CONSTANT ENERGY IGNITION

OPERATION *86.35.00*

A voltage signal generated by the reluctor and pick up assembly is interpreted by the amplifier which switches on and off the current flowing in the primary winding of the HT coils. When a reluctor tooth passes across the pick up limb, the magnetic field strength around the pick up winding is intensified creating a voltage in the winding. The rise and fall of this voltage is sensed by the amplifier and is used to trigger the output of the transistorised amplifier.

Two HT coils are incorporated on the V12 HE engines. The main coil primary winding is connected in parallel with the primary winding of the auxiliary coil. The HT section of the auxiliary coil is not used and the HT outlet is sealed.

The auxiliary coil enables the ignition system to achieve the required performance at high engine speeds under load.

There is no separate ballast resistor in the circuit. The amplifier controls the maximum current flowing in the primary circuit.

The fuel injection lead to the ECU and the lead to the tachometer are taken from the amplifier. The distributor incorporates the standard automatic advance system. The traditional cam and contact breaker are replaced by an antiflash shield, reluctor, and pick up assembly. The reluctor is a gear like component with as many teeth as there are cylinders to the engine and is mounted on the distributor shaft in place of the cam. The pick up consists of a winding around a pole piece attached to a permanent magnet, and is prewired with two leads teminating in a moulded two pin inhibited connector. During normal service the air gap between the reluctor and the pick-up does not alter and will only require re-setting if it has been tempered with. The normal setting is 0.20 to 0.35 mm (0.008 to .014 in).

The pick-up resistance should be 2 to 5 K ohms.

The amplifier assembly consists of a solid state electronic amplifier module, a zenor diode to protect the amplifier in the event of a current surge, a suppression capacitor and a moulding containing two resistors.

The amplifier is a sealed unit containing 'BERYLIA'.

WARNING: THIS SUBSTANCE IS EXTREMELY DANGEROUS IF HANDLED. DO NOT ATTEMPT TO OPEN THE AMPLIFIER MODULE.

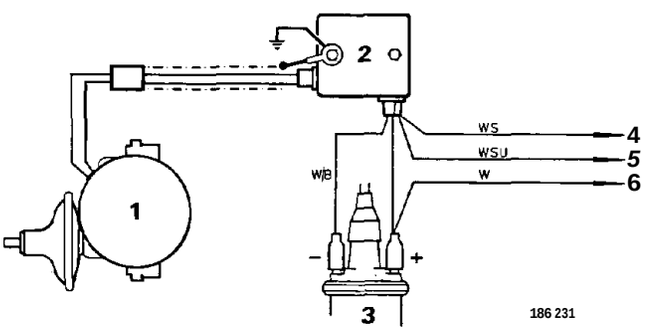


Fig 1

1 Distributor
2 Amplifier
3 HT Coil
4 To ECU
5 To Tachometer
6 To Ignition Switch

Ignition timing **5.3** Litre

P injection

A Emissions (USA) Pre 1983	25" – 27" BTDC.
A Emissions (USA) 1983 on	18" BTDC.
B Emissions (UK & Europe) Not HE	24" BTDC.
Engine hot at 3000 rev/min	
B Emissions (UK & Europe HE	18" BTDC
Vacuum pipe disconnected.	

Initial setting to start the engine only

A Emissions 9° + or – 1° BDTC
B Emissions 4" + or – 1° BTDC

Ignition Timing **3.6** Litre

Federal 18" BTDC at 2000 rev/min with vacuum pipe disconnected engine hot
European 21° BTDC at 2000 rev/min with vacuum pipe disconnected engine hot

FAULT FINDING

Test **1**

Check battery. A heavy discharge test applied to the battery terminals will determine whether the battery is capable of supplying the heavy currents required by the starter motor.
Check the specific gravity of the electrolyte in each cell. A variation of 0.040 in any cell means the battery is suspect.

Test **2**

Check for HT spark. Remove the HT lead from the centre of the distributor cap and position the end of the lead approximately 6 mm (0.25 in) from a good earth on the engine.
Crank the engine and if a spark is obtained, check the HT leads, spark plugs, distributor cover, and the rotor.

Test 3

With the ignition switched on. The voltage at the positive terminal of the MAIN coil 'C' should be 12 volts. If the voltage is below 11 volts check the wiring to/from the ignition switch.

Test 4

Disconnect the leads from the negative terminal of the MAIN coil. With the ignition switched on a 12 volt reading should be obtained from the negative terminal. A zero reading would indicate a faulty MAIN coil. If a 12 volt reading is obtained, reconnect the disconnected leads to the main coil and repeat Test 3 and 4 at the AUXILIARY coil.

Test 5

Disconnect the distributor pick-up leads from the amplifier. Measure the resistance of the distributor pick-up. It should be 2.2 to 4.8 K ohms. An incorrect reading indicates a faulty pick-up coil.

Test 6

Connect a voltmeter between the positive terminal of the battery and the negative terminal of the main coil. Switch on the ignition and the voltmeter should indicate a zero reading. Crank the engine and the voltmeter reading should rise to between 2 and 3 volts. If the voltmeter remains at zero the amplifier is suspect.

FRONT AND REAR PARKING LAMPS

CIRCUIT DESCRIPTION **86.40.00**

With the master light switch in the parking lamp on position current flows to the lamp via the switch contacts A and B, the bulb failure units and fuses. The current flowing through the bulb failure units will cause the bulb failure warning lamp to glow for 15 to 30 seconds. If the warning lamp fails to go out, then there is a bulb failure or a circuit fault in the front parking lamp, rear lamps, or number-plate lamps.

Fault Finding

Check the fuses and all connections, ensuring the earth connections are clean and tight.
With the master light switch in the parking lamp on position, battery voltage should be obtained at the B and the L terminals of the bulb failure unit.
If battery voltage is obtained at the B terminal but a zero reading at the L terminal replace the bulb failure unit.

HEAD AND FOG LAMPS

CIRCUIT DESCRIPTION **86.40.00**

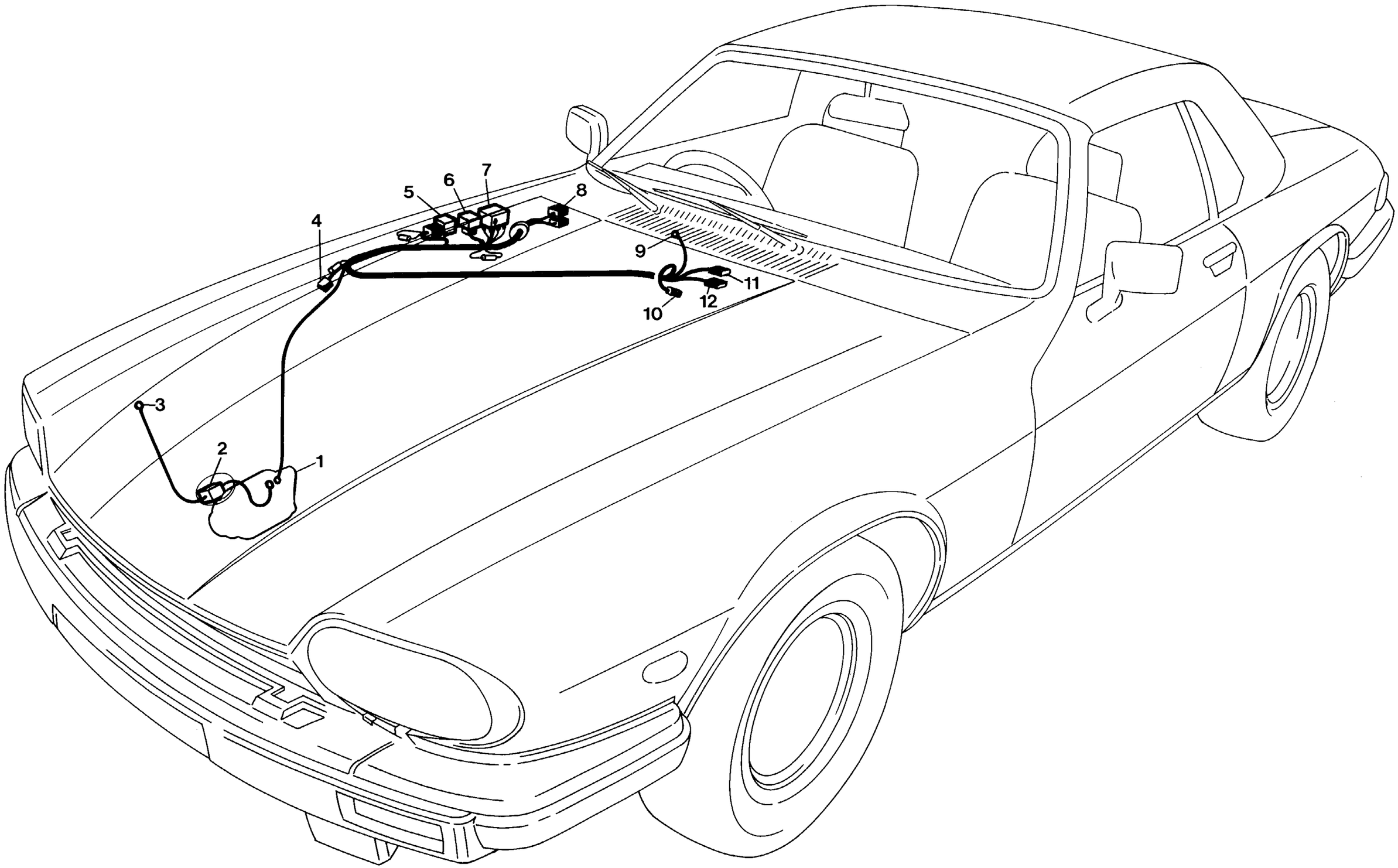
With the master light switch in the headlamp position the contacts are connected together in the main lighting switch to supply power to the headlamp relay. The headlamp flash switch activates the headlamp relay which in turn selects the main or dip headlamp filaments.
When the rear fog guard lamps are selected contacts are connected together to supply power to the rear fog guard lamps. The headlamp inhibit relay is also energised supplying current to the headlamp dip filaments only.

RH FORWARD HARNESS

Key to Diagram

1 Alternator
2 Load dump module
3 Earth point
4 Extra air valve relays
5 Air conditioning compressor relay
6 Stop lamp relay
7 Starter relay
8 To bulkhead harness
9 Battery feed post
10 Starter motor
11 Speed control actuator
12 Engine harness plug

RH FORWARD HARNESS



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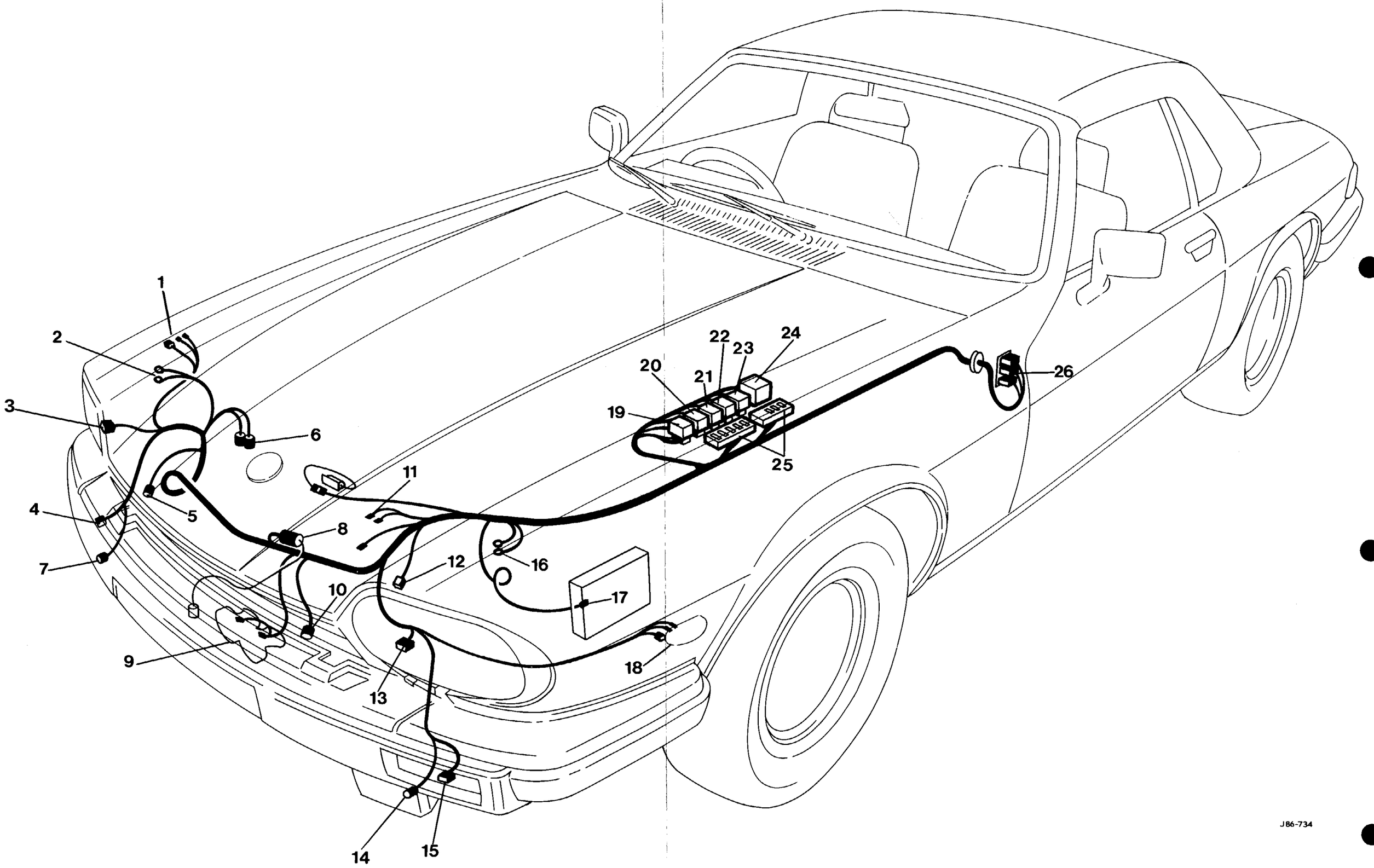
LH FORWARD HARNESS

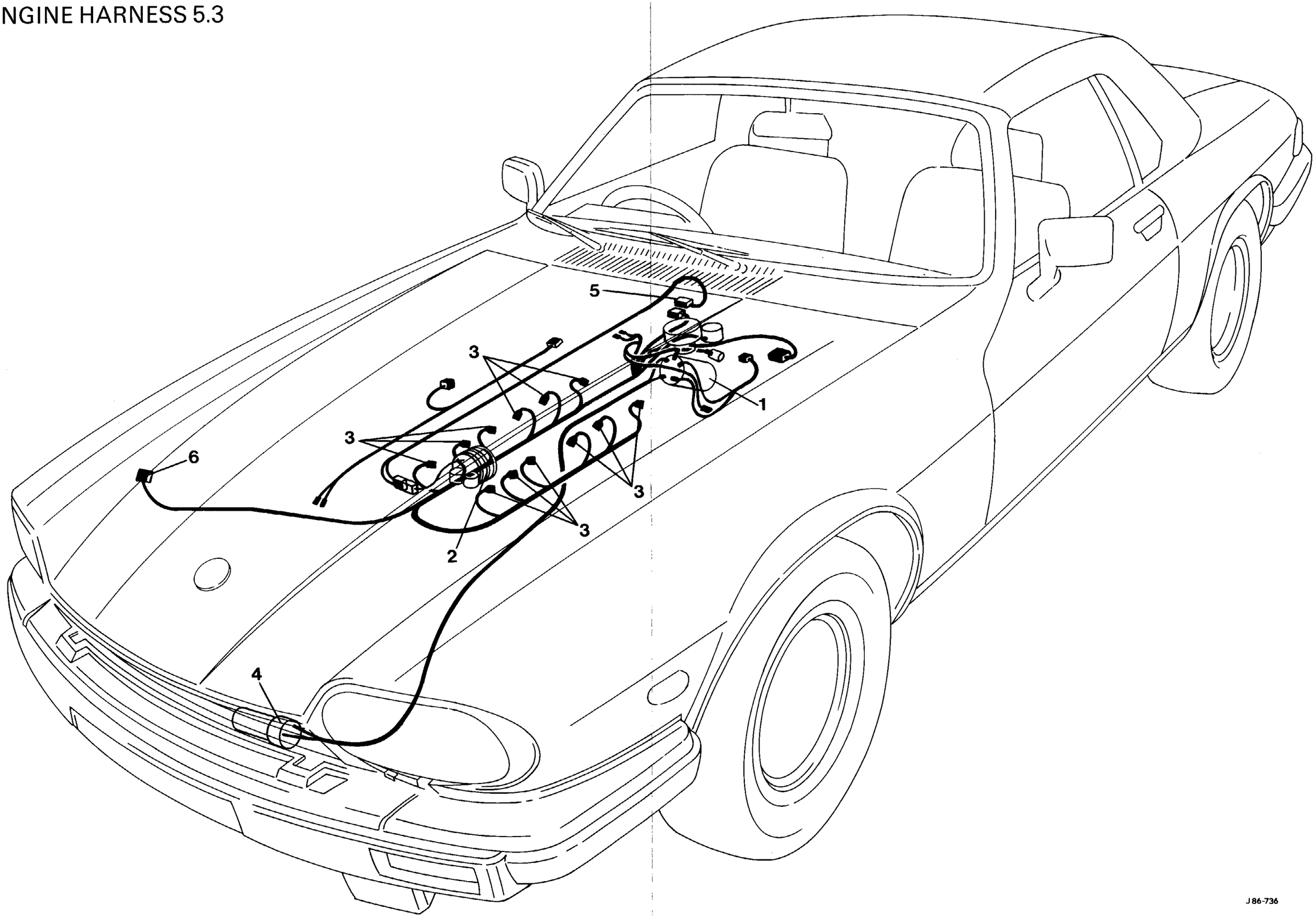


LH FORWARD HARNESS

Key to Diagram

1 RH side marker
2 Earth point
3 RH headlamp
4 RH side lamp
5 RH heated jets
6 Low level sensor
7 RH fog lamp
8 Ambient sensor
9 Horns
10 LH heated jet
11 Radiator fan terminal
12 To wash/wipe harness
13 LH headlamp
14 LH fog lamp
15 LH side lamp
16 Earth point
17 Low coolant probe
18 LH side marker
19 Ignition sense dim/dip relay
20 Side lamp sense dim/dip relay
21 Cooling fan diode pack
22 Horn relay
23 Cooling fan relay
24 Headlamp relay
25 Fuse boxes
26 To bulkhead harness

ENGINE HARNESS 5.3



ENGINE HARNESS 5.3

Key to Diagram

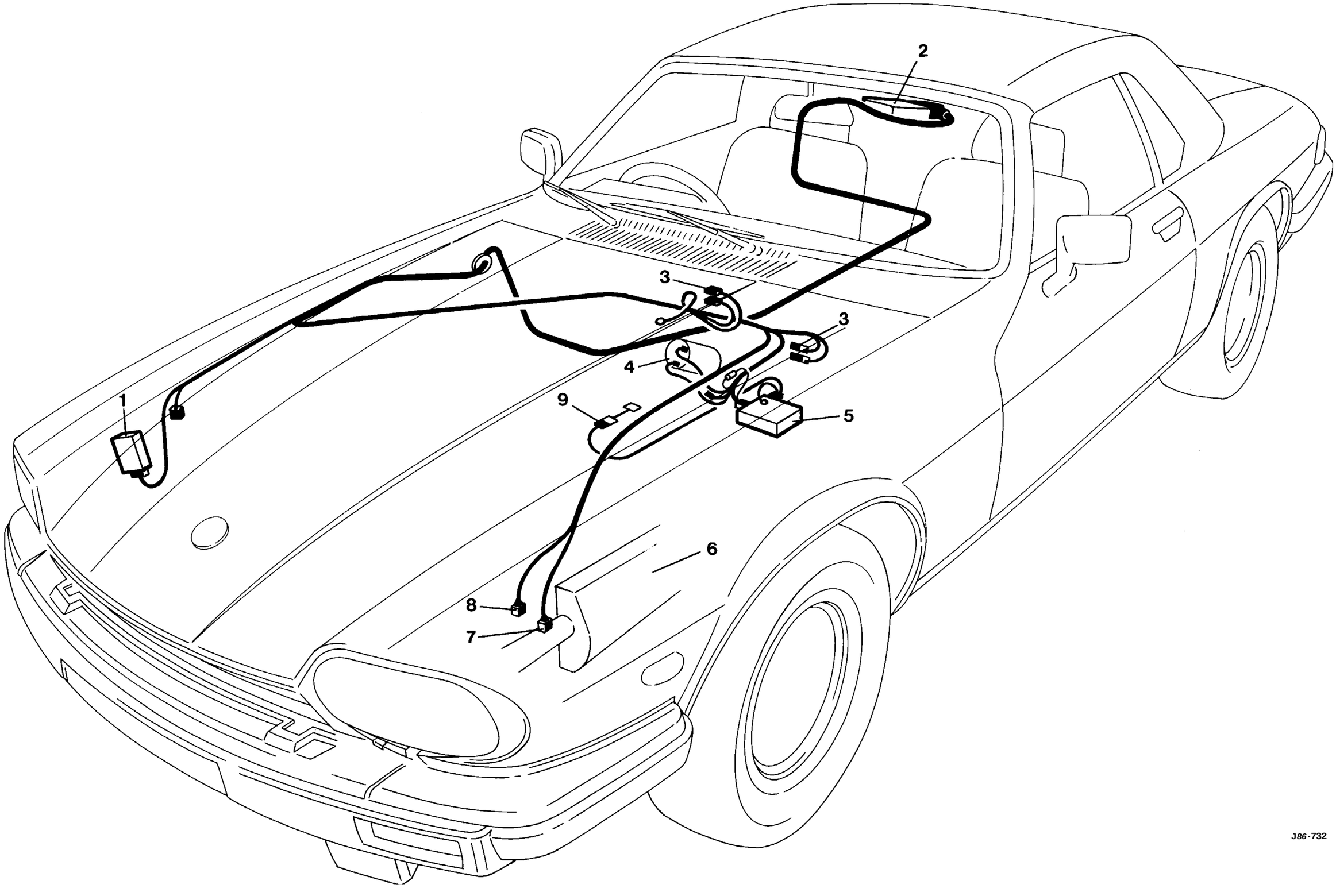
1 HT ignition coil
2 Speed control actuator
3 Injectors
4 Auxiliary coil
5 Throttle micro switches
6 Ballast resistor

FUEL INJECTION HARNESS 5.3

Key to Diagram

1 Ballast resistor
2 ECU
3 Micro switch
4 HT coil
5 Ignition amplifier
6 Air filter
7 Air temperature sensor
8 Coolant temperature sensor
9 Distributor

FUEL INJECTION HARNESS 5.3

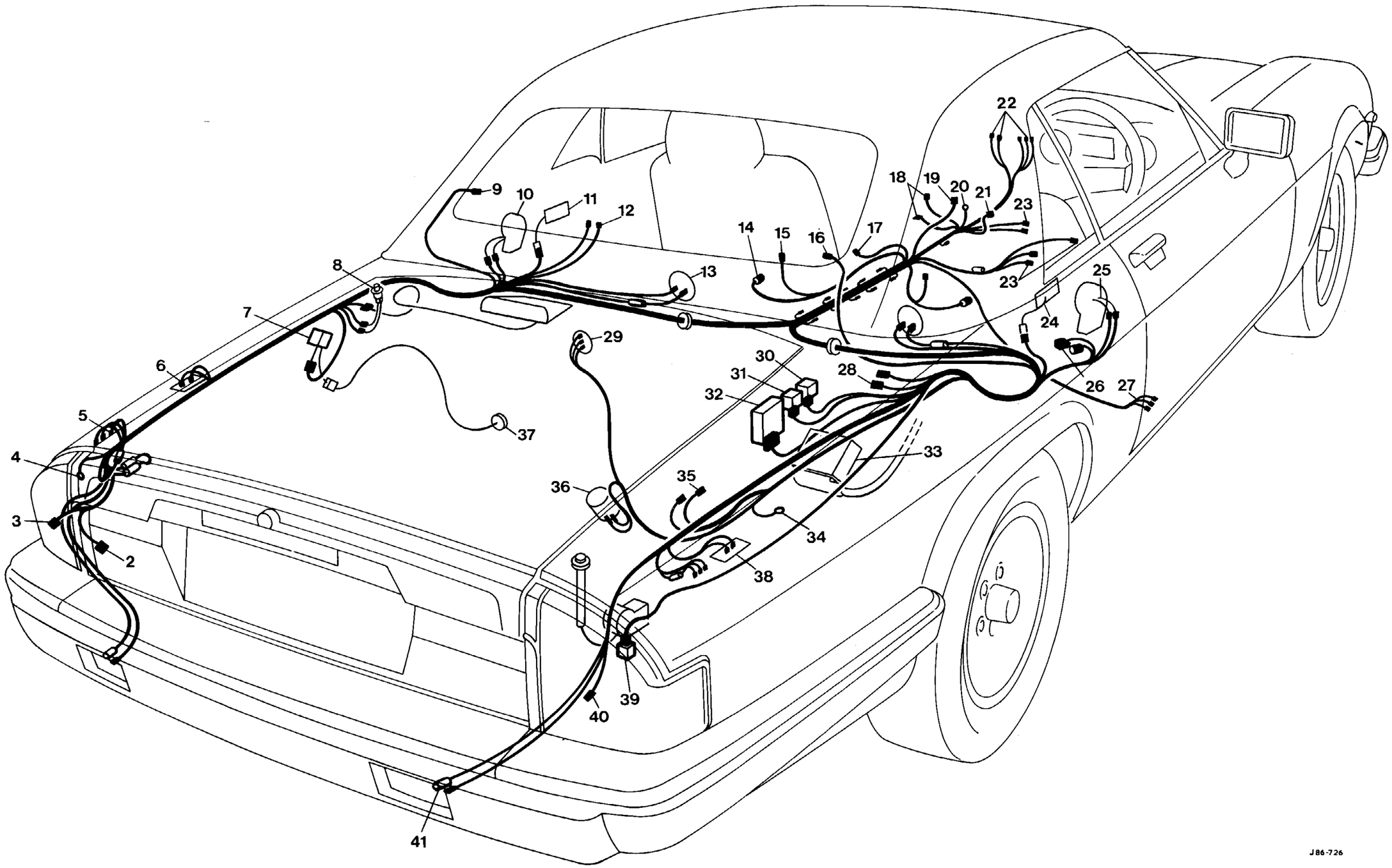


REAR HARNESS 5.3

Key to Diagram

1 LH rear fog lamp
2 Caravan socket
3 Rear lamp
4 Earth point
5 Tail lamp bulb failure sensor
6 Boot lamp
7 Speed interface unit
8 Boot lamp switch
9 Heated rear screen
10 Quarter light motor
11 Interior lamp
12 Heated rear screen disable switch
13 Speaker
14 Seat heater
15 Lumbar motor
16 Heated rear screen
17 Seat belts
18 Seat switch
19 Hoof lift switch
20 Earth point
21 Seat switch
22 Speakers
23 To bulkhead harness
24 Interior lamp
25 Quarter light motor
26 To hood lift harness
27 Handbrake switch
28 To boot lid harness
29 Fuel gauge transmitter
30 Fuel pump relay
31 Fuel injection main relay
32 Fuel interface module
33 Fuel injection ECU
34 Earth point
35 Battery leads
36 Fuel pump
37 To rear axle speed sensor
38 Boot lamp
39 Aerial delay unit
40 Rear lamp
41 RH rear fog lamp

REAR HARNESS 5.3



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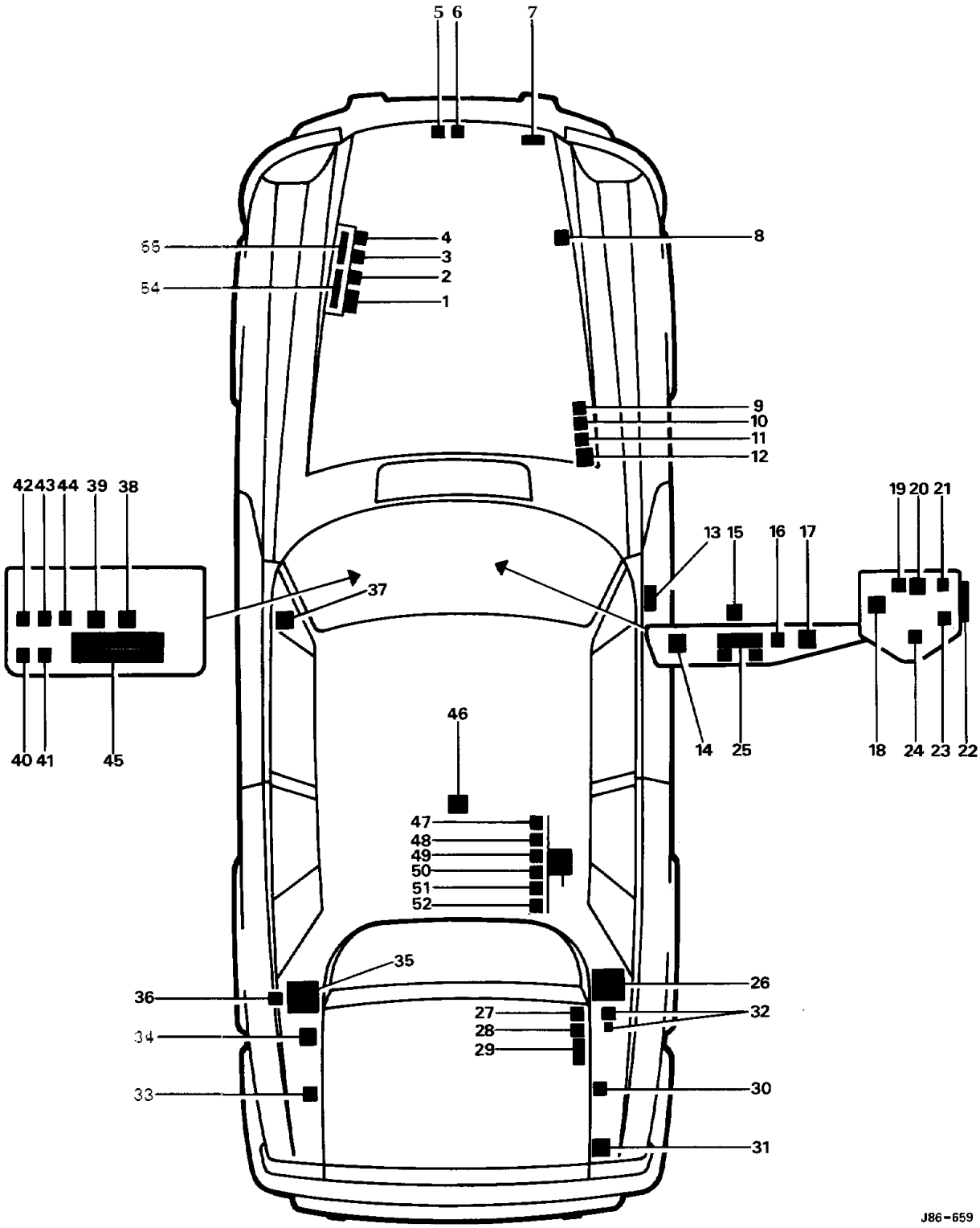
COMPONENT LOCATION 5.3 LHD

Key to Diagram

1 Headlamp relay
2 Cooling fan relay
3 Horn relay
4 Cooling fan diode pack
5 Anti stall relay
6 Anti stall relay
7 Ballast resistor
8 Load dump module
9 Air conditioning compressor relay
10 Feedback inhibit relay
11 Stop light relay
12 Starter relay
13 Door lock control unit (Kiekert)
14 Vacuum delay unit
15 Windscreen wiper delay unit
16 ABS pump relay
17 Interior light delay unit
18 Seat heater delay unit
19 Window lift relay
20 Seat belt logic unit
21 Bulb failure unit
22 Low coolant warning control unit
23 Window lift thermal circuit breaker
24 Bulb failure unit
25 Auxiliary fuse box
26 Fuel injection electronic control unit
27 Fuel pump relay
28 Fuel injection main relay
29 Fuel interface unit
30 Rear lamp bulb failure unit
31 Aerial delay unit
32 Feedback monitor sockets
33 Rear lamp bulb failure module
34 Speed control interface module
35 ABS control unit
36 ABS main relay
37 Inertia switch
38 Heated seat relay
39 Heated rear window delay unit
40 Lumbar support relay
41 Fog light relay
42 Flasher unit
43 Warning light check unit
44 ABS pump relay
45 Main fuse box
46 Stoplight bulb faiure module
47 Quarter light down relay
48 Quarter light up relay
49 Hood down relay
50 Hood up relay
51 Quarter light down relay
52 Quarter light up relay
53 Hood electronic control unit
54 Headlamp fuse box B
55 Headlamp fuse box A

COMPONENT LOCATION 5.3 LHD

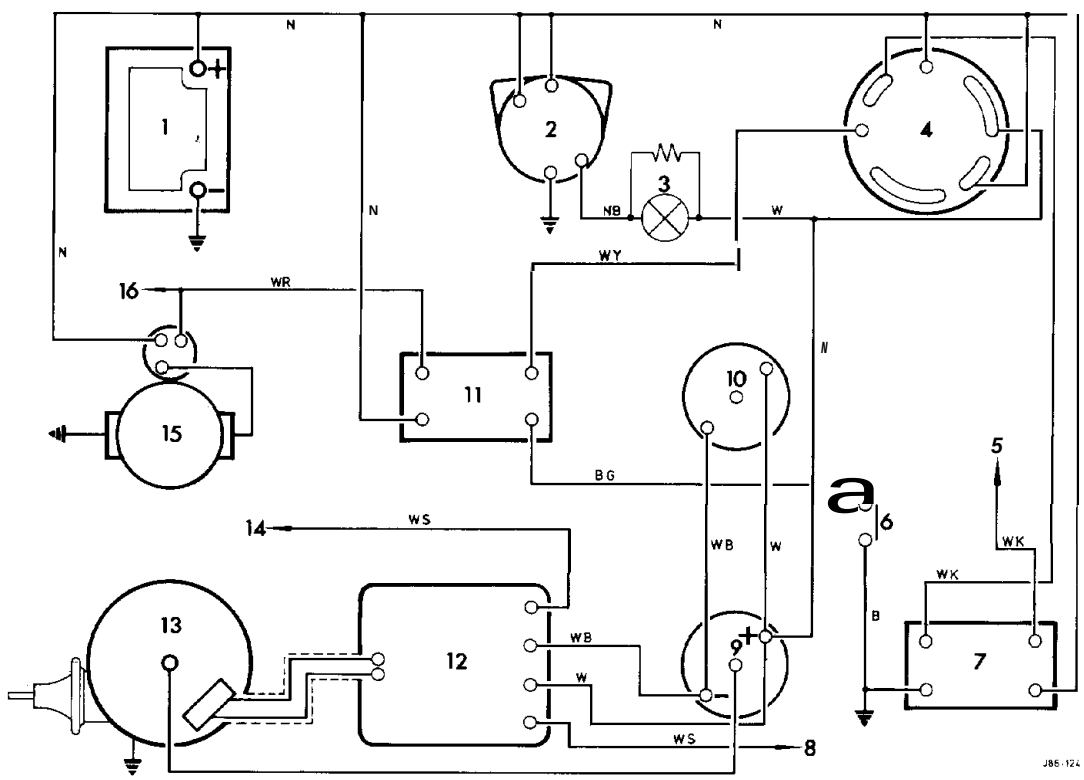


IGNITION, ALTERNATOR AND STARTER SYSTEMS 5.3

Key to Diagram

1 Battery
2 Alternator
3 Warning light
4 Ignition switch
5 To fuse No 12
6 Automatic gearbox safety switch
7 Ignition protection relay
8 To tachometer
9 Main HT coil
10 Auxiliary coil
11 Starter relay
12 Amplifier
13 Distributor
14 To ECU
15 Starter motor
16 To ECU

IGNITION, ALTERNATOR AND STARTER SYSTEMS 5.3



IGNITION SYSTEM 5.3

Key to **Diagram**

A **Distributor**
B **Amplifier**
C HT coil
D **Auxiliary coil**
G **Ignition switch**
E To ECU
F To **tachometer**

IGNITION SYSTEM **5.3**