BY APPOINTMENT TO
HER MAJESTY QUEEN ELIZABETH II
MANUFACTURERS OF DAIMLER AND JAGUAR CARS
JAGUAR CARS LIMITED COVENTRY

BY APPOINTMENT TO
HER MAJESTY QUEEN ELIZABETH
THE QUEEN MOTHER
MANUFACTURERS OF DAIMLER AND JAGUAR CARS
JAGUAR CARS LIMITED COVENTRY

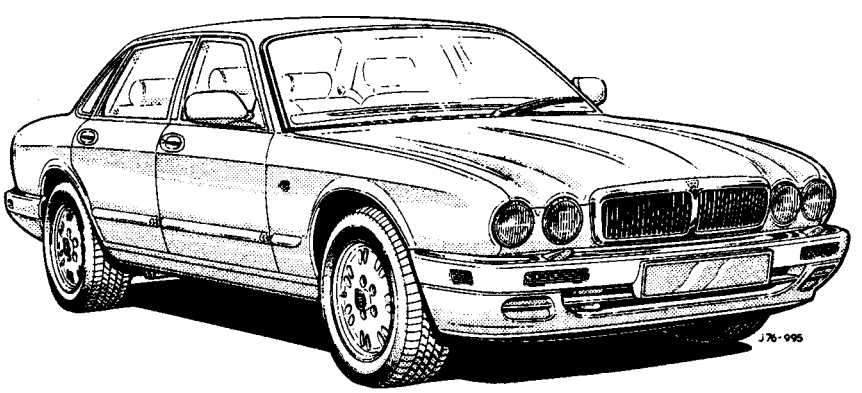
BY APPOINTMENT TO
HIS ROYAL HIGHNESS THE PRINCE OF WALES
MANUFACTURERS OF DAIMLER AND JAGUAR CARS
JAGUAR CARS LIMITED COVENTRY

JAGUAR

XJ6 – XJ12

Electrical Diagnostic Manual

(Cover *2)*



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Note: Due to the complexity of component diagnostics the symptom charts / pin point tests have been collated in group and 'P' code order; their listing commences on page ii.

DIAGNOSTIC FAULT CODES

FUEL AND AIR METERING

		MIL	Diagnostic chart Page No.
GROUP 1A	**A–BANK MANIFOLD ABSOLUTE PRESSURE SENSOR – MAPS**		18
P 0106	MAPS circuit range / performance	Y	
P 0107	MAPS circuit low input	Y	
P 0108	MAPS circuit high input	Y	
	Remove / Refit		21
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P 1106	MAPS circuit range / performance	Y	
P 1107	MAPS circuit low input	Y	
P 1108	MAPS circuit high input	Y	
	Remove / Refit		21
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		MIL	Diagnostic chart Page No.
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P 0132	HO2S circuit high voltage	Y	
P 0133	HO2S circuit **slow** response	Y	
P 0134	No activity detected	Y	
P 0135	Heater circuit malfunction	Y	
	Remove / Refit		54
	Downstream		
P 0137	HO2S circuit low voltage	Y	
P 0138	HO2S circuit high voltage	Y	
P 0139	HO2S circuit **slow** response	Y	
P 0140	No activity detected	Y	
P 0141	Heater circuit malfunction	Y	
GROUP 5B	**B–BANK HEATED OXYGEN SENSOR – HO2S**		49
	Upstream		
P 0151	HO2S circuit low voltage	Y	
P 0152	HO2S circuit high voltage	Y	
P 0153	HO2S circuit **slow** response	Y	
P 0154	No activity detected	Y	
P 0155	Heater circuit malfunction	Y	
	Remove / Refit		54
	Downstream		
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P 0159	HO2S circuit slow response	Y	
P 0160	No activity detected	Y	
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P 1246	Signal high	Y	

5.2

		MIL	Diagnostic chart Page No.
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IGNITION SYSTEM

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P 0206	Injector circuit - cylinder 6 (6A) (3, 6A)	Y	
P 0207	Injector circuit - cylinder 7 (1B) (4, 1B)	Y	
P 0208	Injector circuit - cylinder 8 (2B) (6, 2B)	Y	
P 0209	Injector circuit - cylinder 9 (3B) (5, 3B)	Y	
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P 0302	Cylinder 2 misfire detected (2A)	N	
P 0303	Cylinder 3 misfire detected (3A)	N	
P 0304	Cylinder 4 misfire detected (4A)	N	
P 0305	Cylinder 5 misfire detected (5A)	N	
P 0306	Cylinder 6 misfire detected (6A)	N	
P 0307	Cylinder 1 misfire detected (1B)	N	
P 0308	Cylinder 2 misfire detected (2B)	N	
P 0309	Cylinder 3 misfire detected (3B)	N	
P 0310	Cylinder 4 misfire detected (4B)	N	
P 0311	Cylinder 5 misfire detected (5B)	N	
P 0312	Cylinder 6 misfire detected (6B)	N	
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P 1316	Misfire excess emissions	N	

		MIL	Diagnostic chart Page No.
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P 0443	Valve circuit malfunction	Y	
P 1441	B–Bank incorrect purge valve	Y	
P 1443	Valve circuit malfunction		

***Note:** Codes will cause MIL illumination at 96MY

5.2

VEHICLE SPEED AND IDLE SPEED CONTROL

5.2

INTERNAL CONTROL MODULE

PRELIMINARY INFORMATION

The information in this document is designed to assist non-franchised technicians in fault diagnosis and rectification on 1995MY Jaguar saloon vehicles compliant with OBDII legislation. The document comprises two main sections; Engine Management and Transmission numbered 5.2 and 8.2.

During fault diagnosis procedures reference is made to the Service Drive Cycle, instruction for performing this action are detailed below.

Introduction

The diagnostic system is designed so that all the systems will have been checked (with the exception of catalyst efficiency) by the end of an FTP drive cycle. The catalyst monitoring test requires a period of steady driving.

The diagnostics work on a single or two trip basis before a DTC is stored. A trip is defined as a period including engine start, run and ignition off (engine stop). Most single trip diagnostics detect circuit faults, while most twin trip diagnostics detect rationality or component characteristic faults.

The procedure is to be followed twice, with an engine stop between, to allow the twin trip logic to operate and a DTC to be stored. If the catalyst efficiency is to be checked, the procedure should be followed three times with engine stops in between. Procedure stage 3 (warm up) can be omitted on second (and third) trips if the engine is still hot from the first trip.

Service Drive Cycle

1. Turn off the air conditioning system.
2. Start the engine, and idle for 20 seconds.
3. Wait for the engine to warm up to a coolant temperature of greater than 80°C. This temperature can be read from the 'current powertrain information' screen on the PDU or scan tool. The engine can be revved to shorten the warm up time.
4. Idle the engine for 2 minutes, without turning the steering wheel or operating electrical loads.
5. Drive the car as shown below, with the selector in D unless otherwise shown:

   Accelerate to **34** mph (55kph) and drive steadily at this speed for 1 minute.

   Accelerate to **44** mph (70 kph) and drive steadily at this speed for 10 seconds.

   Accelerate to 56 rnph (90 kph) and drive steadily at this speed for 1 minute.

   Drive for over 10 seconds with the engine above **3000** rpm (select a lower gear to limit vehicle speed if necessary).

   Brake gently to a stop, with the selector in D.

   Accelerate to 22 mph (35 kph) and then brake to a stop. Do this a total of four times.

Note: The speeds shown are targets. If the actual speed is not more than 2 mph different from the target, the test will be performed correctly. However, a steady throttle position must be held at the actual speed achieved. A level road is preferable for this to happen.

6. Interrogate Generic Scan Tool and establish faults, if any.
7. Stop engine.

When performing diagnostics on a vehicle technicians should be aware that erreoneous codes may be introduced by their actions. In order to ensure correct diagnosis, all codes should be noted, before commencing diagnosis, **so** that induced codes can be identified on completion and safely cleared without futher work.

5.2 FUEL, EMISSION CONTROL AND ENGINE MANAGEMENT

5.2.1 introduction

5.2.1.1 Diagnostic Trouble Codes (DTCs)

All emissions related diagnostic trouble codes (DTCs) relating to the **1995** model year Jaguar Sedan vehicles are included in this book. DTCs are divided into two separate categories; obligatory **S.A.E.** dedicated codes and voluntary codes added to a specific application. The **S.A.E.** diagnostic codes, which commence with a number '0', e.g. P 0234, are detailed in numerical order in the Contents Section. Voluntary codes, which have been added to the system and commence with a number '1', e.g. P 1234, are included in their related section.

DTC numbers are displayed at the top outer corner of the relevant page, starting with P **0101,** through to P **1796.** The first page of each section displays all codes for that section. A description of the location and operation of the component is followed by the individual codes and their fault definition.

5.2.1.2 On Board Diagnostics II (OBDII)

OBDII covers any failure of the powertrain system likely to affect exhaust gas quality; this includes fuel, ignition, transmission, anti-lock braking, active suspension, tyre pressure monitoring and active differential failures. The emission effect threshold is an increase of **1.5** times the base vehicle standard.

The OBDII document contains clauses covering standard communication protocols, fault codes, vehicle terminology and vehicle interface points. Whereas the original OBD only monitored failed items, OBDII provides failure prediction by observing performance deterioration over a period of time. The four main areas of observation are catalyst, misfire, exhaust gas recirculation and secondary air system.

5.2.1.3 Catalyst Monitoring

Precise control of the fuel and air mixture to the correct stoichiometric level is essential to the proper function of the three way catalyst, which oxidises Carbon Monoxide (CO) and Hydrocarbons (HC), while reducing Nitrous Oxide (NOx).

Deterioration of the catalyst conversion efficiency leads to a higher level of emissions. In order to be able to detect a change in the efficiency of the catalyst, the control system must observe both the incoming and the outgoing exhaust gases. To achieve this aim, exhaust gas oxygen sensors are fitted both upstream and downstream of the catalytic converter.

5.2.1.4 Misfire Monitoring

As engine misfire **is** the major cause of damaged catalytic converters, CARB requires that control systems must be able to monitor the quality of each individual firing and **so** detect an engine misfiring. The control system must recognise three areas of engine misfire:

- A misfire which causes instantaneous catalyst damage.
- **A** misfire which will cause a vehicle to fail a Federal Emissions procedure.
- **A** misfire which will cause a vehicle to fail an Inspection and Maintenance test.

The misfire detection diagnostic uses the engine speed input, derived from the engine speed sensor, as its primary malfunction detection parameter.

5.2.1.5 Secondary Air Injection Monitoring

The secondary air injection system pumps extra air into the exhaust system (upstream of the catalysts) for a period immediately after engine start. The purpose of secondary air injetion is to reduce catalyst warm up time and thus reduce overall exhaust emission.

Monitoring must indicate when the air flow, from the secondary air injection system, decreases to the extent that an emissions failure level is reached. The system can gauge the air being delivered by recording the drift in oxygen sensor switching levels as secondary air injection is in operation.

5.2.2 DIAGNOSTIC EQUIPMENT

The Data Link Connector (DLC) is situated on the side of the transmission tunnel (Fig. 1). The diagnostic socket and plug designs are specified by **SAE** and are common to all vehicle manufacturers.

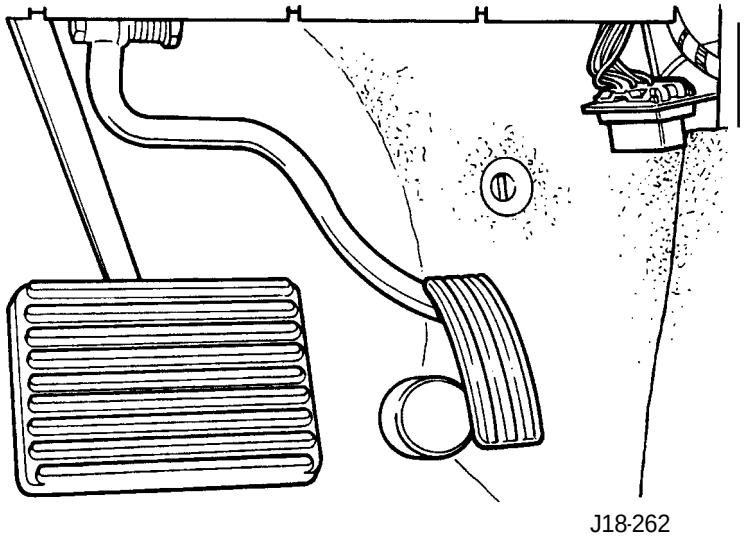


Fig. 1 Location of Diagnostic Socket

The Vehicle Identification Number (VIN) (Fig. 2), will be required to identify the particular vehicle, engine and transmission combination under test. Emission labels are shown in Fig. 1, following page.

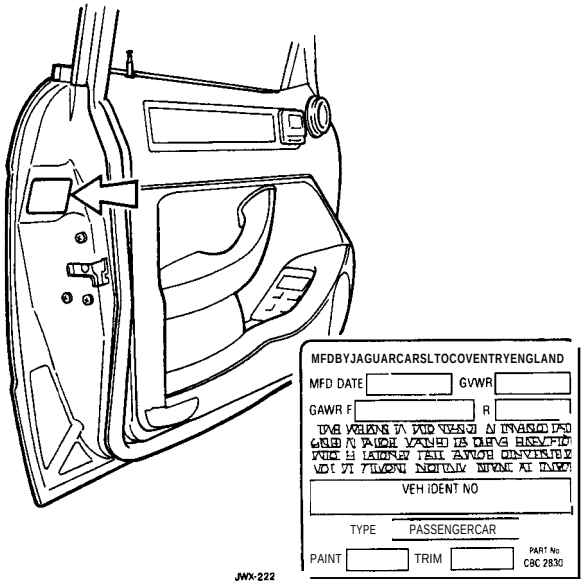


Fig. 2 Vehicle Identification

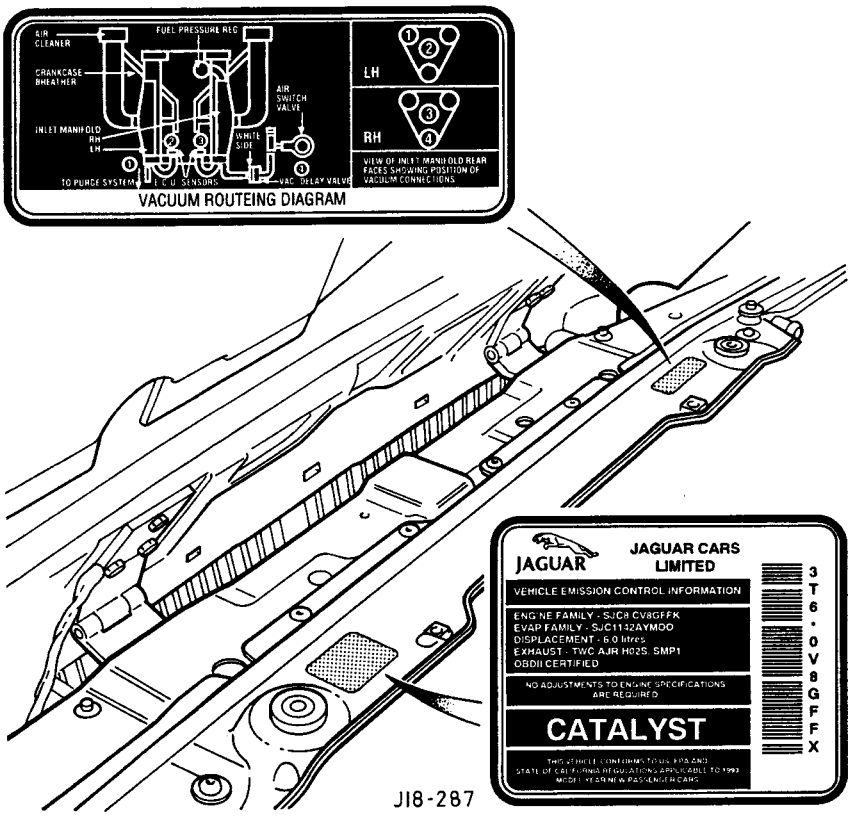


Fig. 1 Emission Labels

5.2

5.2.2.1 FRANCHISED DEALERS

The Jaguar Portable Diagnostic Unit (PDU)

The franchised Jaguar Dealer is equipped with the PDU, a comprehensive electrical diagnosis system, specific to Jaguarvehicles, that can interrogate not only the engine management system, but all control modules on the vehicle which are connected to the communications bus, and then decode and display any diagnostic trouble codes including enhanced diagnostic information. The PDU (Fig. **1**) performs a number of functions, including:

- DataLogger
- Engine Set–up
- Diagnostic Trouble Codes
- Control Module Programming
- Digital Multimeter

Fig. **1** shows two Portable Diagnostic Units on charge on the base station and one removed ready for use.

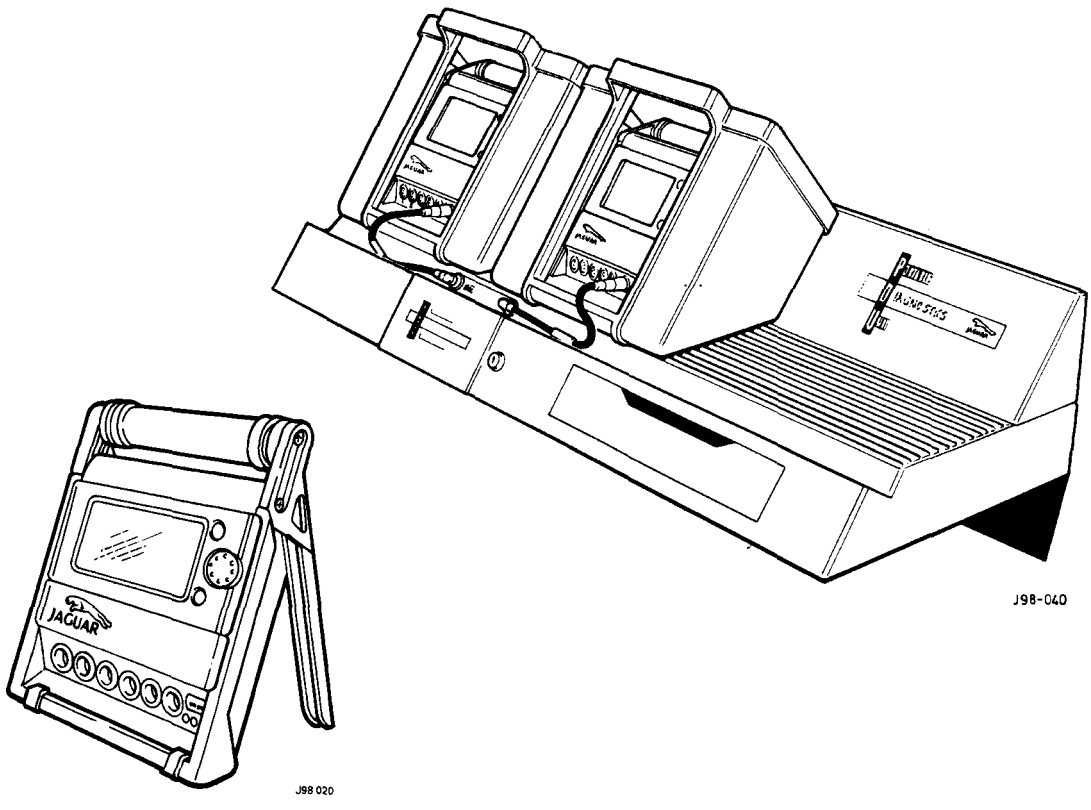


Fig. **1** Jaguar PDU and Base Station Assembly

DataLogger

DataLogger is designed to identify intermittent faults in the vehicle electronics and can capture information from up to three sources simultaneously, i.e. Serial Communications, Vehicle Interfacing and Measurement Probes.

Engine Set–up

Engine Set–up allows adjustable engine parameters to be set to their optimum position.

Diagnostic Trouble Codes

Diagnostic Trouble Codes enables the PDU to monitor selected codes and decode and display any codes or enhanced codes logged by the control modules, together with a count of occurrences. The fault codes recorded on the control modules and the PDU screen can be cleared using this function.

Control Module Programming

Control Module Programming is used as a setting/calibration process for the security system, trip computer and instrument pack.

Digital Multimeter

Digital Multimeter provides the ability, using measurement probes, to measure voltage, current, resistance, frequency, pulse width, pulse period and duty cycle.

5.2.2.2 NON-FRANCHISED SERVICE CENTRES

Scan Tool

The scan tool is available to anyone wishing to purchase it from a tool specialist and can be adapted to interrogate most manufacturers vehicles. The typical scan tool (Fig. 1) will be equipped with an SAE diagnostic plug to engage the diagnostic socket in the vehicle and a cable and plug to obtain power for the tool, inserted into the cigar lighter or a battery adaptor cable. The scan tool must be equipped with the software to interrogate the vehicle system and this may take the form of a memory cartridge, specific to Jaguar, inserted in the tool. The tool manufacturers handbook will instruct the user in the correct method of interrogating the system, any fault codes and instructional text will be displayed on the screen.

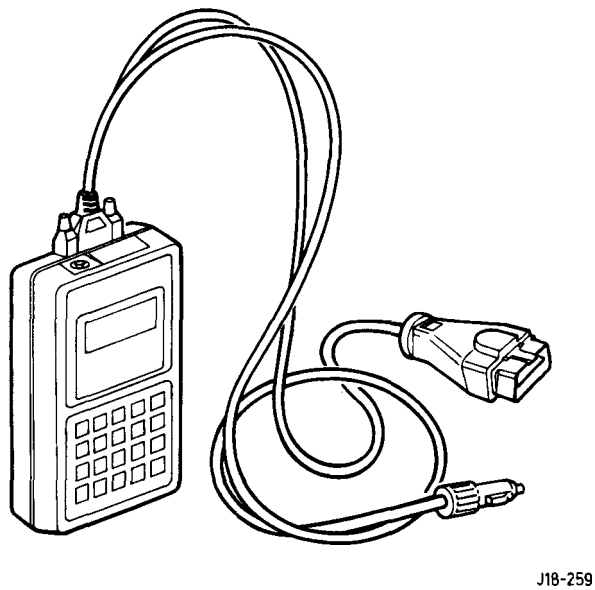


Fig. 1 Typical Scan Tool

Service Equipment

Fault finding at non-franchised service centres assumes the use of general electrical instruments (eg multimeter) of good quality. The digital multimeter specified for use by Jaguar must be of 3.5 digit accuracy with an input resistance of 10 megohm. In the utilisation of such equipment, care must be taken not to introduce further faults from damage to cableconnectorsetc, byclumsyprobing. Probingto the rearofconnectorsthrough the seal isspecifically prohibited.

The digital multimeter probe with a 'banana' coupler is shown in Fig. 1 being coupled with an appropriate adaptor for attachment to a connector or module pin.

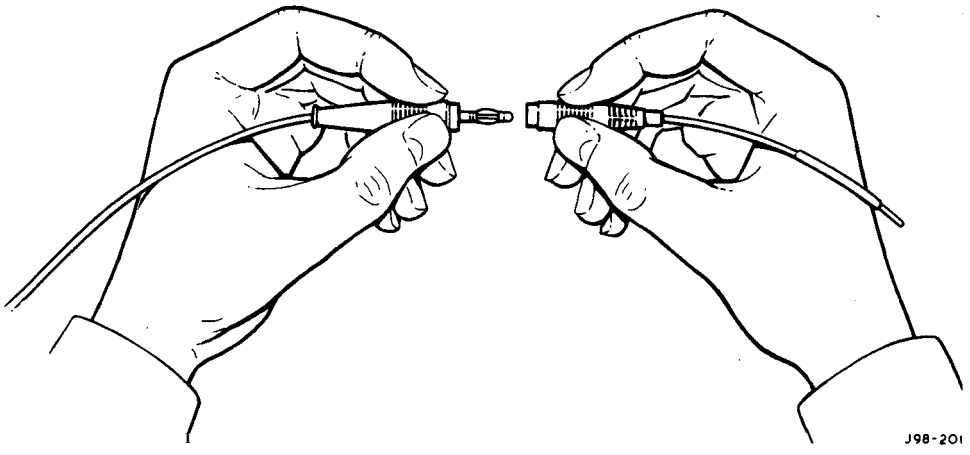


Fig. 1 Adaptor Coupling for use with Digital Multimeter

5.2.3 ENGINE MANAGEMENT SYSTEM COMPONENT DESCRIPTION

Reference numbers eg (1) are shown in Fig. 1, on page **9.**

The engine management system is controlled by the Engine Control Module (ECM) (39) which receives signals from the various EMS sensors, and uses these inputs to modify fuel and ignition settings to provide optimum driveability (i.e. power, refinement) while allowing compliance to emissions standards. In addition a number of other functions are controlled as listed below.

The intake air temperature sensor (IATS) (1) measures the temperature of the air in the induction tract and transmits this to the ECM. Intake air is filtered before entering the induction tract by two air cleaners (2 and 3). Idle air flow can bypass the throttle blades by two idle air control valves (5 and **6).**

Throttle position is detected by the throttle position sensor (TPS) **(4)** which reports to the ECM. The closed throttle position switch (idle switch) is integral to the throttle position sensor.

Excess vapour formed in the fuel tank is absorbed into the evaporative emission purge control canister (9). While the engine is running, the fuel absorbed in the canister is gradually purged back into the engine by manifold depression. The rate of purging is under the control of the evaporative emission purge control solenoid valves (7 and 8) which are controlled by the ECM. This helps control excess hydrocarbon emissions from the vehicle.

The manifold absolute pressure sensors (MAPS) (10 and **12)** measure the absolute pressure in each inlet manifold (i.e. relative to vacuum). The pressure signal is transmitted to the ECM as a voltage. This signal is the primary measure of engine load, and is fundamental to fuel and ignition control, as well as being used for other functions of the EMS.

5.2.3 *ENGINE MANAGEMENT SYSTEM COMPONENT DESCRIPTION (CONTINUED)*

Engine speed is measured by the Engine speed sensor (16) mounted behind the flywheel. This indicates the actual engine rotational speed to the ECM in the form of 12 pulses per engine revolution. The engine speed is used for both fuel and ignition synchronization, as well as other functions.

Engine position is measured by the engine position sensor (or TDC sensor) mounted below the rear of the crankshaft front pulley (15). This sensor provides one pulse every 360$ of crankshaft rotation, indicating when the engine is at cylinder I a TDC position. The camshaft position sensor (CMP) (14) provides one signal every 720$ of crankshaft rotation indicating No. 1A cylinder at TDC prior to the firing stroke. These signals are used by the ECM to control fuel injection and ignition duration and synchronization.

The two fuel pumps (21 and 22) are situated in the fuel tank (20). These supply fuel to the fuel rail. The fuel rail pressure is controlled by a pressure regulator (19) which returns excess fuel to the tank. The pressure regulator is controlled by manifold depression so that fuel delivery pressure is maintained at 3 bar above manifold pressure. The fuel injectors (17 and 18) are located on the fuel rail. The fuel injectors are electrically operated by the ECM. The time over which the injector is open and the fuel rail pressure determine the volume of fuel injected to the manifold.

The tank fuel is measured by the fuel level sensor (23). This signal is used by the ECM as an input to certain diagnostics.

The engine coolant temperature sensor (ECTS) (24) measures engine operating temperature and transmits this to the ECM.

Ignition spark voltages are produced by two ignition coil packs, one per cylinder bank (27 and 28). There are three double ended coils in each pack, and these deliver a spark to two plugs simultaneously. Each coil pack is driven by its own ignition amplifier (25 and 26) which in turn is controlled by the ECM.

5.2

The exhaust gas passes from the exhaust manifold to the catalytic converter assembly, where reactions take place to reduce the levels of pollutants at the tail pipe. The heated oxygen sensors (HO2S) (29, and 30 upstream of the catalysts, 31 and 32 downstream) compare the level of oxygen in the exhaust gas to that in the atmosphere and produce an output signal which is used by the engine closed loop fuel strategy to make fuelling corrections, and thus help control overall emission levels. Also comparison of upstream and downstream signals allows determination of catalyst conversion efficiency. The sensors contain integral heaters (under ECM control) to allow them to reach optimum operating temperature in a short time after engine start.

The secondary air injection system allows decreased catalyst warm-up time, with on overall effect of reduction of vehicle exhaust emissions. The air pump (33) is mechanically driven by the engine when the ECM commands the air pump electrical clutch on via a relay. The ECM also turns on the vacuum solenoid valve (VSV) (35) which in turn activates the secondary air injection switching valve (ASV) (34) allowing air from the pump to the exhaust manifold. Two check valves (36 and 37) are fitted in each air outlet line to prevent the possibility of reverse flow to the pump.

The ignition supply (38) is the main power supply to the ECM this supply will be disconnected by the inertia switch if the vehicle is subject to a violent deceleration in a collision. The ECM has separate ignition and battery supply inputs. The battery input (41) maintains the ECM memory as long as the vehicle battery is connected.

The following inputs are also used as part of the engine control system:

The ECM sends fuel used information to the instrument pack **(40)** (for use by the trip computer) and also signals to the pack when a MIL lamp illumination is needed.

Crank signal (42): This input informs the ECM that the engine is being cranked and forms part of the 'start fuelling' strategy.

Security and locking module (SLCM) (43), inhibits starting (non-federal cars only) until the correct security code is received from the security/locking system ECU.

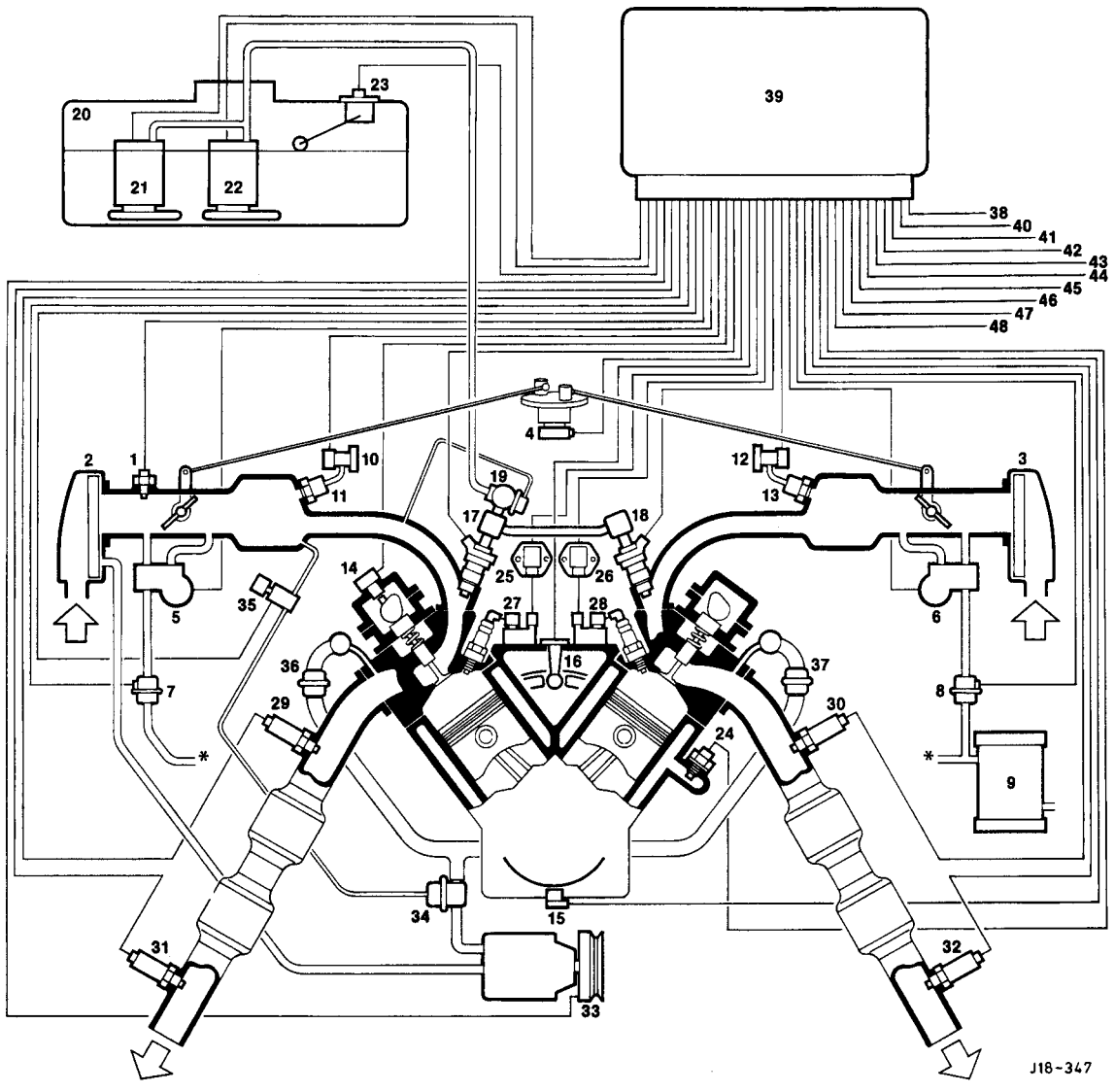
An input / output link **(44)** for a generic scan tool or Jaguar Diagnostic Equipment (JDE) is available to assist with fault diagnosis.

The ECM communicates with the TCM **(45)** over five lines: Engine speed, torque and throttle position signals are sent to the TCM while The TCM sends vehicle speed (for diagnostic use) and torque reduction signals (to improve gearshift quality) to the ECM.

The air conditioning ECU connection (46) communicates with the ECM (to ensure that air conditioning operation does not affect idle quality (due to the extra engine load imposed by the compressor).

Park/neutral input (47): This is used to control idle quality as the transmission selector moves from neutral to drive and back

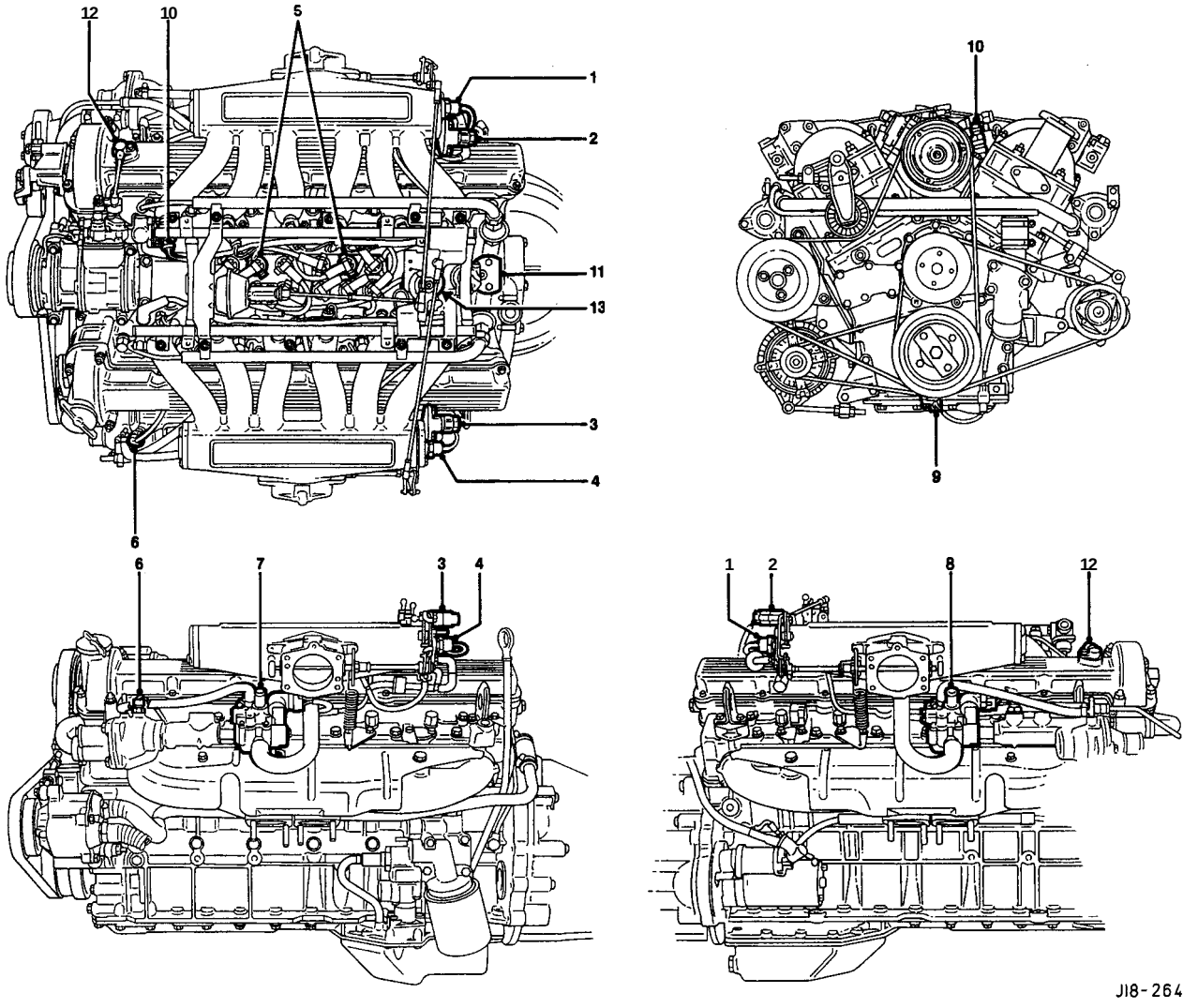
Power steering pressure switch (48): This allows idle speed compensation as the power steering pump places load on the engine



1. Intake Air Temperature Sensor
2. A–Bank Air Cleaner
3. B–Bank Air Cleaner
4. Throttle Position Sensor
5. A–Bank Idle Air Control Valve
6. B–Bank Idle Air Control Valve
7. A–Bank Evap. Emission Purge Control Solenoid Valve
8. B–Bank Evap. Emission Purge Control Solenoid Valve
9. Evap. Emission Purge Control Canister
10. A–Bank Manifold Absolute Pressure Sensor
11. A–Bank Gas Filter
12. B–Bank Manifold Absolute Pressure 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
23. Fuel Level Sensor
24. Engine Coolant Temperature Sensor
25. A–Bank Ignition Amplifier
26. B–Bank Ignition Amplifier
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
34. Secondary Air Injection Switching Valve
35. Vacuum Solenoid Valve
36. A–Bank Secondary Air Injection Check Valve
37. B–Bank Secondary Air Injection Check Valve
38. Ignition Supply
39. Engine Control Module
40. Malfunction Indicator Lamp/ Instrument Pack
41. Battery
42. Cranking Signal
43. Security and Locking Control Module
44. PDU / Generic Scan Tool
45. Transmission Control Module (5 lines)
46. Air Conditioning Control Module (4lines)
47 Park Neutral Switch
48 power Steering Pressure Switch

Fig. 1 EMS System Schematic

5.2.3.1 Component Location Diagram



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 Air Control Valve
8. A–Bank Idle Air Control Valve
9. Engine Position Sensor
10. Fuel Injector
11. Engine Speed Sensor
12. Camshaft Position Sensor

Fig. 1 EMS Component Locations

5.2.3.2 *Engine Management Harness Layout*

1. Intake Air Temperature Sensor
4. Throttle Position Sensor
5. A–Bank Idle Air Control Valve
6. B–Bank Idle Air Control Valve
7. A–Bank Evap. Emission Purge Control Solenoid Valve
8. B–Bank Evap. Emission Purge Control Solenoid Valve
10. A–Bank Manifold Absolute Pressure Sensor
14. Camshaft Position Sensor
15. Engine Position Sensor
16. Engine Speed Senso
17. A–Bank Fuel Injectors
18. B–Bank Fuel Injectors
20. Fuel Tank
21. Main Fuel Pump
22. Secondary Fuel Pump
23. Fuel Level Sensor
24. Engine Coolant Temperature Sensor
25. A–Bank Ignition Amplifier
26. B–Bank Ignition Amplifier
27. A–Bank Ignition Coil
28. B–Bank Ignition Coil
29. A–Bank Upstream Heated Oxygen Sensor
30. B–Bank Upstream Heated Oxygen Sensor
32. B–Bank Downstream Heated Oxygen Sensor
31. A–Bank Downstream Heated Oxygen Sensor
33. Secondary Air injection Pump
35. Vacuum Solenoid Valve
38. inertia Fuel Shut–off Switch
39. Engine Control Module

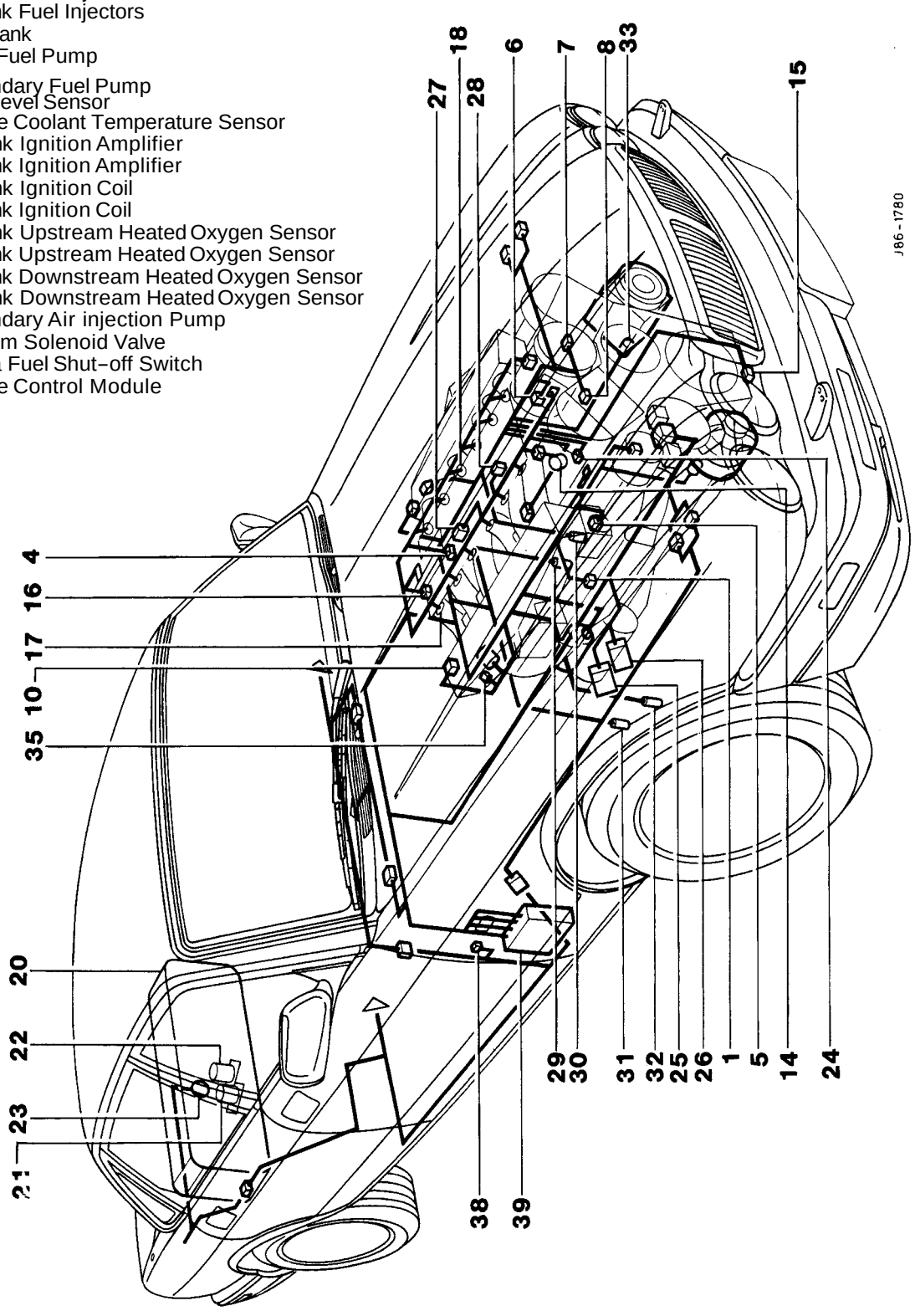


Fig. 1

5.2.3.3 *Engine Management Control Module – Pin Detail*

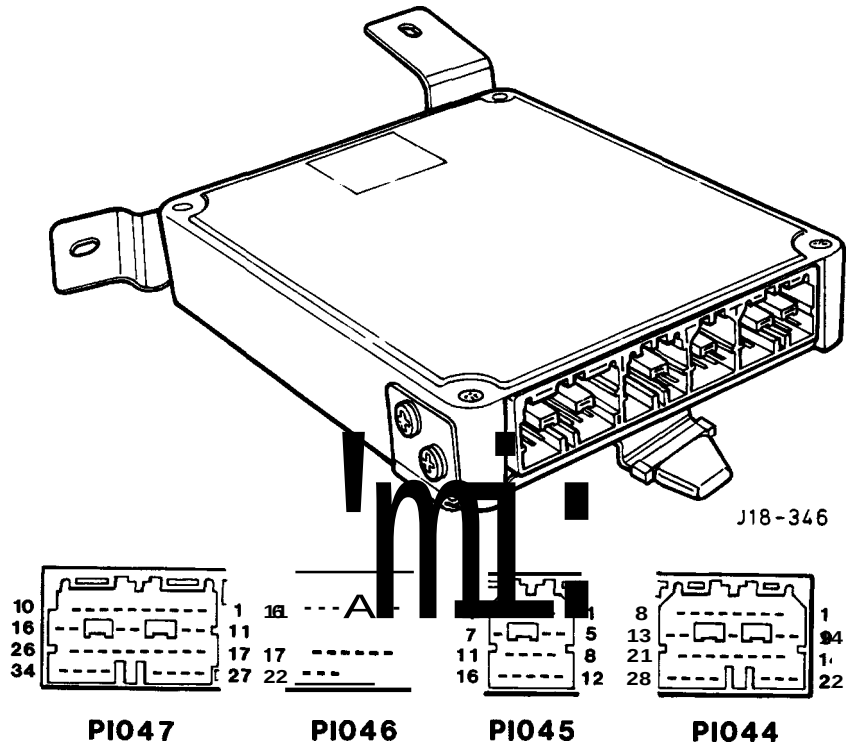


Fig. 1

Connector P1044		Connector P1045	
001	Fuel Used (Instrument Pack)	001	B–Bank Manifold Absolute Pressure Sensor
002	Malfunction Indicator Lamp	002	A—Bank Manifold Absolute Pressure Sensor
003	Engine Torque Signal	003	Idle Switch
004	Throttle PWM – Output	004	Throttle Position Sensor
005	Load Inhibit Signal	005	Coolant Temperature Sensor
006	Torque Reduction	006	Air Temperature Sensor
007	Vehicle Speed	007	Sensor Supply +5V
008	–	008	B–Bank Downstream Heated Oxygen Sensor
009	–	009	A–Bank Downstream Heated Oxygen Sensor
010	Engine Speed	010	B–Bank Upstream Heated Oxygen Sensor
011	–	011	A–Bank Upstream Heated Oxygen Sensor
012	Screen Request Signal	012	Ignition Supply 1
013	Air Conditioning Request Signal	013	Power Steering Pressure Switch
014	Security Signal – Input	014	Small Signal Ground
015	–	015	Screen Grounds
016	–	016	Sensor Ground
017	–		
018	Park / Neutral – Input		
019	–		
020	–		

Connector P1044 continued	
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 P1046	
001	–
002	–
003	B–Bank Downstream Oxygen Sensor Heater
004	A–Bank Downstream Oxygen Sensor Heater
005	A–Bank Upstream Oxygen Sensor Heater
006	B–Bank Upstream Oxygen Sensor Heater
007	Crank Signal
008	Camshaft Position Sensor +ve
009	–
010	Power Grounds
011	Power Grounds
012	Camshaft Position Sensor –ve
013	Engine Position Sensor +ve
014	Engine Speed Sensor +ve
015	–
016	Air Conditioning Clutch Relay
017	Secondary Air Injection Clutch Relay
018	Engine Position Sensor –ve
019	Engine Speed Sensor –ve
020	Ignition Failure – B
021	Ignition Failure – A
022	Power Grounds

Connector P1047	
001	Idle Air Control Valve B – Close
002	Idle Air Control Valve B – Open
003	Idle Air Control Valve A – Close
004	Idle Air 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
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

5.2

5.2.4 TRANSMISSION

5.2.4.1 Transmission Control Module Interface

The Transmission Control Module (TCM) is linked to the ECM providing input / output link to control engine torque request adaptation. Changes in vehicle operating criteria can result in fluctuating torque demands on the engine.

Signals from the ECM relating to engine speed, throttle position and engine torque (or warm–up cycle) are relayed to TCM to assist in achieving efficient operation.

A signal is transmitted to the ECM from the TCM when torque reduction is required, causing subsequent retardation of ignition timing. This signal also indicates transmission fault condition to the ECM.

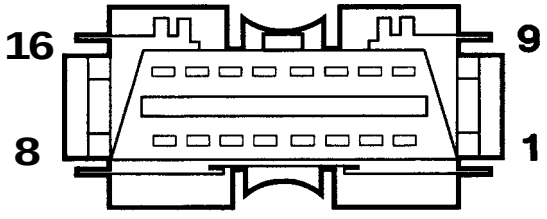
Note: Refer to Section 8.2, Automatic Transmission (V12), for detailed transmission information.

5.2.5 DIAGNOSTICS

5.2.5.1 Data Link Connector (DLC)

The Data Link Connector (DLC) is situated on the side of the transmission tunnel.

The DLC is rectangular in design and capable of accommodating up to sixteen terminals. The connector has keying features to allow easy connection in a one handed / blind operation. The vehicle connector and the test equipment connector have latching features that ensure the test equipment connector will remain mated when properly connected.



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Data Link Connector Pin Details

Cavity	General Assignment	Cavity	General Assignment
1	Ignition Relay Activation	9	Battery Power – Switched
2"	(not used)	10*	(not used)
3	Discretionary (not used)	11	Discretionary (not used)
4"	Chassis Ground	12	Discretionary (not used)
5"	Signal Ground (SIG RTN)	13	Discretionary (not used)
6	Discretionary (not used)	14	Discretionary (not used)
7"	K Line of ISO 9141	15"	L Line of ISO 9141
8	Discretionary (not used)	16"	Battery Power – Unswitched

* Federal Mandated Pins

Fig. 1 Data Link Connector

5.2.6 DATA STREAM INFORMATION

5.2.6.1 Parameter Identification (PID) – Access (Mode 1)

Generic OBD II PID List

PID (Hex)	Freeze Frame		Acronym	Description	Units of Measurement
	ECM	TCM			
0000	X	X	SUPPORT	Supported PIDS	Unitless
0001	X	X	CCNT	Cont. Code Counter	Unitless
0003	X		FUEL–B1	Fuel System Status Bank 1	Open / Closed
					OP DRV
					OP SYS / CL O2S
0003	X		FUEL–B2	Fuel System Status Bank 2	Open / Closed
					OP DRV
					OP SYS / CL O2S
0004	X	X	LOAD	Calculated Engine Load	Percent
0005	X		ECT	Engine Coolant Temp	Degrees
0006	X		SFT1	Short Term Fuel Trim – Bank 1	Percent
0007	X		LFT1	Long Term Fuel Trim 1	Percent
0008	X		SFT2	Short Term Fuel Trim – Bank 2	Percent
0009	X		LFT2	Long Term Fuel Trim 2	Percent
000B	X		MAP	Manifold Absolute Pressure	K Pa A
000C	X	X	RPM	Revolutions Per Minute	RPM
000D	X	X	VSS	Vehicle Speed Sensor	MPH – KPH
000E	X		SPARK	Spark Advance Cyl. 1	Degrees (Angle)
000F	X		IAT	Intake Air Temperature	Degrees
0011	X	X	TP	Throttle Position	Percent
0012	X		AIR	Secondary Air	On / Off
0013	X		O2S	Oxygen Sensor Location	Unitless
0014	X		O2S11	Oxygen Sensor 11	Volts
0014	X		SFT11	Short Term Fuel Trim – O2S 11	Percent
0015	X		O2S12	Oxygen Sensor 12	Volts
0015	X		SFT12	Short Term Fuel Trim – O2S 12	Percent
0018	X		O2S21	Oxygen Sensor 21	Volts
0018	X		SFT21	Short Term Fuel Trim – O2S 21	Percent
0019	X		O2S22	Oxygen Sensor 22	Volts
0019	X		SFT22	Short Term Fuel Trim – O2S 22	Percent

X = Freeze Frame PID (refer to Freeze Frame Access for more information)

Open = Open loop, have not satisfied conditions for closed loop.

Closed = Closed loop using O2S(s) as feedback for fuel control.

OP DRV = Open loop due to due to driving conditions (heavy acceleration)

OP **SYS** = Open loop due to vehicle system fault.

CL O2S = Closed loop fuel control, but fault with O2S sensor(s).

5.2.6.2 Freeze Frame Data – Access (Mode 2)

Freeze Frame Data allows access to emission related data values from specific generic PIDs. These values are stored the instant an emission related DTC is stored in Continuous Memory. This provides a snapshot of the conditions that were present when the DTC was stored. Once one set of freeze frame data is stored, this data will remain in memory even if another emission related DTC is stored, with the exception of Misfire or Fuel System DTCs. Once Freeze frame data for Misfire or Fuel System DTC is stored, it will overwrite any previous data and freeze frame will not be further overwritten. When a DTC associated with the freeze frame is erased or a PCM memory reset is performed, new freeze frame data can be stored again. In the event of multiple emission related DTCs in memory, always note the DTC for the freeze frame data.

Freeze Frame Data Access List

PID (Hex)	Freeze Frame		Acronym	Description	Units of Measurement
	ECM	TCM			
0000	X	X	SUPPORT	Supported PIDS	Unitless
0002	X	X	FCFF	Fault Causing Freeze Frame	Unitless
0003	X		FUELB1	Open / Closed Loop 1	As mode 1
0003	X		FUELB2	Open / Closed Loop 2	As mode 1
0004	X	X	LOAD	Calculated Load Value	Percent
0005	X		ECT	Engine Coolant Temperature	Degrees
0006	X		SFT1	Short Term Fuel Bank 1	Percent
0007	X		LFT1	Long Term Fuel Bank 1	Percent
0008	X		SFT2	Short Term Fuel Bank 2	Percent
0009	X		LFT2	Long Term Fuel Bank 2	Percent
000B	X		MAP	Manifold Absolute Pressure	K Pa A
000C	X	X	RPM	Engine RPM	RPM
000D	X	X	VSS	Vehicle Speed	MPH / KPH
000F	X		IAT	Intake Air Temperature	Percent

5.2

5.2.6.3 Generic Scan Tool

Refer to the scan tool manufacturer's instructions to access Freeze Frame Data (Mode 02).

5.2.6.4 Oxygen Sensor Monitoring Test Results – Access (Mode 05)

The Oxygen Sensor Monitoring Test Results allows access to the On–Board sensor fault limits and actual values during the test cycle. The test cycle has specific operation conditions that must be met (engine temperature, load, etc.) for completion. This information helps to determine the efficiency of the exhaust catalyst. Listed below are the tests and test identification numbers that are available.

Test ID	Test Description	Units
01h	Rich to lean sensor threshold voltage for test cycle	volts
02h	Lean to rich sensor threshold voltage for test cycle	volts
03h	Low sensor voltage for switch time calculation	volts
04h	High sensor voltage for switch time calculation	volts
05h	Rich to lean sensor switch time	seconds

The following codes to be confirmed:

06h	Lean to rich sensor switch time	seconds
07h	Maximum sensor voltage for test cycle	volts
08h	Maximum sensor voltage for test cycle	volts
09h	Time between sensor transitions	seconds

MANIFOLD ABSOLUTE PRESSURE – MAP

Group 1A

P 0106
P 0107
P 0108
P 0125

Group 1B

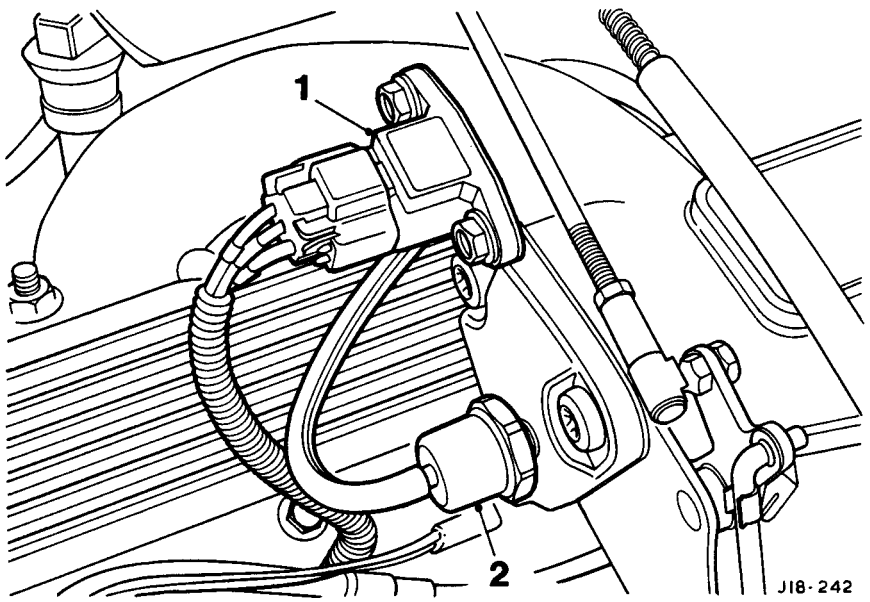
P 1106
P 1107
P 1108

Monitoring Procedure

The sensor output is continuously monitored for high and low value. If a sustained high or low ECM input (indicating a harness or connector fault) is seen, the relevant DTC is stored.

The sensor output voltage is monitored during sustained acceleration at low engine speed following an idle period. If the change in output is significantly less than the expected value then the range / performance failure judgement is made. The DTC is stored if the failure judgement is made on **two** successive trips.

5.2

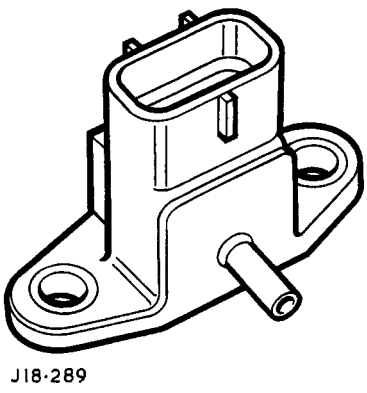


1. MAP Sensor
2. MAP Gas Filter

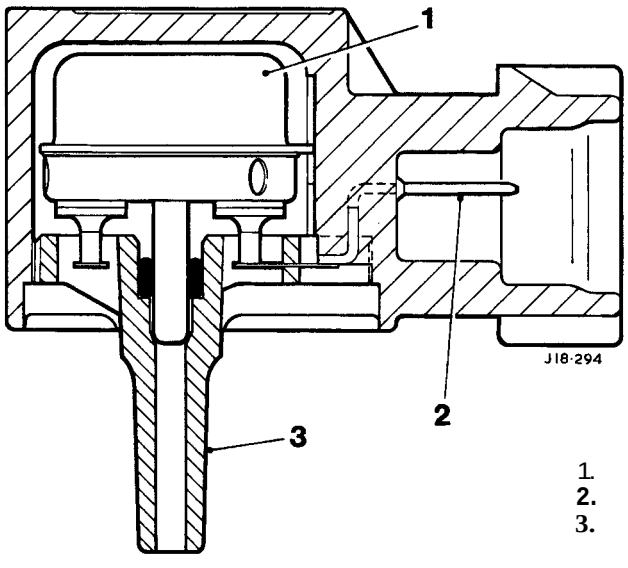
Fig. 1 MAP Sensor Location

MAP Sensor

The MAP Sensors measure the absolute pressure in each inlet manifold. A MAP Sensor is mounted to the rear of each inlet manifold, connected to the manifold via pipes and filters. They are electronically connected to inputs to the ECM and provide a voltage output that is directly proportional to absolute pressure.



Fin. 1 MAP Sensor

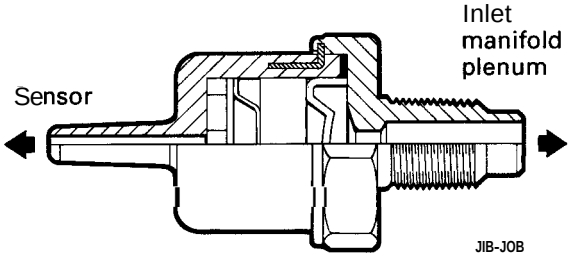


1. Pressure Sensor Capsule
2. Connector Pin
3. Inlet Stub

Fig. 2 MAP Sensor Cross Section

MAP Gas filter (Fig. 3)

This filter is mounted on the manifold negative pressure output port to reduce the amount of gasoline, oil or other foreign matter that might otherwise contaminate the sensor.



Fin. 3 MAP Gas Filter Section

MAPS A – Bank – ECM Interface Circuit

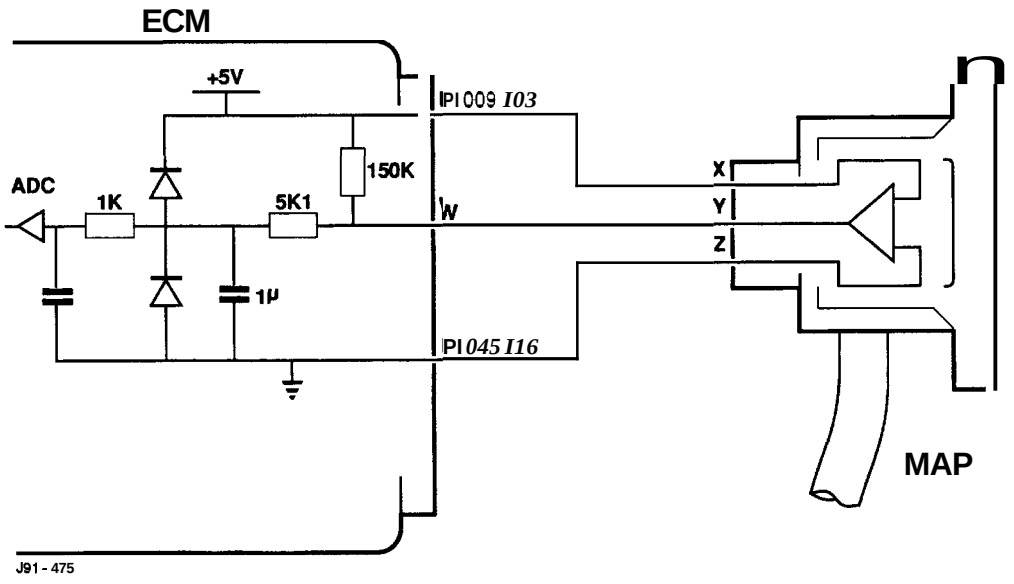


Fig. 1 Sectional – MAP Gas Filter

5.2

Key to Fig. 1

Bank	Connector W	Connector X	Connector Y	Connector Z
A	PI **045** / 01	**PI** 009 / **03**	PI 009 102	PI **009** / **01**
B	PI **045** 102	PI **050** / **03**	PI **050** / **02**	PI **050** / **01**

Additional Information

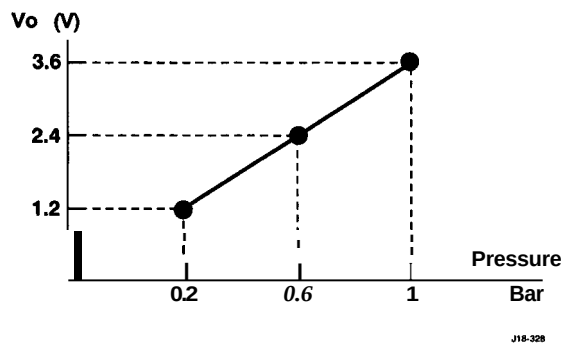


Fig. 2

MANIFOLD ABSOLUTE PRESSURE SENSOR (MAPS), RENEW

SRO 18.30.84 - RIGHT HAND

SRO 18.30.85 - LEFT HAND

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery earth lead.
- Disconnect the MAP sensor vacuum hose (1 Fig 1).
- Disconnect the MAP sensor harness mufti-plug (2 Fig. 1).
- Release bolts (3 Fig. 1) securing MAP sensor to mounting bracket and remove sensor.

Refit

Fitting a new MAP sensor is the reverse of the removal procedure.

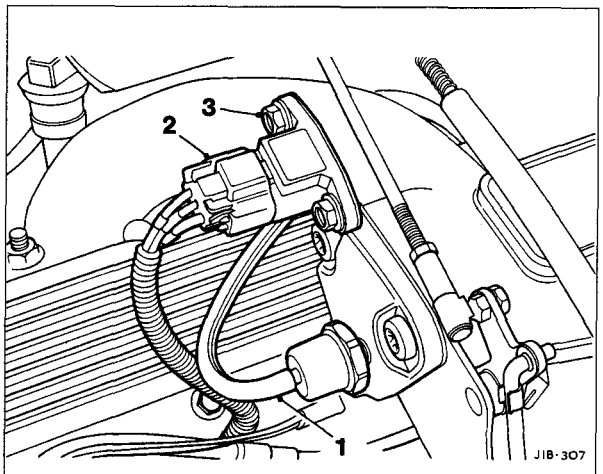


Fig. 1

5.2

MASS AIR FLOW SENSOR – P0106

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0106	MAP Sensor Range/ Performance Fault (Bank A)	Check code P1111 logged indicating service drive cycle complete, if code not logged proceed to pinpoint test A5
		Check harness and connector condition / integrity with ignition off if faulty rectify and proceed to pinpoint test A5
		If faults not found, disconnect sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness insulation PI 009/003 to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A2	Check inlet manifold pressure hose	OK	Proceed to A3
		Faulty	Repair or renew hose, re–connect harness and proceed to A5
A3	Check inlet manifold / pressure hose filter	OK	Proceed to A4
		Faulty	Renew filter, re–connect harness and proceed to A5
A4	Check inlet manifold	OK	Renew sensor, re–connect harness and proceed to A5
		Faulty	Repair or renew manifold, re–connect harness and proceed to A5
A5	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

MASS AIR FLOWSENSOR – P1106

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1 106	MAP Sensor Range Performance Fault (Bank B)	Check code P1111 logged indicating service drive cycle complete, if code not logged proceed to pinpoint test A5
		Check harness and connector condition integrity with ignition off if faulty rectify and proceed to pinpoint test A5
		If faults not found, disconnect sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness insulation PI 0501003 to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A2	Check inlet manifold pressure hose	OK	Proceed to A3
		Faulty	Repair or renew hose, re–connect harness and proceed to A5
A3	Check inlet manifold / pressure hose filter	OK	Proceed to A4
		Faulty	Renew filter, re–connect harness and proceed to A5
A4	Check inlet manifold	OK	Renew sensor, re–connect harness and proceed to A5
		Faulty	Repair or renew manifold, re–connect harness and proceed to A5
A5	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

MASS AIR FLOW SENSOR – P0107

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0107	MAP Sensor Low Input Fault (Bank A)	Check code P1111 logged indicating service drive cycle complete, if code not logged proceed to pinpoint test A6
		Check harness and connector condition ▮ integrity with ignition off, if faulty rectify and proceed to pinpoint test A6
		If faults not found, disconnect sensor and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness continuity PI 009/001 to ECM pin PI 0451016	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A2	Check harness continuity PI 009/002 to ECM pin PI 045/002	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A3	Check harness continuity PI 009/003 to PI 045/007	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A4	Check harness insulation PI 009/001 to PI 009/002	OK	Proceed to A5
		Incorrect	Locate and rectify wiring fault, re–connect harness and proceed to A6
A5	Check harness insulation PI 009/001 to PI 0091003	OK	Renew sensor, re–connect harness and proceed to A6
		Incorrect	Locate and rectify wiring fault, re–connect harness and proceed to A6
A6	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

MASS AIR FLOW SENSOR – P1107

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1107	MAP Sensor Low Input Fault (Bank B)	Check code P1111 logged indicating service drive cycle complete, if code not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A6
		If faults not found, disconnect sensor and proceed to pinpoint test A1

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A1	Check harness continuity PI **050/001** to ECM pin **PI 045/016**	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A2	Check harness continuity PI 050/002 to ECM pin PI **045/001**	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A3	Check harness continuity PI 009/003 to PI **045/007**	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A4	Check harness insulation PI **050/001** to PI **050/002**	OK	Proceed to A5
		Incorrect	Locate and rectify wiring fault, re-connect harness and proceed to A6
A5	Check harness insulation PI 050/001 to PI **050/003**	OK	Renew sensor, re-connect harness and proceed to A6
		Incorrect	Locate and rectify wiring fault, re-connect harness and proceed to A6
A6	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0108	MAP Sensor High Input Fault (Bank A)	Check code P1111 logged indicating service drive cycle complete, if code not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A6
		If faults not found, disconnect sensor and proceed to pinpoint test A1

TEST STEP		RESULT	ACTION
A1	Check harness continuity PI009/001 to PI 045/016	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A6
A2	Check harness continuity PI009/002 to PI 045/002	OK	Proceed to A3
		Open circuit	Repair or renew MAP, re-connect harness and proceed to A6
A3	Check harness continuity PI009/003 to PI 045/007	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A4	Check voltage level PI009/001, PI009/002 & PI009/003 to Vbatt	OV	Proceed to A5
		Above OV	Locate and rectify wiring fault, re-connect harness and proceed to A6
A5	Check harness insulation PI009/002 to PI 009/003	OK	Fit new sensor and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A6	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

MASS AIR FLOW SENSOR – P0108

Symptom Chart

CONDITION	POSSIBLE SOURCE	

Pinpoint Tests

		RESULT	ACTION
A I	Check harness continuity PI 050/001 to PI 045/016	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A2	Check harness continuity PI 050/002 to PI 045/001	OK	Proceed to A3
		Open circuit	Repair or renew MAP, re-connect harness and proceed to A6
A3	Check harness continuity PI 050/003 to PI 045/007	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A4	Check voltage level PI 050/001, PI 050/002 & PI 050/003 to Vbatt	0V	Proceed to A5
		Above OU	Locate and rectify wiring fault, re-connect harness and proceed to A6
A5	Check harness insulation PI 050/002 to PI 050/003	OK	Fit new sensor and proceed to A6
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A6	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

INTAKE AIR TEMPERATURE – IAT

Group 2

P 0111
P 0112
P 0113

Monitoring Procedure

The sensor output is continuously monitored for high and low value. If a sustained high or low ECM input (indicating a harness or connector fault) is seen, the relevant DTC is stored.

The sensor output is monitored while the engine is running. If the sensor indicates air temperature above 100°C, after the engine has run for some time, then the range / performance failure judgement is made. The DTC is stored if the failure judgement is made on two successive trips.

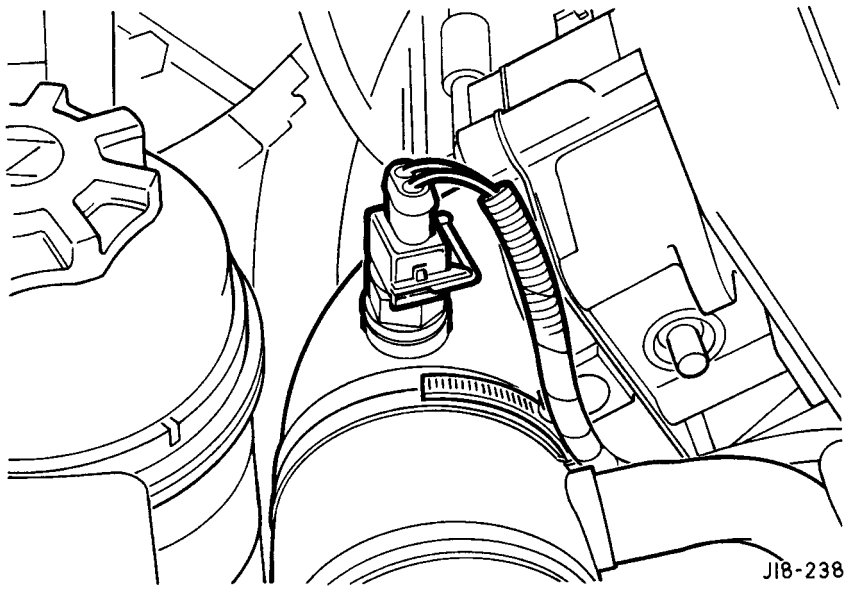


Fig. 1 IAT Sensor Location

Structure of IAT Sensor

The IAT Sensor records the engines intake air temperature and inputs the ECM. The sensor is mounted on the 'A' bank air intake elbow. The sensor is negative temperature coefficient i.e. resistance increases as temperature rises.

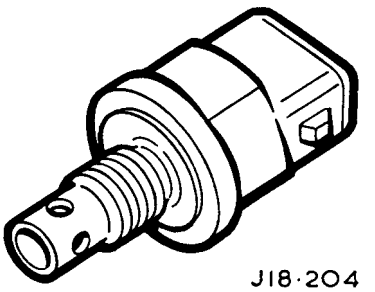
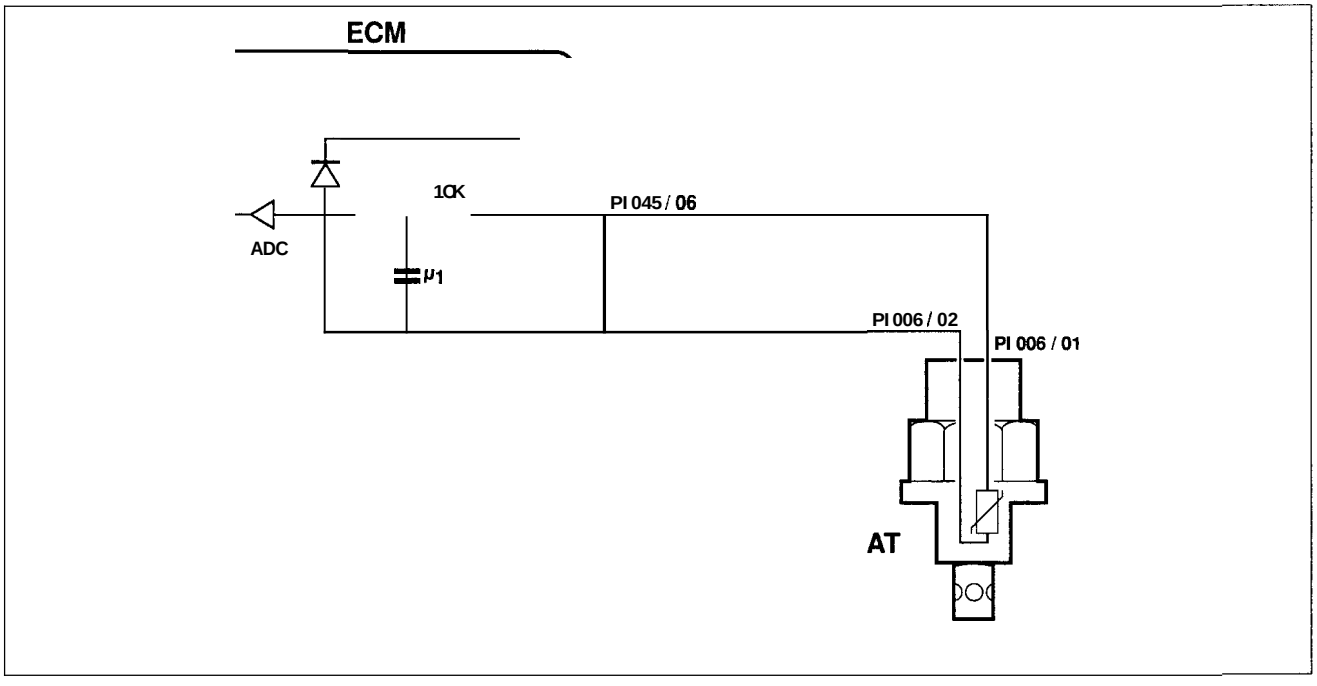


Fig. 2

IAT Sensor – ECM Interface Circuit



5.2

Additional Information

Temperature (°C)	Resistance (kΩ)
–20	15.00
20	2.45
80	0.32
110	0.14

INTAKE AIR TEMPERATURE SENSOR, RENEW

SRO 18.30.52

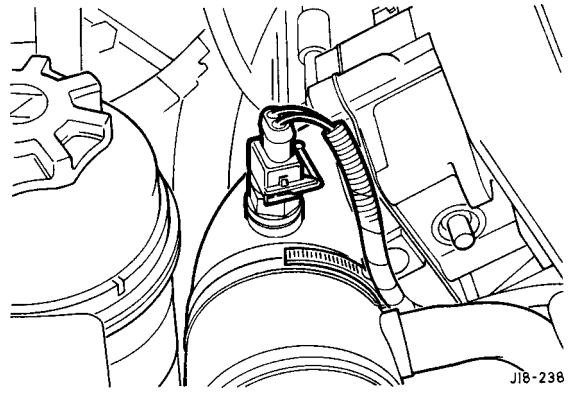


Fig. 1

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery ground lead.
- Disconnect the harness plug from the air intake temperature sensor.
- Undo and remove the air intake temperature sensor and copper sealing washer from the 'A' bank intake elbow.

Refit

Fitting a new air intake temperature sensor is the reverse of the removal procedure. Fit a new copper sealing washer.

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0111	IAT Range / Performance Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A8
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A8
		If fault not found proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	
A I	Monitor PID OFH and check temperature range is within limits	OK	
		Out-of-limits	
A2	Check air intake system	OK	
		Faulty	
A3	Check harness continuity PI 0061001 to PI 045/006	OK	
		Open circuit	
A4	Check harness continuity PI 0061002 to PI 045/016	OK	
		Open circuit	
A5	Check harness insulation PI 0061001 to PI 0061002	OK	
		Short circuit	
A6	Check harness continuity PI 0061002 to ground	OK	
		Open circuit	
A7	Check sensor resistance is within limits of 107 - 26990Ω	OK	
		Out-of-limits	
A8	Clear fault code and perform service drive cycle to verify fault cleared	OK	
		Fault still present	
A9	Return to Symptom Chart and repeat diagnostic procedure	OK	
		Fault still present	

INTAKE AIR SENSOR – P0112

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0112	IAT Low Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A6
		If fault not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Monitor PID OFH and check temperature range is within limits of –48 to +148°C	**OK**	Proceed to A2
		Out–of–limits	Rectify and proceed to A6
A2	Check air intake system	OK	Switch ignition off, disconnect IAT sensor and proceed to A3
		Faulty	Rectify and proceed to A6
A3	Check harness continuity PI 006/001 to PI 045/006	OK	Proceed to A4
		Open Circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A4	Check harness continuity PI 006/002 to PI 045/016	OK	Proceed to A5
		Open Circuit	Locate and rectify wiring fault, reconnect harness and proceed to A6
A5	Check sensor resistance within limits of 107 – 26990Ω	OK	Clear fault code and proceed to A6
		Out–of–limits	Fit new IAT sensor, re–connect harness and proceed to A6
A6	Perform service drive cycle to verify fault cleared	**OK**	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

INTAKE AIR SENSOR – P0113

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0113	IAT High Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A6
		If fault not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Monitor PID OFH and check temperature range is within limits of –48 – +148 °C	OK	Proceed to A2
		Out–of–limits	Rectify and proceed to A6
A2	Check air intake system	OK	Switch ignition off, disconnect IAT sensor and proceed to A3
		Faulty	Rectify and proceed to A6
A3	Check harness continuity PI 0061001 to PI 0451006	OK	Proceed to A4
		Open Circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A4	Check harness continuity PI 0061002 to PI 0451016	OK	Proceed to A5
		Open Circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A5	Check sensor resistance within limits of 107 – 26990Ω	OK	Clear fault code and proceed to A6
		Out–of–limits	Fit new IAT sensor, re-connect harness and proceed to A6
A6	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

ENGINE COOLANT TEMPERATURE – ECT

Group 3

P 0116
P 0117
P 0118

Monitoring Procedure

The sensor output is continuously monitored for high and low value. If a sustained high or low ECM input (indicating a harness or connector fault) is seen, the relevant DTC is stored.

The sensor output is monitored while the engine is running. If the engine has been running under sufficient load for the engine to reach normal operating temperature and the sensor still reads below 30°C then the range/ performance failure judgement is made. The DTC is stored if the failure judgement is made on **two** successive trips

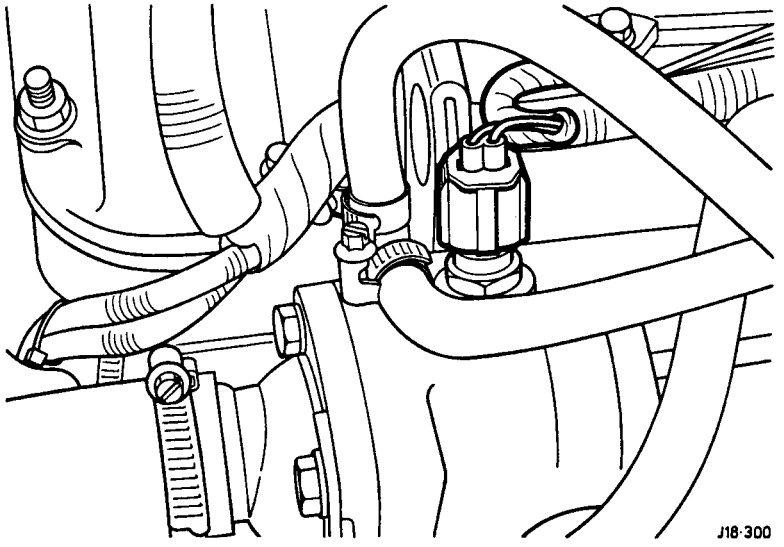
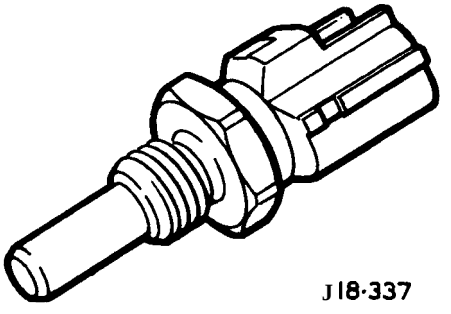


Fig. 1 ECT Sensor Location



Fia.2 ECT Sensor

Structure of ECT Sensor (Fig. 1)

The ECT Sensor measures the engine outlet coolant temperature and inputs the ECM. The sensor is mounted on the **'B'** bank thermostat housing. The sensor is negative temperature coefficient i.e. resistance increases as temperature rises.

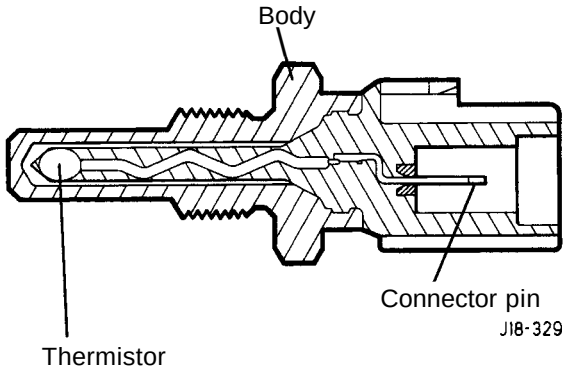


Fig. 1 ECT Sensor Cross Section

ECT / ECM Interface Circuit

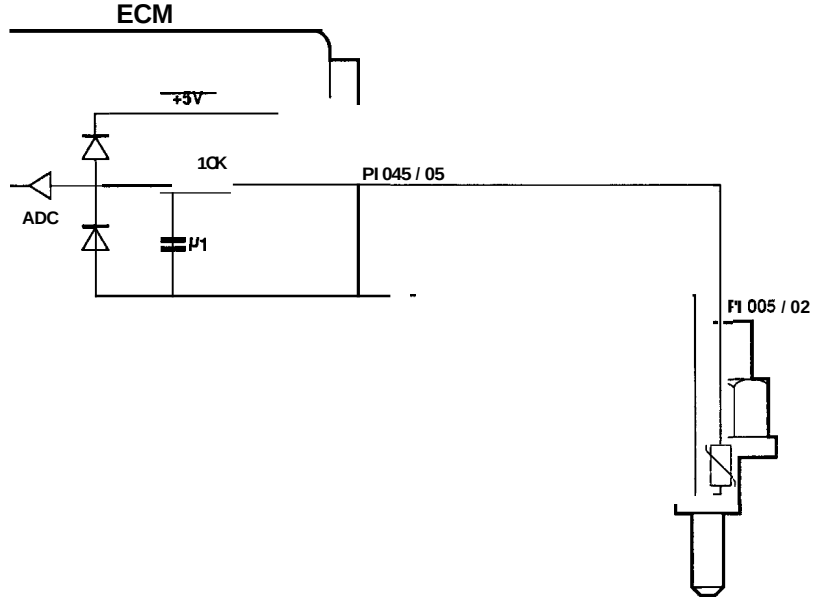


Fig. 2 Interface between ECT and ECM

Additional Information

Temperature (°C)	Resistance (kΩ)
–20	15.00
20	2.45
80	0.32
110	0.14

COOLANT TEMPERATURE SENSOR, RENEW

SRO 18.30.10

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery ground lead.

WARNING: MAKE SURE THAT THE ENGINE IS COLD BEFORE SLACKENING THE COOLANT RESERVOIR CAR

- Carefully slacken coolant reservoir cap to relieve coolant pressure. Re-tighten coolant reservoir cap.
- Disconnect harness plug from the coolant temperature sensor.
- Undo and remove the temperature sensor and copper washer from the 'B' bank reservoir housing.
- Clean the housing.

Refit

Fitting a new temperature sensor is the reverse of the removal procedure. Always use a new copper washer.

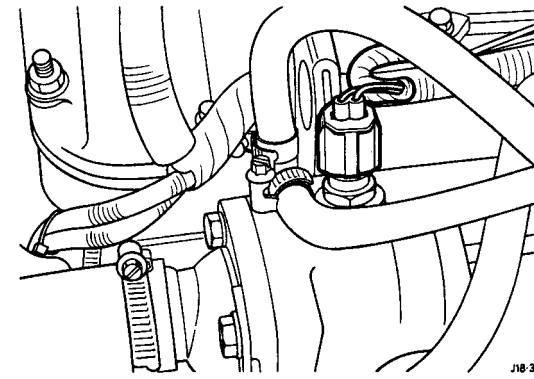


Fig. 1

5.2

ENGINE COOLANT TEMPERATURE SENSOR – P0116

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0116	ECT Range / Performance Fault (Falling Temperature)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A7
		If fault not found switch ignition off and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check engine coolant level	OK	Proceed to A2
		Low	Top–up and proceed to A7
A2	Check coolant temperature gauge on instrument pack	OK	Remove thermostat and proceed to A3
		Faulty	Repair or renew gauge and proceed to A7
A3	Check thermostat operation	OK	Disconnect ECT sensor and proceed to A4
		Incorrect	Fit new thermostat, re–connect harness and proceed to A7
A4	Check harness continuity PI 0051001 to PI 045/016	OK	Proceed to A5
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A5	Check harness continuity PI 0051002 to PI 0451005	OK	Proceed to A6
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A6	Check sensor resistance is within limits of 107 – 26990Ω	OK	Proceed to A7
		Out–of–limits	Renew sensor, re–connect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ENGINE COOLANT TEMPERATURE SENSOR – P0117

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0117	ECT Low Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A5
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A5
		If fault not found, proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Monitor PID 05H and check temperature within range of –48 – +148	OK	Switch ignition off, disconnect ECT sensor and proceed to A2
		Out–of–limits	Rectify and proceed to A5
A2	Check harness continuity PI 0051001 to PI 045/016	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault,re–connect harness and proceed to A5
A3	Check harness continuity PI 0051002 to PI 0451005	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A4	Check sensor resistance is within limits of 107 – 26990Ω	OK	Proceed to A5
		Out–of–limits	Renew sensor, re-connect harness and proceed to A5
A5	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ENGINE COOLANT TEMPERATURE SENSOR – P0118

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0118	ECT High Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A6
		If fault not found, proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Monitor PID 05H and check temperature within range of –48 – +148° C	OK	Switch ignition off, disconnect ECT sensor and proceed to A2
		Out–of–limits	Rectify and proceed to A6
A2	Check harness continuity PI 005/001 to PI 045/016	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault,re–connect harness and proceed to A6
A3	Check harness continuity PI 005/002 to PI 045/005	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A4	Check harness insulation PI 005/001 & PI 005/002 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A6
A5	Check sensor resistance is within limits of 107 – 26990Ω	OK	Proceed to A6
		Out–of–limits	Renew sensor, re–connect harness and proceed to A6
A6	Perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ENGINE COOLANT TEMPERATURE SENSOR - P0125

Note: This fault code will always appear in conjunction with code P0116

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0125	Excessive Time to enter Closed Loop Fuel Control Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A8
		Check harness and connector condition / integrity with ignition off, if faulty rectify and proceed to pinpoint test A8
		If fault not found switch ignition off and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check engine coolant level	OK	Proceed to A2
		Low	Top-up and proceed to A8
A2	Check coolant temperature gauge on instrument pack	OK	Remove thermostat and proceed to A3
		Faulty	Repair or renew gauge and proceed to A8
	Check thermostat	OK	Disconnect ECT sensor and proceed to A4
		Incorrect	Fit new thermostat, re-connect harness and proceed to A8
A4	Check harness continuity PI 0051001 to PI 045/016	OK	Proceed to A5
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A8
A5	Check harness continuity PI 005/002 to PI 0451005	OK	Proceed to A6
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A8
A6	Check harness insulation PI 0051001 to PI 0051002	OK	Proceed to A7
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A8
A7	Check sensor resistance is within limits of 107 - 26990Ω	OK	Proceed to A8
		Out-of-limits	Renew sensor, reconnect harness and proceed to A8
A8	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A9
A9	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

THROTTLE POSITION – TP

Group 4

P 0121
P 0122
P 0123

Note: This section should be considered in conjunction with Group 21, Closed Throttle Position Switch

Monitoring Procedure

The sensor output is continuously monitored for high and low value. If a sustained high or low ECM input (indicating a harness or connector fault) is seen, the relevant DTC is stored.

The sensor output is monitored under steady driving conditions. The output is compared to the expected value (which is mapped against engine load and RPM). If the difference between these values is above a threshold then the range /performance failure judgement is made. The DTC is stored if the failure judgement is made on two successive trips.

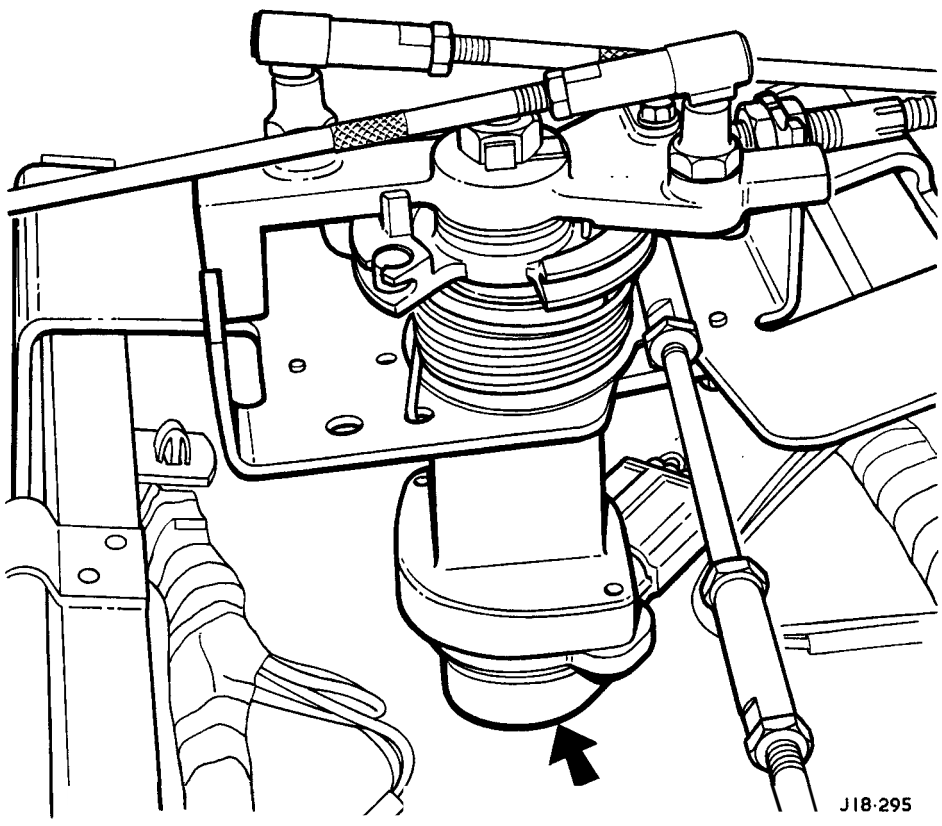


Fig. 1 TP Sensor Location

Structure of TP Sensor

The throttle position sensor is a potentiometer. It is installed on the throttle cable bracket which is connected to the throttle body. As throttle position changes, the TP Sensor sends a voltage signal to the ECM.

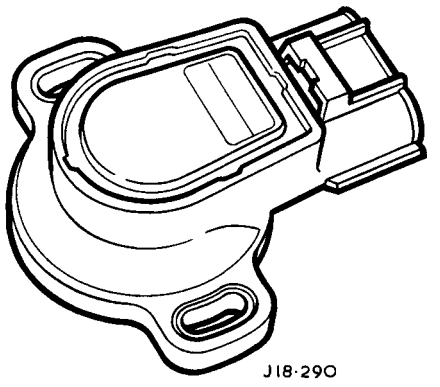
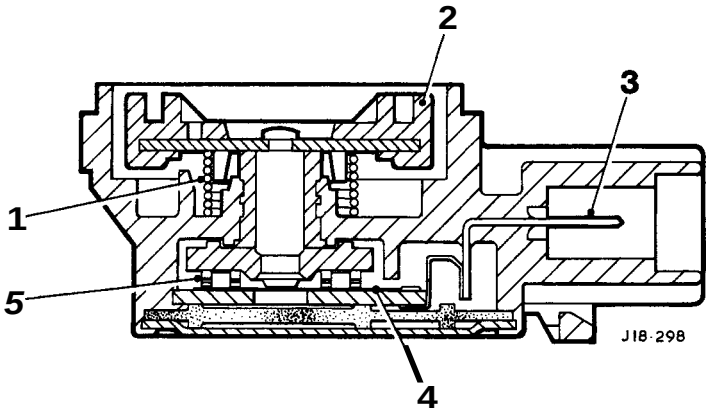


Fig. 1 TP Sensor

5.2



1. Return Spring
2. Dog Drive from Throttle Pedestal
3. Connector Pin
4. Resistive Track
5. Wiper Contact

Fig. 2 TP Sensor Cross Section

TP Sensor / ECM Interface Circuit

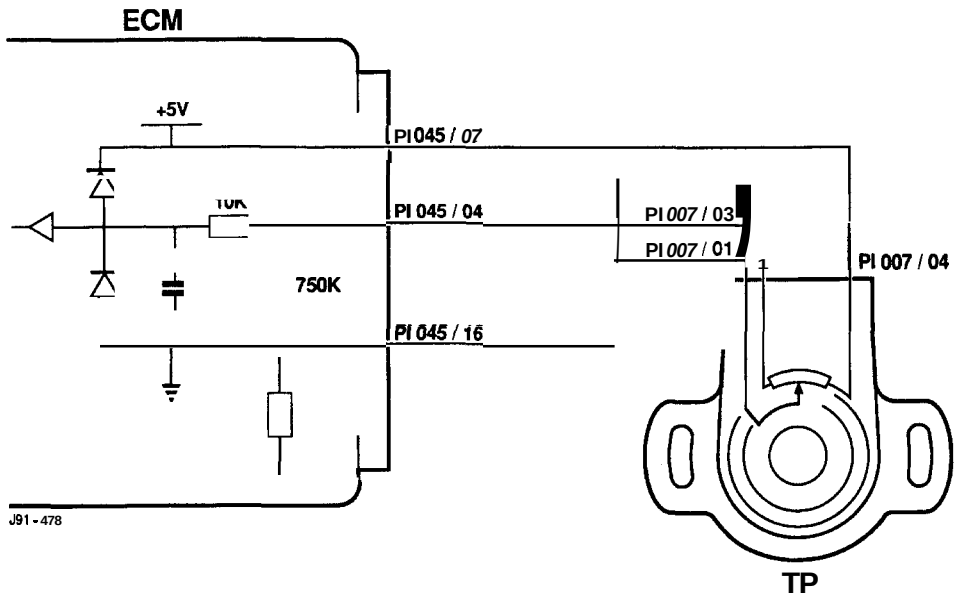


Fig. 1 Interface between TP Sensor and ECM

5.2

Additional Information

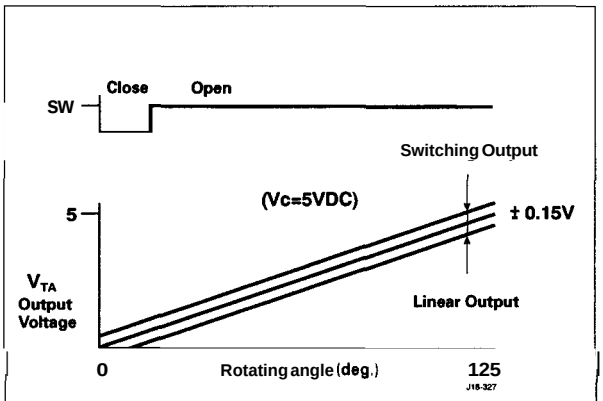


Fig. 2 TP Output Characteristics

Basic Function Check

The resetting procedure presented below is for 'non–franchised' staff who do not have the use of Jaguar diagnostic equipment.

Clearance between lever and stopper	Between terminals	Resistance
0 mm (closed)	$V_{TA} - E_2$	10.2– 11 kΩ
	IDL – E_2	Continuity
Cable bracket pulley (fully open)	IDL – E_2	No continuity
	$V_{TA} - E_2$	2 – 15 kΩ
	$V_C - E_2$	2.9 – 5.3 kΩ
Gradually open the cable bracket and pulley assembly	$V_{TA} - E_2$	Resistance proportional to angle

5.2

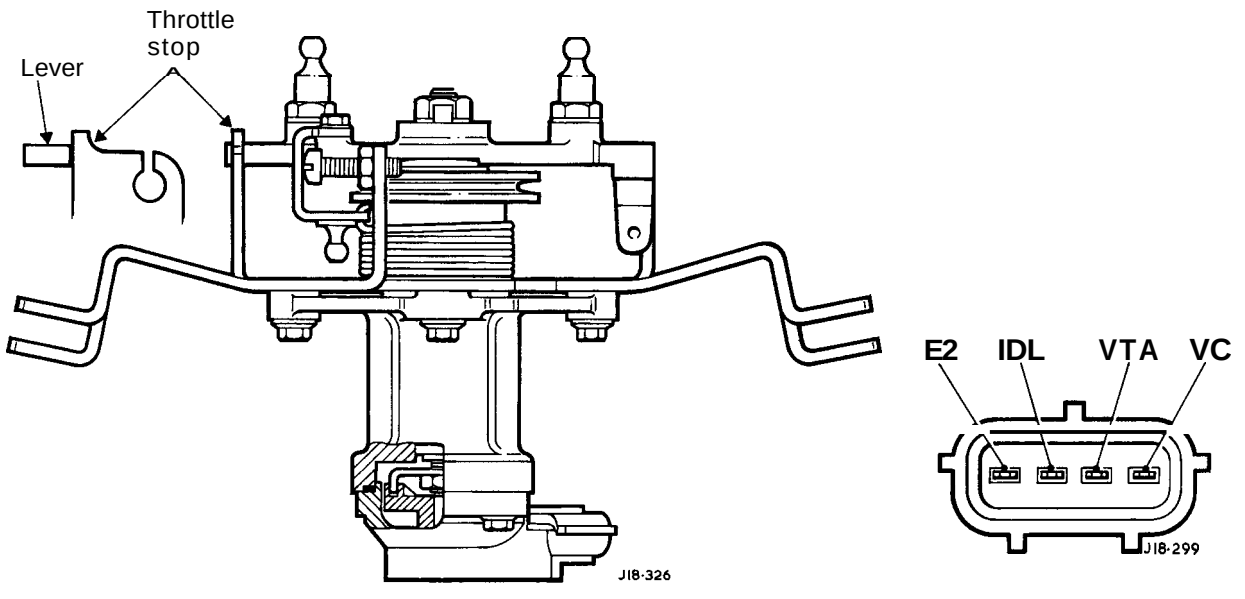


Fig. 1

THROTTLE POSITION SENSOR – RENEW

SRO 18.30.17

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery ground lead.
- Remove the engine cover. Refer to V12 ESM.

- Disconnect the throttle control rods (1 Fig. 1) from the throttle pulley lever ball pins and swing the rods aside.
- Rotate the throttle pulley and disconnect the speed control operating rod (2 Fig. 1) from the ball pins.
- Remove the throttle bracket assembly (3 Fig. 1) to fuel rail securing nuts. Reposition the bracket / pulley assembly for access.
- Disconnect the TP sensor harness multi-plug (4 Fig. 1).
- Undo and remove the TP sensor securing screws. Remove the TP sensor (5 Fig. 1).
- Remove and discard the TP sensor 'O' ring seal from the mating face.
- Clean the mating face of the TP sensor mounting.

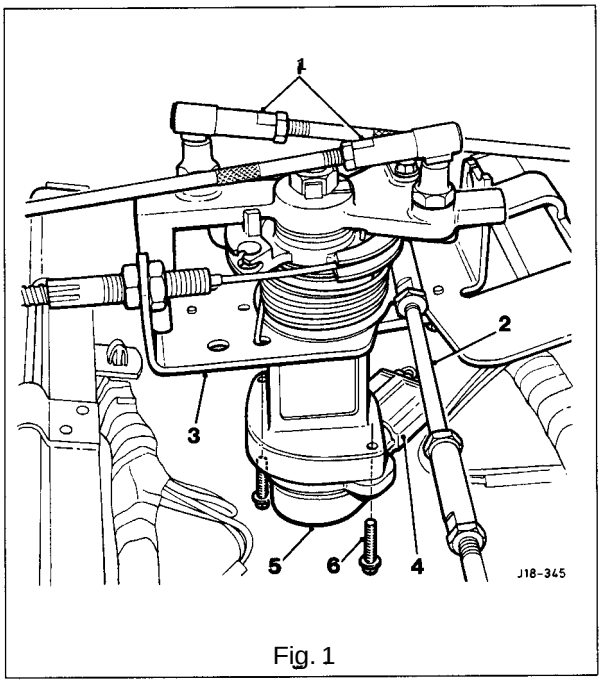


Fig. 1

Refit

Re-fitting is the reversal of the removal procedure.

Note: Reset or adjust the assembly as necessary, see procedure below.

Settting / Adjustment

Connect two digital voltmeters into the vehicle circuit as shown, without breaking the existing circuit.

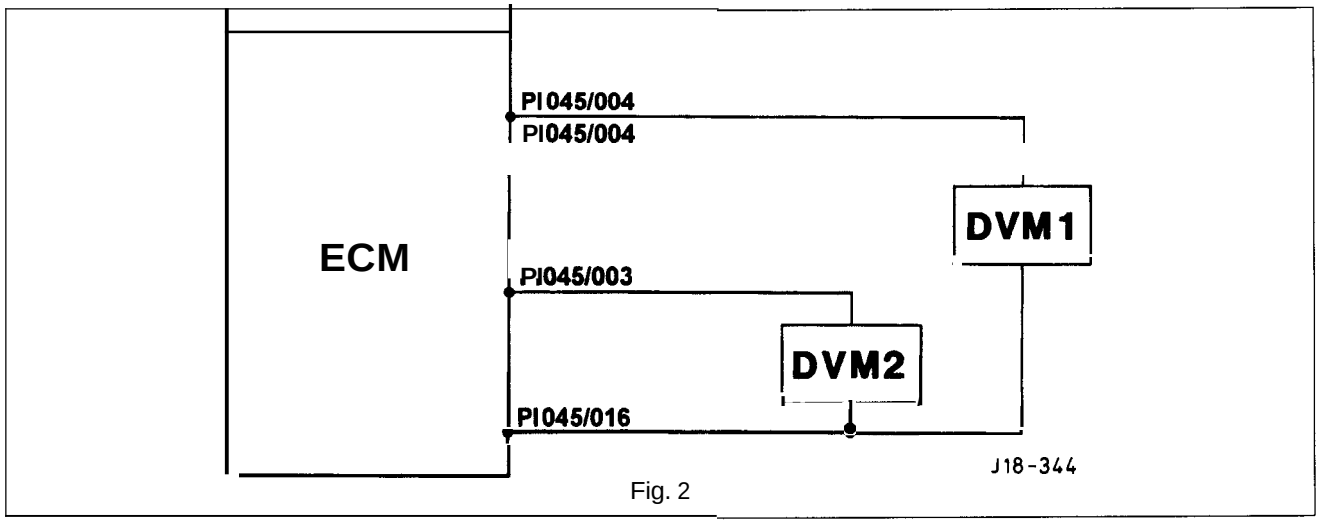


Fig. 2

Set DVM ranges to 'VOLTAGE'. DVM 1 on 0-2V range (0.001mV resolution), DVM 2 on *0* - 20V range.

Ensure the pedastal is fully closed, ie on the mechanical stop.

Turn ignition on and record voltage reading at DVM 1, DVM 2 should read below 20mV.

Rotate the throttle pulley very gently towards open, noting the point where DVM 2 reading changes abruptly to abaove 1lV, indicating idle switch open. Record DVM 1 reading at this point.

Subtract the first DVM 1 reading from the second, a correctly adjusted TPS will give a resulting value of **44** - 54mV.

If result is outside the stated range slacken the TPS securing screws **(6** Fig. 1) and turn TPS slightly with respect to the pedastal.

Repeat the adjustment procedure until voltage reading is within the required range.

Re-tighten screws **(6** Fig. 1) and re-check voltage reading is in range.

Note: Angular checks (using feeler gauges) or resistance checks will not be accurate and must not be relied upon..

Remove DVMs.

THROTTLE POSITION – PO121

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A8
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A8
		Monitor PID 11H and check values correct with throttle open/closed, if faulty rectify and proceed to pinpoint test A8
		If fault not found disconnect TP sensor, switch ignition on and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check 5V +ve at pin PI 007/004 and OV at pin PI 007/001	OK	Switch off ignition and proceed to A2
		Incorrect	Locate and rectify wiring fault, reconnect harness and proceed to A8
A2	Check harness continuity PI 007/002 to PI 0451003	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A8
A3	Check harness continuity PI 007/003 to PI 0451004	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A8
A4	Check harness insulation PI 007/003 to PI 0071001	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A8
A5	Check harness insulation PI 007/003 to PI 007/004	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A8
A6	Connect multi-meter between TP terminals 1 and 3. Move wiper arm slowly through its range checking for smooth response in meter resistance reading.	OK	Proceed to A7
		Incorrect	Repair or renew TP sensor, reconnect harness and proceed to A8
A7	Check for inlet / exhaust blockage	Clear	Fit new TP sensor, reconnect harness and proceed to A8
		Blocked	Clear blockage and proceed to A8
A8	Clear fault code and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A9
A9	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

THROTTLE POSITION - P0122

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0122	TP Low Input Fault	Read PID 11H - check values correct when throttle is held fully open /closed, if correct proceed to pinpoint test A8
		Check harness and connector condition ▮ integrity, if faulty rectify and proceed to pinpoint test A8
		Monitor PID 11H and check values correct with throttle open / closed, if faulty rectify and proceed to pinpoint test A??
		If fault not found, disconnect TP sensor, switch on ignition and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check 5V +ve at pin PI 007/004 and 0V at pin PI 007/001	OK	Switch off ignition and proceed to A2
		Incorrect	Locate and rectify wiring fault, re-connect harness and proceed to A9
A2	Check harness continuity PI 0071002 to PI 0451003	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A3	Check harness continuity PI 0071003 to PI 0451004	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A4	Check harness insulation PI 0071001 to PI 0071003	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A5	Check harness insulation PI 0071003 to PI 0071004	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A6	Check resistance values across TP sensor pins 1 - 3 and 3 - 4	OK	Proceed to A7
		Out-of-limits	Repair or renew TP sensor, re-connect harness and proceed to A9
A7	Check harness insulation PI 0071003 to Vbatt	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A8	Check for inlet ▮exhaust blockage	Clear	Fit new TP sensor, re-connect harness, clear fault code and proceed to A9
		Blocked	Clear blockage and proceed to A9
A9	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A10
A10	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

THROTTLE POSITION – P0123

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0123	TP High Input Fault	Read PID 11H – check values correct when throttle is held fully open / closed, if correct proceed to pinpoint test A8
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A8
		Monitor PID 11H and check values correct with throttle open / closed, if faulty rectify and proceed to pinpoint test A??
		If fault not found, disconnect TP sensor, switch on ignition and proceed to pinpoint test A I

Pinpoint Tests

5.2

TEST STEP		RESULT	ACTION
A I	Check 5V +ve at pin PI 007/004 and 0V at pin PI 007/001	OK	Switch off ignition and proceed to A2
		Incorrect	Locate and rectify wiring fault, re–connect harness and proceed to A9
A2	Check harness continuity PI 007/002 to PI 045/003	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A3	Check harness continuity PI 007/003 to PI 045/004	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A4	Check harness insulation PI 007/001 to PI 0071003	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A5	Check harness insulation PI 007/003 to PI 0071004	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A6	Check resistance values across TP sensor pins 1 – 3 and 3 – 4	OK	Proceed to A7
		Out–of–limits	Repair or renew TP sensor, re–connect harness and proceed to A9
A7	Check harness insulation PI 007/003 to Vbatt	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A8	Check for inlet / exhaust blockage	Clear	Fit new TP sensor, re–connect harness, clear fault code and proceed to A9
		Blocked	Clear blockage and proceed to A9
A9	Perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A10
A10	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

HEATED OXYGEN SENSOR – H02S

Group 5A

Bank A Upstream	P 0131
	P 0132
	P 0133
	P 0134
	P 0135
Bank A Downstream	P 0137
	P 0138
	P 0139
	P 0140
	P 0141

Group 5B

Bank B Upstream	P 0151
	P 0152
	P 0153
	P 0154
	P 0155
Bank B Downstream	P 0157
	P 0158
	PO159
	P 0160
	P 0161

5.2

Monitoring Procedure

These diagnostics are closely linked to the fuel system diagnostics, see Group 6.

The sensor outputs are monitored during steady driving with a fully warm engine.

If the downstream sensors indicate lean Air / Fuel Ratio (AFR) and the fuel system has judged fuel system rich (P 0172 or P 0175) then the upstream sensor is judged to have failed high voltage.

The upstream sensor is judged to have failed low voltage by comparison of its output with that of the downstream sensor.

The upstream slow response judgements are made when any of the following switching rates remain above a threshold: low to high switch time from one mid point of the switching cycle to the next mid point.

If the switching rate of the upstream sensors falls below a value mapped against load and speed then the sensor is judged to have failed low activity.

Downstream sensor slow response and no activity judgements are similar to upstream but the mapped values are different. Also if no activity is seen the AFR is enriched to force a response, and a failure judgement is only made after this has been unsuccessful.

Downstream high and low voltage judgements are made after the sensor has remained above or below predetermined thresholds for a long period.

Both upstream and downstream heater circuit judgements are made by comparing the expected heater drive state with the actual state. If these states are different for too long then the heater circuits are judged to be faulty.

For all the above diagnostics, the relevant DTC is stored if the failure judgement is made on two successive trips.

5.2

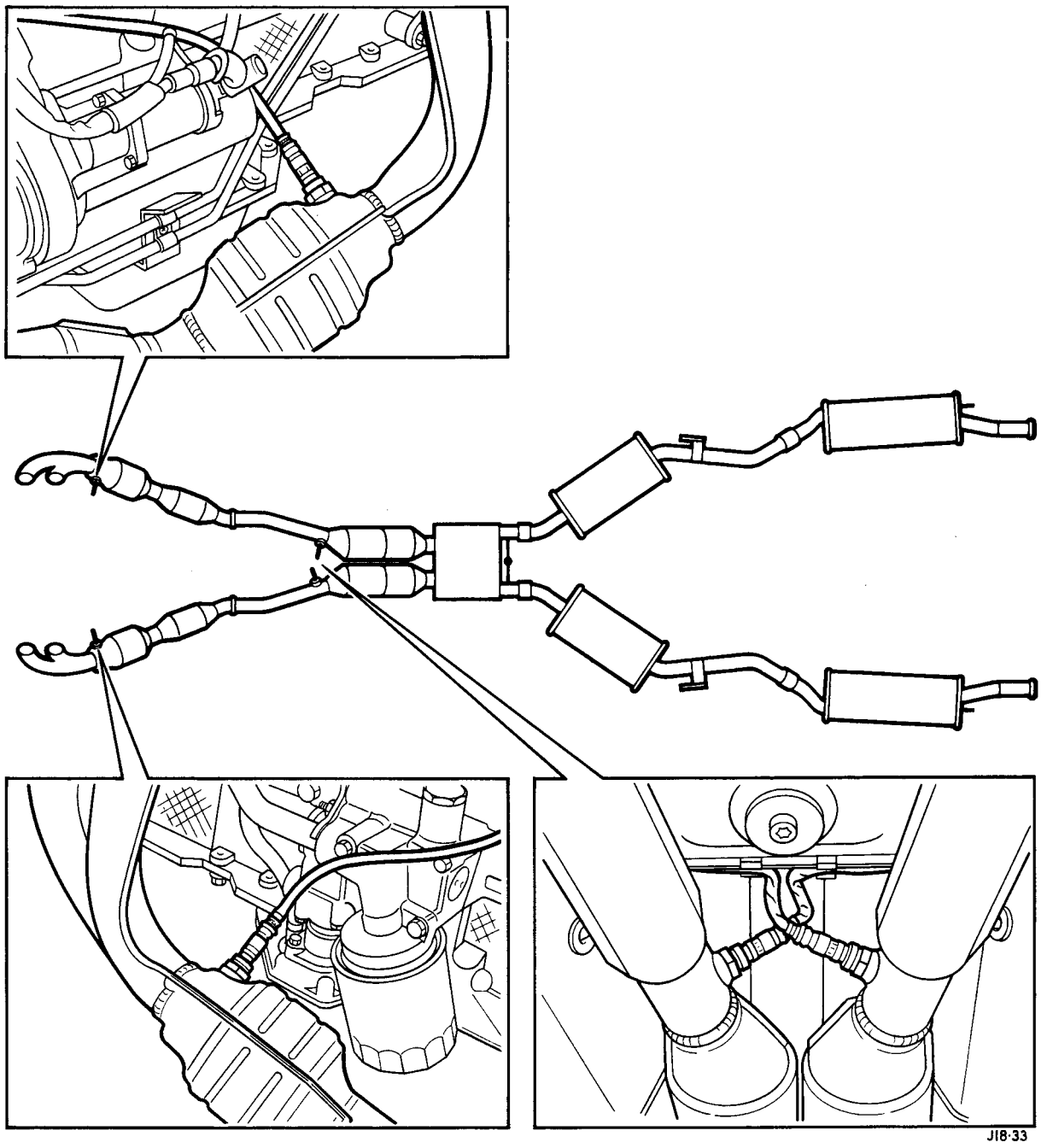


Fig. 1 HO2S Location

Structure of Heated Oxygen Sensor

The heated oxygen sensor detects the concentration of oxygen in the exhaust gases. In operation, the ECM receives input signals from the sensor and varies the iniector opening time duration. The sensor has an internal heater to stabilize the sensor output.

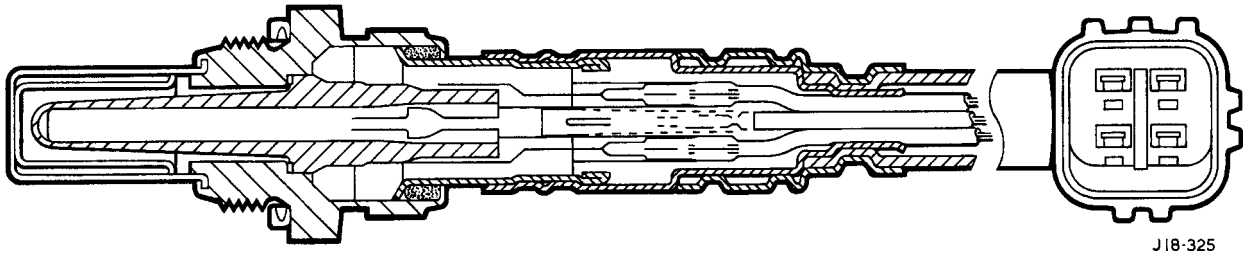


Fig. 1 HO2S Sectional Diagram

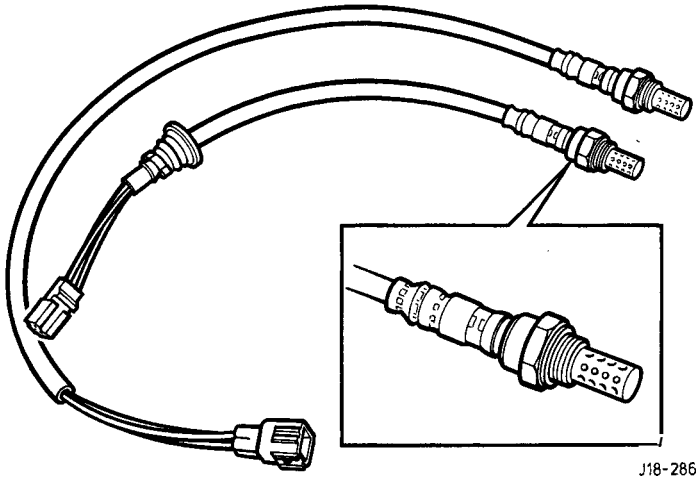


Fig. 2 HO2S with Connector

HO2S – ECM Interface Circuit

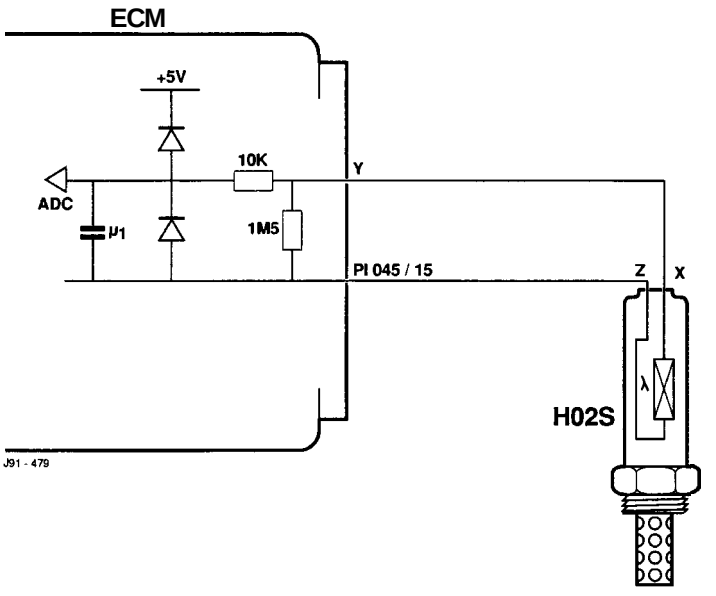


Fig. 1 HO2S / ECM Interface – General Circuit

5.2

Key to Fig. 1 connectors, X, Y and Z

Bank	Position	Connector X	Connector Y	Connector Z
A	Upstream	Pl025–3	Pl045–11	Pl025–4
B	Upstream	Pl027–3	Pl045–10	Pl027–4
A	Downstream	Pl026–3	Pl045–9	Pl026–4
B	Downstream	Pl028–3	Pl045–8	Pl028–4

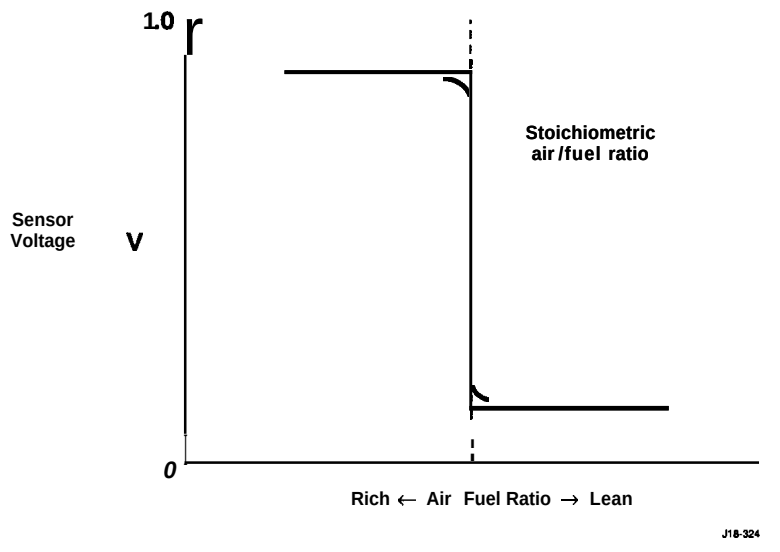


Fig.2 HO2S Characteristic

HO2S Heater – ECM Interface Circuit

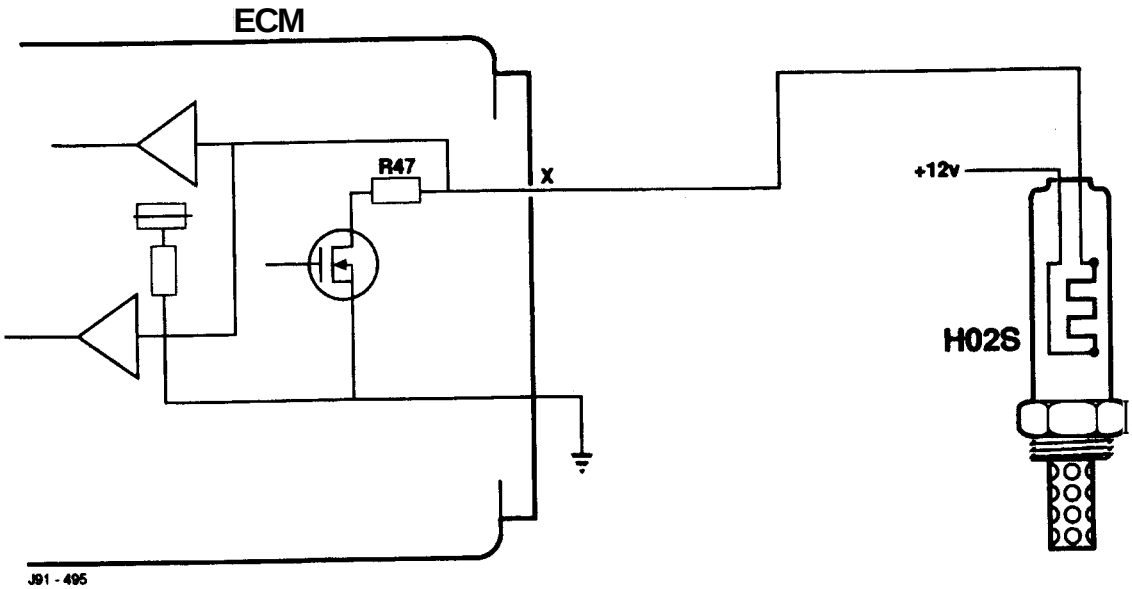


Fig.1 HO2S Heater / ECM Interface – General Circuit

5.2

Key to Fig. 1 connector X,

Bank	Position	Connector X
A	Upstream	PI046–3
B	Upstream	PI046–3
A	Downstream	PI046–3
B	Downstream	PI046–3

Additional Information

1. Vehicle Harness Check

- Check for open and short circuit in harness / connector between HO2S and ECM.
- Check for approx. 12V between heater harness.

2. Heater Resistance Check

- Check resistance between the heater terminals; should read 10Ω to 20Ω at –20°C to 100°C.

3. Performance Check

- Run the engine at 2500 RPM for two minutes, to heatupthe HO2S.
- Check the voltage of the sensor output: Alternates between less than 0.4V at feed back engine conditions and in excess of 0.5V.
- Check the cycle of the front sensor output; should read 15 cycles per minute or more at 1500 RPM
- Check the cycle of the rear sensor output; should read 1 cycle per 3 minutes or more at 1500 RPM

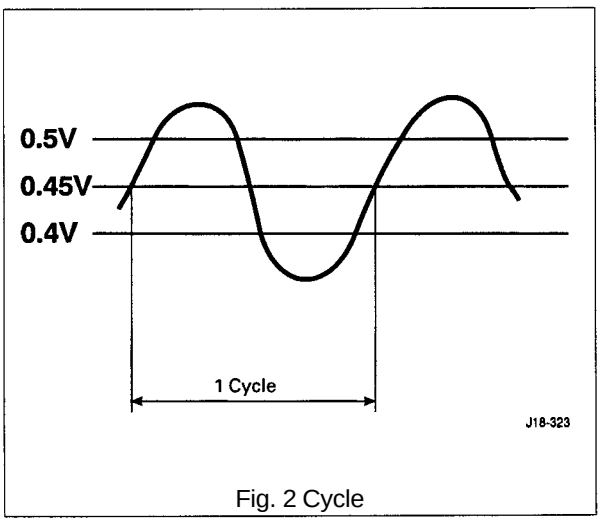


Fig. 2 Cycle

UPSTREAM OXYGEN SENSOR, RENEW

SRO 18.30.79 – LEFT HAND

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery earth lead.

From inside the engine bay:

- Releasethe oxygen sensor multi–plug from the mounting bracket and disconnect.
- Reposition harness from behind the lifting eye.
- Raise the vehicle.

From below:

- Remove the oil filter cartridge. Refer to section 3.2.
- Reposition the oxygen sensor harness and securing tie strap down the dipstick tube to access the tie strap. Cut and remove the tie strap.
- Undo and remove the oxygen sensor.

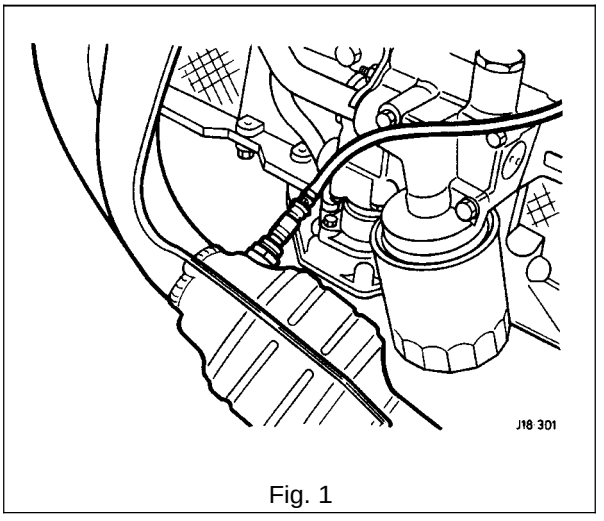


Fig. 1

Refit

Fitting a new upstream oxygen sensor is the reverse **of** the removal procedure.

- Route the harness behind the dipstick tube.
- Fit a new tie strap in its original position.
- Route the multi–plug behind the lifting eye.

5.2

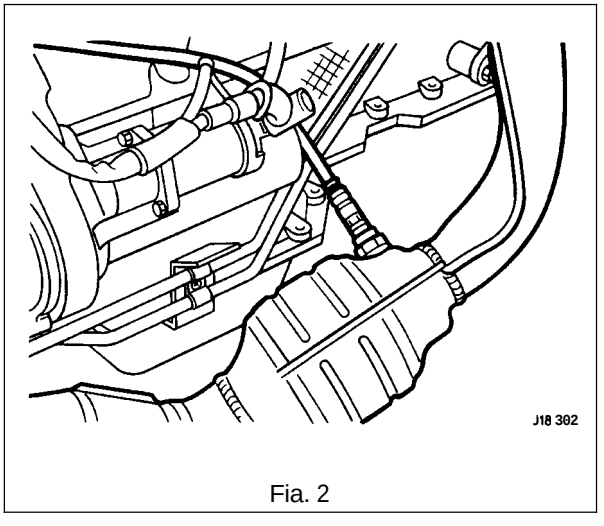
SRO 18.30.78 – RIGHT HAND

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery earth lead.
- Releasethe oxygen sensor multi–plug from the mounting bracket and disconnect.
- Reposition harness from behind the lifting eye.
- Reposition the harness to dipstick tube tie strap. Cut and remove the harness tie strap.
- Raise the vehicle.

From below:

- Undo and remove the harness clip securing screw and remove the clip.
- Route the harness from the engine bay.
- Undo and remove the oxygen sensor.



Fia. 2

Refit

Fitting a new upstream oxygen sensor is the reverse of the removal procedure.

- Route the harness behind the dipstick tube.
- Fit a new tie strap in its original position.
- Route the multi–plug behind the lifting eye.

HEATED OXYGEN SENSORS – P0131

Symptom Chart

N	P SSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A5
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A5
		If fault not found, disconnect bank A upstream sensor and proceed to pinpoint test A I

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and-4 as the current generated		
A I	045/011	Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A2	Check harness continuity PI 0251004 to PI 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and-proceed to A5
A3	Check harness insulation PI 0251003 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A5
A4	ground		and proceed to A5
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A5	le to verify fault	OK	stop
A6	and repeat	OK	Stop

HEATED OXYGEN SENSORS – P0132

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0132	HO2S High Voltage Fault (bank A upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A4**
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test **A4**
		If fault not found, disconnect bank **A** upstream sensor and proceed to pinpoint test **A I**

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins **3** and **4** as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuity PI **025/004** to PI **045/015**	OK	Switch ignition on and proceed to **A2**
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A4**
A2	Check voltage level at PI **045/015**	0V	Proceed to **A3**
		Above 0V	Locate and rectify wiring fault, re-connect harness and proceed to **A4**
A3	Check harness insulation PI **025/003** to Vbatt	OK	Renew sensor, reconnect harness and proceed to **A4**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A4**
A4	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A5**
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	
Fault code P0133	HO2S Slow Response Fault (bank A upstream sensor)	

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A I	Check harness continuity PI **0251003** to PI **0451011**	**OK**	
		Open circuit	
A2	Check harness Continuity PI **0251004** to PI **045/015**	**OK**	
		Open circuit	
A3	Check harness insulation PI **0251003** to Vbatt	**OK**	
		Short circuit	
A4	Check harness insulation PI **025/004** to Vbatt	**OK**	
		Short circuit	
A5	Check harness insulation PI **0251003** to ground	**OK**	
		Short circuit	
A6	Check voltage level at PI **0251004**	0V	
		Above 0V	
A7	Perform service drive cycle to verify fault cleared	OK	
		Fault still present	
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	
		Fault still present	

HEATED OXYGEN SENSORS – P0134

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0134	HO2S No Activity detected (bank A upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank A upstream sensor and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuity PI 025/003 to PI 045/011	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A2	Check harness continuity PI 025/004 to PI 045/015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A3	Check harness insulation PI 025/003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A4	Check harness insulation PI 025/004 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check harness insulation PI 025/003 to ground	**OK**	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A6	Check voltage level at PI 025/004	0V	Fit new sensor, re-connect harness and proceed to A7
		Above 0V	Locate and rectify wiring fault, reconnect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS - P0135

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0135	HO2S Heater Fault (bank A upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A9
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A9
		If fault not found, switch ignition off, disconnect bank A upstream sensor and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuity PI 0251001 to PI 0451006	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A2	Check harness continuity PI 0251002 to RS 0061008	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A3	Check harness insulation PI 0251001 to PI 0251002	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A4	Check harness insulation PI 025/001 to ground	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A5	Check harness insulation PI 0251002 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A6	Check harness insulation PI 0251001 to Vbatt	OK	Proceed to A7
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A7	Check harness insulation PI 0251002 to Vbatt	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A8	Check heater resistance value is within limits of 12.27 - 27.278	OK	Suspect intermittent fault, fit new sensor, re-connect harness and proceed to A9
		Out-of-limits	Fit new sensor, re-connect ault, re-connect harness and proceed to A9
A9	Perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A10
A10	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0137	HO2S Low Voltage Fault (bank A downstream sensor)	Check code P1 111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A5
		Check harness and connector condition ▌ integrity, if faulty rectify and proceed to pinpoint test A5
		If fault not found, disconnect bank A downstream sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity CA 0981004 to PI 0451009	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A2	Check harness continuity CA 0981003 to PI 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A3	Check harness insulation CA 0981004 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A4	Check harness continuity CA 0981003 to ground	OK	Renew sensor, reconnect harness and proceed to A5
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A5	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

HEATED OXYGEN SENSORS – PO138

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0138	HO2S High Voltage Fault (bank A downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A4**
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test **A4**
		If fault not found, disconnect bank A downstream sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuity CA 098/003 to PI 045/015	OK	Switch ignition on and proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A4
A2	Check voltage level at PI 045/015	0V	Proceed to A3
		Above 0V	Locate and rectify wiring fault, re-connect harness and proceed to A4
A3	Check harness insulation CA 098/004 to Vbatt	OK	Renew sensor, re-connect harness and proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A4
A4	Perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0139	HO2S Slow Response Fault (bank A downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank A downstream sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A I	Check harness continuity CA 0981004 to PI 0451009	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A2	Check harness continuity CA 0981003 to PI 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A3	Check harness insulation CA 0981003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check harness insulation CA 0981004 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A5	Check harness insulation CA 098/004 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A6	Check voltage level at CA 098/003	0V	Fit new sensor, re-connect harness and proceed to A7
		Above 0V	Locate and rectify wiring fault, reconnect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

HEATED OXYGEN SENSORS – P0141

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0140	HO2S No Activity detected (bank A downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank A downstream sensor and proceed to pinpoint test A1

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuity CA 098/004 to PI 045/009	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A2	Check harness continuity CA 098/003 to PI 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A3	Check harness insulation CA 0981003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check harness insulation CA 0981004 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check harness insulation CA 0981004 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check voltage level at CA 0981003	0V	Fit new sensor, re-connect harness and proceed to A7
		Above 0V	Locate and rectify wiring fault, re-connect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

5.2

HEATED OXYGEN SENSORS – P0141

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0141	HO2S Heater Fault (bank A downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A9
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A9
		If fault not found, switch ignition off, disconnect bank A downstream sensor and proceed to pinpoint test A I

TEST STEP		RESULT	ACTION
	Note:		
A1	Check harness continuity CA 0981001 to PI 0451004	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A2	Check harness continuity CA 0981002 to RS 0061008	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A3	Check harness insulation CA 0981001 to CA 0981002	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A4	Check harness insulation CA 0981001 to ground	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A5	Check harness insulation CA 0981002 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A9
A6	Check harness insulation CA 0981001 to Vbatt	OK	Proceed to A7
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A7	Check harness insulation CA 0981002 to Vbatt	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A8	Check heater resistance value is within limits of 12.27 – 27.2752	OK	Suspect intermittent fault, fit new sensor, re–connect harness and proceed to A9
		Out–of–limits	Fit new sensor, re-connect ault, reconnect harness and proceed to A9
A9	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A10
A10	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

HEATED OXYGEN SENSORS – P0151

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0151	HO2S Low Voltage Fault (bank B upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A5
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A5
		If fault not found, disconnect bank B upstream sensor and proceed to pinpoint test A1

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuity PI 027/003 to PI 045/010	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A5
A2	Check harness continuity PI 027/004 to PI 045/015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A5
A3	Check harness insulation PI 027/003 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A5
A4	Check harness continuity PI 027/004 to ground	OK	Renew sensor, re-connect harness and proceed to A5
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A5
A5	Perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS – P0152

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0152	HO2S High Voltage Fault (bank B upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found, disconnect bank B upstream sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A I	Check harness continuity PI 0271004 to PI 045/015	OK	Switch ignition on and proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A4
A2	Check voltage level at PI 0451015	0V	Proceed to A3
		Above 0V	Locate and rectify wiring fault, reconnect harness and proceed to A4
A3	Check harness insulation PI 0271003 to Vbatt	OK	Renew sensor, reconnect harness and proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A4
A4	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS – P0153

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0153	HO2S Slow Response Fault (bank B upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank B upstream sensor and proceed to pinpoint test A1

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A1	Check harness continuity PI 027/003 to PI 045/010	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A2	Check harness continuity PI 027/004 to PI 045/015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A3	Check harness insulation PI 027/003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check harness insulation PI 027/004 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check harness insulation PI 027/003 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check voltage level at PI 027/004	0V	Fit new sensor, re-connect harness and proceed to A7
		Above 0V	Locate and rectify wiring fault, re-connect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0154	HO2S No Activity detected (bank B upstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank B upstream sensor and proceed to pinpoint test A I

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A1	Check harness continuitv PI 027/003 to PI 045/010	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A2	Check harness continuity PI 0271004 to PI 045/0 15	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A3	Check harness insulation PI 027/003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check harness insulation PI 0271004 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A5	Check harness insulation PI 0271003 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check voltage level at PI 027/004	0V	Fit new sensor, re-connect harness and proceed to A7
		Above OV	Locate and rectify wiring fault, reconnect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS – P0155

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code **P0155**	HO2S Heater Fault (bank B upstream sensor)	Check code **P1111** logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A9**
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test **A9**
		If fault not found, switch ignition off, disconnect bank B upstream sensor and proceed to pinpoint test **A I**

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resist ice between sensor pins **3** and **4** as the current generated by a multimeter may damage the platinum electrodes		
A I	Check harness continuity PI **027/001** to PI **045/005**	OK	Proceed to **A2**
		Open circuit	Locate and rectify wiring **fault,** re-connect harness and **proceed to A9**
A2	Check harness continuitv PI **027/002** to RS **006/008**	OK	Proceed to **A3**
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A9**
A3	Check harness insulation PI **027/001** to PI **027/002**	OK	Proceed to **A4**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A9**
A4	Check harness insulation PI **027/001** to ground	OK	Proceed to **A5**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A9**
A5	Check harness insulation PI **027/002** to ground	OK	Switch ignition on and proceed to **A6**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A9**
A6	Check harness insulation PI **027/001** to Vbatt	OK	Proceed to **A7**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A9**
A7	Check harness insulation PI **027/002** to Vbatt	OK	Proceed to **A8**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A9**
A8	Check heater resistance value is within limits of **12.27 – 27.278**	OK	Suspect intermittent fault, fit new sensor, re-connect harness and proceed to **A9**
		Out-of-limits	Fit new sensor, re-connect ault, re-connect harness and proceed to **A9**
A9	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A10**
A10	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS – P0157

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0157	HO2S Low Voltage Fault (bank B downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A5
		Check harness and connector condition ▌ integrity, if faulty rectify and proceed to pinpoint test A5
		If fault not found, disconnect bank B downstream sensor and proceed to pinpoint test A I

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A I	Check harness continuity CA 0991004 to PI 0451008	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A2	Check harness continuity CA 0991003 to PI 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A3	Check harness insulation CA 0991004 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A5
A4	Check harness continuity CA 0991003 to ground	OK	Renew sensor, reconnect harness and proceed to A5
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A5
A5	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS – P0158

Symptom Chart

CONDITION	POSSIBLE SOURCE	
Fault code P0158	HO2S High Voltage Fault (bank B downstream sensor)	drive cycle completed, if not logged proceed to pinpoint test A4
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found, disconnect bank B downstream sensor and proceed to pinpoint

Pinpoint Tests

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a		
A I	Check harness continuity CA 0991003 to PI 045/0 15		
			re-connect harness and-proceed to A4
A2	Check voltage level at PI 0451015	0V	Proceed to A3
			re-connect harness and proceed to A4
A3	Check harness insulation CA 0991004 to Vbatt	**OK**	Renew sensor, re-connect harness and proceed to A4
			re-connect harness and proceed to A4
A4	Perform service drive cycle to verify fault cleared	**OK**	stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	**OK**	Stop
		Fault still present	Contact Jaguar Service Hotline

HEATED OXYGEN SENSORS - P0159

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0159	HO2S Slow Response Fault (bank B downstream sensor)	Check code P1 111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank B downstream sensor and proceed to pinpoint test A I

	TEST STEP	RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
	Check harness continuity CA 0991004 to Pl 0451008	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
	Check harness continuity CA 0991003 to Pl 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A3	Check harness insulation CA 0991003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A4	Check harness insulation CA 0991004 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
(A5	Check harness insulation CA 0991004 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check voltage level at CA 0991003	0V	Fit new sensor, re-connect harness and proceed to A7
		Above 0V	Locate and rectify wiring fault, reconnect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

HEATED OXYGEN SENSORS - P0160

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0160	HO2S No Activity detected (bank B downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, disconnect bank B downstream sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A I	Check harness continuity CA 0991004 to PI 0451010	**OK**	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A2	Check harness continuity CA 0991003 to PI 0451015	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A3	Check harness insulation CA 0991003 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check harness insulation CA 0991004 to Vbatt	**OK**	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check harness insulation CA 0991004 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check voltage level at CA 0991003	0V	Fit new sensor, re-connect harness and proceed to A7
		Above 0V	Locate and rectify wiring fault, re-connect harness and proceed to A7
A7	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A8**
A8	Return to Symptom Chart and repeat diagnostic procedure	**OK**	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

5.2

HEATED OXYGEN SENSORS – PO131

Note: Due to software configuration it is necessary to test both upstream sensors during fault diagnosis.

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0161	HO2S Heater Fault (bank B downstream sensor)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A9
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test A9
		If fault not found, switch ignition off, disconnect bank B downstream sensor and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
	Note: Do not attempt to test resistance between sensor pins 3 and 4 as the current generated by a multimeter may damage the platinum electrodes		
A I	Check harness continuity CA 0991001 to PI 045/003	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A2	Check r uit CA 0991002 to RS DO61008	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A3	Check harness insulation CA 0991001 to CA 099/002	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A4	Check harness 1 CA 1 to ground	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A5	Check harness insulation CA 0991002 to ground	OK	Switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A6	Check harness insulation CA 0991001 to Vbatt	OK	Proceed to A7
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A9
A7	Check harness insulation CA 0991002 to Vbatt	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A9
A8	Check heater resistance value is within limits of 12.27 – 27.2761	OK	Suspect intermittent fault, fit new sensor, re-connect harness and proceed to A9
		Out–of–limits	Fit new sensor, re-connect ault, re-connect harness and proceed to A9
A9	Perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A10
A10	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

ADAPTIVE FUEL

Group 6

P 0171
P 0172
P 0174
P 0175

Monitoring Procedure

If the fuel system is continually indicating an air / fuel ratio (AFR) closed loop compensation value fixed at the minimum value during steady driving, the purge valve is closed. If the value still remains at minimum, the fuel system is judged to have failed rich.

If the AFR closed loop compensation value stays above a value mapped against load and speed for too long, the fuel system is judged to have failed lean.

For both rich and lean diagnostics the relevant DTC is stored if the failure judgement is made on two successive trips.

Note: The fuel system judgements are also used to perform the upstream Heated Oxygen Sensor (HO2S) sensor low voltage diagnostics (See group 5, HO2S sensors).

5.2

ADAPTIVE FUEL - P0171

Refer to table below for injector and ECM harness connections when diagnosing fault.

Fault Code	Injector No.	Injector Harness Connections		
		Pin 1	Pin 2	ECM
P0171	1	PI 0321001	PI 0321002	PI 047/010
	2	PI 0331001	PI 0331002	PI 0471006
	3	PI 034/001	PI 0341002	PI 0471008
	4	PI 0351001	PI 0351002	PI 047/006
	5	PI 0361001	PI 0361002	PI 0471010
	6	PI 0371001	PI 0371002	PI 0471008

5.2

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A10
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A10
		If fault not found, disconnect injector harness and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check fuel level in tank	OK	Proceed to A2
		Empty	Refill and proceed to A10
A2	Check harness continuity from each injector pin 1 connector to corresponding ECM connector (see table above)	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A10
A3	Check harness continuity from each injector pin 2 connector (see table above to PI 0201005	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A10
A4	Check fuel system for blockages or leaks	OK	Proceed to A5
		Blocked / leaking	Locate and rectify pipework fault, reconnect harness and proceed to A10
A5	Check fuel pressure at injector rail is approximately 2.3 bar (3.3 absolute)	OK	Proceed to A6
		Incorrect	Rectify fault, re-connect harness and proceed to A10
A6	Check injectors for correct operation	OK	Proceed to A7
		Faulty	Renew or repair, re-connect harness and proceed to A10
A7	Check suspect injector resistance is within limits of 13 - 17Q	OK	Proceed to A8
		Out-of-limits	Renew injector, reconnect harness and proceed to A10

Pinpoint Tests continued

A8	Check for ECT, MAPS, TP, EVAP or IAT fault codes already logged	Clear	Proceed to A9
		Faults logged	Rectify, re-connect harness and proceed to A10
A9	Check for intake air leaks	OK	Re-connect harness and proceed to A10
		Leaking	Repair leak, re-connect harness and proceed to A10
A10	Clear fault and perform service drive cycle to verify fault cleared	**OK**	stop
		Fault still present	Proceed to A11
A11	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ADAPTIVE FUEL – P0172

Refer to table below for injector and ECM harness connections when diagnosing fault.

Fault Code	Injector No.	Injector Harness Connections		
		Pin 1	Pin 2	ECM
P0172	**1**	PI 032/001	PI 032/002	PI 047/010
	2	PI 033/001	PI 033/002	PI 047/006
	3	PI 034/001	PI 034/002	PI 047/008
	4	PI 035/001	PI 035/002	PI 047/006
	5	PI 036/001	PI 036/002	PI 047/010
	6	PI 037/001	PI 037/002	PI 047/008

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0172	System too Rich	Check code P1111 logged indicating service drive cycle completed: if not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A6
		If fault not found, disconnect injector harness and proceed to pinpoint test A I

5.2

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness insulation from each injector pin 1 connector to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A2	Check fuel pressure is approximately 2.3 bar (3.3 absolute)	OK	Proceed to A3
		Incorrect	Rectify fault, re-connect harness and proceed to A6
A3	Check injectors not contiuously open	**No**	Proceed to A4
		Yes	Rectify fault, re-connect harness and proceed to A6
A4	Check suspect injector resistance is within limits of 13 - 1751	OK	Proceed to A5
		Out-of-limits	Locate and rectify wiring fault, re-connect harness and proceed to A6
A5	Check for ECT, MAPS, TP, EVAP, IAT fault codes already logged	OK	Proceed to A6
		Fault Logged	Rectify fault, re-connect harness and proceed to A6
A6	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

Fault Code	Injector No.	Injector Harness Connections		
		Pin 1	Pin 2	ECM
P0174	1	PI 0381001	PI 0381002	PI 0471007
	2	PI 0391001	PI 0391002	PI 047/009
	3	PI 0401001	PI 040/002	PI 0471005
	4	PI 0411001	PI 0411002	PI 0471007
	5	PI 042/001	PI 0421002	PI 047/005
	6	PI 043/001	PI 0431002	PI 0471009

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A10
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A10
		If fault not found, disconnect bank B injector harness and proceed to pinpoint test A I

5.2

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check fuel level in tank	OK	Proceed to A2
		Empty	Refill and proceed to A10
A2	Check harness continuity from each injector pin 1 connector to corresponding ECM connector (see table above)	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A10
A3	Check harness continuity from each injector pin 2 connector (see table above to PI 0201005	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A10
A4	Check fuel system for blockages or leaks	OK	Proceed to A5
		Blocked / leaking	Locate and rectify pipework fault, re-connect harness and proceed to A10
A5	Check fuel pressure at injector rail is approximately 2.3 bar (3.3 bar absolute)	OK	Proceed to A6
		Incorrect	Rectify fault, re-connect harness and proceed to A10
A6	Check injectors for correct operation	OK	Proceed to A7
		Faulty	Renew or repair, re-connect harness and proceed to A10
A7	Check suspect injector resistance is within limits of 13 - 17Q	OK	Proceed to A8
		Out-of-limits	Renew injector, re-connect harness and proceed to A10

Pinpoint Tests continued

A8	**Check for ECT, MAPS, TP, EVAP or IAT fault codes already logged**	Clear	Proceed to A9
		Faults logged	Rectify, re-connect harness and proceed to A10
A9	**Check for intake air leaks**	OK	Reconnect harness and proceed to A10
		Leaking	Repair leak, re-connect harness and proceed to A10
A10	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A11
A11	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ADAPTIVE FUEL - P0174

Refer to table below for injector and ECM harness connections when diagnosing fault.

Fault Code	Injector No.	Injector Harness Connections		
		Pin 1	Pin 2	ECM
P0175	1	PI038/001	PI038/002	PI047/007
	2	PI039/001	PI039/002	PI047/009
	3	PI040/001	PI040/002	PI047/005
	4	PI041/001	PI041/002	PI047/007
	5	PI042/001	PI042/002	PI047/005
	6	PI043/001	PI0431002	PI0471009

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0175	System too Rich	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A6
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A6
		If fault not found, disconnect injector bank B harness and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness insulation from each injector pin 1 connector to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A2	Check fuel pressure is approximately 2.3 bar (3.3 absolute)	OK	Proceed to A3
		Incorrect	Rectify fault, re-connect harness and proceed to A6
A3	Check injectors not contiuously open	No	Proceed to A4
		Yes	Rectify fault, re-connect harness and proceed to A6
A4	Check suspect injector resistance is within limits of 13 - 17Ω	OK	Proceed to A5
		Out-of-limits	Locate and rectify wiring fault, re-connect harness and proceed to A6
A5	Check for ECT, MAPS, TP, EVAP, IAT fault codes already logged	OK	Proceed to A6
		Fault Logged	Rectify fault, re-connect harness and proceed to A6
A6	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

ALTITUDE COMPENSATION (AC)

Group 7

P 1244
P 0105

Monitoring Procedure

The sensor output is continuously monitored for high and low value. If a sustained high or low output is seen, the circuit malfunction DTC is stored.

The sensor output is monitored while the engine is running. If the sensor indicates a value which is much lower than either manifold pressure sensor is currently indicating, the AC sensor range / performance failure judgement is made. The DTC is stored if the failure judgement is made on two successive trips.

The HAC sensor is internally fitted in the ECM. It is not serviceable part.

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1244 Fault code P0105	AC Range / Performance Fault Circuit Malfunction	Clear fault code and perform service drive cycle to verify fault cleared
		If fault still logged renew ECM

5.2

CRANK SIGNAL INPUT

Group 8

P 1245
P 1246

Monitoring Procedure

If the engine has been started without a crank signal being input to the ECM, then a signal low failure judgement is made. The actual crank input is a grounding of the crank input pin which is normally high. The DTC will be stored when a failure is detected on two successive ignition cycles.

The crank signal high judgement is made as follows. If the car has been accelerated to speed and then stopped several times in succession, with a crank signal to the ECM being continuously present, the signal high failure judgement is made. The DTC is stored if the failure judgement is made on two successive ignition cycles.

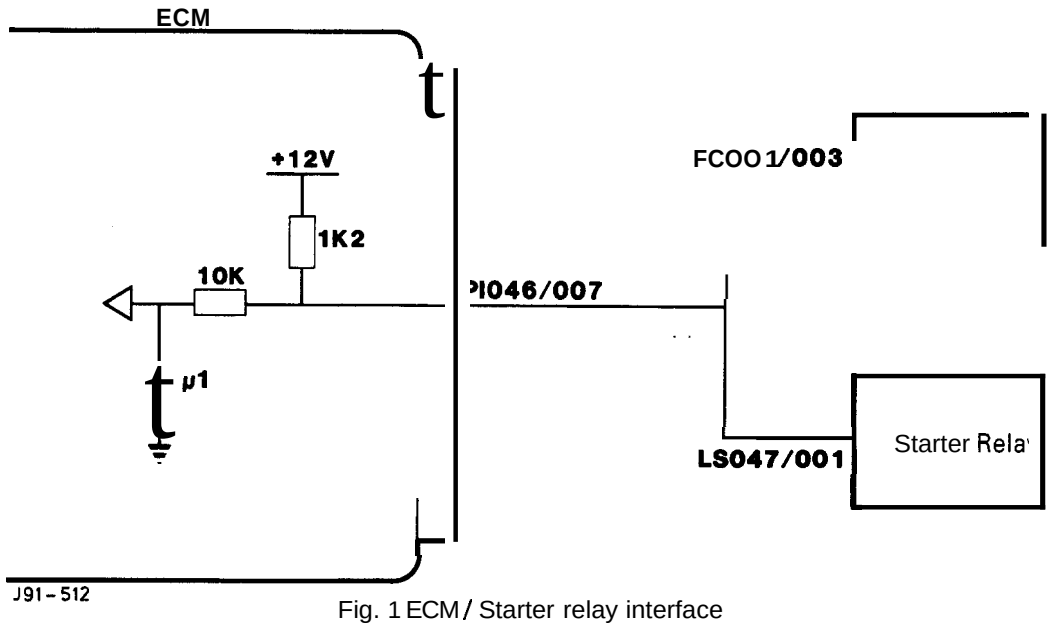


Fig. 1 ECM / Starter relay interface

CRANK SIGNAL - P1245

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1245	Crank Signal Low Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A4
		Check harness and connectors for condition integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found, switch ignition off and proceed to pinpoint test A I

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A1	Check harness continuity PI 0461007 to FC 0011033	OK	Switch ignition on and proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A4
(A2	Check harness continuity PI 045/007 to LS 047/001	OK	Switch ignition on and proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A4
A3	Check harness insulation 046/007 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A4
A4	Clear fault code and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

CRANK SIGNAL - P1246

Symptom Chart

CONDITION	POSSIBLE SOURCE	
Fault code P1246	Crank Signal High Input Fault	

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI 046/007 to FC 001/033	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A2	Check harness continuity PI 046/007 to LS 0471001	OK	Switch ignition on and proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
		OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A4	Check starter relay supply and operation Check starter relay supply and operation	OK	Proceed to A5
		Faulty	Repair or renew relay, reconnect harness and proceed to A6
	Ch ignition switch supply and operation	OK	Proceed to A6
		Faulty	Repair or renew relay, reconnect harness and proceed to A6
A6	Clear fault code and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

FUEL LEVEL SENSOR

Group 9

P 1198
P 1199

Monitoring Procedure

The sensor output is continuously monitored for high and low value. If a sustained high or low ECM input (indicating a harness or connector fault) is recorded the relevant DTC is stored.

Fuel Level Sensor / ECM Interface Circuit

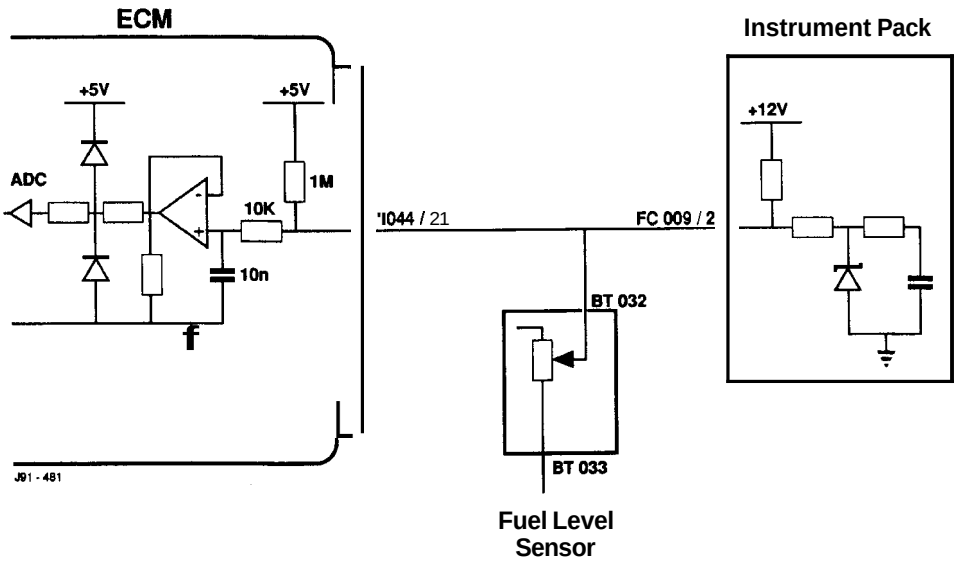


Fig. 1 Interface between Fuel Level Sensor and ECM

5.2

*FUEL LEVEL – **P1198***

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1198	Fuel Level Sensor High Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, switch ignition off, disconnect fuel sensor / instrument pack harness at FC 009 and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness continuity PI 044/021 to BT 032	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A2	Check harness continuity PI 044/021 to FC 009/020	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A3	Check harness continuity BT 033 to ground	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A4	Check sensor resistance value is within limits of 50 – 1000Ω and shows a smooth progression along switch segments	OK	Proceed to A5
		Out–of–limits	Repair or renew sensor re–connect harness and proceed to A7
A5	Check harness insulation BT 033 to PI 044/021	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A6	Check harness insulation PI 044/021 to Vbatt	OK	Renew sensor and proceed to A7
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A7	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Refer to Jaguar Service Hotline

FUEL LEVEL – P1199

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connectors for condition integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, switch ignition off, disconnect fuel sensor instrument pack harness at FC 009 and proceed to pinpoint test A1

TEST STEP		RESULT	ACTION
A1	Check harness continuity PI 0441021 to BT 032	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A2	Check harness continuity PI 0441021 to FC 0091020	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A3	Check harness continuity BT 033 to ground	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check sensor resistance value is within limits of 50 – 1000Ω and shows a smooth progression along switch segments	OK	Proceed to A5
		Out–of–limits	Repair or renew sensor re-connect harness and proceed to A7
A5	Check harness insulation BT 033 to PI 0441021	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check harness insulation PI 0441021 to ground	OK	Renew sensor and proceed to A7
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A7	Clear fault code and perform service drive cycle to verify fault cleared	**OK**	stop
		Fault still present	Proceed to **A8**
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

FUEL PUMP

Group 10

P 1641
P 1646

Monitoring Procedure

With the ignition on, the drive to the main fuel pump relay is examined. If the state of the drive is not as expected, then a main fuel relay failure judgement is made. The DTC is stored if failure is detected on two successive ignition cycles.

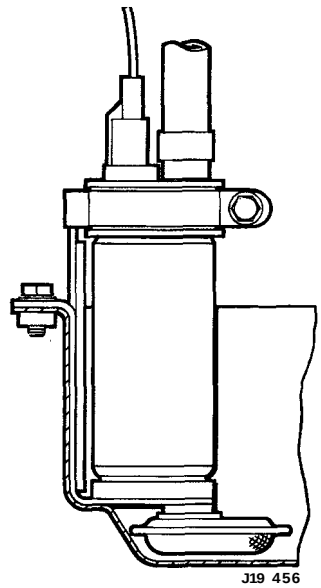


Fig. 1 Fuel Pump

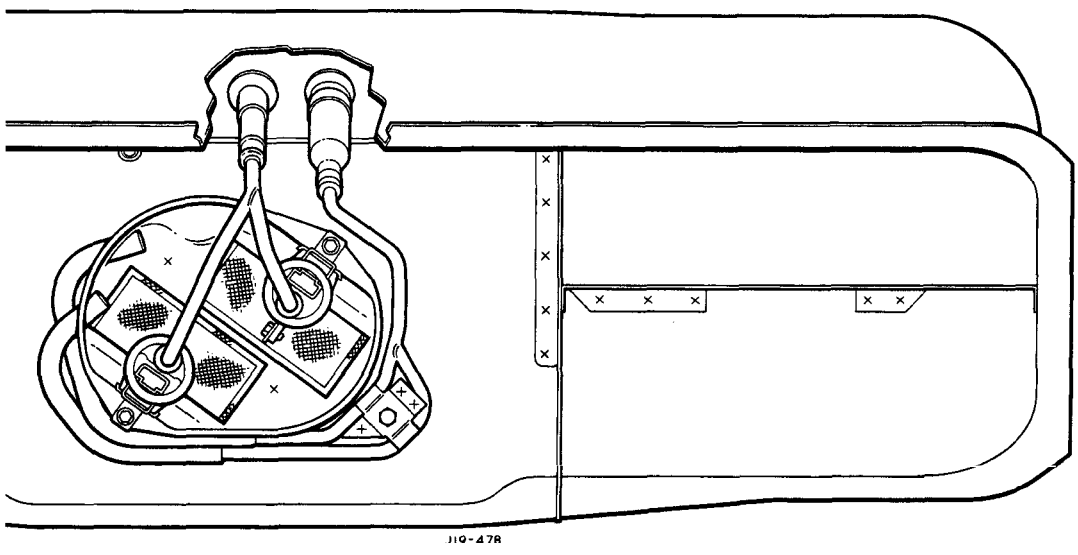


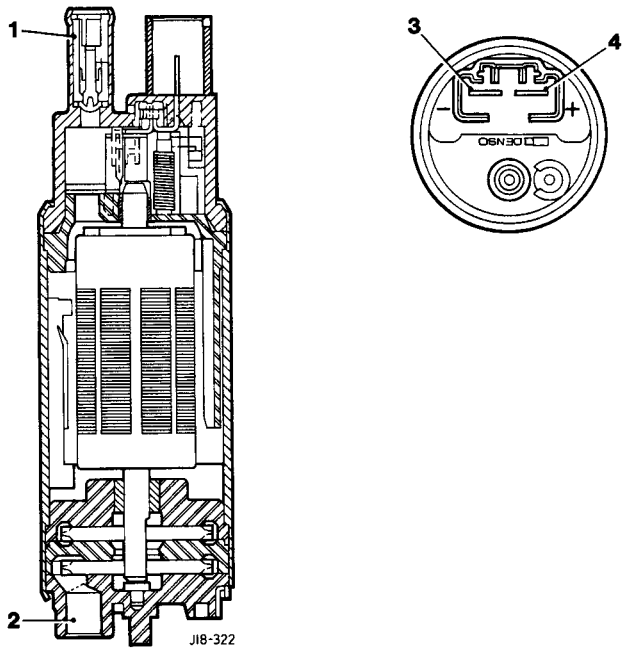
Fig. 2 Fuel Pumps Installation

5.2

5.2

Structure of Fuel Pump

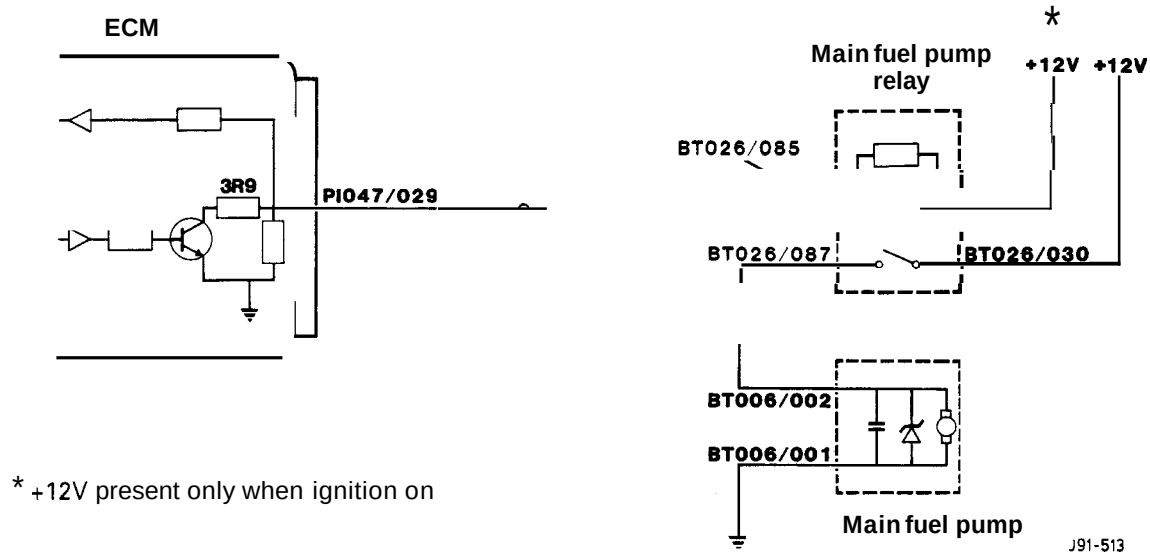
The fuel pump is turbine driven by a direct current motor through a coupling.



1. Outlet Pipe
2. Inlet Pipe
3. Ground terminal (–ve)
4. Positive Terminal (+ve)

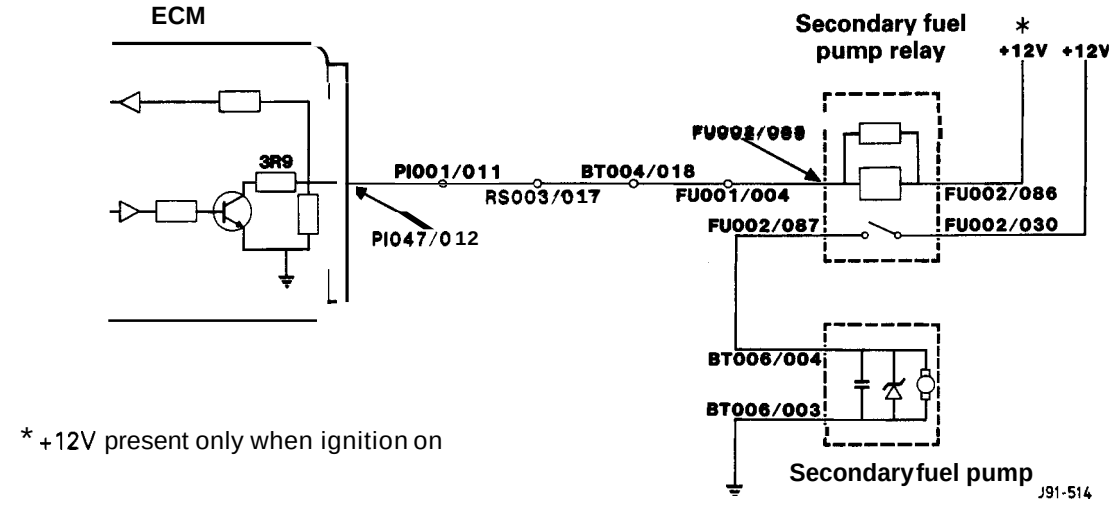
Fig. 1 Fuel Pump Construction

Fuel Pumps – ECM Interface Circuit



* +12V present only when ignition on

Fig. 1 Main Fuel Pump – ECM Interface



* +12V present only when ignition on

Fig. 2 Secondary Fuel Pump – ECM Interface

FUEL PUMP – P1641

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1641	Fuel Pump No. 1 Relay Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A4
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found, switch ignition off, disconnect fuel pump relay No. 1 and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness continuity PI 047/029 to BT 026/085	OK	Proceed to **A2**
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A4**
A2	Check harness insulation PI 047/029 to Vbatt	OK	Proceed to **A3**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A4**
A3	Check relay operation and supply	OK	Proceed to **A4**
		Faulty	Repair or renew relay re-connect harness and proceed to **A4**
A4	Clear fault code and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A5**
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

FUEL PUMP – P1646

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A4
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found, switch ignition off, disconnect fuel pump relay No. 2 and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI 0471012 to FU 0021085	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A4
A2	Check harness insulation PI 047/012 to Vbatt	OK	Proceed to A3
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A4
A3	Check relay operation and supply	OK	Proceed to A4
		Faulty	Repair or renew relay re–connect harness and proceed to A4
A4	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

FUEL INJECTORS

Group 11

Bank A Injector 1	**P 0201**
Bank A Injector 2	**P 0202**
Bank A Injector 3	**P 0203**
Bank A Injector 4	**P 0204**
Bank A Injector 5	**P 0205**
Bank A Injector 6	**P 0206**
Bank B Injector 1	**P 0207**
Bank B Injector 2	**P 0208**
Bank B Injector 3	**P 0209**
Bank B Injector 4	**P 0210**
Bank B Injector 5	**P 0211**
Bank B Injector 6	**P 0212**

MonitoringProcedure

The drive to each pair of injectors is monitored while the engine is running. If the injector drive status is not as expected for a number of times, the injector circuit failure judgement is made. The relevant fault code pair is stored if the failure judgement is made on two successive trips.

5.2

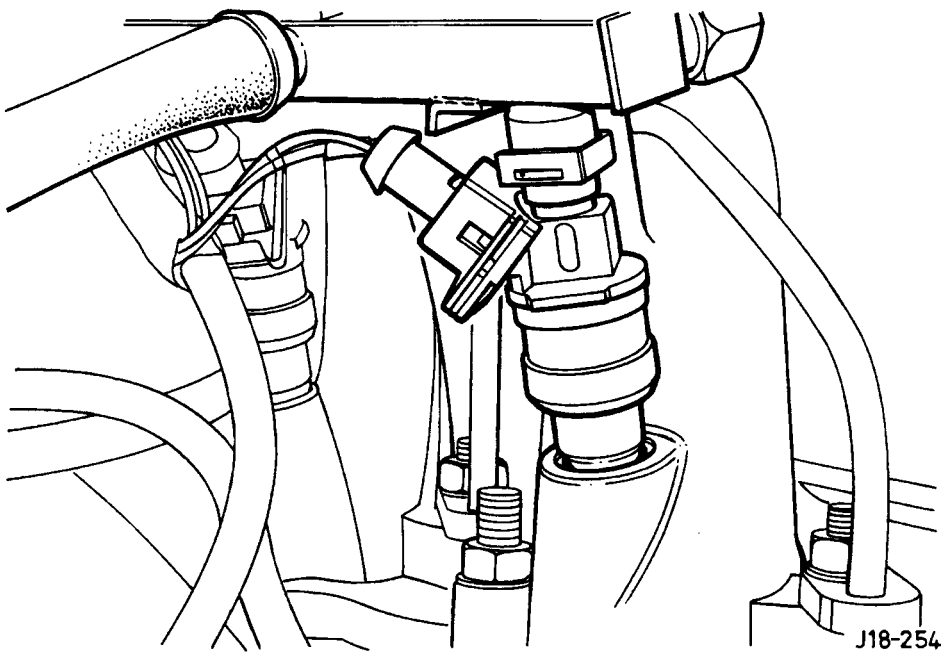


Fig. 1 Fuel Injectors Installation

Structure of Fuel Injector

The injector consists of a solenoid, core, needle valve and housing.

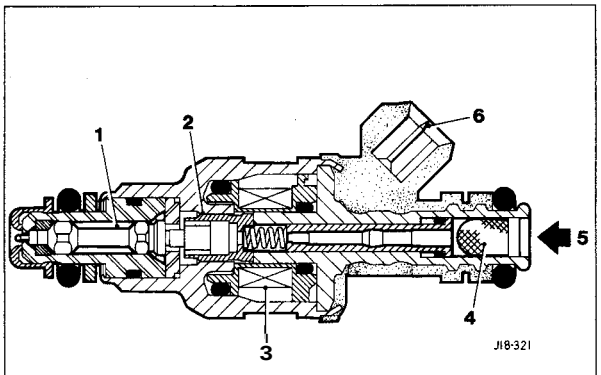
When a control signal from the ECM is applied to the solenoid coil, the needle valve lifts up and fuel is injected into the intake port.

The injection quantity is determined by the length of the time that the signal is applied to the solenoid coil.

Fuel Injector – ECM Interface Circuit

Fault Code	Injector No.	Injector Harness Connections Bank A		
		Pin 1	Pin 2 (+12V)	ECM (X)
P0201	1	PI 032/001	PI 032/002	PI 047/010
P0202	2	PI 033/001	PI 033/002	PI 047/006
P0203	3	PI 034/001	PI 034/002	PI 047/008
P0204	4	PI 035/001	PI 035/002	PI 047/006
P0205	5	PI 036/001	PI 036/002	PI 047/010
P0206	6	PI 037/001	PI 037/002	PI 047/008

Fault Code	Injector No.	Injector Harness Connections Bank B		
		Pin 1 (Y)	Pin 2 (+12V)	ECM (X)
P0207	1	PI 038/001	PI 038/002	PI 047/007
P0208	2	PI 039/001	PI 039/002	PI 047/009
P0209	3	PI 040/001	PI 040/002	PI 047/005
P0210	4	PI 041/001	PI 041/002	PI 047/007
P0211	5	PI 042/001	PI 042/002	PI 047/005
P0212	6	PI 043/001	PI 043/002	PI 047/009



1. Needle Valve
2. Core
3. Solenoid Coil
4. Filter
5. Fuel Supply (Rail)
6. Connector

Fig. **1** Fuel Injector – Sectional

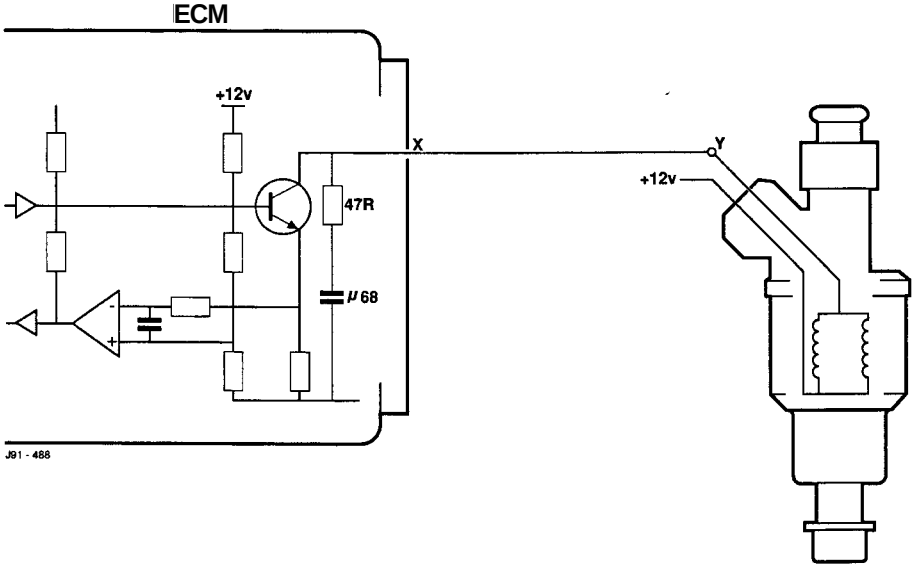


Fig. 2 Fuel Injector – ECM Interface

Note: Sensor resistance = **13 – 1752**

SRO 19.60.13 – FUEL RAIL

SRO 19.45.11 – REGULATOR VALVE

SRO 18.10.01 – INJECTORS

SRO 18.10.02 – INJECTORS (VEHICLE SET)

SRO 18.10.04 – INJECTOR – LEFT HAND BANK

SRO 18.10.05 – INJECTOR – RIGHT HAND BANK

Remove

- Reposition top edge of trunk front liner.
- Disconnect multi-plug from evaporative **loss** flange inset.
- Switch ignition on. Crank engine to depressurize fuel **system**.
- Switch ignition off. Disconnect battery see Section 15.
- Remove engine cover, See section 3.2.
- Remove engine cover 1/4 turn fastener receptacles (1 Fig.1) from fuel rail (2 Fig.1).
- Undo fuel feed hose to fuel rail union nut (3 Fig. 1).
- Reposition fuel feed hose (4 Fig. 1) from fuel rail and discard green seal.
- Undo fuel return hose to fuel pressure regulator union nut (5 Fig. 1).
- Reposition fuel return hose (6 Fig. 1) from fuel pressure regulator and discard green seal (7 Fig. 1).
- Disconnect vacuum hose (1 Fig.2) from cruise control actuator (2 Fig.2).
- Disconnect vacuum hose (3 Fig.3) from fuel pressure regulator.
- Disconnect throttle control rods from throttle pulley assembly ball pins (4 Fig.2).
- Reposition throttle control rods to inner wings.
- Disconnect cruise control rod from throttle pulley assembly ball pin (5 Fig.2).
- Undo and remove bolts securing fuel rail.
- Reposition cruise control rod below throttle pulley assembly.
- Remove cruise control actuator/ bracket assembly and fixings (6 Fig.2).
- Disconnect injector harness plugs (7 Fig.2).
- Disconnect throttle potentiometer multi-plug (8 Fig.2)
- Remove throttle pulley bracket assembly and fixings (9 Fig.2)
- Remove injector harness plastic clips (10 Fig.2) from fuel rail.
- Remove fuel rail / injector assembly (11 Fig.2).

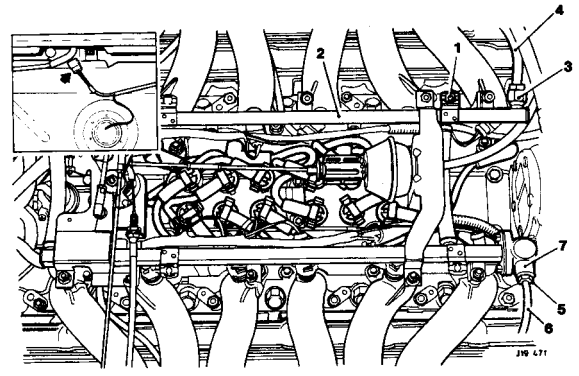


Fig. 1

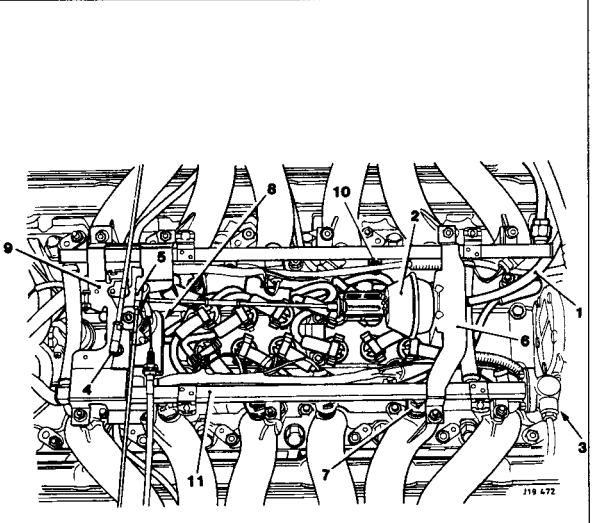


Fig. 2

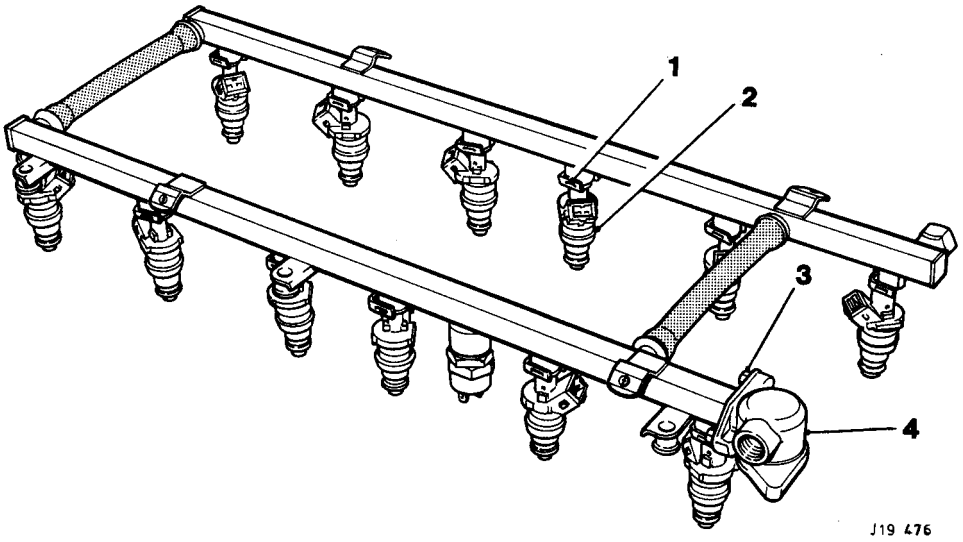


Fig. 1

- Remove injector to fuel rail retaining clips (1 Fig.1).
- Remove injector (2 Fig.1).
- Remove fuel regulator retaining plate and fixings (3 Fig.1).
- Remove fuel regulator (4 Fig.1).
- Remove and discard 'O' ring seals from regulator and injectors.

Refit

Fitting new components is the reverse of the removal procedure.

Ensure new green seals are fitted to fuel feed and return pipes.

Fit new 'O' ring seals to regulator and injectors.

Fault Code	Injector No.	Injector Harness Connections		
		Pin 1	Pin 2	ECM
P0201	1	PI 032/001	PI 032/002	PI 047/010
P0202	2	PI 033/001	PI 033/002	PI 047/006
P0203	3	PI 034/001	PI 034/002	PI 047/008
P0204	4	PI 035/001	PI 035/002	PI 047/006

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
P0206		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A6
		Switch ignition off
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A6
		If fault not found, disconnect suspect injector and proceed to pinpoint test A I

5.2

Pinpoint Tests

		RESULT	ACTION
A I	Check harness continuity injector pin 1 connector to ECM connector	OK	Proceed to A2
		Open circuit	Renew injector, re-connect harness and proceed to A6
A2	Check harness continuity injector pin 2 connector to RS 035/005	OK	Switch on ignition and proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A3	Check voltage at RS 035/002	12v	Switch off ignition and proceed to A4
		< 12v	Locate and rectify wiring fault, re-connect harness and proceed to A6
A4	Check PI main relay operation	OK	Proceed to A5
		Faulty	Repair or renew relay, re-connect harness and proceed to A6
A5	Check resistance injector pin 1 to injector pin 2 is within limits of 13 - 17Ω	OK	Reconnect injector under test and proceed to A6
		Out-of-limits	Renew injector, re-connect harness and proceed to A6
A6	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

INJECTORS (BANK A) – P0207 TP P0212

The following table details harness connector information for each of the six, bank B injectors and the corresponding ECM connector. Reference to this table is necessary when using the diagnostic procedures below.

Fault Code	Injector No.	Injector Harness Connections		
		Pin 1	Pin 2	ECM
P0207	1	PI038/001	PI038/002	PI047/007
P0208	2	PI039/001	PI039/002	PI047/009
PO209	3	PI040/001	PI040/002	PI047/005

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
P0212		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A6
		Switch ignition off
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A6
		If fault not found, disconnect suspect injector and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness continuity injector pin 1 connector to ECM connector	OK	Proceed to A2
		Open circuit	Renew injector, re-connect harness and proceed to A6
A2	Check harness continuity injector pin 2 connector to RS035/005	OK	Switch on ignition and proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A6
A3	Check voltage at RS035/002	12v	Switch off ignition and proceed to A4
		< 12v	Locate and rectify wiring fault, re-connect harness and proceed to A6
A4	Check PI main relay operation	OK	Proceed to A5
		Faulty	Repair or renew relay, re-connect harness and proceed to A6
A5	Check resistance injector pin 1 to injector pin 2 is within limits of 13 – 1751	OK	Re-connect injector under test and proceed to A6
		Out-of-limits	Renew injector, re-connect harness and proceed to A6
A6	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A7
A7	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

SENSOR POWER SUPPLY UNIT

Group 12

P 1240

P 1241

P 1242

Monitoring Procedure

The sensor power supply output is continuously monitored for high and low value. If a sustained high or low **ECM** input *is* seen, the relevant failure judgement is made. The P code is stored if a failure judgement is made on two successive trips.

If the diagnostics for **MAP** sensor **A,** B and the throttle position sensor are all indicating failure judgements, the sensor power supply failure judgement is made. The P code is stored if the failure judgement is made on two successive trips.

5.2

SENSOR POWER SUPPLY – P1240

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connectors at TP I MAP sensors for condition integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, switch ignition off, disconnect TP and MAP sensors and proceed to pinpoint test A I

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A I	Check harness continuity PI 0451007 to PI 0501003	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness sensors and proceed to A7
A2	Check harness continuity PI 0451007 to PI 0091003	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness sensors and proceed to A7
A3	Check harness continuity PI 0451007 to PI 0071004	OK	Re-connect TP & MAP sensors and proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness / sensors and proceed to A7
A4	Check harness insulation PI 045 to ground	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check harness insulation PI 0451007 to Vbatt	OK	Disconnect sensor harnesses, switch ignition on and proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Check voltage level at PI 0451007 is within limits of 4.75 – 5.25V	OK	Re-connect harness and proceed to A7
		Out-of-limits	Rectify, re-connect harness and proceed to A7
A7	Clear fault code and perform service drive cycle to verify fault cleared	Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	Fault still present	Refer to Jaguar Service Hotline

5.2

SENSOR POWER SUPPLY

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1241 Fault code P1242	Sensor Power Supply Low Input Fault Sensor Power Supply High Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A4
		Check harness and connectors at TP / MAP sensors for condition / integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found, switch ignition off, disconnect TP and MAP sensors and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness insulation PI 045/007 to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re-connect harness / sensors and proceed to A4
A2	Check for TP / MAP sensor faults logged	OK	Proceed to A3
		Fault logged	Rectify fault, re-connect harness / sensors and proceed to A4
A3	Clear fault code and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A4
A4	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

MISFIRE

Group 13

P 0300
P 0301
P 0302
P 0303
P 0304
P 0305
P 0306
P 0307
P 0308
P 0309
P 0310
P 0311
P 0312
P 1313
P 1314
P 1316

Monitoring Procedure

The engine is judged to be misfiring when the rate of crankshaft speed fluctuation is above a calibration level.

If a single cylinder cannot be judged to be the cause of the misfire then a random misfire judgement is made.

If the misfire rate is sufficient to cause an emissions test failure then the misfire excess emissions failure is made. If this judgement is made in two successive trips under similar road and speed conditions the appropriate trouble code is stored.

If the misfire rate is high enough to cause catalyst damage the the catalyst damage trouble code is stored immediately.

MISFIRE – P0300

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0300	Random Misfire Detected	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connectors at injectors, HT leads and crank, cam and TDC sensors for condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found switch ignition off and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check fuel level in tank	OK	Proceed to A2
		Low	Top-up, re-connect harness / sensors and proceed to A7
A2	Check fuel system for air ingress	OK	Proceed to A3
		Faulty	Rectify, re-connect harness / sensors and proceed to A7
A3	Check for ignition / fuel fault code recorded	No	Proceed to A4
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A4	Check for P0335, P0336, P0340, P1335 or P1336 fault code recorded	No	Proceed to A5
		Yes	Locate and rectify fault, reconnect harness / sensors and proceed to A7
A5	Check for ECT, MAP, TP or IAT fault code recorded	No	Proceed to A6
		Yes	Locate and rectify fault, reconnect harness / sensors and proceed to A7
A6	Check for EVAP or PCV fault code recorded	No	Re-connect harness / sensors and proceed to A7
		Yes	Locate and rectify fault, reconnect harness / sensors and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

MISFIRE– P0301 TO P0312

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0301 – P0306 P0307 – P0312	Misfire Detected Cylinder 1 – 6 (Bank A) Cylinder 1 – 6 (Bank B)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connectors at iniectors, HT leads and crank, cam and TDC sensors for condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found switch ignition off and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check fuel level in tank	OK	Proceed to A2
		Low	Top–up, re-connect harness / sensors and proceed to A7
A2	Check fuel system for air ingress	OK	Proceed to A3
		Faulty	Rectify, re-connect harness / sensors and oroceed to A7
A3	Check for ignition / fuel fault code recorded	No	Proceed to A4
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A4	Check for P0335, P0336, P0340, P1335 or P1336 fault code recorded	No	Proceed to A5
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A5	Check for ECT, MAP, TP or IAT fault code recorded	No	Proceed to A6
		Yes	Locate and rectify fault, re–connect harness / sensors and proceed to A7
A6	Check for EVAP or PCV fault code recorded	No	Re-connect harness / sensors and proceed to A7
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

MISFIRE– P1313 & P1314

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1313 P1314	Misfire Rate, Catalyst Damage Fault Bank A Bank B	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connectors at injectors, HT leads and crank, cam and TDC sensors for condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found switch ignition off and Droceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check fuel level in tank	OK	Proceed to A2
		Low	Top–up, re-connect harness / sensors and proceed to A7
A2	Check fuel system for air ingress	OK	Proceed to A3
		Faulty	Rectify, reconnect harness / sensors and proceed to A7
A3	Check for ignition / fuel fault code recorded	No	Proceed to A4
		Yes	Locate and rectify fault, reconnect harness / sensors and proceed to A7
A4	Check for P0335, P0336, P0340, P1335 or P1336 fault code recorded	No	Proceed to A5
		Yes	Locate and rectify fault, reconnect harness / sensors and proceed to A7
A5	Check for ECT, MAP, TP or IAT fault code recorded	No	Proceed to A6
		Yes	Locate and rectify fault, re–connect harness / sensors and proceed to A7
A6	Check for EVAP or PCV fault code recorded	No	Reconnect harness / sensors and proceed to A7
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

MISFIRE– P1316

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		drive cycle completed: if not logged proceed to pinpoint test A7
		Check harness and connectors at injectors, HT leads and crank, cam and TDC sensors for condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found switch ignition off and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check fuel level in tank	OK	Proceed to A2
		Low	Top–up, re-connect harness / sensors and proceed to A7
A2	Check fuel system for air ingress	OK	Proceed to A3
		Faulty	Rectify, re-connect harness / sensors and proceed to A7
A3	Check for ignition / fuel fault code recorded	No	Proceed to A4
		Yes . .	Locate and rectify fault, re–connect harness / sensors and proceed to A7
A4	Check for P0335, P0336, P0340, P1335 or P1336 fault code recorded	No	Proceed to A5
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A5	Check for ECT, MAP, TP or IAT fault code recorded	No	Proceed to A6
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A6	Check for EVAP or PCV fault code recorded	No	,Re–connect harness / sensors and proceed to A7
		Yes	Locate and rectify fault, re-connect harness / sensors and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ENGINE SPEED SENSOR

Group 14A **P 0335**
P 0336

CAMSHAFT POSITION SENSOR – CMPS

Group 14B **P 0340**

CRANKSHAFT POSITION SENSOR

Group 14C **P 1135**
P 1136

5.2

Monitoring Procedure

There are three electromagnetic sensors mounted on the engine, the sensors provide engine speed and position signals to the ECM. The signals are generated by a ferrite rotor passing the face of the sensor.

All three sensors are continuously monitored while the engine is running. For the crankshaft position sensor and the engine speed sensor, if the expected number of pulses are not detected, the relevant circuit DTC is stored.

For all three sensors; if unexpected pulses are detected the diagnostic determines which sensor is apparently giving an illogical output and then stores the appropriate DTC.

Engine Speed Sensor (Fig. 1)

The sensor mounted behind the flywheel provides twelve pulses per engine revolution.

Sensor resistance = 800 – 160052

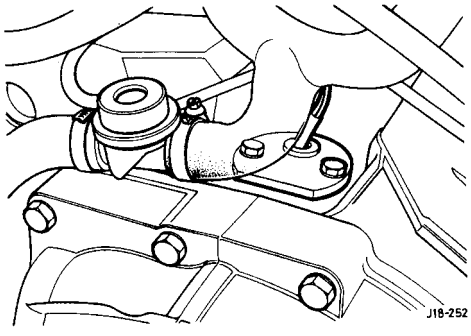


Fig. 1

Camshaft Position Sensor – CMPS (Fig. 2)

The sensor mounted on the 'A' bank camshaft cover provides one pulse per two revolutions on the engine.

Sensor resistance = 1556 – 322552

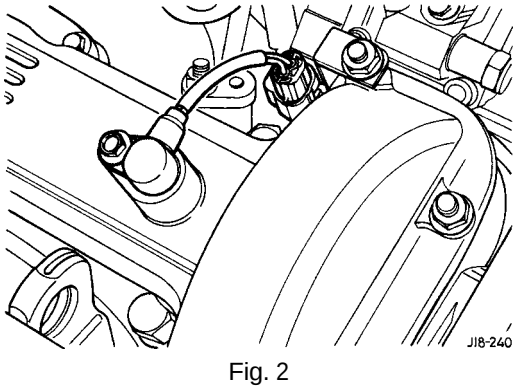


Fig. 2

Crankshaft Position Sensor (Fig. 3)

The sensor mounted on the timing cover provides one pulse per engine revolution.

Sensor resistance = 800 – 160052

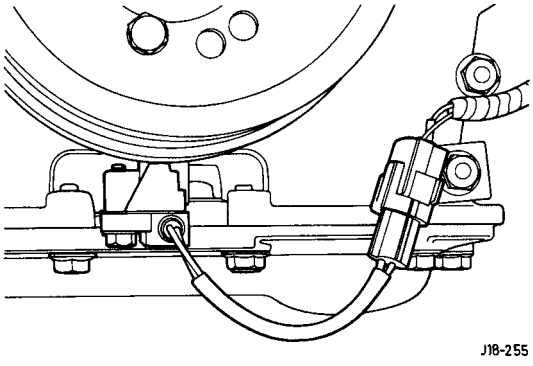


Fig. 3

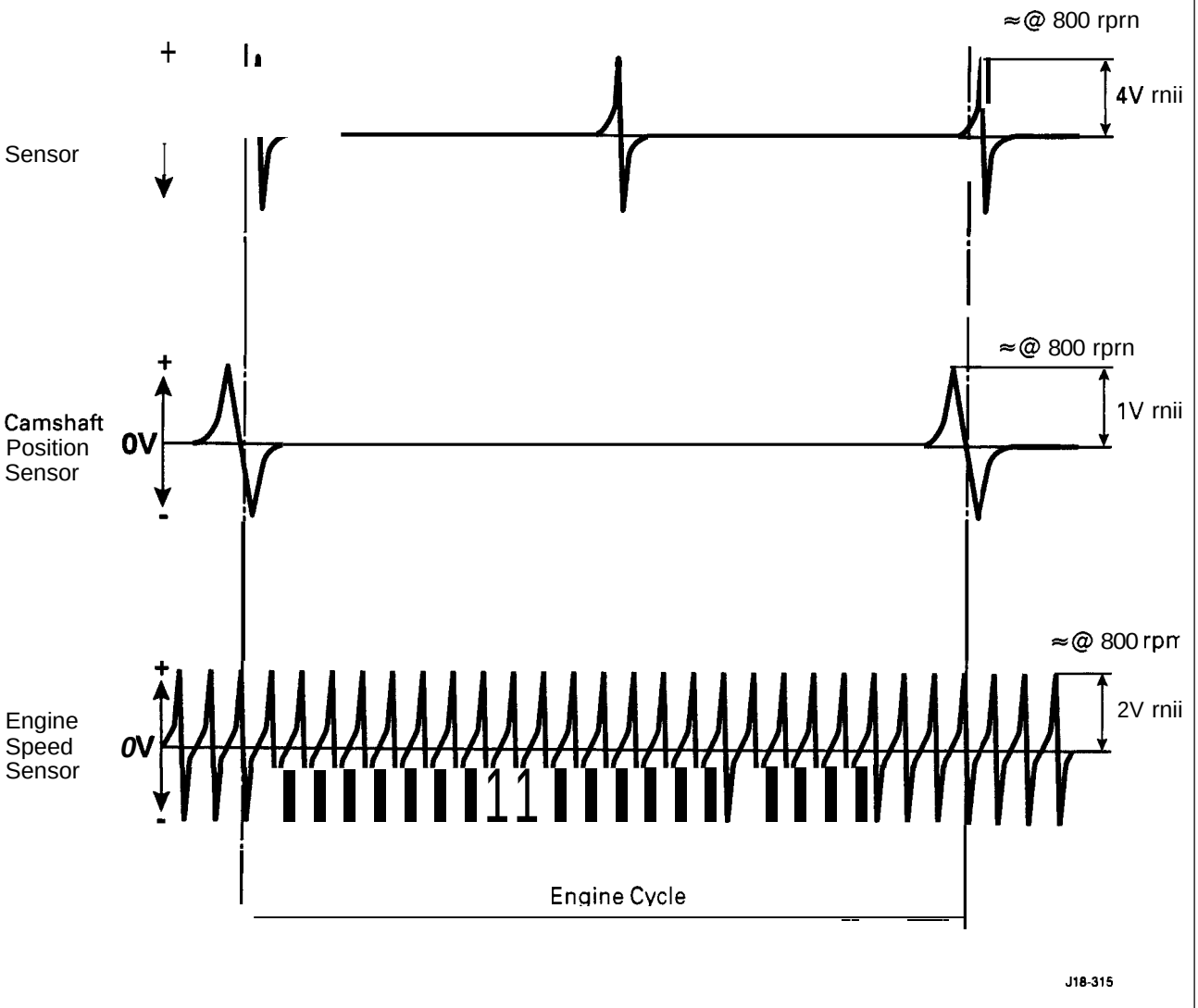
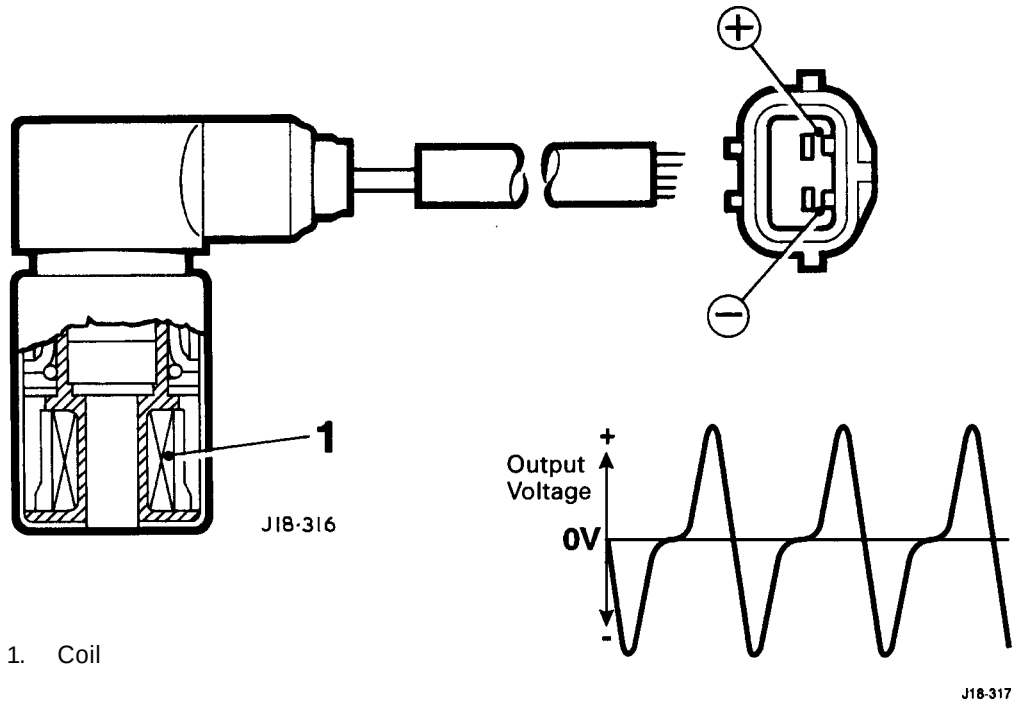


Fig. 1 Full Engine Cycle of all Electromagnetic Sensors

Group 14A – Engine Speed Sensor

Construction and Operation



1. Coil

Fig. 1

Engine Speed Sensor – ECM Interface Circuit

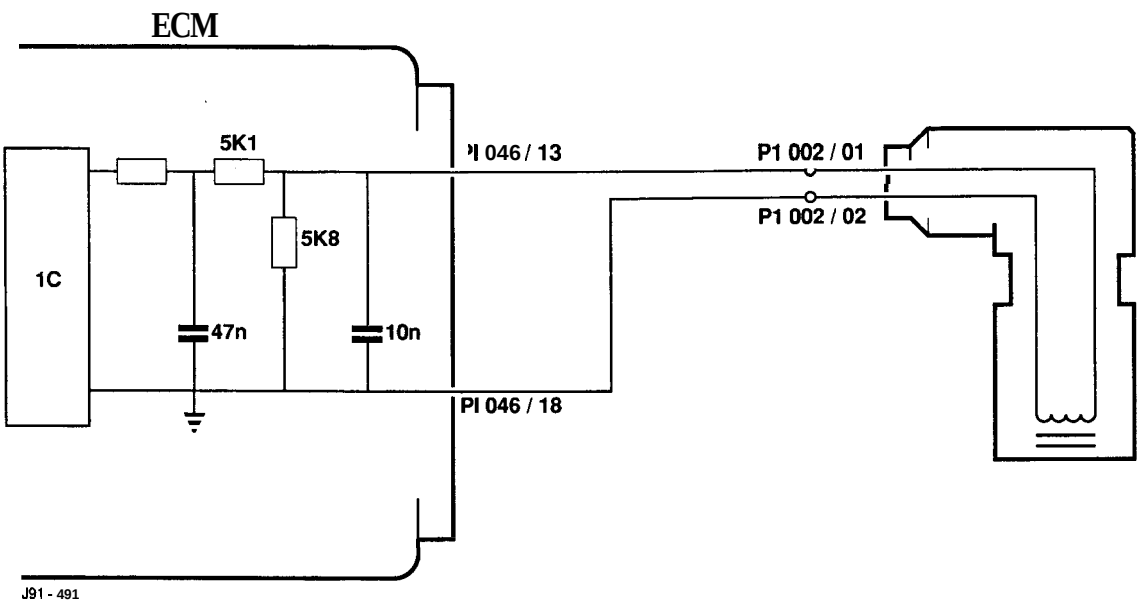


Fig. 2

Additional Information

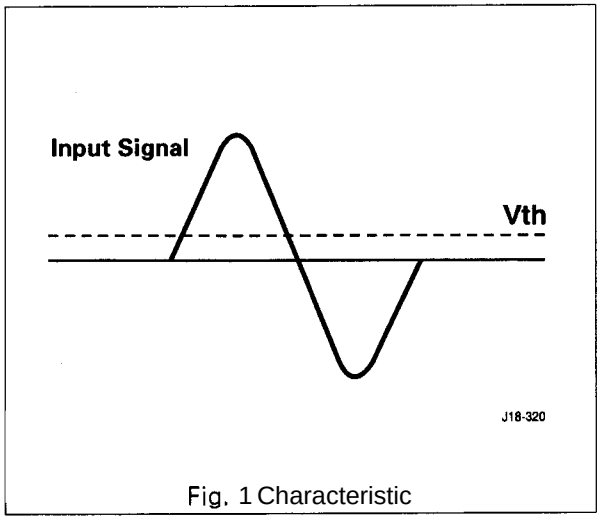


Fig. 1 Characteristic

ENGINE SPEED SENSOR, RENEW

SRO 18.30.64

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery earth lead.
- Disconnect the engine speed sensor multi-plug (1 Fig. 2).
- Undo and remove the sensor mounting bracket securing bolts (2 Fig. 3).
- Displace the sensor mounting bracket from its locating roll pin (3 Fig. 2).
- Remove the sensor and mounting bracket assembly from the cylinder block.
- Push the split grommet out of the mounting bracket and remove it from the sensor lead (4 Fig. 2).
- Push the sensor lead and multi-plug through the mounting bracket aperture.
- Undo and remove the sensor to mounting bracket securing bolts and separate the sensor and bracket.

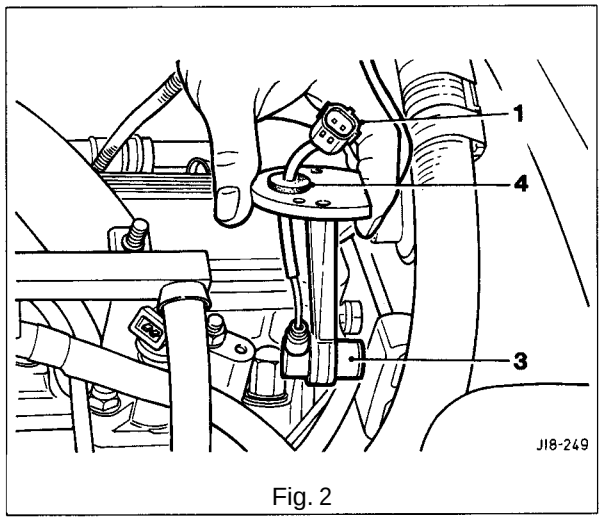


Fig. 2

Refit

Fitting a new engine speed sensor is the reverse of the removal procedure.

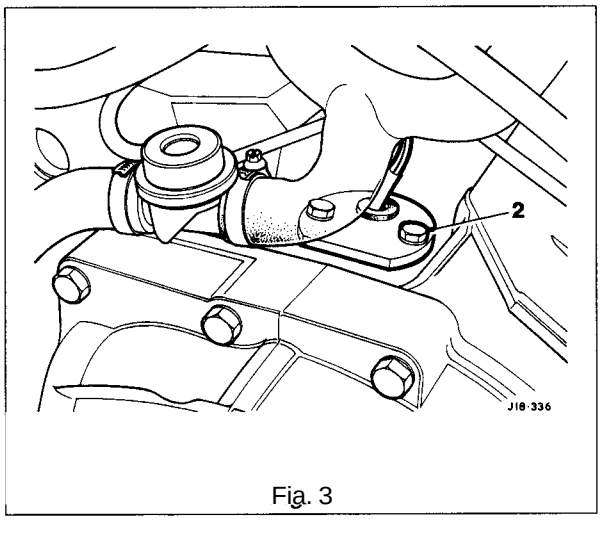
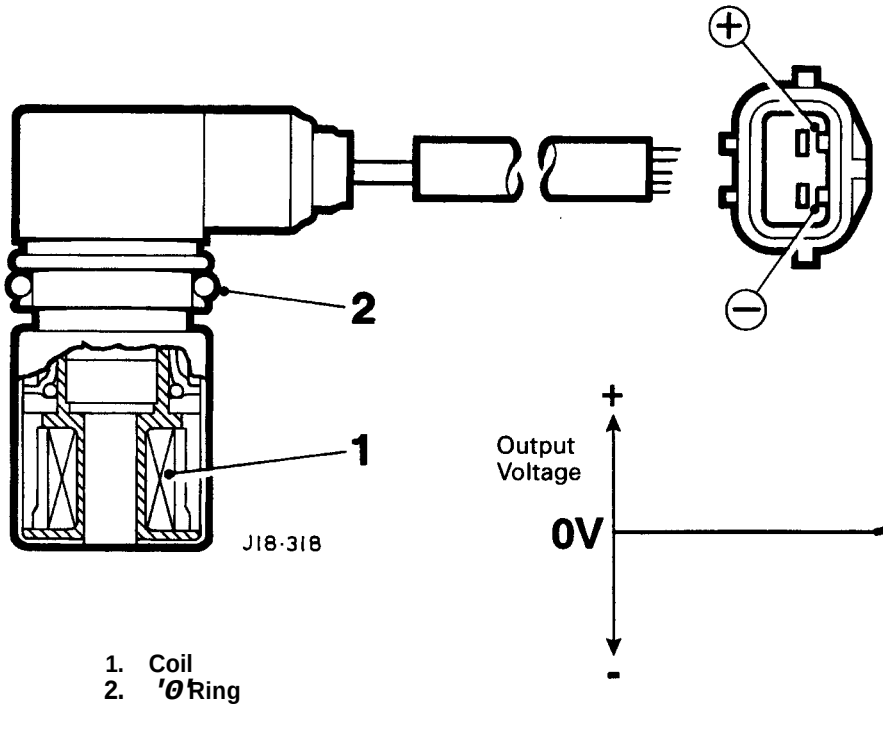


Fig. 3

Group 14B - Camshaft Position Sensor

Construction and Operation



1. Coil
2. 'O' Ring

Fin. 1

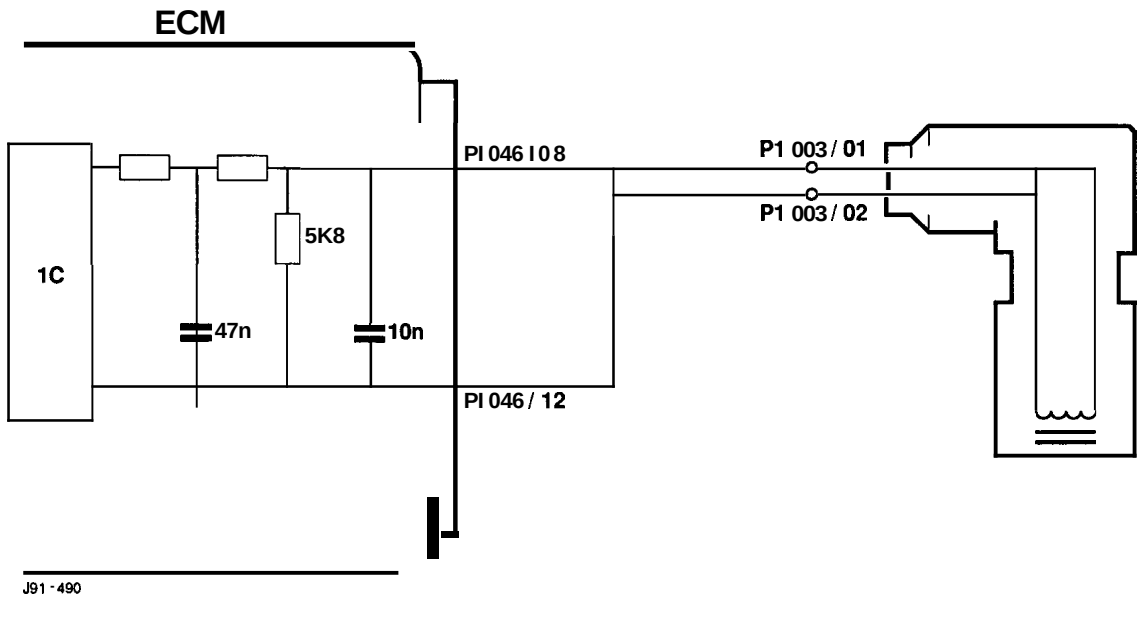


Fig. 2

Camshaft Position Sensor – ECM Interface Circuit

Additional Information

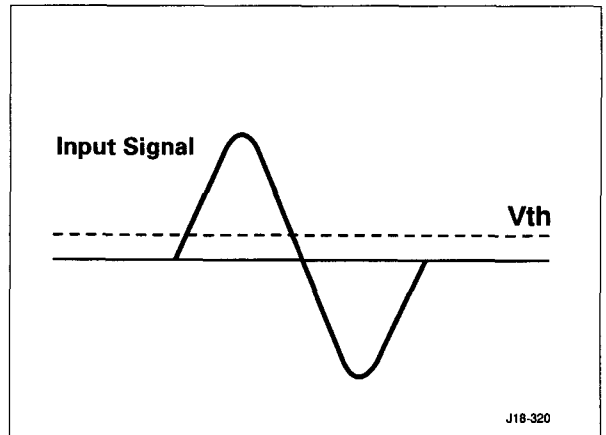


Fig. 1 Characteristic

5.2

CAMSHAFT POSITION SENSOR, RENEW

SRO 18.30.63

Remove

- Open the hood and fit a wing cover.
- Open the trunk and remove the battery cover.
- Disconnect the battery earth lead.
- Disconnect the camshaft position sensor harness multi-plug.
- Undo and remove the camshaft position sensor securing bolt.
- Remove the camshaft position sensor and discard the 'O' ring seal.

Refit

Fitting a new camshaft position sensor is the reverse of the removal procedure.

Always use a new 'O' ring seal and lubricate before fitting.

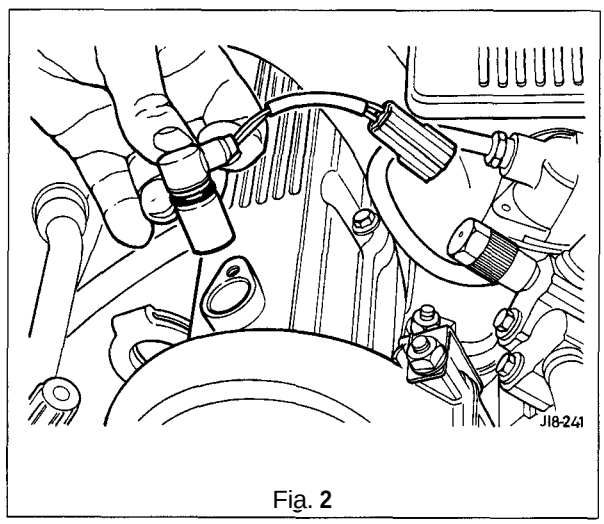
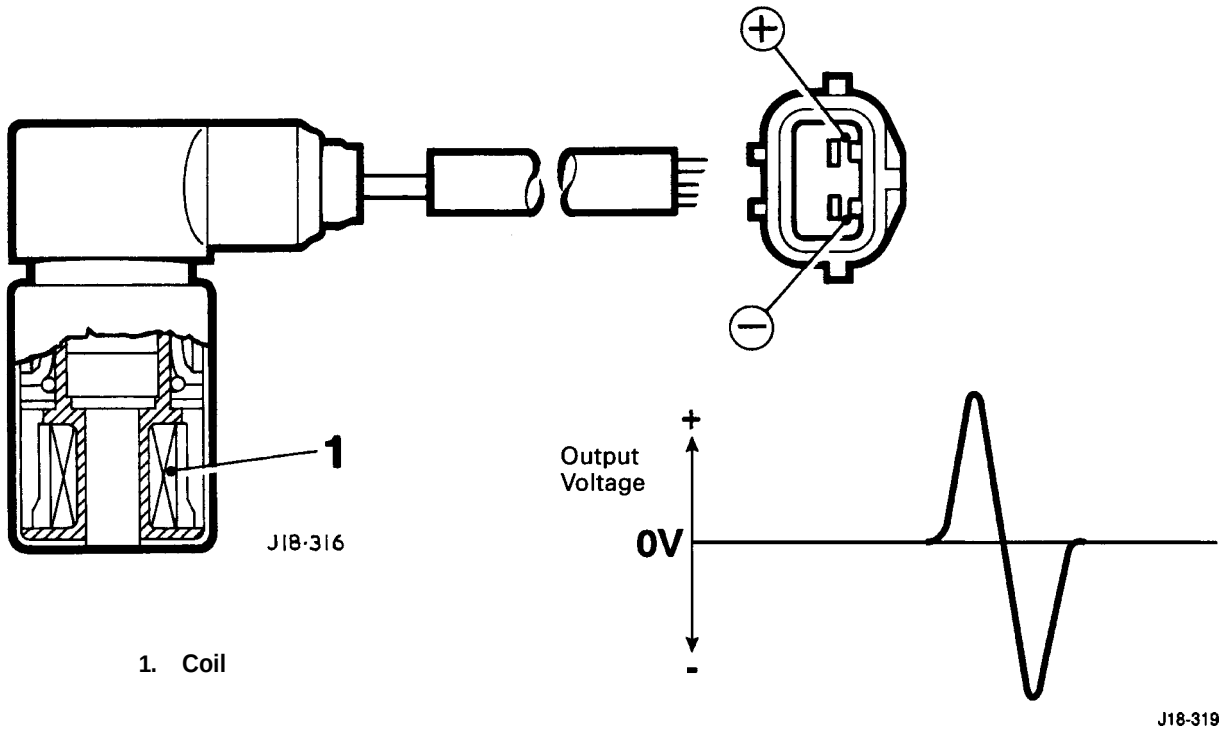


Fig. 2

Group 74C – Crankshaft Position Sensor

Construction and Operation



1. Coil

Fin. 1

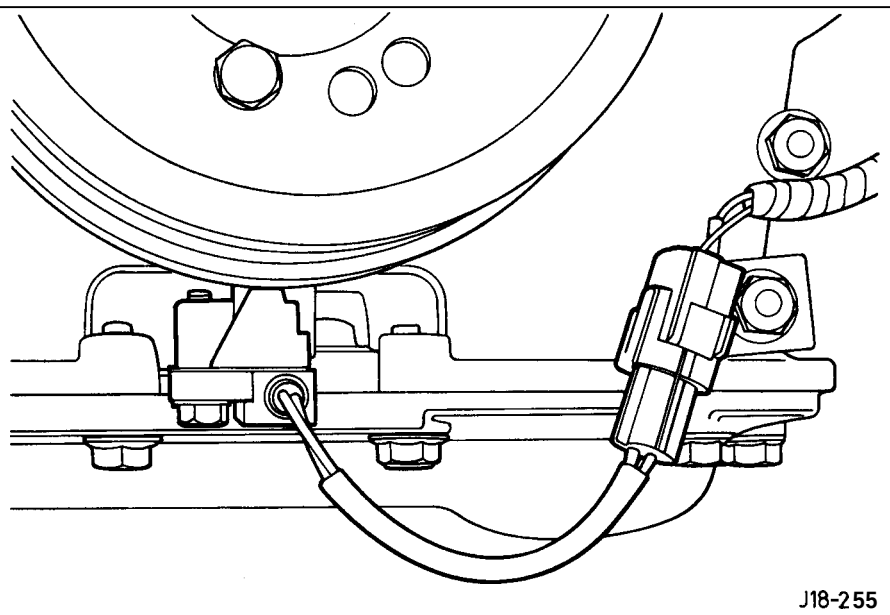


Fig. 2

Crankshaft Position Sensor – ECM Interface Circuit

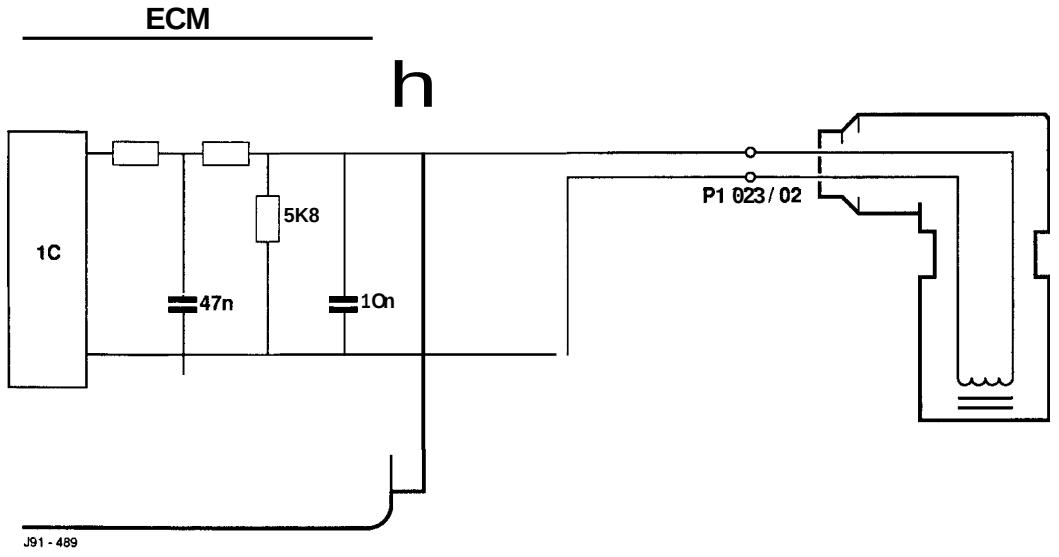


Fig. 1

5.2

CRANKSHAFT POSITION SENSOR (CKP), RENEW

SRO 18.30.12

Remove

- Open the trunk and remove the battery cover.
- Disconnect the battery earth lead.
- Raise the vehicle.
- Disconnect the CKP harness multi-plug.
- Undo and remove the CKP sensor securing bolt.
- Remove the sensor along with the crankshaft pulley TDC bracket.

Refit

Fitting a new CKP sensor is the reverse of the removal procedure.

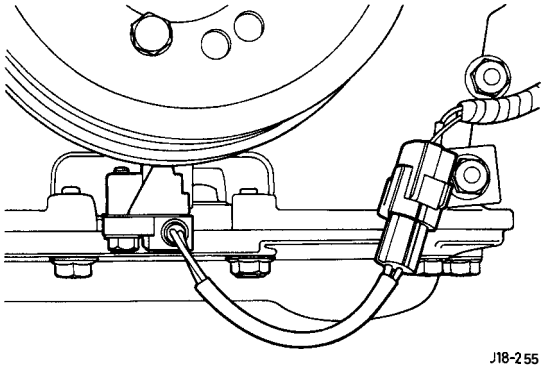


Fig. 2

Additional Information

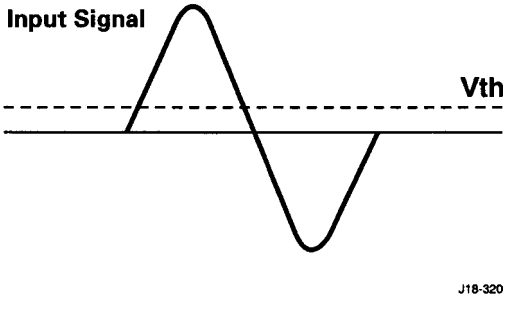


Fig. 3 Characteristic

ENGINE SPEED SENSOR – P0335

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0335	ESS Circuit Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A7**
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test **A7**
		If fault not found switch ignition off, disconnect **ES** sensor proceed to pinpoint test **A I**

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness continuity PI **046/014** to PI **023/001**	OK	Proceed to **A2**
		Faulty	Locate and rectify wiring fault reconnect harness and proceed to **A7**
A2	Check harness continuity PI **046/019** to PI **0231002**	OK	Proceed to **A3**
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A3	Check harness insulation PI **023/001** to ground	OK	Proceed to **A4**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A4	Check harness insulation PI **023/001** to Vbatt	OK	Renew sensor, reconnect harness and proceed to **A5**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A5	Check harness insulation PI **023/002** to Vbatt	**OK**	Proceed to **A6**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A6	Remove sensor, clean sensing face and check resistance value is within limits of **800 – 1660Ω**	OK	Proceed to **A7**
		Out–of–limits	Renew sensor, re-connect harness and proceed to **A7**
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A8**
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaauar Service Hotline

ENGINE SPEED SENSOR - P0336

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0336	**ESS** Range / Performance Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found switch ignition off, disconnect **ES** sensor proceed to pinpoint test A I

		RESULT	ACTION
A I	Check harness continuity PI 046/014 to PI 023/001	OK	Proceed to A2
		Faulty	Locate and rectify wiring fault re-connect harness and proceed to A7
A2	Check harness continuity PI 046/019 to PI 023/002	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A3	Check harness insulation PI 023/001 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A4	Check harness insulation PI 023/001 to Vbatt	OK	Renew CKP, re-connect harness and proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check harness insulation PI 023/002 to Vbatt	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A6	Remove sensor, clean sensing face and check resistance value is within limits of 800 - 166052	OK	Proceed to A7
		Out-of-limits	Renew sensor, re-connect harness and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A8**
		Check harness and connector condition integrity, if faulty rectify and proceed to pinpoint test **A8**
		If fault not found switch ignition off, disconnect CMP sensor proceed to pinpoint test **A I**

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI **0461008** to PI **0031001**	**OK**	Proceed to **A2**
		Faulty	Locate and rectify wiring fault reconnect harness and proceed to **A8**
A2	Check harness continuity PI **0461012** to PI **0031002**	**OK**	Proceed to **A3**
		Open circuit	Locate and rectify wiring fault, reconnect harness and-proceed to **A8**
A3	Check harness insulation PI **0031001** to ground	**OK**	Proceed to **A4**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A8**
A4	Check harness insulation PI **0031001** to Vbatt	**OK**	Renew CMP, re-connect harness and proceed to **A5**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A8**
A5	Check harness insulation PI **0021002** to Vbatt	**OK**	Proceed to **A6**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A8**
A6	Remove CMP sensor, clean sensing face and check resistance value is within limits of **1556 - 322552**	**OK**	Proceed to **A7**
		Out-of-limits	Renew sensor, re-connect harness and proceed to **A8**
A7	Refit sensor, ensuring mounting face is clean, and visually check timing disc peg for damage	**OK**	Re-connect harness and proceed to **A8**
		Damaged	Renew disc sensor as necessary, re-connect harness and proceed to **A8**
A8	Clear fault and perform service drive cycle to verify fault cleared	**OK**	stop
		Fault still present	Proceed to **A9**
A9	Return to Symptom Chart and repeat diagnostic procedure	**OK**	stop
		Fault still present	Contact Jaguar Service Hotli

CRANKSHAFT POSITION SENSOR - P1135

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P **1135**	CKP Circuit Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A8**
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test **A8**
		If fault not found switch ignition off, disconnect CKP sensor proceed to pinpoint test **A I**

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI **046/013** to PI **002/001**	OK	Proceed to A2
		Faulty	Locate and rectify wiring fault re-connect harness and proceed to A8
A2	Check harness continuity PI **046/018** to PI **002/002**	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A8
A3	Check harness insulation PI **002/001** to ground	OK	Proceed to A4
		Short circuit . .	Locate and rectify wiring fault, re-connect harness and proceed to A8
A4	Check harness insulation PI **002/001** to Vbatt	OK	Renew CKP, re-connect harness and proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A8
A5	Check harness insulation PI **002/002** to Vbatt	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A8
A6	Remove CKP, clean sensing face and check resistance value is within limits of **800 - 1660Ω**	OK	Proceed to A7
		Out-of-limits	Renew sensor, re-connect harness and proceed to A8
A7	Refit sensor, ensuring mounting face is clean, check clearance to crank damper is within limits of **0.5 - 1.5mm** and damper is not damaged	OK	Re-connect harness and proceed to A8
		Out-of-limits or damaged	Renew disc / sensor, re-connect harness and proceed to A8
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A6
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A8
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A8
		If fault not found switch ignition off, disconnect CKP sensor proceed to pinpoint test A I

Pinpoint Tests

	TEST STEP	RESULT	ACTION
A I	Check harness continuity PI 046/013 to PI 002/001	OK	Proceed to A2
		Faulty	Locate and rectify wiring fault re–connect harness and proceed to A8
A2	Check harness continuity PI 046/018 to PI 002/002	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A8
A3	Check harness insulation PI 002/001 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A8
A4	Check harness insulation PI 002/001 to Vbatt	OK	Renew CKP, re–connect harness and proceed to A5
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A8
A5	Check harness insulation PI 002/002 to Vbatt	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A8
A6	Remove CKP, clean sensing face and check resistance value is within limits of 800 – 1660Ω	OK	Proceed to A7
		Out–of–limits	Renew sensor, re–connect harness and proceed to A8
A7	Refit sensor, ensuring mounting face is clean, and check clearance to timing disc is within limits of 0.5 – 1.5mm and disc is not damaged	OK	Proceed to A8
		Out–of–limits or damaged	Re–adjust or renew sensor / disc as necessary, re–connect harness and proceed to A8
A8	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A9
A9	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

IGNITION DIAGNOSTIC MONITOR

Group 15

P 1367
P 1368

Monitoring Procedure

The ignition amplifier for each bank sends an output to the ECM when the ignition has operated correctly. If greater than a set number of pulses are not seen from the amplifier (indicating missing ignition pulses) then the ignition circuit for that bank is judged to be faulty. The appropriate DTC is stored immediately.

Ignition Amplifiers

The ignition amplifiers receive ignition signals from the ECM and controls the primary current of the ignition coils. The switching of the current generates a high voltage at the secondary windings of the ignition coils.

The ignition monitoring circuit senses the primary current of the ignition coils and informs the ECM that correct ignition has occurred. If the information indicates incorrect ignition, the ECM stops fuel injection to the relevant bank and provides 'limp home' mode for the other bank.

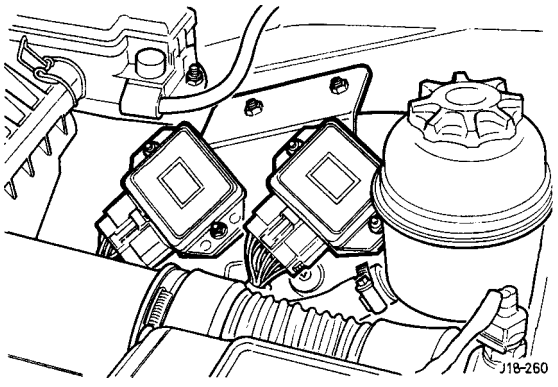


Fig. 1 Ignition Amplifiers Installed

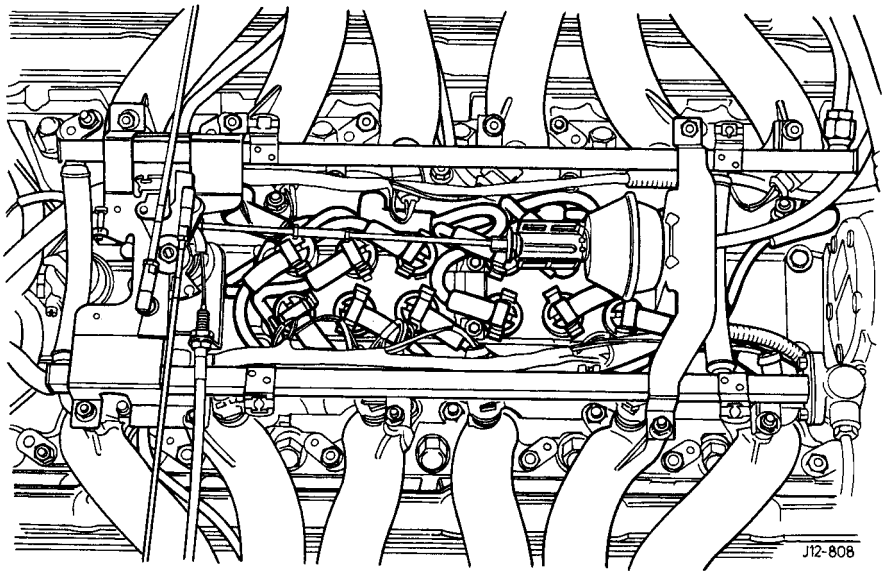


Fig. 2 Ignition Coil Location

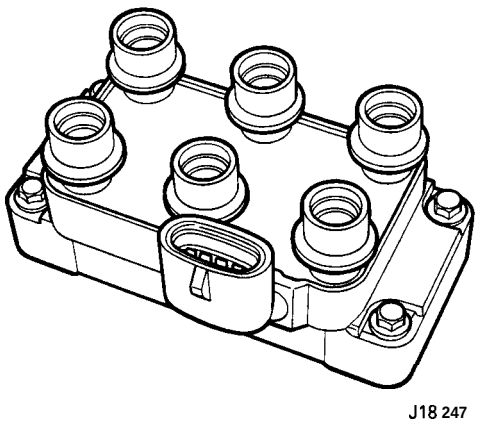
5.2

Structure of Ignition Amplifier

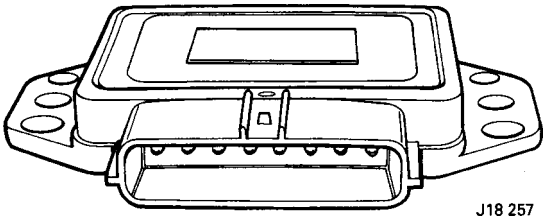
The ignition coil provides the high tension spark to ignite the fuel / air mixture in each cylinder.

The ignition coil pack contains three separate ignition coils which are controlled by the igniter through three coil leads. Each ignition coil ignites **two** spark plugs simultaneously, one spark in the compression stroke and one on the exhaust stroke.

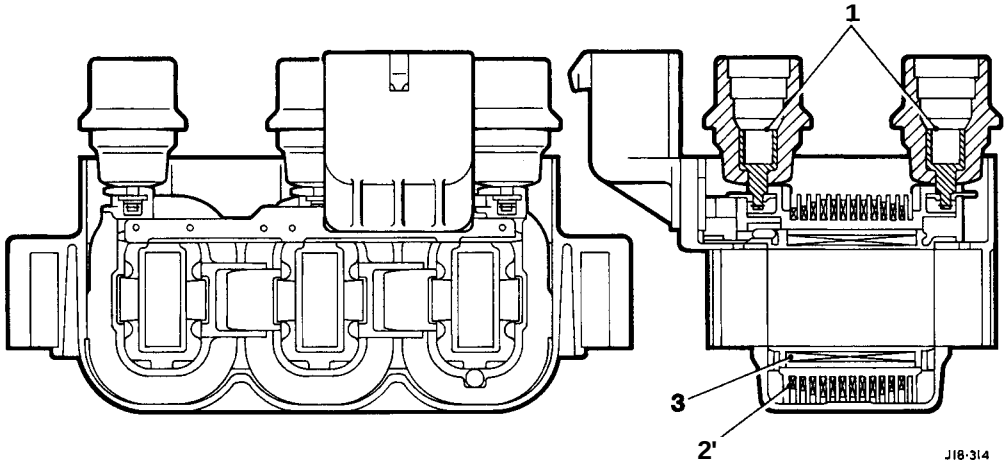
The spark plug ignited on the exhaust stroke uses very little of the ignition coil's stored energy, the majority being used on the compression stroke. Since these **two** spark plugs are connected in series, the igniting voltage of one spark plug will be negative with respect to ground, while the other will be positive with respect to ground.



Fia. 1 lanition Coil



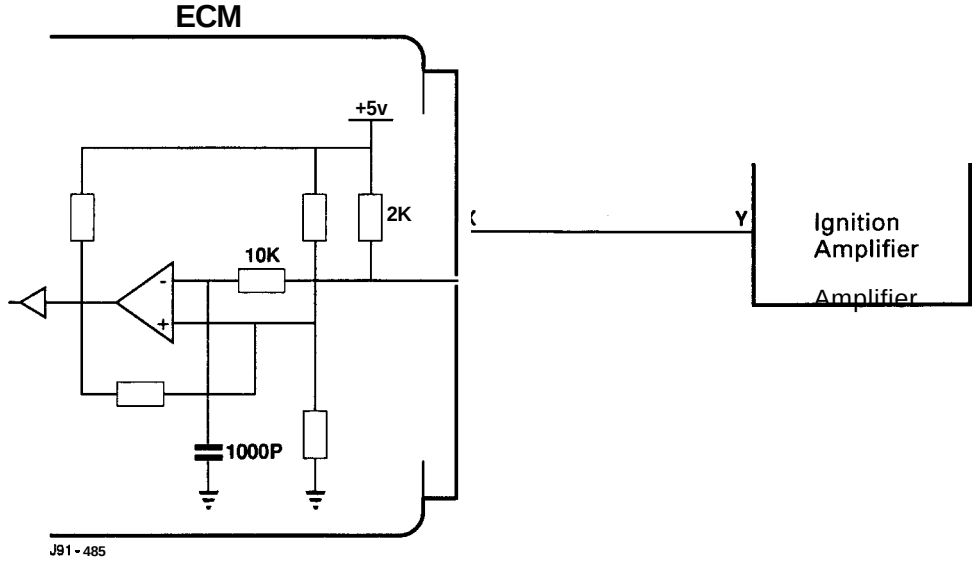
Fin. 2 Ignition Amplifier



1. High Tension Terminals
2. Secondary Coil
3. Primary Coil

Fig. **3** Ignition Coil Sectional

Ignition Amplifier – ECM Interface Circuit



Fia. 1 Interface between TP Sensor and ECM

5.2

Connector information for Fig. 1

Designation	Connector X ECM	Connector Y (Amplifier)
ignition Module 1A	Pi 047/021	PI 010/001
ignition Module 2A	PI 047/021	PI 010/003
ignition Module 3A	PI 047/020	PI 010/006
ignition Failure A	PI 046/021	PI 010/007
ignition Module 1 B	PI 047/019	Pi 011/001
ignition Module 2B	PI 047/018	PI 011/003
ignition Module 3B	PI 047/017	Pi 011/006
ignition Failure B	PI 046/020	Pi 011/007

CONDITION	POSSIBLE SOURCE	ACTION
		drive cycle completed, if not logged proceed to pinpoint test A12
		Check harness and connectors at TP / **MAP** sensors for condition / integrity, if faulty rectify and proceed to pinpoint test A12
		If fault not found, switch ignition off, disconnect bank A ignition coil and proceed to pinpoint test A I

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI 0101001 to PI 047/022	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to A12
A2	Check harness continuity PI 0101003 to PI 047/021	**OK**	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to A12
A3	Check harness continuity PI 0101006 to PI 0471020	OK	Proceed to A4
		Open Circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to A12
A4	Check harness continuity PI 0101007 to PI 0461021	OK	Proceed to A5
		Open circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to A12
A5	Check harness continuity PI 0101004 to PI 0531003	OK	Proceed to A6
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to A12
A6	Check harness continuity PI 0101002 to PI 0121002	OK	Proceed to A7
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to A12
A7	Check harness continuity PI 0101005 to PI 012/003	OK	Proceed to A8
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to A12
A8	Check harness continuity PI 0101008 to PI 0121004	OK	Proceed to A9
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to A12

Pinpoint Tests continued

A9	Check harness continuity PI 012/001 to PI 0531003	OK	Proceed to A10
		Open circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to A12
A10	Check harness insulation PI 010 (all connections except 004) to Vbatt	OK	Proceed to A11
		Short circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to A12
A11	Check operation of ignition coil relay	OK	Proceed to A12
		Faulty	Repair or renew relay, re-connect harness / coil and proceed to A12
A12	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A13
A13	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code **P1368**	Ignition Monitor Fault Bank **B**	Check code **P1111** logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A12**
		Check harness and connectors at TP / **MAP** sensors for condition / integrity, if faulty rectify and proceed to pinpoint test **A12**
		If fault not found, switch ignition off, disconnect bank **B** ignition coil and proceed to pinpoint test **A I**

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI **0111001** to PI **0471019**	OK	Proceed to **A2**
		Open circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to **A12**
A2	Check harness continuity PI **0111003** to PI **0471018**	OK	Proceed to **A3**
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to **A12**
A3	Check harness continuity PI **0111006** to PI **047/017**	OK	Proceed to **A4**
		Open Circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to **A12**
A4	Check harness continuity PI **0111007** to PI **0461020**	OK	Proceed to **A5**
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to **A12**
A5	Check harness continuity PI **0111004** to PI **0531003**	OK	Proceed to **A6**
		Open circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to **A12**
A6	Check harness continuity PI **0111002** to PI 0**131002**	OK	Proceed to **A7**
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to **A12**
A7	Check harness continuity PI **0111005** to PI **013/003**	OK	Proceed to **A8**
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to **A12**
A8	Check harness continuity PI **0111008** to PI **0131004**	OK	Proceed to **A9**
		Open circuit	Locate and rectify wiring fault, reconnect harness / coil and proceed to **A12**

Pinpoint Tests continued

A9	Check harness continuity Pl 0131001 to Pl 0531003	OK	Proceed to A10
		Open circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to A12
A10	Check harness insulation Pl 011 (all connections except 004) to Vbatt	OK	Proceed to A I 1
		Short circuit	Locate and rectify wiring fault, re-connect harness / coil and proceed to A12
A11	Check operation of ignition coil relay	OK	Proceed to A12
		Faulty	Repair or renew relay, reconnect harness / coil and proceed to A13
A12	Clear fault code and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A13
A13	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

SECONDARY AIR INJECTION– AIR

Group 76

P 0410
P 0414

Monitoring Procedure

This diagnostic operates only once per ignition cycle, during the first long duration hot idle period after engine start. Air injection operation is started and the change in AFT closed loop control value is monitored. After a while, if this value does not change by at least a pre–determined value, then the secondary air system malfunction judgement is made. The DTC is stored if the failure judgement is made on two successive ignition cycles.

If the fuel system diagnostic (group **6)** has flagged a lean failure on both banks, the air injection switching valve circuit failure judgment is made. The DTC is stored if the failure judgement is made on **two** successive ignition cycles.

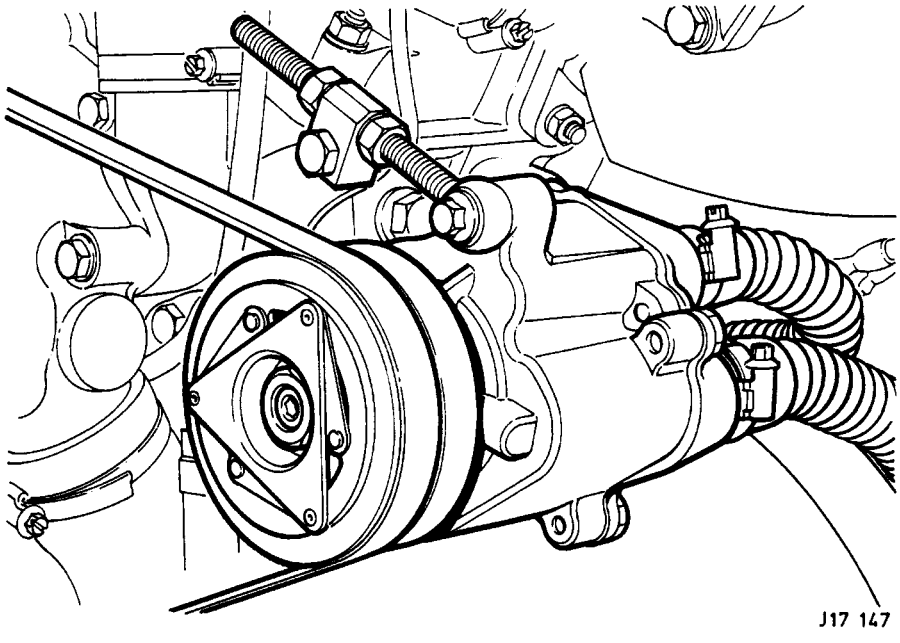
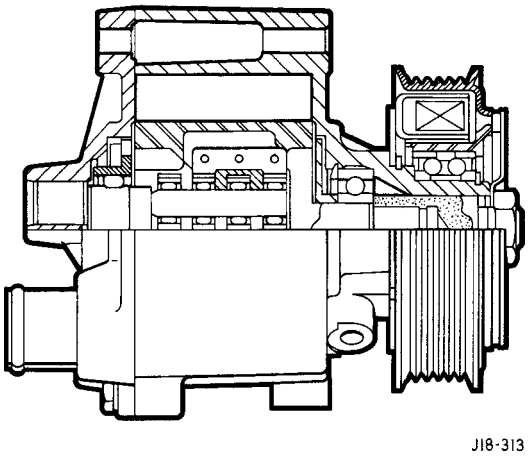


Fig. 1 AIR Pump Location

Structure of AIR Pump

The vane type pump of the secondary air injection system is driven by a multi-groove belt via a magnetic clutch.



Fin. 1 AIR Pump

AIR Pump Relay/ AIR Switching Valve - ECM Interface Circuit

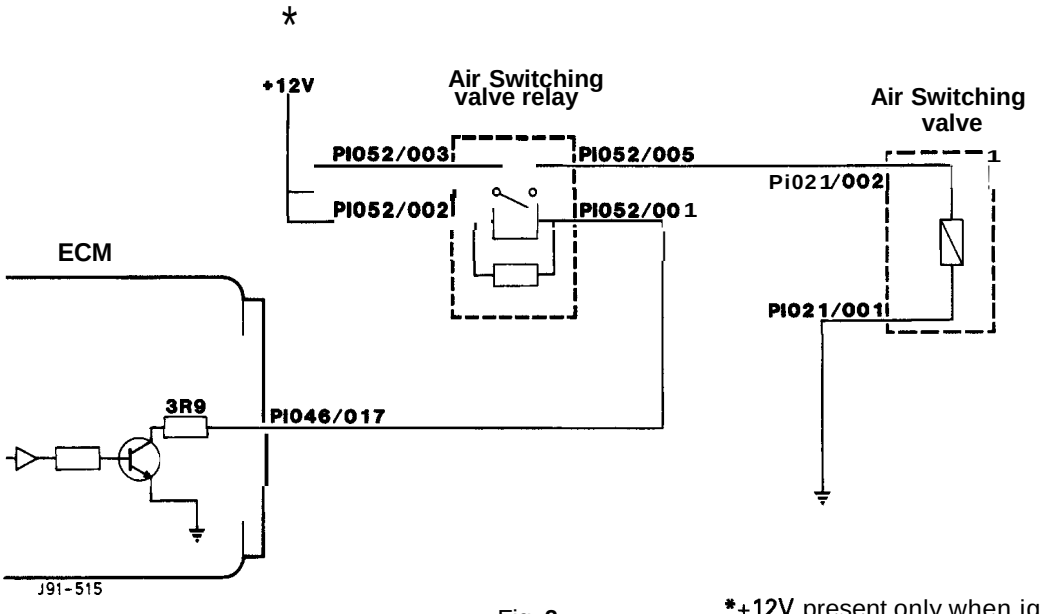


Fig. **2**

*+12V present only when ignition on

Structure of AIR Switching Valve (ASV)

The Air Switching Valve (ASV), operated **by** vacuum, controls the flow of air for injection.

A vacuum solenoid valve (VSV) provides a vacuum switching function for the air switching valve, in response from an electrical signal, to control a vacuum servomotor.

When the solenoid **is** energized, ported vacuum flows to the air switching valve causing it to open. When the solenoid is de-energized, ported vacuum is not applied to the air switching valve, causing it to close.

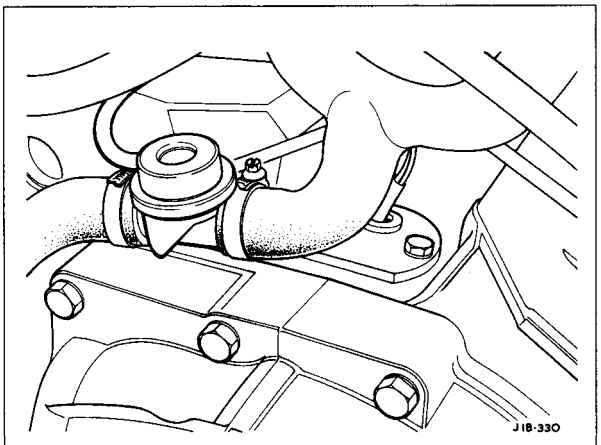


Fig. 1 ASV Location

5.2

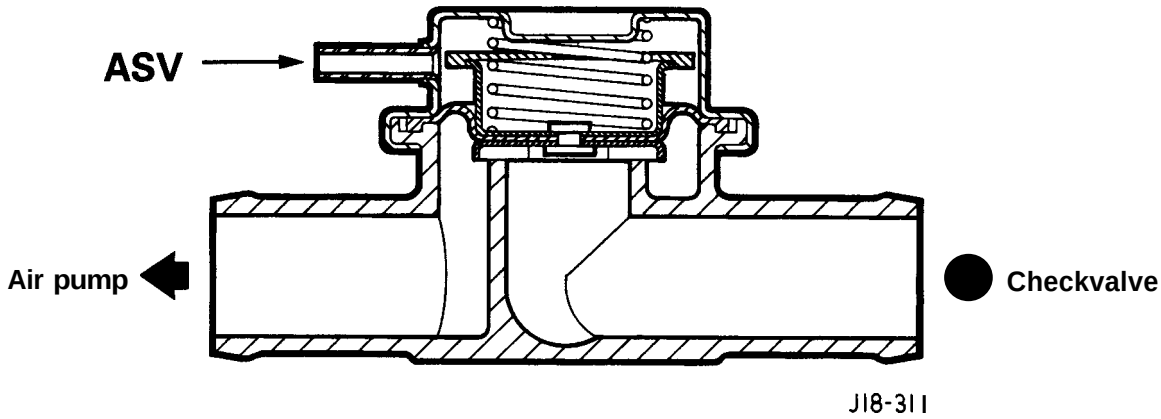


Fig. **2** ASV Section

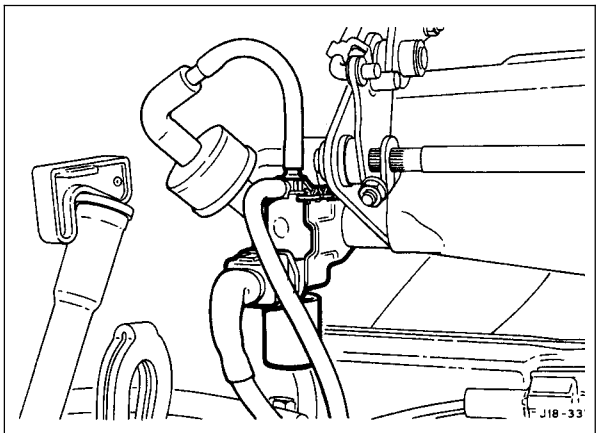
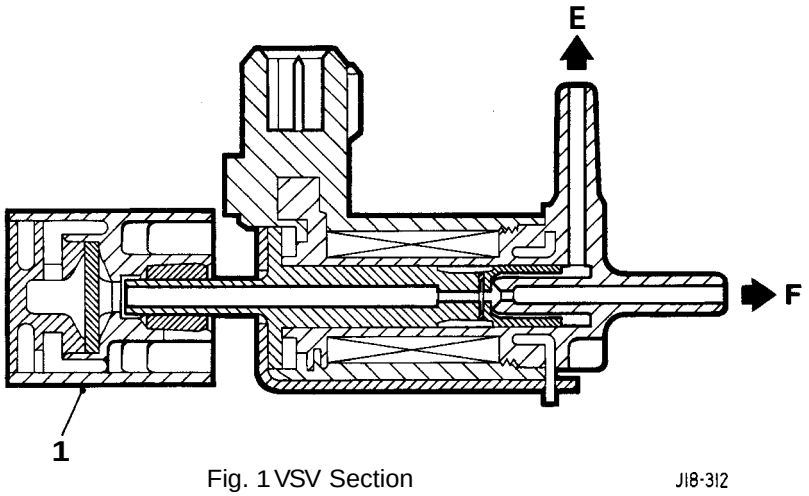


Fig.3 VSV Location



Air filter
ASV
F Vacuum

Fig. 1 VSV Section J18-312

Additional Information

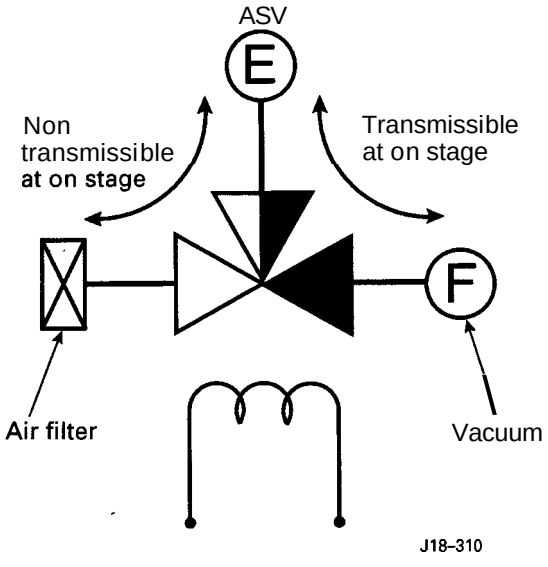


Fig. 2 Operating Schematic of Vacuum Solenoid Valve

1. 'A' Bank Induction Manifold
2. Vacuum Delay Valve
3. Air Switching Valve
4. Solenoid Vacuum Valve

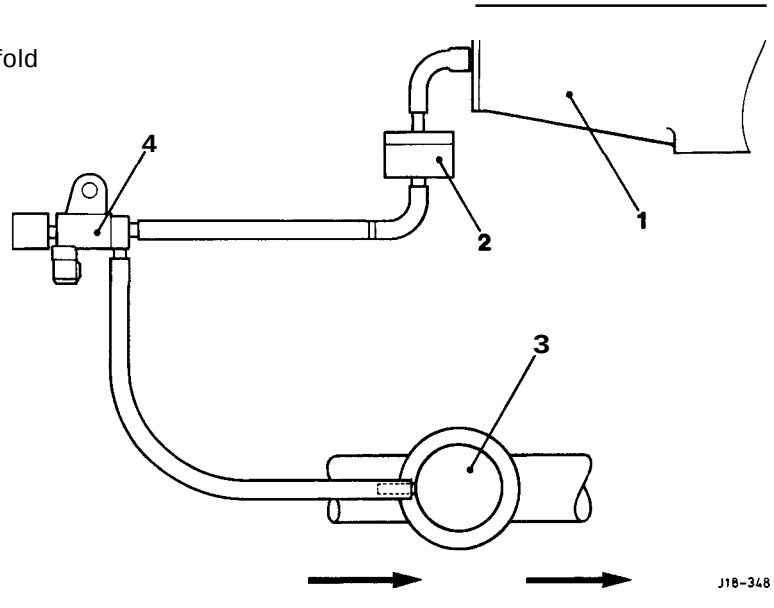


Fig. 3 ASV / VSV Vacuum Circuit

ARY AIR INJECTION SYSTEM - P0410

Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0410	AIR Malfunction	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A15
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A15
		If fault not found proceed to pinpoint test A I

TEST STEP		RESULT	ACTION
A1	Check AIR pump drive belt	OK	Proceed to A2
		Faulty	Rectify and proceed to A15
A2	Check AIR pump hoses	OK	Switch ignition off, remove AIR relay and proceed to A3
		Faulty	Rectify and proceed to A15
A3	Check harness continuity PI 052/001 to PI 0461017	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A15
A4	Check harness continuity PI 052/002 to RS 006/005	OK	Proceed to A5
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A15
A5	Check harness continuity PI 052/003 to RS 006/005	OK	Disconnect air pump clutch and solenoid vac valve and proceed to A6
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A15
A6	Check harness continuity PI 052/005 to PI 021/002	OK	Proceed to A7
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A15
A7	Check harness continuity PI 021/001 to ground	OK	Proceed to A8
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A15
A8	Check harness continuity PI 022/001 to PI 052/005	OK	Proceed to A9
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A15
A9	Check harness continuity PI 022/001 to PI 052/005	OK	Proceed to A10
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A15

5.2

Pinpoint Tests continued

A10	Check harness continuity PI 0221002 to PI 047/011	OK	Re-connect AIR clutch and solenoid vac valve, switch ignition on and proceed to A11
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A15
A11	Check voltage at RS 0061005	Vbatt	Proceed to A12
		< Vbatt	Locate and rectify wiring fault, re-connect harness and proceed to A15
A12	Check AIR relay operation	OK	Proceed to A13
		Faulty	Renew relay, re-connect harness and proceed to A15
A13	Check AIR pump operation	OK	Proceed to A14
		Faulty	Renew pump, re-connect harness and proceed to A15
A14	Check solenoid vac valve	OK	Proceed to A15
		Faulty	Renew valve, re-connect harness and proceed to A15
A15	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A16
A16	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A14
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A14
		If fault not found, disconnect **AIR** relay and proceed to pinpoint test A1

		RESULT	ACTION
A1	Check **AIR** pump drive belt	OK	Proceed to A2
		Faulty	Rectify and proceed to A14
A2	Check AIR pump hoses	OK	Switch ignition off, remove AIR relay and proceed to A3
		Faulty	Rectify and proceed to A14
A3	Check harness continuity PI 0521001 tc F 0461017	OK	Proceed to A4
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A14
A4	Check harness continuity PI 052/002 to RS 0061005	OK	Proceed to A5
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A5	Check harness continuity PI 0521003 to RS 0061005	OK	Disconnect air pump clutch and solenoid vac valve and proceed to A6
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A6	Check harness continuity PI 0521005 to PI 0211002	OK	Proceed to A7
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A7	Check harness continuity PI 021/001 to ground	OK	Proceed to A8
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A8	Check harness continuity PI 022/001 to PI 0521005	OK	Proceed to A9
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A9	Check harness continuity PI 022/002 to PI 047/011	OK	Proceed to A10
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14

Pinpoint Tests continued

A10	Check voltage at RS 0061005	Vbatt	Proceed to A11
		< Vbatt	Locate and rectify wiring fault, re–connect harness and proceed to A14
A11	Check AIR relay operation	OK	Proceed to A12
		Faulty	Renew relay, re–connect harness and proceed to A14
A12	Check AIR pump operation	OK	Proceed to A13
		Faulty	Renew pump, re–connect harness and proceed to A14
A13	Check solenoid vac valve	OK	Proceed to A14
		Faulty	Renew valve, re–connect harness and proceed to A14
A14	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A15
A15	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

CATALYST MONITOR

Group 17

P 0420
P 0421

Monitoring Procedure

The catalyst efficiency is monitored in two ways during steady speed driving. Firstly the average value of downstream HO2S sensor amplitude is monitored. If this value is less than a predetermined limit then the catalyst efficiency is judged to be normal. If the normal judgement is not made, the outputs from upstream and downstream HO2S sensors are compared. If the outputs do not correctly match those expected from an efficient catalyst, and the overall conversion of the system falls below ***60%*** then the catalyst efficiency failure judgement is made. The trouble code is stored when three successive failure judgements have been made. These can be, but need not be on the same trip.

5.2

CATALYST SYSTEM EFFICIENCY - P0420

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A3
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A3
		If fault not found, switch off ignition and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check for HO2s fault codes already logged	No	Proceed to A2
		Fault logged	Rectify fault and proceed to A3
A2	Check catalyst for damage	OK	Proceed to A3
		Damaged	Fit new catalyst to bank A and proceed to A3
A3	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A4
A4	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CATALYST SYSTEM EFFICIENCY – P0430

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0430	Catalyst Efficiency Low – B Bank	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A3
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A3
		If fault not found, switch off ignition and Proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check for HO2s fault codes already logged	No	Proceed to A2
		Fault logged	Rectify fault and proceed to A3
A2	Check catalyst for damage	OK	Proceed to A3
		Damaged	Fit new catalyst to bank A and proceed to A3
A3	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A4
A4	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

EVAPORATIVE EMISSION CONTROL – EVAP

Group 18

P 0441
P 0443
P 1441
P 1443

Monitoring Procedure

This diagnostic operates during the first long duration hot idle period after engine start. the diagnostic works by gradually opening the purgevalve on each bank inturn and monitoring changes in AFR closed loopcontrol value, idle speed control feedback and engine RPM. If none **of** these variables changes by more than a predetermined value the purge flow failure is made.

The purge valve drive circuits monitored during driving operation; if the driver state does not match the command state for over a predetermined number of on/off operations then a failure judgement is made.

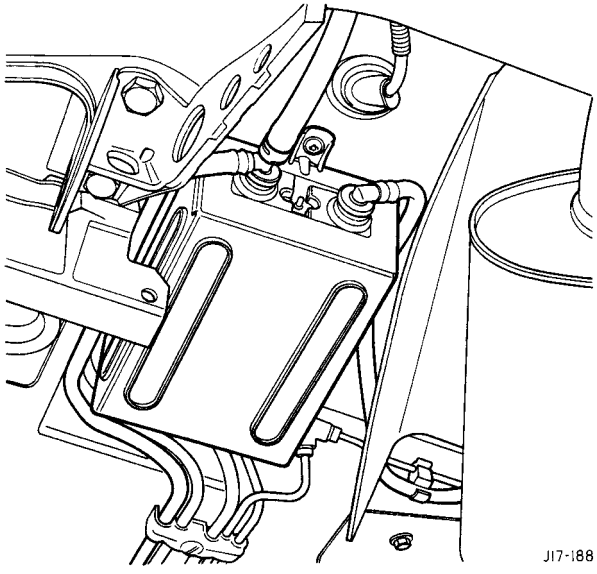
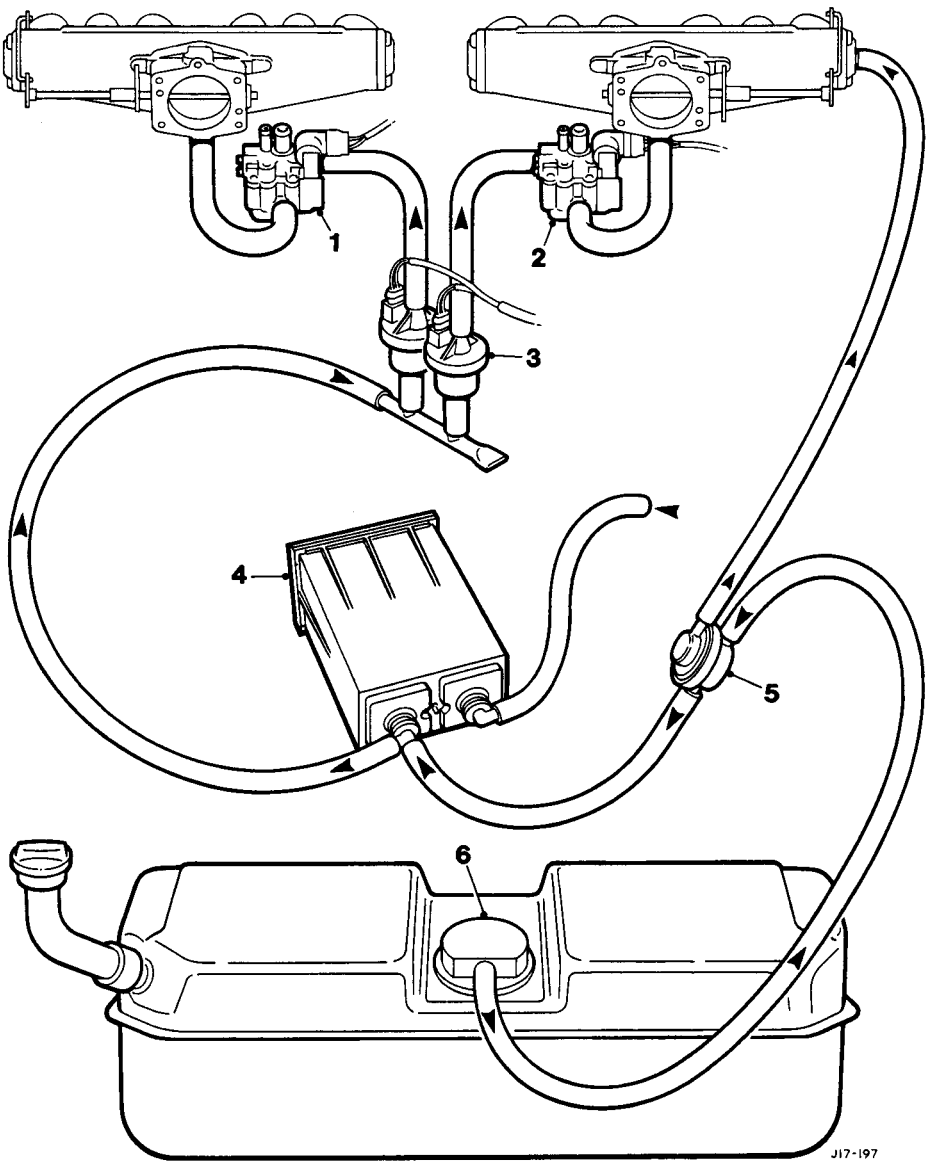


Fig. 1 EVAP Installation

5.2

5.2



1. A–Idle Speed Control Valve
2. B–Idle Speed Control Valve
3. Purge Valves
4. Carbon Cannister
5. Rochester Valve
6. Evaporative Loss Flange

Fig. 1 EVAP System

EVAP Canister Purge Valves A & B – ECM Interface Circuit

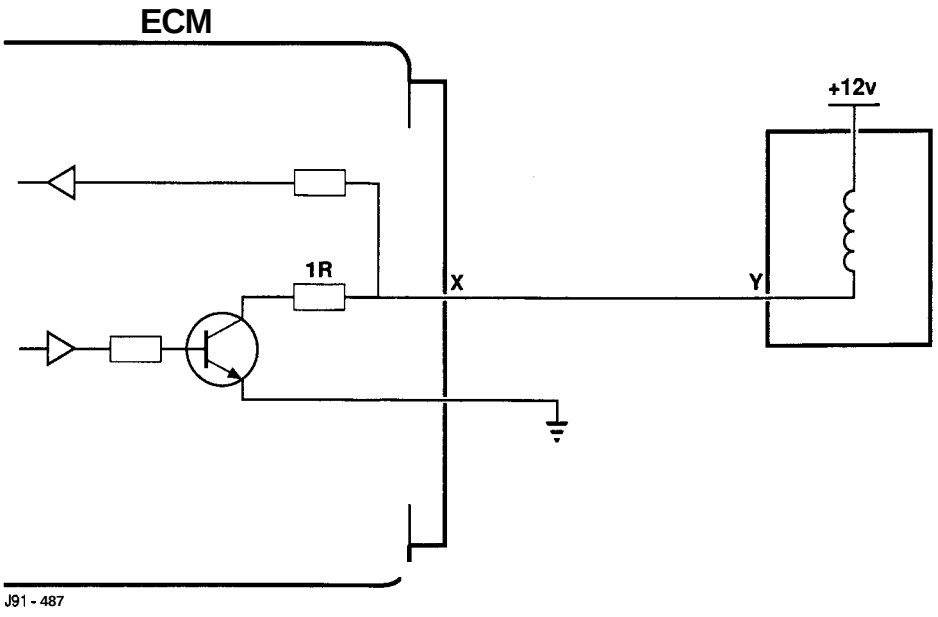


Fig. 1

Bank	ECM	Purge Valve	
	Point X	Point Y	+12V Supply
A	PI 0471034	PI 0181002	PI 018/001
B	PI 0471033	PI 0191002	PI 0191001

Additional Information

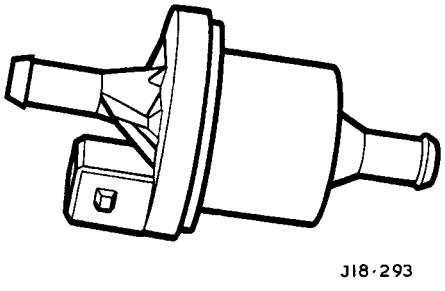


Fig. 2 EVAP Purge Valve

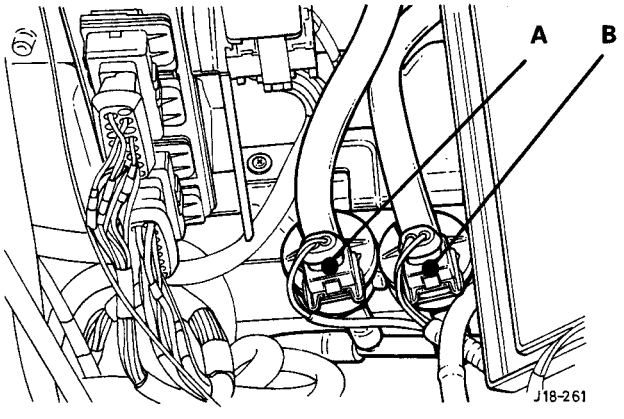


Fig. 3 Purge Valves Installation

Note: **Sensor resistance is 22–3052**

CONDITION	POSSIBLE SOURCE	ACTION
Fault code **P0441**	EVAP Purge Flow Fault – Bank **A**	Check code **P1111** logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A7**
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test **A7**
		If fault not found, switch ignition off, disconnect bank **A** purge valve and proceed to pinpoint test **A I**

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI **018/001** to RS **0061005**	OK	Proceed to **A2**
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A2	Check harness continuity PI **018/002** to PI **047/034**	**OK**	Proceed to **A3**
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A3	Check harness insulation PI **018/001** to ground	OK	Proceed **to A4**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A7**
A4	Check harness insulation PI **018/002** to Vbatt	OK	Proceed to **A5**
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to **A7**
A5	Check **A** bank purge valve resistance is within limits of **22 – 304**	OK	Proceed to **A6**
		Out–of–limits	Renew valve, reconnect harness and proceed to **A7**
A6	Check purge valve operation	OK	Re–connect harness and proceed to **A7**
		Faulty	Renew valve, reconnect harness and proceed to **A7**
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A8**
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

EVAPORATIVE EMISSION CONTROL – P0443

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0443	EVAP Purge Control Valve Circuit – Bank A	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, switch ignition off, disconnect bank A purge valve and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI 018/001 to RS 006/005	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A2	Check harness continuity PI 018/002 to PI 047/034	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A3	Check harness insulation PI 018/002 to Vbatt	OK	Switch ignition on and proceed to A4
		Short circuit . .	Locate and rectify wiring fault, re–connect harness and proceed to A7
A4	Check voltage level at PI 018/001	Vbatt	Proceed to A5
		< Vbatt	Locate and rectify wiring fault, re–connect harness and proceed to A7
A5	Check A bank purge valve resistance is within limits of 22 – 30Ω	OK	Proceed to A6
		Out–of–limits	Renew valve, re–connect harness and proceed to A7
A6	Check purge valve operation	OK	Re–connect harness and proceed to A7
		Faulty	Renew valve, re–connect harness and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1441	EVAP Purge Flow Fault – Bank B	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, switch ignition off, disconnect bank B purge valve and proceed to pinpoint test A I

		RESULT	ACTION
A I	Check harness continuity PI 019/001 to RS 006/005	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A2	Check harness continuity PI 019/002 to PI 047/033	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A3	Check harness insulation PI 019/001 to ground	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A7
A4	Check harness insulation PI 019/002 to Vbatt	OK	Proceed to A5
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A7
A5	Check B bank purge valve resistance is within limits of 22 – 3061	OK	Proceed to A6
		Out-of-limits	Renew valve, re-connect harness and proceed to A7
A6	Check purge valve operation	OK	Reconnect harness and proceed to A7
		Faulty	Renew valve, reconnect harness and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

EVAPORATIVE EMISSION CONTROL – P1443

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1443	EVAP Purge Control Valve Circuit – Bank B	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A7
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A7
		If fault not found, switch ignition off, disconnect bank B purge valve and proceed to pinpoint test A I

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI 019/001 to RS 006/005	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A2	Check harness continuity PI 019/002 to PI 047/033	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A3	Check harness insulation PI 019/002 to Vbatt	OK	Switch ignition on and proceed to A4
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A7
A4	Check voltage level at PI 019/001	Vbatt	Proceed to A5
		< Vbatt	Locate and rectify wiring fault, re–connect harness and proceed to A7
A5	Check A bank purge valve resistance is within limits of 22 – 30Ω	OK	Proceed to A6
		Out–of–limits	Renew valve, re–connect harness and proceed to A7
A6	Check purge valve operation	OK	Re–connect harness and proceed to A7
		Faulty	Renew valve, re–connect harness and proceed to A7
A7	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A8
A8	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

VEHICLE SPEED SENSOR – VSS

Group 19 **P *0500***

Monitoring Procedure

The vehicle speed input from the transmission control module is monitored during deceleration of the vehicle. If no input speed is seen while all other ECM inputs (e.g. manifold pressure, neutral switch, engine RPM) indicate a moving vehicle then the vehicle speed input failure judgement is made. The DTC is stored if the failure judgement is made on two successive trips.

5.2

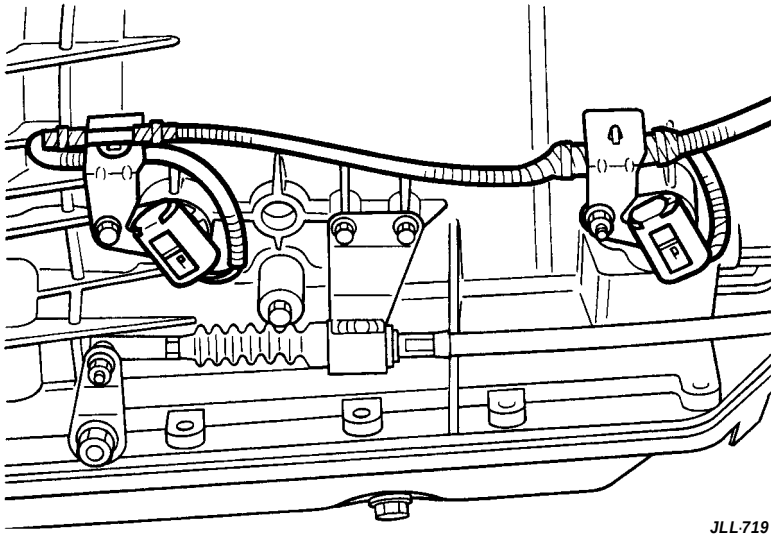


Fig. 1 Vehicle Speed Sensor Installation

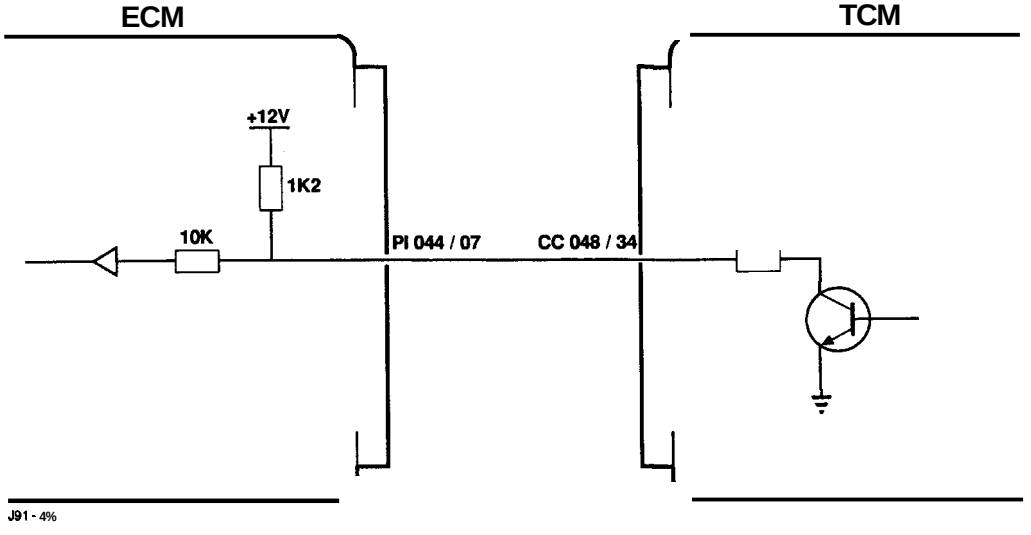


Fig. 2 ECM / TCM Speed Signal Interface

VEHICLE SPEED SENSOR – P0500

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0500	VSS fault	Disconnect VSS and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Drive vehicel at 30mph and check PID OD indicates vehicle speed	OK	Proceed to A3
		0 speed shown	Reconnect harness and proceed to A2
A2	Check harness continuity PI 044/010 to CC 048/030	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A4
A3	Check TCM for stored fault codes P0720, P0721 & P0722	OK	Proceed to A4
		Faults stored	Rectify fault, re–connect harness and proceed to A4
A4	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

IDLE SPEED CONTROL SYSTEM – ISC

Group 20 A–Bank	**P 0506**
	P 0507
B–Bank	**P 1506**
	P 1507

Monitoring Procedure

Thisdiagnostic operates onlyonce per trip, during the first long duration hot idle period after engine start. The diagnostic works **by** changing the position **of** the idle speed control valve on each bank in turn. If the engine RPM or manifold pressure does not change as expected then a failure judgement is made. The actual engine RPM is compared to the target speed that the ECM is trying to achieve, **to** determine which DTC will be set. The appropriate DTC is stored if the failure judgement is made on two successive trips.

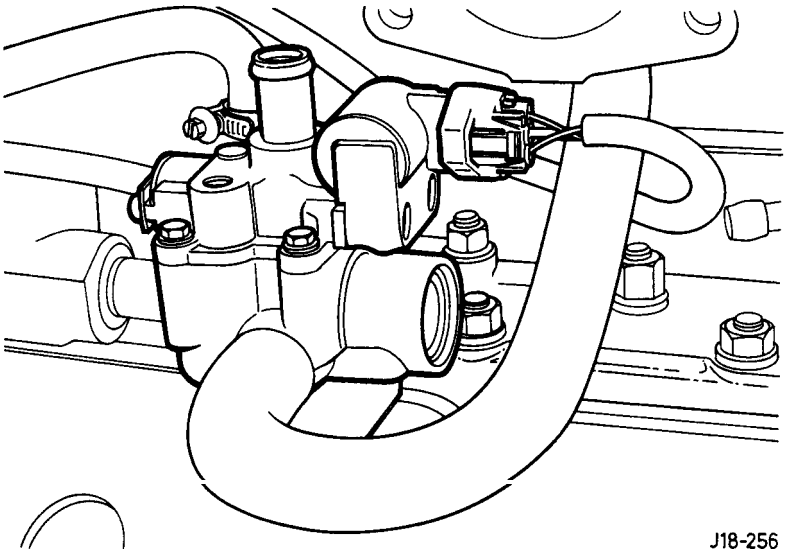


Fig. 1 Idle Speed Control Valve (B–Bank)

Structure of Idle Speed Control Valve (ISCV)

The ISC valve is mounted on the cylinder head and is operated by signals from the ECU. The ISC valve controls the amount of intake air by-passing, so that the target idle speed of the engine is maintained.

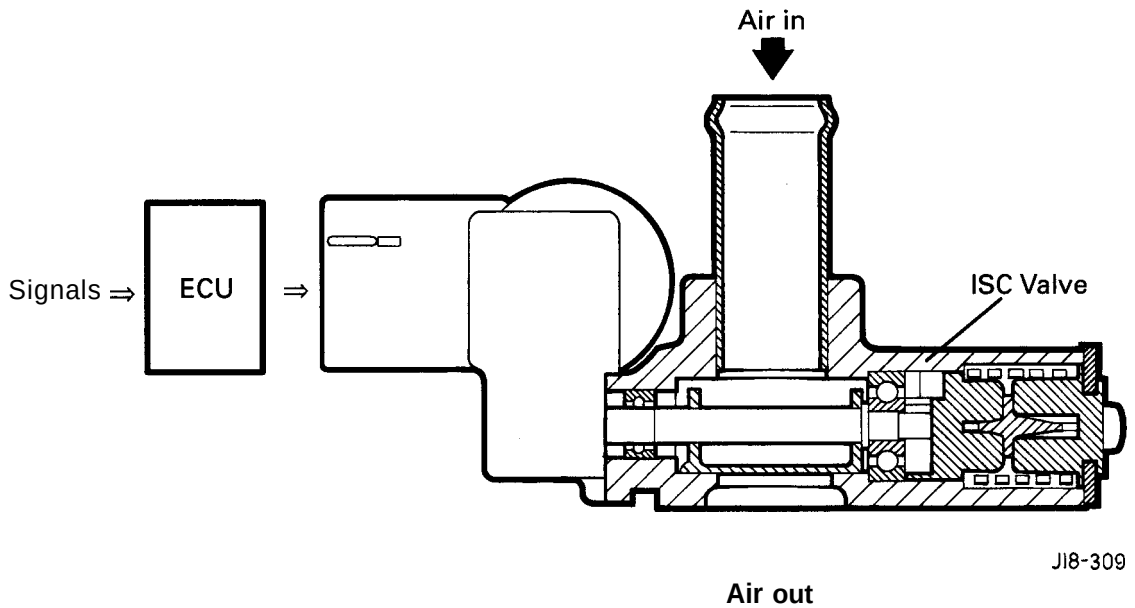


Fig. 2 Idle Speed Control Valve Sectional View

Idle Speed Control (A–Bank shown) – ECM Interface Circuit

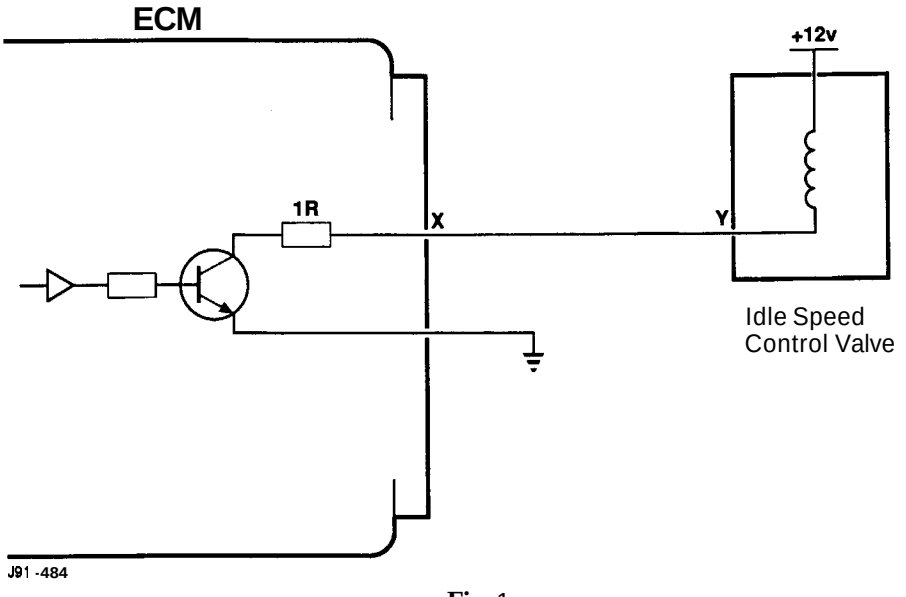


Fig. 1

Bank	Function	X	Y
A	Open	P 1047–1	P 1029–1
B	Close	P 1047–3	P 1029–3
A	Open	P 1047–2	P 1030–1
B	Close	P 1047–1	P 1030–3

IDLE SPEED CONTROL – P0506

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0506	ISC RPM Low Fault (Bank A)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A14
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A14
		If faults not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check for blockages in intake air system	OK	Proceed to A2
		Blocked	Repair or renew valve / ducting and proceed to A14
A2	Check **MAP** sensor filter for blockages	OK	Proceed to A3
		Blocked	Clear or renew filter and proceed to A14
A3	Check **MAP** sensor hose	OK	Proceed to A4
		Faulty	Repair or renew and proceed to **A14**
A4	Check ISC valve operation	OK	Disconnect bank **A** ISC valve and proceed to **A5**
		Faulty	Repair or renew valve and proceed to **A14**
A5	Check harness continuity PI **0471004** to PI **0291001**	OK	Proceed to **A6**
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A14**
A6	Check harness continuity PI **047/003** to PI **0291003**	OK	Proceed to **A7**
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A14**
A7	Check harness continuity PI **0291002** to RS **0061008**	OK	Proceed to **A8**
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A14**
A8	Check harness insulation PI **0291001** to PI **0291002**	OK	Proceed to **A9**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A14**
A9	Check harness insulation PI **0291001** to PI **0291003**	OK	Proceed to **A10**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A14**

5.2

Pinpoint Tests continued

A10	Check harness insulation PI **029/002** to PI **029/003**	OK	Proceed to **A11**
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to **A14**
A11	Check for misfire fault codes already logged	No	Proceed to **A12**
		Yes	Rectify fault, re-connect harness and proceed to **A14**
A12	Check fuel pressure	OK	Proceed to **A13**
		Incorrect	Rectify fault, re-connect harness and proceed to **A14**
A13	Check air conditioning compressor not seized	OK	Proceed to **A14**
		Seized	Renew compressor, re-connect harness and proceed to **A14**
A14	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A15**
A15	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

IDLE SPEED CONTROL – P0507

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0507	ISC RPM High Fault (Bank A)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A14
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A14
		If faults not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check for blockages in intake air system	OK	Proceed to A2
		Blocked	Repair or renew valve / ducting and proceed to A10
A2	Check throttle valve not sticking	OK	Proceed to A3
		Faulty	Rectify and proceed to A10
A3	Check accelerator mechanism	OK	Proceed to A4
		Faulty	Repair or renew and proceed to A10
A4	Check ISC valve operation	OK	Disconnect Bank A ISC valve and proceed to A5
		Faulty	Repair or renew valve and proceed to A10
A5	Check harness insulation PI029/001 to ground	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A10
A6	Check harness insulation PI029/002 to ground	OK	Proceed to A7
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A10
A7	Check harness insulation PI029/003 to ground	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A10
A8	Check for MAP sensor filter blockage	OK	Proceed to A9
		Blocked	Clear or renew filter, re-connect harness and proceed to A10
A9	Check MAP sensor hose	OK	Proceed to A10
		Faulty	Repair or renew, re-connect harness and proceed to A10
A10	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A11
A11	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

5.2

IDLE SPEED CONTROL - P1506

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
		drive cycle completed, if not logged proceed to pinpoint test A14
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A14

TEST STEP		RESULT	ACTION
A1	Check for blockages in intake air system	OK	Proceed to A2
		Blocked	Repair or renew valve / ducting and proceed to A14
A2	Check MAP sensor filter for blockages	OK	Proceed to A3
		Blocked	Clear or renew filter and proceed to A14
A3	Check MAP sensor hose	OK	Proceed to A4
		Faulty	Repair or renew and proceed to A14
A4	Check ISC valve operation	OK	Disconnect bank B ISC valve and proceed to A5
		Faulty	Repair or renew valve and proceed to A14
A5	Check harness continuity PI 047/002 to PI 030/001	OK	Proceed to A6
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A6	Check harness continuity PI 047/001 to PI 030/003	OK	Proceed to A7
		Open circuit	Locate and rectify wiring fault, re-connect harness and proceed to A14
A7	Check harness continuity PI 030/002 to RS 006/008	OK	Proceed to A8
		Open circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A8	Check harness insulation PI 030/001 to PI 030/002	OK	Proceed to A9
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14
A9	Check harness insulation PI 030/001 to PI 030/003	OK	Proceed to A10
		Short circuit	Locate and rectify wiring fault, re-connect harness and proceed to A14
A10	Check harness insulation PI 030/002 to PI 030/003	OK	Proceed to A11
		Short circuit	Locate and rectify wiring fault, reconnect harness and proceed to A14

5.2

Pinpoint Tests continued

A11	Check for misfire fault codes already logged	No	Proceed to A12
		Yes	Rectify fault, re-connect harness and proceed to **A14**
A12	Check fuel pressure	OK	Proceed to **A13**
		Incorrect	Rectify fault, re-connect harness and proceed to **A14**
A13	Check air conditioning compressor not seized	OK	Proceed to **A14**
		Seized	Renew compressor, re-connect harness and proceed to **A14**
A14	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed **to A15**
A15	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Contact Jaguar Service Hotline

IDLE SPEED CONTROL – P1507

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1507	ISC RPM High Fault (Bank B)	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A14
		Check harness and connector condition / integrity, if faulty rectify and proceed to pinpoint test A14
		If faults not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check for blockages in intake air system	OK	Proceed to A2
		Blocked	Repair or renew valve / ducting and proceed to A10
A2	Check throttle valve not sticking	OK	Proceed to A3
		Faulty	Rectify and proceed to A10
A3	Check accelerator mechanism	OK	Proceed to A4
		Faulty	Repair or renew and proceed to A10
A4	Check ISC valve operation	OK	Disconnect Bank B ISC valve and proceed to A5
		Faulty	Repair or renew valve and proceed to A10
A5	Check harness insulation PI 030/001 to ground	OK	Proceed to A6
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A10
A6	Check harness insulation PI 030/002 to ground	OK	Proceed to A7
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A10
A7	Check harness insulation PI 030/003 to ground	OK	Proceed to A8
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A10
A8	Check for MAP sensor filter blockage	OK	Proceed to A9
		Blocked	Clear or renew filter, re–connect harness and proceed to A10
A9	Check MAP sensor hose	OK	Proceed to A10
		Faulty	Repair or renew, re–connect harness and proceed to A10
A10	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A11
A11	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

CLOSED THROTTLE POSITION SWITCH

Group 21

P 1512
P 1513

Monitoring Procedure

This diagnostic operates during repeated vehicle acceleration and deceleration. If the ECM has seen five accelerations (open throttle, to above 20 mile / hour) and decelerations (closed throttle, to a stop) without a change of state of the idle switch, then the switch is judged to be faulty. The particular DTC depends on the output the switch gives during the failure judgement. The DTC is stored if the failure judgement is made on two successive trips.

Note: The CTPS / idle switch comprises part of the throttle position sensor assembly, Group 4.

CONDITION	POSSIBLE SOURCE	ACTION
		Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A3
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A3
		If fault not found, switch ignition off, disconnect CTP sensor and proceed to pinpoint test A I

5.2

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI 0451003 to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re-connect harness / sensor and proceed to A3
A2	Check sensor adjustment, refer to page 44	OK	Re-connect harness / sensor and proceed to A3
		Out-of-limits	Adjust or renew sensor, re-connect harness and proceed to A3
A3	Clear fault code and perform service drive-cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to A4
A4	Return to Symptom Chart and repeat diagnostic procedure	OK	stop
		Fault still present	Refer to Jaguar Service Hotline

CLOSED THROTTLE POSITION – P1513

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1513	CTP Switch High Input Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test **A3**
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test **A3**
		If fault not found, switch ignition off, disconnect CTP sensor and proceed to pinpoint test **A I**

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity PI **0451003** to Vbatt	OK	Proceed to **A2**
		Short circuit	Locate and rectify wiring fault, re-connect harness ▮sensor and proceed to **A3**
A2	Check sensor adjustment, refer to Page **44**	OK	Re-connect harness ▮sensor and proceed to **A3**
		Out-of-limits	Adjust or renew sensor, re-connect harness and proceed to **A3**
A3	Clear fault code and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A4
A4	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Refer to Jaguar Service Hotline

5.2

PARK / NEUTRAL POSITION SWITCH – PNPS

Group 22

P 1516
P 1517

Monitoring Procedure

If the ECM receives a cranking signal input with the neutral switch input indicating that the transmission is in gear, the cranking failure judgement is made. The DTC is stored if the failure judgement is made on two successive trips.

If the vehicle is travelling in excess of 50 mile/ hour under load for some time while the neutral switch input indicates that the transmission is in neutral then the gear change failure judgement is made, as it would be impossible to achieve this condition unless a gear was selected. The DTC is stored if the failure judgement is made on two successive trips.

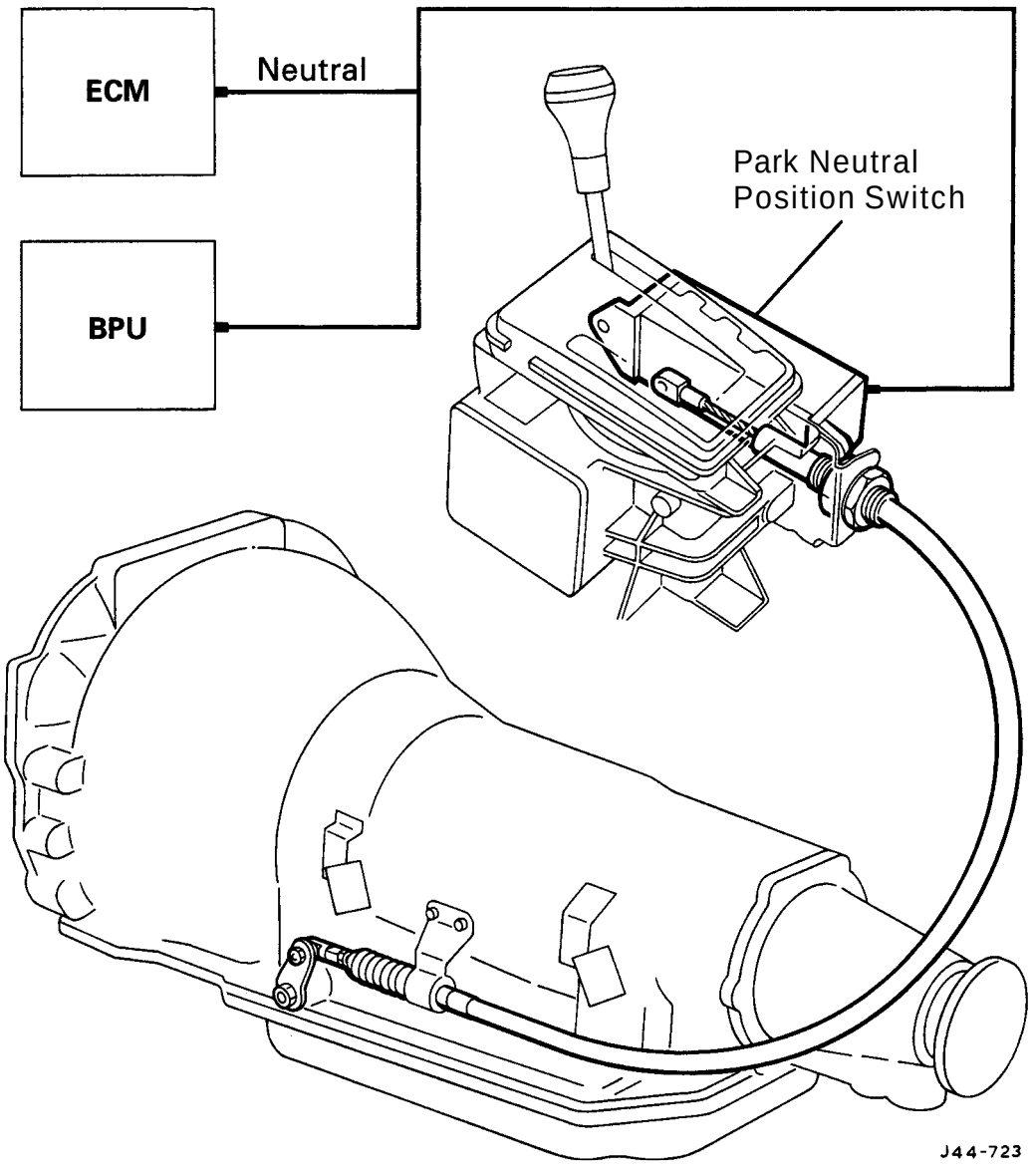
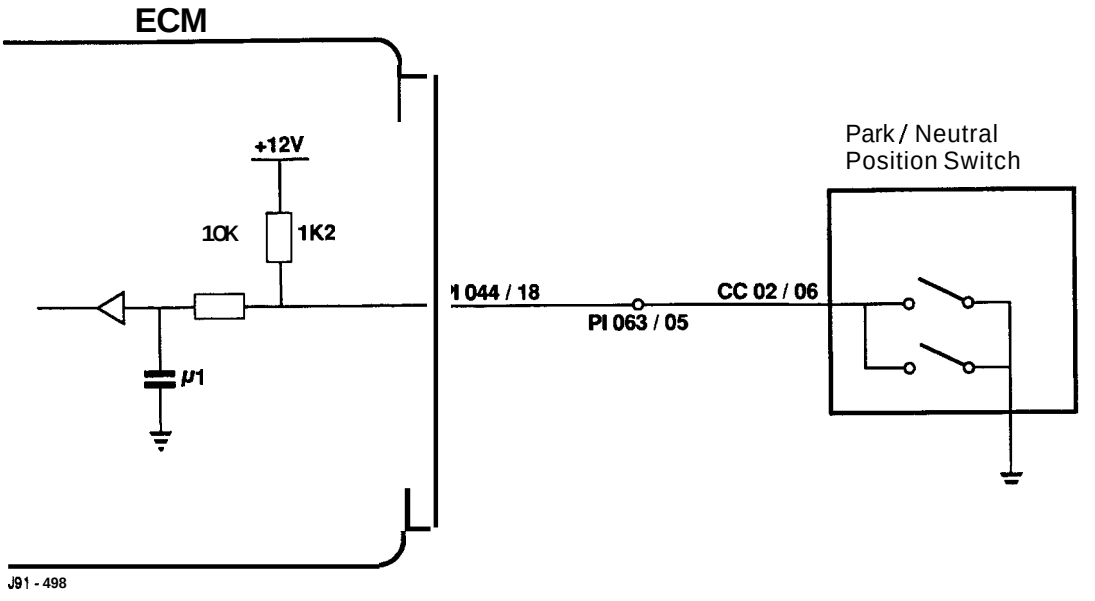


Fig.1 PNPS Installation

PNPS – ECM Interface Circuit



Fia. 1

5.2

PARK/ NEUTRAL SWITCH – P1516

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1516	Gear Change Neutral / Drive Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A3
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A3
		If fault not found switch ignition off, disconnect PNPS and proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness insulation CC 021/006 to ground	OK	Proceed to A2
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A3
A2	Check operation of PNPS	OK	Proceed to A3
		Faulty	Renew switch, re–connect harness and proceed to A3
A3	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A4
A4	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

PARK / NEUTRAL SWITCH – P1517

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1517	Cranking Neutral / Drive Fault	Check code P1111 logged indicating service drive cycle completed, if not logged proceed to pinpoint test A5
		Check harness and connectors for condition / integrity, if faulty rectify and proceed to pinpoint test A5
		If fault not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A1	Check harness continuity CC 021/006 to FC 002/020	OK	Proceed to A2
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A2	Check harness continuity CC 021/006 to PI 044/018	OK	Proceed to A3
		Open circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A3	Check harness insulation CC 021/006 to Vbatt	OK	Proceed to A4
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A5
A4	Check operation of PNPS	OK	Re–connect harness and proceed to A5
		Faulty	Renew switch, re–connect harness and proceed to A5
A5	Clear fault and perform service drive cycle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A6
A6	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ENGINE CONTROL MODULE (ECM)

Group 23

P 1000
P 1111

Monitoring Procedure

These indicate whether the diagnostic system checks have all been completed since the last memory clear (ie during battery disconnection. Either P1000 or P1111 will always be present (North American Markets only).

P1000 indicates that further additional driving will be necessary to complete all the diagnostic judgements.

P1111 indicates that all the diagnostic judgements have been made at least once (diagnostics will continue to run even with this code set).

ENGINE CONTROL MODULE – P1000

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1000	Further vehicle operation is needed to allow all on-board diagnostics to be completed	Check code P1000 logged indicating service drive cycle not completed satisfactorily
		Perform service drive cycle. **Note:** Only necessary to complete all diagnostic judgements if required

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1111	All on-board diagnostics completed. Code P1000 will be displayed only if the ECU memory is cleared using a scan tool or the vehicle battery has been disconnected	No action required, this is an information code showing service cycle completed satisfactorily

ENGINE CONTROL MODULE (ECM) – TRANSMISSION RELATED

Group 24

P 1775
P 1776

Monitoring Procedure

This diagnostic monitors the communication to the TCM. If the torque reduction request signal from the TCM holds at **12%** for several seconds, the TCM is indicating to the ECM that a MIL Lamp illumination is required due to a fault in the TCM. The fault code **is** stored immediately.

If the TCM requests torque reduction from the ECM for too long, then the ECM recognises that the signal is faulty and stores the Ignition Retard Request Duration fault code.

ENGINE CONTROL MODULE – P1775

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code **1775**	MIL illumination request from TCM	Proceed to pinpoint test **A I**

TEST STEP		RESULT	ACTION
AI	Perform an ignition cycle as follows: Switch ignition on Turn ignition switch to fully on Switch ignition off	OK	Proceed to **A2**
		Incorrect	Rectify and proceed to **A3**
A2	Interrogate TCM for stored fault codes	OK	Proceed to **A3**
		Faulty	Repair TCM and proceed to **A3**
A3	Clear fault and perform service drive cycle to verify fault cleared	OK	stop
		Fault still present	Proceed to **A4**
A4	Return to Symptom Chart and repeat diagnostic procedure	**OK**	stop
		Fault still present	Contact Jaguar Service Hotline

ENGINE CONTROL MODULE – P1776

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P1776	Ignition Retard Request Duration Fault	Perform service drive cycle to clear fault and re–scan, if fault still present proceed to pinpoint test A1
		Check harness and connectors (ECM & TCM) for condition / integrity, if faulty rectify and proceed to pinpoint test A4
		If fault not found proceed to pinpoint test A1

Pinpoint Tests

TEST STEP		RESULT	ACTION
A I	Check harness continuity CC 0481007 to PI 0471006	OK	Proceed to A2
		Open Circuity	Locate and rectify wiring fault, re–connect harness and proceed to A4
A2	Check harness insulation CC 0481007 to ground or Vbatt	OK	Proceed to A3
		Short circuit	Locate and rectify wiring fault, re–connect harness and proceed to A4
A3	Interrogate TCM for stored fault codes	OK	Proceed to A4
		Faulty	Repair TCM, re–connect harness and proceed to A4
A4	Clear fault and perform service drive cvcle to verify fault cleared	OK	Stop
		Fault still present	Proceed to A5
A5	Return to Symptom Chart and repeat diagnostic procedure	OK	Stop
		Fault still present	Contact Jaguar Service Hotline

5.2

ENGINE CONTROL MODULE

Group 25

P 0603

P 0605

ECM KEEP ALIVE MEMORY ERROR - P0603

Monitoring Procedure

The intent of the diagnostic is to detect malfunctions of the ECM due to corruption of the factory programmed settings. The ECM is programmed by storing a data value in two seperate memory locations. the locations are compared by the diagnogstic and if they do not match the data has been corrupted.

Note: Due to the nature of this diagnostic the ECM shuts down and will not communicate with the scan tool, hence the code is not accessible without the use of Jaguar Diagnostic Equipment.

Note: Where an ECM is renewed ensure only a correctly, 'PECUS' programmed unit, obtainable from Jaguar Dealerships, is fitted.

Symptom Chart

5.2

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0605	Control Module 'keep alive' memory errorFault	Fit new ECM and perform service drive cycle to verify fault cleared
		If fault still present refer to Jaguar Service Hotline

ECM ROM TEST ERROR - P0605

Monitoring Procedure

The intent of the diagnostic is to diagnose malfunctions in the ECM by monitoring the checksum. In this manner corrupted memory and program can be detected. The diagnostic can be minimally defined as; stored checksum does not equal calculated checksum.

Note: Due to the nature of this diagnostic the ECM shuts down and will not communicate with the scan tool, hence the code is not accessible without the use of Jaguar Diagnostic Equipment.

Note: Where an ECM is renewed ensure only a correctly, 'PECUS' programmed unit, obtainable from Jaguar Dealerships, is fitted.

Symptom Chart

CONDITION	POSSIBLE SOURCE	ACTION
Fault code P0605	Control Module Internal ROM Test Fault	Fit new ECM and perform service drive cycle to verify fault cleared
		If fault still present refer to Jaguar Service Hotline