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MANUFACTURERS OF DAIMLER AND JAGUAR
CARS

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JAGUAR CARS LIMITED COVENTRY

Technical Guide

XJ6 & XJ12 RANGE 1995 MODEL YEAR TECHNICAL INTRODUCTION

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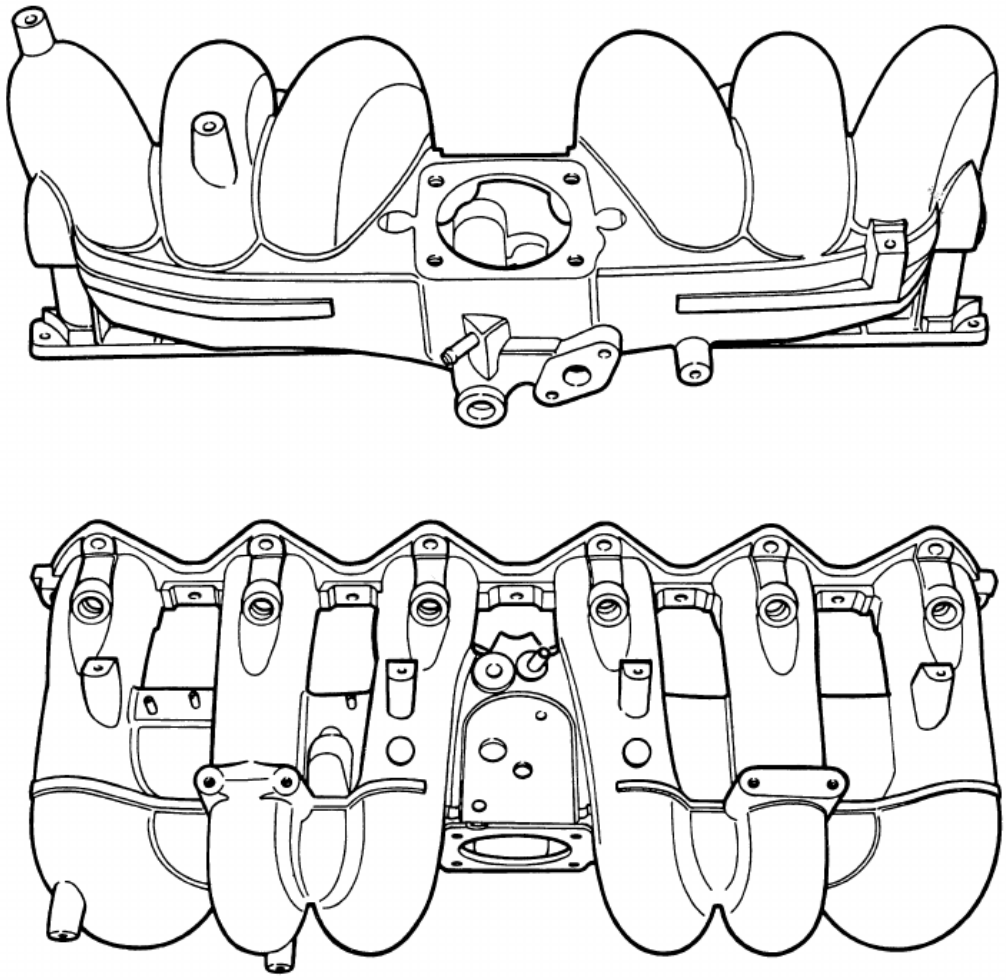
Intake Manifold - NA Engines

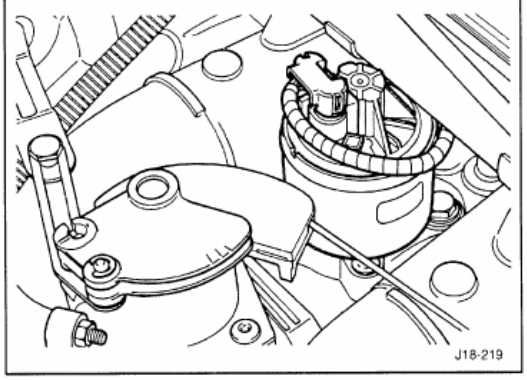
With the deletion of the separate idle speed control valve, the intake manifold is revised accordingly. On North American vehicles, the manifold has a revised EGR pipe connection and additional mounting provisions for the installation of a new EGR valve.

INLET MANIFOLD



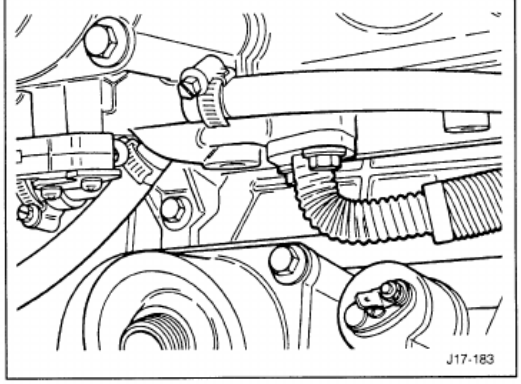
J19-448 & J19-449

EGR VALVE



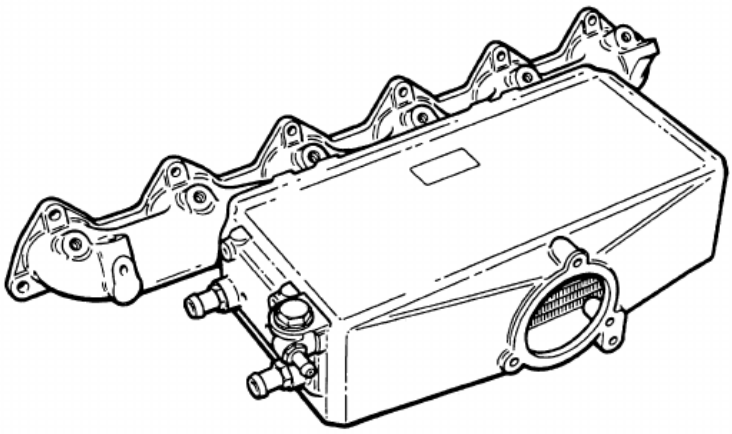
J18-219

EGR PIPE CONNECTION



J17-183

INLET MANIFOLD - SC ENGINE

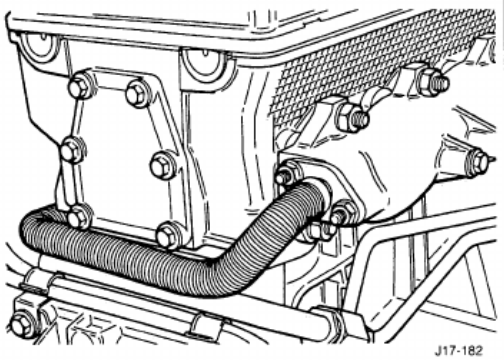


J12-816

Intake Manifold - SC Engine

A new intake manifold, with an integral intercooler, is introduced for the SC engine. The manifold is attached to the cylinder head in the same way as the manifold for NA engines.

EGR PIPE CONNECTION

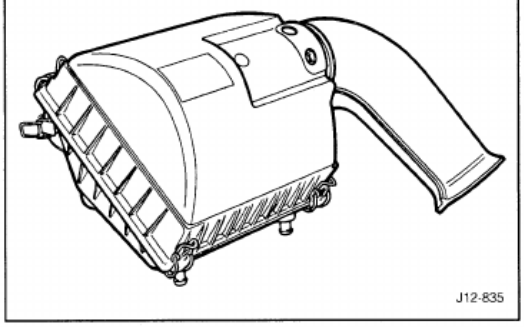


J17-182

Exhaust Manifolds

To improve sealing, seven studs secure each manifold in position, instead of four as previously. A new gasket is introduced to accommodate the revised fixing arrangement.
On the NA engine of North American vehicles, the rear exhaust manifold is revised to replace the EGR valve mounting provisions with a connection for the EGR transfer pipe.

AIR CLEANER

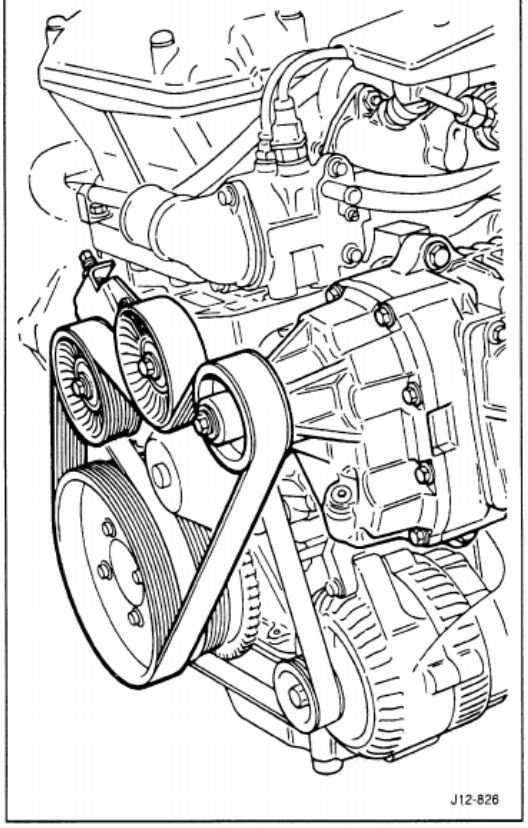


J12-835

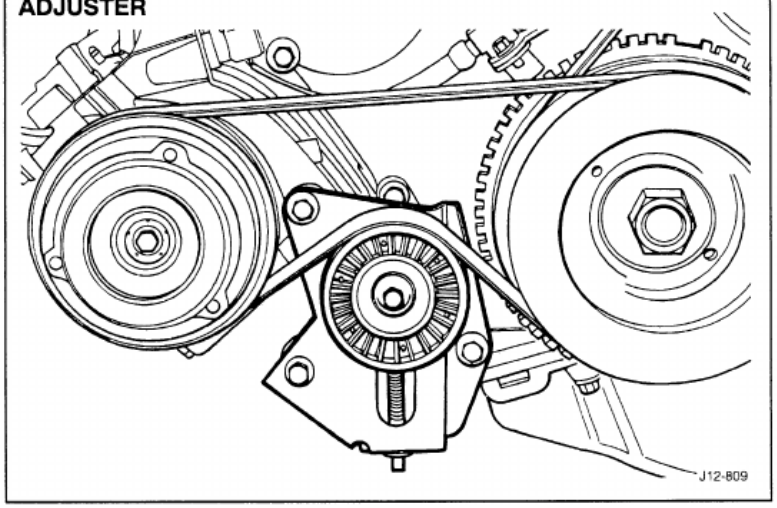
Air Cleaner

The location lugs are enlarged to accommodate the new mass air flow sensor of the EMS. The surface texture of the cleaner casing is revised to improve appearance. A new intake duct positions the air intake immediately behind the left headlamp housing, to eliminate water ingress.
On the SC engine the base of the air cleaner is revised to accommodate minor changes to the position of the mass air flow sensor and the air injection pipe.

SUPERCHARGER DRIVE BELT AND ADJUSTER



AIR CONDITIONING COMPRESSOR DRIVE BELT AND ADJUSTER



Accessory Drive Belts

With the introduction of the electric air injection pump in place of the belt driven version the related drive belt is deleted.

A new, four ribbed drive belt with revised tension settings is introduced for the power assisted steering pump/air conditioning compressor. Belt tension is adjusted with an idler pulley.

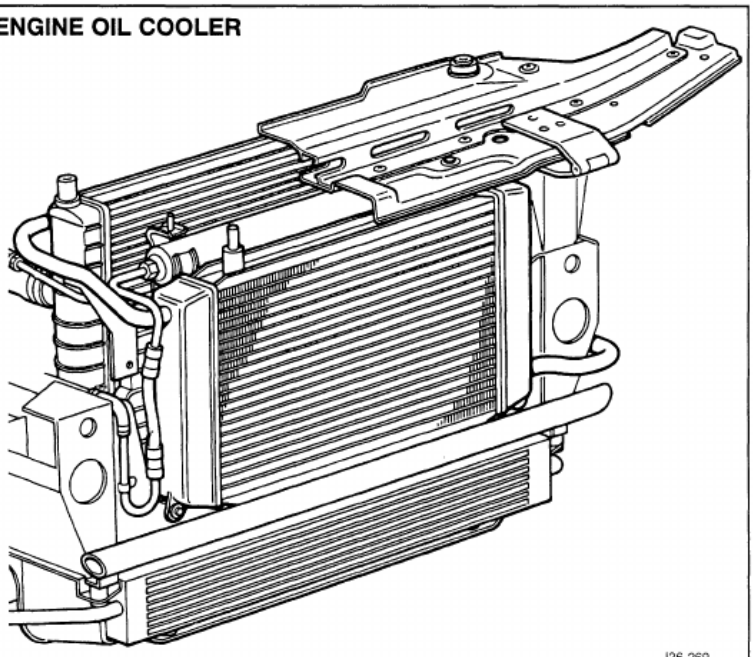
On the SC engine a new, seven ribbed drive belt drives the supercharger from an additional drive pulley installed on the front of the crankshaft. Belt tension is adjusted with an idler pulley.

Drive Belt Tensions

	New Belt Setting	In-service Minimum	In-service Setting
Generator/coolant pump drive belt on normally aspirated engine (measured at mid-point of run between crankshaft and generator)*	556 to 578 N 125 to 130 lbf 174 to 180 Hz	356 N 80 lbf 140 Hz	511 to 534 N 115 to 120 lbf 167 to 173 Hz
Generator/coolant pump drive belt on supercharged engine (measured at mid-point of run between crankshaft and generator)*	560 to 600 N 126 to 135 lbf 180 to 186 Hz	335 N 75 lbf 131 Hz	405 to 445 N 91 to 100 lbf 155 to 161 Hz
AC compressor drive belt (measured at mid-point of upper run between crankshaft and compressor)	556 to 578 N 125 to 130 lbf 167 to 173 Hz	245 N 55 lbf 85 Hz	378 to 400 N 85 to 90 lbf 127 to 133 Hz
Supercharger drive belt (measured at mid-point of run between crankshaft and supercharger)	See Service Manual		

* New cold belt to be set to New Belt Setting, engine run for one minute minimum, belt allowed to cool and checked/reset to In-service Setting

ENGINE OIL COOLER



J26-269

Engine Oil Cooler (European SC 4.0 Litre Models Only)

An engine oil cooler is installed below the supercharger radiator, behind the front grille. The oil cooler is the same as that used on the 6.0 litre models. Core depth is 28 mm (1.1 in).

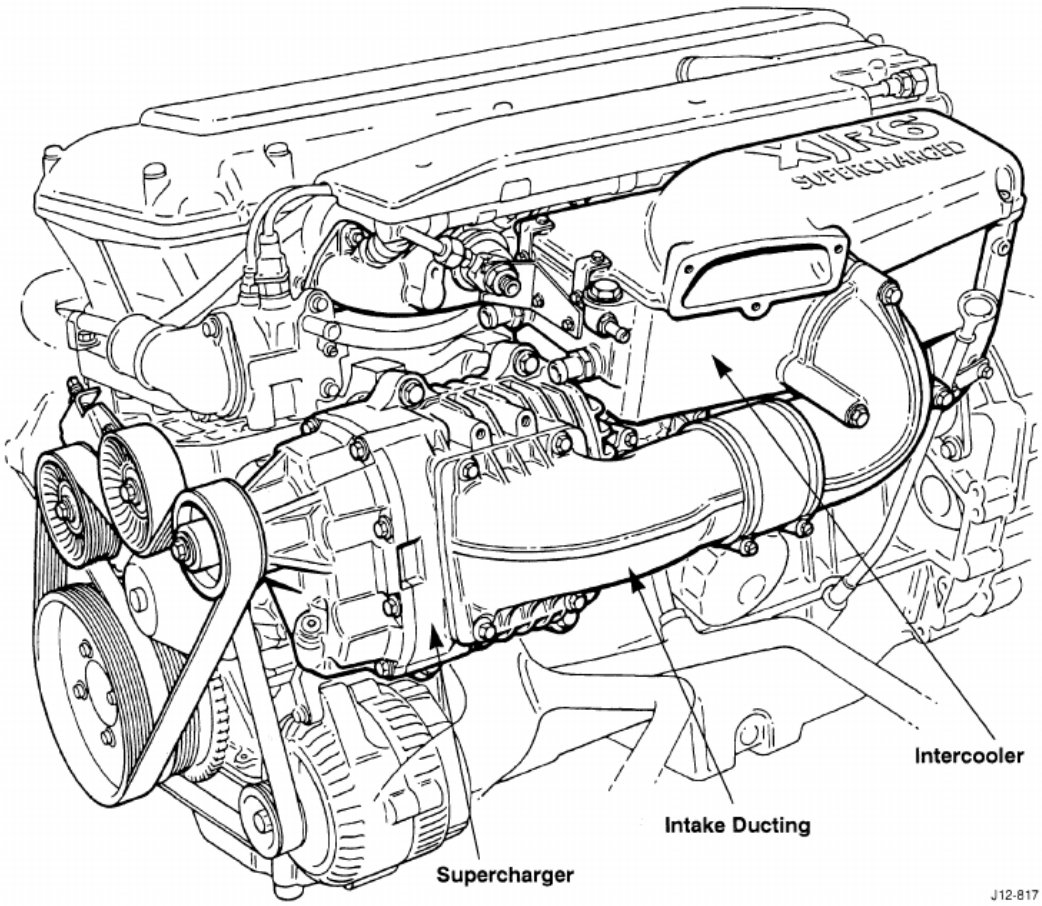
Engine Supercharger

The 4.0 litre supercharged engine has a throttle body adapter, a supercharger and an intercooler, together with associated ducting, installed between the throttle body and the intake manifold.

Air from the throttle body passes through the throttle body adapter to the supercharger, where it is compressed and directed through ducts to the intercooler. The intercooler extracts some of the heat added to the air during compression. The compressed and cooled air then enters the intake manifold.

A port in the supercharger outlet duct connects

SUPERCHARGER INSTALLATION



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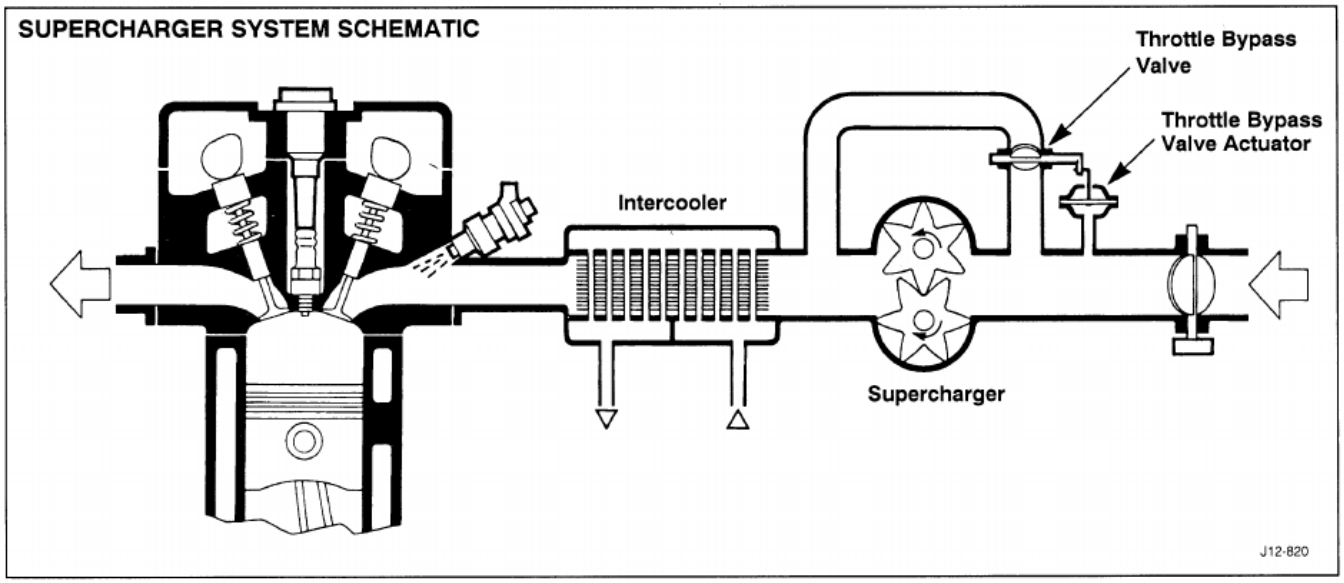


with a bypass valve, which bypasses excess compressed air back to the supercharger intake, effectively taking the supercharger off load for a large proportion of the driving cycle.

Throttle Body Adapter

The throttle body adapter provides the interface between the throttle body and the supercharger. It incorporates those components and connections that are installed on the intake manifold of NA engines. Connections for the bypass valve and the actuation pipe of the bypass valve actuator are also incorporated.

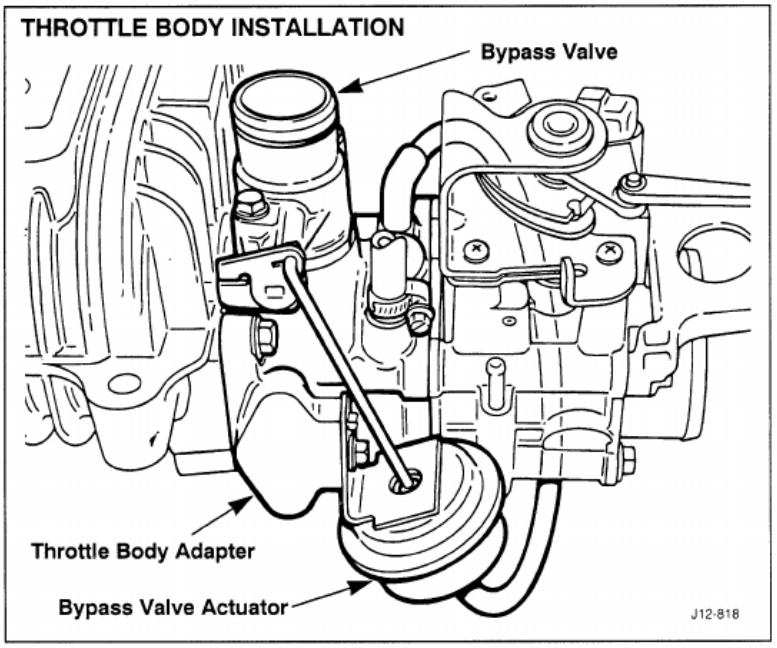
Bypass Valve

The bypass valve consists of a butterfly valve contained in an aluminum housing installed between the outlet duct of the supercharger and the throttle body adapter. A bypass valve actuator and a spring are attached to the spindle of the valve.

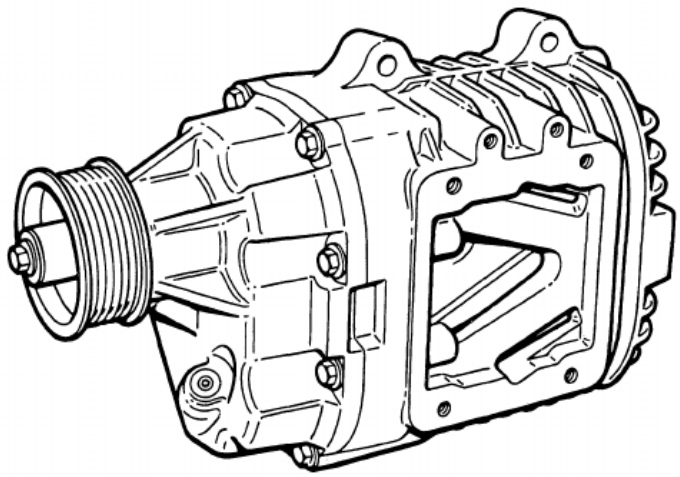
With a closed or partially open throttle, the vacuum actuator overcomes spring pressure to hold the bypass valve fully open, allowing excess air back to the supercharger intake. As the throttle opens, the depression in the manifold decreases, and the spring progressively overcomes the pull of the vacuum actuator to close the valve, increasing the pressure of the air supplied to the intercooler and intake manifold.

Bypass Valve Actuator

The bypass valve actuator is a vacuum actuator attached to the spindle of the bypass valve. The actuation pipe of the actuator connects to the throttle body adapter at the intake to the supercharger.



SUPERCHARGER



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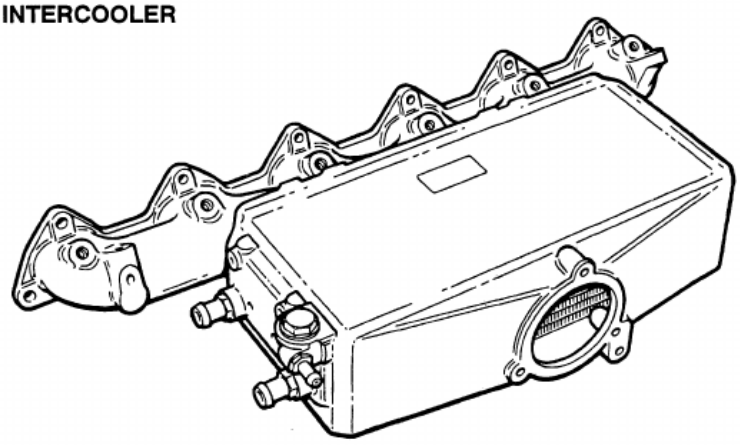
INTERCOOLER



J12-816

Supercharger

The supercharger is a second generation version of the Eaton M90, installed on the front left side of the engine, above the coolant pump. A cast bracket attaches the supercharger to four bosses on the cylinder block.

The belt driven supercharger has a gearbox driving two meshed helix rotors, producing a maximum pressure increase of approximately 0.7 bar (10.2 lbf.in2) at 2750 engine rpm. A seven ribbed belt, driven by the crankshaft, turns the supercharger pulley at 2.5 times engine speed. The supercharger is a sealed unit, with an internal lubrication system.

Intercooler

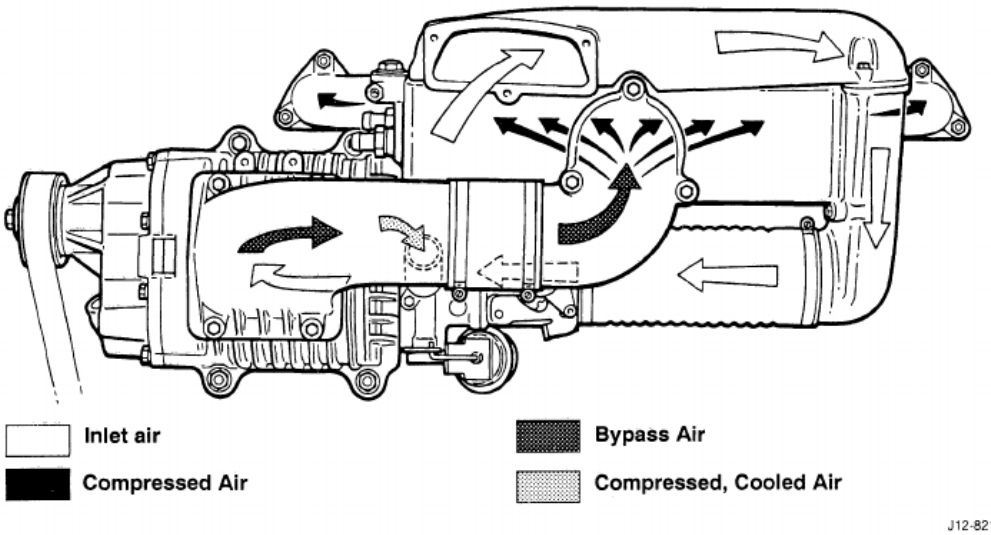
The intercooler is a fin and tube, air to liquid, heat exchanger integrated into the intake manifold. It cools the air leaving the supercharger to increase the mass of air entering the engine.

For details of the liquid cooling circuit, see AJ16 Engine - Engine Cooling System.

Intake Ducting

A corrugated flexible hose connects the mass air flow sensor to a cast duct attached to the intercooler. The cast duct guides the air rearwards and below the intercooler. A reinforced, corrugated hose connects the downstream end of the cast air duct to the throttle body. A short length of high temperature hose connects an elbow on the supercharger outlet to an elbow on the intercooler intake. O-rings seal the joints between the cast aluminium elbows and their respective components.

AIR FLOW THROUGH INLET DUCTING



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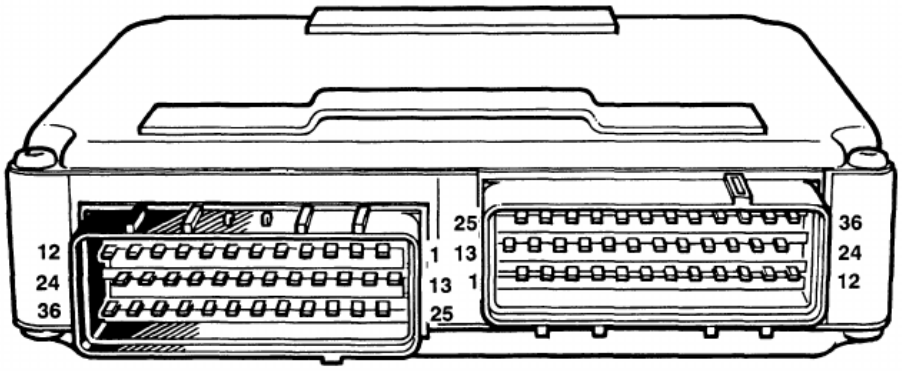
ENGINE CONTROL MODULE (ECM) PIN-OUT



ECM Black Connector (HIGH POWER) INPUTS/OUTPUTS Pins PI 104 -

001	Power Ground
002	Injector 1 Output
003	Idle Speed Control Coil 1 Output
004	Oxygen Heater Drive A Downstream Output
005	Ignition Coil 4 Output
006	Ignition Coil 3 Output
007	Air Pump Injection Control Output
008	Ignition Coil 2 Output
009	Ignition Coil 5 Output
010	Ignition Coil 1 Output
011	Ignition Coil 6 Output
012	Power Ground
013	Injector 4 Output
014	Injector 3 Output
015	Injector 2 Output
016	Idle Speed Control Coil 2 Output
017	Fuel Used Output
018	ECM Control Relay Drive Output
019	Fuel Pump Relay Output
020	Check Engine/ MIL Output
021	Air Conditioning Clutch Relay Output
022	Engine Speed Output
023	Crankshaft Sensor Input
024	ECM Control Relay Supply Input
025	Injector 6 Output
026	Crankshaft Ground
027	Injector 5 Output
028	Idle Speed Control Coil 3 Output
029	Idle Speed Control Coil 4 Output
030	Oxygen Heater Drive B - Upstream Output
031	* Not Used
032	Throttle Position Output
033	Engine Torque Output
034	Canister Purge Valve Output
035	EGR Solenoid Valve Output
036	Power Ground

ECM Red Connector (LOW POWER) INPUTS/OUTPUTS Pins PI 105 -

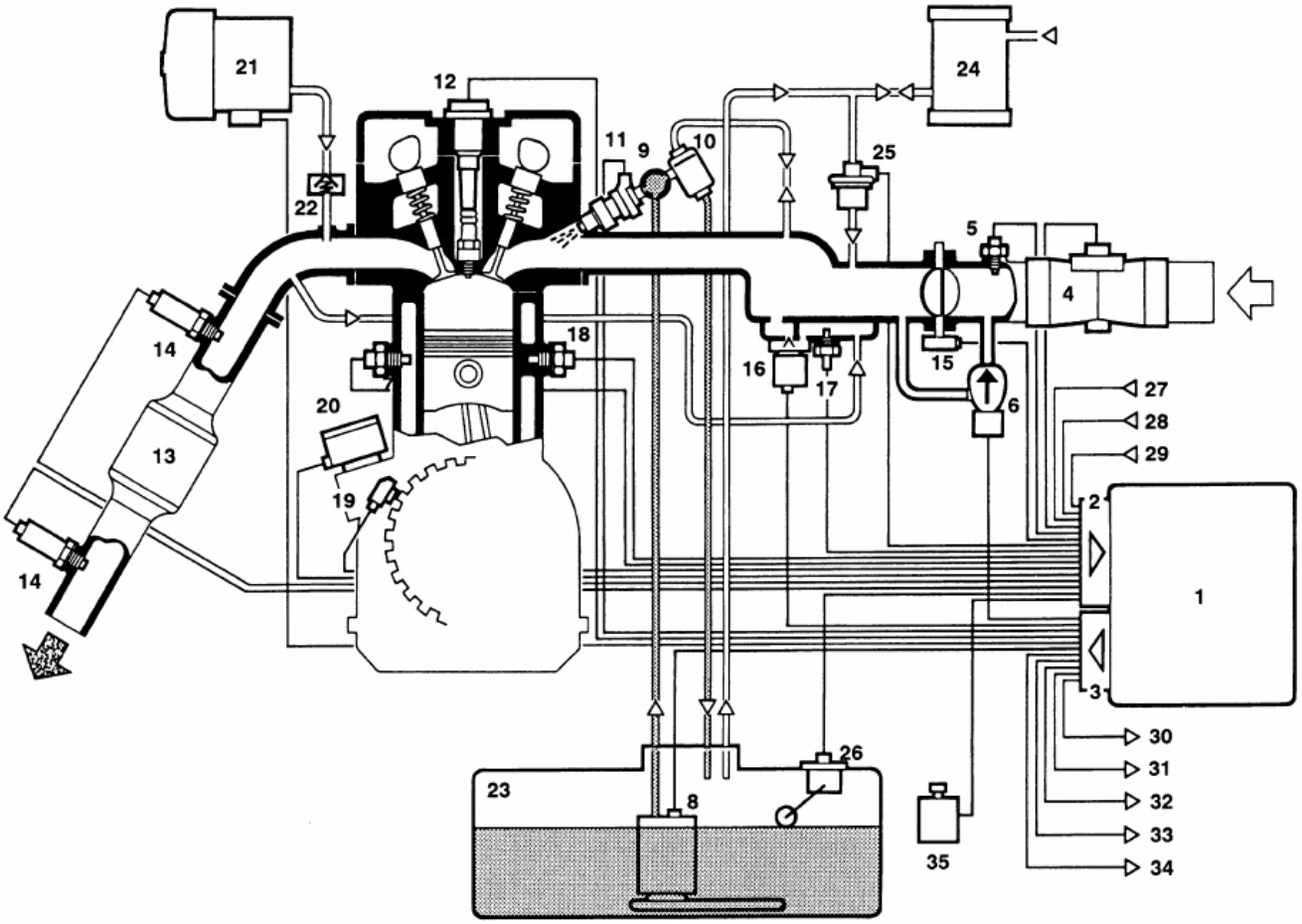
001	Intake Air Temperature Input
002	* Not Used
003	EGR Valve Function Input
004	Mass Air Flow Input
005	* Not Used
006	HO2S Sensor 3 Input
007	Throttle Sensor 5V Ground Input
008	HO2S Sensor Signal Ground Input
009	Knock Sensor Ground Input
010	Diagnostic K-line
011	Throttle Position Sensor and EGR Valve Potentiometer 5V Supply Output
012	Throttle Position Input
013	* Not Used
014	Engine Coolant Temperature Input
015	EGR Valve Position Input
016	HO2S Sensor 1 Input
017	Battery Voltage Correction (BVC) Input
018	HO2S Sensor 2 Input
019	HO2S Sensor 4 Input
020	Fuel Tank Level Sensor Input
021	Knock Sensor A input
022	* Spare
023	* Spare
024	Engine Position/Sensor 12V Supply Output/Input
025	* Not Used
026	Transmission Torque Reduction Input
027	Park/Neutral Position Input
028	Road Speed Input
029	Mass Air Flow Sensor Ground Input
030	Small Signal Ground Input
031	Engine Coolant Temperature Sensor Ground
032	Knock Sensor B Input
033	Ignition ON Input
034	Engine Position Sensor Input
035	Start Inhibit Input
036	Air Conditioning ON ECM Input

System Overview

The Electronic Control Module (ECM) receives and processes signals from a number of sensors, then modifies the fuel and ignition settings to maintain the correct stoichiometric fuel and air mixture under all conditions.

Note: All sensors input signals to the ECM.

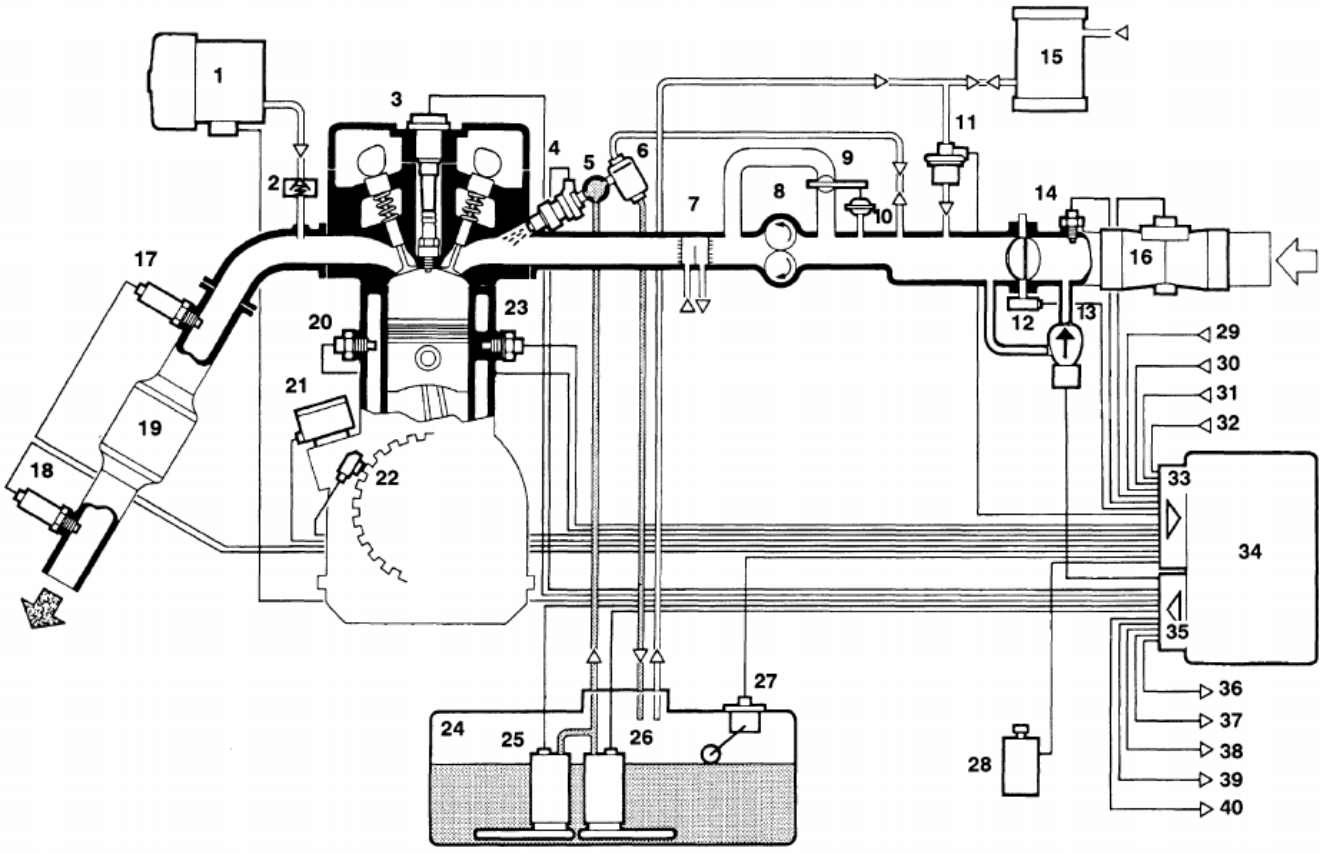
ENGINE MANAGEMENT SYSTEM - NORMALLY ASPIRATED ENGINES



1 Engine Control Module (ECM)
2 ECM Input
3 ECM Output
4 Mass Air Flow Sensor
5 Intake Air Temperature Sensor
6 Idle Speed Control Valve
7 Coolant Temperature Sensor
8 Fuel Pump
9 Fuel Rail
10 Fuel Pressure Regulator
11 Fuel Injector
12 Spark Plug With Integral Coil
13 Catalyst
14 Heated Oxygen Sensor (HO2S)
15 Throttle Potentiometer
16 Exhaust Gas Recirculation (EGR) Valve
17 EGR Function Sensor
18 Knock Sensor
19 Crankshaft Position Sensor
20 Engine Position Sensor
21 Secondary Air Injection Pump
22 Check Valve
23 Fuel Tank
24 Activated Charcoal Canister
25 Canister Purge Valve
26 Fuel Level Sensor
27 Park/Neutral Switch
28 Security Control Module
29 Ignition ON
30 Instrument Pack (Road Speed)
31 Trip Computer
32 Malfunction Indication Lamp (MIL)
33 Diagnostic Interface
34 Transmission Control Module (Torque Control)
35 Inertia Switch

J18-234

ENGINE MANAGEMENT SYSTEM - SUPERCHARGED ENGINES



1 Secondary Air Injection Pump
2 Mechanical Check Valve
3 Spark Plugs and Ignition Coils
4 Fuel Injector
5 Fuel Rail
6 Fuel Pressure Regulator
7 Supercharger Intercooler
8 Supercharger
9 By-pass Valve
10 By-pass Valve Actuator
11 Canister Purge Valve
12 Throttle Potentiometer
13 Idle Speed Control Valve
14 Intake Air Temperature Sensor
15 Activated Charcoal Canister
16 Mass Air Flow Sensor
17 Heated Oxygen Sensor - Upstream
18 Heated Oxygen Sensor - Downstream
19 Catalyst
20 Coolant Temperature Sensor
21 Engine Position Sensor
22 Crankshaft Position Sensor
23 Knock Sensor
24 Fuel Tank
25 Fuel Pump - Additional for V12 and Supercharged Engines
26 Fuel Pump
27 Fuel Level Sensor
28 Inertia Switch
29 Park/neutral Switch
30 Security Control Module
31 Ignition ON
32 Transmission Control Module - Torque Reduction
33 ECM Inputs
34 Engine Control Module (ECM)
35 ECM Outputs
36 Instrument Pack (Road Speed)
37 Trip Computer
38 Malfunction Indicator Lamp
39 Diagnostic Interface
40 Transmission Control Module - Torque Control

J18-244

Mass Air Flow Sensor (MAFS) - Measures the quantity of air drawn into the engine.

ntake Air Temperature Sensor (IAT) - Measures the temperature of air in the induction tract.

Idle Speed Control Valve (ISC) - Directed by the ECM to govern engine idle speed in conjunction with ignition timing control.

Engine Coolant Temperature Sensor (ECT) - Monitors engine coolant temperature.

Fuel Pump - Situated in the fuel tank, supplies fuel to the injectors via the fuel rail and pressure regulator.

Spark Plugs and Ignition Coils - Each spark plug is fitted with its own ignition coil. Ignition timing is varied according to the engine speed and load.

Heated Oxygen (HO2S) Sensors - Continually monitor exhaust gases entering and leaving the first catalysts. From the output of the downstream sensors, the ECM adjusts the fuel settings to reduce emissions from the exhaust. The sensors integral heaters accelerate the warm-up period on start-up, and allow the tip temperature to be controlled accurately. In order to meet CARB OBD II requirements, North American vehicles have 4 sensors: 2 upstream and 2 downstream. By comparing the output of the sensors upstream and downstream, the ECM can determine the efficiency of the first catalysts.

Throttle Potentiometer (TP) - Measures the position of the throttle.

Exhaust Gas Recirculation Valve (EGR) - Activated by the ECM to introduce exhaust gas into the intake air stream to dilute the intake fuel/air mixture. This lowers the combustion temperature and reduces the formation of nitrous oxide. The temperature of the gases is monitored by the EGR Function Sensor.

Knock Sensors (KS) - Detects combustion knock in specific cylinders. If knock is detected the ECM will retard the ignition timing for the cylinder which is knocking.

Crankshaft Position Sensor (CKP) - Measures engine speed and crankshaft position for accurate ignition timing. By monitoring differences in crankshaft acceleration between cylinders, it also detects ignition misfires.

Engine Position Sensor (CMP) - This signal allows the ECM to synchronise operation of the fuel injectors and ignition.

Secondary Air Injection Pump (AIR) - Is switched on via a relay by the ECM to provide additional air to reduce the level of carbon monoxide (CO) and hydrocarbons (HC) in the exhaust gases during warm up. The additional air rapidly accelerates the rise in exhaust gas temperature to the catalyst operating temperature level. The relay also energises the solenoid operating the integral stop valve, opening the air line through the mechanical check valve to the exhaust manifold.

Fuel Tank - Maximum fuel capacity is 90% of tank capacity. As fuel is withdrawn from the tank the volume of fuel laden air (vapor) expands and is vented to atmosphere through an Activated Charcoal Canister which absorbs the fuel.

Canister Purge Valve - Is activated by the ECM to open the canister line to intake manifold vacuum, drawing air through the activated charcoal canister and carrying fuel vapor into the intake manifold.

Fuel Level Sensor - Measures the level of fuel in the tank.

The remaining signals input to the ECM are: **the Park/Neutral Switch ; the Security CM, and Ignition ON.**

The remaining signals output by the ECM are: **Road Speed (Instrument Pack); Trip Computer; Malfunction Indicator Lamp (Engine Fault); Diagnostic Interface; Transmission Control Module (TCM).**

The **Inertia Switch** disconnects electrical power when the vehicle is subjected to a sudden deceleration/acceleration.

Emission Control Standards (ECS)

The engine management system described above is designed to meet the Federal Type A emissions control standards. Standards are classified according to the level of emissions and diagnostics an engine is expected to meet. The emission control standards that AJ16 engines meet are listed in the table below.

AJ16	ECS No.	Nominal Market	Emissions & Diagnostics
3.2L	9(E)	Europe	95 RON: catalyst & EVAP
4.0L	1(B)	R.O.W	91 RON: no ECS
	3(D)	R.O.W	91 RON: EVAP
	9(E)	Europe	95 RON: catalyst & EVAP
	14(C)	Stockholm	95 RON: AIR, catalyst & EVAP
	18(A)	Federal	95 RON: OBDII, EGR, catalyst & 2 canister EVAP
4.0L S/C	9(E)	Europe	95 RON: catalyst & EVAP
	14(C)	Stockholm	95 RON: AIR, catalyst & EVAP
	18(A)	Federal	95 RON: OBDII, EGR, catalyst & 2 canister EVAP

Engine Mechanical

A number of changes are introduced to support the new engine management system. Other changes include a new crankshaft and damper, new air conditioning compressor, new crankcase breather system, a new oil cooler and the introduction of idle speed control valves.

Crankcase

A mounting boss is machined at the rear of the crankcase, between the cylinder blocks, to accommodate the installation of a new engine speed sensor.

With the deletion of the distributor, the distributor drive shaft (jackshaft) is deleted and the breather chest cover is revised.

In order to provide more accurate readings, the engine oil dipstick is moved to a position approximately halfway along the left side of the crankcase. The new dipstick has larger graduations and records the oil level at the front of the sump.

Cylinder Block Front Cover

The cylinder block front cover is revised to accommodate the installation of a new engine position sensor.

Crankshaft

A cast iron crankshaft replaces the previous forged crankshaft. The damper and timing ring at the front end of the crankshaft are revised. The timing ring, which produces the signal in the engine position sensor, now has one signal peg instead of three.

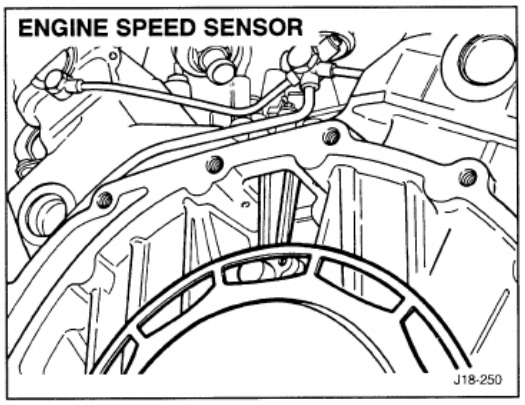
A timing disc is introduced at the rear of the crankshaft. Radial spokes around the outer edge of the disc produce the signal in the engine speed sensor.

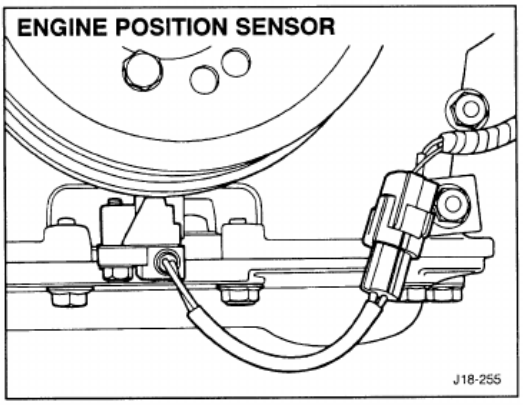
`A' Bank Camshaft Cover

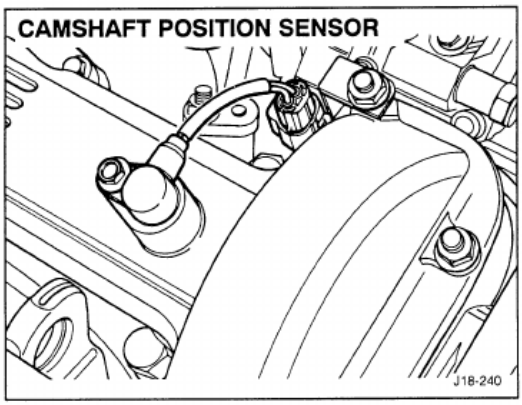
A mounting boss is added to the front of the camshaft cover to accommodate the installation of a camshaft position sensor.

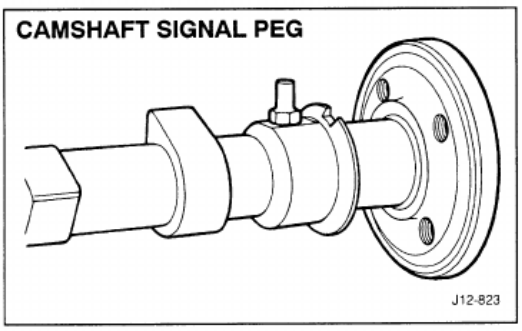
`A' Bank Camshaft

The camshaft on `A' bank is modified to include a signal peg in a raised diameter. The peg produces the signal in the camshaft position sensor.









This Technical Guide is produced as an outline description of the XJ Sedan 1995 Model Year programme changes, for Jaguar Dealer workshop personnel.

It is intended to complement updates to the Service Manual. By providing the information as a cohesive package, developments can be seen in isolation, in contrast with their dispersed nature in the Service Manual. Where a feature is restricted to certain countries, it is identified as such in the text. Major changes are described, but no attempt is made to cover every technical detail.

The information contained in this publication should be considered as preliminary information and is accurate at the time of printing. The right is reserved to make changes at any time without notice.

The information given in this Technical Guide will not be updated. Until the release of the Technical Guide for the next Model Year programme, information on changes to the XJ Sedan range can be obtained from Service Bulletins and revisions to the Service Manual.

Ignition Coil Pack
The two ignition coil packs are installed between the cylinder heads. There are three separate coils in each pack and each supplies HT to two spark plugs simultaneously to provide a spark on the firing stroke and a second, weaker, spark on the exhaust stroke.

The Engine position, Camshaft position and Engine speed sensor signals are generated by a ferrite rotor passing the face of the sensors. The engine position sensor is mounted on the timing cover and provides a signal of one pulse per engine revolution. The camshaft position sensor is mounted on the A bank camshaft cover and provides a signal of one pulse per two engine revolutions. The engine speed sensor is mounted behind the flywheel and provides a signal of twelve pulses per revolution.

Manifold Absolute Pressure (MAP) Sensors - These convert manifold absolute pressure into a voltage signal for input to the Engine Control Module.

Coolant Temperature Sensor - The sensor is a thermistor whose resistance decreases as the temperature increases.

Gas Filter - This is mounted on the manifold negative pressure output port to prevent petrol, oil and other foreign matter reaching the manifold pressure sensor.

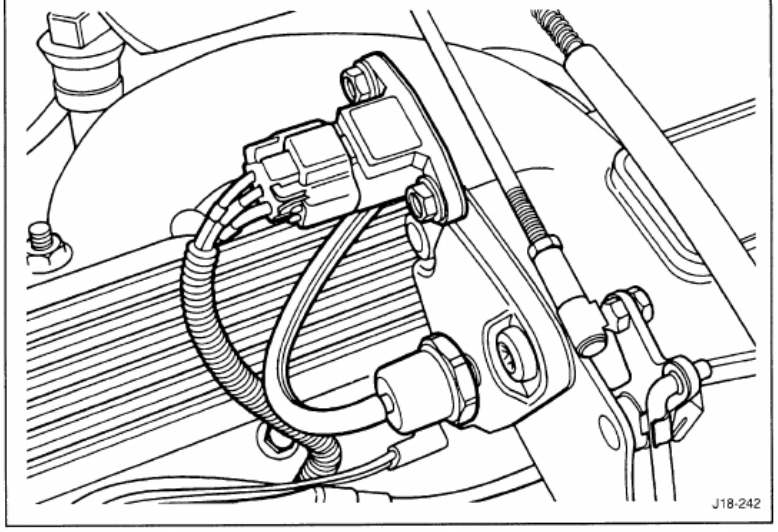
Air Switching Valve (ASV) - The valve is operated by vacuum from the Vacuum Solenoid Valve to control the output of the secondary air injection pump.

Secondary Air Injection Pump - The pump is a maintenance-free vane type pump operated by a magnetic clutch and ribbed "V" belt.

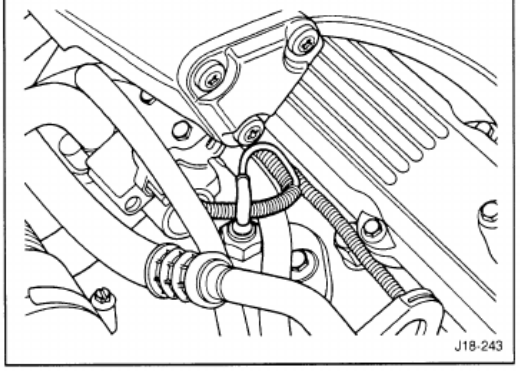
Vacuum Solenoid Valve (VSV) - The valve applies vacuum to the ASV to open it when the solenoid is energised by a signal from the ECM.

Idle Speed Control Valves (ISCV) - The ISCV's are mounted on the cylinder head, and operated by signals from the ECM to control the amount of intake air in order to maintain the target idle speed of the engine.

MANIFOLD ABSOLUTE PRESSURE SENSOR AND GAS FILTER



COOLANT TEMPERATURE SENSOR

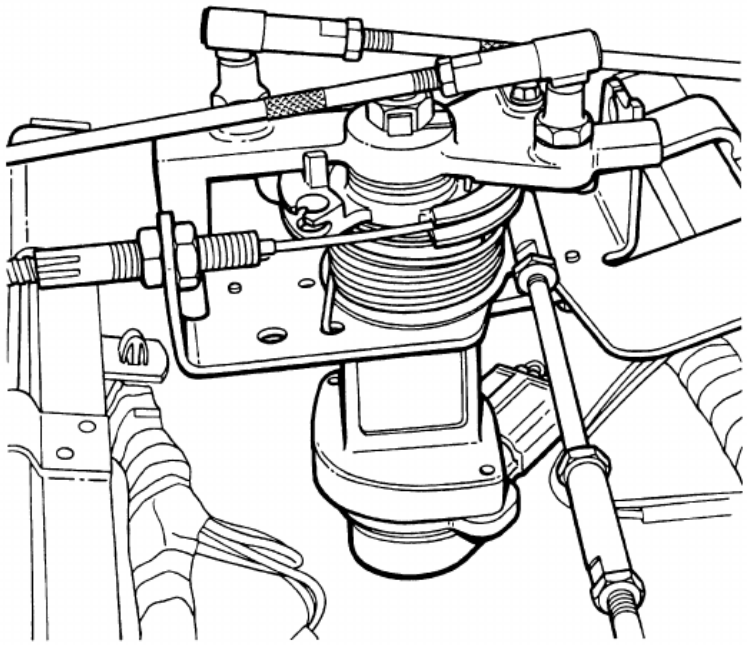


Powered Steering Pressure Switch - The switch is mounted on the back of the powered steering pump to detect movements of the steering wheel at low engine speeds. Because this action imposes a load on the engine, the ECM uses the signal to maintain the target idle speed.

Throttle Position Sensor - The sensor is a potentiometer installed at the bottom of the throttle assembly. As the throttle position alters the sensor sends a voltage signal proportional to the throttle angle to the ECM.

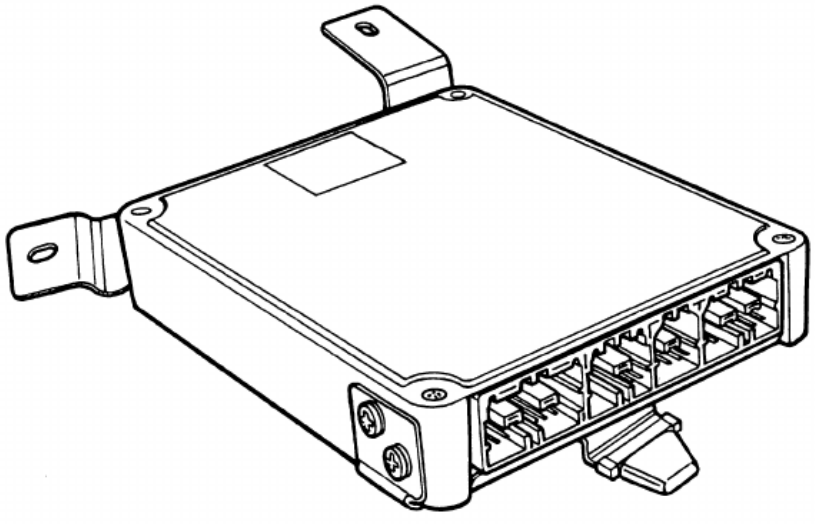
Heated Oxygen Sensors - The sensors continually monitor oxygen concentrations in the exhaust gases from the catalysts. The output signals from the upstream sensors are sent to the ECM to vary the fuel injection adaption. Integral heaters bring the sensor element rapidly up to operating temperature on start-up. In order to meet CARB OBD II requirements, North American vehicles have 4 sensors: 2 upstream and 2 downstream. By comparing the outputs of the sensors upstream and downstream, the ECM can determine the efficiency of the catalysts.

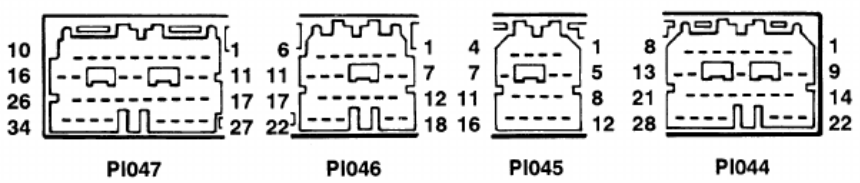
THROTTLE POSITION SENSOR



J18-248

ENGINE CONTROL MODULE (ECM) SIGNAL INPUTS/OUTPUTS





J18-258

Electronic Control Module - Inputs/Outputs

Connector PI044

001 Fuel Used (Instrument Pack)
002 Check Engine/Malfunction Indicator Lamp
003 Engine Torque Signal
004 Throttle pwm - Output
005 Load Inhibit Signal
006 Torque Reduction
007 Vehicle Speed
008
009
010 Engine Speed
011
012 Screen Request Signal
013 Air Conditioning Request Signal
014 Security Signal - Input
015
016
017
018 Park/Neutral - Input
019
020
021 Fuel Level
022 Diagnostic L Line
023 Diagnostic K Line
024 Battery Input
025 Ignition Supply 2
026 Flexible Fuel Select Switch
027
028 Small Signal Ground

Connector PI046

001
002
003 Oxygen Sensor Heater B - Downstream
004 Oxygen Sensor Heater A - Downstream
005 Oxygen Sensor Heater B - Upstream
006 Oxygen Sensor Heater A - Upstream
007 Crank Signal
008 Cam Position Sensor Positive
009
010 Power Grounds
011 Power Grounds
012 Cam Position Sensor Ground
013 Engine Position Sensor Positive
014 Engine Speed Sensor Positive
015
016 Air Conditioning Clutch Relay
017 Secondary Air Injection Control Relay
018 Engine Position Sensor Ground
019 Engine Speed Sensor Ground
020 Ignition Failure B
021 Ignition Failure A
022 Power Grounds

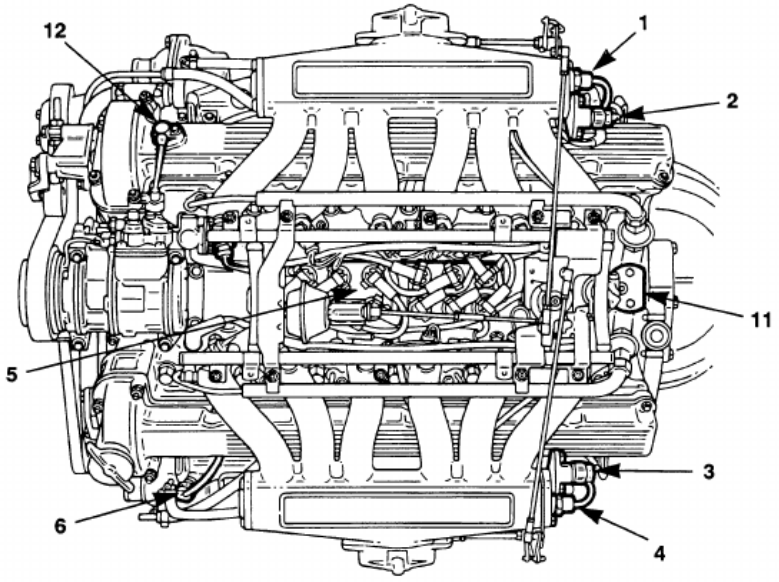
Connector PI045

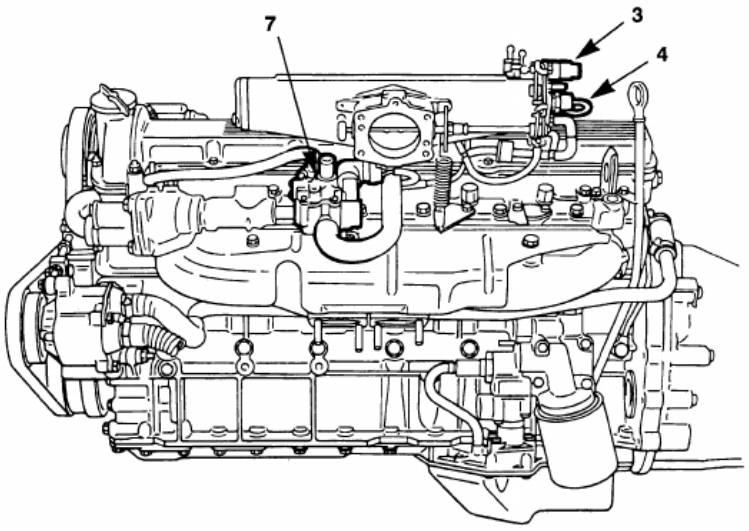
001 Manifold Pressure Sensor Bank B
002 Manifold Pressure Sensor Bank A
003 Idle Switch
004 Throttle Position Sensor
005 Coolant Temperature Sensor
006 Air Temperature Sensor
007 Sensor Supply +5V
008 Heated Oxygen Sensor B - Downstream
009 Heated Oxygen Sensor A - Downstream
010 Heated Oxygen Sensor B - Upstream
011 Heated Oxygen Sensor A - Upstream
012 Ignition Supply 1
013 Power Steering Pressure Switch
014 Small Signal Ground
015 Screen Grounds
016 Sensor Ground

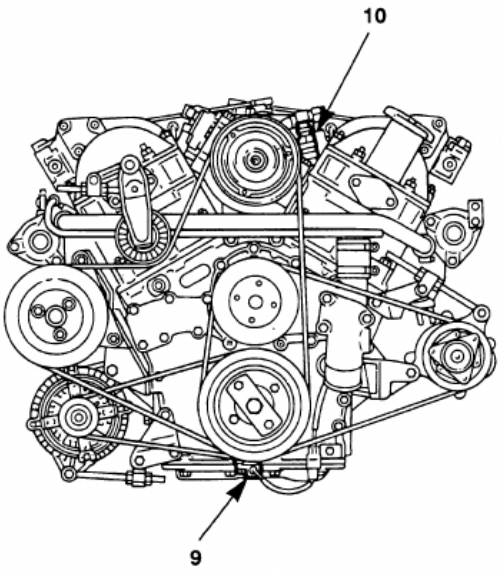
Connector P1047

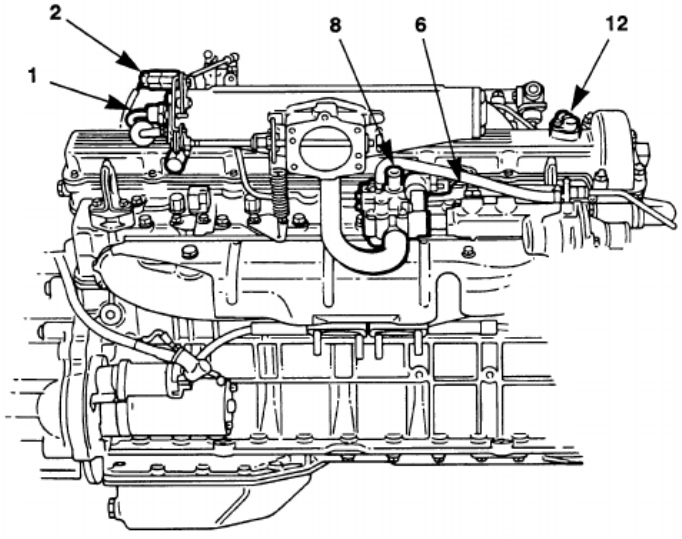
001 Idle Speed Control Valve B - Close
002 Idle Speed Control Valve B - Open
003 Idle Speed Control valve A - Close
004 Idle Speed Control Valve A - Open
005 Fuel Injector 3B/5B
006 Fuel Injector 2A/4A
007 Fuel Injector 1B/4B
008 Fuel Injector 3A/6A
009 Fuel Injector 2B/6B
010 Fuel Injector 1A/5A
011 Secondary Air Vacuum Solenoid Valve Control
012 Fuel Pump Relay 2
013 Power Grounds
014 Power Grounds
015 Power Grounds
016 Power Grounds
017 Ignition Module 3B
018 Ignition Module 2B
019 Ignition Module 1B
020 Ignition Module 3A
021 Ignition Module 2A
022 Ignition Module 1A
023 Power Ground
024
025
026 Power Ground
027 Power Ground
028 Power Ground
029 Fuel Pump Relay #1
030
031
032
033 Purge Valve B
034 Purge Valve A

V12 ENGINE MANAGEMENT SYSTEM COMPONENT LOCATIONS









1 A Bank Gas Filter
2 A Bank Manifold Absolute Pressure Sensor
3 B Bank Manifold Absolute Pressure Sensor
4 B Bank Gas Filter
5 A and B Bank Ignition Coil Packs
6 Coolant Temperature Sensor
7 B Bank Idle Speed Control Valve
8 A Bank Idle Speed Control Valve
9 Engine Position Sensor
10 Injector
11 Engine Speed Sensor
12 Camshaft Position Sensor

J18-264

Transmission - Mechanical

Manual Transmission

The transmissions are all carried over from the previous model year. For European markets, the Getrag 290 five-speed transmission from the normally aspirated 4.0 litre model is installed as standard on the supercharged 4.0 litre model.
An adjustable, over-center spring is introduced to the clutch pedal housing to reduce clutch pedal operating loads.

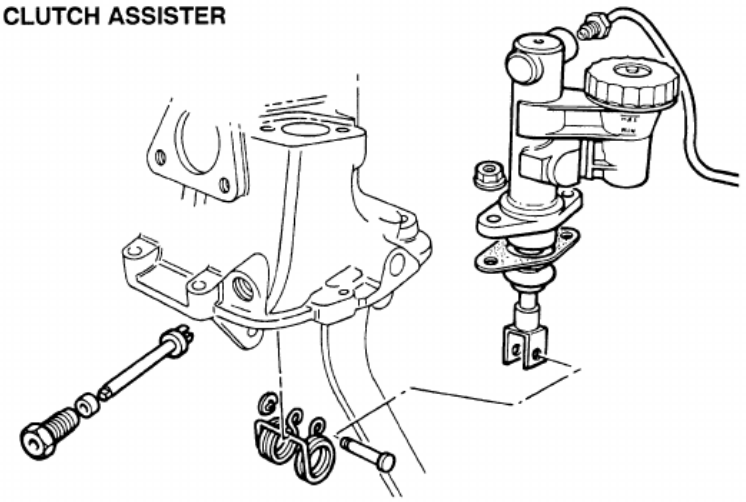
Automatic Transmission

On 3.2 and 6.0 litre models, the transmissions are carried over from the previous model year. On normally aspirated 4.0 litre models, the transmission is carried over except for the torque converter, which is now the lightweight type recently introduced on the XJS 4.0 litre models.
The GM 4L80E four-speed transmission that is installed in 6.0 litre models is installed as standard in the supercharged 4.0 litre model, except in European markets where it is an option. The supercharged 4.0 litre model also has the lightweight torque converter.
On all models with the GM 4L80E transmission, transmission fluid is cooled by a six plate cooler integrated into the left side of the main radiator. All models except the 3.2 litre have a new dipstick. Normally aspirated 4.0 litre models also have a new transmission fluid filler tube.

Lightweight Torque Converter

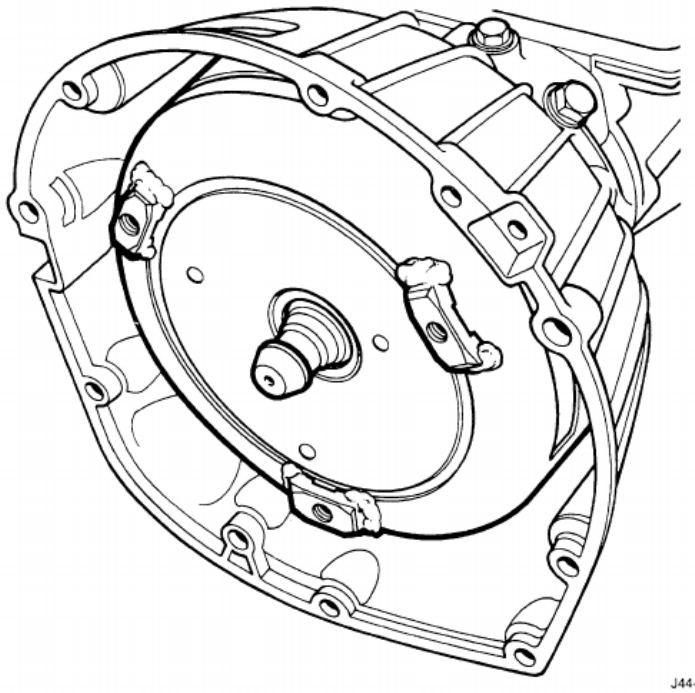
The new torque converter is functionally the same as the converter it replaces, but is 30 mm (1.18 in) shallower and has a smaller mass. The resulting decrease in inertia improves engine responsiveness.
A new torque converter housing accommodates the shallower torque converter, reducing the overall length of the transmission installation.

CLUTCH ASSISTER



J33-077

TORQUE CONVERTER AND HOUSING 4.0 LITRE MODELS

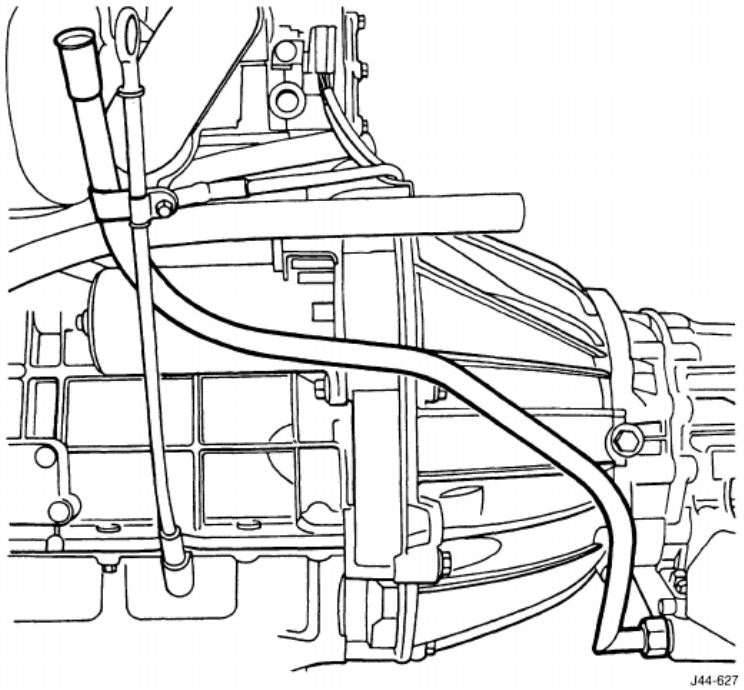


J44-669

Transmission Filler Tube

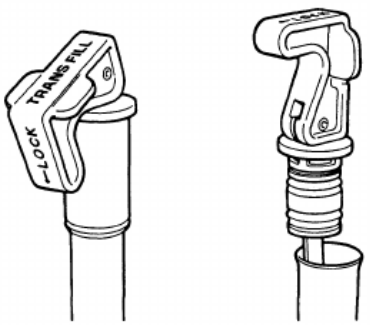
To improve fluid level readings, the new filler tube positions the end of the dipstick adjacent to the transmission fluid sump.

FILLER TUBE - NORMALLY ASPIRATED 4.0 LITRE MODELS



J44-627

DIPSTICK HANDLE



J44-626

Dipstick

The new dipsticks have a 'flip-top' handle and revised fluid level markings. A compressible seal below the handle locks the dipstick in the filler tube. A cam on the handle operates the seal, and goes over-center to lock the handle with the seal in the compressed condition. With the exception of 3.2 litre models, the new dipstick is now installed on all sedan and XJS models. The handles are color coded for each model application. Except for the 6.0 litre sedan and 6.0 litre XJS, the dipstick for each model is unique. To avoid incorrect fluid level readings, it is essential that only the specified dipstick is used.

Dipstick Handle Color Codes

Model	Handle Color	Letter color
3.2 Litre Sedan	Orange (Carry Over of Existing Handle)	
4.0 Litre Normally Aspirated Sedan	Black	White
4.0 Litre Supercharged Sedan	White	Black
6.0 Litre Sedan	Red	Black
4.0 Litre XJS	Silver	Black
6.0 Litre XJS	Red	Black

Driveshaft (Propshaft)

On normally aspirated 4.0 litre models with automatic transmission, the length of the driveshaft is increased by 30 mm (1.18 in) to compensate for the shorter transmission.

The driveshaft for supercharged 4.0 litre models is the same as that used on the 6.0 litre models, except that the length is revised.

All other driveshafts are carried over from the previous model year.

Carbon Canister

The rectangular carbon canister recently introduced on the XJS replaces the previous cylindrical canister. The canister is now installed under the floor on the left, immediately in front of the rear axle. The associated body fixing and hoses are revised accordingly. Normally aspirated North American vehicles have a second canister, connected in series, installed to the right of the first.

3.2 and 4.0 Litre Models

Purge Valve

A Siemens purge valve replaces the Bosch version used previously. The valve is installed below the left headlamp module. Operation of the normally closed valve is controlled by the engine control module.

Running Loss Control Valve

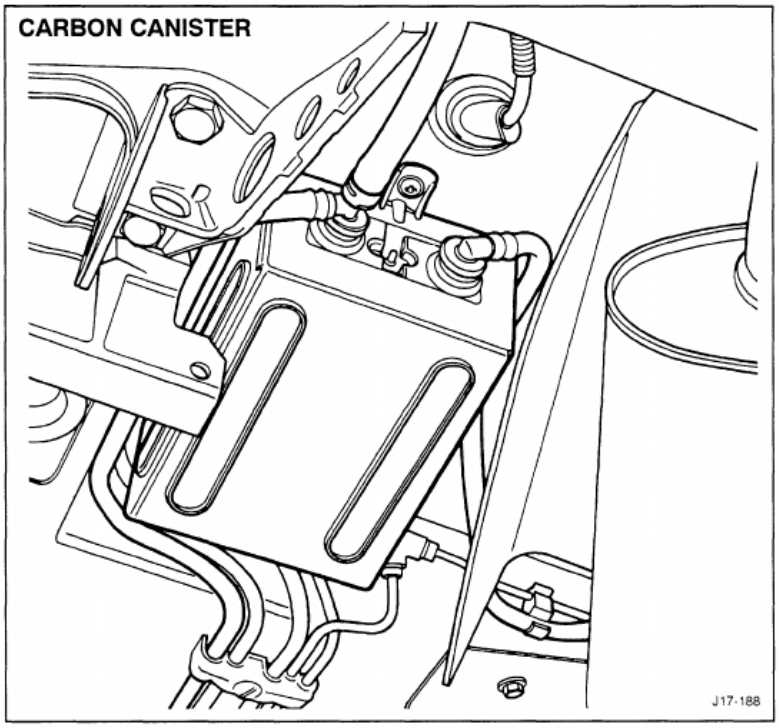
The running loss control valve is installed on the left side of the fuel tank, in the vent line between the fuel tank and the carbon canisters. It permits free venting of the tank, but prevents fuel entering the vent line when fueling the tank. Normally, the valve is open, venting the interior of the tank to atmosphere via the carbon canisters. When fueling the tank, the incoming fuel produces a positive pressure in the tank and the valve closes, blocking off the vent line.

6.0 Litre Models

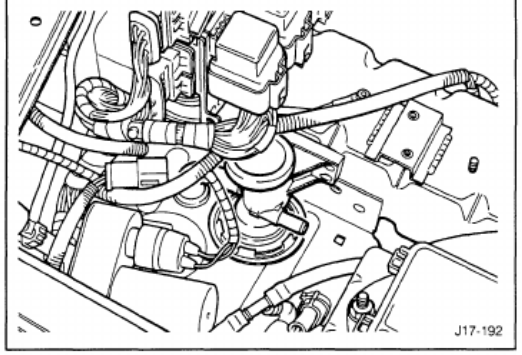
Purge Valves

The Bosch purge valves are now normally closed valves instead of normally open. As on other models, the valves are located below the left headlamp module. The engine control module controls the operation of the valves.

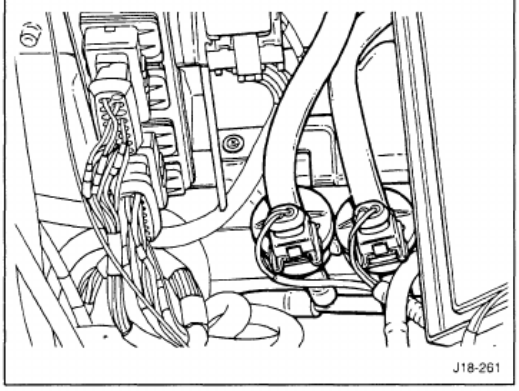
CARBON CANISTER



PURGE VALVE - 3.2 & 4.0 LITRE MODELS



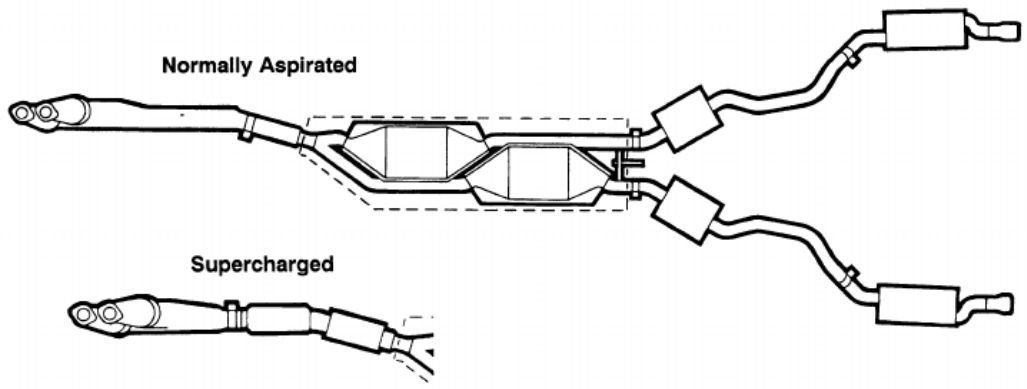
PURGE VALVE - 6.0 LITRE MODELS



3.2 and 4.0 Litre Models

Non-catalyst exhaust systems are carried over from the previous model year.
Catalyst exhaust systems are new, as detailed below, to give improved engine performance. The minimum diameter of the pipes in the catalyst exhaust system is increased from 45 to 50 mm (1.77 to 1.97 in).

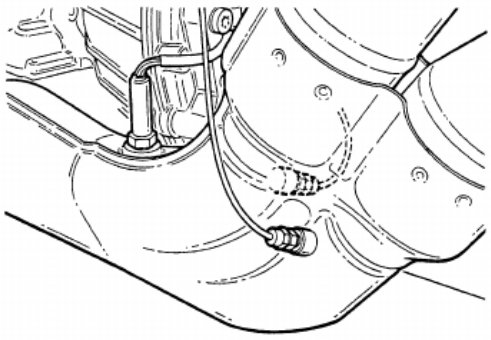
EXHAUST SYSTEM



J30-223

Downpipe
To optimise their tuning, the length of the two outlet pipes is increased. A slip joint replaces the clamp joint between the downpipe and the under-floor catalyst assembly. On vehicles with a supercharged engine, a shorter downpipe is introduced to accommodate the different gearbox installation.
On North American vehicles, the downpipe has two additional oxygen sensors. The new oxygen sensors are installed, one in each outlet pipe, upstream of the primary catalyst.
On Japanese vehicles, the temperature sensor at the junction of the outlet pipes is replaced by a separate temperature sensor in each outlet pipe.

TEMPERATURE SENSORS - JAPANESE VEHICLES ONLY



J30-236

Under-floor Catalyst Assembly
The under-floor catalyst assembly is revised to match the new downpipe and to include the larger diameter connecting pipes.

Intermediate Silencers
The intermediate silencers are revised to include the larger diameter connecting pipes.

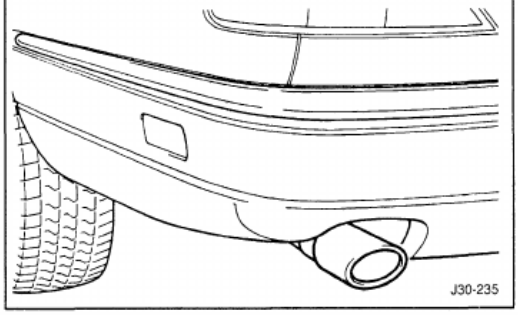
Rear Silencers
The rear silencers are of a larger volume and include the larger diameter connecting pipes. The rear silencers on vehicles with a supercharged engine are three-pass silencers. Vehicles with a normally aspirated engine retain the straight-through design of silencer.

Tailpipes
New, oval section tailpipes are installed.

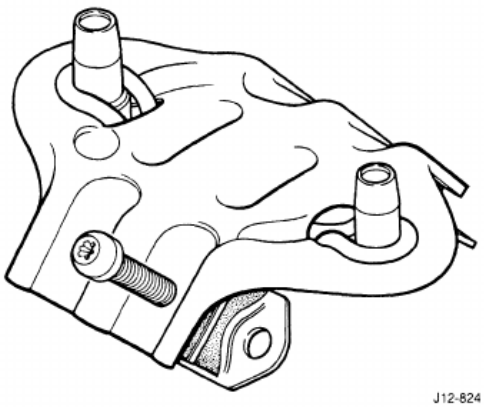
6.0 Litre Models

Already introduced as a running change, the clamp joint between the left downpipe and the underfloor catalyst assembly has been replaced by a slip joint. New, oval section tailpipes are installed.
On North American vehicles, the under-floor catalyst assembly is revised to accommodate two additional oxygen sensors.

EXHAUST TAILPIPE

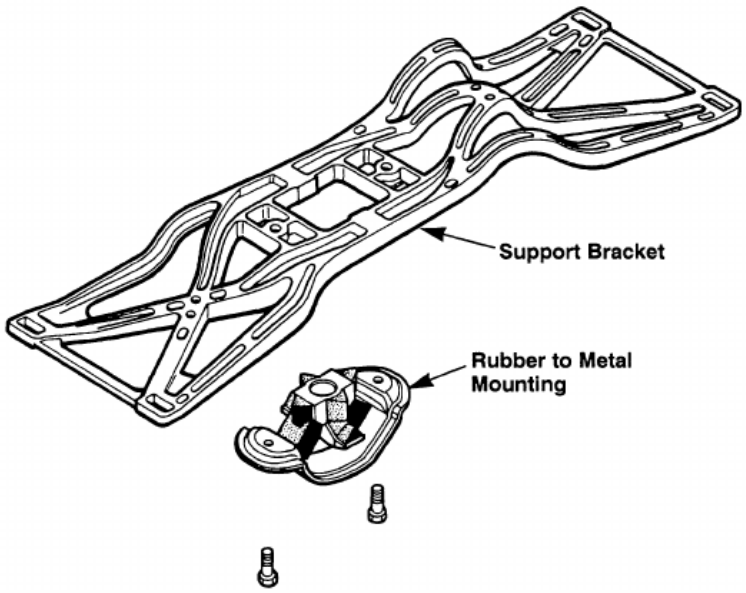


VEE MOUNT



J12-824

REAR ENGINE/TRANSMISSION MOUNTING



J44-671

Front Suspension

The springs, shock absorbers and stabiliser bar are retuned.

As a minor modification to the cross-beam, a clip location loop is added. Its purpose is to provide a means to secure the new power steering electrical link lead away from the steering pinion area.

As part of a refinement initiative, the two front Vee mounts that locate the front subframe to the body longitudinal members, are modified. The new Vee mounts alter the lateral and vertical static stiffness.

With the revised dynamic specification, the new Vee mounts: reduce rear seat cabin boom; improve road noise isolation; reduce road surface ridge harshness.

Additionally, the rear engine/transmission mounting is completely revised. The former twin spring design, attached to the body-in-white, is replaced by a rubber to metal mount. The mount is secured to a support bracket which bridges the two body underframe longitudinal members.

Rear Suspension

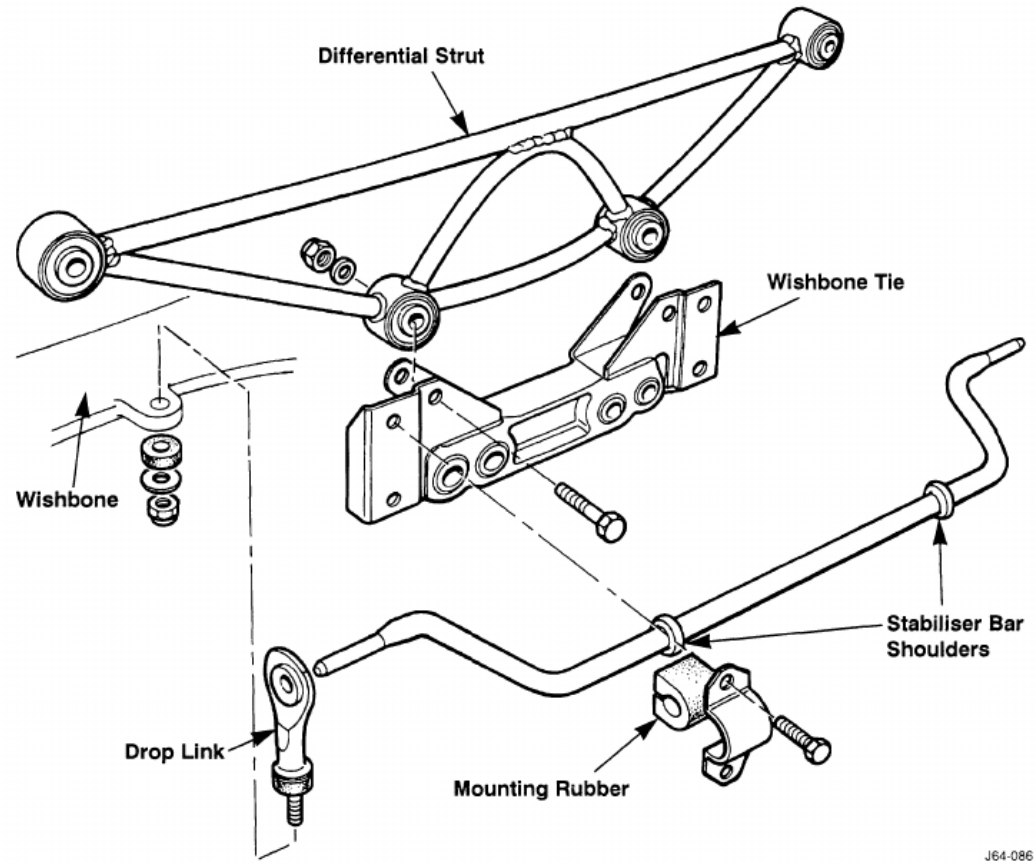
The components supplied below apply to some, but not all, vehicle specifications.
The springs and shock absorbers are retuned.

Differential Strut
A redesigned differential strut is introduced on XJR (manual gearbox supercharged) vehicles. The former two differential struts are replaced by a single monostrut. The monostrut provides increased stiffness and reduces the possibility of axle tramp.

Wishbone Tie
The wishbone tie is modified to accommodate either the 'supercharged' differential monostrut or the two standard differential struts.

Stabiliser Bar
The rear stabiliser bar is a bayonet fit into the stabiliser bar drop links. Additionally, the stabiliser bar has two shoulders that locate on the mounting bushes to prevent lateral movement.

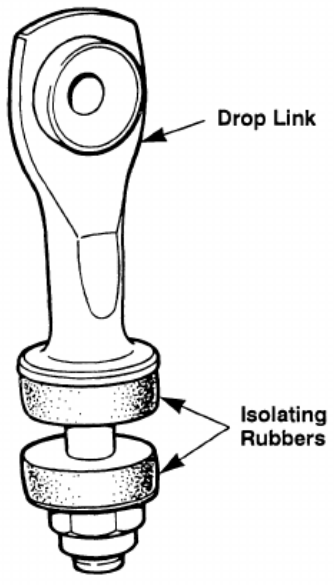
REAR STABILISER BAR INSTALLATION - SUPERCHARGED MODEL



Stabiliser Bar Drop Link

The cast iron rear wishbone is modified to include lugs through which the two new stabiliser bar drop links are fitted. The drop links attach the stabiliser bar to the wishbone and allow movement as the suspension travels up and down. Each threaded drop link has two isolating rubbers and is secured to the lug with a nut and washer.

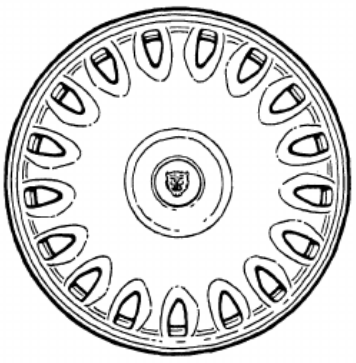
STABILISER BAR DROP LINK



Wheels and Tires

Six basic wheel designs are used for the 1995 model year Sedan. The six basic wheels are supplied in different finish and lug nut combinations. The designs are identified as: 'Steel' with trim; Kiwi; '20-spoke'; 'Dimple'; 'Sports'; 'Turbine'.

STEEL WITH TRIM

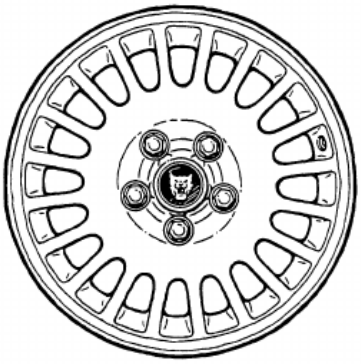


JLX-095

20 SPOKE WITH CENTRE CAP

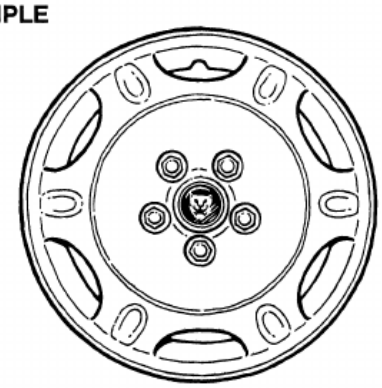
JLX-062

20 SPOKE WITH EXPOSED NUTS



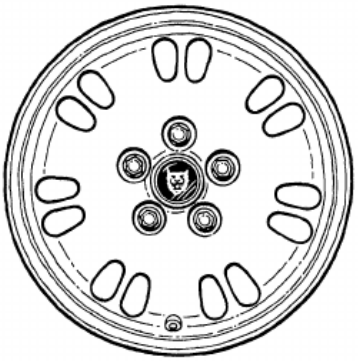
JLX-109

DIMPLE



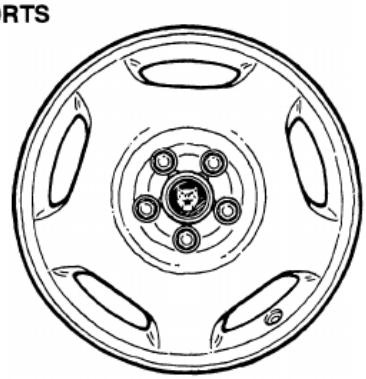
JLX-094

KIWI



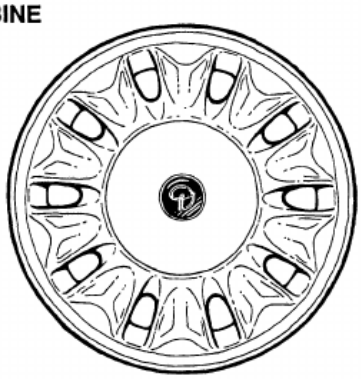
JLX-110

SPORTS



JLX-097

TURBINE



JLX-096

Climate Control System

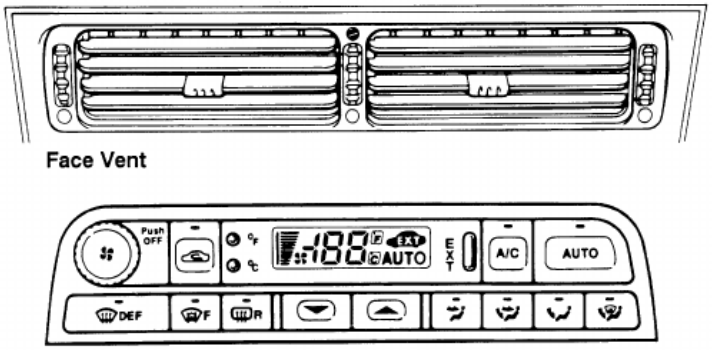
Introduction

The climate control system fitted to the 1995 model year sedan offers automatic control of temperature, blower motors and air distribution to maintain optimum comfort. Manual controls are provided to override the automatic settings. Two levels of climate control are available: a heater and air conditioning system and a heater only version. Heating is supplied from the engine coolant system via a solenoid operated control valve and circulated by an electric pump.

In vehicles fitted with air conditioning, cooling air is provided by passing air through the evaporator, which is situated immediately behind the heater/cooler inlet ducts.

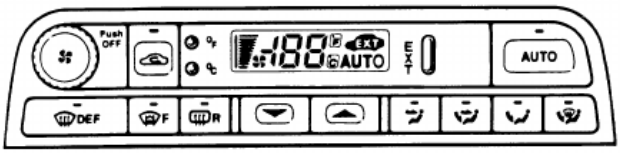
Electric servo motors with integral potentiometers are used to position all flaps. There are no vacuum operated components in the system.

FACE VENT AND CONTROL PANEL VARIANTS



Face Vent

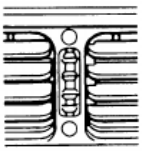
Air Conditioning Panel



Heater Panel

J82-492

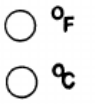
Key to Face Vent and Control Panel Illustration



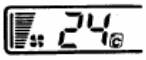
Face Vent Temperature Control

Push On/Off
Rotate for manual blower speed selection

Manual recirculation

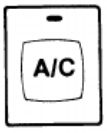


Centigrade/Fahrenheit selection buttons

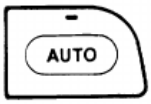


Display panel

External temperature



Air conditioning (not available on heater only system)

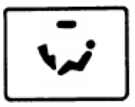


Automatic operation

Manual distribution:

Face only

Bi-level (face and feet)



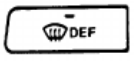
Feet only

Demist (screen and feet)

Temperature selection
(a) Decrease
(b) Increase

Heated rear screen

Heated front screen (where fitted)



Defrost

Features

- Self-diagnostic control system with displayed error codes
- Servomotor self check
- Single control (thumb wheel) for differential air flow
- Soft touch logic controls
- Serial link from panel to control module
- LCD display for temperature, status and fan speed
- Variable fan speed in automatic and manual
- Manual air flow distribution over-rides
- Compensated air flow with regard to vehicle speed
- Rear footwell outlets
- Rear face outlets
- Heated front screen (option)

Switching ON

The system can be switched on by pressing one of the following buttons:

AUTO - switches the system on in the automatic mode. The word AUTO appears in the display panel and the temperature, fan speed and air distribution are automatically controlled.
The fans will not operate until the engine is warm, except in Defrost. The fan speed is automatically compensated for changes in vehicle speed.

DEF - switches the system on in the defrost mode. Air is directed onto the front screen at maximum fan speed. This selection also switches on the heated front screen (where fitted). The fan speed may be manually reduced as required by operating the rotary fan speed control knob. Pressing DEF again will return the system to the last setting. Pressing AUTO returns the system to automatic control.

A/C - (not available on heater only system) - switches the system on in the last setting, with the air conditioning on. Pressing A/C again will switch off the air conditioning refrigeration system. The refrigeration system is automatically engaged when AUTO is selected.

Push On/Off - switches the system on in the last setting.

Temperature Control

Temperature Selection

The selected interior temperature is shown in the display panel. The required temperature is set using the red (increase) and blue (decrease) buttons.
In AUTO temperature is automatically controlled between 17°C and 31°C (61°F and 90°F). At the extremes HI and LO provide maximum heating or maximum cooling at maximum fan speed.

Face Vent Temperature Control

This thumbwheel is located in the center air distribution vent. It allows the face vent air to be reduced relative to the footwell air temperature.

Heated Screens

Heated Front Screen - The heated front screen assists rapid defrost/demist. It can only be selected when the engine is running and is automatically selected when defrost is selected. It automatically switches off after 6 minutes.

Heated Rear Screen - The heated rear screen can be independently switched on at any time to enable rapid defrost/demist at any time when the engine is running. The screen heater automatically switches off after 20 minutes.

Manual Fan Speed - Fan speed is increased by clockwise rotation of the control knob and decreased by anti-clockwise rotation. The fan speed will be shown in the display panel and the word AUTO will disappear.
Automatic control will resume when AUTO is pressed. The fans will not operate until the engine is warm (except in defrost). The fan speed is automatically compensated for changes in vehicle speed.

Ambient Temperature Display - Operation of °C and °F displays the temperature in the LED display panel.

Manual Air Recirculation

A push On/Off button prevents outside air from being drawn into the cabin. There are two modes of operation: press and immediate release provides a timed recirculation cycle of 5 minutes; press and hold for 2 seconds latches on air recirculation for a continuous cycle until deselected.

System Description

Air Conditioning Control Module

In-car temperature is maintained at the level selected on the control panel by the action of the air conditioning control module (A/CCM). This receives and computes signals input from a number of switches and sensors and provides the required power outputs to drive the servos, fans, valves and heaters.

MANUAL INPUTS

- Control panel
- Face vent temperature control

AUTOMATIC INPUTS

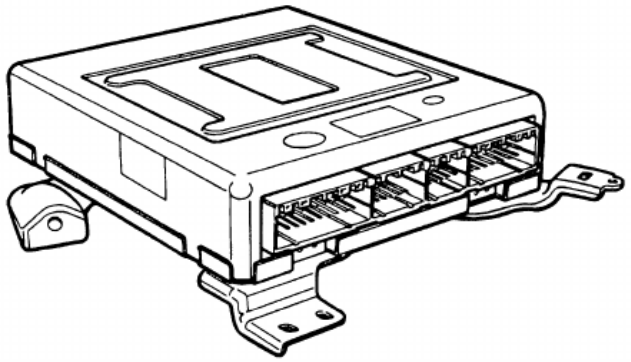
- Temperature and solar sensors
- Flap servo potentiometers
- Compressor lock sensor (V12)
- Instrument pack: coolant temperature, road speed and engine RPM via Engine Control Module

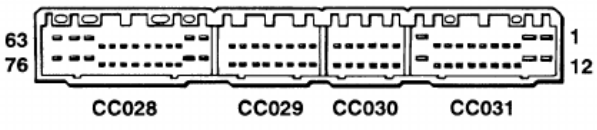
OUTPUTS

- Blower motors - left and right and relays
- Flap servo motors
- Heated front/rear screens and exterior mirror relays
- Motorized in-car aspirator
- Compressor clutch request to engine control module
- Coolant pump relay
- Solenoid operated coolant valve

The A/CCM is capable of self-diagnosis and will store Diagnostic Trouble Codes for subsequent interpretation by the Jaguar Portable Diagnostic Unit or universal scan tool. Details on fault diagnosis may be obtained from the Service Manual.

ELECTRONIC CONTROL MODULE





J80-098

Key to Electronic Control Module Illustration on Page 87

CONNECTOR CC028-

001	Compressor on	input
002	Coolant valve	output
003	Right-hand blower control	output
004	Front screen heaters	output
005	Door mirror heater	output
006	Defrost servo positive	output
007	Vent servo positive	output
008	Left air intake servo positive	output
009	Right air intake positive	output
012	Feet servo positive	output
013	Cool air bypass servo positive	output
016	Left-hand blower control	output
017	Coolant pump control	output
018	Rear screen heater	output

CONNECTOR CC029-

001	Solar sensor	input
002	Vent servo feedback	input
003	Right air intake servo feedback	input
005	Cool air bypass servo feedback	input
009	Differential feedback	input
010	Defrost servo feed back	input
011	Left air intake servo feedback	input
015	Blower voltage feedback	input
016	Left-hand blower drive	output

CONNECTOR CC030-

001	Screen request - to ECM	output
002	Clock	output
003	Data out	output
004	Comp lock sensor	input
007	Data in	input
006	Air temperature sensor	input
008	Start	output
011	In-car temperature sensor	input
012	Evaporator sensor	input

CONNECTOR CC031-

001	Ignition +ve	input
002	Isolate battery	input
003	Auxiliary ground	input
004	Auxiliary +ve	input
005	Battery supply	input
006	Engine speed	input
007	Load inhibit	input
009	Clutch request	output
010	JDS L-Line	input
011	Coolant pump in	input
012	Ignition +ve	output
013	System ground	input
014	Ground	output
015	Isolate relay	output
016	Road speed	input
017	Trip pressure switch	input
018	Aspirator motor	output
020	Logic ground	input
021	JDS K-Line	input
022	Coolant pump ground	input

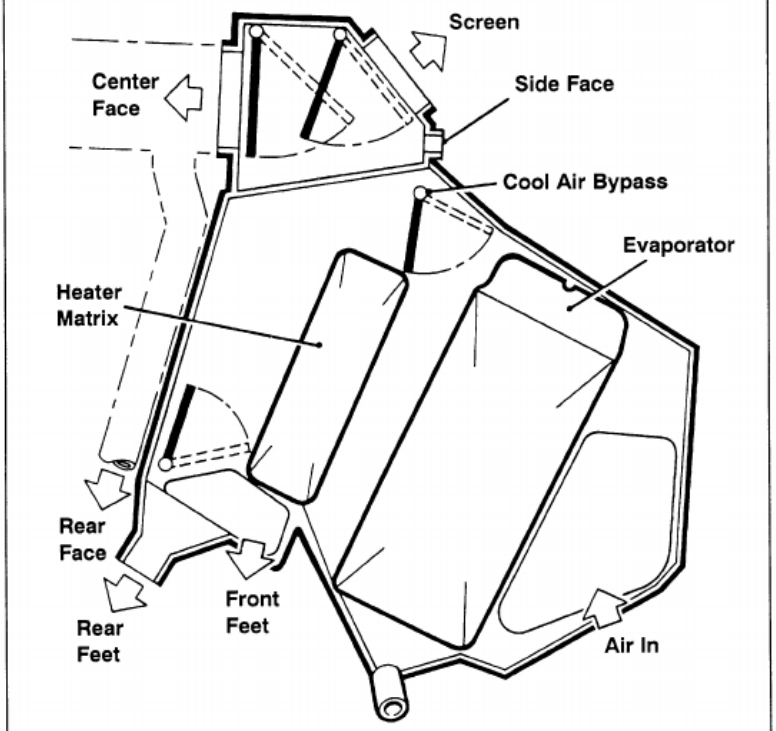
Air Distribution

Fresh air enters the blowers via the plenum chamber and is directed into the heater/cooler. It then flows through the evaporator and heater matrix and into the cabin via ducting and vents. Cooler air to the face vents is provided by opening the cool air bypass flaps. The flaps for feet, cool air, center vent, defrost and LH and RH recirculation are driven to the desired position by individual servo-motor/ potentiometer units.

Air Conditioning and Heater Unit

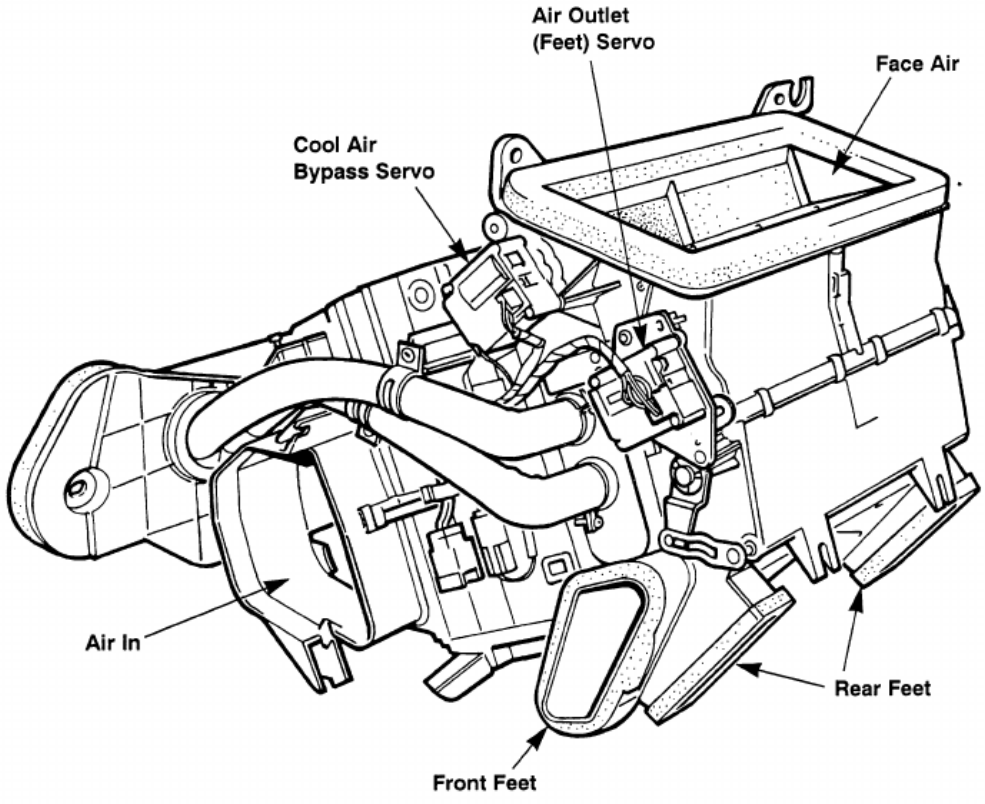
The unit is located behind the fascia and is connected to the right and left-hand blower motors by ducting. The unit directs air into the cabin at the desired temperature via a series of servo motor operated flaps: left and right air inlets; cool air bypass; air outlet (FEET); air outlet (FACE) and air outlet (DEFROST). The position of the flaps is signalled to the air conditioning control module by non-adjustable potentiometers integrated with the servo motors.

AIR DISTRIBUTION



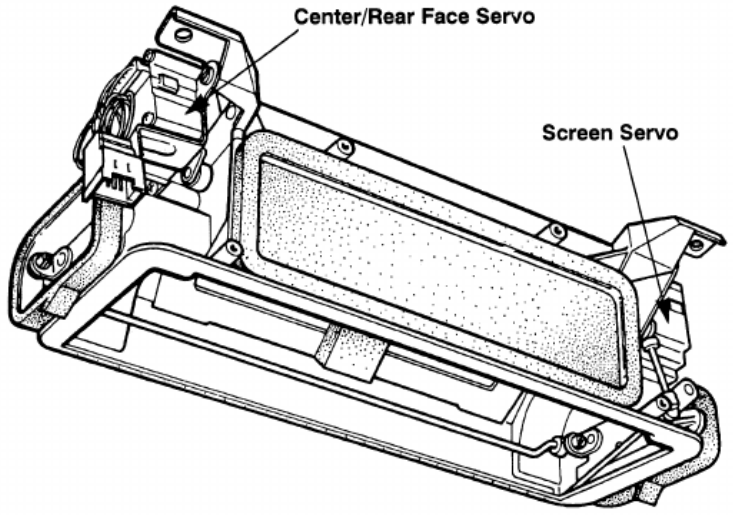
J82-494

AIR CONDITIONING HEATER UNIT



J80-095

UPPER AIR DISTRIBUTION



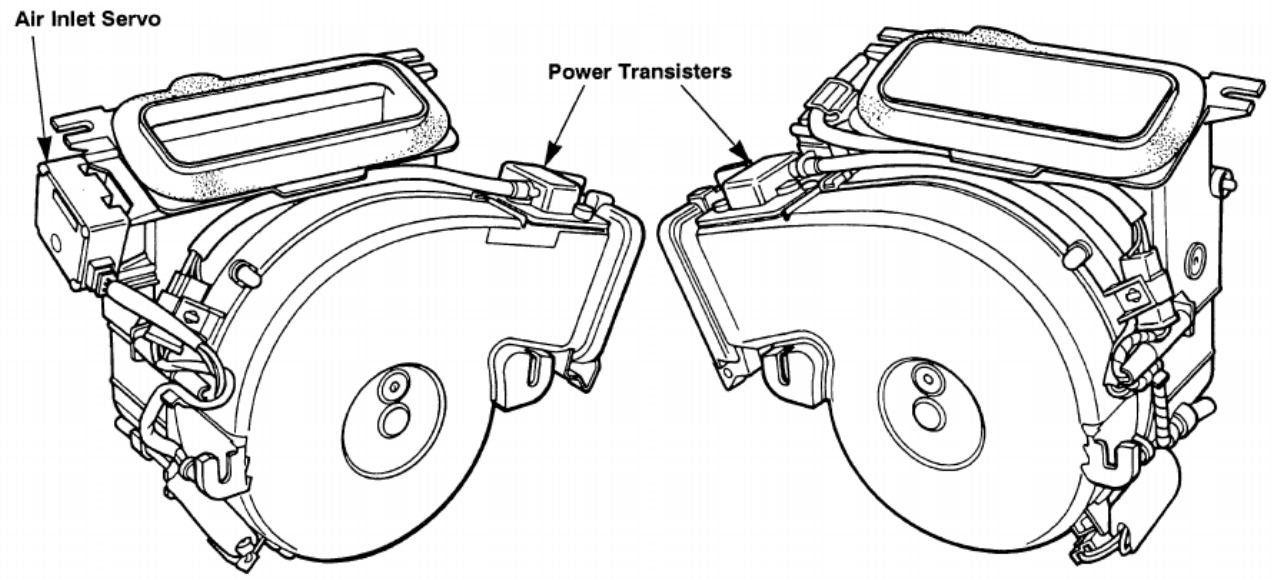
Upper Air Distribution Box

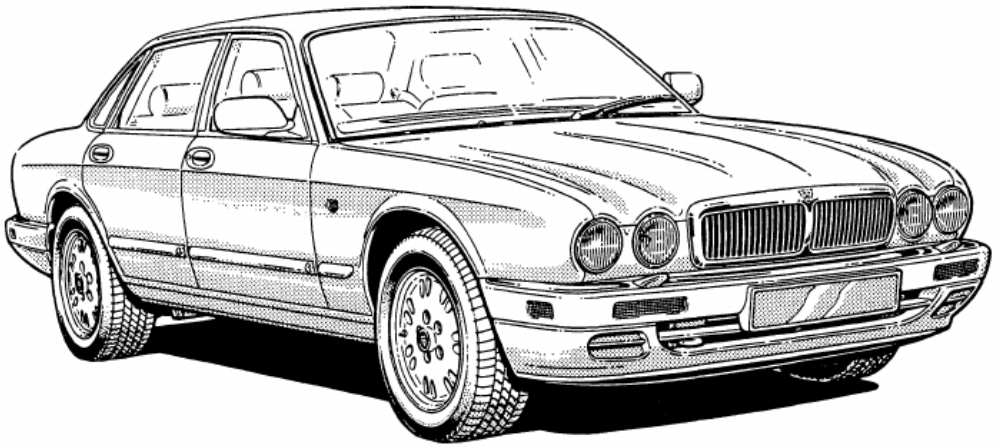
The upper air distribution box is sub-assembled into the fascia and sits on top of the air conditioning and heater unit. It contains the servo operated flaps for the center and rear (passengers) face, and screen.

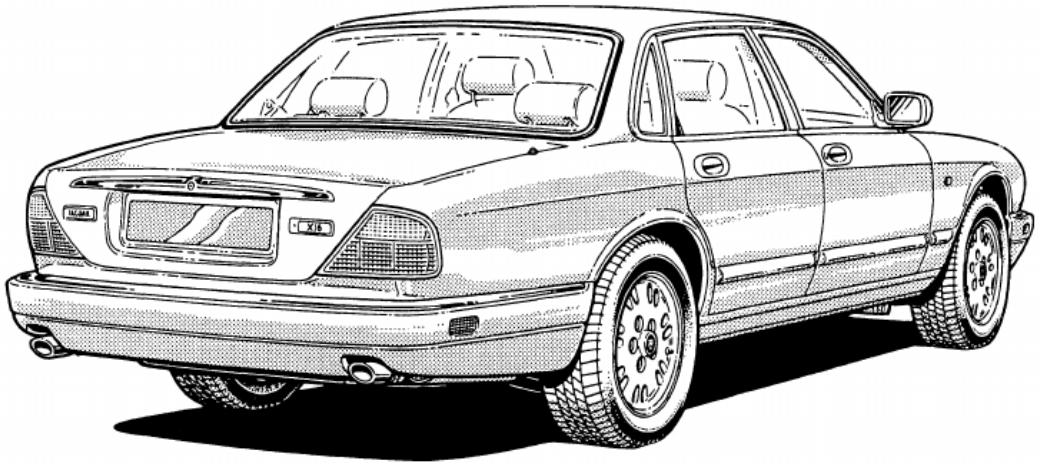
Blower Motors

The speed of the each blower motor is smoothly controlled by a power transistor over the normal speed range. High speed relays switch battery voltage directly to the blowers when high speed is demanded. The high speed and normal speed relays are located in the right-hand heelboard. Blower motor speed is automatically stepped down by a signal from the engine control module as the vehicle speed increases in order to maintain constant airflow through the vehicle.

BLOWER MOTORS







The new XJ series is easily recognised by the newly styled front and rear sections, and the colour keyed bumpers. An all new interior complements the new body style. The trunk area is also completely revised, and detail changes enhance the appearance of the engine compartment.
The new AJ16 six cylinder in-line engine recently introduced to the XJS range is now introduced to the sedan range. The introduction of a supercharged 4.0 litre version of the engine extends the available range of Sports models. New engine management systems are introduced for both the AJ16 and the V12 engines, and electronically controlled automatic transmissions get new control modules. Detail changes to the final drive unit, a revised fuel system and new catalytic exhaust systems augment the revised powertrains.

The brake system is revised to improve brake pedal effort and feel, and to accommodate the introduction of traction control. Traction control is introduced as standard on all V12 and supercharged 4.0 litre AJ16 models, and is available as an option on normally aspirated 4.0 litre AJ16 models, replacing the first gear inhibit previously found on 4.0 litre models with automatic transmission. The suspension is retuned to improve ride refinement. Speed sensitive power assisted steering gives improved steering feel.

Occupant environment is improved by a new sunroof, new air conditioning system and revisions to the instrument display, control switches and in-car entertainment systems. Occupant protection is revised by the introduction of an electro-mechanical control system for air bag deployment. A new vehicle security system has additional security and convenience features.

All exterior and interior lights are new. An all new electrical system is introduced to maximise the benefits of the comprehensive equipment changes. The on-board diagnostics system is refined and enhanced to meet legislative requirements.

Gearshift and Keylock Relays
Both micro relays have black cases with a blue stripe and light-blue bases.

1 Gearshift interlock. Fitted to AJ16 and V12 Automatic Transmission only.
2 Keylock. Fitted to AJ16 and V12 Automatic Transmission only.

Manually Adjusted Seat Relays
(Not Fitted to North American Vehicles)

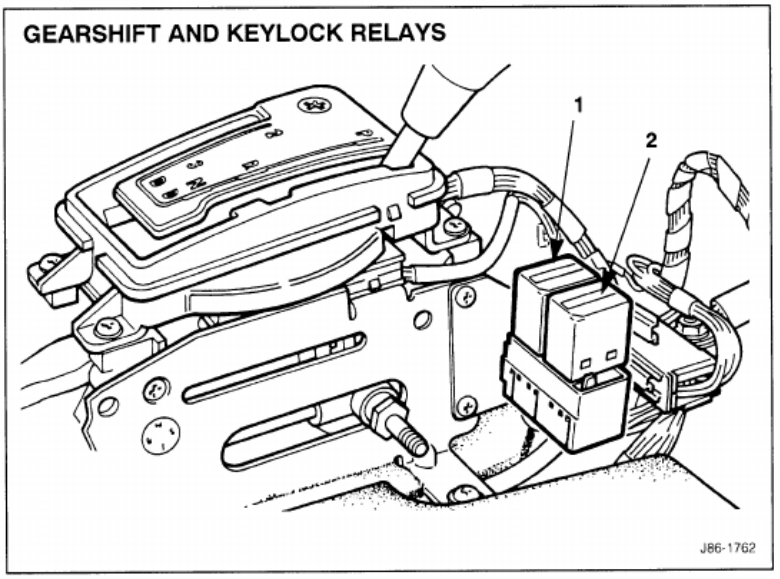
- Seat height UP. Black case with purple stripe, blue base. All AJ16 and V12 variants.
- Seat height DOWN. Black case with purple stripe, blue base. All AJ16 and V12 variants.
- Seat heater. Blue case, black base. All AJ16 and V12 variants.

Windshield Heater Relays
Both relays have light-blue cases and black bases. The two relays are located at the bottom of the A post.

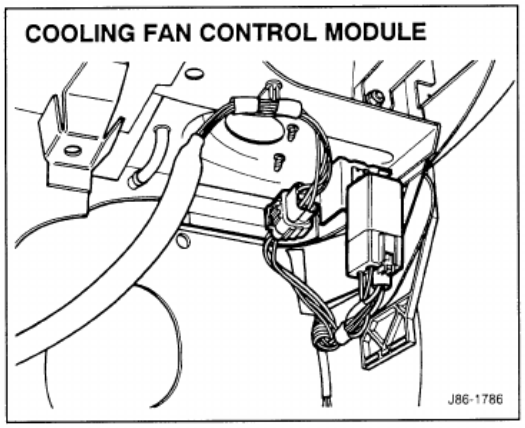
- Left-hand front screen heater. Optional for all vehicles.
- Right-hand front screen heater. Optional for all vehicles.

Cooling Fan Control Module
The cooling fan control module is located behind the bumper and under the outer headlamp, on the left-hand side of the vehicle. It has a grey case and contains two 12V relays that control the left and right radiator cooling fans.

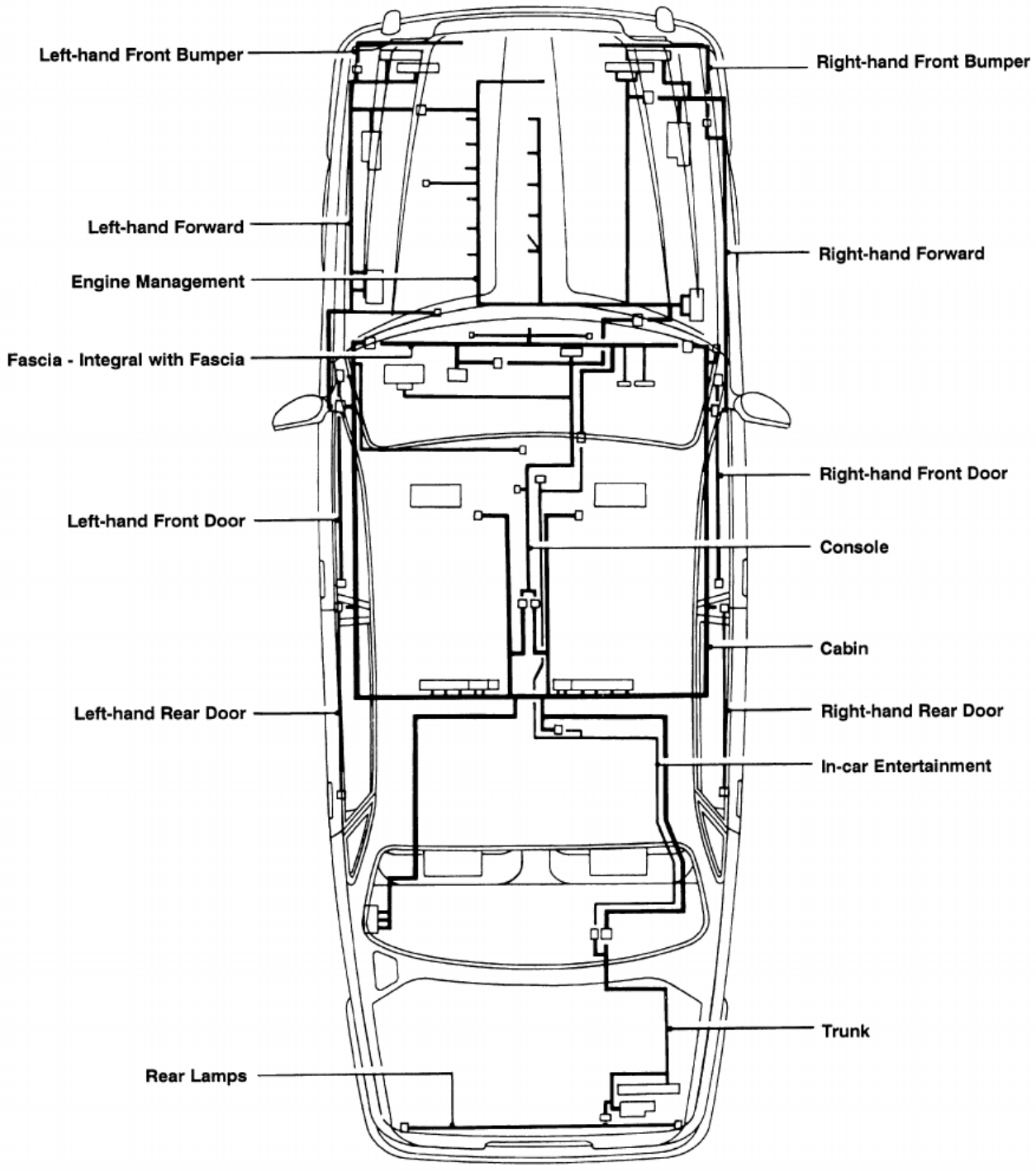
GEARSHIFT AND KEYLOCK RELAYS



COOLING FAN CONTROL MODULE



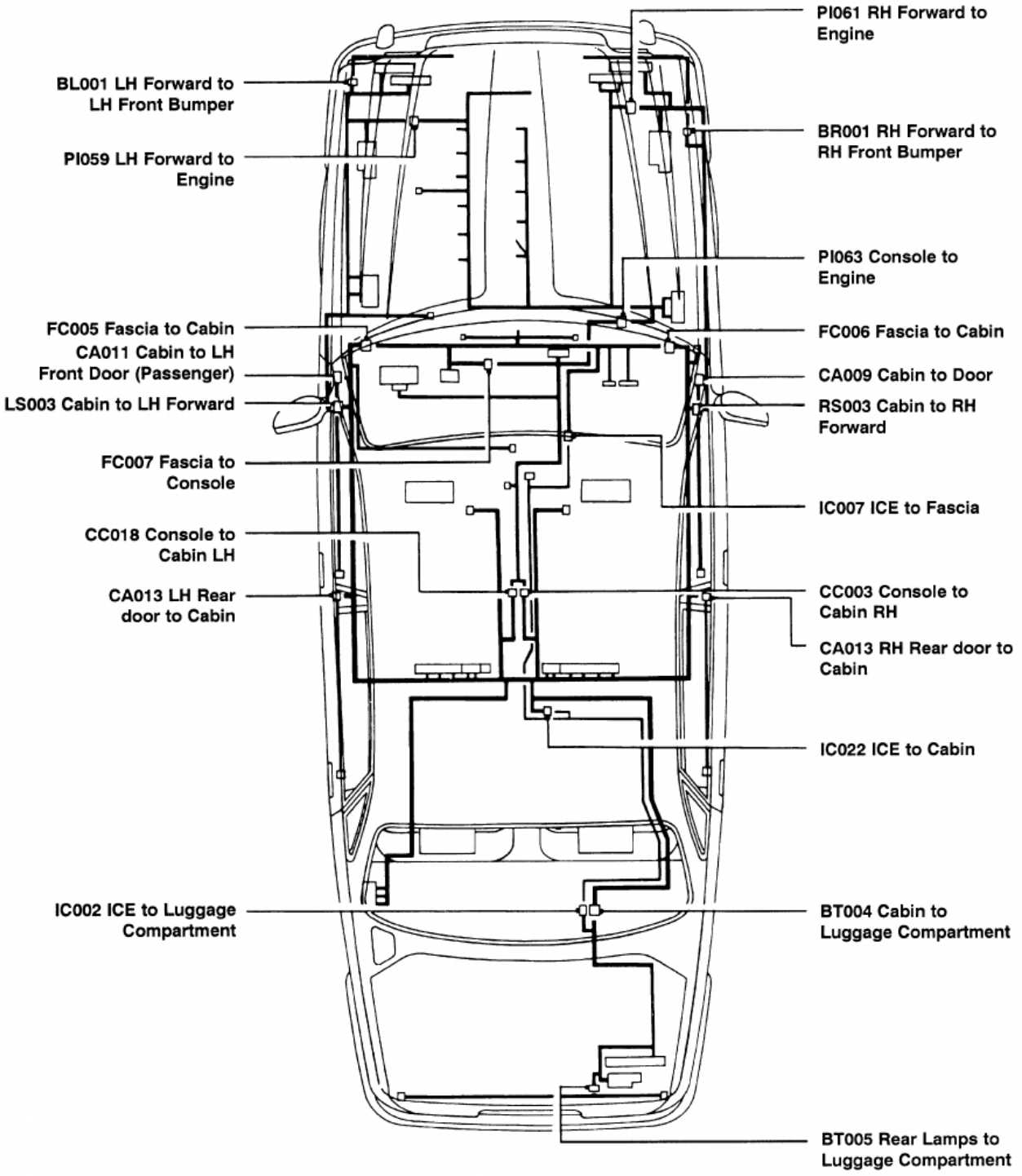
HARNESS LAYOUT



Wiring Harnesses

Considerable advances have been made in the design and layout of the vehicle wiring harnesses in order to eliminate water ingress, improve signal and power distribution and make individual circuits more readily accessible for servicing. Extensive use is made of shielding and sleeving in order to preserve the integrity of the wiring. The vehicle wiring is arranged in a number of separate harnesses. Flying leads are virtually eliminated and components are plugged directly into the harness.

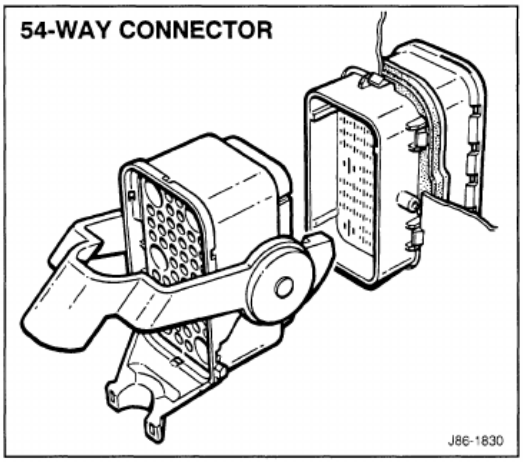
54-WAY CONNECTORS AND HARNESS CONNECTORS



Harness Connectors

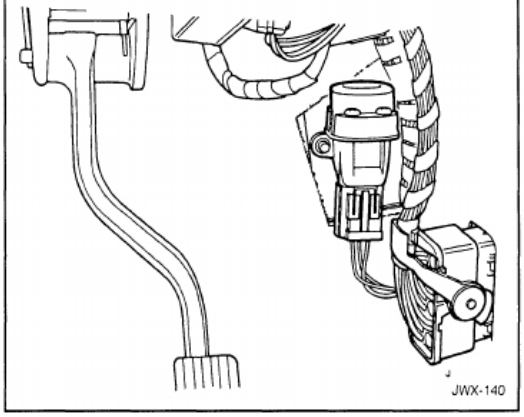
Another innovation is the introduction of 54 way through-panel connectors at the junction of vehicle harnesses. There are six of these: Fascia to Console; Cabin to Left-hand forward; Fascia to Cabin left-hand side; Fascia to Cabin right-hand side; Cabin to right-hand forward, and Cabin to trunk. All connectors are secured by fixings to eliminate rattle. 80% of the connectors in the vehicle are AMP multilock.

54-WAY CONNECTOR



J86-1830

INERTIA SWITCH

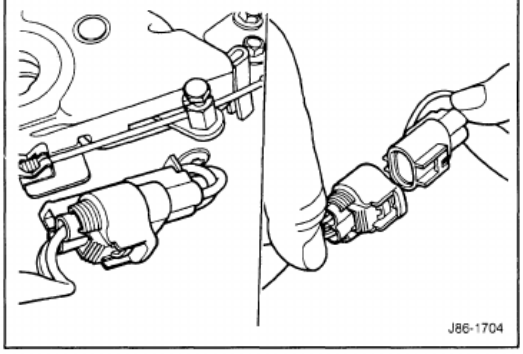


JWX-140

Inertia Switch

A new inertia switch is fitted alongside the A post in the right-hand footwell. The switch disconnects electrical power when the vehicle is subjected to a sudden deceleration / acceleration.

FORD CONNECTOR



J86-1704

Ford Connector

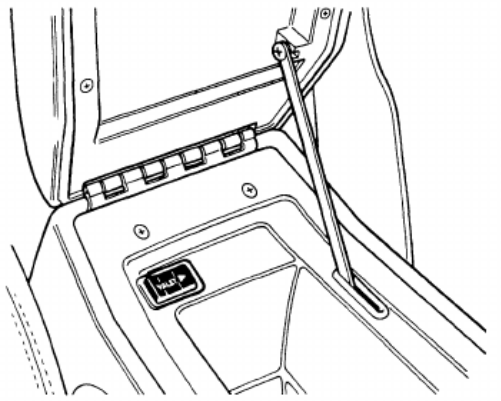
Other innovations include the introduction of Ford connectors on the air bag harness and 0.35mm CSA cable in place of 0.50mm cable for low power circuits.

Switchgear

The switchgear is substantially changed from the previous model year.

Trunk Release Inhibit (Valet) Switch
A new, momentary action, switch is installed inside the center cubby box. Its operation electronically inhibits the trunk release switch on the fascia panel.

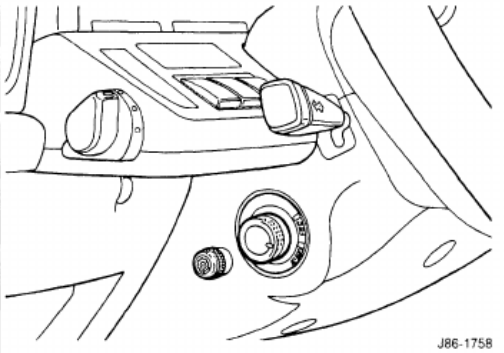
VALET SWITCH



JWX-163

Steering Column Adjustment Switch
This new switch enables 4-way axial and pitch adjustments to be made to all electrically operated columns. It is mounted on the left-hand side of the lower column cowl adjacent to the dimmer control knob. The switch operates the column motors via the column / mirrors movement electronic control module. For further details see the Steering and Suspension section.

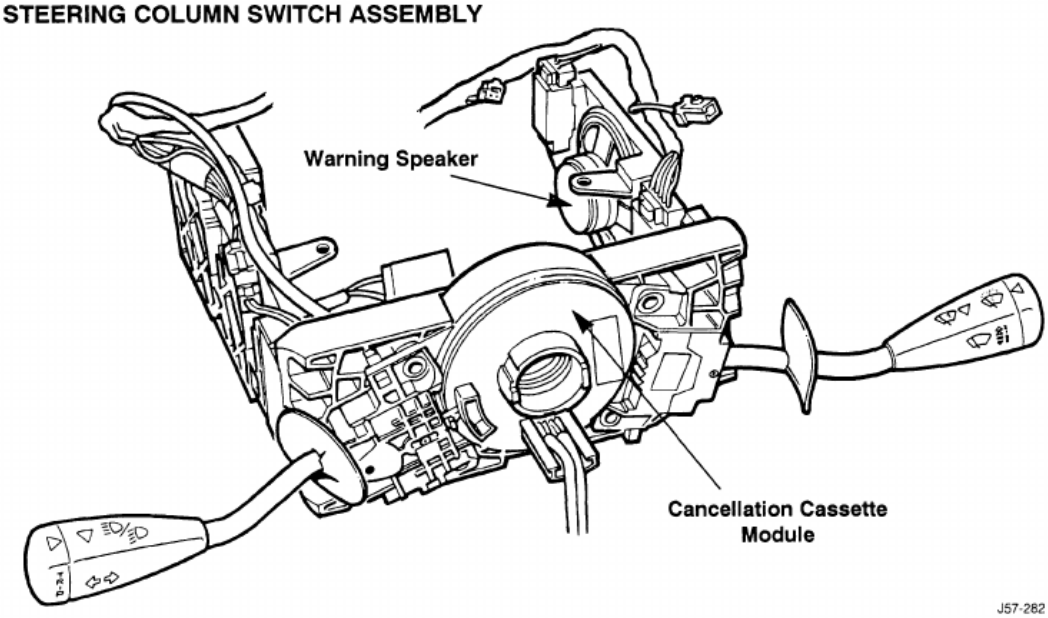
STEERING COLUMN ADJUSTMENT SWITCH



J86-1758

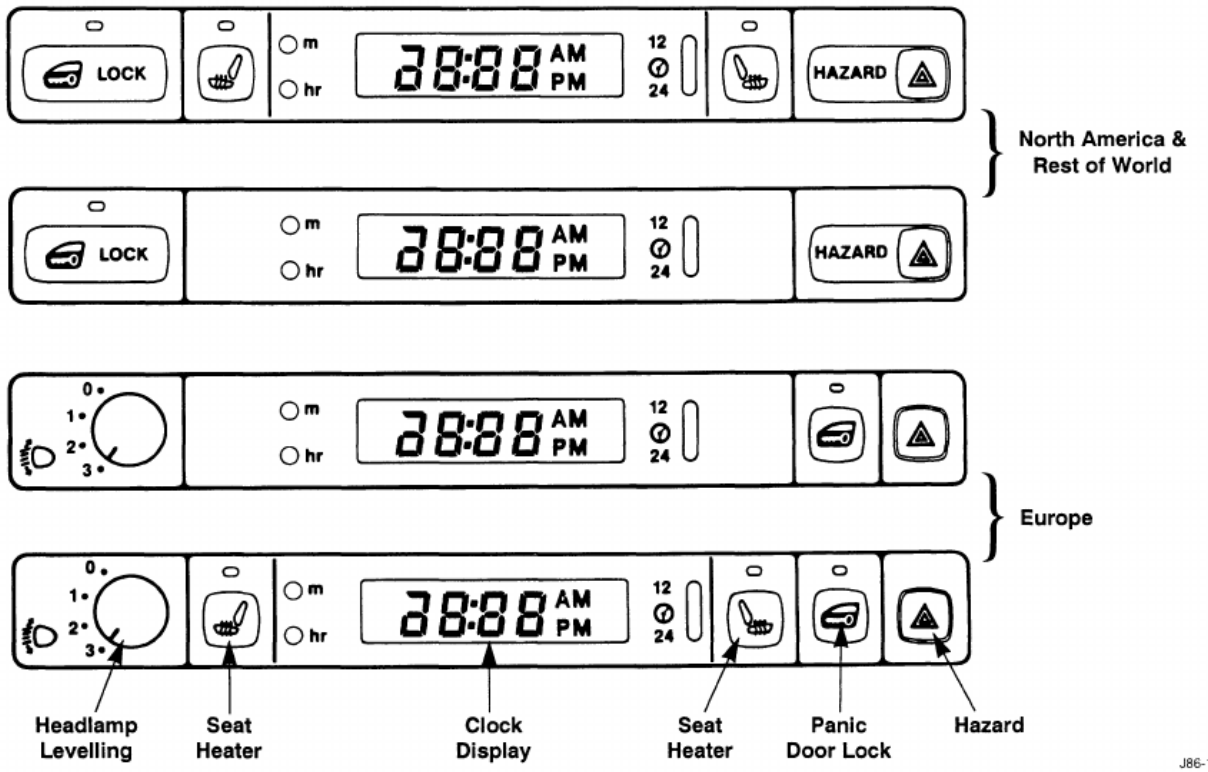
Steering Column Switch Assembly
The assembly has one new component: the cancellation cassette module. All components are mounted on a new moulded bracket. The direction indicator and wiper arms switches are similar to the previous model year. The function and operation of the assembly is unchanged.

STEERING COLUMN SWITCH ASSEMBLY



J57-282

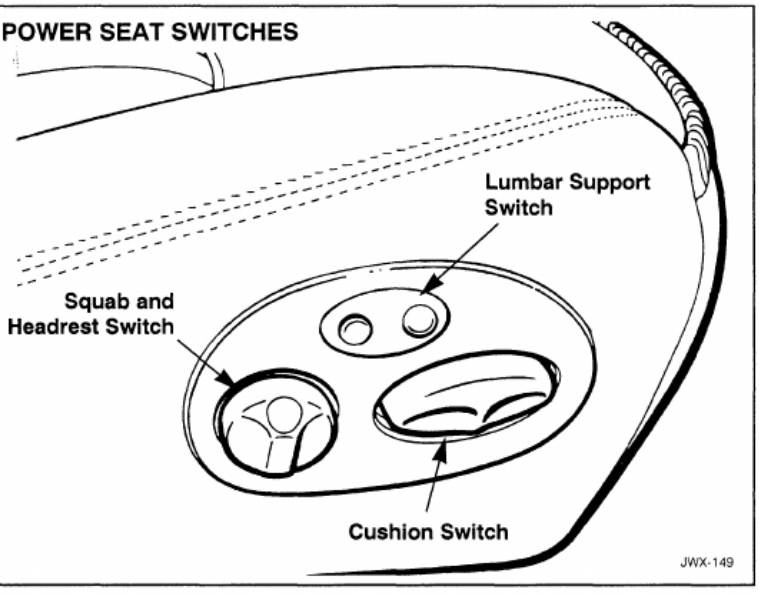
CENTER CONSOLE CLOCK PANEL



Center Console/Clock Panel

This new panel occupies the central position in the carrier housing the air conditioning panel and radio-cassette player. The panel incorporates: an LCD clock, seat heater switches, panic lock switch, hazard switch and headlamp levelling switch. There are four variants.

POWER SEAT SWITCHES



Power Seat Switches

New power seat switch assemblies are fitted in the outboard side of the driver's and front passenger's seat. The switches operate motors via the seat ECM to arrange the seat to suit individual preferences. Specifically, the switches enable fore and aft movement of the seat, squab and seat cushions, and up and down movement of the headrest. A separate switch operates the lumbar pump motor. All switches are color coordinated with the seat trim.

Manual Seats (All Markets Except USA)

A new switch is fitted to the driver's seat to adjust its height.

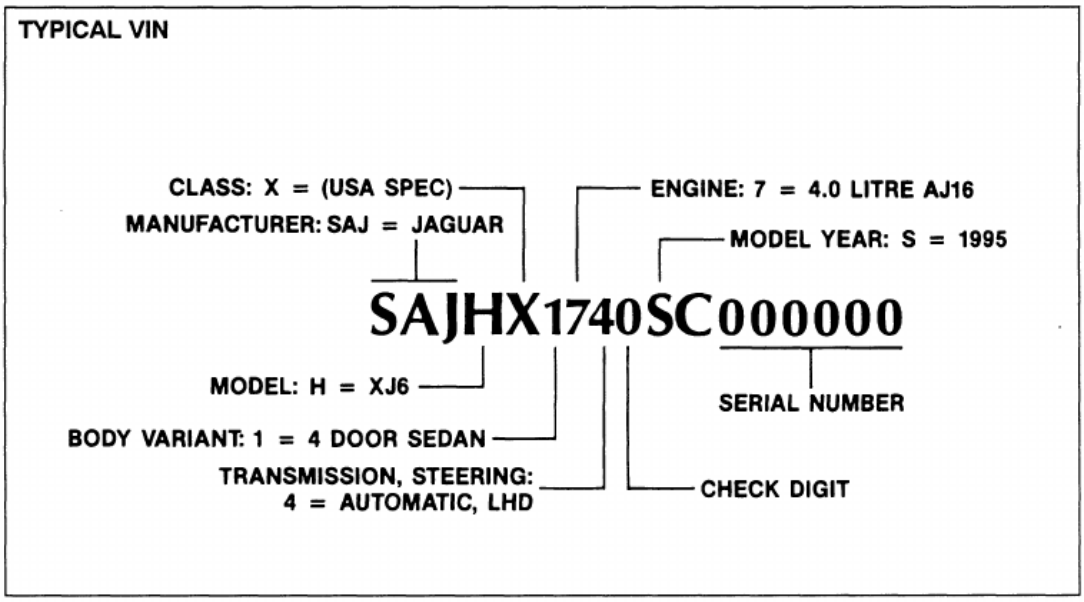
Model Line Up

Model	Engine Size - Litres NA = Normally Aspirated SC = Supercharged	Transmission M = Manual A = Automatic
XJ6	3.2 NA 4.0 NA	M or A M or A
XJ Sport	3.2 NA 4.0 NA	M or A M or A
(XJR)	4.0 SC	M or A
Sovereign	3.2 NA 4.0 NA	M or A M or A
Daimler Six	4.0 NA	M or A
Vanden Plas	4.0 NA	A
XJ12	6.0 NA	A
Daimler Double Six	6.0 NA	A

Note: Not all markets receive all model variants

Vehicle Identification Number (VIN)

TYPICAL VIN



Carried Over From Previous Model Year

Motorola hardware.
The current, optional, arm rest lid.
The new integrated harness accommodates the 93 and 94 model year Jaguar (Motorola) telephones.

Deleted Features
The telephone audio speaker is deleted.

Airtime
Kit collation and airtime are by Jaguar In-Car Communications.

Markets
Proprietary Motorola telephone parts are sourced locally.
Installation kits for export are available from UNIPART.

Instrument Pack

The instrument pack incorporates some new features but has the same fixtures, fittings and dimensions as the one installed in the previous model year. A number of features have been deleted.

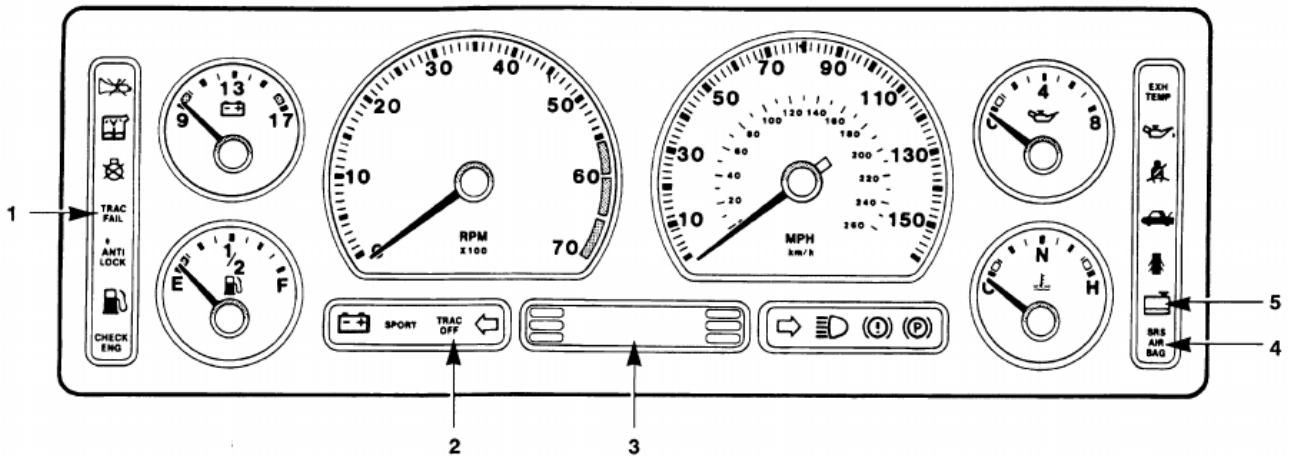
New Features
Air bag fault warning system. This includes a warning light and LCD message display.

Traction control status warnings, with a traction control failure light and traction OFF tell-tale indicator.
Driver information messages. Air bag fault. Brake fluid low.

Note:
The direction indicator tell-tales operate with hazard warning even when the ignition is switched OFF.

Deleted Features
Fuel failure codes are no longer displayed.
fuse failure warning light and associated driver information messages.
Vehicle condition monitor function and button are replaced by driver information messages.
There is no first gear inhibit (WINTER MODE) feature.
High coolant temperature warning light.
There is no brake pad wear sensing.
Brake pressure failure warning.
Trip function keyboard switches. Clear and reset are retained, but trip functions may only be selected via the multi-function switch stalk.

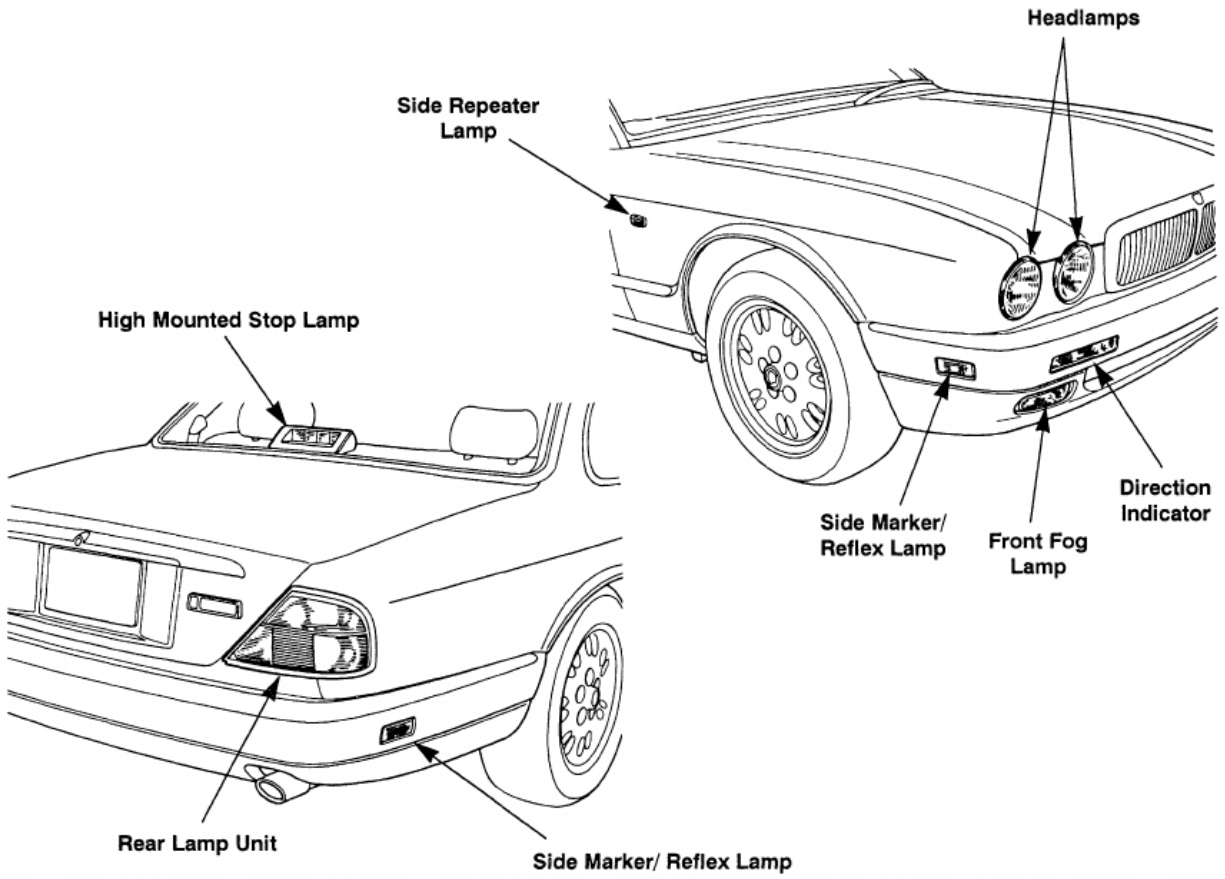
INSTRUMENT PACK



1. Traction Control Failure
2. Traction Control Off (Green)
3. LCD Message Display
4. Air Bag Fault
5. Coolant Level (Changed Position)

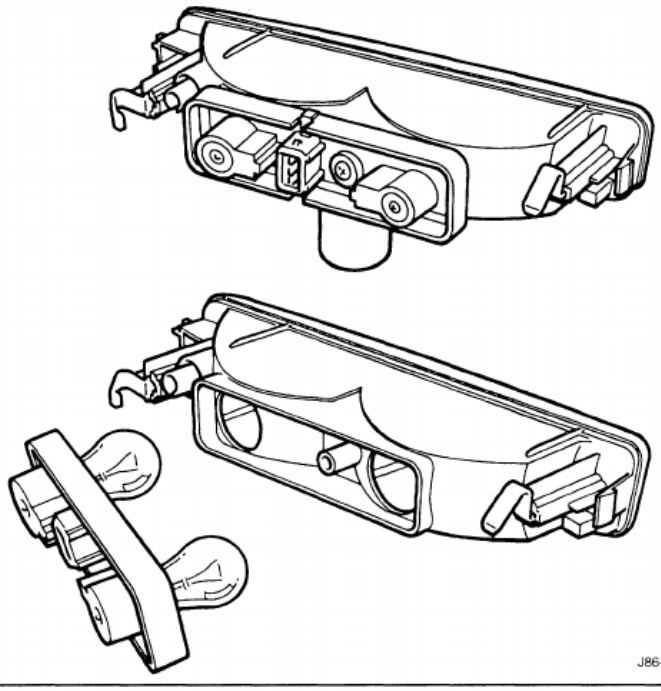
J88-137

EXTERIOR LIGHTS



J76-990 & J76-989

FRONT DIRECTION INDICATOR



J86-1711

Exterior Lighting

Exterior lighting is controlled via the central processor located behind the fascia. Left and right bulb failure modules for the forward lamps are located behind each headlamp unit, while the rear bulb failure module is installed in the trunk electrical carrier.

Front Direction Indicator

The direction indicators are a new design with an integrated connector and two P21W bulbs in a Philips carrier. The bodies are designed to be front loaded into the vehicle bumper and may be removed with the aid of a spring delatching tool.

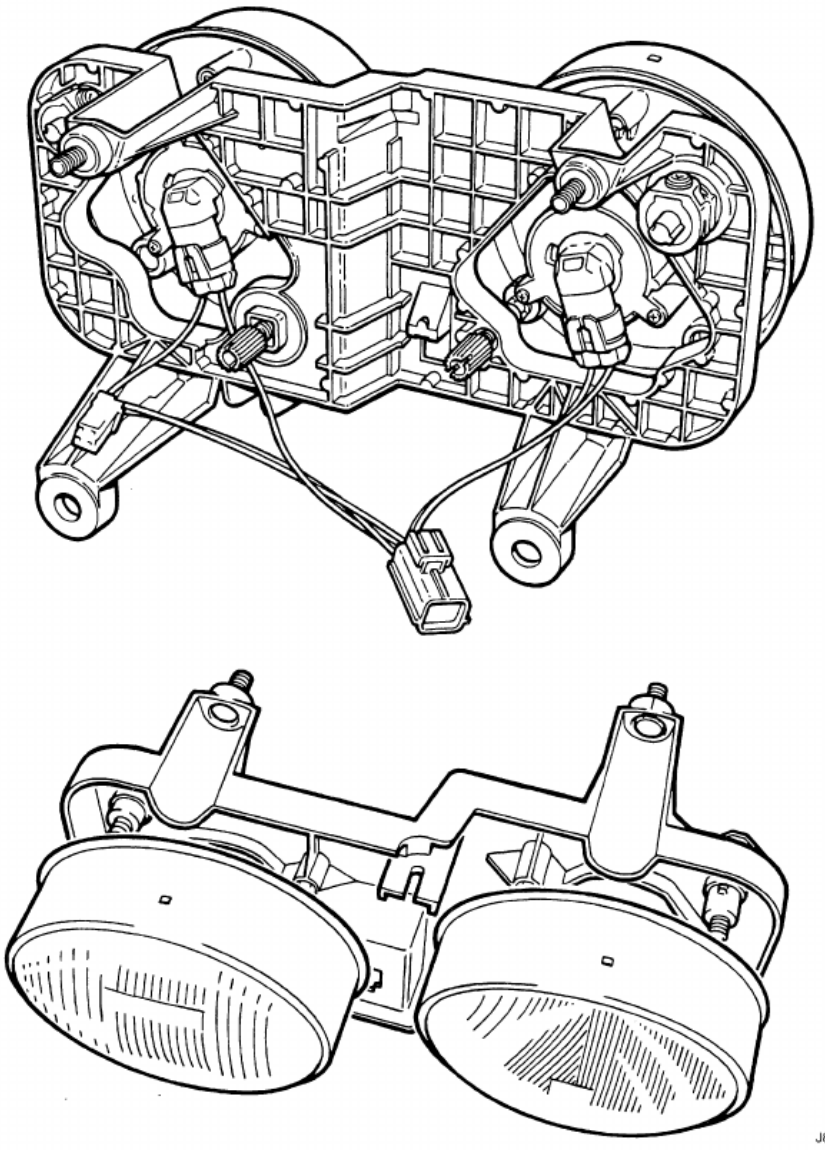
Side Markers and Reflectors

The vehicle has two amber side marker/reflex lamps and two red side marker reflex lamps. These are designed to be front loaded into the vehicle.

Headlamps

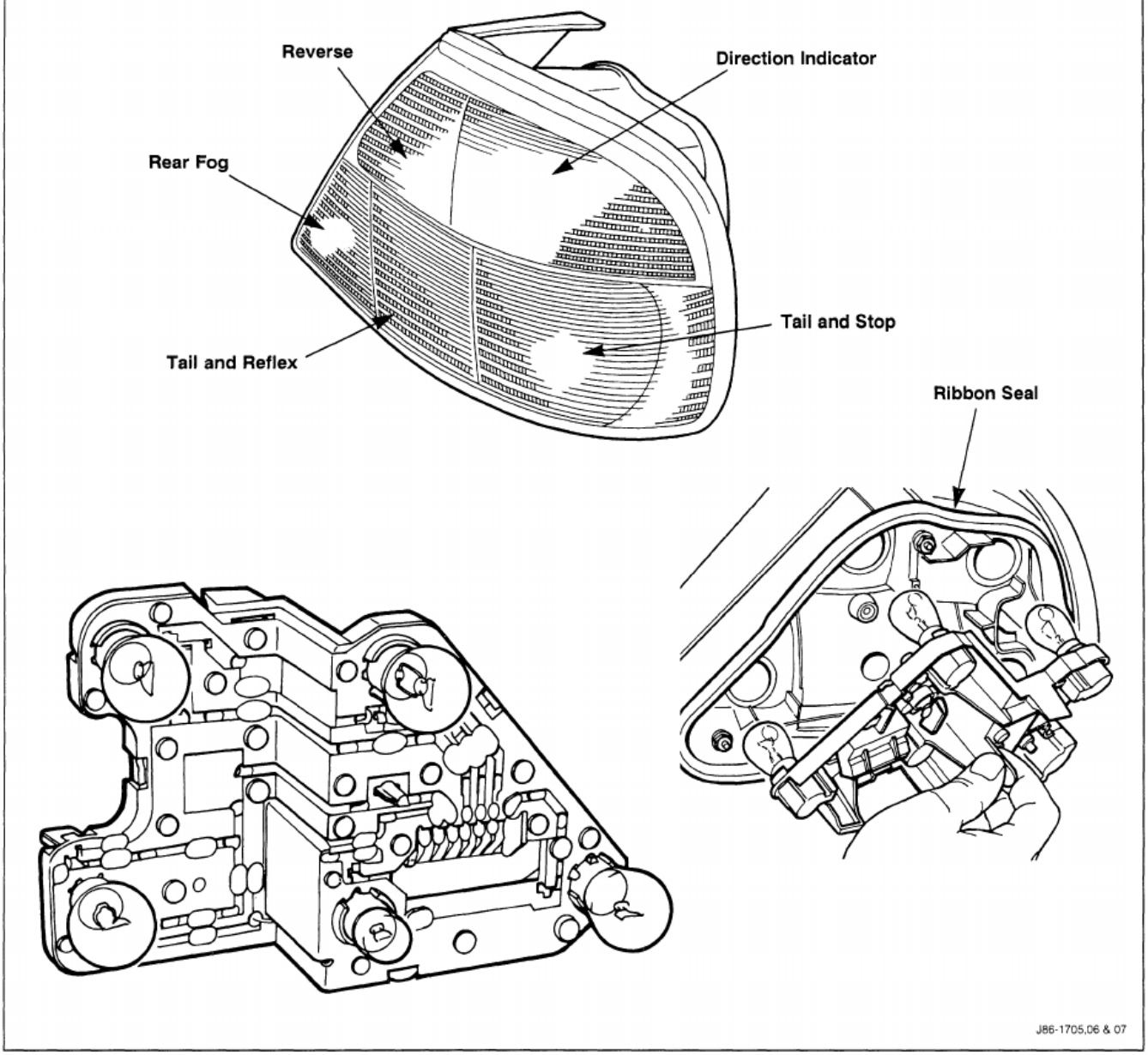
The headlamps are newly styled Valeo quads fitted with H1 bulbs in place of the H4 bulbs used on the headlamps on the previous model year. The inboard lamps are the main driving lamps. Only the outboard lamps dip. Pilot bulbs are fitted to the outboard lamp holders. Each bulb has its own connector. The fixings are carried over from the previous model year. Headlamps in United Kingdom and European vehicles are fitted with a levelling motor.

HEADLAMP UNIT



J86-1709 & J86-1708

REAR LAMP UNIT



Rear Lamps

The rear lamp cluster is a completely new design providing seven functions: reverse, direction indicator, fog, tail and reflex, and tail and stop. These functions are provided by five bulbs supplied via an integrated electrical connector. There is a common specification for vehicles in all markets, with the exception of Singapore and Brunei which are not supplied with rear fog lamps.

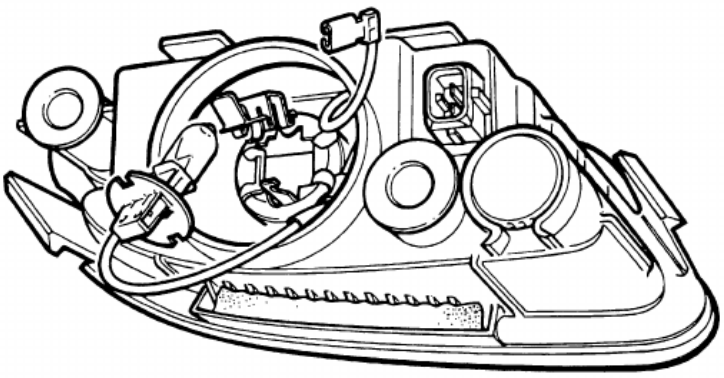
The lamp body has a ribbon gasket seal to prevent water ingress, and a dust seal. It is located to the body by a datum peg and three fixings, instead of the four utilised on the previous model year.

Front Fog Lamps

The fog lamp is a newly designed, self-supporting unit with a captive bezel and integral beam adjuster. It is loaded into the bumpers from the front and held in place by two spring clips. These are de-latched with the aid of dealer supplied tools.

The lamps are a standard fitting on Sovereign models and above and an option on all other vehicles.

FRONT FOG LAMP UNIT



J86-1789

Interior Lighting

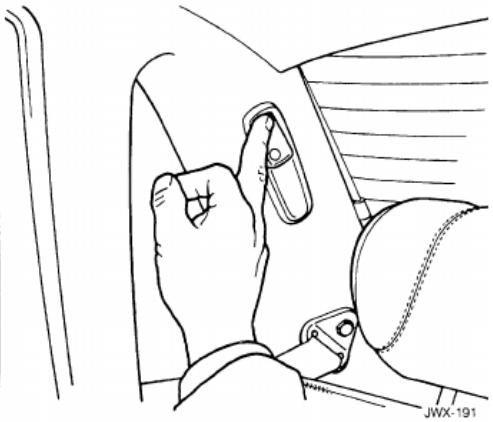
Interior lighting is controlled via the interior lighting central processor.

E Post Lamps

New styled interior courtesy lamps are fitted in the E posts. All vehicles have a 5W courtesy light and 6W map light.

The lamps are automatically switched on when the doors are opened and may also be operated by the integral lamp switches.

E POST LAMPS

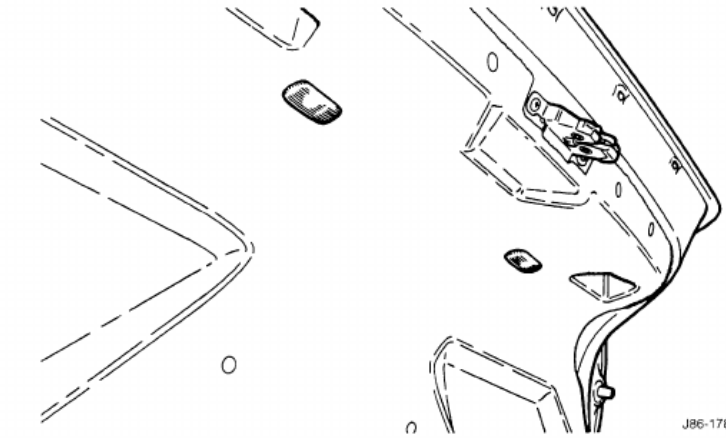


JWX-191

Trunk Lamps

Two new lamps are fitted in the trunk lid. The lamps are operated by the central processor in response to signals from a sensor in the lid locking mechanism.

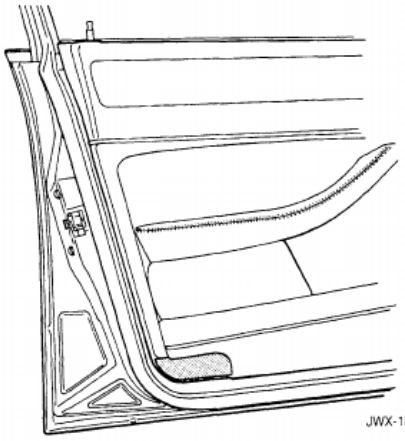
TRUNK COMPARTMENT LAMPS



J86-1784

Door Courtesy/Hazard Lamps
Revised door/courtesy lamps are fitted in the lower door trim.

DOOR COURTESY / HAZARD LAMPS



Programmable Electronic Control Units

Most systems on the vehicle are controlled by an electronic control module (hardware - see schematic). Most perform a series of operations according to a preset programme (software) that is fixed for similar systems in all vehicles in all markets. However, a number of modules, designated Programmable Electronic Control Units (PECUS), are programmed in the factory with information to meet specific vehicle and market variations.
There are six basic PECUS modules: Transmission control; AJ16 Engine control (GEMS); V12 Engine control (NIPPONDENSO); Security & locking; Instrument pack, and Body processing.

1. Transmission Control Module (4 Litre Only)
Hardware - 1 module
Software - 3 variants providing for differences in emissions calibration data in USA, Europe and the Rest of World (ROW)

2. AJ16 Engine Control Module
Hardware - 5 modules:
- USA normally aspirated
- Europe normally aspirated
- ROW normally aspirated
- USA Supercharged
- Europe and ROW Supercharged

Software - 30 variants providing for differences in engine, transmission, emissions and security

3. V12 Engine Control Module
Hardware - 1 module
Software - 10 variants providing for differences in emissions and standards of security

4. Security and Locking Module
Hardware - 3 modules:
- RF 433 Mhz
- RF 315 Mhz
- Non RF (key only)

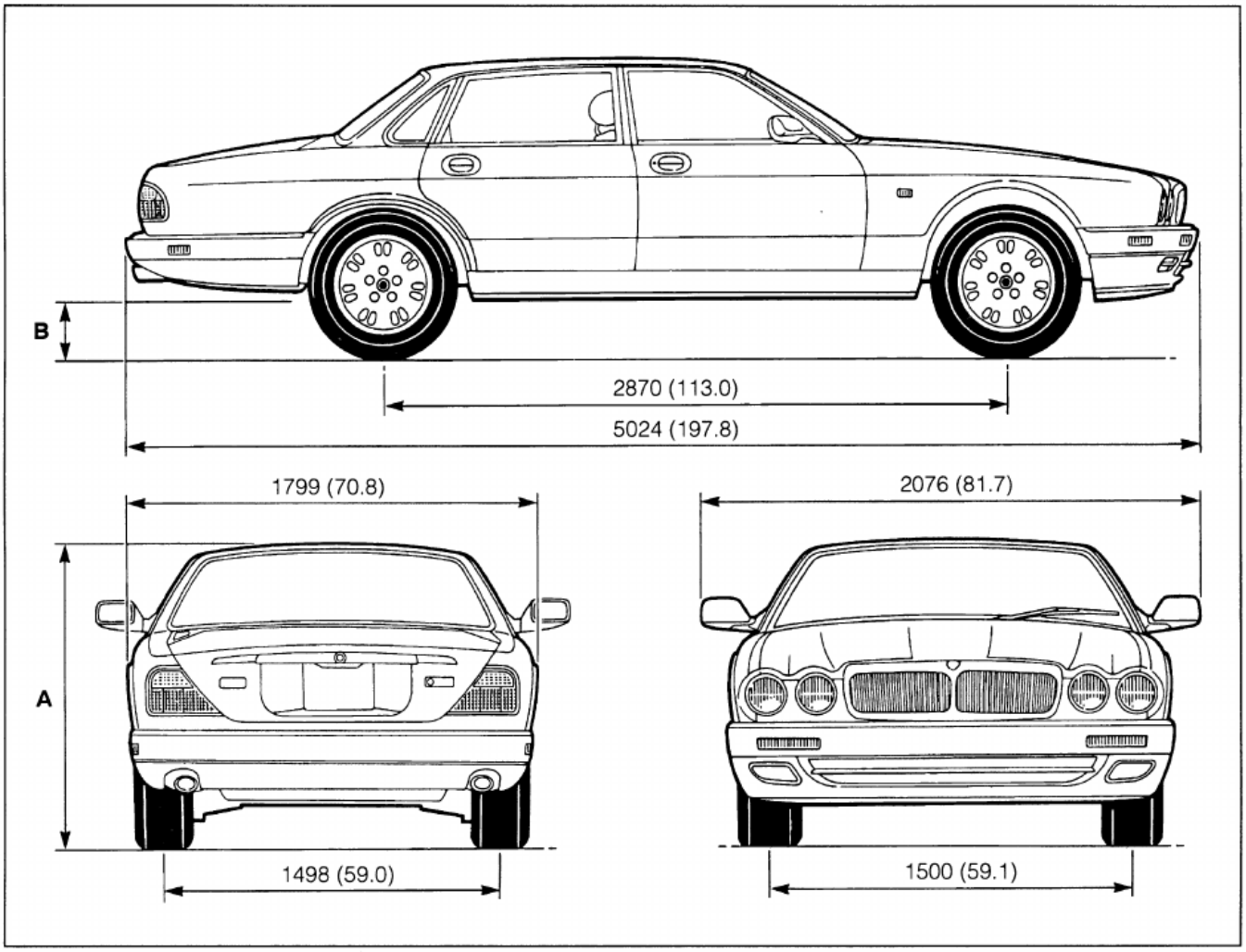
Software - 15 variants providing for differences in audible and lighting warnings, locking and transmitter functions

5. Instrument Pack Module
Hardware - 9 modules:
- mile/h 3.2 or 4 litre
- km/h 3.2 or 4 litre
- mile/h 4 litre USA
- mile/h V12
- km/h V12
- mile/h V12 USA
- mile/h Sports or Supercharged
- km/h Sports or Supercharged
- mile/h Sports or Supercharged USA

Software - 12 variants providing for differences in gauge and trip computer calibrations

6. Body Processor Module
Hardware - 1 module
Software - 18 variants providing for differences in audible and lighting warnings and levels of security

Dimensions



A = Overall Height at Gross Vehicle Weight:

AJ16 Comfort	- 1314 (51.7)
V12 Comfort	- 1315 (51.8)
AJ16 Sports	- 1307 (51.5)
AJ16 Supercharged	- 1303 (51.3)
V12 Sports	- 1307 (51.5)

B = Minimum Ground Clearance at Gross Vehicle Weight: 116 (4.6)

All Dimensions in mm (in)

Vehicle Weights

Rest of World

Model	Kerb Weight	Gross Vehicle Weight
XJ6 3.2	1800 (3969)	2220 (4895)
XJ6 4.0	1800 (3969)	2220 (4895)
XJ Sport 3.2	1800 (3969)	2220 (4895)
XJ Sport 4.0 NA	1800 (3969)	2220 (4895)
XJ Sport 4.0 SC (XJR)	1875 (4134)	2295 (5060)
Sovereign 3.2	1800 (3969)	2220 (4895)
Sovereign 4.0	1800 (3969)	2220 (4895)
Daimler Six	1825 (4024)	2245 (4950)
Vanden Plas	-	-
XJ12	1975 (4354)	2395 (5280)
Daimler Double Six	1975 (4354)	2395 (5280)

All Weights in kg (lb)

North America/Taiwan

Model	Kerb Weight	Gross Vehicle Weight
XJ6 3.2	-	-
XJ6 4.0	1850 (4080)	2260 (4985)
XJ Sport 3.2	-	-
XJ Sport 4.0 NA	-	-
XJ Sport 4.0 SC (XJR)	1910 (4215)	2320 (5120)
Sovereign 3.2	-	-
Sovereign 4.0	-	-
Daimler Six	-	-
Vanden Plas	1862 (4105)	2273 (5010)
XJ12	2005 (4420)	2415 (5325)
Daimler Double Six	-	-

All Weights in kg (lb)

Glazing

The revised backlight has rounded corners. Two clips cover the joints between the two parts of the outer finisher.

Already introduced as a running change, the adhesive used for installation of the windshield and the backlight is changed from Betaseal HV3 to 1855. The new adhesive sets harder, giving an 8 % increase in body torsional rigidity.

B/C Post Finisher

New B/C post finishers enhance the semi-flush door glazing and assist improvements in sealing. The finishers are now fixed to the body with adhesive pads instead of screws.

Fuel Filler

The hinge of the new fuel filler is integrated into the lid. In the event of an electrical failure, the locking actuator can be manually unlocked by pulling on a tag located in the front left side of the trunk.

Trim Finishers

Trim finishers on door frames and posts, drip rail, waist-rail and screen are in a chrome or black finish, to give model differentiation.

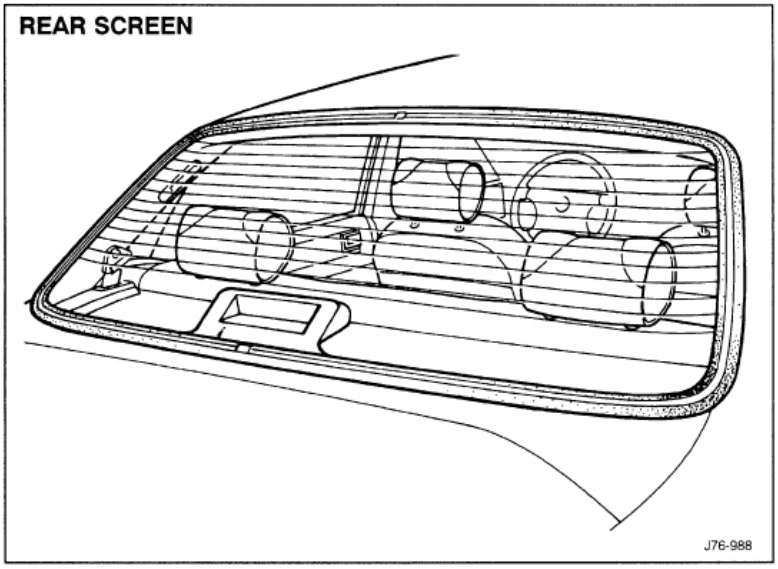
Coachlines

On higher specification models, single painted coachlines replace the adhesive strips used previously.

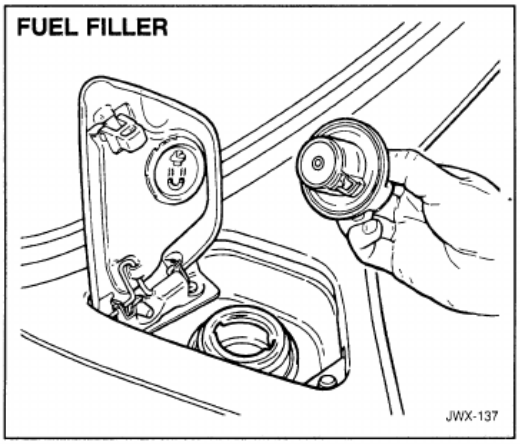
Badges

New badges are featured on the radiator grille, B/C post, trunk lid and wheel centers. The badges are in different styles and colors, for model differentiation.

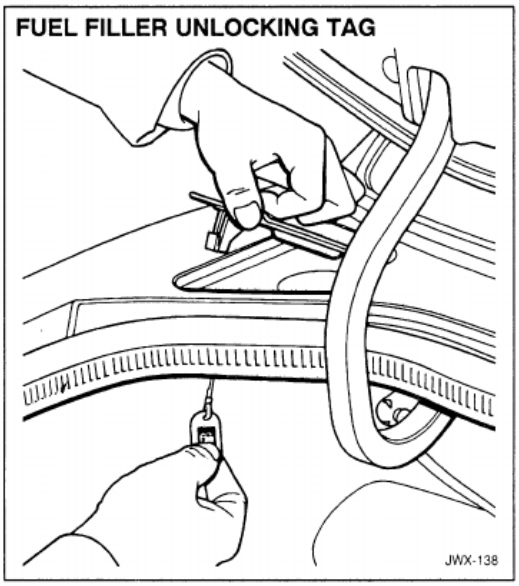
REAR SCREEN



FUEL FILLER



FUEL FILLER UNLOCKING TAG



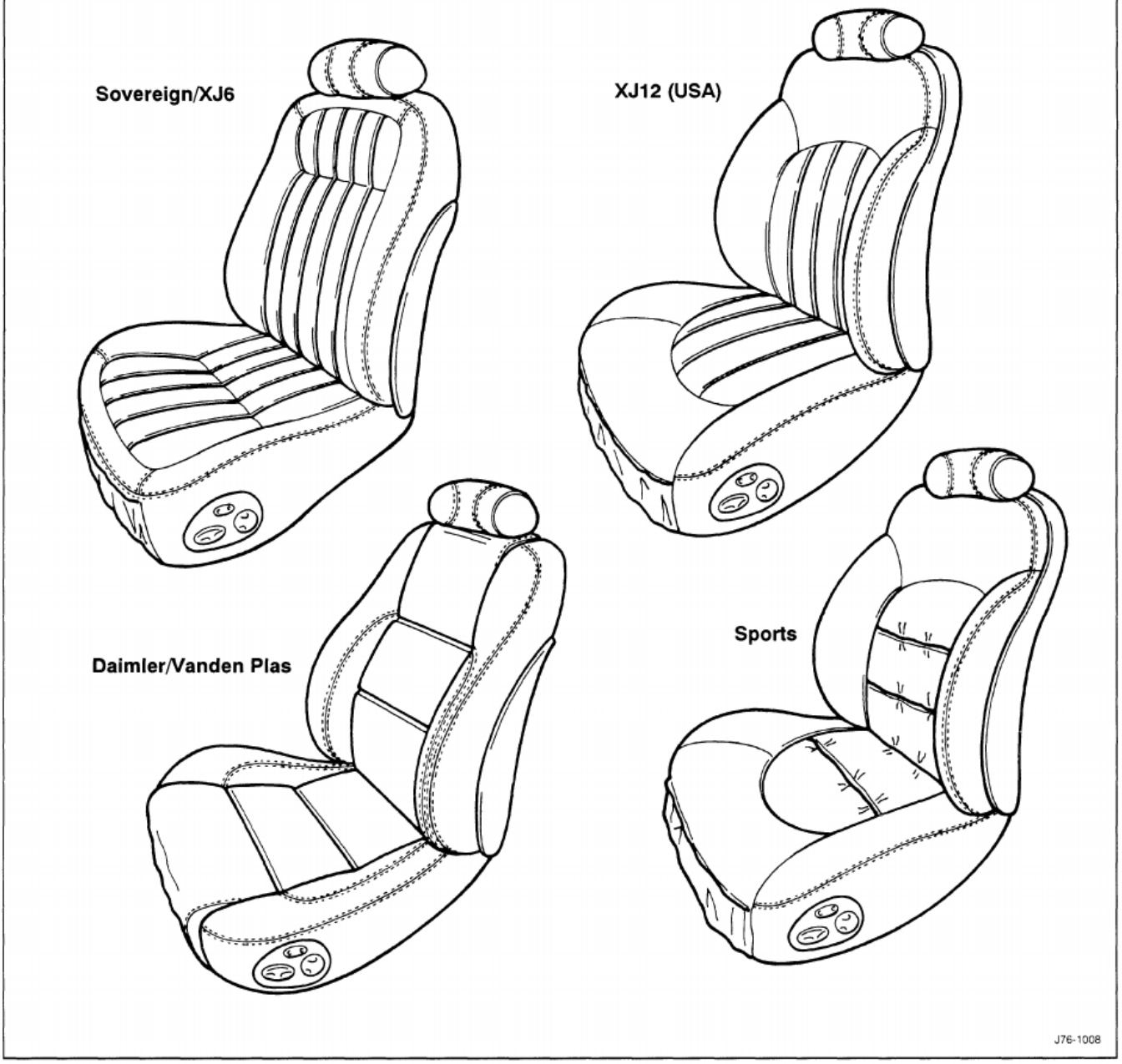
Interior Trim

The interior is revised with new seats and a new carpet. The overall appearance is further improved with detail changes to the fascia, veneers, grab handles and carpet, and increased color keying.

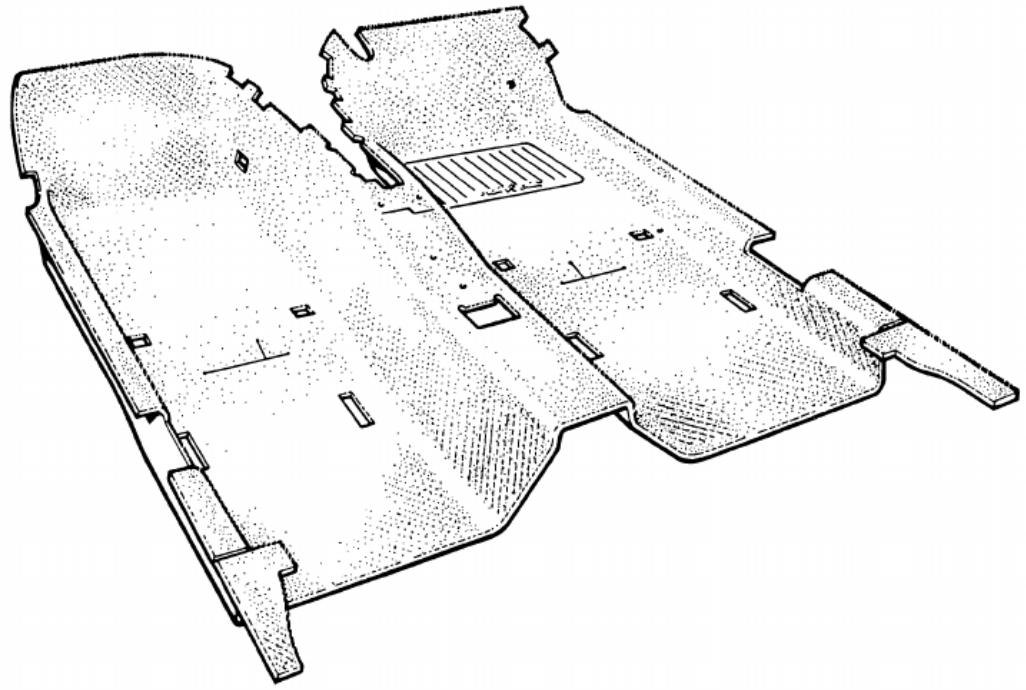
Seats

The front and rear seats are redesigned to increase headroom and to improve comfort and support. Different stitching provides model differentiation. Stowage pockets are added to the front seats, and their fore and aft travel is increased by 20 mm (0.8 in).

SEAT STYLES



INTERIOR CARPET



J76-1002

Carpet

The carpet is now a one-piece moulded carpet, with integrated sound deadening, heel mats and driver's foot rest. Plastic clips below the door treadplates secure the edges of the carpet to the body. The front seats must be removed if it is necessary to remove the carpet.

Heel Board Covers

Two covers protect the electrical components installed on the heel board below the rear passenger seat. Each cover is secured by two locating brackets on the floor and by two latches on the cover. The latches are released by pushing down on the two recesses in the top edge of the cover.

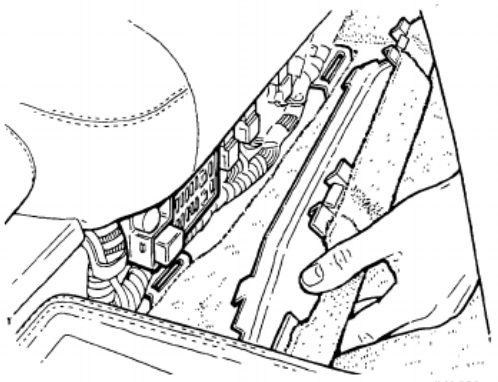
Roof Console

The roof console is redesigned and now includes a sunglasses holder. Moulded and burr walnut finishes provide model differentiation. For details of the controls on the console, see Electric/Electronics section.

Grab Handles

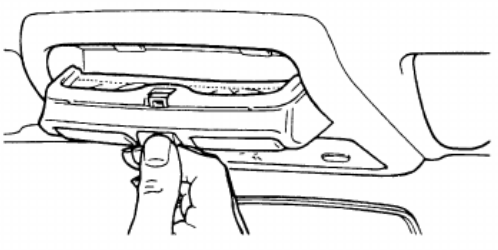
The grab handles are of a new design. A handle is added for the front passenger.

HEEL BOARD COVER

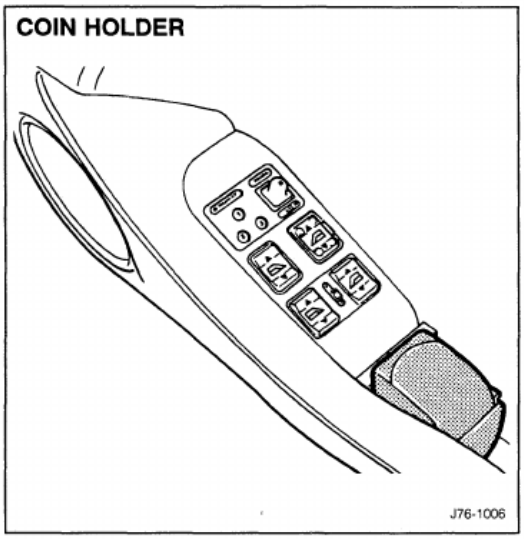


JLX-086

ROOF CONSOLE SUNGLASSES HOLDER



JWX-195



Door Trim
The doors have new arm rests and stowage pockets. On higher specification models, a coin holder is incorporated into the arm rest of the driver's door.

Headlining
The headlining is extended to meet the top edges of the front and rear screens.

Fascia
A deeper fascia profile accommodates larger air vents and ducts.

Veneer Profiles
The profiles of the veneers on the fascia, door top roll and instrument pack are revised to update their appearance and provide manufacturing benefits.

Center Cubby Box
The fuse box has been deleted and the interior revised to increase the available space.

Trunk

Spare Wheel

The spare wheel is now carried flat on the left side of the trunk floor, and can be either a space saver wheel or a full sized road wheel. The wheel changing equipment is stowed around the spare wheel.

Trim

New trim, in a dark grey velour finish, is introduced to accommodate the revised shape of the trunk. The side trims are a push fit, and include location slots for the fuel tank backboard. The right side trim has a retaining strap for the vehicle literature pack.

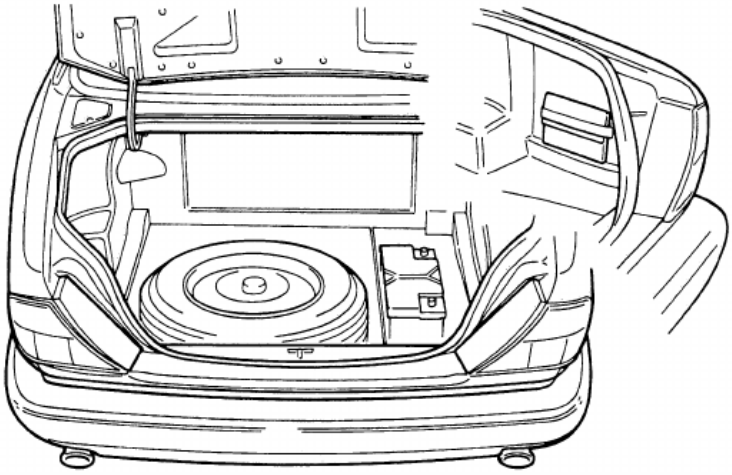
The floor board rests on the spare wheel. The front and rear edges of the floor board locate in blocks on the fuel tank backboard and on the rear of the body. The blocks accommodate the two possible height settings caused by the difference in thickness between the space saver and full sized spare wheels.

On the right side of the trunk a cover is installed over the battery and the electrical carrier.

Recesses are provided in the floor board and the battery cover to enable their removal.

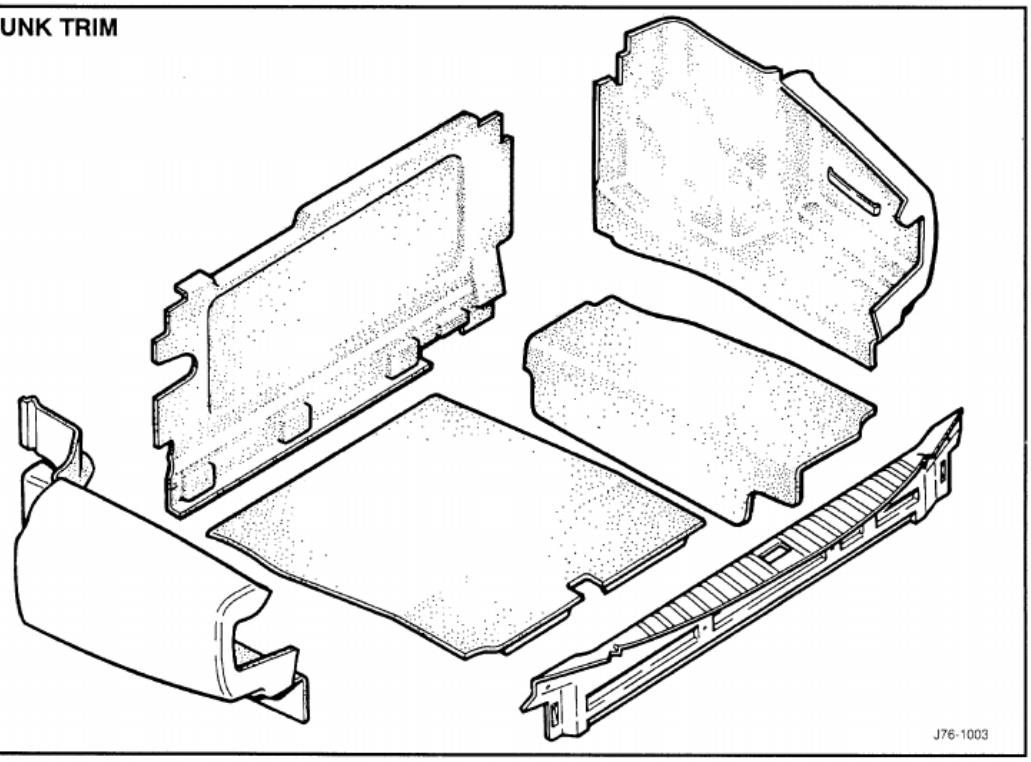
A new moulded liner is installed on the trunk lid. The liner accommodates two lamps for illumination of the trunk. Where specified, the liner also accommodates a collapsible warning triangle.

TRUNK LAYOUT



JWX-213

TRUNK TRIM



J76-1003

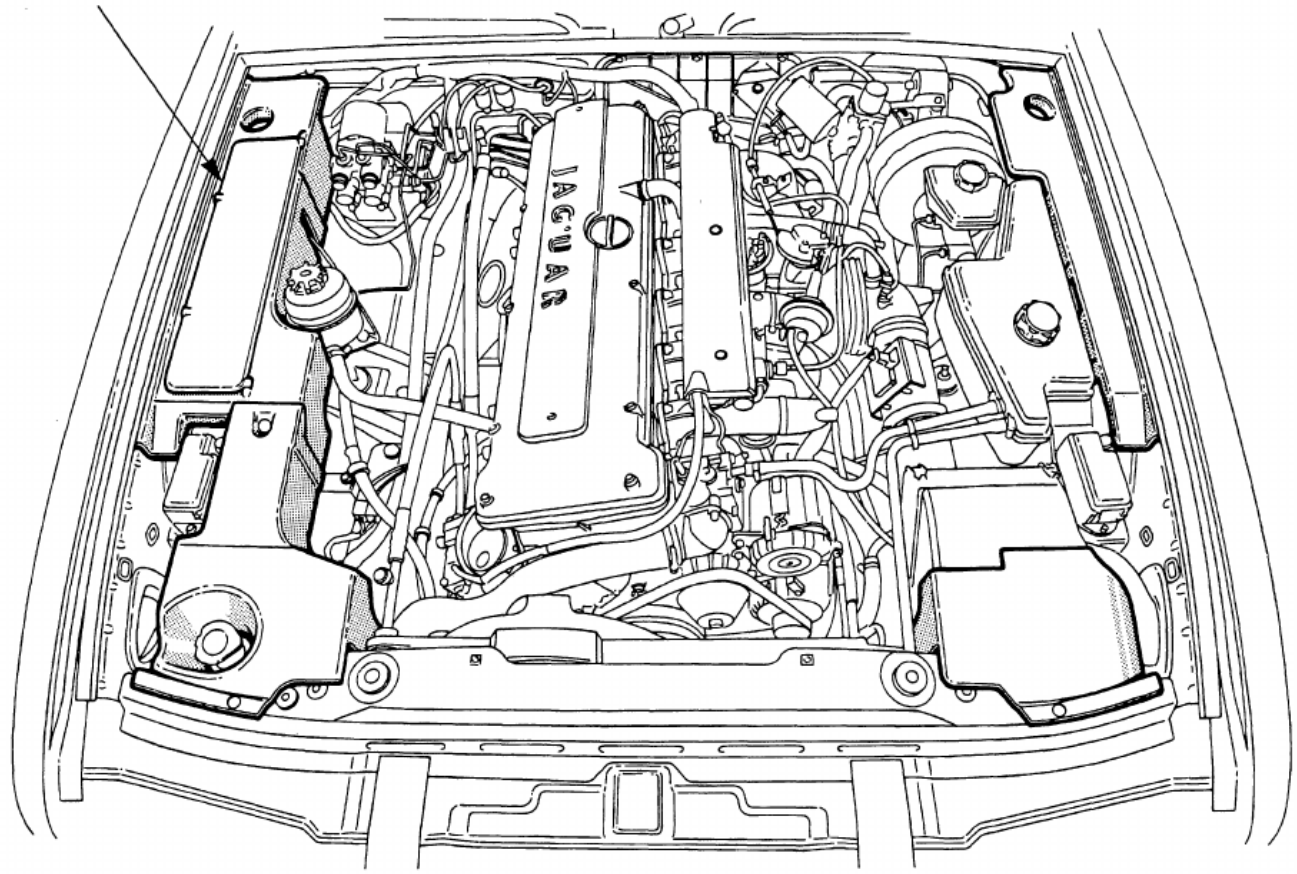
Engine Compartment

Black moulded covers and new labelling are introduced to enhance the appearance of the engine compartment.

Moulded Covers

In addition to trim covers on the engine itself, moulded covers are now installed over the inner fenders and immediately behind the headlamps. The cover over the right inner fender contains a compartment for storing spare fuses and, where fitted, the vehicle tool kit.

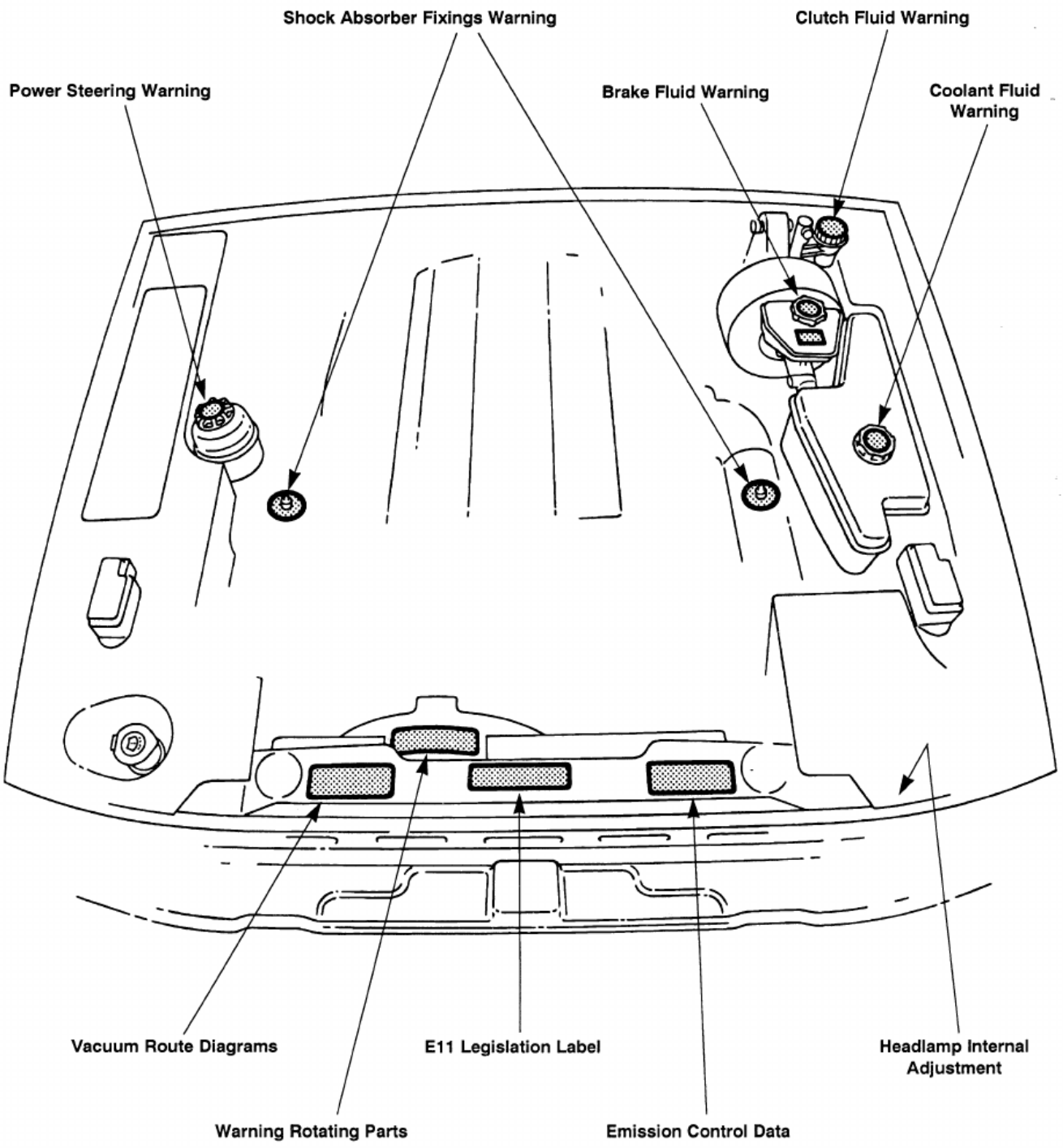
ENGINE COMPARTMENT MOULDED COVERS



Underhood Labels

In order to improve the underhood appearance and achieve a uniformity of design, modified warning and reference labels are introduced. Some labels are relocated.

UNDER BONNET LABELS

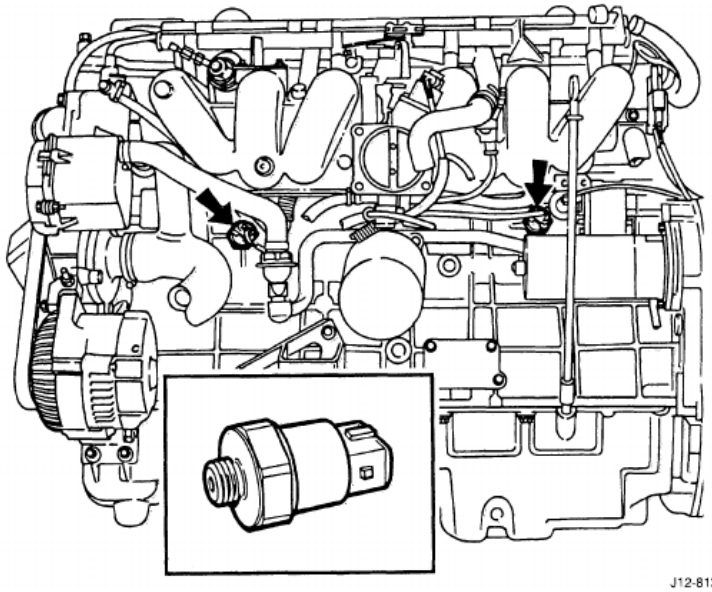


Engine Specifications

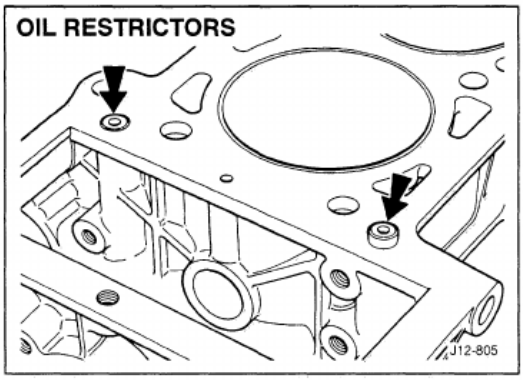
Configuration	6 cylinder in-line
Cylinder head	Twin overhead cams, 4 valves per cylinder

	3.2 Litre Normally Aspirated, Catalyst Exhaust	4.0 Litre Normally Aspirated, Catalyst Exhaust	4.0 Litre Supercharged, Catalyst Exhaust
Bore	91 mm (3.558 in)	91 mm (3.558 in)	91 mm (3.558 in)
Stroke	83 mm (3.268 in)	102 mm (4.020 in)	102 mm (4.020 in)
Displacement	3239 cc (198 in^3)	3980 cc (243 in^3)	3980 cc (243 in^3)
Compression Ratio	10.0 : 1	10.0 : 1	8.5 : 1
Maximum Power (DIN)	219 PS (215.9 BHP; 161 kW) at 5100 rpm	249 PS (245.4 BHP; 183 kW) at 4800 rpm	326 PS (321.8 BHP; 240 kW) at 5000 rpm
Maximum Torque (DIN)	315 Nm (232.3 lbf.ft) at 4500 rpm	392 Nm (289.1 lbf.ft) at 4000 rpm	512 Nm (377.7 lbf.ft) at 3050 rpm
Maximum rpm	5500 rpm	5500 rpm	5500 rpm

KNOCK SENSORS



OIL RESTRICTORS



Engine - Mechanical

The AJ16 engine recently introduced in the XJS 4.0 litre models is now introduced for the 3.2 and 4.0 litre models of the Sedan range. The AJ16 engine gives improved performance, economy and refinement. It also has additional features for the engine management system (EMS), on board diagnostics (OBD) and, on USA Federal emissions standard vehicles, the exhaust gas recirculation (EGR) system.

In addition to normally aspirated (NA) 3.2 and 4.0 litre versions, a supercharged (SC) 4.0 litre version of the engine is introduced. Unless stated otherwise, the information in this Section applies to all three versions of the AJ16 engine.

Cylinder Block

The depth of the coolant jackets is reduced to improve the engine warm-up time, which is now 15 % quicker. The smaller coolant jackets also improve block stiffness and mechanical noise levels. Two bosses are added to the left side of the block for the installation of knock sensors. On the SC engine, four bosses are also added to the left side of the block for the attachment of the supercharger.

A 2,5 mm (0.098 in) nominal diameter restrictor is introduced to each camshaft oil supply gallery at the upper face of the block. The restrictors reduce the oil flow to the camshafts, and thus the level of oil which collects between the two camshafts before draining back to the sump.

Cylinder Head

Revised porting improves performance and economy, and additional holes in the top deck improve oil draining. Revised load transfer paths give the new head greater resistance to distortion. Additional bosses and tappings provide extra fixing points for the new exhaust manifolds. The torque to which the cylinder head bolts are tightened is revised (see Service Manual). However, the bolt tightening sequence remains the same.

Cylinder Head Gasket

The head gasket is revised to improve sealing. The new gasket has wider reinforcement rings around the cylinder bores, and a narrower silicone sealant track. The narrower track results in higher clamping loads across the full width of the gasket.

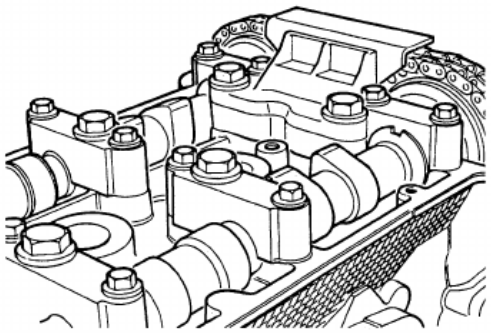
Camshaft

Re-profiled cam lobes give greater valve lift to improve performance. The valve timing of the SC engine is marginally different from that of the NA engines, but the method of timing the camshafts for both versions remains the same as on the AJ6 engine.

Camshaft Bearing Caps

Changes to the design, material and manufacturing method of the camshaft bearing caps results in higher cylinder head clamping loads, further improving the cylinder head to block sealing. The tightening torque of the bearing cap securing bolts remains the same as on the AJ6 engine.

CAMSHAFT BEARING CAPS



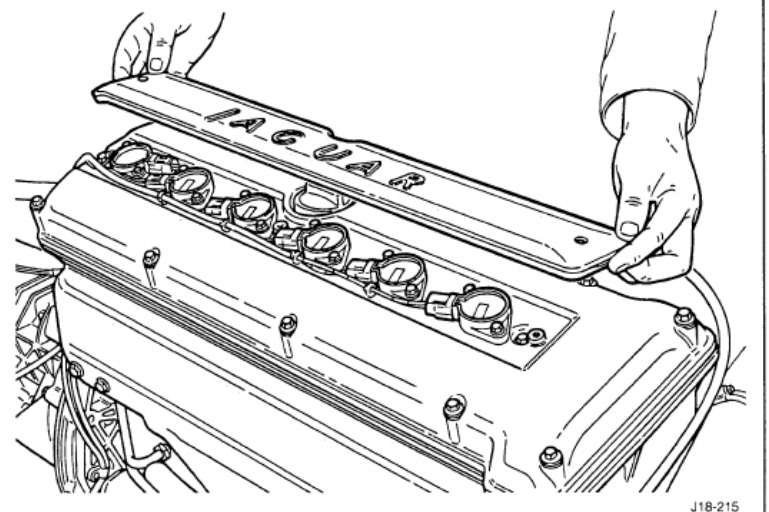
J12-806

Camshaft Cover

A new camshaft cover, with a smooth, silver paint finish, accommodates the new `on-plug' coils of the ignition system. The new cover is manufactured in magnesium alloy, to decrease weight and improve sound absorbtion. A cover plate over the on-plug coils improves the appearance of the engine.

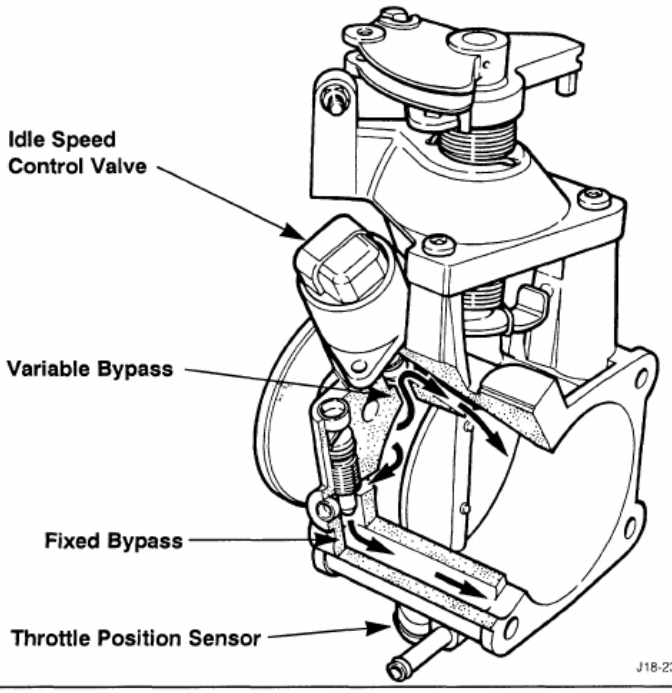
The cam cover seal now incorporates the `half-moon' seals previously supplied separately.

CAMSHAFT COVER

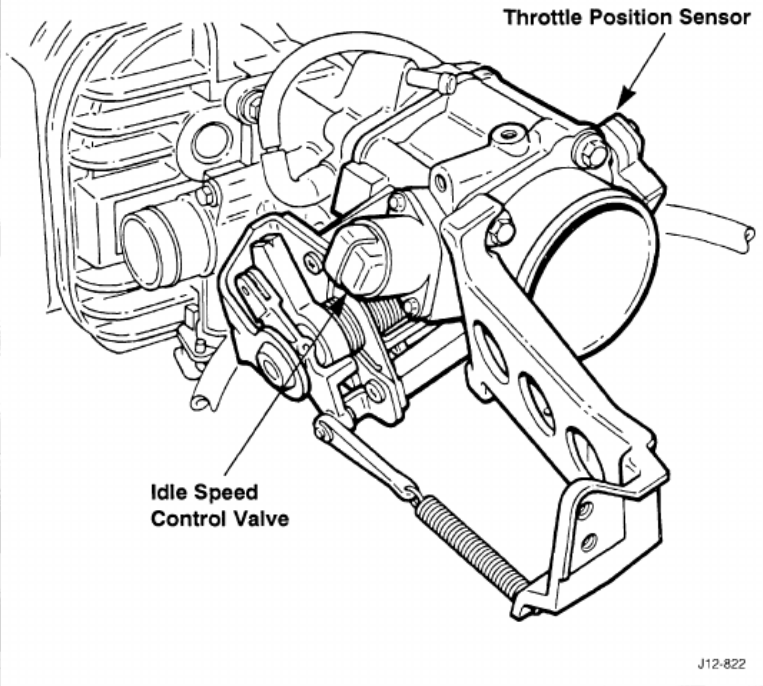


J18-215

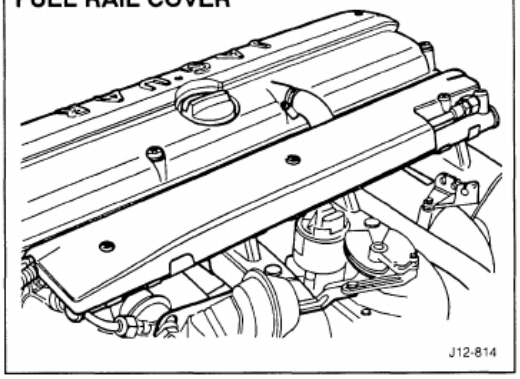
THROTTLE BODY- NORMALLY ASPIRATED ENGINE



THROTTLE BODY- SUPERCHARGED ENGINE



FUEL RAIL COVER



Fuel Rail Cover

A silver colored cover is installed over the fuel rail to enhance engine appearance.

Valve Gear

New valves are introduced, with a stem diameter of 7 mm (0.275 in) instead of 8 mm (0.315 in). The associated parts of the valves are revised accordingly. The lighter valve gear is quieter and requires less power to operate.

Pistons

New pistons give compression ratios of 10 : 1 (from 9.5 : 1) for the NA engines and 8.5 : 1 for the SC engine.

Throttle Body

The new throttle body has an integral idle speed control valve and a single track throttle position sensor. Both the idle speed control valve and the throttle position sensor are connected to the engine control module (ECM).

A fixed bypass in the body, set during manufacture, gives a base idle setting. The idle speed control valve gives a variable bypass capability, enabling the ECM to control the idle speed.

The idle speed control valve consists of a conical valve and a stepper motor attached to a boss on the throttle body. The conical valve locates on a seat in a butterfly bypass drilling. In response to signals from the ECM, the stepper motor operates the conical valve to control the flow of air through the bypass drilling, and thus control the idle speed of the engine.

The throttle position sensor is non-adjustable. The ECM automatically adapts to the sensor setting.

On the SC engine, the throttle body is installed on a throttle body adapter attached to the supercharger air intake. The installations of the coolant hoses and controls attached to the throttle body are revised accordingly.

Engine Ancillaries

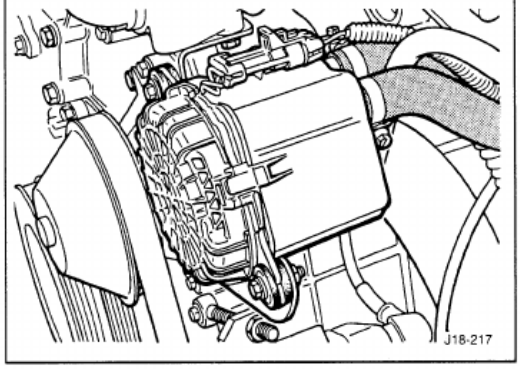
Air Injection Pump

A Saginaw electric pump replaces the Nippondenso engine driven pump. The air cut-off valve is deleted and the associated pipe-work is revised accordingly. The new air injection pump attaches to an engine bracket using rubber shock mounts. On the NA engines the new pump is located in the same position as the previous version, at the front left side of the engine. On the SC engine, the new pump is installed on the front right side of the engine.

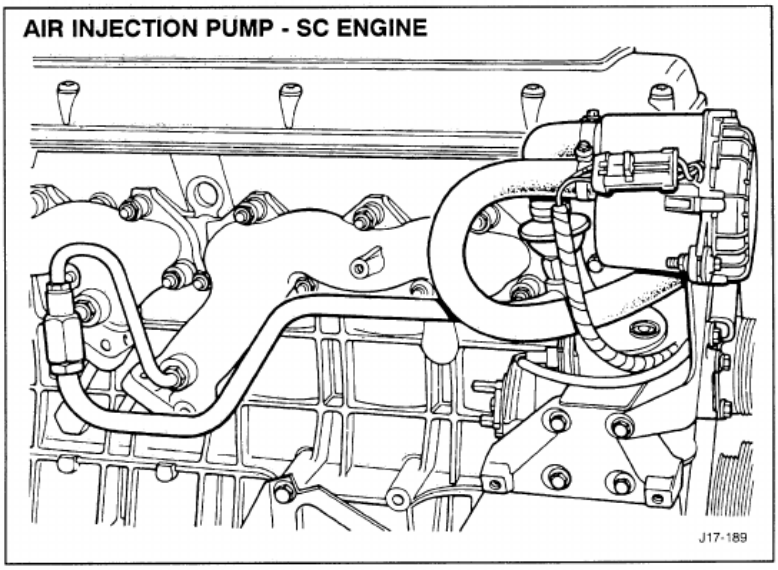
The pump has a regenerative turbine coupled to a dc electric motor within a housing. An integral solenoid valve controls the flow of air from the pump. Two stub pipes on the rear of the pump are connected to the air intake and outlet hoses. An electrical connector on top of the pump provides the interface with the vehicle electrical system.

At engine start, the engine control module (ECM) energises the air pump relay, and power is supplied to the pump motor and the solenoid valve. The solenoid valve opens and the pump supplies air to the exhaust manifolds, via the check valve. After 25 seconds the air pump relay de-energises, closing the solenoid valve and stopping the pump.

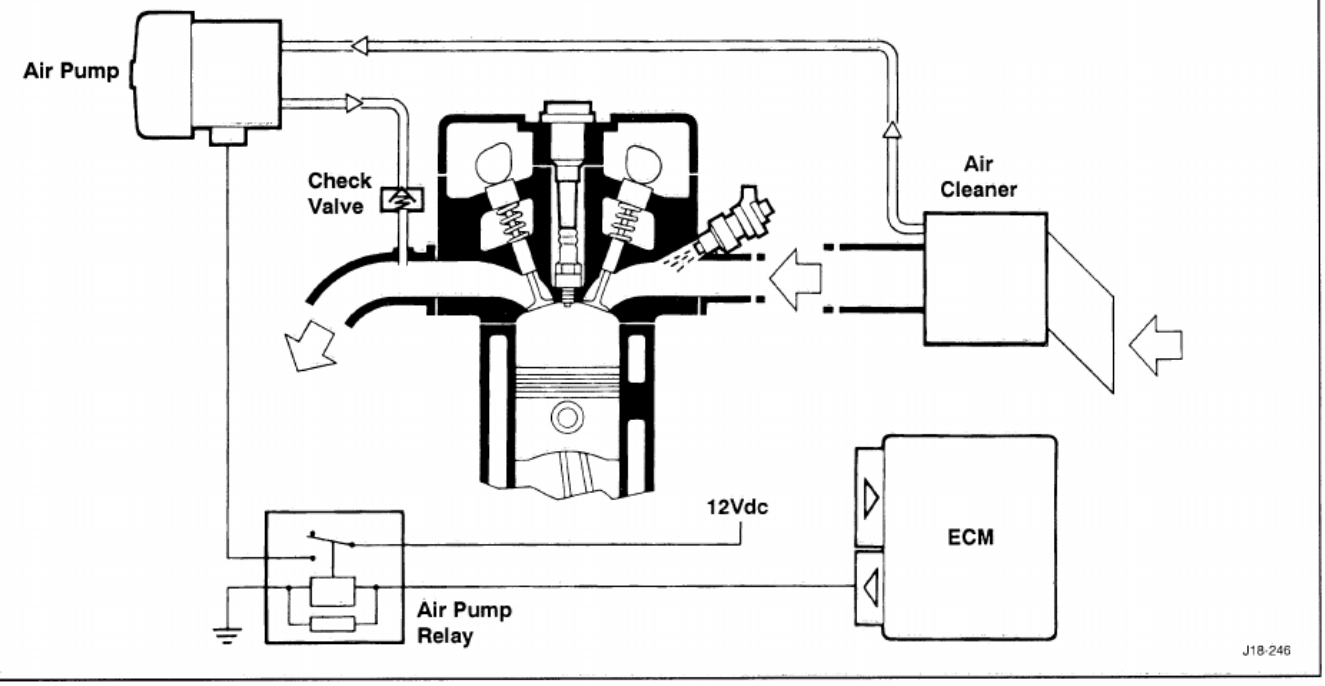
AIR INJECTION PUMP - NA ENGINE



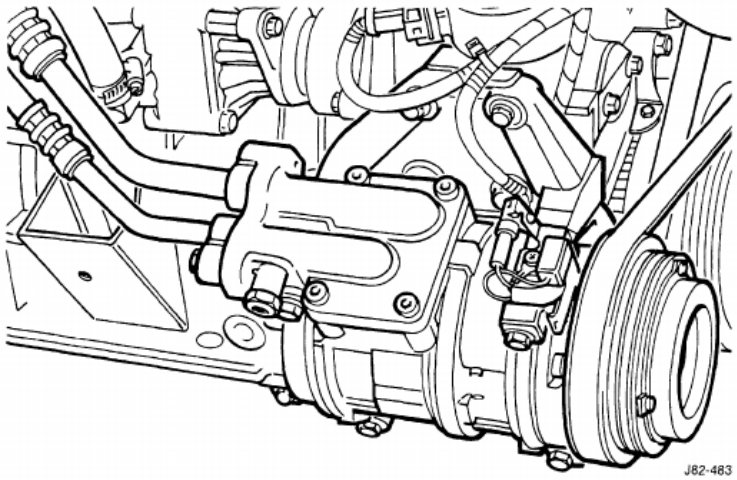
AIR INJECTION PUMP - SC ENGINE



AIR INJECTION SYSTEM

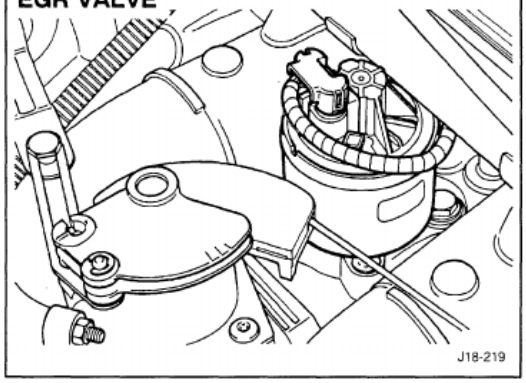


AIR CONDITIONING COMPRESSOR



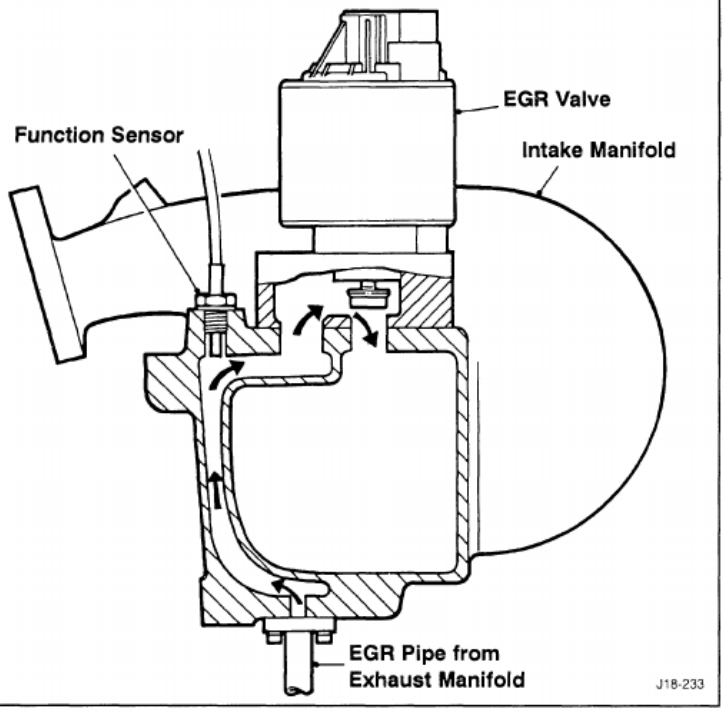
J82-483

EGR VALVE



J18-219

EGR VALVE AND EGR VALVE FUNCTION SENSOR



J18-233

Air Conditioning Compressor

A Nippondenso air conditioning compressor is introduced. The compressor is installed on a rigid engine mounting. Drive belt tension is adjusted with an idler pulley.

Exhaust Gas Recirculation System (North American NA Models Only)

The exhaust gas recirculation (EGR) system helps to control the nitrous oxide (NOx) content of the exhaust emissions. It does this by directing a proportion of the exhaust gasses back to the engine intake manifold, which results in a reduction of combustion temperatures and NOx emissions.

The EGR system consists of an EGR valve, an EGR valve function sensor and a transfer pipe.

EGR Valve

The vacuum operated EGR valve used in previous systems is replaced by an electrical valve to enable mapped control of valve opening by the engine control module (ECM). The new EGR valve is a variable position pintle valve, installed on the intake manifold. In the de-energised condition the pintle extends to the closed position. In the energised condition the pintle retracts to the open position. A pintle position sensor in the EGR valve supplies a feed-back signal to the ECM, for closed loop control.

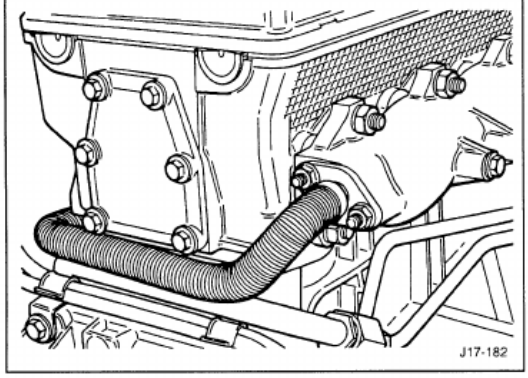
EGR Valve Function Sensor

The EGR valve function sensor is a thermistor, which is connected to the ECM. The sensor is installed on the intake manifold adjacent to the EGR valve.

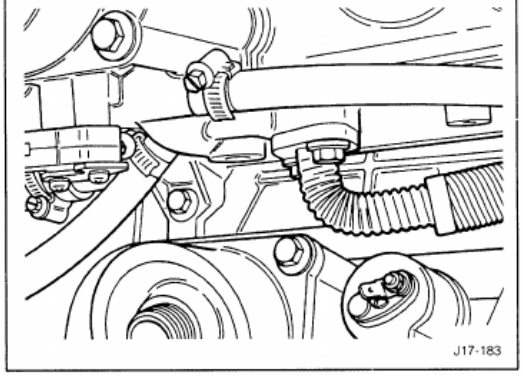
Transfer Pipe

The transfer pipe is a flexible steel pipe, with a flanged connector on both ends, which connects the exhaust manifold to the intake manifold.

EGR TRANSFER PIPE - EXHAUST



EGR TRANSFER PIPE - INLET



System Operation

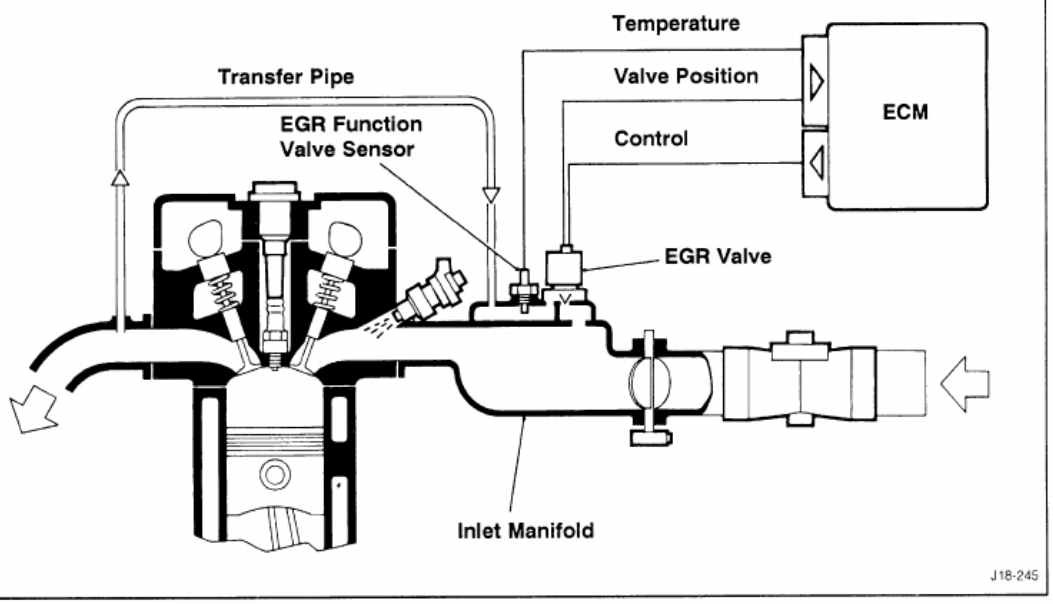
The ECM determines the required position of the pintle in the EGR valve from engine speed and load (mass air flow) inputs. It then energises the EGR valve and the pintle retracts, allowing exhaust gasses through the transfer pipe to the intake manifold. From the feed-back signal of the pintle position sensor, the ECM continuously checks for any discrepancy between required and actual pintle positions and, if necessary, adjusts the energising signal to correct any error. The temperature of the recirculating gasses is supplied to the ECM by the EGR valve function sensor, for diagnostic checks of system operation.

To prevent the build-up of carbon deposits and confirm the range of movement of the EGR valve, the ECM cycles the valve from closed to fully open and back each time the engine ignition switch is set to OFF.

Operation of the system is disabled when the vehicle is stationary, the engine is at idle rpm or the engine is running at full load.

The ECM does not open the EGR valve the full amount required until the engine temperature reaches the normal operating range. As the engine temperature increases, so the ECM progressively increases the percentage of valve opening until, at an engine coolant temperature of 70°C (158°F), the valve is at 100% of the required position.

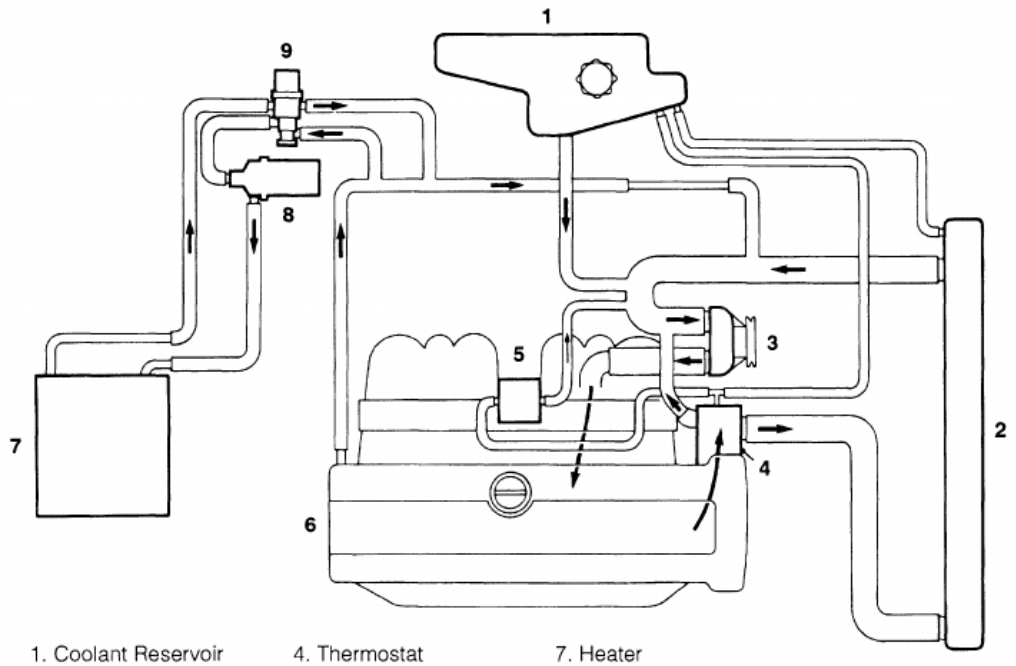
EGR SYSTEM



Engine Cooling System

Changes to the cooling system consist of a new radiator, coolant reservoir, engine-driven coolant pump and radiator bottom hose. In addition, a new shut-off valve and an electric pump are introduced to the heater circuit. On vehicles with the SC engine, a new coolant circuit is introduced for the supercharger intercooler. The intercooler circuit contains a radiator and an electric pump, together with the necessary connecting hoses.

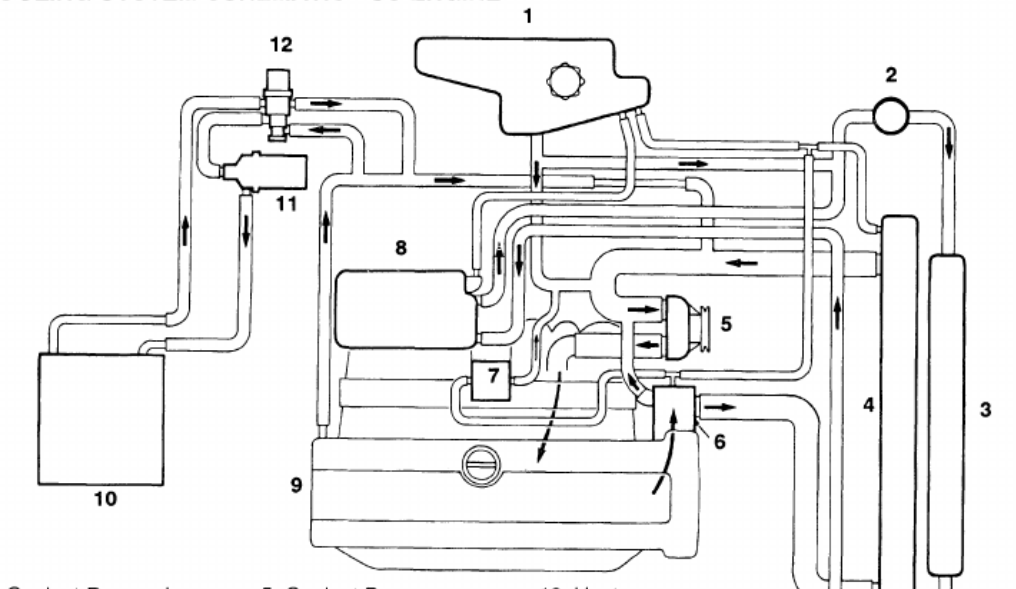
COOLING SYSTEM SCHEMATIC - NA ENGINE



1. Coolant Reservoir
2. Radiator
3. Coolant Pump
4. Thermostat
5. Throttle Body
6. Engine
7. Heater
8. Heater Pump
9. Heater Shut-off Valve

J26-265

COOLING SYSTEM SCHEMATIC - SC ENGINE



1. Coolant Reservoir
2. Supercharger Coolant Pump
3. Supercharger Radiator
4. Main Radiator
5. Coolant Pump
6. Thermostat
7. Throttle Body
8. Intercooler
9. Engine
10. Heater
11. Heater Pump
12. Heater Shut-off Valve

J26-266

Radiator
The new radiator is thinner and lighter than the previous version, but retains the same performance. Core depth is reduced from 40 mm (1.57 in) to 32 mm (1.26 in). On vehicles with a SC engine, the left side of the radiator incorporates a six plate cooler for transmission fluid.

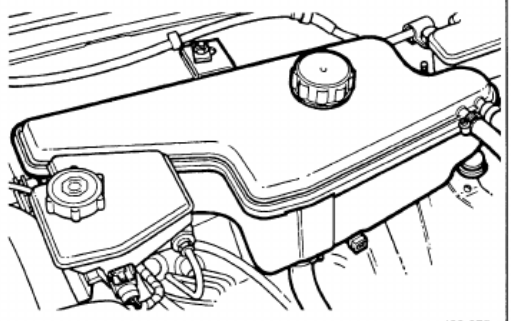
Coolant Reservoir
The new coolant reservoir is introduced to accommodate changes to the body. The coolant level probe is installed in the base of the reservoir. A connector on the base of the probe provides the interface with the vehicle harness.

Engine-driven Coolant Pump
A new coolant pump, with only one intake connection, is installed. The intake connections from the filler pipe and the thermostat housing are deleted, leaving the radiator bottom hose as the only intake connection.
With the introduction of the electric air injection pump, the drive belt between the coolant pump and the air injection pump is deleted. A single groove pulley replaces the previous twin groove pulley. The capacity of the pump is unchanged.

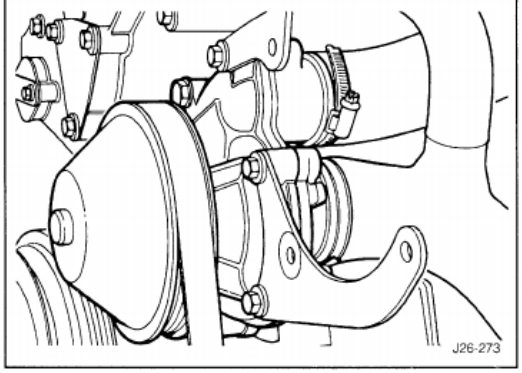
Heater Shut-off Valve
The solenoid operated shut-off valve is installed in the engine compartment, on the left side of the toe-board. The shut-off valve simultaneously opens or closes the supply and return lines of the heater, under the control of the climate or heater control modules (see Climate Control section for details).

Heater Pump
The electric heater pump is installed on the toe-board, adjacent to the heater shut-off valve, in the supply line to the heater. Operation of the pump is also controlled by the climate or heater control modules.

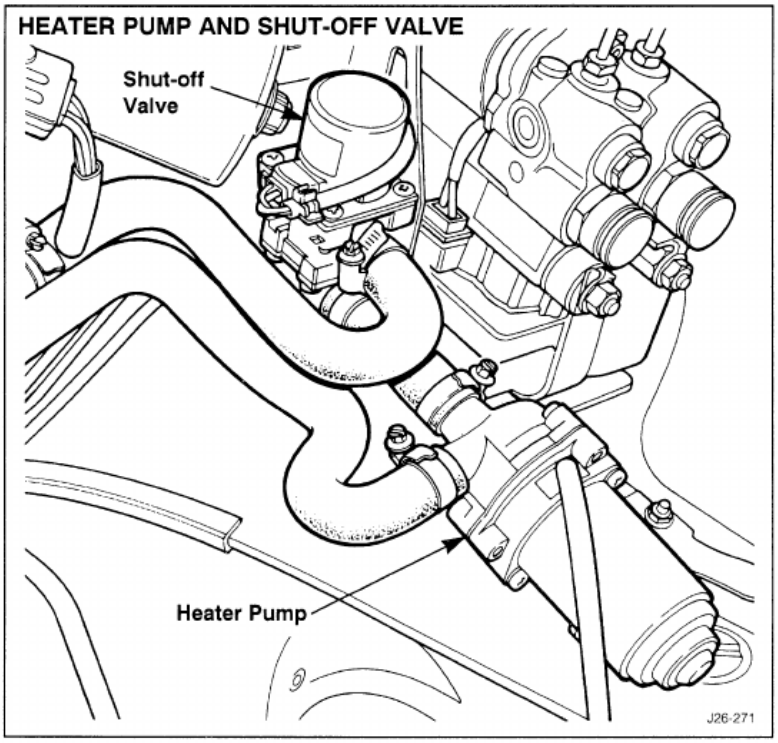
COOLANT RESERVOIR



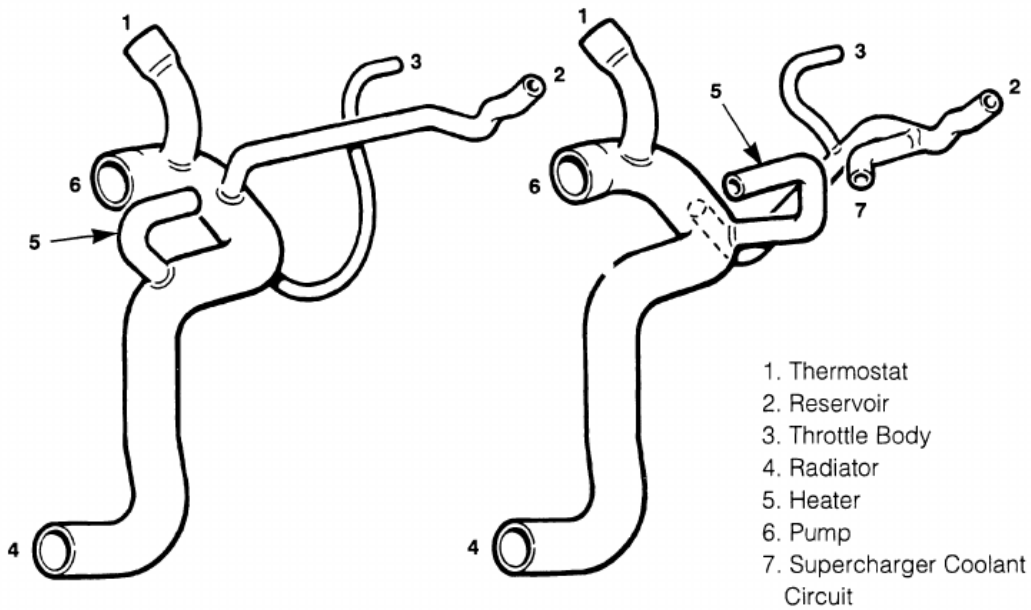
WATER PUMP



HEATER PUMP AND SHUT-OFF VALVE



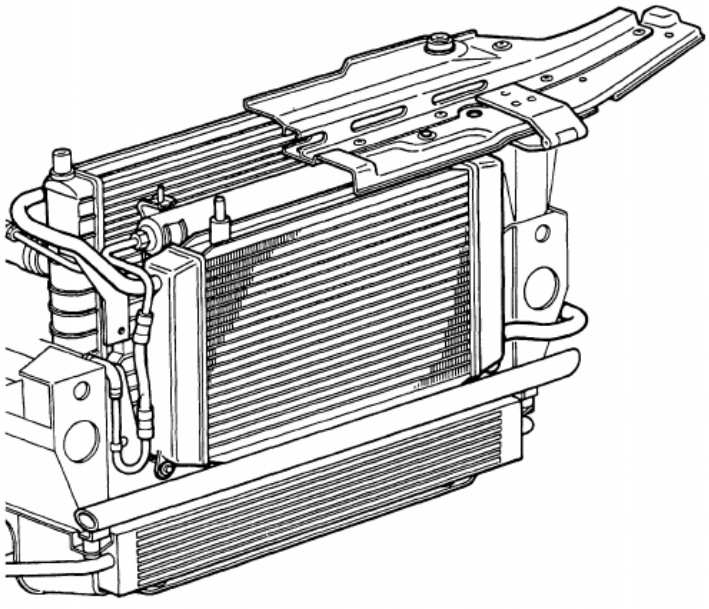
RADIATOR BOTTOM HOSE



1. Thermostat
2. Reservoir
3. Throttle Body
4. Radiator
5. Heater
6. Pump
7. Supercharger Coolant Circuit

J26-268

SUPERCHARGER RADIATOR



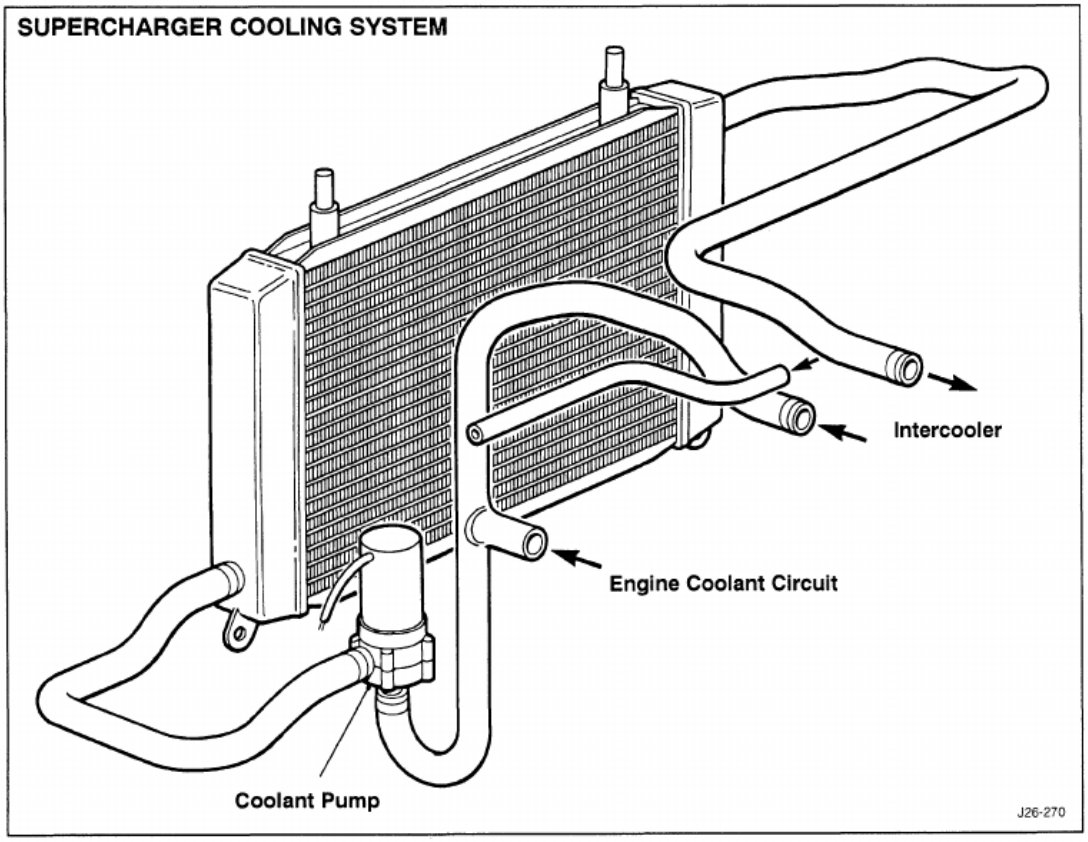
J26-269

Radiator Bottom Hose

The radiator bottom hose is revised to accommodate the new coolant pump. In addition, the hoses from the thermostat housing bypass, heater outlet and throttle body outlet are now integrated into the bottom hose.

Supercharger Radiator

The supercharger radiator is a fin and tube, liquid to air heat exchanger installed between the air conditioning condenser and the front grille.



Supercharger Coolant Pump

The supercharger coolant pump is an electric pump used to ensure an adequate flow of coolant through the intercooler. It is attached to the left end of the cross tube, adjacent to the air cleaner, in the return line from the intercooler. The pump runs continuously while the ignition is switched on.

Supercharger Coolant Hoses

Additional hoses are introduced to form the supercharger coolant circuit. A connection on the hose between the intercooler and the supercharger coolant pump is attached to the radiator bottom hose, to provide an interface with the engine coolant circuit. To accommodate the connection of the intercooler bleed hose with the coolant reservoir, the bleed hoses from the engine thermostat housing and the main radiator are connected to the coolant reservoir via a Tee connector.

Engine Management

The new Engine Management Systems (EMS) for the 4.0 Litre AJ16 engine has variations to meet the exhaust emissions and on-board diagnostic requirements for markets in Europe, North America and the Rest of the World (ROW) (see On-board Diagnostics section). The variants for North America comply with the comprehensive emissions monitoring demanded by the California Air Resources Board (CARB) On-board Diagnostic II regulations.

Features
Some components are carried over from the previous model year and a substantial number of new components are introduced. The new AJ16 EMS system provides a number of features that offer significant improvements in engine performance and reduced exhaust emissions:

Sequential Fuel Injection - optimises injection time on and provides cylinder-to-cylinder air flow corrections, idle stability and reduced emissions.

Knock Sensing - Prevents audible knock, improves power, provides greater tolerance to variations in engine build and reduces the potential for engine damage due to poor fuel quality.

Adaptive Fuelling - Optimises fuelling over the life of the engine.

Improved Purge Control - Required to meet the more stringent legislative requirements.

Hardware Changes
Some hardware is carried over from the previous model year. The bulk is new or modified.

Carried Over Components

Intake Air Temperature Sensor - The intake air temperature sensor is installed in the intake manifold elbow.

Coolant Thermistor - The Coolant Thermistor remains in its current vehicle position in the thermostat housing.

Modified Components
Fuel Injectors - The 6 fuel injectors are similar to those used in the previous model year. The flow rates are changed. Each consists of a solenoid, core, disc valve and housing. When the "ON" control signal from the Engine Control Module is applied to the solenoid coil, the disc valve lifts up and fuel is injected into the intake port. The quantity of injected fuel is determined by the time that the "ON" signal is applied to the coil.

Crankshaft Sensor - The length of the crankshaft sensor electrical flying lead is reduced and is fitted with a new connector and connector clipping bracket.

Exhaust Gas Recirculation Check Sensor - The length of the electrical flying lead of the Exhaust Gas Recirculation (EGR) check sensor (North America only) is increased.

New Components

Engine Control Module (ECM) 12/24Mhz 1.5Mbit - This replaces the previous 15CU 8Kbit module. The increased capacity is provided to meet the demands made by the CARB OBD II regulations.

On-Plug Ignition Coils - The HT leads, distributor and ignition coil are replaced by individual ignition coils that clip directly onto the spark plugs.

Mass Air Flow Sensor - A new sensor of improved design with a calibration range that encompasses normally aspirated and super-charged engines.

Purge Valve - A new Purge Valve with improved flow control is specified.

Electric Air Pump - This replaces the mechanical pump, belt assembly and solenoid vacuum valve. It is a much simpler arrangement with fewer parts, and reduces parasitic power losses on the engine.

Electric Exhaust Gas Recirculation Valve (EGR) - This replaces the mechanical vacuum EGR valve and solenoid vacuum valve. The new arrangement provides accurate position feedback and consequently greater control of valve movement over its operating range.
The EGR is cycled through its operating range when the ignition is switched off in order to prevent carbon build-up.

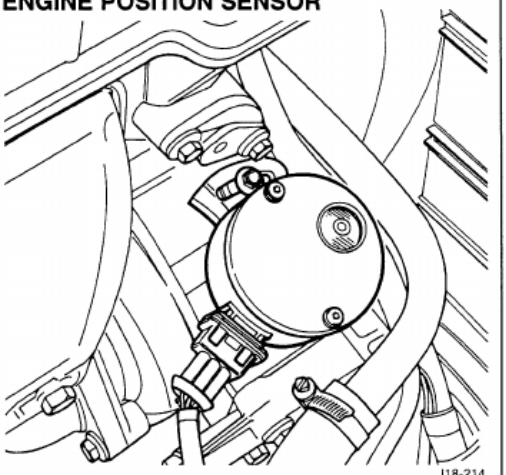
Heated Oxygen (HO2S) Sensors) - North American vehicles - 4 sensors are fitted, 2 upstream and 2 downstream of the first two catalysts; one per bank of three cylinders. Rest of the World 2 have downstream as on previous model year vehicles.

Knock Sensor - Two sensors are added to the system to optimise ignition timing, improve idle stability and prevent engine damage due to poor fuel quality.

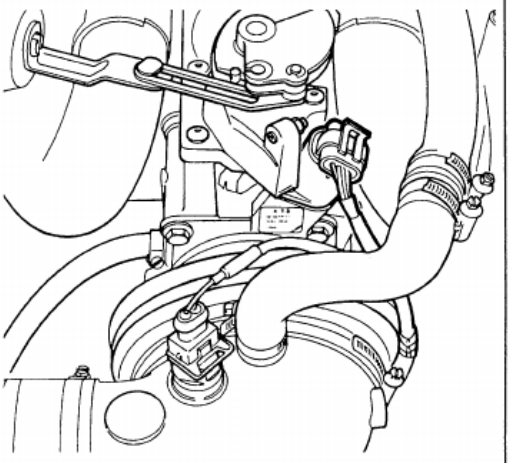
Engine Position Sensor - This is added to the system in order to synchronize operation of the fuel injectors and ignition. It serves the same function as a camshaft sensor; i.e. runs at half engine speed.

Throttle Body Assembly - This replaces the throttle body assembly and separate idle speed control valve previously installed. The new assembly incorporates a new idle speed control valve and a new single track, non-adjustable, throttle potentiometer.

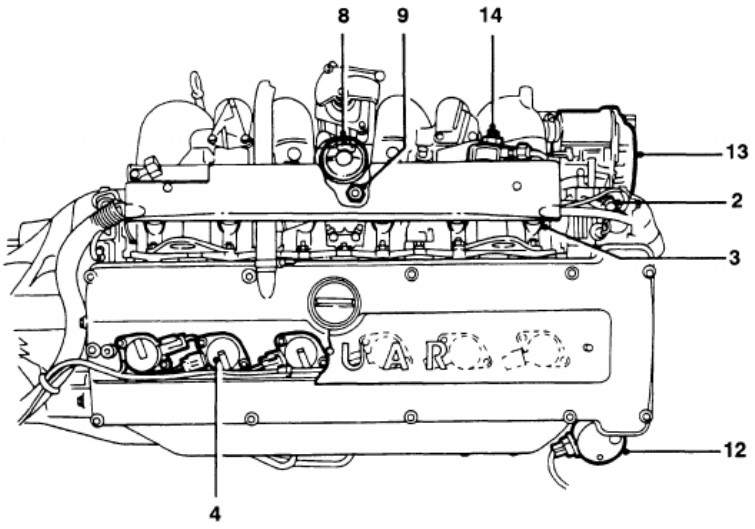
ENGINE POSITION SENSOR

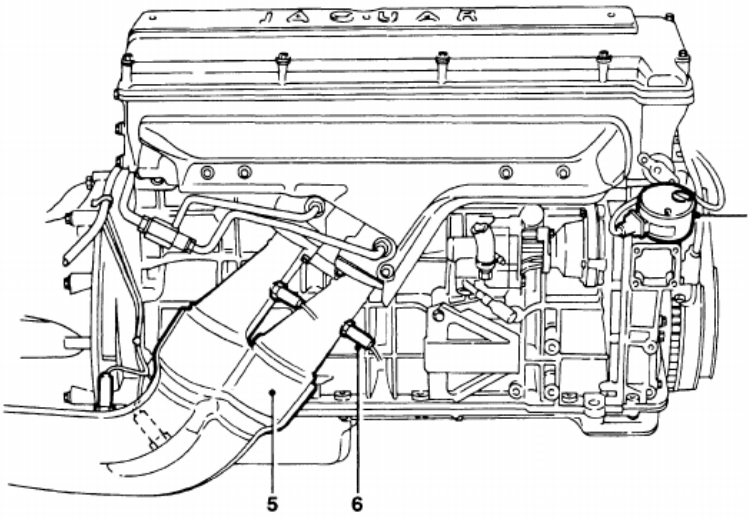


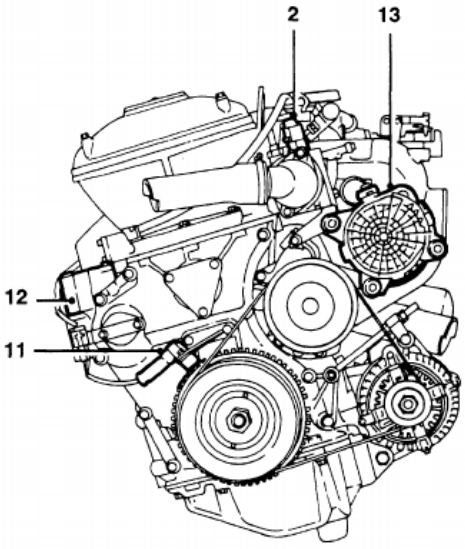
IDLE SPEED CONTROL VALVE

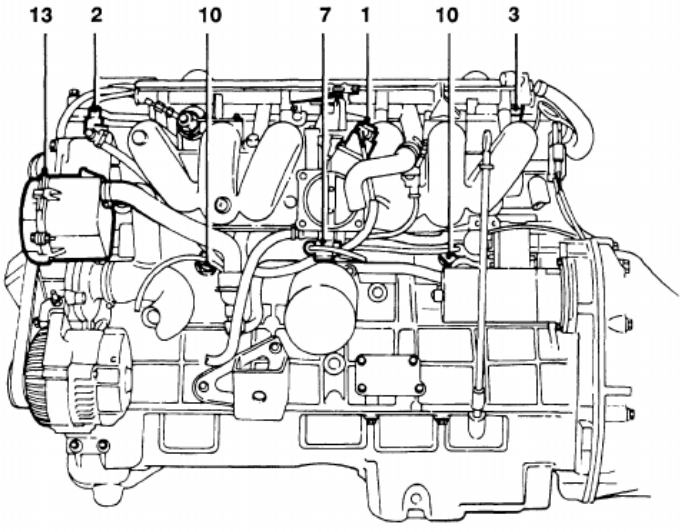


EMS COMPONENT LOCATION









1 Idle Speed Control Valve (ISC)
2 Coolant Temperature Sensor (ECT)
3 Injector (FI)
4 Spark Plugs and Ignition Coils
5 Catalyst
6 Heated Oxygen Sensors (H02S)
7 Throttle Potentiometer (TP)
8 Exhaust Gas Recirculation Valve (EGR)
9 EGR Function Sensor
10 Knock Sensor (KS)
11 Crankshaft Position Sensor (CKP)
12 Engine Position Sensor (CMP)
13 Secondary Air Injection System (AIR)
14 Fuel Pressure Regulator

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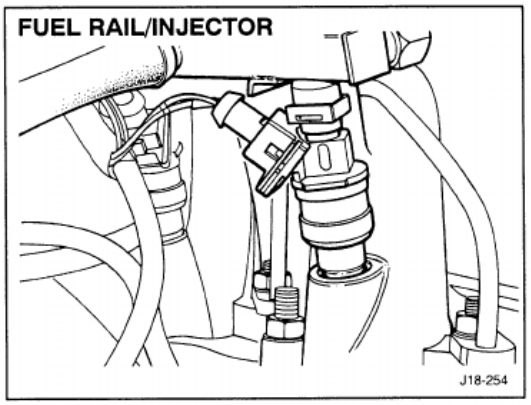
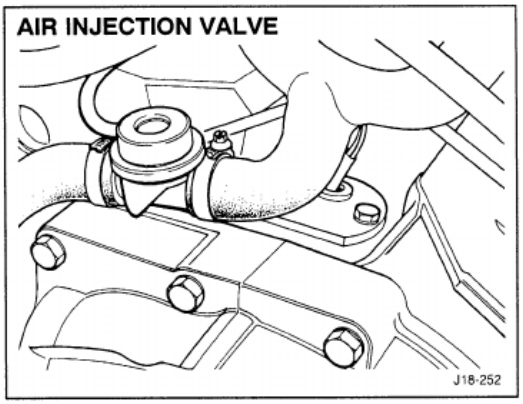
FUEL RAIL/INJECTOR



AIR INJECTION VALVE



Coolant Rails

The coolant rail at the rear of each cylinder bank is deleted.

Fuel Rails

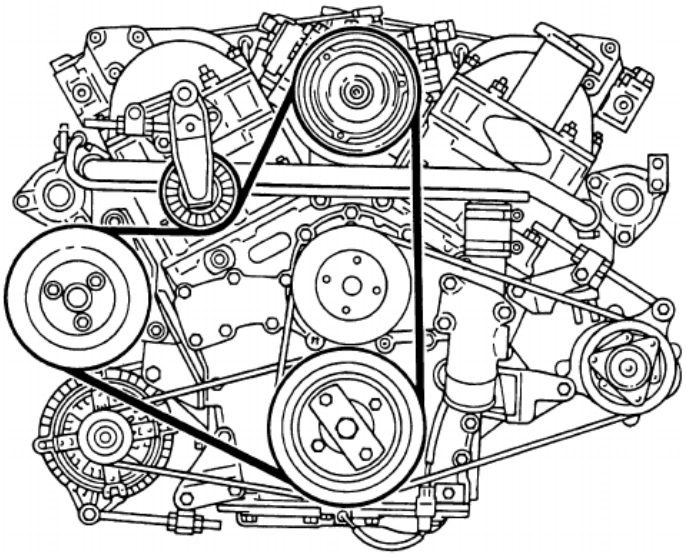
The injector connections on the fuel rails are revised to accommodate Nippondenso fuel injectors.

Drive Belts

A new, seven ribbed drive belt, with revised tension settings, is introduced for the air conditioning compressor/power assisted steering (PAS) pump. The tension settings of the new belt, measured at the mid-point of the run between the crankshaft and the AC compressor, are as follows:

New Belt Setting	In-Service Minimum	In-Service Setting
790 N	270 N	630 N
(178 lbf)	(61 lbf)	(142 lbf)
(114 to 120 Hz)	(70 Hz)	(87 to 93 Hz)

ACCESSORY DRIVE BELT



Engine Oil Cooler

A new oil cooler is installed on all 6.0 litre models. It is the same as that installed on supercharged 4.0 litre models in European markets. The new cooler is smaller and lighter than the previous version. Core depth is reduced from 45 mm (1.77 in) to 28 mm (1.1 in).

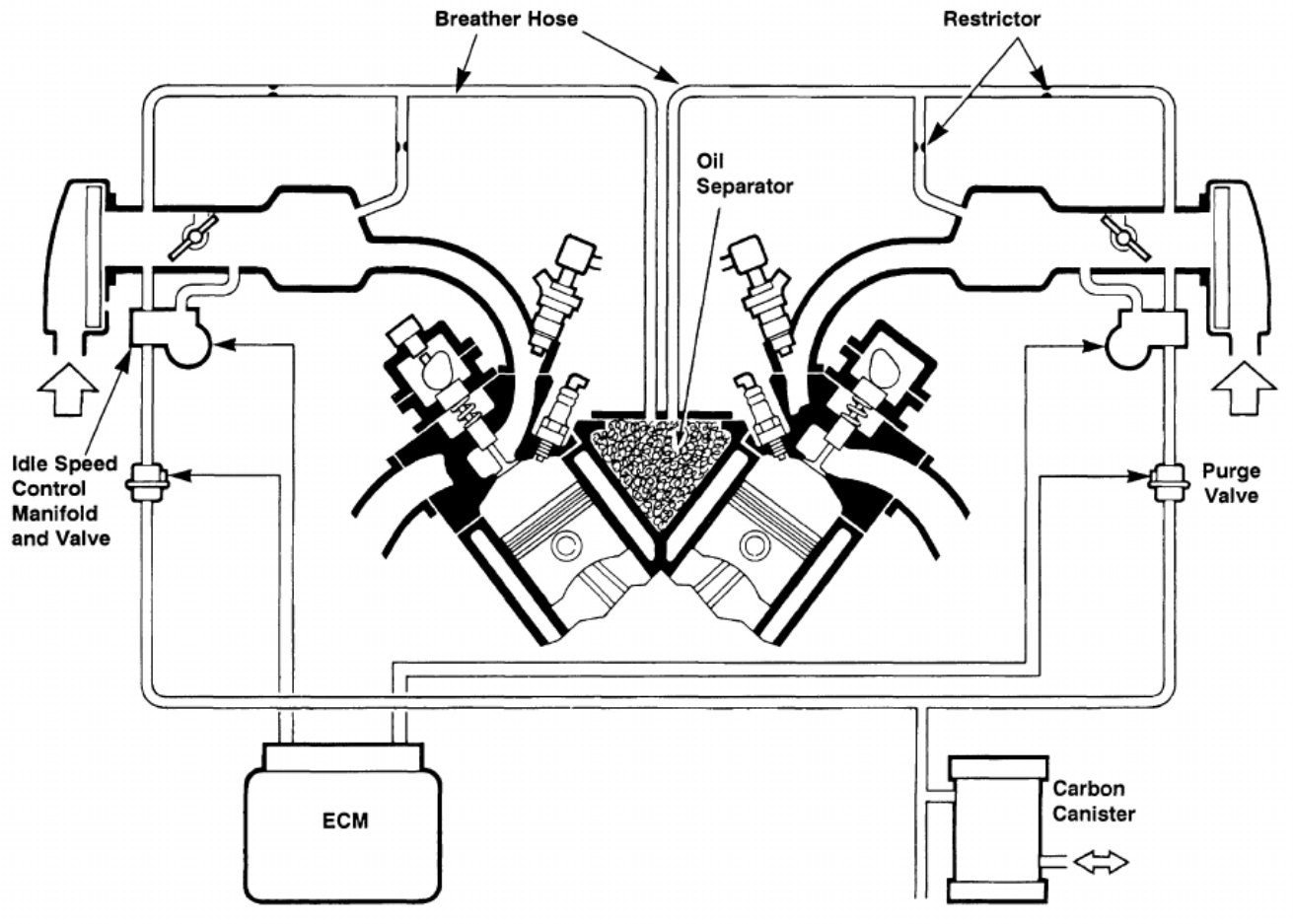
Crankcase Ventilation

A new crankcase ventilation system is introduced. The system consists of breather hoses and an oil separator. The breather hoses connect the intake manifold and air intake duct of each cylinder bank to a crankcase breather outlet on the breather chest cover. The new oil separator consists of five cylinders of breather gauze, installed below the rear half of the breather chest cover, instead of separate part load and full load oil separators. A sliding-fit, breather gauze retainer keeps the breather gauze cylinders clear of the auxiliary idler shaft.

The mounting boss for the previous full load oil separator, on the front face of `B' bank cylinder head, is deleted.

With the engine running at part load, gases are drawn from the breather chest by the depression in the intake manifolds. At full load, the gases are drawn from the breather chest by the depression in the air intake ducts. Restrictors in the breather hoses ensure the gasses flow in the correct direction at all engine running conditions.

CRANKCASE VENTILATION / IDLE SPEED CONTROL SCHEMATIC



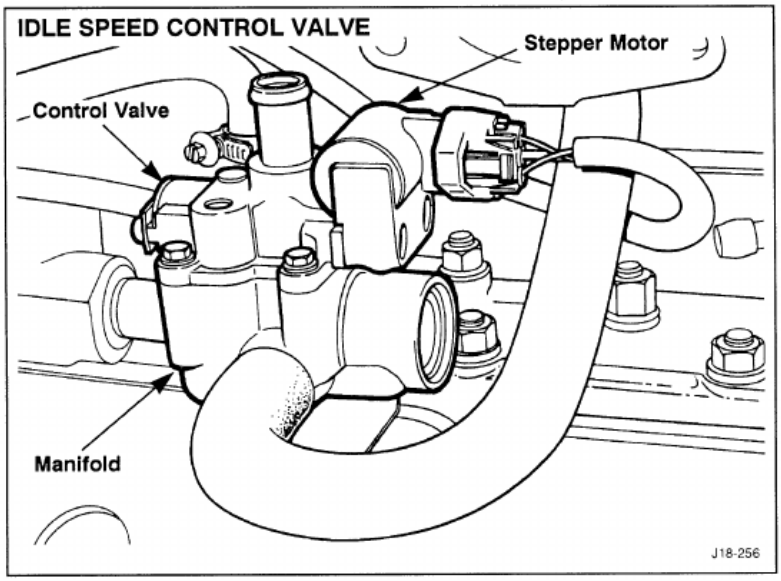
Idle Speed Control

An idle speed control system is introduced for each throttle housing. Each system consists of an idle speed control manifold, an idle speed control valve and associated hoses.

The idle speed control valve is attached to the cast, idle speed control manifold, which is installed on the cylinder head. Spigots on the idle speed control manifold provide connections for hoses from the air intake duct, the engine intake manifold, an emissions system purge valve and a coolant system inlet and outlet. The idle speed control valve has a rotary valve operated by a stepper motor under the control of the engine control module (ECM).

At idle, the majority of the air for the engine passes through the idle speed control system, bypassing the throttle. From the air intake duct, air enters the idle speed control manifold. It then flows through the rotary valve and out to the engine intake manifold. In response to signals from the ECM, the stepper motor drives the rotary valve to adjust the flow of air, and thus control the idle speed of the engine. When the emissions purge valve is open, vapor from the carbon canister is drawn in to the idle speed control manifold, where it joins the flow of air from the air intake duct.

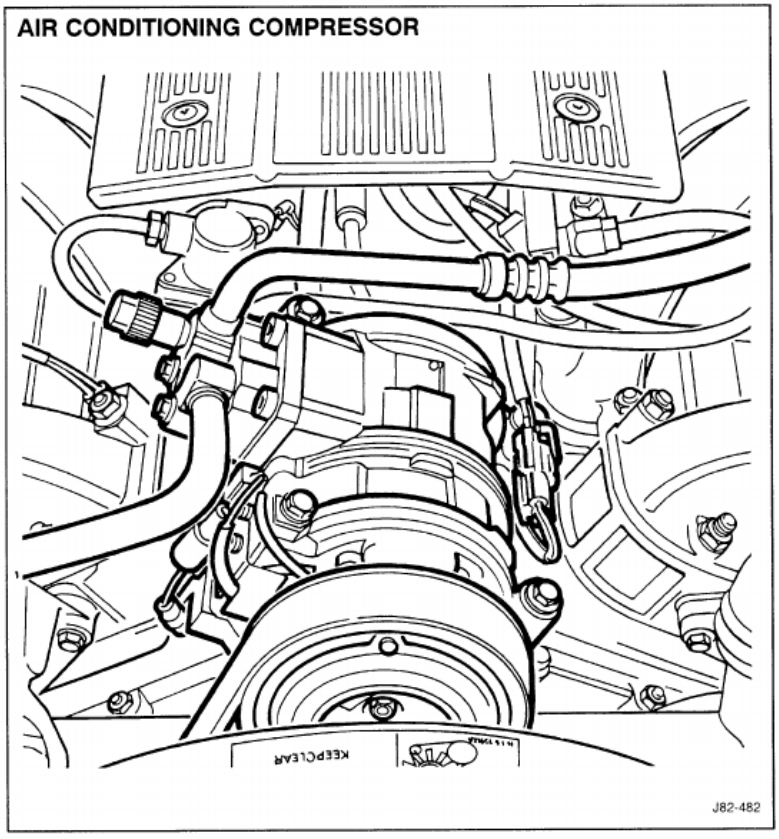
A flow of coolant through tappings in the idle speed control manifold prevents the formation of ice at low ambient temperatures.



Engine Ancillaries

Air Conditioning Compressor

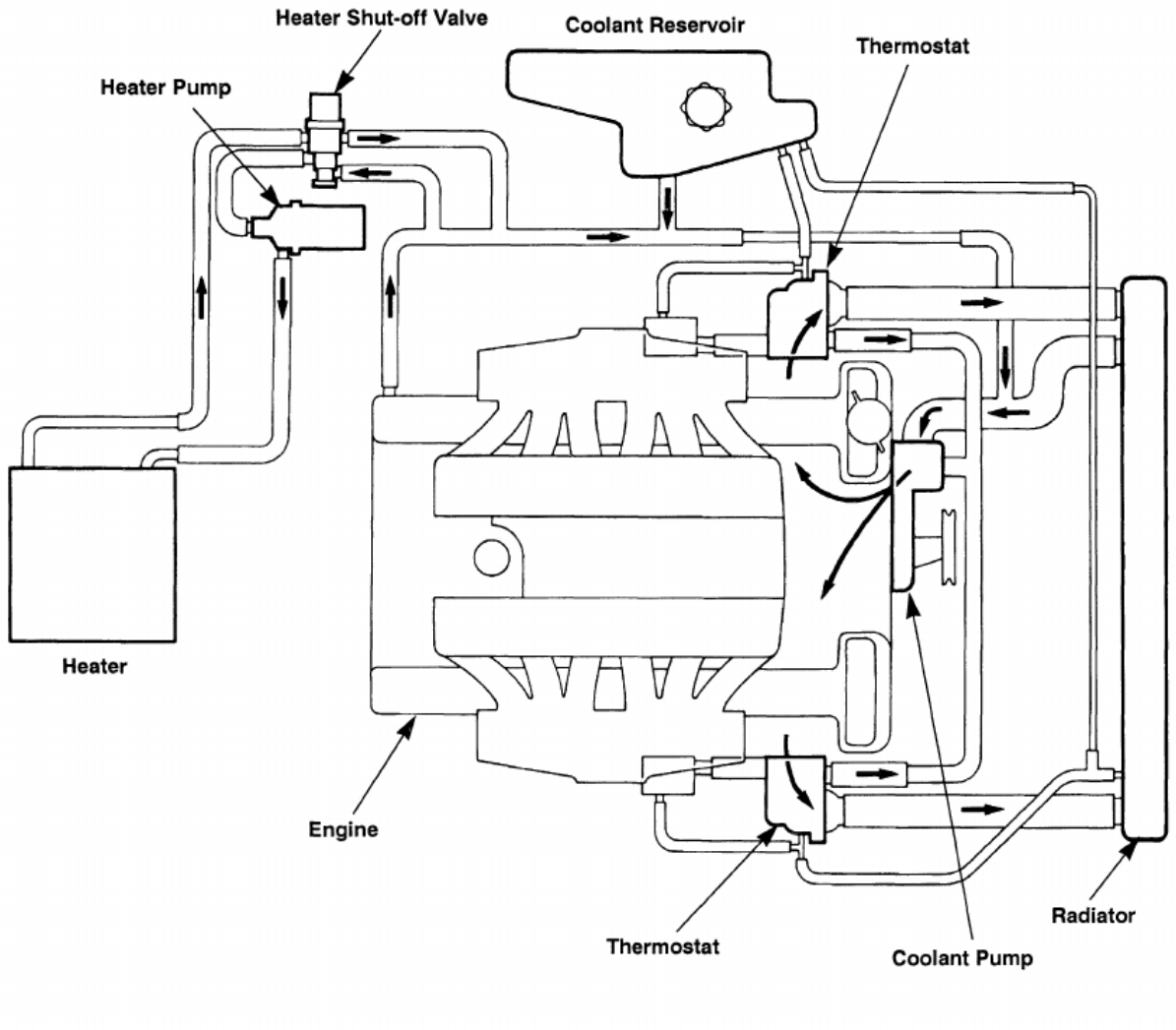
A Nippondenso air conditioning compressor is introduced. The compressor is installed on a rigid engine mounting. Drive belt tension is adjusted with an idler pulley.



Secondary Air Injection System

The AC Delco check valves and air injection switching valve are replaced with Nippondenso components. The operation of the valves remains the same.

COOLING SYSTEM SCHEMATIC - V12 ENGINE



Engine Cooling System

Changes to the cooling system consist of a new radiator and coolant reservoir, and the introduction of a shut-off valve and an electric pump to the heater circuit. Except for the radiator, these components are all common to those installed on AJ16 engined vehicles

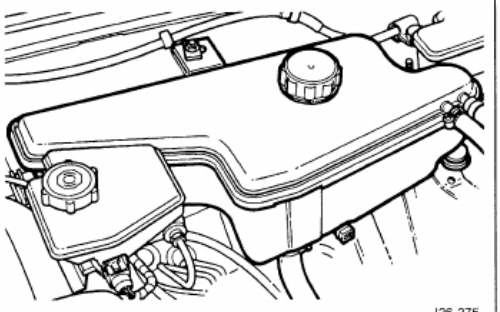
Radiator

The new radiator is smaller and lighter than the previous version, but retains the same performance. Core depth is reduced from 40 mm (1.57 in) to 32 mm (1.26 in). The left side of the radiator incorporates a six plate cooler for transmission fluid. A fan cowl on the rear of the radiator accommodates the engine driven cooling fan.

Coolant Reservoir

The new coolant reservoir is introduced to accommodate changes to the body. The coolant level probe is installed in the base of the reservoir. A connector on the base of the probe provides the interface with the vehicle harness.

COOLANT RESERVOIR



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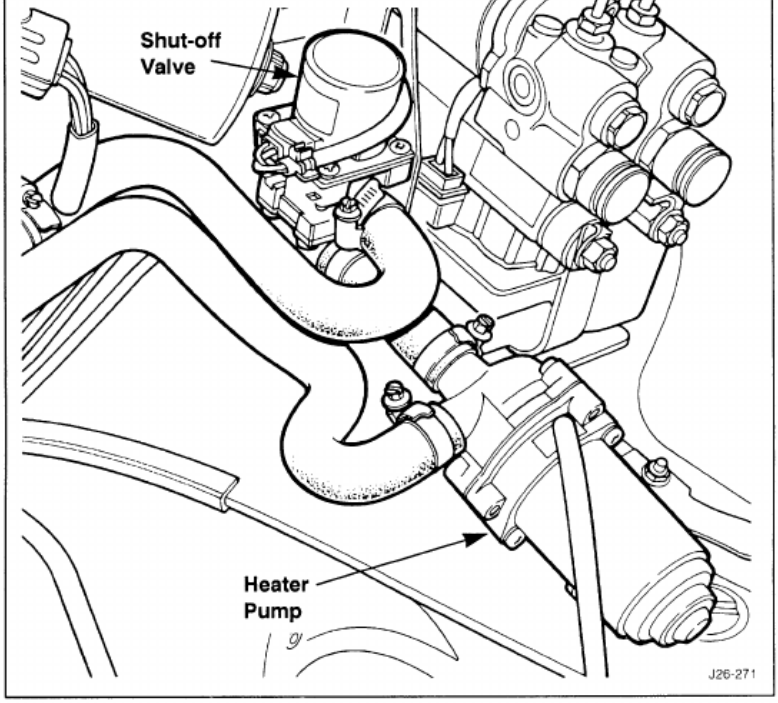
Heater Shut-off Valve

The solenoid operated shut-off valve is installed in the engine compartment, on the left side of the toe-board. The shut-off valve simultaneously opens or closes the supply and return lines of the heater, under the control of the climate or heater control modules (see Climate Control section for details).

Heater Pump

The electric heater pump is installed on the toe-board, adjacent to the heater shut-off valve, in the supply line to the heater. Operation of the pump is also controlled by the climate or heater control modules.

HEATER PUMP AND SHUT OFF VALVE



J26-271

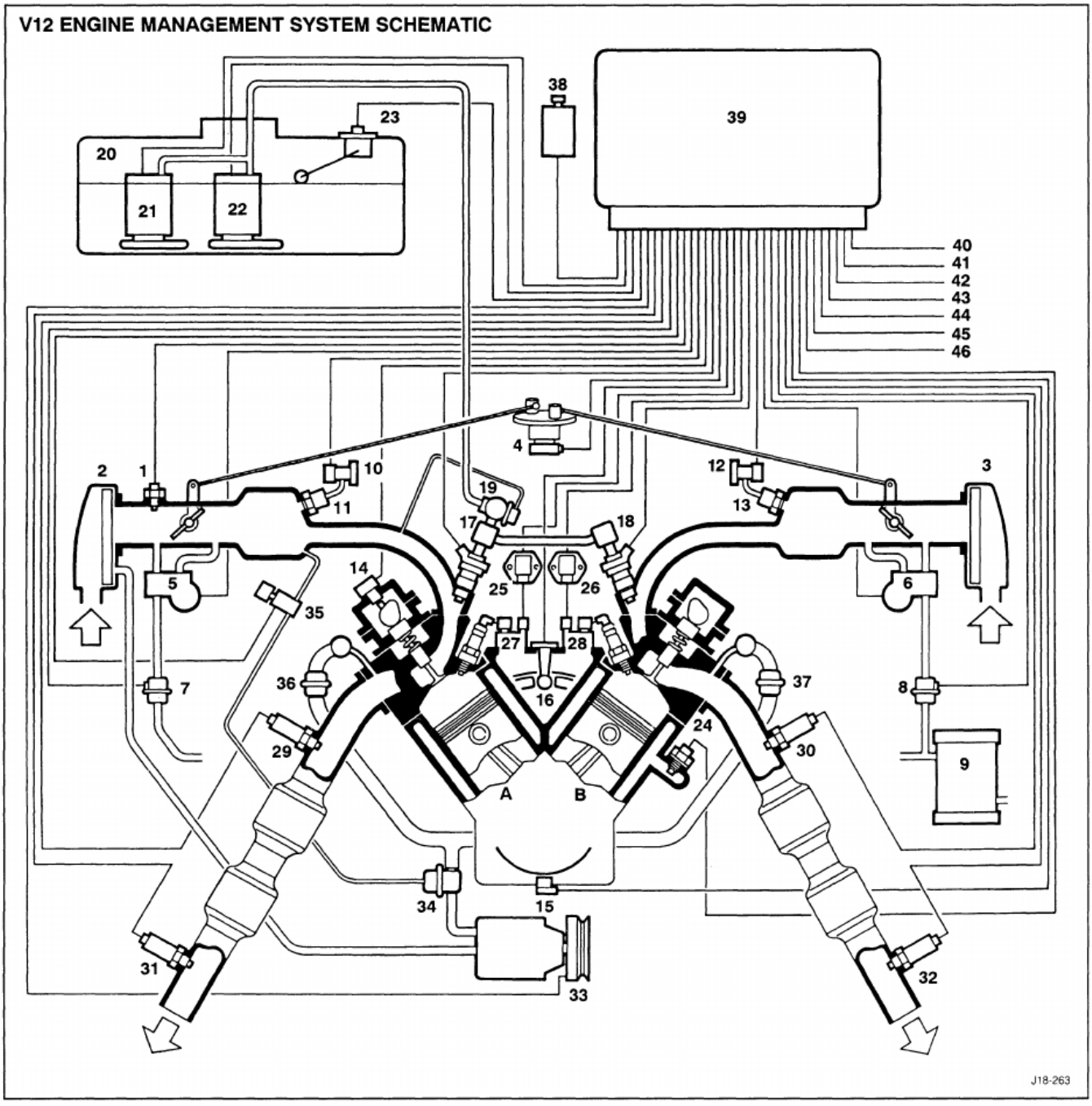
Engine Management

The V12 engine is upgraded and utilises a new Nippondenso engine management system. System variations are provided for markets in Europe, North America and the Rest of the World. The variant for North America complies with the comprehensive emissions monitoring demanded by the California Air Resources Board (CARB) On-board Diagnostic II regulations.

Carried Over Components

The Lucas Intake Air Temperature sensor is carried over from the previous model year. All other engine management system components and sensors are new.

V12 ENGINE MANAGEMENT SYSTEM SCHEMATIC



Key to V12 Engine Management System Schematic Illustration

1 Intake Air Temperature (IAT) Sensor
2 A Bank Air Cleaner
3 B Bank Air Cleaner
4 Throttle Position Sensor
5 A Bank Idle Air Control Valve (IVAC)
6 B Bank Idle Air Control Valve
7 A Bank Evaporative Emission Purge Control Solenoid Valve (EVAP)
8 B Bank Evaporative Emission Purge Control Solenoid Valve
9 Evaporative Emission (EVAP) Purge Control Canister
10 A Bank Manifold Absolute Pressure (MAP) Sensor
11 A Bank Gas Filter
12 B Bank Manifold Absolute Pressure (MAP) Sensor
13 B Bank Gas Filter
14 Camshaft Position Sensor
15 Engine Position Sensor
16 Engine Speed Sensor
17 A Bank Fuel Injectors
18 B Bank Fuel Injectors
19 Fuel Pressure Regulator
20 Fuel Tank
21 Main Fuel Pump
22 Secondary Fuel Pump
24 Coolant Temperature Sensor (CTS)
23 Fuel level sensor
25 A Bank Igniter
26 B Bank Igniter
27 A Bank Ignition Coil
28 B Bank Ignition Coil
29 A Bank Upstream Heated Oxygen Sensor
30 B Bank Upstream Heated Oxygen Sensor
31 A Bank Downstream Heated Oxygen Sensor
32 B Bank Downstream Heated Oxygen Sensor
33 Secondary Air Injection Pump (Magnetic Clutch)
34 Secondary Air Injection Switching Valve (ASV)
35 Vacuum Solenoid Valve (VSV) For Air Switching Valve (ASV)
36 Secondary Air Injection A Bank Check Valve
37 Secondary Air Injection B Bank Check Valve
38 Inertia switch
39 Engine Management System Control Module (ECM)
40 Malfunction Indicator Lamp (MIL)
41 Battery
42 Tachometer
43 Security Control Module
44 PDU/ Generic Scan Tool
45 Transmission Control Module (TCM)
46 Air Conditioning Control Module

New Components

Engine Control Module (ECM) - The ECM is mounted behind the trim at the base of the A post on the right-hand side of the vehicle. In addition to monitoring and maintaining engine performance and controlling exhaust emissions, it provides an interface for on-board diagnostics.

Features

The new system incorporates features that afford significant advantages in terms of performance and emissions:

Ignition Misfire Detection

Catalyst Efficiency Monitoring - Twin heated oxygen (HO2S) sensors fitted in each exhaust downpipe.

Semi-sequential Fuel Injection - A software strategy that operates fuel injectors in pairs.

Adaptive Fuelling - Optimises fuelling over the life of the engine to take account of differences in engine build, engine mileage and variations in fuel quality.

Idle Speed Control - Controls engine idle speed within +/- 25 rpm of target speed.

Variable Shift Energy Management - Including software changes and a new communication link between the engine and the transmission electronic control module. The feature retards/advances ignition timing during gearshifts.

System Overview
The Engine Control Module (ECM) processes signals from a number of sensors and modifies the fuel and ignition settings to maintain the correct stoichiometric fuel and air mixture under all conditions. The ECM also controls emissions and on-board diagnostics.

Electronic Fuel Injection
The ECM controls the function of 12 fuel injectors. These are solenoid operated and connected electrically in pairs. The ECM software governs both the sequence and duration in which the injectors are operated. Fuel may be supplied by two methods: grouped bank injection - i.e. all injectors in a bank are simultaneously operated, and semi-sequential injection when the injectors are operated in pairs.
The ECM maintains fuelling at the correct stoichiometric by monitoring the oxygen sensors, manifold absolute pressure, intake air temperature, throttle position, rate of change of throttle movement, cranking status, battery voltage, ambient air pressure and the number of engine revolutions after starting.
Fuel injectors are immobilized by the engine overrun and overspeed protection circuits and the security system.

Electronic Ignition Control
The ECM controls ignition timing and spark energy to provide maximum engine power for minimum fuel consumption. Ignition timing is also controlled to prevent knock and reduce exhaust emissions. Ignition spark voltages are developed by two ignition coil packs; one per cylinder bank. There are three coils in a pack and these deliver an electrical charge to two spark plugs simultaneously. An ignition coil pack is operated by its own ignition module. The ECM provides the synchronising and triggering signals for the ICM'S to charge and discharge the coils.

Idle Speed Control
The ECM controls engine idle speed to within +/- 25 RPM of target speed. This is achieved by varying the amount of air flow bypassing the intake butterfly valves and the ignition spark advance in response to engine speed feedback signals.

Transmission Controller Interface
The ECM provides engine torque information via an electronic PWM signal to the Transmission Control Module (TCM). The TCM in turn provides a relative speed signal to the ECM for idle speed control. The ECM aids shift energy management by ignition retard control in response to a torque reduction request signal from the TCM.

Secondary Air Injection
Secondary air injection is required to reduce the level of carbon monoxide (CO) and hydrocarbons (HC) in the exhaust gases during warm up. The additional air supply rapidly accelerates the rise in exhaust gas temperature to the catalyst operating temperature level. The ECM controls secondary air injection in response to signals derived from coolant temperature, engine speed, time after start-up and diagnostic monitoring. The secondary air injection pump is brought on-stream via the Secondary Air Injection Relay, Vacuum Solenoid Valve (VSV) and the Air Switching Valve (ASV).

Mapped Purge Vapour Control
The ECM controls the A and B Bank purge valves to maintain the correct stoichiometric air/fuel ratio during purging.

Mapped Fuel Pump Control
The ECM controls two fuel pumps: one for low fuel demand and the other for a calibrated high fuel demand. Control is maintained via external relays. The ECM also operates the 2nd pump when instructed via the ISO diagnostic communication line.

On-board Diagnostics

The ECM is equipped for system self-diagnosis. This is to meet legislative requirements around the world, and in particular the California Air Resources Board On-board Diagnostics II regulations. Output stages are monitored to ensure that the correct signals are present during normal operation. Deviations are stored in a non-volatile memory, together with information about the nature of the fault: high, low, out of range, intermittent etc. The memory may be interrogated via the diagnostic link by the Jaguar Portable Diagnostic Unit (PDU) or generic scan tool. Comprehensive information on-board diagnostics may be obtained from the Jaguar Service Manual.

Limp Home Capability

An alternative operating strategy allows the vehicle to be driven safely when failures have been detected and the Malfunction Indicator Lamp (MIL) is illuminated.

Security Immobilisation

The ECM prevents the fuel injector solenoids and MIL operation from being energised on power-up until it receives the correct coded signal from the security control module. This immobilising function is disregarded after the engine has started.

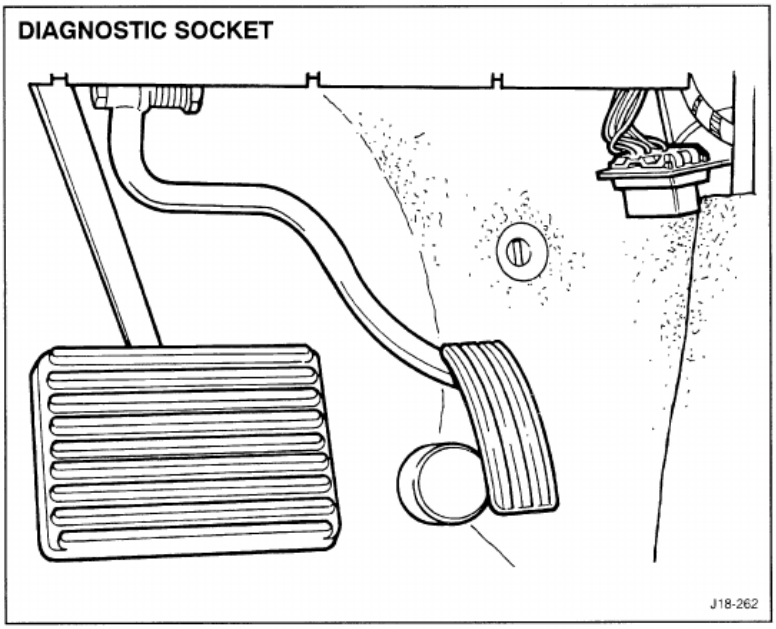
Air Conditioning Interface

The ECM supplies engine speed and load inhibit signals to the air conditioning control module. It also controls the compressor clutch relay, and disengages the compressor clutch under conditions of high acceleration and high load. The air conditioning control module sends compressor on and screen request signals to the ECM.

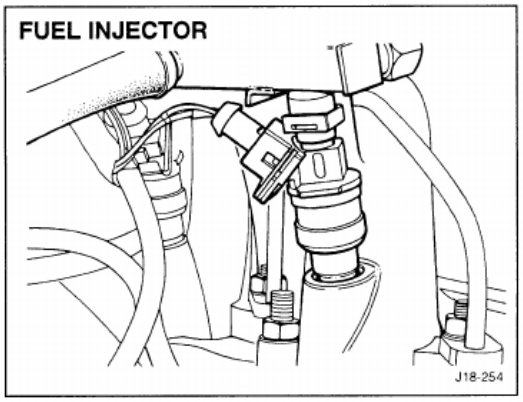
Driver Interface

The Malfunction Indicator Lamp (MIL), fuel used signal (indicator) and tachometer are the means by which the driver interfaces with the ECM. The engine speed signal is also supplied to the TCM and air conditioning control module. The fuel used signal is a pulse train of one pulse per 1/50000th of an imperial gallon of fuel used by the engine. This calculation is determined by the length of time the fuel injectors remain on.

DIAGNOSTIC SOCKET



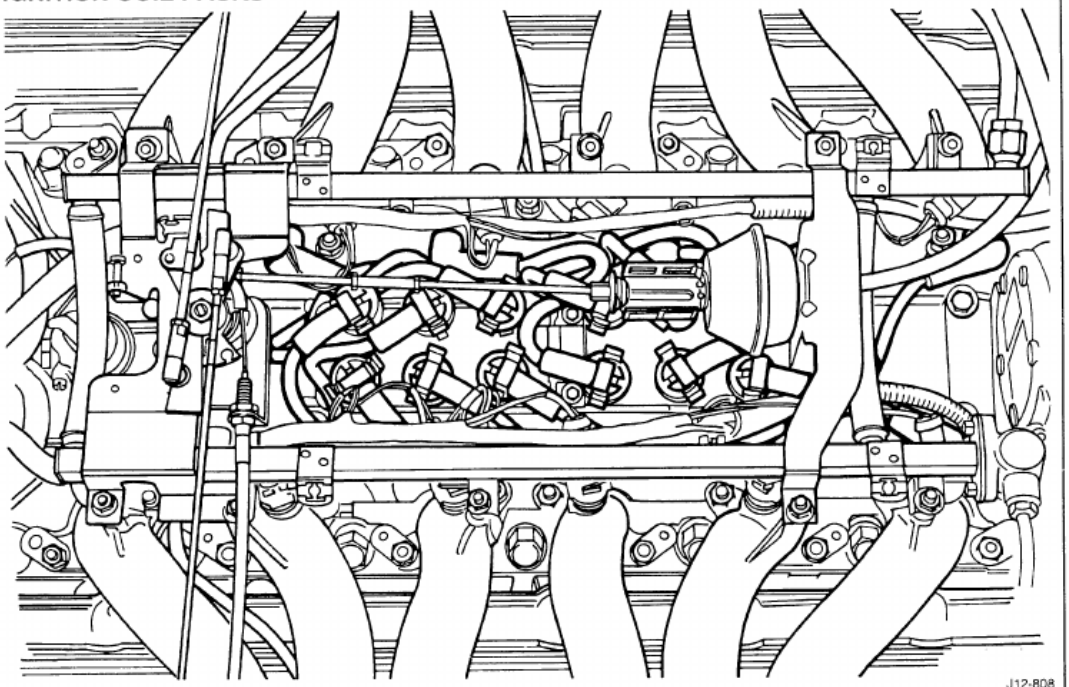
FUEL INJECTOR



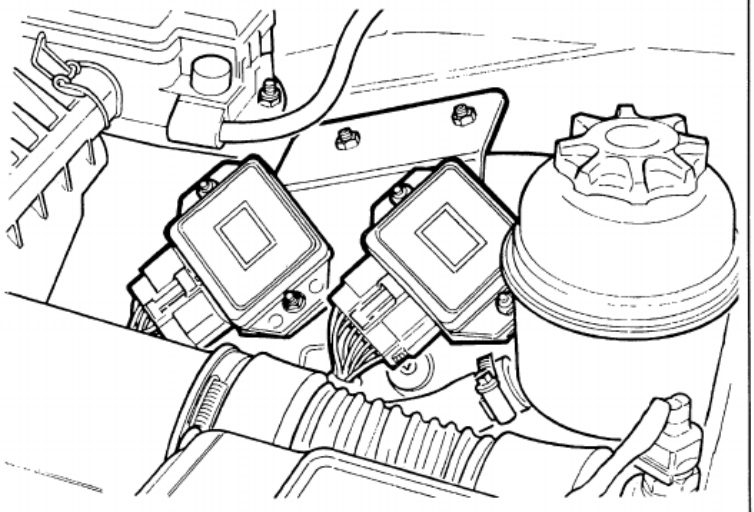
Fuel Injectors

Each of the 12 cylinders is fitted with an injector, comprising a solenoid, core and needle valve. The needle valve lifts to admit fuel into the intake port when the solenoid is energised by the ECM. The amount of fuel injected being determined by the length of time that the "ON" signal is applied to the solenoid.

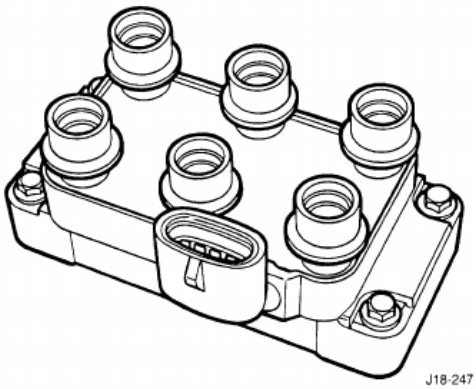
IGNITION COIL PACKS



IGNITION MODULES



IGNITION COIL PACK



Ignition Modules

Two ignition modules are mounted on a bracket by the power steering reservoir on the right-hand side of the engine compartment. Each module controls the current in the primary ignition coils in response to signals from the ECM. By continually switching the current ON/OFF high tension (HT) current is induced in the coils' secondary windings. A monitoring circuit sends a signal to the ECM when ignition takes place. If this is not received by the ECM, it halts fuel injections.

Fuel Pumps

The primary and secondary fuel pumps are identical. Each consists of a turbine pump driven by a DC motor through a coupling.

Final Drive Unit

The gears of the final drive unit are ground for quieter operation. New drive ratios are introduced for all models, as follows:

- Supercharged 4.0 litre models, 3.27 : 1
- 6.0 litre and normally aspirated 4.0 litre models, 3.54 or 3.58 : 1
- 3.2 litre manual transmission models, 3.77 : 1
- 3.2 litre automatic transmission models, 4.08 or 4.09 : 1

AJ16 - Transmission Management

Normally Aspirated 4.0 Litre Models

The transmission management system is revised to accommodate the introduction of the AJ16 engine, on-board diagnostics (OBD) II and, where fitted, traction control.

A transmission fluid temperature sensor is introduced to improve gear change quality at low fluid temperatures. Component changes consist of a new transmission internal harness, a new transmission mode switch and a new transmission control module (TCM). The TCM to engine management interface is revised to reduce the number of connections.

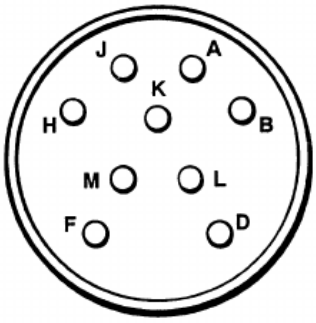
Transmission Internal Harness

The new internal harness has an integral thermistor probe to supply a fluid temperature signal to the TCM. To accommodate the temperature signal, the harness connector on the left side of the transmission is changed from an eight-way to a nine-way connector.

Transmission Mode Switch

As a result of the introduction of traction control,

TRANSMISSION INTERNAL HARNESS PIN CONNECTORS



J91-442

A - Road Speed (-)
B - Oil Pressure Regulator Control
D - Oil Temperature Sensor
F - Road Speed (+)
H - Solenoid Valve 1 Control
J - Oil Temperature Ground
K - Solenoid Valve 2 Control
L - Solenoid Valve 3 Control
M - Solenoids Supply

Inputs and Outputs

Changes to the inputs and outputs of the TCM are as follows:

- Two connections are added for the transmission fluid temperature sensor
- Where traction control is installed, a traction control connection is added from the anti-lock braking system/traction control, electronic control module (ABS/TC CM)
- One of the torque reduction signal connections is deleted
- The pin code connections are deleted: PECUS programming is now implemented through the electronically erasable programmable read only memory (EEPROM)
- The throttle position sensor connections are deleted: a new connection with the engine control module now supplies the throttle position signal
- The first gear inhibit selection input and indicator output connections are deleted.

Transmission Control Module

The new TCM is a single board unit which is calibrated to match the AJ16 engine. The unit is programmed for specific market applications using the programmable electronic control unit system (PECUS). A 55-way connector on the TCM casing provides the interface with the vehicle wiring.

The TCM is installed on a two-part bracket assembly in the interior, on the passenger side of the upper toe-board. One part of the bracket attaches to the mounting studs of the anti-lock braking system modulator and the other to the TCM. A single securing nut locks the two parts together, enabling easy removal/installation.

The TCM uses the bulk fluid temperature signal to calculate gear change fluid pressure offsets, to optimise gear change quality at low temperatures.

On receipt of the traction control active signal, the TCM adopts a traction control shift pattern to assist in preventing wheelspin.

Fault codes are now stored in a non-volatile, electronically erasable programmable read-only memory (EEPROM), and can only be erased with a portable diagnostic unit (PDU) or scan tool (disconnecting the battery or the TCM connector no longer erases the fault codes). The numbering of the TCM fault codes is revised to conform to the requirements of the OBD II system (see Electric/Electronic - OBD II section). Additional fault codes are introduced for the bulk fluid temperature and traction control signals.

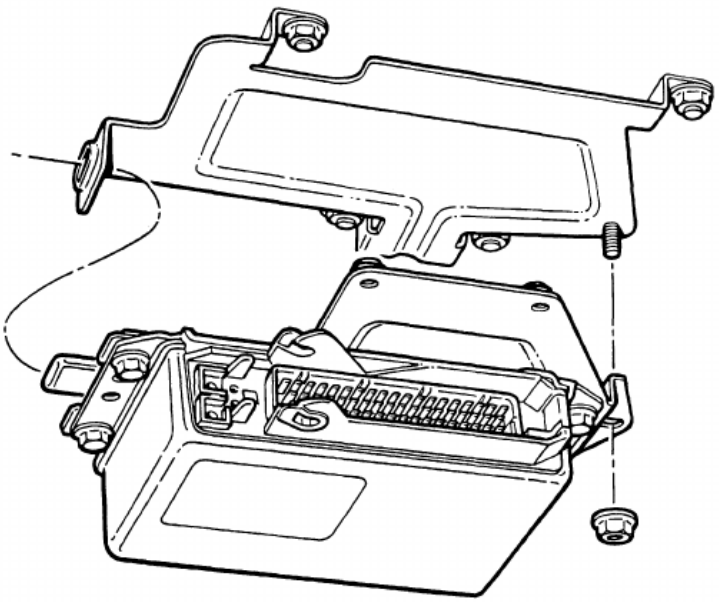
If the TCM detects a fault, it stores the fault code and activates the transmission malfunction indicator lamp (MIL). For faults detected in less critical inputs/outputs, the TCM substitutes the faulty input/output with a default value and continues the normal mode of operation. This allows the vehicle to be driven normally, although gear change quality will be affected to a greater or lesser degree.

For certain faults the TCM also disables the sport mode.

For more serious faults, the TCM may adopt a `limp home' mode by disabling the shift and torque converter clutch solenoids. This allows the vehicle to be driven, but no gear changes will occur in the forward range. If the `limp home' mode is adopted while the vehicle is in motion the transmission is kept in fourth gear. If the vehicle is then brought to a halt, neutral selected and drive re-selected, or if the `limp home' mode is adopted while the vehicle is stationary, the transmission is kept in third gear.

With the new TCM, activation of the transmission MIL during the start sequence is also revised. When the ignition switch is set to position II (ignition ON) the MIL comes on briefly and then goes off; when the ignition switch is set to position III (engine start) the MIL may flash briefly, but then remains off. A continuously flashing MIL indicates the data in the EEPROM is corrupted or the TCM is not PECUS programmed.

TCM AND MOUNTING BRACKET



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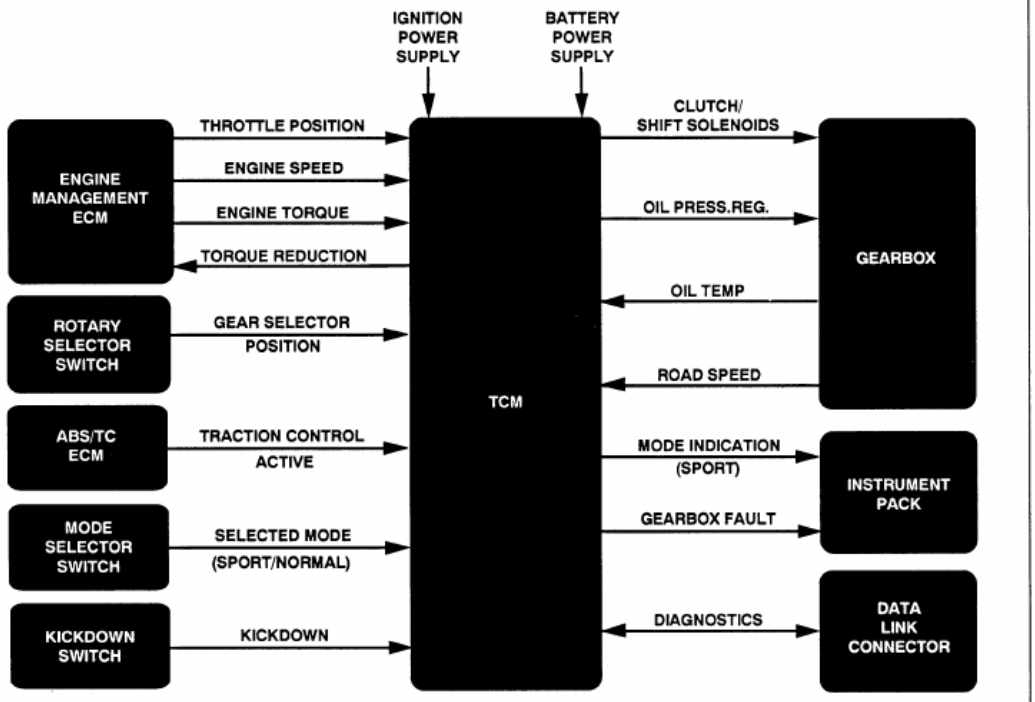
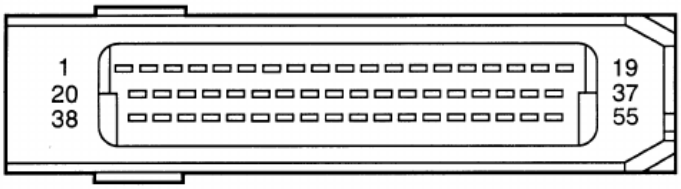
TCM INPUTS AND OUTPUTS



TCM PIN CONNECTOR



1	Ignition Power Supply	19	Solenoids Supply	39	Permanent Battery Power Supply
2	Road Speed (+)	20	Road Speed Screen	40	*
3	Engine Speed	21	Engine Torque Signal	41	Kickdown Switch
4	Mode Selection (Sport/Normal)	22	*	42	Solenoid Valve 3 Control
5	Solenoid Valve 1 Control	23	*	43	*
6	Oil Pressure Regulator Control	24	Solenoid Valve 2 Control	44	Oil Temperature Ground
7	Digital Ground	25	*	45	*
8	*	26	Power Ground	46	Oil Temperature Sensor
9	*	27	*	47	Throttle Position
10	*	28	*	48	*
11	*	29	Traction Control Active	49	Sport Mode Indicator
12	*	30	*	50	Gear Selector Position Code X
13	*	31	*	51	Diagnostic K Line
14	Gear Selector Position Code Y	32	Engine Torque Reduction	52	*
15	Diagnostic L Line	33	Gear Selector Position Code Z	53	*
16	Gearbox Fault Warning	34	*	54	*
17	*	35	*	55	*
18	*	36	*		
		37	*		
		38	Road Speed (-)		

* = Not Used

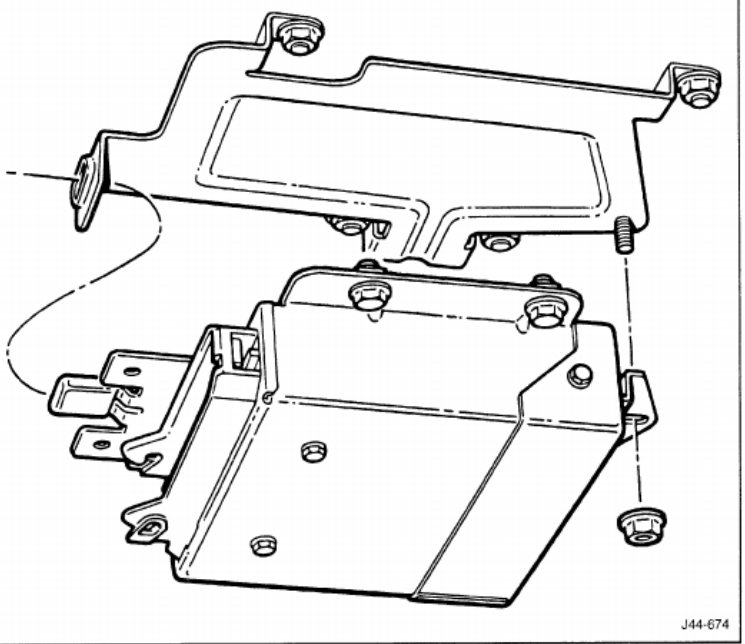
6.0 Litre and Supercharged 4.0 Litre - Transmission Management

On 6.0 litre models a new transmission control module (TCM) accommodates the introduction of the new engine management system, on-board diagnostics (OBD) II and traction control. The same TCM, with revised calibration, is adopted for the supercharged 4.0 litre models.

Inputs and Outputs

The TCM now receives an engine torque input from the engine control module (ECM), and a traction control active input from the anti-lock braking system/traction control, electronic control module (ABS/TC CM). The barometric pressure, air temperature, air conditioning clutch active and one of the two calibration select inputs are deleted.
On 6.0 litre models, there is a road speed output for the ECM.

TCM AND MOUNTING BRACKET

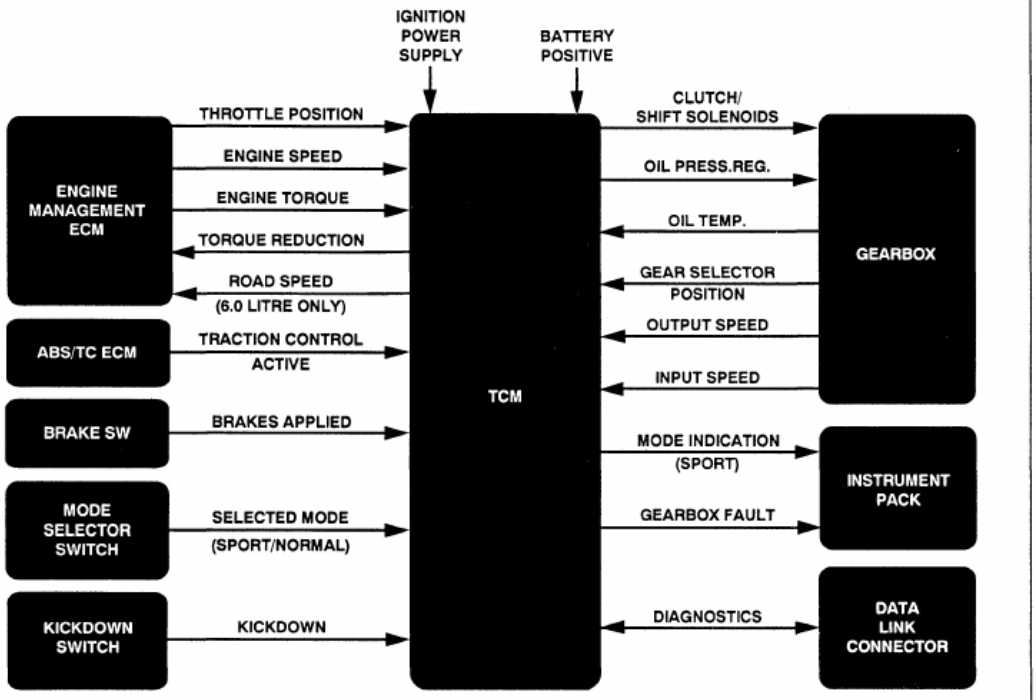


Transmission Control Module

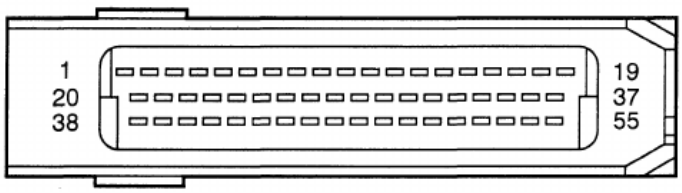
The new TCM is a single board unit contained in a rectangular casing. A 55-way connector on the casing provides the interface with the vehicle wiring. The TCM is installed on a two-part bracket assembly in the interior, on the passenger side of the upper toe-board. One part of the bracket attaches to the mounting studs of the anti-lock braking system modulator and the other to the TCM. A single securing nut locks the two parts together, enabling easy removal/installation of the TCM.
The main feature differences of the new TCM are as follows:

- The TCM uses an engine torque input from the ECM instead of calculating it from throttle position, engine speed, barometric pressure, air temperature and air conditioning clutch active inputs
- On receipt of the traction control active input, the TCM adopts a traction control shift pattern to assist in preventing wheelspin.
- On 6.0 litre models the TCM generates a road speed output for the ECM
- The calibration select input is not utilised (but remains hardwired for future eventualities). To accommodate the calibration differences between the 6.0 litre and the supercharged 4.0 litre models, the respective TCM's are loaded with different software
- The torque reduction request to the ECM is variable instead of fixed, so the ignition retard at gear change is optimised to the driving configuration
- The check engine input from the ECM no longer causes any default action. Only if the TCM detects a fault will it revert to a back-up mode of operation
- The numbering of the TCM fault codes is revised to conform to the requirements of the OBD II system (see Electric/Electronic - OBD II section)
- Additional fault codes are introduced for the traction control signals.

TCM INPUTS AND OUTPUTS



TCM PIN CONNECTOR



1	*	19	*	39	Shift Solenoid A
2	* (Air Conditioning Active)	20	*	40	Transmission MIL
3	Pressure Switch Manifold Code X	21	Engine Fault	41	Sport Mode Indicator
4	Pressure Switch Manifold Code Z	22	Pressure Switch Manifold Code Y	42	Torque Converter Clutch Solenoid
5	Mode Selection B (Traction Control Active)	23	Mode Selection A (Normal/ Sport)	43	Shift Solenoid B
6	* (Calibration Select)	24	Kickdown Switch	44	*
7	Torque Reduction Request	25	Brake Switch	45	Diagnostic K Line
8	*	26	Transmission Temperature Sensor	46	*
9	*	27	*	47	*
10	*	28	*	48	*
11	Throttle Position	29	*	49	Force Motor Low
12	Engine Torque	30	Engine Speed	50	Transmission Input Speed Ground
13	*	31	* (Air Temperature)	51	Transmission Output Speed Ground
14	Sensor Ground	32	*	52	Force Motor High
15	* (Barometric Pressure Signal)	33	*	53	Ignition Supply
16	Diagnostic L Line	34	Road Speed (6.0 Litre Only)	54	Power Ground
17	* (Barometric Pressure Sensor +5 V)	35	*	55	Battery Positive
18	*	36	Transmission Output Speed		
		37	Transmission Input Speed	* = not used	
		38	*		

Fuel Delivery System

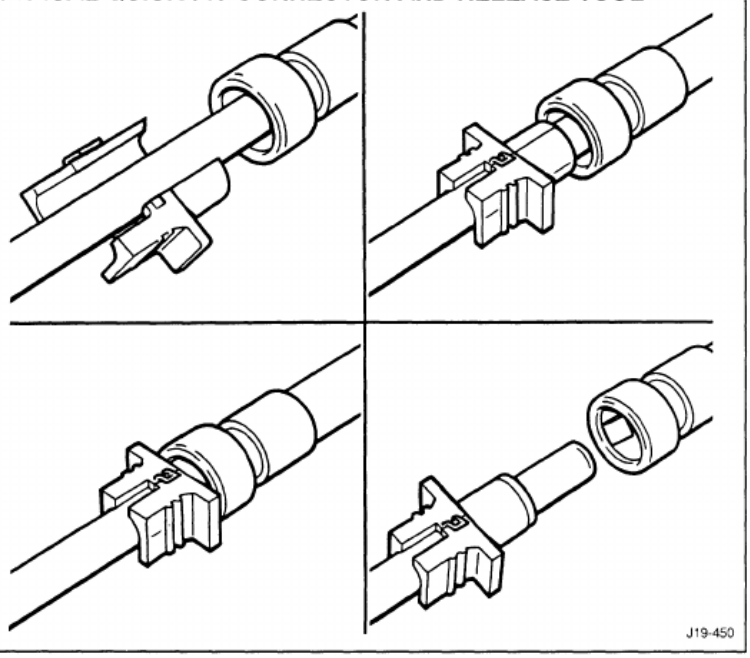
Fuel Lines

Conductive anti-permeation (CAP) tubing replaces the flexible hoses of the fuel supply and return lines. In addition, a new type of quick fit connector is introduced.

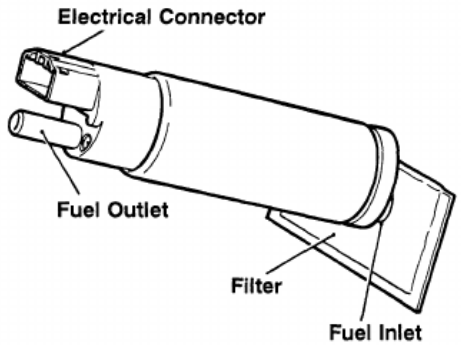
The tubing is cold formed to the fittings, and heat cured to the required form. For fire and damage protection purposes, viton rubber sleeving is installed over the tubes.

CAP tubing does not return to its original shape after being deformed, so bending or clamping (eg. for sealing purposes prior to disconnection) of the tubes is prohibited, since deformation will restrict fuel flow.

TYPICAL QUICK-FIT CONNECTOR AND RELEASE TOOL



FUEL PUMP



J19-451

Quick Fit Connectors

The supply and return line connectors at the fuel tank and in the engine compartment are the positive latching, quick fit type. They provide positive sealing and ease of disconnection/reconnection. The connectors for the supply and return lines in the engine compartment are of different sizes, to correspond with the difference in pipe diameters. The connectors for the supply and return lines at the fuel tank are the same size, but clipping of the lines to the body prevents incorrect assembly.

The female half of a connector is a push fit on the male half. Latches in the female half engage a rim on the male half to lock the two halves together. Two O-rings in the female half seal the joint.

A release tool is required to open the connectors. Pushing the release tool into the female half disengages the latches, and allows the two halves to be pulled apart.

The two release tools, one for each size of connector, are manufactured by Huron and are available from Jaguar Parts Operations or local distributors.

Fuel Pumps

Nippondenso fuel pumps replace the Walbro version used previously. Vehicles with the 3.2 or 4.0 litre normally aspirated engine have one pump. Vehicles with the 4.0 litre supercharged or 6.0 litre engine have two pumps.

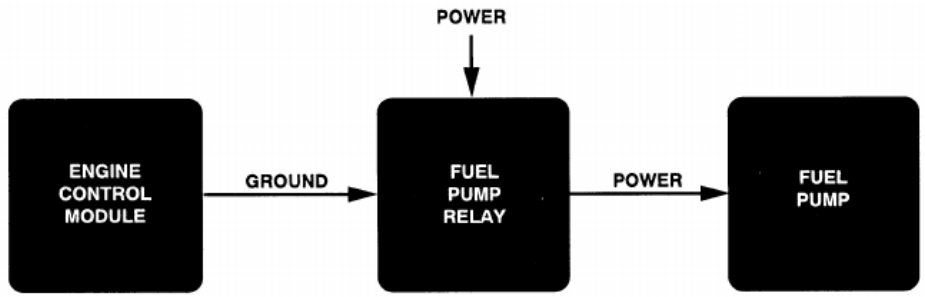
Each pump unit has a turbine pump driven by a DC motor. The output from the turbine provides a cooling flow around the motor before leaving the pump through a check valve. The check valve prevents reverse flow during single pump operation and when the engine is switched off. An inlet filter prevents contaminants from entering the pump.

Nominal pump delivery is 90 litres/hour (23.8 US gallons/hour) at 3 bar (43.5 lbf/in^2) - 3.7 bar (53.7 lbf/in^2) on pumps fitted to vehicles with the supercharged engine. The pump motor draws 7 amperes at 13.2 volts.

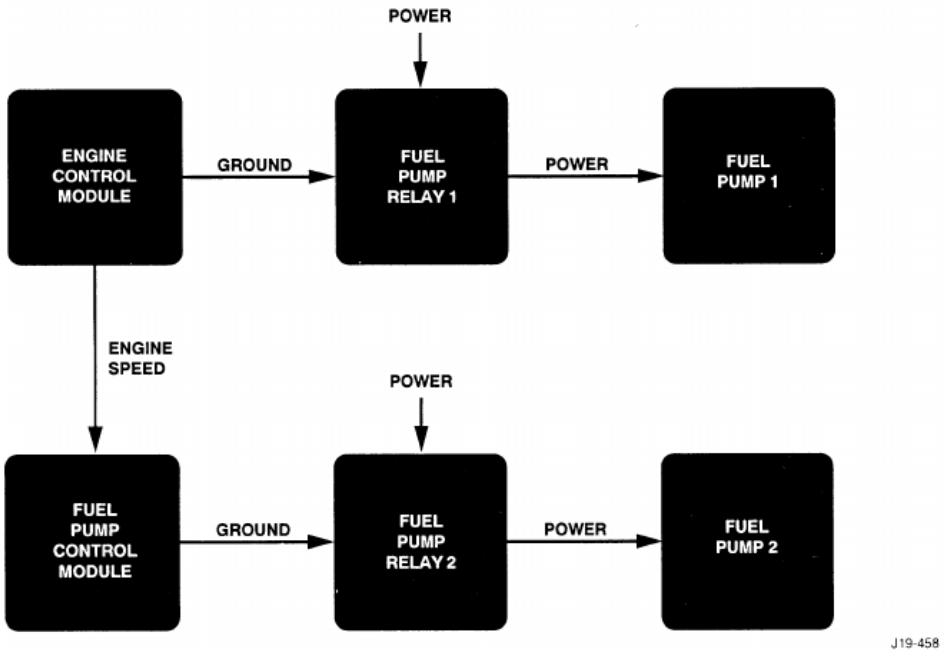
The fuel pumps are switched on and off via relays. On 3.2 litre, 4.0 litre normally aspirated and 6.0 litre engined vehicles, the relays are controlled by the engine control module (ECM). On vehicles with the supercharged engine, one relay is controlled by the ECM and one by the fuel pump control module.

On single pump installations the fuel pump operates continuously while the ignition is on.
On vehicles with the supercharged engine, fuel pump 1 operates continuously while the ignition is on, but fuel pump 2 operates only in the higher rpm range. The fuel pump control module switches pump 2 on at 4000 rpm and off at 3200 rpm. The engine speed input for the fuel pump control module comes from the ECM.
On vehicles with the 6.0 litre engine, when the ignition switch is set to ignition ON the ECM initially switches fuel pump 2 on, after a delay of 0.1 second. When the ignition switch is then set to engine crank, the ECM switches fuel pump 2 off and switches fuel pump 1 on. Fuel pump 1 then operates continuously, and the ECM switches fuel pump 2 on only at higher engine loads. During the engine start, if the ignition switch remains at ignition ON, without being set to engine crank, the ECM will switch fuel pump 2 off after a maximum of 3 seconds.

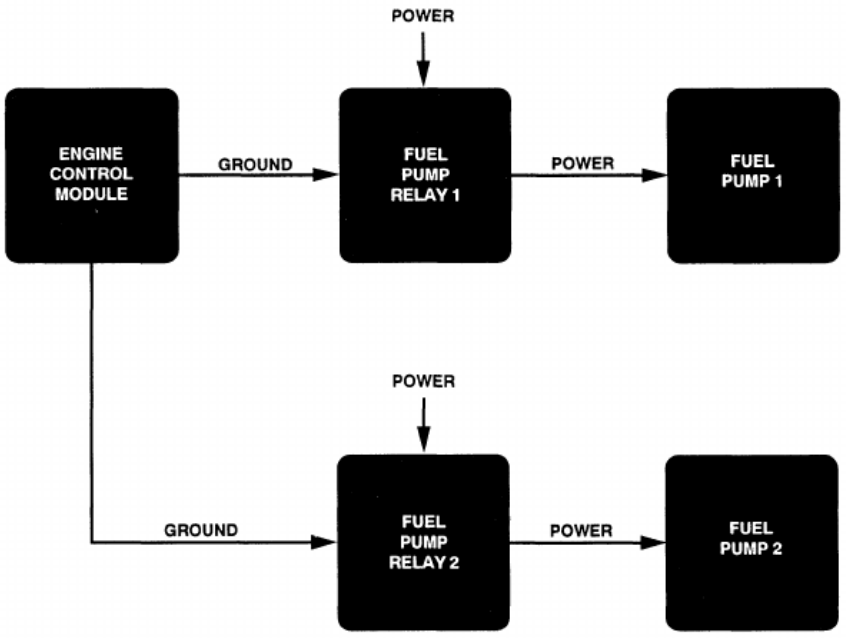
FUEL PUMP CONTROL - SINGLE PUMP INSTALLATION



FUEL PUMP CONTROL - TWIN PUMP INSTALLATION - SUPERCHARGED ENGINE



FUEL PUMP CONTROL - TWIN PUMP INSTALLATION - 6.0 LITRE



Fuel Tank

The fuel tank is revised to suit the introduction of the new fuel line connectors and new fuel pump(s).

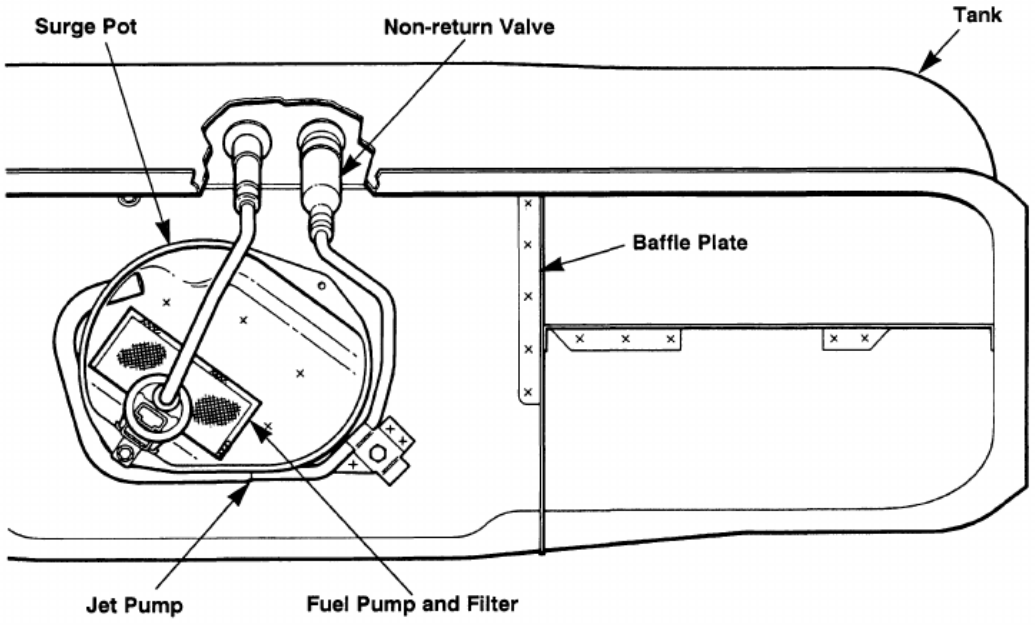
The tank contains baffle plates to reduce fuel surge, and a surge pot to provide a constant reservoir of fuel for the pump(s). A rubber mount and a rubber clamp hold each pump in a clamp bracket attached to the surge pot. Access to the pump is through the evaporative loss flange on top of the tank.

Connector halves for the fuel return and fuel supply lines are installed in the lower, center, front wall of the tank. Pipes connect the fuel pump(s) outlet and a jet pump to the connector halves. A non-return valve in the return line connector half prevents reverse flow through the return line. The flow of return fuel through the jet pump induces fuel from the adjacent area of the tank through a tube connected to the surge pot, and keeps the surge pot full of fuel.

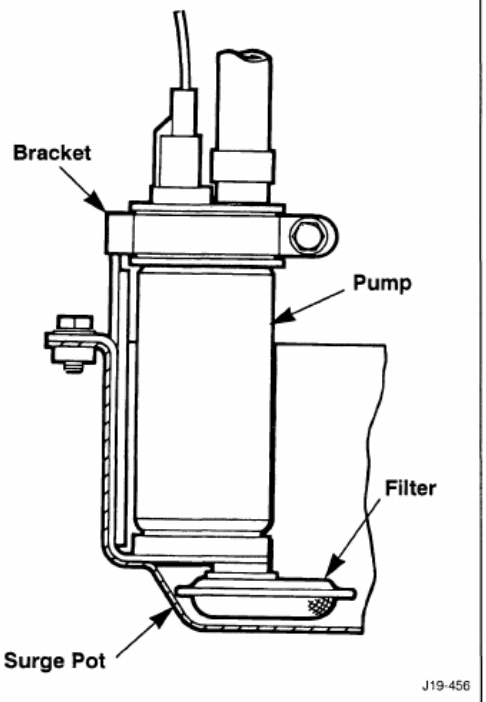
Fuel Injectors - 3.2 and 4.0 Litre Models

Nippondenso fuel injectors replace the Lucas fuel injectors. The new injectors are similar in construction to the previous injectors, but have disc valves instead of needle valves.

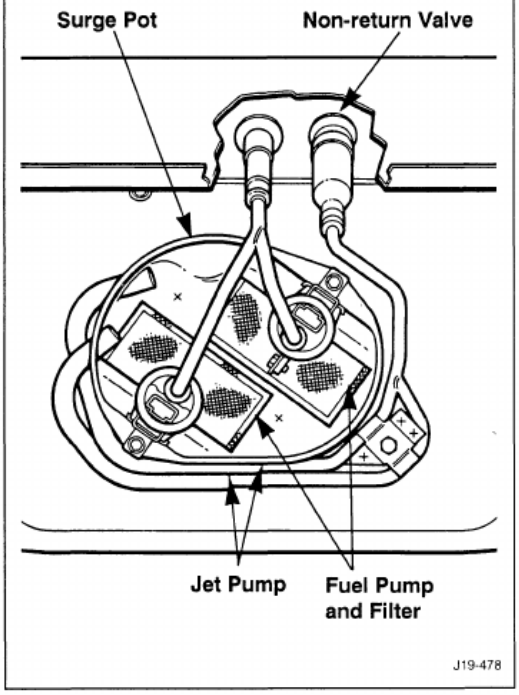
SINGLE PUMP INSTALLATION



FUEL PUMP FIXINGS



TWIN FUEL PUMP INSTALLATION

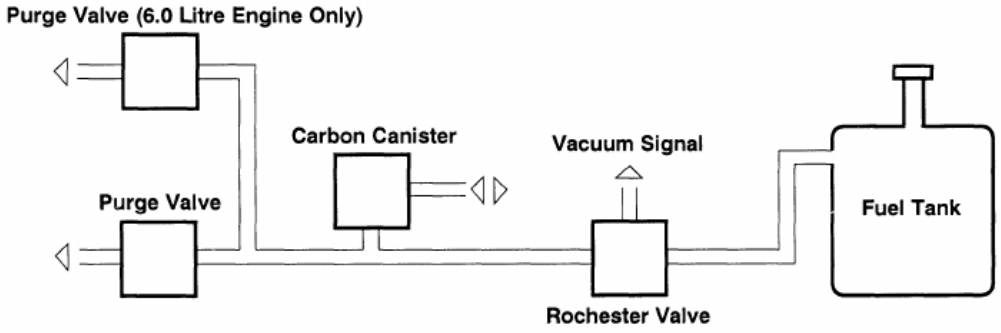


Evaporative Loss Control System

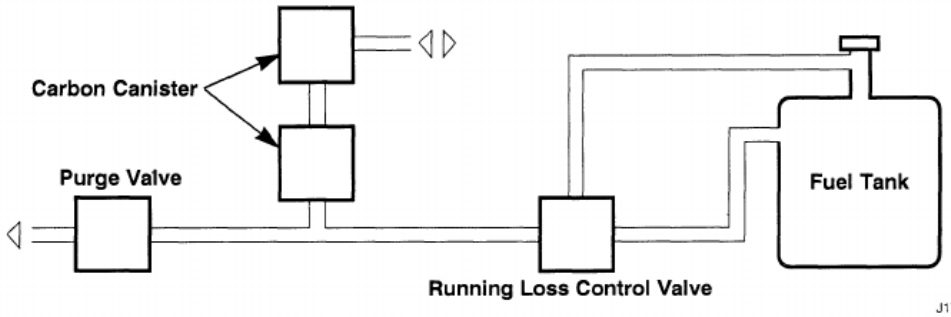
A new carbon canister and purge valve is introduced on all models.
On North American vehicles with the normally aspirated 4.0 litre engine, a second carbon canister is installed, and a running loss control valve replaces the vacuum/pressure relief valve (Rochester valve).

EVAPORATIVE LOSS CONTROL SYSTEM

ALL EXCEPT NORTH AMERICAN, NORMALLY ASPIRATED 4.0 LITRE VEHICLES



NORTH AMERICAN, NORMALLY ASPIRATED 4.0 LITRE VEHICLES ONLY



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The wheel finish and lug nut combinations are as follows:

Base Wheel: size 7in x 16in

7 x 16 styles: Steel with trim
Kiwi, exposed nuts, diamond turned
20 spoke, exposed nuts diamond turned
Dimple, exposed nuts, diamond turned
Turbine, painted
Turbine, chromed

Sports Wheel: size 8in x 16in

8 x 16 styles: 20-spoke, diamond turned
Dimple, exposed nuts, painted

Supercharged Wheel: size 8in x 17in

8 x 17 style: Sports, exposed wheel nuts, diamond turned

Vehicle Wheel Fitment Specifications

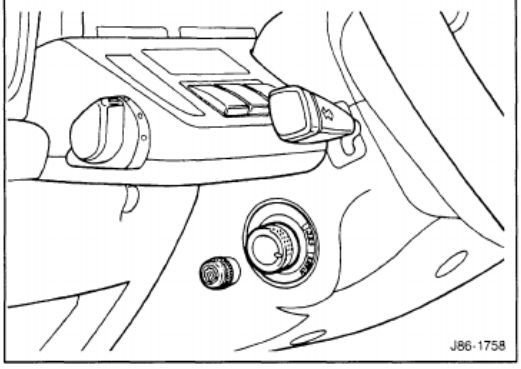
Wheel Style	Size/Type	Finish	USA/Canada	R.O.W.
Steel	7 x 16	Trim	No	Yes
Kiwi	7 x 16	Exposed Nuts (Diamond Turned)	No	Yes
20 Spoke	7 x 16	Exposed Nuts (Diamond Turned)	Yes	No
20 Spoke	8 x 16	Centre Cap (Diamond Turned)	No	Yes
Dimple	7 x 16	Exposed Nuts (Diamond Turned)	Yes	No
Dimple	8 x 16	Exposed Nuts (Painted)	No	Yes
Sports	8 x 17	Exposed Nuts (Diamond Turned)	Yes	Yes
Turbine	7 x 16	Painted + Centre Cap	Yes	Yes
Turbine	7 x 16	Chromed	Yes (Option)	Yes (Option)

The tyre sizes are as follows.

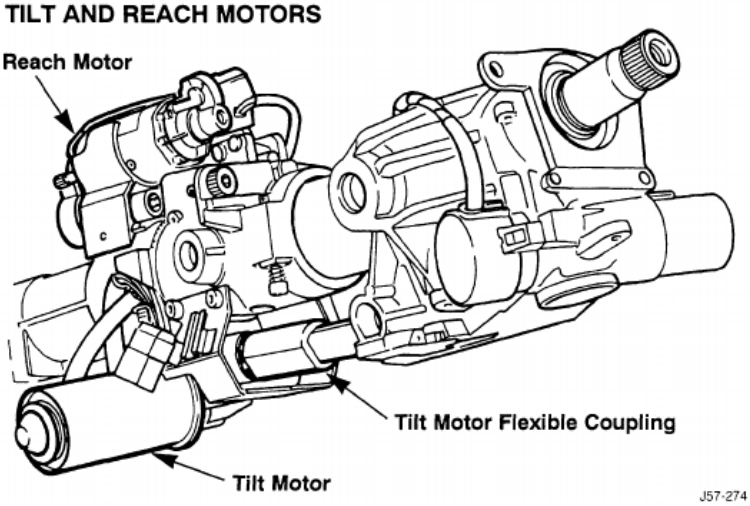
Base: 225/60 ZR16
Sports: 225/55 ZR16
Supercharged: 255/45 ZR17
Space saver: 115/85 R18

Steering System

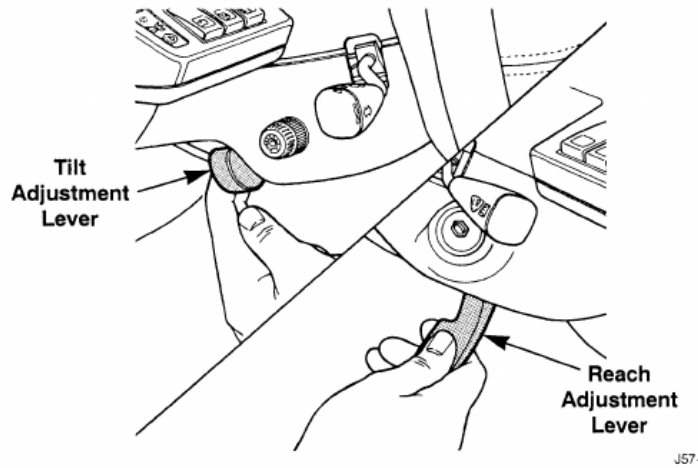
ADJUSTMENT SWITCH



TILT AND REACH MOTORS



MANUAL ADJUSTMENT LEVERS



Steering Column

The new steering column has the following features:

- Tilt and reach adjustment
- Entry/exit feature
- Automatic tilt away (powered version)
- Infinitely variable positions (within a range)
- Improved ergonomic key position
- Multi-position column lock.

Depending upon model specification, tilt and reach adjustment is performed by electrical or manual operation. Powered variants may be either automatically or manually adjusted. All types have the entry/exit feature.

The column uses carry-over mountings, i.e. upper swing link (Vee bracket) and lower body-in-white fixings. The column covers are new with a common upper section. The lower sections differ for power or manual column adjustment variants. The upper column universal joint is new.

Operating Description

Powered Steering Column

Two independent motor/gearbox assemblies provide infinite adjustments for tilt and reach within approximate ranges of 13° and 35mm respectively. Adjustments may be automatically made in conjunction with the seat memory facility or manually using the steering adjustment switch. When the steering switch is moved to OFF, the automatic exit/entry feature is disabled.

Manual Steering Column

Tilt variations are stepped at approximately 3° intervals. Six positions are available with the uppermost position being unlatched. The cable operated reach adjustment is infinite within a range of 35mm. The desired position is maintained by a rack and wedge latch mechanism.

WARNING:

COLUMN TRAVEL SHOULD BE MANUALLY RESTRAINED TO CHECK UPWARD SPRING ASSISTANCE. RESTRAINT IS ESPECIALLY IMPORTANT IF THE STEERING WHEEL HAS BEEN REMOVED FOR MAINTENANCE REASONS.

Variable Assist Power Steering System (Servotronic)

Features

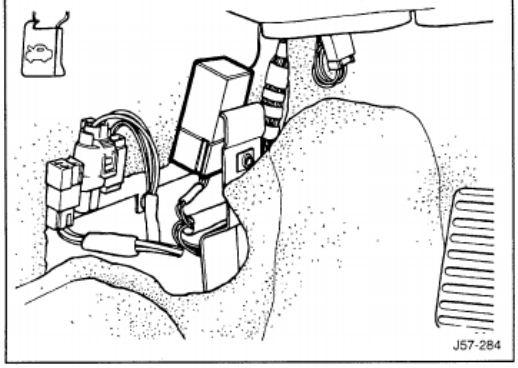
The 'Servotronic' system provides full power assist to reduce steering effort during parking and low speed manoeuvres and progressively reduces power assistance as the vehicle speed rises. This feature enhances steering 'feel' at highway speeds.

System Components

The variable assist steering system is made up of the following components:

- **An engine driven rotary vane pump**, belt drive on V12 engines, direct drive from the timing gear on six cylinder engines. The pump has a falling flow characteristic (as pump speed increases, fluid flow decreases) and an integral pressure release valve.
- **A remote fluid reservoir** with integral 'return' line filter.
- **The steering rack**, incorporating a speed sensitive transducer.
- **A steering control module (SCM)**, located on the left 'A' post.
- **A fluid cooler** with associated pipework. The fluid cooler, situated in the radiator pack, is unchanged from the previous model year condition.

STEERING CONTROL MODULE



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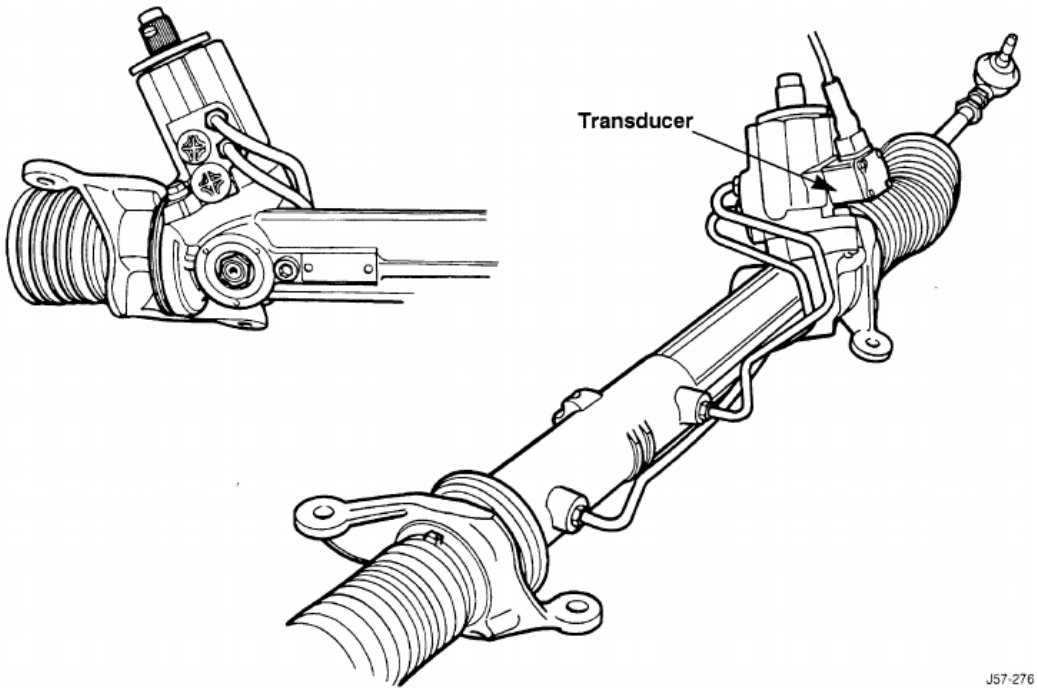
ZF STEERING RACK



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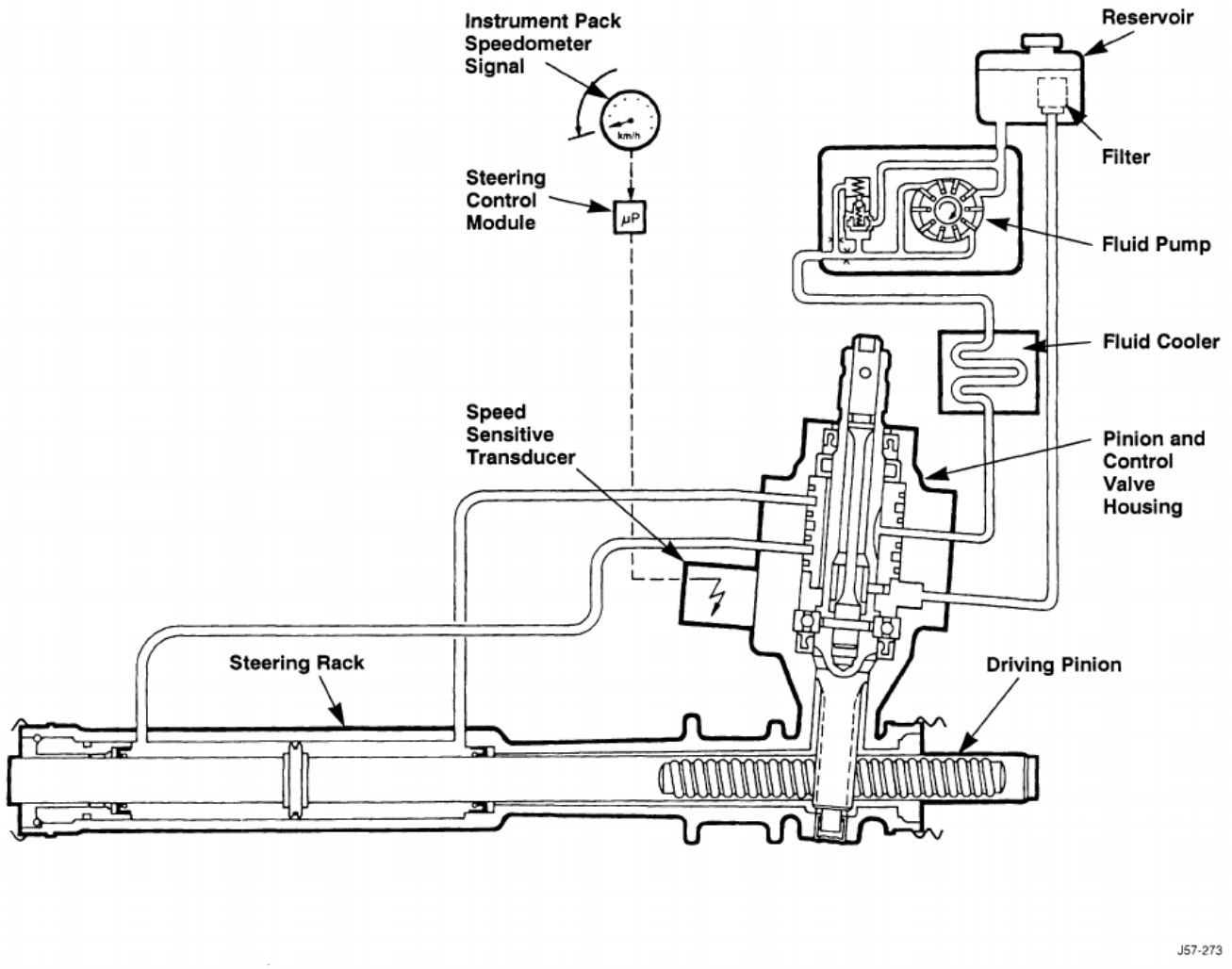
STEERING SYSTEM SCHEMATIC DIAGRAM



System Description

The Servotronic system uses a rotary valve within the pinion housing which is fitted with a hydraulic reaction piston (HRP). Inputs to the HRP are:

- Differential pressure on the piston rack, proportional to vehicle cornering force
- The position of the transducer valve, controlled by the steering control module from road speed data.

Full operating characteristics will be provided in the Service Manual.

Working Precautions

The importance of cleanliness cannot be over-emphasised. The small orifices, seals and valves in the system are vulnerable to contaminants.

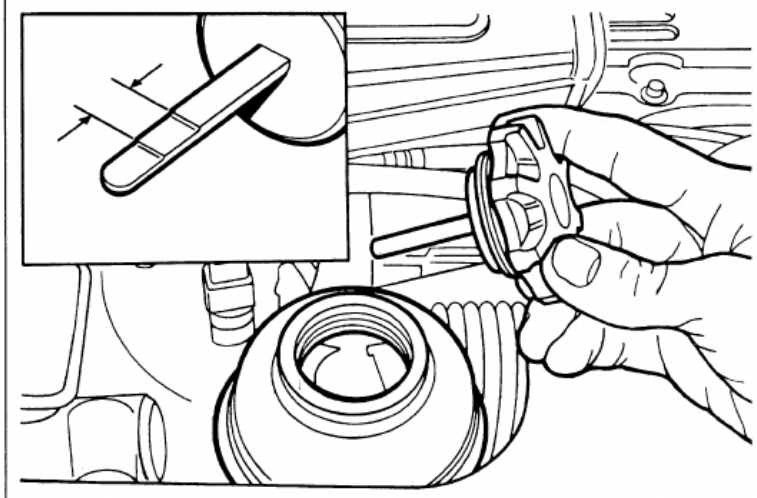
CAUTION:

It is imperative that the power-assisted steering system does not become contaminated in any way. Always decant fluid from a fresh sealed container and clean the area around the reservoir neck both before and after topping-up. Never return drained fluid to the system.

Fluid Reservoir

The reservoir has an integral, non-serviceable return side filter - do not attempt to clean it. Should any component be renewed or the system broken into for any reason, it is essential that the reservoir and the fluid are changed. Under normal operating conditions, fluid change is not required.

RESERVOIR WITH DIPSTICK



Lubrication Data

Fluid type:

Dexron IIE (Dexron IID when IIE is unavailable)

System capacity:

Approximately one litre (0.26 US gal) from dry

Level checking frequency:

16000 km (10000 miles)

Pressure:

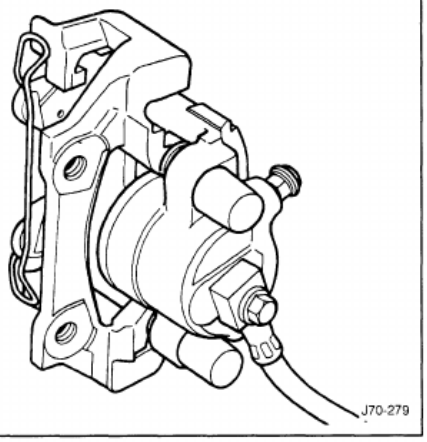
100 to 110 bar (1450 to 1595 lb f/in^2)

Foundation Brakes

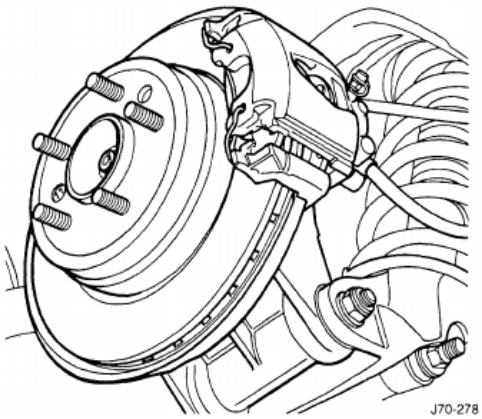
Front Calipers

Due to the system improvements of the new Teves Mk IV-GI anti-lock braking system, the fitment of larger calipers to V12 models is no longer necessary.

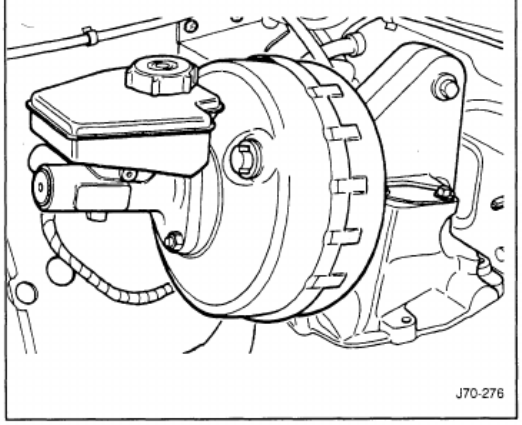
CALIPER HOSE CONNECTION



VENTILATED REAR DISC



MASTER CYLINDER ASSEMBLY



Rear Calipers and Discs

With the introduction of traction control, the rear brake discs are changed to ventilated type discs providing additional cooling performance. The disc thickness increases from 10 to 20mm. In addition, the caliper pistons are increased in diameter from 36 to 48mm to cope with the increased demands brought about by the operation of traction control. For commonisation purposes, non-traction control vehicles also share the above changes.

The disc back plate cover is larger to accommodate the larger caliper and is profiled so as not to cover the disc ventilations. The pad material is changed to Jurid 101.

Hose connection to the caliper is made by a 'banjo' fitting. Brake system pipe routing is changed to accommodate the new rear braking system installation.

Pad Wear

The brake pad wear sensors are deleted from all brake pads and no wear warning indicator is provided. Pads approaching wear limits must be determined during normal servicing.

Hydraulic Force

A conventional master cylinder/reservoir/vacuum boost arrangement is used to provide the hydraulic force for the foundation brakes. Vacuum for the servo boost is sourced from the intake manifold. The vacuum line from the servo assembly to the intake manifold includes a one-way check valve.

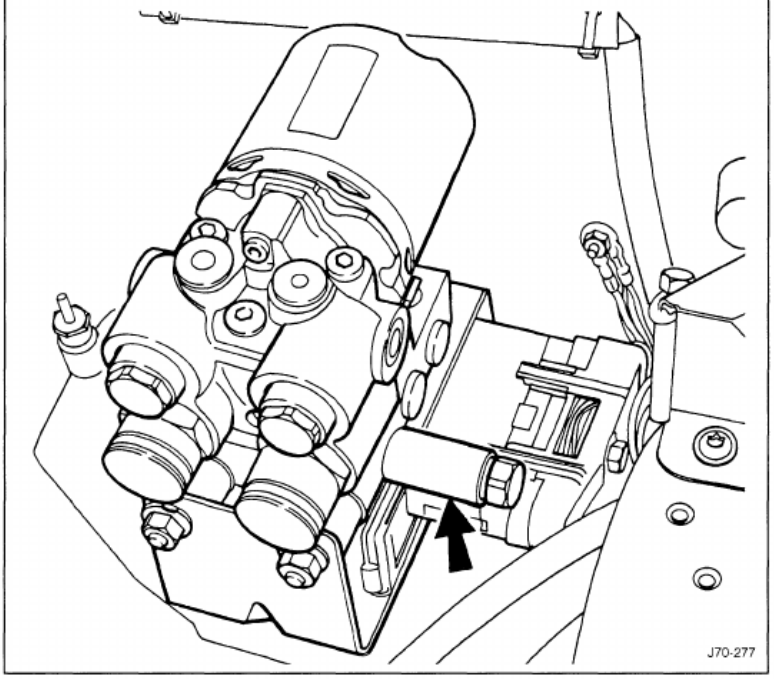
The new fluid reservoir incorporates a level sensor. The sensor's electrical connector is moulded to the side of the reservoir.

Hydraulic Circuits

The hydraulic circuits are split front/rear as on previous model year vehicles. They are illustrated in the ABS/TC section. During normal braking operation, the ABS modulator has no effect other than to act as a manifold in the system.

To prevent over-braking to the rear brakes, a pressure conscious reduction valve is fitted to the modulator. On traction control vehicles, two pressure conscious reduction valves are fitted to serve each rear brake line. The valve(s) throttle off to the rear brakes at pressures over a certain threshold, to provide a closer balance between front and rear brakes.

PRESSURE CONSCIOUS REDUCTION VALVE



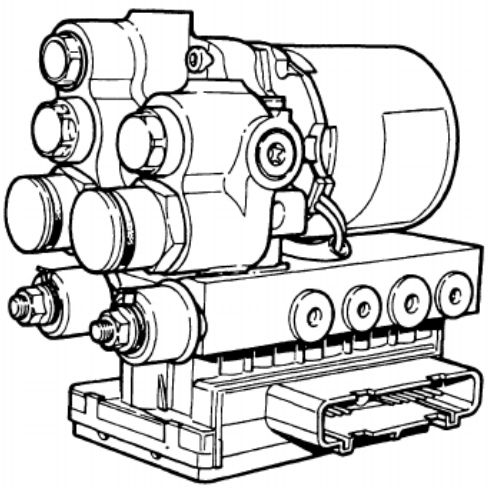
Anti-lock Braking System and Traction Control

The anti-lock braking system (ABS) is upgraded to the Teves Mk IV-GI. Where fitted, traction control (TC) is integrated into the ABS. The ABS/TC control module activates the ABS when a wheel(s) rotates slower than the comparative norm (approaching wheel lock); it activates TC when a rear wheel rotates faster than the comparative norm (wheel spin).

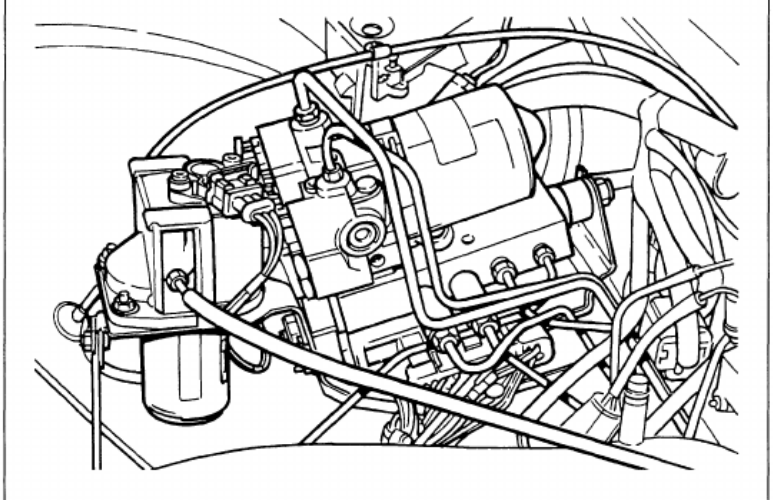
Components

Hydraulic Modulator - This incorporates a pump, motor, low pressure accumulator, valve block and control module (two modulator variants: traction control and non-traction control). Contained within the hydraulic modulator are the electro-hydraulic inlet and outlet valves which regulate brake system pressure during ABS and traction control. The modulator has 4 ports (two front, two rear) with traction control, 3 ports (two front, one rear) without traction control.

ABS/TC HYDRAULIC MODULATOR



ABS/TC HYDRAULIC MODULATOR & THROTTLE ACTUATOR



Wheel Speed Sensors - The four wheel speed sensors are hub end mounted and identical to the previous model year condition. The cables are re-routed to clear suspension components.

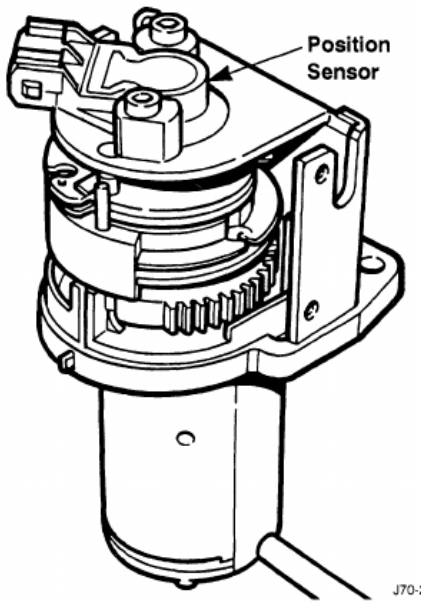
Warning Indicators - The three warning indicators are: ABS fail; traction fail; traction Off. In addition there is a brake warning light (for reservoir low) and a fascia switch panel mounted traction OFF/ON switch.

Throttle Valve Actuator - The traction control throttle valve actuator and position sensor are mounted adjacent to the hydraulic modulator.

Various Auxiliary Inputs - These provide information to the ABS/TC CM.

Diagnostic Communication Input/Output Link - Allows PDU to communicate with the ABS/TC CM.

TC THROTTLE VALVE ACTUATOR



System Description

ABS Control

The solenoid operated hydraulic valves are activated by signals from the ABS/TC CM, which are generated using signals received from the wheel speed sensors. Hydraulic pressure is applied by the modulator's motor/pump unit.

For vehicles without traction control, the valves operate on three circuits, two front and one rear, as necessary to prevent wheel locking during braking.

Brake pressure is modulated individually at the front wheels and collectively at the rear. Rear wheel control operates a 'select low' principle such that if locking in either wheel is sensed, brake pressure is controlled and will be applied to both wheels simultaneously.

For vehicles with Traction control, under ABS control, the system operates as previously described, even though there is a brake line to each wheel.

Note:

During TC, the drive (rear) wheels are hydraulically controlled separately.

The ABS/TC system as a whole is monitored constantly by the ABS/TC CM and is disabled (switched off until fault is rectified) automatically when certain failures are identified. In the event of a failure being detected, the ABS and TC malfunction indicator (MIL) lamps, located on the instrument pack, will illuminate. Full boosted brake operation and normal acceleration control is available when ABS/TC is disabled.

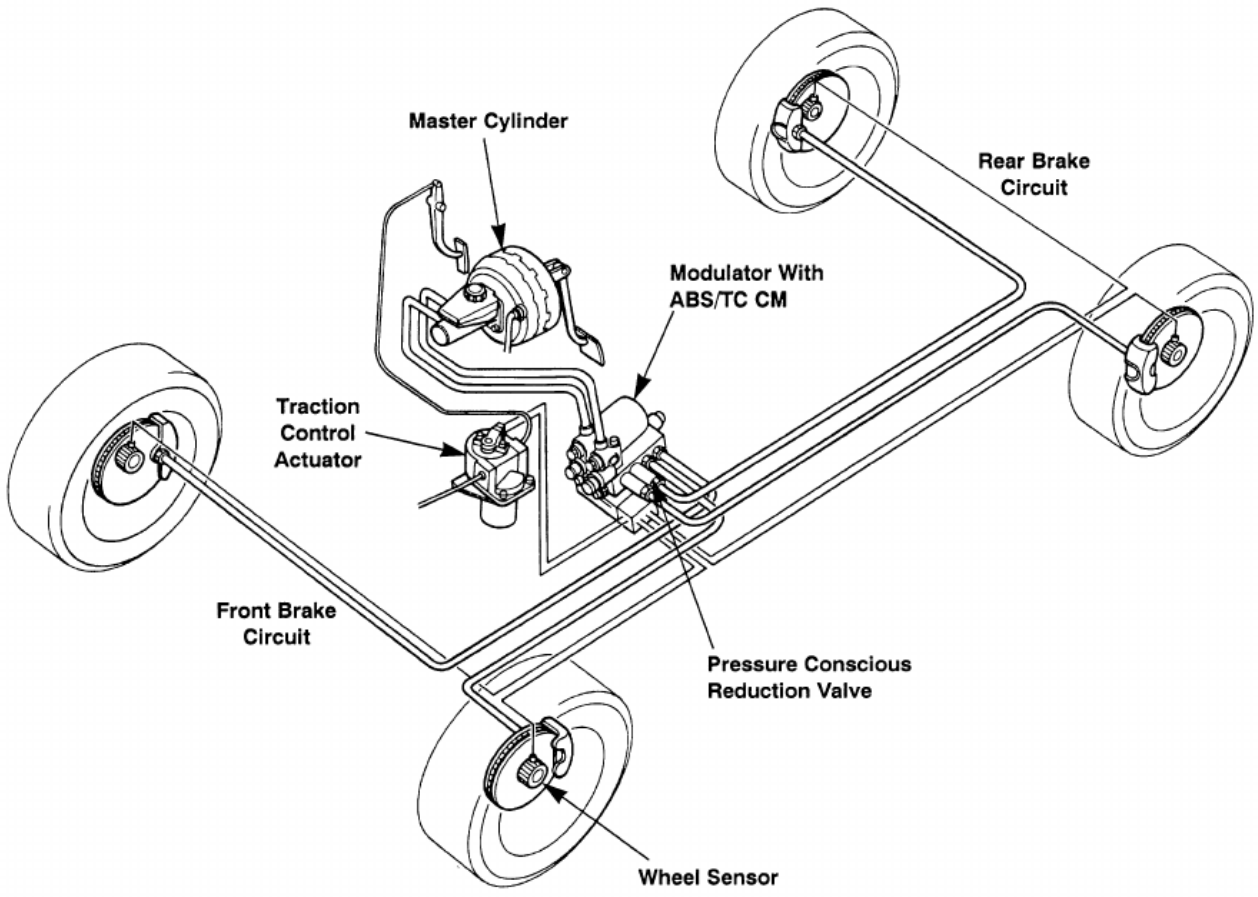
Traction Control

The traction control system prevents wheel spin at the drive wheels. As soon as a drive wheel starts to spin because of insufficient grip between the tyre and road surface, the system automatically reduces the torque of the engine by closing the throttle and applies brake pressure to the spinning wheel. Under normal operating conditions, the system is enabled by default. The ABS recognises a wheel spin by comparing all the wheel speed sensor inputs.

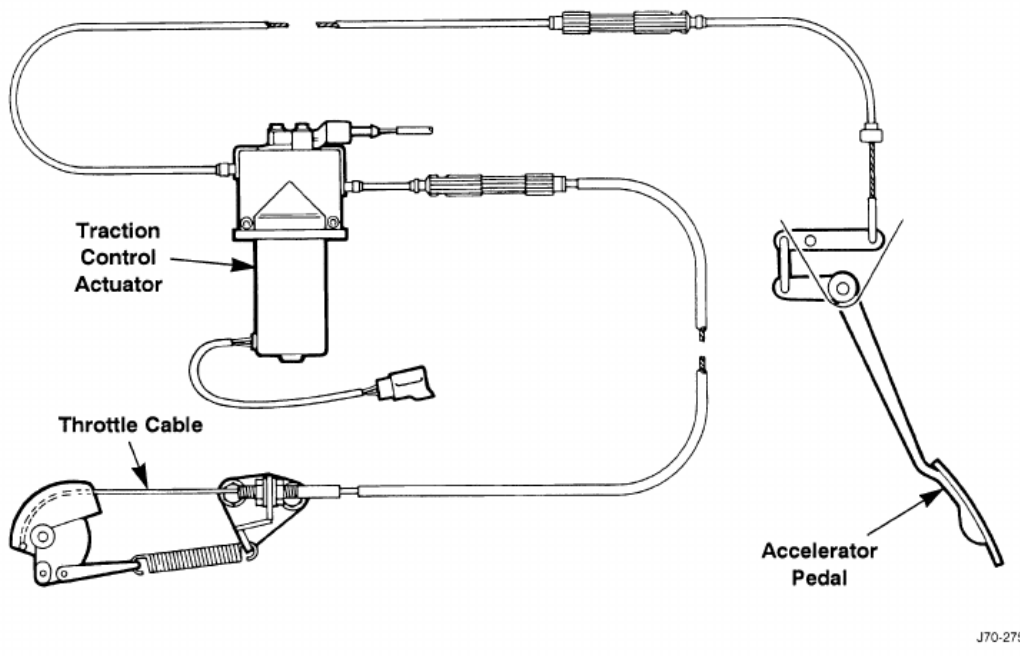
Throttle control is achieved by using a small motor and pulley arrangement, located in the throttle cable assembly. This adjusts the relative position of the throttle valve during TC. Using the rear wheel speed sensor inputs, the ABS/TC CM regulates the throttle valve position independent of the accelerator position to prevent wheel spin. Along with throttle control, braking pressure is applied through the ABS modulator's motor/pump unit, to the spinning wheel. Precise positioning of the throttle valve is achieved by the ABS/TC CM using the TC throttle position sensor input signal.

During traction control activation, the driver may notice a very slight fluctuation on the accelerator pedal.

ABS/TRACTION CONTROL SCHEMATIC LAYOUT



THROTTLE CONTROL ACTUATOR WORK ARRANGEMENT



When the ignition switch is turned from OFF to ON (position II) the 'Traction Off' warning indicator and 'Traction Fail' warning indicator will come on for approximately five seconds. This is part of the instrument panel bulb check cycle.

After the engine is started, the traction control system can be switched OFF by pressing the switch on the right-hand side of the fascia switch panel; the 'Traction OFF' warning indicator will come on and remain on while the system is switched off. To switch the traction control on, depress the switch again or restart the engine.

Should the 'Traction Fail' MIL come on while driving with the traction control system switched on, a malfunction in the system is indicated. See Electrical/Electronic section for instrument pack warning indicators.

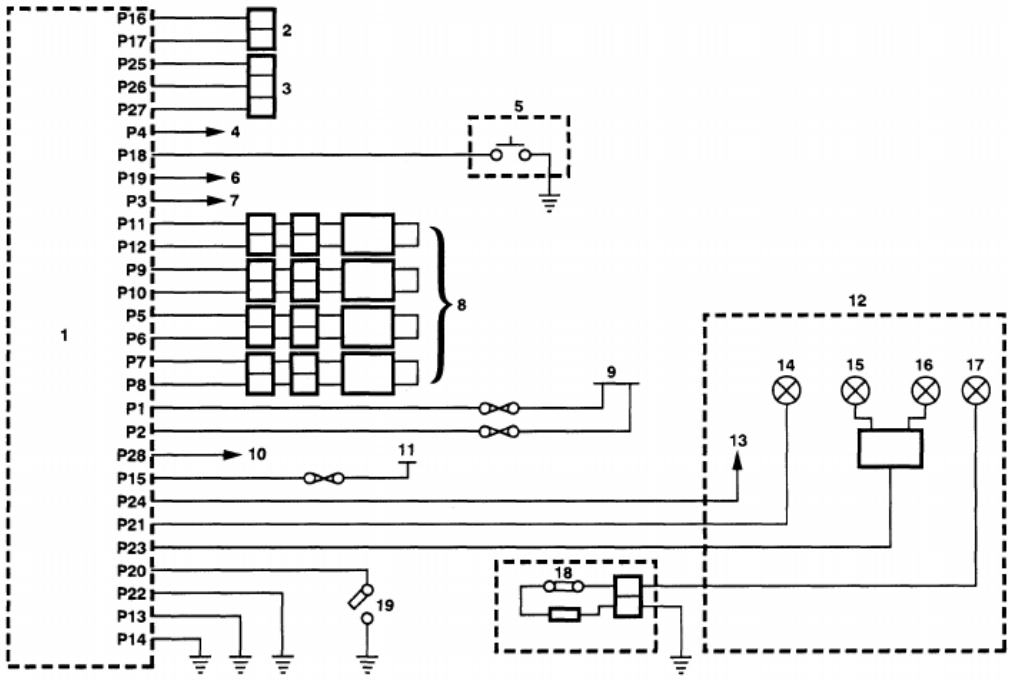
Should the 'Traction Fail' MIL come on while driving with the traction control system switched on, a malfunction in the system is indicated. See Electrical/Electronic section for instrument pack warning indicators.

Note:

If speed control is engaged, it will automatically be cancelled should traction control be activated.

A fuller ABS/TC system description is given in the Service Manual.

ABS/TC PIN OUT IDENTITY



1. ABS/TC Control Module
2. Throttle Valve Actuator
3. Throttle Position Sensor
4. Cruise Control Inhibit
5. Traction OFF/ON Switch
6. Not Used
7. Gearshift Inhibit (When Traction Control is Active)
8. Wheel Speed Sensors
9. Battery Voltage Input
10. Diagnostic Communication BUS
11. Ignition Voltage Input
12. Instrument Pack
13. Speedometer Signal
14. ABS MIL
15. Traction Control MIL
16. Traction Control OFF
17. Braking Warning Indicator
18. Fluid Level Switch
19. Stop Lamp Switch

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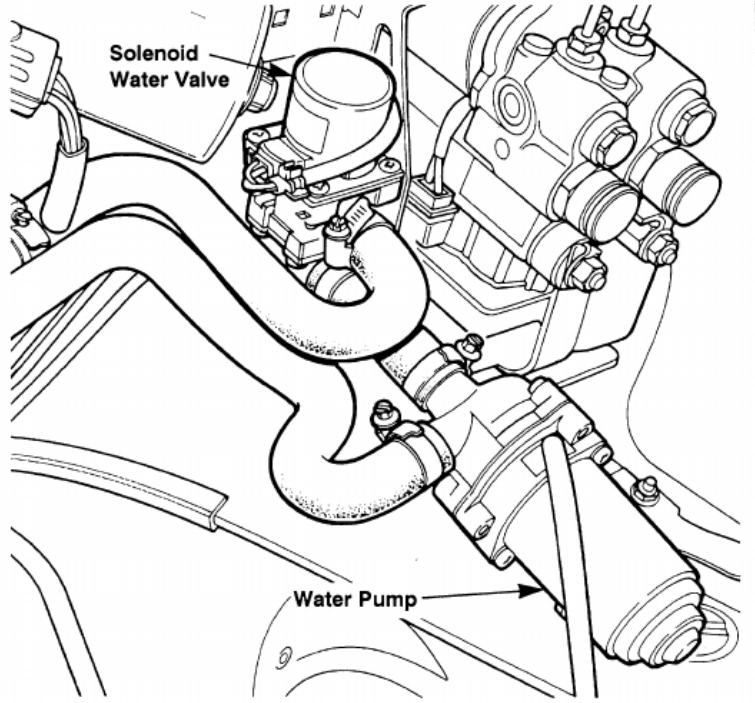
Heating and Cooling

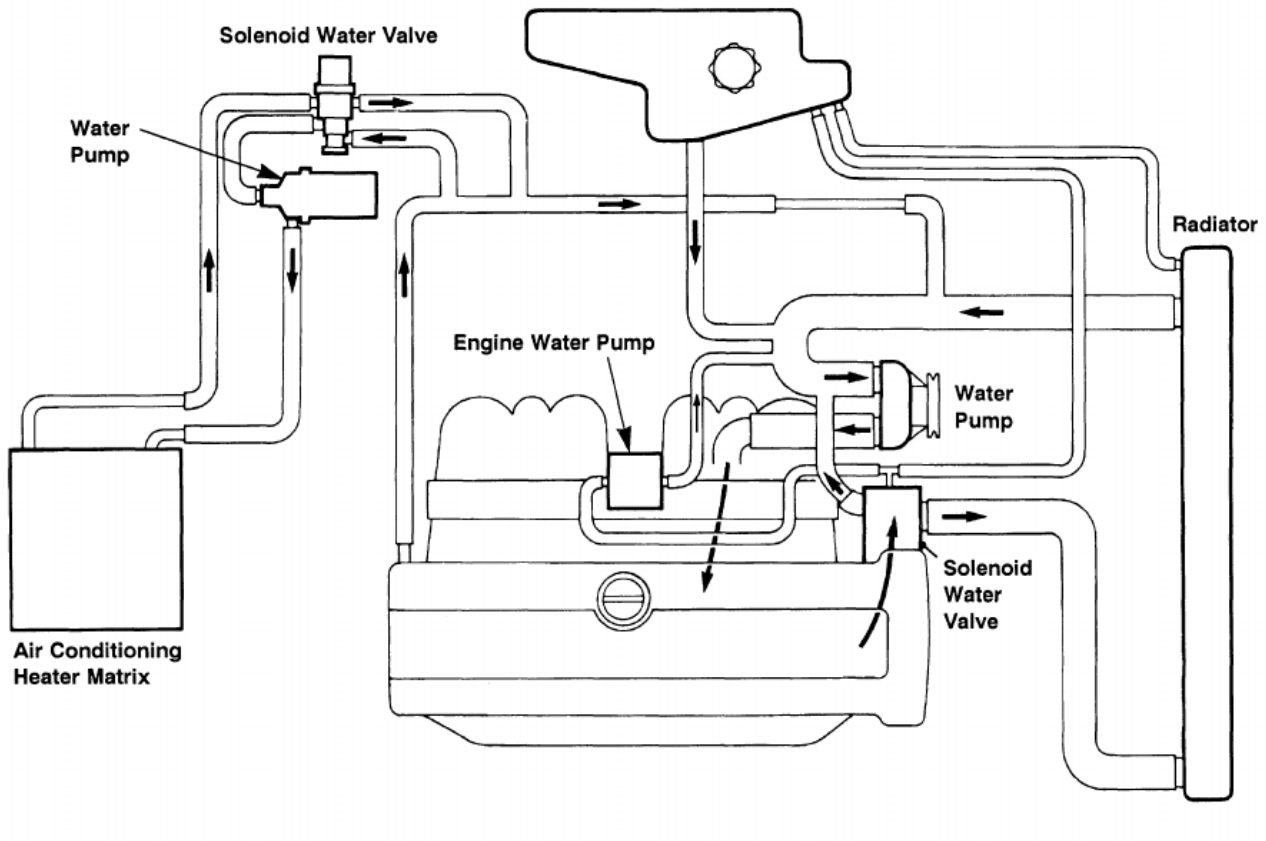
The heater matrix is supplied from the main engine coolant system via a solenoid operated valve. The valve is energised/ de-energised by signals from the A/CCM to allow engine coolant to flow into the air conditioning heater matrix until the desired temperature is reached. When the valve is open, coolant from the engine flows through the heater matrix and back into the main circuit. When the valve is closed, coolant circulates within a closed loop of valve - pump-heater matrix.

Because the flow rate of the engine coolant pump varies with engine speed, a separate electric coolant pump is provided to ensure a stable supply. The electric coolant pump runs continually when the engine is switched on. When a large amount of heat is demanded, the solenoid valve will remain open, routing coolant into the heater matrix until the desired level is achieved. Under normal running conditions, however, the coolant valve is opened and closed at intervals during a 6 second duty cycle. The length of time that the valve is open in each 6 second cycle is determined by the amount of heat required. Complete details on the heating circuit and refrigeration cycle are given in the Service Manual.

SOLENOID WATER VALVE AND PUMP



HEATING AND COOLING SCHEMATIC



Sensors

The aspirated in-car sensor, ambient sensor and solar sensor are all new NipponDenso components, but perform the same function as those on the previous model year. The sensors are situated in the following locations : aspirated in-car sensor - under driver's kneeroll; ambient sensor - brake cooling duct; solar sensor - between the screen outlets on top of dashboard.

The evaporative outlet thermistor is located alongside the evaporator fins to sense the temperature of air emerging from the evaporator. When the temperature approaches 0°C, a trigger is activated in the control module to disengage the compressor clutch and prevent freezing. The compressor is re-engaged when the temperature rises.

The heater core outlet thermistor monitors the heater core outlet temperature. Its signal controls the duty cycle of the coolant valve in order to maintain the temperature of air entering the cabin at the desired level.

Power Distribution

Substantial improvements are introduced to enhance the distribution and control of electrical power. These improvements are in line with the Jaguar policy of continuous development and are detailed below.

Power Supplies

The 120A generator is carried over from the previous model year. A new low maintenance battery is fitted in the right-hand side of the trunk adjacent to the electrical carrier. There are two battery variants: United Kingdom and Europe - VARTA 72 Ah; All Other Markets - VARTA 92 Ah.

Heavy duty cables distribute electrical power to five fuseboxes. The cables are protected by three power fuses: 2 X 250A (500A) in a cassette bolted to the battery positive post, and one fuse 250A in the rear seat pan.

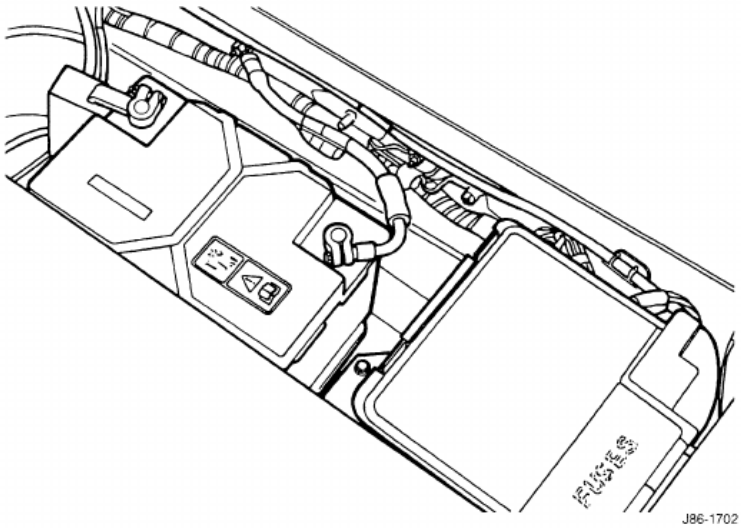
Fuses

A master fuse location label is on the underside of the toolbox which is located on the right-hand valance cover. All power lines are fused and there are no unfused feeds. The fuses are located in five fuseboxes: left and right-hand engine bay; left and right-hand heelboards, and the trunk. Those in the engine bay and trunk are readily accessible for servicing, and trim has to be removed to gain access to the two heelboard fuseboxes. Seat fuses are located in the opposite hand side heelboard fusebox to provide greater access in the event of a seat circuit failure. No provision is made to indicate fuse failure and there is no dedicated ignition fusebox.

Relays

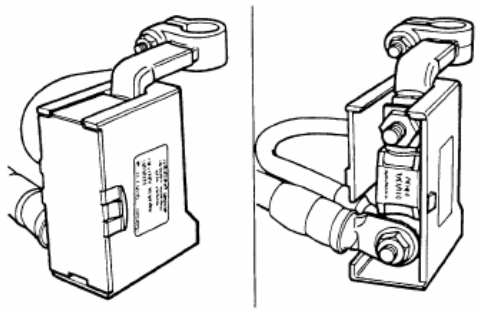
There are significant differences in both the type and layout of relays from the previous model year. Splashproof relays (black cases) are introduced for the first time in the engine compartment. Micro relays, which are about half the size of power relays are introduced for applications in which the current is less than 20A. There are no cycling relays located in the cabin.

BATTERY AND TRUNK ELECTRICAL CARRIER



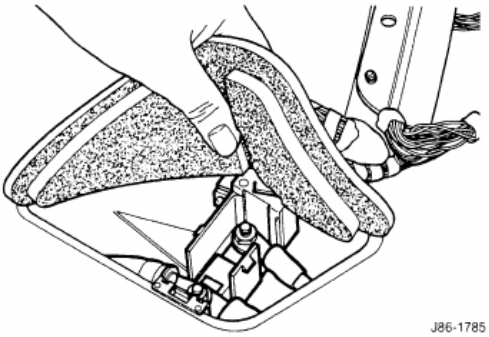
J86-1702

POWER FUSES - BATTERY MOUNTED

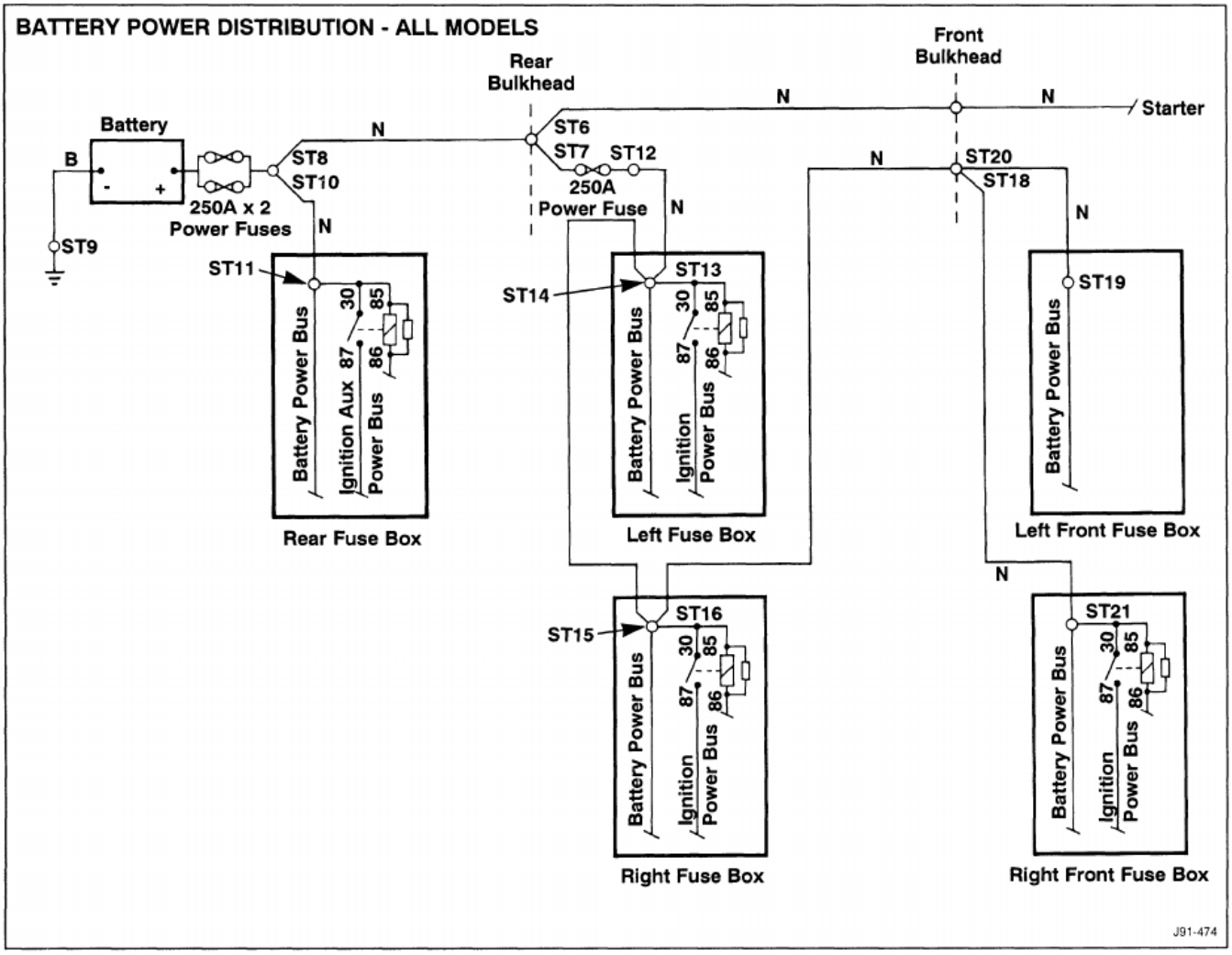


J86-1703

POWER FUSE - REAR SEAT PAN



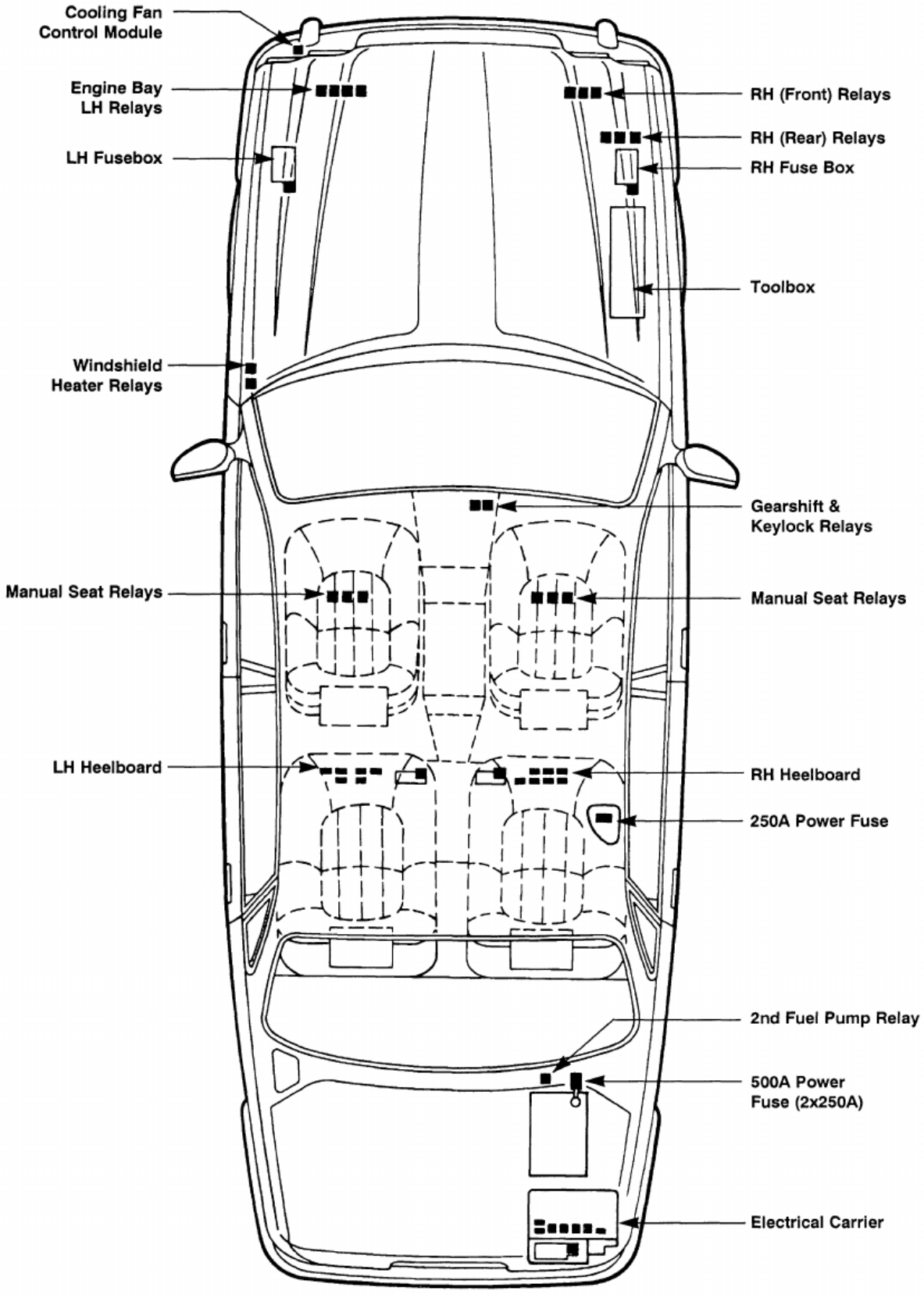
J86-1785



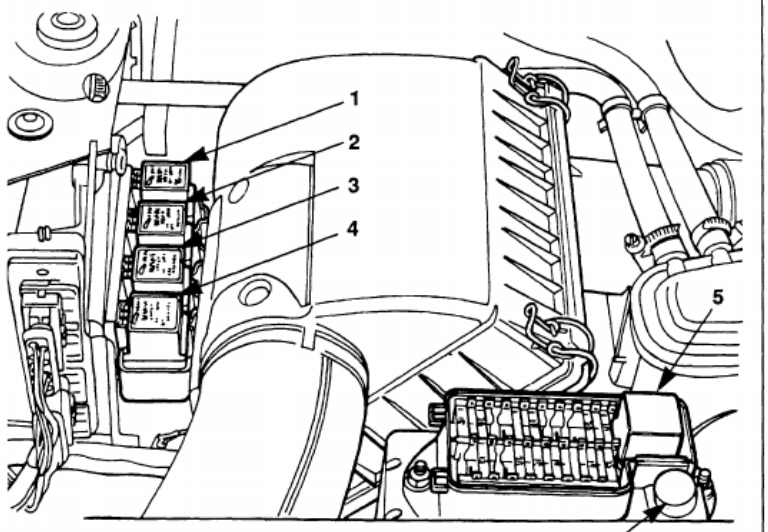
Accessory Supplies

Electrical supplies are provided for Jaguar approved accessories. There are two connectors: one at the bottom of the left-hand A post and another alongside the battery in the trunk. Both connectors are identified with accessory connection labels. The accessory relay and 30A fuse (F13) are located in the electrical carrier in the trunk (SEE ELECTRICAL CARRIER ILLUSTRATION AND KEY).

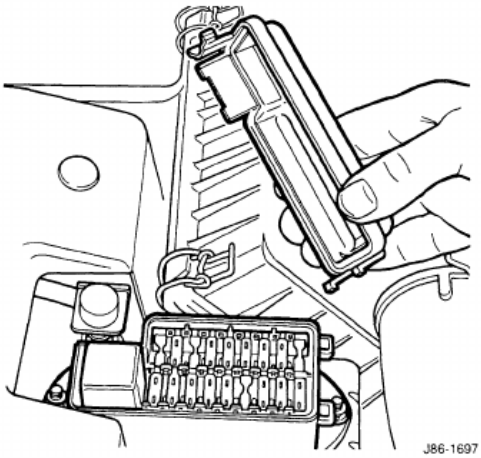
RELAY, POWER FUSE AND FUSE BOX LOCATIONS



ENGINE BAY LH RELAYS AND FUSES



FUSE BOX COVER REMOVAL



Engine Bay. Left-hand Side.

Relays

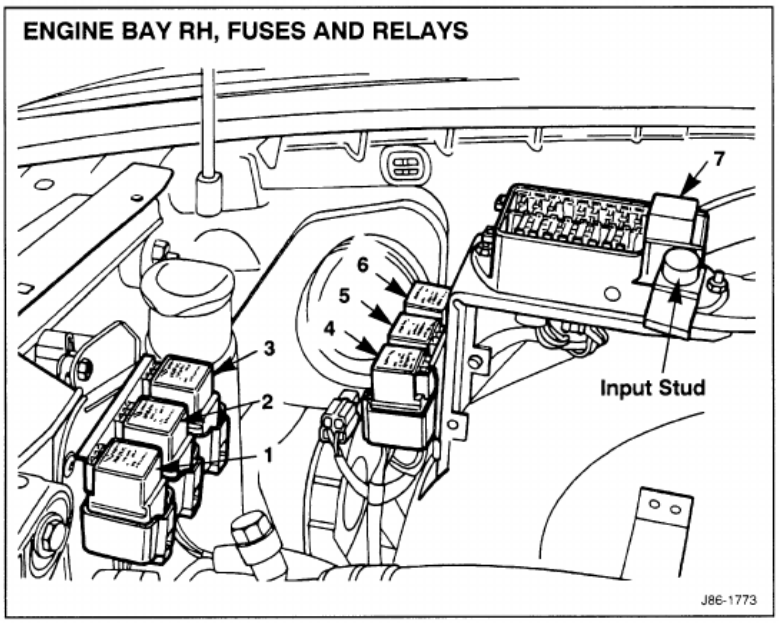
Unless otherwise stated, all relays have black cases and bases.

Position	Function
1	Starter solenoid. Fitted to all AJ16 and V12 engine model variants.
2	Air conditioning coolant pump. Fitted to all AJ16 and V12 engine model variants.
3	Wiper motor FAST/SLOW. Fitted to all AJ16 and V12 engine model variants.
4	Wiper motor ON/OFF.Fitted to all AJ16 and V12 engine model variants.
5	Horn. Fitted to all AJ16 and V12 engine model variants. Blue case and black base.

Left Fusebox. Fuse No 1 is next to the input stud

No.	Rating	Circuit
F1	25A	RH Heated front screen - right-hand (where fitted)
F2	10A	Main beam headlamp - left-hand side
F3	25A	Starter solenoid
F4	10A	Dipped beam headlamp - left-hand side
F5	10A	Side marker light - front left-hand side
		Direction indicator - front left-hand side
		Side repeater flasher - left-hand side
F6	20A	Windscreen wiper system
F7	-	not used
F8	15A	Coolant pump (Air conditioning)
F9	-	not used
F10	10A	Horn 1
F11	30A	Cooling fans -series/parallel
F12	-	not used
F13	-	not used
F14	10A	Horn 2
F15	25A	Heated front screen left-hand side (where fitted)
F16	-	not used
F17	30A	Cooling fans (series)
F18	10A	Front fog lamp -left-hand side (where fitted)

Engine Bay. Right-hand Side



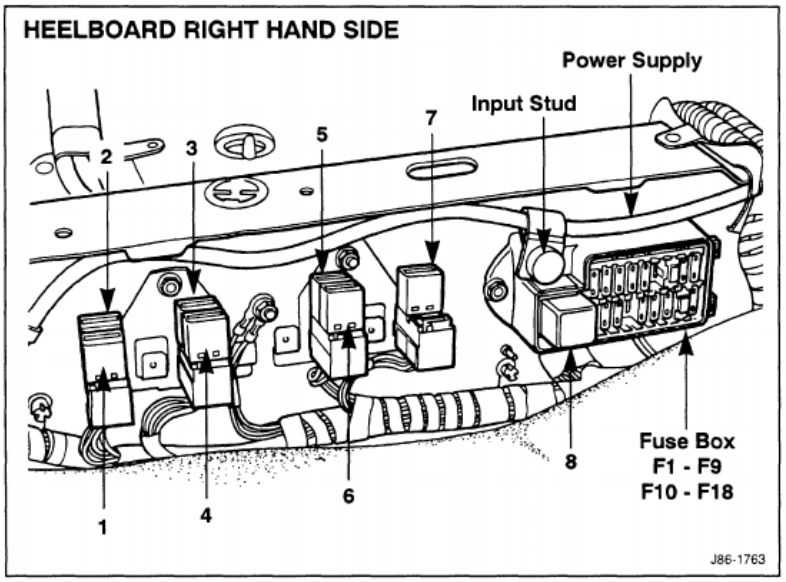
Relays

Unless otherwise stated, all relays have black cases and bases.

Position	Function
1	Air conditioning clutch relay. Fitted to all AJ16 and V12 engine model variants. In non air conditioned vehicles the relay is replaced by a dummy relay (black case/ white stripe).
2	Secondary air injection control. Fitted to AJ16 and V12 engine model variants. In non air injection vehicles the relay is replaced by a dummy relay (black case/white stripe).
3	Engine management system control (AJ16). PI Main (V12).
4	Ignition coil (V12).
5	Screen wash. Fitted to all AJ16 and V12 engine model variants.
6	Power wash. Fitted to all AJ16 and V12 engine model variants. In non-power wash vehicles the relay is replaced by a dummy relay (black case/white stripe).
7	Ignition. Fitted to all AJ16 and V12 engine model variants. Blue case/black base.

Right Fusebox. Fuse No 1 is next to input stud

No.	Rating	Circuit
F1	-	not used
F2	10A	Main beam headlamp - right-hand side
F3	-	not used
F4	10A	Dipped beam headlamp - right-hand side
F5	10A	Side marker light - front right-hand side, Direction indicator front right-hand side, Side repeater flasher - right-hand side
F6	5A	Engine Management System ECM
F7	25A	Air pump (3.2 and 4.0 litre) (where fitted), Ignition coils (6.0 litre V12)
F8	10A	Air conditioning clutch, Breather heater
F9	-	not used
F10	5A	Generator, Front lighting control module - right-hand, Air conditioning clutch, Windscreen wash/ headlamp power wash heaters and relays, Breather heater relay (3.2 & 4.0 litre)
F11	20A	Engine Management System, Starter relay, Ignition coil sensing and air pump relay (3.2 and 4.0 litre) Petrol injection relay, Engine management sensing (6.0 litre V12)
F12	10A	Engine Management System, Starter relay, Ignition coil sensing and air pump relay (3.2 and 4.0 litre) Petrol injection relay, Engine management sensing (6.0 litre V12)
F13	10A	Windscreen washer pump
F14	10A	HO2S heaters, Idle speed control valve
F15	-	not used
F16	10A	Air pump control, Solenoid vacuum valve (6.0 Litre V12), Coolant pump (4.0 litre Supercharged)
F17	30A	Headlamp power wash pump
F18	10A	Front fog lamp - right-hand side (where fitted)



Heelboard. Right-hand Side

Relays

All micro relays have black cases with a blue stripe and light-blue bases. Unless otherwise stated all relays are fitted to all AJ16 and V12 engine model variants.

Position	Function
1	Air conditioning blower. Left-hand side. High speed.
2	Air conditioning blower. Left-hand side.
3	Air conditioning blower. Right-hand side.
4	Air conditioning blower. Right-hand side. High speed.
5	Air conditioning isolator.
6	Cigar lighter.
7	Door mirror heaters.
8	Ignition. Light blue case, black base.

Right Fusebox. Fuse No 1 is next to input stud

No.	Rating	Circuit
F1	15A	Central door locking, Dead locking (where fitted)
F2	5A	Gear shift interlock, Column CM, Center console switch pack, interior lighting switch
F3	15A	Seat motors - left-hand side
F4	15A	Seat motors - left-hand side
F5	5A	Automatic Transmission CM
F6	-	not used
F7	30A	Anti-lock braking system (ABS) control via CM
F8	10A	Interior lights, Trunk lights,Garage door opener (where fitted)
F9	25A	Seat heaters
F10	5A	Jaguar Diagnostic System (JDS), Fuel pump relay coil
F11	20A	Air conditioning blower motor - right-hand
F12	10A	Air conditioning, Seat CM's, Mirror heaters relay, Power assisted steering
F13	-	not used
F14	10A	Mirrors, Heated rear window, Cigar lighter, Rear lighting control module -left-hand, High mounted stop lamp (where fitted)
F15	30A	RH window lift (front and rear) right-hand
F16	10A	Windscreen wiper system, Front screen heaters, Front lighting control module -left-hand, Coolant pump relay, Headlamp levelling (where fitted), Clock
F17	15A	Air bag
F18	15A	Sunroof (where fitted)

Heelboard. Left-hand Side

Relays

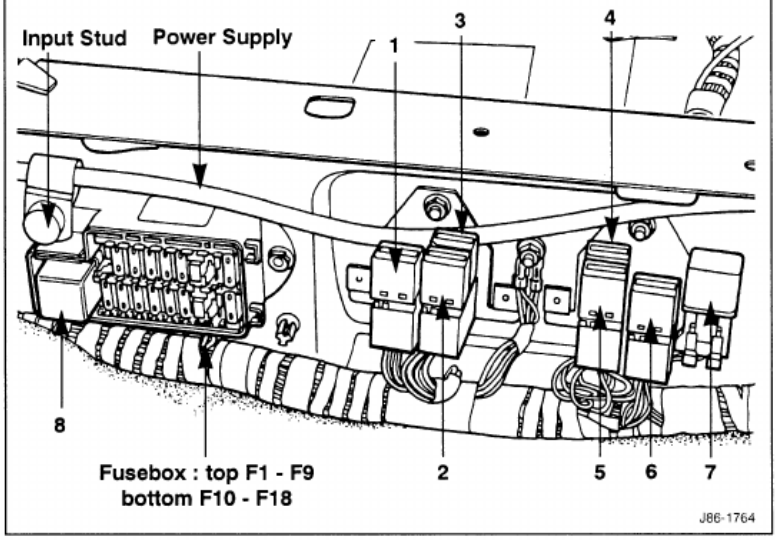
All micro relays have black cases with a violet stripe and a violet base. Unless otherwise stated, all relays are fitted to all AJ16 and V12 engine model variants.

Position	Function
1	Driver's side UNLOCK. Fitted only to vehicles in North America.
2	Doorlock UNLOCK.
3	Doorlock LOCK.
4	Deadlock: Front left-hand side and rear right-hand side. All vehicles except USA and Japan.
5	Deadlock: Front right-hand side and rear left-hand side. All vehicles except USA and Japan.
6	Fuel flap lock.
7	Puddle lamps. Light blue case, yellow base.
8	Ignition. Light blue case, black base.

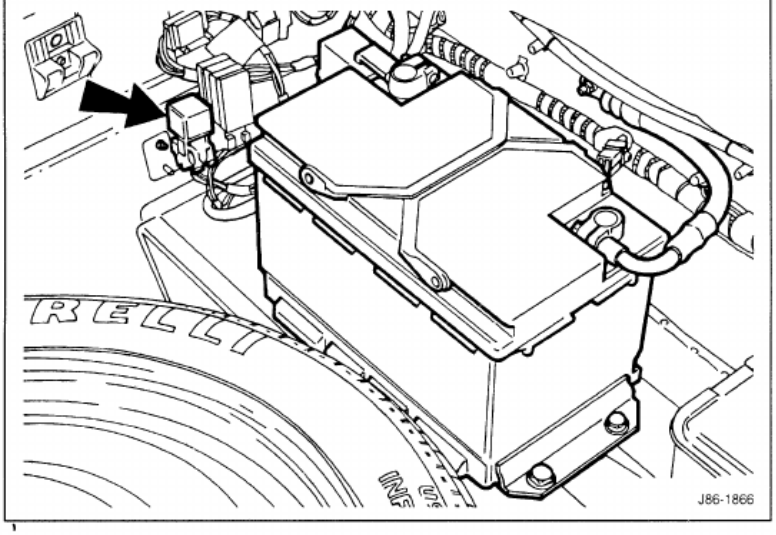
Left Fusebox. Fuse No 1 is next to the input stud

No.	Rating	Circuit
F1	-	not used
F2	10A	Heated door mirrors, Instrument illumination dimmer
F3	15A	Seat motors - right-hand side
F4	15A	Seat motors - right-hand side
F5	10A	Instrument pack
F6	5A	Seat CM's, Low power door switch pack, mirror motors
F7	30A	Anti-lock braking system (ABS) pump - via CM
F8	-	not used
F9	20A	Cigar lighters
F10	5A	Speed (cruise) control
F11	20A	Air conditioning blower motor - left-hand
F12	5A	Instrument pack
F13	15A	Steering column - electric power tilt/axial operation
F14	10A	Automatic transmission, Ignition supply
F15	30A	Window lift (front & rear) left-hand side
F16	5A	Anti-lock braking system (ABS), ignition supply
F17	-	not used
F18	10A	Air conditioning supply

HEELBOARD - LEFT HAND SIDE



SECOND FUEL PUMP RELAY



Second Fuel Pump Relay

The relay is located adjacent to the battery in the trunk. It operates the second fuel pump fitted to all supercharged AJ16 and V12 engine model variants. The relay has a light blue case and a yellow base.

Trunk Electrical Carrier

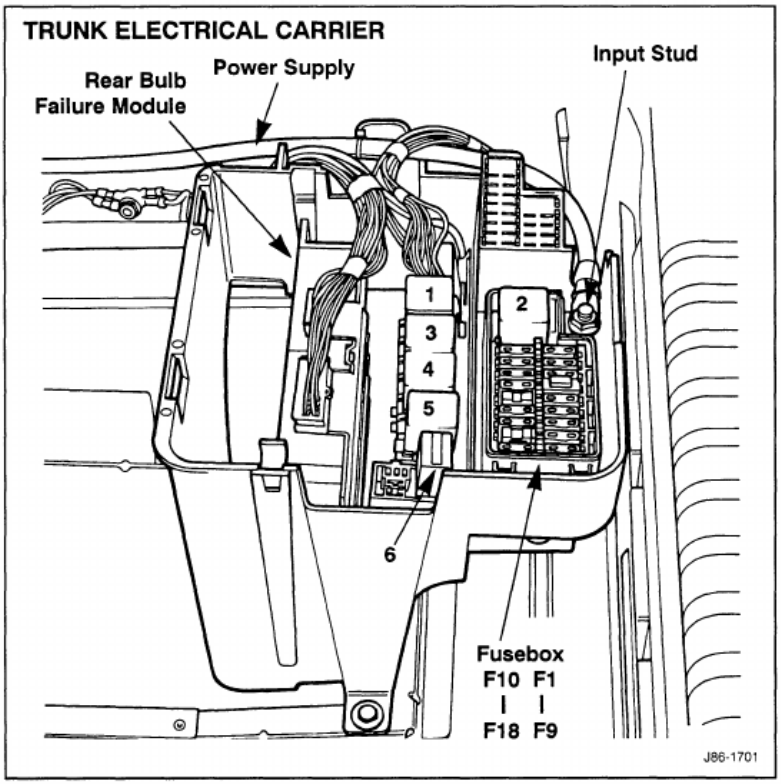
Relays

All relays have light blue cases, except the luggage release micro relay which has a black case with a violet stripe. The base colors of each relay are set out below.

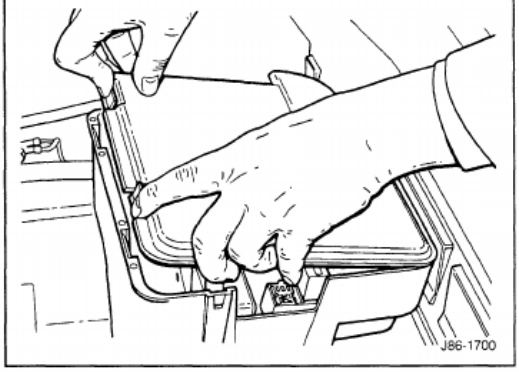
Position	Function
1	High mounted stoplamps - red base.***
2	Auxiliary positive relay - light blue base.
3	Fuel pump - green base.
4	Accessory relay - black base. Dealer fit.
5	Heated rear window - yellow base.
6	Trunk release - violet base.

*** HIGH MOUNTED STOPLAMPS Mandatory fitment: USA, Canada, Australia, New Zealand, Israel.
Optional fitment: all other markets except Italy, France, Holland, Belgium, Germany

TRUNK ELECTRICAL CARRIER



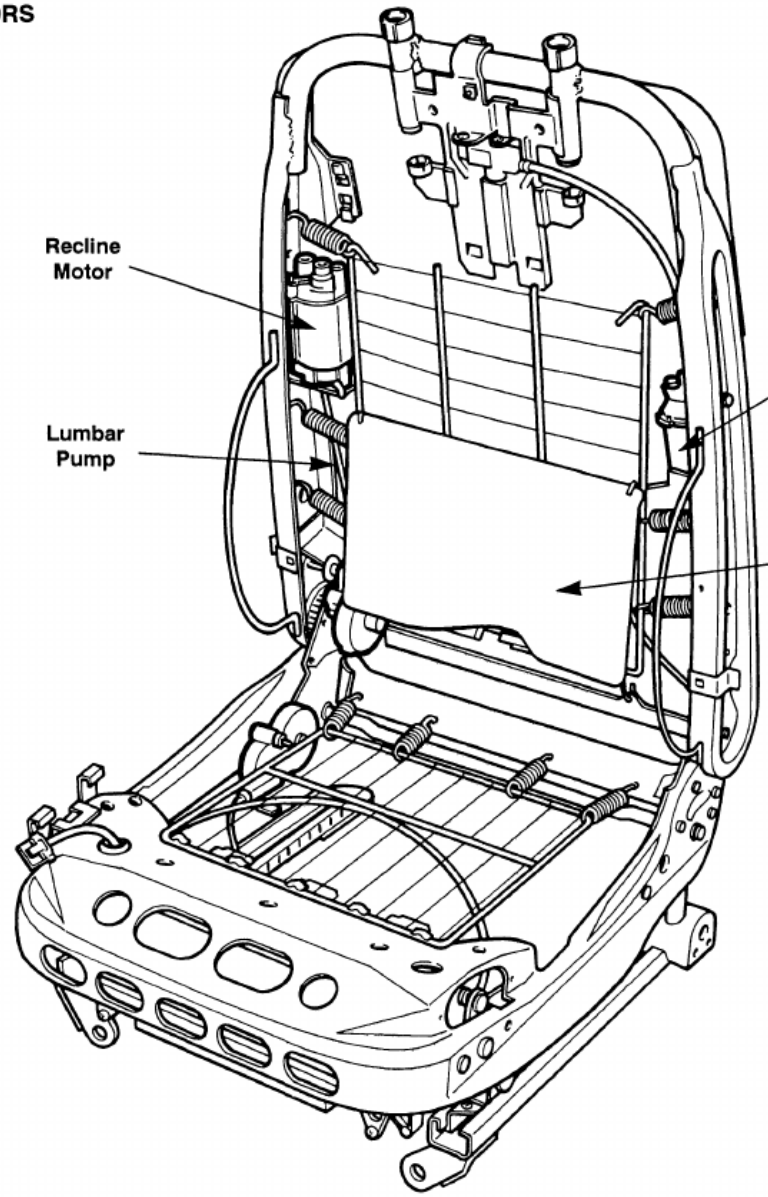
COVER REMOVAL

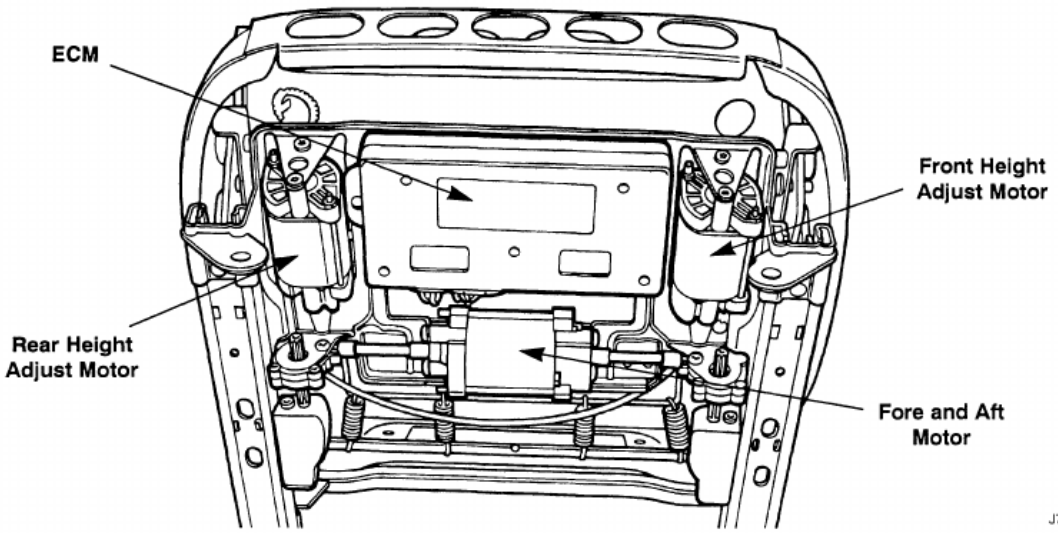


Fusebox. Fuse No 1 is next to the input stud

No.	Rating	Circuit
F1	25A	Power amplifier - radio/cassette and compact disc player (where fitted)
F2	5A	Tail light - left-hand side marker, Number plate light - left-hand side
F3	15A	Reverse lights, Stop light - left - hand side, Direction indicator - rear left-hand side
F4	10A	Security system
F5	10A	Central processor unit (CPU)
F6	5A	Jaguar Diagnostic System (JDS), Radio telephone (where fitted)
F7	30A	Fuel pump
F8	15A	Trunk remote release, Aerial, Radio/cassette and compact disc player memory feed
F9	15A	Rear fog guard lamps, Stop light,right-hand side, Direction indicator,rear,right-hand side
F10	5A	Radio/cassette and compact disc player control relay
F11	25A	Caravan/ trailer module
F12	5A	Accessories and telephone relay
F13	10A	Accessories
F14	-	not used
F15	25A	Heated rear window
F16	5A	Air bag warning
F17	-	not used
F18	5A	Tail light - right-hand side , Number plate light - right-hand side

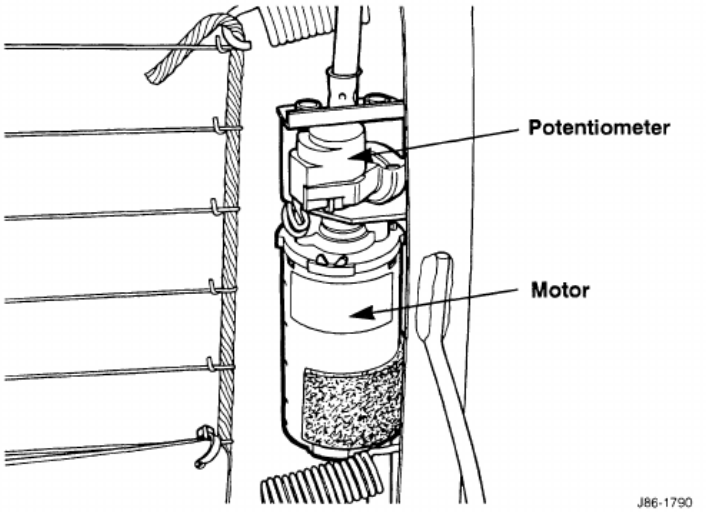
FRONT SEAT MOTORS





J76-985 & J76-986

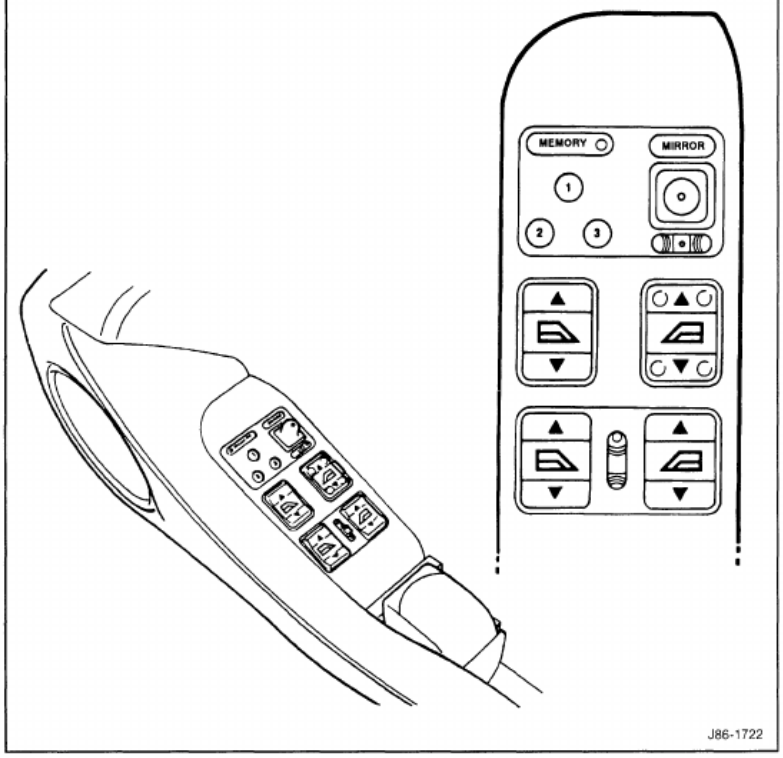
SEAT MOTOR AND POTENTIOMETER



Front Seat Position Adjustments

The driver's and front passenger's powered seats are each equipped with a dedicated electronic control module, wiring harness and electric seat motors and lumbar pump. Adjustments of the seat, steering column and exterior view mirrors are made by operating the appropriate control switches. Releasing a switch immediately stops movement. On seats equipped with driving position memory, the motors are fitted with position feedback potentiometers.

DRIVER'S DOOR SWITCH ASSEMBLY



Driver/Passenger Door Switches

New switch assemblies are fitted in all doors. The driver's door assembly comprises: all window lift switches and the rear window isolation switch; the mirror select and adjustment switch and seat memory switches.
The front passenger's door switch assembly houses the window lift switch and seat memory switches. The rear passenger doors are fitted with window lift switches only.

Reverse Mirror Tilt

The passenger side rear view mirror may be tilted down using the mirror switch, to assist parking, when reverse gear is selected. It returns to the original position when reverse gear is disengaged or the mirror switch is operated.

Driving Position Memory

The electronic control module can memorise up to three different driving position profiles: the position of the driver's seat; the angle of the exterior rear view mirrors, and the tilt and height of the telescopic steering column.
Storing a driving position profile can only be achieved with the key in the ignition switch.
The procedure is simple:
Adjust the seat, steering column and exterior rear view mirrors to the desired position.
Push set button, and when the light illuminates push memory buttons 1,2 or 3 to store the driving profile. The set light then extinguishes and a beep sound indicates the setting is complete.

Automatic Memory Recall

A driving profile is recalled by pressing the appropriate 1,2 or 3 button. The following conditions must be met before the memory can be activated:

Key in ignition and gear shift in P position;
or Key in ignition switch and handbrake on;
or Key out of ignition switch, drivers door open and within 30 seconds of closing the door.

Memory recall will stop if: the relevant memory button, manual adjustment switches or brake pedal are operated while a driving profile is being recalled from the memory.

A driving position profile cannot be recalled while the vehicle is moving.

The memory is non-volatile and will not be erased if the vehicle's battery is disconnected.

Roof Console

A new roof console housing the interior and map lamps and associated switches is installed in the vehicle. There are four variants: standard; standard plus sunroof switch; standard plus universal garage door opener (UGDO) and standard plus sunroof and UGDO. The last two mentioned are for the North American market only. All consoles incorporate a stowage compartment for sun glasses.

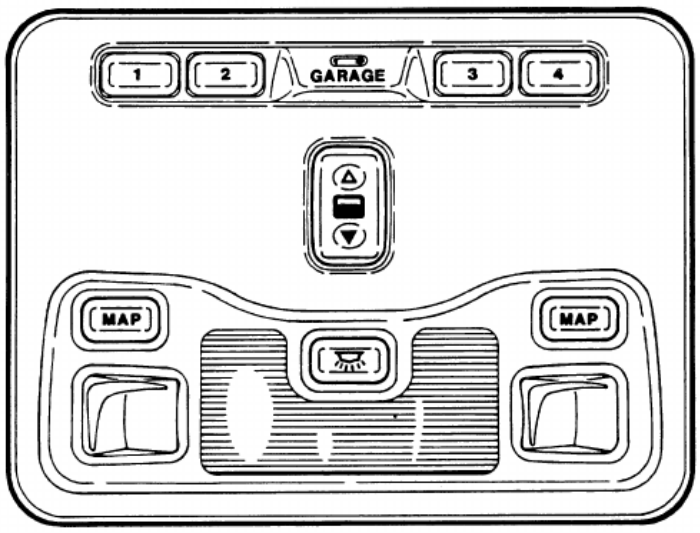
Universal Garage Door Opener

(North America Only)

The universal garage door opener (UGDO) activates up to four proprietary garage door opening transmitters from switches in the roof console. The UGDO module, installed in the roof console, scans transmitted signals within the 220Mhz - 390Mhz range and stores them in a non volatile memory.

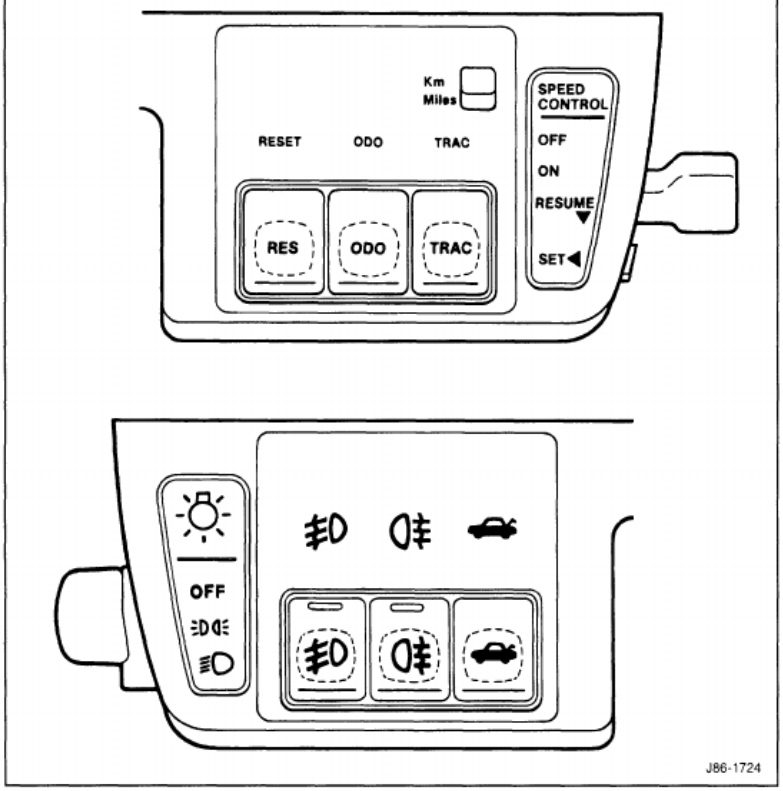
Instructions on how to programme an UGDO to emulate transmitter signals is given in the owner's handbook.

ROOF CONSOLE



J86-1836

LEFT AND RIGHT FASCIA SWITCH ASSEMBLIES



Fascia Switch Assemblies

The left and right-hand switch assemblies are modified and color coordinated with the fascia. The left-hand assembly incorporates a new shaped lighting switch, together with switches for the front and rear fog lamps and trunk release.

A new cruise control paddle switch is fitted to the right-hand assembly. The trip computer keyboard and keyboard illumination switch have been deleted. These are replaced by the odometer, reset, traction control and km/miles switches. Both switch assemblies have their own electrical connectors.

Security System

A new security system is introduced with the following security and convenience features.

Security Features

- Two-button radio frequency (RF) transmitter, with flashing LED indicators
- Engine immobilisation (not USA/Canada or markets without perimeter sensing fitted)
- Vehicle perimeter sensing for doors, trunk and hood (optional in certain markets)
- Tilt sensing to prevent tow-away theft (Dealer fit in certain markets)
- Passive arming of the vehicle (Dealer option)
- Warning labels on side windows
- Drive-away door locks
- Two-stage unlock (USA and Canada)
- Deadlocking (Not North American and Japanese markets)
- Central locking
- RF remote panic alarm (USA and Canada as standard - Dealer option elsewhere).

Convenience Features

- Driver's seat memory select (optional in certain markets)
- Trunk lock isolate switch
- All close - Sunroof and window closing after all doors (using door key)
- Remote headlamp convenience
- Remote trunk lid release.

Note:

The radio frequency remote system operates on a frequency subject to its destination market legislative requirements.

Radio Frequency (RF) Key-ring Transmitter

The Security System is controlled remotely, by a radio frequency (RF), battery operated key-ring transmitter. This locks and unlocks all doors and the trunk and arms or disarms the security system alarm and controls various convenience features.

Two transmitters are supplied with each vehicle and are designed to be attached to the driver's key ring.

The key-ring transmitters are effective within an area of approximately ten metres (33 feet) anywhere around the vehicle.

The key-ring transmitter is activated by aiming it at the vehicle and pressing one of the two operating buttons; the large button locks the vehicle and sets the security system alarm, whilst the small button unlocks the vehicle and disarms the security system alarm. When either one of the buttons is pressed, an LED on the key-ring transmitter flashes; red for the large button, green for the small button.

Transmitter Battery Renewal

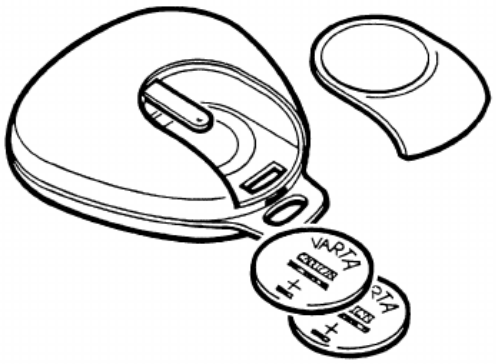
When a noticeable reduction in the effective range of the key-ring transmitter occurs, and the red and green LED's flash less brightly, battery renewal is required.

Note:

If the transmitter batteries are removed for a period greater than two minutes, or a transmitter button is pressed whilst the batteries are removed, the transmitter will loose its rolling code synchronisation and will need to be reprogrammed using PDU or JDS.

To renew the batteries, carefully prise off the circular battery cover with a slim blade and remove the twin disc battery cells. Fit two new cells with the side marked positive (+) uppermost. Refit the battery cover and click into place with light thumb pressure.

BATTERY RENEWAL



J86-1696

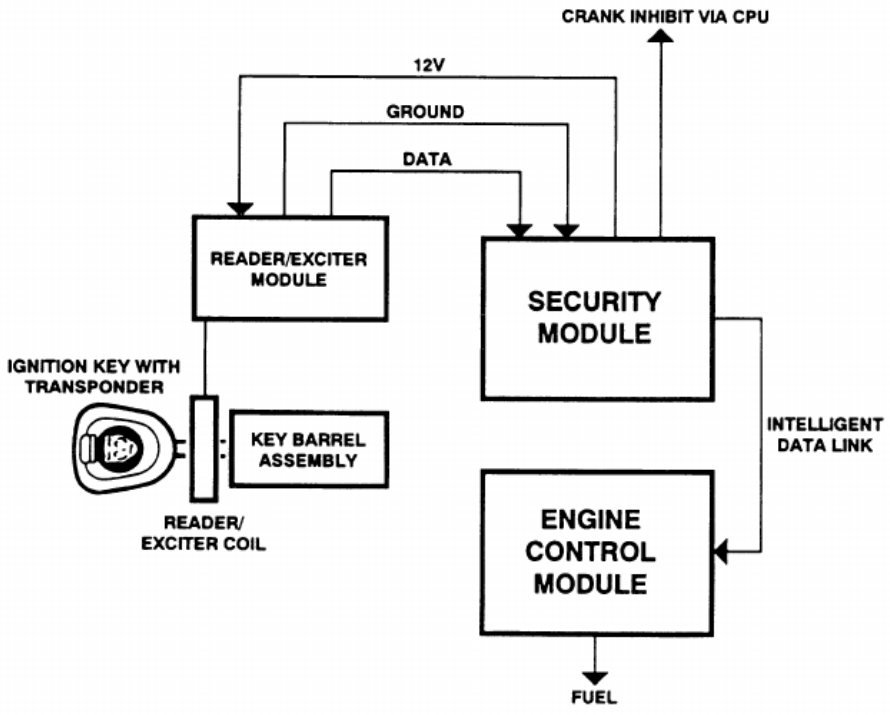
Key Transponder Engine Immobilisation System

The key transponder is injection moulded into the ignition key head, and is thereby invisible to the customer. Should the transponder fail, the key must be replaced. The immobilisation system inhibits fuelling via the engine management ECM plus cranking of the engine.

The following electrical functions are also immobilised:

- Direction indicators (except hazard)
- Windscreen wipers
- Crank relay
- Heated seats
- Audible warnings and tick tock
- Gearshift interlock
- Interior light
- Lighting logic
- Visual warning (instrument pack).

IMMOBILISATION SYSTEM



J86-1692

Drive-away Door Locking
This facility locks all the doors and trunk as soon as the gear selector is moved out of the 'PARK', position. Whilst driving, all the locks can be unlocked by either pressing the central locking button or by lifting the driver's or passenger's door lock button.

Note:
The fuel filler flap remains unlocked.

If the doors are unlocked while driving and 'PARK' is selected (without switching ignition OFF), the doors and the trunk will relock when the gear selector is moved out of 'PARK'.

Component Locations

Security and Locking CM
Located between the trunk inner rear panel and the rear LH fender as on previous model year vehicles.

Intrusion Sensors
Located on the RH and LH sides of the passenger compartment headlining as in previous model year vehicles.

Inclination Sensor
Located to the rear of the security and locking CM.

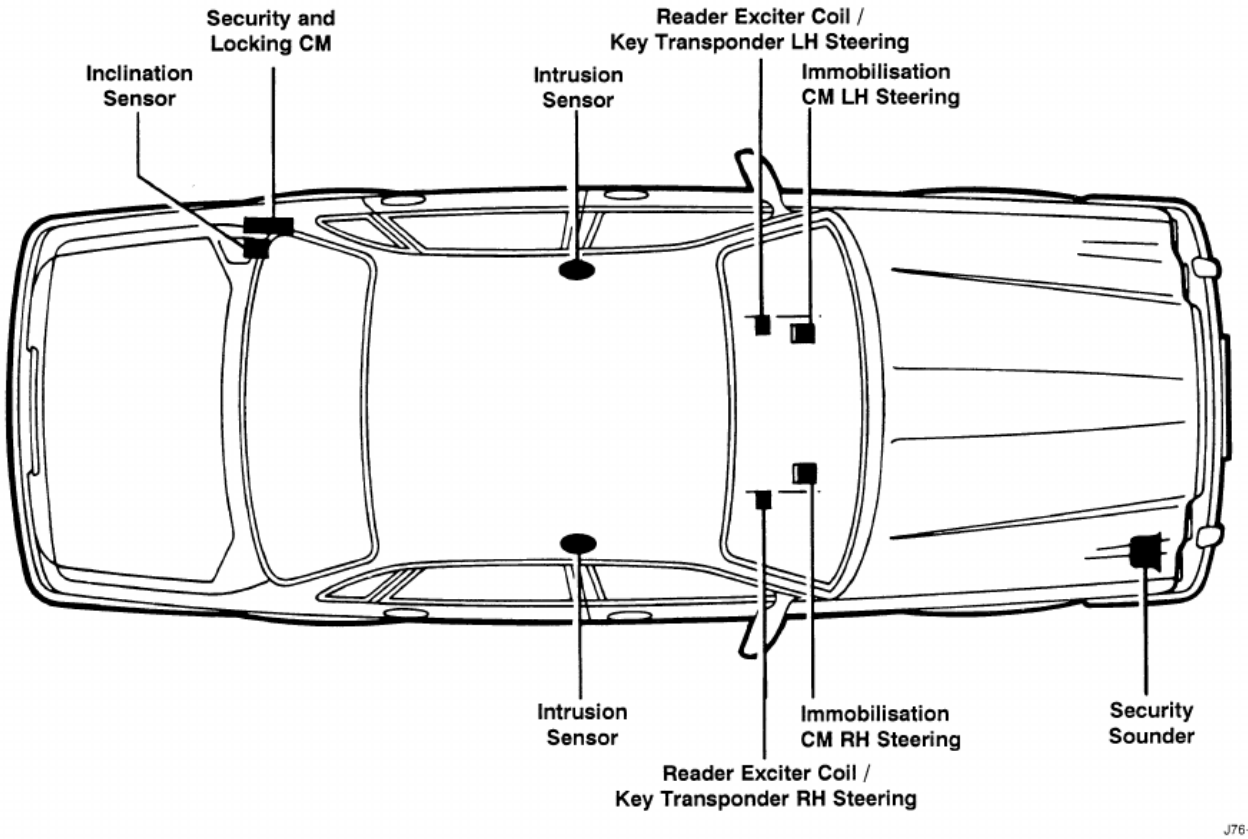
Security Sounder
Located behind the RH headlight unit, in the engine bay.

Immobilisation CM
Located on the underside
of the instrument pack, on the opposite side of the steering column to the mirror/column memory CM.

Reader Exciter Coil
Located around the ignition key barrel, behind the lower column cowl moulding.

Key Transponder
Injection moulded into the key head.

COMPONENT LOCATION



PECUS/PDU Programmable

The security and locking CM is pre-programmed at vehicle build to meet the functional and legislative requirements of its destination market. There are three functional/legislative modes:

1) UK/Europe specification
2) North American specification
3) Rest of World (ROW) specification.

It is possible to enable/disable certain features in service by the use of the portable diagnostic unit (PDU). These Dealer programmable features are listed below:

Audible Alarm

- Time duration for panic alarm
- Time delay prior to passive arming
- Time duration for audible tick.

Central Locking

- Key immobilisation
- Slam locking inhibit
- Enable gear selector position locking.

Remote Central Locking

- Remote panic
- Headlamp convenience
- Memory seat recall
- Memory seat 1
- Memory seat 2
- Remote trunk release.

Security System 1

- Inclination sensing
- Intrusion sensing during passive arming
- Enable passive arming.

Security System 2

- Enable audible tick via sounder
- Enable arming tone
- Enable disarming tone
- Error tones
- Enable battery back-up sounder
- Active disarming via the key transponder
- Intrusion: 00 No intrusion sensing
  01 Low sensitivity
  10 Medium sensitivity
  11 High sensitivity.

Replacement Key

- Key transponder learn mode
- Transponders programmed flag.

Key-ring Transmitter or Transponder Key Loss

Before supplying the customer with a replacement transmitter or transponder key, the Jaguar Dealer must ask for proof of vehicle ownership. Keys containing transponders and key ring transmitters are only available at Jaguar Dealers.

The transmitters can be re-programmed to the vehicle in service if a transmitter or the rolling code is lost by either:

1) The PDU
2) A 'flick' switch mode via the trunk valet switch, when the vehicle is disarmed. The Service Manual will provide details on this function.

Transponder keys can only be programmed to the vehicle using a PDU. If all keys are lost, the Dealer must provide on-site service or have the vehicle transported to the Dealership.

In-car Entertainment

Main Components
The radio cassette player is substantially different from the one installed in the previous model year.

Styling
The panel has larger graphics and two stage illumination to make it compatible with the air conditioning panel. The liquid crystal information display provides a positive image; dark characters on a light background.

New Features
(See owner's Sound System handbook for more information)

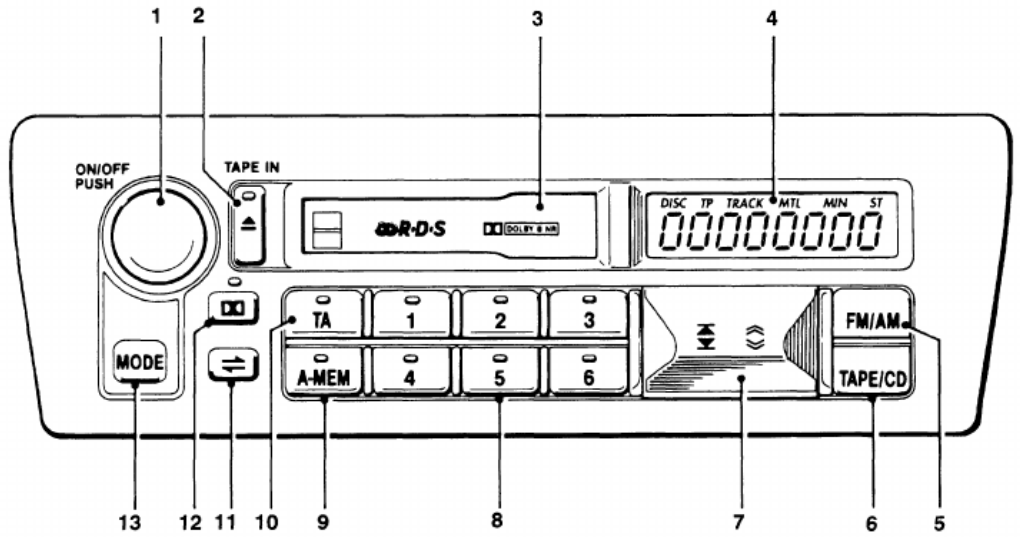
Wiring Harness
A dedicated wiring harness is installed to minimise radio interference. It follows the same route as the harness in the previous model year vehicle. The harness connectors are: an AMP 20 way multilock; a 6 pin DIN and an 8 pin DIN.

Automatic Volume Control
Sound volume automatically increases to counteract the effect of road noise as vehicle speed increases.

Radio Data Systems (RDS)
United Kingdom and Europe only. Assists in finding and staying tuned to a selected radio station. When this control is pressed, the radio station name is displayed in eight characters.

Telephone Interface
Dealers may configure the system with the following features: "set-up" mode; tape clean warning; aerial clean warning; telephone interface ON/OFF; RDS mode normal/mute. For USA & FAR EAST markets the radio frequency can be configured for USA or AUSTRALIA.
Many of the controls are multifunctional in order to provide the widest possible range of facilities. For specific operation of the controls refer to the owner's sound system handbook.

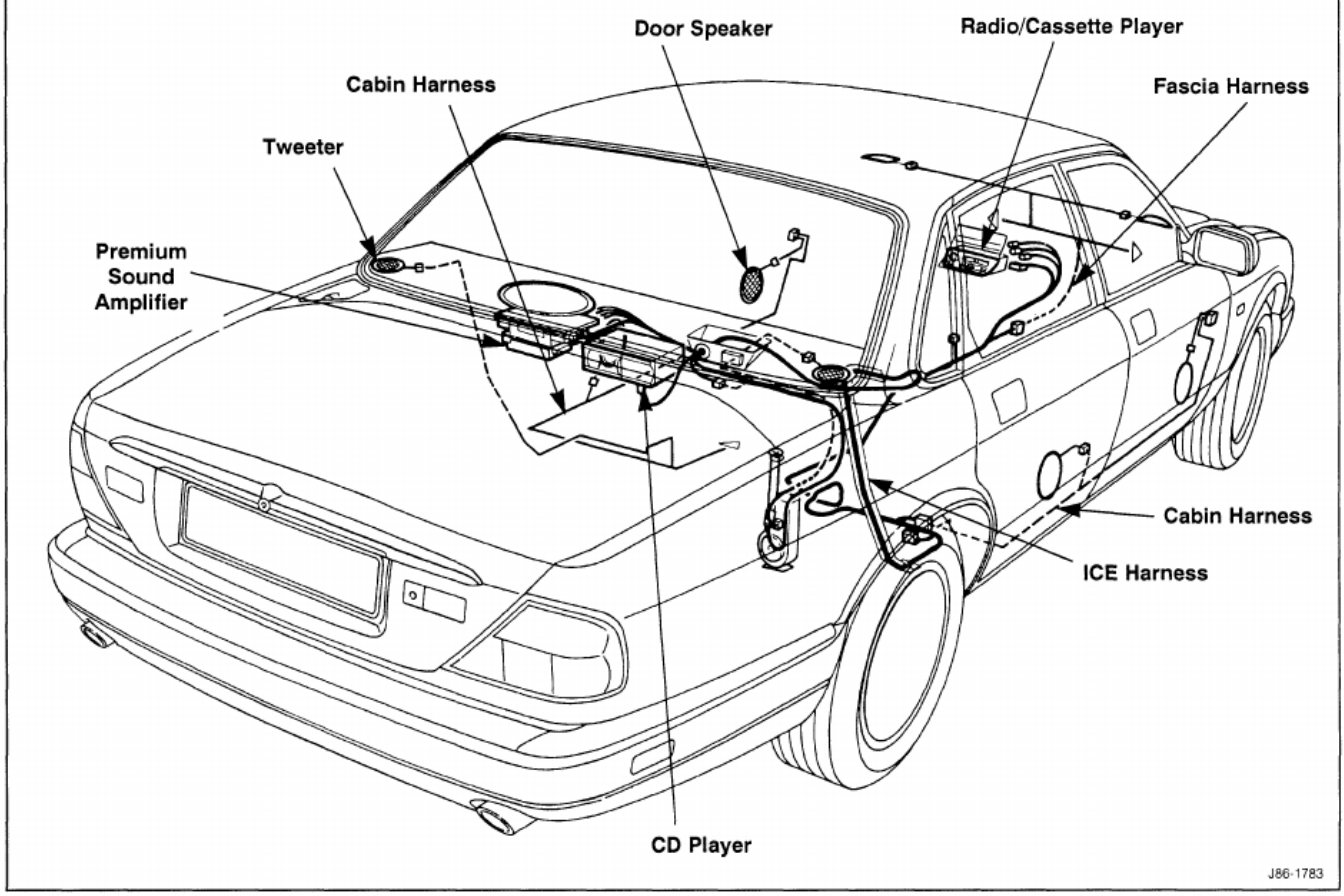
RADIO / CASSETTE PLAYER



1 Push ON/OFF and rotary volume control
2 Cassette eject and Tape in LED
3 Cassette deck auto reverse
4 LED display
5 FM/AM band switch
6 Cassette tape CD/player button
7 Radio tuning control, Cassette tape forward/rewind control and CD player forward/reverse control (where fitted)
8 Presets 1-6 for radio stations and CD's
9 Auto memory (A-MEM)
10 Radio Data System(RDS), SCAN or Traffic Information (Japan only)
11 Programme change (cassette operation)
12 Dolby B noise reduction
13 Mode: treble,bass,fader,balance

JWX-126

ICE HARNESS AND CONNECTORS



Options

The six disc CD autochanger is carried over from the previous model year.

Customers will be offered the option of a premium sound system.

Installation

The eight speakers and electric, rear mounted antenna are carried over from the previous model year.

Fixtures and fittings for the radio/cassette player and speakers are carried over from the previous model year.

The CD autochanger and antenna are also carried over from the previous model year. The CD autochanger is secured by new fixing brackets in the trunk.

Cellular Telephone

New Features

The wiring harness is a standard fit in vehicles for USA and Germany and an option elsewhere. The microphone is color coded with the interior trim.

There is a new in-car entertainment interface providing an audio-mute facility and hands-free speech through the in-car entertainment speakers.

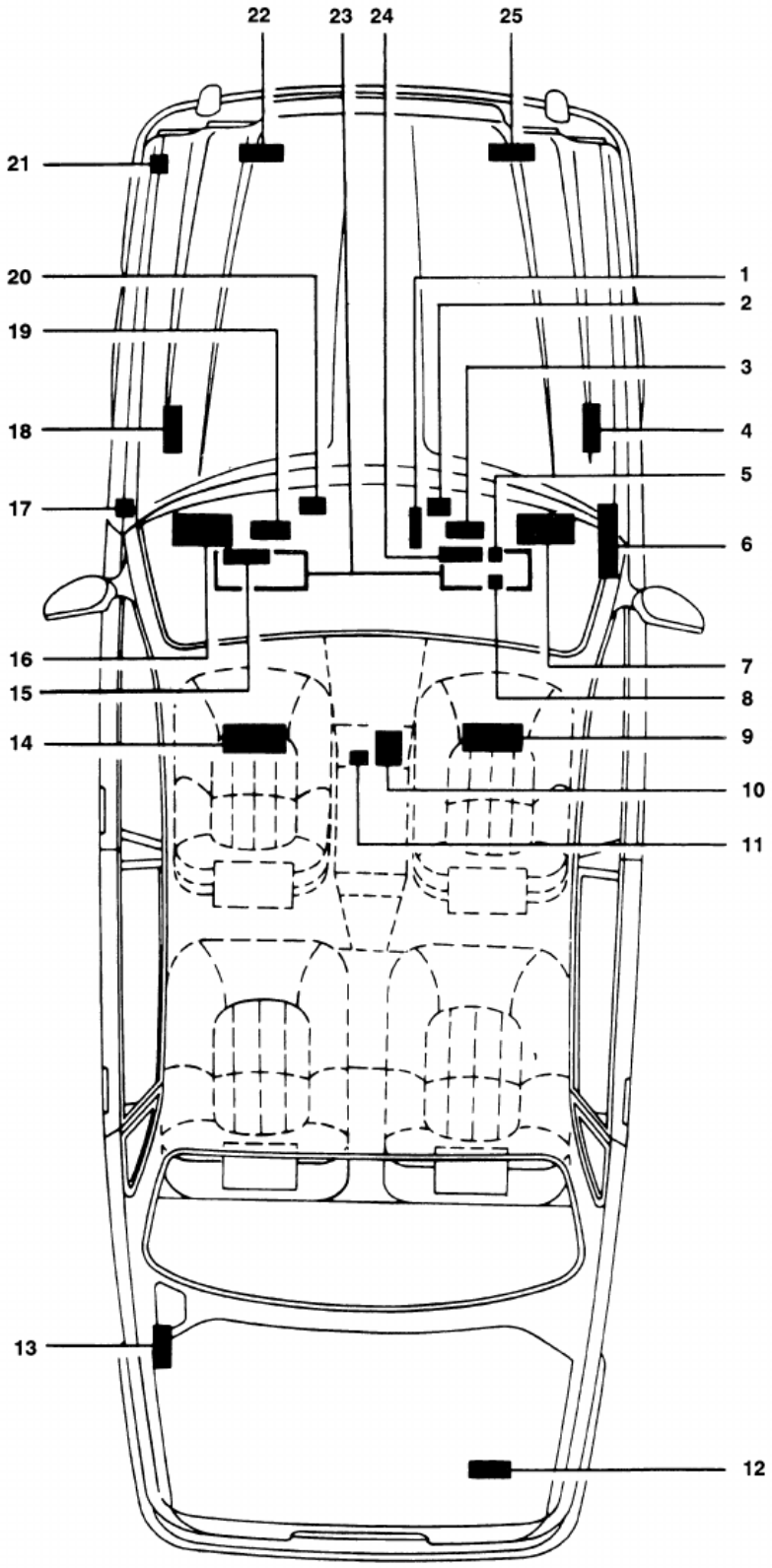
The transceiver is moved from under the CD Changer to a new location. It is now installed on the left-hand side of the trunk beneath the parcel shelf and is secured by new mounting brackets. This is also the location of the optional in-car entertainment premium sound amplifier (where fitted) and transceiver.

Drivers who wish to retain their cup-holders are offered a new, handset mounting pod on the passenger side of the console.

Note:

When installing a Jaguar Motorola telephone, the radio "TEL MUTE" must be activated via the set up mode.

ELECTRONIC CONTROL MODULES



1 Air Conditioning CM
2 Cruise Control, Right-hand Drive
3 Body Processing Module, Left-hand Drive
4 Teves, Left-hand Drive
5 Column/Mirror CM
6 Engine Control Module
7 Transmission Control Module, Left-hand Drive
8 Reader Exciter
9 Seat & Mirror Memory
10 Sunroof
11 Universal Garage Door Opener
12 Rear Bulb Failure
13 Security
14 Seat & Mirror Memory
15 Supplementary Restraint Systems (SRS) Diagnostic Module, Right-hand Drive
16 Transmission, Right-hand Drive
17 Servotronic Steering Module
18 Teves, Right-hand Drive
19 Body Processing Module, Right-hand Drive
20 Cruise Control, Left-hand Drive
21 Cooling fan control module
22 Bulb Failure Module Forward
23 Instrument pack
24 SRS Diagnostic Module, Left-hand Drive
25 Bulb Failure Module Forward

J86-1693

Occupant Restraints

ELR/ALR Seat Belts - USA/Canada

The new emergency locking retractor/automatic locking retractor (ELR/ALR) can be recognised by the translucent planetary gear cover at one end. It is fitted to the three passenger seats (not driver's seat or center rear position).

The new seat belts have two operating modes:
1) Inertia reel mode (ELR), for adult passengers
2) Static reel mode (ALR), for children (in child seats).

The inertia reel mode operates as the previously fitted type, allowing the occupant some freedom of torso movement. The static reel mode prevents belt payout and thereby does not allow the occupant freedom of torso movement. When the seat belt is attached to a child seat which has its own independent harness, the static mode must be used. For child seats that do not have their own independent harness, refer to the seat manufacturer's instructions.

The seat belt defaults to the inertia reel (adult passenger) mode when in the stowed (fully retracted) position.

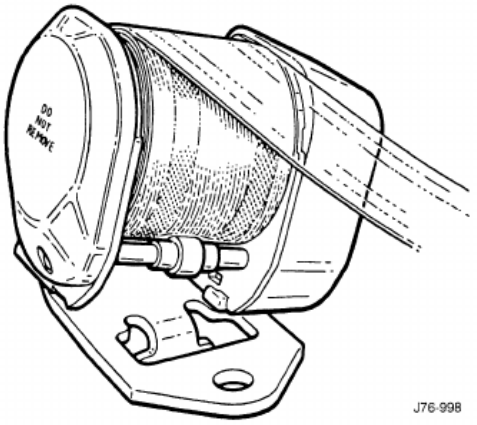
To activate the static reel (child seat) mode, pay out the belt to its full extension. The ratchet mechanism is now engaged. When retracting the belt back into the reel, the ratchet operation may be felt. It can be noticed that the belt is unable to reverse direction.

To revert to the inertia reel mode, pay the belt back into the reel to the stowed position.

Anchorage Location Change

On the front seats, the outboard anchorage for the lap belt portion of the seat belt is moved from the BC post to the seat slide. This enables the anchorage to always move with the seat when the occupant slides the seat forwards or backwards.

SEAT BELT RETRACTOR



Tear Loop Units

Tear loop units, are fitted to both front seat belts for all markets. Web Lockers (fitted in certain markets) are no longer provided. The passenger's tear loop unit is fitted to the seat belt buckle. The driver's unit is fitted to the outboard anchorage.

The seat belt tear loop reduces chest load as the occupant travels forward into the air bag in the event of a vehicle front end collision. The tear loop is housed in the buckle assembly and is coupled with a wire coil. When deployed, the wire uncoils along with the tear loop, taking energy out of the system to reduce chest load. When the buckle head appears from the shroud, a warning label becomes visible, indicating that the buckle assembly must be replaced.

Supplementary Restraint Air Bag System

General

The previous all mechanical system is replaced by an electro-mechanically sensed air bag system. The same system is fitted worldwide. The air bags are located, as before, in the center of the steering wheel and in the passenger side fascia panel. In the event of an impact, both air bags are designed to deploy at the same time.

When the ignition switch is turned to position II, the 'SRS AIR BAG' malfunction indicator lamp (MIL) on the instrument panel illuminates for approximately five seconds (as part of the instrument panel bulb check cycle). This indicates that the air bag system is functional. The MIL is supplemented by the word 'AIRBAG' on the liquid crystal display (LCD) odometer/trip computer panel, located below the speedometer.

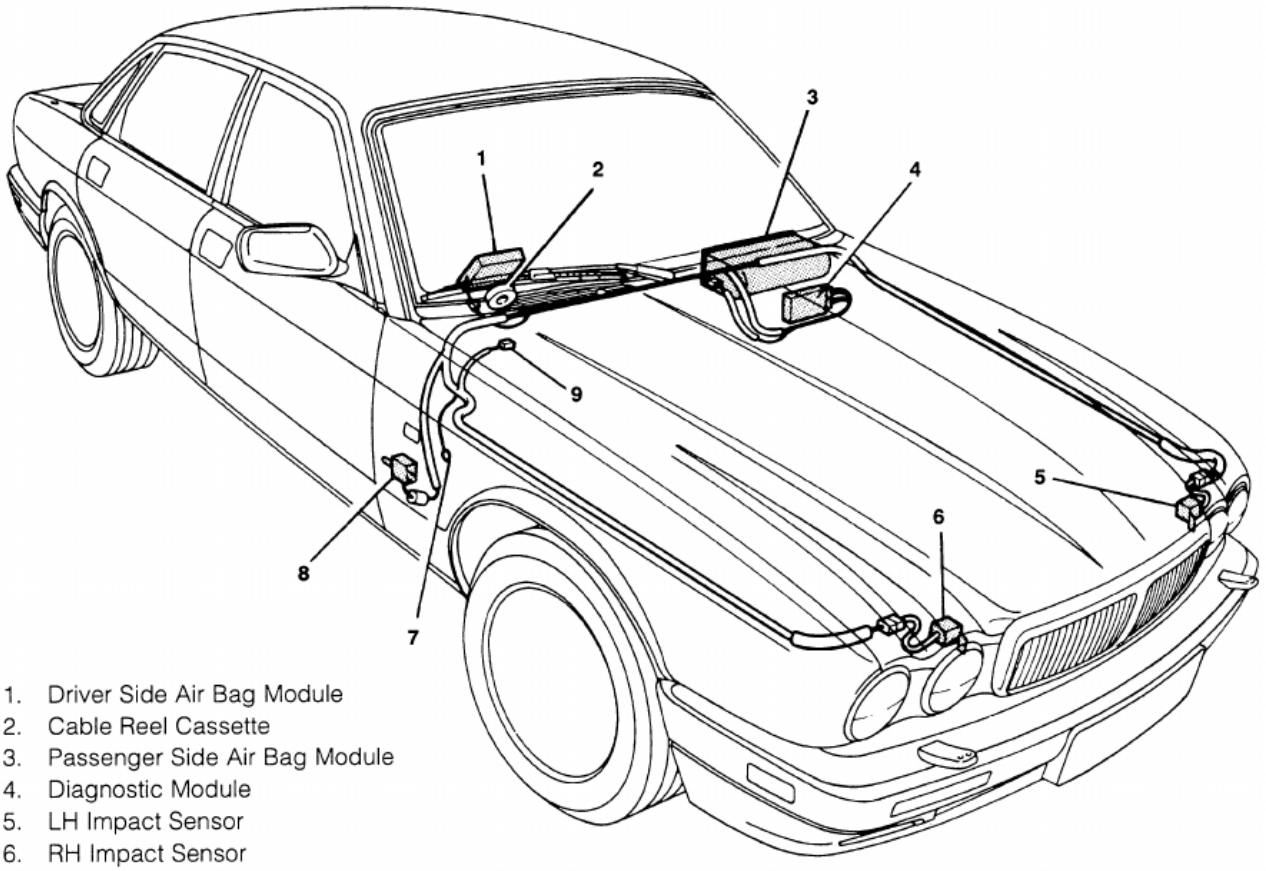
System Description

The supplementary restraint system (SRS) installation comprises:

- Driver and passenger side air bag modules
- Two front impact sensors
- One safing sensor
- Electronic diagnostic module
- Dedicated wiring harness
- One cable reel cassette (integral part of the steering column harness)
- Malfunction indicator lamp (MIL) and driver information message.

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

SRS INSTALLATION



1. Driver Side Air Bag Module
2. Cable Reel Cassette
3. Passenger Side Air Bag Module
4. Diagnostic Module
5. LH Impact Sensor
6. RH Impact Sensor
7. Ground
8. Safing Sensor
9. Cabin Harness Connector

J86-1690

In the event of a collision, the impact/safing sensors operate, completing the electrical firing circuit and causing the air bags to inflate. At least two of the three sensors (one impact and one safing) must be activated to initiate firing. For the system to be operational, the ignition switch must be in position II.

Faults in system components, installation or wiring are indicated by the illumination of the 'SRS AIR BAG' MIL, located on the instrument panel. Indication is also given by the driver information message 'AIRBAG' displayed on the LCD panel.

Note:

If a fault exists within the SRS, the 'AIR BAG' message can be removed from the LCD display by pressing the 'ODO' button. It will reappear the next time the ignition is switched on, unless the fault is rectified.

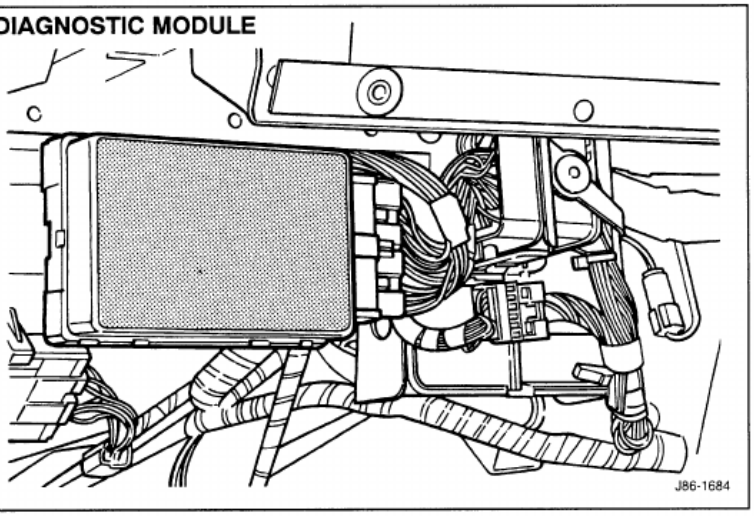
Component Description

Diagnostic Module

The diagnostic module (DM), is mounted below the passenger side air bag behind the console fascia panel. It is the electronic microprocessor that monitors the airbag system. The state of the three system sensors, two air bag modules and the wiring harness is monitored continuously to detect activation criteria and component faults.

The module also confirms correct supply conditions by comparing a direct battery voltage input, with an ignition switched input, of the same voltage value. Detection of system faults are relayed by the module to the instrument panel to illuminate the AIR BAG MIL.

DIAGNOSTIC MODULE



The module contains a reserve power supply unit, enabling the air bags to fire even if the supply voltage is lost during an impact situation. The reserve power charge is retained for approximately one minute after the supply voltage is disconnected.

Wiring Harness

A dedicated wiring harness, covered in yellow sheathing, independent of any other vehicle system, is used to electrically connect all the SRS components. To allow for steering column movement and steering wheel rotation, a cable reel cassette is incorporated into the driver side air bag module circuitry. The cable reel cassette forms an interface between the steering column and the air bag module. Due to its coiled construction, it is able to expand or retract as required. The cable reel cassette is driven by a tang located in the steering wheel. Because the connection is by wires, the cassette assembly is only capable of approximately five full turns, lock to lock.

WARNING:

DO NOT REMOVE THE STEERING COLUMN FROM THE VEHICLE WITH THE STEERING WHEEL ATTACHED UNLESS THE STEERING IS CENTERED AND THE COLUMN LOCK IS ENGAGED. IF THE LOCK BARREL IS TO BE RENEWED, 'LOCK WIRE' THE ASSEMBLY TO PREVENT ROTATION. FAILURE TO OBSERVE THIS AND CONSEQUENT DAMAGE TO THE CABLE REEL CASSETTE, MAY RESULT IN AN INOPERATIVE AIR BAG SYSTEM.

THE STEERING RACK, STEERING COLUMN AND STEERING WHEEL MUST BE CENTERED DURING ASSEMBLY TO ALLOW FULL EXPANSION AND RETRACTION OF THE CABLE REEL CASSETTES.

Air Bag Modules

The two air bag modules contain a charge of sodium azide/copper oxide which, when ignited by an electrical impulse, generate a volume of nitrogen gas sufficient to inflate the air bag. The amount of gas generated is greater in the passenger side air bag due to its larger size. Both modules, including surrounding trim panels, are non-serviceable and once activated must be renewed as a complete assembly.

Impact Sensors

The three impact sensing devices determine when air bag firing is necessary by detecting impact conditions according to direction of travel and force of movement. An impact of sufficient force in a forward direction closes contacts in either one, or both (left and right) of the front impact sensors. When either (or both) of the front sensors contacts are closed, the impact force must be sufficient to also close the safing sensor contacts, before air bag firing commences. The front impact sensors are mounted between each headlamp mounting bracket and hood hinge mounting on the left and right-hand sides. The safing sensor is mounted on the right-hand side footwell at the base of the 'A' post.

WARNING:

DISARM SRS BEFORE SERVICING ANY SRS OR STEERING COLUMN COMPONENT.

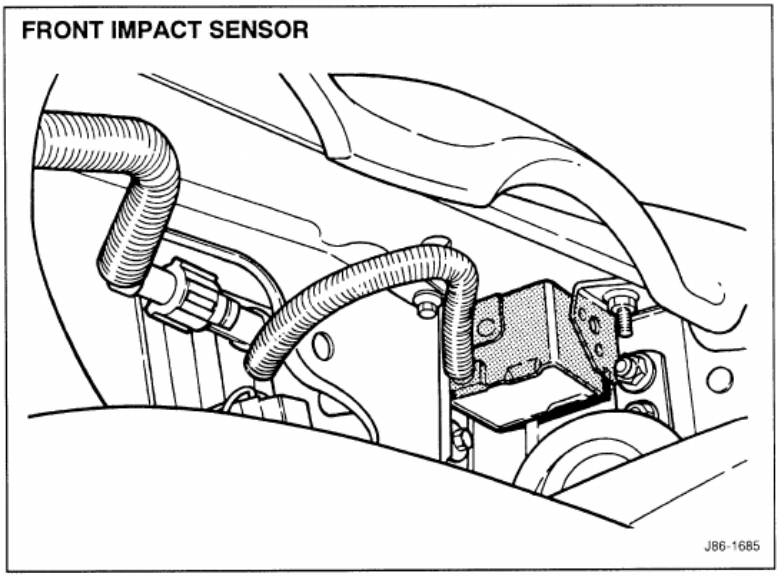
ALWAYS DISCONNECT THE BATTERY NEGATIVE LEAD AND ALLOW A MINIMUM OF ONE MINUTE FOR THE BACK-UP POWER SUPPLY TO DISCHARGE.

THE SYSTEM COMPONENTS ARE NON-SERVICEABLE, IF FAULTS ARE SUSPECTED CHANGE COMPONENTS FOR NEW ITEMS.

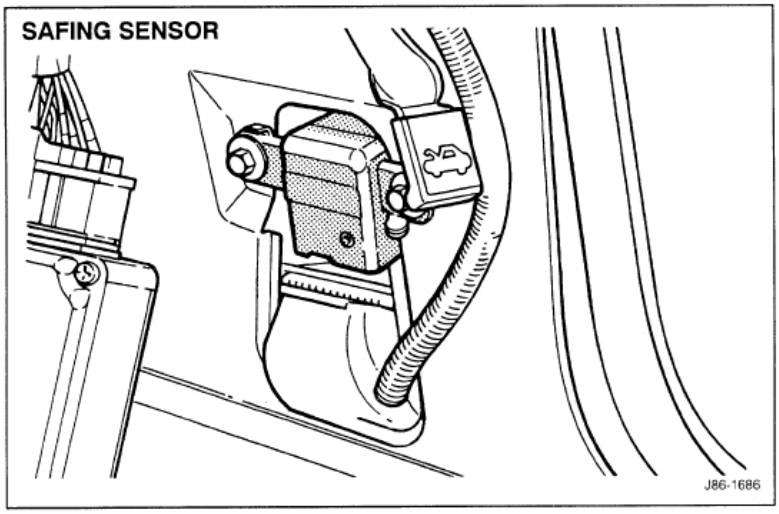
NEVER PROBE THE CONNECTORS OF AN AIR BAG MODULE.

OBSERVE ALL AIR BAG SAFETY PROCEDURES GIVEN IN THE SERVICE MANUAL.

FRONT IMPACT SENSOR



SAFING SENSOR



On-board Diagnostics

Electronic engine management systems have increased engine reliability and the intervals between routine services. This enables manufacturers to meet the increasingly tighter exhaust emissions legislation enacted by governments all over the world and especially in North America. Self monitoring or On Board Diagnostics is also seen by environmental protection agencies and legislators as a key factor in reducing atmospheric pollution.

The California Air Resources Board (CARB) are pioneers in this field, and it is largely their initiatives that have guided the automobile industry in the development of enhanced On-Board Diagnostics.

CARB OBD I - was introduced by the Californian legislature in 1988. It requires all vehicles to be equipped with an On-Board Diagnostics system capable of diagnosing faults in electronic fuel systems and monitoring both open and closed circuit faults. It also requires manufacturers to display a visual warning to the customer and a coded message to the service technician when a fault occurs. These warnings are known, respectively, as the Malfunction Indicator Lamp (MIL) and the Fuel Fail Code (FF).

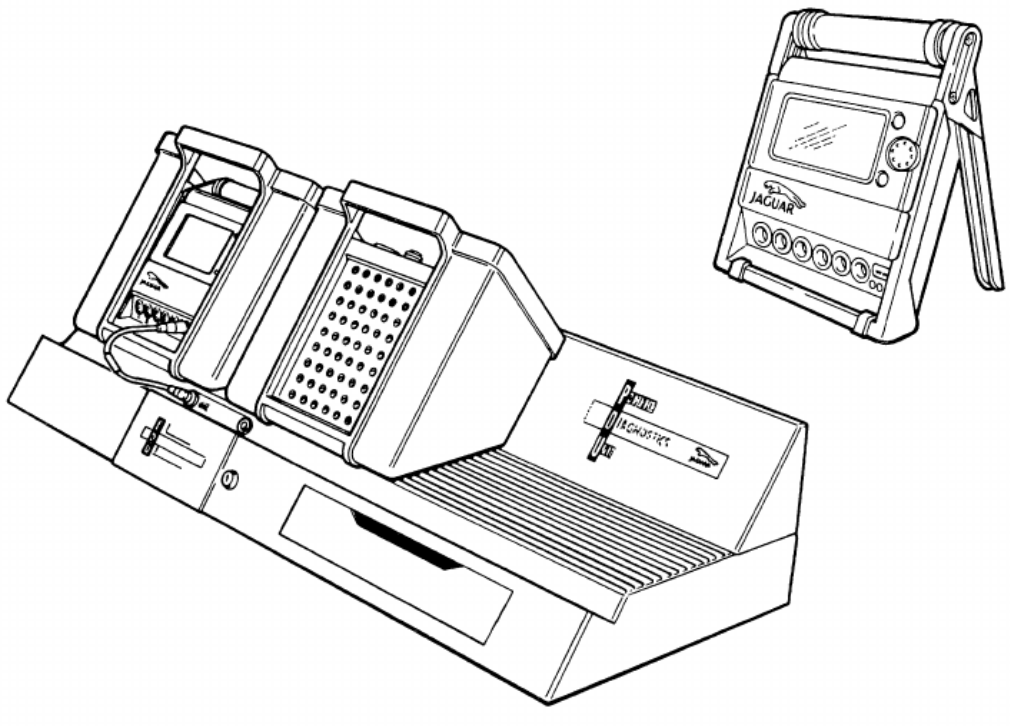
CARB OBD II - refined and greatly enhanced the previous legislation to cover any failure in the power train likely to affect the quality of the exhaust gases. This includes fuel, ignition and transmission. The emission effect threshold was also set at 1.5 times the base vehicle standard (e.g. HC emission base = 0.31 grammes/mile: Failure level = 0.465 grammes/mile).

OBD II also introduces standard communications protocols, diagnostic trouble codes (DTC's), vehicle terminology and vehicle diagnostic interface points.

Finally, whereas OBD I only monitored failed items, OBD II predicts failure by monitoring performance deterioration over a period of time. The five main areas of observation being the catalyst, misfire, exhaust gas recirculation, secondary air system and oxygen sensor monitoring.

Jaguar Portable Diagnostic Unit (PDU)

JAGUAR PORTABLE DIAGNOSTIC UNIT (PDU)



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Jaguar Portable Diagnostic Unit (PDU)
Faults may be diagnosed using the Jaguar Portable Diagnostic Unit (PDU) or a universal scan tool. These connect into the on-board diagnostics via the serial communications link, the universal 16 pin DATA LINK CONNECTOR at the rear of the driver's foot well. The PDU or scan tool will decode and display any Diagnostic Trouble Codes (DTC's) and associated freeze frame data logged by the ECM (see Table 2 - Diagnostic Trouble Codes).

Emissions and Diagnostics
The ECM is programmed prior to the despatch of the vehicle with software appropriate to the nominal market and associated emissions type (see Table 1 below). In vehicles destined for North America, the diagnostics in the ECM are fully activated in accordance with the requirements of CARB OBD II.

DATA LINK CONNECTOR

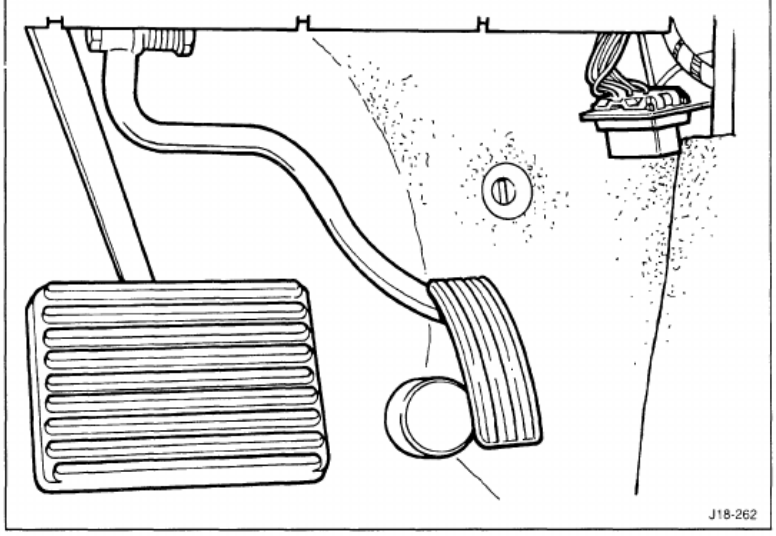


Table 1 - Emissions and Diagnostics

Emission Type	Nominal Market	Emissions & Diagnostics
A	North America	Catalyst, Air, Evaporative Loss, EGR, Full OBD II
B	R.O.W	Non-catalyst
C	Europe	Catalyst, Air, Evaporative Loss
D	R.O.W	Non-catalyst, Evaporative Loss

The Jaguar Guide to OBD II
A detailed section on OBD II is provided in the Service Manual.

Diagnostic Trouble Code (DTC) Tables
The Diagnostic Trouble Codes which either directly or indirectly light the Malfunction Indicator Lamp (MIL) are categorised in Table 2 below. When interrogating the ECM, these register on the PDU and universal scan tool displays.

Table 2 - Diagnostic Trouble Codes

First Code	Quantity	Category
P1000	1 Code	System check not complete since last memory clear
P1111	1 Code	System check complete since last memory clear
P0101	92 Codes	Fuel and air metering
P0300	42 Codes	Ignition system
P0400	15 Codes	Auxiliary emission controls
P0500	12 Codes	Vehicle speed control and idle speed control systems
P0603	8 Codes	Computer and output circuits
P0702	30 Codes	Transmission control

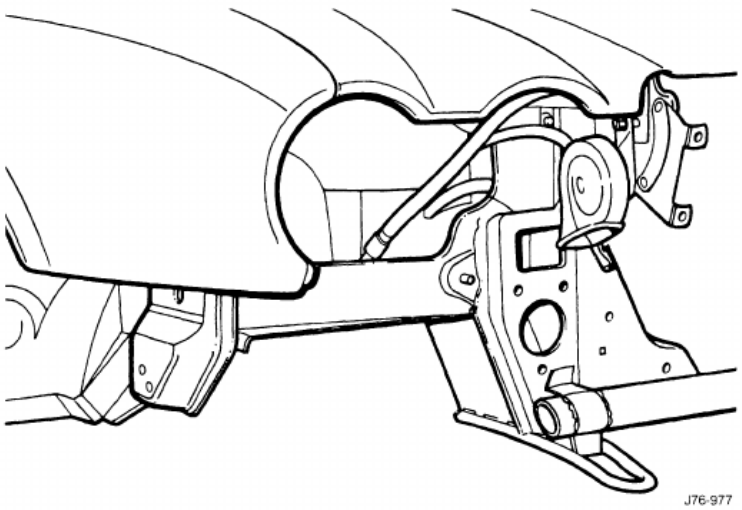
Body Structure

Approximately 65% of body parts are new, the most significant visual differences being at the front and rear of the vehicle.

Front

The front has a new hood and front fenders to accommodate restyled headlamps and the introduction of a one piece bumper assembly in place of the separate bumper and spoiler. The front towing eye is now positioned behind a grille vane in the front bumper: the vane must be removed before the towing eye is used.

FRONT OF BODY



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Rear

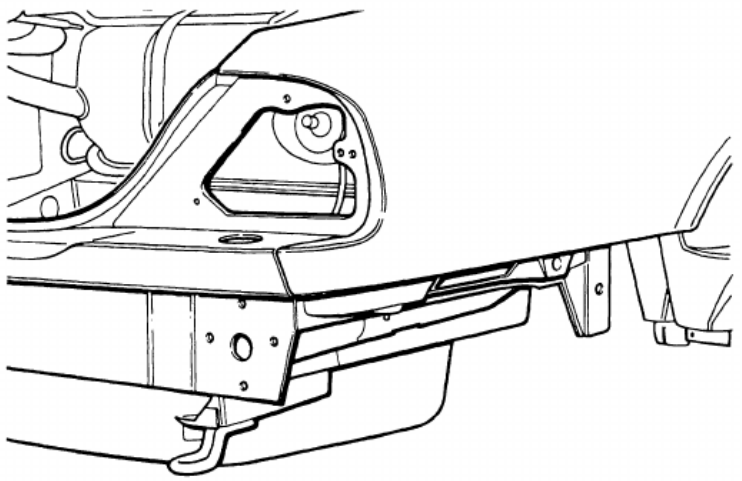
The changes to the rear of the vehicle are primarily to accommodate restyled rear lamp modules, a one piece bumper and a horizontally mounted spare wheel on the floor of the trunk.

The opening angle of the new trunk lid is increased to almost 90 degrees. The gas struts are now attached between the lid hinge and the inner wheel arch (instead of the fender and the trunk lid). The gas struts incorporate dynamic end-damping and automatically open the lid after it is manually opened approximately 5 degrees.

Ventilation of the trunk is provided by two vent frames installed in the floor. These vent into the sheltered areas behind the sides of the rear bumper, to prevent spray from the rear wheels entering the trunk.

The E-posts are now integrated into the rear fender panels, allowing the finisher at the base of each E-post to be deleted.

REAR OF BODY



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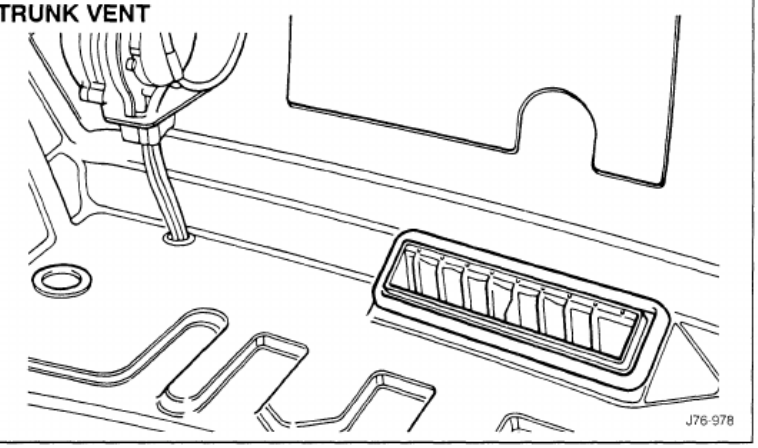
TRUNK VENT



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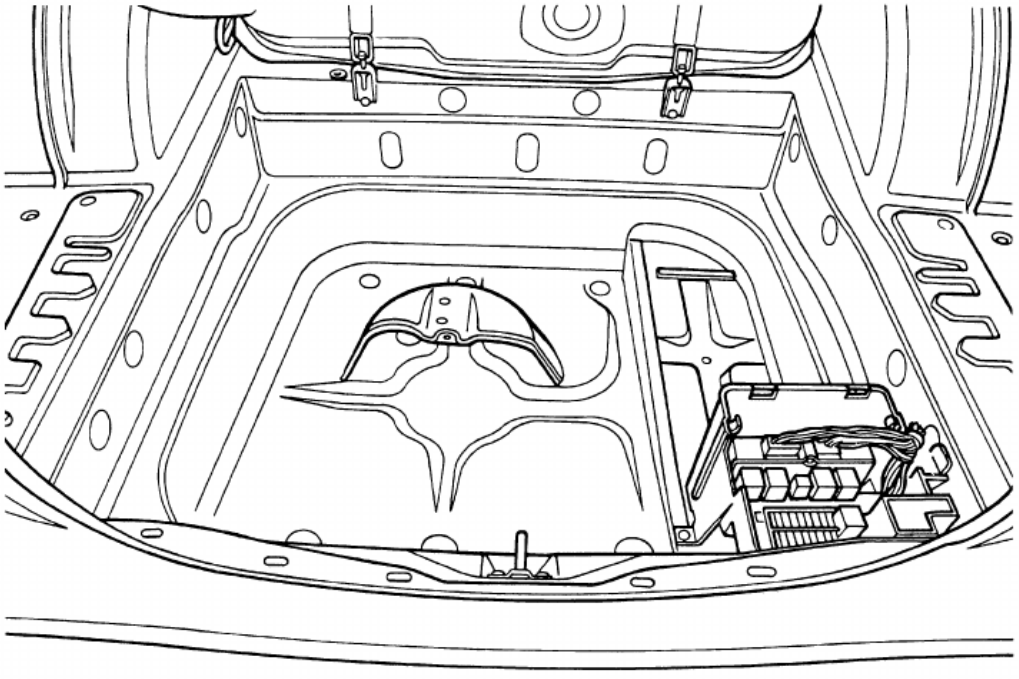
TRUNK



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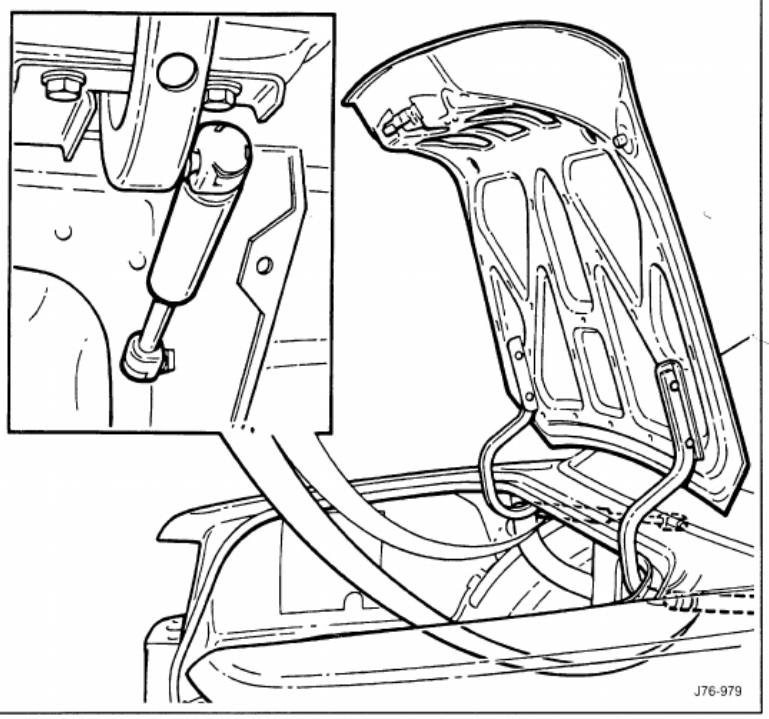
TRUNK AND GAS STRUT



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Doors

The window frame on the front and rear doors is welded in place instead of bolted, giving increased strength and improved door seal gap control. The form of the frame is revised to further increase strength and to accommodate revised door seals, separate outer finishers and semi-flush glazing. Energy absorbing blocks are installed in the front doors for improved side impact protection. A feature on the forward edge of the rear doors helps prevent interlocking in a forward impact.

At the shut lines of the doors, hood and trunk lid, the gaps are reduced to 4 mm (0.157 in) nominal.

VIN Plate

On vehicles for North American markets, the VIN (vehicle identification number) plate is re-located to the rear shut face of the driver's door.

Exterior Trim

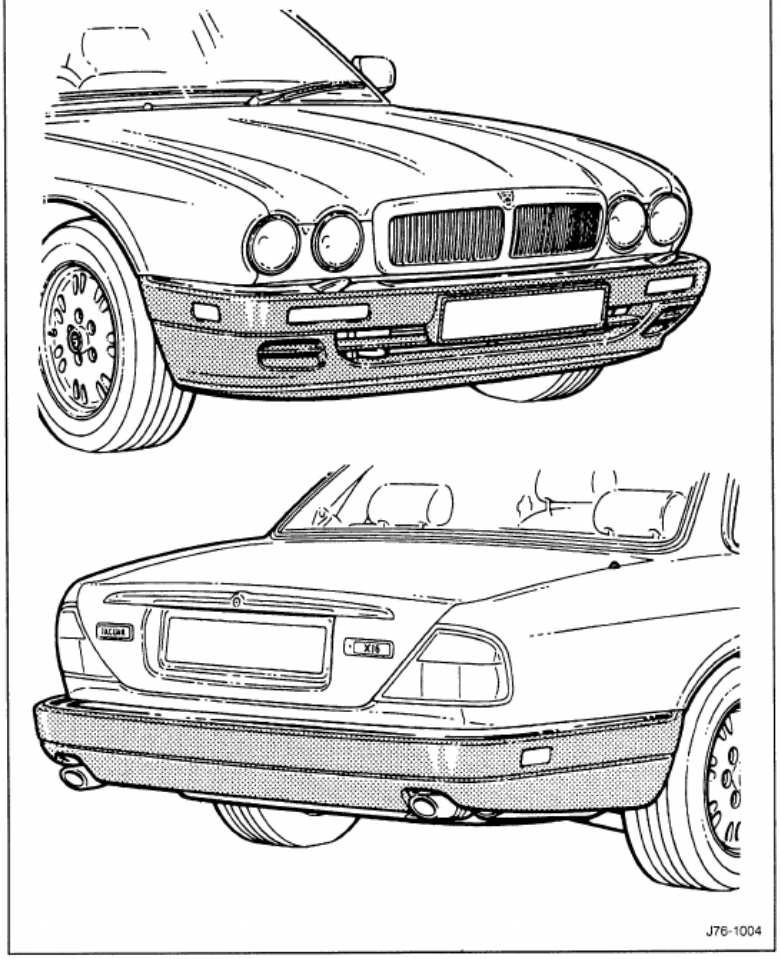
Extensive changes to the exterior compliment the restyled body.

Bumpers

The front and rear bumpers are body colored, fully integrated bumper and spoiler assemblies. The front bumper also incorporates an under-tray. Apertures in the bumpers accommodate fog lights, direction indicator lights and side marker lights/reflectors (see Electric/Electronic - Lighting section for further details). Brake cooling ducts are incorporated in the front bumper. Where specified, the left cooling duct contains an ambient air temperature sensor for the climate control system, and the right cooling duct contains an ambient air temperature sensor for the heaters in the powerwash jets of the headlamp washers: the powerwash jets are mounted in new covers on the top surface of the bumper section.

The bumpers are manufactured from polyurethane plastic, around a horizontal beam, and have chromed, stainless steel blades on the top surface of the bumper section. On North American vehicles the beam is made from aluminum, on all other market vehicles the beam is made from plastic. Replacement bumpers are painted in primer, ready for finishing with the standard paint system.

FRONT AND REAR BUMPERS



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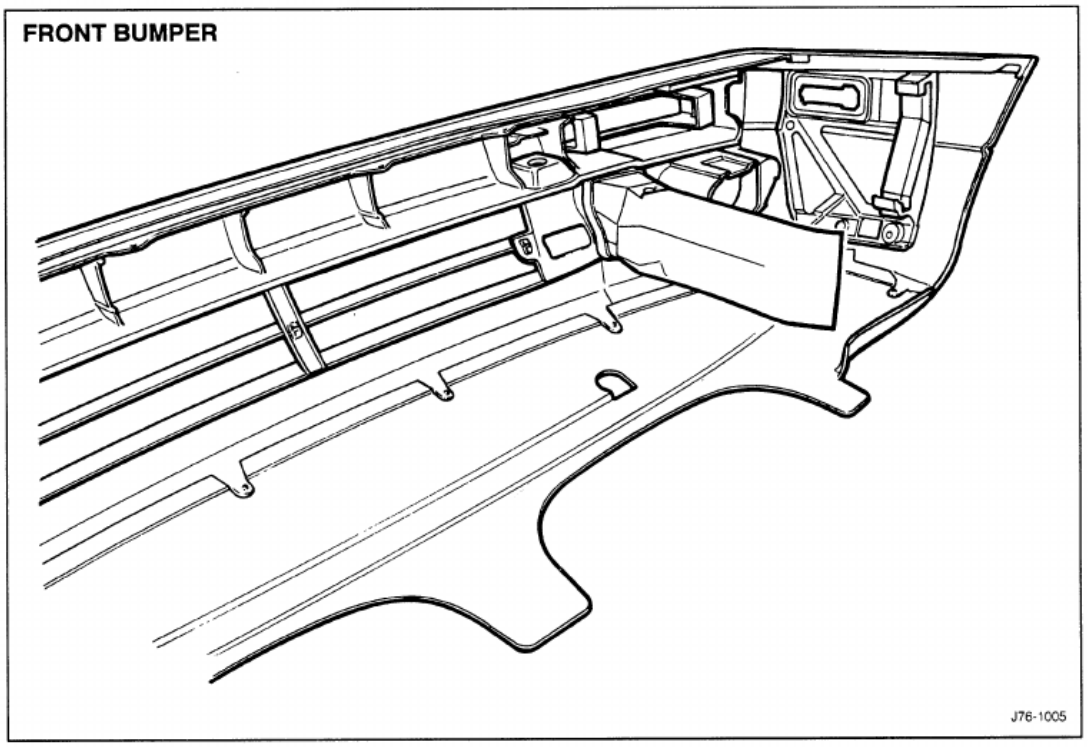
FRONT BUMPER



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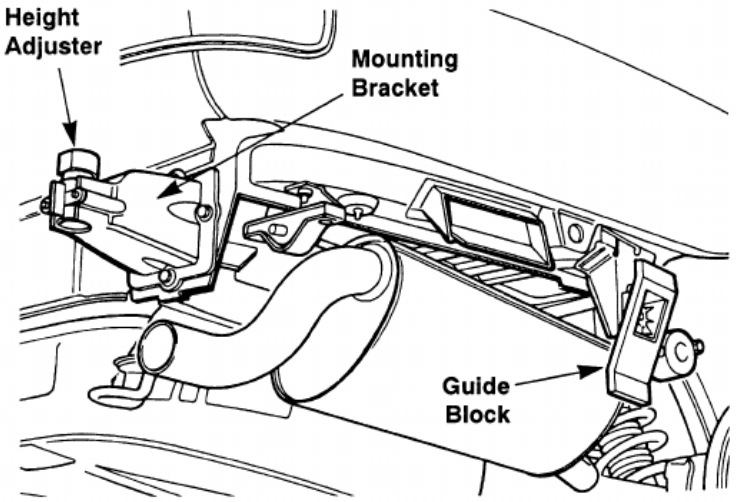
BUMPER MOUNTING BRACKET / STRUT AND GUIDE BLOCK

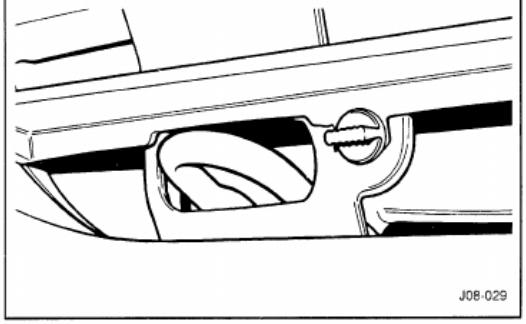


On North American vehicles, each bumper attaches to two energy absorbing mounting struts and is supported on each side by an adjustable guide block. Vehicles for all other markets have mounting brackets in place of the energy absorbing mounting struts. A single bolt secures the bumper to a height adjuster in each mounting strut/bracket.

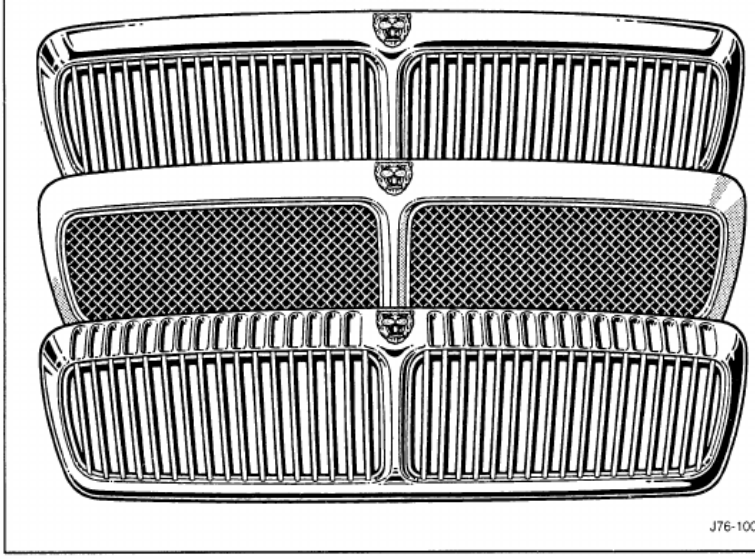
A 10 mm (0.4 in) horizontal overlap between the bumper and the body produces a smooth, gap-free appearance.

The grille vane in the front bumper conceals the front towing eye. The towing eye is accessed by releasing two, three-quarter turn fasteners and removing the grille vane.

BUMPER GRILLE VANE FASTENER



RADIATOR GRILLE



Radiator Grille

Restyled radiator grilles are introduced. On standard grilles, the vanes and the surround are both chromed. Sports models have body colored vanes and a chromed surround, except for the XJR model, which has a stainless steel mesh screen (in place of vanes) and a body colored surround.

Sunroof

The new sunroof is of a lightweight modular design. It improves headroom and has several additional features. These include: a tilt facility, one touch opening and closing (in slide), consistent closing (in slide and from tilt openings of less than 4 mm (0.16 in)), and a wind deflector.

The sunroof is operated by a cable and lever mechanism driven by an electric motor. An electronic control module (CM) controls the motor in response to selections made on a switch in the roof console or an input from the security system (for automatic closing). Both the motor and the CM are easily accessed by removing the roof console.

In the event of an electrical failure the operating mechanism can be turned manually using a wide bladed screwdriver in a slot in the drive gear of the motor (turning clockwise to open and counter-clockwise to close the sunroof). Manual operation disengages the drive gear from the motor. Before restoring electrical operation the drive gear must be turned in the reverse direction for one quarter of a turn to re-engage the motor.

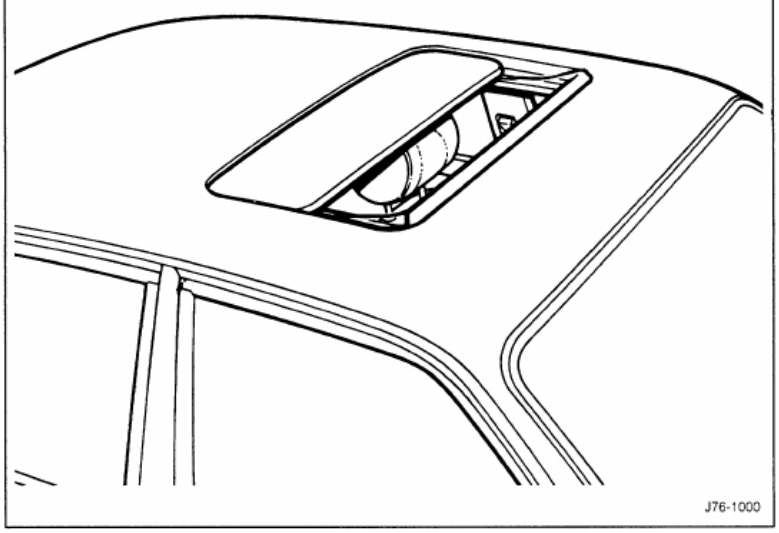
The CM is held in position by clips and has two electrical connectors interfacing with the electric motor and with the roof console switch/security system. Prior to installing a replacement CM, the sunroof must be in the neutral closed position. This gives the CM a sunroof position datum, to ensure accurate and consistent operation (see Service Manual for details). Obstacle sensing operates on closing, in the slide mode only. If the sunroof lid encounters an obstruction between the open positions of 4 and 200mm (0.16 and 7.87in) the CM detects the increased load on the motor. It then reverses the motor to drive the sunroof to the fully open position.

The seal around the sunroof lid now has a metal inner section. Once removed, a seal cannot be re-used. The replacement seal must be installed on the lid using the Jaguar approved crimping tool.

External Door Handles

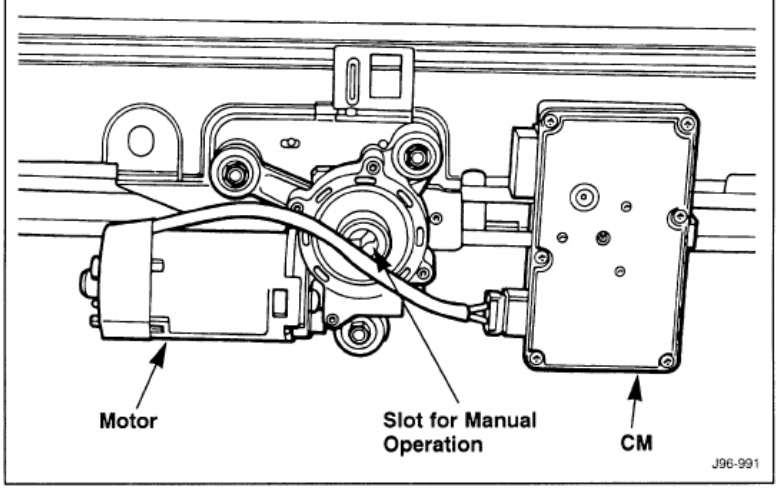
The restyled external door handles have a body colored bowl and flap, except on higher specification models, where the handle is chromed.

SUNROOF



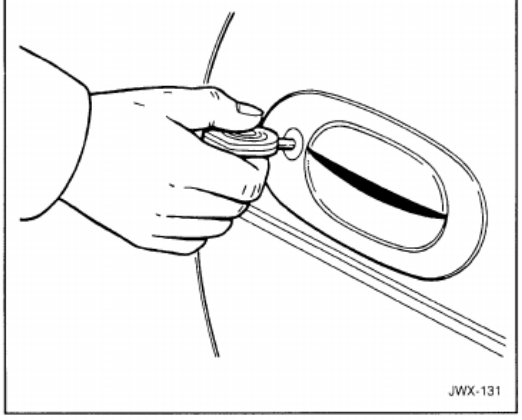
J76-1000

SUNROOF DRIVE MOTOR AND CM



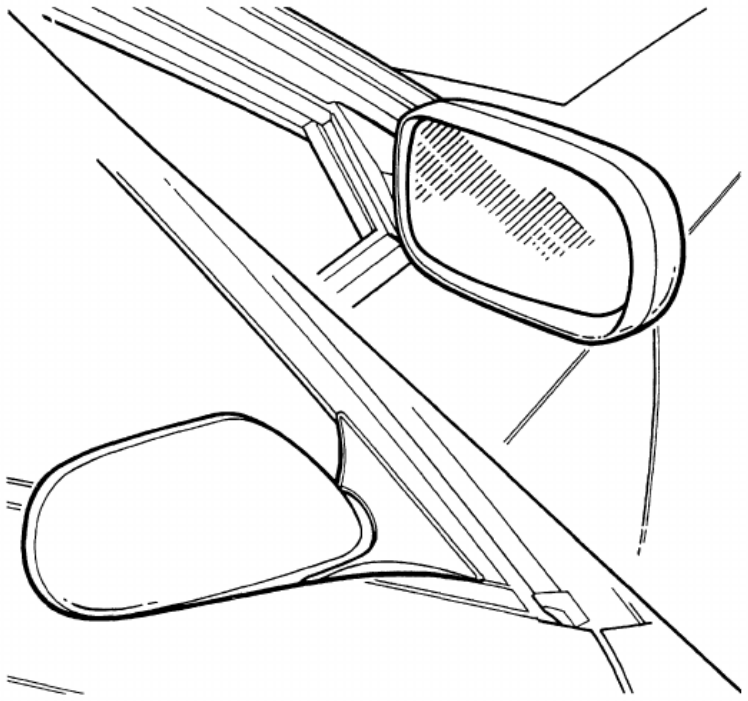
J96-991

EXTERNAL DOOR HANDLE



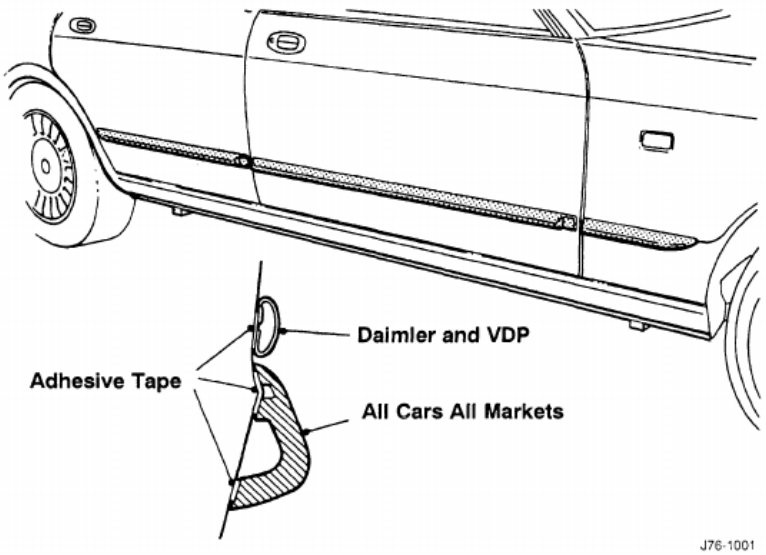
JWX-131

DOOR MIRROR



J76-984

BODY SIDE MOULDINGS



J76-1001

Door Mirrors

The new door mirrors are electrically operated and heated on all models. For some markets the mirror glass is slightly curved to eliminate blind spots.

For access to the internal mechanism, the mirror glass can be removed. Adjust the mirror to the fully inboard position, slide it outboard, then pull it away from the case. The body colored or chromed mirror caps can also be removed once the glass is removed.

On vehicles for the Japanese market, the mirrors have powered parking to turn the mirror body parallel to the side of the vehicle (and so reduce the overall width of the vehicle). On vehicles for all other markets the mirrors can be parked manually.

The motor of the mirror now has a connector interfacing with the vehicle harness, instead of flying leads.

Door Seals

A new sealing system is introduced to reduce wind noise and leaks. A primary and a secondary seal are installed on the door frame. A third seal is integrated into the draft welt finisher installed around the door opening in the body. The primary seal is installed around the full circumference of the door. Around the upper part of the door it is mounted in a channel, around the lower part of the door it is peg mounted. The secondary seal is mounted in a channel around the upper part of the door only.

Body Side Mouldings

Body colored, protective body side mouldings are installed along the side lower feature line on all models. Higher specification models also have a bright body side moulding immediately above the protective moulding.

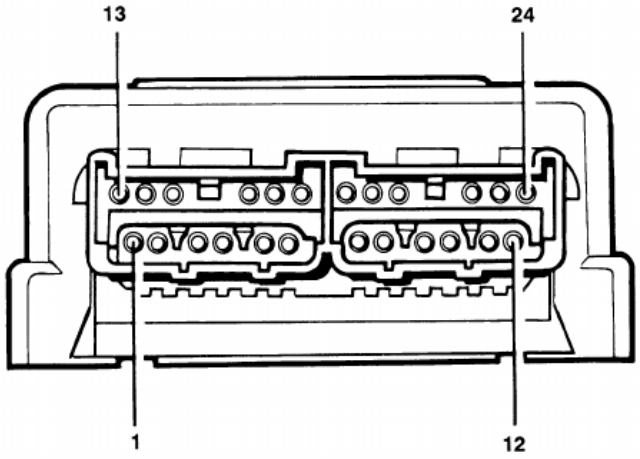
The mouldings are bonded in position. Both the moulding and the associated vehicle panel must be heated when installing a replacement. An even load must then be applied along the length of the moulding to achieve proper adhesion.

Diagnostic Module Fault Codes

Fault codes can be extracted using Jaguar diagnostic equipment (PDU) or by use of an SRS service tool. The SRS service tool emits a series of flashes. Each series of flashes represents a two digit number, giving the fault code. For example, fault code 24 is displayed as:
Two flashes, a one second pause, four flashes, three second pause; it is then repeated.
All codes are listed in order of priority.

Code	Component/Fault Description
-	No MIL - Inoperative lamp circuit or no ignition voltage to DM
-	Continuous MIL - DM disconnected or inoperative
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 circuit 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 air bag circuit high resistance or open
33	Passenger side air bag circuit high resistance or open
34	Driver side air bag circuit low resistance or short circuit
35	Passenger side air bag 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	DM 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 DM failure
-	Rapid continuous flashing of MIL (no fault code) - All front impact sensors disconnected

DIAGNOSTIC MODULE CONNECTOR



Pin	Circuit Identification
1	Ignition Supply
2	LH Impact Sensor Monitor
3	Ground Input
4	Instrument Pack Interface - MIL
5	Ground
6	RH Impact Sensor Monitor
7	Not Used (Driver's Only Input)
8	Passenger Air Bag Module Feed Monitor
9	Passenger Air Bag Module Return
10	Driver Air Bag Module Feed
11	Driver Air Bag Module Return
12	Safing Sensor Output
13	Battery Input
14	Not Used
15	Safing Sensor Input
16	Safing Sensor Ground Monitor
17	LH Impact Sensor Speed
18	RH Impact Sensor Speed
19	Not Used
20	LH Impact Sensor Ground Monitor
21	RH Impact Sensor Ground Monitor
22	Not Used
23	Safing Sensor Feed
24	Test Input

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