

Saab 9000

SERVICE MANUAL

**3:2 Electrical system,
system diagrams
operation and
fault-tracing**
M 1991

Power supply

Engine electronics

Lighting systems

Windscreen and headlamp wipers

Instruments and warning systems

Heating and ventilation systems

Other systems

Accessories

List of components

Units

The basic and derived units used throughout the Service Manual are in accordance with the SI system. (Système International d'Unités)

For users not familiar with the SI units, some non-Continental units are given in brackets after the respective SI unit.

The following symbols and abbreviations are used:

| SI unit | Equivalent unit and symbol |
|------------------|---|
| Millimeter (mm) | inch (in) |
| Kilogramme (kg) | pound (lb) |
| Newton (N) | pound-force (lbf) |
| Newtonmeter (Nm) | foot pound (ft lb) |
| Atmosphere (bar) | pound-force per square inch (lbf/in ²) (Also abbreviated: psi) |
| Liter (l) | US liquid quart (liq qt) (Also abbreviated: qts) |
| | US gallon (USgal) |
| °Celcius (°C) | °Fahrenheit (°F) |

Conversion factors

| | |
|-------------------------|----------------------------------|
| 1 in = 25.4 mm | 1 mm = 0.039 in |
| 1 lb = 0.45 kg | 1 kg = 2.20 lb |
| 1 lbf = 4.45 N | 1 N = 0.23 lbf |
| 1 lbf ft = 1.36 Nm | 1 Nm = 0.74 lbf ft |
| 1 psi = 0.07 bar | 1 bar = 14.5 lbf/in ² |
| 1 US liq qt = 0.83 UKqt | 1 l = 1.05 liq qt |
| | 1 USgal = 0.83 UKgal |
| °F = °C x 9/5 + 32 | °C = (°F - 32) x 5/9 |

Market codes

The codes refer to market specifications

| | | | |
|----|-------------|----|---------------|
| AT | Austria | GB | Great Britain |
| AU | Australia | GR | Greece |
| BE | Belgium | IS | Iceland |
| CA | Canada | IT | Italy |
| CH | Switzerland | JP | Japan |
| DE | Germany | ME | Middle East |
| DK | Denmark | NL | Netherlands |
| ES | Spain | NO | Norway |
| EU | Europe | SE | Sweden |
| FE | Far East | US | USA |
| FI | Finland | UC | US California |
| FR | France | | |

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Introduction

This Service Manual deals with the electrical system of the 1991 Saab 9000 and is a supplement to Group 3:1 of the Service Manual, dealing with the Electrical system and instrumentation.

The purpose of the Manual is to facilitate fault-tracing and service work on the electrical system of the car. So each electrical sub-system, such as the ignition system, hazard warning lights, etc., is described individually, and a separate wiring diagram is shown for each sub-system. Each such diagram is an extract from the comprehensive wiring diagram for the car.

The list of the electrical components of the car is included at the end of the Manual. Comprehensive diagrams for the entire electrical system of the car are presented in a separate manual, Group 3:4.

Note

Follow the instructions when fitting extra equipment. Failure to do so may result in maloperation of the electronic and control units, which may even sustain serious damage.

This Manual is applicable to cars delivered to all markets. Note that certain cars delivered to the European market, for instance, may be equipped in accordance with the "USA specification".

Safety instructions

Caution – arcing may cause injuries.

Although the system voltage is only 12 V, injuries may be caused by flash-over or fire in the car, since the energy content of the battery is very high. Short-circuit may give rise to very high currents.

Caution – high voltage.

The ignition system of the car is of electronic type, operating at voltages of more than 30 000 V. This voltage may be fatal to persons with a weak heart and persons who have a pacemaker. So treat the entire ignition system with great caution.

Before starting work on the electrical system:

- Take off your wrist-watch and any rings you may be wearing.
- Disconnect one terminal of the battery if any electrical components are to be removed.
- Always follow the instructions and recommendations in the Service Manual, Group 3:1, Electrical system, Instruments.

Wiring diagrams

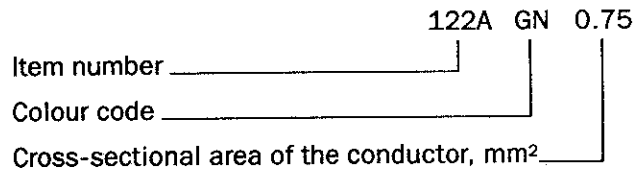
Each wiring diagram generally consists of two spreads, i.e. a total of four pages. A typical example of a wiring diagram, explanations of the symbols used, etc. are shown on the next spread.

On the first spread, the wiring diagram for the relevant sub-system is shown on the left-hand side, and a brief description of the operation as well as fault-tracing hints are given on the right-hand side.

The second spread shows how the relevant cables are run in the car and where the electrical components are located. In addition, a picture is shown of each of the electrical components involved in the sub-system. Whenever necessary, a supplementary description of the location of each component is given on the left-hand side of the spread.

Cable codes

As a general rule, each cable in the electrical system of the car has a code consisting of three parts, as illustrated by the example below:



Item number. Every cable is designated by a unique number, which is usually followed by a letter designation. Cables with the same number, e.g. 122, 122A, 122B, etc. normally belong to the same sub-system.

Colour code. The following colour codes are used in the wiring diagrams as well as in the comprehensive diagrams. The colour codes can also be used in various combinations, e.g. BL/RD, GL/VT, etc.

| Code | Colour |
|------|--------|
| BU | Blue |
| BN | Brown |
| YE | Yellow |
| GN | Green |
| GY | Grey |
| OG | Orange |
| PK | Pink |
| RD | Red |
| BK | Black |
| VT | Violet |
| WH | White |

Cross-sectional area of the conductor. The cross-sectional area of the conductor is specified in mm². The current that the cable is capable of carrying is dependent on the cross-sectional area of the conductor.

Abbreviations

The Manual includes the following abbreviations:

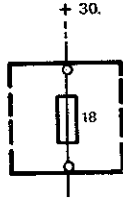
| | |
|--------|---|
| AB | Airbag |
| ABS | Anti-lock Brake System |
| AC | Air Conditioning |
| ACC | Automatic Climate Control |
| AIC | Automatic Idling Control |
| APC | Automatic Performance Control |
| AUT | Automatic transmission |
| BT | Belt Tensioner |
| D | Driver |
| DCC | Driver/Co-driver Computer |
| DI | Direct Ignition system, in which each spark plug is connected directly to its own ignition coil |
| EAS | Electrically adjustable seat |
| EASM | Electrically adjustable seat with memory |
| EDU | Electronic Display Unit |
| EEH | Electric Engine Heater |
| EM | Electrically-operated rear-view Mirrors |
| ETS | Electronic throttle control |
| EZK | Elektronische Zündung mit Klopfkontrolle (Breakerless ignition system with knock sensor) |
| GEH | Gasoline Engine Heater |
| I | Injection engine |
| I16 | Car with 16-valve injection engine |
| I16λ | Car with 16-valve injection engine with catalytic converter |
| ISAT | Intelligent SAab Tester |
| LH | Luftmassenmesser Hitzdraht (Air-mass meter with hot-filament sensor) |
| LHD | Left-hand drive |
| LHF | Left-hand front |
| LHR | Left-hand rear |
| LHS | Left-hand side |
| MAN | Manual gearbox |
| P | Passenger, co-driver |
| RHD | Right-hand drive |
| RHF | Right-hand front |
| RHR | Right-hand rear |
| RHS | Right-hand side |
| SRS | Supplemental Restraint System (Airbag) |
| T16 | Car with 16-valve Turbo engine |
| T16λ | Car with 16-valve Turbo engine with catalytic converter |
| TC/ABS | Traction Control/Anti-lock Brake System |
| TCS | Traction Control System, anti-spin system |
| TSI | Timing Service Instrument |
| 4-D | 4-door model |
| 5-D | 5-door model |

6 Introduction

Using the sub-system wiring diagram

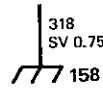
An example of two spreads for a sub-system – in this case the interior lighting with time delay – is shown below, together with explanations of the designations used, etc.

Unless otherwise specified, switches are shown in un-actuated condition and relays in de-energised condition.



In the sub-system diagrams, every sub-system is generally shown from the relevant fuse in the electrical distribution box, up to each consumer or sub-system, and then to the earthing point (chassis connection).

The supply to each fuse is shown separately in the section entitled "Positive supply", which also deals with the electrical distribution box, ignition switch, etc.



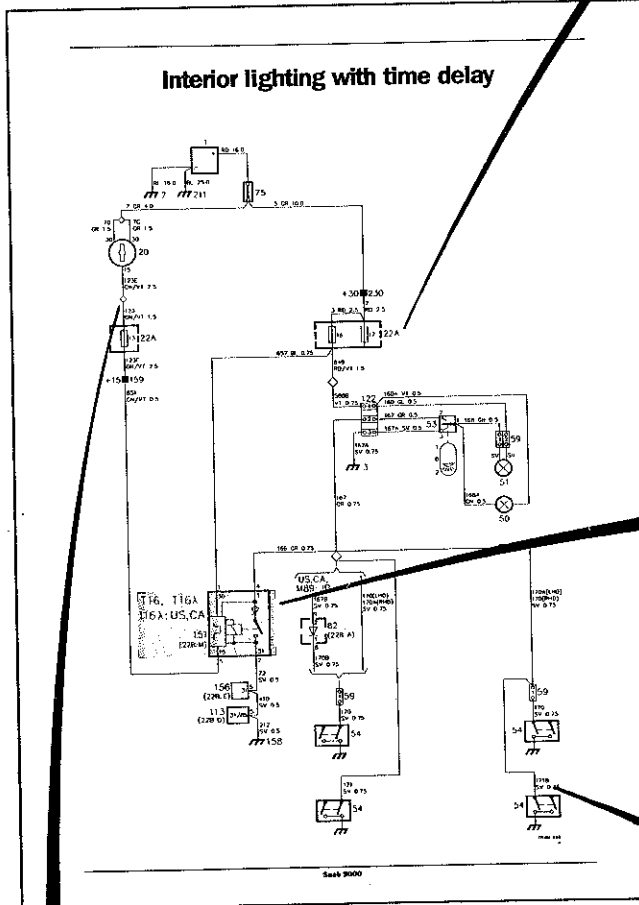
If +30, for instance, is written above fuse, the supply from the battery to particular fuse is shown in the section entitled "Positive supply +30".

Most of the earthing points in the various earthing points in each diagram marked with the appropriate number component numbers are specified in a section entitled "Earth connections".

Component number. Every component has an identity number adjacent to the symbol for the relevant component on the wiring diagram. The same number is also used in the comprehensive diagram for the car. In addition, the component number is given:

- in the description of the location of the component
- at the place in the car where the component is located
- on the appropriate exterior picture of the component.

Spread 1



Operation

The interior lighting system of cars for certain markets and models includes relay 151 which provides a time delay.

The supply to the lighting is taken from fuse 16, while time-delay relay 151 is supplied from fuses 16 and 13.

When the interior lighting is switched on by a door being opened or a switch being operated, the relay will be energised, since its terminal T will be earthed. When the circuit is then opened by the door being closed or the switch being opened, the interior lighting will stay alight. This is due to the fact that the delay circuit of the relay will keep the earth connection closed across contacts T and 31.

The time delay is about 15 seconds, but will be interrupted if the ignition switch is turned to the drive position. A positive voltage will then be applied to terminals 15 and 30, thus de-energising the relay and opening the earth circuit across contacts T and 31.

Fault-tracing hints

1. Check fuse 16 and check that the supply to it is live.
2. Check lamps 50 and 51 and check that the supply to them is live.
3. Check that terminal 30 of relay 151 is live.
4. Set the ignition switch to the drive position. Check fuse 13 and check that the supply to it is live.
5. Check that the supplies to switch 53 and to terminal 15 of the relay are live.
6. Check the door switches, connectors, wiring and earth connections.

Components and cables within a marked area denotes that these are only available on a special market or on a particular model. The market is indicated by an abbreviation, e.g. CA stands for Canada, as shown in the abbreviations list on page 2.

The cable code consists of:

- Item number of the cable (see under the heading "Cable codes", on the preceding spread)
- Colour code of the cable, consisting of letter combinations in accordance with the table on the preceding spread
- Cross-sectional area of the conductor in mm²

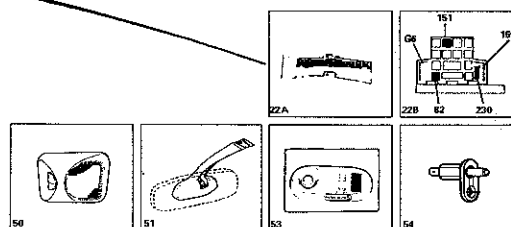
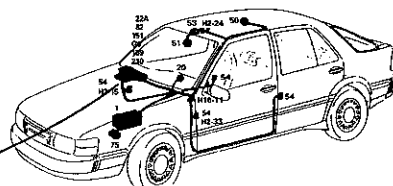
◇ = crimped connection/branch-off point directly in the cable harness.

Spread 2

Locations of components

- 1 Battery on the left-hand side of the engine compartment
- 20 Ignition switch on the right-hand side of the steering column
- 22A Fuse board behind the access panel in the glove compartment
- 50 Roof lamp, centre in the centre of the roof
- 51 Roof lamp, front at the inner rear-view mirror
- 53 Switch, interior lighting in the roof console, at the inner rear-view mirror
- 54 Door switch for the interior lighting one in each door frame
- 75 Distribution block in the engine compartment, forward of the cylinder
- 82 Seat belt/ignition switch warning relay in the electrical distribution box behind the glove compartment (22B A)
- 151 Time-delay relay for the interior lighting in the electrical distribution box behind the glove compartment (22B M)
- 159 Distribution terminal +15 in the electrical distribution box behind the glove compartment
- 230 Distribution terminal +30 in the electrical distribution box behind the glove compartment
- G2 Earthing point on the left-hand wheel housing
- G6 Negative distribution terminal in the electrical distribution box behind the glove compartment
- G8 Earthing point in the fascia at the left-hand front speaker opening
- G25 Earthing point on the gearbox
- H2-15 2-pole connectors in the right-hand A pillar
- H2-24 under the roof console at the rear-view mirror
- H2-33 in the left-hand A pillar
- H10-11 10-pole connector at the extreme left, under the fascia (behind the knee shield)

Components



Saab 9000

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Using a universal instrument for fault-tracing

Measuring equipment

A voltmeter and an ohmmeter are suitable instruments for fault-tracing in the car.

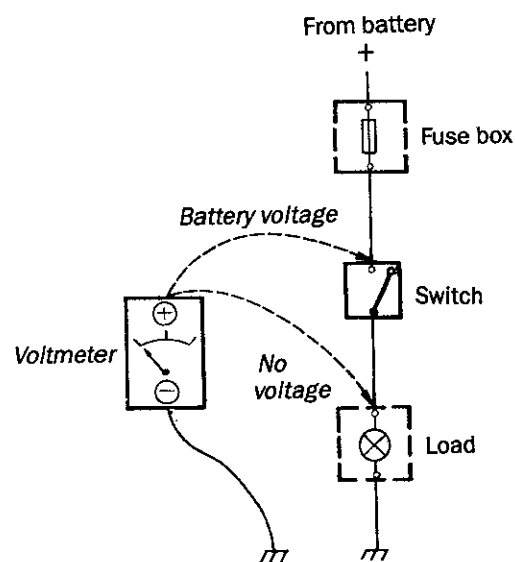
Use a voltmeter for measuring the voltage at various points in a circuit. If the voltmeter is of analog type, it should have an internal resistance of at least 20 000 ohm/V.

The ohmmeter is used for carrying out measurements in cable harnesses and on connectors, switches and contacts. An ohmmeter should not be used for measurements on components or relays containing semi-conductors, such as control units, time delay relays, etc.

Since the ohmmeter incorporates a battery which energises the circuit to be measured, the battery of the car should be disconnected while measurement is in progress. This will ensure that no current is already flowing through the relevant circuit and that the correct reading will be obtained.

Voltage measurement

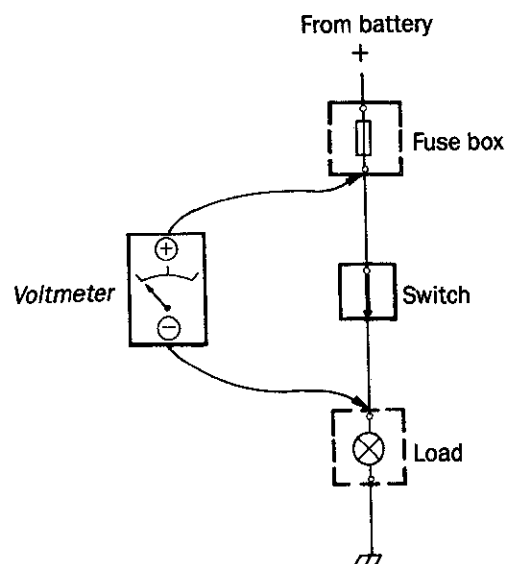
1. Connect the negative lead of the voltmeter to a reliable earthing point in the car or directly to the negative pole of the battery.
2. Connect the positive lead of the voltmeter to the point in the circuit at which you wish to measure the voltage.
3. If a reading is obtained on the voltmeter, this indicates that current is flowing to the relevant point. The voltage reading should not deviate by more than 1 volt from the measured battery voltage. If the deviation is greater than 1 volt, this indicates a fault. One of the reasons may be poor contact at a connection to some component or in a connector. Carry out further measurements in the circuit to pin-point the location of the fault.



Checking the voltage drop

This measurement is carried out to determine whether the voltage drop is too high, e.g. along a cable or across a switch.

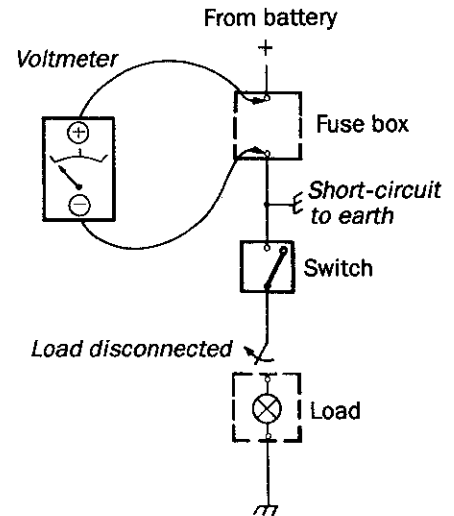
1. Connect the positive lead of the voltmeter to the end of the cable or the side of the switch which is nearest to the battery.
2. Connect the negative lead of the voltmeter to the other end of the cable.
3. When the circuit is energised, i.e. when current flows through it, the voltmeter will show the difference in voltage between the two points. If the circuit is in good condition, the voltage drop should not be greater than about 1 V. In simple circuits, such as across connectors and short cables, the voltage drop should not exceed about 0.5 V.



Checking for short-circuit to earth

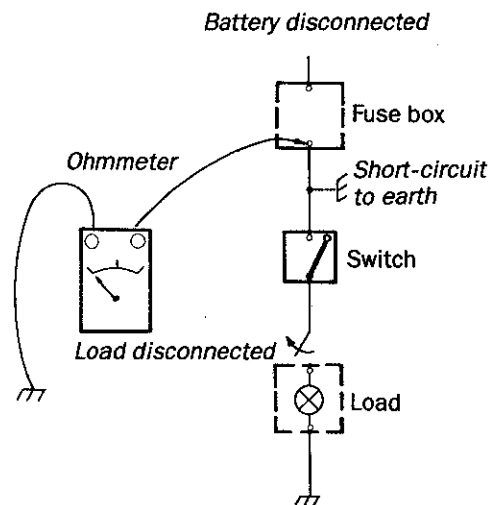
Using a voltmeter

1. Remove the fuse which has blown and disconnect the load.
2. Connect the voltmeter across the fuse terminal pins in the fuse box.
3. Move the relevant cable harness while observing the voltmeter. Start at the electrical distribution box and then continue out towards the relevant components/load. If a voltmeter reading is obtained, this indicates that the cable is short-circuited to earth.



Using an ohmmeter

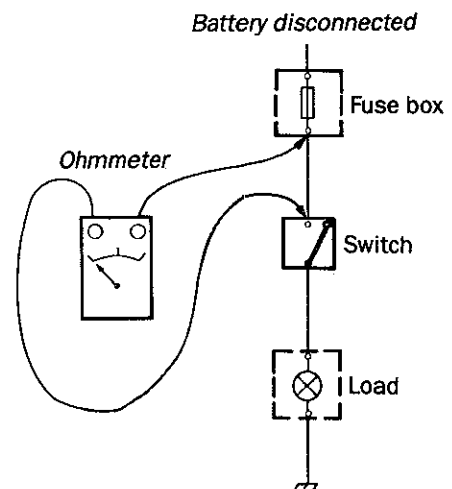
1. Hold the ohmmeter leads in contact with one another. Adjust the ohmmeter until the reading is 0 ohm.
2. Remove the fuse which has blown, and disconnect the load and the battery.
3. Connect one of the ohmmeter leads to the fuse terminal pin on the load side.
4. Connect the other ohmmeter lead to a reliable earthing point in the car.
5. Move the relevant cable harness while observing the ohmmeter. Start at the electrical distribution box and then move out towards the appropriate components/load. If the ohmmeter reads infinite resistance, there is no short circuit. On the other hand, if it reads low resistance or none at all, this indicates that the cable is short-circuited to earth.



Checking for open-circuit

Use an ohmmeter.

1. Hold the ohmmeter leads in contact with one another. Adjust the ohmmeter until the reading is 0 ohm.
2. Disconnect the battery of the car.
3. Connect one lead of the ohmmeter to one end of the cable to be tested.
4. Connect the other ohmmeter lead to the other end of the cable.
5. If the ohmmeter reads a low resistance or none at all, this indicates that the cable is in good condition.



Diagnostic and test sockets

The cars are equipped with a number of diagnostic and test sockets for connection to special diagnostic and test equipment for testing and fault tracing.

Engine electronics

The following diagnostic and test sockets are provided for checking the fuel and ignition systems:

73 TSI socket

The tapping is intended for a special ignition timing service instrument and has the following terminals:

1. Positive supply directly from the battery across distribution block 75.
2. Earth.
3. The solenoid (terminal 50) on starter motor 4.
4. Positive supply from the ignition switch when in the drive position (across fuse 13).
5. Ignition pulses from control unit 176 for EZK (I16, I16λ 2.0)/control unit 343 for DI (I16, I16λ 2.3)/control unit 343 for DI-APC (T16, T16λ.)
6. Spare.

145 Test tapping for the EZK system

The tapping is intended for special test equipment and has the following terminals:

1. Earth.
2. Positive supply from the ignition switch when in the drive position (across fuse 13).
3. Signal from pin 3 of the ignition system control unit (CHECK ENGINE function).
4. Connected to pin 15 of the control unit.

204 Test connector for the LH injection system

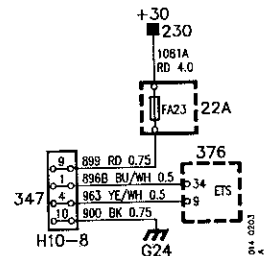
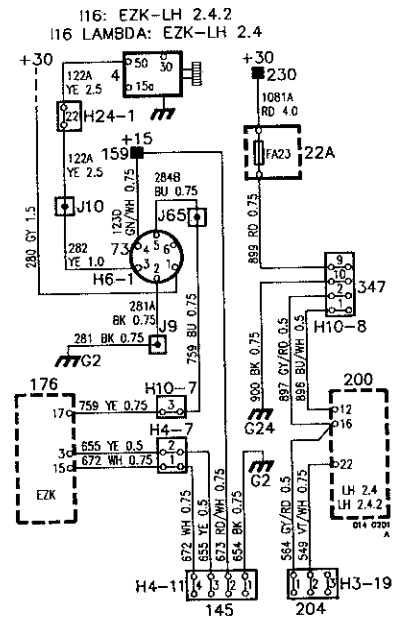
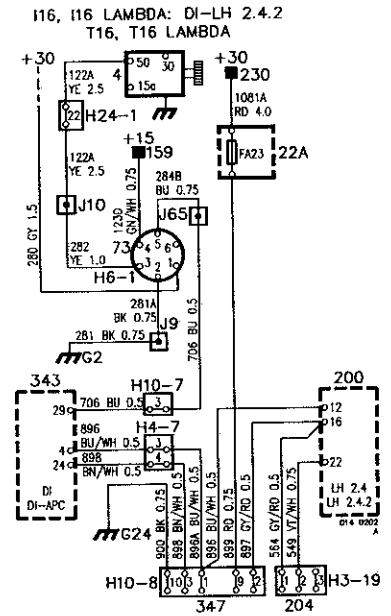
The connector has connections for checking:

1. Flashing codes on the CHECK ENGINE lamp when the pin is earthed.
2. Flashing codes on an external lamp.
3. Unused.

347 Test socket for diagnostic test

The test socket is black and is intended for connecting the ISAT for diagnosis on:

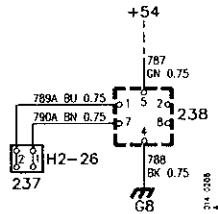
LH fuel system, DI ignition system, APC/DI, ETS electronic throttle control system.



Car electronics

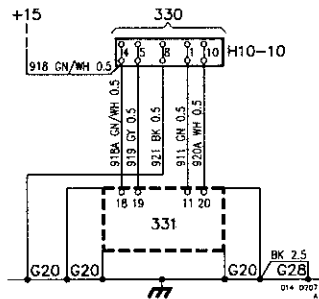
Seat-belt tensioner

Test tapping 237 is intended for inspection in production and must not be used for service fault-tracing.

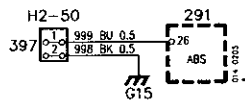


Airbag

Test connector 330 is provided for connecting the SRS system test equipment for the airbag. If faults are indicated, the fault codes are stored in the memory of the diagnostic unit. These codes can be read on the test equipment.



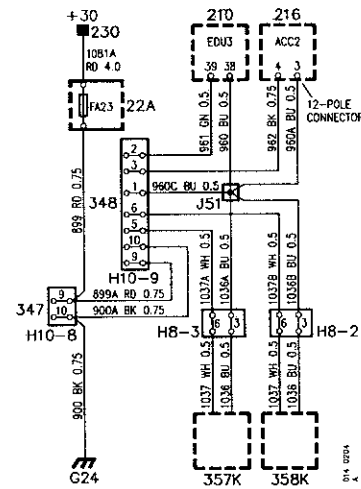
ABS



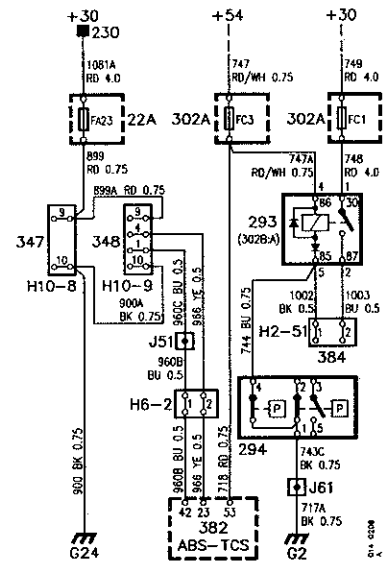
348 Test socket for diagnostic testing

The test socket is green and is intended for connecting the ISAT for diagnosis on:

- EDU1/EDU2 Electronic Display Unit
- ACC2 Automatic Climate Control system
- EASM Electrically Adjustable Seat with Memory
- TC/ABS Traction control/Anti-lock brake system (anti-lock brake system with anti-spin system)



TC/ABS

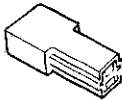
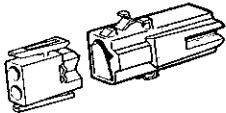
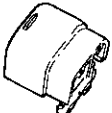
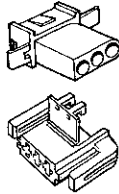
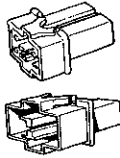
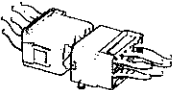
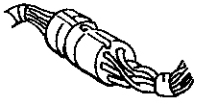
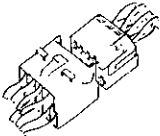
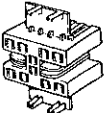
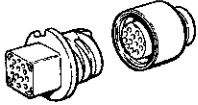
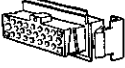
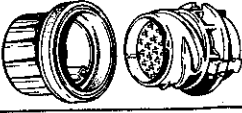


12 Introduction

Connectors

The table below shows examples of the connectors used in the car. NOTE: Connectors located in the

engine compartment must be of splash-proof design.

| Component number | Number of pins | Appearance | |
|------------------|----------------|--|---|
| | | Not splash-proof | Splash-proof |
| H1 | 1 |  | |
| H2 | 2 |  |  |
| H3 | 3 |  | |
| H4 | 4 | | |
| H6 | 6 |  |  |
| H7 | 7 |  | |
| H8 | 8 |  | |
| H10 | 10 |  | |
| H12 | 12 |  | |
| H22 | 22 |  | |
| H24 | 24 | |  |

Locations of the connectors

Single-pole connectors

| | |
|------|--|
| H1-1 | On the AC compressor connection, at the extreme front to the right, above the manifold |
| H1-2 | In the right-hand front door |
| H1-3 | In the left-hand front door |
| H1-4 | Under the centre console, at the gear selector lever |
| H1-5 | In the roof console, at the rear-view mirror |
| H1-6 | In the roof console, at the rear-view mirror |
| H1-7 | In the engine compartment, beside the battery |
| H1-8 | In the engine compartment, behind the bulkhead, to the right |
| H1-9 | Under the facia, to the left of the steering column (electronics bracket) |

2-pole connectors

| | |
|-------|--|
| H2-1 | At the coolant expansion tank |
| H2-2 | In the engine compartment, to the left, at the bulkhead |
| H2-3 | On the inside of the grille, to the left, at the left-hand headlamp |
| H2-4 | At the radiator fan motor |
| H2-5 | In the left-hand front wing, at the horn |
| H2-6 | In the electrical distribution box behind the glove compartment, at the seat-belt warning relay (FE:LHD) |
| H2-7 | Adjacent to the ventilation fan motor 199 |
| H2-8 | Adjacent to the ventilation fan motor |
| H2-9 | In the centre console, under the front ash-tray (ME) |
| H2-10 | At the washer fluid reservoir |
| H2-11 | At the windscreen wiper motor |
| H2-12 | In the engine compartment, to the left of the brake fluid reservoir |
| H2-13 | In the right-hand front door |
| H2-14 | In the right-hand front door |
| H2-15 | In the right-hand A pillar |
| H2-16 | At the locking mechanism, inside the right-hand front door |
| H2-17 | Adjacent to the heater control panel |
| H2-18 | In the engine compartment, at the windscreen wiper motor |
| H2-19 | Under the facia, to the left of the steering column |
| H2-21 | Above the pedal bracket, at the pedal switches |
| H2-22 | At the left-hand side direction indicators |
| H2-23 | At the right-hand side direction indicators |
| H2-24 | Under the roof console at the rear-view mirror |
| H2-25 | In the front of the roof, adjacent to the sunroof motor |
| H2-26 | Under the driver's seat (237) |
| H2-27 | In the right-hand rear door |
| H2-28 | At the locking mechanism inside the right-hand rear door |
| H2-29 | In the right-hand rear door |
| H2-30 | In the right-hand rear door |

| | |
|-------|--|
| H2-31 | Under the centre console |
| H2-32 | Adjacent to the LED at the left-hand speaker grille |
| H2-33 | In the left-hand A pillar |
| H2-34 | At the locking mechanism inside the left-hand front door |
| H2-35 | In the left-hand front door |
| H2-36 | In the left-hand rear door |
| H2-37 | In the left-hand rear door |
| H2-38 | At the locking mechanism inside the left-hand rear door |
| H2-39 | In the left-hand rear door |
| H2-40 | In the luggage compartment lid |
| H2-41 | In the luggage compartment lid |
| H2-42 | At the space provided for the electric aerial on the left-hand side at the rear |
| H2-43 | At the space provided for the electric aerial on the left-hand side at the rear |
| H2-44 | At the left-hand rear wheel housing |
| H2-45 | At the fuel filler cap |
| H2-46 | In the engine compartment behind the bulkhead at the extreme left |
| H2-47 | In the engine compartment behind the bulkhead at the extreme right |
| H2-48 | Under the back seat, on the left-hand side under the carpet |
| H2-49 | Under the back seat, on the right-hand side under the carpet |
| H2-50 | To the left of the ABS control unit (397) |
| H2-52 | Orange, short-circuiting connector at the (335) steering wheel |
| H2-53 | Under the facia, behind the knee shield, to the right of the glove compartment |
| H2-54 | In the engine compartment, behind the bulkhead, to the right |
| H2-55 | In the engine compartment, to the left of the (368) bulkhead, at the control unit for the LH fuel system |
| H2-56 | Behind the light switch |
| H2-57 | In the electrical distribution box behind the glove compartment |
| H2-58 | In the facia, at the radio contact box |
| H2-59 | In the facia, at the radio contact box |

3-pole connectors

| | |
|-------|--|
| H3-1 | Behind the right-hand headlamp |
| H3-2 | Behind the left-hand headlamp |
| H3-3 | Under the right-hand front seat |
| H3-4 | At the radiator fan motor |
| H3-5 | At the windscreen wiper motor |
| H3-6 | In the left-hand B pillar |
| H3-7 | In the right-hand B pillar |
| H3-8 | In the driver's side door |
| H3-9 | Under the left-hand front seat (406) |
| H3-10 | Under the left-hand front seat 13.1 |
| H3-11 | Under the right-hand front seat |
| H3-12 | In the tailgate (5-D) |
| H3-14 | In the luggage compartment lid, adjacent to motor 188 |
| H3-15 | Adjacent to sensor 332A in the engine compartment, under the electrical distribution box |

14 Introduction

- H3-16 Adjacent to sensor 332B, in the engine compartment, on the mounting plate at the right-hand wing
- H3-17 Spare
- H3-18 In the engine compartment, on the left-hand side, (322) at the bulkhead, at the LH control unit
- H3-19 In the engine compartment, on the left-hand side at (204) the bulkhead
- H3-20 Behind the combined instrument, at the speedometer(ME)
- H3-21 In the tailgate (5-D)
- H3-22 In the front of the roof, at the sunroof motor
- H3-24 Adjacent to control unit 356 for speed warning

4-pole connectors

- H4-1 In the left-hand front door
- H4-2 In the right-hand front door
- H4-3 Under the facia, to the right, behind the radio (375) compartment
- H4-4 At the fuel pump, under the luggage compartment floor
- H4-5 In the engine compartment, to the left, on the bulkhead, at the control unit for the LH fuel system
- H4-6 Under the left-hand front seat
- H4-7 Under the left-hand front seat
- H4-8 In the engine compartment, at the battery
- H4-9 In the engine compartment, at the battery
- H4-10 In the engine compartment, at the battery
- H4-11 In the engine compartment, on the left-hand side, (145) at the bulkhead
- H4-12 At the pressure switch for the radiator fan, to the left, below the windscreen
- H4-13 In the left-hand front door (adjacent to microswitch 274)
- H4-14 At the temperature switch, on the left-hand side of the radiator

6-pole connectors

- H6-1 On the left-hand side, at the bulkhead (73)
- H6-2 In the engine compartment, to the left, on the bulkhead, at the control unit for the LH fuel system

7-pole connectors

- H7-1 On the inside of the cable entry in the left-hand B pillar
- H7-2 On the inside of the cable entry in the right-hand B pillar

8-pole connectors

- H8-2 Under the right-hand front seat
- H8-3 Under the left-hand front seat
- H8-4 At the left-hand rear wheel housing
- H8-5 At the left-hand rear lamp cluster (258)
- H8-A To the left on the DCC, under the buzzer
- H8-B To the right on the DCC, under the date code

10-pole connectors

- H10-1 Under the facia, to the left of the heater housing
- H10-2 In the centre console, behind the radio compartment (267)
- H10-3 In the centre console, behind the radio compartment (267)
- H10-4 On the inside of the glove compartment, on the ACC servo motor unit
- H10-5 Under the left-hand front seat
- H10-6 At the left-hand rear wheel housing
- H10-7 Under the left-hand front seat
- H10-8 Diagnostic test connector for the engine (347) electronics, under the right-hand front seat
- H10-9 Diagnostic test connector for the car electronics, (348) under the right-hand front seat
- H10-10 Air bag test connector, in the centre console (330) behind the bottom compartment
- H10-11 At the extreme left, under the facia (behind the knee shield)

12-pole connectors

- H12-1 On the right-hand side, under the facia (behind the knee shield), on the electronic unit bracket

13-pole connectors

- H13-1 In the centre console, behind the radio compartment
- H13-2 In the centre console, behind the radio compartment

22-pole connectors

- H22-1 On the inside of the cable entry in the left-hand A pillar
- H22-2 On the inside of the cable entry in the right-hand A pillar

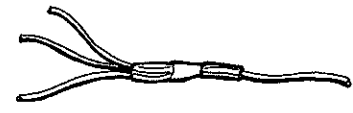
24-pole connectors

- H24-1 In the engine compartment, at the windscreen wiper motor

Crimped connections

To reduce the number of connectors and improve the contact properties, many connections are crimped (branch points). The appearance of a crimped connection and the symbol used for it in the wiring diagrams are shown in the figure.

Note that the connection may have a different appearance, depending on the model year of the car.



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Positive supply

General

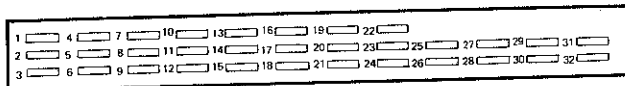
The +12 V supply of the car is distributed to the various consumers across two electrical distribution boxes, one of which is located behind the glove compartment, and the other in the engine compartment, at the left-hand headlamp. Most of the fuses and relays are located in the electrical distribution boxes.

For information on the fuses and relays for the ABS brake system, see the section entitled "Anti-lock Brake System (ABS)".

Electrical distribution box behind the glove compartment

Fuses

The fuses are located in a fuse box and can be reached through an access panel in the glove compartment. The locations of the fuses are shown below.



| Fuse | Function | Rating (A) |
|------|---|------------|
| 1 | Automatic Climate Control (ACC) Recirculation for AC | 10 |
| 2 | Cruise Control system Electrically operated rear-view mirrors | 10 |
| 3 | Seat-belt warning Seat belt and ignition key warning Storage compartment in centre console Reading lamps Corner lights Make-up mirrors | 10 |
| 4 | Spare | |
| 5 | DI/APC system | 10 |
| 6 | Ventilation fan | 30 |
| 7 | Headlamp wipers Horn | 10 |
| 8 | Windscreen wipers | 15 |
| 9 | Reversing lights Rear window regulators Electrically operated sunroof Electric heating pads for the front seats | 10 |
| 11 | Front window regulators | 20 |
| 12 | Direction indicators Headlamp beam control | 25 |
| 13 | Combined instrument Fuel injection system EDU1/EDU2 | 15 |
| | | 10 |

| Fuse | Function | Rating (A) |
|------|---|------------|
| 14 | Fuel pump | 20 |
| 15 | Electronic throttle control | 5 |
| 16 | Central locking Electrically operated lock for luggage compartment lid Interior lighting Courtesy lights Luggage compartment illumination | 15 |
| 17 | ACC EDU1/EDU2 | 10 |
| 18 | Heater element for the rear window | 30 |
| 19 | Radio, electrically-operated aerial clock, DCC | 15 |
| 20 | AC radiator fan, compressor | 30 |
| 21 | Horn, electronic throttle control | 25 |
| 22 | Hazard warning lights | 15 |
| 23 | Test connectors for engine electronics and car electronics | 5 |
| 24 | Brake lights | 15 |
| 25 | Electrically adjustable seat, left-hand | 30 |
| 26 | Electrically adjustable seat, right-hand | 30 |
| 27 | Lighting for instruments and controls Radio | 15 |
| 28 | Lambda sensor | 10 |
| 29 | Parking lights, right-hand Engine compartment illumination | 10 |
| 30 | Parking lights, left-hand Glove compartment illumination | 10 |
| 31 | Daylight driving lights (CA) | 15 |
| 32 | Rear fog lights | 15 |

NOTE: Some of the fuses are discussed only under the heading "Operation" in certain sections, and they are thus not dealt with under the heading "Positive supply".

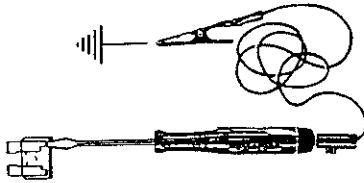
The fuses are of the blade type and, together with the connectors used, cause a lower voltage drop in the system than the earlier type. In addition, the fuses are more resistant to corrosion.

Colour-coding of blade fuses:

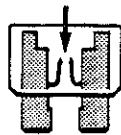
| Colour | Rating (A) |
|-------------|------------|
| Brown | 5 |
| Red | 10 |
| Blue | 15 |
| Yellow | 20 |
| Transparent | 25 |
| Green | 30 |

Checking the blade fuses

Every blade fuse has test tappings, so that it can be checked without the need for removing it from the fuse box. If both tappings are live, the fuse is intact.

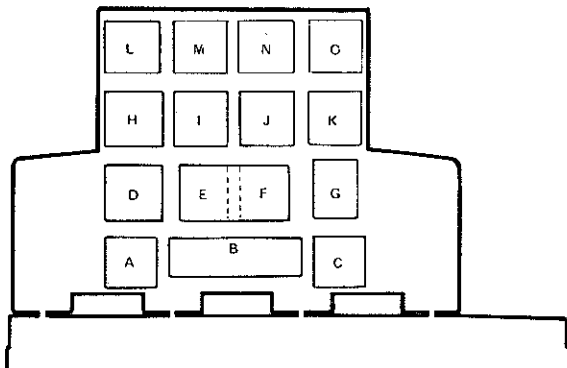


When the fuse has been removed, it will be clearly visible whether or not the fuse wire has melted.



Relays

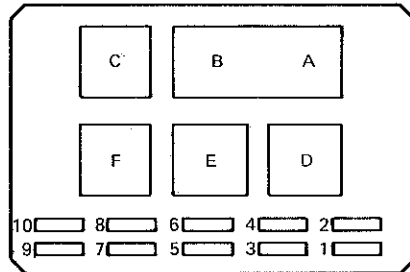
The glove compartment must be removed to provide access to the relays in the electrical distribution box. The locations of the relays are shown below.



| Location | Component No. | Function |
|----------|---------------|---|
| A | 82 | Seat belt warning |
| B | 228A | Filament monitor |
| C | 68 | Horn |
| D | 113 | Heater element for the rear window |
| | | Heater elements for rear-view mirrors |
| E | 156 | AC/ACC radiator fan and compressor, time-delay relay for LH 2.4 without electronic throttle control |
| F | 405 | Reversing light relay, automatic transmission |
| G | 21 | Ignition switch |
| H | 229 | LH fuel injection system |
| I | 102 | LH fuel pump |
| J | 377 | Electronic throttle control (ETS) |
| K | | Spare |
| L | 83 | Intermittent operation of the windscreen wipers |
| M | 151 | Time delay for the interior lighting |
| N | 23 | Flasher |
| O | 174 | Relay for daylight driving lights CA (US) |

Electrical distribution box in the engine compartment

The electrical distribution box is located in the engine compartment, at the left-hand headlamp, and is easily accessible. The locations of the fuses and relays are shown below.



Fuses

| Fuse | Function | Rating (A) |
|------|--------------------------------------|------------|
| 1 | Headlamp dipped beam, left-hand | 15 |
| 2 | Headlamp dipped beam, right-hand | 15 |
| 3 | Headlamp full beam, left-hand | 15 |
| 4 | Headlamp full beam, right-hand | 15 |
| 5 | Extra fog lamps | 15 +30 |
| 6 | Time delay relay for radiator fan | 5 |
| 7 | Radiator fan, radiator fan low speed | 30 +30 |
| 8 | Radiator fan, high speed | 30 +30 |
| 9 | Ignition system | 15 |
| 10 | Provision for mobile telephone | max 20 |

Relays

| Location | Component No. | Function |
|----------|---------------|--------------------------------------|
| A+B | 8 | Headlamp full beam and dipped beam |
| C | 228B | Filament monitor |
| D | 107 | Extra fog lamps |
| E | 26/155 | Radiator fan/Radiator fan, low speed |
| F | 81 | Radiator fan, high speed |

Ignition switch and supplies

The supplies available in the car are designated by "+" and a digit combination. Some of the supplies are available only when the engine is being started, when the car is travelling, etc.

The following supplies (positive voltages) are available: +30, +X, +15, +54, and +B. The +30 supply is taken directly from the battery, and the components supplied from "+30" are therefore always energised. Other supplies are taken from the ignition switch and are dependent on the setting of the ignition switch.

The picture below shows the ignition switch terminals that are energised in each position. The incoming supply (+30) from the battery is connected to pin 30.

The test position is used for checking certain warning and indicating lamps and the pictogram. (See the section entitled "Pictogram – Filament monitor".) In the test position, pin C1 is interconnected with pin C which is connected to earth.

| Connection between... | Locked position | Parked position | Drive position | Test position | Start position |
|-----------------------|-----------------|-----------------|----------------|---------------|----------------|
| 30-50 | | | | | |
| 30-54 | | | | | |
| 30-15 | | | | | |
| 30-X | | | | | |
| 30-B | | | | | |
| C-C1 | | | | | |

The system diagrams show all components connected to the various supplies. Some of the components are thus not fitted to cars delivered to certain markets and to cars of certain variants.

The system diagram for the +50 supply is shown in the diagram for the starting system (page 36). For particulars of supply B, see the sections entitled "Instrument and warning system" and "Seat belt and ignition switch warning".

Distribution terminals

The electrical distribution box includes the following three distribution terminals:

- Distribution terminal +30
- Distribution terminal +54
- Distribution terminal +15

