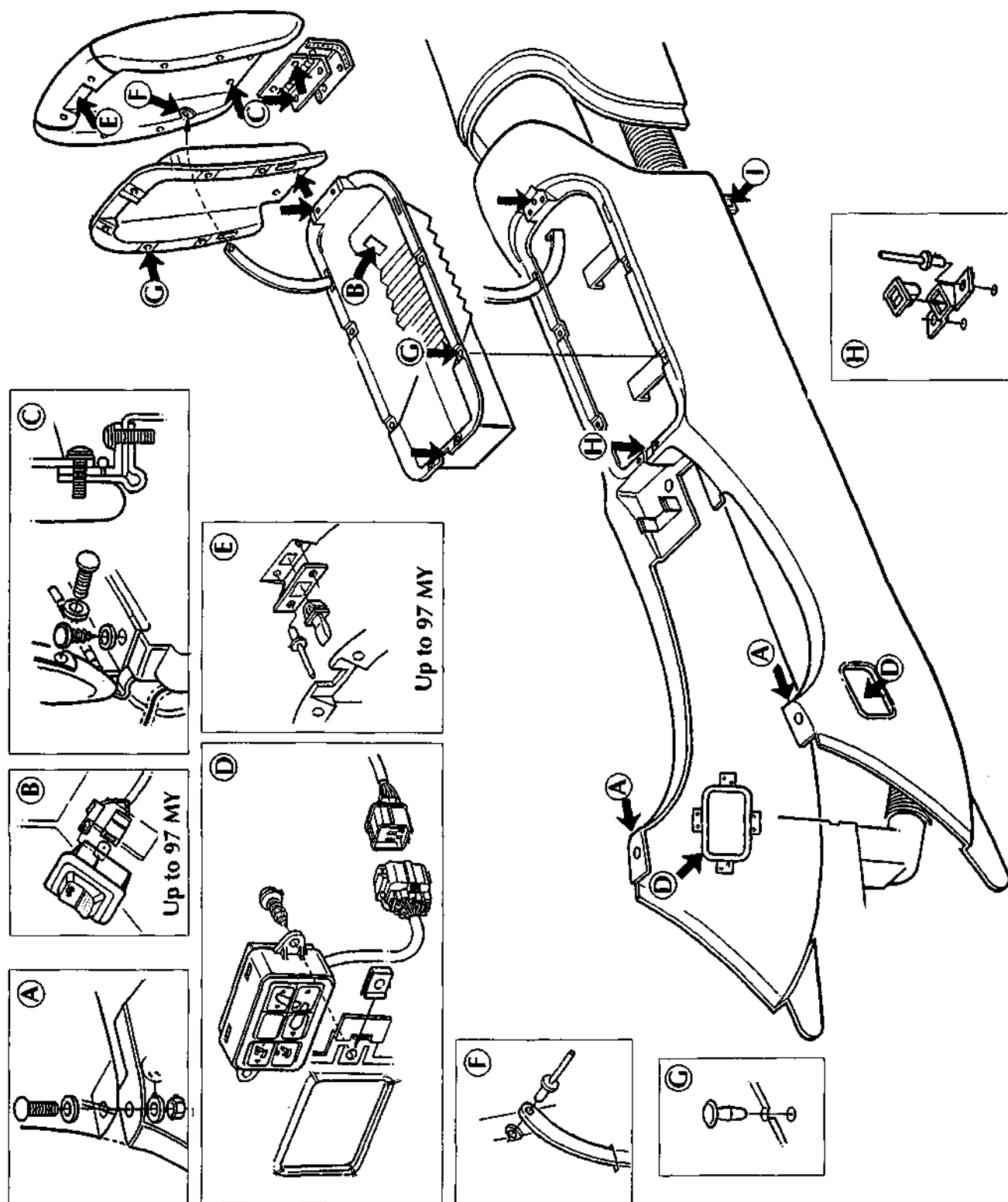


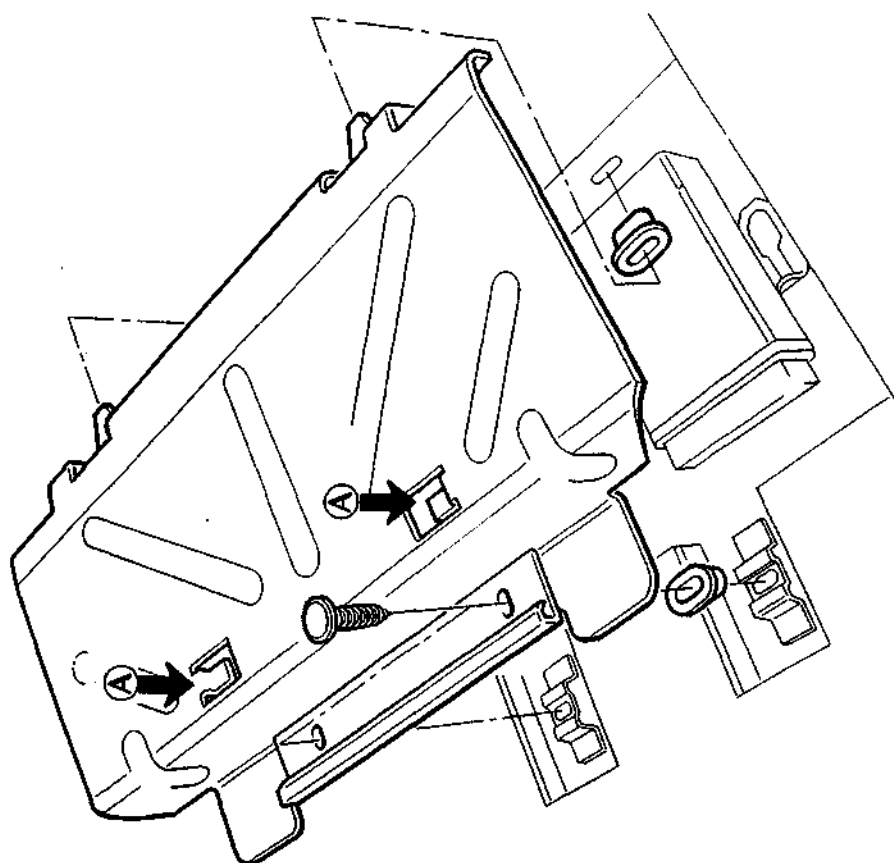
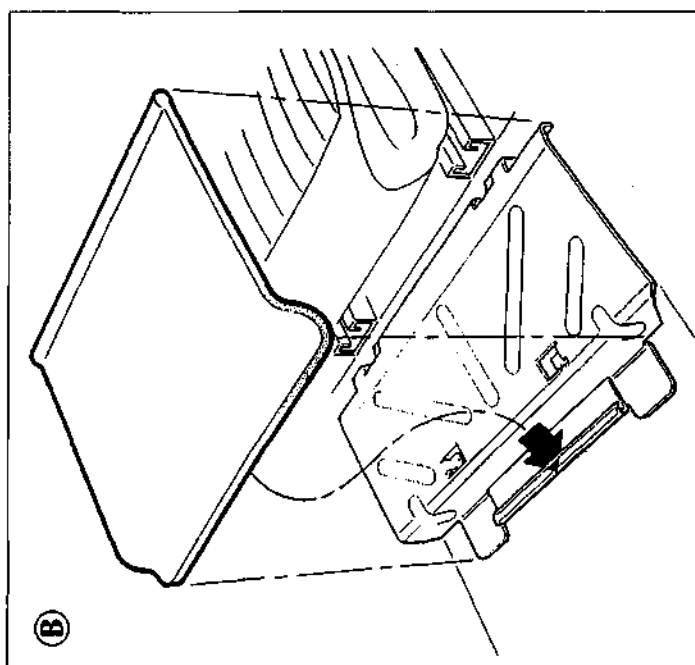
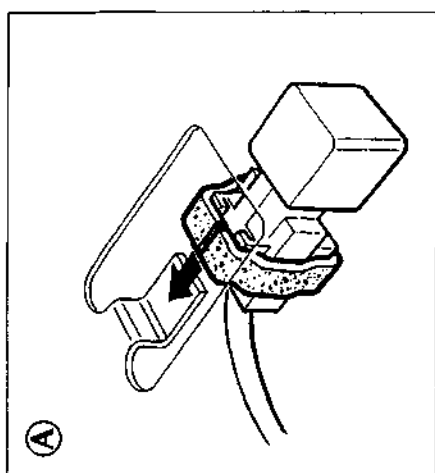
DB7

Body and Trim

Sheet 22

**Centre
Console**





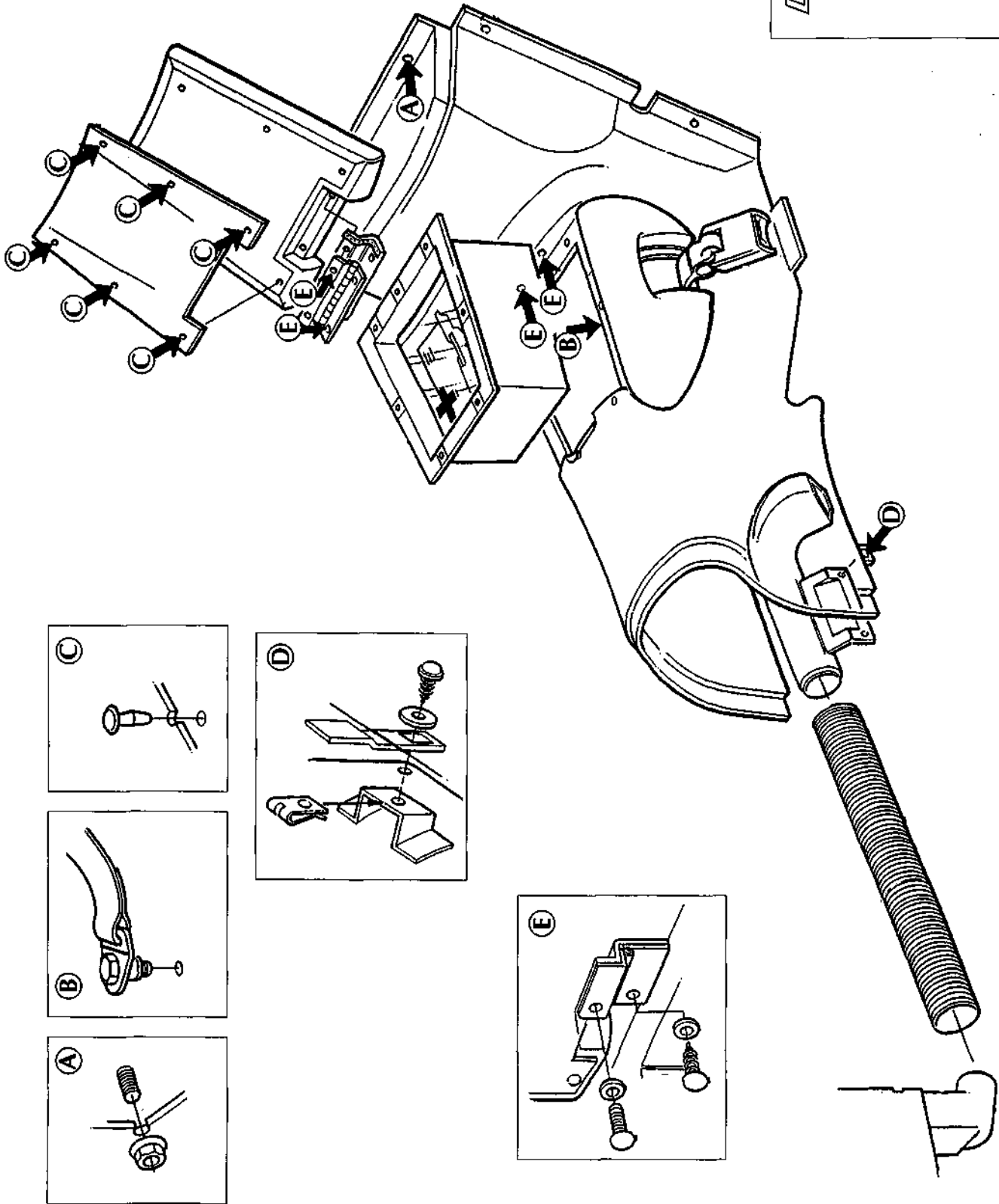
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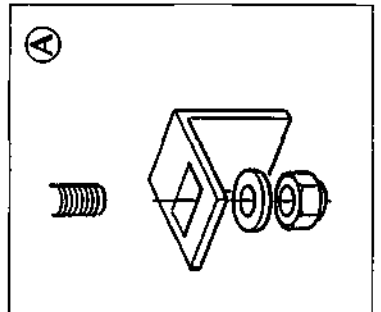
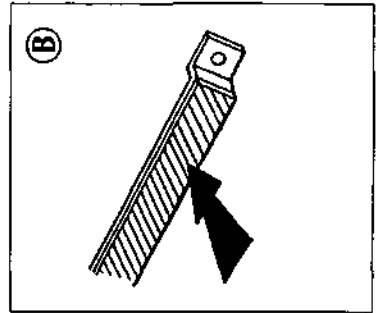
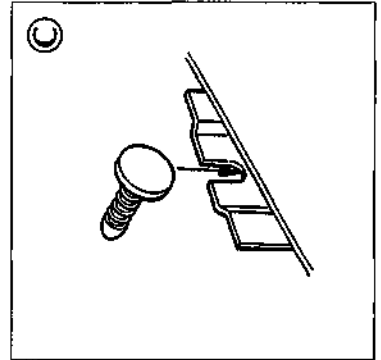
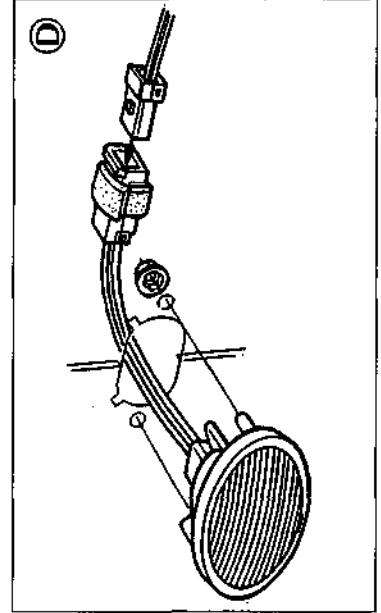
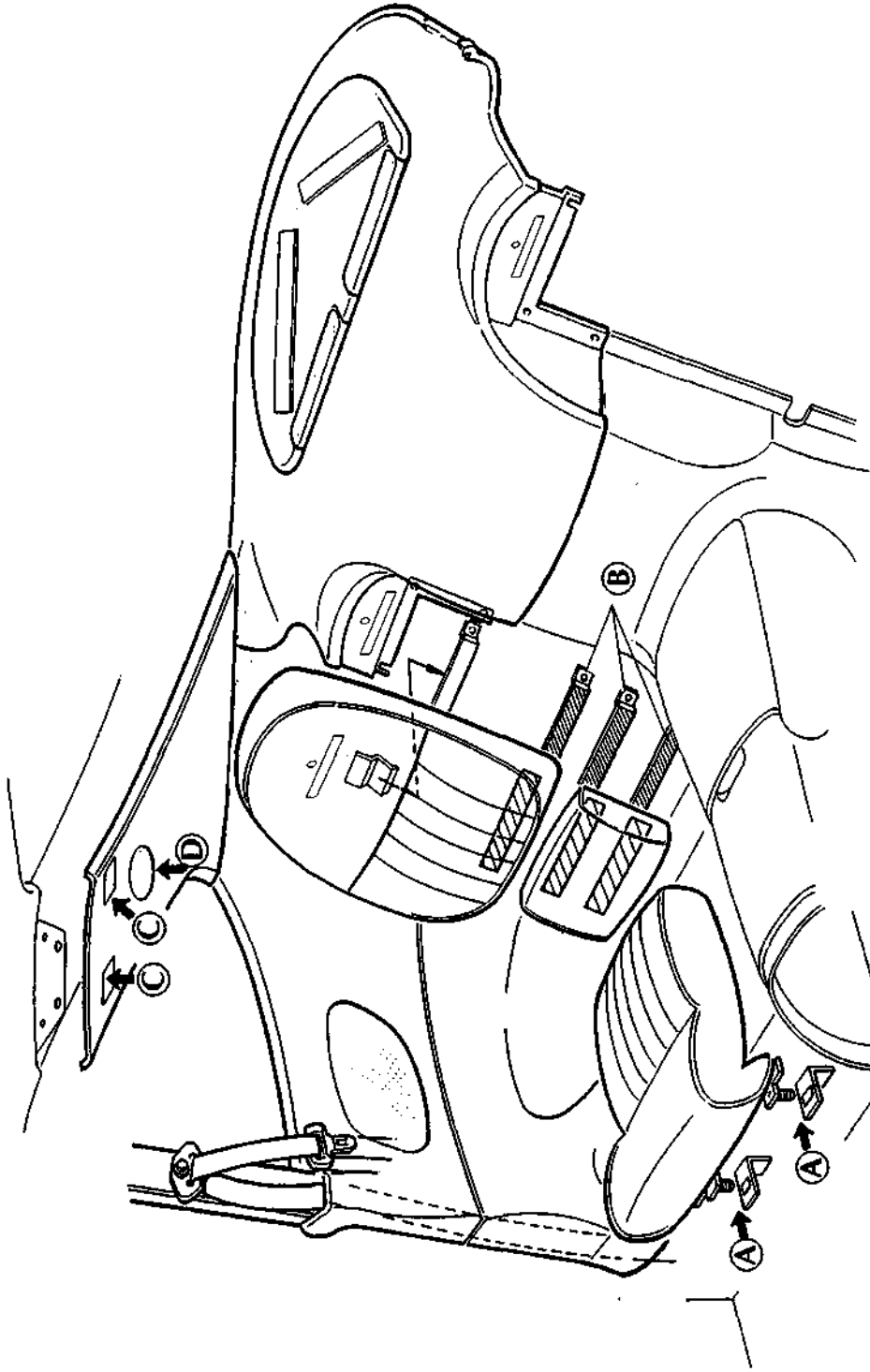
Body and Trim

Sheet 24

**Rear
Console**

Coupe Only

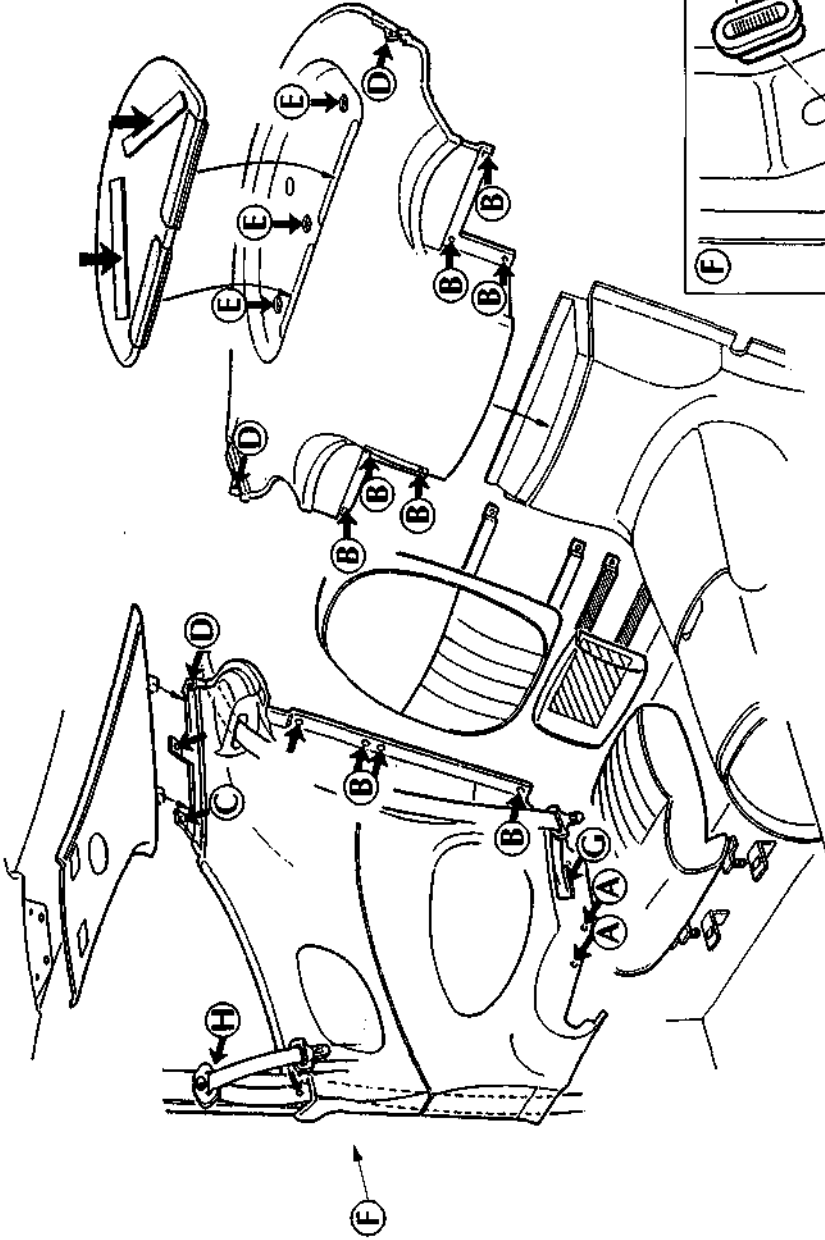
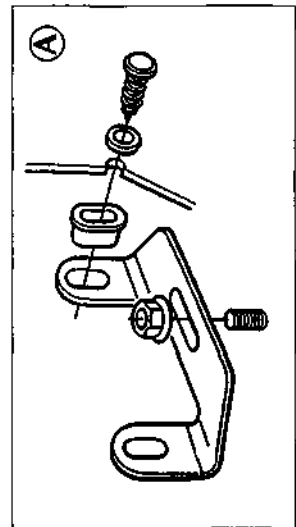
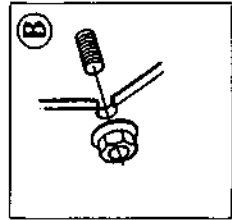
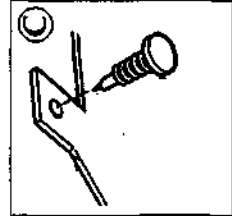
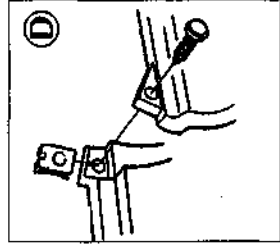
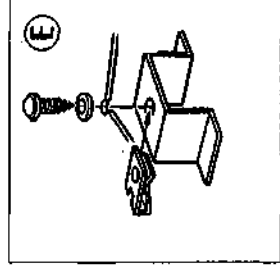
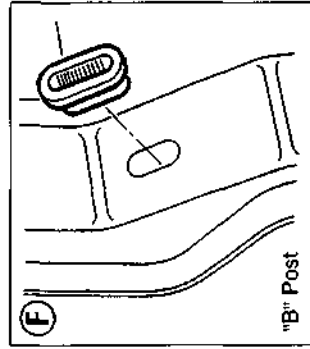
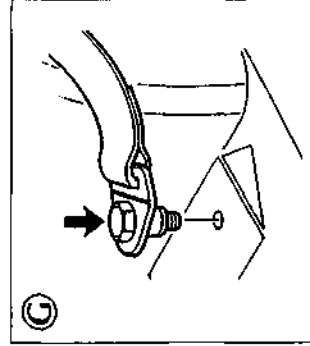
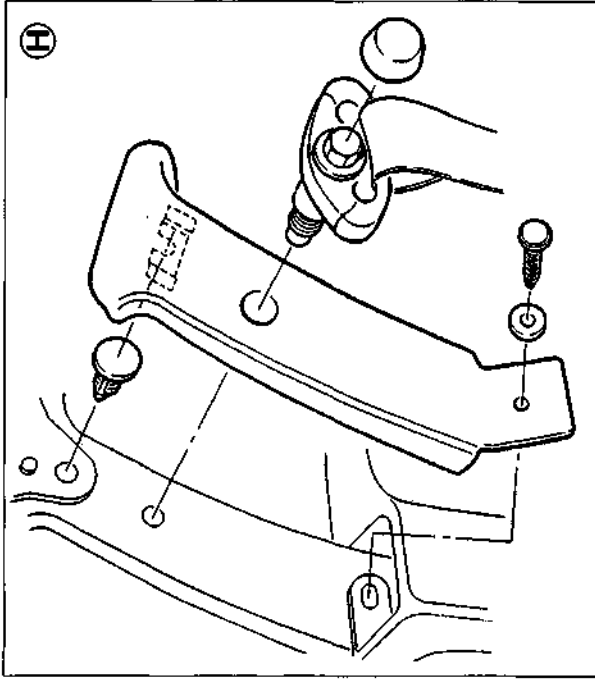


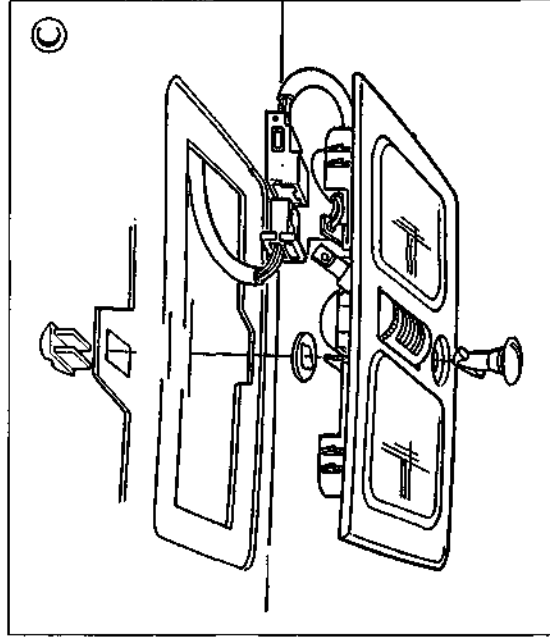
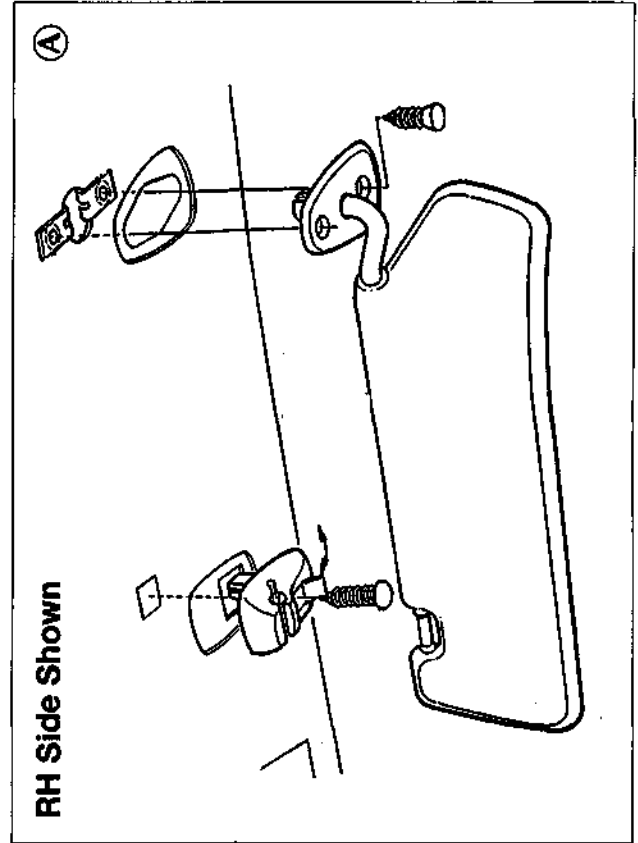
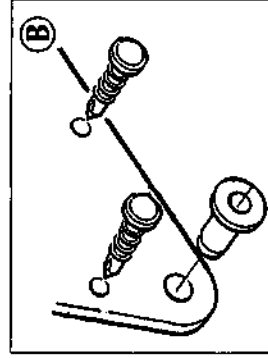
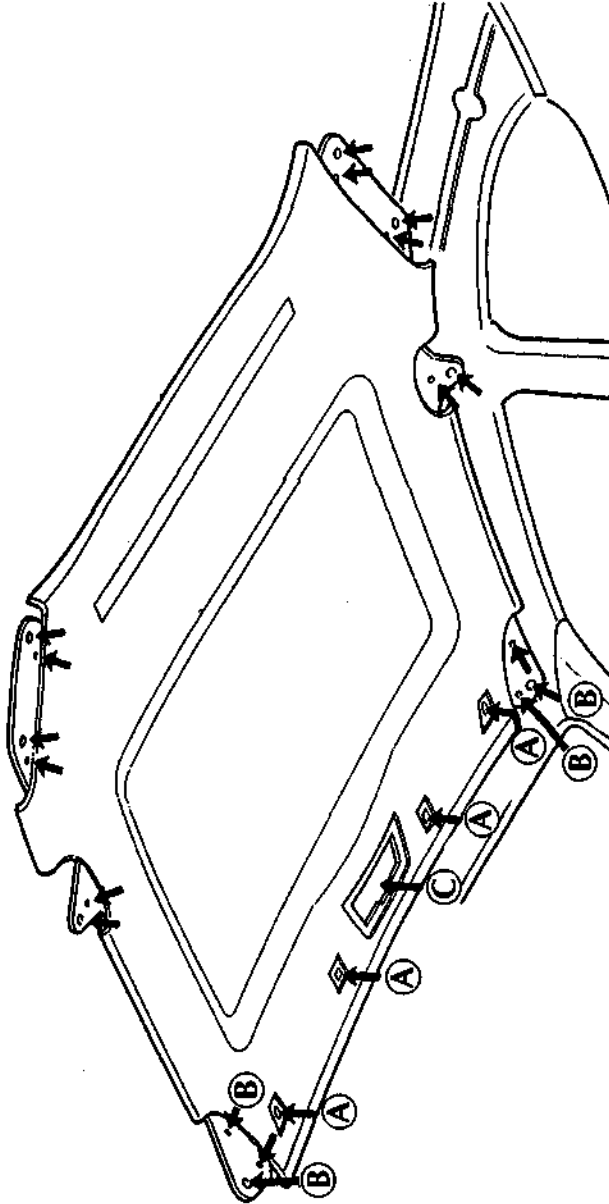


DB7

Body and Trim

Sheet 26
Coupe Only
1/4 Panels,
'B' Panels
Parcel Shelf





Volante Roof

Description

The system comprises an electrically driven hydraulic pump and two hydraulic rams for raising and lowering the roof. The pump is powered via two heavy duty changeover relays. Two further pairs of changeover relays power the rear quarter windows (one pair for each window). The roof hydraulic pump is protected by a 30A fuse, the windows by circuit breakers.

An electronic control module (ECM) is actuated by the roof switch on the centre console. The ECM controls the operation of both the roof and rear quarter window circuits so that they can only be operated in a pre-programmed manner. When in operation, the ECM provides signals to the roof and to the rear quarter windows.

When the roof switch is moved into the open (Roof Down) position, the roof and rear windows move together until approximately four seconds has elapsed. At this time, the ECM will remove power from the rear window circuits, leaving the roof motor running. The roof motor will stop after 12 seconds (i.e. a further 8 seconds after the rear window motors stop).

The signals will be removed from the rear window relay after 4 seconds and from the roof relay after 12 seconds if the roof switch is held in either position for longer than 12 seconds.

In order to comply with legislation, the following features are built into the system:

If the roof switch is operated in either direction and then released before that operation is complete, the roof and rear quarter windows will stop immediately. If, whilst the system is in operation, the ignition switch is turned to the off position, the system will immediately stop.

If the roof switch is pressed again after pausing during a roof movement, the timing sequence will be as follows:

1. If the previous direction is selected, the timing recommences from where it left off and will continue to completion. If the ignition has been turned off, the timing will start from the beginning of its cycle.
2. If the opposite direction is selected, the timing sequence will commence from the beginning of the newly selected direction and continue to completion.

Roof and Rear Quarter Light Control

The following diagrams show the component location and the electrical control for the roof and rear quarter light systems.

Roof Component Location

Roof Switch

Hydraulic Pump

ECM

Roof Up Relay

Roof Down Relay

LH Q Light Up Relay

LH Q Light Down Relay

RH Q Light Up Relay

RH Q Light Down Relay

Fuse and Circuit Breakers

Hydraulic Rams

Heated Rear Window Override Switch

Figure 1. Roof System Component Location

Roof Control System

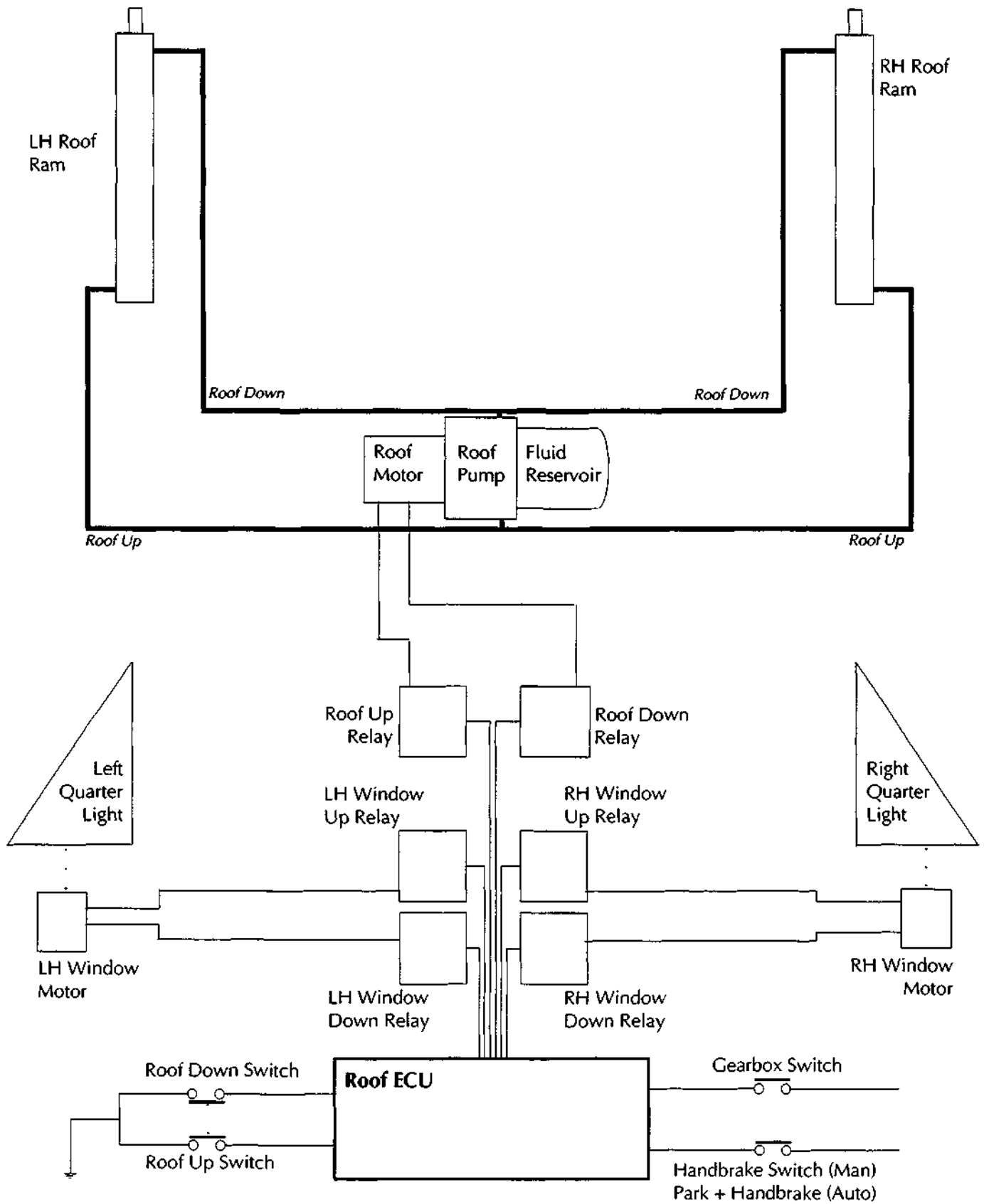


Figure 2. Roof System - Control Schematic Diagram

9.0.02.1 - Roof Removal/Replacement

1. Move the front seats fully forward for access.
2. Remove the rear seat squab and cushion. Remove the rear quarter trim panel.
3. Release the roof side curtain clips.
4. Release the rear window support bracket securing bolts (Fig 1-2).
5. Remove the side curtain clips (2 per side).
6. Release the side curtain rods and move the curtains aside.
7. Disconnect the heated rear window connector.
8. Release the rear window support bracket from the body.

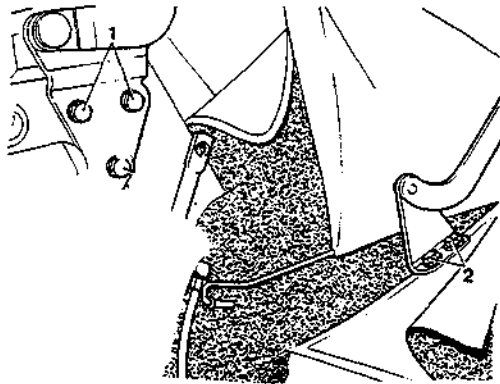


Figure 1. Rear Window Support Bracket

9. Release the roof catches.
10. Select Manual on the roof motor control switch. Lower the roof to the midway position. Select Electric on the roof motor control switch - the roof will remain in a raised position.
11. Raise the trim and remove the cable securing nuts.

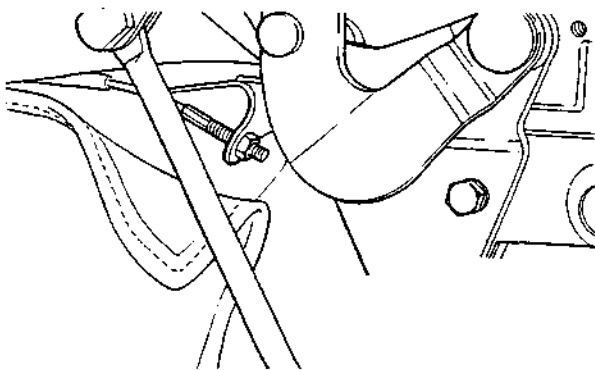


Figure 2. Cable Securing Nuts

12. Release the roof outer finisher securing screws and remove the finisher.
13. Release the cable and roof material from the body channel.

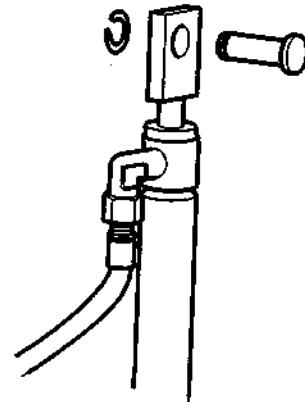


Figure 2. Ram Mountings

14. Select the Manual position on the roof motor control switch. Fold the roof and remove the ram to roof securing pins.
15. Remove the six roof to body securing bolts.
16. Remove the roof assembly.

Refitting

1. Fit the roof into position on the vehicle, aligned with the fixing holes.
2. Refit the six roof to body securing bolts.
3. Locate the rams to the pivot.
4. Select Manual on the roof motor control switch. Place the roof in the partially open position to align the ram fixing holes. Fit but do not tighten the securing bolts.
5. Fit the pivot pins and securing clips.
6. Finally tighten all bolts.
7. Position the rear window support bracket, fit and tighten the securing bolts.
8. Fully raise the roof. Select Electric on the roof motor control switch.

9. Position the rear edge of the roof to the body.
10. Position the rear cable to the roof lower edge. Position the loops on the cable (approximately 17in equi-spaced apart). Position the cable to the mounting brackets, fit but do not tighten the securing nuts.

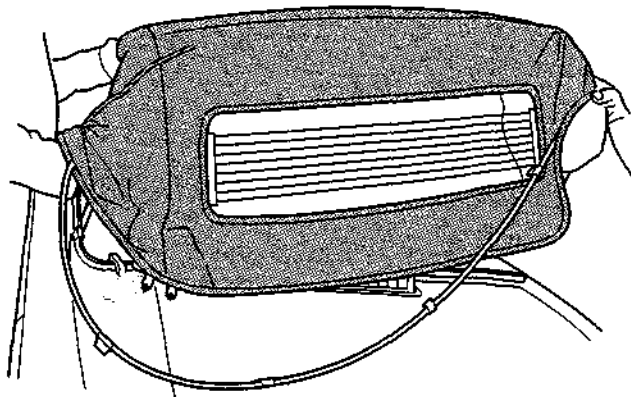


Figure 3. Cable, Roof Channel and Body Channel

11. Align the rear edge of the roof material to the body and commence tightening the cable nuts evenly. Stop frequently and check that the cable and roof channel are correctly bedding into the body channel. Continue tightening and checking until the roof is fully seated in the body channel.
12. Fit and secure the roof finishers.
13. Reconnect the heated rear window connector.
14. Position the roof inner curtain. Fit clips to the curtain rods. Fit and tighten the securing screws.
15. Refit all trim and check the roof mechanism for correct operation and fitting.

9.0.02.3 - Roof Hydraulic Control System

Procedure

1. Move the front seats forward for access.
2. Fully lower the roof.
3. Remove the rear seat squab and cushion. Remove the rear quarter trim panels.
4. Remove both the cylinder pivot pins. Release the ram cylinder assemblies (take care not to kink the pipes).
5. Remove the screws from the hydraulic pipe grommet in the rear of the roof storage well. Remove the grommet.
6. Release the pipe securing clips.

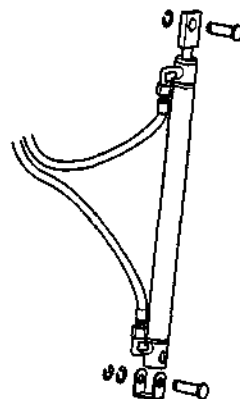


Figure 2. Ram Mountings

7. Open the boot and remove the boot floor trim panel. Remove the pump mounting plate securing bolts.
8. Release and remove the pump cover.
9. Disconnect the pump multi-plug.
10. Release the pump mounting rubbers from the plate.
11. Feed both ram cylinders into the boot through the aperture in the roof well rear wall.
12. Remove the complete hydraulic system from the boot.

Note: Check that the reservoir fluid level is correct. Always bleed the hydraulic system before topping up.

Refitting is the reverse of the removal procedure.

On completion of the refitting, check the roof operation.

9.0.02.5 - Bleeding the Roof Hydraulic System

Procedure

This procedure is completed in two stages:

- a) Bleed the left hand ram by disconnecting it from the pump.
- b) Bleed the right hand ram and pump by disconnecting both from the left hand ram.

Bleed the left hand ram:

1. Remove the roof hydraulic system.
2. Disconnect the left cylinder union nuts at the pump.

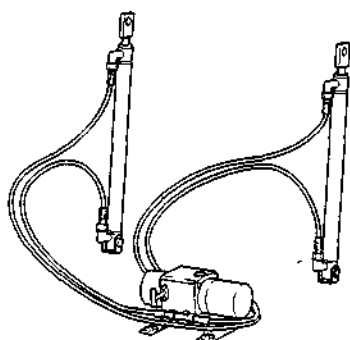


Figure 1. Left Hand Ram Bleeding

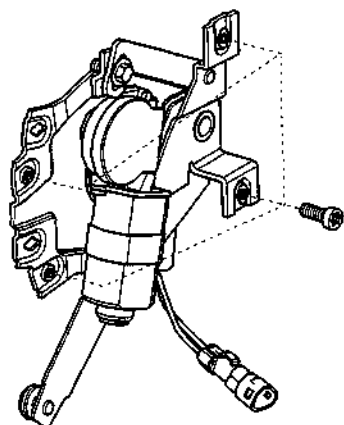
3. Submerge the two tubes in hydraulic fluid.
4. Fully extend the left hand ram to draw in clean hydraulic fluid.
5. Invert the cylinder, pause for any air in the cylinder to rise to the top and then fully retract the ram to expel any remaining air.
6. Reconnect the tubes to the pump and tighten the union nuts.
7. Remove the reservoir filler plug and fill to the maximum level indicated on the fluid reservoir. Refit the filler plug.

Bleed the right hand ram and pump:

8. Release the left hand cylinder tubes at the cylinder and submerge the tubes in hydraulic fluid.
9. Turn the motor control valve to the Electric position.
10. Fully extend the right hand ram to draw in clean fluid.
11. Invert the right hand cylinder and pause for any trapped air to rise to the top.
12. Fully retract the right hand ram to expel any trapped air.
13. Reconnect the two pipes to the left hand cylinder and tighten the union nuts.
14. Remove the filler plug and top up the reservoir with clean fluid to the maximum level indicated on the reservoir. Refit the filler plug.
15. Refit the roof hydraulic system.

9.1.01.1 - Rear Quarter Window Renewal**Procedure**

1. Move the front seat forward to gain access.
2. Switch on the ignition, release the roof locking latches and lower the roof to approximately the midway position. Switch off the ignition.
3. Remove the rear seat squab and cushion. Remove the rear quarter trim panel.
4. Remove the roof cylinder support bracket securing bolts.
5. Support the roof, remove the cylinder to roof securing bolt. Remove the cylinder bracket.
6. Disconnect the cylinder from the pivot and carefully lower the roof.
7. Remove the window motor cover. Disconnect the window motor feed wires.

*Figure 1. Window Motor Mountings*

8. Release and remove the window motor finisher, feeding the wires through the grommet.
9. Remove the window motor mounting bracket securing bolts.
10. Remove the motor assembly, disengaging it from the glass.
11. Remove the window carrier securing nuts and special washers.
12. Remove the window adjusters, displace and remove the window carrier.

Reassembly

Reassembly is the reverse of the removal procedure.

On reconnection of the motor, check the window height as follows:

1. Switch on the ignition and raise the rear quarter windows.
2. Check that the top of the glass is exactly level with the top edge of the fully raised door window.
3. Check for a complete vertical seal between the rear quarter window and the door window.
4. If the rear window alignment is not correct, adjust it using the procedure in the Wind Noise and Sealing section.
5. Switch off the ignition and complete the reassembly.
6. Switch on the ignition, raise the roof and recheck for complete sealing at the rear window top edge.

9.1.01.2 - Rear Quarter Glass Adjustment

The rear quarter glass can be adjusted in three planes, Lateral, Up and Down, and Front to Rear. During initial assembly, assuming that the door is correctly gapped and profiled, the door glass is set to the upper 'A' post seal and the front frame seal. The rear quarter glass is then set to the door glass.

Both glass tops should be accurately aligned and there should be a minimum 2mm gap between the glasses. Any minor adjustments are then made using the following procedures.

Lateral Adjustment

Remove the rear quarter trim panel. Remove the adjuster stud locknuts and special washers (Fig 7-A). Using a 5mm box spanner, rotate the adjuster screw clockwise to move the glass inboard or anti-clockwise to move the glass outboard (Fig 7-B). Refit the special washers, refit and tighten the locknuts. Refit the rear quarter trim panel.

Front to Rear Adjustment

Remove the rear quarter trim panel. Loosen the three adjuster stud locknuts. Adjust the glass front to rear as required (Fig 7-C). Re-tighten the locknuts. Check and readjust as required. Refit the rear quarter trim panel.

Up and Down Adjustment

Remove the rear quarter trim panel. Slacken off the lockbolt (Fig 7-D) two to three turns. Adjust the vertical position of the glass as required. Re-tighten the lockbolt. Recheck the glass position and readjust as required. Refit the rear quarter trim panel.

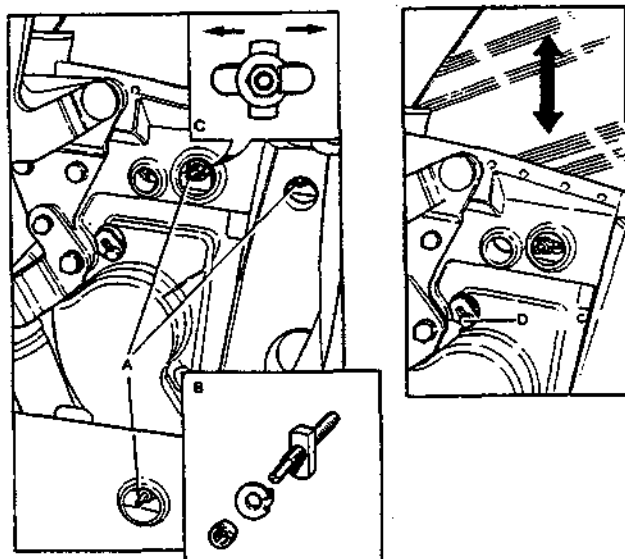
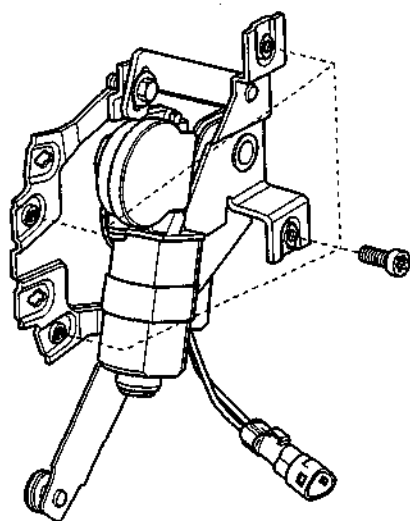


Figure 7. Rear Quarter Glass Adjustments

9.1.01.4 - Rear Quarter Window Lift Motor - Left Hand**Procedure**

1. Move the front seat forward to gain access.
2. Switch on the ignition, release the roof locking latches and lower the roof. Switch off the ignition.
3. Remove the rear seat squab and cushion. Remove the rear quarter trim panel.
4. Disconnect the window motor feed wires.

*Figure 1. LH Window Lift Motor Removal*

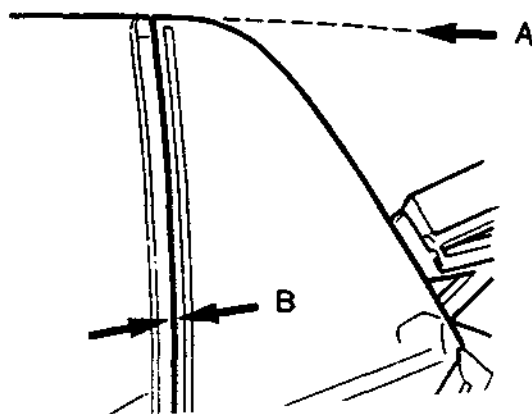
5. Release and remove the window motor finisher, feeding the wires through the grommet.
6. Remove the window motor mounting bracket securing bolts.
7. Remove the motor assembly, disengaging it from the glass.
8. Remove the motor to carrier securing bolts and remove the motor.

Reassembly

Reassembly is the reverse of the removal procedure.

On reconnection of the motor, check the window height as follows:

1. Switch on the ignition and raise the rear quarter windows.
2. Check that the top of the glass is exactly level with the top edge of the fully raised door window.
3. Check for a complete vertical seal between the rear quarter window and the door window.

*Figure 1. Rear Quarter Window Alignment*

4. If the rear window alignment is not correct, adjust it using the procedure in the Wind Noise and Sealing section.
5. Switch off the ignition and complete the reassembly.
6. Switch on the ignition, raise and latch the roof, recheck for complete sealing at the rear window top edge.

9.1.01.5 - Rear Quarter Window Lift Motor - Right Hand

Procedure

1. Move the front seat forward to gain access.
2. Switch on the ignition, release the roof locking latches and lower the roof. Switch off the ignition.
3. Remove the rear seat squab and cushion. Remove the rear quarter trim panel.
4. Disconnect the window motor feed wires.

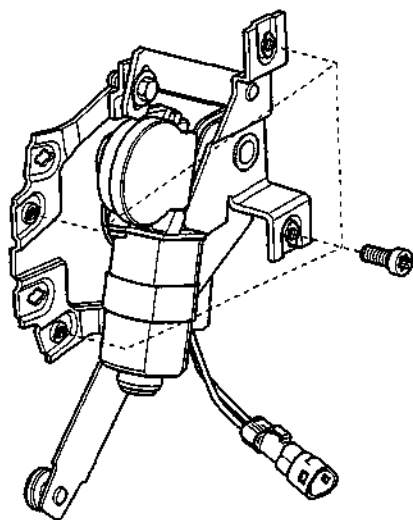


Figure 1. LH Window Lift Motor Removal

5. Release and remove the window motor finisher, feeding the wires through the grommet.
6. Remove the window motor mounting bracket securing bolts.
7. Remove the motor assembly, disengaging it from the glass.
8. Remove the motor to carrier securing bolts and remove the motor.

Reassembly

Reassembly is the reverse of the removal procedure.

On reconnection of the motor, check the window height as follows:

1. Switch on the ignition and raise the rear quarter windows.
2. Check that the top of the glass is exactly level with the top edge of the fully raised door window.
3. Check for a complete vertical seal between the rear quarter window and the door window.

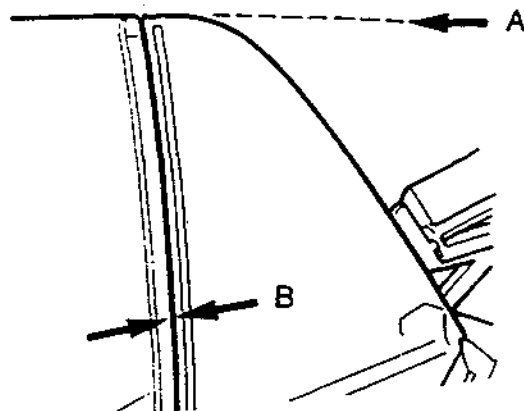


Figure 2. Rear Quarter Window Alignment

4. If the rear window alignment is not correct, adjust it using the procedure in the Wind Noise and Sealing section.
5. Switch off the ignition and complete the reassembly.
6. Switch on the ignition, raise and latch the roof, recheck for complete sealing at the rear window top edge.

Roof Sealing and Wind Noise

Roof seals and side windows have been provided with a range of adjustments capable of dealing with any leaks which may occur.

The following information is divided into five sections:

1. A post and header sealing/roof lock adjustment
2. Roof seals - adjustment
3. Cheater plate seals - adjustment/renewal
4. Door glass - adjustment
5. Rear quarter glass - adjustment (9.1.01.2)

When a leak is reported, either wind noise or water ingress, try to pinpoint the actual leak path using any of the following methods:

- An ultrasonic leak detector
- An air flow detector, e.g. Dräger smoke tube
- Paper test strips at seal contact areas

9.2.01.5 - 'A' Post/Header Sealing and Lock Adjustment

When a leak is detected at the top of the 'A' post adjacent to the header rail seal, first ensure that the roof lock is correctly adjusted.

If the lock is difficult to operate, it is probably overtensioned. Release the retaining hook locknut and extend the hook one full turn. Check and repeat the adjustment as necessary.

If the locking handle is loose, it is undertensioned. Release the retaining hook locknut and screw the hook inwards one full turn. Check and repeat the adjustment as necessary.

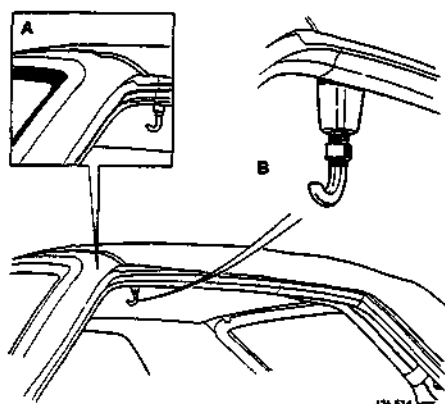


Figure 1. Roof Lock

Open the roof and check for obvious seal defects i.e. collapse, damage or manufacturing faults. Replace where necessary. If the lock tension is correct and a leak is still evident, it may be caused by lack of pressure between the front frame and header seals (Fig 2).

Increase seal pressure by inserting a packer between the front and rear frame seals (see DB7 Volante parts manual).

Note: After fitting seal packers, check the locking handle tension and adjust if necessary. If a leak is still evident, go to 9.2.01.6.

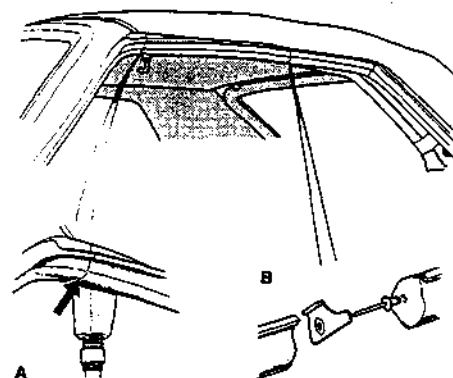


Figure 2. Front and Rear Seal Packers

9.2.01.6 - Roof Seals - Adjustment

Seal adjustment is done in two stages. First stage - lateral adjustment, and second stage - outward adjustment. Seals are packed out using selected packing strips.

Lateral Adjustment

Partially open the roof.

Front frame seal only: Remove the seal retaining plate. Remove the seal from the channel.

Slacken the channel securing screws and reposition the channel as required, moving it on the slotted screw holes (Fig 3-A). Tighten the channel securing screws.

Apply soft soap to the seal and insert the outer seal edge into the channel. Then press in the inner edge to fully seat the seal.

Refit the seal retaining plate.

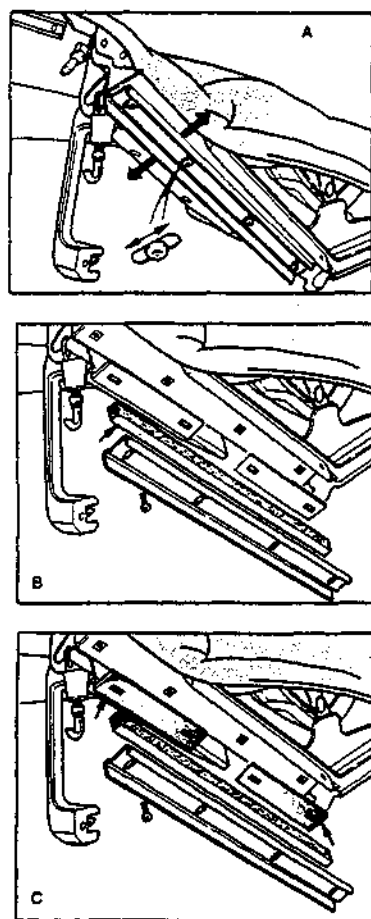


Figure 3. Front Frame Seal Adjustment

Outward Adjustment

Partially open the roof.

Remove the seal retaining plate. Remove the seal from the channel. Mark the position of the channel for reference, release the screws and remove the channel.

Select the appropriate packing (Figure 3-B)(see DB7 Volante parts manual):

Rear frame seal foam strip
Front frame seal foam strip
Main column seal foam strip
Upper 'A' post seal foam strip

Note: The foam strips are for full length packing. For packing at one end only, a shorter rubber wedge can be used. (Fig 1-C)

Fit the foam strip/rubber wedge and channel. Align the channel in the previously marked position. Fit and tighten the securing screws.

Apply soft soap to the seal and insert the outer seal edge into the channel. Then press in the inner edge to fully seat the seal. Refit the seal retaining plate.

Note: It is important at all times to retain the overall shape of the roof seal line (Fig 4). Where a leak necessitates the adjustment of only one or two seals, ensure that there are no misalignments. A more satisfactory result may be obtained by adjusting the adjacent component, i.e. the door glass or rear quarter glass.

The relationship between the roof seals is very important. Two seals in very close contact will promote leakage problems. Sealing will be far more effective if the seals touch lightly or exhibit a small air gap (Fig 4).

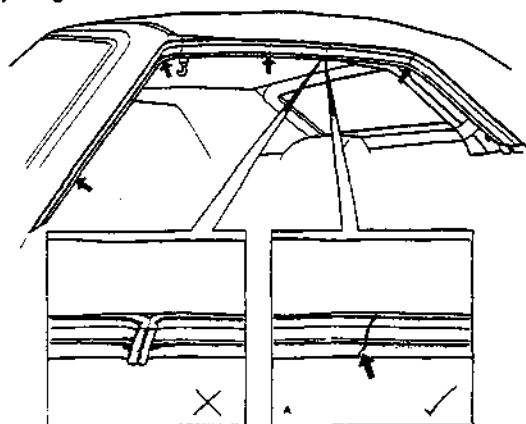


Figure 4. Seal Line and spacing

9.2.01.7 - Cheater Plate Seals - Adjust/ Renew

The contact line along the front edge of the door glass, and continuing via the cheater plate, is critical. Closer examination of the cheater plate assembly (following leak path identification) may reveal ridges where the upper and lower seals are joined. (Fig 5). The only solution is to carefully fit new seals using an appropriate sealant and contact adhesive.

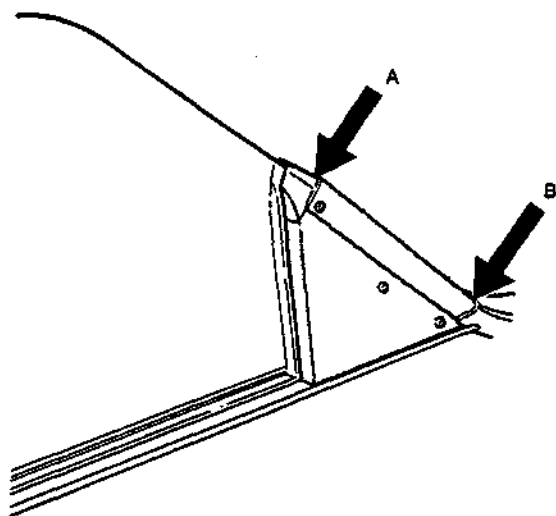


Figure 5. Cheater Panel Seals

If the leak is caused by incorrect positioning of the door glass, carry out the adjustment procedure as detailed in 9.2.01.8.

9.2.01.8 - Door Glass Adjustment

The door glass can be adjusted in three planes, Lateral, Up and Down, and Front to Rear. It is advisable however to avoid forward and rearward adjustment if possible, as this will affect the height and overall position of the glass relative to the seals. Use this adjustment only to correct serious misalignment.

Lateral Adjustment

Remove the door trim pad. Partially lower the window to allow access to the glass channel mounting bracket (Fig 6-A). Slacken off the four nuts to allow lateral adjustment. Move the glass to the desired position and tighten the nuts. Close the window and recheck the alignment. Repeat the adjustment until the optimum alignment is achieved. Refit the door trim pad.

Upward Adjustment

Remove the door trim pad. Slacken off the regulator locknut (Fig 6-B). With the door closed, operate the window to the fully closed position and tighten the locknut. Refit the door trim panel.

Front to Rear Adjustment

Remove the door trim pad. Partially lower the window to allow access to the glass channel mounting bracket (Fig 6C). Slacken the four screws to allow glass movement. Move the glass to the required position and tighten the screws. Close the window and recheck the alignment. Repeat the adjustment as necessary until the optimum front to rear alignment is achieved. Refit the door trim pad.

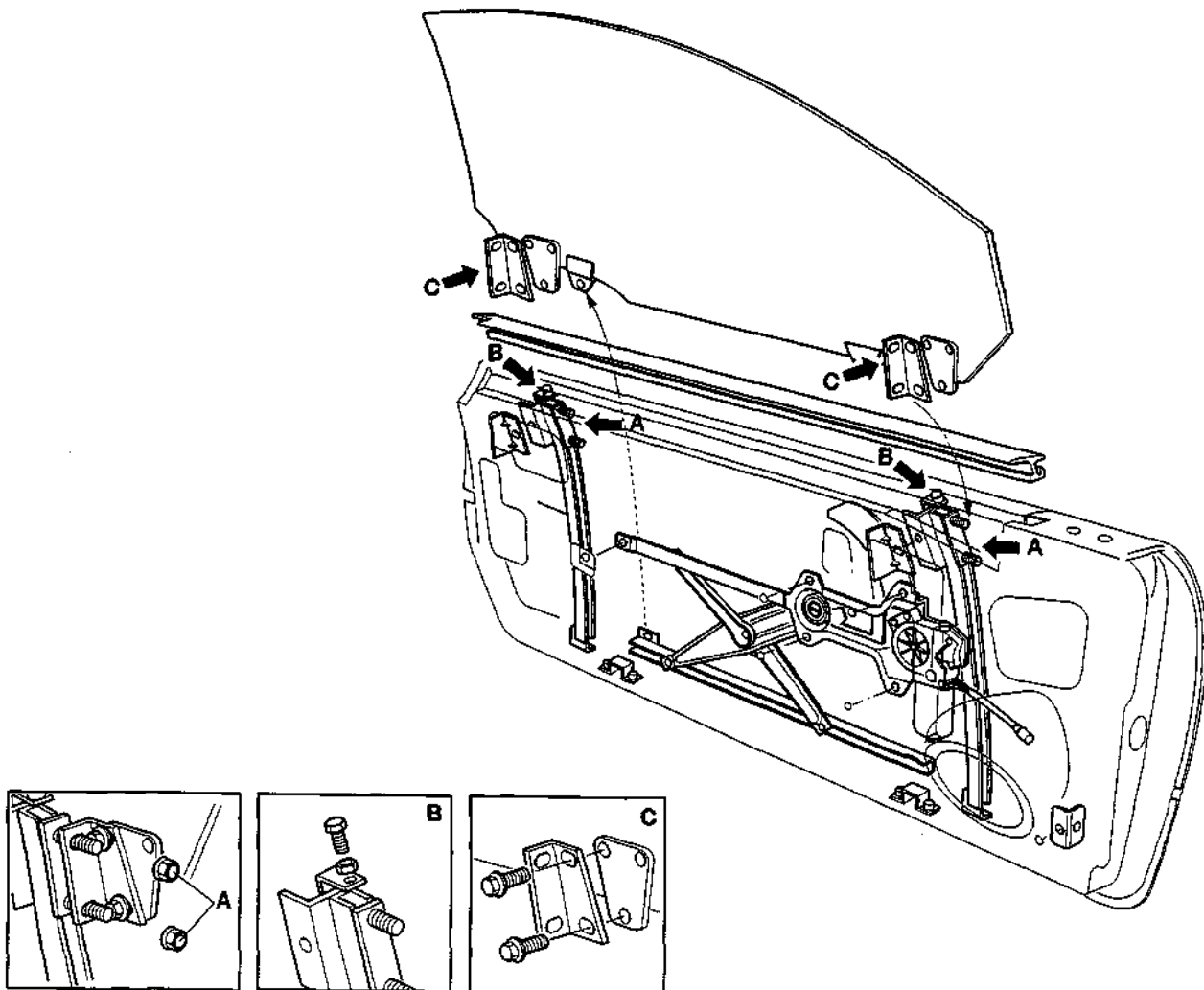


Figure 6. Door Glass Adjustments

Cleaning of Alcantara Trimmed Roof Lining and Interior Components

Recommendations

1. Clean the stain immediately.
2. Clean the stain working from the edge to the centre of the spot to prevent a ring forming.
3. Delicately remove most of the dirt with a blunt scraper and immediately blot the spot with a clean white cloth.
4. Once you've identified the type of stain, follow the instructions in the spot removal chart.
5. Never pour a solvent directly on the spot; instead pour the solvent on a clean cloth.
6. After you've applied the spot remover, remove it with a dry clean cloth. Afterwards, brush the area against the material nap.
7. Let the spot dry. Do not sit on a humid part. Afterwards, vacuum the spot with a vacuum cleaner.

Spot Removal Chart

Type of Stain	Cleaning Product and Cleaning Method
Alcohol-Liquors	Wash with mild soap, then blot with denatured alcohol
Beer	Blot with lukewarm water (max 50°C) and denatured alcohol at 3%
Coffee, Tea, Milk	Wash with mild soap. If the stain persists, blot with denatured alcohol or ammonia diluted at 10%.
Chocolate, Confectionary	Blot with lukewarm water (max 50°C) or with ammonia diluted at 5%.
Paints	Oil Paint - Blot with ethyl alcohol then wash with mild soap. Water Based Paint - If the stain is fresh, blot with cold water. An old stain is very difficult to remove, consult a specialist.
Cosmetics	Apply ethyl alcohol or perchloroethylene, then wash with mild soap. If the stain persists, use ammonia diluted at 5% or denatured alcohol.
Grass, Plants	Blot with lukewarm water (max 50°C) then wash with mild soap.
Chewing Gum	Blot with acetone.
Ink	Remove as much as possible with a paper towel. Blot with a solution of 30% denatured alcohol and 70% water, then wash with mild soap. Lemon juice also gives good results.
Marmalade, Syrup, Fruit Juice	Blot with lukewarm water (max 50°C). If the stain persists, use ethyl alcohol or perchloroethylene
Oil, Grease	Blot with denatured alcohol, then wash with mild soap.
Ballpoint Pen	Blot with perchloroethylene and denatured alcohol.
Wine Beverages	Blot with water and vinegar (50%), then wash with mild soap.

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General Description

Specifications

Refrigerant

Designation

Refrigerant R134A
(HFC134A)

Charge weight

1050 g \pm 50 g

Manufacturer and Type

ICI Klea or equivalent

Compressor

Type & model

SD-7H15

Configuration

7 cylinder

Manufacturer

Sanden
155 cm³ per revolution

Compressor Lubricants

Designation

Polyalkylene glycol (PAG)

System Capacity

120-150 ml

Manufacturer and Type

Sanden SP 20

Standard for Recovery, Recharge and Recycle Equipment.

Feature

Requirement

Recovery rate

0.014-0.062 m³/min. (1.36 kg in 20 minutes)

Cleaning capability

15 ppm moisture; 4000 ppm oil; 330 ppm non-condensable gases in air

Oil separator

With hermetic compressor and automatic oil return

Vacuum pump

2 stage 0.07 -0.127 m³/min.

Filter

Replaceable with moisture indicator

Charge

Selectable charge weight and automatic delivery

Hoses

Dedicated Refrigerant R134A port connections.

Charge pressure

Heating element to increase pressure

Compressor Belt Tension

Type

Condition and range

Vee belt

All figures apply to a cold belt.

Burroughs method

New belt 578 to 623 N

If tension is below 356 N, reset at 512 to 534 N

Clavis method

New belt 147 to 153 Hz

If tension is below 110 Hz, reset at 132 to 138 Hz

Note: The tension is measured midway between the compressor and crankshaft pulleys. For a new belt, rotate engine three revolutions minimum and then re-check the tension.

Climate Control System

Features

- Refrigerant R134A (Hydro fluorocarbon), non ozone depletory.
- PAG (polyalkylene glycol) synthetic compressor lubricating oil.
- Dedicated and improved compressor for Refrigerant R134A.
- Quick fit and release self sealing charge and discharge ports.
- Triple pressure (Trinary) switch to control the compressor (incorporated into the liquid line).
- Clamp retained 'O' ring seals at the expansion valve and evaporator.
- All aluminium evaporator matrix and pipe work.
- Aluminium receiver-dryer (without sight glass) and HFC dedicated desiccant.
- Parallel flow extended height condenser.
- Single muffler situated in the suction hose.
- Improved electrical system connectors.
- Improved system control panel.
- System Recognition

Identification Features

- Aluminium pipes.
- Large diameter, quick release charge and recovery ports.
- No sight glass.

System Description

The in-car temperature and humidity are regulated by the electronically controlled air conditioning system. The system comprises four subsystems:

- heater matrix, supplied with water from the engine cooling system
- refrigeration
- vacuum
- electronic control

Apart from the ambient temperature sensor and the aspirated in-car temperature sensor, most of the components are housed in the air conditioning unit (Fig. 1) situated behind the dash board, or in the engine compartment.

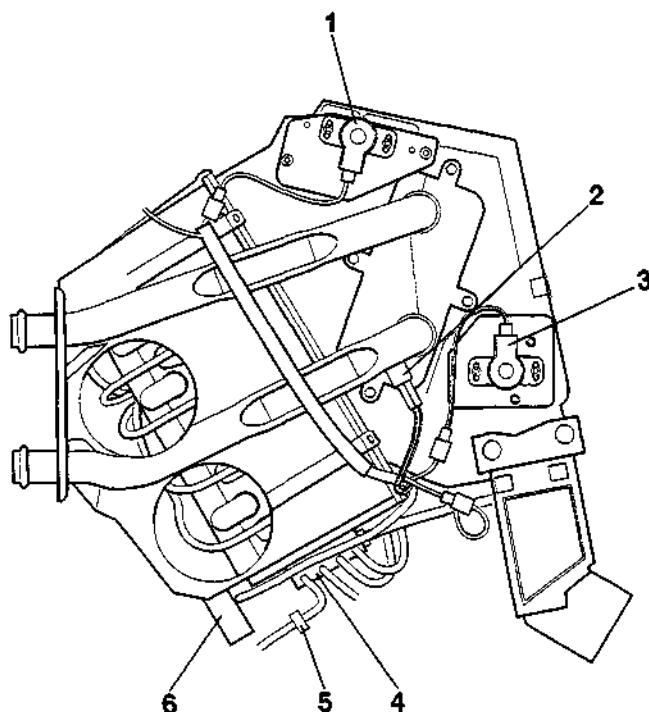


Figure 1.

Key to Fig. 1 - Left Hand Air Conditioning Unit

1. Upper feedback potentiometer
2. Water temperature switch
3. Lower feedback potentiometer
4. Vacuum valve block
5. Vacuum restrictor
6. Condensate drain tube

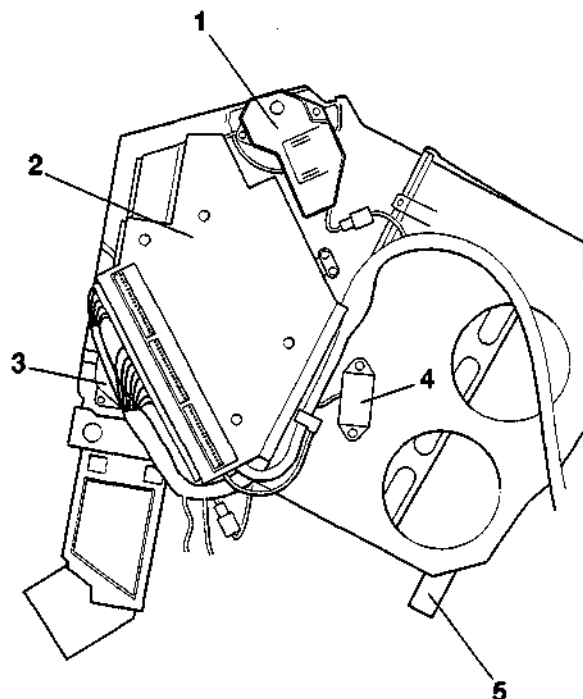


Figure 2.

Key to Fig. 2 - Right Hand Air Conditioning Unit

1. Upper servo motor
2. Electronic control module
3. Lower servo motor
4. Evaporator sensor
5. Condensate drain tube

Special Servicing Tools and Equipment

- 1 PDU system
- 1 Charging station
- 1 Leak detector
- 1 Temperature test box

- 1 Sanden compressor service tool kit
- 1 GM Type compressor service tool kit
- 1 Digital voltmeter
- 1 Multimeter

Working Practices

General

Be aware of, and comply with, all health and safety requirements.

Before beginning any repair or service procedure, disconnect the vehicle battery ground connection and protect the vehicle from dirt or damage.

Work in a well ventilated, clean and tidy area.

Recovery and charge equipment must comply with, or exceed the standard detailed in the General Description.

Handling Refrigerant

Wear eye protection at all times.

Use gloves, keep skin that may come into contact with refrigerant covered. If the refrigerant comes into contact with your eyes or skin wash the affected area *immediately* with cool water and seek medical advice, *do not* attempt to treat yourself.

Avoid inhaling refrigerant vapour, it will irritate your respiratory system.

Never use high pressure compressed air to flush out a system. Under certain circumstances a combination of HFC 134A and compressed air in the presence of a source of combustion (for instance, welding or brazing equipment), results in an explosion that releases toxic compounds into the atmosphere.

The refrigerant and CFC 12 must never come into contact with each other as they form an inseparable mixture that can only be disposed of by incineration.

Do not vent refrigerant directly into the atmosphere, always use approved recovery equipment. *Refrigerant is costly but it can be recycled.* Clean the refrigerant, using the recovery equipment and reuse it.

Carry out Leak Tests only with an electronic analyser dedicated to Refrigerant E134A.

Do not attempt to guess the amount of refrigerant in a system, always recover it and recharge with the correct charge weight. Do not depress the charge or discharge port valves to check for the presence of refrigerant.

Handling Lubricating Oil

Avoid breathing lubricant mist, it will cause irritation to your respiratory system.

Always decant fresh oil from a sealed container. Do not leave oil exposed to the atmosphere for any reason other than to fill or empty a system; PAG oil is hygroscopic (it absorbs water) and is contaminated rapidly by atmospheric moisture.

Following the recovery cycle *do not* reuse the oil when it has been separated from the refrigerant; dispose of the oil safely.

System Maintenance

Do not leave the system open to the atmosphere. If a unit or part of the system is left open for more than five minutes, it is advisable to renew the receiver-dryer. There is not a safe period in which work is to be carried out. *Always* plug pipes and units immediately after disconnection and only remove plugs when re-connecting.

If replacement parts are supplied without transit plugs and seals do not use the parts. Return them to your supplier.

Diagnostic equipment for pressure, mass and volume should be calibrated regularly and certified by a third party organisation.

Use extreme care when handling and securing aluminium fittings, always use a backing spanner and take special care when handling the evaporator.

Use only the correct or recommended tools for the job and apply the manufacturer's torque specifications.

Keep the working area, all components and tools clean.

Temperature Distribution System

The heating and ventilation unit case consists of three sections:

- the front, which contains the air conditioning system evaporator
- the rear section, which consists of two parts and contains the heater matrix and rotary flaps
- the lower outlets which direct air to footwell and rear passenger compartment and are removable.

Temperature variation within the car is achieved by all incoming air passing through the evaporator and then being directed through or around the heater matrix by rotary flaps:

- Full heating (Fig. 1)
- Defrost (Fig. 2)
- Full cooling (Fig. 3)
- Blend (Fig. 4)

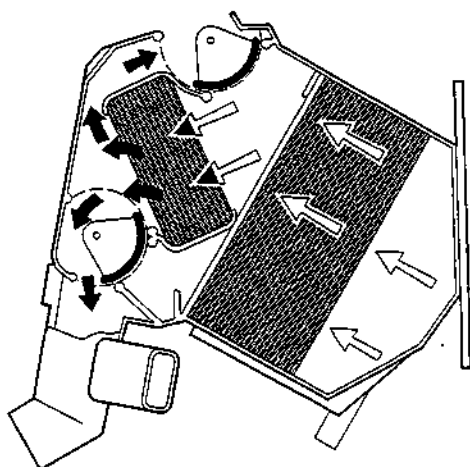


Figure 1.

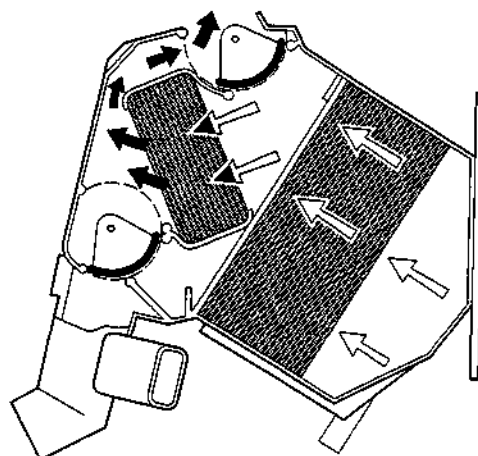


Figure 2.

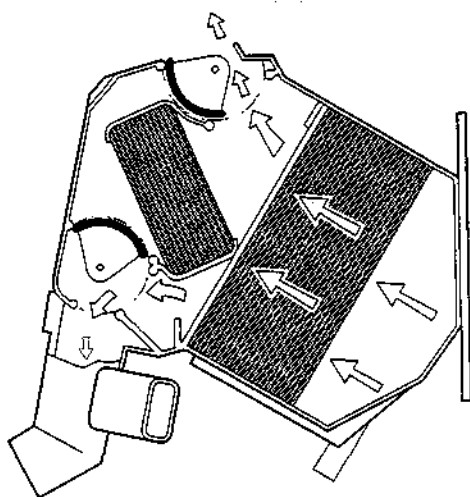


Figure 3.

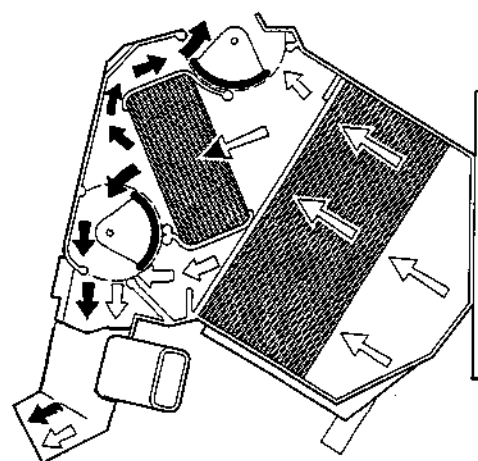


Figure 4.

The rotary flaps are opened or closed by servo motors, as directed by the control system, and flap position information is relayed to the ECM by feedback potentiometers.

(Solid arrow = Hot, Line arrow = Cold)

The Control Panel (Fig. 4) contains:

- Fan speed-defrost rotary switch (Mode-Switch),
- Air Conditioning Function Switch
- Temperature differential rotary control
- Temperature rotary control,

The control panel relays information to the ECM.

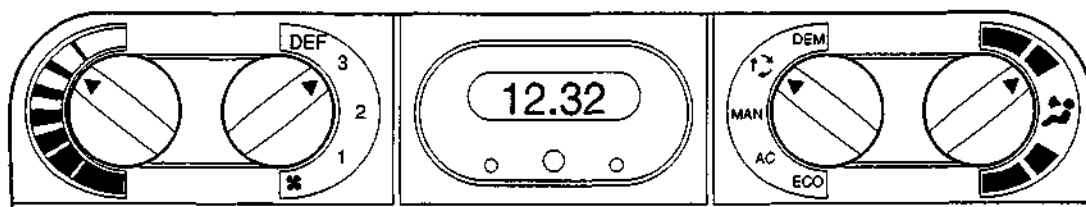




Figure 4.

Fan Speed Control (Mode Switch)

The rotary switch controls airflow from the blower motors. The switch has five positions: , 1, 2, 3 and DEFROST.

- | | |
|---|---|
|  | The system is not operational; a residual signal is sent to the Electronic Control Module (ECM) to ensure that the blower flaps are closed to prevent outside air from entering the system. |
| 1, 2,3 | Selection information is relayed to the ECM. Signals are also relayed to the ECM from the temperature selector feedback circuits and various sensors. Fan speed is steplessly controlled by the ECM, within the ranges 1, 2 and 3. |
| DEFROST | the fans operate at maximum speed, front screen vents open fully, lower flaps close fully and maximum output is directed to the windscreen (there may be a delay of up to 30 seconds from selection to execution of this function). |

Face Level Temperature Differential

This control is used to vary the temperature difference between the air coming through the face vents and that coming through the lower vents into the footwell.

Temperature Rotary Control

This is used to preset the in car heat level in either automatic or manual mode. There are three temperature sensors located in the system:

- Exterior ambient
- In-car
- Evaporator.

An input voltage is supplied to the sensors from AC4-13 of the control module. The temperature sensing signal from the sensors is transmitted to the control module via AC4-4 and AC2-4 respectively. The sensors are semiconductor devices which provide a voltage output proportional to the sensed temperature.

Air Conditioning Function Switch

When AC, DEM or Re-circulation \updownarrow is selected the system engages the Air conditioning compressor using the electromagnetic clutch. The in-car temperature is automatically corrected to the pre selected level by the system sensors.

When MAN (manual mode) is selected it provides the operator selection of fan speed and in-car temperature selection facilities. The in-car temperature is not thermostatically corrected to a predetermined level by the system sensors.

When ECO is selected the system is in economy mode which allows the fan speed and heating levels to be selected but gives no cooling. The air conditioning compressor is not engaged putting a minimum load on the engine.

When manual re-circulation is selected the blower flaps are closed and only that air which is in the vehicle is re-circulated. When the ignition is turned off the blower flaps revert to the fresh air position.

Refrigeration Cycle

The Compressor draws low pressure refrigerant from the evaporator and by compression, raises refrigerant temperature and pressure. High pressure, hot vaporised refrigerant enters the Condenser where it is cooled by the flow of ambient air. A change of state occurs as the refrigerant cools in the condenser and it becomes a reduced temperature high pressure liquid.

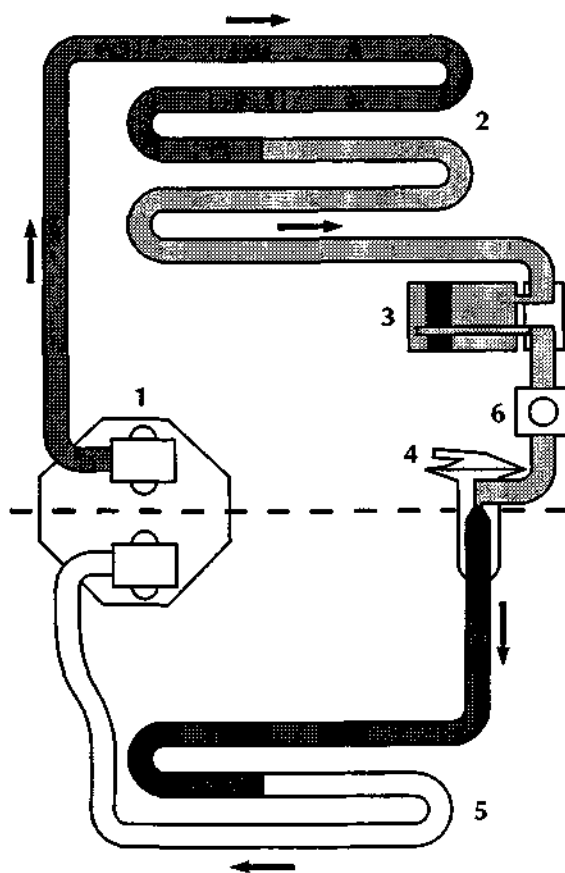


Figure 5.

- | | |
|-------------------|--|
| 1. Compressor | 4. Expansion Valve |
| 2. Condenser | 5. Evaporator |
| 3. Receiver-Drier | 6. Triple Pressure Switch (Trinary switch) |

From the condenser the liquid passes into the Receiver-Drier which has three functions:

- Storage vessel for varying system refrigerant demands.
- Filter to remove system contaminants.
- Moisture removal via the desiccant.

With the passage through the receiver-drier completed the, still high pressure liquid refrigerant, enters the Expansion Valve where it is metered through a controlled orifice which has the effect of reducing the pressure and temperature.

The refrigerant, now in a cold atomised state, flows into the Evaporator and cools the air which is passing through the matrix.

As heat is absorbed by the refrigerant it once again changes state, into a vapour, and returns to the compressor for the cycle to be repeated (Fig. 5).

There is an automatic safety valve incorporated in the compressor which operates should the system pressure be in excess of 41 bar. The valve re-seats when the pressure drops below 35 bar.

Note: The division of HIGH and LOW side is simply the system pressure differential created by the compressor discharge (pressure), suction (inlet) ports and the relative inlet and outlet ports of the expansion valve. This differential is critical to system fault diagnosis and efficiency checks.

System Protection

The trinary pressure switch, located in the liquid line, cuts electrical power to the compressor clutch if the system pressure is outside of the range of 2 Bar (1st Function) to 27 Bar (2nd Function). The third function is to switch on the cooling fans when pressure exceeds 20 bar.

General System Procedures

Leak Test

Faults associated with low refrigerant charge weight and low pressure may be caused by leakage. Leaks traced to mechanical connections may be caused by torque relaxation or joint face contamination. Evidence of oil around such areas is an indicator of leakage. When checking for non visible leaks use only a dedicated Refrigerant E134A electronic analyser and apply the probe all round the joint connection. Should a leak be traced to a joint, check that the fixing is secured to the correct tightening torque before any other action is taken.

Do not forget to check the compressor shaft seal and evaporator.

Note: Never use a dedicated CFC 12 or naked flame type analyser.

Charge Recovery (System Depressurisation)

The process of refrigerant recovery depends on the basic characteristics of your chosen recovery-recycle-recharge equipment, therefore, follow the manufacturers instructions carefully. Remember that compressor oil may be drawn out of the system by this process, take note of the quantity recovered so that it may be replaced.

CAUTION: Observe all relevant safety requirements.

- **Do not vent refrigerant directly to atmosphere and always use approved recovery-recycle-recharge equipment.**
- **Wear suitable eye and skin protection.**
- **Do not mix the refrigerant with CFC 12.**
- **Take note of the amount of recovered refrigerant, it indicates the state of the system and thus the magnitude of any problem.**

Evacuating the System

This process, the removal of unwanted air and moisture, is critical to the correct operation of the air conditioning system. The procedure depends on the characteristics of the recovery-recycle-recharge equipment and must be carried out exactly in accordance with the manufacturer's instructions.

Moisture can be highly destructive and may cause internal blockages due to freezing, but more importantly, water suspended in the PAG oil will damage the compressor. Once the system has been opened for repairs, or the refrigerant charge recovered, all traces of moisture *must* be removed before recharging with new or recycled refrigerant.

Adding Compressor Lubricating Oil

Oil can be added by three methods, two of which are direct into the system

- via the recovery-recycle-recharge station
- by proprietary oil injector.

Equipment manufacturer's instructions must be adhered to when using direct oil introduction.

The third method may be required because of rectification work to the existing compressor, or the need to fit a new compressor. From an existing compressor, drain the oil into a measuring cylinder and record the amount. Flush the unit out with fresh PAG oil and drain thoroughly. Refill the compressor with the same amount of PAG oil that was drained out originally and plug all orifices immediately ready for refitting to the vehicle. The transit lubricating oil must be drained and discarded from a new compressor before it may be fitted. An adjustment should be made to the system oil level by taking into account:

- the quantity found in the original compressor
- the quantity deposited in the recovery equipment oil separator from the charge recovery operation.

Typically, 80 ml can be drained from the original compressor and 30 ml found in the oil separator; the sum of these volumes ($80 + 30 = 110$ ml) is the amount of fresh PAG oil that must be put into the new compressor prior to fitting.

Note: The discrepancy between this figure and the nominal capacity of 135 ml is caused by normally not recoverable oil being trapped in components such as the receiver-drier or evaporator.

The above statements are only true if there is no evidence of a leak. Where a leak has been detected and rectified, the compressor must be refilled with the specified quantity.

Caution: Always decant fresh oil from a sealed container and do not leave oil exposed to the atmosphere. PAG oil is very hygroscopic (absorbs water) and rapidly attracts atmospheric moisture.

PAG oil must NEVER be mixed with mineral based oils.

Do not reuse oil following a recovery cycle, dispose of it safely.

Depending on the state of the air conditioning system immediately prior to charge recovery and the rate of recovery, an amount of oil is drawn out with the refrigerant. The quantity is approximately 30 to 40 ml; this may vary, and the figure is given only for guidance. It is most important that the oil separator vessel in the recovery equipment is clean and empty at the start of the process so that the amount drawn out may be accurately measured.

Adding Refrigerant

In order that the air conditioning system may operate efficiently it must contain a full refrigerant charge. The indications of some system defects, and the results of certain tests, shows that a low charge is the most probable cause of the fault. In such cases the charge should be recovered from the system, the weight noted, and the correct amount installed.

Note: Never attempt to guess the amount of refrigerant in a system. Always recover and recharge with the correct charge weight, this is the only accurate method.

Caution: If oil is drawn out during the recovery process, the correct amount can be added directly from your recovery-recycle-recharge station (if so equipped) prior to the charging process. It must be stressed that the need to protect compressor oil from moisture is vital, observe the procedures in Handling Lubricating Oil.

Warning: Liquid refrigerant boils at -29°C (-20°F) at atmospheric pressure. Serious injury, even blindness, can occur if the refrigerant comes into contact with the eyes.

Goggles and gloves must be worn while working with refrigerant.

First Aid

If refrigerant should contact the eyes or skin, bathe the eyes or affected area with cold water for several minutes. Do not rub. As soon as possible thereafter, obtain treatment from a doctor or eye specialist.

Functional Check

This functional check procedure is provided as a simple system validation and is structured to augment the Portable Diagnostic Unit (PDU).

Stage 1 (Cold engine only, if not proceed to Stage 2)

Procedure	Normal System Reaction
1. Ignition ON Select MIN temperature, MAN, speed 3, Mid face. (Engine Stationary)	Fans Start
2. Select MAX temperature	Fans continue to run
3. Ignition OFF Select MAX temperature and defrost Ignition ON	Fans start at maximum speed
4. Select fan speed 1	Fan speed adjusts accordingly - system OK

Stage 2

Procedure	Normal System Reaction						
1. Start up engine and warm up Select fan speed 1, MAN, MAX TEMPERATURE and mid face							
2. Open all vents	Fans start after 3 seconds						
2. Select fan speed 2	Fan speed increases then stabilises						
3. Select fan speed 3	Fan speed increases then stabilises						
4. Select defrost	Fan speed steady at high All air at screen and dash end						
5. Re-select fan speed 1 Select AUX ignition key position							
6. Slowly select MIN temperature	Solenoids switch <table> <tr> <td>1.</td><td>centre vent</td></tr> <tr> <td>2.</td><td>water valve</td></tr> <tr> <td>3.</td><td>Re-circulation</td></tr> </table>	1.	centre vent	2.	water valve	3.	Re-circulation
1.	centre vent						
2.	water valve						
3.	Re-circulation						
7. Re-select MID temperature							
8. Select DEM	Solenoid clicks Air at screen						
9. Select manual re-circulation	Solenoid click						
10. Check flap for position							
11. Run Engine to normal temperature							
12. Select: MAN, 3/4 MAX heat and fan speed 2.	Air from door vents cool, air temp from foot outlet slightly warm						
13. Select MAX temperature and air differential to hot face	All vent outlets max temp except screen vent						
14. Select temperature approx. 1/4 MAX heat and mid face level	Cool air from centre vents						
15. Select MIN temperature	Blower flaps at re-circulation position All outlets blowing cold air except screen vent						

Procedure	Normal System Reaction
16. Select ECO	Blower flaps revert to fresh air position
17. Select AC	Engine revs change then stabilise
18. Select fan speed 3	Small increase in fan speed
19. Select fan speed 2	Fan speed lower Centre vent and dash end cold footwell cool
20. Select MAX temperature allow in-car temperature to stabilise..... (Passenger side underscuttle panel must be in place)	Hot air from footwell, warm from dash end
21. Select MIN temperature and mid face level	System goes to full cooling automatically Cold air from all vent except from screen vent Centre vent open Blower at re-circulation
22. Select DEMIST and full heat	Demist vents open, centre vent closes and blower flaps revert to fresh air position
System check now complete	System good.

Note: A small amount of air will bleed from the ends of the demist-defrost vents in all cases, but there should be no leak along the length of the vents.

System Trouble Shooting

There are five basic symptoms associated with air conditioning fault diagnosis. It is very important to identify the area of concern before starting a rectification procedure. Spend time with your customer on problem identification, and use the following trouble shooting guide.

The following conditions are not in order of priority.

No Cooling

1. Is the electrical circuit to the compressor clutch functional?
2. Is the electrical circuit to the blower motor(s) functional?
3. Slack or broken compressor drive belt.
4. Compressor partially or completely seized.
5. Compressor shaft seal leak (see 9).
6. Compressor valve or piston damage^u (may be indicated by small variation between HIGH & LOW side pressures relative to engine speed).
7. Broken refrigerant pipe (causing total loss of refrigerant).
8. Leak in system (causing total loss of refrigerant).
9. Blocked filter in the receiver drier.
10. Evaporator sensor disconnected?
11. Dual pressure switch faulty?

Note: Should a leak or low refrigerant be established as the cause, follow the procedures for Recovery-Recycle -Recharge, and observe all refrigerant and oil handling instructions.

Insufficient Cooling

1. Blower motor(s) sluggish.
2. Restricted blower inlet or outlet passage
3. Blocked or partially restricted condenser matrix or fins.
4. Blocked or partially restricted evaporator matrix.
5. Blocked or partially restricted filter in the receiver drier.
6. Blocked or partially restricted expansion valve.
7. Partially collapsed flexible pipe.
8. Expansion valve temperature sensor faulty (this sensor is integral with valve and is not serviceable).
9. Excessive moisture in the system.
10. Air in the system.
11. Low refrigerant charge.

12. Compressor clutch slipping.
13. Blower flaps or distribution vents closed or partially seized.
14. Water valve not closed.
15. Evaporator sensor detached from evaporator.

Intermittent Cooling

1. Is the electrical circuit to the compressor clutch consistent?
2. Is the electrical circuit to the blower motor(s) consistent?
3. Compressor clutch slipping.
4. Faulty air distribution flap potentiometer or motor.
5. Motorised in-car aspirator or evaporator temperature sensor faulty, causing temperature variations.
6. Blocked or partially restricted evaporator or condenser.

Noisy System

1. Loose or damaged compressor drive belt.
2. Loose or damaged compressor mountings.
3. Compressor oil level low, look for evidence of leakage.
4. Compressor damage caused by low oil level or internal debris.
5. Blower(s) motor(s) noisy.
6. Excessive refrigerant charge, witnessed by vibration and 'thumping' in the high pressure line (may be indicated by high HIGH & high LOW side pressures).
7. Low refrigerant charge causing 'hissing' at the expansion valve (may be indicated by low HIGH side pressure).
8. Excessive moisture in the system causing expansion valve noise.

Note: Electrical faults may be more rapidly traced using PDU.

Insufficient Heating

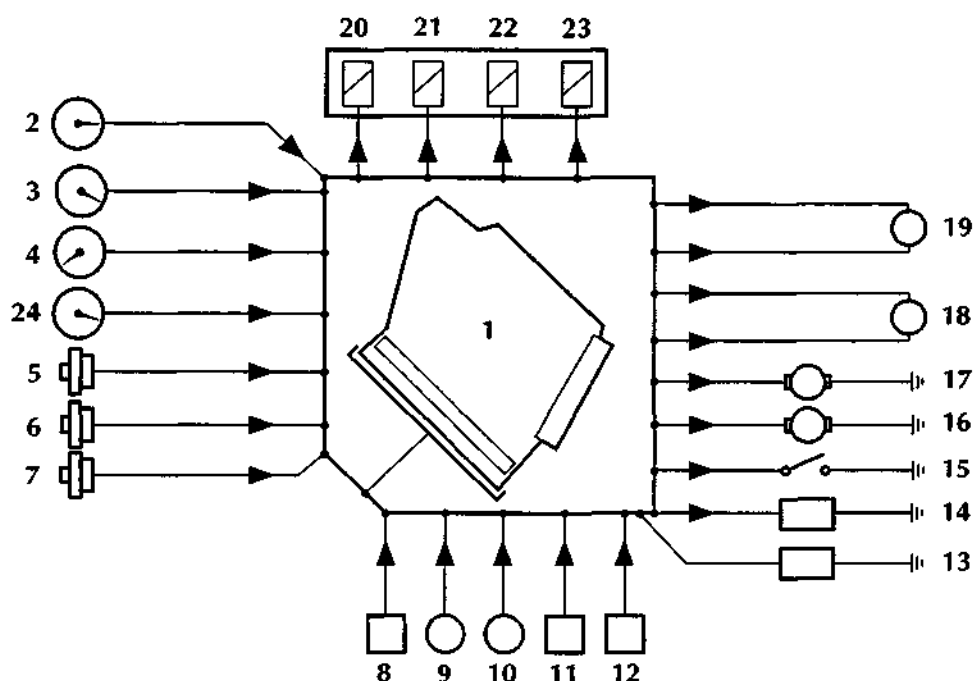
1. Water valve stuck in the closed position.
2. Motorised in-car aspirator seized.
3. Blend flaps stuck or seized.
4. Blocked or restricted blower inlet or outlet.
5. Low coolant level.
6. Blower fan speed low.
7. Coolant thermostat faulty or seized open.

Electronic Control Module (ECM)

The Electronic Control Module (ECM) is located on the right hand side of the heater unit.

The ECM has a digital microprocessor that allows the air conditioning system to maintain the selected in-car conditions. To do this it compares the signals from the in-car controls with those it receives from the system temperature sensors and feedback devices. On the basis of these comparisons it makes appropriate voltage changes to vary the blower motor speed, flap position and the state of other solenoids that effect the selected temperature demand.

The ECM is a non-serviceable component but may be interrogated for system testing. Care must be exercised when connecting the test equipment as the ECM may be irreparably damaged should any of the test pins be shorted or bent.



Figure

- | | |
|---------------------------------------|---|
| 1. Electronic control module (ECM) | 13. High speed relay |
| 2. Differential temperature control | 14. High speed relay |
| 3. Temperature control | 15. Compressor clutch |
| 4. Fan speed control | 16. Blower motor |
| 5. Ambient temperature sensor | 17. Blower motor |
| 6. Motorised in-car aspirator | 18. Lower flap servo motor |
| 7. Evaporator temperature sensor | 19. Upper flap servo motor |
| 8. Coolant temperature switch | 20. Defrost vacuum solenoid |
| 9. Lower flap feedback potentiometer | 21. Auto re-circulation vacuum solenoid |
| 10. Upper flap feedback potentiometer | 22. Centre vent vacuum solenoid |
| 11. Left hand blower motor feedback | 23. Water valve vacuum solenoid |
| 12. Right hand blower motor feedback | 24. Air conditioning function switch |

Description

The ECM (Fig 1) controls the air conditioning system so that selected temperatures are maintained. It cannot be repaired but input and output signals can be measured, using the PDU, for diagnostic purposes.

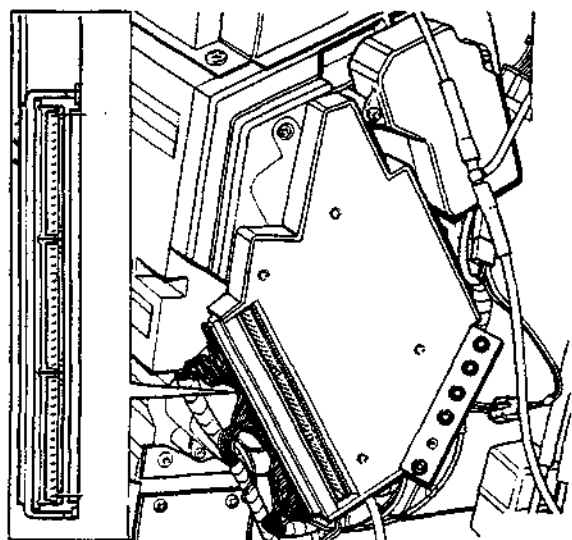


Figure 1.

The ECM is turned on when the ignition is turned on to auxiliary position 1. Its operating range is 13.5-14.2 volts.

The ECM power unit supplies +5 volts for the temperature sensors, feedback potentiometers and high speed relays.

An integrated circuit protects the ECM against reversed polarity and voltage surges.

Caution: Take care when connecting test equipment. If test pins are allowed to be shorted together, to ground or to positive supplies the ECM will be damaged.

Input-Output Voltage Signals

The following voltage signal levels are input and output from the ECM:

Digital input levels:

Low	0.16 to 1.1V
High	3.70 to 4.50V

Analogue input levels:

General	0 to 0.2885 V
Blend Flap Potentiometer	0 to 5.0V

Digital output levels

Relays	On	8.0V
	Off	1.0 to 5.0V
Vacuum manifold	Pull-in	5.6V (typical)
	Drop-out	3.5V (typical)

Analogue output levels

Blend Flap Servo Motors	0.5 to 6.5V
Blower Motors	0.5 to 2.5V

In Car Controls

Temperature Demand Switch

In-car temperatures are selected by the temperature demand switch (Fig. 1).

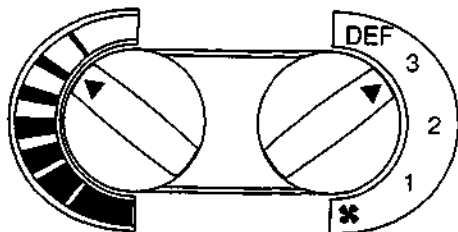


Figure 1.

The switch is coupled to a 590 ohm potentiometer (Fig. 2) supplied with +5 volts from pin 43 of the ECM. The output voltage is from zero to 2.885 volts which represents a range of temperatures from 16 to 38°C. Rotation of the switch is restricted mechanically to 180° of travel.

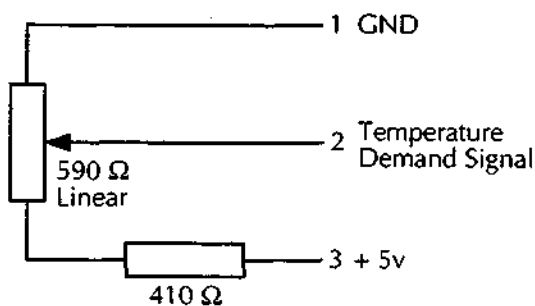


Figure 2.

Face Level Differential Controller

The face level differential control alters the temperature of the air distributed through the face level vents. The switch is coupled to a 10 K ohm potentiometer supplied with +5 volts from pin 43 of the control module (Fig. 3). Temperature, from the face vents, is decreased by moving the switch anti-clockwise and increased by moving it clockwise.

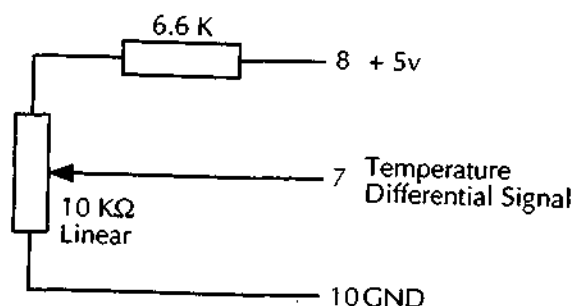


Figure 3.

Air Conditioning Function Switch

The air conditioning function switch (Fig. 4) has five positions: Economy (ECO), Air conditioning (AC), Manual (MAN), Re-circulation and Demist (DEM). These settings have the following functions:

ECO (Economy) In this setting the air conditioning compressor is switched off. No cooling is available but incoming air may be heated to the selected temperature. This mode puts a minimum load on the engine. Pin 23 at the ECM is earthed through the switch to select economy mode.

AC This setting allows the heating and cooling functions to be performed automatically, the required in-car temperature is maintained and the air is dehumidified. Pin 26 at the ECM is earthed through the switch to select this mode.

MAN (Manual) In the Manual mode the fan speed and temperature control can be set at any level and heating or cooling will be performed despite the internal temperature of the car. Pins 26 and 19 at the ECM are earthed through the switch to select this mode

(Re-circulation) With this setting selected the external air inlets are closed and conditions are maintained by circulating the air within the car. Heating and cooling functions are controlled automatically to give the required in-car temperature. Pins 9 and 26 at the ECM are earthed through the switch to select the manual Re-circulation.

DEM (Demist) Air is directed directly onto the screen in this mode. Air speed and temperature depend on the selected fan speed and in-car temperature. Heating and cooling functions are still controlled automatically to give the required in-car temperature. Pin 8 and 26 at the ECM are earthed through the switch to give the required in-car temperature.

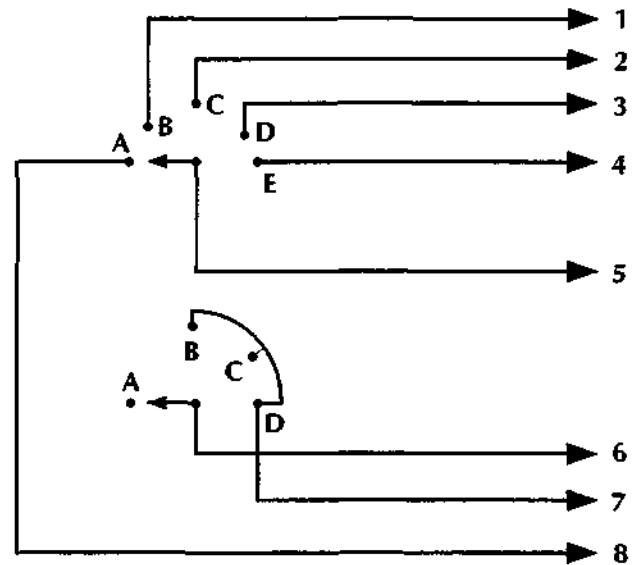


Figure 4.

Key to Fig. 4

- 1. AC signal Pin 26 ECM
- 2. MAN signal Pin 19 ECM
- 3. REC signal Pin 9 ECM
- 4. DEM signal Pin 8 ECM
- 5. Earth-ground Pin 1 ECM
- 6. Earth-ground Pin 1 ECM
- 7. AC signal Pin 26 ECM
- 8. ECO signal Pin 23 ECM
- A ECO
- B AC
- C MAN
- D Re-circulation
- E DEM

Fan Speed Control Switch (Mode Switch)

✱ On Mode

The system is not operational, a residual signal to the ECM ensures that the blower flaps are closed to prevent air entering the system.

1. Low Blower Mode

The fan speed is low and the air conditioning function switch is fully operational. Pin 13 on the ECM is earthed through the switch and a 12V signal is returned to Pin 44.

2. Medium Blower Mode

The fan runs at medium speed and the function switch is fully operational. Pin 14 of the ECM is earthed through the switch and a 12V signal is returned to Pin 44.

3. High Blower Mode

The fan speed is high and the function switch is fully operational. Pin 15 at the ECM is earthed through the switch and a 12V signal is returned to Pin 44.

DEF Defrost Blower Mode

The fan speed is high, the function switch and temperature switch are not operational, front screen vents are fully open and lower flaps are fully closed. Pin 27 at the ECM is earthed through the switch and a 12V signal is returned to Pin 44.

Temperature Sensors

The system has three temperature sensors:

- the ambient sensor (Fig. 5)

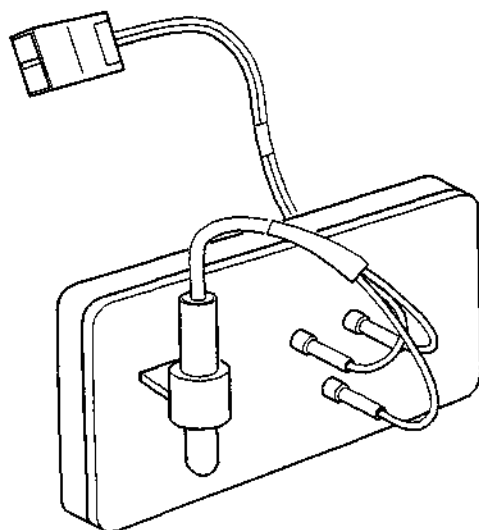


Figure 5.

- the evaporator sensor (Fig. 6)

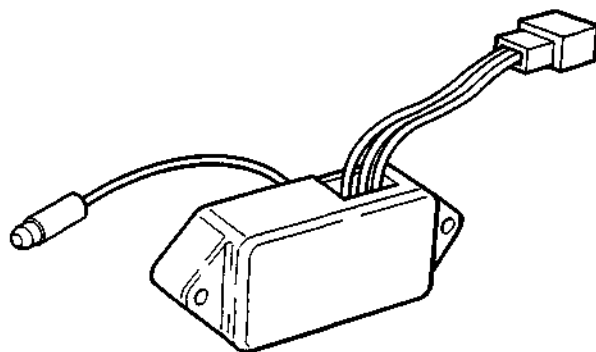


Figure 6.

- and the in-car aspirated sensor.

Each sensor contains a semiconductor whose output or sensing voltage varies with temperature changes. All three are supplied via pin 43 of the ECM. The sensing voltages are fed back into the module via the following pins (Fig. 7):

- ambient temperature sensor - pin 34
- in-car aspirated sensor - pin 4
- evaporator temperature sensor - pin 5

At 0°C the sensing voltage should be 2.732 volts. This voltage rises or falls by 0.01 volts for every 1°C change in temperature; for instance, if the temperature rises 5°C above zero, the voltage rises by 0.05 volts to 2.782 volts. Sensors have built in potentiometers which are preset at the factory and must not be adjusted.

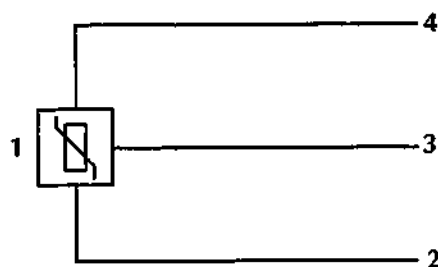


Figure 7.

Key to Fig. 7

- Sensor
- Pin 43 control module
- Sensing voltages:
Pin 4 In-car aspirated temp sensor
Pin 5 Evap temp sensor
Pin 34 Ambient temp sensor
- Earth-ground

Evaporator Sensor

The evaporator sensor allows the ECM to monitor the temperature of the refrigerant in the evaporator core continuously. When the temperature falls below 0°C the ECM de-energises the compressor's electromagnetic clutch and prevents refrigerant from flowing through the system. The clutch is re-engaged when the temperature rises.

Motorised In-Car Aspirated Sensor

The motorised aspirator (Fig. 8), which is fitted to the passenger side fascia underscuttle panel, incorporates a motor driven fan (Fig. 8-1) that draws air continuously over the in car temperature sensor (Fig. 8-2).

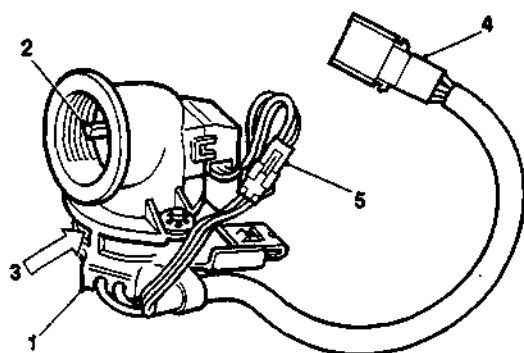


Figure 8.

Key to Fig. 8

1. Motor
2. Sensor
3. Fan
4. Connector SCAO07
5. Connector SAC030

The motor (Fig. 8-1) is supplied, independently of the air conditioning system, from the ignition switch (position 2). Its operating voltage range is 13.5 to 14.2 volts. Maximum current is 120 mA. The sensor (Fig. 8-2) has a temperature operating range of -30°C to +85°C. It is fed with 5 volts from the ECM (pin 43), while the sensing voltage is supplied to pin 4 of the ECM. At 0°C the sensing voltage is 2.732V \pm 0.002V. The rate of change of sensing voltage is 0.01V \pm 0.002V per 1°C.

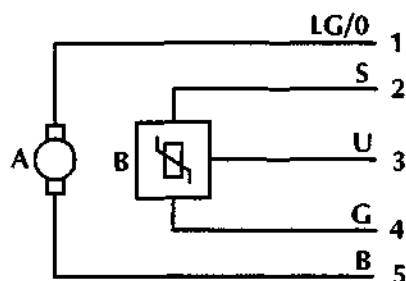


Figure 9.

Key to Fig. 9

1. Ignition switched supply to motor
2. +5V supply to sensor from pin 43 of ECM
3. Sensor voltage output to pin 10 of ECM
4. Sensor earth-ground to pin 4 of ECM
5. Motor earth-ground
- A. Motor
- B. Sensor

Ambient Temperature Sensor

An ambient temperature sensor (Fig. 10-1) is fitted in the plenum air intake to provide the ECM with information on the temperature of the air entering the air conditioning unit and so offset the in-car temperature at extremes of ambient. The voltage signal output from the sensor is proportional to the temperature of the surrounding air. The sensor temperature range is -30°C to 85°C. At 0°C the output of the sensor is 2.732V \pm 0.005V. The rate of change is + 0.01V \pm 0.002V per 1°C.

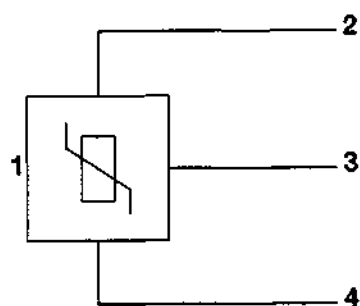


Figure 10.

Key to Fig. 10

1. Ambient temperature sensor
2. +5 volts from ECM Pin 43
3. Sensing signal to ECM Pin 34
4. Earth-ground

Water Temperature Switch

The water temperature switch (Fig. 1) is fitted to the lower side of the heater matrix inlet pipe.

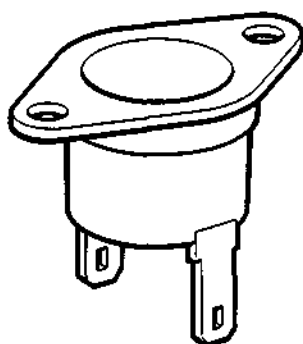


Figure 1.

It is connected to pin 21 of the ECM. The switch contacts are open to prevent the blower motors operating until the temperature of the water in the heater matrix reaches 30°C. The water temperature switch is overridden when cold air is demanded, defrost mode is selected and fan speed 3 is selected.

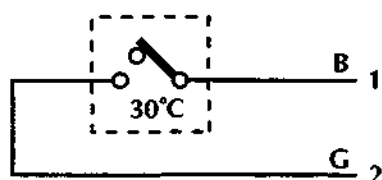


Figure 2.

Key to Fig. 2

1. Earth-ground
2. Output to Pin 21 ECM

Blower Motors

The air conditioning system has two blower motors (Fig. 1-7) that operate together to maintain the flow of air into the car at the desired level. The motors are supplied from an ignition switched supply through transistorised control circuits fitted in the motor outlets. The circuits steplessly vary the speed of the motors at 1 and 2 selections of the mode switch and operate the motors to high speed when 3 is selected. The electronic components are assembled on a heat sink and include a power transistor (Fig. 1-9) and feedback diode (Fig. 1-8). The switches are supplied and controlled by the ECM.

When the mode switch is set to 3, the high speed relay (Fig. 1-10) is energised from pin 16 of the ECM, opening a path to earth-ground, and allowing full battery voltage to be applied to the motor. At 1 and 2, the motor is supplied with a continuously variable voltage by the power transistor and the earth-ground return is made via the ECM. The feedback diode enables the ECM to sense the voltage at the negative terminal of the blower motor.

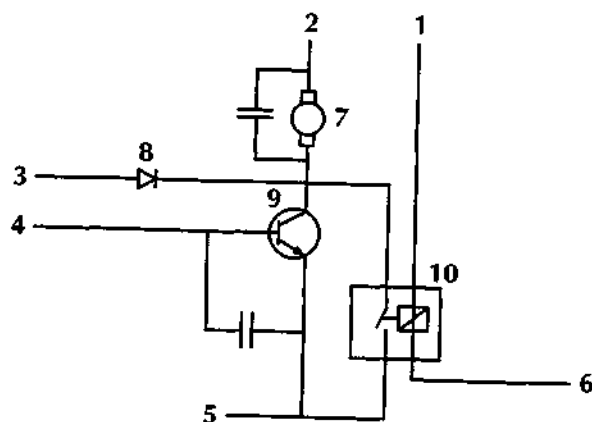


Figure 1.

Key to Fig. 1

1. Output signal from Pin 16 ECM
2. Power feed
3. Blower feedback
Left hand Pin 22, Right hand 33
4. Blower output Left Pin 31, Right 32
5. Control switch earth-ground
6. ECM earth-ground Pin 45
7. Blower motor
8. Feedback diode
9. Power transistor
10. High speed relay

Potentiometers

Lower Feedback Potentiometer

The lower feedback potentiometer determines the position of the lower blend flap in the air conditioning unit and feeds this information to the ECM. The ECM is thereby able to command the lower flap servo motor to move the flap to a new position and maintain the temperature of the air to the feet and rear outlets at the desired level.

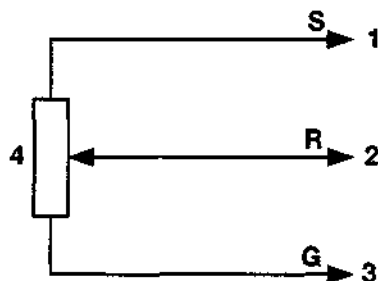


Figure 1.

1. +5 volts from ECM Pin 43
2. Feedback signal to ECM Pin 29
3. Earth-Ground

The potentiometer is supplied with +5V from pin 43 of the ECM and returns its feedback signal via pin 29. The feedback signal is 100mV (COLD AIR) to 1.2V (HOT AIR). The potentiometer also provides a single feedback signal of 2.9V when the blend flap is in DEFROST. In this position, the feet and rear outlets are closed and all air is directed to the screen.

Upper Feedback Potentiometer

The upper feedback potentiometer determines the position of the upper blend flap in the air conditioning unit and feeds this information to the ECM enabling it to command the upper flap servo motor to move the flap to a new position and maintain the desired temperature of the air at the dashboard, centre, screen and side demist vents.

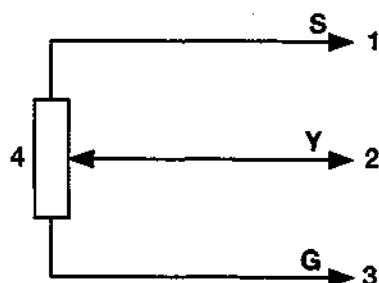


Figure 2.

1. +5 volts from ECM Pin 43
2. Feedback signal to ECM Pin 30
3. Earth-Ground

The potentiometer is supplied with +5V from pin 43 of the ECM and returns its feedback signal via pin 30. The feedback signal is 100mV (COLD AIR) to 1.9V (HOT AIR).

Servo Motors

Lower Servo Motor

The lower blend flap assembly has two inlets and a single outlet which are wholly or partially blocked by the flap to control the temperature of air entering the lower half of the vehicle.

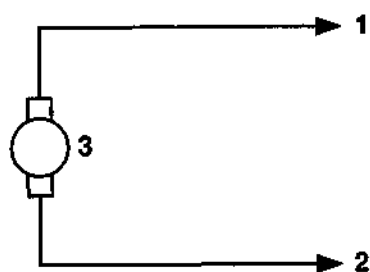


Figure 1.

1. Energising voltage Lower Servo ECM Pin 37 (Upper ECM 40)
2. Energising voltage Lower Servo ECM Pin 41 (Upper ECM 42)

A servo motor (Fig. 1) drives the lower blend flap to the desired position via a 1500:1 reduction gear box. The motor is bidirectional and energised from pins 37 and 41 of the ECM. The energising voltages have the following values: LOW \pm 0.0V to 2.0V; HIGH \pm 7.0V to 9.5V.

Upper Servo Motor

The upper servo motor (Fig. 1) drives the upper blend flap to the desired position through a 1500:1 reduction gearbox. Like the lower servo motor it is bi-directional and energised by the ECM (pins 40 and 42). The energising voltages are:

- LOW + 0.0V to 2.0V
- HIGH + 7.0V to 9.5V.

Vacuum System

The flaps in the cabin air distribution vents and the water valve in the pipeline from the engine coolant system to the heater matrix are all operated by vacuum actuators. The vacuum for these is supplied by four solenoids mounted in pairs behind the front footwell outlets. Each solenoid and its associated pipe work is identified by a colour:

- Defrost Green
- Auto Re-circulation Blue
- Water valve Red
- Centre vent Black.

The vacuum supply pipes to the re-circulation and centre vent actuators are fitted with restrictors in order to slow down the operation of the flaps and avoid hunting. The re-circulation flaps can take up to 30 seconds to move to a new position.

Vacuum is piped to the solenoids from the engine manifold through a reservoir. The solenoids are energised by signals from the ECM in response to demand, sensing and feedback signals.

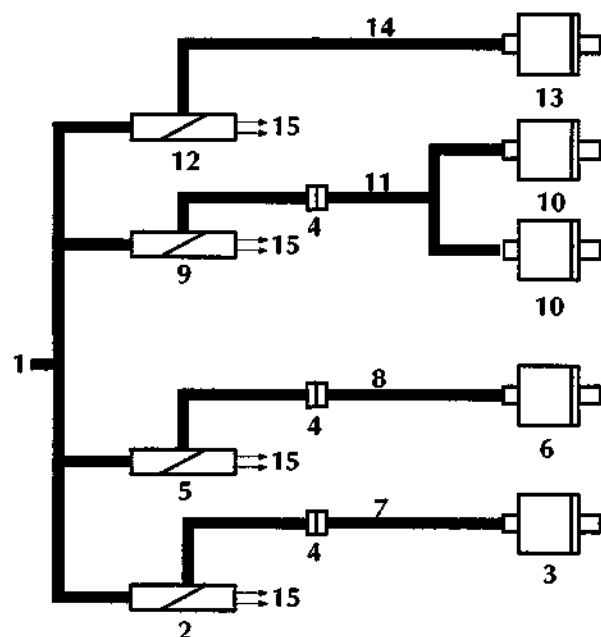


Figure 1.

Key to Fig. 1

1. Vacuum reservoir
2. Defrost solenoid
3. Defrost-demist actuator
4. Restrictors
5. Centre vent solenoid
6. Centre vent actuator
7. Defrost vacuum pipe
8. Centre vent vacuum pipe
9. Recirc. solenoid
10. Recirc. actuator
11. Recirc. vacuum pipe
12. Water valve solenoid
13. Water valve actuator
14. Water valve vacuum pipe

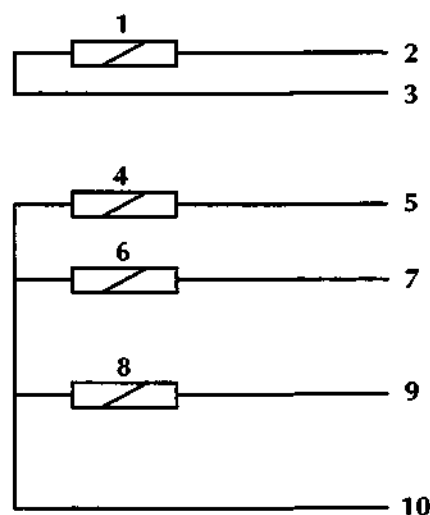


Figure 2.

Key to Fig. 2

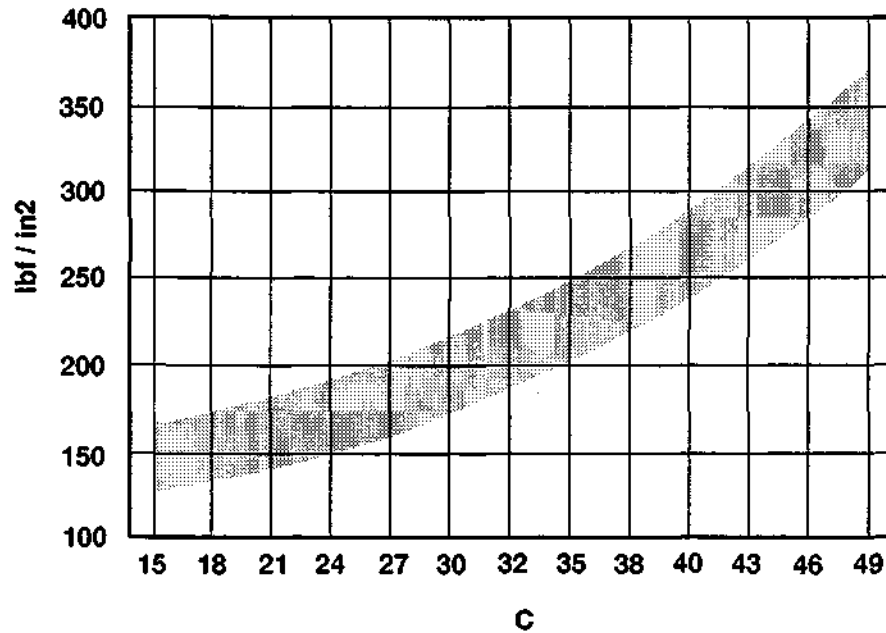
1. Defrost (Green) solenoid
2. +12V Defrost input from ECM pin 12
3. Defrost output to ECM Pin 11
4. Recirc (Blue) solenoid
5. +12V Recirc. input from ECM Pin 3
6. Water valve (Red) solenoid
7. +12V Water valve input from ECM Pin 17
8. Centre vent (Black) solenoid.
9. +12V Centre vent input from ECM Pin 18
10. ECM earth-ground

Pressure-Temperature Graphs

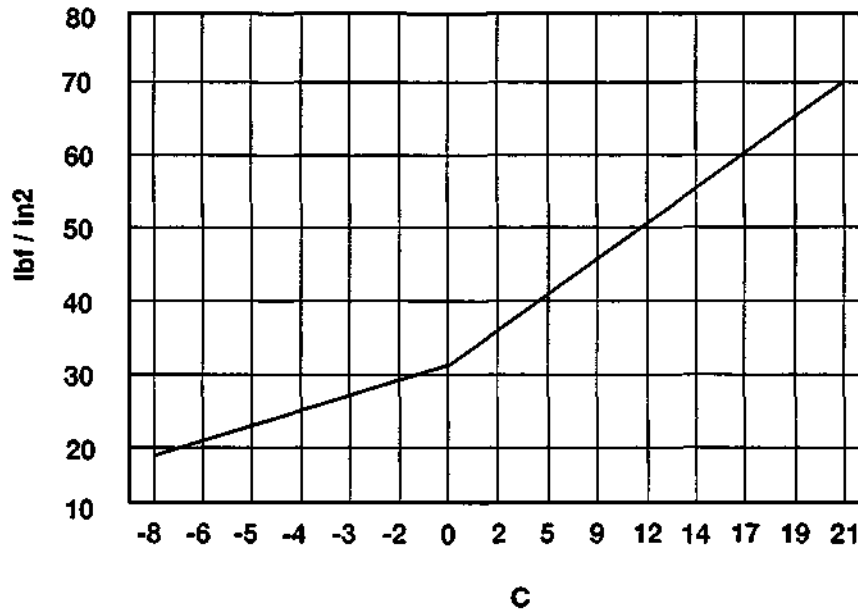
To obtain Bar multiply the lbf/in^2 by 0.068

To obtain kgf/cm^2 multiply lbf/in^2 by 0.07

High Side (lbf/in^2) - Ambient ($^{\circ}\text{C}$)



Low Side (lbf/in^2) - Ambient ($^{\circ}\text{C}$)



System Fault Diagnosis

Probable causes of faults can be found by comparing actual system pressures, registered on the manifold gauge set or recovery-recharge-recycle station, and the pressure to temperature relationship graphs found on the previous page. The chart below shows the interpretation that may be made by this difference. The 'Normal' condition is that which is relevant to the prevailing ambient and evaporator temperatures.

Note: If erratic or unusual gauge movements are experienced, check the equipment against a known manifold gauge set.

Low Side Gauge	High Side Gauge	Symptom	Diagnosis
Normal	Normal	Discharge air initially cool then warms up	Moisture in system
Normal to low	Normal	As above	As above
Low	Low	Discharge air slightly cool	HFC 134A charge low
Low	Low	Discharge air warm	HFC 134A charge very low
Low	Low	Discharge air slightly cool or frost build up at expansion valve	Expansion valve stuck closed
Low	Normal to high	Discharge air slightly cool	Restriction in High side of system
High	Low	Compressor noisy	Defective reed valve
High	High	Discharge air warm and high side pipes hot	HFC 134A charge high or condenser malfunction
High	High	Discharge air warm	Expansion valve stuck open
		Sweating or frost at evaporator	

Fault Finding

Caution: The microprocessor is extremely sensitive and should only be tested using a digital multimeter with no less than a 3.5 digit display and a resistance of no less than 2 M ohms. The use of any other form of multimeter will damage the microprocessor irreparably.

Note: Always allow time for the servo motors and blower motors to come to a rest before starting a check.

The car should be in a workshop and the ambient temperature should be stable e.g. 24°C (75°F) for at least 30 minutes before commencing the automatic check.

At 24°C the sensor voltage is 2.972 V \pm 2 mV. The rate of change is 10mV per 1°C.

Unless stated otherwise, all checks are carried out at the ECM test plugs

Mode Switch: Off Ignition Switch: Aux 2

Signal	Pin No.	Voltage
Battery supply	1	11 to 14V
Recirc input	9	0 to 2V
Earth-ground	2	0 to 40mV
Earth-ground	6	0 to 40mV
Earth-ground	10	0 to 40mV
Earth-ground	38	0 to 40mV
Earth-ground	45	0 to 40mV
From mode switch	44	0 to 12V
To mode switch	12	10 to 13.3V

Mode Switch: Low - Function Switch: Manual

Low input	13	150 to 350mV
Clutch output- Evap sensor below 2.72V	20	0.6V
Clutch output- Evap sensor above 2.72V	20	11.4V
Medium input	14	3 to 5V
High input	15	3 to 5V
Defrost	27	3 to 5V
From ON-OFF Switch.	44	10.3 to 13.3V
Output	43	4.73 to 5.2V
Recirc. output	3	0 to 200mV
HS Relays	16	0 to 200mV
Water valve solenoid	17	0 to 200mV
Centre vent solenoid	18	0 to 200 mV

Mode Switch: Medium - Function Switch: Manual

Low input	13	3 to 5V
Medium input	14	150 to 350mV
High input	15	3 to 5V
Defrost	27	3 to 5V

Mode Switch: High Servo Motors Stationary - Function Switch: Manual

Low input	13	3 to 5V
Medium input	14	3 to 5V
High input	15	150 to 350V
Defrost input	27	3 to 5V

Mode Switch: Defrost - Function Switch: Manual

Low input	13	3 to 5V
Medium input	14	3 to 5V
High input	15	3 to 5V
Defrost input	27	150 to 350mV

Mode Switch: Low, Medium or High - Function Switch: Manual

Air Differential - cold face	28	2.665 to 3.105V
Air Differential - hot face	28	0 to 200mV

Mode Switch: Low, Medium or High - Function Switch: Manual

Temp. Maximum demand	35	2.665 to 3.105V
Temp. Minimum demand	35	0 to 200mV

Mode Switch: Low, Medium or High Temperature Demand Switch: Mid-Range - Function Switch: AC

Servo motor lower flap	37	0 to 2.0V
Servo motor lower flap	41	0 to 2.0V
Servo motor upper flap	40	0 to 2.0V
Servo motor upper flap	42	0 to 2.0V

Mode Switch: Low, Medium or High Temperature Demand Switch: Mid-Range - Function Switch: AC

Servo motor lower flap	37	7.0 to 9.5V
Servo motor lower flap	41	7.0 to 9.5V
Serve motor upper flap	40	7.0 to 9.5V
Servo motor upper flap	42	7.0 to 9.5V

Mode Switch: Low or Medium Temperature Demand Switch: Mid-Range - Function Switch: AC

Recirc. input	9	10 to 12V
Recirc. output	3	0 to 500mV
Reference voltage	7	2.875 to 2.895V
Defrost output	11	0 to 500mV
High speed relays	16	0 to 500mV
Lower feedback pot.	29	0.6 to 0.9V
Upper feedback pot.	30	1.15 to 1.45V
Water temp. switch engine cold	21	260 to 460mV
Water temp. switch engine hot	21	4.5 to 5.5V
Defrost output	11	0 to 500mV
Clutch output- evaporator above 2.745 V	20	10.3 to 13.3V
Right hand Blower feedback	33	10 to 13V
Left hand Blower feedback	22	10 to 13V
Right hand Blower control	32	0 to 0.5V
Left hand Blower control	31	0 to 0.5V
Water valve solenoid	17	0 to 500mV
Centre vent solenoid	18	0 to 500mV

Mode Switch: (Auto) Low Temperature Demand Switch: Minimum

Face Level to mid-range	28	1.43 to 1.45V
-------------------------	----	---------------

Servo Motors Stopped

Servo motor lower flap	37	0 to 40mV
Servo motor lower flap	41	0 to 40mV
Servo motor upper flap	40	0 to 40mV
Servo motor upper flap	42	0 to 40mV
Lower feedback pot.	29	0 to 0.2V
Upper feedback pot.	30	0 to 0.2V

Mode Switch: Low Temperature Demand Switch: Mid-Position - Function Switch: AC

Temperature demand	35	1.43 to 1.45V
--------------------	----	---------------

Servo Motors Stopped

Servo motor lower flap	37	0 to 40mV
Servo motor lower flap	41	0 to 40mV
Servo motor upper flap	40	0 to 40mV
Servo motor upper flap	42	0 to 40mV
Lower feedback pot.	29	0.57 to 0.87V
Upper feedback pot.	30	0.6 to 0.9V

Mode Switch: Low Temperature Demand Switch: Maximum - Function Switch: AC

Temp demand	35	2.665 to 3.105V
Lower flap feedback pot	29	0.979 to 1.279V
Upper flap feedback pot.	30	1.518 to 1.9V

Mode Switch: (Auto) Face Level: Cold Face

Differential temp.	28	2.665 to 3.105V
Lower flap feedback pot.	29	0.979 to 1.279V
Upper flap feedback pot.	30	1.340 to 1.640V

Blower Motor Test

Face Level: Hot Face Temperature Demand Switch: Minimum

Differential temp.	28	0 to 200mV
Temperature demand	35	0 to 200mV

Note: Allow the servo motors to come to rest before checking voltage levels. Typical figures are given in brackets.

Mode Switch	RH Control	LH Control	RH Feedback	LH Feedback
Position	Pin No. 32	Pin No. 31	Pin No. 33	Pin No. 22
Low	1 - 2V (1.77V)	1 - 2V (1.77V)	4 - 6V (5.8V)	4 - 6V (5.63V)
Med	2 - 3V (2.28V)	2 - 3V (2.27V)	3 - 5V (3.7V)	3 - 5V (3.4V)
High	1 - 2v (1.17V)	1 - 2V (1.19V)	1 - 2V (1.22V)	1 - 2V (1.27V)

Set Face Differential Pot. to Mid Point

Mode Switch	RH Control	LH Control	RH Feedback	LH Feedback
Position	Pin No. 32	Pin No. 31	Pin No. 33	Pin No. 22
Low	1 - 2V (1.24V)	1 - 2V (1.27V)	6.5 - 9V (8.7V)	6.5 - 9V (8.7V)
Medium	1 - 2V (1.4V)	1 - 2V (1.4V)	6.9 - 9V (7.5V)	6.5 - 9V (7.5V)
High	2 - 3V (2.2V)	2 - 3V (2.2V)	3 - 5V (4.1V)	3 - 5V (4.0V)

Set Face Differential Pot. to Cold Face

Mode Switch	RH Control	LH Control	RH Feedback	LH Feedback
Position	Pin No. 32	Pin No. 31	Pin No. 33	Pin No. 22
Low	1 - 2V(1.67V)	1 - 2V(1.63V)	6.5 - 9V(6.25)	6.5 - 9V(6. IV)
Medium	2 - 3V(2.17)	2 - 3V(2.1V)	3 - 5V(4.25V)	3 - 5V(4.2V)
High	2 - 3V(2.3V)	2 - 3V(2.2V)	3 - 5V (3.7V)	3 - 5V(3.5V)

Open Water Temperature Switch Needs

Set Temperature Demand Switch to Midpoint Pin No. 35 1.43 -145V

RH Servo control	Pin 32	0 - 0.5V
LH Servo control	Pin 31	0 - 0.5V

Short Water Temperature Switch Leads

Mode Switch: Low

Clutch output	Pin 20	9.3 - 12.3V
RH Servo control	Pin 32	1 - 2V
LH Servo control	Pin 31	1 - 2V
Set diff to hot face	Pin 28	0 - 200mV
Set temp demand to minimum	Pin 35	0 - 200mV
Recirc. output	Pin 3	9.3 - 12.3V
High speed relays	Pin 16	0 - 200mV
Water valve solenoid	Pin 17	9.3 - 12.3V
Centre vent solenoid	Pin 18	9.3 - 12.3V
Defrost output	Pin 27	0 - 500mV
MODE SWITCH: DEFROST	Pin 27	150 - 350mV
High speed relays	Pin 16	9.3-12.3V
Lower feedback pot.	Pin 29	2.709-3.100V
Upper feedback pot.	Pin 30	1.714 -2.014V
MODE SWITCH: OFF	Pin 44	0-IV
Recirc. output	Pin 3	9.3-12.3V

Refrigeration

Safety Precautions

The air conditioning system is designed to use only Refrigerant E134A (dichlorodifluoromethane). Extreme care must be taken NOT to use a methylchloride refrigerant. The chemical reaction between methylchloride and the aluminium parts of the compressor results in the formation of products which burn spontaneously on exposure to air, or decompose with violence in the presence of moisture. The suitable refrigerant is supplied under the following names.

E134A KLEA or equivalent

Warning: Take care when handling refrigerant. Serious damage will occur if it is allowed to come into contact with the eyes. Always wear with goggles and gloves when working with refrigerant.

First Aid

If refrigerant should come into contact with the eyes or skin, splash the eyes or affected area with cold water for several minutes. DO NOT RUB. As soon as possible thereafter, obtain treatment from a Doctor or an eye specialist.

Good Practice

1. Protective sealing plugs must be fitted to all disconnected pipes and units.
2. The protective sealing plugs must remain in position on all replacement components and pipes until immediately before assembly.
3. Any part arriving for assembly without sealing plugs in position must be returned to the supplier as defective.
4. It is essential that a second backing spanner is always used when tightening or loosening all joints.

This minimises distortion or strain on components or connecting hoses.
5. Components must not be lifted by connecting pipes, hoses or capillary tubes.
6. Care must be taken not to damage fins on the condenser or evaporator matrices. Any damage must be rectified by the use of fin combs.
7. Before assembly of tube and hose joints, use a small amount of clean new refrigerant oil on the sealing seat.
8. Refrigerant oil for any purpose must be kept very clean and capped at all times. This prevents the oil absorbing moisture.
9. Before assembly the condition of joints and flares must be examined. Dirt and even minor damage will cause leaks at the high pressure points encountered in the system.
10. Dirty end fitting can only be cleaned using a cloth wetted with alcohol.
11. After removing sealing plugs and immediately before assembly, visually check the bore of pipes and components. Where any dirt or moisture is discovered, the part must be rejected.
12. All components must be allowed to reach room temperature before sealing plugs are removed.

This prevents condensation should the component be cold initially.
13. Before finally tightening hose connections ensure that the hose lies in the correct position, is not kinked or twisted and will not be trapped by subsequent operations, e.g., refitting or closing bonnet.
14. Check that hoses are correctly fitted in clips or straps.
15. The compressor must be stored horizontally with the sump down. It must not be rotated before fitting and charging. Do not remove the shipping plate until immediately before assembly. Always use new "O" ring seals in those joints that incorporate them. "O" ring seals should be coated with compressor oil before fitting.
16. Components or hoses removed must be sealed immediately after removal.
17. After the system has been opened the receiver-drier must be renewed.
18. Before testing, run the engine until normal running temperature is reached. This ensures that sufficient vacuum is available for test. For cooling tests the engine must be running for the compressor clutch to operate.

Compressors

Compressor Clutch Control

The compressor pulley is driven continuously when the engine is running. An electromagnetic clutch allows the compressor to be engaged or disengaged. The clutch is energised by battery supply voltage when the clutch relay RF3 is closed by a signal from the ECM (pin 21) via the engine management system.

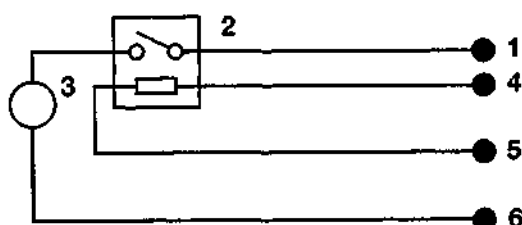


Figure 1

Key to Fig. 1

1. +ve battery supply
2. Clutch relay
3. Compressor clutch
4. Pin 20 ECM supply to clutch relay solenoid
5. Earth-Ground
6. Earth-Ground

Trinary Switch

High Side Low Pressure Switch

The high side low pressure switch (HSLP) is connected in the earth-ground return lead of the compressor clutch coil. The switch is a function of the trinary switch and monitors the pressure on the high side of the refrigeration system. If the pressure drops below 25 psi (+ 5 psi) the contacts open to de-energise the clutch coil and disengage the clutch. Low pressure occurs when there is a fault in the system, and the HSLP switch contacts remain open until the fault has been rectified.

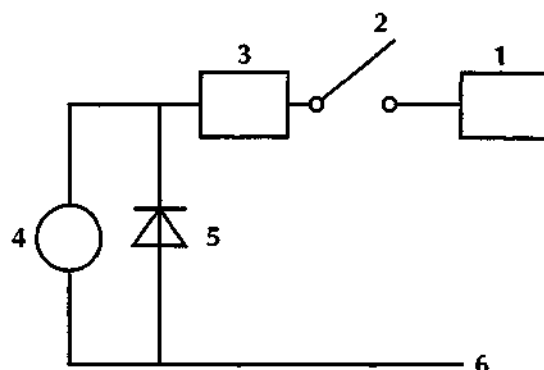


Figure 2

Key to Fig. 2

1. Clutch relay supply
2. Compressor clutch
3. HSLP switch
4. Protection diode
5. Earth-ground

Condenser

The condenser (Fig. 3) consists of a refrigerant coil mounted in a series of thin cooling fins to provide maximum heat transfer in the minimum amount of space. It is mounted directly behind the car radiator and receives the full flow of ram air induced by the forward motion of the car and the suction of the cooling fan. Refrigerant enters the inlet at the top of the condenser as a high pressure hot vapour. As the vapour passes down through the condenser coils cooled by ram air, a large quantity of heat is transferred to the outside air and the refrigerant changes to a high pressure warm liquid.

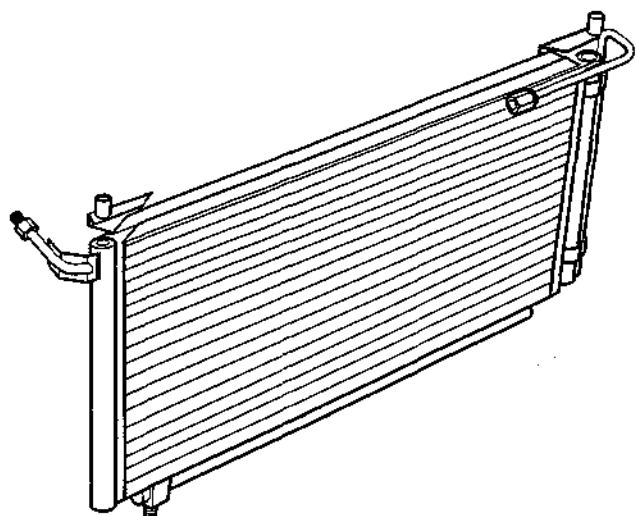


Figure 3.

Receiver-Drier

The receiver drier (Fig. 1) accepts high pressure warm refrigerant liquid from the condenser and delivers it via an expansion valve to the evaporator. It contains a quantity of molecular sieve desiccant to remove moisture from the refrigerant, and a filter to remove contaminants. It also provides a reservoir of refrigerant for the evaporator under varying operating conditions.

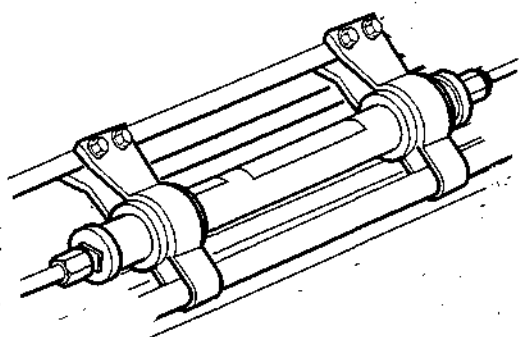


Figure 1.

Evaporator

The evaporator consists of a refrigerant coil mounted in a series of thin fins to provide a maximum amount of heat transfer in a minimum amount of space. It is housed in the air conditioning unit and all air entering the system passes across its coil.

The evaporator receives refrigerant from the thermostatic expansion valve as a low pressure cold atomised liquid. As this cold liquid passes through the evaporator coils, it absorbs heat from the surrounding air and changes into a low pressure warm vapour.

Expansion Valve

The expansion valve is the dividing point between the high and low pressure sides of the system. It automatically meters high pressure, warm liquid refrigerant via a metering orifice into the low pressure, cold side of the evaporator matrix. The valve senses outlet pipe temperature, inlet pipe pressure and regulates the flow of refrigerant into the evaporator to ensure that only vaporised refrigerant appears at the outlet.

Sanden Compressor SD7H15

The Sanden SD7H15 compressor is a 7 cylinder machine with a bore of 29.3 mm (1.15 in) and a stroke of 32.8 mm (1.29 inches).

The displacement per revolution is 155cc (9.5 cubic inches).

The magnetic clutch is engineered with the compressor as a complete assembly resulting in a relatively small unit of lightweight construction.

The compressor may be mounted up to 90° from its upright position.

The compressor incorporates a lubrication system which reduces the oil circulation ratio to a level of less than 2% at 1800 rpm.

An oil deflector and positive pressure differential lubrication system promotes oiling to the cylinder wall, piston rod assemblies, main bearings and shaft seal, and ensures that oil circulation to the refrigeration circuit is kept to a minimum. The compressor is charged with 135 cc (4.6 fluid ounces) of Sunico No 5GS oil at the factory. Only this oil or one of the equivalent oils detailed below should be used.

Key to Fig. 2.

1. Service port
2. Cylinder head
3. Hose connection
4. Anti-rotation gear
5. Oil filler plug
6. Planet plate
7. Clutch bearing
8. Electromagnetic clutch
9. Valve plate assembly
10. Cylinder and valve plate gasket
11. Cylinder block
12. Piston
13. Cam rotor
14. Needle thrust bearing
15. Front housing and 'O' ring
16. Shaft seal

Compressor Oils

Sunico No 5GS
Texaco Capella E
Virginia Chemicals 500 Viscosity

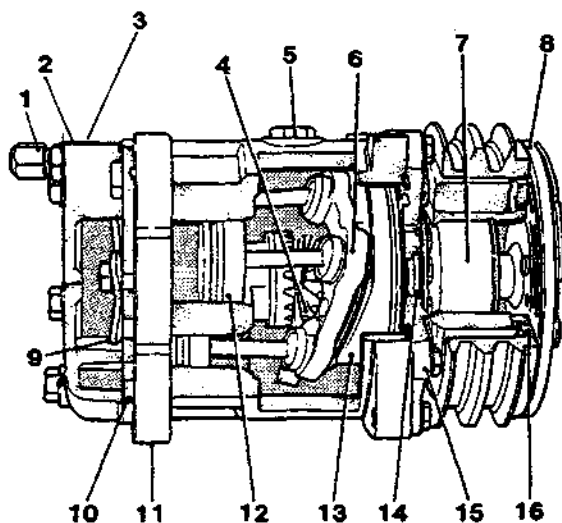


Figure 2.

Manifold Gauge Set

The manifold gauge set is a most important tool for fault diagnosis and system efficiency assessment. The relationship to each other of HIGH and LOW pressures and their correlation to AMBIENT and EVAPORATOR temperatures must be compared to determine system status. Because of the heavy reliance upon this piece of equipment for service diagnosis, ensure that the gauges are calibrated regularly and the equipment is treated with care.

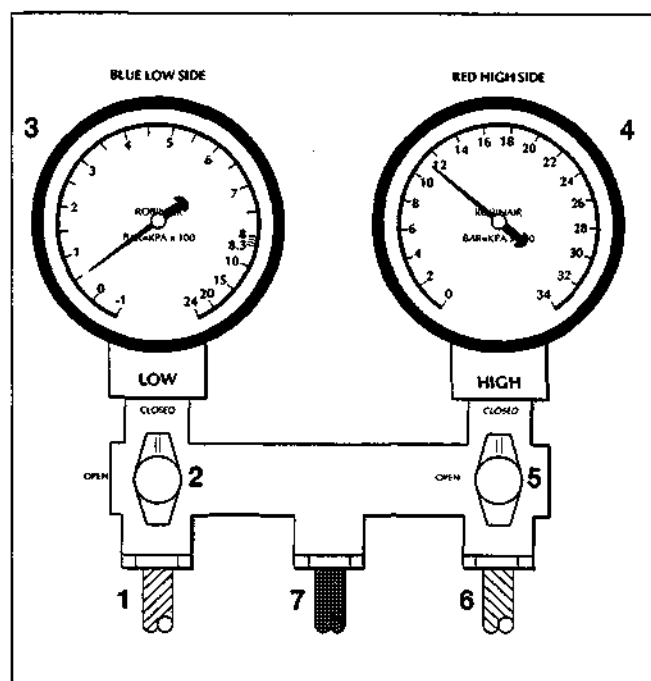


Figure 1

The gauge set (Fig. 1) consists of a manifold fitted with:

- 1 Low side service hose - BLUE.
- 2 Low Side hand valve - BLUE.
- 3 Low pressure compound gauge - BLUE.
- 4 High pressure gauge- RED.
- 5 High Side hand valve - RED.
- 6 High side service hose - RED.
- 7 System service hose - NEUTRAL COLOUR (commonly yellow).

Manifold.

The manifold is designed to control refrigerant flow. When connected into the system, pressure is registered on both gauges at all times. During system tests both the high and low side hand valves should be closed (rotate clockwise to seat the valves). The hand valves isolate the low and the high sides from the centre (service) hose.

Low Side Pressure Gauge.

This compound gauge is designed to register positive and negative pressure and may be calibrated as follows:

- Full Scale Deflection - 0 to 24 bar pressure in a clockwise direction
- 0 to 1 bar FSD negative pressure in a counter clockwise direction.

High Side Pressure Gauge.

This pressure gauge may be calibrated from 0 to 34 bar FSD in a clockwise direction. Depending on the manufacturer, this gauge may also be of the compound type.

System Checking with the Manifold Gauge Set

Connecting the Manifold Gauge Set

Caution: Only use hoses with connectors which are dedicated to HFC 134A charge ports.

Attachment of the hose quick release connectors to the high and low side system ports is straightforward, provided that the high and low valves are closed and the system is NOT operational.

Assessment of the system's operating system can be carried out by using the facilities of the Recovery-Recharging-Recycling station. Follow the manufacturer's instructions carefully and closely observe the safety procedures.

Warning: Under no circumstances should the connections be made with the system in operation or the valves open. Should the valves be open and a vacuum pump or refrigerant container attached, an explosion could occur as a result of high pressure refrigerant being forced back into the vacuum pump or container.

Stabilising the System

Accurate test gauge data can be attained only if the system temperatures and pressures are stabilised.

Ensure that equipment and its hoses cannot come into contact with moving parts or heat sources.

It is recommended that a free standing air mover is placed in front of the vehicle to provide mass air flow through the condenser-cooling system.

Checking Procedure

1. Start the engine and allow it to attain normal working temperature then set it at fast idle (typically 1200 to 1500 rpm).
2. Select full air conditioning performance.
3. With all temperatures and pressures stable or displaying symptoms of faults, begin relevant test procedures.

Connecting the Gauge Set.

A test hose connected to the fitting directly under the low side gauge is used to connect the low side of the test manifold into the low side of the system, and a similar connection is found on the high side. When connecting the gauge manifold set to the air conditioning system an access valve core removing tool is available for connecting the test hoses to the high and low sides of the system.

Using the valve removing tool it enables the valve core to be removed and held back inside the tool eliminating restrictions and, thereby, providing a full flow of refrigerant.

Warning: Do not open the high side hand valve while the air conditioning system is in operation because, high pressure refrigerant will be forced through the high side gauge and to the refrigerant container, if it is attached. This could cause the container to rupture or the fitting at the safety container valve to burst resulting in damage and personal injury.

1. With the engine switched off, remove the protective caps from the schraeder valves.
2. Fit the access valve removal tool to the schraeder valves. Ensure that both the manifold hand valves are in the closed position.
3. Connect the high pressure manifold gauge hose (to the high pressure side of the air conditioning side of the system (high side is always the line from the compressor to the condenser). Connect the low pressure or compound gauge hose to the low pressure side of the air conditioning system.
4. Using the access valve removal tool loosen and screw out the valve cores.

Purging the Test Hoses

1. With the manifold test set attached to the system.
2. Purge the high pressure test hose by cracking open the high pressure side hand valve on the manifold gauge set for 3 to 5 seconds. This allows the system refrigerant to purge the air from the test hose and discharge through the manifold centre test hose. Immediately close the high pressure side hand valve.
3. Purge the low pressure test hose in the same manner by cracking open the low pressure side hand valve manifold gauge set for 3 to 5 seconds, then close the hand valve.

Stabilising the System

The manifold gauge set is now attached to the system and the test hoses purged of air. With both hand valves closed, the system must be operated for a few minutes to stabilise all pressures and temperatures throughout the system in order to obtain accurate test gauge readings.

Proceed as follows:

1. Place all test hoses, gauge set and other equipment away from all engine moving parts. Also keep the hoses from touching the hot engine manifold.
2. Start the engine and adjust engine speed to fast idle
3. Turn on the air conditioning and set for maximum cooling with blower fans on high speed
4. Open the car doors and/or windows (to quickly eliminate car interior heat).
5. Operate the system under these conditions for 5 to 10 minutes to stabilise the system ready for testing.
6. Check the system for full refrigerant by noting the sight glass indications. Some refrigerant loss occurs over a period of time.

Note: The air conditioning system must contain a full refrigerant charge before an accurate system check can be made. An insufficient charge is indicated by a stream of bubbles or foam. If the refrigerant charge is low, the system must be fully discharged into a refrigerant recovery station and recharged with the correct weight of refrigerant 82.30.08. Do not top up a system with refrigerant.

Leak Test

A high proportion of all air conditioning work consists of locating and repairing leaks.

Many leaks are located at connections and are caused by vibration. They may only require the re-tightening of a connection or clamp.

Occasionally a hose rubs on a structural part of the vehicle and creates a leak, or a hose deteriorates which will require a replacement.

The specified maximum leakage rate at each fitting is 0.5 kg of R 134a in 40 years and a leak detector capable of operating to this accuracy must be provided. To check place the leak detector probe at the lowest point of each joint, pause for two seconds. Do not wave the probe about as refrigerant is heavier than air and flows to the lowest point. If a leak is greater than 0.5 kg in forty years is detected identify the leak point for rectification.

Check that the leaking fitting has been tightened to the correct torque. If the torque is low, rectify and repeat leak test. If the torque is satisfactory, depressurise the system, dismantle the leaking connection and check the quality of the fitting.

If the fitting is satisfactory, clean and reassemble after applying a thin film of refrigerant to the seat of a flare fitting, or a new oiled "O" ring to an "O" ring fitting.

Tighten to the correct torque.

Charge the system with 200 g of E134A and leak test the rectified system. If the system is satisfactory, depressurise, evacuate and recharge the system.

If the system is unsatisfactory, i.e. leakage greater than 0.5 kg in forty years, depressurise and replace the leaking assembly.

Pressure Temperature Relationship.

Note: Pressures shown are under exact conditions (see test conditions) and are not necessary true for every car checked. Ambient Temperature is given as the air surrounding the condenser and is taken 5 cm in front of the condenser.

Test Conditions.

Use a large fan to substitute for normal ram air through the condenser. Engine adjusted to fast idle speed.

All conditions equivalent to 30 m.p.h. or 48 km/h.

Ambient Evaporator Temp °C	High Pressure Gauge Reading lbf/in ²	Low Pressure Gauge Reading lbf/in ²	Temp °C
16	95-115	10	-16
18	105-125	12	-14
21	115-125	4	-12
24	130-150	16	-10
27	150-170	18	-8
29	165-185	20	-6
32	175-195	22	-5
35	185-205	24	-4
38	210-230	26	-3
41	230-250	28	-1
43	250-270	30	0
46	265-285	35	2
49	280-310	40	5
		45	9
		50	11
		55	14
		60	17
		65	19
		70	21

Normal operating ambient temperature range is: -24 to 43°C.

Normal operating evaporator temperature range is: -12 to 0°C.

Under normal running conditions system pressure should be, as follows:

Low side: 1.05 to 2.10 kgf/cm² 1.034 to 2.06 bar 15 to 30 lbf/in²

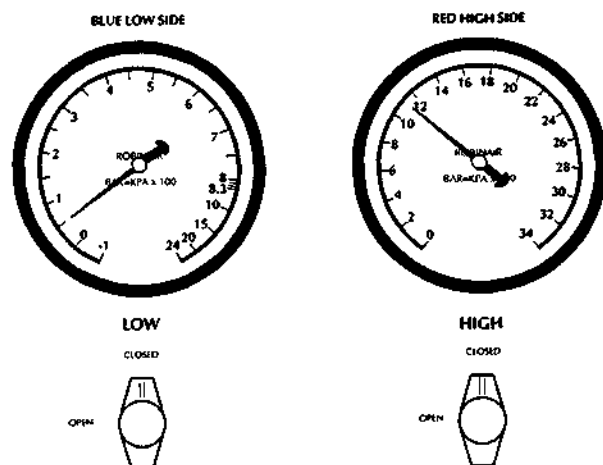
High side: 13.00 to 14.40 kgf/cm² 12.75 to 14.34 bar 185 to 205 lbf/in²

Manifold Gauge Set Check Procedures

Refrigerant Slightly Low.

Complaint.

Little or no cooling.



Condition.

1. The low side gauge reading is too low.
2. The high side gauge reading is too low.
3. A stream of bubbles evident in the sight glass.
4. The discharge air from the evaporator only slightly cool.

Diagnosis.

The system low on refrigerant due to slight leak.

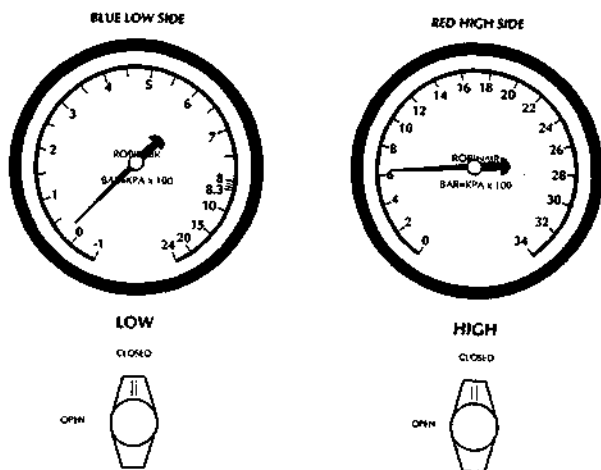
Correction.

1. Test the system for leaks.
2. Depressurise the system.
3. Repair the leaks, and if necessary renew hoses or units.
4. Check the compressor oil level. The system may have lost oil due to leakage.
5. Evacuate the system using a vacuum pump.
6. Recharge the system with new refrigerant.
7. Operate the system and check the performance.

Refrigerant Excessively Low.

Complaint.

Cooling is not adequate.



Condition.

1. The low side gauge is reading very low.
2. The high side gauge reading very low.
3. No bubbles or liquid evident in the sight glass.
4. The discharge air from the evaporator is warm.

Diagnosis.

System refrigerant excessively low. Serious leak indicated.

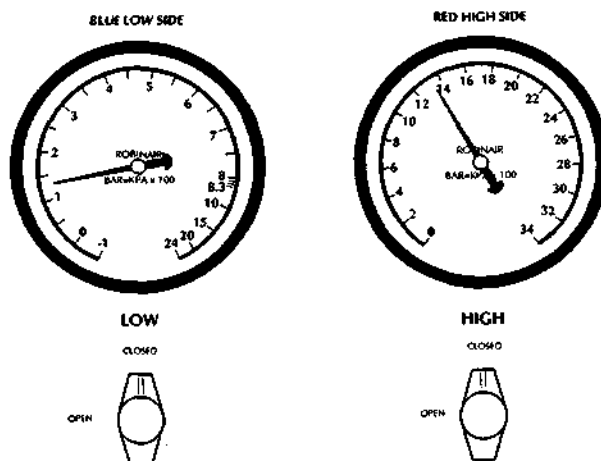
Correction.

1. Test the system for leaks.
Note: Partially recharge the system before testing the system for leaks to ensure that leak detection is obtained.
2. Depressurise the system.
3. Repair the leaks, and if necessary renew hoses or units.
4. Check the compressor oil level. The system may have lost oil due to leakage.
5. Evacuate the system using a vacuum pump.
6. Recharge the system with new refrigerant.
7. performance.

Air In The System.

Complaint.

Cooling is not adequate.



Condition.

1. The low side gauge reading is constant and does not drop. The pressure should drop until the compressor cycles (thermostat control)
2. The high side gauge reading is slightly high (or slightly lower especially if a large fan is used to substitute ram air).
3. The sight glass is free of bubbles or only shows an occasional bubble.
4. The discharge air from the evaporator is only slightly cool.

Diagnosis.

Non condensables present in the system. Air or moisture present instead of a full refrigerant charge.

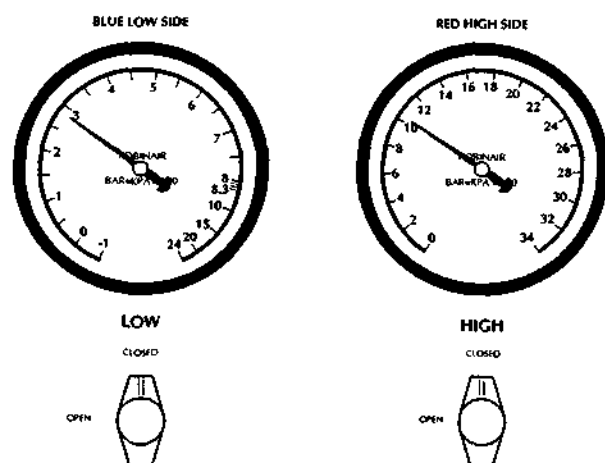
Correction.

1. Test the system for leaks. Test the compressor seal area very carefully.
2. Depressurise the system. Repair the leaks, and if necessary renew hoses or units.
3. Renew the drier bottle, probably water saturated.
5. Check the compressor oil level.
6. Evacuate the system using a vacuum pump.
7. Recharge the system with new refrigerant.
8. Operate the system and check the performance.

Compressor Malfunction

Complaint.

Cooling is not adequate.



Condition

1. The low side gauge reading is too high.
2. The high gauge reading is too low.
3. The sight glass is free of bubbles and the system is fully charged.
4. The discharge air from the evaporator is not sufficiently cool.

Diagnosis.

Internal leak in the compressor.

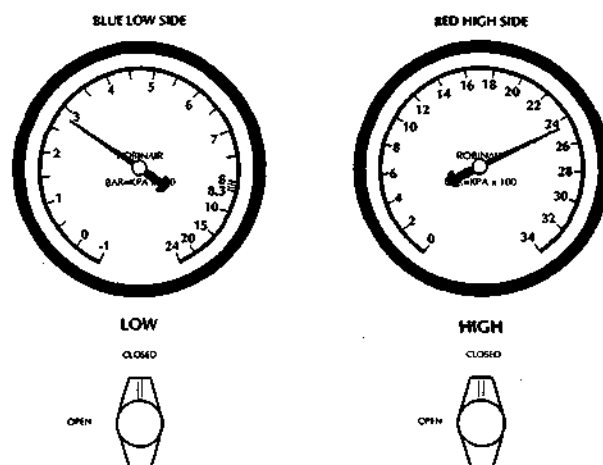
Correction.

1. Depressurise the system.
2. Renew the compressor and the drier bottle.
3. Evacuate the system using a vacuum pump.
4. Charge the system with new refrigerant.
5. Operate the system and check the performance.

Condenser Malfunction or System Overcharge

Complaint.

Little or no cooling. Overheating of the engine may also be noted.



Condition.

1. The low side gauge reading excessively high.
2. The high side gauge reading is also excessively high.
3. Bubbles may appear occasionally in the sight glass and the liquid line to the evaporator is very hot.
4. The discharge air from the evaporator is warm.

Diagnosis.

The condenser not operating correctly through lack of cooling caused by too high a high side pressure. The system may have either a normal or overcharge of refrigerant.

Correction.

1. Check the compressor drive belt for correct tension.
2. Check the condenser for clogged air passages preventing air flow through the condenser.
3. Inspect the condenser mounting for correct radiator clearance.
4. Check for correct fan operation.
5. Check the coolant pressure cap for correct type and operation.

After making the above checks operate the system and check the performance. If the Condition is not rectified.

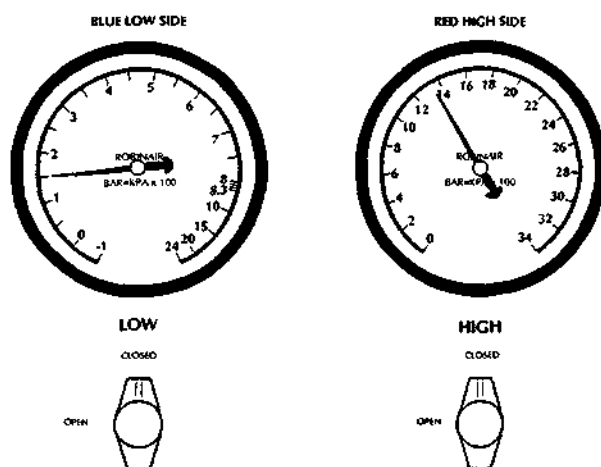
1. Inspect the system for overcharge of refrigerant and rectify as follows.
 - A. Discharge the system, until a stream of bubbles appear in the sight glass and both gauge readings drop to below normal.
 - B. Add new refrigerant until the bubbles disappear and the pressures are normal. Then add 0.25 to 0.5 lb. of additional refrigerant.
2. Operate the system and check the performance. If the gauge readings are still too high.
3. Depressurise the system.
3. Remove and inspect the condenser for oil clogging. Clean and flush the condenser to ensure the free passage refrigerant or renew the condenser.
4. Renew the receiver-drier.
5. Evacuate the system using a vacuum pump Recharge the system with new refrigerant. Operate the system and check the performance

Moisture in the System

Complaint.

Cooling not adequate during the hot part of the day.

Note: Cooling may be satisfactory during early morning / late evening but inadequate during the hot part of the day.



Condition.

1. The low side gauge reading normal but may drop into vacuum during testing.
2. The high side gauge reading normal but drops when the low side drops into vacuum. The sight glass may show tiny bubbles.
3. The discharge air from the evaporator is cold but becomes warm when the low side gauge drops into vacuum.

Diagnosis.

Excessive moisture in the system.

Desiccant agent saturated with moisture which is released during high temperatures. The moisture collects and freezes in the expansion valve which stops the refrigerant flow.

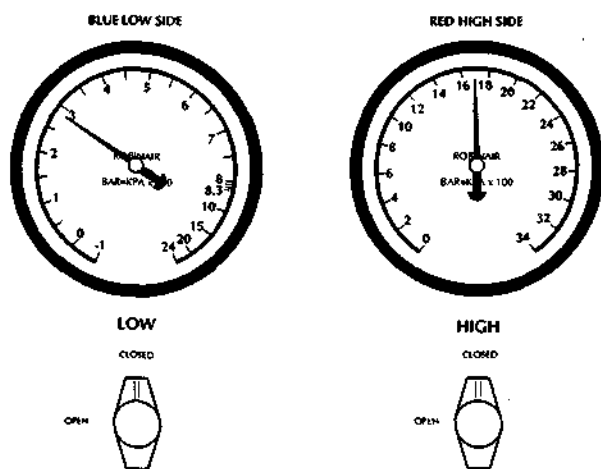
Correction.

1. Depressurise the system.
2. Renew the drier bottle.
3. Evacuate the system using a vacuum pump.
4. Recharge the system with new refrigerant.
5. Operate the system and check the performance.

A Large Amount of Air in the System.

Complaint.

Little or no cooling.



Condition.

The low side gauge reading is too high. The high side gauge reading is too high. An occasional bubble in the sight glass. The discharge air from the evaporator is not cool.

Diagnosis.

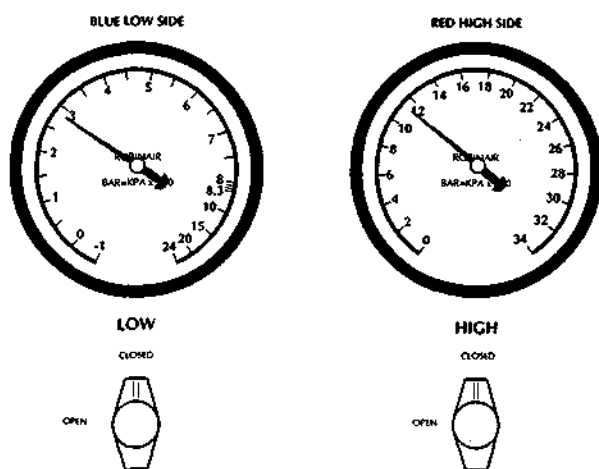
Air in the system. The refrigerant contaminated by non-condensables (air and/or moisture).

Correction.

1. Depressurise the system.
2. Renew the receiver-drier.
3. Evacuate the system using a vacuum pump.
4. Recharge the system with new refrigerant.
5. Operate the system and check the performance.

Expansion Valve Malfunction.

The valve stuck open.



Complaint.

Little or no cooling.

Condition.

The low side gauge reading is too high.

The high side gauge reading is normal or slightly low.

The discharge air from the evaporator is warm. The suction hose and the evaporator show signs of heavy sweating.

Diagnosis.

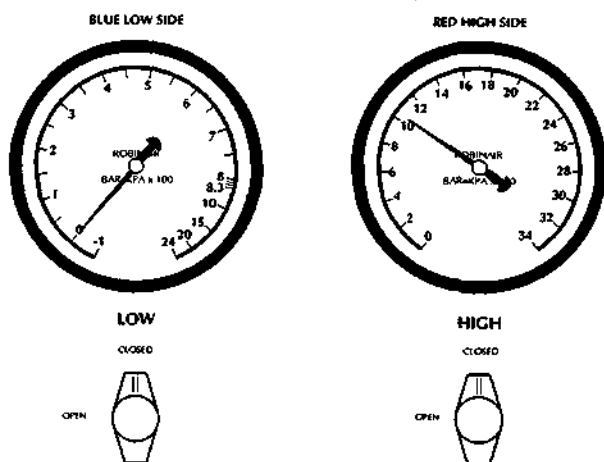
The expansion valve allowing excessive flow of refrigerant through the evaporator coils causing flooding of the coils.

Correction.

1. Depressurise the system.
2. Renew the expansion valve.
3. Renew the drier bottle.
4. Evacuate the system using a vacuum pump.
5. Recharge the system with new refrigerant.
6. Operate the system and check the performance.

Expansion Valve Malfunction

The valve stuck closed.



Complaint.

Cooling is not adequate.

Condition.

1. The low gauge reading is too low (0 or a vacuum).
2. The high side gauge reading is too low.
3. The discharge air from the evaporator only slightly cool.
4. The expansion valve shows signs of heavy sweating or frost.

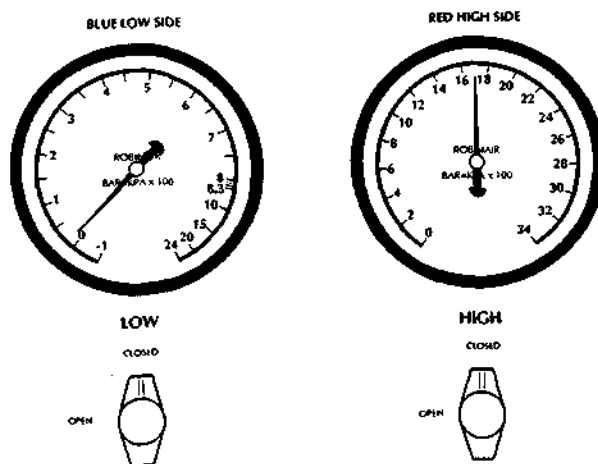
Diagnosis.

The expansion valve restricting the refrigerant flow.

Correction.

1. Depressurise the system.
2. Renew the expansion valve.
3. Renew the drier bottle.
4. Evacuate the system using a vacuum pump.
5. Recharge the system with new refrigerant.
6. Operate the system and check the performance.

Restriction in the High Pressure Side.



Complaint.

Cooling is not adequate.

Condition.

1. The low side gauge reading is low.
2. The high side gauge reading builds up to an excessively high reading.
3. The discharge air only slightly cool.
4. The high pressure liquid hose from the drier bottle to the evaporator is cool to the touch or shows signs of heavy sweating or frost.

Diagnosis.

A restriction in the receiver-drier or the high pressure liquid hose from the drier bottle. Which results in the compressor removing refrigerant from the evaporator faster than it can enter. This results in a starved evaporator.

Correction.

1. Depressurise the system.
2. Renew the drier bottle and/or the high pressure liquid hoses or other defective parts.
3. Evacuate the system using a vacuum pump.
4. Recharge the system with new refrigerant.
5. Operate the system and check the performance.

Torque Levels for the Hose Connections

COMPONENT	TORQUE	Nm
Evaporator Hose		
Hose to Expansion Valve	32.0 ±	4.0
Hose to Compressor	34.0 ±	2.0
Condenser Hose		
Hose to Compressor	34.0 ±	2.0
Hose to Compressor	25.0 ±	4.0
Condenser Pipe		
Pipe to Drier Bottle	6.0 ±	1.5
Evaporator Pipe		
Pipe to Expansion Valve	16.0 ±	1.5

Air Conditioning Procedures**Depressurising**

Note: Observe all safety precautions and do not smoke while carrying out the following procedures.

1. With the engine switched off, remove the protective caps from the schrader valves.
2. Ensure the manifold gauge set hand valves are in the closed position, then by using the access valve core remover connect the manifold gauge set to the system with the red hose to the high pressure side and the blue hose to the low pressure side.
3. Screw out the valve core to allow the refrigerant to flow.
4. Place the centre hose of the manifold set into a suitable container.
5. Slowly open the high or low side manifold hand valve and adjust the valve for a smooth refrigerant flow. Watch the refrigerant for any signs of escaping oil and adjust the hand valve to prevent any oil escaping.
6. If oil is lost during the discharge, the compressor oil level must be checked and if necessary topped up.
7. As the discharge rate slows down, open the other manifold hand valve so that refrigerant flows from both high and low pressure sides of the system.
8. Constantly adjust the hand valves to ensure that oil does not flow. When a zero reading is shown on both high and low pressure gauges the system is discharged.
8. Close both manifold hand valves.

Recovering Refrigerant

Caution: The Recovery-Recycle-Recharging equipment has special fittings to avoid cross contamination with R-12 systems. Do not attempt to adapt this unit for R-12 as system failure will result.

Warning: Follow the safety procedures as defined at the beginning of the section.

Caution: The unit's overfill limitation mechanism has been calibrated specifically for use with the 50 lb. (23 Kg) refillable refrigerant tank.

As the refrigerant is recovered it is passed through an oil separator and a filter drier before it is allowed to enter the refrigerant tank. When it is dry the moisture indicator turns green.

Recovery Procedure

Note: Run the air-conditioning system for a few minutes before starting the recovery procedure as this will enable more refrigerant to be recovered. Turn the system off before starting the procedure.

1. Attach the red (high side) hose of the unit to the high side fitting of the system on the vehicle then fit the blue (low side) fitting to the low side on the vehicle.

Note: Make sure that the Air conditioning system has pressure in it before beginning the recovery process; if there is no system pressure there is no refrigerant to recover. Also make sure that the oil drain valve is closed.

2. Open both the high and low side valves on the control panel.
3. Open the red GAS (vapour) valve and the blue LIQUID valve on the tank.
4. Turn on the MAIN POWER switch.
5. Press the RECOVERY key on the key-pad. The display shows that the unit is in the RECOVER mode and AUTOMATIC cycle. After the compressor starts the display shows the weight of refrigerant being recovered. The compressor shuts off automatically when the recovery is complete and the display shows the message 'CPL' and the final weight of the recovered refrigerant.

6. Wait for five minutes and watch the manifold gauges for a rise above 0. If a rise occurs press the HOLD/CONT key. Repeat as needed until the system pressure holds for two minutes.

Note: Drain the oil separator after each job.

7. Slowly open the oil drain valve and drain the oil into the oil catch bottle. When all the recovered oil has completely drained close the valve.
8. Replace oil lost during the recovery procedure by measuring the amount of oil in the catch bottle and adding the same amount of new oil to the system.
Note: Dispose of the recovered oil in an approved way.
9. When the recovery tank is full the compressor is shut off and the display shows the message FULL.

Evacuating and Recycling the Refrigerant

1. Open the red (high side) and the blue (low side) valves on the unit and open the red GAS (vapour) valve and the blue LIQUID valve on the tank.
2. Enter the required time using the key-pad, press enter, the display shows the entered time in minutes.
3. Start the vacuum pump by pressing the VACUUM KEY again. The recycling process begins approximately five seconds after the vacuum pump starts and the message RECYCLE is displayed.

Note: If the vacuum pump has run for ten hours or over without an oil change the message OIL flashes on the display. Change the pump oil and then press the SHIFT/RESET key and the zero key to reset the oil change timer to zero.

The digital display counts down the evacuation time.

4. Check for non-condensibles after five minutes recycling. If the gauge needles are more than 10 psi apart purge the non-condensibles from the tank by opening the purge valve on the back of the unit and continue to bleed until both needles show the same reading.

The vacuum sequence continues until the programmed time has elapsed at which point the message CPL is displayed.

5. If the moisture indicator turns green recharge with refrigerant.
or
5. If the moisture indicator has not turned green replace the unit's filter-drier, which is probably saturated.

Note: Pressing any key at this point allows the next function to be accessed.

To recycle the refrigerant only without pulling a vacuum for an indefinite period of time press the SHIFT/RESET key and the RECYCLE key on the key-pad. Press the SHIFT/RESET key to cancel.

For vacuum only press the SHIFT/RESET key and the ENTER key and then press "1". Run the vacuum pump as long as required and then press "1" or press SHIFT/RESET to cancel.

Recharging the System

1. Open the high side valve on the unit control panel. If the messages PROGRAM and CHARGE are not displayed press the CHG key to enter PROGRAM mode.
2. Key in the amount of refrigerant needed to recharge the system and press ENTER.
3. Press the CHG key; the message AUTOMATIC and the entered amount of refrigerant will be displayed. The display counts down to zero as the charging process proceeds. When the charging is complete the message CPL is displayed.

If the refrigerant transfer is too slow the charging unit emits a signal. If the message CHECK REFRIGERANT is not displayed, close the high side valve, open the low side valve and start the air conditioning system to pull the remainder of the charge into the system.

If the refrigerant transfer will not complete and the message CHECK REFRIGERANT is displayed, press the HOLD/CONT key to interrupt the cycle then reset the unit by pressing the RESET key. Recover the refrigerant already charged into the system by following the procedure for recovering the refrigerant, add new refrigerant to the tank and return to Step 1 to recharge the system.

4. If the air conditioning system is not running start it and let it run until the gauge pressure readings stabilize (compare the gauge readings with the system manufacturer's specifications).

Note: Ensure that the readings are accurate by closing both the high and low side valves on the unit's control panel.

5. Check the evaporator outlet temperature to make sure that the air conditioning system is operating properly (refer to the system manufacturer's specifications for the proper temperature).

Compressor Oil Check

Data

Special Tools

Sanden oil dipstick JD 149

Torque Figures

Oil filler plug 8-12 Nm

Procedure

Whenever a component has been replaced in the refrigerator system or there is an obvious oil leak, the following procedure should be carried out.

A Sanden oil dipstick and angle gauge are required in order to carry out the check.

1. Run the compressor for 10 minutes at engine idle speed.
2. Depressurise the system.
3. Lay the angle gauge across the flat surfaces of the two front mounting lobes. Centre the bubble and note the mounting angle.
4. Remove the compressor from the vehicle.
3. Remove the plug from the oil filler hole (1 Fig. 1).
4. Rotate the counter weight (3 Fig. 1) on the front of the clutch to allow the dipstick (2 Fig. 1) to penetrate to its fullest extent.

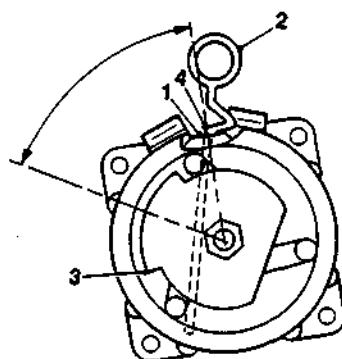


Figure 1.

5. Insert the dipstick to its stop position (4 Fig. 1). The point of dipstick angle should be facing left.
6. Remove the dipstick and check the oil level against the figures quoted in the chart below.

Mounting Angle	Acceptable Oil Level
Degrees	Increments
0°	3- 5
10°	4- 6
20°	5- 7
30°	6- 8
40°	7- 9
50°	8 - 10
60°	9 - 11
90°	10-12

If the level indicated on the dipstick does not match the increments given in the table for a particular mounting angle, add or subtract oil to the midpoint value.

7. Ensure that the "O" ring seal and seat are clean. Coat the seal with compressor oil and refit the oil filler plug.
8. Torque tighten the plug to 8-12 Nm. Do not over tighten the plug to stop a leak. If necessary, remove the plug and fit a new oil seal.
9. Refit the compressor.
10. Recharge the system with refrigerant.

8.1.01.1 Compressor Removal/Renewal

Procedure

1. Open the bonnet and fit a wing cover.
2. Depressurise the air conditioning system.
3. Disconnect the low and high pressure hoses from the rear of the compressor. Plug the hose ends to prevent the ingress of dirt.
6. Remove the compressor pivot bolt securing nut.
7. Carefully separate the muffler from the compressor and remove and discard the 'O' ring seal.
8. Fit a blanking plug to the muffler and a blanking plate to the compressor, fit and tighten the bolt that secures blanking plate.
9. Raise the vehicle to working height on a ramp.

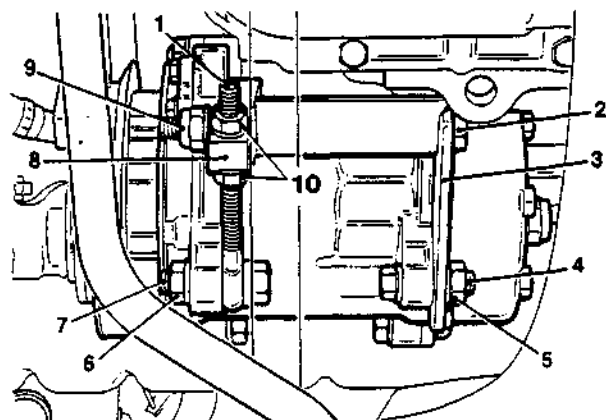


Figure 1.

10. Slacken the compressor drive belt adjuster rod and adjuster plate securing nuts and bolts (Fig. 1-4, 5, 6 and 7)
11. Slacken adjuster nut (Fig. 1-10).
12. Remove the nut and bolt (Fig. 1-4 and 5) from adjuster plate (Fig. 1-3).
13. Slacken trunnion nut and bolt (Fig. 1-9 and 2) and remove the adjuster rod (Fig. 1-1).
14. Disconnect the compressor multi-plug.
15. Remove the compressor drive belt.
16. Pivot the compressor away from engine, support the compressor and remove the top pivot bolt and lift the compressor clear of the vehicle.
17. Remove the mounting brackets from the compressor.
26. Lift the compressor up to the engine and fit the top pivot bolt (Fig. 1-2) from above.
27. Attach adjustment rod loosely to the compressor (Fig. 1-1) with nut and bolt (Fig. 1-6 and 7).
28. Loosely attach adjustment plate (Fig. 1-3) to the compressor with nut and bolt (Fig. 1-4 and 5).
29. Fit bolt (Fig. 1-2) through trunnion (Fig. 1-8) and fit nut (Fig. 1-9) to the bolt.
30. Fit the drive belt over the pulley, move the compressor away from the engine to tension the drive belt and lightly tighten the bolts and nuts.
31. To obtain the correct tension on the drive belt tighten adjuster nuts (Fig. 1-10). The belt is correctly tensioned when a load of 59- 63.6 kg (130 -140 lb) applied at the centre deflects the belt 4 mm.
32. Ensure that all securing bolts and nuts are fully tightened.
33. Lower the vehicle to the ground.
34. Remove the blanking plate and the blanking plugs from the compressor.
36. Fit new 'O' ring seals to the low and high pressure hoses and connect them to the compressor. Fit the retaining plate, fit and tighten the screw.
38. Charge the air conditioning system.
39. Remove the wing cover and close the bonnet.

8.1.02.1 Field Coil Renewal

Procedure

1. Open the bonnet and fit a wing cover.
2. Depressurise the air conditioning system.
3. Remove the compressor.
4. Remove the compressor drive clutch.
5. Remove the compressor pulley.
6. Slacken the field coil wire clamp screw (Fig. 1) and release the wire from the clamp.

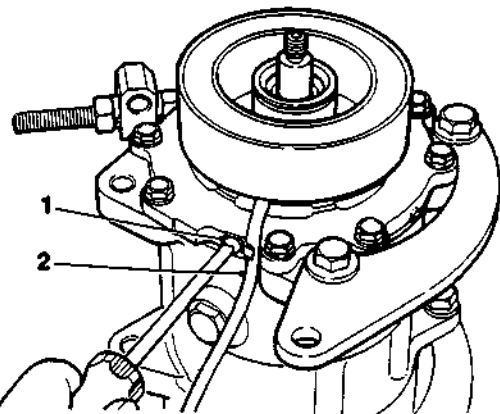


Figure 1.

7. Remove the field coil retaining snap ring and detach the field coil.
8. Clean the mating face of the compressor with a cloth moistened with an approved cleaning fluid.
9. Position the new field coil on the compressor and fit the retaining snap ring.
10. Route the wire to the compressor and fit the wire clamp, tighten the securing screw.
11. Fit the compressor pulley.
12. Fit the compressor drive clutch.
13. Fit the compressor.
14. Recharge the air conditioning system.
15. Remove the wing cover and close the bonnet.

8.1.03.1 Renew Gasket Kit

Data

Torque Figures

Cylinder head bolts 29.83 to 33.9 Nm.

Procedure

1. Open the bonnet and fit a wing cover.
2. Depressurise the air conditioning system.
3. Remove the compressor.
4. Position the compressor in a vice, tighten the vice onto the compressor body lugs.
5. Remove the outlet port blanking plate securing bolt and detach the plate.
6. Remove and discard the 'O' ring seals from the outlet port.
7. Remove the compressor cylinder head securing bolts, detach the cylinder head.
8. Detach the valve plate from the compressor.
9. Remove the gaskets from the compressor.
10. Remove all traces of gasket material from the mating surfaces of the cylinder head, valve plate and cylinder block.

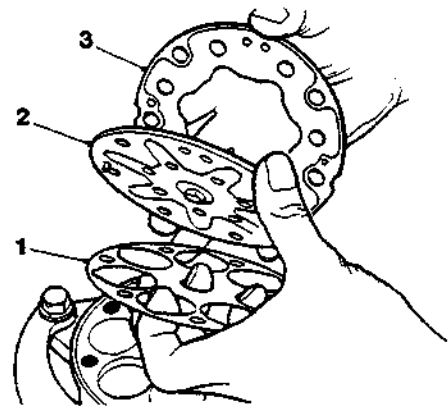


Figure 1.

11. Position new gaskets (Fig. 1-1 and 3) on the valve plate (Fig. 1-2) and then place it on the cylinder block.

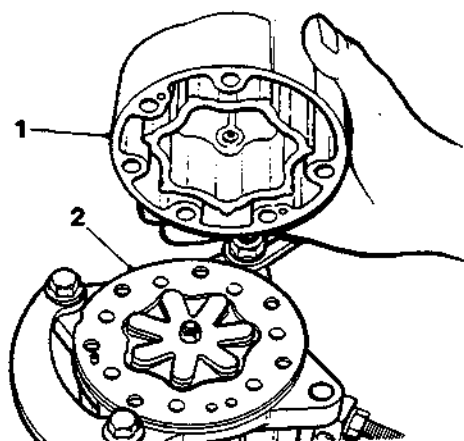


Figure 2.

12. Position the cylinder head (Fig. 2-1) on the cylinder block (Fig. 2-2), fit and tighten the securing bolts in the sequence shown in Fig. 3.

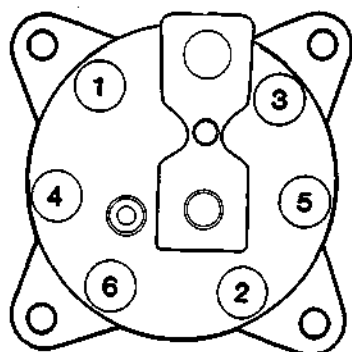


Figure 3.

13. Fit new 'O' ring seals in the compressor outlet port, position the outlet port blanking plate and fit and tighten the securing bolt.
14. Check and top up compressor oil
15. Refit the compressor.
16. Recharge the air conditioning system.

8.1.04.1 Valve Plate Renewal

Data

Torque Figures

Cylinder head bolts 29.83 - 33.9 Nm

Procedure

1. Open the bonnet and fit a wing cover.
2. Depressurise the air conditioning system.
3. Remove the compressor.
4. Position the compressor in a vice, tighten the vice onto the compressor body lugs.
5. Remove the outlet port blanking plate securing bolt and detach the plate.
6. Remove the 'O' ring seals from the compressor outlet port.

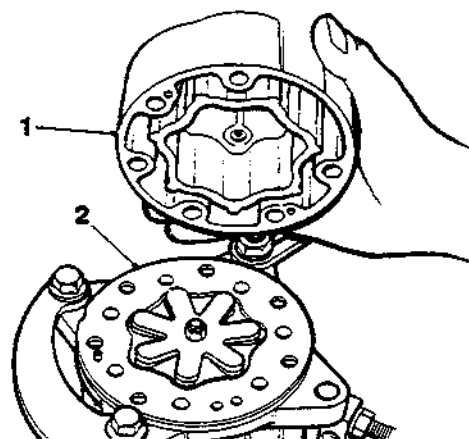


Figure 1.

7. Remove the cylinder head securing bolts and detach the cylinder head (Fig. 1-1) from the cylinder block.
8. Remove valve plate (Fig. 1-2) from the compressor.
9. Remove all traces of gasket material from the mating surfaces of the cylinder head and compressor.
10. Apply clean refrigerant oil to the gaskets and then position them on the valve plate.

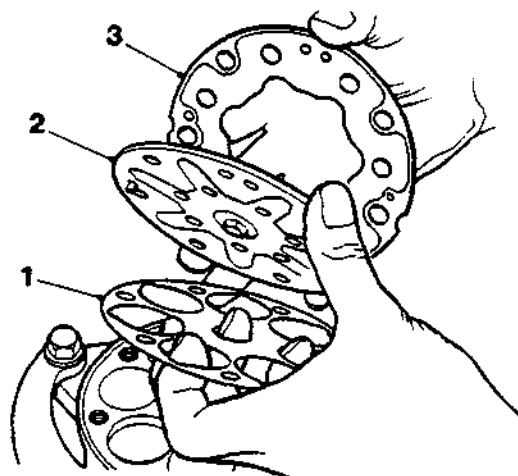


Figure 2.

11. Position valve plate and gaskets (Fig. 2-1 and 2) on the compressor and fit the cylinder head.
12. Tighten the cylinder head securing bolts in the order shown in Fig. 3.

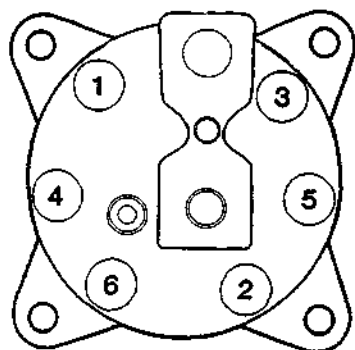


Figure 3.

13. Fit new 'O' rings to the outlet port blanking plate, position the plate on the compressor and fit and tighten the securing bolt.
14. Check compressor oil and top up in necessary.
14. Refit the compressor.
15. Remove the wing mat and close the bonnet.

8.1.05.1 Expansion Valve Renewal

1. Depressurise the air conditioning system.
2. Undo the pipe to expansion valve clamp bolt and retaining plate and disconnect the pipes (Fig. 1)

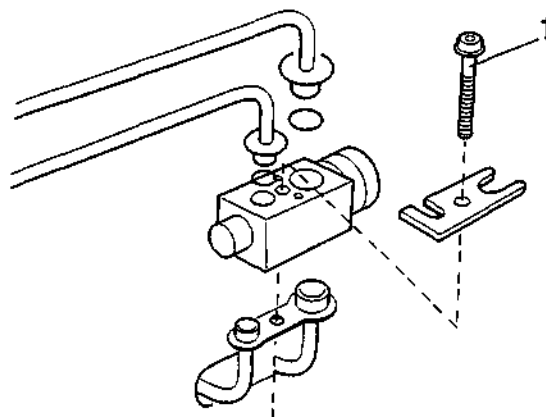


Figure 1.

3. Fit blanking plugs to the expansion valve and to the pipes.
4. Reposition the pipes to one side.
5. Unscrew the two torx head retaining screws and remove the expansion valve from the air conditioning unit (Fig. 1-1).
6. Remove and discard the 'O' rings.
7. Fitting a new valve is the reversal of the removal procedure.
8. Ensure new 'O' rings to all union connections are fitted.
9. Evacuate the system.
10. Recharge the system.

8.1.06.1 Hose-Compressor to Evaporator Renewal**Procedure**

1. Open the bonnet and fit a wing cover.
2. Depressurise the air conditioning system.
3. Remove the hose to evaporator valve clamping plate, disconnect the hose from the valve, remove and discard the 'O' ring seal.
4. Fit a blanking plug to the evaporator valve. Release the evaporator hose securing clips.
5. Remove the compressor outlet port retaining bolt.
6. Disconnect the hose from the compressor, discard the hose complete with 'O' ring seals.
7. Connect the hose to the evaporator valve and tighten clamp onto the hose.
8. Route the hose to the compressor, fit a new 'O' ring seal and connect it to the compressor.
9. Position the outlet port retaining plate on the compressor, fit and tighten the securing bolt.
10. Refit the hose to the clips.
11. Charge the air conditioning system.
12. Remove the wing cover and close the bonnet.

8.2.01.1 Air Conditioning Unit Renewal

1. Disconnect the battery earth lead.
2. Drain the engine coolant into a suitable container.
3. Depressurise the air conditioning system.
4. Disconnect the high and low pressure hoses and expansion valve from the air conditioning unit (see expansion valve renewal).
5. Slacken the coolant hose to the heater matrix pipe securing clips and disconnect the hoses from the matrix. (This will require the removal of the air intake hose for access.)
6. Remove the following items from inside the car:
 - front seats
 - underscuttle panels/knee bolsters
 - glove box assembly
 - facia trim (walnut trim)
 - radio and ashtray
 - centre console switch panel assembly
 - instrument panel and surround trim
 - steering wheel and column
 - facia assembly complete
 - hoses - distribution box to door vents
 - facia support frame

Details and drawings of the above operations can be found in the electrical and trim sections.

7. Disconnect the vacuum hoses from the blower motors, water valve and reservoir.
8. Un-clip the electrical harness from the air conditioning unit, release the electrical connections and reposition the harness to allow removal of the unit.
9. Displace and remove the footwell ventilator ducts and hoses (Fig. 1-1).

10. Disconnect the pliable trunking from the unit (Fig. 1-2).

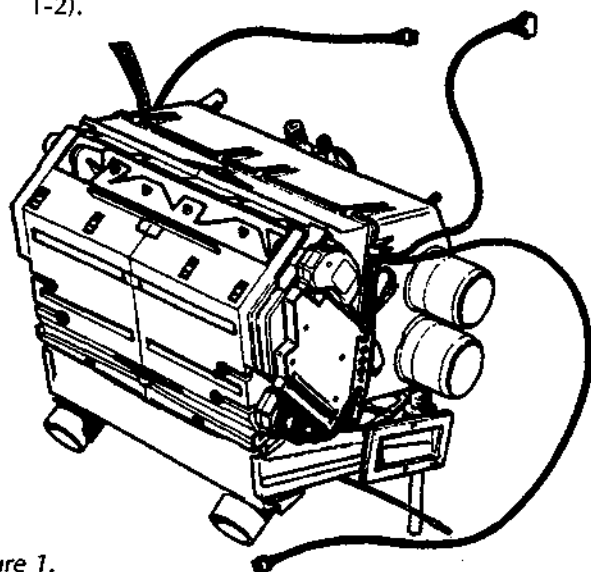


Figure 1.

11. Twist and pull out the four air conditioning unit stub pipes (Fig. 1-3)
12. Remove the screws securing the air conditioning unit support stays.
13. Displace the tunnel carpet for access to the lower fixing bolts and remove the stays.
14. Disconnect the condensate drain tubes.
15. Peel off the tape securing the windscreen demist duct to the distribution box (Fig. 1-4).
16. Remove the air conditioning unit to bulkhead securing nuts.
17. Carefully lift out the air conditioning unit complete with the distribution box.
18. Remove the distribution box securing screws and remove the assembly (Fig. 1-5).
19. Reverse the removal procedure to refit the air conditioning unit.

Note: Ensure new 'O' rings are fitted to all air conditioning hose connections.

8.2.02.1 Evaporator Unit Renewal

1. Remove the air conditioning unit assembly.
2. Remove the heater pipe guide plate securing screws and remove the guide plate.
3. Remove the screws securing evaporator sensor and withdraw the sensor from the evaporator.
4. Remove the screws securing the solenoid mounting plate and displace the mounting plates from the unit.
5. Remove the harness to casing earth bolt and displace the harness.
6. Cut and remove the harness to casing securing ratchet straps and displace the harness from the casing.
7. Displace the vacuum hose from the casing.
8. Displace and remove the casing securing clips.
9. Split the casing and remove the evaporator from the unit.
10. Remove the expansion valve guide securing screws and remove the plate.
11. Displace and remove the plate from the evaporator.
12. Fitting the new evaporator is the reversal of the removal procedure.
13. Refill the engine cooling system with coolant.
14. Recharge the air conditioning system.

8.2.03.1 Upper Servo Feedback Potentiometer Renewal

1. Disconnect the battery earth lead.
2. **(On left hand cars)** Remove the instrument pack and surround trim.
2. **(On right hand cars)** Remove the glove box assembly.
3. Remove the securing screws and the potentiometer assembly. Disconnect the electrical connector.
4. Fitting a new potentiometer is the reverse of the removal procedure.

8.2.04.1 Lower Servo Feedback Potentiometer Renew

1. Disconnect the battery earth lead.
2. Un-clip and remove the left hand underscuttle casing.

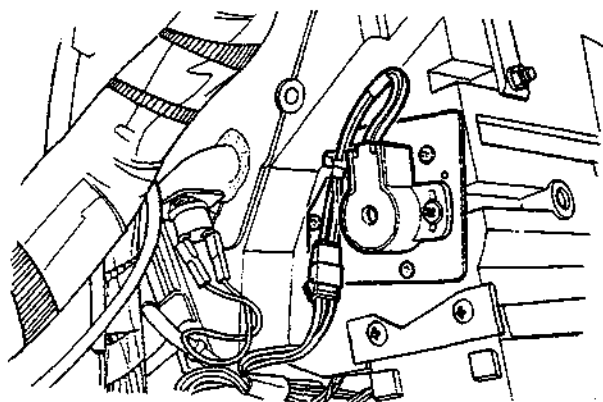


Figure 1.

3. Disconnect the electrical block connector (Fig. 1).
4. Remove the securing screw and the potentiometer assembly.
5. Fitting a new potentiometer is the reversal of the removal procedure.

8.2.05.1 Upper Flap Motor Assembly Renew

1. Disconnect the battery earth lead.
2. Remove the electronic control module.
3. Disconnect the motor block connector.
4. Remove the securing screws and motor assembly (Fig 1).

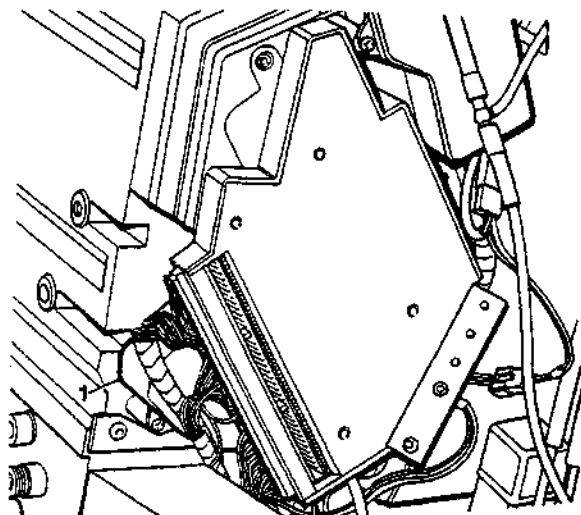


Figure 5.

5. Fitting a new motor is the reverse of the removal procedure.

8.2.06.1 Lower Flap Motor Assembly Renew

1. Disconnect the battery earth lead.
2. Remove the right hand side underscuttle casing.
3. Remove the electronic control unit.
4. Disconnect the block connector.
5. Remove the screws securing the motor to the air conditioning unit.
6. Displace the 'P' clip.
7. Withdraw and remove the motor from the air conditioning unit .
8. Fitting a new motor is the reversal of the removal procedure.

8.2.07.1 Ambient Temperature Sensor Renew

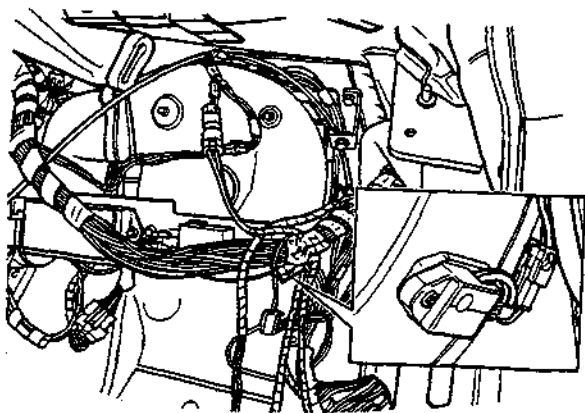


Figure 1.

The ambient temperature sensor is located in the left hand side of the air plenum chamber under the lower windshield panel (Fig. 1-1).

Procedure

1. Disconnect the battery earth lead.
2. **(On left hand cars)** Remove the steering wheel (mark the position on the column shaft for re-assembly), instrument pack and surround trim.
2. **(On right hand cars)** Remove the glove box lid and liner.
3. Disconnect the hose from the distribution box to the side vent outlet. Reposition the hose for access.
4. Disconnect the sensor block connector.
The sensor has locating clips and is a push fit into the plenum chamber.
5. Lever the sensor free.

8.2.08.1 Blower Motor Driver Side Renewal

8.2.09.1 Blower Motor Passenger Side Renewal

1. Move seat fully rearward.
2. Disconnect vehicle battery ground lead.
3. Remove the under scuttle/knee pad bolster.
4. Remove the lower brace bar/facia assembly underscuttle knee pad.

Driver Side Only

5. Remove the instrument pack, bonnet release handle mounting bracket and steering column..
6. Disconnect the air hose from the facia side air outlet.

Passenger Side Only

7. Remove the glove box lid and liner.

Both

8. Remove the nuts securing the component panel (Fig. 1-1).

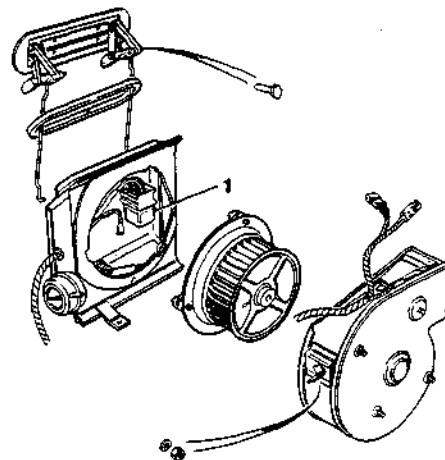


Figure 1.

9. Ease the component panel clear for access to the blower assembly mounting bolts.
10. Disconnect the pliable trunking from the stub pipes on either side of the air conditioning unit (Fig. 1-3).
11. Disconnect the blower motor electrical harness at the block connector.

12. Disconnect the vacuum pipe from the flap actuator (Fig. 1-4).
13. Open the re-circulation flap in the base of the blower assembly and fit a wedge to retain it in the open position (Fig. 1-5).
14. Remove the bolts securing the blower assembly and ease the blower unit from its location (Fig. 1-6).
15. Remove the tape securing the ducting to the assembly and remove the ducting (Fig. 1-7).

Note: To remove the blower motor assembly from the vehicle, the lower flap must be opened to allow the upper flap to disengage from the upper body aperture.

8.2.10.1 Blower Assembly Driver/ Passenger Side Overhaul

Note: Blower assemblies under warranty must not be dismantled.

1. Remove the three self tapping screws (Fig. 1-1) from the air intake casing.

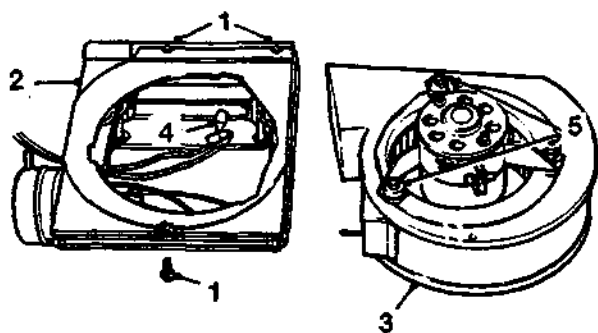


Figure 1.

2. Part the air intake casing (Fig. 1-2) from the motor assembly (Fig. 1-2) and disconnect the electrical connections at the lucar connectors (Fig. 1-4).

Note: Mark the position of the various components with paint or a scribe. This facilitates re-assembly.

3. One lucar connector has a raised projection which matches the aperture in the motor casing to ensure that the connections are replaced correctly and that the rotation of the motor is unaffected.
4. Remove the bolts securing the motor mounting bracket to the fan housing (Fig. 1-5).
5. Remove the motor and fan assembly from the fan housing.
6. Remove the mounting bracket from the motor.
7. Using appropriate Allen key, remove the impellor fan from the spindle.

Re-assembling

1. Refit the fan to the motor and secure it to the spindle.
2. Refit the mounting bracket to the motor.
3. Locate the fan and mounting assembly into the fan housing.

4. Place the flap box assembly to the fan housing and reconnect the electrical connections.
5. Fit and tighten the screws securing the flap box to the housing.
6. Raise the re-circulation flap, fit and tighten the remaining screw.
7. Refit the blower motor assembly.
8. Reconnect the battery earth-ground lead.

8.2.11.1 Blower Motor High Speed Relay Renewal

1. Remove the blower motor assembly complete.

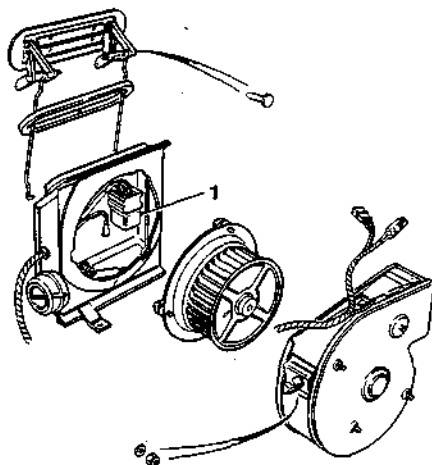


Figure 1.

2. Open the flap for access.
3. Using a suitable tool remove the relay from the blower assembly (Fig. 1-1).
4. Fit a new relay and refit the blower motor assembly.

8.2.12.1 Water Temperature Switch Renewal

1. Disconnect the battery earth lead.
2. Un-clip and remove the left hand underscuttle casing.

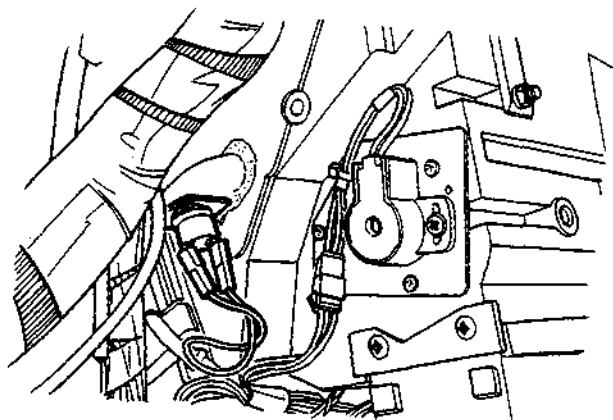


Figure .

3. Note and disconnect the feed wires from the switch (Fig. 1-1).
4. Displace and remove the switch from the water pipe.
5. Fitting a new switch is the reversal of the removal procedure.

8.2.13.1 Heater Matrix Renewal

1. Disconnect the battery earth lead.
2. Remove the left hand underscuttle panel.
3. **(On right hand cars)** Remove the glove box assembly.
3. **(On left hand cars)** Remove the instrument pack and surround trim, steering column and mounting bracket.
4. Drain the coolant into a suitable container.
5. Remove the matrix cover panel securing screws.
6. Remove the rear panel, displace the front panel and foam seal for access.
7. Place rag in position.
8. Remove screws securing the feed pipe and disconnect the pipe from the matrix.
9. Remove and discard the gasket.
10. Remove the screws securing the feed pipe and disconnect the pipe from the matrix.
11. Remove and discard the gasket.
12. Disconnect the water temperature switch feed wires.
13. Remove the foam pad from the pipes.
14. Remove the front panel from the unit.
15. Undo the heater hose matrix pipe hose clips and disconnect the hoses from the pipes.
16. Reposition the pipes from the matrix.
17. Remove the matrix from the air conditioning unit.
18. Fitting a new matrix is the reversal of the removal procedure.
19. Ensure that new gaskets are fitted.

8.2.14.1 Electronic Control Module Renew

1. Disconnect the battery earth lead.
2. Remove the right hand underscuttle casing.
3. **(On left hand cars)** Remove the glove box assembly.
3. **(On right hand cars)** Remove the instrument pack and surround trim.
4. Disconnect the earth wire and three block connectors from the control module (Fig. 1-2).
5. Remove the securing screws and module from the air conditioning unit (Fig. 1-1).

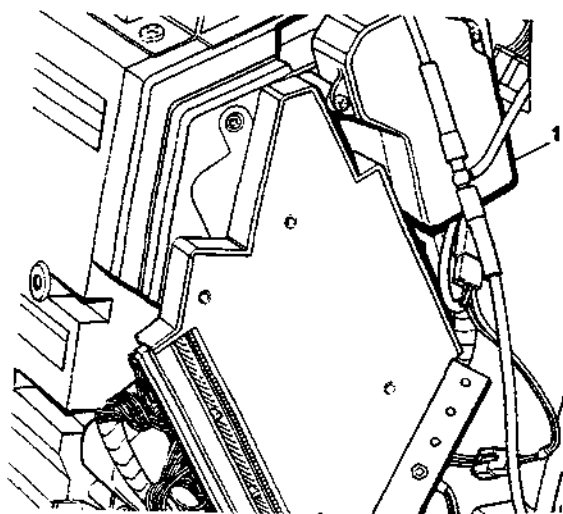


Figure 1.

6. Fitting a new module is the reversal of the removal procedure.

8.3.01.1 Vacuum System Solenoid Renewal

The flaps in the cabin air distribution vents and the water valve in the pipe line from the engine coolant system to the heater matrix are all operated by vacuum actuators. The vacuum for these is supplied by four solenoids mounted in a manifold pack located behind the front left hand footwell outlet. Failure of a solenoid will require replacement of the manifold pack.

Procedure

1. Disconnect the battery earth lead.
 2. Remove the following:
 - glove box and lid
 - facia trim (walnut strip)
 - radio and ashtray
 - centre console switch assembly
 - left hand underscuttle casing/knee bolster
- Details of the above operations can be found in the trim and the electrical sections.
2. Remove the fixings joining the centre console to the facia. This allows the front of the console to be repositioned for access.
 3. Disconnect the ducting from the left hand footwell outlet.
 4. Remove the two plastic fixings that secure the slotted footwell outlet and slide the outlet out of the unit.
 7. Cut the tie strap holding the vacuum lines and electrical harness to the underside of the air conditioning unit.
 8. Remove the screws that secure the manifold pack to the underside of the air conditioning unit and slide out the plate complete with the manifold pack.
 10. To fit a new manifold pack reverse the steps for the removal.

The Air Conditioning System Diagnostics

The air-conditioning control module (A/CCM) is located at the right end of the air-conditioning unit.

A digital microprocessor within the A/CCM receives data signals from the operator controlled switches. Comparison of these signals with those returned from the system temperature sensor and feedback devices results in the appropriate voltage changes necessary to vary: blower motor speed, flap positions and system solenoids to respond to the drivers selected temperature demand.

The air from the two blower motors is passed through the evaporator matrix which, depending on the A/C mode selected, removes heat from the incoming air. Depending on the position of the two blend flaps, the cold air passes either directly into the vehicle outlet vents, or is passed through the heater matrix to be reheated and then passed to the vehicle outlet vents.

The amount of air passing through the heater matrix is infinitely variable depending on ambient temperature and the temperature selected within the vehicle.

Air Conditioning Diagnostics

Cable Connections to the A/CCM

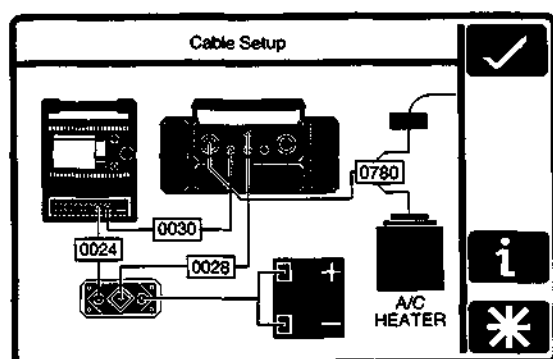


Figure 1. PDU connections to the A/CCM

1. Remove the right side underdash trim panel.
2. Connect the VBA (0024) to the vehicle battery
3. Connect the PDU to the VBA (0024).
4. Connect the VIA to the PDU using the VIA-PDU cable (0030).
5. Connect the AirCon DataLogger harness (0780) between the VIA Channel A and the Air-Conditioning Control Module on the vehicle.

Air Conditioning Signal Monitoring

The following signals can be monitored using the PDU. The abbreviated name of the signal is shown on the PDU display.

Display Name	Full Signal Name
AMBTMP	Ambient temperature sensor
ARECIP	Auto-Recirculation input
ARECOP	Auto-Recirculation output
AUX+	Auxiliary battery positive
CLUREL	Clutch relay drive output
CVSOL	Centre vent solenoid
DEFSOL	Defrost solenoid
DIFF	Temperature differential
EVSEN	Evaporator sensor
FANDEF	Fanspeed defrost
FANHIG	Fanspeed high
FANLOW	Fanspeed low
FANMED	Fanspeed medium
FIVEV	Five volt supply voltage
FORSERL	Lower servo forward drive
FORSERU	Upper servo forward drive
GND10	Ground voltage
GND2	Ground voltage
GND38	Ground voltage
GND45	Ground voltage
GND6	Ground voltage
HSREL	High speed relay drive
ICSEN	In-Car sensor
LBLOFB	Left blower feedback voltage
LBLOWOP	Left blower output voltage
LSERFB	Lower servo feedback potentiometer
MPROBE	Measurement probe
POWIN+	Switched power input
POWOP+	Power output
RBLOFB	Right blower feedback voltage
RBLOWOP	Right blower output voltage
REF	Reference signal
REVSERL	Lower servo reverse drive
REVSERU	Upper servo reverse drive
TEMPDEM	Temperature demand
USERFB	Upper servo feedback potentiometer
WATSW	Water switch
WATVAL	Water valve

The following signals are supported on the Air-Conditioning Control Module. For each signal, The signal name, mnemonic and background information are detailed.

Ambient Temperature Sensor

(AMBTMP)

A/CCM Pin 34 ref Pin 6

This sensor is located in the right hand blower motor. This signal is used to enable the A/C system to compensate for changes in ambient air temperature. The output to pin 34 is 2.732 volts at 0 degrees Celsius and changes by 0.01 volts for each degree Celsius above or below zero.

Auto-Recirculation Input

(ARECIP)

A/CCM Pin 9 ref Pin 6

This is effectively an On/Off switch for the A/C system and forms part of the fan control switch.

Switch Off - Pin 9 should be at ground

Switch On - Pin 9 should be at 10+ volts.

When pin 9 is at ground, pin 3 will be at 10+ volts causing the recirculation flaps to open.

Auto-Recirculation Output

(ARECOP)

A/CCM Pin 3 ref Pin 6

This signal will cause the recirculation flaps to close. Operating conditions should be:

A/C Off - 10+ volts at pin 3, flaps open.

Temp demand minimum - 10+ volts at pin 3, flaps open.

Defrost - 0 volts at pin 3, flaps closed.

Temp demand max - 0 volts at pin 3, flaps closed.

Auxiliary Battery Positive

(AUX+)

A/CCM Pin 1 ref Vehicle Battery -ve

This signal is the auxiliary supply to the A/CCM. Pin 1 should read battery voltage if the ignition switch is in the auxiliary or ignition on positions. Pin 1 should read 0 volts when the ignition switch is in the Off position or in position III whilst cranking the engine. Loss of this supply will cause total failure of the A/C system.

Clutch Relay Drive Output

(CLUREL)

A/CCM Pin 20 ref Pin 6

This signal responds to the input at pin 5 (evaporator sensor). When pin 5 is between 2.715 and 2.725 volts, pin 20 should read below 1 volt, and the compressor clutch will be switched off. When pin 5 is between 2.735 and 2.745 volts, pin 20 will rise to 10+ volts and the compressor will re-engage.

Centre Vent Solenoid

(CVSOL)

A/CCM Pin 18 ref Pin 6

The centre vent solenoid controls the operation of the centre vent flap. The centre vent will open to increase the cooling capabilities of the vehicle when cooling is selected. In all other conditions, the centre vent will be closed.

Solenoid energised: pin 18 should read 10+ volts and the centre vent will be open.

Solenoid de-energised; pin 18 should read below 0.5 volts and the centre vent should be closed.

Defrost Solenoid

(DEFSOL)

A/CCM Pin 11 ref Pin 6

The defrost solenoid controls the operation of the screen vents. When the solenoid is energised, the screen vents will be held closed by the vacuum created. To open the vents the solenoid is de-energised.

The solenoid is energised when a ground supply is provided to pin 11. The solenoid is de-energised when the ground supply is removed, at which point 10+ volts can be read at pin 11.

Temperature Differential

(DIFF)

A/CCM Pin 28 ref Pin 6

This sets the differential between the position of the upper and lower flaps. With minimum differential selected, pin 28 should read between 0 and 100 millivolts. The voltage at pin 28 will rise smoothly as the differential is increased, up to a maximum of 2.885 volts.

Evaporator Sensor

(EVSEN)

A/CCM Pin 5 ref Pin 6

This sensor monitors the temperature of the evaporator matrix, the output is used to trigger the compressor circuit via the A/CCM pin 20. Operating conditions are 2.732 volts at 0 degrees Celsius ± 0.01 volts for every degree Celsius above or below zero.

Fanspeed Defrost

(FANDEF)

A/CCM Pin 27 ref Pin 6

This signal is normally held at 3.6 ± 0.8 volts by the control module. When Defrost is selected from the control panel, the line is pulled down to 0.6 volts or below. This will cause the defrost flaps to open by applying system voltage (approx 11 volts) to pin 11. In addition, both fans will go to full speed i.e. high speed fan relay energised.

Fanspeed High

(FANHIG)

A/CCM Pin 15 ref Pin 6

This signal is generated from the fan speed control switch.

Switch at High, pin 15 should read 0.6 volts.

Switch at Off, L, M or D positions, pin 15 should read 3.6 ± 0.8 volts.

Fanspeed Low

(FANLOW)

A/CCM Pin 13 ref Pin 6

This signal is generated from the fanspeed control switch.

Switch at Low, pin 13 should read 0.6 volts.

Switch at Off, M, H or D positions, pin 13 should read 3.6 ± 0.8 volts.

Fanspeed Medium

(FANMED)

A/CCM Pin 14 ref Pin 6

This signal is generated from the fanspeed control switch.

Switch at Low, pin 14 should read 0.6 volts.

Switch at Off, L, H or D positions, pin 14 should read 3.6 ± 0.8 volts.

Five Volt Supply

(FIVEV)

A/CCM Pin 43 ref Pin 6

This 5 volt rail provides the power supply for all the sensors and the feedback potentiometers. Any variation in this signal would totally upset the balance of the whole system.

Flap Servo Drive Signals

The servo drive signals control the position of the upper and lower flaps. The drive signals work in pairs, two for the upper and two for the lower flaps.

Lower Servo Forward Drive

(FORSERL)

A/CCM Pin 37 ref Pin 6

Upper Servo Forward Drive

(FORSERU)

A/CCM Pin 40 ref Pin 6

Lower Servo Reverse Drive

(REVSERL)

A/CCM Pin 41 ref Pin 6

Upper Servo Reverse Drive

(REVSERU)

A/CCM Pin 42 ref Pin 6

When the flaps are stationary, all signals will be at 0.6 volts approximately. When the flap(s) is being driven, the drive line(s) will rise to approximately 6 volts.

As the flap approaches its final position, the drive signal will be pulsed to nudge the flap to the exact position required.

Note: If a drive signal rises to above 8.5 volts and the servo motor does not operate, suspect an open circuit within the servo.

Ground Voltage

(GND10)

A/CCM Pin 10 ref Pin 6

This is the ground supply from the A/CCM to the in-car sensor and should read below 10 millivolts.

Failure of this line will cause the in-car sensor to believe the vehicle temperature to be at maximum all the time, thus forcing the system into permanent cooling. Under these circumstances, pin 4 (in-car sensor output) will be approximately 5 volts.

Ground Voltage

(GND2) A/CCM Pin 2 ref Pin 6

Ground Voltage

(GND38) A/CCM Pin 38 ref Pin 6

Ground Voltage

(GND45) A/CCM Pin 45 ref Pin 6

Ground Voltage

(GND6) A/CCM Pin 6 ref Battery -ve

The four ground signals above must be at battery negative voltage at all times.

High Speed Relay Drive

(HSREL) A/CCM Pin 16 ref Pin 6

The high speed relay drive signal is used to energise the high speed relay and to run the blowers at full speed, bypassing the normal fan control circuit. The high speed relay will be energised whenever Defrost or High speed Fans is selected.

Relay energised, pin 16 should read 10+ volts

Relay de-energised, pin 16 should read below 0.5 volts.

If the signal at pin 16 is correct but only one fan responds, suspect a fault in the harness or relay.

In-Car Sensor

(ICSEN) A/CCM Pin 4 ref Pin 6

The in-car temperature sensor operates in the range 0-5 volts. Actual output is 2.732 volts at 0 degrees Celsius ± 0.01 volts for every degree Celsius above or below zero. The sensor signal forms a reference point for the whole system.

If the signal on this pin remains at less than 1 volt, suspect either a short to ground on the signal wire or an open circuit on the 5 volt supply line to the sensor.

If the signal rises to approximately 3 volts, then suspect an open circuit on the ground supply to the sensor.

Left Blower Feedback Voltage

(LBLOFB)

A/CCM Pin 22 ref Pin 6

This signal informs the control module of the present voltage applied to the left blower. The control module can then monitor and vary this voltage to change blower motor speed. With Manual selected, the blower operates in four basic ranges:

Low SpeedTemp Min: pin 22 = 5 ± 1 voltTemp Med: pin 22 = 9 ± 1 voltTemp Max: pin 22 = 5 ± 1 volt**Medium Speed**Temp Min: pin 22 = 2 ± 1 voltTemp Med: pin 22 = 6 ± 1 voltTemp Max: pin 22 = 2 ± 1 volt**High Speed**Pin 22 = 1 ± 1 volt at all temperature settings**Defrost**Pin 22 = 1 ± 1 volt at all temperature settings**Left Blower Output Voltage**

(LBLOWOP)

A/CCM Pin 31 ref Pin 6

This signal is produced by the control module to drive the blower motor. The signal can vary from 0-3 volts depending on blower motor speed. The higher the voltage, the higher the blower motor speed. This signal is amplified by a simple amplifier circuit inside the blower motor. This circuit also supplies the feedback signals to pins 22 and 33.

Note: If the signal rises above 5 volts, then suspect a fault in the amplifier circuit.

Lower Servo Feedback Potentiometer

(LSERFB)

A/CCM Pin 29 ref Pin 6

This feedback signal informs the control module of the exact position of the flaps, enabling accurate control of flap position.

Defrost - Lower flap signal should be 2.9 volts (flap closed) upper flap signal should read 1.9 volts.

Max Temp - Lower flap signal should read 1.14 volts, upper flap signal should read 1.9 volts.

Min Temp - Both lower and upper flap signals should read 130 ± 80 millivolts.

Note: If the feedback sticks low, with the fan continually running, suspect an open circuit in the 5 volts supply to the feedback potentiometer or the potentiometer itself.

Measurement Probe

(MPROBE)

Measurement probe (RED) with reference to measurement probe (BLACK).

Switched Power Input

(POWIN+)

A/CCM Pin 44 ref Pin 6

Switched power-in is a signal from the control module. Unlike the unswitched power available on pins 1 and 12, this signal is only available when the A/C is switched on.

Power Output

(POWOP+)

A/CCM Pin 12 ref vehicle battery +ve

This is the ignition power for the whole A/C system. It passes through the A/CCM via pins 1 and 12 (and a feedback protection diode) before supplying the fan control switch. Pin 12 should normally read battery voltage with the ignition switch in positions I or II. With the ignition switch off, pin 12 should read 0 volts.

Right Blower Feedback Voltage

(RBLOFB)

A/CCM Pin 33 ref Pin 6

The purpose of the blower feedback is to inform the control module of the present blower speed. This enables the control module to directly monitor and control blower motor speed. With Manual selected, the blower operates in four basic ranges:

Low Speed

Temp Min: pin 33 = 5 ± 1 volt
Temp Med: pin 33 = 9 ± 1 volt
Temp Max: pin 33 = 5 ± 1 volt

Medium Speed

Temp Min: pin 33 = 2 ± 1 volt
Temp Med: pin 33 = 6 ± 1 volt
Temp Max: pin 33 = 2 ± 1 volt

High Speed

Pin 33 = 1 ± 1 volt at all temperature settings

Defrost

Pin 33 = 1 ± 1 volt at all temperature settings

Right Blower Output Voltage

(RBLOWOP)

A/CCM Pin 32 ref Pin 6

This signal is produced by the control module to drive the blower motor. The signal can vary from 0-3 volts depending on blower motor speed. The higher the voltage, the higher the blower motor speed. This signal is amplified by a simple amplifier circuit inside the blower motor. This circuit also supplies the feedback signals to pins 22 and 33.

Note: If the signal rises above 5 volts, then suspect a fault in the amplifier circuit.

Reference Signal

(REF)

A/CCM Pin 7 ref Pin 6

This is the main reference signal for the A/CCM. All the sensors reference against this voltage. Drift in this signal will cause inconsistent temperature control.

Normal voltage should read 2.885 ± 10 millivolts

Temperature Demand

(TEMPDEM)

Temperature demand control either selects the required temperature of the system (auto mode) or the outlet temperature of the vents (manual mode). Pin 35 will vary from 0 volts at full cooling up to 2.885 volts at full heating.

Note: When defrost is selected, the signal at pin 35 is ignored. The system will go into full heating through the upper flaps only.

Upper Servo Feedback Potentiometer

(USERFB)

A/CCM Pin 30 ref Pin 6

The feedback signal informs the control module of the exact position of the flaps, enabling accurate control of the flap position.

Defrost - Lower flap signal should read 2.9 volts (flap closed, the upper flap signal should read 1.9 volts.

Max Temperature - Lower flap signal should read 1.14 volts, upper flap signal should read 1.9 volts.

Min Temperature - Both upper and lower flap signals should read 130 ± 80 millivolts.

Note: If the feedback sticks low, with the fan continually running, suspect an open circuit in the 5 volt supply to the feedback potentiometer or the potentiometer itself.

Water Switch

(WATSW)

A/CCM Pin 21 ref Pin 6

The water switch monitors the temperature of the coolant and inhibits heating by restricting fan operation at coolant temperatures below 30 degrees celsius. This enables the vehicle to warm up at a faster rate. It can be overridden by selecting Defrost.

Water Valve

(WATVAL)

A/CCM Pin 17 ref Pin 6

The water valve controls the flow of hot coolant to the heater matrix. When manual full cooling is selected, the valve will close inhibiting the heating effort of the matrix, thus enhancing the cooling effect

Full cooling selected; pin 17 should read 10+ volts and the water valve should be closed.

All other conditions, pin 17 should read below 0.5 volts and the water valve should be open.

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Introduction

This guide contains instructions for the installation of the Portable Diagnostic Unit hardware in Aston Martin Dealer workshops. To achieve maximum benefit from the system, please follow the instructions carefully. The following System Diagram shows the principal system components and panel details.

This introduction briefly describes the system and its capabilities. This is followed by the Installation and Power-Up procedures which give detailed instructions on how to start the system and access the self-contained Interactive Training Programme.

The subsequent sections detail the fault diagnosis and maintenance procedures.

WARNING: *The equipment must only be used by trained personnel. Care should be taken to use the equipment in accordance with the operating procedures. Observe all safety warnings in this guide. If any part of the system is damaged do not use it. Call your local GenRad Service Centre immediately for a substitute part. Refer to 'Parts Ordering'.*

WARNING: *If the system is used to measure high voltages, these voltages can appear on the pins of other connectors in the system. Ensure that socket covers are fitted on unused sockets. Ensure that all connections are made prior to applying the high voltage to the probes. Do not leave the equipment unattended in this state. The maximum voltage that may be applied between the test probes is 150 volts AC or DC.*

Radio Interference Statements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

This equipment has been tested and found to comply with the limits for Class A digital device pursuant to part 15 of the Federal Communications Commission (FCC) rules. However, operation in close proximity to domestic communication equipment may cause interference. It is the responsibility of the user to avoid or correct this condition.

The Aston Martin Diagnostic System

The Aston Martin Diagnostic System is a new generation diagnostic tool which fulfils a number of functions in aiding the technician to quickly and accurately locate faults. The heart of the system is the Portable Diagnostic Unit, a lightweight powerful computer/measurement system providing a step-by-step user friendly interface for the technician.

PDU functions include:

Data Logger - The ability to monitor and record control module signals even whilst the vehicle is being driven.

On-Line Help - Containing detailed descriptions in the operation of the vehicles electronic components.

Vehicle Setup - The ability to setup various adjustable parameters to their optimum settings.

Diagnostic Trouble Codes - The ability to extract recorded fault information from the DB7's control modules.

Each of these functions is described in detail in the PDU Users Guide.

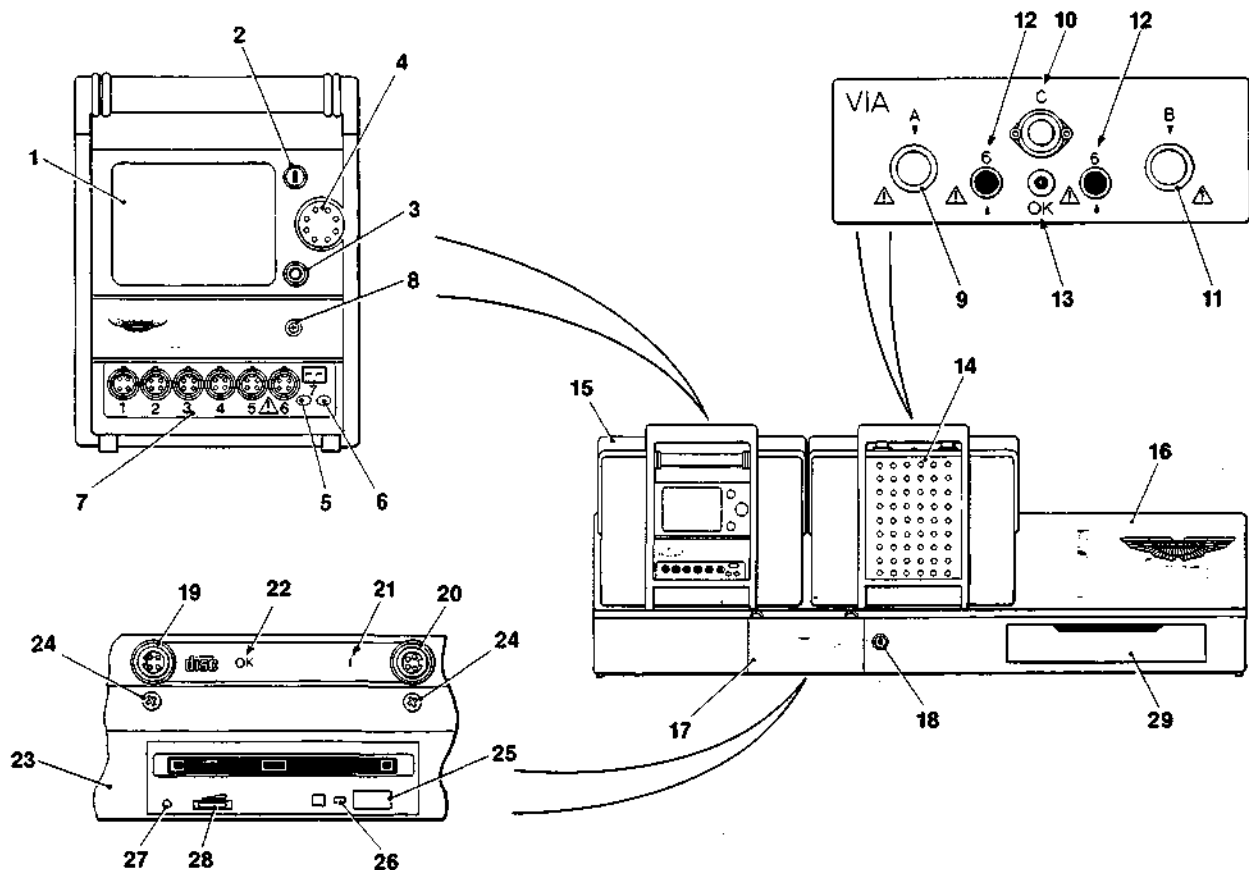


Figure 1. The Aston Martin Diagnostic System

Key to Figure 1

- | | |
|--|---|
| 1. LCD touch screen | 12. Connector for PDU cable |
| 2. Power on switch | 13. VIA status indicator |
| 3. Power off switch | 14. Vehicle Interface Adaptor (VIA) |
| 4. Screen contrast control | 15. Portable Diagnostic Unit (PDU) |
| 5. Battery charge indicator (Orange/Yellow) | 16. Base Station |
| 6. Power on indicator (Green) | 17. Base station door |
| 7. PDU interface connectors | 18. Base station door lock |
| 7.1. Black probe | 19. Charging and loading data connector |
| 7.2. Red probe | 20. Secondary charging connector |
| 7.3. Current clamp | 21. Power on indicator (Green) |
| 7.4. Pressure transducer | 22. Status Indicator (Red) |
| 7.5. Vehicle battery adaptor (VBA) | 23. CD-ROM drive |
| 7.6. VIA, base station, serial interface and system test | 24. Electronic module securing screws |
| 7.7. Temperature probe | 25. CD-ROM eject button |
| 8. Battery cover | 26. CD-ROM drive active light |
| 9. Connector A for vehicle cable | 27. Audio output (not used) |
| 10. VIA power input cable | 28. Audio level (not used) |
| 11. Connector B for vehicle cable | 29. Base station drawer. |

Component Identification

Base Station (Fig 1-16)

The Base Station is a wall or bench mounted steel unit on which up to two Portable Diagnostic Units and a Vehicle Interface Adaptor can be stored.

Portable Diagnostic Unit (PDU) (Fig 1-15)

The PDU is a hand held diagnostic tool utilising a touch sensitive screen and serial communications capability

Electronics Module

The Electronics Module is located behind the base station door (Fig 1-17) and facilitates the charging of the PDU battery. Also contained in the module is the CD-ROM drive (Fig 1-23) for the storage of all system software. The PDU must be connected to the electronic module whenever it is located on the base station.

Vehicle Interface Adaptor (VIA) (Fig 1-14)

The VIA enables the PDU to interface with vehicle systems not equipped with serial communications.

Vehicle Battery Adaptor (VBA)

The VBA provides the correct voltage to power the PDU from the vehicle battery and also protects the PDU from any interference from the vehicles electrical systems.

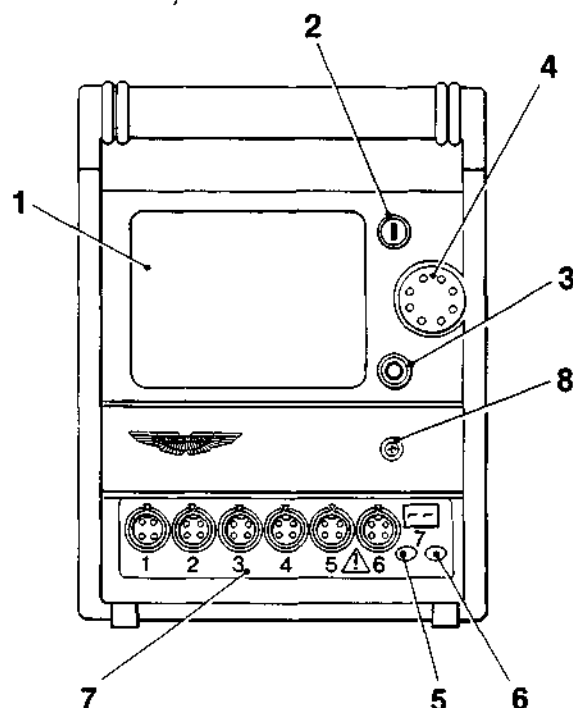


Figure 2. The Portable Diagnostic Unit

Controls

The Touching the Power On button (Fig 2-2) will switch on the unit and bring on the screen backlight. Also note that the Power On Indicator (Fig 2-6) will illuminate.

Touching the Power Off button (Fig 2-3) will turn off the unit, screen backlight and power on indicator.

The Touch Sensitive Screen (Fig 2-1) is used to display information in digital or in graphic forms. Program options are also displayed and may be selected by touching the appropriate area of the screen.

CAUTION: The use of sharp pointed implements will damage the touch sensitive screen. Use only light finger pressure to operate the PDU.

To adjust the screen contrast, rotate the contrast control (Fig 2-4) to the required position.

In order to preserve the battery charge, the power to the screen backlight is automatically switched off after 5 minutes of inactivity. In this state, the Power On indicator (Fig 2-6) remains illuminated to indicate that the PDU is in stand-by mode. Touching the screen will return the PDU to normal operating mode.

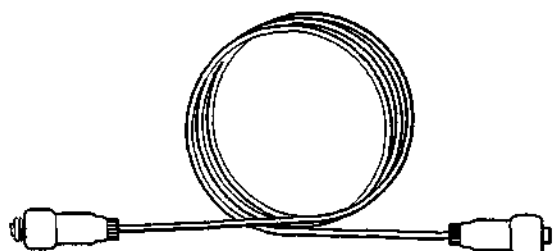
Diagnostic System Cables

Cables

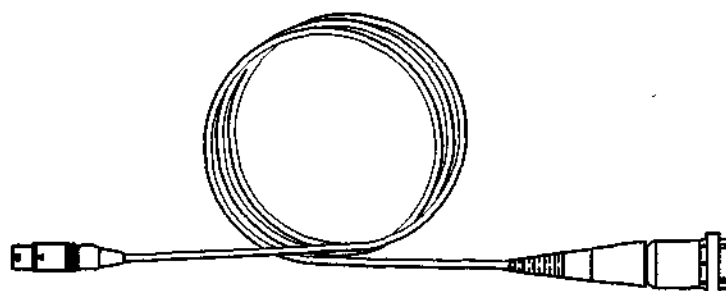
The cables connecting the diagnostic system elements together and to the electronic units of the vehicle are identified in the following illustrations.

The cables should be stowed in the base station drawer or in the pockets of the PDU and VIA carrying cases.

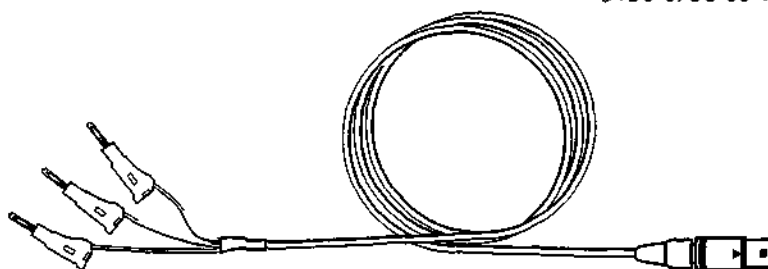
CAUTION: Care must be taken when using the vehicle cables since they are capable of passing high currents. Short Circuits are a fire risk.

Diagnostic System Cables

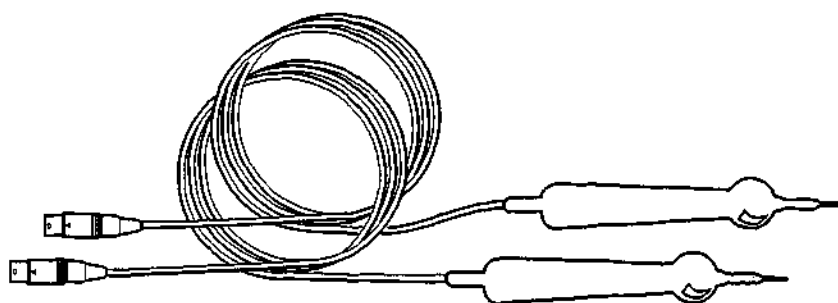
3130-0028-01 VIA-VBA Cable

3130-0753-00
3130-0754-00
Red and Black Croc Clips

3130-0756-00 Transmission Test Cable

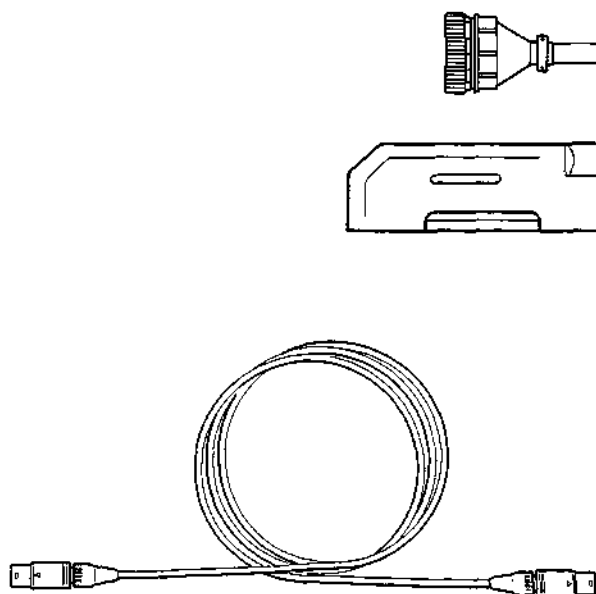


3130-0026-01 Scope and Self Test Adaptor Cable

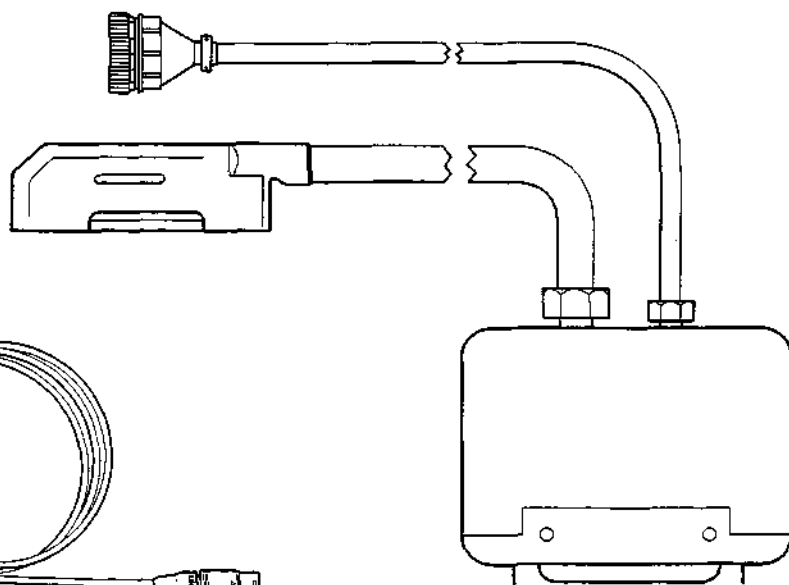
3130-022-01 Red Probe
3130-023-01 Black Probe

3130-1242-00 Aston Martin Protocol Adaptor

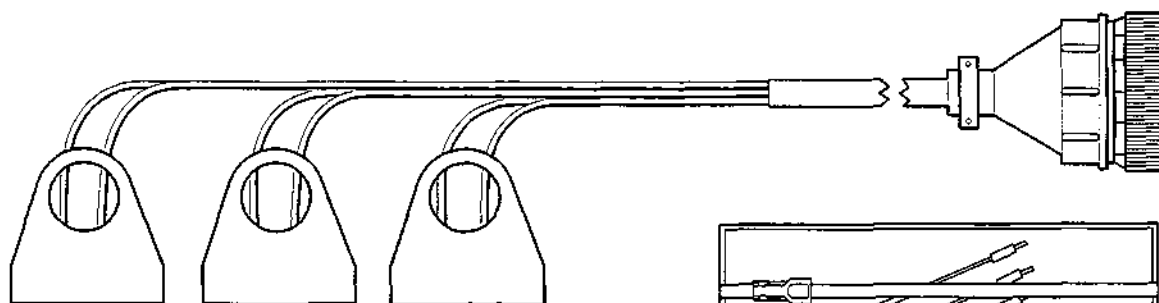
Diagnostic System Cables



3130-0030-01 VIA-PDU Cable



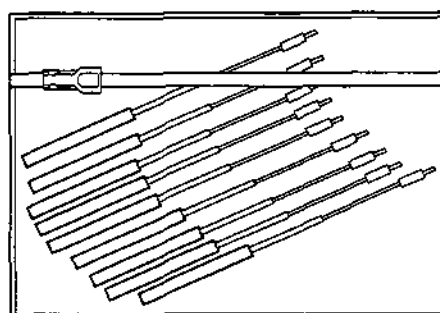
3130-0778-00-B Anti-Lock Brakes



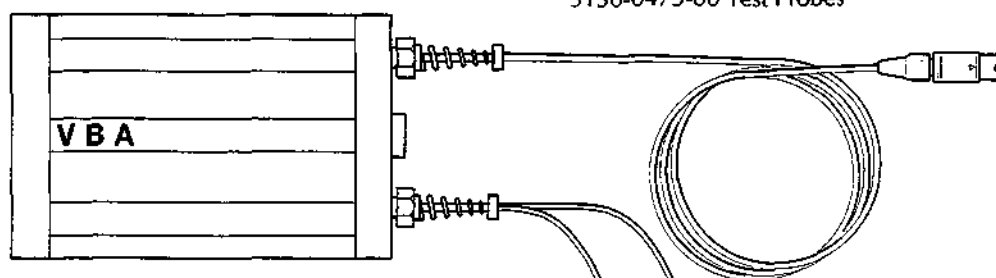
3130-0780-00-B Air Conditioning Test Cable Cable



3130-0064-01 Base Station-PDU Cable



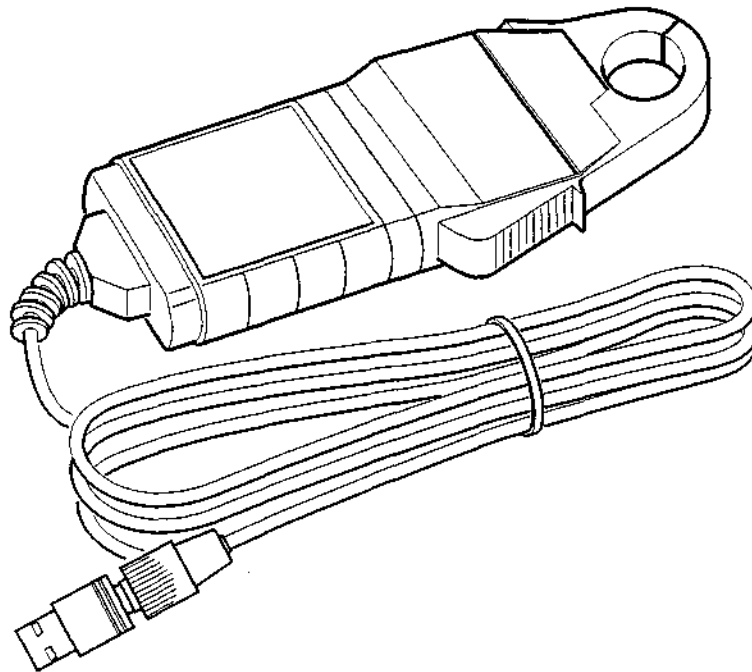
3130-0475-00 Test Probes



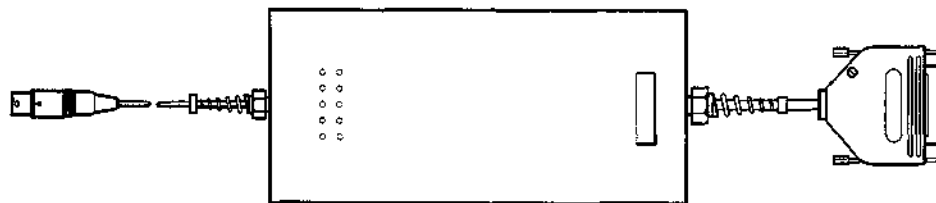
3130-0024-01 Vehicle Battery Adaptor



3130-0764-00 Road Test Ext Cable

Diagnostic System Cables

3130-1213-01 Aston Martin Current Probe



3539-1169-02 Aston Martin Printer Lead



3538-0100-01 Aston Martin Multi Protocol Adaptor

Base Station Installation

It is recommended that the base station is wall mounted (Fig 3). Alternatively it may be mounted on a bench. The base station houses the CD-ROM drive and power supplies.

Note: The electronic module should only be fitted after the base station has been installed.

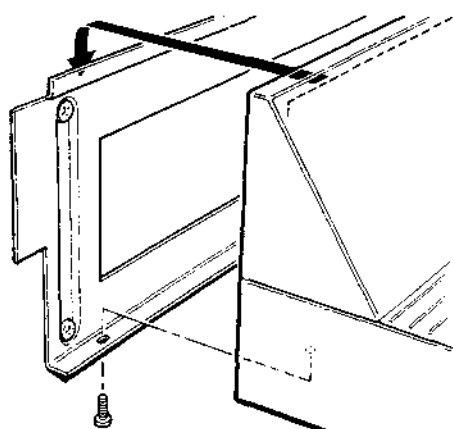
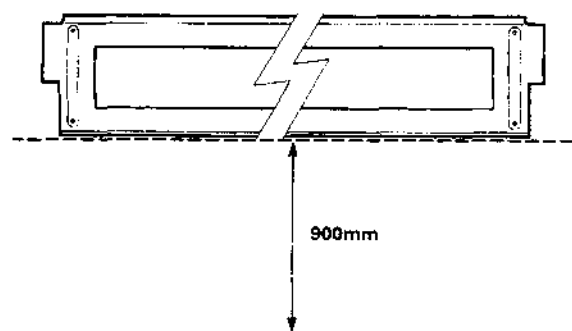
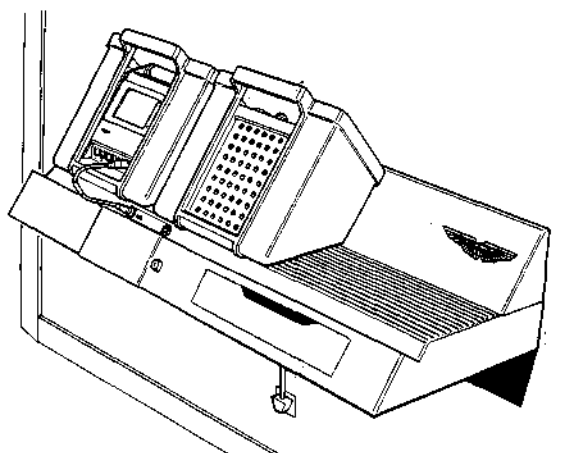


Figure 3. Wall Mounted installation

Wall Mounting

It is important that the following points be considered before carrying out the mounting procedure.

1. The location should be close to the vehicle repair bays. The base station will require a power outlet close by, such that the 2m mains lead will comfortably reach the outlet.
2. The wall plate should be attached with four fasteners, each of which has a minimum pull-out strength of 300 kg (662 lb). The four fasteners are not supplied, as the type of fastening will depend on the wall material. The mounting holes in the wall plate are 8mm diameter with a maximum clearance for a socket spanner of 30mm. It is recommended that 6mm diameter bolts are used to secure the wall plate.

WARNING: The mains power outlet must be close to the equipment and be clearly recognisable as the power source for safety reasons.

French Market Only: Do not connect the PDU equipment to IT (Impedante Terre) power systems.

WARNING: This equipment must be earthed via the mains lead through the outlet socket. In markets where three pin main power outlets are not available, a separate earth point must be used

Procedure

1. Select a suitable location.
2. Mark a horizontal line on the wall 900mm above the floor (Fig 3)
3. Remove the two screws securing the wall mounting plate to the base station and remove the wall mounting plate.
4. Hold the wall mounting plate up to the marked line and mark four hole positions for the wall mounting plate bolts.
5. Drill the wall to the correct diameter and depth required for the four bolts.
6. Securely fasten the wall mounting plate to the wall. Lift the base station onto the wall mounting plate, fit and tighten the two screws/washers to secure the base station to the mounting plate.

CAUTION: The gap beneath the base station should be maintained free from obstructions to allow a flow of air under the unit for cooling.

Bench Mounting

The base station may also be mounted on a bench, which must be in a safe position, stable and protected from hazards and impacts. The base station must be mounted at the back of the bench. 'Z' clips are provided for permanent mounting. The bench surface must be kept free from dust at all times.

CAUTION: A gap under the base station must be maintained free from obstructions to allow a flow of air under the unit for cooling.

Electronic Module Installation

WARNING: The base station electronic module must be disconnected from the mains supply prior to installation/removal from the base station assembly. **DO NOT** reconnect to the mains supply until the module is safely fitted into the base station. This unit must be earthed.

Note: Users in North America are advised to replace the ceramic mains fuse in the electronic module with the glass fuse supplied.

Procedure

1. Unlock the base station door
2. Pull the right spring-loaded hinge (Fig 4-1) and remove the door.
3. Remove the electronics module from the packaging and place it on a firm surface.
4. Remove the two screws and washers from the front of the module (Fig 4-3).
5. Insert the mains power lead into the socket at the rear of the module (Fig 4-4), **DO NOT CONNECT TO THE MAINS SUPPLY.**
6. Insert the two guide pins on the sides of the module (Fig 4-5) into the base station slots.
7. Slide the module into the base station until fully home, raise the front so that it is level and draw it slightly forward.
8. The two connectors on the front of the module will appear through the matching holes in the base station. Support the module whilst refitting the two retaining screws and washers (Fig 4-6).
9. Secure the mains lead to the underside of the base station using the two cable ties provided (Fig 4-7).
10. If bench mounting, the base station will need to be turned on its back to install and secure the mains lead.
11. Refit the base station door.

CAUTION: Take care to avoid the sharp edges of the module whilst installing. Take care to support the module from the underside until the mounting screws are secured.

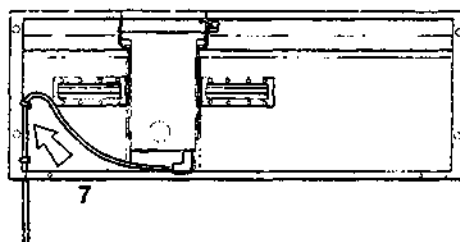
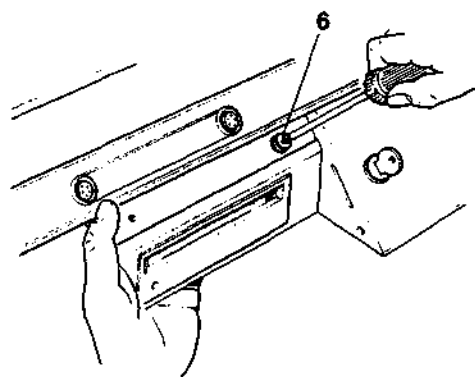
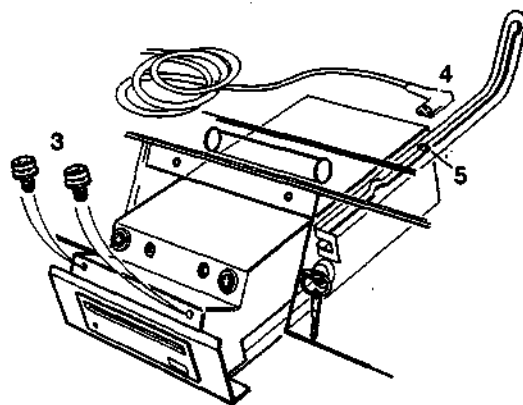
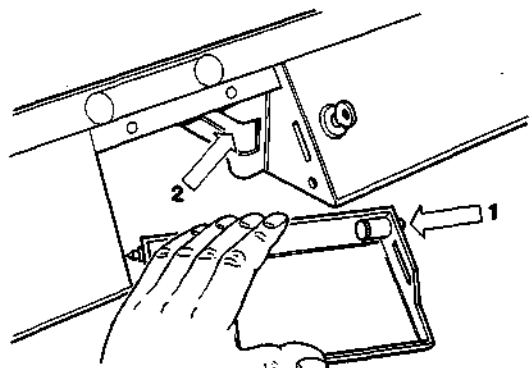


Figure 4. Electronic Module Installation

Powering-Up the Base Station

When first operating the System or when first using a PDU fitted with substitute batteries, it will take up to 36 hours to achieve full charge. In the meantime, the PDU can be used whilst connected to the base station or to the vehicle battery.

WARNINGS:

When using the system equipment, basic safety precautions should always be followed, including:

Carefully read and follow all instructions.

Care should be taken as burns can occur from touching hot parts.

Do not operate the appliance with a damaged mains lead or if the appliance has been dropped or damaged. Call your local GenRad Service Centre immediately for a substitute part.

Do not let the mains lead hang over the edge of the table, bench or counter or come into contact with hot manifolds or moving fan blades.

The Aston Martin Portable Diagnostic Unit is fitted with an auto switching power supply suitable for voltage supplies of 100 - 240 VAC 50 - 60 Hz. You need only check that the power cord connector is of the correct type for your power outlets.

1. Connect the mains lead to the mains outlet.
2. Check that the green indicator lamp above the base station door is illuminated. If the green lamp does not come on, see the problem solving section for advice.
3. After a few seconds, during which the electronics module completes its self-test, the red OK indicator lamp should illuminate. If the red lamp does not come on, see the problem solving section for advice.
4. Allow the base station electronics module to reach working temperature. This will take approximately 30 minutes, after which time the base station will be ready to accept the software on CD-ROM.
5. Slide the PDU into its carrying case and place the associated cables and probes in the carrying case compartments.

6. Place the carrying case onto the base station at the far left side (Fig 5). This is the normal place for charging the battery, loading software and storing the PDU. Note that it is retained by raised retaining blocks which fit inside the recesses under the carrying cases (Fig 5).
7. Remove the protective cover from the PDU interface panel socket (Fig 1-7.6)
8. Using the PDU to base station cable (0064) connect panel socket 6 to the base station left socket (Fig 1-19). The indicator lamp will glow orange during fast charge and yellow during trickle charging.
9. A second PDU can be fitted on the central position on the base station and may be connected to the right charging socket using a second cable (0064). Note that both units may be charged simultaneously but software may only be loaded from CD-ROM using the left base station socket.

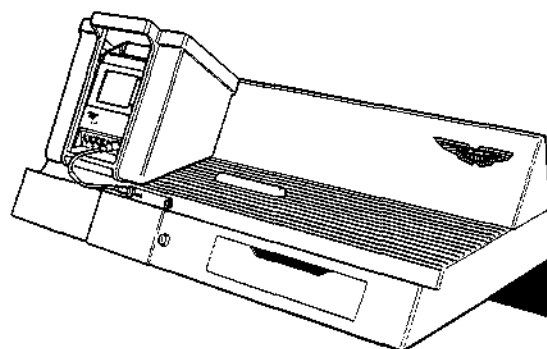


Figure 5. Normal PDU position

Installing the CD-ROM (Early Systems)

1. Ensure that your hands are clean before touching the CD-ROM disc, disc caddy, or the CD-ROM drive.
2. Open the base station door to gain access to the CD-ROM drive.
3. Open the CD caddy by squeezing the sides whilst lifting the hinged door upwards (Fig 6).
4. Handling the CD by the edges only, remove it from the protective sleeve and insert it into the caddy with the image side uppermost. Close the caddy door.
5. Insert the CD caddy into the CD drive in the base station. Close and lock the CD-ROM drive door. The base station is now ready for use.

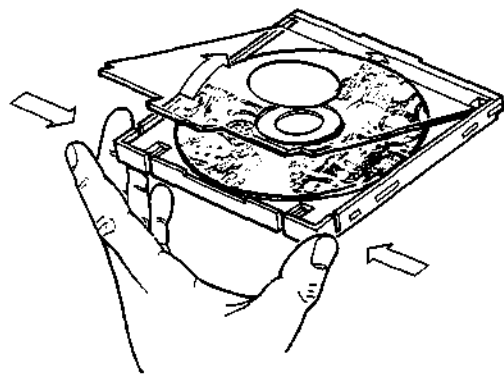


Figure 6. CD-ROM Installation (Early Systems)

Installing the CD-ROM (Later Systems)

Later PDU systems have an improved CD-ROM drive incorporating a tray loading mechanism for the CD-ROM disc.

1. Ensure that your hands are clean before touching the CD-ROM disc, or the CD-ROM drive.
2. Open the base station door to gain access to the CD-ROM drive.
3. Press the tray eject button on the CD-ROM drive (Fig 7). The tray will open automatically.
4. Remove the CD from its protective sleeve and place it on the tray with the image side uppermost.
5. Gently push on the tray and the motorised mechanism will start to retract the tray automatically.

Alternatively, pressing the eject button will cause the tray to close.

6. Close and lock the CD-ROM drive door. The base station is now ready for use.

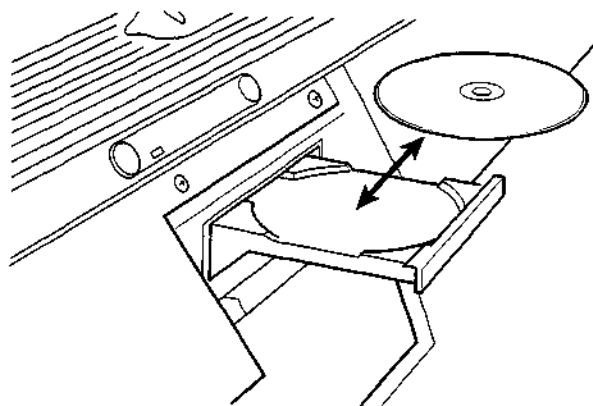


Figure 7. CD-ROM Installation (Later Systems)

Removing the CD-ROM (Early Systems)

1. Ensure that your hands are clean before touching the CD-ROM disc, disc caddy, or the CD-ROM drive.
2. Unlock and open the CD-ROM drive door.
3. Press the eject button on the CD-ROM drive (Fig 1-25).
4. After a short delay, the CD caddy will be ejected. Remove the caddy from the CD drive.
5. Open the caddy and remove the CD. Place the CD into its storage sleeve and store in the base station drawer (Fig 8).

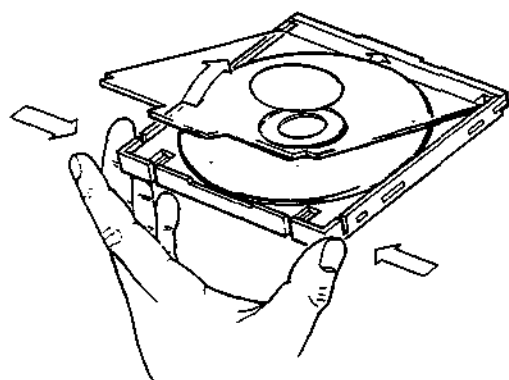


Figure 8. CD-ROM Removal (Early Systems)

Removing the CD-ROM (Later Systems)

1. Ensure that your hands are clean before touching the CD-ROM disc, or the CD-ROM drive.
2. Unlock and open the CD-ROM drive door.
3. Press the eject button on the CD-ROM drive (Fig 1-25).
4. The CD tray will open fully. Remove the CD from the tray.
5. Gently push on the tray or press the eject button again to close the motorised tray (Fig 9).

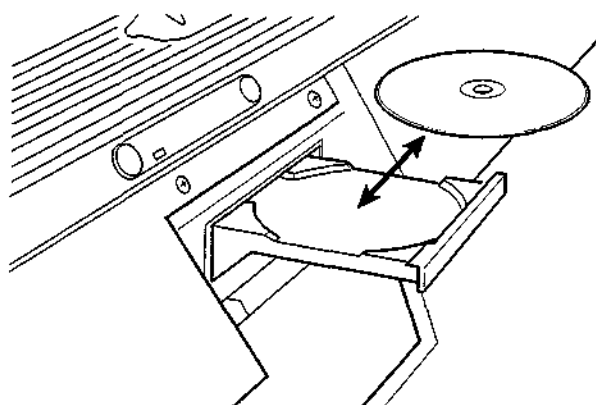


Figure 9. CD-ROM Removal (Later Systems)

Powering-Up the PDU

1. Install the CD-ROM.
2. Press the PDU power on switch (Fig 1-2). An audible tone will be heard and the green PDU power on indicator (Fig 1-6) will illuminate. The touch sensitive screen will also be activated. If this does not happen, see the problem solving section.
3. Adjust the contrast control (Fig 1-4).
4. When the PDU is switched on, it will perform an automatic self-check to test the internal components. On successful completion of the self-check, a PDU symbol will appear with a 'tick' next to it (Fig 10). The PDU will then display the language selection screen (Fig 11).
5. Select the required language and confirm the selection (Fig 11).
Note: PDU text is available in English, French, Italian, German and Japanese.
6. The PDU will then load its software from the CD-ROM and display the 'main menu' (Fig 12).
7. New users may select 'Training' and press the 'tick' icon to enter the on-screen PDU training programme.

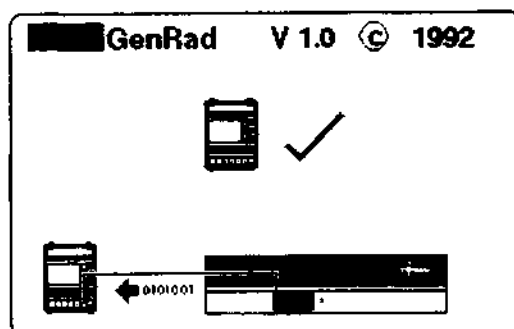


Figure 10. Self-check completed screen

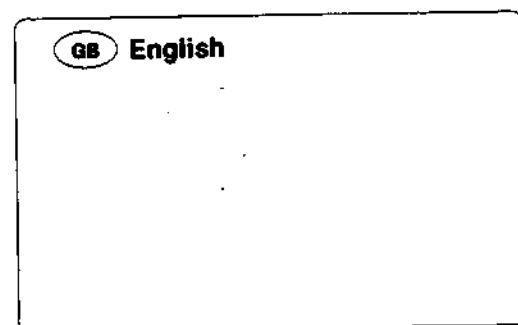


Figure 11. Language selection screen

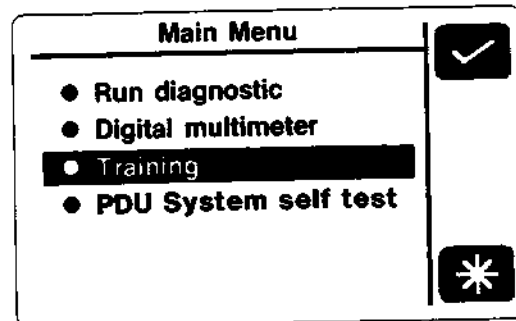


Figure 12. The main menu

Battery Charging

The PDU is fitted with internal NICAD batteries which allow the PDU to be transported whilst retaining programs. The batteries are not designed to be used as a general power source. A special circuit monitors the amount of charge in the batteries so that they cannot be overcharged.

From the time when first operating the system or a PDU fitted with substitute batteries, it will take up to 36 hours to achieve full charge. In the meantime, the PDU can be used whilst connected to the base station or to the vehicle battery. Keep transit times to and from the vehicle as short as reasonably possible to preserve battery charge.

Subsequent battery charges should take six to seven hours from fully discharged. The PDU must always be left connected to the base station when not in use in order to keep the batteries fully charged.

CAUTION: The rechargeable NICAD batteries fitted to the PDU are of a special type and must only be replaced with GenRad approved parts. Do not substitute the batteries with any other type. Always dispose of old batteries in compliance with local recycling regulations. The procedure for changing the battery pack is described later in this installation guide.

Operating Procedures

Refer to the Aston Martin Diagnostic System Users Guide for detail on each of the PDU software options

Selecting Diagnostics

1. Switch on the PDU, the main menu will be displayed.
2. Select 'Run Diagnostic' from the main menu and confirm the selection by pressing the 'tick' icon. A sequence of menus will be displayed requesting identification of the vehicle under test.
3. The system will load the appropriate software.
4. On completion of software loading, disconnect the PDU from the base station and transfer it in its carrying case to the vehicle. The additional pockets in the carrying case may be used for carrying any interface cables required.
5. If the VIA is required, also transfer it in its carrying case to the vehicle together with any vehicle interface cable required.

Using the PDU on the Vehicle

At the vehicle, the PDU may be removed from its carrying case if required. The PDU should always be connected to the vehicle using the Vehicle Battery Adaptor (VBA) (0024). The PDU will continue to charge from the vehicle battery.

Vehicle Battery Adaptor

This unit transforms battery voltage to the correct level for the PDU. The VBA (Fig 13) also contains electrical filters to protect the PDU from any voltage spikes or other interference from the vehicle which could affect PDU operation.

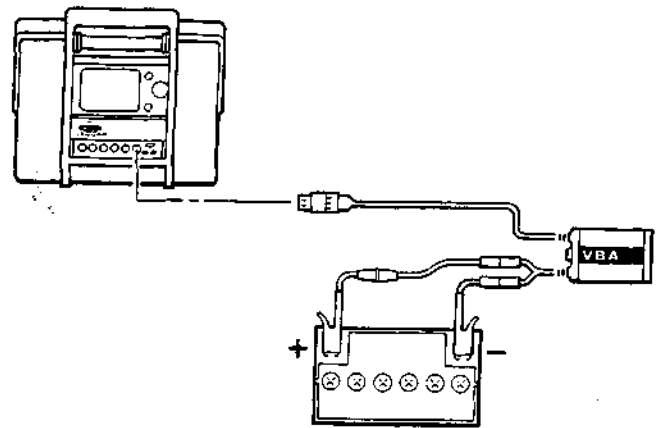


Figure 13. The vehicle battery adaptor

Vehicle Interface Adaptor

When the software requires the Vehicle Interface Adaptor to be used, it is powered from the vehicle battery (Fig 14). The Vehicle Battery Adaptor incorporates a socket into which the VIA to VBA cable (0028) is inserted. The opposite end of this cable is inserted into the connector on the VIA panel.

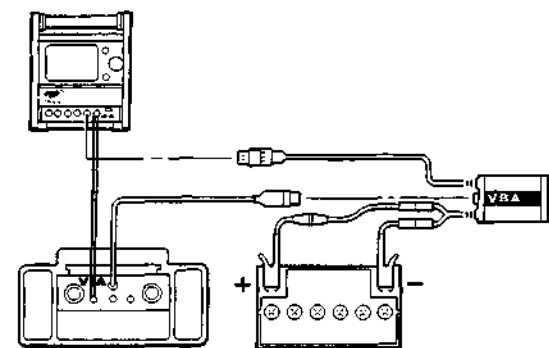


Figure 14. The vehicle interface adaptor

Finishing the Test

When data analysis is finished, switch off the PDU and disconnect it from the vehicle. Store the PDU and cables in the carrying case and refit the case to the base station.

Connect the PDU to the base station using cable 0064. The base station will keep the PDU batteries fully charged at all times (Fig 15).

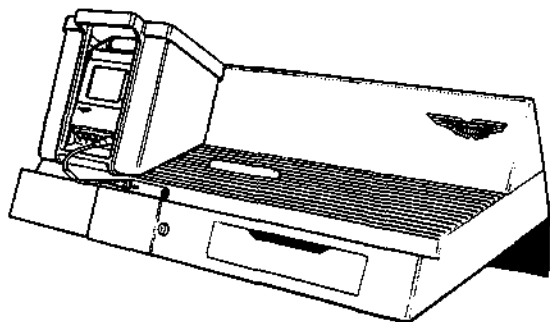


Figure 15. PDU connected for recharging

Care of the Equipment

CAUTION: *With the exception of those parts referred to in the Servicing and Maintenance section, there are no user serviceable parts. All servicing must be carried out by GenRad Service Centres.*

Switch off the power before cleaning the equipment. The Aston Martin Diagnostic System should only be cleaned using a non-abrasive, mild cleaning agent. Dust and other particles should be lightly brushed from the surface before cleaning. Cleaning agent should be applied to a soft lint-free cleaning cloth and never directly to the unit. Do not soak the cleaning cloth and take care not to allow cleaning fluid to enter connectors.

CAUTION: *If any liquid is spilt on the equipment, switch off immediately. Ensure that the equipment has dried out completely before operating it again, especially in connectors where fluid can lodge.*

Problem Solving

CAUTION: If any part of the system is damaged, do not use it. Call your local GenRad Service Centre immediately for a substitute part. Refer to 'Parts Ordering'.

CAUTION: With the exception of those parts referred to in the Servicing and Maintenance section, there are no user serviceable parts. All servicing must be carried out by GenRad Service Centres.

PDU Self-Test

The system self test routine should be run periodically even if there are no apparent problems with the system. Running the system self-test will identify any problems before they impact on productivity.

If it is suspected that the system is operating incorrectly, run the PDU system self test option on the main menu).

If the system self test will not run, or the PDU will not switch on, the instructions in this section must be followed carefully.

If one of the following test steps advises you to order or fit a new part, make a note of the test step, part number and description. Then follow the parts ordering procedure later in this section.

Step 1

Connect the mains power to the base station. Is the green base station indicator illuminated?

YES - Go to step 4

NO - Go to step 2

Step 2

Check the mains supply, then check the mains lead. Is the mains lead faulty?

YES - Renew the mains lead.

NO - Go to step 3

Step 3

Remove the electronic module from the base station.

Using a small screwdriver, open the fuse drawer below the power socket on the rear of the module (Fig 16). Remove the fuse and fit the spare fuse. The fuse must be IEC 127 approved ceramic type 250V 2A (T). Re-install the module into the base station, power up the system. Is the base station green indicator illuminated?

YES - The fuse was faulty

NO - Renew the electronic module (0019)

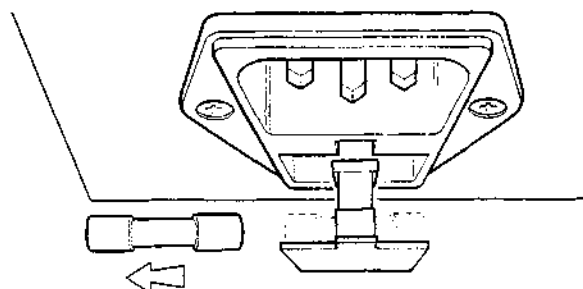


Figure 16. Electronic Module Fuse Replacement

Step 4

Connect the mains power to the base station. Is the base station red indicator illuminated?

YES - Go to step 5

NO - Renew the electronic module (0019)

Step 5

Switch off the PDU and disconnect all cables. Set up the PDU to charge from the left charge socket on the base station using one of the PDU to base station cables. Is the PDU charge indicator (Fig 1-5) illuminated.

YES - Go to step 9

NO - Go to step 6

Step 6

Set up the PDU to charge from the right socket on the base station using the same PDU to base station cable. Is the PDU charge indicator (Fig 1-5) illuminated.

YES - Go to step 8

NO - Go to step 7

Step 7

Using the VBA, connect the PDU to a charged vehicle battery. Is the PDU charge indicator illuminated?

YES - Go to step 8

NO - Renew the PDU (0017)

Step 8

Switch off the PDU and disconnect all cables. Connect the PDU to the base station left connector using the second PDU to base station cable (0064). Is the PDU charge indicator illuminated?

YES - The first PDU to base station cable (0064) is faulty, renew the cable.

NO - Renew the electronic module (0019).

Step 9

Switch on the PDU. Is the PDU power indicator (Fig 1-6) illuminated?

YES - Go to step 10.

NO - Renew the PDU (0017).

Step 10

Is the PDU touch screen illuminated?

YES - Go to step 12.

NO - Go to step 11.

Step 11

Adjust the contrast control. Is the PDU touch screen illuminated?

YES - Go to step 12

NO - Renew the PDU (0017)

Step 12

Observe the display screen. Is the screen displaying a PDU hard error symbol similar to that shown in Fig 17

YES - Note the number and refer to 'Parts Ordering'.

NO - Go to step 13

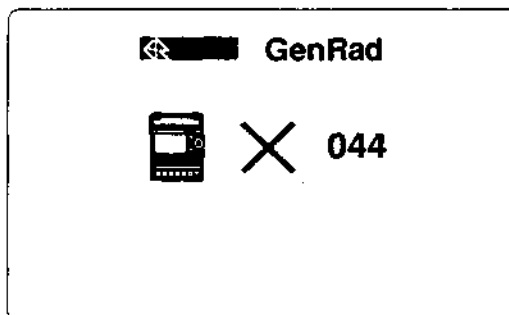


Figure 17. PDU hard error code

Step 13

Observe the screen display. Is the screen displaying the main menu (Fig 9)?

YES - Go to step 14

NO - Go to step 15

Step 14

Select the PDU system self test option and press the 'tick' icon. Does the screen respond?

YES - Go to step 15

NO - Renew the PDU (0017)

Step 15

Observe the display screen. Is the screen displaying the symbol shown in Fig 18?

YES - Connection problem, go to step 17

NO - Go to step 16

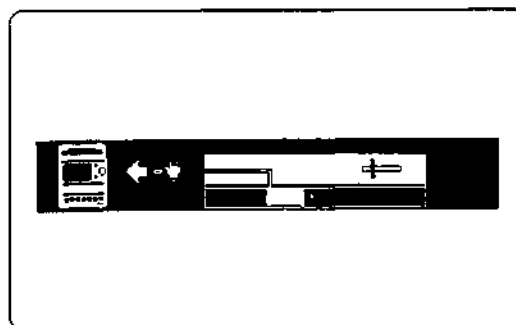


Figure 18. Communications blocked

Step 16

Observe the display screen. Is the screen displaying either of the symbols shown in Fig 19?

YES - Remove the CD caddy and check the CD-ROM. Re-install the CD-ROM. Go to step 13.

NO - Go to step 19

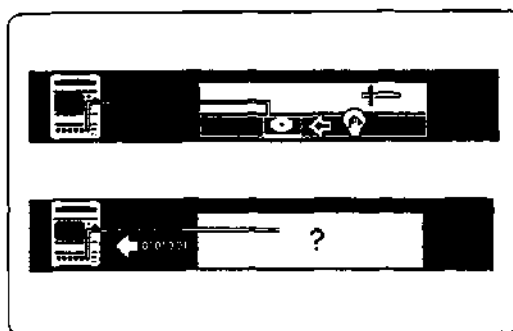


Figure 19. Reload the CD and retry

Step 17

Connect the PDU to the base station top left connector using the second PDU to base station cable (0064) (Fig 34). Is the screen displaying the symbol shown in Fig 15?

YES - Go to step 18

NO - The first PDU to base station cable is faulty, renew the cable (0064)

Step 18

Connect the PDU to the VIA using cable (0030) and connect the VIA to the VBA using cable (0028). Connect the VBA to a charged battery. Does the VIA panel indicator flash for more than 5 seconds after pressing the 'tick' icon.

YES - Renew the electronic module (0019)

NO - Renew the PDU (0017)

Step 19

Observe the screen display. Is the screen displaying the symbol shown in Fig 20?

YES - During the data transfer, the connection was lost. Check to see if the cable connections are intact, if not, reconnect and go back to step 13.

NO - Go to step 20

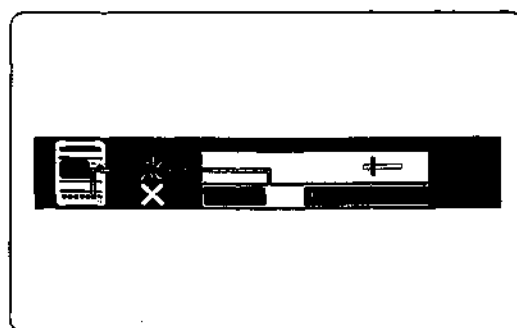


Figure 20. Data transfer connection lost

Step 20

Observe the screen display. Is the language selection screen displayed (Fig 21)?

YES - Try to select a language, go to step 21

NO - Call your local GenRad Service Centre for advice.

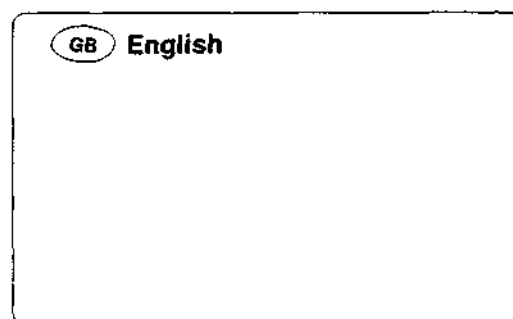


Figure 21. Language selection screen

Step 21

Observe the screen display. Is the system loading from the CD-ROM?

YES - Go to step 13.

NO - Renew the PDU (0017).

Parts Ordering

Before calling GenRad, it is essential that the system self test is run from the main menu. If the system self test will not run or the PDU does not switch on, follow the Problem Solving procedures.

The system self test option will identify any fault and display a fault code on the PDU screen. This fault code number must be recorded. When in contact with your local GenRad Service Centre, they will require this number in order to send the correct substitute parts.

Before calling the GenRad Service Centre, please have the following information available.

- Dealer Name and Address
- Name of the contact at that address
- PDU Serial Number (base station LHS - Fig 22)
- Fault Code, Component Name and Serial Number as given on the PDU screen during self test.

If the system self test will not run, GenRad will require the name and part number of the component identified during the Problem Solving Procedures.

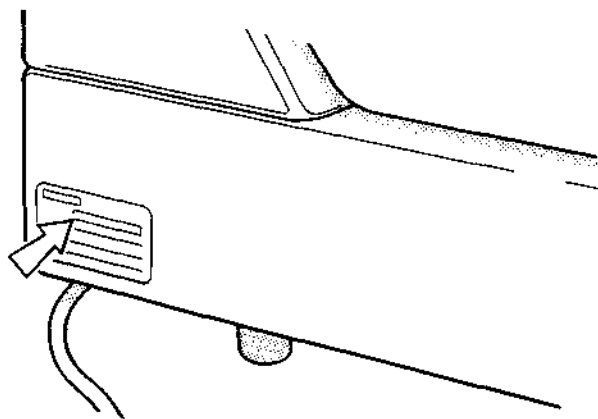


Figure 22. Diagnostic System Serial Number

Service Centres**UK and EIRE**

GenRad Limited, Horsefield Way, Bredbury Industrial Park, Bredbury, Stockport, Cheshire SK6 2SU, England

Telephone: 061-406-8209 Fax: 061-406-8480

Germany

GenRad GmbH, Neumarkter Strasse 83, 81673 München, Germany

Telephone: 01049-89-431990 Fax: 01049-89-43199101

Switzerland and Austria

GenRad AG, Drahzug Strasse 18, Postfach 8032, Zürich, Switzerland

Telephone: 010411-422-2420 Fax: 010411-422-2065

Italy

GenRad SPA, Via Fantoli 21/13, 20138 Milano, Italy

Telephone: 01039-2-502951 Fax: 01039-2-5063331

France, Spain and Portugal

GenRad Europe Paris, Succursale de GenRad Europe Limited, 6 Rue Vincent Van Gogh, 93364, Neuilly Plaisance Cedex, France.

Telephone: 01033-1-49442200 Fax: 01033-1-49442298

Sweden, Norway, Denmark and Finland

Lagercrantz Kontest AB, Kung Hans väg 3, Box 986, 191 29 Sollentuna, Sweden

Telephone: 01046-8-626-06-20 Fax: 01046-8-754-88-67

Netherlands, Belgium and Luxembourg

Multidata BV, Postbus 137, Bedrijvencentrum "De Baanderije", Parallelweg Zuid 33/1, 5280 AC Boxtel, Netherlands

Telephone: 01031-4116-83775 Fax: 01031-4116-85359

USA and Canada

GenRad Inc, 300 Baker Avenue, Concord, Massachusetts, 1742, USA.

Telephone: 0101-508-369-4400 Fax: 0101-508-287-2011

Singapore, Taiwan, Hong Kong and Thailand

GenRad Inc, 73 Science Park Drive, Cintech Building #03-04, Singapore, Singapore 0511.

Telephone: 01065-2784400 Fax: 01065-7766422

Australia and New Zealand

Nilsen Instruments, 25-27 Paul Street North, North Ryde, New South Wales 2113, Australia.

Telephone: 01061-2-7362888 Fax: 01061-2-7363005

Japan

Tokyo Electron Limited, 2-30-7 Sumiyoshi-Cho, Fuchu City, Tokyo, Japan 183

Telephone: 01081-423-33-8377 Fax: 01081-423-33-8489

Warranty

The Aston Martin Diagnostic System is covered by a one year warranty. Should any of the electrical components fail during the warranty period, contact your local GenRad Service Centre for a replacement part. Note that the warranty does not include physical damage.

Spare Parts

Refer to the Aston Martin Diagnostic System Users Guide for a full parts list. All spare parts should be obtained from your local GenRad Service Centre who can advise you on current prices.

Servicing and Maintenance

CAUTION: *With the exception of those parts listed in this section, there are no user serviceable parts within the system. All servicing must be carried out by GenRad Service Centres.*

Battery Testing.

The NICAD batteries fitted in the PDU are designed to be rechargeable and should normally last through many recharge cycles. Battery life of three to five years can be expected. The capacity of new batteries improves after several charging cycles. After extended use, they may require renewing. The following procedure will assist you to determine when renewal is required. Do not use this procedure with new batteries or with a new PDU.

Testing Procedure

1. Remove all cables from the PDU.
2. Switch the PDU on and leave it until it switches off (the power on indicator will extinguish)
3. Connect the PDU to the base station for at least 12 hours charging.
4. Remove all cables from the PDU, switch on the PDU and start timing.
5. If the PDU switches off in less than 30 minutes, the batteries should be renewed.

Changing the Battery Pack

CAUTION: *Always read and follow safety warnings and instructions printed on the equipment. The rechargeable NICAD batteries fitted to the PDU are of a special type. They must only be substituted by GenRad approved parts. Do not substitute the batteries with any other type. Always dispose of old batteries in compliance with local recycling regulations.*

Battery Changing Procedure

A spare battery pack kit (0975) is available from your local GenRad Service Centre.

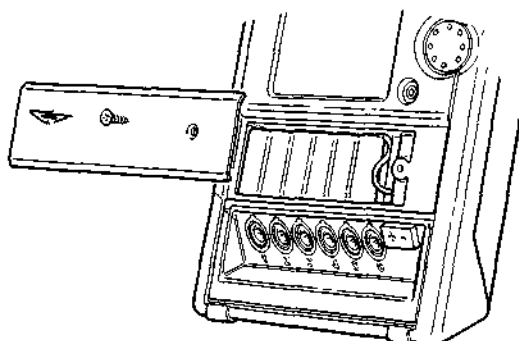


Figure 23. Battery cover screw

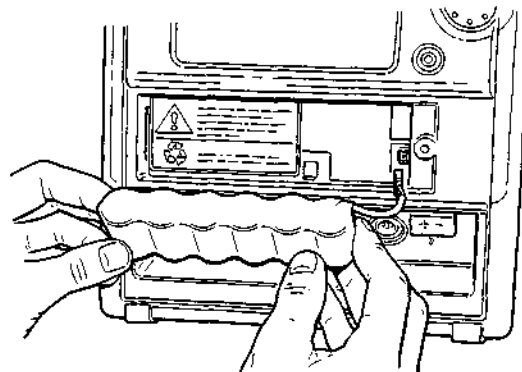


Figure 24. Battery pack

1. Switch off the PDU and remove all cables.
2. Remove the cover screw (Fig 23) and remove the cover.
3. If damaged, remove the old foam gasket from the cover and replace with the new one supplied.
4. Note the orientation of the connector. Disconnect the connector and remove the old battery pack.
5. Fit and connect the new battery pack (Fig 24) with the black cable towards the touch screen.
6. Refit the cover and cover screw.
7. Refer to the Battery Charging instructions for recharging times.

Changing the Dust Filter

The electronic module has a dust filter fitted to the underside of the module. Every three months a new filter will be supplied. To change the filter, proceed as follows:

1. Switch off the mains supply and pull out the old filter (Fig 25).
2. Feed in the new filter with the blue side facing in, pushing it well into the corners of the holder.
3. Switch on the mains supply.

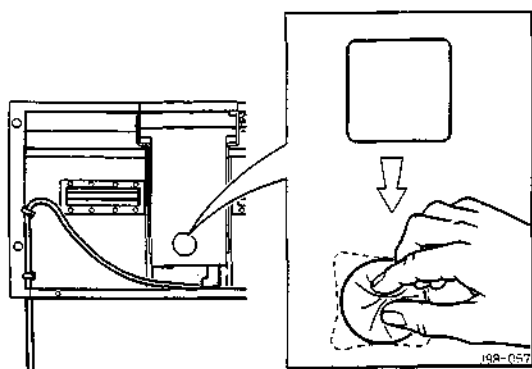


Figure 25. Dust filter replacement

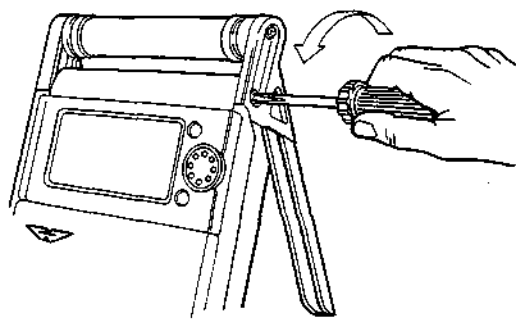


Figure 26. Support arm adjustment

Support Arm Adjustment

Periodically the support arm mechanism may require adjustment.

1. Remove the cross head arm fixing screw.
2. Using a suitable screwdriver, turn the tensioning screw (Fig 26) anti-clockwise half a turn.
3. Refit the leg fixing screw and repeat the operation on the opposite side.
4. Check that the arm tension is enough to support the weight of the PDU without movement.

VIA Carrying Case

The VIA unit (0018) is secured into its carrying case with two fixing screws from the underside of the case. If a new VIA is required, remove the two fixing screws and lift the VIA from the carrying case. Return only the VIA for replacement, do not return the carrying case.

New CD-ROM Releases

The latest version of the Aston Martin Diagnostic System software will be supplied with the system. When necessary, new releases of software will be issued by mail to each user of the system. Immediately fit the new CD-ROM to the disc caddy, retaining the old CD in its protective case as a backup. The new software should be loaded at the next use of the PDU.

In order to identify the revision level of the software, the version number is included on the disc.

e.g. DB7 PDU 001 is version 001 of the DB7 PDU software.

Technical Specifications

Electronics Module

Voltage Supply	100-240 VAC
Frequency	50-60 Hz
Current Consumption	1.0-0.5 Amp
Operating Temperature	0 - 45°C
Operating Humidity	15 - 85% non-condensing

PDU and VIA

Voltage Supply	12 VDC
PDU Current Consumption	2.5 Amp
VIA Current Consumption	6.5 Amp
Operating Temperature	0 - 50°C
Operating Humidity	95% max non-condensing 12 hours
Storage Humidity	60% RH max non-condensing 1000 hours
Storage Temperature	-20°C to 70°C

Weights

Base Station	20.5 kg (45.2 lb)
Electronic Module	3.7 kg (8.16 lb)
PDU	3.7 kg (8.16 lb)
Carrying Case	2.0 kg (4.4 lb)
VIA	4.3 kg (9.48 lb)

Statement of Calibration

Product Range Aston Martin Diagnostic System

Product Type Portable Diagnostic Unit

Product Number 3130-0017

We certify that the above product has been tested and found to conform to the product specification, prior to dispatch from GenRad. The measurements performed by this equipment are traceable to international measurement standards. Calibration records, including the date of calibration and the serial numbers of the measurement instruments are maintained by GenRad and are traceable through the PDU System serial number.

NOTE: The PDU will not require any periodic adjustment in order to maintain specified measurement accuracy.

Calibration Measurements

Ambient temperature during calibration $20 \pm 1^\circ\text{C}$.

The test resistances in the table below are applied between the red and black probes. The PDU is set to measure resistance between these probes using the DMM function. The PDU reading must be between the limits shown.

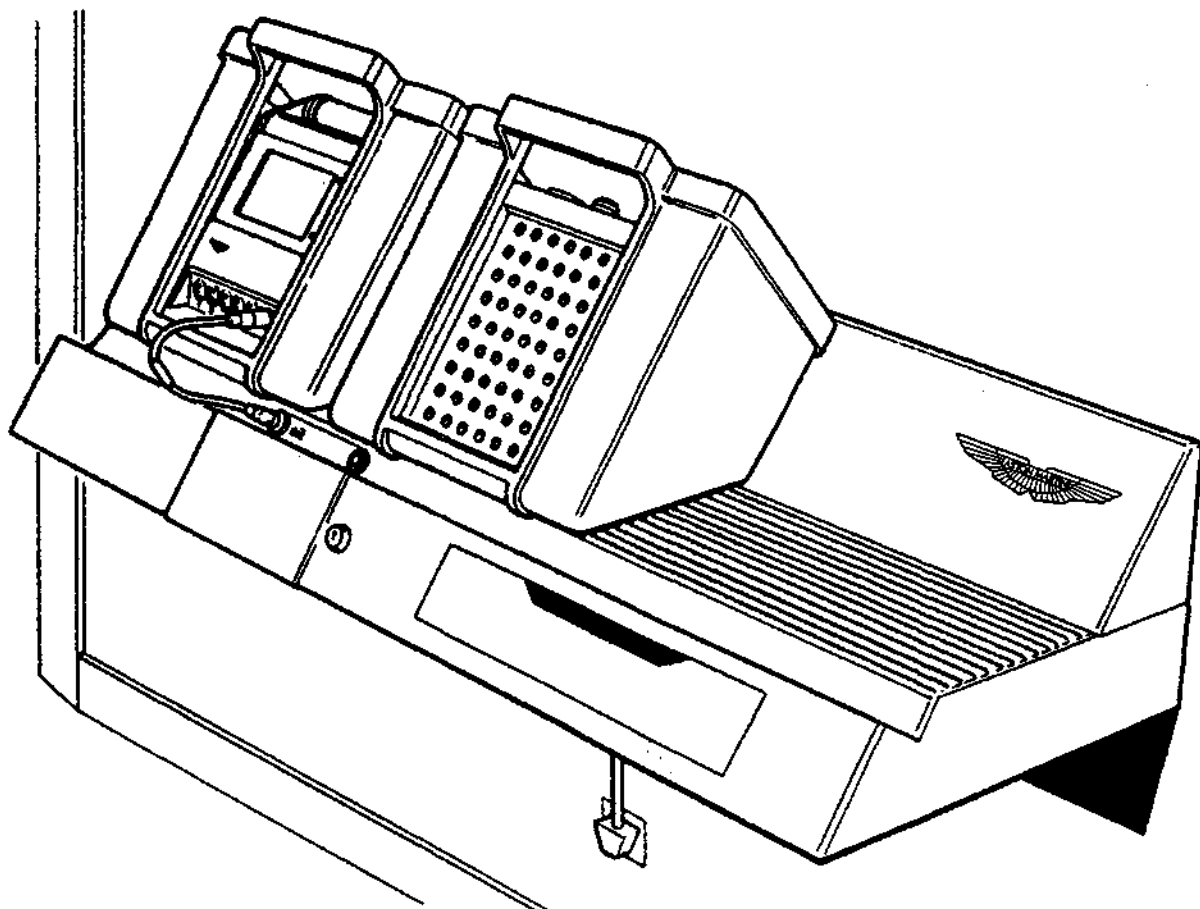
Test Resistance	PDU Reading Limits
10 Ω	9.84 Ω - 10.16 Ω
10M Ω	8.22M Ω - 11.78M Ω

The test voltages in the table below are applied between the red and black probes. The PDU is set to measure voltage between these probes using the DMM function. The PDU reading must be between the limits shown.

Test Voltage	PDU Reading Limits
50mV	48mV - 52mV
100mV	98mV - 102mV
160mV	157mV - 163mV
350mV	345mV - 355mV
720mV	712mV - 728mV
1.45V	1.43V - 1.47V
2.90V	2.86V - 2.94V
7.25V	7.17V - 7.33V
14.5V	14.35V - 14.65V
29V	28.7V - 29.3V
49V	48.5V - 49.5V
98V	97.0V - 99.0V
175V	173.7V - 176.3V

The Aston Martin Lagonda Diagnostic System

The Aston Martin Lagonda Diagnostic System fulfils a number of functions in aiding the technician to quickly and accurately locate faults. The heart of the system is the Portable Diagnostic Unit (PDU), a lightweight powerful computer/measurement system providing a step-by-step user friendly interface for the technician.



PDU Functions

The PDU main menu provides access into the following functions:

- Diagnostics
- Training
- Digital Multimeter
- User Self Test

Diagnostics

On selecting 'Diagnostics' from the main menu, the user will be prompted to enter the features and market specification of the vehicle to be tested. Use of the diagnostics in each of the above areas is described later in this guide.

Diagnostics Menu - 95 Model Year

- Engine
- Anti-Lock Braking System
- Transmission
- Climate Control

Diagnostics Menu - 97 Model Year

- Engine Diagnostics
- OBD II Scan Tool
- Airbag
- Seat Belt Pretensioner
- Engine Datalogger
- Climate Control
- PATS System
- Transmission
- Anti-Lock Braking System
- Security

Digital Multimeter

The Digital Multimeter function provides the capability to measure voltage, current, resistance, frequency, pulse width, pulse period, and duty cycle. These measurements are usually made using the PDU measurement probes. Measurements may also be made using the module pin selection function on the Teves Mk II braking system and on the Air Conditioning system.

Training

An on-screen programme is provided to train new users in the use of screen icons and in the use of the digital multimeter and datalogger functions.

User Self Test

In order to prove that the equipment is functioning correctly, a complete user self test is incorporated. The user is directed to test the PDU and then to progressively connect each part of the PDU system which will be tested by the software. Any fault identified during the test is notified to the user. If no faults are identified, the user is advised on the correct functioning of the system.

PDU Power

Power for the PDU is supplied via an internal rechargeable battery pack which can keep the PDU operational for approximately one hour when disconnected from the base station and the vehicle. In order to preserve PDU battery charge, power to the screen backlight is automatically cut after five minutes of inactivity. The power ON indicator remains lit, indicating that the PDU is in 'stand-by' mode. One touch of the screen will restore backlight power.

When connected to the base station, power is supplied to the PDU from the Electronic Module to recharge the PDU battery pack as necessary.

On 95 MY vehicles, the Vehicle Battery Adaptor (VBA) is used to maintain PDU power.

On 97 MY vehicles, when connected via the MPA to either diagnostic socket on the vehicle, power is supplied via pin 4 (chassis ground) and pin 16 (battery power) to maintain PDU power at all times even when the vehicle ignition is switched off.

On all model years, when connected to the air conditioning system using the VIA, the vehicle battery adaptor (VBA) must also be used to maintain PDU power.

Software

Software for the PDU system is supplied on CD ROM discs and supports diagnosis on the following control units:

- Zytex Engine Management System (95 MY)
- EEC-V Engine Management System (97 MY)
- GM 4L80-E Transmission Controller
- PATS - Passive Anti Theft System
- Teves Mk II ABS System (95 MY)
- Teves Mk IV ABS System (97 MY)
- Valeo Air Conditioning System
- FMC Airbag System
- Megamos Security System
- Autoliv Drivers Seat Belt Pretensioner (where fitted)

All of these systems are supported in English, French, Italian, German and Japanese.

In addition to the specific system software listed above, the PDU is also equipped with general purpose software to provides multimeter, printing and PDU training options.

Software for 95 and 97 Model Year Vehicles

Software for both the 95 and 97 model year vehicles is provided.

The PDU system requires a Vehicle Interface Adaptor (VIA) to communicate with the control units of 95 model year vehicles.

Communication with 97 model year control units is principally via an Aston Martin multi-protocol adaptor to 2 inbuilt diagnostic sockets in the vehicle. Only the air conditioning unit requires the VIA on 97 model year vehicles.

If the multimeter function is used, the Vehicle Battery Adaptor (VBA) will be required to provide the basic supply and ground levels for the multimeter.

Software Loading and Selection

Ensure that the system is powered up and that the PDU is correctly connected to the base station. Check and if necessary load the DB7 software CD Revision 002. (see the installation guide)

Switch 'on' the PDU which will run through two front screens and then load the following initial PDU software.

- Operating System
- Main Menu
- Selector
- Digital Multimeter
- Interactive Training

Vehicle Features

The vehicle features screen illustrated below is used to identify the vehicle particulars and the model year.

If Airbag - NO is selected, the vehicle is assumed to be 95 model year.

If Airbag - YES is selected, 97 model year is assumed. On completing entries in the vehicle features screen, the appropriate vehicle area screen will be displayed.

Vehicle Features

Transmission **MANUAL** AUTO

Airbag **YES** NO

*

Vehicle Area

This screen allows selection of the vehicle system to be accessed. Only 4 systems may be accessed on 95 model year vehicles, on 97 model year cars, 8 systems may be accessed as follows:

Vehicle Areas

- Engine Diagnostic
- Engine DataLogger
- Transmission
- OBDII Scan Tool
- Climate Control
- Anti-Lock Braking System
- Airbag
- DATA

✓

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95 model year software

- Zytec Engine Management
- GM 4L80-E Transmission Controller
- Teves Mk II Anti-Lock Braking System
- Valeo Air Conditioning

97 model year software

- EEC-V Engine Management
- GM 4L80-E Transmission Controller with OBDII
- Teves Mk IV Anti-Lock Braking System
- Valeo Air Conditioning
- PATS Engine Immobiliser
- Megamoss security system
- FMC Airbag system
- Autoliv seatbelt pretensioner

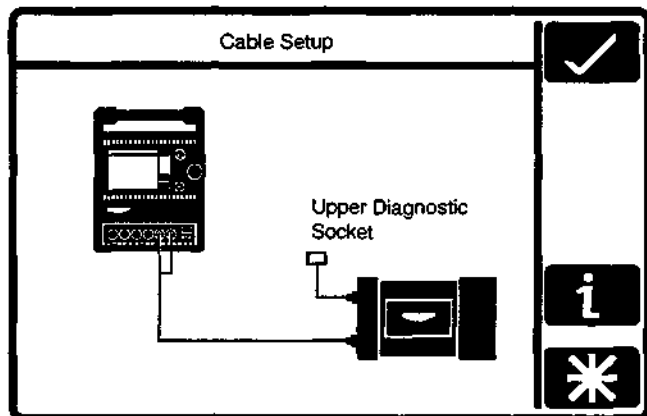
Cable Setup - 95 MY

On selecting the required vehicle area, the selected software will be loaded and then the Cable Setup screen will appear.

Connections will be shown directly to the selected control unit on 95 model year vehicles using the vehicle interface adaptor (VIA) and appropriate cables from the PDU kit. Select the specified interface devices and cables from the PDU kit and connect as shown in the diagram.

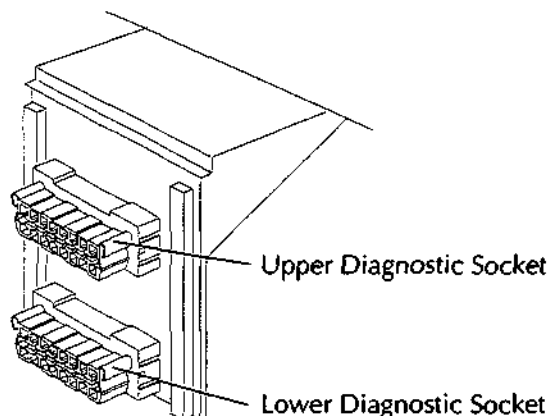
Cable Setup - 97 MY

On 97 model year vehicles, connections to the vehicle are made via the Aston Martin Multi-Protocol Adaptor and two diagnostic sockets for most vehicle systems.



Diagnostic Sockets - 97 MY

The diagnostic sockets are located behind the passenger side underscuffle panel.



The sockets are mounted on a bracket and labelled Upper and Lower. The following lists describe the systems accessed from each socket.

Upper Diagnostic Socket

- Transmission Control Module (TCM)
- Megamoss Security System
- FMC Airbag System
- Teves Mk IV Anti-Lock Braking System

Lower Diagnostic Socket

- EEC V Powertrain Control Module (PCM)
- PATS Passive Anti-Theft System
- Autoliv Seatbelt Pretensioner System

Air Conditioning Diagnostics

The Valeo air-conditioning system uses a unique communications protocol and therefore the vehicle interface adaptor (VIA) is required and is connected directly to the air-con CPU in order to carry out diagnostics work on the system.

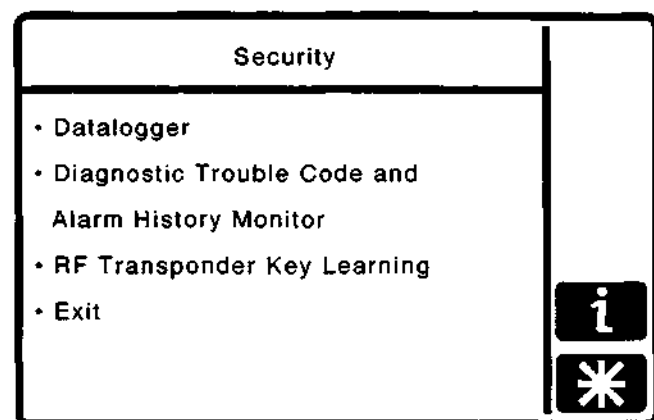
Establishing Communications

When cable connections are completed, switch on the vehicle ignition. The electronic control units will 'wake up' and communication between the selected control unit and the PDU will be established.

As communication is established with the selected system, a system menu similar to that below will be displayed.

System Menu Selections

The options for each vehicle system are described in detail on the following pages but menu entries fall into the following general areas:



Datalogger

The Datalogger function is described in detail using a worked example at the end of this PDU Users Guide.

Diagnostic Trouble Codes

This application enables the PDU to monitor selected control module trouble codes and provides the following functions:

- Decode and display any trouble codes logged by the control module being monitored.
- When supported by the module, decode and display enhanced trouble codes, together with any count of the number of occurrences
- Clear all of the trouble codes and freeze frame data logged in the control module.
- Monitor other data such as the alarm history in this example.

Note: The 95 model year ZyteK engine management system permits clearing of individual trouble codes selected by the technician on the PDU.

System Specific Tests

These menu entries cover special tests required to program or test system specific features. The following are examples of tests provided:

Engine	KOEO and KOER tests OBDII Readiness test Output State Control test Throttle Potentiometer track test
PATS	Ignition Key Learn Menu
Security	Remote Transmitter Key Learn Tests Special Functions Programming

Exit

Selecting and then confirming the exit option will return the PDU to the Main Menu.

PDU Use

In the following pages, the use of the PDU on each vehicle system is described.

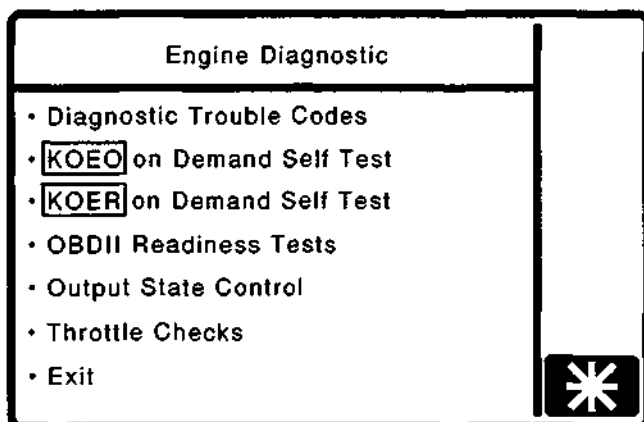
Engine Diagnostics
Transmission Diagnostics
Climate Control Diagnostics
Anti-Lock Brakes Diagnostics
Passive Anti-Theft (PATS) Diagnostics
Security System Diagnostics
Airbag Diagnostics
Seat Belt Pretensioner Diagnostics

After these system specific descriptions, the following general purpose functions are described:

Datalogger
Digital Multi-Meter
Diagnostic Trouble Codes
Printing
Training
OBD II Scan Tool
User Self-Test

Engine Diagnostics - 97 MY

Selecting Engine Diagnostics from the Vehicle Area screen brings up the following Engine Diagnostics Screen.



Diagnostic Trouble Codes (DTCs)

On selecting Diagnostic Trouble Codes, the PCM memory will be scanned and any recorded DTCs will be decoded and displayed.

The engine and transmission DTCs are integral to the On Board Diagnostics (OBD II) system and are fully described in the DB7 OBD II Diagnostics Manual.

Before attempting to clear the logged DTCs, record all logged DTCs for use in subsequent fault analysis.

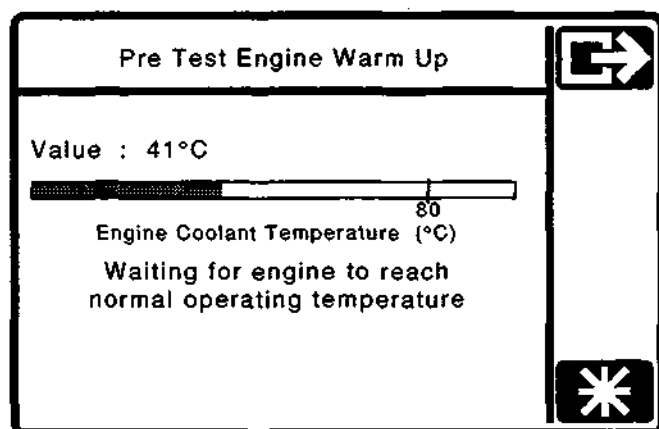
All logged DTCs may be cleared by selecting the EEC-V EMS DTCs title. This will bring up the Clear (C) icon which may be selected and confirmed to clear all logged DTCs.

Note that on clearing all logged DTCs you will also clear the associated timers, counters and fault history files (and extinguish the engine management warning light for North American vehicles). The OBD II readiness test status will also clear down and a P1000 (OBD II readiness test incomplete) trouble code will be set. A full drive cycle (see DB7 OBD II Diagnostics Manual) must be completed to clear the P1000 code if required. The P1000 code will clear automatically after some miles of driving when all required tests have satisfactorily completed.

Caution: If a transmission code is logged in the PCM, the TCM DTCs must be cleared first and then clear the PCM DTCs. If the PCM DTCs are cleared without clearing the TCM, the TCM code will immediately reset in the PCM when power is restored.

Key On Engine Off (KOEO) and Key On Engine Running (KOER) On Demand Self Tests

Before either the KOEO or KOER test will run, the engine coolant temperature must be in excess of 80°C. Select and confirm either the KOEO or KOER test. If the coolant temperature is too low, the Pre Test Engine Warm Up screen will appear. Start the engine and run until coolant temperature is at 80+°C.



KOEO Test

As coolant temperature rises through the 80°C level, the technician will be requested to turn the ignition off and then on again. The KOEO test will then commence. Static inputs to the PCM will be checked and any faults detected will be recorded and displayed as DTCs. If any DTCs other than P1000 are logged, go to the OBD II Diagnostics Manual and resolve the concern(s) using the OBD II diagnostic procedures.

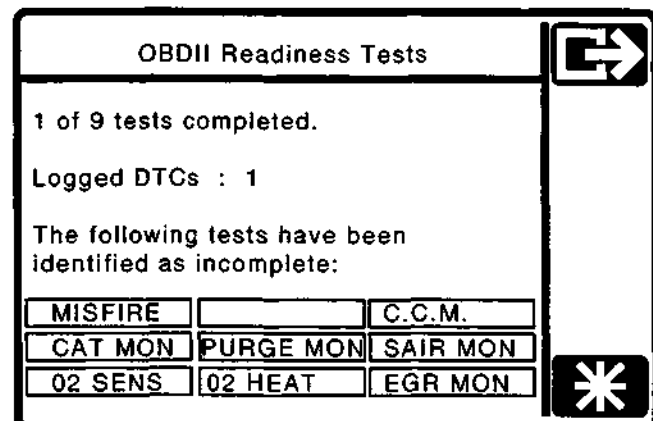
KOER Test

If coolant temperature level is below 80°C, the technician will be prompted to start and run the engine until coolant temperature rises above 80°C. As the temperature passes the 80°C level, the KOER test will commence automatically.

If coolant temperature is above the 80°C level, the technician will be requested to start the engine. The KOER test will commence as the engine is started. Dynamic inputs to the PCM will be checked and any faults detected will be recorded and displayed as DTCs. If any DTCs other than P1000 are logged, go to the OBD II Diagnostics Manual and resolve the problem(s) using the OBD II diagnostic procedures.

OBD II Readiness Test Monitor - 97 MY

Selecting OBD II Readiness Tests will bring up the following screen.



This software monitors the status of all significant components and parameters required to control vehicle emissions. When the tests are satisfactorily completed, the test boxes will be empty and the P1000 status code will be removed from the DTC list.

If any problem is detected, the tests will be terminated and the status will be shown as on the screen above e.g.: 1 of 9 tests completed, Logged DTCs : 1

Incomplete test titles will remain in the screen boxes. Completed test titles are deleted from the screen boxes.

Details of any trouble codes may be accessed using the Diagnostic Trouble Code function.

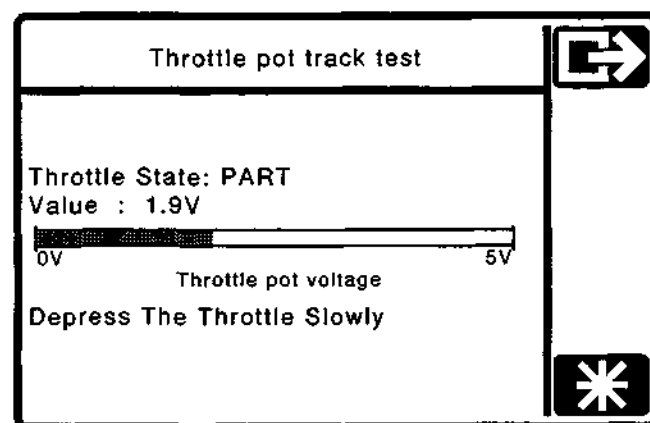
The tests incorporated into this routine are as follows:

- Misfire Monitoring
- Fuel System Monitoring
- Comprehensive Component Monitoring
- Catalyst Monitoring
- Purge System Monitor
- Secondary Air Injection Monitor
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- Exhaust Gas Recirculation Monitor

Throttle Position Sensor Track Test - 97 MY

This test is used to detect any problems with the throttle potentiometer track which could cause faulty throttle position signals to enter the PCM. Such signals would result in incorrect calculation of engine power demand and possibly create excessive fuelling and high emissions.

Selecting Throttle Checks from the Engine Diagnostics screen will bring up the Throttle Position Sensor Track Test screen:



Follow the screen instructions to test the throttle position sensor track. The throttle must be moved slowly from fully closed to fully open without hesitation. Any pause in throttle movement will be interpreted as a track fault.

If a fault is detected, repeat the test several times to eliminate hesitant throttle movement errors from actual potentiometer faults. If a repeatable fault is detected, the potentiometer must be replaced.

Output State Control - 97 MY

This menu item provides a quick test of the basic electro-mechanical components controlled by the PCM. These tests should be performed in a key on engine off state.

The selections available are:

- Low Speed Cooling Fans
- High Speed Cooling Fans
- Set Electromechanical Outputs

Low and High Speed Fans

Selecting and confirming either the low or high speed cooling fans will run the fans at the selected speed for 5 seconds to verify their operation.

Electromechanical Outputs

This selection will cause the following electromechanical devices to operate for five seconds

- Air Pump
- Fuel Pumps
- Canister Purge Valve
- Idle Air Control Valve

Observing each device in turn as the PCM outputs are turned 'On' will enable the technician to verify correct operation.

Engine Datalogger

The datalogger software is designed to aid the technician in identifying permanent or intermittent faults in the DB7's electrical and electronic systems. It can provide a recorded view of selected signals over a chosen time period. This recording may be captured in a static, rolling road or road test situation. Data recorded during such tests may then be analysed on completion of the test or printed out for later analysis.

Datalogger operation is described using a fully worked example at the end of this PDU Users Guide.

The full list of datalogger signal names and descriptions is provided in the DB7 OBD II Diagnostic Manual and on the PDU screen. The following list is a summary of the PCM signals which may be monitored.

Signal	Description
ACCS	Air-Con Control Switch - 1 = A/C On
ACP	Air-Con Pressure Sensor - 1 = A/C pressure high
ACT MAX	Maximum Intake Air Temperature signal during normal running
Adap Fuel 1	Current Adaptive Fuel Correction - (% of range)
Adap Fuel 2	Current Adaptive Fuel Correction - (% of range)
ADPT1F	Adaptive Fuel - Table 1 failure mode
ADPT2F	Adaptive Fuel - Table 2 failure mode
AIR	Air Pump On/Off - 1 = Pump On
AIRM	Air Pump Monitor - 1 = high, pump on
B+	Battery Positive - Volts
BARO	Barometric Pressure
CID	Cylinder Identification - Cam sensor status
CMP STAT	Cam Position Sensor - 1 = CID mis, not currently reliable
DRVCNT	Number of OBDII Drive Cycles Completed
DSDRPM	Desired engine speed (RPM)
DTCCNT	Diagnostic Trouble Codes Count (Fault codes + pending codes. MIL and non-MIL)
ECT MAX	Maximum Engine Coolant Temperature signal during normal running
ECT STAT	Engine Coolant Temperature - In or out of range
ECT-C	Engine Coolant Temperature - °C or raw counts
ECT-V	Engine Coolant Temperature - Volts or raw counts
EGR STAT	EVP EGR sensor failure
ENGLOAD	Engine Load (Ratio of air charge over standard)
ENGRPM	Engine Speed - RPM
EPT	DPFE Sensor feedback
EVAP DC	Cannister Purge Duty Cycle (% on)
EVAPCVA	Vapour Management Valve (VMV) fault detected
Evts HI	Cumulative cylinder events total carried over from previous background logic executions
Evts LO	Cumulative cylinder events total carried over from previous background logic executions
FPM	Fuel Pump Monitor - 0 = pump off, 1 = pump on
FPUMP DC	Desired Fuel Pump Duty Cycle - 0% or 100%
H02S12	Sensor Output - Volts
H02S21	Sensor Output - Volts
H02S22	Sensor Output - Volts
H02SII	Sensor Output - Volts
HFC	High Speed Fan Status
Htr11 ret	Highest number of retries seen on the HO2S 11 heater
Htr12 ret	Highest number of retries seen on the HO2S 12 heater
Htr21 ret	Highest number of retries seen on the HO2S 21 heater
Htr22 ret	Highest number of retries seen on the HO2S 22 heater
HTRCM11	HO2S 11 heater current
HTRCM12	HO2S 12 heater current
HTRCM21	HO2S 21 heater current
HTRCM22	HO2S 22 heater current

Signal	Description
IACDTCY	Idle Air Control Duty Cycle (% open)
IAT	Intake Air Temperature - °C or raw input counts
IAT STAT	Air Temperature - Temperature sensor failure
IAT-V	Intake Air Temperature - Volts or raw counts
IGN	Desired Ignition Timing - ° BTDC
INDS	Input from manual lever position sensor (counts)
IPWA	Injector Pulse Width in mS- Bank A (Cylinders 1-3)
IPWB	Injector Pulse Width in mS- Bank B (Cylinders 4-6)
LAMSE1	Current Short Term Fuel Trim 1, adjustment from stoich - (% of range)
LAMSE2	Current Short Term Fuel Trim 2, adjustment from stoich - (% of range)
LFC	Low Speed Fan Status
LOOP	Fuel Control - 1 = Open Loop, 0 = Closed Loop
MAF MAX	Maximum Mass Air Flow signal during normal running
MAF	Raw MAF sensor output (A/D counts)
MAF STAT	Mass Air Flow Meter - MAF sensor failure
MIL	Malf. Indicator Lamp Status - 1 = Lamp On
Mis HI	Cumulative misfires detected by misfire test (Hi bit).
Mis LO	Cumulative misfires detected by misfire test (Lo bit).
Mis nc HI	Cumulative misfires detected by a misfire test (Hi bit).
Mis nc LO	Cumulative misfires detected by a misfire test.
Mis1 HI	Cumulative misfires detected by cylinder 1 misfire test (Hi bit).
Mis1 LO	Cumulative misfires detected by cylinder 1 misfire test (Lo bit).
Mis2 HI	Cumulative misfires detected by cylinder 2 misfire test (Hi bit).
Mis2 LO	Cumulative misfires detected by cylinder 2 misfire test (Lo bit).
Mis3 HI	Cumulative misfires detected by cylinder 3 misfire test (Hi bit).
Mis3 LO	Cumulative misfires detected by cylinder 3 misfire test (Lo bit).
Mis4 HI	Cumulative misfires detected by cylinder 4 misfire test (Hi bit).
Mis4 LO	Cumulative misfires detected by cylinder 4 misfire test (Lo bit).
Mis5 HI	Cumulative misfires detected by cylinder 5 misfire test (Hi bit).
Mis5 LO	Cumulative misfires detected by cylinder 5 misfire test (Lo bit).
Mis6 HI	Cumulative misfires detected by cylinder 6 misfire test (Hi bit).
Mis6 LO	Cumulative misfires detected by cylinder 6 misfire test (Lo bit).
MISF	Misfire Monitor - 1 = Currently misfiring
ODCODES	Total number of on-demand codes currently stored.
PGM CVS DC	Purge Management Duty Cycle (% on)
PIP	Profile Ignition Pick-Up - PIP input level
PNP	Park Neutral Position Switch
R-BIAS1	Rear bias trim (Bank 1, cylinders 1-3)
R-BIAS2	Rear bias trim (Bank 2, cylinders 4-6)
RATCH	Lowest TP reading during driving
TP MAX	Maximum Throttle Potentiometer signal during normal running
TP STAT	Throttle Position Sensor - TP sensor failure
TP	Throttle Potentiometer - Volts or counts
TPR-V	Raw counts from sensor
TQ-NET	Net torque into the torque converter
TRIP	OBDII Drive Cycle Complete (except cat monitor) - 1 = Trip completed
TRIPCNT	Number of Completed OBDII Trips
VS MAX	Maximum Vehicle Speed signal during normal running
VS STAT	Vehicle Speed Sensor mode flag
VS	Vehicle Speed - MPH
WAC	Wide Open Throttle A/C Cut-Off - 1 = High (WOT Relay)

Engine Setup - 95 MY

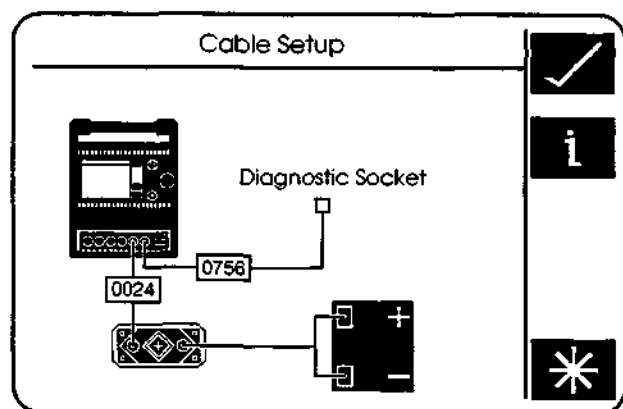
Two adjustments may be set with the aid of the PDU on 95 MY vehicles.

- Throttle Potentiometer
- Idle Fuelling Trim

From the 95 MY Main Menu, make and confirm the following sequence of selections:

Diagnostics	✓
Manual or Auto Transmission	✓
Engine	✓
Engine Setup	✓

The following connection diagram will then be displayed.



Engine Setup Connections

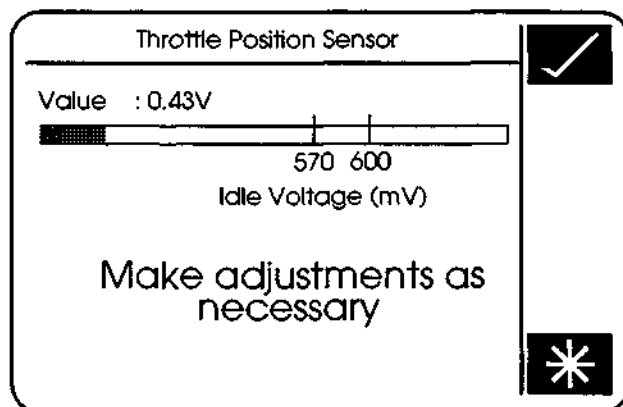
Throttle Sensor Adjustment - 95 MY

Note: The throttle stop and throttle cable adjustments must be correct before setting the throttle potentiometer.

On completion of the engine setup connections the test selection screen will be displayed.

1. Select Throttle Potentiometer.
2. Turn the ignition switch to position II but do not start the engine.
3. Monitor the throttle potentiometer bargraph voltage at fully closed and then at fully open throttle.
4. The throttle potentiometer voltage specifications are:

Throttle Closed 0.57 - 0.59V
Throttle Full Open 4.00 +V



Throttle Potentiometer Voltage

5. If both voltages are either high or low, loosen the two throttle pot screws and adjust the potentiometer until the specified voltages are achieved. Carefully tighten both screws ensuring that the potentiometer does not move during tightening.
6. If either voltage is unstable or if the specified voltages cannot be achieved, investigate the cause. If the potentiometer is replaced, set the new pot using steps 3 - 5 above.

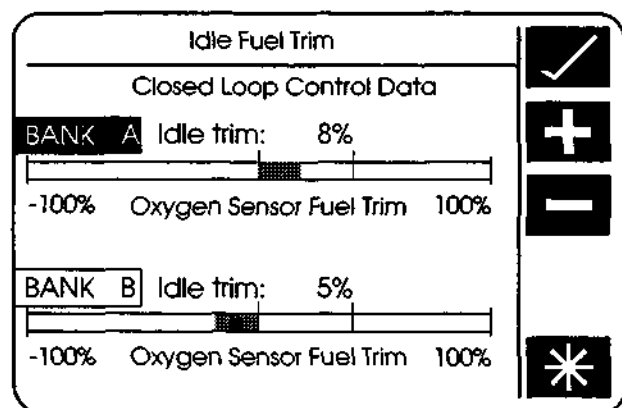
Note: On automatic vehicles, the kickdown switch adjustment check follows the throttle pot adjustment.

Idle Fuelling Trim - 95 MY

This program is used to check and if necessary reset the fuelling level at idle to ensure that the specified idle speed and emission levels are attainable. The throttle potentiometer adjustment sequence must be completed before the fuel trim sequence can be run.

Note: The throttle setup must be completed before attempting to set the Idle Fuelling Trim. An error in throttle stop, throttle cable or throttle pot adjustments can cause serious difficulties in setting the Idle Fuelling.

1. Select Idle Fuelling Trim from the Engine Setup Menu. (The PDU connections are as for the Throttle Potentiometer Adjustment.)
2. Start the DB7 engine and allow it to warm to normal operating temperature.
3. Follow the screen instructions to run the idle fuelling trim procedure.
4. Observe the bargraphs for oxygen sensors A and B. The bargraph indications should oscillate evenly about the 0% position on the bargraph.



Idle Fuelling Trim Display

5. If the bargraph indications are not oscillating evenly about the 0% position, select the A (cylinders 1, 2 and 3) or the B (cylinders 4, 5 and 6) sensor. The Increase/Decrease buttons will appear.
6. Adjust the fuel trim as required to achieve even oscillation about the 0% mark for both sensors. When the adjustment is correct, select the 4 icon and confirm that the idle fuelling trim is correct. On confirmation of the adjustment, the PDU will exit from the idle fuelling program.
7. On completion of the procedure, select Exit from the Engine Diagnostics Software.

Transmission Diagnostics

Automatic transmission DB7s are fitted with a GM4L80-E gearbox electronically controlled by a Transmission Control Unit (TCM)

The TCM is mounted on the rear left wheel arch. It may be electronically accessed from the upper diagnostic socket.

The TCM continuously monitors requests made by the driver via the gear selector, throttle pedal, mode switch, etc. This data is used in conjunction with speed input from the transmission unit to calculate the optimum shift points under current conditions. Shift pressure and ignition retard are also controlled from this data to enhance shift quality and reduce transmission wear.

The TCM also detects faults within the transmission system and stores the relevant fault codes for later analysis.

Gearshifts are controlled by two solenoid valves and a pressure regulator within the transmission valve block assembly.

If a serious fault occurs, the TCM removes all electrical power from these valves and the transmission defaults to a 'limp home' condition. In this state, only mechanical selection of either reverse or second gear is available.

Gearshift Timing

Inputs from the performance mode switch (Sport, Normal or 1st Gear Inhibit) and the throttle position sensor are used to modify transmission gearshift operation as required by the driver.

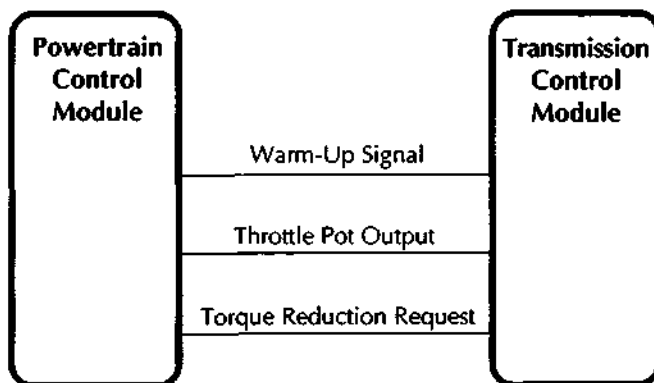
Sport mode raises the road speed at which gearshifts occur enabling higher acceleration rates for the vehicle.

1st gear inhibit prevents engagement of first gear to reduce the risk of wheel slip in icy conditions.

The throttle position sensor signal is continuously monitored by the TCM to detect a rapid throttle opening. If the throttle position sensor signal rises rapidly to above 4.5 volts, a 'Kickdown' condition is initiated. In this condition, upshifts are delayed to higher road speeds to provide the higher acceleration required for overtaking etc.

TCM - PCM Communication

The interface between TCM and PCM allows continuous exchange of the primary data required to appropriately control the gearshifts required during driving under a wide range of conditions.



Warm-Up

The Warm-Up signal is sent from the TCM to the PCM and is used to detect when the transmission reaches normal operating temperature of approximately 100°C (212°F). As this temperature is reached, the modified gearshift timing required with a cold gearbox may be abandoned in favour of the standard timing for a warm gearbox.

Throttle Pot Output

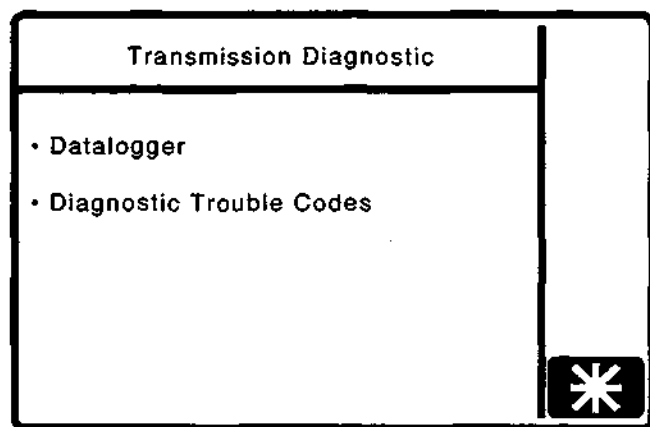
The ThrottlePot Output signal is sent from the PCM to the TCM. The TCM can then use this information to control shift timing in relation to the power demanded by the driver.

Torque Reduction Request

The Torque Reduction Request signal is sent from the TCM to the PCM. It is used to temporarily retard the ignition timing during gear shifts to improve shift quality. When the gearshift is completed, ignition timing will be returned to normal.

Transmission Diagnostics

Selecting 'Transmission' from the vehicle area menu will present the technician with the following transmission diagnostic tools menu:



The Datalogger function is fully described in the worked example at the rear of this PDU Users Guide.

Transmission Datalogger

The PDU datalogger function may be used to monitor the following transmission controller signals

DTCS Number of DTCs Logged

The Diagnostics status manager (DSM) receives and processes fault information and decides when a DTC should be logged and the MIL turned on (if enabled). The actual total stored is indicated by the parameter DTCS.

FBRAKE Brake Switch

The footbrake switch signal is input to the TCM. The input is normally at ground potential and goes open circuit when the brakes are applied. If the torque converter clutch is applied it will disengage when this signal is detected.

FMA Actual Force Motor Current

The force motor regulates the transmission fluid pressure. It is a variable force solenoid whose coil current is determined by the TCM. Range 0 - 1.245 amps. A driver circuit limits excessive current flow and performs a ratiometric comparison of Desired (commanded) Force Motor Current and Actual Force Motor current. The parameter monitors the Actual Force Motor current 1 Bit = 1/204.8amps.

HOT Hot Mode

The signal from the transmission temperature sensor is used to control TCC and line pressure. It is also used in many diagnostic signals and is a critical component for OBD II. Above 120°C the TCC is on in 2nd, 3rd and 4th gears. This reduces transmission temperature by decreasing the heat generated by the torque converter. It also provides maximum cooling by routing transmission fluid directly to the transmission cooler in the radiator. When the Hot Mode is ON the bit is set to 1.

IGN+ Ignition Feed Positive

The TCM receives ignition voltage through TCM pin 53.

MD Desired Force Motor Current

The force motor regulates the transmission fluid pressure. It is a variable force solenoid whose coil current is determined by the TCM. Range 0 - 1.245 amps. A driver circuit limits excessive current flow and performs a ratiometric comparison of Desired (commanded) Force Motor Current. The parameter monitors the Desired Force Motor current 1 Bit = 1/204.8amps.

RATIO Actual Gear Ratio

The diagnostic detects malfunction in the transmission output components by monitoring the actual gear ratio. The actual gear ratio is calculated using input (Ni) and output speed (No): Ratio = Ni/No. This is compared with the standard gear ratio for each gear. Malfunction can be defined as: actual gear ratio is not equal to any of the standard gear ratios.

RPM Engine Speed

The engine speed signal is input from the instrument pack. The signal originates at the crankshaft sensor. The crankshaft sensor signal is modified by the PCM and the instrument pack before being input to the TCM.

SSA Shift Solenoid A

Shift solenoid A is attached to the valve body and its outlet is open to exhaust when it is switched off. A OFF - outlet open - 2nd and 3rd gears selected. The solenoid is energised by the TCM providing an internal ground to close the outlet. A ON - outlet closed - 1st and 4th gears selected.

SSB Shift Solenoid B

Shift solenoid B is attached to the valve body and its outlet is open to exhaust when it is switched off. B OFF - outlet open - 1st and 2nd gears selected. The solenoid is energised by the TCM providing an internal ground to close the outlet. B ON - outlet closed - 3rd and 4th gears selected.

TCCS Torque Converter Clutch Solenoid

The torque converter clutch solenoid is mounted on the valve body. The signal is Pulse Width Modulated at 32Hz to provide closed loop control of the pressure across the converter clutch plates. 1 bit = 0.39% Range 0 to 100%

TCS Torque Converter Slip

Torque converter slip is defined as the difference between the Input/turbine (ni) speed and the Engine speed (Ne): Slip = Ne-Ni. The PWM duty cycle may increase from 0 to 100% when TCC is fully applied. In practice a 100% duty cycle will be achieved only if a large slip is detected. Normally only a 60 to 95% duty cycle will be required for full application of the TCC. Slip is expressed in rpm. 1 Bit - 1/8 rpm. Range -4096 to +4096 rpm.

TCSW Transmission Control Switch

A three position switch allows the driver to select Sport, Normal or 1st Gear Inhibit mode. When 'Sport' is selected gearshifts take place at higher engine revs. When '1st Gear Inhibit' is selected, the transmission only operates in the higher forward ratios to prevent wheel slip in icy conditions.

TISSA Turbine Input Shaft Speed

Turbine speed is the speed of the input shaft of the transmission measured by the input speed sensor mounted on the transmission. An alternating waveform is induced in the sensor by 31 serrations on the forward clutch housing as it rotates. The waveform frequency and amplitude is low at low speeds and high at high speeds. The TCM changes this signal into a digital signal. 1 bit = 1/8 RPM. Range: 0 - 8192 RPM.

TOS+ Transmission Output Speed

The output speed sensor is mounted on the transmission case and measures the speed of the output shaft. As the shaft rotates an alternating waveform is induced in the sensor which varies in frequency and voltage. The waveform is converted into a digital signal by the TCM and used to control TCC, line pressure, shift timing and torque management. 1 bit = 1/8 RPM. Range 0 - 8192 RPM

TOT Transmission Oil Temperature

The transmission temperature sensor signal is used to control TCC and line pressure. It has a negative temperature coefficient so when the temperature is cold its resistance is high and the TCM sees a high voltage. As the temperature warms the volts drop across the sensor decreases and the signal voltage becomes lower. The TCM converts this analogue input into a digital signal.

1 bit = 1°C Range -55°C to +200°C.

TP Throttle Position

This is provided by the EECV Engine Management System as a Pulse Width Modulated signal derived from the throttle position signal read by that module from the throttle position sensor.

TRX Transmission Control Switch X

TRY Transmission Control Switch Y

TRZ Transmission Control Switch Z

The transmission range is detected by the pressure switch manifold (PSM) and input to the TCM. The signal consists of three discrete lines X, Y, Z which transmit a 3 bit binary code as shown in the table below.

0 = open circuit

1 = short circuit to ground

	X	Y	Z
P	0	0	0
R	1	0	1
N	0	0	0
D	1	0	0
3	0	1	1
2	0	1	0
Error	1	1	1

VS Vehicle Speed

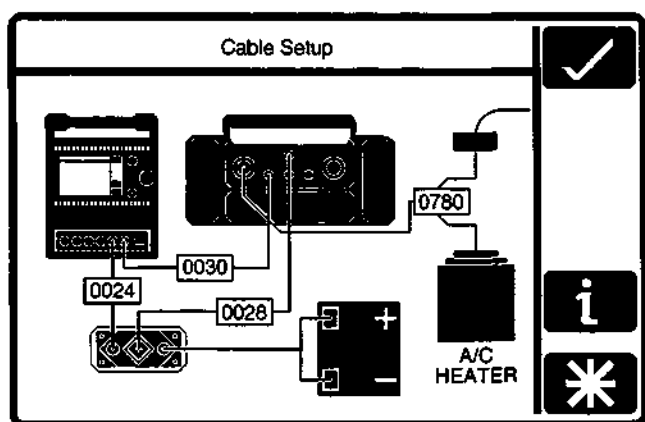
Vehicle speed is derived from a pulsed wave form generated by the speed sensor in the hypoid unit. There are 40 pulses per shaft rotation and the TCM converts this to vehicle speed and applies correction for axle ratio and road wheel diameter. 1 bit - 1kph. Range 0 - 255kph

Transmission Diagnostic Trouble Codes

The diagnostic trouble codes supported by the GM 4L80-E Transmission Control Module are covered in detail in the DB7 OBD II Diagnostics Manual.

Climate Control Diagnostics

The air conditioning control module is located at the right end of the air conditioning unit. Since this controller uses a unique communications protocol, the PDU must be connected directly to the unit via the Vehicle Interface Adaptor as shown in the following cable setup screen.



A digital microprocessor within the control module receives data signals from the operator controlled switches. Comparison of these signals with those returned from system temperature sensors and feedback devices results in the appropriate output voltage changes needed to vary: Blower motor speed, flap position and the solenoids which respond to operator selected temperature demand.

The air from two blower motors is passed through the evaporator matrix which, depending on the positions of the humidity buttons, removes heat from the incoming air. Depending on the position of the two blend flaps, the cold air either passes directly to the vehicle outlet vents, or is passed through the heater matrix to be reheated and then to the vehicle outlet vents.

The amount of air passing through the heater matrix is infinitely variable depending on ambient temperature and the temperature selected within the vehicle.

Selecting 'Climate Control' from the vehicle area menu, will present the technician with the datalogger tool selection screen.

Details of the signals which may be monitored in the system may be found in the DB7 Workshop Manual - Section 8 - Air Conditioning'

Anti-Lock Braking Diagnostics

The Teves Mk IV Braking System consists of two sub-systems, power braking and anti-lock braking.

The PDU software (DataLogger) only allows the monitoring of the anti-lock braking system.

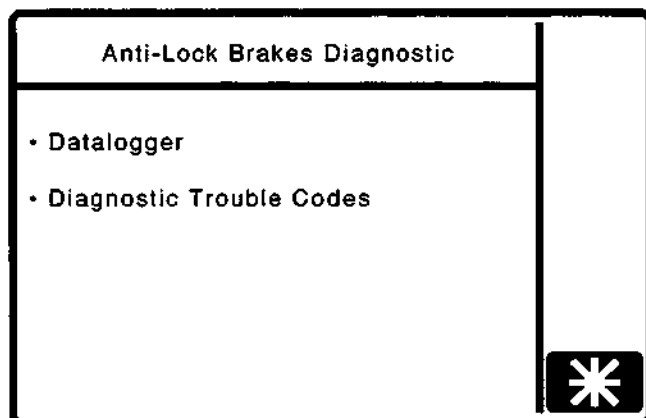
The ABS System consists of:

- Four wheel speed sensors.
- One control module.
- Seven solenoid valves.
- One pressure switch.
- One fluid level switch.

The ABS System is controlled and continuously monitored by the ABS control module, which automatically switches off the system if a failure is identified, illuminating a warning lamp and leaving full, boosted braking to all wheels. A wheel speed sensor is installed at each wheel. Their wheel speed related signals are processed by the control module, which triggers the solenoid valves to modulate hydraulic pressure, preventing the wheels from locking. The control module also monitors the fluid level and will inhibit ABS operation should low fluid level be detected.

The DataLogger function will permit monitoring of the complete system apart from the solenoid valves. The control module transmits short duration test pulses of 25 to 100 microseconds to the solenoid valves. These pulses are too fast for the PDU to monitor and as a result would cause confusing waveforms.

Selecting 'Anti-Lock Braking' from the vehicle area menu, will present the technician with the following menu of diagnostic tools screen:



ABS Diagnostic Trouble Codes

The DTCs which are supported in the Teves Mk IV ABS system are listed in the workshop manual - Section 5 Brakes Wheels and Tyres.

ABS Datalogger

The following signals in the Teves Mk IV ABS system may be monitored using the datalogger function.

DTCs Number of DTCs Logged

The Diagnostic status manager (DSM) receives and processes fault information and decides when a DTC should be logged and the MIL turned on. The actual total stored is indicated by the parameter.

FBRAKE Brake Switch

The signal from the brake switch is used by the CM to ensure that traction control is inhibited when the brakes are applied. The input circuitry within the CM is a 10K pull-up to ignition voltage. When the switch is closed the parameter is set to 1.

FLWS Front Left Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

FRWS Front Right Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

RLWS Rear Left Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

RRWS Rear Right Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

Passive Anti Theft (PATs) Diagnostics

Security System Diagnostics

Because of the requirement to maintain vehicle security, the PATs and Security System operating instructions and diagnostics are covered in the Vehicle Security supplement to section 6 of the workshop manual. This supplement has restricted circulation and is only available to Aston Martin Dealers.

Airbag System Diagnostics

WARNING: Whilst it is completely safe to access and read the airbag diagnostic module memory at the diagnostic socket, significant personal risks exist in the performance of any other tasks on the airbag system or components. Therefore all workshop manual warnings must be read and all safety procedures must be followed before, during and on completion of any other practical work on the airbag system.

System Description

The airbag system installation comprises:

- Airbag Diagnostic Module
- Driver and passenger airbag modules
- Two front impact (crash) sensors
- One 'safing' sensor
- Dedicated wiring harness
- SRS indicator/warning lamp

The system is designed to provide protection for both driver and front seat passenger by automatically deploying airbags in the event of a collision during forward travel.

In the event of a collision, the crash and safing sensors will operate, completing the firing circuit and causing the airbags to inflate within 32 milliseconds. At least one crash sensor and the safing sensor must operate to fire the airbags.

Any faults in system components, installation or wiring will be indicated by a flashing code on the SRS/AIRBAG warning lamp. Fault code information may also be monitored using the PDU or scan tool.

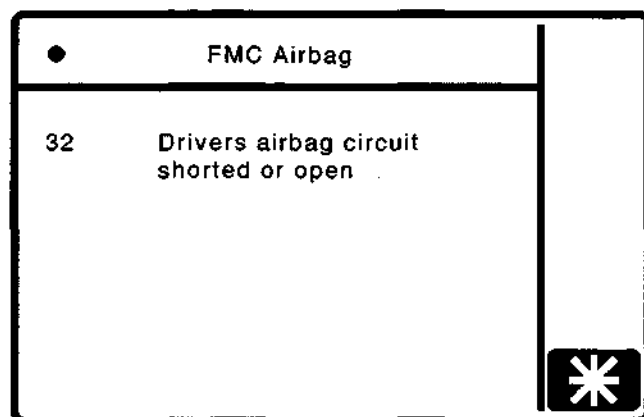
A full description of the airbag system components is included in the workshop manual.

Airbag Diagnostics

The Airbag Control Module indicates a fault by transmitting a pulsed signal down the Airbag System Failure line to flash the SRS/AIRBAG warning lamp. The fault code is repeated continuously. If there are two or more faults, the fault code with the highest priority is transmitted first. The second fault code is only transmitted when the first fault has been rectified.

The SRS/AIRBAG warning lamp is also used to indicate any problem in the seat belt pretensioner system (if fitted). Flashing of the lamp indicates an airbag fault, constant illumination of the lamp indicates a seat belt pretensioner fault.

At the top left of the PDU screen there is a bullet mark which indicates the current state of the Airbag System Failure line. As a code is transmitted the bullet mark can be seen to flash. The PDU reads the fault code, and writes the code number and fault description to the screen. The PDU continues to monitor the transmitted code. If the transmitted code changes, the new code number and description will appear below the first.



When remedial action has been taken to correct a fault, press the Clear Button to clear down the PDU display. Then use the PDU to ensure that no faults are reported.

A series of audible beeps, continuously transmitted by the Airbag Diagnostic Module, indicates that there is an Airbag System fault to report and that the Airbag System Failure line is open circuit. The PDU is not able to monitor the fault line in this situation as there is no pull-up resistor, normally provided by a warning lamp in the instrument pack.

Rapid continuous flashing of the Instrument Pack Airbag Failure Lamp indicates that both front impact sensors are disconnected. No fault code is reported on the PDU, however on close inspection the bullet mark can be seen to flicker.

Airbag Diagnostic Trouble Code Monitor

The following diagnostic trouble codes are supported by the Airbag Control Module:

- 12 Low battery voltage
- 13 Air bag circuit shorted to ground
- 14 Front impact sensor circuit shorted to ground
- 21 Safing impact sensor incorrectly mounted to vehicle
- 22 Safing impact sensor output shorted to battery voltage
- 23 Safing impact sensor input feed / return open circuit
- 24 Safing impact sensor output feed / return open circuit
- 32 Driver side airbag circuit high resistance or open
- 33 Passenger side airbag circuit high resistance or open
- 34 Driver side airbag circuit low resistance or short circuit
- 41 Front right impact sensor feed / return open circuit
- 42 Front left impact sensor feed / return open circuit
- 44 Front right impact sensor incorrectly mounted to vehicle
- 45 Front left impact sensor incorrectly mounted to vehicle
- 51 Airbag CM internal thermal fuse - intermittent short to ground
- 52 Back up power supply - voltage boost fault
- 53 Front impact sensor circuits resistance to ground or internal Airbag CM failure

Seat Belt Pretensioner Diagnostics (where fitted)

Description

The DB7 seat belt pretensioner system operates the drivers seat belt pretensioner in conjunction with the Airbag system. The seat belt pretensioner control module is located under the right hand seat, beside the seat control module.

The pretensioner control module calculates changes in vehicle speed using an input signal from an accelerometer. When a collision is detected (Rapid reduction in vehicle speed) the pretensioner charge is fired using electrical energy stored in a capacitor within the pretensioner control module. Firing of the pretensioner charge applies additional tension to the drivers seat belt.

The airbag and seat belt pretensioner systems share the SRS (Airbag) warning lamp. Any fault detected by the pretensioner control module is indicated by constant illumination of the SRS (Airbag) warning lamp. Flashing of the SRS warning lamp indicates a fault in the airbag system.

Should both systems develop faults, the pretensioner system will permanently illuminate the warning lamp. This would mask the airbag system warning indication. Therefore, rectify the pretensioner fault and then retest for faults in the airbag system.

The pretensioner control module can log up to 10 diagnostic trouble codes together with a time since each fault was alerted to the driver. Each fault will be identified as 'Permanent' or 'Intermittent' on the PDU diagnostic trouble codes screen.

System Connections

The Autoliv RC5 Pretensioner Control Module has an 18 pin connector featuring six shorting bridges. The mating halves of the connector may be securely locked using a double mechanical locking system.

The following pins on the control module connector are used in the Aston Martin seat belt pretensioner system:

Pin 1	Ground
Pin 2	SRS/Airbag Warning Lamp
Pin 11	Drivers airbag positive
Pin 12	Drivers airbag negative
Pin 14	Serial communications
Pin 15	12 volt positive feed
Case	Ground

System Fault Strategy

No single fault may cause an unexpected deployment. The controller will supervise the airbag/pretensioner electrical system in order to warn the driver should a fault occur. Any fault detected by the self diagnostics shall cause the airbag warning lamp to be activated, and in some cases the pretensioner control module to enter shutdown mode. In shutdown mode, the energy of the reserve capacitors shall be discharged to avoid unintended deployment.

As the ignition is switched on, the pretensioner controller will directly discharge the energy capacitors. When the start up procedure is completed without detecting any faults, the convertor will be activated allowing the capacitors to be charged. The system shall be fully active within 11 seconds after switching the ignition on providing that no faults are detected.

All system faults monitored by the controller are filtered in software to avoid fault warnings due to transient electrical disturbances.

If a fault which could lead to inadvertent deployment be detected by the microprocessor, a software shutdown will be generated. However, a leakage to an earth or positive potential in the pretensioner output circuit shall not cause the controller to enter shutdown mode.

If a permanent short of the ignition transistor occurs, a shutdown shall be generated by the hardware circuit. If a shutdown occurs, the system shall be unable to deploy the pretensioner after a period of 3 seconds (i.e. capacitors discharged to under minimum deployment voltage).

WARNING: To avoid the possibility of personal injury caused by accidental deployment of the pretensioner, disconnect the vehicle battery and wait at least 10 minutes for all voltages to fully discharge before working on the pretensioner system. This covers the possibility of the normal capacitor discharge circuits being inoperative and failing to discharge the capacitor when instructed to do so.

If the module enters shutdown mode, all diagnostic functions are stopped, but the communications link remains active. A fault code corresponding to the cause of the problem may be read by the PDU.

Seatbelt Pretensioner Diagnostic Trouble Codes

050A Pretensioner squib leak to battery positive
050B Pretensioner squib leak to ground
050C Pretensioner squib high resistance
050D Pretensioner squib low resistance
0D13 Capacitor voltage error
0D14 Capacitor capacitance
0D09 Energy reserve switch
0D1E Energy shutdown switch
050E Seatbelt pretensioner switch error
0109 Accelerometer function
010A Acceleration out of range
010B Accelerometer offset
0209 Safing sensor error
030A Temperature sensor error
060C Warning lamp short circuit
060D Warning lamp open circuit
060E Warning lamp driver error
0A0C Analogue voltage error
0A09 Communications error
090A EEPROM not programmed
0909 EEPROM checksum
0A0A External watchdog error
0A0B External watchdog time out
020A Safing sensor not closed
090C RAM check error

Print Facility

The print trace and print screen facilities provided on DB7 CD2 will enable the Dealer to print directly to a serial printer via an isolated RS 232 cable.

General Information

This cable is designed to provide full electrical isolation between the Portable Diagnostic Unit (PDU) and a device using the RS232 serial communication port. The cable is constructed with an in-line module that contains the optical isolation circuitry, powered from the PDU.

Printer type

The cable is supplied configured to suite an Epson LX300 printer. This is the only installation verified and approved by Aston Martin Lagonda Ltd.

Unexpected results may occur if used with an unapproved printer.

Part Number Equipment type

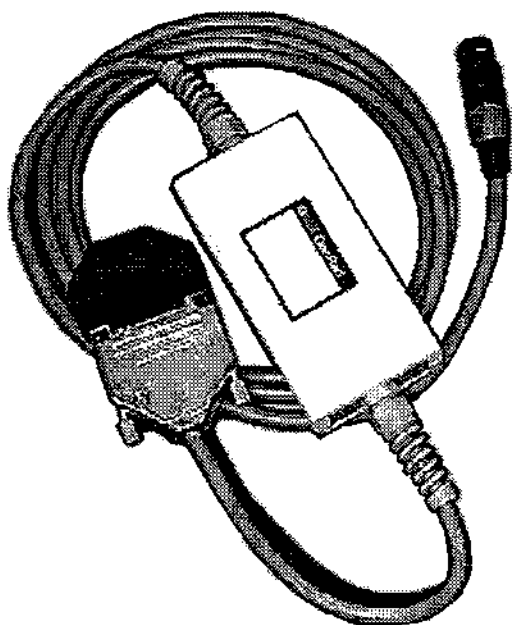
3539-1114-03 Epson LX300 printer cable kit

comprising
3539-1169-03 Printer Cable

3539-1175-02 User Self Test Adaptor

Connecting to the PDU

Connection to the PDU RS232 port is made by plugging the circular connector with the BLUE ident ring into socket (1) on the PDU interface panel.



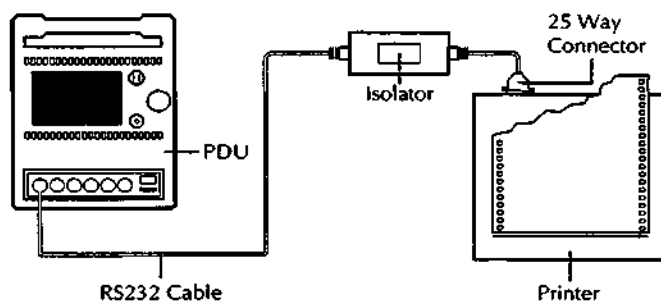
RS232 Printer Cable

RS232 Protocol

The RS232 protocol operated by the PDU is 9600 baud, 8 bit, no parity, 1 stop bit, RTS / CTS hardware handshake.

Printer Configuration

When connected to the printer a hardcopy of the PDU data can be produced.



Printer Connection

When connecting to the printer please record original printer settings prior to making any changes. Neither GenRad nor Aston Martin Lagonda can accept responsibility for re-configuration of the printer for other applications.

Self Test Adaptor

Each cable type is supplied with a User Self Test (UST) adaptor. This allows the function of the cable to be verified independently of a printer. Future releases of UST software will include testing procedures for this cable.

Printer Use

Print Trace

The Trace Buffer is used to record technician use of the PDU. As the diagnostics are executed, the following information is written to trace:

- Screen Title
- Menu options selected
- Operator questions selected
- Operator actions
- Control module information
- Test limits and results
- P codes detected by the DTC monitor
- Snapshot data from the datalogger
- OBD II freeze frame data

Set up the printer and load with paper. Select Print Trace and confirm the selection. All recorded information in the above list will be printed.

Print trace is supported in English, French, German and Italian.

Print Screen

The Print Screen function dumps a bitmap image of the current screen display to the printer. This function is particularly useful for recording data such as waveforms captured by the datalogger application.

The print screen function is supported in English, French, German, Italian and Japanese.

Digital Multimeter

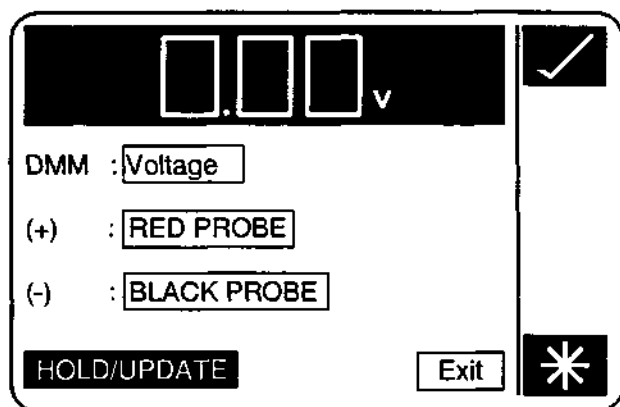
Introduction

The Digital Multi-Meter provides the capability to measure voltage, current, resistance, frequency, pulse width, pulse period and duty cycle using measurement probes or vehicle interface adaptor channels.

WARNING: DMM measurements must not be taken while the PDU is connected to the base station. The PDU measurement system becomes referenced to earth when connected to the base station. Serious measurement errors may be present because of any voltage difference between vehicle ground and base station earth. Operation of the PDU in this mode has both functional and safety implications and therefore must be avoided.

A digital multimeter (DMM) is resident within the PDU software toolbox.

The DMM application can be accessed from the main menu. On selection of "Digital Multimeter" from the main menu, the PDU will always display the same screen, known as the DMM general screen.



The DMM General Screen

The DMM is used to display measured values, to three significant figures, in the correct units.

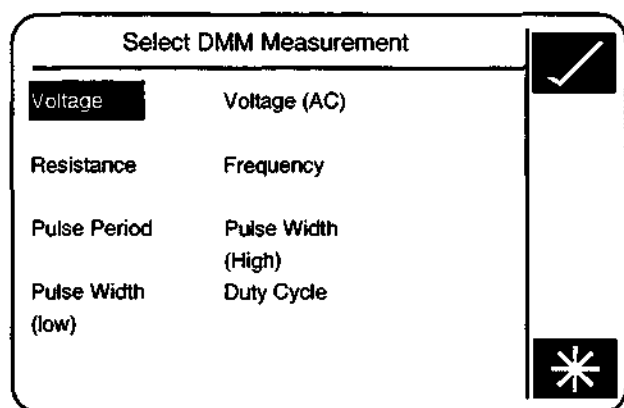
Modes of measurement are Voltage, Voltage (AC), Resistance, Frequency, Pulse Period, Pulse Width (High/Low) and Duty Cycle. Current measurements up to 50A may be made using the current probe. Measurements are usually made directly using the PDU measurement probes. On the air conditioning system only, when using the VIA, measurements may be made between specific module pins. If required, this mode must be specified when specifying the measurement to be made.

Operation

On selection of DMM the general screen, as shown in Fig. 1, will be displayed.

Voltage is the default selection for measurement, with red and black probes selected as sources. To choose alternatives to these options, press the relevant description for change followed by the 'tick' icon in the top, right-hand, corner.

If the measurement mode (Voltage) is selected for change, followed by a confirming 'tick', a screen as shown will be displayed.



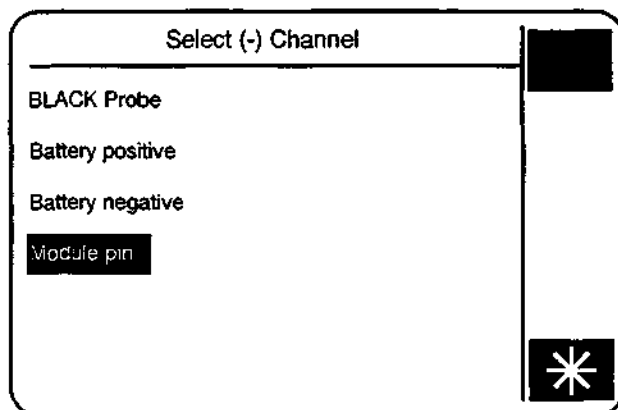
DMM Measurement Selection

Selection of any option from this screen, followed by a confirming 'tick', will return the operator to the general screen but with the new mode displayed against DMM.

If 'Resistance' is selected an additional icon, showing an audio symbol, will appear above the "EXIT" display. This icon allows the enabling / disabling of an audible signal which sounds when measured value falls below 0.5 ohms. Touch the icon to toggle the warning ON / OFF directly, no confirming 'tick' is necessary. A 'cross' is displayed over the icon when warning is turned OFF.

Measurement Source Selection

If a measurement source (either RED or BLACK PROBE) is selected, a screen as shown will be displayed. This screen may vary depending upon the various probes which can be connected to the PDU. A full list of possible sources will be displayed on the 'Source Select' screen.



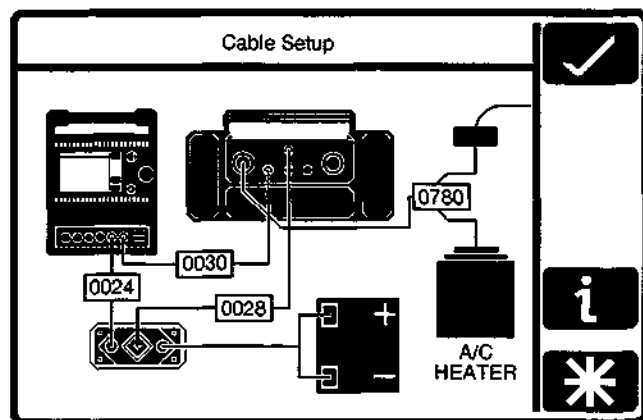
Selection of (+) and (-) measurement channels

Selection of any source option, except "Module Pin", will return the user to the general screen, which will display the revised source.

Module Pin Selection (Air-Con only)

Selection of "Module Pin" will display a screen as shown.

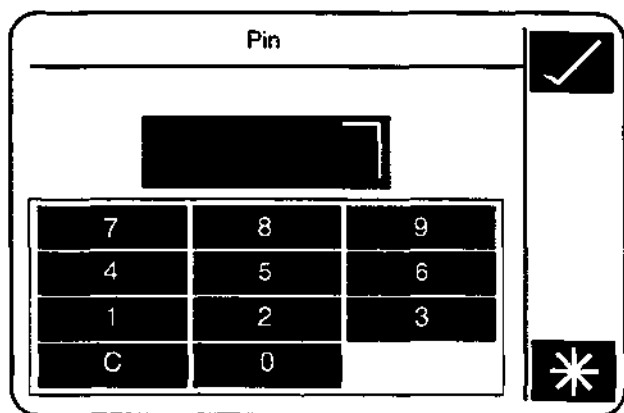
Selection of one of the options displayed on this screen allows the operator to make measurements on designated pins of the air conditioning control module. When the air conditioning module is selected PDU will display a wiring connection diagram, as shown.



Module Connection

The PDU will then check the cable connections. Until all connections are correct, the PDU will not allow progression beyond this screen. Pressing the 'asterisk' icon and selecting abort returns the operator to the general screen if an incorrect system has been chosen.

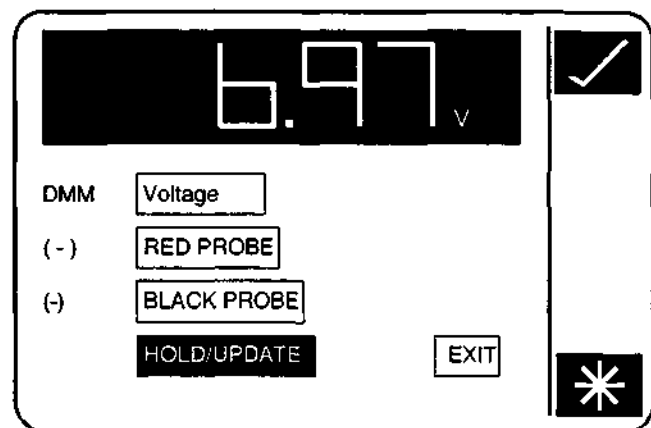
If selection and wiring are correct a numeric keypad will be displayed. The operator can now enter a pin number to be tested, using this keypad.



Numeric Keypad

Display Freezing

To assist the operator a "HOLD/UPDATE" option is displayed on the general screen. This option is selected as default on the general screen and allows a reading to be 'frozen' on screen when the 'tick' icon is pressed. A 'tick' button is also incorporated into the red probe so that a remote 'freeze' command can be sent to PDU, holding the reading until the operator can view the screen. A frozen value is displayed on a 'grey' background indicating that the value is on HOLD. Re-pressing the 'tick' icon (either local or remote) unfreezes the display and restores the normal display background.



The Hold/Update option

The "HOLD/UPDATE" option operates on one touch of the 'tick' icon (or 'tick' button) irrespective of the state of the screen backlight. Therefore it is not necessary to reinstate the screen backlight if there has been no operator contact with the PDU for five minutes (or longer). Pressing "HOLD/UPDATE" reinstates the backlight and initiates/releases display 'freeze' automatically.

System Exit

At any point during DMM operation it is possible to exit the system by either pressing the 'asterisk' icon and selecting abort, or pressing "EXIT" (where available) followed by a confirming 'tick'.

Diagnostic Trouble Codes

Introduction

The 'Diagnostic trouble codes' application enables the PDU to monitor the trouble codes logged in selected control module's and provides the following functions:

- Decode and display any trouble codes logged by the control module(s) being monitored.
- Decode and display enhanced diagnostic information, together with any count of the number of occurrences, when supported by the control module(s).
- Clear some or all of all these trouble codes selected by the user on the PDU screen, when supported by the control module(s).

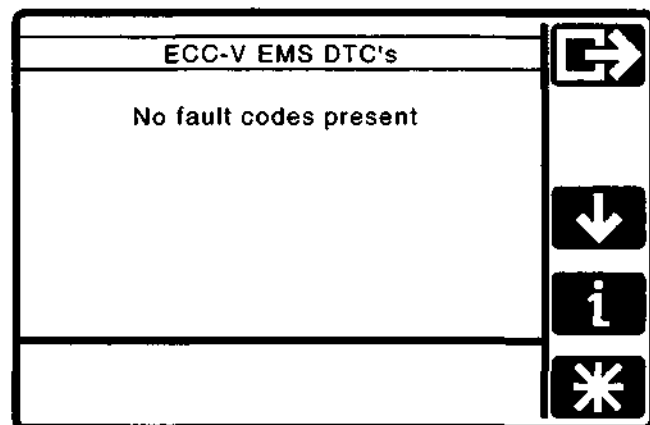
Diagnostic Trouble Codes are logged by the Engine Management and by the Automatic Transmission control units and can be accessed using the PDU. Logged codes in the 95 MY Teves Mk II ABS controller can only be accessed using the brake warning light. The Air Conditioning control unit does not log trouble codes.

Operation

From the Main Menu make the following selections:

- Select Diagnostics
- Select Engine or Transmission
- The system will then load the appropriate software
- Select Diagnostic Trouble Codes
- Connect the PDU to the car as shown on the screen diagram
- Select the ✓ icon to confirm connection
- The PDU will then interrogate the chosen control unit and will display any logged trouble codes.

If no trouble codes have been flagged by the control module, the PDU will display a screen similar to Fig. 15



The No Fault Codes screen

The trouble code screen will be headed by a module title block followed by a list showing all logged trouble codes for the selected module.

Note: There may be more logged diagnostic trouble codes than displayed on the first screen. Use the 'up arrow' and 'down arrow' icons if necessary to scroll through the total display.

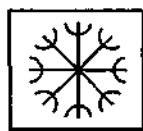
On the Zytec engine management system only, each trouble code definition will be individually selectable to invoke the clear trouble codes screen. If one or more trouble codes are selected, the clear all and clear selected trouble code icons will be displayed.

On all other systems, only the 'Clear All' function is available.



'Clear All' and 'Clear Selected Codes' Icons

Freeze Frame Data



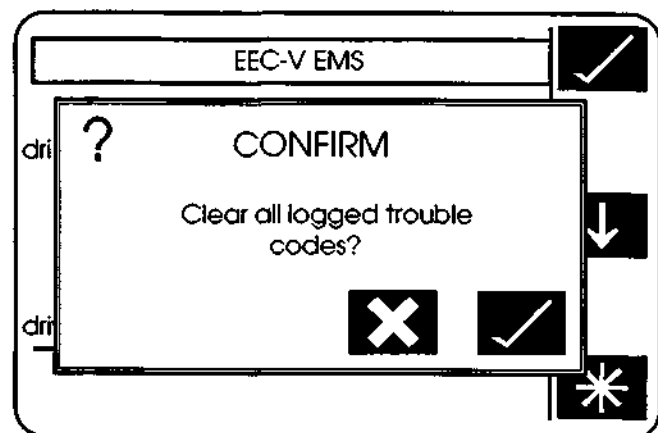
As any engine management trouble code is logged, the system takes a snapshot (freeze frame) and records the state of all signals at that time.

On the Zytec engine management system (95 MY), freeze frame data can be displayed by selecting a logged trouble code and touching the 'snowflake' icon.

On the 97 MY EEC V engine management system, freeze frame data is accessed using the OBD II scan tool.

Clear all Trouble Codes

Selecting the clear all trouble codes icon will invoke a confirmation window.



'Clear All Codes' confirmation screen

Selecting the 'tick' will instruct the PDU to clear all logged trouble codes in the selected module and return to the no logged codes screen.

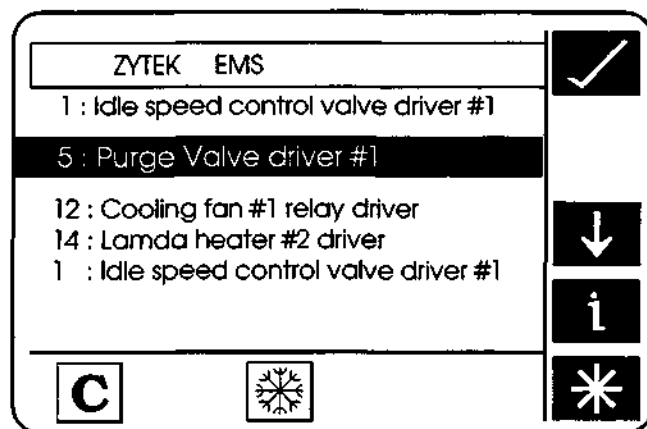
Select the 'tick' icon to exit Diagnostic Trouble Codes.

Clear Selected Trouble Codes

(95 MY Zytex Engine Management Only)

If you wish only to clear selected codes on the Zytex ECU and leave others for later investigation, proceed as follows:

Highlight only the trouble code(s) to be cleared.



Highlighting Selected Trouble Codes

Select the 'clear selected trouble codes' icon; this will invoke a confirmation window.

Selecting the 'tick' icon will instruct the PDU to clear only the selected trouble codes from the control module fault table, and if successful, the system will return to the 'Diagnostic trouble codes' screen.

If any attempt to clear trouble codes is unsuccessful, a warning window will be displayed.

This will indicate that some selected trouble codes remain logged, selecting the 'tick' icon will return to the 'Diagnostic trouble codes' screen.

Select the 'tick' icon again to exit Diagnostic Trouble Codes.

Datalogger

Introduction

DataLogger is software produced to identify permanent or intermittent faults on vehicle electronics. The objective of DataLogger is to provide a view of the vehicle's electrical behaviour, such that intermittent activity can be recorded and interpreted quickly and accurately. Running on the Portable Diagnostic Unit (PDU), the DataLogger application can capture vehicle information in three ways.

- Serial communications direct from the control unit.
- Parallel communications using the Interface Adaptor.
- Direct signal monitoring using the measurement probes.

Serial Communication

Serial Communication is a two-wire communication link between the PDU and most vehicle control modules providing digital measurements for connected components. The serial communication link allows the tester to determine the current condition of components connected to the control module, and to identify any history of faults.

On later vehicles, the PDU is connected to the vehicle diagnostic sockets via the multi Protocol Adaptor (MPA) to gather serial data from the control modules.

Parallel Communication

The Vehicle Interface Adapter (VIA) provides an interface between the PDU and the vehicle harnesses for the acquisition of multiple analogue measurements. The VIA is connected between the relevant vehicle control module and its harness connector. This allows the PDU to capture information from a multitude of channels entering the control module. This vehicle interface is used with control modules not equipped with a serial communication link (Teves Mk II braking system and the air conditioning system).

Measurement Probes

The measurement probes permit readings to be taken directly from any connector on the vehicle.

DataLogger Applications

Datalogger may be used to interrogate the following DB7 systems:

- ABS braking system controller
- Engine Management Controller
- Air Conditioning Controller
- Automatic Transmission Controller
- Passive Anti Theft (97 MY)
- Security System (97 MY)

Using the Datalogger

Configure the vehicle to the normal operating conditions for the system under test.

From the PDU main menu screen:

Highlight 'Diagnostics'.

Press the 'tick' icon to confirm the selection.

Enter the Transmission Type and confirm the selection.

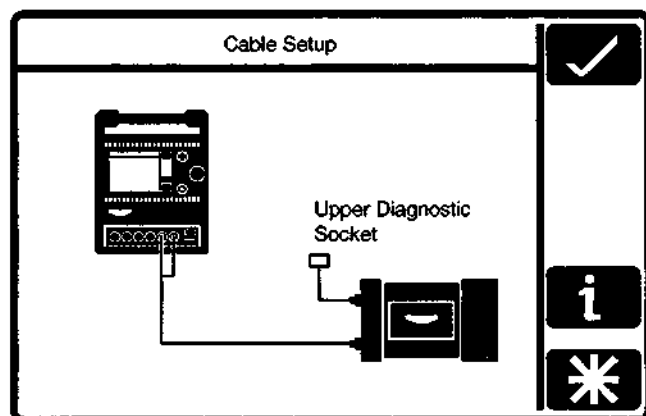
Select the Vehicle Area to be tested and confirm the selection.

The PDU tools screen should now be displayed.

Highlight 'DataLogger'.

Confirm the selection with the 'tick' icon.

The PDU connection screen should now be displayed.



PDU Connections for Datalogger

Connect the PDU to the vehicle as described in the screen image.

Switch On the ignition and press the 'tick' icon.

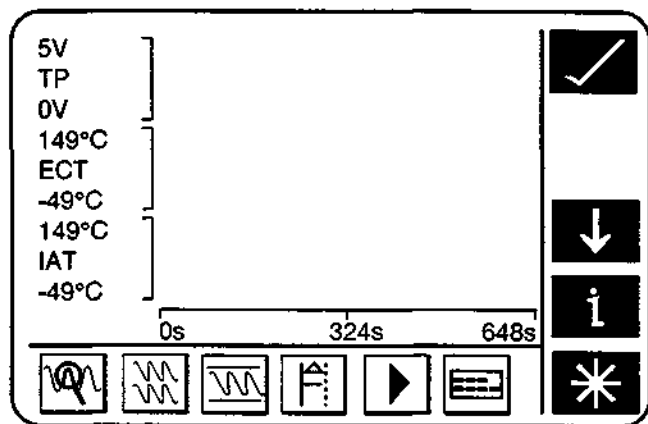
'Establishing connection to control module' should now be displayed on the screen.

If for any reason the PDU cannot communicate with the relevant vehicle control module a 'communications failure screen' will be displayed with a retry option.

Check all connections before retrying.

Once communications are successful 'Starting DataLogger' will appear on the screen momentarily.

DataLogger will automatically default to the waveform screen.



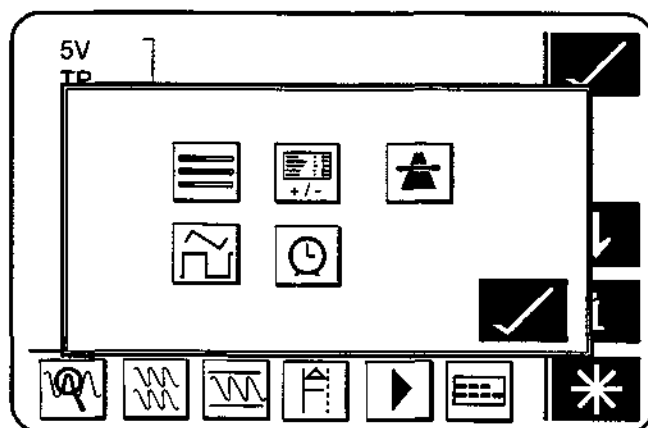
Datalogger Waveform Screen



The default waveform screen will display previous selected parameters. If these parameters are ideal for the test procedure then DataLogger can be started immediately, simply by pressing the record icon.



Select the main menu icon to go to the main menu screen.



Datalogger Main Menu

Main Menu

The datalogger main menu) is the main control screen, and can be selected from any of DataLogger's screens.

The main menu provides a single touch entry to each of DataLogger's features.

These features include (left to right, top to bottom):

- Bargraph Display
- Parameter Customisation
- On-Road Manual Trigger
- Waveform Display
- DataLogger timing

Parameter Customisation

Parameter customisation enables the selection of signals to be recorded by DataLogger. It also enables the signal units to be selected, the order in which the signals are displayed, and whether the displayed signals are to be used as a trigger.

The Parameter Customisation screen presents selections in a five column table. Each column from left to right represents:

- Parameter name or acronym.
- Record enabled.
- Display order.
- Trigger action.
- Display S.I. Units.

Signals					S.I.	
BAT +						✓
ECT	▶	2			°C	
EGR S						
ETCC						
ETCS						
FF11						
FF12						
A B C	1 2 3	✗	C			✱

Parameter Customisation

Parameter Name

Parameters can be fault codes, inputs to, or specific outputs from, a vehicle control module.

The number of parameters selectable is limited to 32.

If the number of parameters available for customization exceeds the display area, the arrow buttons will be present, allowing display area scrolling.

The parameters declared to DataLogger are initially presented in alphabetical order.

Record Enabled

Record enabled is used to select which signals are to be recorded.

To select a signal for recording, touch the rectangle next to the signal name.

The record button will then be displayed.

Note: Additional rectangles may appear in other columns beside a selected signal name, indicating that the signal units may be changed or that the signal may be used as a trigger.

It should be noted that the more parameters you select to record the slower the PDU's sample rate will be for each parameter e.g. The PDU may be able to monitor six parameters sampling each parameter twice a second. If the number of parameters is increased to twelve then the PDU would only be able to sample each parameter once per second, thus reducing its ability to capture fast faults; therefore it is recommended that the number of parameters is kept to a minimum.

Display Order

Parameters may be displayed on the waveform / bargraph screen in any order.

To set the parameter display order, press the required rectangle to create a numbered list.

Note: It is not necessary to display all of the parameters required to be recorded.

This has particular benefits if a parameter is to be used as a trigger but is not required to be displayed.

Trigger Action


For a detailed description of trigger action, refer to the Trigger Customisation description on the following page.


S.I. Units

Certain parameters can be measured / displayed in a number of different units eg temperature in °C or °F. If a rectangle appears around the displayed units in the 'S.I.' column then the units are selectable. Each time the rectangle is pressed, the selectable units scroll one step through the available options.

Other Features


To make parameter customization easier two icons have been introduced on to the bottom of the screen, these are:

 This icon simply puts all of the signals selected for recording in alphabetical order irrespective of the language.

 This icon will put all of the signals selected for recording at the top of the parameter list in numerical order.

After the parameter customization process is completed, return to the DataLogger main menu.

Default Customisation

 To cancel all customisations, press the Customisation Reset icon. This will reset the customisation on all parameters to the default setting.

Trigger Customisation

DataLogger operates using a 'rolling memory'.

When the Record icon is selected on the waveform display, PDU will start to record data, it will then continue to record data until its memory is full.

At this point it will continue recording by overriding the oldest data. This process will continue indefinitely or until the trigger is activated.

When the trigger is activated it performs a number of functions.

- The first function is to place a zero time point within the stored data, this enables the trigger point to be easily accessible in later stages.
- The second function is to set a timer, ensuring that the PDU will only continue recording for the time selected in 'test-duration'.

Only the data within the selected time period will be stored. A trigger is used to define the zero time point on any waveform display. This is used to make it easier to locate the actual point at which the fault occurred on the waveform display. Triggers may take three forms.

1. Manual Trigger

A manual trigger would be used in circumstances where the technician can clearly identify the point when the fault occurs and has access to the PDU at this point.

The trigger icon should be pressed on the waveform / bargraph display (or the on-road trigger icon) at the instant the fault occurs. This will then become the zero point for the waveform/bargraph display. The waveform/bargraph display up to this point would have a negative form.

2. Fault Code Trigger

The fault code trigger is used when the first indication of a fault is normally by the appearance of a warning lamp within the instrument pack. For some vehicle systems DataLogger can trigger on specific fault codes, this type of triggering is more precise than simply triggering on the warning lamp.

This trigger is selected during the parameter customisation process. To select a fault code to trigger 'on', set the fault code (parameter) to record.

Assign the display order by touching the rectangle below the Eye icon repeatedly until the desired display order number is shown.

Press the rectangle in the trigger column.

Highlight the fault code parameter again and select the magnifying glass icon. The trigger customisation screen will be displayed.

Select the appropriate trigger style icon and select the tick icon to confirm.

Press the Tick icon again to return to the main DataLogger screen.

Select the Record icon to start data capture.

The unit will trigger when the fault code appears and will set the zero time point of the waveform / bargraph display.

3. Specific Signal Trigger

It is possible to select a specific parameter or signal to trigger DataLogger.

Triggering on specific signals is likely to be used when the vehicle system has no on-board diagnostics or when diagnostic information is not readily available at the time the fault occurs, e.g. air-conditioning.

This type of trigger should only be used when it is known that a particular signal has certain characteristics at the time the fault occurs, e.g. one signal will always go from 12 Volts to ground, bringing on a warning lamp when a particular fault occurs, as this is a known event, this signal may be used to trigger the PDU.

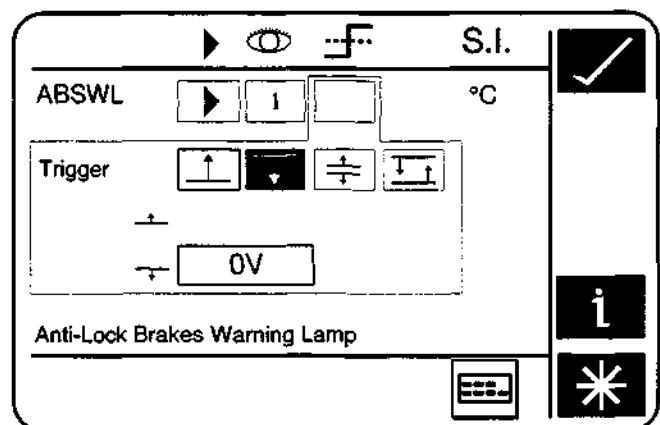
Trigger Selection

Any of the record enabled parameters may be used to trigger DataLogger.

To select a trigger highlight the parameter name, a magnifying glass type icon will appear at the bottom of the screen.


Select the magnifying glass type icon.


The trigger action screen should be displayed.





Trigger Action Screen

The following trigger options are available:-

 Triggers when the signal passes above a specified value, i.e. stop lamp.

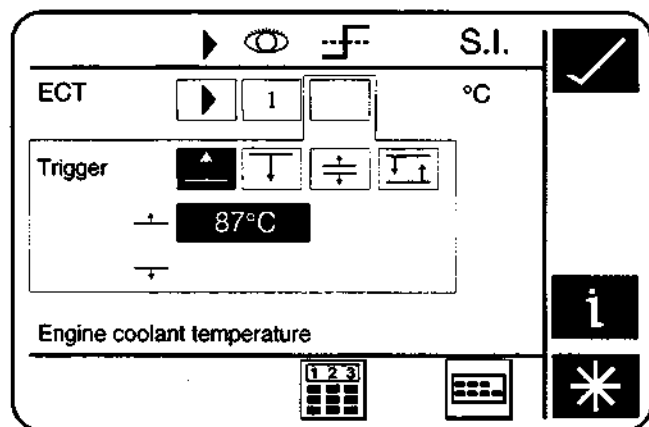
 Triggers when the signal passes below a specified value, i.e. Anti-Lock brakes warning lamp.

 Triggers when the signal passes outside a specified band, i.e. oxygen sensor feedback.

 Triggers when the signal passes into a specified band.

Once the type of trigger has been selected the trigger value(s) (i.e. the signal level at which the trigger point will occur) should be set.

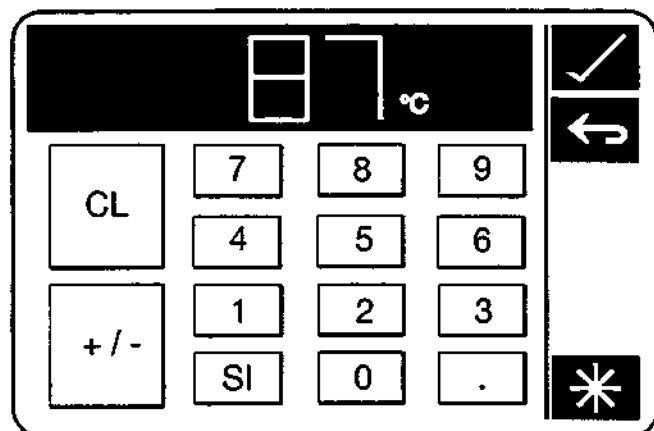
These values are set by highlighting the existing value.



Highlighted Trigger Value

Press the calculator-style icon.

A new screen should now be displayed.



Trigger Value Entry

Enter the required trigger value using the calculator-style screen buttons.

The S.I. button enables unit selection, where applicable, refer to S.I. Units.

Confirm the trigger value by pressing the 'tick' icon.

The trigger screen will now be re-displayed.

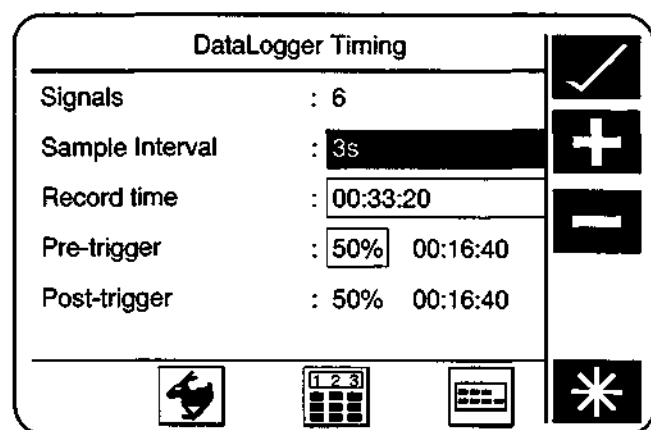
Press the 'tick' icon to go back to the Parameter Customisation screen.

Press the 'tick' icon again to return to the datalogger main menu.

Datalogger Timing

Select the 'clock' icon from the main menu screen.
Confirm the selection using the 'tick' icon.

The DataLogger timing screen should now be displayed.



Datalogger Timing

The DataLogger timing screen allows customisation of the sample interval and duration of data capture.

The display will identify the number of parameters (channels) which have been selected to be recorded by DataLogger.

Timing changes can only be made while data capture is inactive. Entering DataLogger timing while vehicle data is being captured will display the current settings, but disable selection.

Signals

The signals are the number of parameters set for sampling by DataLogger.

Sample Interval

The sample interval (frequency) defines the time interval between successive block requests for all recorded parameters.

The sample interval is selectable to enable fast response to intermittent faults.

Note: Very short sample intervals may reduce test duration because the PDU memory becomes full of data.

Select the sample interval rectangle.

A calculator-style icon should now be displayed.



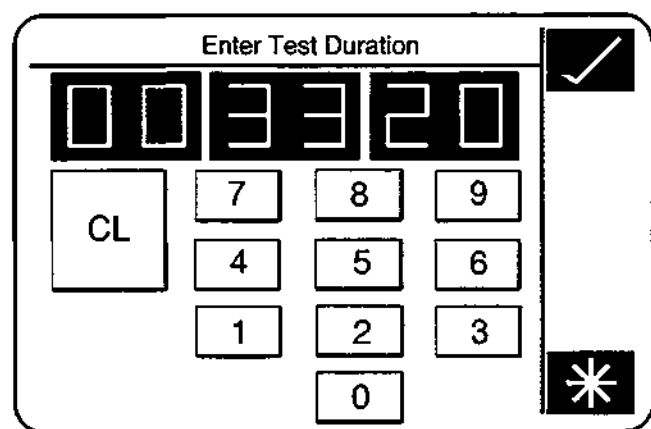
As well as a calculator-style icon being displayed there will be a hare icon, selecting this icon will automatically set the fastest sample rate for the selected parameters.



Note: The fastest sample rate set using the 'hare' icon may be too fast for some applications.

Select the calculator-style icon.

A new screen should now be displayed.



Test Duration

Enter the required value in milliseconds up to a maximum of 60,000 mS (1 min). At this stage DataLogger will not verify if the entered sample interval can be achieved.

When DataLogger is actioned to start recording vehicle data, and the sample interval is shorter than the fastest achievable capture time, a warning screen will be displayed, requesting changes to the sample interval.

Record Time

The record time (test duration) defines the length of the data slice which will be preserved for analysis after the fault occurs. The selected time will be split equally before and after the fault trigger. e.g. a 10 minutes recording will preserve data from 5 minutes before to 5 minutes after the fault.

At the end of the record time the PDU will automatically stop recording.

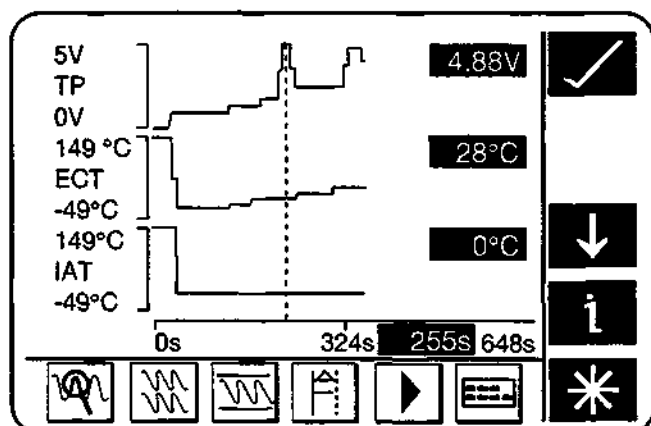
The record time is entered in the same way as the sample interval, by enabling the rectangle and selecting the calculator-style icon.

Pre-trigger and Post-trigger

The pre-trigger and post-trigger represent the duration of the tests before and after the trigger point respectively.

Waveform

Select the waveform icon from the main menu, confirm selection using the 'tick' icon; the waveform screen should now be displayed.



Waveform Display

The screen consists of three parts:

- Waveform Display
- System icons
- DataLogger Specific icons

Waveform Display

The waveform display provides a graphical indication of activity occurring within the displayed parameters. This feature provides a display of various waveforms simultaneously. Each waveform represents a vehicle parameter indicating measured activity in relation to time. The display is dynamically updated at the frequency of the sample interval.

To the right-hand side of the waveform is a digital read-out of that signal.

A vertical dotted line (cursor) on the screen represents the point in time displayed by the digital read-out.

This cursor may be moved by applying finger pressure to the screen in the position the cursor is required.

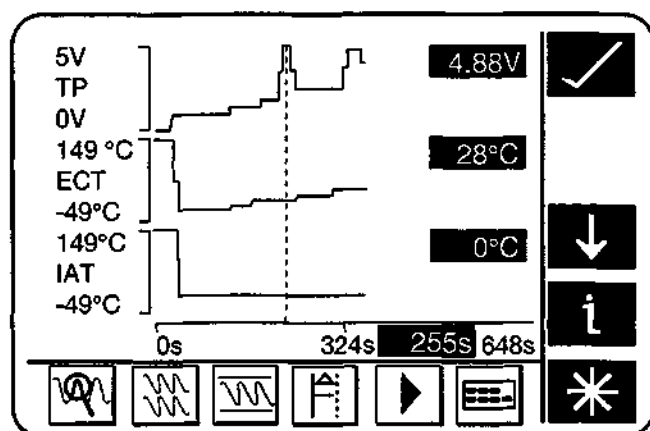
The system up or down icons can be used to scroll the waveform display up or down respectively to look at the other displayed waveforms.

System Icons

For a detailed description of each of the system icons, refer to the on-screen Dataslogger Training Programme.

DataLogger Specific Icons

The DataLogger specific icons are those at the bottom of the screen.



Datalogger Icons

Record Icon

Press the record icon to start capturing data, a trigger icon will replace the record icon.



Press the trigger icon to instigate the manual trigger.

Once the trigger procedure has occurred, a stop icon will replace the trigger icon.

Press the stop icon to stop capturing data.

The following icons are to aid viewing / analysis.

Split Cursor Icon



The split cursor icon splits the vertical cursor into two parts.

One permanent static cursor represented by a solid vertical line in the waveform display, and one moveable cursor represented by a dotted vertical line, this is moved by applying finger pressure to the screen in the position the cursor is required.

The digital display of the waveforms will now represent the difference in levels between the two cursors and not the absolute signal level as detailed earlier.

Re-scale Vertical Icon



Normally all of the waveforms are displayed with the vertical axis representing the maximum possible variation of the signal, e.g. battery voltage 0 to 16 V.

The re-scale icon causes the waveform to scale such that the recorded variation determines the scale, this normally enlarges the vertical scale.

The scaling operation can be performed on any of the displayed waveforms by highlighting the parameter name prior to the operation.

Once auto-scaling has taken place, further manual scaling may be achieved by using the '+' and '-' system icons.

Waveform Display Number



This icon enables control of the number of waveforms displayed on the screen at any one time.

Pressing this icon causes the '+' and '-' system icons to appear. Using these system icons increase or decrease the number of displayed waveforms.

It should be noted that the more waveforms displayed the poorer the detail becomes, therefore the number of displayed waveforms should be kept to a minimum.

Horizontal Scale



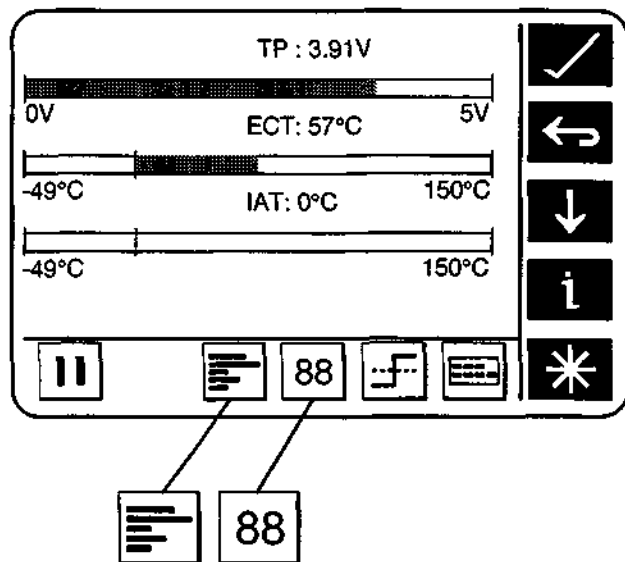
This icon performs the same function as the re-scale vertical icon only for the horizontal axis.

By expanding the scale more detail will be available, thus proving easier to analyse. However the amount of time displayed on any one screen will be reduced.

Bargraph / Digital display

Bargraph / Digital display provides another format in which to display recorded data.

The DataLogger icons operate similar to those used in the waveform display. However one new icon is provided as a toggle option from bargraph to digital display.



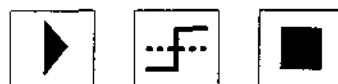
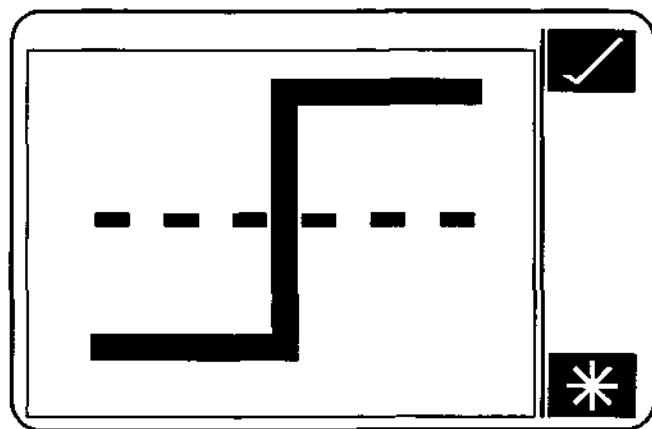
Bargraph / Digital Display

On-Road Trigger

When on-road trigger is selected using the motorway icon from the main menu a symbol is displayed over the entire screen display area.

This option is intended for use during on-road tests to ensure that the PDU screen does not distract the driver.

Press the record icon to start capturing data, a trigger icon will replace the record icon.



Datalogger Trigger Icon

Press the trigger icon to instigate the manual trigger.

Once the trigger procedure has occurred, a stop icon will replace the trigger icon. Press the stop icon to stop capturing data.

Datalogger Example

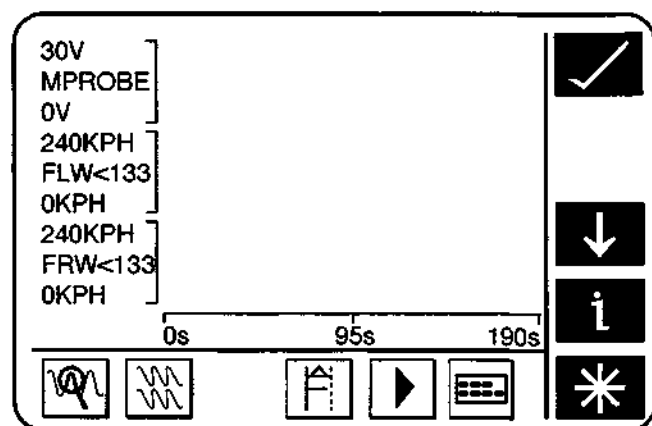
A customer reported intermittent illumination of the anti-lock Brakes (ABS) warning lamp.

The ABS control module was interrogated, producing fault code 33 (95 MY), right-rear wheel speed sensor.

The PDU was used to check the wheel speed sensor output using the ABS warning lamp as a trigger.

The PDU was setup to the vehicle's configurations and DataLogger was accessed.

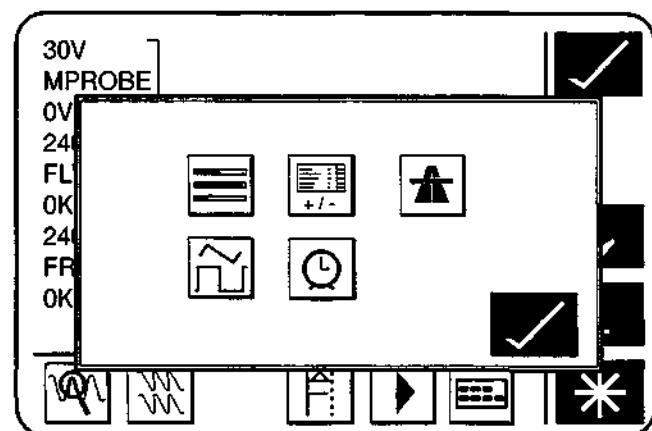
DataLogger automatically defaulted to the waveform screen.



Datalogger Waveform Screen

The main menu icon was selected to access the main menu screen.

The main menu screen is the main control screen for access to DataLogger's subsystems.

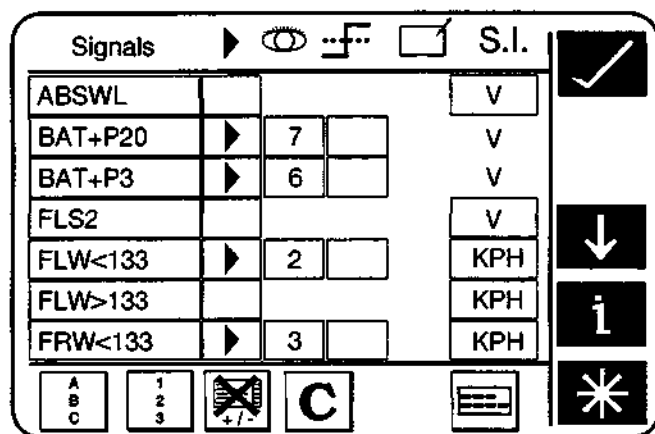


Datalogger Main Menu



The customisation icon was selected, and the selection was confirmed using the 'tick' icon.

The parameter customisation screen was then displayed.



Parameter Customisation Screen

All pre-defined parameters were cancelled using the 'C' icon, the screen was now similar to that below.

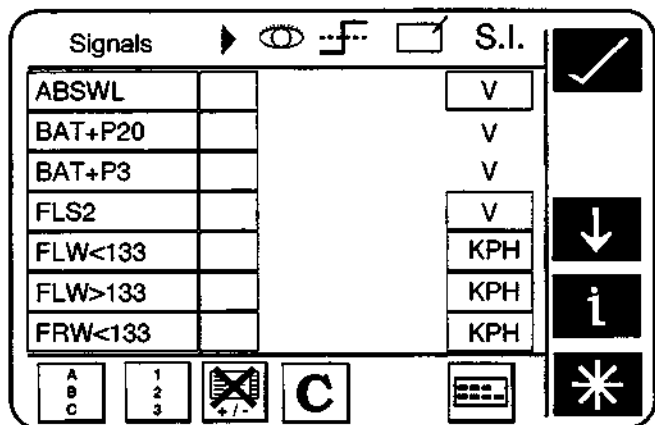


Fig. 35 Parameter Setup

The rectangle below the play icon next to 'ABSWL' (Anti-lock Brakes System Warning Lamp) was selected to be recorded.

The rectangle below the 'eye' icon in the 'ABSWL' row was selected to be recorded.

The screen was scrolled down until 'RLW<133' was displayed.

The rectangle below the play icon in row 'RLW<133' was selected.

The rectangle below the eye icon in row 'RLW<133' was selected.

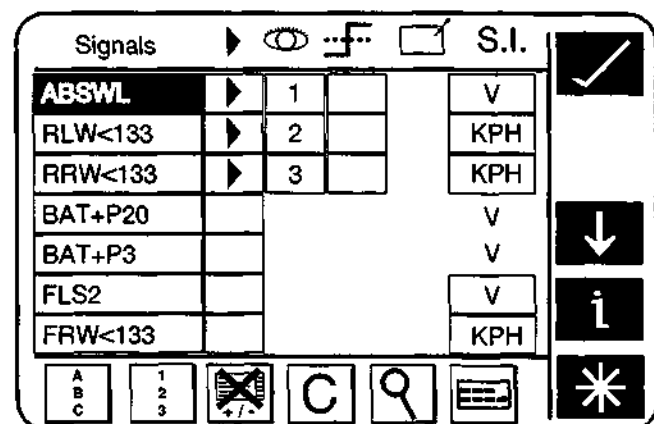
The screen was scrolled down until 'RRW<133' was displayed.

The rectangle below the play icon on row 'RRW<133' was selected.

The rectangle below the eye icon in row 'RRW<133' was selected.

The 're-order' icon was then selected; this places the record enabled parameters at the top of the parameter list in numerical order.

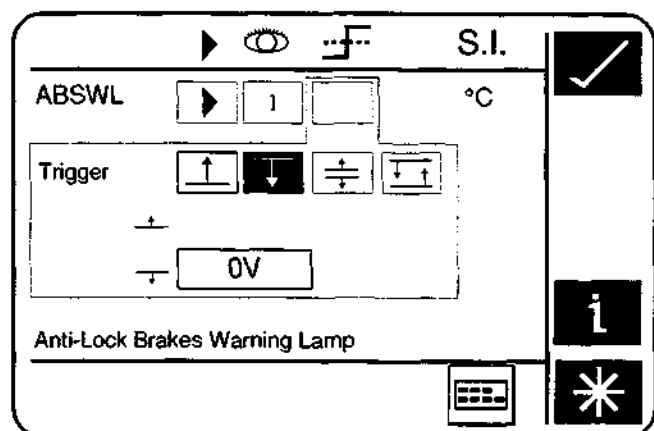
The 'ABSWL' parameter was then selected and the trigger switched on by touching the rectangle in the ABSWL line below the trigger symbol.



ABS Warning Light selection

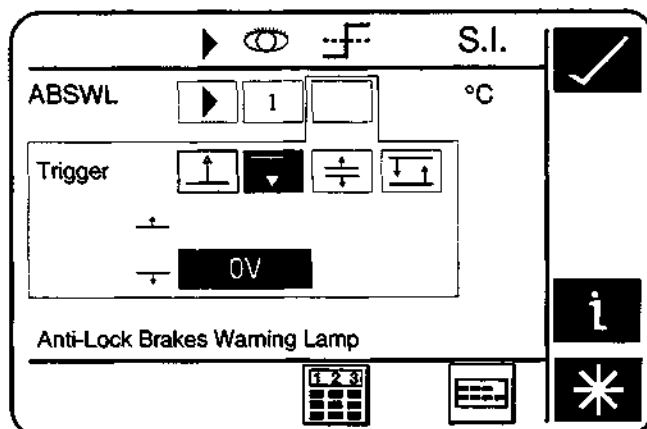
The magnifying-glass type icon was then selected to lead to the trigger customization screen.

The 'falling-edge' trigger icon was then selected. DataLogger will then trigger from the ABSWL when the signal passes below a specified value.



Falling Edge Trigger Icon

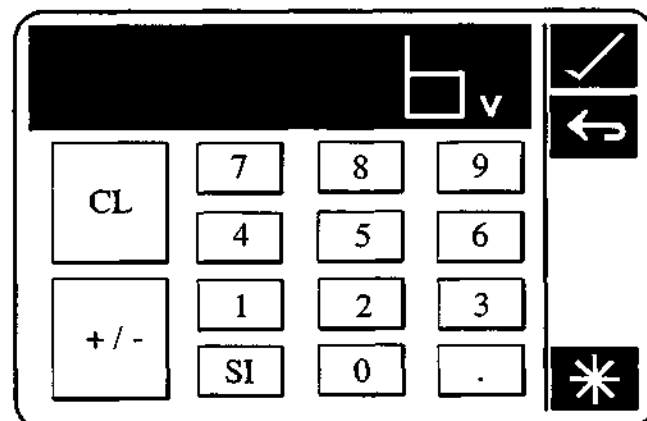
The 'OV' rectangle was then selected.



Selection of the 0V trigger point

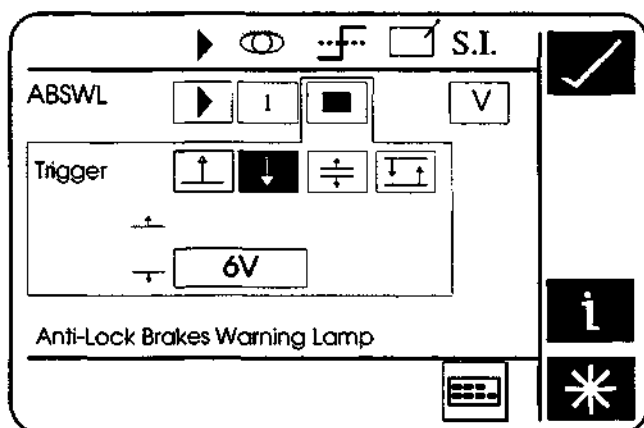
The calculator-style icon was then selected to alter the trigger value.

Using the calculator-style screen buttons, a threshold value of 6 Volts was entered.



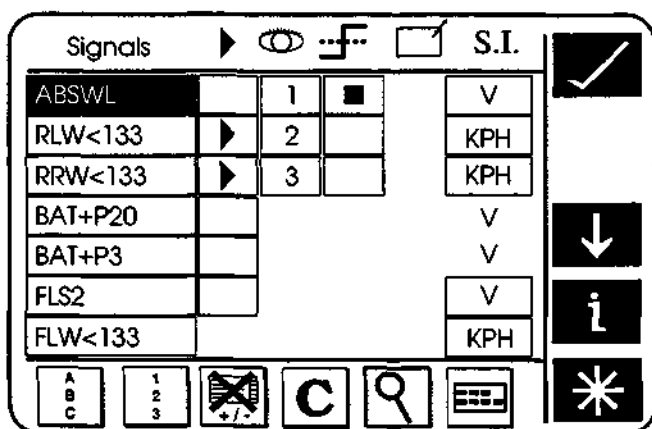
Trigger Point setting to 6V

The 'tick' icon was selected to return to the trigger screen which will then be as shown below.



The Trigger Set-Up Screen

The 'tick' icon was then selected to return to the parameter customisation screen. The screen should now look similar to that below.



Parameter Customisation - Final Setup

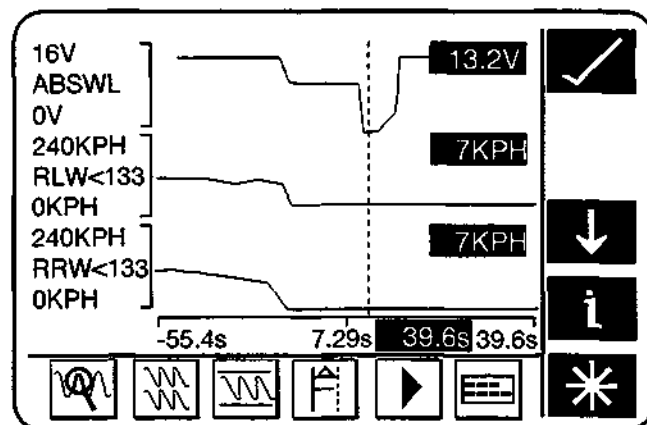
The 'tick' icon was pressed to access the waveform display.

The PDU was now ready to start recording data.

The 'record' icon was selected to start recording data.

When the fault occurred, the ABS warning lamp automatically triggered the PDU. This will place a fixed cursor on the screen and set the time base to zero. The PDU will stop recording after the preset record time. If no record time has been entered, the PDU will use its default record time of 16minutes and 40 seconds. 8m20s pre-trigger and 8m20s post trigger.

The following figure indicates the typical waveform display for the wheel speed sensor fault. The dotted vertical line represents the trigger point.



Wheel Speed Sensor Display

Training

The training programme incorporated into the PDU software is designed to cover the needs of new users and those who have basic PDU skills but require further training on the DMM and Datalogger functions.

Select 'Training' from the PDU main menu to bring up the training menu.

New User Training

The new user training program takes the student through a structured sequence of activities to learn the meaning and use of the basic screen icons. The trainee may then work through programmed exercises to learn the digital multi-meter and then the datalogger functions.

Existing User Training Menu

In this program the existing user may select training from the following list:

- User Screen Controls
- Digital Multi-Meter
- Datalogger

OBD II Scan Tool (Not 95 MY)

The OBD II Scan Tool is designed to access the memories of the engine and transmission control units to monitor and extract data relative to emissions control.

The following types of data may be accessed:

- Current Powertrain Data
- Monitor Freeze Frame Data
- Request Trouble Codes
- Clear Trouble Codes
- Request Oxygen Sensor Test Results
- Monitor Oxygen Sensors
- Display Pending Trouble Codes
- Request On-Board Monitoring Test Results
- Examine Readiness Tests
- Malfunction Lamp Status

The data to be monitored is selected from the OBD II main menu.

For example if Monitor Freeze Frame Data is selected, the system will display up to 11 parameters which are always recorded when a fault code is logged. The parameters are as follows:

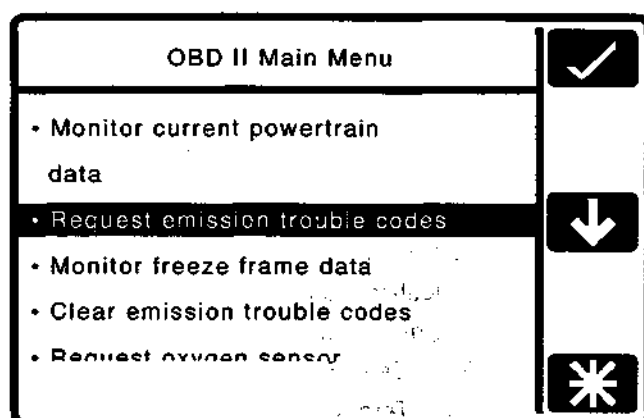
0 : SUPP	Supported
2 : FCFF	Fault Causing Freeze Frame
3 : FSS	Fuel System Status
4 : CLV	Calculated Load Value
5 : ECT	Engine Coolant Temperature
6 : STFT-B1	Short Term Fuel Trim - bank 1 (Cyl 1-3)
7 : LTFT-B1	Long Term Fuel Trim - bank 1 (Cyl 1-3)
8 : STFT-B2	Short Term Fuel Trim - bank 2 (Cyl 4-6)
9 : LTFT-B2	Long Term Fuel Trim - bank 2 (Cyl 4-6)
12 : RPM	Engine Speed
13 : VS	Vehicle Speed

Accessing Freeze Frame Data

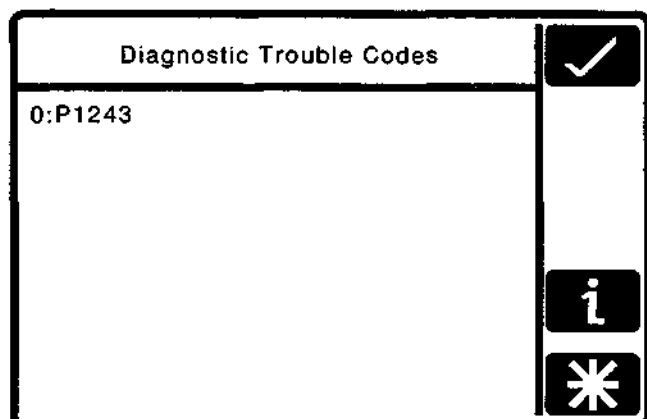
The freeze frame data is vital in analysing unresolved trouble codes. If an emissions related trouble code occurs, complete a diagnostic trouble code report form including the vehicle data, logged trouble codes and the freeze frame data. Fax a copy of the form to Aston Martin Service Operations Department who will assist in resolving the concern.

To access freeze frame data, proceed as follows:

1. Switch on the PDU and select 'Engine Diagnostics'.
2. Select 'OBD II Scan Tool'. The scan tool software will load and the 'Cable Setup' screen will appear.
3. Connect the PDU to the lower diagnostic socket using the multi protocol adaptor (MPA). Switch on the ignition. After communications are established, the OBD II Main Menu will appear.

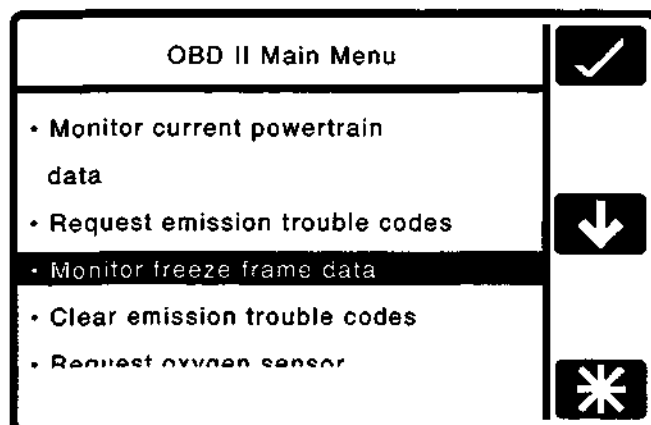


4. Select 'Request Emission Trouble Codes' and press the 'tick' icon.

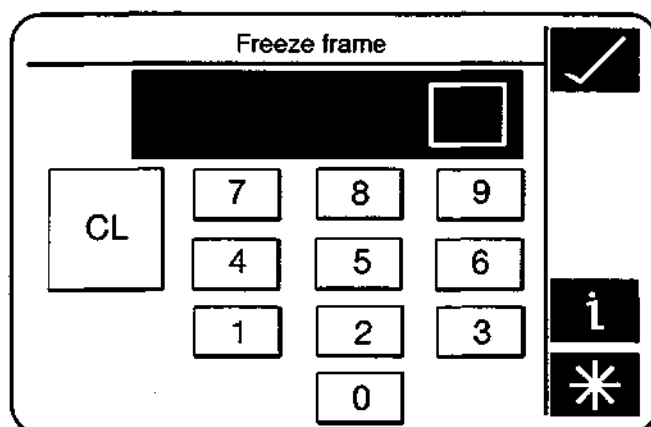


5. Any logged diagnostic trouble codes will be displayed on the screen (e.g. 0:P1243). Record both the list number (e.g. 0, 1, 2, etc) and the logged 'P' codes (e.g. P1243, etc).

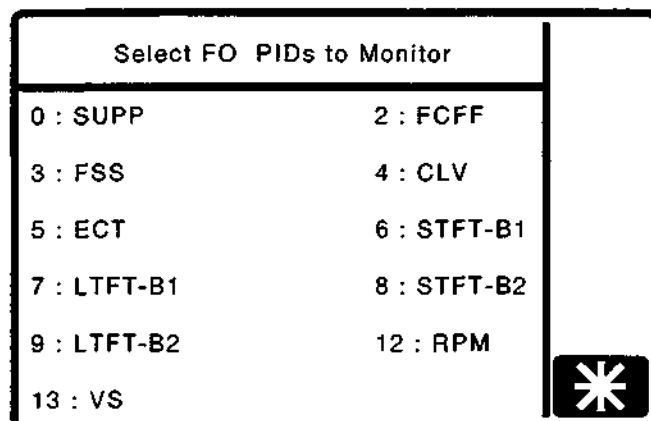
6. Press the 'tick' icon and return to the OBD II main menu.



7. Select 'Monitor Freeze Frame Data' and press the 'tick' icon.
8. The numeric keypad screen will appear. Enter the list number noted in step 5 for the fault code to be investigated and press the 'tick' icon.



9. The 'Select PIDS to Monitor' screen will appear.



10. Select all PIDS (Parameter Identifications) and press the 'tick' icon.

Select FO PIDs to Monitor	
0 : SUPP	2 : FCFF
3 : FSS	4 : CLV
5 : ECT	6 : STFT-B1
7 : LTFT-B1	8 : STFT-B2
9 : LTFT-B2	12 : RPM
13 : VS	

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11. The freeze frame data for the selected parameters will appear (Press the down arrow to scroll to the lower part of the display).

FO	SUPP	\$10 : \$7f980000
FO	FCFF	\$10 : \$1243
FO	FSS	\$10 : (#1) \$2
FO	CLV	\$10 : 28.6%
FO	ECT	\$10 : 79°C
FO	STFT-R1	\$10 : -1.5%

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FO	STFT-R1	\$10 : -1.5%
FO	LTFT-B1	\$10 : 0.0%
FO	STFT-B2	\$10 : 5.4%
FO	LTFT-B2	\$10 : 0.0%
FO	RPM	\$10 : 795r/min
FO	VS	\$10 : 0km/h

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12. Enter the freeze frame data onto the DTC Report Form together with the vehicle details and 'P' codes.

13. Select the 'asterisk' icon and return to the main PDU menu.

User Self Test

The self-test function built into the PDU software enables users to completely test the system for faulty modules and cables. By following the screen instructions, faulty system components can be identified.

Procedure

Select User Self-Test from the PDU main menu. The self-test software will load from the CD.

The first screen shows the cable setup with the PDU connected to the base station. After confirming that the connections are correct, the self-test sequence begins.

The initial test is of the PDU and base station electronics and takes slightly less than 2 minutes.

The user is then directed to connect the various external elements of the system in turn and confirm the cable setup at each stage. As each element is connected and tested, the sequence will either direct that the next element is connected or will report a fault in the last element tested.

Using this procedure, any faulty element in the system will be identified. If the self-test concludes with no fault reported, any problem encountered must be in the vehicle or as a result of incorrect use.

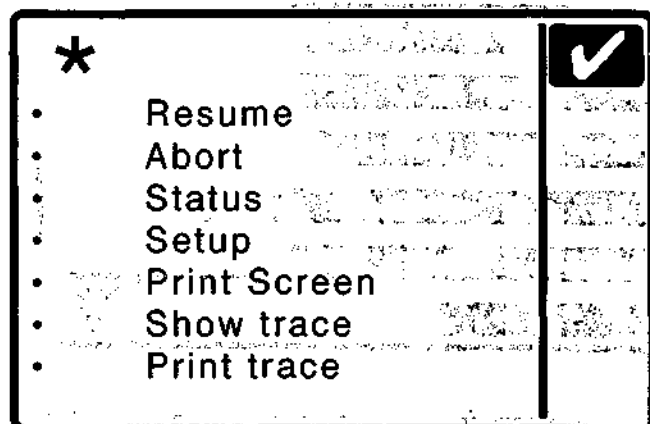
Self-Test Problems

If the self test software will not load or if unidentified problems are encountered during the self-test, go to the problem solving procedure in the PDU installation guide.

Be prepared to record any problem codes which are reported during problem solving. The Genrad Service Centre will require the problem code number to identify the correct remedial action and replacement parts.

The Asterisk (*) Icon

When available, selecting the asterisk icon will bring up the following menu of general facilities:



Resume

Return to the screen from which you selected the asterisk icon.

Abort

Return to the PDU Main Menu.

Status

Show the current software level and the application currently loaded.

Print Screen

Send the current screen display to the printer.

Show Trace

Display the current contents of the trace memory on the screen (Use the Down and Up arrows to scroll through the display if more than one screenful).

Print Trace

Send the current contents of the trace memory to the printer.

System Setup

The System Setup Menu may be accessed at any time from the asterisk (*) menu. The menu provides system configuration options for the following parameters:

Display Mode

Sets the screen to either Black on White or White on Black display

Trace Mode

Sets the trace information gathering to All the Time or Only After a Fault.

Trace Type

Sets the trace system to gather Everything or Only Test Information.

Fault Override

If fault override is OFF, the trace recording will stop when a fault occurs. With fault override set to ON, trace recording will continue after fault occurrence and show vehicle performance after the fault.

Language

Permits selection of one of the following languages:

- English
- German
- French
- Italian
- Japanese

Caution: Check that the correct language is selected. If you accidentally select and confirm the wrong language, it may be difficult to configure the system back to a familiar language.