Chapter 12
Body electrical systems

Contents

Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

Fuses - pre-1992 models

Main fuse board:

No	Rating (amps)	Circuit(s) protected
1	3	Electronic engine control system
2	15	Interior light, cigarette lighter, clock and radio memory
3	20	Central locking system
4	30	Heated rear window element
5	10	Dim-dip lighting
6	10	Left-hand side lights and rear fog light
7	10	Right-hand side lights
8	10	Left-hand dipped beam
9	10	Right-hand dipped beam
10	15	Left-hand main beam and right-hand auxiliary driving light
11	15	Right-hand main beam and left-hand auxiliary driving light
12	20	Heater fan motor and reversing light
13	30	Radiator cooling fan motor
14	15	Front foglights (XR2i only)
15	15	Horn
16	20	Wiper motor and windscreen/tailgate washer pump
17	10	Brake stop lights, instrument illumination and instrument warning
18	30	Electrically operated windows
19	20	Electric fuel pump
20	10	Oxygen sensor (vehicles with catalytic converter)
21	10	Left-hand direction indicators
22	10	Right-hand direction indicators

Additional fuses behind main fuse board:

No	Rating (amps)	Circuit(s) protected
23	-	Unused
24/25	10	Rear fog lights
26	15	Tailgate remote release
27/28	30	Heated windscreen

Fuses - 1992 models onward

Main fuse board:

Fuses 1 to 22	Unchanged from pre-1992 models

Additional fuses behind main fuse board:

No	Rating (amps)	Circuit(s) protected
23*	-	Unused
23**	10	Rear fog lights
24*	-	Unused
24**	10	Rear fog lights
25	15	Tailgate remote release, anti-theft warning system
26	30	Heated windscreen
27	30	Heated windscreen
28*	20	Full-length sunroof
28**	30	Automatic transmission starter inhibitor
29	10	Air bag

** Pre-1994 models*
*** 1994 models onward*

Relays (pre-1992 models)

Note: *Relay locations and circuits controlled are liable to change from year to year. Consult a Ford dealer, for specific information.*

No	Circuit(s) controlled
I	Heated rear window
II	Windscreen wiper delay
III	CFi (fuel injection) delay relay
IV	Not used on UK models
V	Ignition switch
VI	Automatic transmission starter inhibitor/electric fuel pump (bridge fitted to carburettor engines without automatic transmission)
VII	Headlight main beam
VIII	Dim-dip lighting
IX	Not used on UK models
X	Not used on UK models
XI	Heated windscreen
XII	Anti-lock braking system
A	Idle speed control (automatic transmission) two-tone horn (where fitted)
B	Not used on UK models
C	Front foglights (XR2i)
D	Headlight dipped beam
E	Dim-dip lighting

Relays (1992 models onward)

Note: *Relay locations and circuits controlled are liable to change from year to year. Consult a Ford dealer, for specific information.*

No	Circuit(s) controlled
I	Heated rear window
II	Windscreen wiper delay
III	CFi delay relay or EFi supply relay (fuel injection)
IV	Not used on UK models
V	Ignition switch
VI	Automatic transmission starter inhibitor, anti-theft warning system
VII	Headlight main beam
VIII	Anti-lock braking system and/or dim-dip lighting
IX	Not used on UK models
X	Not used on UK models
XI	Heated windscreen
XII	Anti-lock braking system
A	Idle speed control (automatic transmission) or two-tone horn (where fitted)
B	Fuel pump
C	Front foglights (XR2i, RS Turbo and RS 1800)
D	Headlight dipped beam
E	Dim-dip lighting
F	Not used on UK models

Bulbs

	Wattage
Headlight (halogen)	H4, 60/55
Sidelight (front)	5
Direction indicators (main)	21
Side direction indicator repeaters	5
Auxiliary driving and foglights (S and XR2i)	H3, 55
Stop/tail light	21/5
Rear foglight	21
Reversing light	21
Number plate light	10
Interior light	10
Luggage compartment light	5
Instrument warning lights	1.3 or 2.6
Panel illumination	1.3 or 2.6
Cigarette lighter illumination	1.4
Automatic transmission selector illumination	2

Lubricants

Grease for windscreen wiper linkage and pivots	To Ford specification SAM-1C-911-A

Torque wrench settings

	Nm	lbf ft
Wiper motor to bracket	8 to 9	6 to 7
Wiper motor bracket to bulkhead/tailgate	6 to 8	4 to 6
Windscreen wiper crank to driving shaft nut	22 to 24	16 to 18
Windscreen/tailgate wiper arm retaining nut	17 to 18	12 to 13
Windscreen wiper pivot shaft nut	9 to 12	7 to 9
Windscreen/tailgate washer reservoir securing bolts	2.5 to 3.5	2 to 3
Headlight retaining bolt	5.4 to 7.0	4 to 5
Tail light securing nuts	1.5 to 2.5	1 to 2
Auxiliary light retaining nut (S models)	6.8 to 9.2	5 to 7
Horn bracket retaining bolt	24 to 33	18 to 24
Starter inhibitor switch	9 to 14	7 to 10

1 General information and precautions

General information

The electrical system is of 12-volt negative earth type. Power for the lights and all electrical accessories is supplied by a lead/acid battery, which is charged by the engine-driven alternator.

This Chapter covers repair and service procedures for the various electrical components not associated with the engine. Information on the battery, ignition system, alternator, and starter motor can be found in Chapter 5A and B.

All models from 1994 onwards are fitted with a driver's air bag, which is designed to prevent serious chest and head injuries to the driver during an accident. A similar bag for the front seat passenger is also available. The combined sensor and electronics for the air bag is located next to the steering column inside the vehicle, and contains a back-up capacitor, crash sensor, decelerometer, safety sensor, integrated circuit and microprocessor. The air bag is inflated by a gas generator, which forces the bag out of the module cover in the centre of the steering wheel. A "clock spring" ensures that a good electrical connection is maintained with the air bag at all times - as the steering wheel is turned in each direction, the spring winds and unwinds.

An anti-theft alarm system is available on later models, and is triggered if the vehicle is broken into through the doors, bonnet, or tailgate. The alarm will also be triggered if the ignition or audio equipment is tampered with. Additionally, from the 1994 model year onwards, a Passive Anti-Theft System (PATS) is fitted. This system, (which works independently of the standard alarm) prevents the engine from being started unless a specific code, programmed into the ignition key, is recognised by the PATS transceiver.

Precautions

Warning: Before carrying out any work on the electrical system, read through the precautions given in "Safety first!" at the beginning of this manual and in Chapter 5A, Section 1.
Caution: Prior to working on any component in the electrical system, the battery negative lead should first be disconnected, to prevent the possibility of electrical short-circuits and/or fires. If a radio/cassette player with anti-theft security code is fitted, refer to the information given in the reference sections of this manual before disconnecting the battery.

2 Electrical fault-finding - general information

Note: *Refer to the precautions given in "Safety first!" and in Section 1 of this Chapter before starting work. The following tests relate to testing of the main electrical circuits, and should not be used to test delicate electronic circuits (such as engine management systems), particularly where an electronic control unit is used. Also refer to the precautions given in Chapter 5A, Section 1.*

General

1 A typical electrical circuit consists of an electrical component, any switches, relays, motors, fuses, fusible links or circuit breakers related to that component, and the wiring and connectors which link the component to both the battery and the chassis. To help to pinpoint a problem in an electrical circuit,

wiring diagrams are included at the end of this manual.

2 Before attempting to diagnose an electrical fault, first study the appropriate wiring diagram, to obtain a complete understanding of the components included in the particular circuit concerned. The possible sources of a fault can be narrowed down by noting if other components related to the circuit are operating properly. If several components or circuits fail at one time, the problem is likely to be related to a shared fuse or earth connection.

3 Electrical problems usually stem from simple causes, such as loose or corroded connections, a faulty earth connection, a blown fuse, a melted fusible link, or a faulty relay (refer to Section 3 for details of testing relays). Visually inspect the condition of all fuses, wires and connections in a problem circuit before testing the components. Use the wiring diagrams to determine which terminal connections will need to be checked in order to pinpoint the trouble-spot.

4 The basic tools required for electrical fault-finding include a circuit tester or voltmeter (a 12-volt bulb with a set of test leads can also be used for certain tests); an ohmmeter (to measure resistance and check for continuity); a battery and set of test leads; and a jumper wire, preferably with a circuit breaker or fuse incorporated, which can be used to bypass suspect wires or electrical components. Before attempting to locate a problem with test instruments, use the wiring diagram to determine where to make the connections.

Warning: Under no circumstances may live measuring instruments such as ohmmeters, voltmeters or a bulb and test leads be used to test any of the air bag circuitry or components. Any testing in these areas must be left to a Ford dealer as there is a danger of activating the system if the correct procedures are not followed.

5 To find the source of an intermittent wiring fault (usually due to a poor or dirty connection, or damaged wiring insulation), a "wiggle" test can be performed on the wiring. This involves wiggling the wiring by hand to see if the fault occurs as the wiring is moved. It should be possible to narrow down the source of the fault to a particular section of wiring. This method of testing can be used in conjunction with any of the tests described in the following sub-Sections.

6 Apart from problems due to poor connections, two basic types of fault can occur in an electrical circuit - open-circuit, or short-circuit.

7 Open-circuit faults are caused by a break somewhere in the circuit, which prevents current from flowing. An open-circuit fault will prevent a component from working.

8 Short-circuit faults are caused by a "short" somewhere in the circuit, which allows the current flowing in the circuit to "escape" along an alternative route, usually to earth. Short-circuit faults are normally caused by a breakdown in wiring insulation, which allows a feed wire to touch either another wire, or an earthed component such as the bodyshell. A short-circuit fault will normally cause the relevant circuit fuse to blow.

Finding an open-circuit

9 To check for an open-circuit, connect one lead of a circuit tester or the negative lead of a voltmeter either to the battery negative terminal or to a known good earth.

10 Connect the other lead to a connector in the circuit being tested, preferably nearest to the battery or fuse. At this point, battery voltage should be present, unless the lead from the battery or the fuse itself is faulty (bearing in mind that some circuits are live only when the ignition switch is moved to a particular position).

11 Switch on the circuit, then connect the tester lead to the connector nearest the circuit switch on the component side.

12 If voltage is present (indicated either by the tester bulb lighting or a voltmeter reading, as applicable), this means that the section of the circuit between the relevant connector and the switch is problem-free.

13 Continue to check the remainder of the circuit in the same fashion.

14 When a point is reached at which no voltage is present, the problem must lie between that point and the previous test point with voltage. Most problems can be traced to a broken, corroded or loose connection.

Finding a short-circuit

15 To check for a short-circuit, first disconnect the load(s) from the circuit (loads are the components which draw current from a circuit, such as bulbs, motors, heating elements, etc).

16 Remove the relevant fuse from the circuit, and connect a circuit tester or voltmeter to the fuse connections.

17 Switch on the circuit, bearing in mind that some circuits are live only when the ignition switch is moved to a particular position.

18 If voltage is present (indicated either by the tester bulb lighting or a voltmeter reading, as applicable), this means that there is a short-circuit.

19 If no voltage is present during this test, but the fuse still blows with the load(s) reconnected, this indicates an internal fault in the load(s).

Finding an earth fault

20 The battery negative terminal is connected to "earth" - the metal of the engine/transmission and the vehicle body - and many systems are wired so that they only receive a positive feed, the current returning via the metal of the car body. This means that the component mounting and the body form part of that circuit. Loose or corroded mountings can therefore cause a range of electrical faults, ranging from total failure of a circuit, to a puzzling partial failure. In particular, lights may shine dimly (especially when another circuit sharing the same earth point is in operation), motors (eg wiper motors or the radiator cooling fan motor) may run slowly, and the operation of one circuit may have an apparently-unrelated effect on another. Note that on many vehicles, earth straps are used between certain components, such as the engine/transmission and the body, usually where there is no metal-to-metal contact between components, due to flexible rubber mountings, etc.

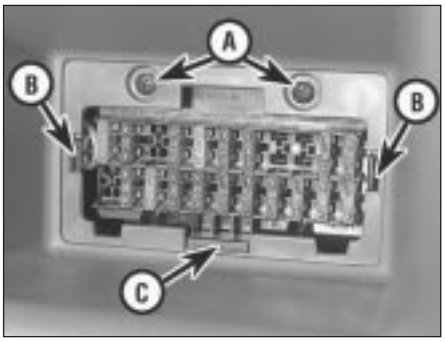
21 To check whether a component is properly earthed, disconnect the battery (refer to Chapter 5A, Section 1) and connect one lead of an ohmmeter to a known good earth point. Connect the other lead to the wire or earth connection being tested. The resistance reading should be zero; if not, check the connection as follows.

22 If an earth connection is thought to be faulty, dismantle the connection, and clean both the bodyshell and the wire terminal (or the component earth connection mating surface) back to bare metal. Be careful to remove all traces of dirt and corrosion, then use a knife to trim away any paint, so that a clean metal-to-metal joint is made. On reassembly, tighten the joint fasteners securely; if a wire terminal is being refitted, use serrated washers between the terminal and the bodyshell, to ensure a clean and secure connection. When the connection is remade, prevent the onset of corrosion in the future by applying a coat of petroleum jelly or silicone-based grease, or by spraying on (at regular intervals) a proprietary ignition sealer or a water-dispersant lubricant.

3 Fuses and relays - general information

Note: *It is important to note that the ignition switch and the appropriate electrical circuit must always be switched off before any of the fuses (or relays) are removed and renewed.*

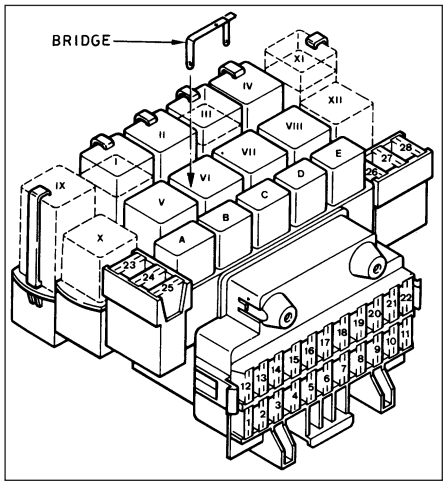
1 The main fuse and relay board is located below the facia panel to the right of the steering wheel. The fuses can be inspected and if necessary renewed, by removing the hinged access cover. The remaining additional fuses and relays (depending on model) may be accessed by removing the two fuse board retaining screws, releasing the retaining lugs on either side of the main fuse plate and withdrawing the fuse/relay board downwards into the driver's footwell. Each fuse location is numbered - refer to the fuse chart in the *Specifications* at the start of this Chapter to check which circuits are protected by each fuse. Plastic tweezers are attached to



3.1a Method of fuse/relay board retention

A Retaining screws
B Retaining lugs
C Support

3.1b Withdrawing the fuse/relay board downwards into the driver's footwell



3.1c Component layout on the fuse/relay board. See *Specifications* for relay identification

the inside face of the cover to remove and fit the fuses **(see illustrations)**.

2 To remove a fuse, use the tweezers provided to pull it out of the holder. Slide the fuse sideways from the tweezers. The wire within the fuse is clearly visible, and it will be broken if the fuse is blown.

3 Always renew a fuse with one of an identical rating. Never renew a fuse more than once without tracing the source of the trouble. The fuse rating is stamped on top of the fuse.

4 With the exception of the indicator flasher relay, the remainder of the relays are fitted to the reverse side of the main fuse/relay board. Access is as described in paragraph 1.

5 The various relays can be removed from their respective locations on the fuse board by carefully pulling them from the sockets.

6 The direction indicator flasher relay is attached to the multi-function switch unit on the steering column. Access to the relay is made by undoing the retaining screws and removing the steering column shrouds. The relay can then be withdrawn from the switch.

7 If a system controlled by a relay becomes inoperative and the relay is suspect, listen to the relay as the circuit is operated. If the relay is functioning, it should be possible to hear it click as it is energised. If the relay proves satisfactory, the fault lies with the components or wiring of the system. If the relay is not being energised, then it is not receiving a main supply voltage or a switching voltage, or the relay is faulty.

4 Switches - removal and refitting

Ignition switch (loom plate and lock barrel)

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

2 Remove the manual choke control knob, where fitted, by depressing the lug securing it, and pulling it from its shaft. The lug is found on the side of the control knob shank.

3 Remove the lower steering column shroud by undoing its four retaining screws, then detach the choke warning light switch/pull control assembly from the lower shroud by unscrewing its retaining collar (bayonet-type fixing), using a suitable tool to locate in the collar recesses.

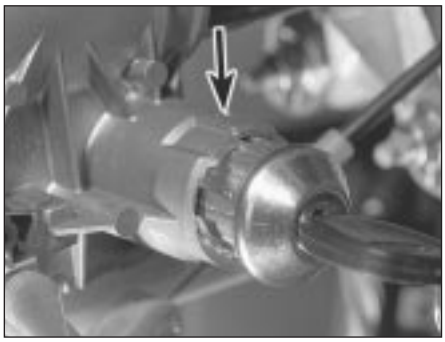
4 Remove the two screws securing the upper steering column shroud from above, and the two screws securing it from below, the latter accessible only with the lower shroud removed.

5 Disconnect the ignition switch wiring multi-plug connector. Insert a thin-bladed screwdriver into the lock tab aperture, release the locking tab and remove the loom plate from its location on the left-hand side of the steering column.

6 Where applicable, undo the single screw and withdraw the Passive Anti-Theft System (PATS) transceiver from the ignition switch/steering lock barrel.

7 Insert the key and turn the ignition switch to position "I". Depress the lock barrel plunger through the steering column lock housing. As the lock barrel plunger is depressed, pull on the ignition key to remove the lock barrel **(see illustration)**.

8 Refitting is a reversal of the removal procedure. When relocating the switch to the steering lock, the barrel driveshaft must align with the switch shaft as it is pushed into position. Check the switch for satisfactory operation on completion.



4.7 Withdraw the lock barrel after depressing its plunger through the aperture in the steering column lock housing (arrowed)

Steering column multi-function switch

9 Carry out the operations described in paragraphs 1 to 4 above.

10 Disconnect the wiring multi-plugs from the multi-function switch assembly, then remove the single screw securing the switch assembly to the steering column lock housing. This retaining screw is located directly forward of the hazard warning light switch. Remove the switch assembly.

11 Refitting is a reversal of the removal procedure.

Facia centre panel switches (below heater controls)

12 These switches individually control the front and rear foglights, heated windscreen and heated rear window element. Where these features are not fitted to the vehicle, blanking plates are installed instead of switches.

13 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

14 Remove the radio/cassette player as described in Section 22.

15 Remove the ashtray, then undo the three screws from the base of the centre panel. Withdraw the centre panel, disconnecting the cigarette lighter connections as it is withdrawn.

16 Push the required switch/switches out from behind, disconnect the multi-plug and remove the switch.

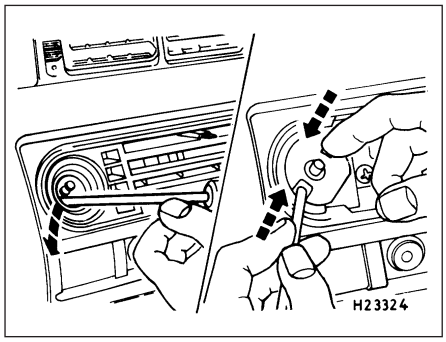
17 Refitting is a reversal of the removal procedure.

Centre console switches

18 The switches mounted on the centre console control the electrically operated

4.20a Prise the centre console switch up from its location . . .

4.20b . . . then disconnect its multiplug and remove the switch



4.23 Heater fan motor control switch removal

windows (early models) and the tailgate remote release mechanism, where fitted.

19 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

20 To remove a switch, carefully prise it from its location using a thin flat-bladed screwdriver, then disconnect the multi-plug **(see illustrations)**.

21 To refit, connect the multi-plug then push home to secure.

Heater fan motor control switch

22 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

23 Pull the heater fan motor control knob off, then move the air distribution and temperature controls fully to the right. Unclip and remove the heater slide facia towards the left-hand side of the vehicle, removing the slide control knobs only as necessary, and disconnecting its bulbholder (bayonet type) as it is withdrawn **(see illustration)**.

24 Squeeze the two release tabs together on the heater fan motor control switch, and remove it, disconnecting its multi-plug as it is withdrawn.

25 Refit by reversing the removal procedure.

Brake stop-light switch

26 The brake stop-light switch is attached to the brake pedal mounting bracket.

27 Detach the wiring multi-plug from the switch, then twist the switch through a quarter of a turn (90º) anticlockwise and withdraw it from the bracket.

28 Insert the switch into its retainer, press it lightly against the brake pedal until all free play is just taken up, then turn the switch clockwise to secure. Reconnect the switch wiring connector and the battery.

Handbrake warning light switch

29 Push the carpet mounding down as necessary to gain access to the switch, located on the handbrake lever.

30 Remove the cover, then disconnect the warning light switch wiring multi-plug **(see illustration)**. Undo the two screws securing the switch to the handbrake lever assembly and remove the switch.

31 Refit by reversing the removal procedure.

Low brake fluid level warning light switch

32 This is incorporated into the brake fluid reservoir cap, and senses fluid level in the reservoir. It cannot be renewed separately from the cap.

33 To remove, disconnect the warning indicator loom multi-plug and unscrew the reservoir cap.

34 Refit by reversing the removal procedure.

Courtesy light switches

35 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

36 With the door open, undo the retaining screw and withdraw the switch from the door pillar. Pull out the wiring slightly, and tie a piece of string to it, so that it can be retrieved if it drops down into the door pillar.

37 Disconnect the wiring from the switch.

38 Refitting is a reversal of removal.

Reversing light switch

39 Refer to Chapter 7A, Section 6.

Starter inhibitor switch (automatic transmission)

40 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

41 The starter inhibitor switch is located on the transmission housing, and prevents the engine from being started with the selector lever in any position except "P" or "N". Access to the switch is gained after raising and supporting the vehicle at the front end on axle stands (see *"Jacking and vehicle support"*).

42 Detach the switch multi-plug, then unscrew and remove the switch from the transmission, together with its O-ring. As the switch is removed, catch any fluid spillage in a suitable container, and plug the switch aperture in the transmission to prevent any further loss.

43 Refitting is a reversal of the removal procedure. Use a new O-ring, and tighten the switch securely. Ensure that the wiring connection is securely made. On completion, check and if necessary top-up the automatic transmission fluid (see Chapter 1) then check that the engine only starts when the selector is in the "P" or "N" position.

Luggage area contact plate

44 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

45 Open the tailgate and release the contact plate side retaining clips using a thin-bladed screwdriver. Push the contact plate from its location in the body.

46 Disconnect the wiring multi-plug and remove the plate **(see illustration)**.

47 Refit in the reverse order of removal.

Luggage area contact switch

48 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

49 Open the tailgate and remove its inner trim panel (see Chapter 11).

4.30 Removing the cover from the handbrake warning light switch

4.46 Withdrawing the luggage area contact plate for access to disconnect the multi-plug

50 Undo the two screws securing the contact switch and withdraw it from its tailgate location.
51 Unclip and disconnect the switch multi-plug, and disconnect the earth wiring. Remove the switch.
52 Refit in the reverse order of removal. Make sure that the pins and their contacts are clean. On completion, check the operation of the rear wipers, courtesy light, heated rear window and the tailgate release/central locking system.

Electric window switches (1992 models onward)

53 On later models the electric window switches are located in the upper surfaces of the door stowage pockets. Removal and refitting is the same as for the earlier centre console mounted switches described previously in this Section.

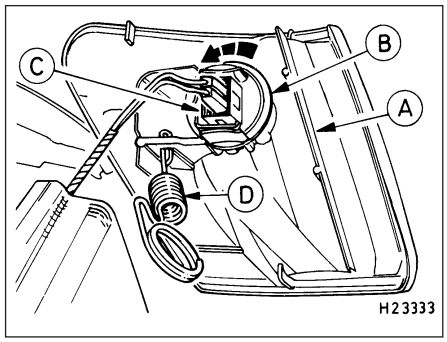
5 Bulbs (exterior lights) - renewal

Note: *Ensure that all exterior lights are switched off before disconnecting the wiring connectors to any exterior light bulbs. Note that if a bulb fails, and has just been in use, it will still be extremely hot, particularly in the case of a headlight bulb.*

Headlight

1 From within the engine compartment, disconnect the multi-plug from the back of the headlight.
2 Remove the rubber bulb protective cap, then unlock the bulb retaining spring clip or retaining ring (according to type) and withdraw the bulb **(see illustrations)**.

Caution: Take care not to touch the bulb glass with your fingers - if accidentally touched, clean the bulb with methylated spirit.



5.8 Remove the front direction indicator light bulbholder by turning it anti-clockwise

A Light unit
B Bulbholder
C Multi-plug
D Retaining spring

5.2a Remove the protective cap . . .

5.2b . . . then unlock the headlight bulb retaining spring and withdraw the bulb

3 Refitting is a reversal of the removal procedure.

Front sidelight

4 The bulbholder is located on the side of the headlight unit, and is removed by twisting anti-clockwise and withdrawing from within the engine compartment.
5 Withdraw the push-fit bulb from its holder.
6 Refitting is a reversal of the removal procedure.

Front direction indicator

7 Remove the direction indicator light unit by releasing the retaining spring from its body location, then pulling the light assembly forwards. Disconnect its multi-plug as it is withdrawn.
8 Turn the bulbholder anti-clockwise and remove it **(see illustration)**. The bulb is a bayonet type fitting in its holder.
9 Refitting is a reversal of the removal procedure.

Front direction indicator side repeater

10 Remove the appropriate front wheel arch liner as described in Chapter 11.
11 Remove the appropriate sill scuff plate as described in Chapter 11, and release the clip securing the insulation to the panel forward of the lower A-pillar.
12 Disconnect the supply lead connector and the earth lead, then release their grommet from its panel location.
13 From outside the vehicle, twist the light assembly to release it, then withdraw it and its leads **(see illustration)**.
14 Refitting is a reversal of the removal procedure, ensuring that the grommet is seated correctly in its panel location.

5.13 Removing the direction indicator side repeater bulbholder assembly

Auxiliary lights

S models

15 Undo the screw at the base of the light, then withdraw the lens and reflector assembly from the light housing.
16 Disconnect the wiring then release the bulb retainer and remove the bulb.
17 Refitting is a reversal of the removal procedure.

XR2i models

18 Remove the auxiliary light assembly from its bumper location, as described in Section 7.
19 Release the bulb retainer, then remove the bulb **(see illustration)**.
20 Refitting is a reversal of the removal procedure.

Rear light cluster (all models except Courier)

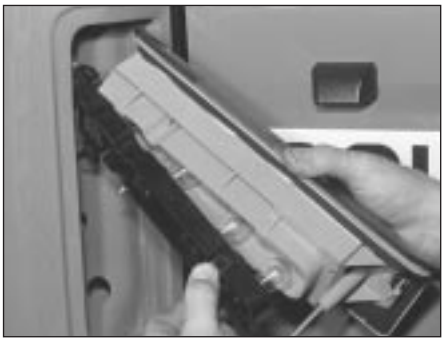
21 Access to the rear light cluster bulbholder is gained from the luggage compartment. Disconnect the multi-plug from the bulbholder, then press the retaining lugs on

5.19 Releasing the auxiliary light bulb retainer (XR2i models)

5.21a Disconnect the ear light cluster multi-plug from the bulbholder . . .

5.21b . . . then having pressed its retaining lugs, withdraw the bulbholder for access to the bulbs

5.24a On Courier models, unscrew the two black plastic nuts securing the rear light cluster assembly . . .



5.24b . . . then withdraw the assembly to the outside of the vehicle

5.29 Release the number plate light securing tab (arrowed) and separate the bulbholder and light cover

the bulbholder together and remove it **(see illustrations)**.

22 All bulbs are of bayonet type fitting.

23 Refitting is a reversal of the removal procedure.

Rear light cluster (Courier models)

24 Working inside the load compartment, unscrew the two black plastic nuts securing the light cluster assembly. Withdraw the assembly to the outside of the vehicle, disconnecting the wiring from the bulbholder **(see illustrations)**.

25 All bulbs are of bayonet type fitting.

26 Refitting is a reversal of the removal procedure.

Number plate lights

27 Insert a thin flat-bladed screwdriver between the light assembly and the bumper, and carefully prise the light out. Use a rag, or a piece of card, between the screwdriver and the bumper, to prevent damage to the bumper.

28 Detach the connections on the underside of the light assembly.

29 Release the tab securing the light cover to the bulbholder, and remove the cover **(see illustration)**.

30 The bulb is a bayonet type fitting in its holder.

31 Refitting is a reversal of the removal procedure.

6 Bulbs (interior lights) - renewal

Instrument panel illumination and warning lights

1 Refer to Section 10.

Automatic transmission selector illumination

2 Using a thin flat-bladed screwdriver, prise up the selector cover and remove it.

3 Pull the bulb assembly to release it from the selector lever, then remove its cover. The bulb is a bayonet fit in its holder **(see illustrations)**.

4 Refitting is a reversal of the removal procedure.

Hazard warning switch

5 The hazard warning light switch, an integral part of the steering column multi-function switch assembly, has a bulb cover which pulls off. The bulb is removed by pulling it from its location.

6 Refitting is a reversal of the removal procedure.

Clock illumination

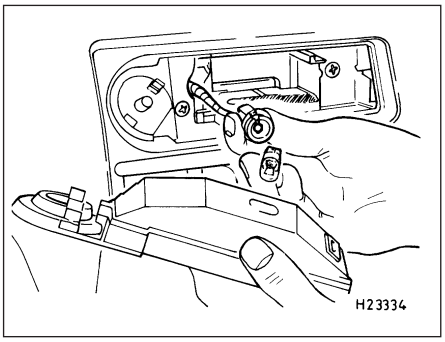
7 Carefully prise the clock out of its facia location, as described in Section 13.

8 Twist the bulbholder and withdraw it from the rear of the clock **(see illustration)**. Note

6.3a Remove the selector illumination bulb cover . . .

6.3b . . . followed by the (bayonet fitting) bulb

6.8 Withdrawing the clock illumination bulb and its integral holder from the rear of the clock



6.13 Heater fan illumination arrangement

6.16a Releasing the interior (courtesy) light from its location

6.16b Interior (courtesy) light pivoted for access to the bulb

that the bulb and bulbholder cannot be separated - they are replaced as an assembly.
9 Refitting is a reversal of the removal procedure.

Cigarette lighter illumination

10 Remove the cigarette lighter, as described in Section 12.
11 Pull the bulbholder from its location in the illuminated surround, then pull the bulb out of the bulbholder.
12 Refitting is a reversal of the removal procedure.

Heater facia illumination

13 Pull the heater fan motor control knob off, then move the air distribution and temperature controls fully to the right. Unclip and remove the heater slide facia towards the left-hand side of the vehicle, removing the slide control knobs only as necessary, and disconnecting its bulbholder (bayonet type) as it is withdrawn **(see illustration)**.
14 The bulb is removed by pulling it from its bulbholder.
15 Refitting is a reversal of the removal procedure.

Interior (courtesy) light

16 Insert a thin flat-bladed screwdriver into the slot in the light assembly, and carefully lever it out of its aperture. The bulb is a bayonet fit **(see illustrations)**.
17 Refit the bulb by reversing the method of removal, then insert the switch end of the light to the aperture, pivot the light upwards and push home to secure.

Luggage compartment (courtesy) light

18 Carefully prise the luggage compartment (courtesy) light assembly out of its location, using a thin flat-bladed screwdriver. Twist the bulbholder anti-clockwise to remove.
19 The bulb is removed by pulling it from its bulbholder.
20 Refitting is a reversal of the removal procedure.

7 Exterior light units - removal and refitting

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1), before removing any of the light units.

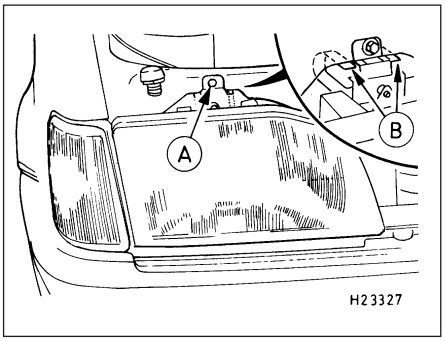
Headlight

2 Disconnect the multi-plug from the back of the headlights **(see illustration)**.
3 Twist the sidelight bulb holder to release, then withdraw it.
4 Remove the headlight securing bolt and depress the headlight retaining spring, to allow the headlight assembly to be hinged forwards and out of its location **(see illustration)**.
5 Refitting is a reversal of the removal procedure, ensuring that the lower headlight mounting guide is inserted correctly, and that the retaining spring engages fully **(see illustration)**.
6 On completion, check the headlight beam alignment as described in Section 8.

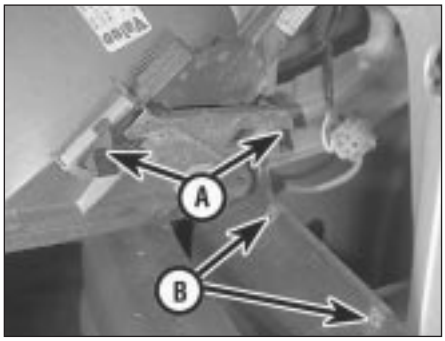
7.2 Disconnecting the multi-plug from the back of the headlight

Front direction indicator

7 To remove, release the indicator light retaining spring from its body location, then pull the light assembly forwards and disconnect its multi-plug as it is withdrawn **(see illustrations)**.

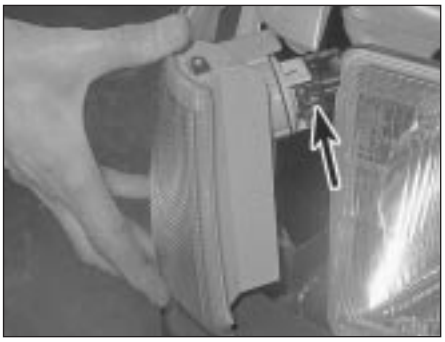


7.4 Headlight retaining bolt (A), and retaining spring arrangement (B)



7.5 Refitting the headlight. Mounting guides (A) to fit to panel (B)

7.7a Release the front direction indicator light retaining spring from its body location . . .



7.7b . . . then pull the light unit out to enable the multi-plug (arrowed) to be disconnected

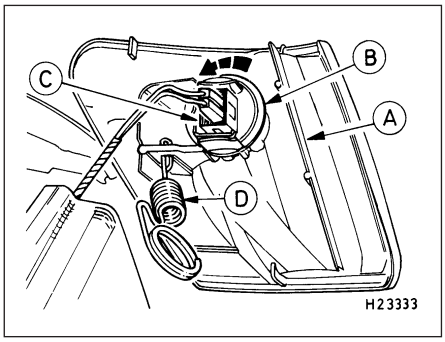
8 Refitting is a reversal of the removal procedure.

Front direction indicator side repeater

9 Remove the appropriate front wheel arch liner as described in Chapter 11.
10 Remove the appropriate sill scuff plate as described in Chapter 11, and release the clip securing the insulation to the panel forward of the lower A-pillar.
11 Disconnect the supply lead connector and the earth lead, then release their grommet from its panel location.
12 From outside the vehicle, twist the light assembly to release it, then withdraw it and its leads.
13 Refitting is a reversal of the removal procedure, ensuring that the grommet is seated correctly in its panel location.

Rear light cluster

14 Disconnect the multi-plug from the bulbholder, then press the retaining lugs on the bulbholder together and remove it **(see illustration)**.



7.14 Press the retaining lugs on the rear light cluster bulbholder together (broken arrows) to release the bulbholder

15 Unscrew the four nuts securing the light unit, then remove the unit and its seal.
16 Refitting is a reversal of the removal procedure. Tighten the light unit securing nuts to their specified torque.

Number plate light

17 Insert a thin flat-bladed screwdriver between the light assembly and the bumper, and carefully prise the light out. Use a rag, or a piece of card, between the screwdriver and the bumper, to prevent damage to the bumper.
18 Detach the connections on the underside of the light assembly.
19 Refitting is a reversal of the removal procedure.

Auxiliary lights

S models

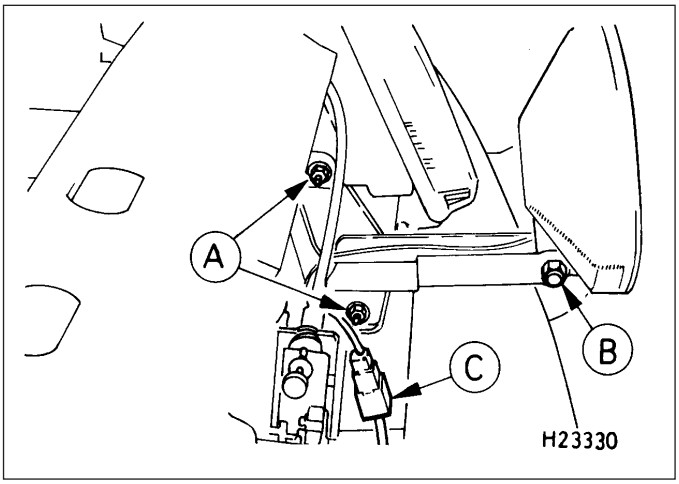
20 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
21 Disconnect the light wiring multi-plug then unscrew its retaining nut, withdraw the bolt and remove the light unit **(see illustration)**.
22 Refitting is a reversal of the removal procedure, tightening the retaining nut to the specified torque. On completion, check the auxiliary light beam alignment as described in Section 8.

XR2i models

23 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
24 Undo the four Torx retaining screws securing the relevant dual light assembly to its bumper location. Note that the retaining and adjusting screws are captive within the light assembly - they cannot be removed from the assembly **(see illustration)**.
25 Withdraw the light assembly from its location, then remove the caps protecting the bulbs and disconnect the wiring.
26 If required, the lights may be removed individually from their housing at this stage. Each light is secured to its housing unit by a combination of two types of clips - foglight retention differs from driving light retention.
27 The adjusting/retaining clips are removed by undoing the adjustment screws on the front of the housing unit, then turning the clips using pliers or similar tool, before withdrawing. To remove a retaining-only clip, lift the lug on the side of the clip using a screwdriver, then turn the clip using pliers or similar tool, before withdrawing.
28 Refitting is a reversal of the removal procedure. On completion, check the auxiliary light beam alignment as described in Section 8.

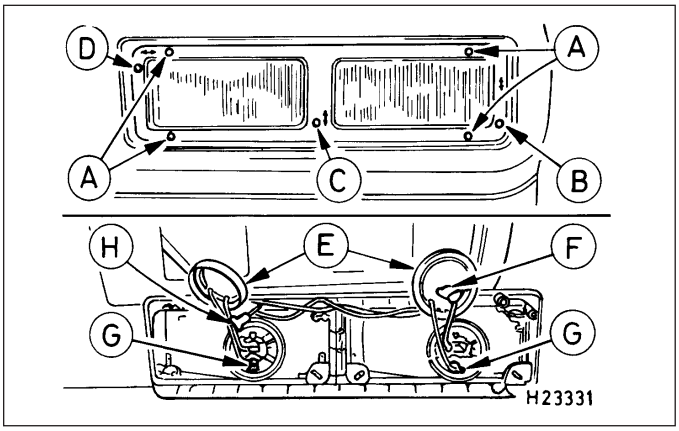
8 Headlight and auxiliary light beam alignment - checking and adjustment

1 Accurate adjustment of the headlight and auxiliary light beams is only possible using optical beam-setting equipment, and this



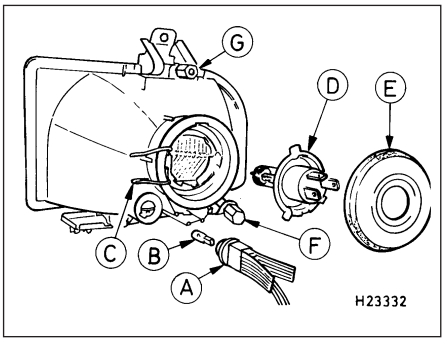
7.21 Auxiliary light fixture (S models)

A Bracket retaining nuts
B Auxiliary light retaining nut
C Auxiliary light multi-plug



7.24 Auxiliary light assembly (XR2i models) - left-hand unit shown

A Light assembly retaining screws
B Fog light vertical adjustment screw
C Driving light vertical adjustment screw
D Driving light horizontal adjustment screw
E Bulb protective caps
F Fog light bulb connector
G Bulb earth leads
H Driving light bulb connector



8.2 Exploded view of the headlight unit

A Sidelight bulb holder
B Sidelight bulb
C Headlight bulb retainer
D Headlight bulb
E Bulb protective cap
F Horizontal adjustment screw
G Vertical adjustment screw

work should therefore be carried out by a Ford dealer or service station with the necessary facilities.

2 Temporary adjustment can be made when the headlight has been removed and refitted, or to compensate for normal adjustment whenever a heavy load is being carried. Turn the adjustment screws at the rear of the headlight unit to make the adjustment **(see illustration)**.

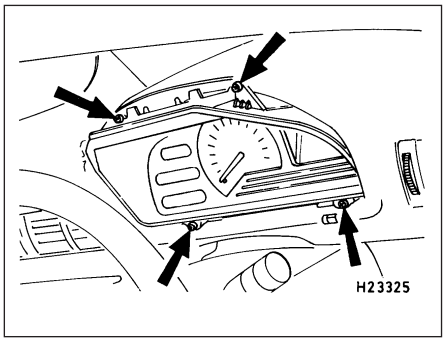
3 Before making any adjustments to the headlight settings, it is important that the tyre pressures are correct, and that the vehicle is standing on level ground. Bounce the front of the vehicle a few times to settle the suspension. Ideally, somebody of normal size should sit in the driver's seat during the adjustment, and the vehicle should have a full tank of fuel.

4 S model auxiliary lights are adjusted by slackening the light retaining nuts and swivelling the light assemblies **(see illustration 7.21)**. Tighten the nuts upon completion.

5 XR2i model auxiliary lights are individually adjustable within their housings, provision being made for both vertical and horizontal adjustment of the driving lights, and vertical adjustment only of the foglights. Adjustment is made via Torx-head captive screws on the front of the housings **(see illustration 7.24)**.

6 Whenever temporary adjustments are made, the settings must be reset as soon as possible once the vehicle is in normal use.

9 Instrument panel - removal and refitting



9.4a Instrument cluster securing screws (arrowed)

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

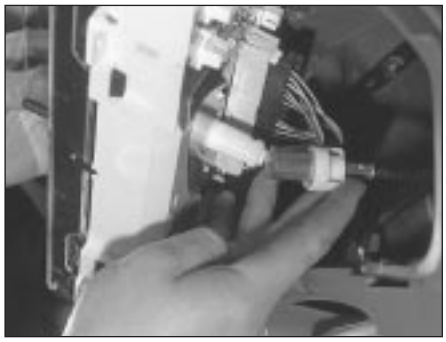
2 Disconnect the speedometer cable at the transmission casing (see Section 11).

3 Remove the two screws securing the instrument panel bezel from its underside. Remove the bezel.

4 Remove the four screws securing the instrument panel to its location, then carefully pull it out to allow access to the speedometer cable and multi-plug connections. Disconnect the speedometer cable and multi-plug, then remove the instrument panel from the vehicle **(see illustrations)**.

Refitting

5 Refitting is a reversal of removal. On completion check the function of all electrical components.



9.4b Disconnect the speedometer cable from the rear of the instrument cluster . . .

10 Instrument panel components - removal and refitting

Removal

1 Remove the instrument panel as described in Section 9.

Panel illumination and warning light bulbs

2 All bulbholders are a bayonet fit, requiring a "twist and withdraw" removal technique **(see illustration)**. Bulbs cannot be removed from their holders -they are renewed complete.

Printed circuit

3 Insert a thin flat-bladed screwdriver into the multi-plug retainer and carefully unclip it, having noted its orientation **(see illustration)**.

4 Remove all panel illumination and warning light bulbholders.

5 Using a suitable tool (a trim clip removal tool is ideal), carefully prise the printed circuit off its instrument terminals, and release it from its retainers before removing.

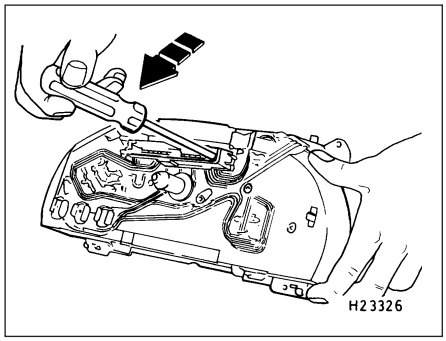
Speedometer

6 Remove the two bulbholders on the top of the panel assembly, and release their strip of printed circuit from its retainers, so that the instrument panel halves may be separated.

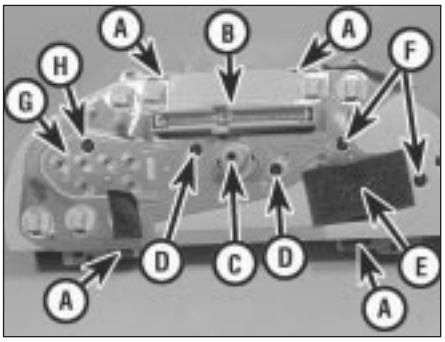
7 Separate the panel halves by releasing the

9.4c . . . then disconnect the multi-plug

10.2 Removing a bulbholder from the rear of the instrument cluster (bayonet type fitting)



10.3 Unclipping the multi-plug retainer from the rear of the instrument cluster



10.7 Rear view of instrument cluster

A Retaining tags
B Multi-plug retainer
C Speedometer cable connection
D Speedometer gauge retaining screws
E Tachometer terminals (obscured by protective pad)
F Tachometer gauge retaining screws
G Fuel and temperature gauge assembly terminals
H Fuel and temperature gauge assembly retaining screw

retaining tags, taking care to avoid damaging or losing the warning light graphic strips **(see illustration)**.

8 Remove its two Torx-head retaining screws, then detach and withdraw the speedometer from the front of the assembly.

Tachometer

9 Carry out the procedure given in paragraphs 6 and 7.

10 Carefully prise the printed circuit from the tachometer terminals, using a similar method to that described in paragraph 5, releasing it from its retainers as necessary.

11 Remove its two Torx-head retaining screws, then unclip and withdraw the tachometer from the front of the assembly.

Fuel and temperature gauge assembly

12 Removal and refitting procedures are similar in method to those for the tachometer, but only one Torx-head screw retains the assembly.

Refitting

13 Refitting is a reversal of removal.

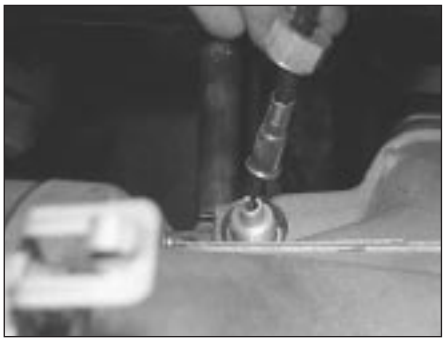
11 Speedometer cable - removal and refitting

Removal

1 Remove the instrument panel as described in Section 9.

2 Unscrew the speedometer cable from the pinion/speed sensor on the transmission **(see illustration)**.

3 Release the cable-ties and retaining clips in the engine compartment, and withdraw the cable grommet from the bulkhead.



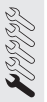
11.2 Detaching the speedometer cable at the transmission casing

4 Note the cable routing for use when refitting. Pull the speedometer cable through into the engine compartment, and remove it from the car.

Refitting

5 Refitting is the reversal of removal. Ensure that the cable is routed as noted before removal, secured with the relevant clips and cable-ties, and that the grommet is properly located in the bulkhead.

12 Cigarette lighter - removal and refitting



Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

2 Remove the cigarette lighter element (heated section).

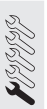
3 Carefully prise the element barrel out from the illuminated surround, disconnecting its multi-plug as it is withdrawn.

4 Hinge the illuminated surround out carefully, removing its bulb feed connector as it is withdrawn.

Refitting

5 Refitting is a reversal of the removal procedure.

13 Clock - removal and refitting



Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

2 Using a thin flat-bladed screwdriver, carefully prise the clock out of the facia **(see illustration)**. Use a piece of card or similar to prevent damage to the facia. Withdraw the clock so that its multi-plug may be disconnected, then remove it from the vehicle.

Refitting

3 Refitting is a reversal of removal. Reset the clock on completion.

13.2 Carefully prise the clock out of the facia

14 Horn - removal and refitting

Removal

1 The horn is mounted forward on the left-hand side of the engine compartment, near the battery.

2 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

3 Remove the wiring loom connection from the horn(s).

4 Both single and dual horns are mounted to a bracket which is secured to the bodywork by a single bolt. Remove the bolt and withdraw the horn(s) and bracket from the vehicle. The horn(s) may be separated from the bracket, as required, by removing the retaining nut(s).

Refitting

5 Refitting is a reversal of removal.

15 Wiper arms - removal and refitting

Removal

1 With the wiper(s) "parked" (ie in the normal at-rest position), mark the positions of the blade(s) on the screen, using a wax crayon or strips of masking tape.

2 Lift up the plastic cap from the bottom of the wiper arm, and loosen the nut one or two turns.

3 Lift the wiper arm, and release it from the taper on the spindle by moving it from side to side.

4 Completely remove the nut and washer, then withdraw the wiper arm from the spindle.

Refitting

5 Refitting is a reversal of the removal procedure. Make sure that the arm is fitted in the previously-noted position.

16.6a Remove all retaining screws from the right-hand half of the bulkhead panel (upper centre screw shown) . . .

16.6b . . . then disengage the right-hand half of the panel from under its single retaining nut (left-hand shown)

16.7 Unscrew the nut from the wiper motor driving shaft

16 Windscreen wiper motor and linkage - removal and refitting

Removal

Wiper motor

1 Operate the wiper motor, then switch it off so that it returns to its rest position.
2 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
3 Dependent on model, disconnect and remove the air cleaner components as necessary to allow access to remove the bulkhead panel.
4 Remove the cooling system expansion tank as described in Chapter 3.
5 Release the wiring loom, any connectors, cable-ties and hoses from the right-hand half of the bulkhead panel, then remove its rubber seal.
6 The right-hand half of the bulkhead panel is secured by screws and a single nut. The nut is located behind the panel at the bonnet hinge end. Release the right-hand half of the panel and, having ensured that it is free to move, remove it **(see illustrations)**.
7 Unscrew the nut from the driving shaft, and pull the crank off the driving shaft taper **(see illustration)**.
8 Undo the three wiper motor retaining bolts and withdraw the motor assembly **(see illustrations)**. Remove the motor cover, then disconnect the multi-plug and remove the motor from the vehicle.

Linkage

9 Pull the rubber seal off the bulkhead panel.
10 Bring the windscreen wiper linkage to an accessible position, using the ignition switch as a means of stopping the wiper motor returning to the parked position.
11 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
12 Prise the linkages off their ball pivots as required, using a suitably-sized open-ended spanner. The crank has a dual (vertically stacked) ball pivot with a bellows separating the two linkages **(see illustrations)**.
13 If the running faces of the ball pivots are damaged, the pivot shaft(s) or crank must be renewed.

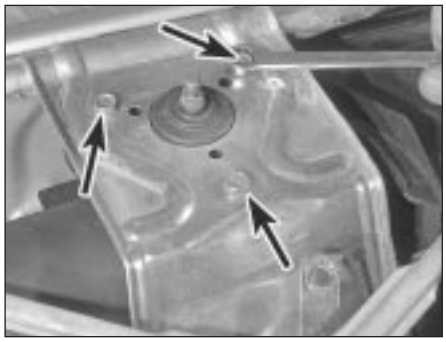
Refitting

Wiper motor

14 Refitting is a reversal of the removal procedure, tightening all nuts and bolts to the specified torque. Refit the expansion tank as described in Chapter 3.

Linkage

15 Prior to refitting, grease the ball pivot sockets on the linkages, then locate them on their appropriate ball pivots and press into position using a suitably-sized socket. The bellows between the two linkages on the crank must also be greased using the specified lubricant. Refit the bulkhead panel rubber seal on completion.



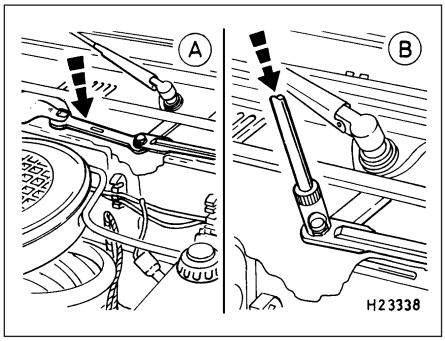
16.8a With the crank removed from the driving shaft taper, undo the three wiper motor retaining bolts (arrowed)

17 Windscreen wiper pivot shaft - removal and refitting

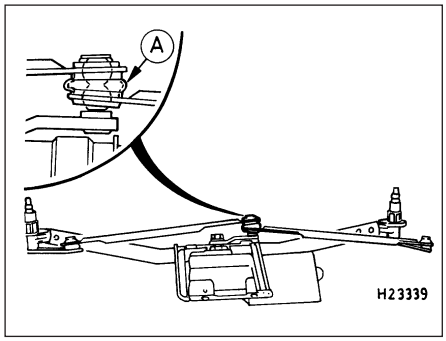
Removal

1 Remove the windscreen wiper arms as described in Section 15.

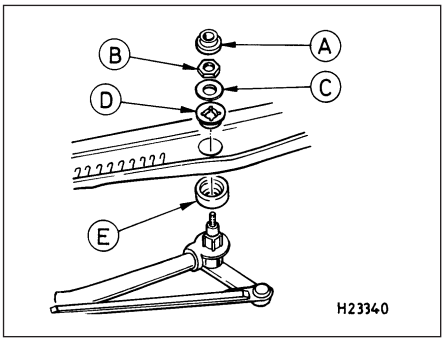
16.8b . . . and withdraw the wiper motor assembly



16.12a Windscreen wiper linkage
A Removal B Refitting



16.12b Windscreen wiper motor bracket with linkage and motor. Inset shows bellows arrangement (A)



17.3 Windscreen wiper pivot shaft fixture

A Collar
B Pivot shaft securing nut
C Washer
D Outer rubber bush
E Inner rubber bush

2 Carry out the procedure detailed in Section 16, paragraphs 2 to 6.
3 Remove the collars from the pivot shafts, unscrew the pivot shaft securing nuts and remove the washers and outer rubber bushes **(see illustration)**.
4 Undo the two wiper motor bracket securing bolts and remove the bracket assembly from the vehicle, disconnecting the multi-plug from the motor as the assembly is withdrawn **(see illustration)**.
5 Remove the inner rubber bush from the pivot shaft being renewed, and disconnect its linkage as described in paragraph 12 of the previous Section.
6 Remove the circlip, washers, shims and O-ring, keeping them in order for refitting, and withdraw the pivot shaft from the wiper motor bracket assembly.

Refitting

7 Refitting is a reversal of the removal procedure, greasing the pivot shaft with the specified lubricant before inserting it to its location. Refer to paragraph 15 in the previous Section before refitting the linkage. Reference must also be made to the *Specifications* for details of tightening torques.
8 Refit the windscreen wiper arms in accordance with Section 15. Refit the expansion tank as described in Chapter 3.

18 Tailgate wiper motor assembly - removal and refitting

Removal

1 Operate the wiper, then switch it off so that it returns to its rest position. Note that the wiper motor will only operate with the tailgate shut, as the spring-tensioned connector pins must be in contact with the contact plates.
2 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
3 Remove the wiper arm with reference to Section 15.

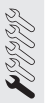
17.4 Removing the wiper motor bracket and linkage assembly (wiper motor removed)

4 Remove the tailgate trim panel as described in Chapter 11.
5 Disconnect the wiper motor multi-plug and earth lead, then undo the three bolts securing the wiper motor bracket, and remove the assembly from the vehicle **(see illustration)**.
6 The wiper motor may be separated from its bracket by undoing the three mounting bolts securing it. Note washer/spacer and rubber insulator fitment.

Refitting

7 Refitting is a reversal of the removal procedure, ensuring that the wiper motor shaft locates through its collar on the exterior panel surface. Tighten all bolts to their specified torque.

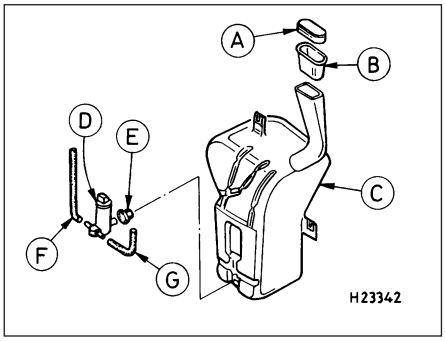
19 Windscreen/tailgate washer system components - removal and refitting



Removal

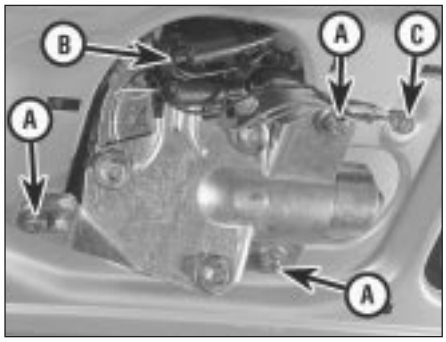
Washer pump

1 Chock the rear wheels then jack up the front of the car and support it on axle stands (see *"Jacking and vehicle support"*).
2 Withdraw the washer pump from the reservoir, collecting the fluid in a suitable container as the pump is removed. Note the seal fitment **(see illustration)**.
3 Having noted hose fitment to pump connectors, remove the multi-plug and hoses, then remove the pump from the vehicle.
4 Examine the pump seal. If it is perished or otherwise damaged, it should be replaced.



19.2 Exploded view of windscreen/tailgate washer reservoir and pump components

A Cap
B Filter
C Reservoir
D Washer pump
E Pump seal
F Tailgate washer hose
G Windscreen washer hose (marked with adhesive tape)

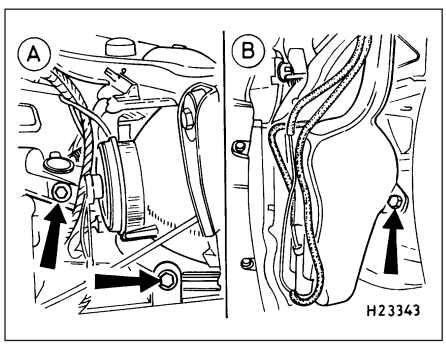


18.5 Tailgate wiper motor

A Wiper motor bracket retaining bolts
B Wiper motor and tailgate "contact fingers" multi- plugs
C Earth connection

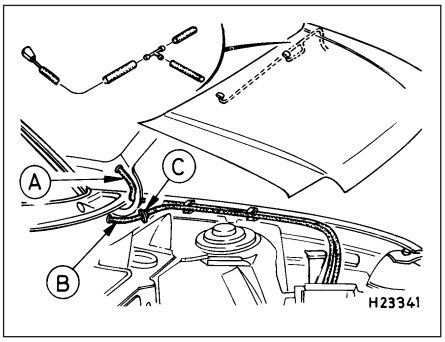
Reservoir

5 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
6 Chock the rear wheels then jack up the front of the car and support it on axle stands (see *"Jacking and vehicle support"*). Remove the left-hand front roadwheel.
7 Remove the wheelarch liner as described in Chapter 11.
8 Withdraw the windscreen/tailgate washer pump from the reservoir with its hoses and multi-plug attached, collecting the fluid in a suitable container. Note the seal fitment.
9 Release the hoses and wiring from the reservoir guide and remove the three reservoir securing bolts **(see illustration)**. Remove the reservoir.



19.9 Windscreen/tailgate washer reservoir securing bolts (arrowed)

A In engine compartment
B In wheelarch (wheelarch liner removed)



19.16 Routing of washer hoses in the engine compartment

A Windscreen washer hose
B Tailgate washer hose
C Tailgate washer hose one-way valve

Windscreen washer jets and hoses

10 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
11 With the bonnet raised and supported on its stay, release the fasteners securing its insulation panel (where fitted). Remove the insulation panel.
12 Carefully press in the retaining lugs on the washer jets using a flat-bladed screwdriver, then raise the washer jets from the exterior surface of the bonnet and separate them from their hoses
13 The windscreen washer jet hose may have been fitted with a one-way (non-return) valve. If this is the case, the main hose run sections can be removed from either side of the valve as required.
14 Chock the rear wheels then jack up the front of the car and support it on axle stands (see *"Jacking and vehicle support"*).
15 Disconnect the windscreen washer hose (marked with adhesive tape) from the washer pump **(see illustration 19.2)**. Withdraw the hose from the reservoir guide, and into the engine compartment.
16 Release the hose from its clips in the engine compartment, including the bonnet hinge clip, release the hose grommet from the bonnet (where fitted) and withdraw the hoses from the bonnet **(see illustration)**.

Tailgate washer jet and hose

17 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
18 On XR2i models, remove the tailgate spoiler as described in Chapter 11.
19 Remove the central blanking plug from the upper interior surface of the tailgate, to expose the washer jet base.
20 Depress the washer jet retaining lug using a flat-bladed screwdriver, then push the washer jet out through the panel. From the outside, fully withdraw the washer jet and disconnect it from its hose. Note washer jet seal fitment.
21 Remove the left-hand sun visor.
22 Remove the left-hand A-pillar trim as described in Chapter 11.
23 Release the left-hand side of the headlining by removing the retaining clips/grab handles/coat hooks, as applicable.
24 In the engine compartment, disconnect the tailgate washer hose from its valve. The forward hose run may be removed, if required, in a manner similar to that described in paragraphs 15 and 16 above, releasing it from its clips in the engine compartment.
25 Remove the tailgate washer hose grommet, then withdraw the hose through the bulkhead into the passenger compartment.
26 Release the hose from its A-pillar and roof frame locations. Release the grommet (hose protector) from its tailgate and body locations, and withdraw the hose from the vehicle.

Refitting

27 Refitting is a reversal of removal. Always renew the pump-to-reservoir seal washer, and ensure that all connections are securely made. When reconnecting the pump hoses, ensure that the hose marked with tape is connected to the correspondingly marked connection on the pump.
28 On completion, top-up the washer reservoir (*"see Weekly checks"*) and check that the operation of the washers is satisfactory. If necessary, adjust the windscreen washer jets by inserting a pin into the centre of the jet and directing the flow at the top part of the windscreen.

20 Electric window regulator motor - removal and refitting

Removal

1 Remove the window regulator from the vehicle, as described in Chapter 11.
2 To remove the motor from the regulator mechanism, undo and remove the two Torx head bolts securing it, then carefully separate by unscrewing **(see illustration)**.

Refitting

3 Carefully screw the motor shaft into the regulator mechanism.
4 Temporarily connect the multi-plug, switch on the ignition and activate the motor, to engage and pull the motor fully into the regulator mechanism.
5 Ensure that the multi-plug connection is located on top of the motor (as if the window regulator is in position in the door), before securing the motor to the regulator mechanism with its two Torx-head bolts.
6 Switch off the ignition and disconnect the multi-plug.
7 Refit the window regulator to the vehicle, in accordance with Chapter 11.

21 Tailgate remote release motor - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
2 Remove the tailgate inner trim panel as described in Chapter 11.
3 Remove the two motor securing screws, then twist the operating rod retaining clip and withdraw the operating rod from it.
4 Disconnect the wiring and remove the motor assembly.
5 The motor may be separated from its bracket by removing two further screws.

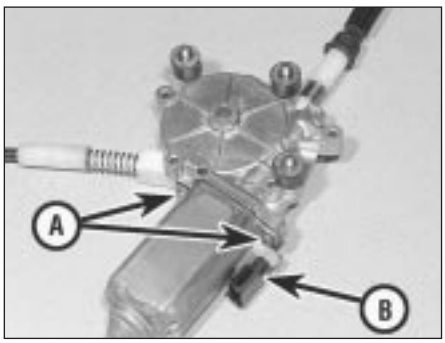
Refitting

6 Refitting is a reversal of the removal procedure.

22 Radio/cassette player - removal and refitting

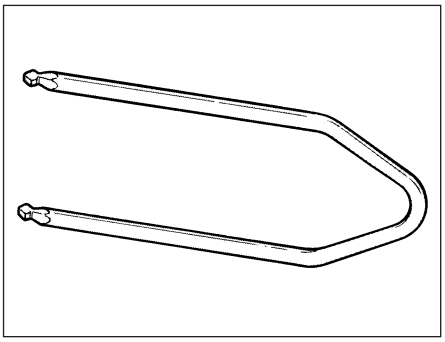
Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).
2 Unscrew the four hexagonal head securing pins from the corners of the unit with an Allen key **(see illustration)**.
3 In order to release the radio retaining clips, two U-shaped rods must be inserted into the special holes on each side of the radio **(see**



20.2 Electrically operated window motor-securing bolts (A), and multi-plug connection (B)

22.2 Unscrewing the securing pins from the radio/cassette player



22.3 Radio/cassette player extractor tool

23.3 Remove the screws securing the speaker assembly to the front door

illustration). If possible, it is preferable to obtain purpose-made rods from an audio specialist, as these have cut-outs which snap firmly into the clips so that the radio can be pulled out. Pull the unit squarely from its aperture, or it may jam.

4 With the radio/cassette sufficiently withdrawn, disconnect the feed, earth, aerial and speaker leads.

5 Remove the tools from the unit by gently wiggling and pulling.

Refitting

6 Refitting is a reversal of removal. When the leads are reconnected to the rear of the unit, press it into position to the point where the retaining clips are felt to engage. Reactivate the unit in accordance with the code and the instructions given in the Ford Audio Operating Manual supplied with the vehicle.

23 Speakers - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

Front speaker

2 Remove the side door inner trim panel as described in Chapter 11.

3 Remove the four screws securing the speaker assembly to the door and withdraw the speaker from the door. Disconnect its multi-plug as it is withdrawn **(see illustration)**.

Rear speaker

4 The rear speakers are suspended beneath the parcel shelf supports and are secured in position by locating tags and screws.

5 Remove the securing screws then lower the speaker, disengaging its locating tags from the parcel shelf support **(see illustrations)**. Disconnect its multi-plug as it is withdrawn.

Refitting

6 Refitting is a reversal of the removal procedure.

24 Speaker balance control joystick - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

2 Using a thin flat-bladed screwdriver, carefully prise the joystick assembly out of the facia. Use a piece of card or similar to prevent damage to the facia. Withdraw the assembly so that its multi-plug may be disconnected, then remove it from the vehicle **(see illustration)**.

Refitting

3 To refit, first connect its multi-plug then push home to secure.

4 Reconnect the battery negative lead.

25 Radio aerial - removal and refitting

Note: *The roof-mounted aerial mast section should be removed prior to using an automatic carwash. This is achieved by unscrewing it from the aerial base.*

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

2 Unscrew the aerial mast section, then remove the base section as follows. Insert a thin flat-bladed screwdriver into the slot in the interior (courtesy) light assembly and carefully lever the assembly out.

3 Through the resultant opening, the aerial base securing screw is accessible. Remove the screw and detach the aerial base from the roof of the vehicle, having noted the aerial lead fitment.

Refitting

4 Refitting is a reversal of the removal procedure, ensuring that the aerial base sits squarely on the roof. Insert the switch end of the light assembly to its aperture first, then pivot the light upwards and push home to secure.

26 "Lights-on" warning module - removal and refitting

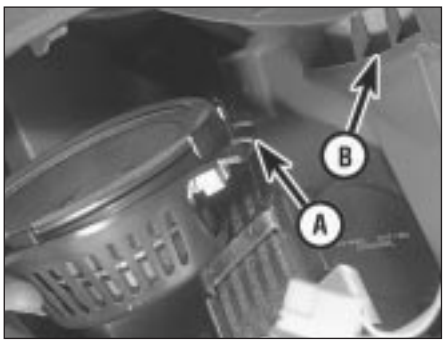
Removal

The "lights-on" warning feature is fitted to certain models from 1993 onwards. The warning module, which resembles an ordinary relay, is located behind the facia, between the steering column and radio/cassette player. It can be removed by reaching up behind the facia and unclipping it from its mounting.

Refitting

Refitting is a reversal of removal.

23.5a Remove the rear speaker securing screws . . .



23.5b . . . then disengage the locating tags (A) from their location on the parcel shelf support (B)

24.2 Carefully prise the speaker balance control joystick from its location

27 Anti-theft systems - general information

Anti-theft alarm system

1 This system provides an added form of vehicle security. When the system is activated, the alarm will sound if the vehicle is broken into through any one of the doors, the bonnet, or tailgate. The alarm will also be triggered if the ignition system is turned on or the radio/cassette disconnected whilst the system is activated.
2 This system is activated/de-activated whenever one of the front doors is locked/unlocked by the key. The system operates on all doors, the bonnet and tailgate whenever each door is individually locked (or, in the case of central locking, when the central locking is engaged). In addition, the ignition/starting system is also immobilised when the system is activated.
3 A further security feature included is that even though the battery may be disconnected whilst the system is activated, the alarm activation continues as soon as the battery is reconnected. Because of this feature, it is important to ensure that the system is de-activated before disconnecting the battery at any time, such as when working on the vehicle.
4 The system incorporates a diagnostic mode to enable Ford technicians to quickly identify any faults in the system. In the event of a system malfunction, any testing or component removal and refitting should be entrusted to a Ford dealer.

Passive Anti-Theft System (PATS)

5 From 1994 model year onwards, a Passive Anti-Theft System (PATS) is fitted. This system, (which works independently of the standard alarm system) is a vehicle immobiliser which prevents the engine from being started unless a specific code, programmed into the ignition key, is recognised by the PATS transceiver.
6 The PATS transceiver, fitted around the ignition switch, decodes a signal from the ignition key as the key is turned from position "O" to position "II". If the coded signal matches that stored in the memory of the PATS module, the engine will start. If the signal is not recognised, the engine will crank on the starter but will not fire.

28 Air bag (driver's side) - removal and refitting

Warning: Handle the air bag with extreme care as a precaution against personal injury, and always hold it with the cover facing away from your body. If in doubt concerning any proposed work involving the air bag or its control circuitry, consult a Ford dealer or other qualified specialist.

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

Warning: Before proceeding, wait a minimum of 15 minutes, as a precaution against accidental firing of the air bag. This period ensures that any stored energy in the back-up capacitor is dissipated.
2 Undo the screws, and remove the steering column lower shroud.
3 Undo the two external screws and the two internal screws and remove the steering column upper shroud.
4 Turn the steering wheel as necessary so that one of the air bag module retaining bolts becomes accessible from the rear of the steering wheel. Undo the bolt, then turn the steering wheel again until the second bolt is accessible. Undo this bolt also.
5 Withdraw the air bag module from the steering wheel far enough to access the wiring multi-plug. Some force may be needed to free the module from the additional steering wheel spoke retainers.
6 Disconnect the multi-plug from the rear of the module, and remove the module from the vehicle.

Warning: Position the air bag module in a safe place, with the mechanism facing downwards as a precaution against accidental operation.

Warning: Do not attempt to open or repair the air bag unit, or apply any electrical current to it. Do not use any air bag which is visibly damaged or which has been tampered with.

Refitting

7 Refitting is a reversal of the removal procedure.

29 Air bag (passenger's side) - removal and refitting

Warning: Handle the air bag with extreme care as a precaution against personal injury, and always hold it with the cover facing away from your body. If in doubt concerning any proposed work involving the air bag or its control circuitry, consult a Ford dealer or other qualified specialist.

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

Warning: Before proceeding, wait a minimum of 15 minutes, as a precaution against accidental firing of the air bag. This period ensures that any stored energy in the back-up capacitor is dissipated.
2 Remove the facia as described in Chapter 11.
3 Undo the air bag module retaining nuts and remove the unit from the facia.

Warning: Position the air bag module in a safe place, with the mechanism facing downwards as a precaution against accidental operation.

Warning: Do not attempt to open or repair the air bag unit, or apply any electrical current to it. Do not use any air bag which is visibly damaged or which has been tampered with.

Refitting

4 Refitting is a reversal of the removal procedure.

30 Air bag control module - removal and refitting

Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5A, Section 1).

Warning: Before proceeding, wait a minimum of 15 minutes, as a precaution against accidental firing of the air bag unit. This period ensures that any stored energy in the back-up capacitor is dissipated.
2 Remove the module access cover from the rear of the glovebox.
3 Press the module wiring multi-plug locking tag upwards then pivot the retaining strap over and disconnect the multi-plug.
4 Remove the facia as described in Chapter 11.
5 Undo the three retaining bolts and remove the module from its location.

Refitting

6 Refitting is a reversal of the removal procedure.

31 Air bag clock spring - removal and refitting

Removal

1 Remove the steering wheel as described in Chapter 10.
2 Undo the three retaining screws, and remove the clock spring from the steering wheel. As the unit is withdrawn, note which aperture in the steering wheel the air bag

wiring passes through, as an aid to reassembly.

Refitting

3 Position the clock spring on the steering wheel, routing the wiring as noted on removal, and secure with the retaining screws.

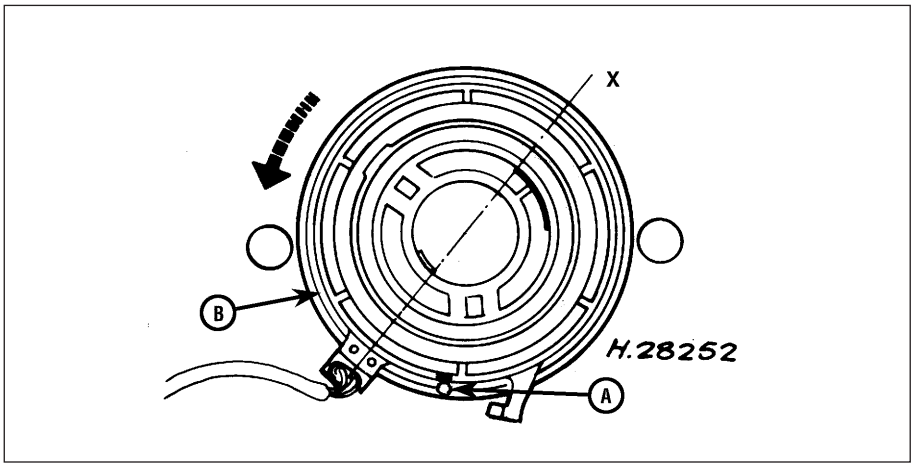
4 The clock spring must now be centred as follows.

5 Depress the locking pin, and rotate the clock spring outer rotor fully anti-clockwise until it is tight **(see illustration)**.

6 Now turn the outer rotor approximately 3.75 turns clockwise, then release the locking pin. Ensure that the locking pin engages when it is released.

7 Check that the relative position of the direction indicator cancelling cam to the cable connector on the clock spring assembly is as shown **(see illustration 31.5).**

8 Refit the steering wheel as described in Chapter 10.

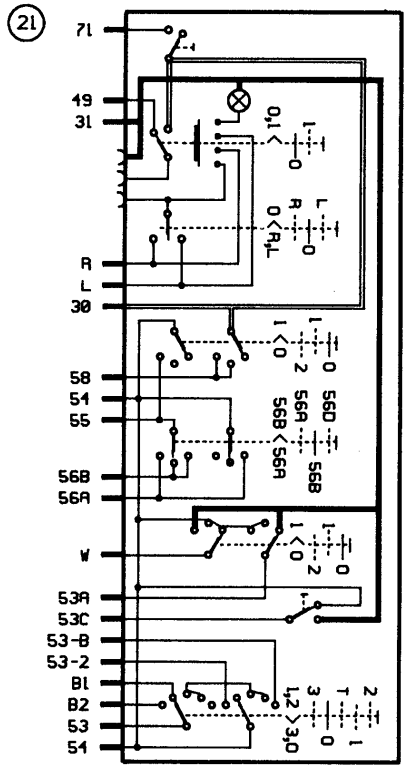


31.5 Centring the air bag clock spring. Depress locking pin (A) and rotate outer rotor (B) anti-clockwise ("X" indicates relative position of the direction indicator cancelling cam to the cable connector - see text)

NOTES:

1. All diagrams are divided into numbered circuits depending on function e.g. Diagram 2: Exterior lighting.
2. Items are arranged in relation to a plan view of the vehicle.
3. Wires may interconnect between diagrams and are located by using a grid reference e.g. 2/A1 denotes a position on diagram 2 grid location A1.
4. Complex items appear on the diagrams as blocks and are expanded on the internal connections page.
5. Brackets show how the circuit may be connected in more than one way.
6. Not all items are fitted to all models.

INTERNAL CONNECTION DETAILS



FUSEBOX

FUSE	RATING	CIRCUIT
1	3A	Electric Engine Control System
2	15A	Interior Lamp, Cigar Lighter, Clock And Radio Memory
3	20A	Central Locking
4	30A	Heated Rear Window
5	10A	Dim Dip Lighting
6	10A	LH Side Lamp And Rear Foglamp
7	10A	RH Side Lamp
8	10A	LH Dipped Beam
9	10A	RH Dipped Beam
10	15A	LH Main Beam And RH Spot Lamp
11	15A	RH Main Beam And LH Spot Lamp
12	20A	Heater Blower And Reversing Lamp
13	30A	Radiator Cooling Fan
14	15A	Front Foglamps (XR2i Only)
15	15A	Horn
16	20A	Wash/wipe
17	10A	Brake Lights And Instruments
18	30A	Electric Windows
19	20A	Electric Fuel Pump
20	10A	HEGO Sensor
21	10A	LH Direction Indicators
22	10A	RH Direction Indicators
23		Free
24		Free
25		Free
26	15A	Tailgate Release
27	30A	Heated Windscreen
28	30A	Heated Windscreen

FUSEBOX (CHANGES FROM 1992)

FUSE	RATING	CIRCUIT
25	15A	Tailgate Release
26	30A	Heated Windscreen
27	30A	Heated Windscreen
28	20A	Power Sunroof

a = No Charge Warning Lamp
b = Handbrake Warning Lamp
c = Main Beam Warning Lamp
d = Instrument Illumination
e = Fuel Gauge
f = Temperature Gauge
g = Oil Pressure Lamp
h = Tachometer
i = Voltage Stabilizer
j = ABS Warning Lamp
k = Choke Warning Lamp
l = Dir. Ind. Warning Lamp LH
m = Dir. Ind. Warning Lamp RH

KEY TO INSTRUMENT CLUSTER

KEY TO SYMBOLS

PLUG-IN CONNECTOR

EARTH G1004

BULB

DIODE

SOLDERED JOINT S1003

FUSE/ FUSIBLE LINK

Notes, internal connection details, and key to symbols

H24500
T.M.MARKE

12

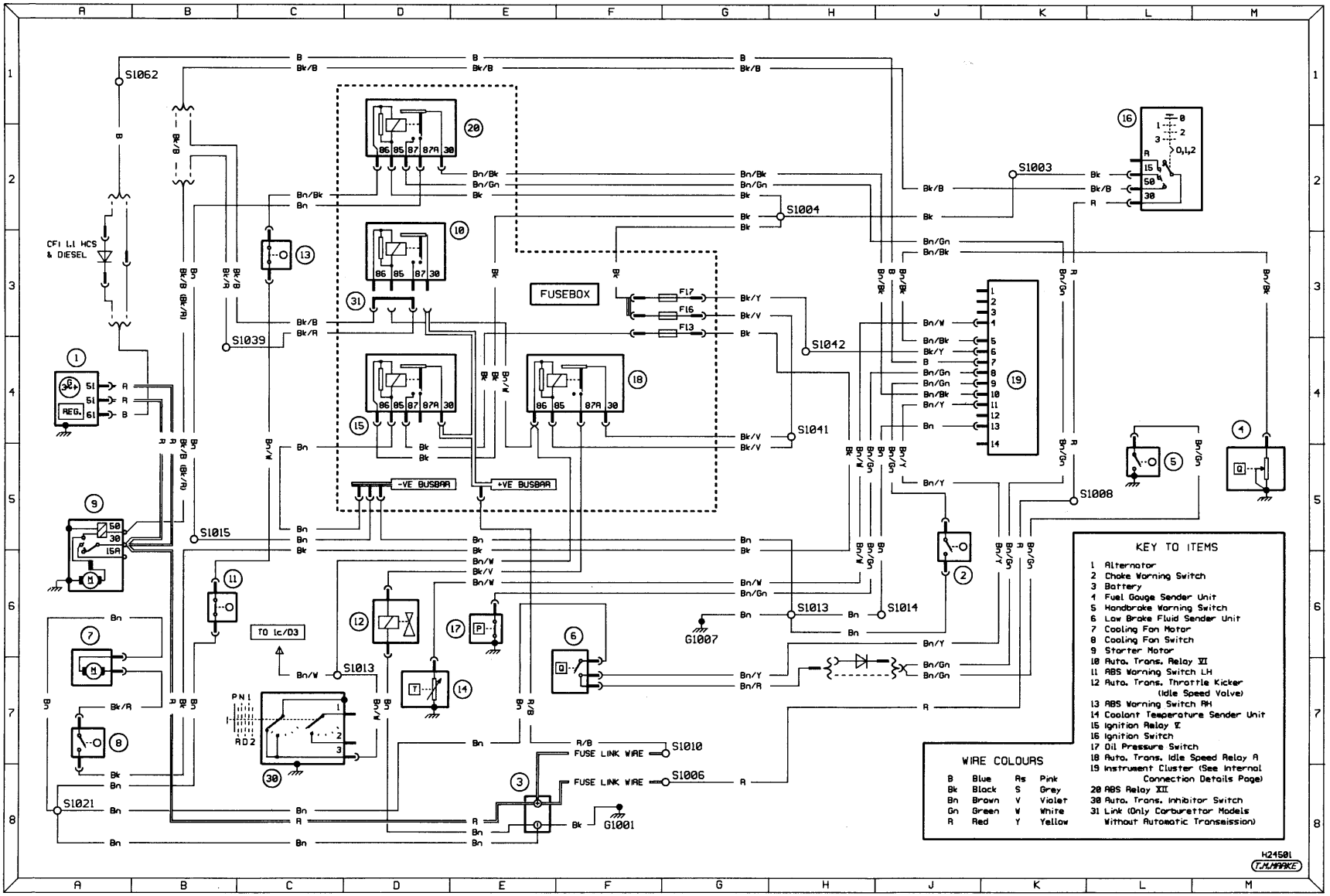


Diagram 1: Starting, charging, cooling fan, ABS, warning lamps and gauges

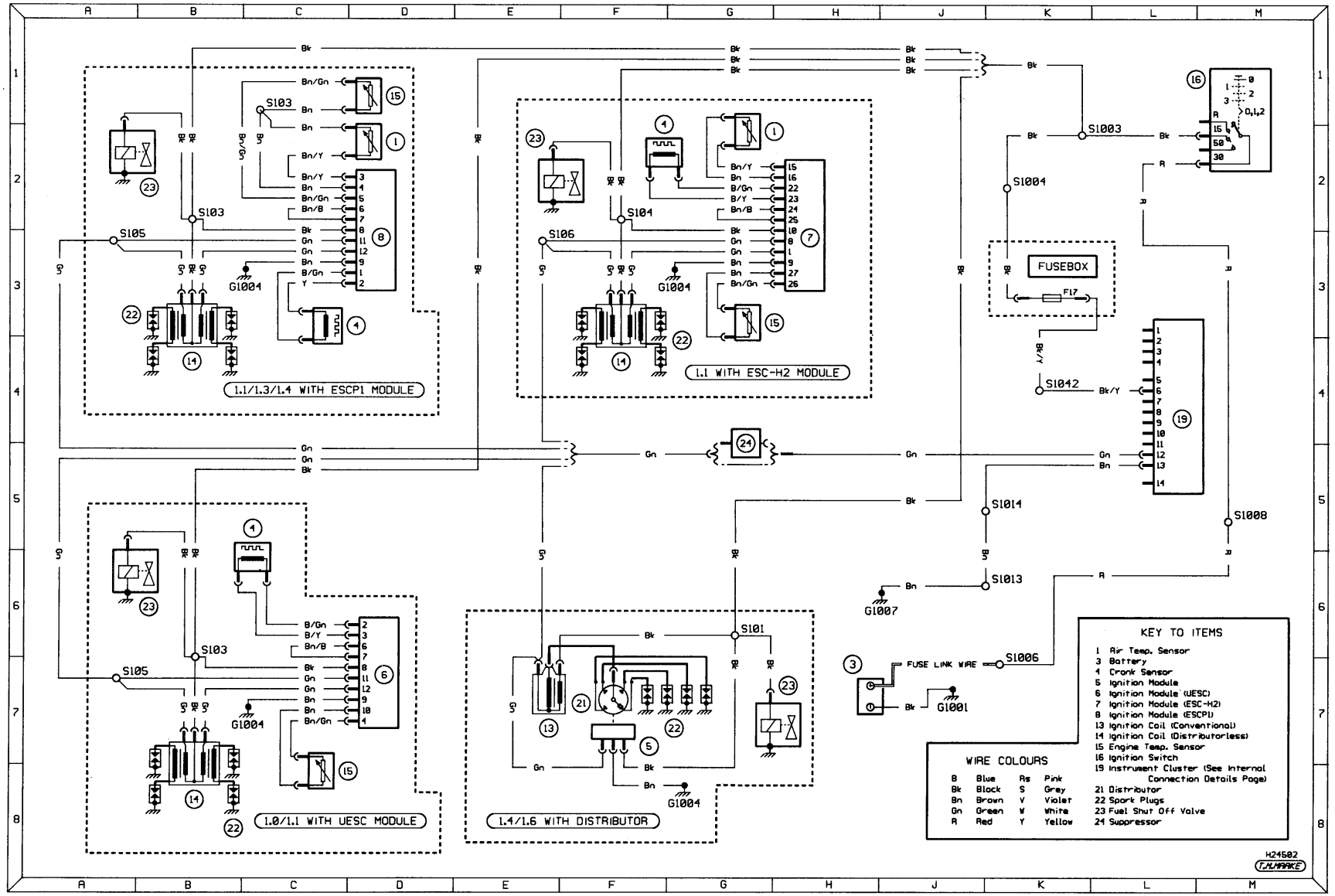


Diagram 1a: Ignition system – carburettor models

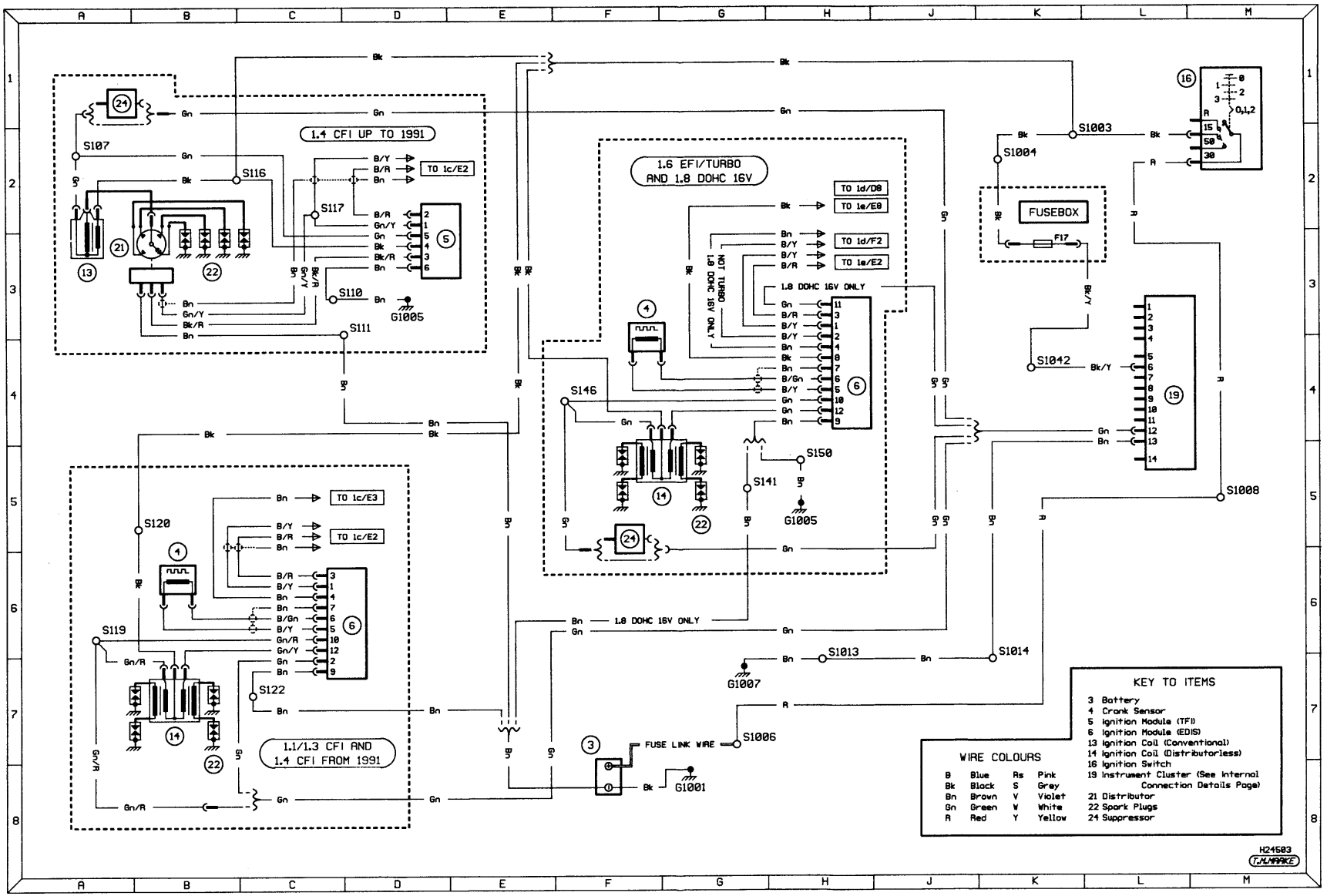


Diagram 1b: Ignition system – fuel-injected models

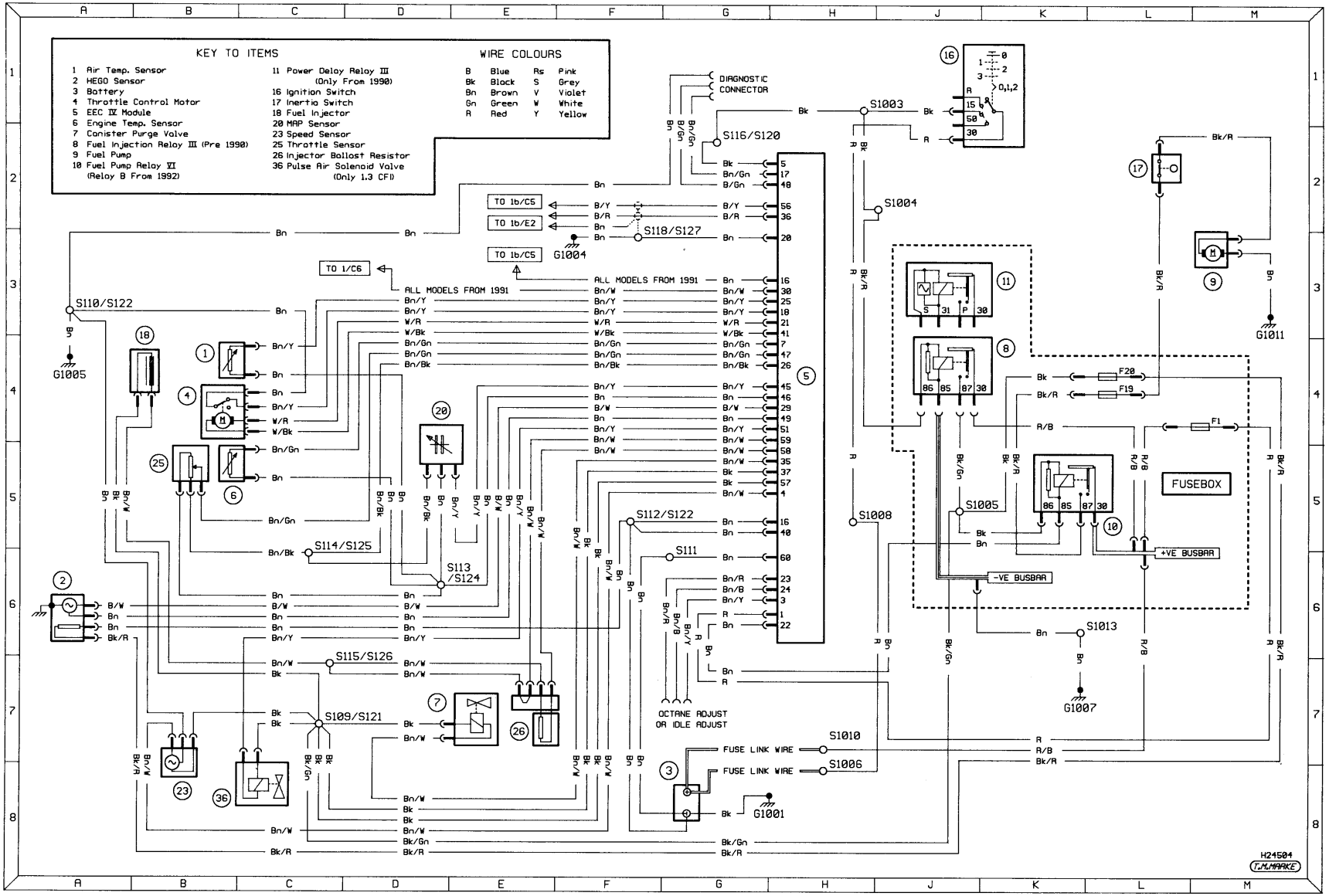


Diagram 1c: Typical 1.1/1.3/1.4 CFi fuel injection

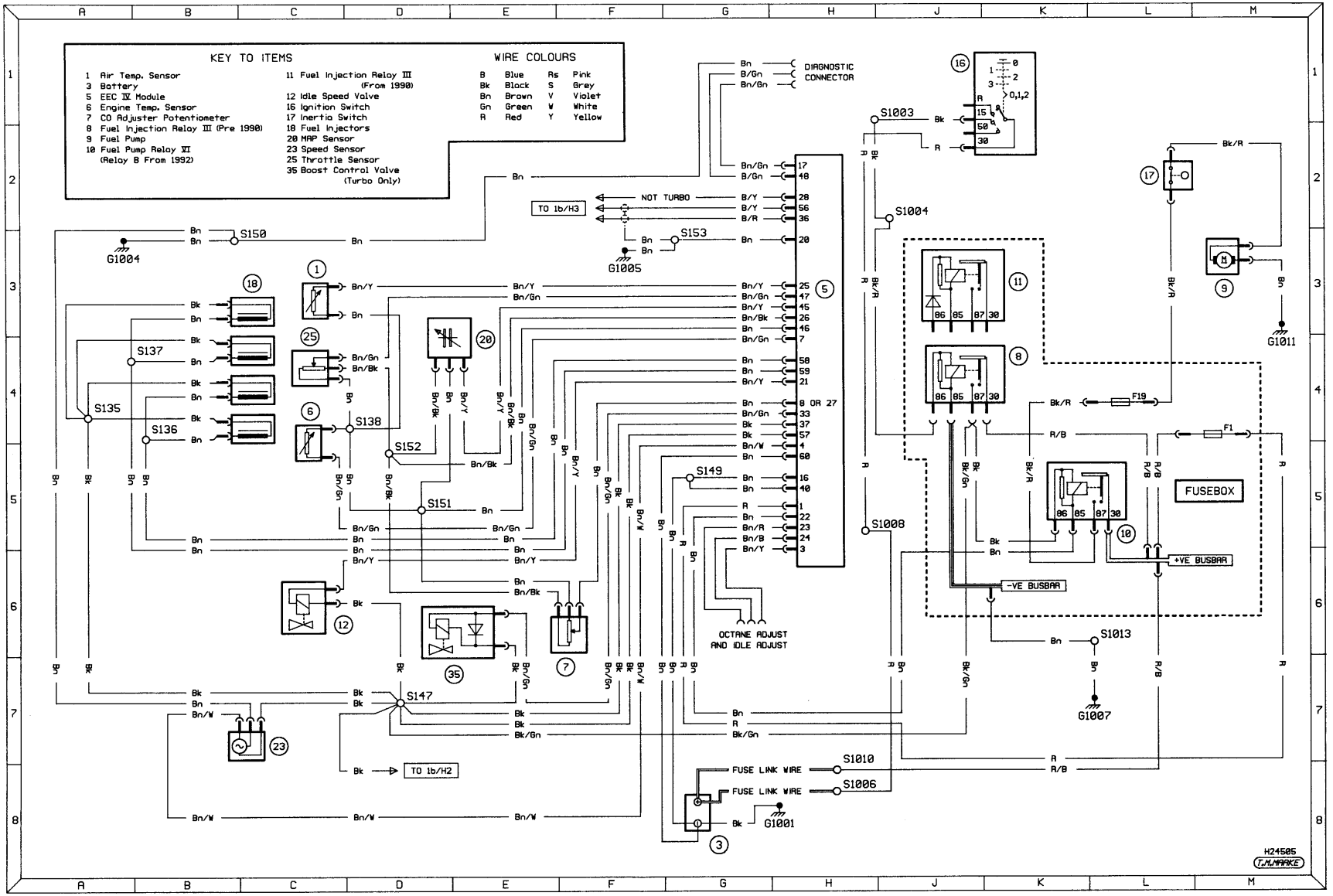


Diagram 1d: 1.6 EFi fuel injection (including RS Turbo)

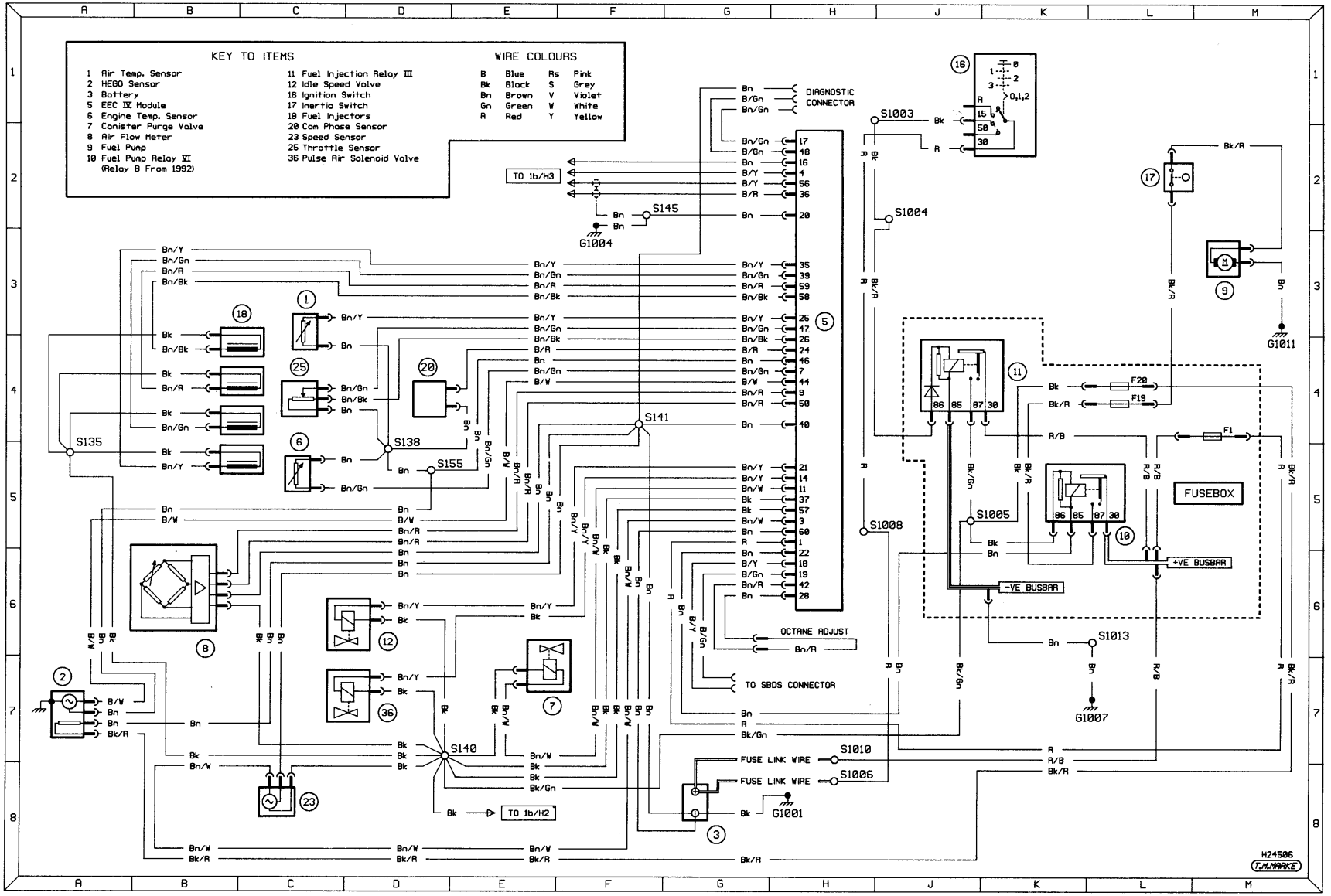


Diagram 1e: DOHC 16-valve fuel injection

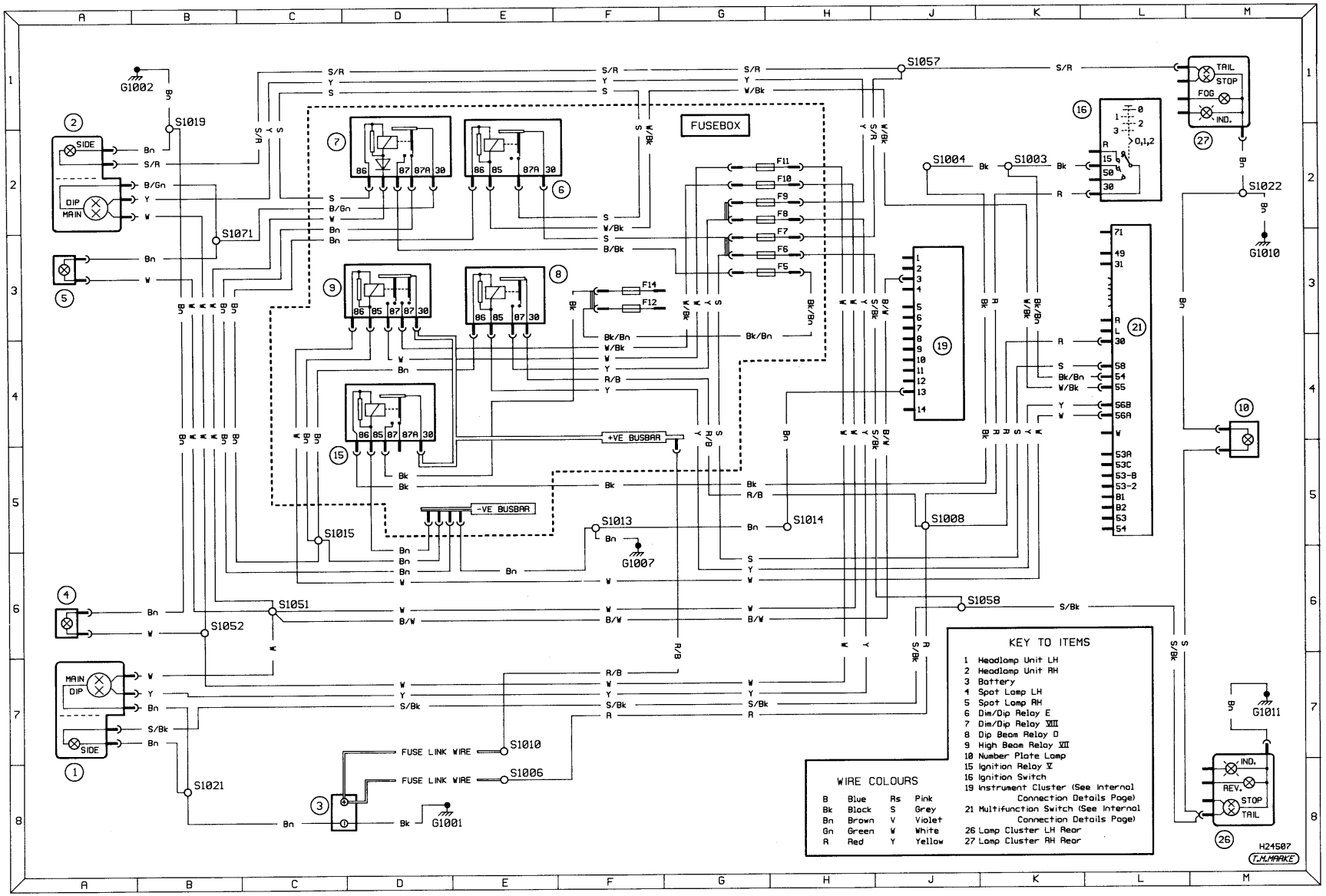


Diagram 2: Exterior lighting – side and headlamps

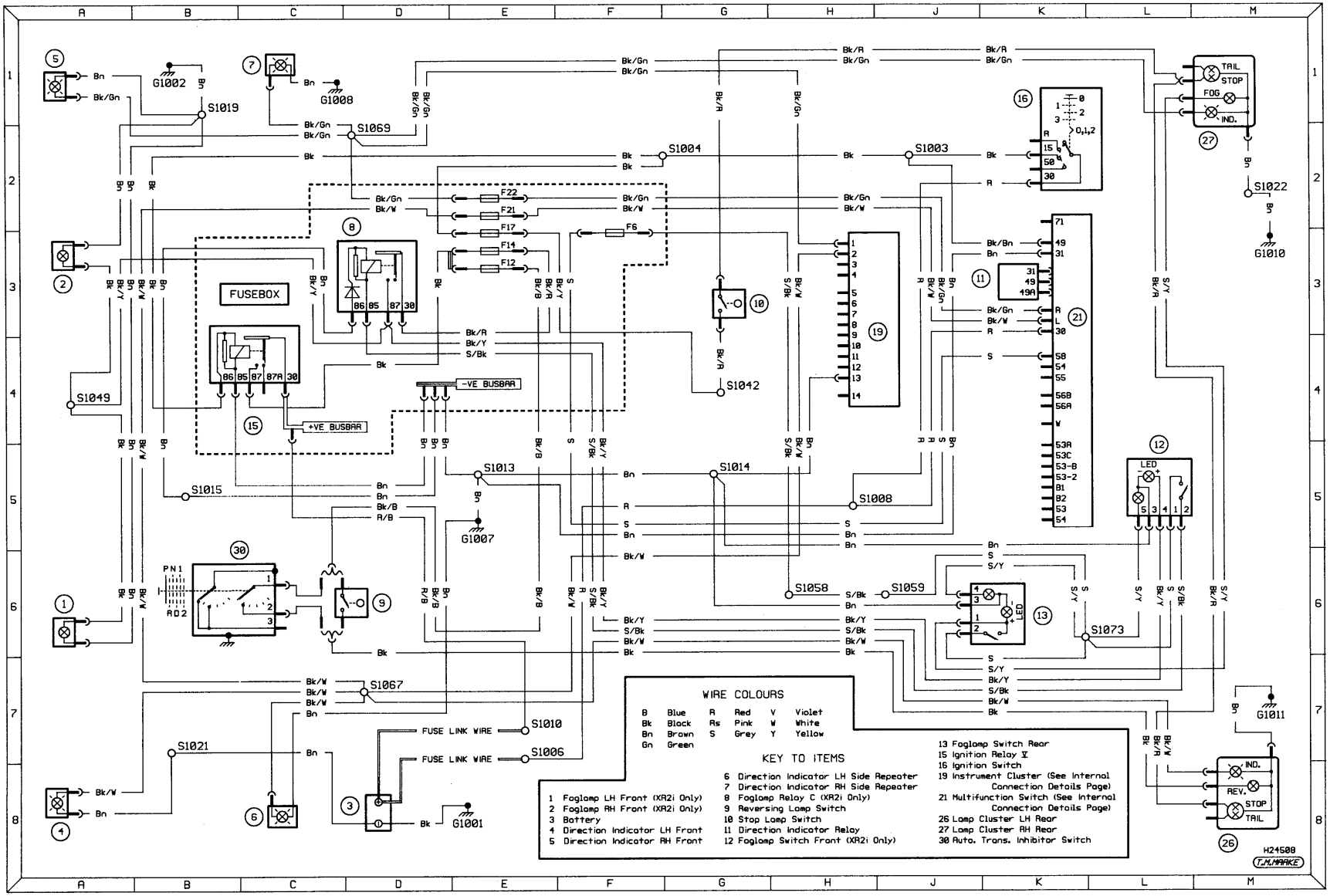


Diagram 2a: Exterior lighting – stop, reversing, fog and direction indicator lamps

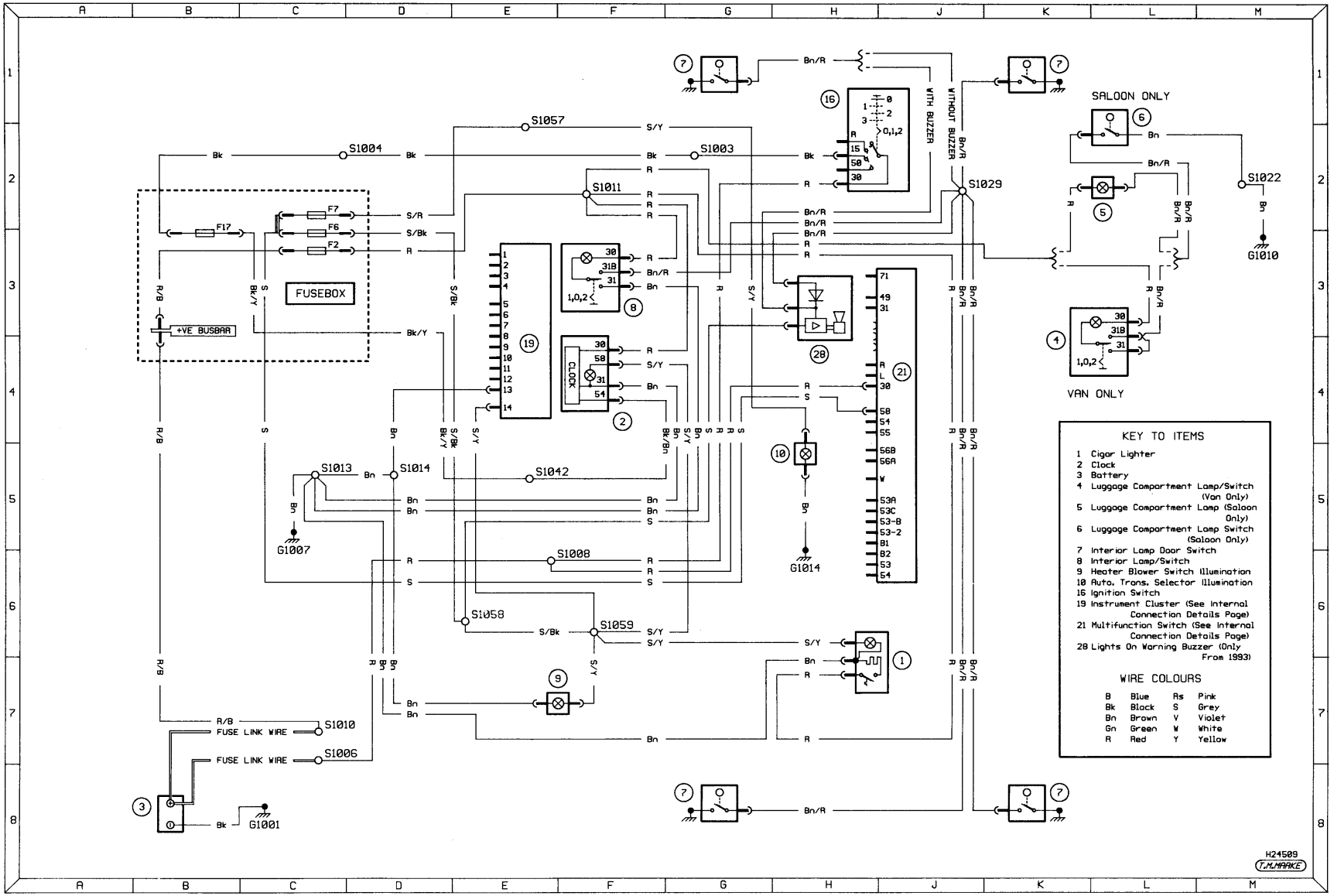


Diagram 2b: Interior lighting, lights-on warning buzzer, clock and cigar lighter

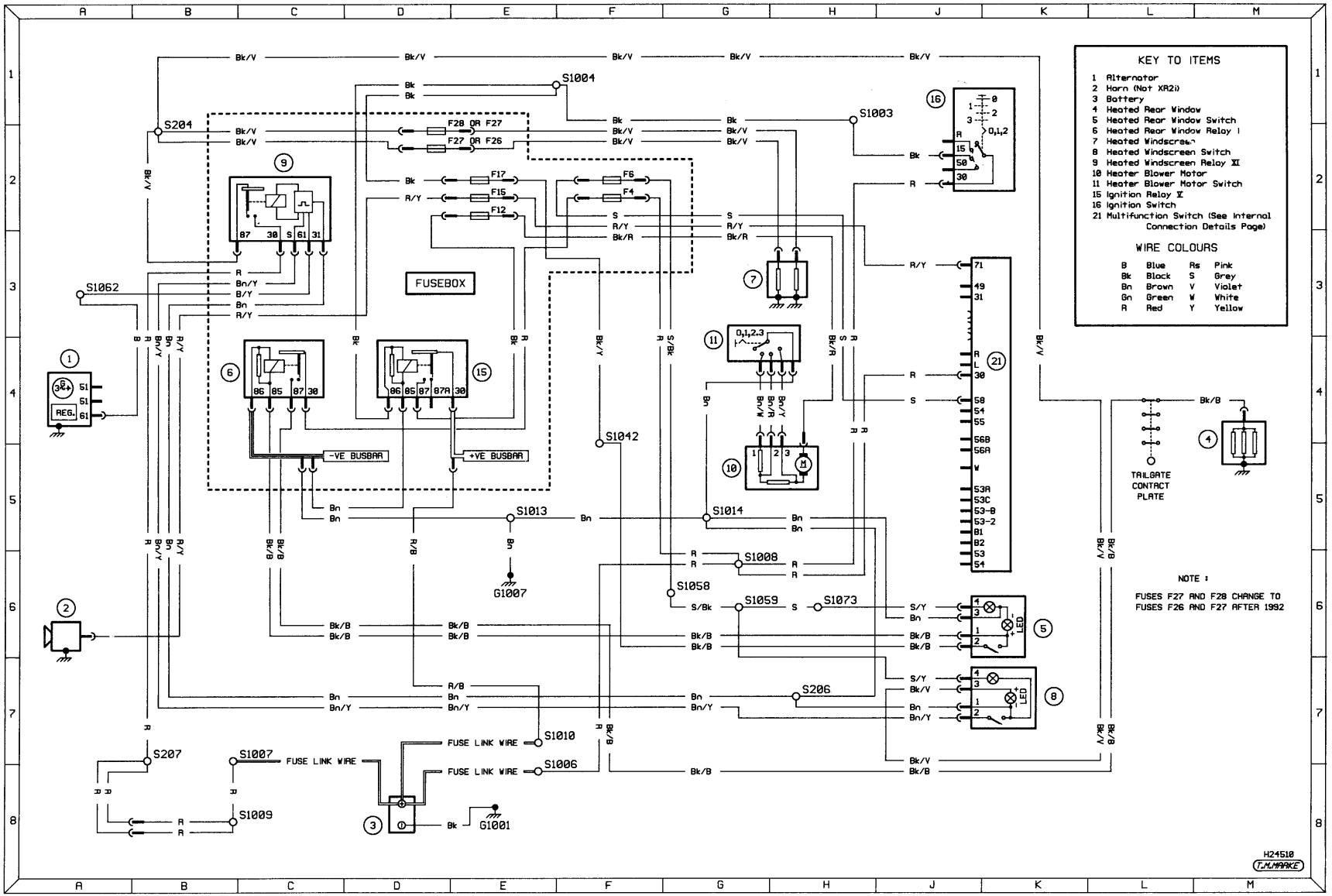


Diagram 3: Ancillary circuits – horn (except XR2i/RS models), heater blower and heated front /rear screens

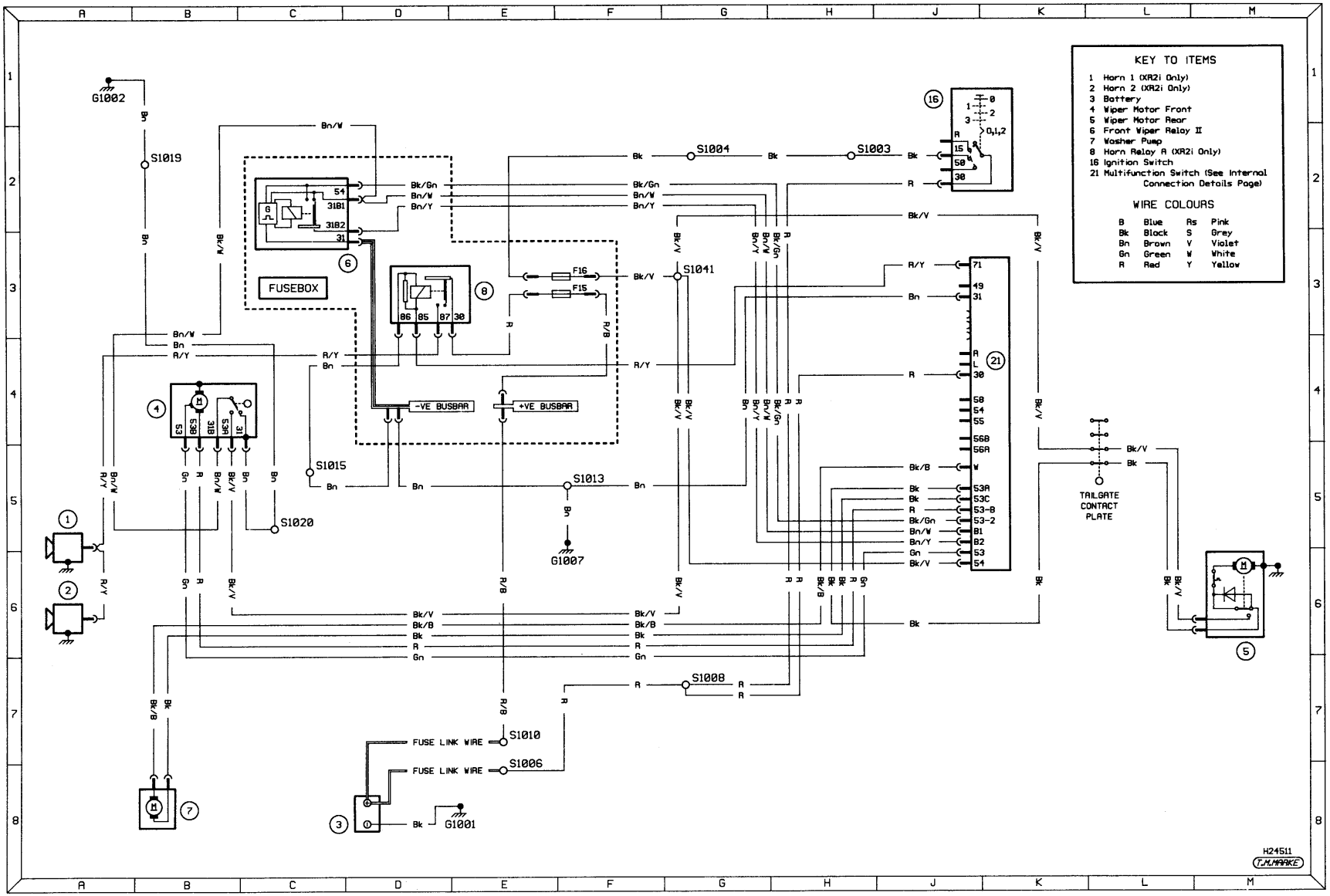


Diagram 3a: Ancillary circuits – horn (R2i and RS models) and wash/wipe

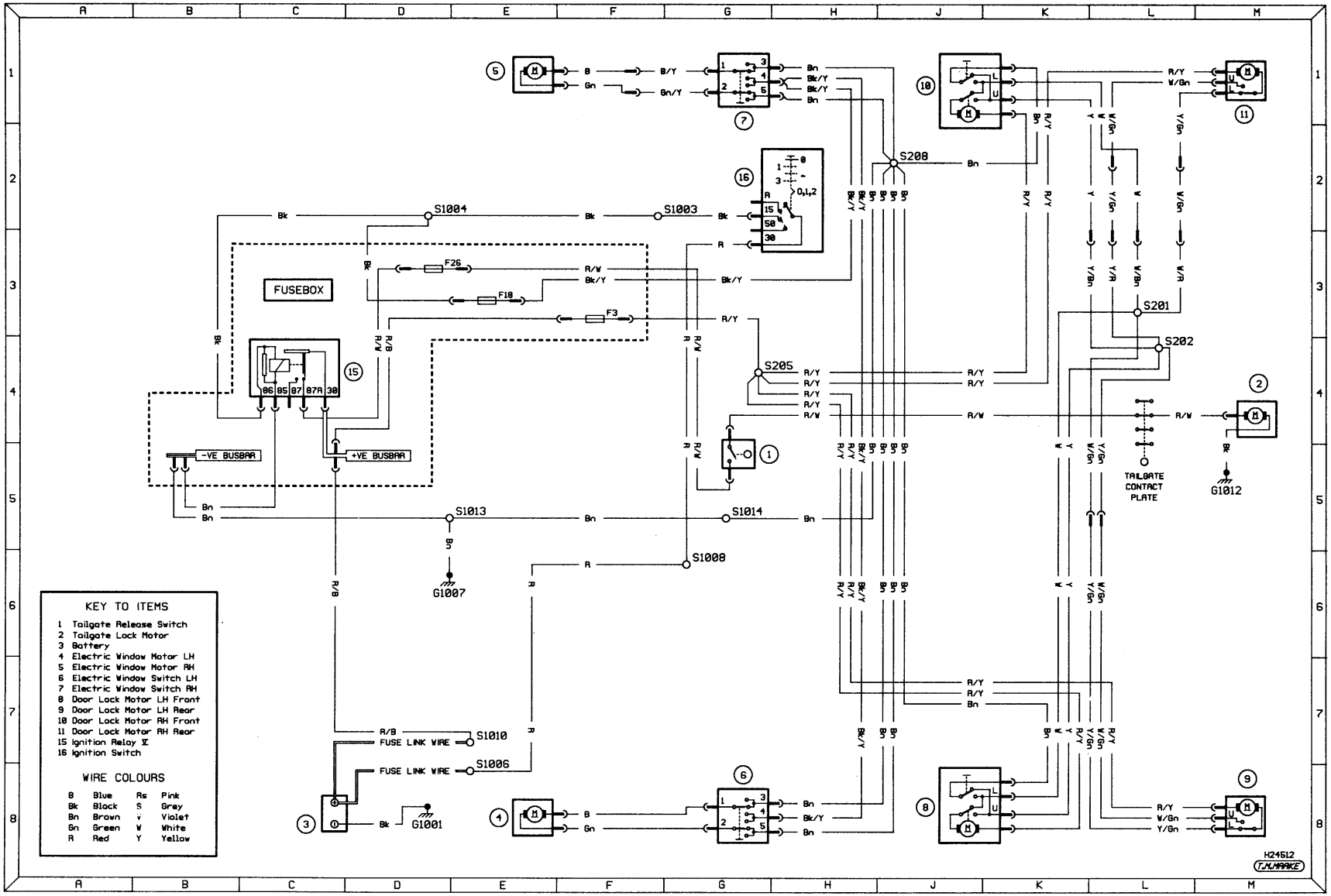


Diagram 3b: Ancillary circuits – central locking, electric windows and tailgate release (up to 1992)

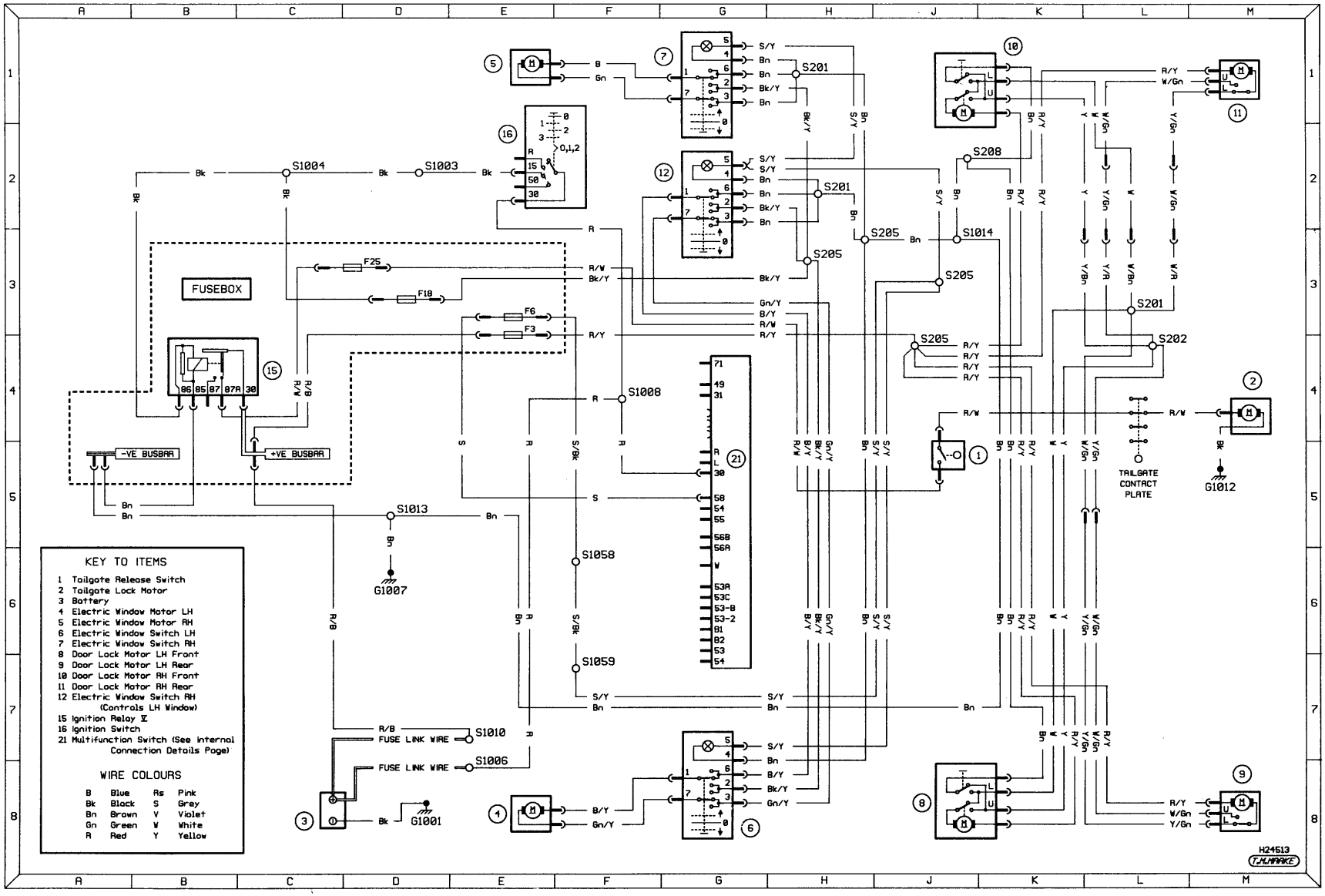


Diagram 3c: Ancillary circuits – central locking, electric windows and tailgate release (1992-on)

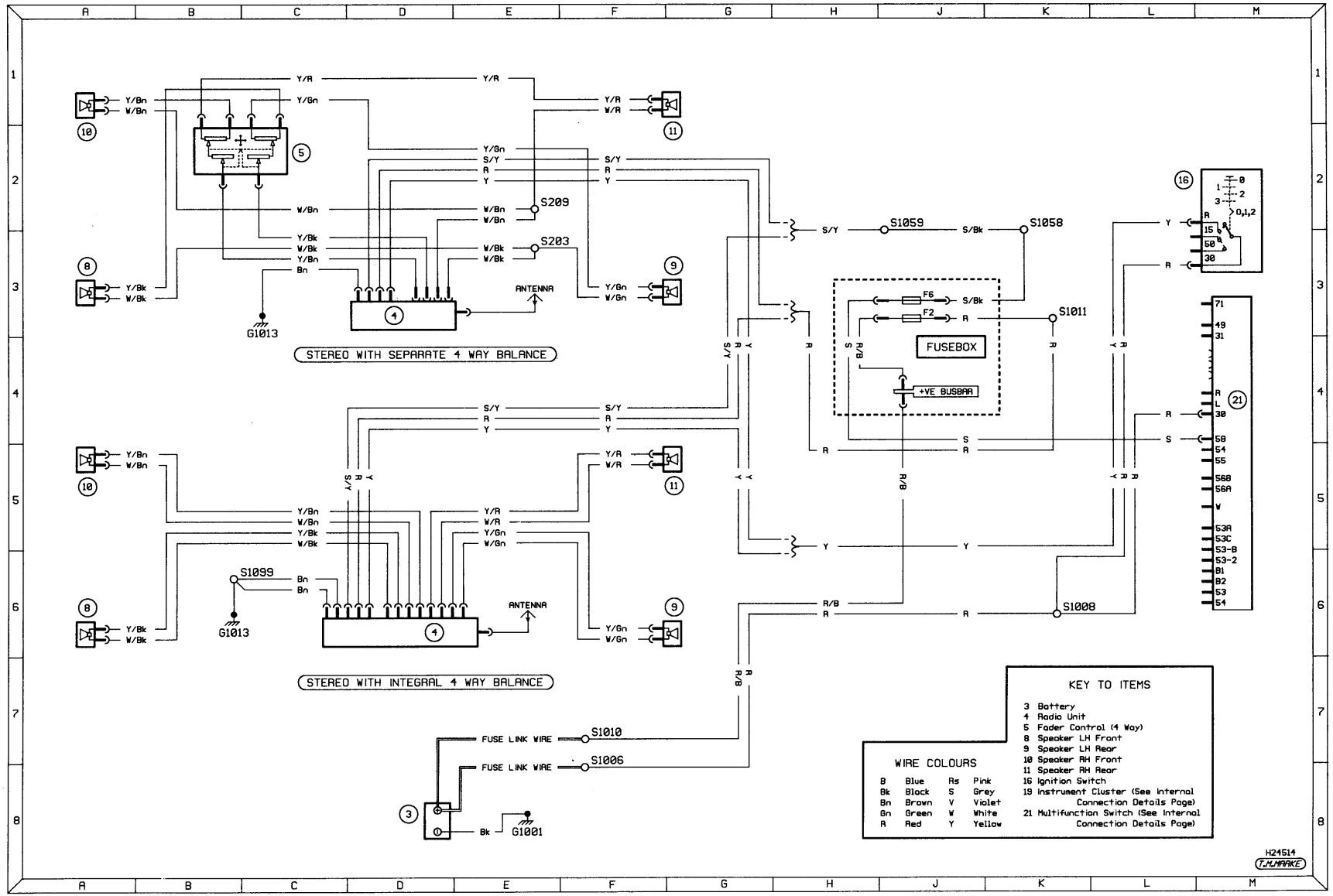


Diagram 4: In-car entertainment