

# Chapter 12 Body electrical system

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## Degrees of difficulty

<b>Easy</b> , suitable for novice with little experience 	<b>Fairly easy</b> , suitable for beginner with some experience 	<b>Fairly difficult</b> , suitable for competent DIY mechanic 	<b>Difficult</b> , suitable for experienced DIY mechanic 	<b>Very difficult</b> , suitable for expert DIY or professional 
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## Specifications

### Fuses (auxiliary fusebox in engine compartment)

**Note:** Fuse ratings and circuits are liable to change from year to year. Consult the handbook supplied with the vehicle, or consult a Ford dealer, for specific information.

Fuse No	Rating	Colour	Circuit(s) protected
1	80	Black	Power supply to main fusebox
2	60	Yellow	Radiator electric cooling fans
3	60	Yellow	Diesel engine glow plugs and/or ABS braking system
4	20	Yellow	Ignition system, or ignition and daytime running lights
5	30	Light green	Heated windscreen (left-hand side)
6	30	Light green	Heated windscreen (right-hand side)
7	30	Light green	ABS braking system
8	30	Light green	Air conditioning compressor/heated seats or air conditioning compressor/daytime running lights
9	20	Light blue	ECU (petrol), Cold start solenoid (Diesel)
10	20	Light blue	Ignition switch
11	3	Violet	ECU memory
12	15	Light blue	Horn and hazard flasher warning system
13	15	Light blue	Oxygen sensor
14	15	Light blue	Fuel pump
15	10	Red	Dipped beam headlight (right-hand side)
16	10	Red	Dipped beam headlight (left-hand side)
17	10	Red	Main beam headlight (right-hand side)
18	10	Red	Main beam headlight (left-hand side)

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### Fuses (main fusebox in passenger compartment)

**Note:** Fuse ratings and circuits are liable to change from year to year. Consult the handbook supplied with the vehicle, or consult a Ford dealer, for specific information.

Fuse	Rating	Colour	Circuit(s) protected
19	7.5	Brown	Heated door mirrors
20	10	Black	Front/rear wiper motor (circuit breaker)
21	30	Light green	Front electric windows (only)
21	40	Orange	Front and rear electric windows
22	7.5	Brown	ABS module
23	15	Light blue	Reversing lights
24	15	Light blue	Stop-lights
25	20	Yellow	Central locking system/double-locking/anti-theft alarm
26	20	Yellow	Foglights
27	15	Light blue	Cigar lighter
28	30	Light green	Headlight washer system
29	30	Light green	Heated rear window
30	7.5	Brown	Interior lighting and auxiliary warning system
31	7.5	Brown	Instrument panel illumination
32	7.5	Brown	Radio
33	7.5	Brown	Front and rear sidelights (left-hand side)
34	7.5	Brown	Interior lighting and digital clock
35	7.5	Brown	Front and rear sidelights (right-hand side)
36	30	Light green	Air bag
37	30	Light green	Heater blower
38	7.5	Brown	Adaptive damping

### Relays (auxiliary fusebox in engine compartment)

Relay	Colour	Circuit(s) protected
R1	Green	Daytime running lights (left-hand-drive, but not all countries) or dim-dip lights (UK)
R2	Black	Radiator electric cooling fan (high speed)
R3	Blue (petrol)	Air conditioning cut-out
R3	Brown (Diesel)	Air conditioning in conjunction with Diesel engine
R4	Yellow	Windscreen heater time delay
R5	Dark green (petrol)	Radiator electric cooling fan (low speed)
R5	Black (Diesel)	Radiator electric cooling fan (low speed)
R6	Yellow	Starter solenoid
R7	Brown	Horns
R8	Brown	Fuel pump
R9	White	Dipped beam headlights
R10	White	Main beam headlights
R11	Brown	ECU power supply (petrol), cold start (Diesel)

### Relays (main fusebox in passenger compartment)

Relay	Colour	Circuit(s) protected
R12	White	Interior, courtesy and footwell lights
R13	Yellow	Heated rear window
R14	Yellow	Heater blower
R15	Green	Windscreen wiper motor
R16	Black	Ignition

### Auxiliary relays (not in the fuseboxes)

Relay	Colour	Circuit(s) protected	Location
R17	Black	Diesel glow plug	Battery tray
R18	Black	"One-touch down" driver's window relay	Driver's door
R19	Blue	Speed control cut-off	Central fuse box bracket the below instrument panel
R20	Blue	Headlight washer system	Bulb module bracket
R21	Orange	Rear screen wiper interval	Bulb module bracket
R22	White	Foglights (left-hand-drive only)	Interface module bracket
R23	Black	Direction indicators	Steering column
R24	White	Anti-theft alarm (left-hand side)	Door lock module bracket
R25	White	Anti-theft alarm (right-hand side)	Door lock module bracket
R26	Black	Heated seats	Door lock module bracket

**Bulbs**

	Wattage
Headlight main beam .....	55
Headlight dipped beam .....	55
Foglights .....	55
Sidelights .....	5
Direction indicator lights .....	21
Side repeater lights .....	5
Stop-lights .....	21
Reversing lights .....	21
Rear fog/tail lights (Saloon and Estate) .....	21/4
Rear tail light (Saloon and Hatchback) .....	5
Number plate lights .....	5
Engine compartment .....	10
Interior lights .....	10
Reading light .....	5

**Type**

Halogen
Halogen
Halogen
Wedge
Bayonet
Wedge
Bayonet
Bayonet
Bayonet
Festoon
Wedge
Festoon
Wedge

**Torque wrench settings**

	Nm	lbf ft
Windscreen wiper motor bolts:		
Into old motor (see text) .....	8	6
Into new motor (see text) .....	12	9

**1 General information**



**Warning:** Before carrying out any work on the electrical system, read through the precautions given in "Safety first!" at the beginning of this manual.

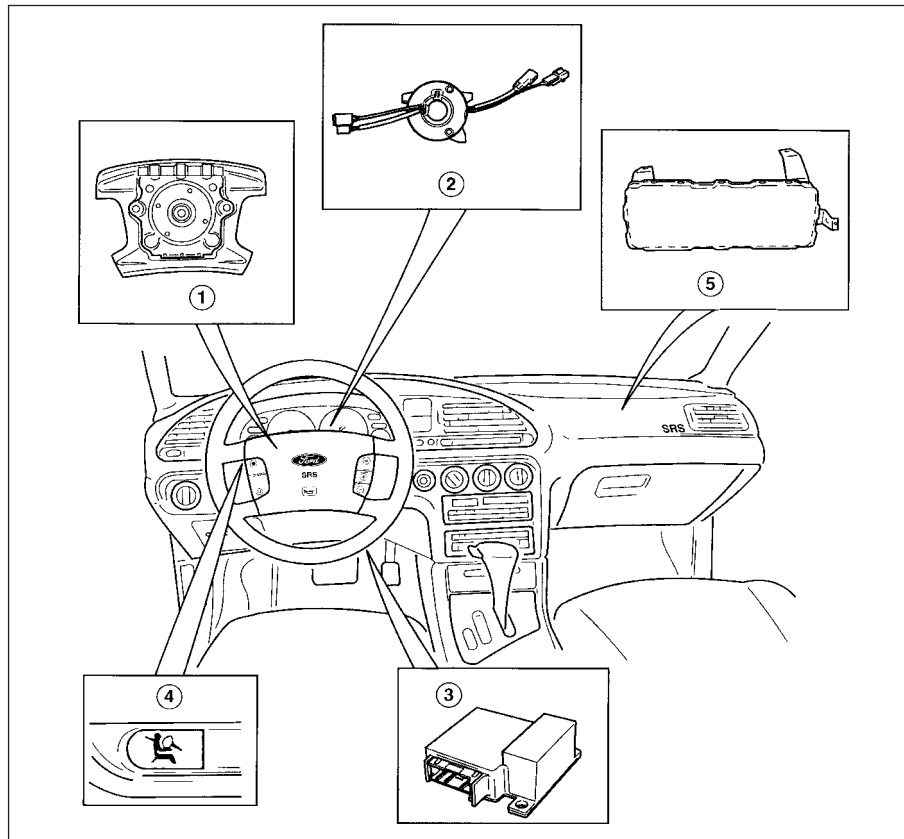
The electrical system is of 12-volt negative earth type. Power for the lights and all electrical accessories is supplied by a lead/acid battery which is charged by the alternator.

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 5.

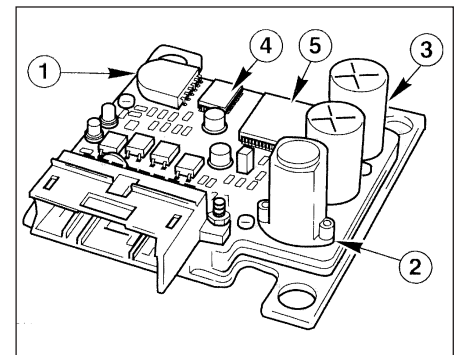
All models are fitted with a driver's air bag, which is designed to prevent serious chest and head injuries to the driver during an accident. A similar bag for the front seat passenger is also available (see illustration). The sensor and electronic unit for the air bag is located next to the steering column inside the vehicle, and contains a back-up capacitor, crash sensor, decelerometer, safety sensor, integrated circuit and microprocessor (see illustration). 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.

All UK models are fitted with an alarm system incorporating a movement sensor and ignition immobiliser. On Saloon and Hatchback models, the alarm system horn is located on the left-hand side of the luggage



**1.3A Air bag system components**

- 1 Air bag module (driver's)
- 2 Clock spring
- 3 Diagnostic and sensor unit
- 4 Air bag indicator light
- 5 Air bag module (passenger's)



**1.3B Air bag sensor and electronic unit**

- 1 Crash sensor
- 2 Safety sensor
- 3 Voltage back-up
- 4 Application Specific Integrated Circuit
- 5 Microprocessor

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compartment, but on Estate models, it is on the right-hand side.

Some models are fitted with a headlight levelling system, which is controlled by a knob on the fascia. On position "0", the headlights are in their base position, and on position "5", the headlights are in their maximum inclined angle.

It should be noted that, when portions of the electrical system are serviced, the cable should be disconnected from the battery negative terminal, to prevent electrical shorts and fires.



**Caution:** When disconnecting the battery for work described in the following Sections, refer to Chapter 5, Section 1.

### 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, anti-lock braking systems, etc), particularly where an electronic control module is used. Also refer to the precautions given in Chapter 5, 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.

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 unit 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 5, 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 such as Holts Damp Start, or a water-dispersant lubricant such as Holts Wet Start.

### 3 Fuses, relays and timer module - testing and renewal



**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. In the event of the fuse/relay unit having to be removed, the battery earth lead must be disconnected. When reconnecting the battery, reference should be made to Chapter 5.

**1** Fuses are designed to break a circuit when a predetermined current is reached, in order to protect components and wiring which could be damaged by excessive current flow. Any excessive current flow will be due to a fault in the circuit, usually a short-circuit (see Section 2). The main fusebox, which also carries some relays, is located inside the vehicle below the fascia panel on the passenger's side, and is accessed by a lever behind the glovebox (see illustration).

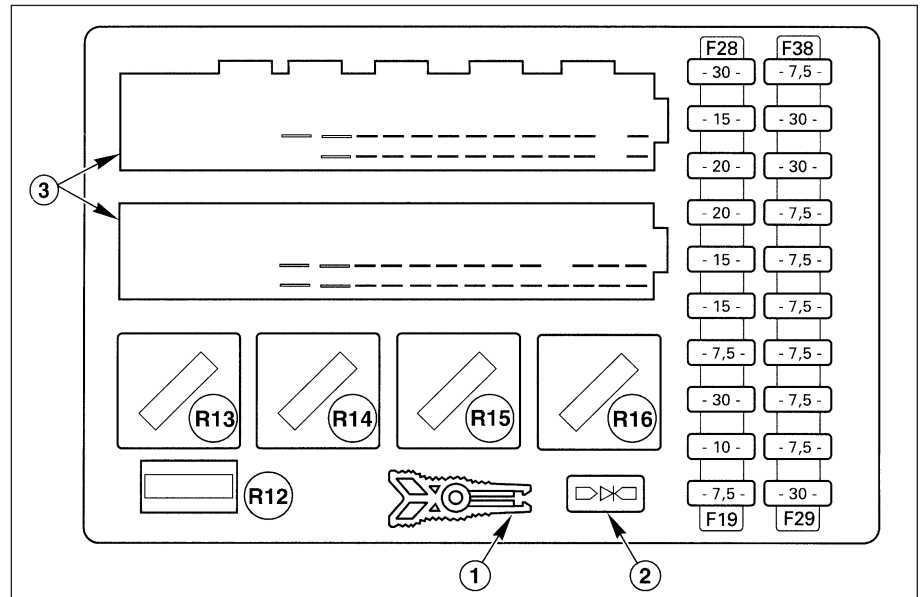
**2** A central timer module is located on the bottom of the main fusebox. This module contains the time control elements for the heated rear window, interior lights and intermittent wiper operation. The module also activates a warning buzzer/chime when the vehicle is left with the lights switched on, or if a vehicle fitted with automatic transmission is not parked in position "P".

**3** The auxiliary fusebox is located on the front left-hand side of the engine compartment, and is accessed by unclipping and removing the cover. The auxiliary fusebox also contains some relays (see illustration). Each circuit is identified by numbers on the main fusebox and on the inside of the auxiliary fusebox cover. Reference to the fuse chart in the Specifications at the start of this Chapter will indicate the circuits protected by each fuse. Plastic tweezers are attached to the main fusebox and to the inside face of the auxiliary fuse and block cover, to remove and fit the fuses and relays.

**4** 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 (see illustration).

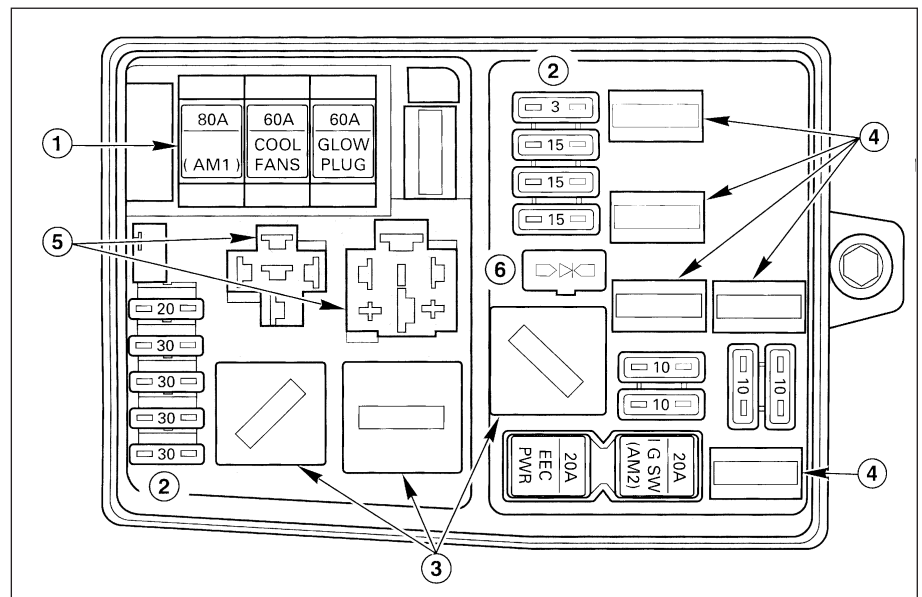
**5** Always renew a fuse with one of an identical rating. Never substitute a fuse of a higher rating, or make temporary repairs using wire or metal foil; more serious damage, or even fire, could result. The fuse rating is stamped on top of the fuse. Never renew a fuse more than once without tracing the source of the trouble.

**6** Spare fuses of various current ratings are



3.1 Main fusebox layout

1 Fuse/relay removal tweezers 2 Diode 3 Multi-plug connections

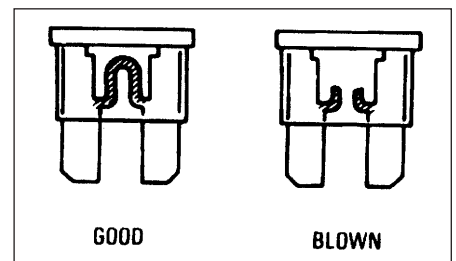


3.3 Auxiliary fusebox layout

1 Fuses 1 to 3 2 Fuses 4 to 8, 11 to 14 3 Relays R2, R5 and R6 4 Relays R7 to R11 5 Relay sockets for relays R1 and R4 6 Diode

provided in the cover of the auxiliary fusebox. Note that if the vehicle is to be laid up for a long period, fuse 34 in the main fusebox should be removed, to prevent the ancillary electrical components from discharging the battery.

**7** Relays are electrically-operated switches, which are used in certain circuits. The various relays can be removed from their respective locations by carefully pulling them from the sockets. Each relay in the fuseboxes has a plastic bar on its upper surface to enable the use of the tweezers. The locations and



3.4 The fuses can be checked visually to determine if they are blown





3.7 "One-touch down" window relay in the driver's door



4.3A Depress the locking plunger . . .



4.3B . . . and withdraw the ignition lock barrel

functions of the various relays are given in the Specifications (see illustration).

8 If a component 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 energized. If the relay proves satisfactory, the fault lies with the components or wiring of the system. If the relay is not being energized, then either the relay is not receiving a switching voltage, or the relay itself is faulty. (Do not overlook the relay socket terminals when tracing faults.) Testing is by the substitution of a known good unit, but be careful; while some relays are identical in appearance and in operation, others look similar, but perform different functions.

9 The central timer module located on the bottom of the main fusebox incorporates its own self-diagnosis function. Note that diagnosis cannot take place if the heated rear window is defective.

10 To activate the system, press the heated rear window button while the ignition is being switched on, then release the button. Operate the light switch, washer pump switch and all of the door switches one after the other, and check that the buzzer confirms that the input signals are correct.

11 Now move the wiper lever to the intermittent wipe position, and check the output signals by operating the same switches.

12 The self-diagnosis function is turned off by switching the ignition off and on again.

## 4 Switches - removal and refitting



### Removal

#### Ignition switch and lock barrel

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

2 Remove the rubber gaiters and locking rings, then remove the securing screws and take off the steering column upper and lower shrouds.

3 Insert the ignition key, and turn it to the accessory position. Using a small screwdriver or twist drill through the hole in the side of the lock housing, depress the locking plunger and withdraw the lock barrel (see illustrations).

4 The switch may be removed from the steering column assembly by disconnecting the multi-plug, then using a screwdriver to release the switch retaining tab (see illustrations).

#### Windscreen wiper multi-function switch

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

6 Remove the rubber gaiters and locking rings, then remove the securing screws and take off the steering column upper shroud.

7 Disconnect the multi-plug (see illustration).

8 Depress the plastic tab with a screwdriver, and lift the switch assembly from the steering column (see illustrations).



4.4A Release the retaining tab . . .



4.4B . . . and remove the ignition switch



4.7 Disconnecting the multi-plug from the windscreen wiper multi-function switch



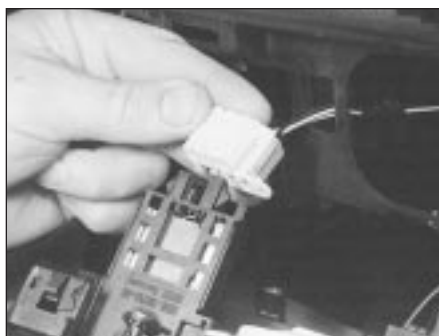
4.8A Depress the plastic tab with a screwdriver . . .



4.8B . . . and remove the windscreen wiper multi-function switch



4.10 Prising out the light switch



4.11 Disconnecting the multi-plugs from the light switch and rheostat



4.23 Removing the direction indicator, dipped beam and hazard flasher multi-function switch. Direction indicator relay (flasher unit) is attached

### Main light, auxiliary foglight and rear foglight combination switch

**Note:** From July 1994 a revised main light switch was introduced; this was fitted as standard in production. If the revised switch is to be fitted to a pre-July 1994 model, an adapter lead will also be required to prevent electrical damage occurring. Refer to your Ford dealer for further information

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

10 Carefully prise the switch panel from the facia, using a screwdriver against a cloth pad to prevent damage to the facia (see illustration).

11 Disconnect the multi-plugs and withdraw the switch panel (see illustration).

12 Unscrew the four mounting screws, and remove the switch from the panel.

13 Pull off the switch control knob, and remove the blanking plug and retainer.

14 Depress the plastic tabs, and remove the front cover and switch.

### Instrument light rheostat

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

16 Carefully prise the light switch panel from the facia, using a screwdriver against a cloth pad to prevent damage to the facia.

17 Disconnect the multi-plugs from the rear of the switch, then remove the screws and withdraw the instrument light rheostat from the panel.

### Door mirror control switch

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

19 Carefully prise the switch from the facia, using a screwdriver against a cloth pad to prevent damage to the facia.

20 Disconnect the multi-plug and withdraw the switch.

### Direction indicator, dipped beam and hazard flasher multi-function switch

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

22 Remove the rubber gaiters and locking rings, then remove the screws and take off the steering column upper shroud.

23 Depress the retaining lug and withdraw the switch assembly, then disconnect the multi-plug (see illustration).

24 With the switch assembly removed, pull out the direction indicator relay if required.

### Horn switch (steering wheel without air bag)

**Note:** When an air bag is fitted, the horn switch is removed with the air bag unit. Refer to Section 28.

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

26 Carefully pull off the padded centre of the steering wheel which incorporates the horn switch.

27 Disconnect the wiring and remove the switch assembly.

### Luggage compartment switch

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

29 With the tailgate/bootlid open, pull the weatherstrip from the centre of the rear cross panel.

30 Carefully prise out the trim fasteners from the bottom corners of the rear trim, then unscrew the retaining screws and remove the trim panel.

31 Disconnect the wiring multi-plug, and pull out the switch.

### Electrically-operated window switch (single)

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

33 Carefully prise out the switch from the door inner trim panel, using a cloth pad to prevent damage to the trim.

34 Disconnect the multi-plug and remove the switch.

### Electrically-operated window switch (multiple) and isolator

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

36 Prise the blanking cap from inside the inner door handle cavity, and remove the screw.

37 Hold the inner door handle in its open position, then remove the bezel and withdraw it over the handle.

38 Depress the retaining lug and remove the switch assembly, then disconnect the multi-plug.

### Electrically-operated sunroof switch and traction control switch

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

40 Carefully prise out the switch with a screwdriver, using a cloth pad to prevent damage to the trim.

41 Disconnect the multi-plug and remove the switch.

### Handbrake-on warning switch

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

43 Remove the centre console as described in Chapter 11.

44 Disconnect the multi-plug, then remove the screw and withdraw the switch from the handbrake lever mounting bracket (see illustration).

### "Economy/Sport" mode switch (automatic transmission models)

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

46 Select Neutral, then prise out the selector indicator panel, using a cloth pad to prevent damage to the surrounding trim.

47 Push the switch out of the panel, and disconnect the multi-plug.



4.44 Disconnecting the multi-plug from the handbrake lever



4.49 Prising out the heated rear window switch



4.50 Disconnecting the multi-plug from the heated rear window switch



4.57A Unscrew the cross-head screw . . .

**Heated windscreen switch and heated rear window switch**

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

49 Carefully prise out the switch, using a cloth pad to prevent damage to the trim (see illustration).

50 Disconnect the multi-plug and remove the switch (see illustration).

**Electrically-operated seat switch and heated seat switch**

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

52 Carefully prise out the switch, using a cloth pad to prevent damage to the trim.

53 Disconnect the multi-plug and remove the switch.

**Adaptive damping switch**

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

55 Carefully prise out the switch, using a cloth pad to prevent damage to the trim.

56 Disconnect the multi-plug and remove the switch.

**Courtesy light door switch**

57 Open the door, then unscrew the cross-head screw and carefully pull the switch from the pillar (see illustrations). Take care not to force the wire from the switch terminal, otherwise it will be difficult to retrieve it from the pillar.

58 Disconnect the wire, and tie it in a loose knot to prevent it dropping back into the pillar.

**Refitting**

59 Refitting of all switches is a reversal of the removal procedure.

**5 Bulbs (exterior lights) - renewal**



**Note:** Ensure that all exterior lights are switched off before disconnecting the wiring connectors from any exterior light bulbs. Do not touch the glass of halogen-type bulbs (headlights, front foglights) with the fingers; if the glass is accidentally touched, clean it with methylated spirit.

**Headlight (dipped beam)**

1 Working under the bonnet, depress the plastic clips and remove the cover from the rear of the headlight unit (see illustration).

2 Release the spring clip and withdraw the bulb, then disconnect the wiring lead (see illustrations).

3 Fit the new bulb using a reversal of the removal procedure. Have the headlight beam alignment checked as described later in this Chapter.

**Headlight (main beam)**

4 Working under the bonnet, depress the plastic clips and remove the cover from the rear of the headlight unit.

5 Turn the bulbholder anti-clockwise, and remove it from the rear of the headlight unit (see illustration).



4.57B . . . and pull out the courtesy light switch



5.1 Removing the cover from the rear of the headlight



5.2A Release the spring clip . . .



5.2B . . . and withdraw the headlight bulb



5.5 Removing the headlight (main beam) bulbholder





5.6 Removing the headlight (main beam) bulb from the bulbholder



5.9 Removing the front sidelight bulbholder from the rear of the headlight unit



5.10 Pulling the wedge-type bulb from the bulbholder

6 Pull out the bulb and disconnect the wiring lead (see illustration).

7 Fit the new bulb using a reversal of the removal procedure, making sure that the bulbholder is correctly located in the headlight unit. Have the headlight beam alignment checked as described later in this Chapter.

### Front sidelight

8 Working under the bonnet, depress the plastic clips and remove the cover from the rear of the headlight unit.

9 Pull the bulbholder from the rear of the headlight unit (see illustration).

10 Pull the wedge-type bulb from the bulbholder (see illustration).

11 Fit the new bulb using a reversal of the removal procedure.

### Front direction indicator

12 Open the bonnet. Loosen (but do not remove) the screw located above the front direction indicator (see illustration 7.10).

13 Withdraw the front direction indicator light unit.

14 Rotate the bulbholder anti-clockwise, and withdraw it from the light unit.

15 Twist the bulb anti-clockwise, and remove it from the bulbholder (see illustration).

16 Fit the new bulb using a reversal of the removal procedure, but before refitting the light unit, first insert the holding spring in its bore.

### Side repeaters

17 The side repeater light is held in position by spring pressure.

18 Depending on how the light unit was previously fitted, press it either forwards or rearwards, and remove it from the front wing (see illustration).

19 Turn the bulbholder anti-clockwise, and disconnect it from the housing (see illustration).

20 Pull the wedge-type bulb from the holder (see illustration).

21 Fit the new bulb using a reversal of the removal procedure.

### Front foglight

22 Unscrew the cross-head screws securing

the front foglight unit to the valance, and withdraw the light unit.

23 Prise open the plastic clips and remove the rear cover from the light unit.

24 Release the spring clips and withdraw the bulb, then pull off the wiring connector.

25 Fit the new bulb using a reversal of the removal procedure.

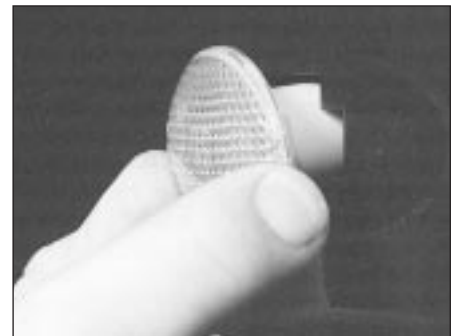
### Rear light cluster

26 With the tailgate or bootlid open, flip open the trim cover to reveal the bulbholder in the rear corner of the luggage compartment. On Estate models, pull back the weatherstrip and unclip the trim cover (see illustrations).

27 Press the two plastic locking tabs together, and withdraw the complete rear light cluster (see illustrations).



5.15 Removing the front direction indicator bulb



5.18 Removing the side repeater from the front wing



5.19 Removing the bulbholder from the side repeater lens/bulbholder



5.20 Removing the wedge-type bulb from the side repeater bulbholder



5.26A Pull back the weatherstrip . . .



5.26B ... and unclip the trim cover



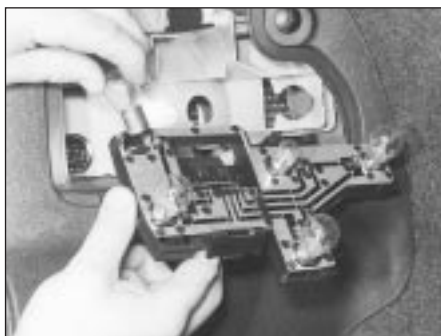
5.27A Pressing the two plastic locking tabs together (Estate)



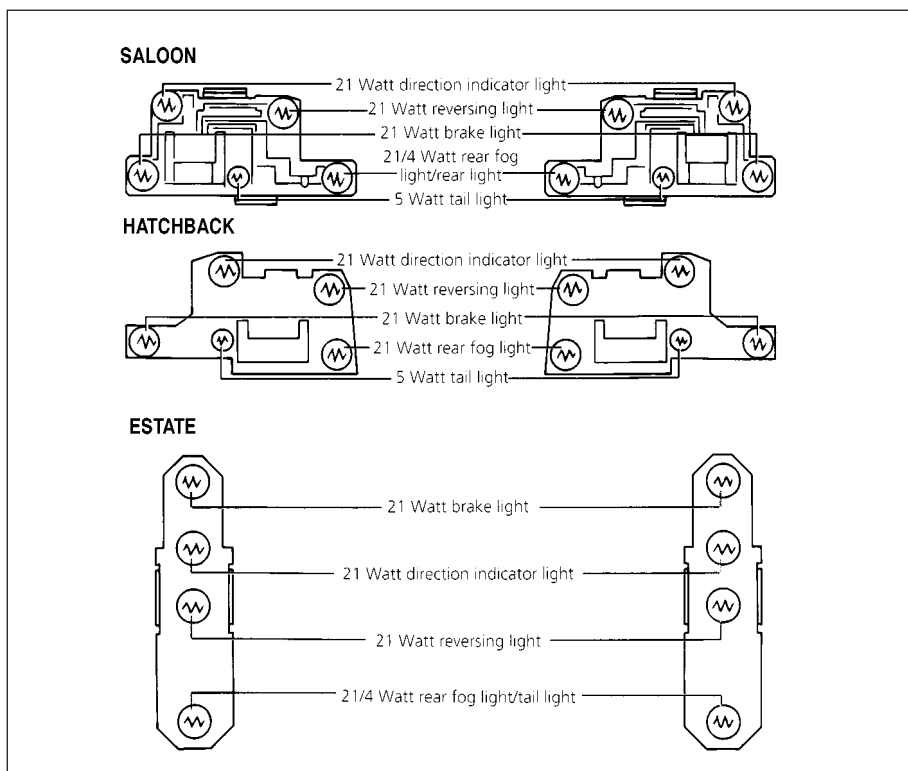
5.27B Removing the rear light cluster (Estate)



5.27C Removing the rear light cluster (Saloon)



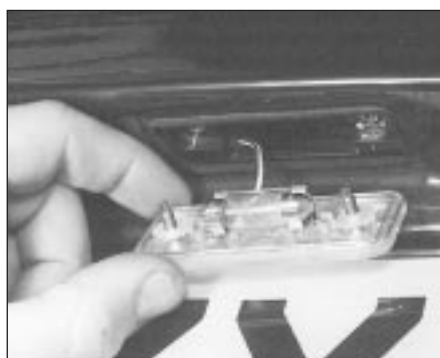
5.28A Removing a bulb from the rear light cluster bulbholder



5.28B Bulb positions in the rear light cluster



5.30 Remove the cross-head screws ...



5.31 ... for access to the festoon-type bulb

28 Depress and twist the appropriate bulb to remove it from the bulbholder (see illustrations).

29 Fit the new bulb using a reversal of the removal procedure. Make sure that the rear light cluster is fully inserted.

**Number plate light**

30 Remove the cross-head screws from the number plate light, and remove the light unit (see illustration).

31 Release the festoon-type bulb from the contact springs (see illustration).

32 Fit the new bulb using a reversal of the removal procedure. Make sure that the tension of the contact springs is sufficient to hold the bulb firmly.



6.4 Prise out the interior light with a screwdriver



6.5 Lifting the reflector from the interior light



6.11 Removing a bulb from the rear of the instrument panel

## 6 Bulbs (interior lights) - renewal



### Engine compartment light

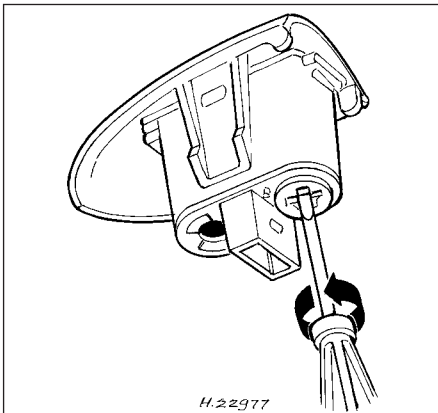
- 1 With the bonnet open, pull the wedge-type bulb from the bulbholder.
- 2 Fit the new bulb using a reversal of the removal procedure.

### Interior lights

- 3 Switch off the interior light by locating the switch in its middle position.
- 4 Using a small screwdriver, carefully prise out the light or bulb cover, as applicable (see illustration).
- 5 Lift up the reflector, then release the festoon-type bulb from the contact springs (see illustration).
- 6 Fit the new bulb using a reversal of the removal procedure. Make sure that the tension of the contact springs is sufficient to hold the bulb firmly.

### Reading light

- 7 With the reading light switched off, prise out the light using a small screwdriver.
- 8 Hinge back the contact plate, and release the festoon-type bulb from the contact springs.



6.14 Removing the bulb from the foglight warning indicator

- 9 Fit the new bulb using a reversal of the removal procedure. Make sure that the tension of the contact springs is sufficient to hold the bulb firmly.

### Instrument panel illumination and warning lights

- 10 Remove the instrument panel as described in Section 10.
- 11 Twist the bulbholder anti-clockwise to remove it (see illustration).
- 12 Fit the new bulbholder using a reversal of the removal procedure.

### Foglight warning indicator

- 13 Using a screwdriver, prise out the indicator from the fascia, and disconnect the multi-plug.
- 14 Twist the bulbholder anti-clockwise with the screwdriver, and remove it (see illustration).
- 15 Fit the new bulb using a reversal of the removal procedure.

### Hazard warning light

- 16 Pull the cover directly up from the switch, then remove the bulb (see illustrations).
- 17 Fit the new bulb using a reversal of the removal procedure.

### Glovebox light

- 18 Open the glovebox, then pull out the wedge-type bulb from the light located under the upper edge.



6.16A Pull off the hazard warning light cover . . .

### Heater fan switch illumination

- 19 Pull off the switch knob, then depress and twist the bulb to remove it.

### Automatic transmission selector panel illumination

- 20 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 21 Remove the ashtray.
- 22 Select Neutral, then prise out the panel from the centre console.
- 23 Disconnect the multi-plug from the overdrive control switch.
- 24 Disconnect the bulbholder and pull out the wedge-type bulb.
- 25 Fit the new bulb using a reversal of the removal procedure.

### Interior door handle illumination

- 26 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 27 Remove the door interior trim panel as described in Chapter 11.
- 28 Using a knife, cut free the foam watershield for access to the rear of the interior door handle.
- 29 Pull out the bulbholder and remove the bulb.

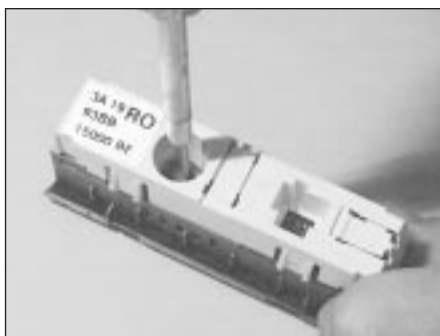
### Clock illumination

- 30 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 31 Remove the clock as described in Section 13.

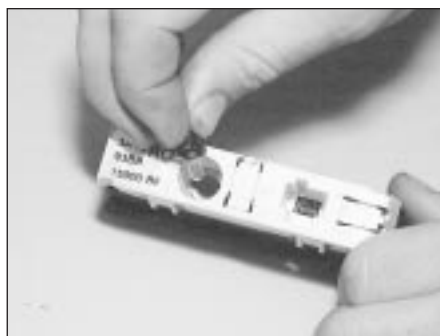


6.16B . . . and remove the bulb





6.32A Twist the bulbholder anti-clockwise . . .



6.32B . . . and remove it from the rear of the clock



7.4 Disconnecting the headlight unit wiring multi-plug

32 Twist the bulbholder anti-clockwise using a screwdriver, then remove the bulbholder from the rear of the clock (see illustrations).

### Heater control illumination

33 Remove the heater control panel (Chapter 3), then twist the bulbholder anti-clockwise and remove the bulb from the rear of the panel.

## 7 Exterior light units - removal and refitting



### Removal

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

### Headlight unit

2 With the bonnet supported in its open position, loosen (but do not remove) the screw located above the front direction indicator.

3 Withdraw the front direction indicator unit forwards, and disconnect the wiring multi-plug. Place the unit to one side.

4 Disconnect the wiring multi-plug for the headlight unit (see illustration).

5 Remove the radiator grille as described in Chapter 11.

6 Remove the front bumper as described in Chapter 11.

7 The headlights fitted from new are a single unit, joined by a plastic back-piece running across the front of the vehicle. However, if it is required to renew a headlight unit on one side

only, the back-piece must first be removed complete, then cut in half on the bench.

8 Unscrew the mounting bolts from each side of the headlight unit, and withdraw the unit from the front of the vehicle (see illustrations). Use a hacksaw to cut through the centre of the headlight unit (ie between the two headlights), and obtain a connecting kit from a Ford dealer to attach the new unit.

9 If necessary, the lens may be removed separately by releasing the clips (see illustrations). To remove the diffuser, release the clips, then remove the rubber seal.

### Front direction indicator

10 With the bonnet supported in its open position, loosen (but do not remove) the screw



7.8A Unscrew the outer mounting screws . . .



7.8B . . . and inner mounting screws . . .



7.8C . . . and withdraw the headlight unit assembly



7.8D Using a hacksaw to cut through the middle of the headlight back-piece, in order to fit a new unit



7.9A Release the clips . . .



7.9B . . . and remove the headlight lens





7.10 Loosen the front direction indicator retaining screw

located above the front direction indicator (see illustration).

11 Withdraw the front direction indicator light unit.

12 Rotate the bulbholder anti-clockwise, and withdraw it from the light unit. Alternatively, the wiring plug can be disconnected from the bulbholder, leaving the bulb in position (see illustration). Remove the light unit.

#### Foglight (front)

13 Unscrew the cross-head screws securing the front foglight unit to the valance, and withdraw the light unit from the valance.

14 Prise open the plastic clips, and remove the rear cover from the light unit.

15 Release the spring clips and withdraw the bulb, then pull off the wiring connector. Remove the foglight unit.

#### Rear light cluster

16 With the tailgate or bootlid open, unhook the parcel net (where fitted) from the rear of the luggage compartment.

17 On Saloon and Hatchback models, remove the screws, release the clips, and remove the trim panel from the rear cross panel. On Estate models, it is sufficient to open the flap.

18 Remove the screws, and press the rear light trim cover from the guides (where applicable).

19 Disconnect the wiring multi-plug.

20 Unscrew the four mounting nuts, and withdraw the light unit from the outside of the vehicle (see illustrations).

#### Rear number plate light assembly

21 Remove both number plate lights as described in Section 5.

22 With the tailgate or bootlid open, remove the screws and withdraw the inner trim panel.

23 Unscrew the nuts, and remove the outer cover and number plate base from the tailgate.

24 Disconnect the multi-plug and remove the light assembly.

#### Refitting

25 Refitting of all the external light units is a reversal of the removal procedure, noting the following points:



7.12 Disconnecting the wiring plug from the indicator bulbholder

(a) When refitting the rubber seal on the headlight unit, note that it has a tapered seat.

(b) If one or both headlights have been disturbed, have the beam alignment checked as described in the next Section.

(c) When refitting the rear light cluster, check the condition of the sealer on the body panel, and if necessary renew it.

#### 8 Headlight beam alignment - checking and adjustment

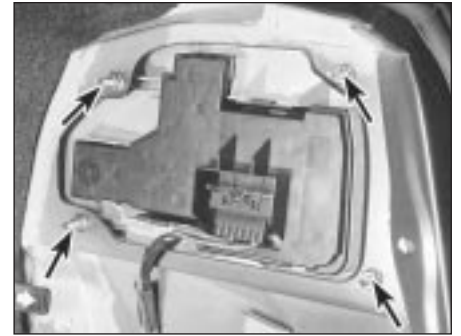
1 Accurate adjustment of the headlight beam is only possible using optical beam-setting equipment. This work should therefore be carried out by a Ford dealer, or other service station with the necessary facilities.

2 Temporary adjustment can be made after renewal of a headlight bulb or unit, or as an emergency measure if the alignment is incorrect following accident damage. Turn the adjustment screws on the top of the headlamp unit to make the adjustment (see illustration).

3 Before making any adjustments to the 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 average size should sit in the driver's seat during the adjustment, and the vehicle should have a full tank of fuel. Where a vehicle is fitted with an electrical beam levelling system, set the switch to the "O" position before making any adjustments.



7.20B Removing the rear light cluster unit



7.20A Rear light cluster mounting nuts (arrowed)

4 Whenever temporary adjustments are made, the settings must be checked and if necessary reset by a Ford dealer or other qualified person as soon as possible.

#### 9 Headlight levelling motor - removal and refitting

##### Removal

1 Remove the headlight unit as described in Section 7, then remove the cover.

2 Disconnect the wiring multi-plug from the motor.

3 Rotate the motor upwards approximately 60°, then pull it forwards slightly.

4 Disconnect the adjustment spindle by pressing the ball coupling to one side, away from the socket on the reflector.

5 Withdraw the motor from the headlight unit.

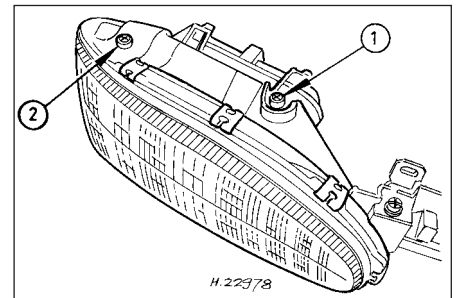
##### Refitting

6 Refitting is a reversal of the removal procedure, but make sure that the motor is turned down until it engages the stop.

#### 10 Instrument panel - removal and refitting

##### Removal

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



8.2 Headlight beam setting adjustment screws

1 Vertical alignment screw

2 Horizontal alignment screw



10.6 Removing the foglight warning indicator



10.7 Removing a switch blanking cover



10.8A With the blanking covers removed, unscrew the concealed screws . . .



10.8B . . . and the remaining screws . . .



10.8C . . . and lift out the instrument panel surround



10.9 Three of the instrument panel mounting screws (arrowed)



10.10 Disconnecting the multi-plugs from the rear of the instrument panel



11.1 Rear view of the instrument panel, showing bulbholders



11.2 Bezel retaining lug on the instrument panel

- 2 Where fitted, remove the clock as described in Section 13.
- 3 Where fitted, remove the trip computer module as described in Section 18.
- 4 Remove the heated rear window switch as described in Section 4.
- 5 Where fitted, remove the heated windscreen switch.
- 6 Where fitted, remove the display assembly warning indicator for the foglights (see illustration).
- 7 Remove any blanking covers from the unused switch positions (see illustration).
- 8 Prise out the blanking covers, then unscrew the retaining screws and remove the instrument panel surround (see illustrations).
- 9 Unscrew the mounting screws, and

withdraw the instrument panel a little way from the fascia (see illustration).

10 Disconnect the two multi-plugs from the rear of the instrument panel (see illustration).

11 Withdraw the instrument panel from the fascia, at the same time releasing the speedometer intermediate cable.

### Refitting

12 Refitting is a reversal of the removal procedure.

### 11 Instrument panel components - removal and refitting



### Removal

1 Remove the warning light and illumination bulbs by twisting them anti-clockwise (see illustration).

2 Carefully prise off the glass and bezel from the front of the instrument panel, noting the positions of the retaining lugs (see illustration).

3 Note the positions of the five diffusers, then remove them from the instrument panel.

4 To remove the speedometer head, unscrew the three mounting screws and withdraw the head from the housing.

5 To remove the tachometer, unscrew the single screw and withdraw it from the housing.



12.7A Squeeze the collar . . .



12.7B . . . and disconnect the speedometer main cable from the intermediate cable



12.9A Unscrew the cable nut . . .

6 Similarly remove the fuel gauge and temperature gauge by unscrewing the single screws.

7 Remove all the pin contacts.

8 Using a small punch, push in the multi-plug securing pins, and remove the multi-plugs.

9 Carefully lift the printed circuit from the location dowels on the housing, taking care not to damage it.

**Refitting**

10 Refitting is a reversal of the removal procedure.

**12 Speedometer drive cable - removal and refitting**



**Removal**

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

2 With the bonnet closed, release the grille panel upper edge from just in front of the windscreen, by prising off the caps and unscrewing the upper retaining screws.

3 Open the bonnet, and support with the stay.

4 Pull off the sealing strip from the cross panel at the rear of the engine compartment.

5 Unscrew the lower screws, and remove the grille panel halves from in front of the

windscreen, withdrawing first one side and then the other.

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

7 Reach in behind the bulkhead. Squeeze the collar on the upper end of the speedometer cable, where it is attached to the intermediate cable from the rear of the speedometer head. Disconnect the cable, and withdraw it from the bulkhead inner panel, together with the rubber grommet (see illustrations).

8 Apply the handbrake, jack up the front of the vehicle and support it on axle stands.

9 Unscrew the nut and disconnect the speedometer cable from the vehicle speed sensor on the transmission, then withdraw the cable from within the engine compartment. Use two spanners to loosen the nut - one to counterhold the sensor, and the other to unscrew the cable nut (see illustrations).

**Refitting**

10 Refitting is a reversal of the removal procedure.

**13 Clock - removal and refitting**



**Removal**

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

2 Using a small screwdriver, prise the clock out of the facia (see illustration). To prevent damage to the facia, place a cloth pad beneath the screwdriver.

3 Disconnect the multi-plug from the rear of the clock, and withdraw the clock (see illustration).

**Refitting**

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

**14 Horn - removal and refitting**



**Removal**

1 Apply the handbrake, jack up the front of the vehicle and support it on axle stands.

2 Unscrew the bolts, and release the clips securing the radiator lower cover to the front of the vehicle.

3 Disconnect the wiring from the horn terminal.

4 Unscrew the mounting bolt, and withdraw the horn with its mounting bracket from under the vehicle (see illustration).

**Refitting**

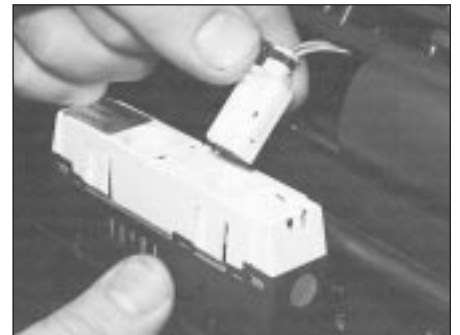
5 Refitting is a reversal of the removal procedure.



12.9B . . . and disconnect the speedometer cable from the vehicle speed sensor



13.2 Prising the clock out of the facia



13.3 Disconnecting the multi-plug from the rear of the clock





14.4 Horn and mounting bracket (arrowed)



15.3 Loosening the wiper arm retaining nut



15.5 Removing the wiper arm from the spindle

## 15 Wiper arms - removal and refitting



### Removal

- 1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1). If the windscreen wiper arms are to be removed, close the bonnet.
- 2 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.
- 3 Lift up the plastic cap from the bottom of the wiper arm, and loosen the nut one or two turns (see illustration).
- 4 Lift the wiper arm, and release it from the taper on the spindle by moving it to one side.

- 5 Completely remove the nut, and withdraw the wiper arm from the spindle (see illustration).

### Refitting

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

## 16 Windscreen wiper motor and linkage - removal and refitting



### Removal

- 1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 2 Remove the wiper arms as described in Section 15.
- 3 With the bonnet closed, release the grille

panel upper edge from just in front of the windscreen, by prising off the caps and unscrewing the upper retaining screws (see illustrations).

- 4 Open the bonnet, and support it with the stay.

5 Pull off the bonnet sealing strip from the cross panel at the rear of the engine compartment (see illustration).

6 Unscrew the lower screws, and remove the grille panel halves from in front of the windscreen, withdrawing one side then the other side (see illustrations).

7 Unscrew the mounting bolts securing the wiper motor and linkage to the bulkhead. On right-hand-drive models, the linkage is on the right-hand side of the bulkhead (see illustration); on left-hand-drive models, it is on the left-hand side.



16.3A Prise off the cap . . .



16.3B . . . and remove the upper retaining screws



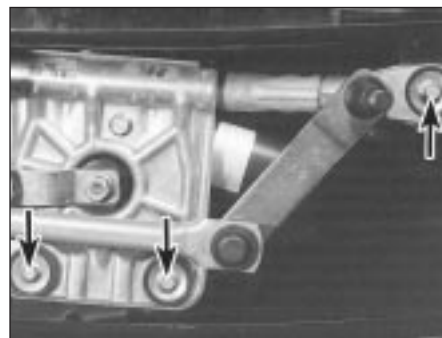
16.5 Removing the bonnet sealing strip



16.6A Unscrew the lower screws . . .

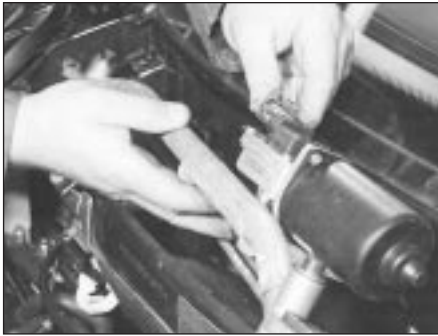


16.6B . . . and remove the grille panel from in front of the windscreen



16.7 Wiper motor mounting bolt locations (right-hand-drive)





16.9 Removing the wiper motor and linkage



16.10 Wiper motor arm and mounting plate located on the motor



17.4 Disconnecting the tailgate wiper motor multi-plug

- 8 Disconnect the wiper motor multi-plug.
- 9 Withdraw the wiper motor, complete with the linkage, from the bulkhead (see illustration).
- 10 Mark the position of the motor arm on the mounting plate, then unscrew the centre nut (see illustration).
- 11 Unscrew the motor mounting bolts, and separate the motor from the linkage assembly.

**Refitting**

12 Refitting is a reversal of the removal procedure. There are two tightening torques for the motor mounting bolts - the lower one for bolts that are being re-inserted into an old motor, and the higher ones for bolts that are being inserted into a new motor. Make sure that the wiper motor is in its "parked" position before fitting the motor arm, and check that the wiper linkage is in line with the motor arm.

**17 Tailgate wiper motor assembly - removal and refitting**

**Removal**

- 1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 2 Remove the tailgate wiper arm as described in Section 15.
- 3 Remove the tailgate inner trim panel by unscrewing the retaining screws.
- 4 Release the multi-plug from the clip, then disconnect it (see illustration).



17.6B ... and remove the tailgate wiper motor assembly (Hatchback shown - Estate similar)

- 5 Disconnect the wiper motor earth lead.
- 6 Unscrew the mounting bolts, and remove the wiper motor from inside the tailgate (see illustrations).
- 7 Unbolt and remove the mounting plate. If necessary, remove the mounting rubbers for renewal (see illustrations).

**Refitting**

8 Refitting is a reversal of the removal procedure. Make sure that the wiper motor is in its "parked" position before fitting the wiper arm.

**18 Trip computer module - removal and refitting**

**Removal**

- 1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 2 Using a small screwdriver, prise the trip computer module out of the fascia. To prevent damage to the fascia, place a cloth pad beneath the screwdriver.
- 3 Disconnect the multi-plug from the rear of the trip computer module, and withdraw the unit.
- 4 If necessary, the bulb can be removed by twisting it anti-clockwise.

**Refitting**

5 Refitting is a reversal of the removal procedure.



17.7A Tailgate wiper motor assembly and mounting plate

**19 Auxiliary warning system - general information and component renewal**

- 1 Some models are fitted with an auxiliary warning system, which monitors brake lights, sidelights, dipped beam and tail lights, external temperature, and door/tailgate/bootlid opening. An engine oil level warning light on the instrument panel is also part of the system.
- 2 The auxiliary warning system module and graphic warning display are combined into one unit.

**Service interval reminder**

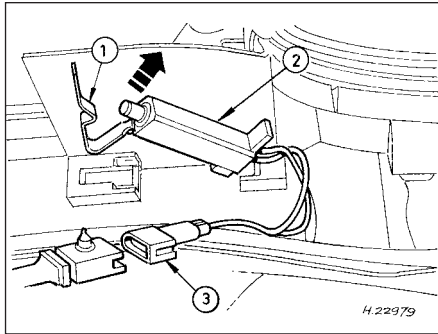
- 3 The system also includes a service interval reminder warning light, which is illuminated if



17.6A Unscrew the mounting bolts ...



17.7B A mounting rubber removed from the mounting plate



**19.9 Low air temperature sender unit removal**

1 Clip 2 Sender unit 3 Multi-plug

the specified mileage (or time) since the last service has been reached.

4 To reset the service interval system and turn off the light, a switch inside the glovebox must be depressed for a minimum of 4 seconds with the ignition switched on. This should be carried out by a Ford dealer if the vehicle is still in the warranty period.

### Component renewal

5 The following paragraphs describe brief removal procedures for the auxiliary warning system components. Disconnect the battery negative (earth) lead before commencing work (refer to Chapter 5, Section 1). Refitting procedures are a reversal of removal.

### Display warning bulb

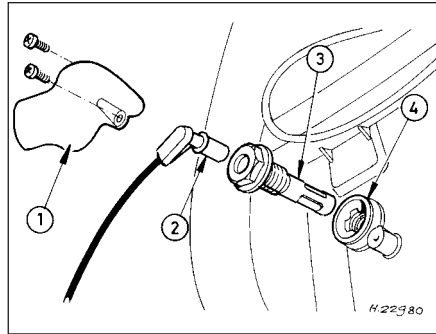
6 Remove the control assembly.  
7 Prise off the cover, and pull out the relevant bulb and bulbholder.

### Low air temperature warning sender unit

8 Remove the front bumper.  
9 Unclip the sender unit and disconnect the multi-plug (see illustration).

### Engine oil level sensor

10 Apply the handbrake, jack up the front of the vehicle and support it on axle stands.  
11 Place a container beneath the oil level sensor, to catch any spill oil.



**19.14 Engine oil level sensor removal**

1 Cover 2 Multi-plug 3 Sensor 4 Seal

12 Unscrew the screws and remove the cover from the sensor.

13 Disconnect the multi-plug.

14 Unscrew and remove the sensor, and remove the seal (see illustration).

### Door ajar sensor

15 Remove the door lock as described in Chapter 11, Section 14.

16 Unclip the sensor and disconnect the multi-plug.

### Low coolant warning switch

17 Refer to Chapter 3, Section 6.

### Low washer fluid switch

18 Disconnect the multi-plug from the washer fluid reservoir.

19 Drain or syphon out the fluid from the reservoir.

20 Using a screwdriver, lever out the switch from the reservoir (see illustration).

### Service indicator reset switch

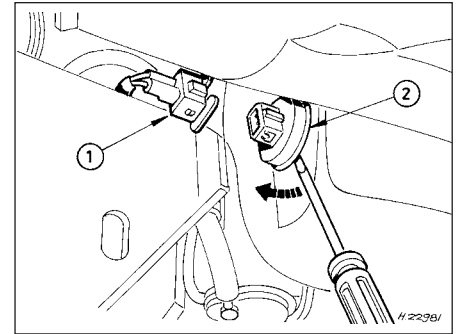
21 Remove the glove compartment lid as described in Chapter 11, Section 32.

22 Carefully lever out the switch using a small screwdriver.

23 Remove the rear cover and disconnect the wiring (see illustration).

### Control assembly

24 Remove the instrument panel surround, referring to Section 10.



**19.20 Removing the low washer fluid switch**

25 Unscrew the mounting screws, disconnect the multi-plugs and remove the assembly.

### Bulb failure module

26 Remove the lower facia panel from under the steering wheel.

27 Unclip the bulb failure module and disconnect the multi-plug.

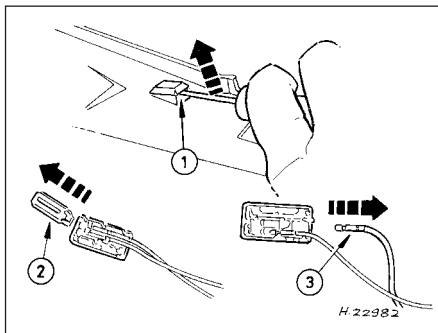
## 20 Anti-theft alarm system - general information

**Note:** From November 1993, for added security, a complex Bosch immobiliser system was fitted to some models. For further details, refer to your Ford dealer.

1 All UK models are fitted with an anti-theft alarm system, incorporating movement sensors and an ignition immobiliser. The system is activated when the vehicle is locked.

2 The system includes a start inhibitor circuit, which makes it impossible to start the engine with the system armed.

3 The movement sensors consist of two ultrasonic units, located in the "B" pillars, incorporating transmitters and receivers (see illustrations). The receivers check that the echo frequency matches the original frequency. If there is any significant difference, the system triggers the alarm.



**19.23 Service indicator switch removal**

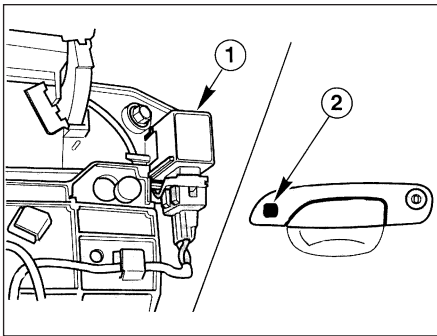
1 Lever out the switch 2 Cover 3 Wiring



**20.3A Disconnecting a movement sensor multi-plug**

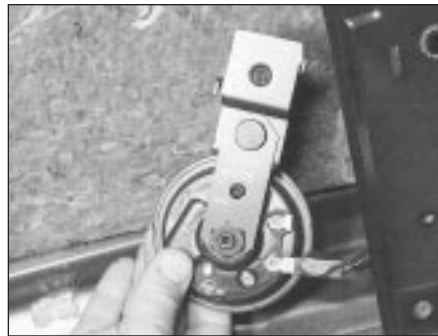


**20.3B Removing a movement sensor**

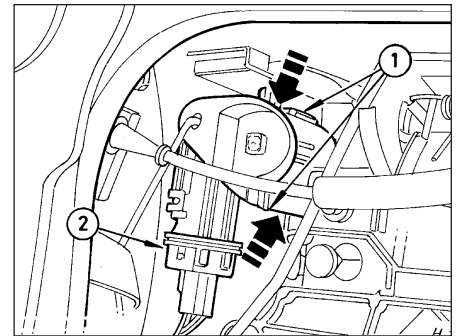


20.6 Infra-red receiver location on the door handle

1 Receiver 2 Infra-red eye on the door handle



20.7 Alarm system horn location on Hatchback and Saloon models



20.10 Alarm system door lock switch removal

1 Clips (arrowed) 2 Multi-plug

4 The system module is located on a bracket beneath the right-hand side of the facia. The set and reset switches are located in a housing by the lock barrel holder in the doors, tailgate or bootlid.

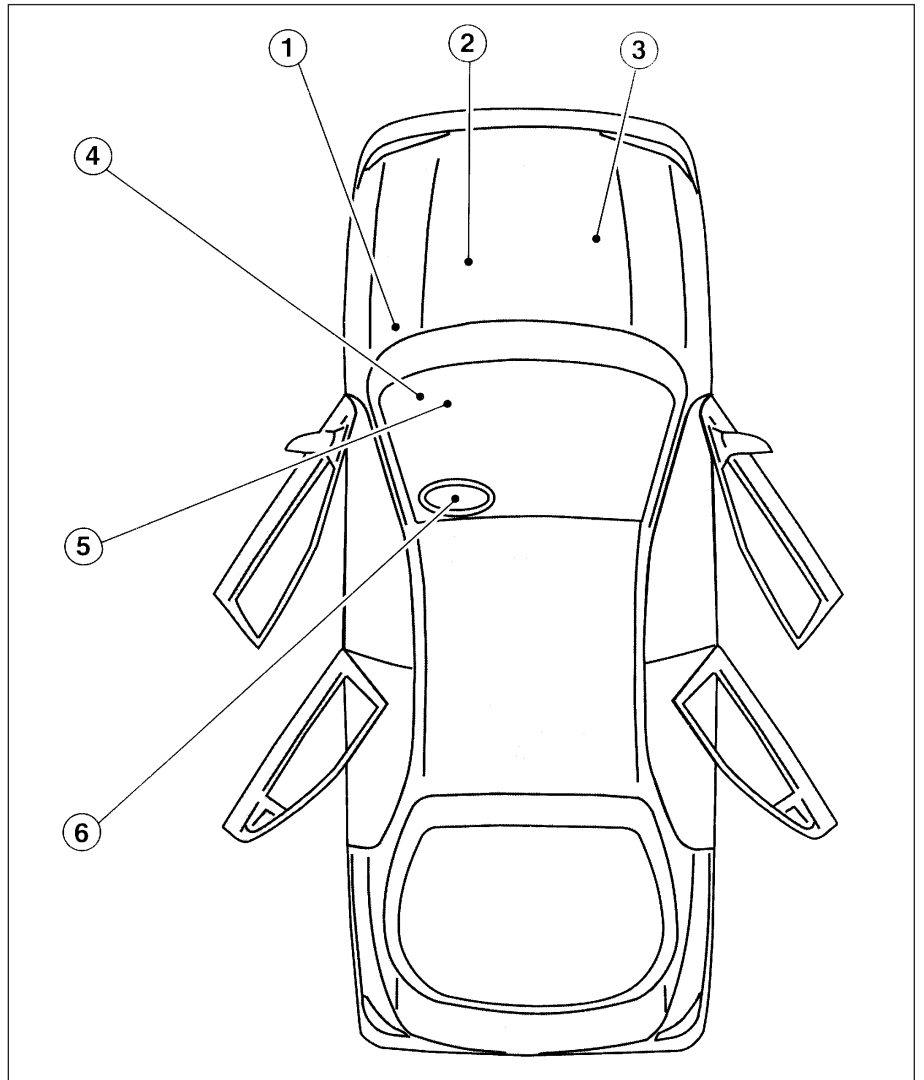
5 To allow temporary opening of the tailgate or bootlid, an inhibit switch is fitted to the lock barrel. This suppresses the alarm system until the tailgate or bootlid is closed again.

6 Where remote central locking is fitted, an infra-red receiver is located on the exterior door handle (see illustration). Note that excessive heat can destroy this receiver; therefore, it should be covered with aluminium tape if (for instance) a paint-drying heat process is to be used.

7 The alarm system is fitted with its own horn. On Hatchback and Saloon models, it is located on the left-hand side of the luggage compartment; on Estate models, it is located on the right-hand side of the luggage compartment (see illustration).

8 The alarm system incorporates a self-test function, which can be activated by operating the bonnet switch or one of the lock position switches eight times within 10 seconds. During the check, the horn or buzzer issues acoustic signals which should occur every time a door, bonnet or tailgate is opened. If the doors are double-locked, the signal will occur when something is moved within the passenger compartment. A more comprehensive test can be made using the Ford FDS 2000 diagnostic tester.

9 The door lock switches associated with the alarm system are located behind the door trim panels (see illustration).



21.2 Cruise control component location on left-hand drive models

- 1 Speed control unit
- 2 Vehicle speed sensor (VSS)
- 3 Throttle valve actuator
- 4 Interrupt relay (vehicles with traction control system only)
- 5 Stop-light switch, brake and clutch pedal-operated disable switches
- 6 Driver's controls (buttons on steering wheel)

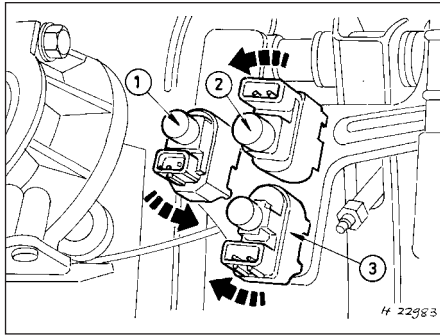
## 21 Cruise control system - general information



1 Cruise control is available as an option on some models.

2 The cruise control system components are shown in the accompanying illustration (see illustration). The system is active at road speeds between 25 mph and 125 mph.

3 The system comprises an electronic speed control unit with integral actuator and



**21.14 Removal of the speed control disable switches**

- 1 Clutch switch      3 Stop-light switch  
2 Brake pedal switch

switches mounted in the engine compartment with a control cable connected to the throttle valve actuator, driver-operated switches, brake and clutch pedal switches, an indicator light, and a road speed sensor.

4 The driver-operated switches are mounted on the steering wheel, and allow the driver to control the various functions.

5 The vehicle speed sensor uses the speedometer cable drive pinion to generate pulses which are fed to the speed control unit.

6 The stop-light switch, brake pedal switch and (when applicable) clutch pedal switch are used to disable the cruise control system. The stop-light switch is activated when the brake pedal is applied gently, and the brake pedal switch is activated when the brake pedal is applied forcibly.

7 An indicator light on the instrument panel is illuminated when the system is in operation.

8 The following paragraphs describe brief removal procedures for the cruise control system components. The battery negative (earth) lead should be disconnected before commencing work (refer to Chapter 5, Section 1). Refitting is a reversal of removal.

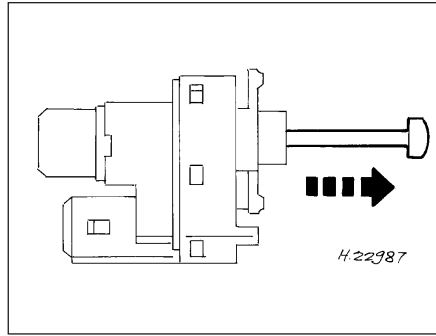
### Speed control switch

9 Remove the steering column upper and lower shrouds, with reference to Chapter 10.

10 Remove the air bag module as described in Section 29.



**22.2 Washer reservoir mounting bolts (arrowed)**



**21.15 Resetting the brake pedal and stop-light switches**

11 Disconnect the multi-plugs, then unscrew the screws and remove the switch.

### Disable switches

12 Remove the lower fascia panel from under the steering column.

13 Disconnect the multi-plugs from the clutch switch, brake pedal switch and stop-light switch.

14 To remove the clutch and brake pedal switches, twist them anti-clockwise. To remove the stop-light switch, twist it clockwise (see illustration).

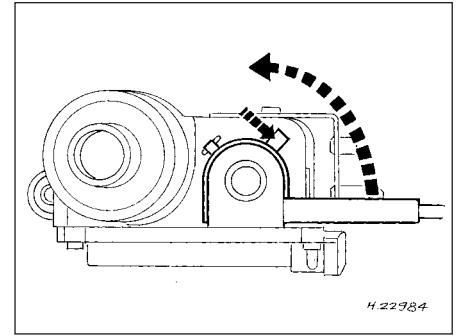
15 Refitting is the reverse of removal. To ensure correct operation of the brake pedal switches, reset the switch by fully extending its plunger (see illustration). Depress the pedal until the distance between it and the mounting bracket is as shown in Chapter 9, illustration 25.6. Hold the pedal in this position, clip the switch securely into position and gently raise the pedal to the at-rest position. This will automatically set the position of the switch.

### Speed control actuator

16 Remove the air cleaner as described in Chapter 4.

17 Disconnect the actuator cable from the throttle linkage on the throttle housing, by releasing the inner cable end fitting from the segment and unclipping the outer cable from the bracket.

18 Unscrew the actuator mounting bolt, then



**21.20 Removing the actuator cable locking arm**

slide the actuator out of the mounting pin holes.

19 Disconnect the multi-plug and remove the assembly.

20 Depress the actuating cable cap locking arm, and remove the cap by turning it anti-clockwise (see illustration).

21 Gently raise the cable retaining lug by a maximum of 0.5 mm, and push the cable end out of the slot in the pulley.

22 When refitting, make sure that the cable end locks into the slot in the pulley.

23 To locate the cable cap onto the actuator pulley, keep the cable taut and in the pulley groove, and pull the throttle linkage end of the cable to draw the cable cap onto the pulley.

24 To refit the cable cap, keep the cable taut and the pulley still, then refit the cable cap tabs into the actuator slots; turn the cap clockwise until the locking arm locates on the locking stop. **Note:** *Incorrect assembly of the cable onto the pulley may result in a high idle speed. Check that the throttle lever is in its idle position after refitting the actuator.*

## 22 Windscreen/tailgate washer system components - removal and refitting



### Removal

#### Washer reservoir and pump

1 Unscrew the bolts, and release the clips to remove the radiator lower cover.

2 Unscrew the mounting bolts, and pull the reservoir forwards slightly (see illustration). For better access, it may be necessary to remove the front bumper.

3 Disconnect the multi-plugs for the windscreen washer pump and fluid level sensor (see illustration).

4 Disconnect the hoses from the windscreen washer pump and (where applicable) from the headlamp washer pump. Anticipate some loss of fluid by placing a container beneath the reservoir.

5 Withdraw the reservoir from the vehicle.

6 Pull the level sensor, the windscreen washer pump, and (where applicable) the



**22.3 Disconnecting the washer pump and level sensor multi-plugs**





**22.6 Pulling the windscreen washer pump from the reservoir**

headlamp washer pump, from the reservoir (see illustration).

7 Remove the rubber seals.

**Washer nozzle (windscreen)**

8 With the bonnet supported in its open position, carefully disconnect the washer tube from the bottom of the nozzle.

9 Using a screwdriver and working from under the bonnet, carefully prise out the nozzle. Where necessary, disconnect the wiring for the nozzle heater.

**Washer nozzle (rear window)**

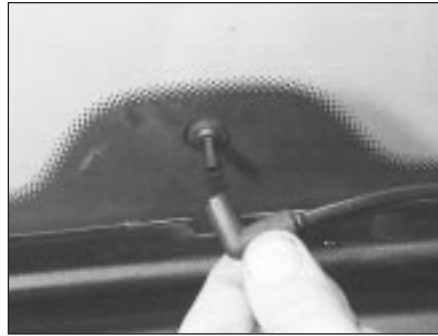
10 With the tailgate open, carefully pull off the inner trim panel from the top of the tailgate.

11 Pull the washer tube from the bottom of the nozzle (see illustration).

12 Carefully prise the nozzle out of the tailgate glass, then prise out the rubber grommet (see illustrations). Where necessary, disconnect the wiring for the nozzle heater.

**Refitting**

13 Refitting is a reversal of the removal procedure. In the case of the washer nozzles, press them in until they are fully engaged. The rear window washer nozzle must rest against the rubber seal.



**22.11 Pull the washer tube from the bottom of the nozzle**



**22.12B . . . and prise out the rubber grommet**



**22.12A Remove the nozzle from the tailgate glass . . .**



**23.6 Using the special U-shaped rods to remove the radio**

do not have the code or details of the correct procedure, but can supply proof of ownership and a legitimate reason for wanting this information, the vehicle's selling dealer may be able to help.

3 Note that these units will allow only ten attempts at entering the code - any further attempts will render the unit permanently inoperative until it has been reprogrammed by Ford themselves. At first, three consecutive attempts are allowed; if all three are incorrect, a 30-minute delay is required before another attempt can be made. Each of any subsequent attempts (up to the maximum of ten) can be made only after a similar delay.

**Removal**

4 Disconnect the battery negative (earth) lead.

5 Where fitted, prise the cover/surround from the front of the radio/cassette player. Note that the cover is not fitted to all models.

6 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 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. If the unit proves difficult to withdraw, remove the cassette tray (or where applicable, the CD player) from

beneath the unit, then reach through the aperture and ease it out from behind.

7 With the radio partly withdrawn, disconnect the feed, earth, aerial and speaker leads. Where applicable, also detach and remove the plastic support bracket from the rear of the unit.

**Refitting**

6 Refitting is a reversal of removal. With the leads reconnected to the rear of the unit, press it into position until the retaining clips are felt to engage. Reactivate the unit by entering the correct code in accordance with the maker's instructions.

**24 Radio/cassette player power amplifier - removal and refitting**

**Removal**

1 Disconnect the battery negative (earth) lead. See Chapter 5, Section 1.

2 Unscrew the screws and remove the lower fascia panel.

3 The radio/cassette player power amplifier is located beneath the fascia.

4 Unscrew the cross-head screws, disconnect the wiring and remove the amplifier.

**Refitting**

5 Refitting is a reversal of the removal procedure.

**23 Radio/cassette player - coding, removal and refitting**



**Note:** Special tools are required to remove the radio.

**Coding**

1 If a Ford "Keycode" unit is fitted, and the unit and/or the battery is disconnected, the unit will not function again on reconnection until the correct security code is entered. Details of this procedure are given in the "Ford Audio Systems Operating Guide" supplied with the vehicle when new, with the code itself being given in a "Radio Passport" and/or a "Keycode Label" at the same time.

2 For obvious security reasons, the re-coding procedure is not given in this manual - if you



## 25 Compact disc player - removal and refitting

1 A compact disc (CD) player is available as an optional extra on most models. On some models, an autochanger version is available, which can hold a number of discs at a time.

### Removal

2 The battery negative (earth) lead should be disconnected before commencing work.

### CD player, or autochanger control unit

3 The procedure is identical to that for the radio/cassette player described in Section 23.

### CD player autochanger

4 The CD player autochanger unit is mounted on the right-hand side of the luggage compartment. The wiring loom passes up the "C" pillar, across to the left-hand side "A" pillar, then to the centre console area.

5 Remove the trim cover from the autochanger unit.

6 Unscrew the mounting screws, and remove the autochanger unit from its mounting bracket.

7 Disconnect the multi-plug and remove the unit from inside the vehicle.

### Refitting

8 Refitting is a reversal of the removal procedure.

## 26 Speakers - removal and refitting

### Removal

1 Remove the door trim panel as described in Chapter 11.

2 Unscrew the cross-head screws, and withdraw the speaker from the door inner panel.

3 Disconnect the wiring and remove the speaker.

### Refitting

4 Refitting is a reversal of the removal procedure.



28.3 Unscrewing an air bag mounting bolt

## 27 Radio aerial - removal and refitting

### Removal

1 Prise out the trim cover from the headlining immediately below the base of the aerial.

2 Unscrew the cross-head screw from the base of the aerial, and remove the aerial mast.

### Refitting

3 Refitting is a reversal of the removal procedure.

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



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

### Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, 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 Rotate the steering wheel so that one of the mounting bolt holes is visible above the steering column upper shroud.

3 Unscrew and remove the first mounting bolt, then turn the steering wheel as necessary and remove the remaining mounting bolts (see illustration).

4 Carefully withdraw the air bag unit from the steering wheel far enough to disconnect the wiring multi-plug, then remove it from inside the vehicle (see illustration).



28.4 Disconnecting the air bag wiring multi-plug (arrowed)



**Warning: Stand the unit with the cover uppermost, and do not expose it to heat sources in excess of 100°C.**



**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 unit which is visibly damaged or which has been tampered with.**

### Refitting

5 Refitting is a reversal of the removal procedure.

## 29 Air bag control module - removal and refitting

### Removal

1 Disconnect the battery negative (earth) lead (refer to Chapter 5, 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 facia panel as described in Chapter 11.

3 Disconnect the multi-plug from the module, by pressing the locking tab upwards and swivelling the retaining strap.

4 Unscrew the mounting bolts and remove the module from the vehicle.

### Refitting

5 Refitting is a reversal of the removal procedure.

## 30 Air bag clock spring - removal and refitting

### Removal

1 Remove the air bag unit as described in Section 28.

2 Disconnect the horn switch multi-plug.

3 If fitted, disconnect the multi-plugs for the cruise control.

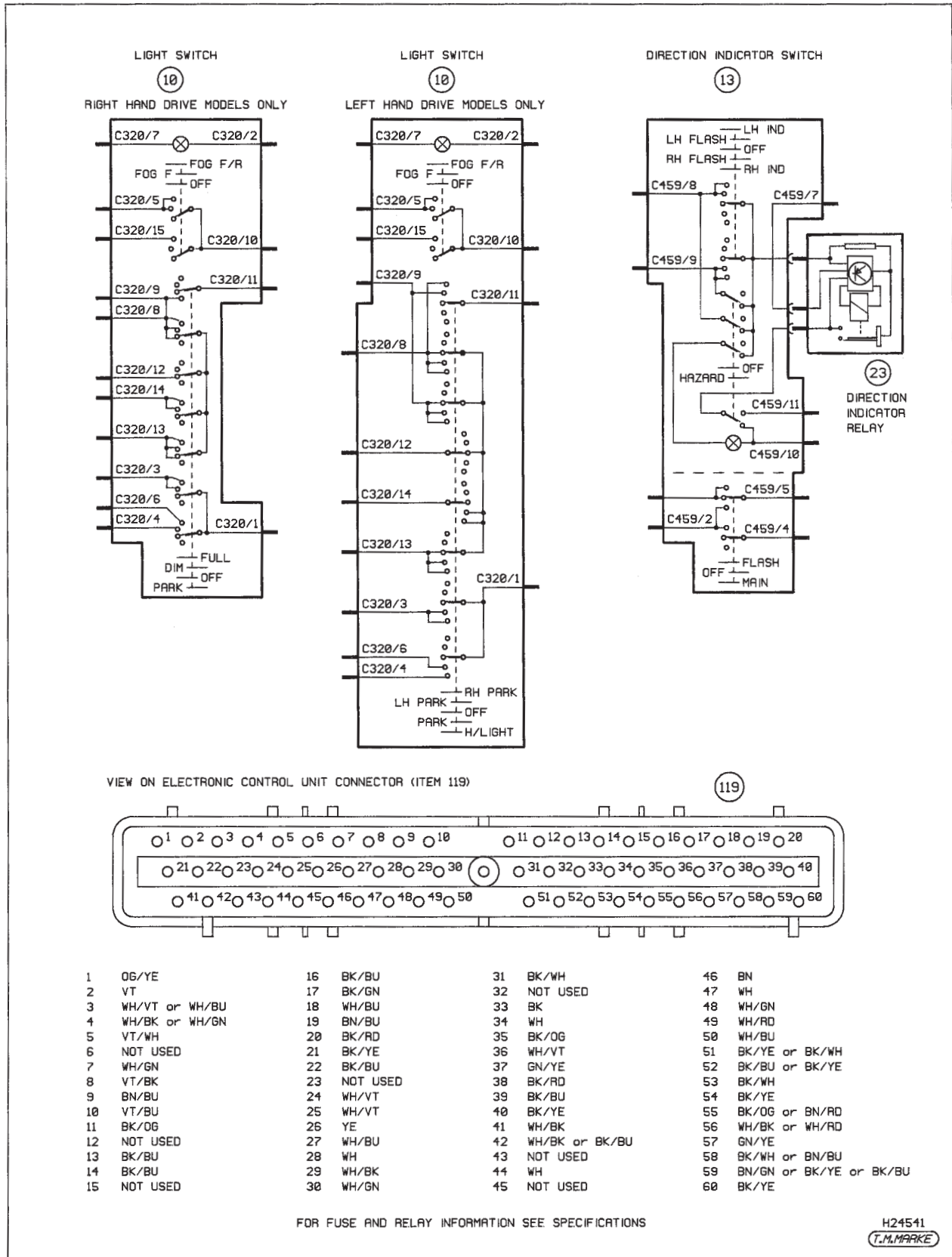
4 Remove the steering wheel and shrouds.

5 Using a small screwdriver, release the retaining tabs, then remove the clock spring from the steering column.

### Refitting

6 Refitting is a reversal of the removal procedure, but make sure that the steering wheel is centralised. The clock spring must be fitted in its central position, with the special alignment marks aligned and the TOP mark uppermost. To check for this position, turn the clock spring housing anti-clockwise until it is tight, then turn in the opposite direction by two-and-three-quarter turns.





Internal connection details continued



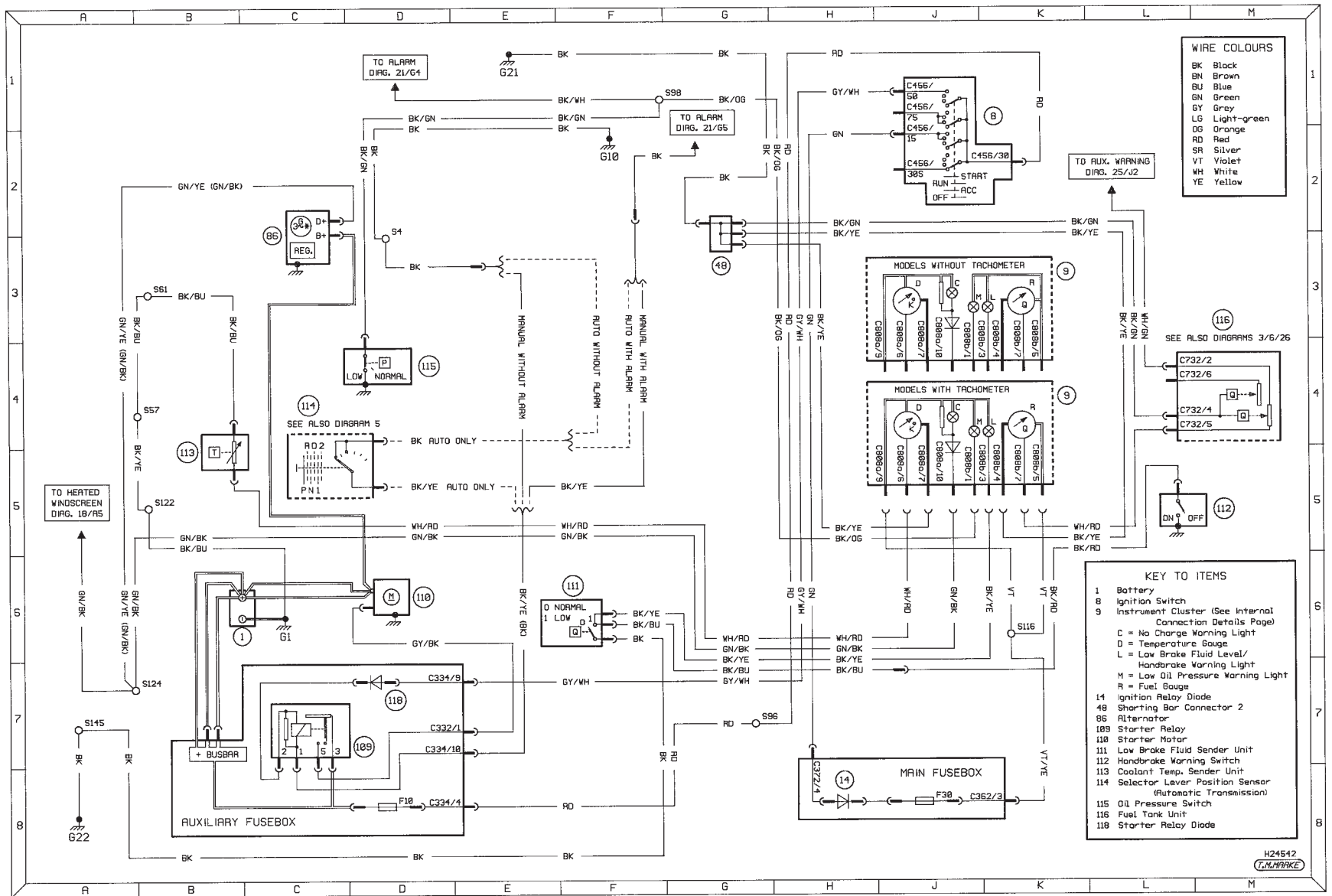


Diagram 1: Starting, charging, warning lights and gauges

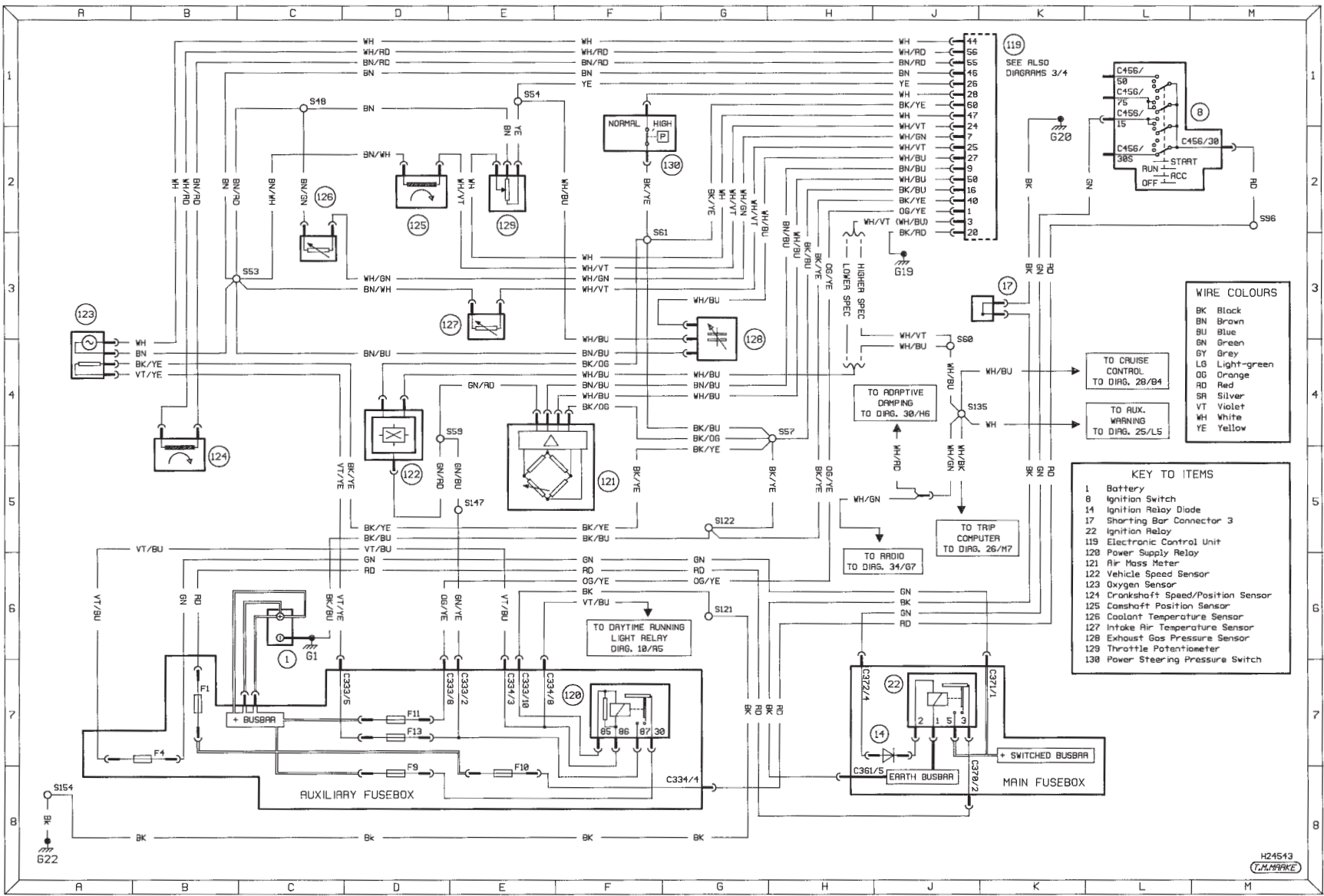


Diagram 2: Engine management – sensor inputs (manual transmission models)

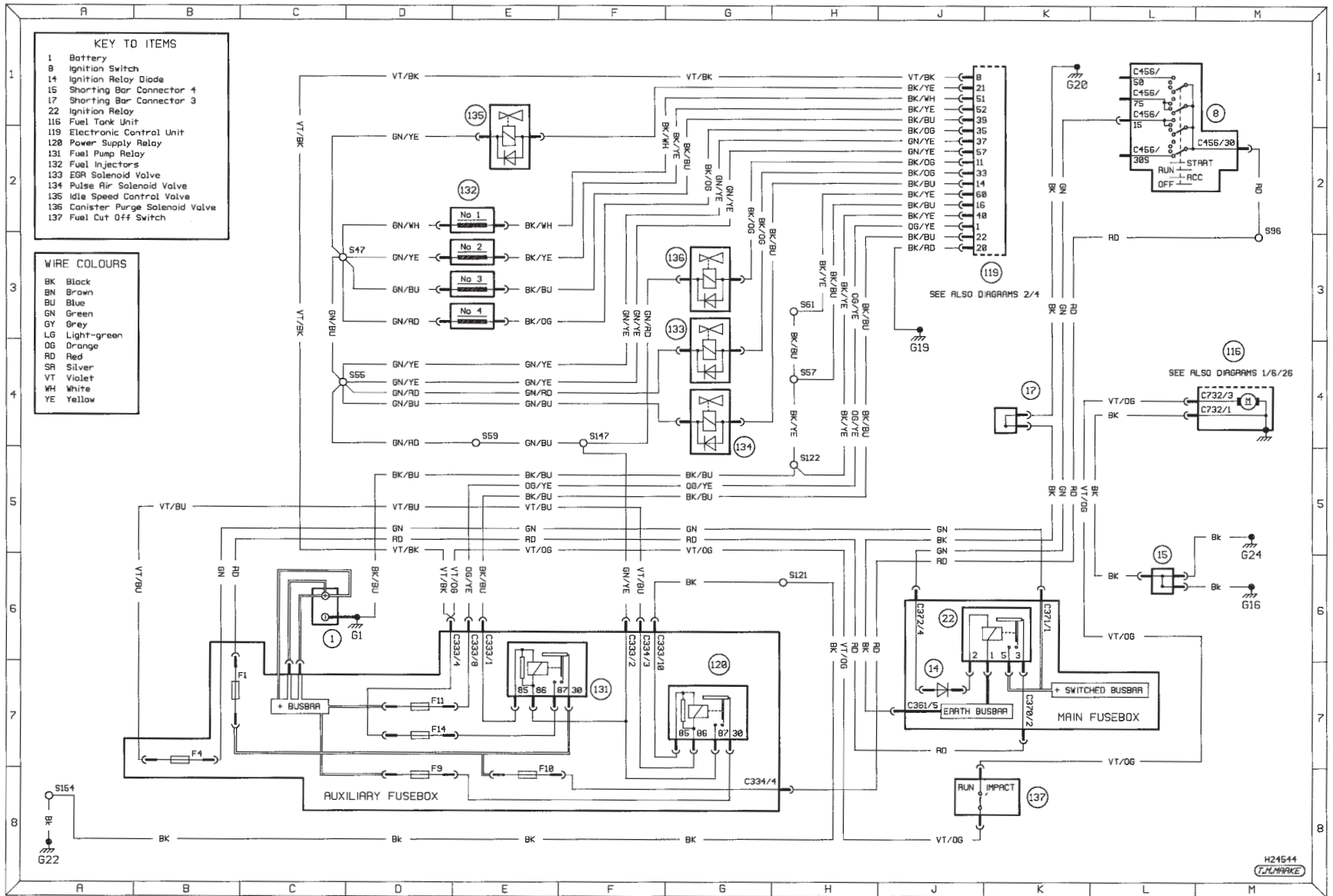


Diagram 3: Engine management – solenoid outputs and fuel pump (manual transmission models)

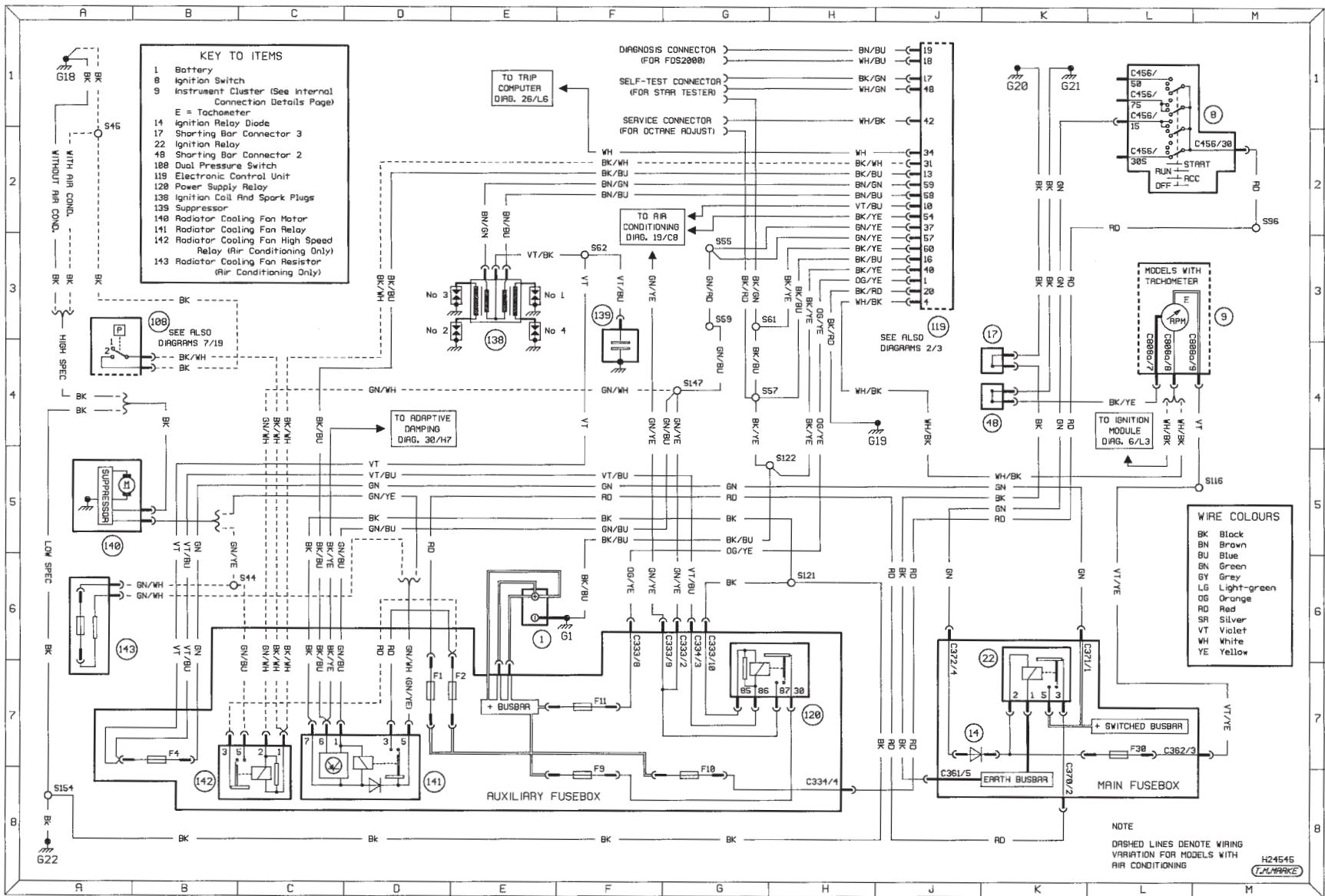


Diagram 4: Engine management - ignition, tachometer, cooling fan and diagnostic connectors (manual transmission models)



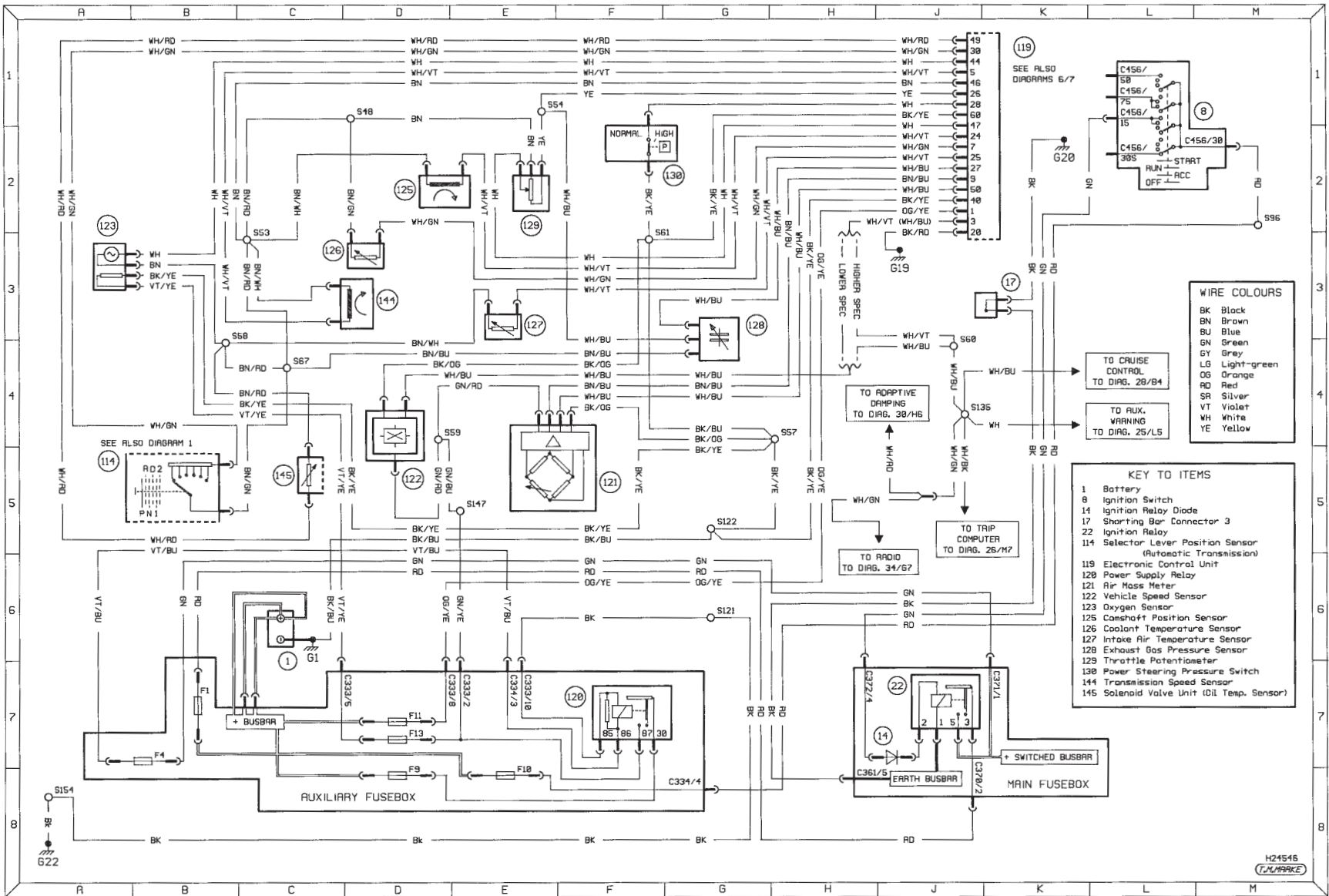


Diagram 5: Engine management - sensor inputs (automatic transmission models)

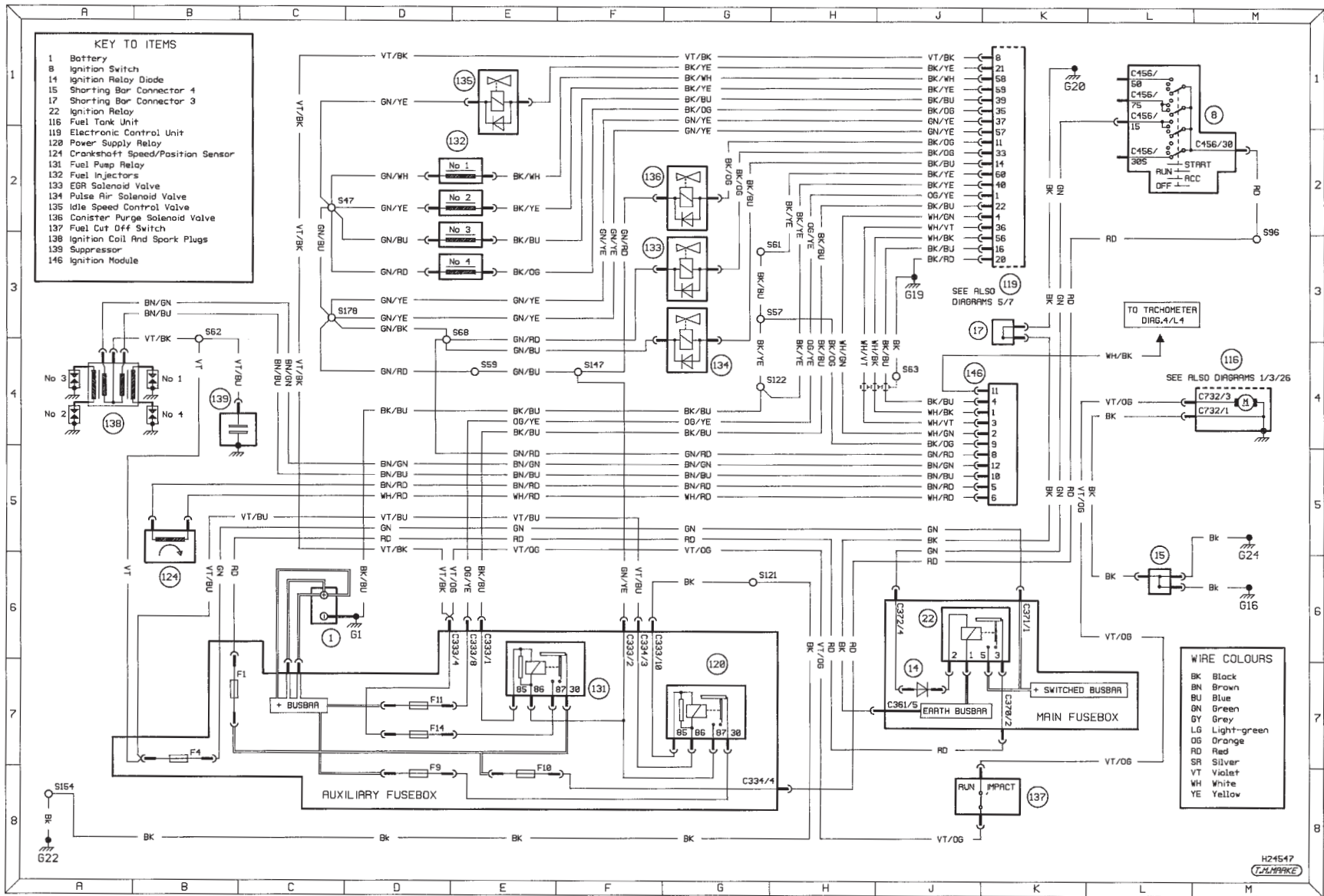


Diagram 6: Engine management – solenoid outputs, ignition and fuel pump (automatic transmission models)

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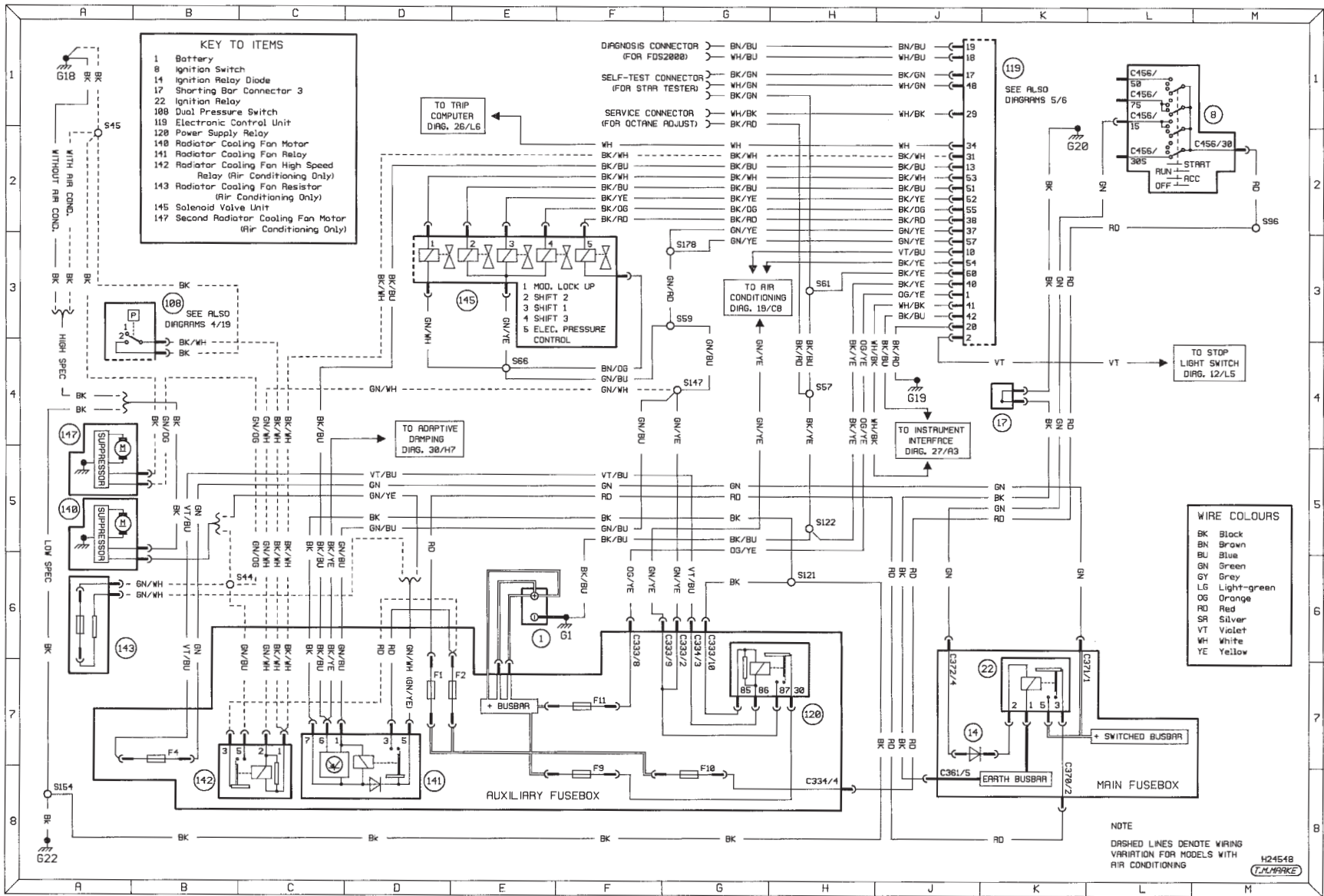


Diagram 7: Engine management – cooling fan, solenoid valve unit and diagnostic connectors (automatic transmission models)

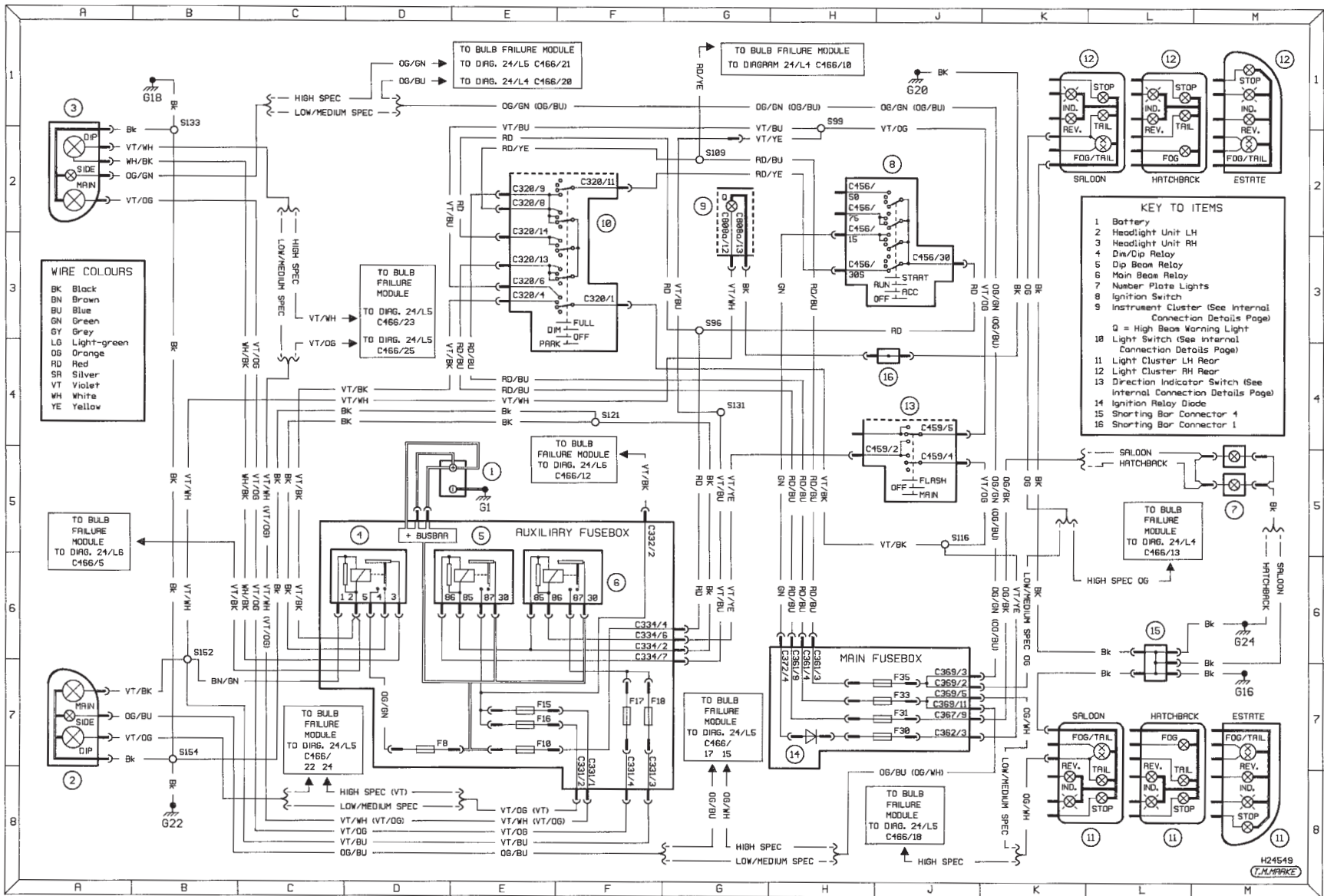


Diagram 8: Exterior lighting – side and headlights (right-hand drive models: dim-dip)



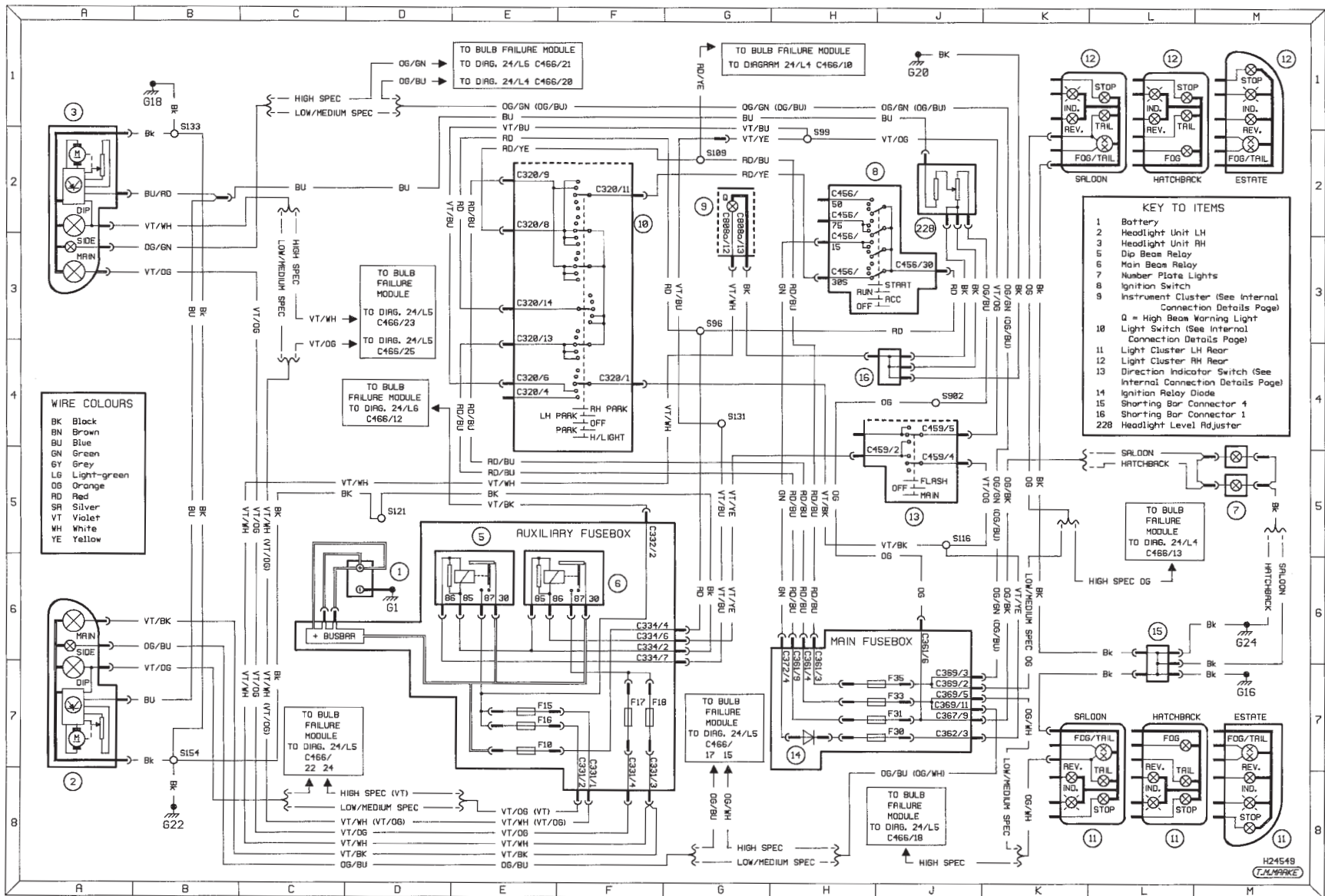


Diagram 9: Exterior lighting - side and headlights (left-hand drive models: non dim-dip)

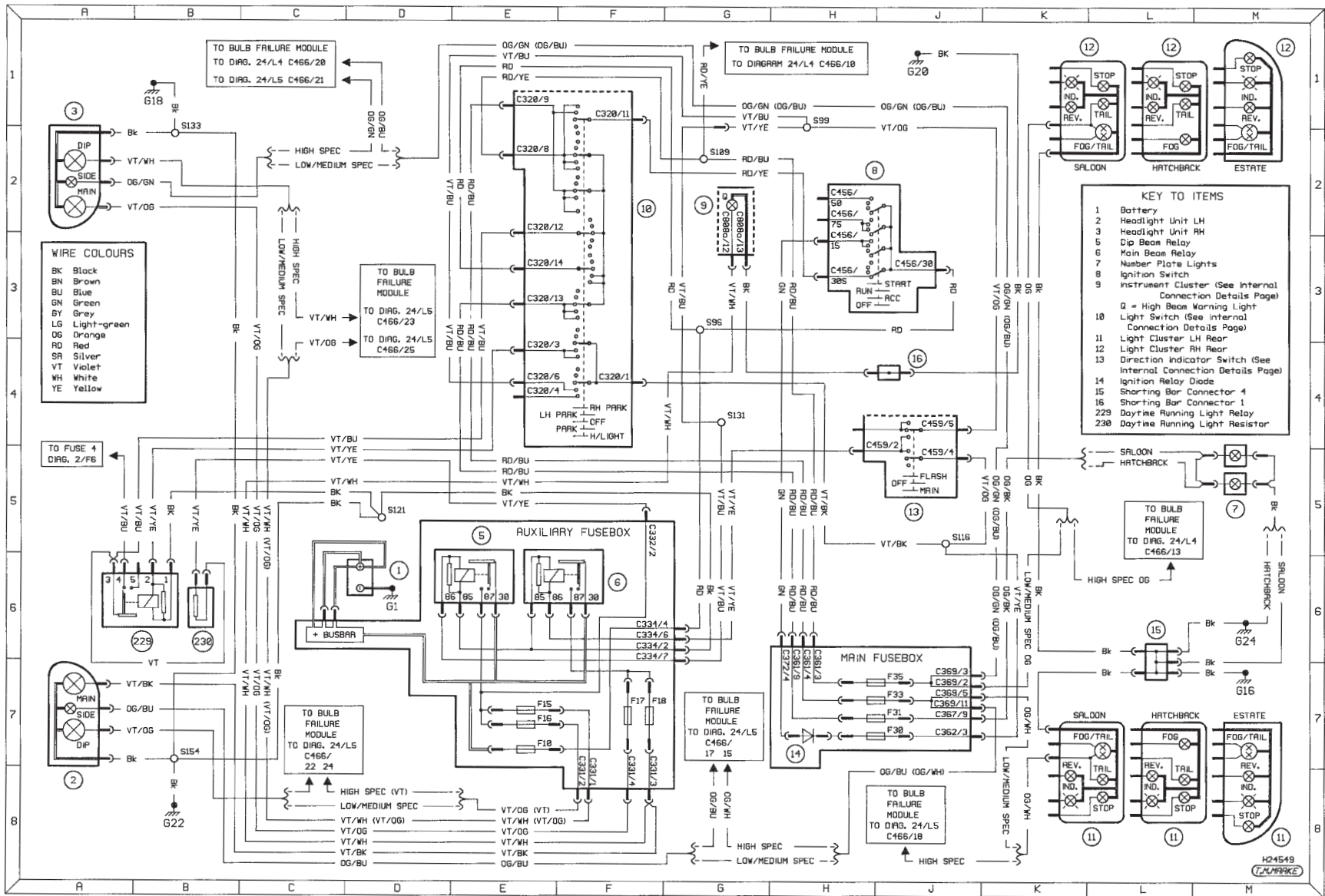


Diagram 10: Exterior lighting - side and headlights (left-hand drive models: daytime running lights)

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T.M. MARKE

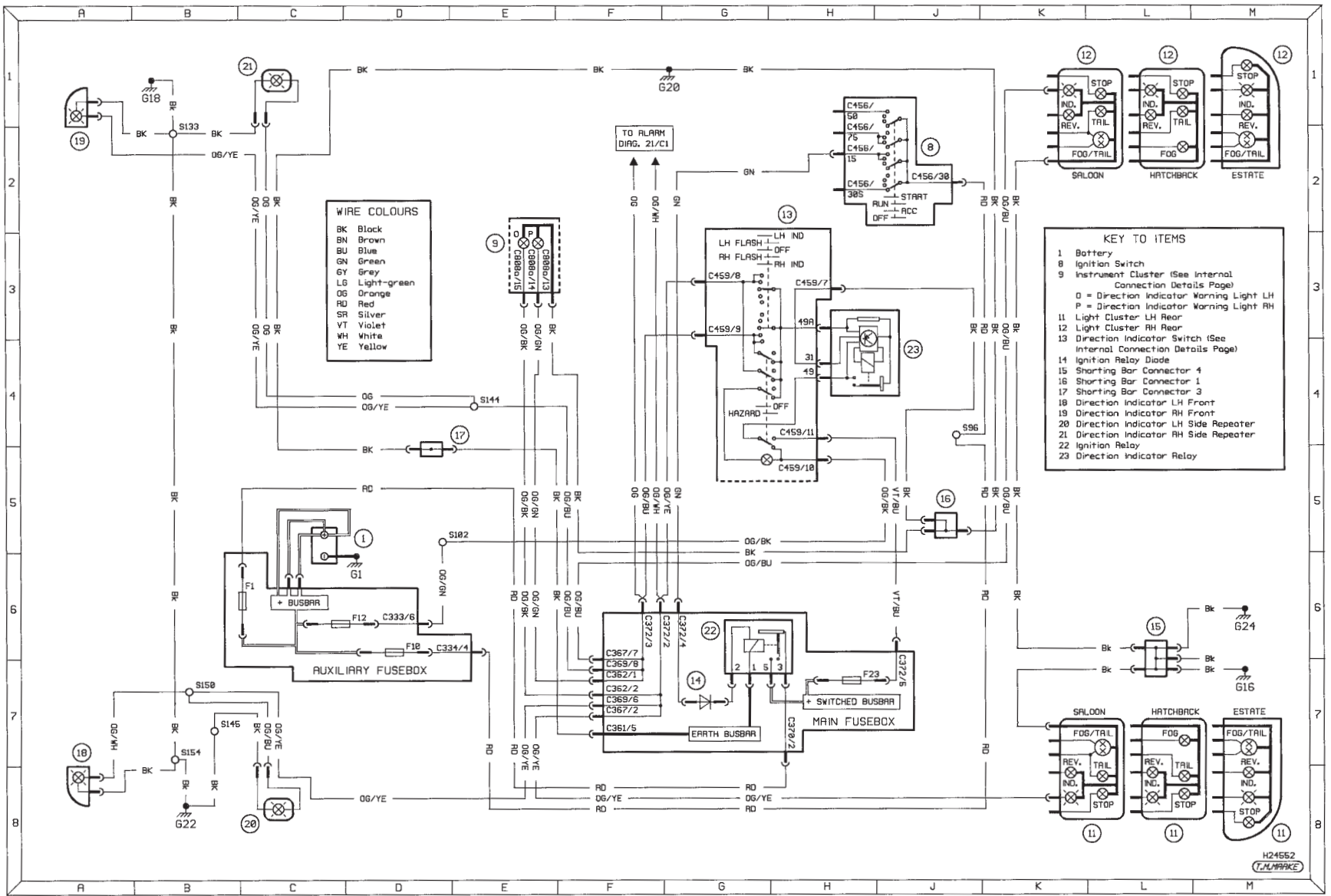


Diagram 11: Exterior lighting - hazard flasher and direction indicators

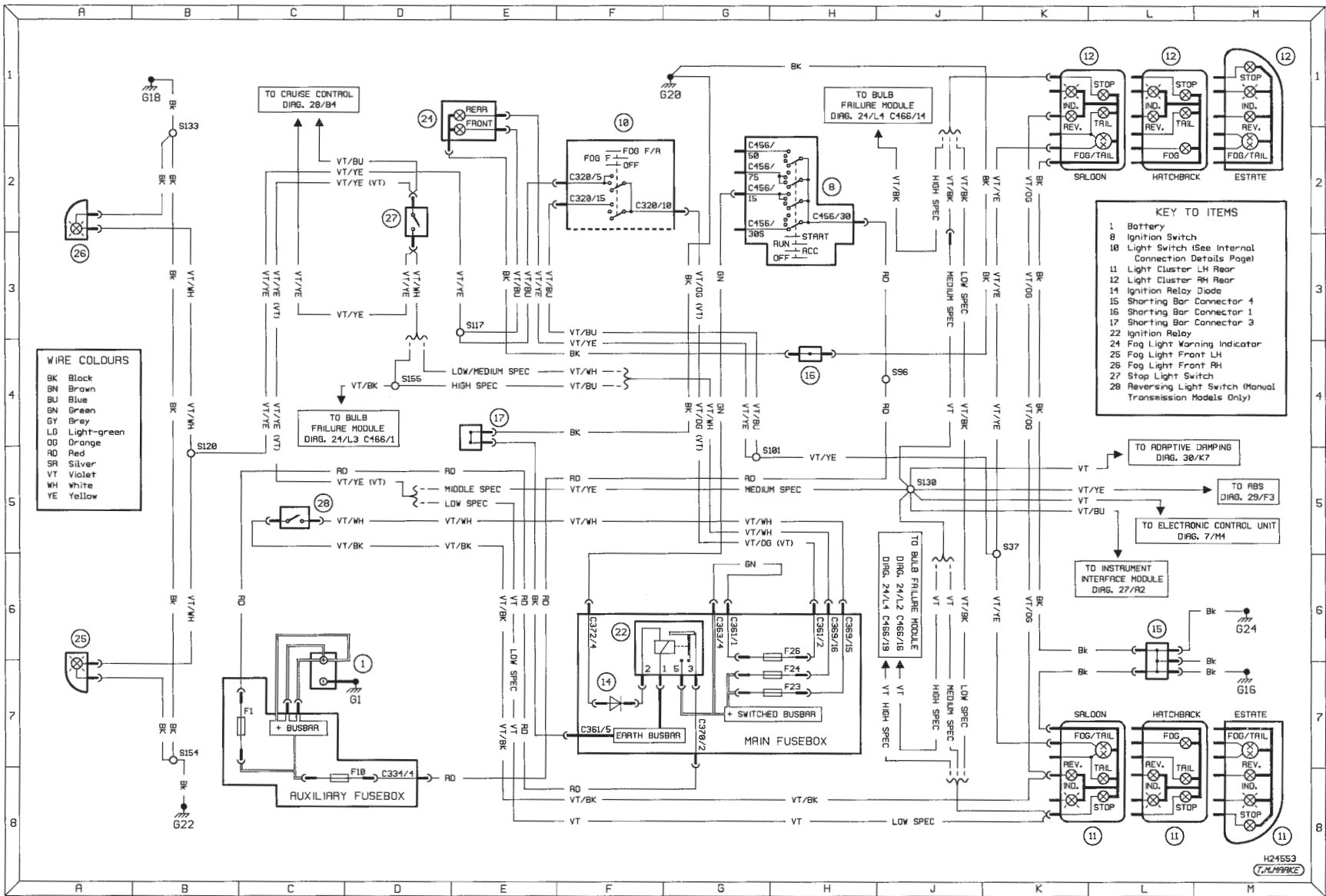


Diagram 12: Exterior lighting – foglights, stop-lights and reversing lights

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T.M.MARKE



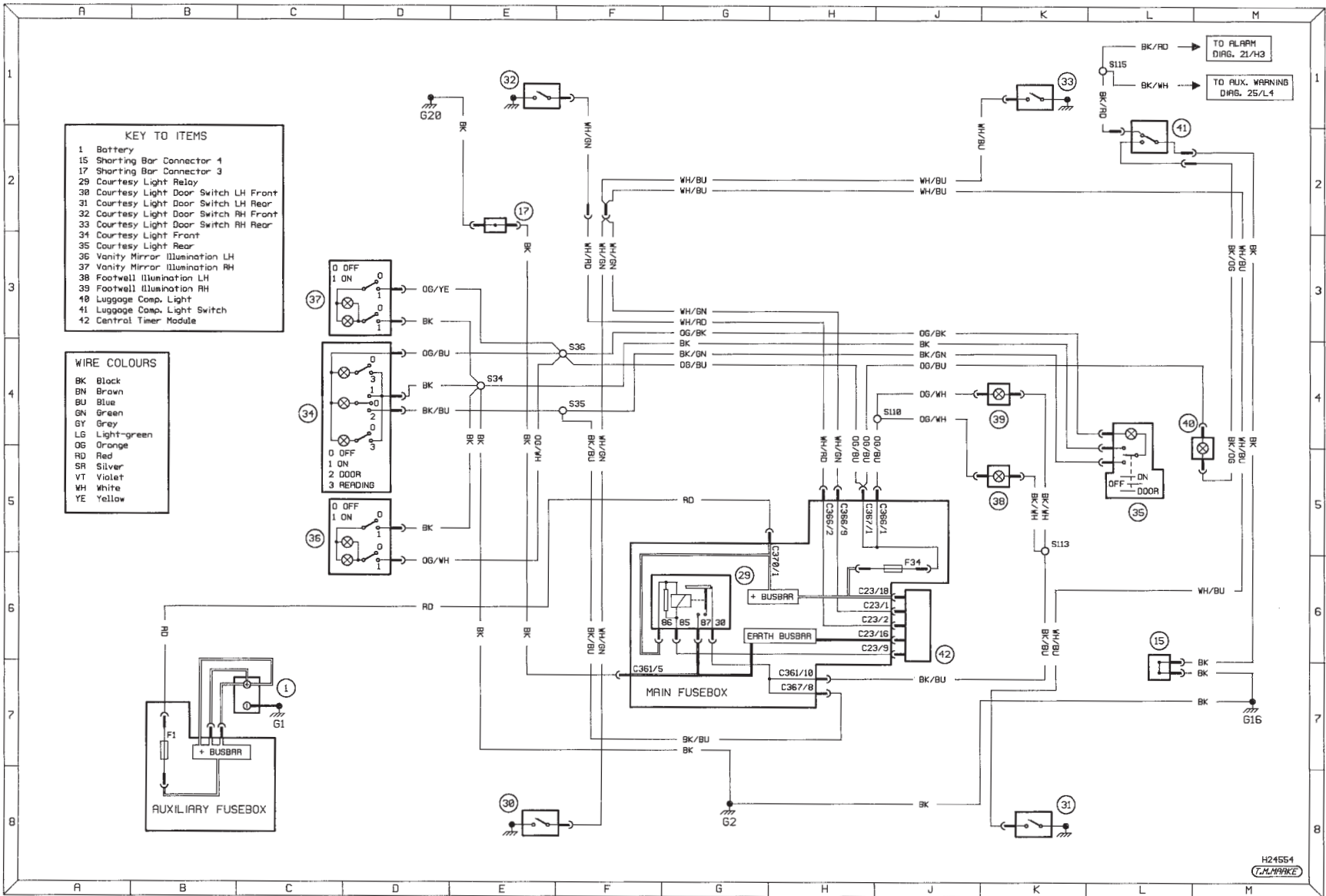


Diagram 13: Interior lighting – front and rear courtesy, footwell and luggage compartment lights

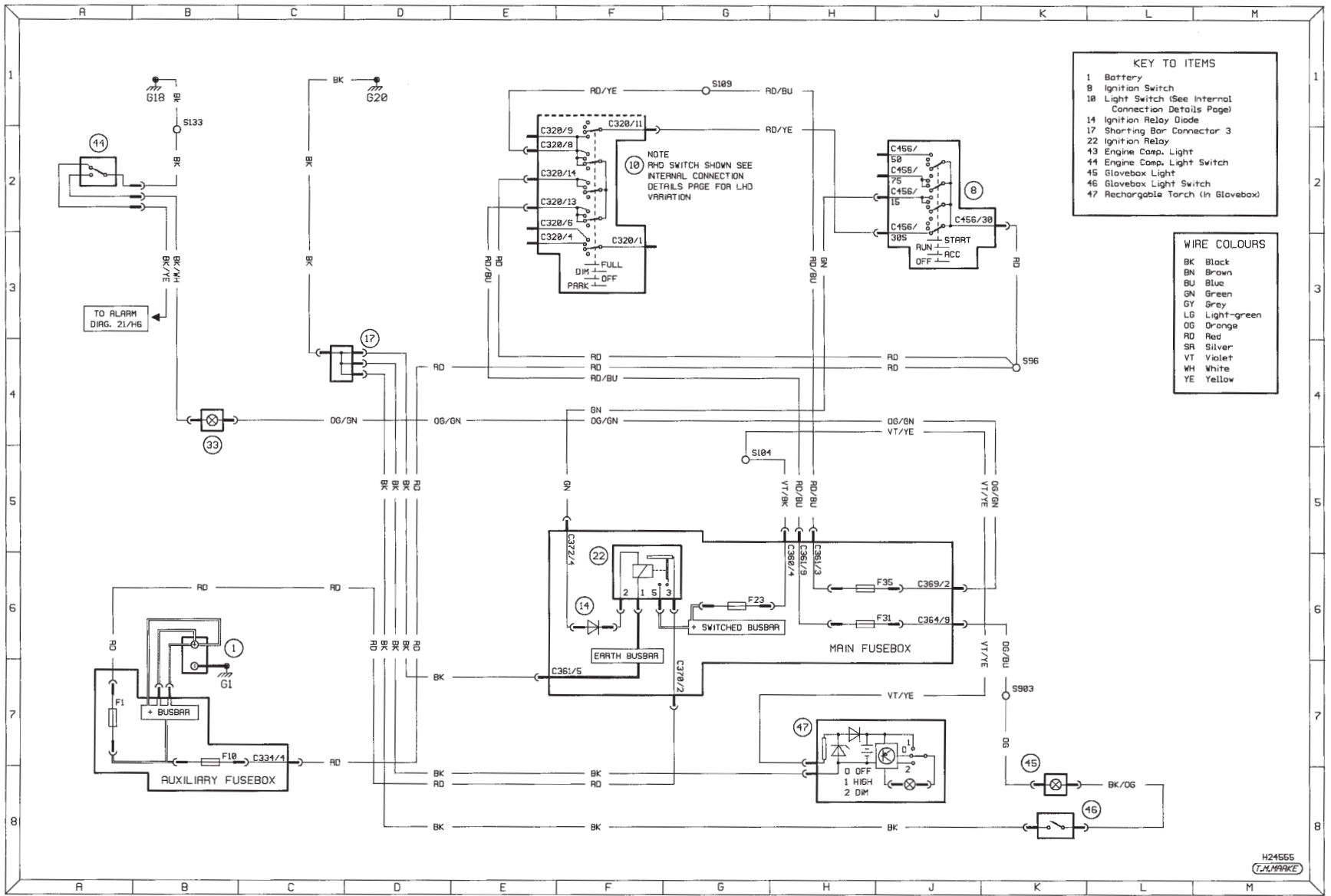


Diagram 14: Interior lighting – torch, glovebox and engine compartment lights

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T.M. MARKER

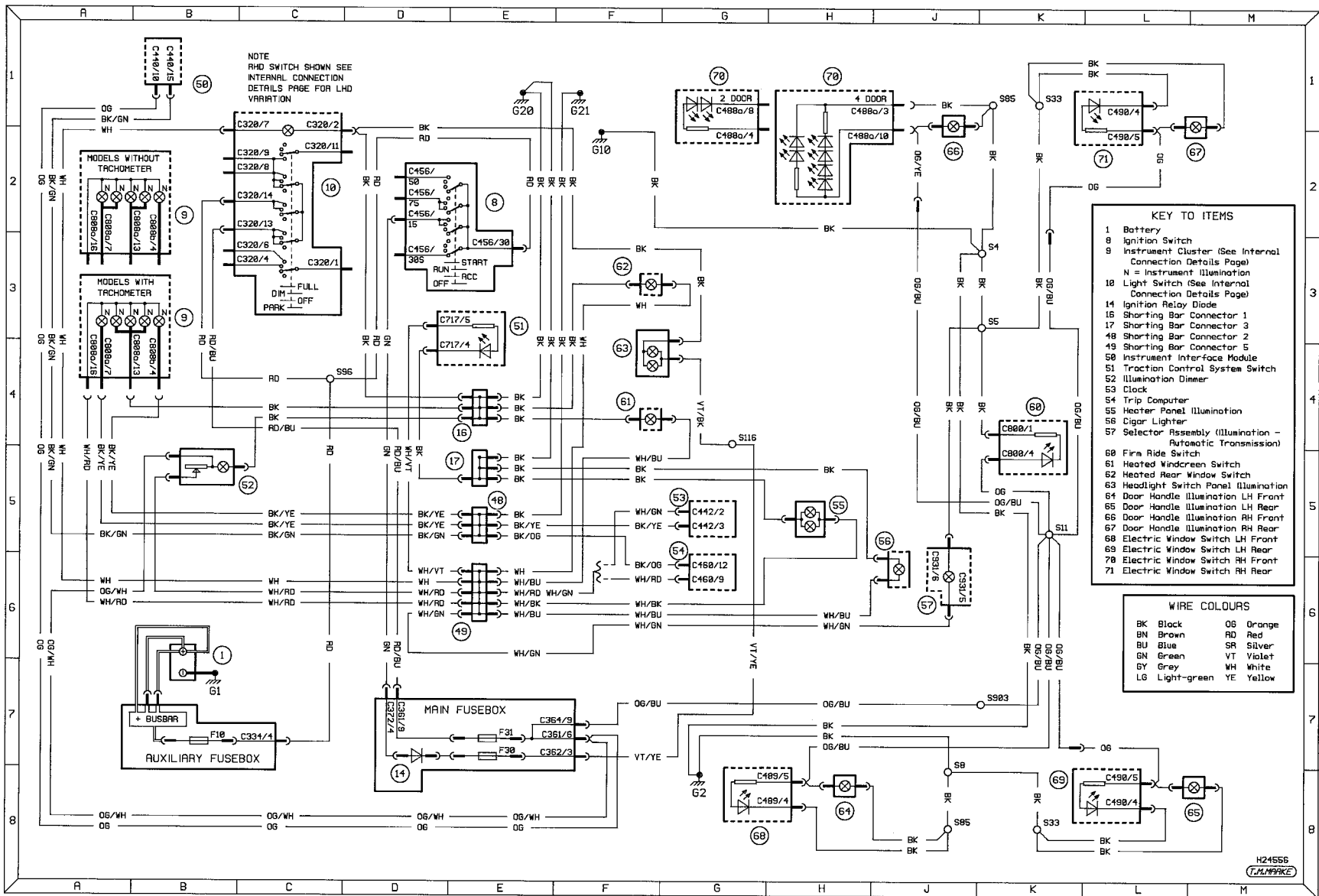


Diagram 15: Interior illumination

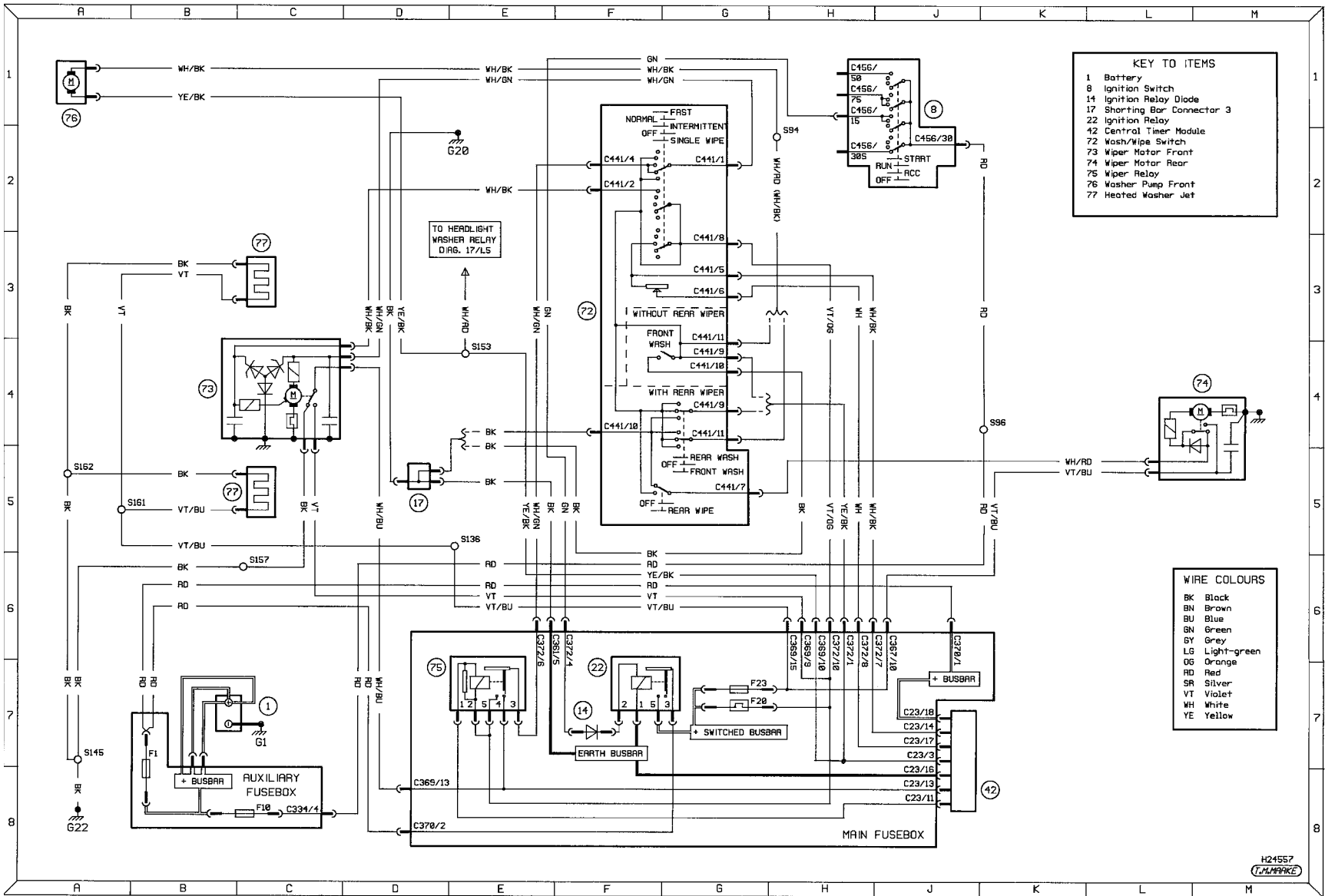


Diagram 16: Wash/wipe and heated washer jets

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T.MARKER



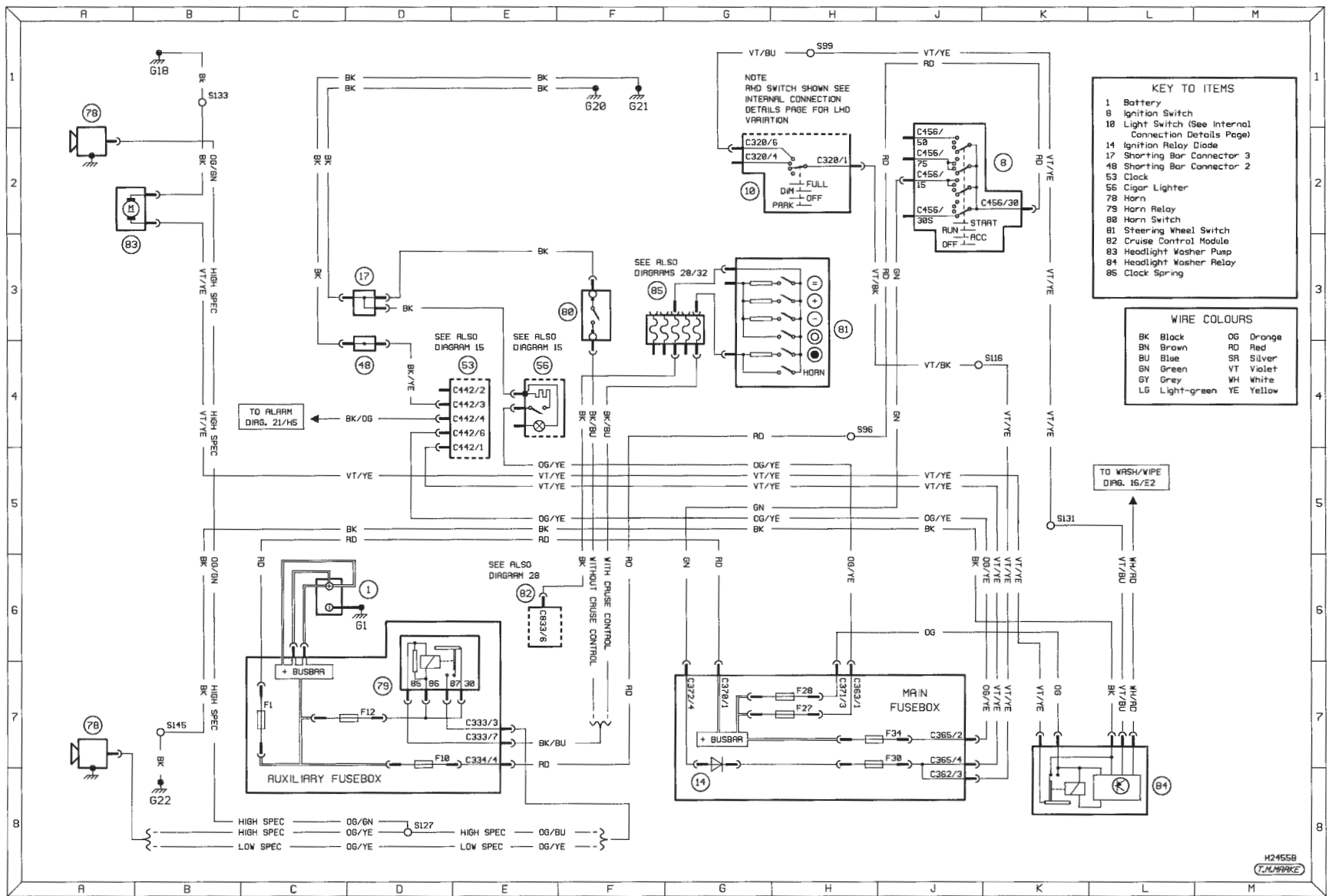


Diagram 17 Headlight washer, horn, clock and cigar lighter

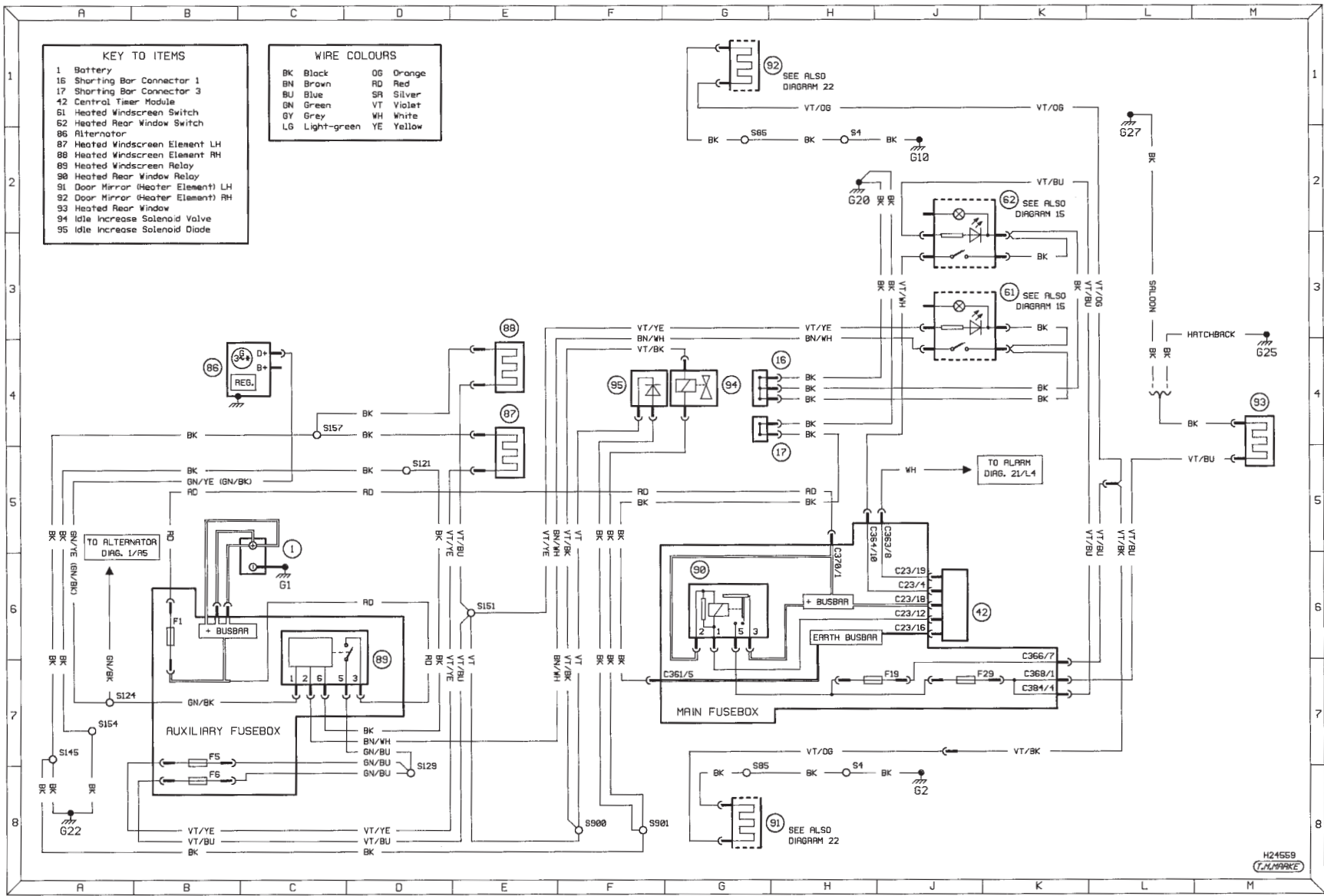


Diagram 18: Heated mirrors and heated front/rear screens

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LAMPARKE

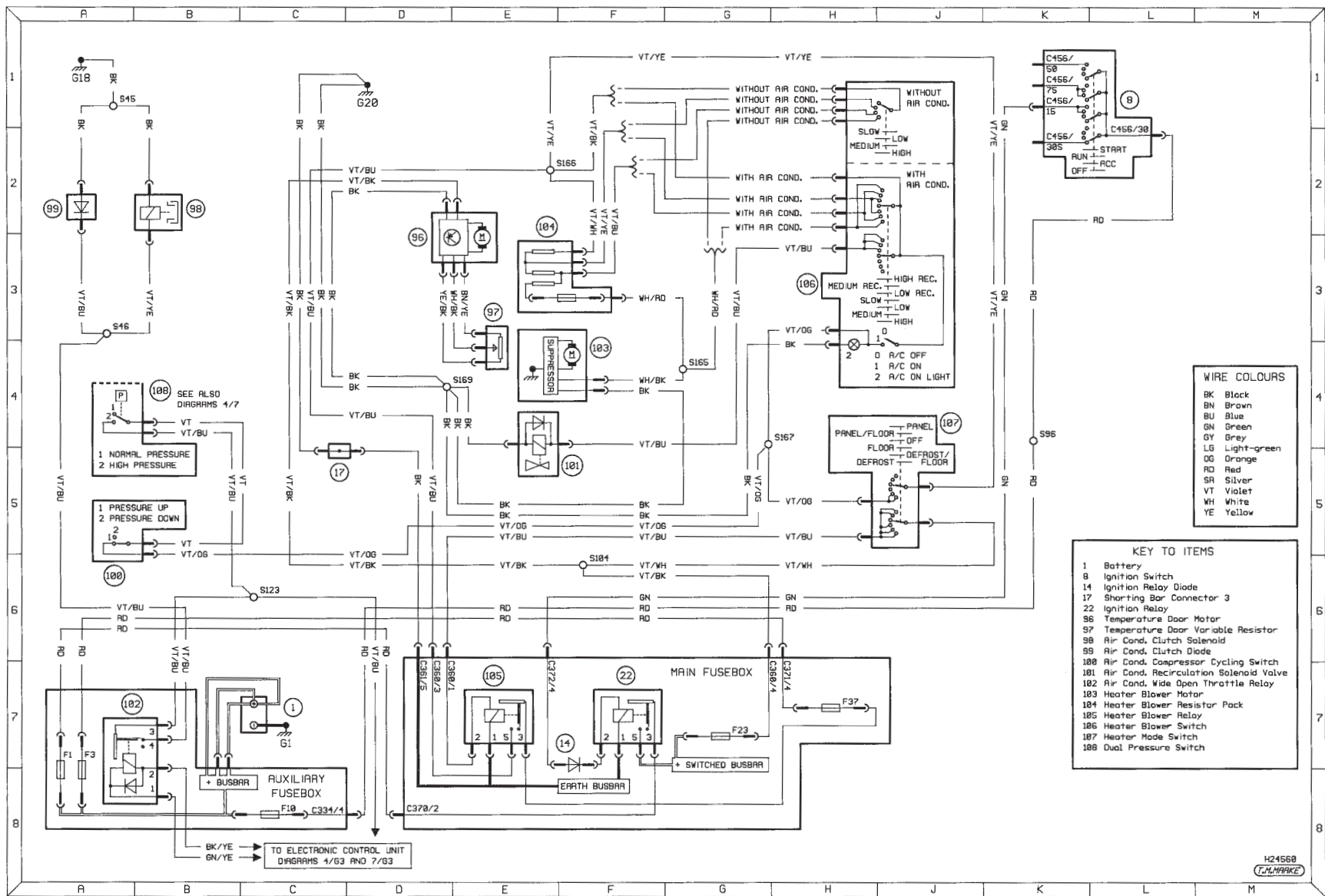


Diagram 19: Air conditioning and heater blower

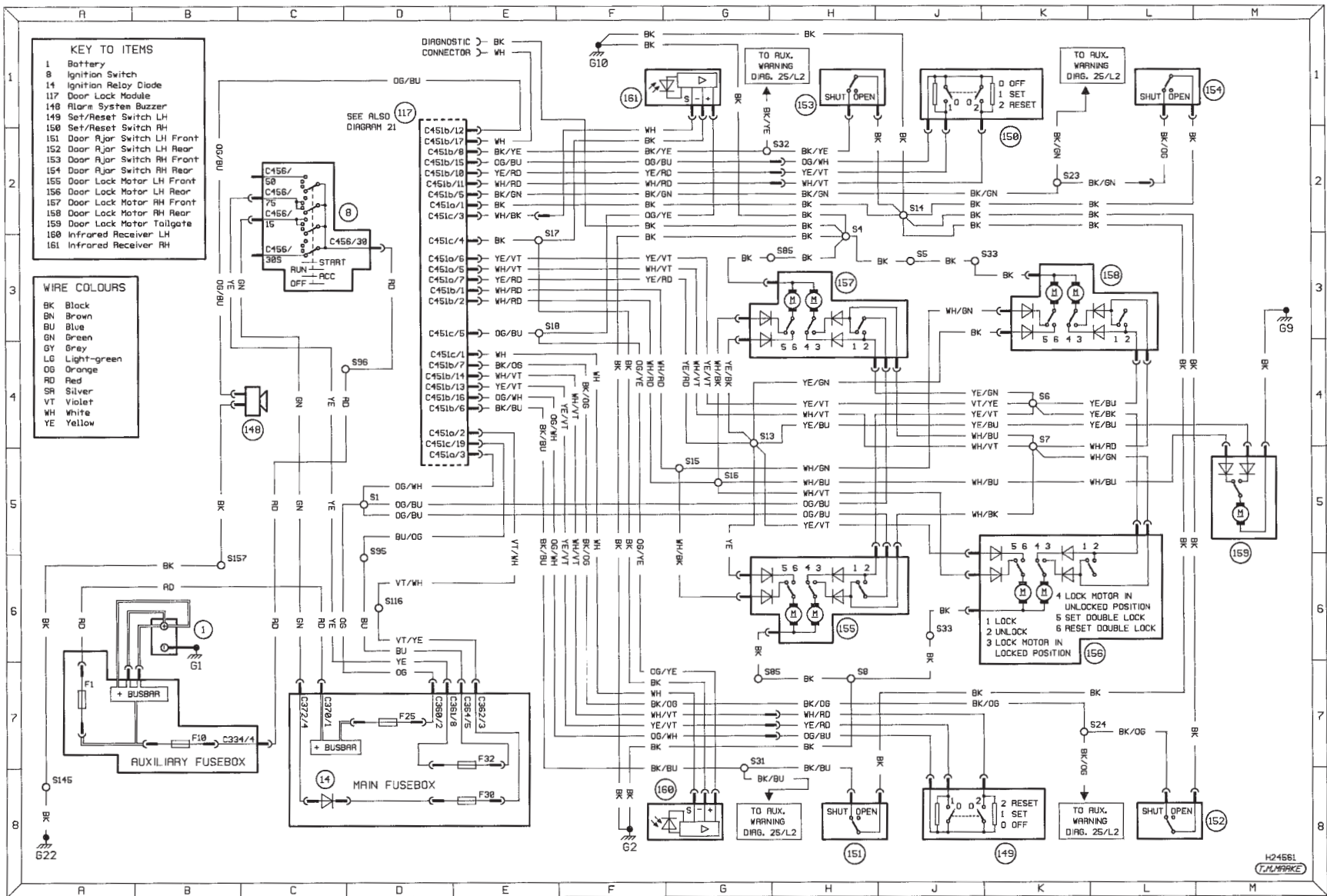


Diagram 20: Central door locking (with double locking)

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T.M. MARKE







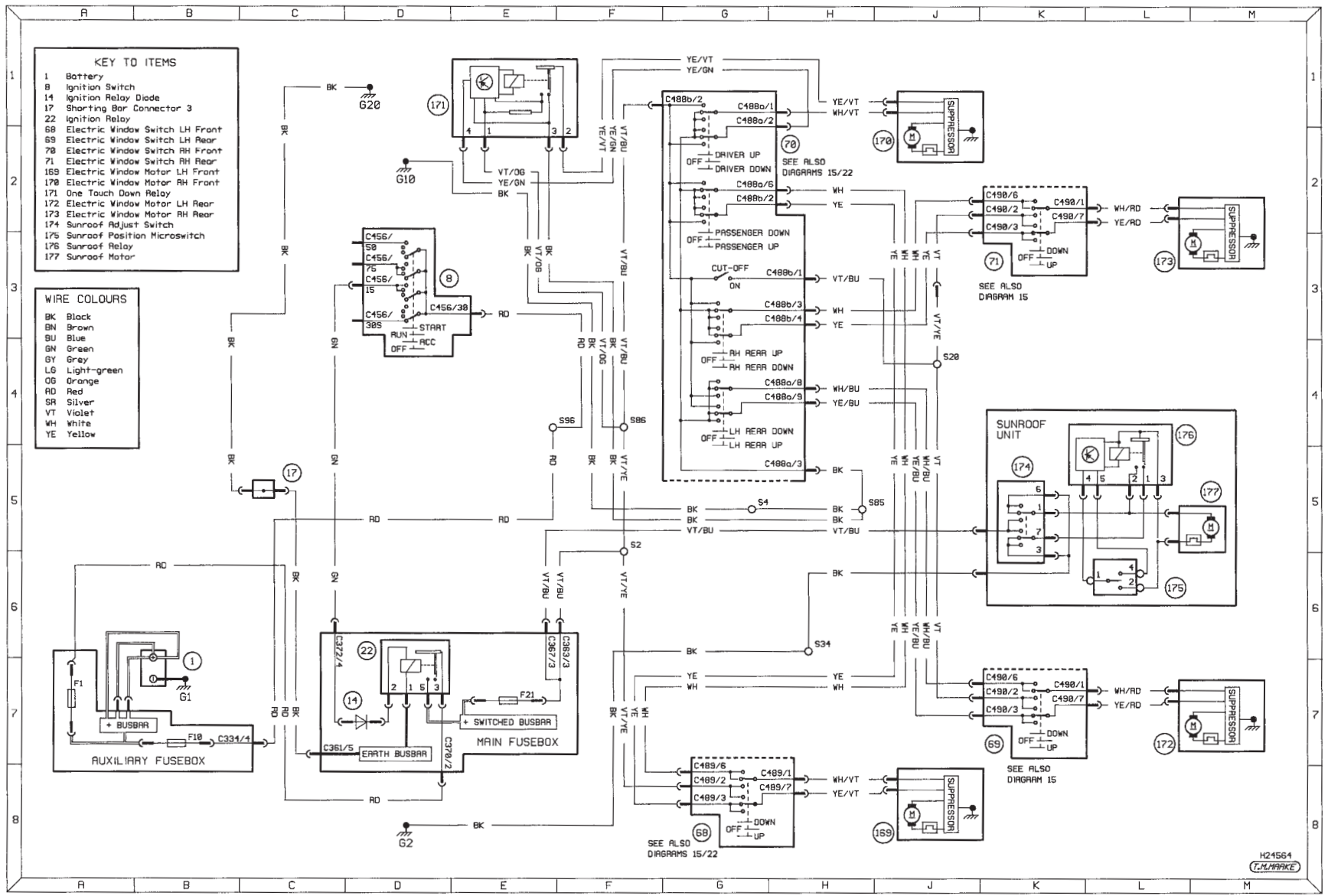


Diagram 23: Electric sunroof and (front and rear) electric windows

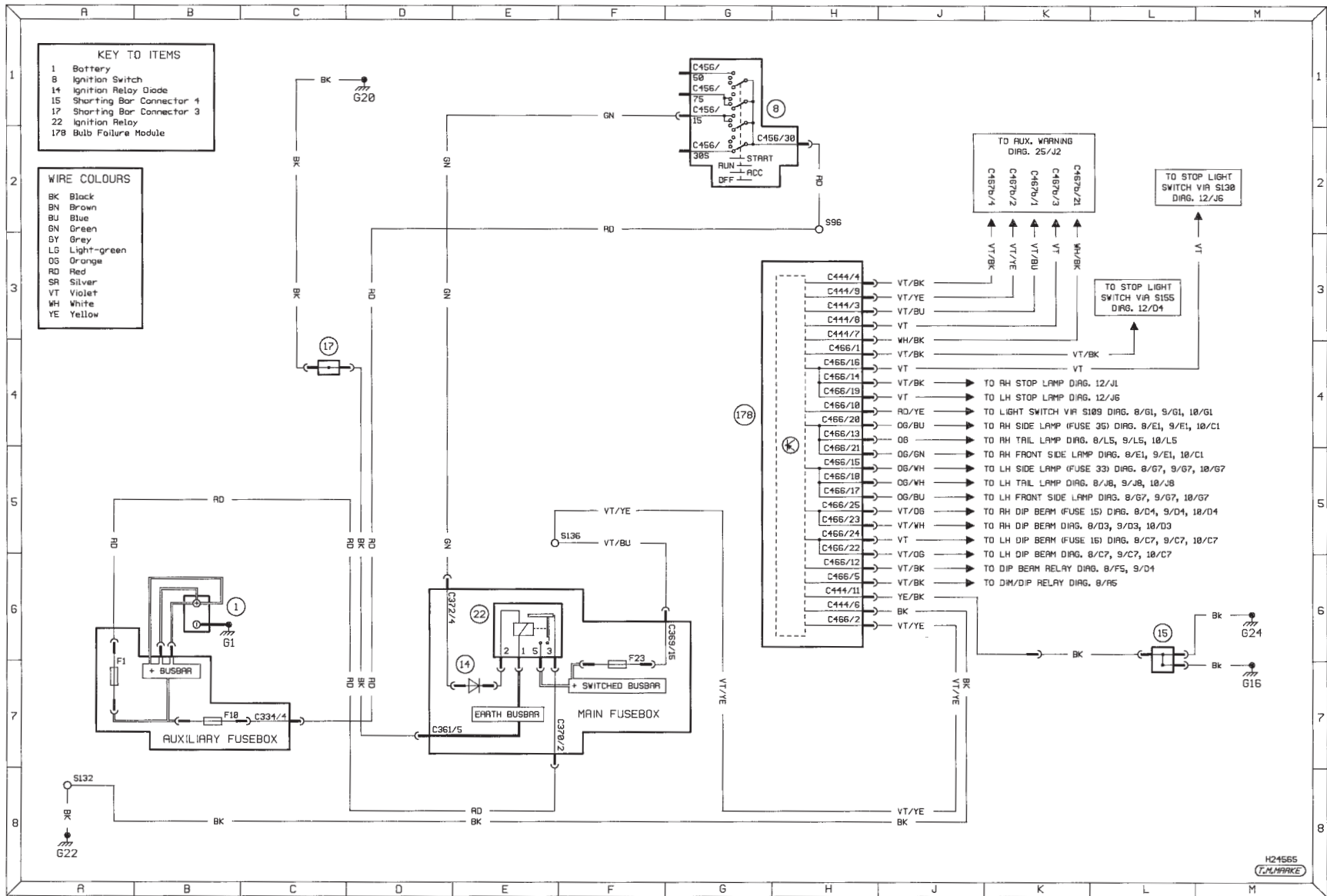
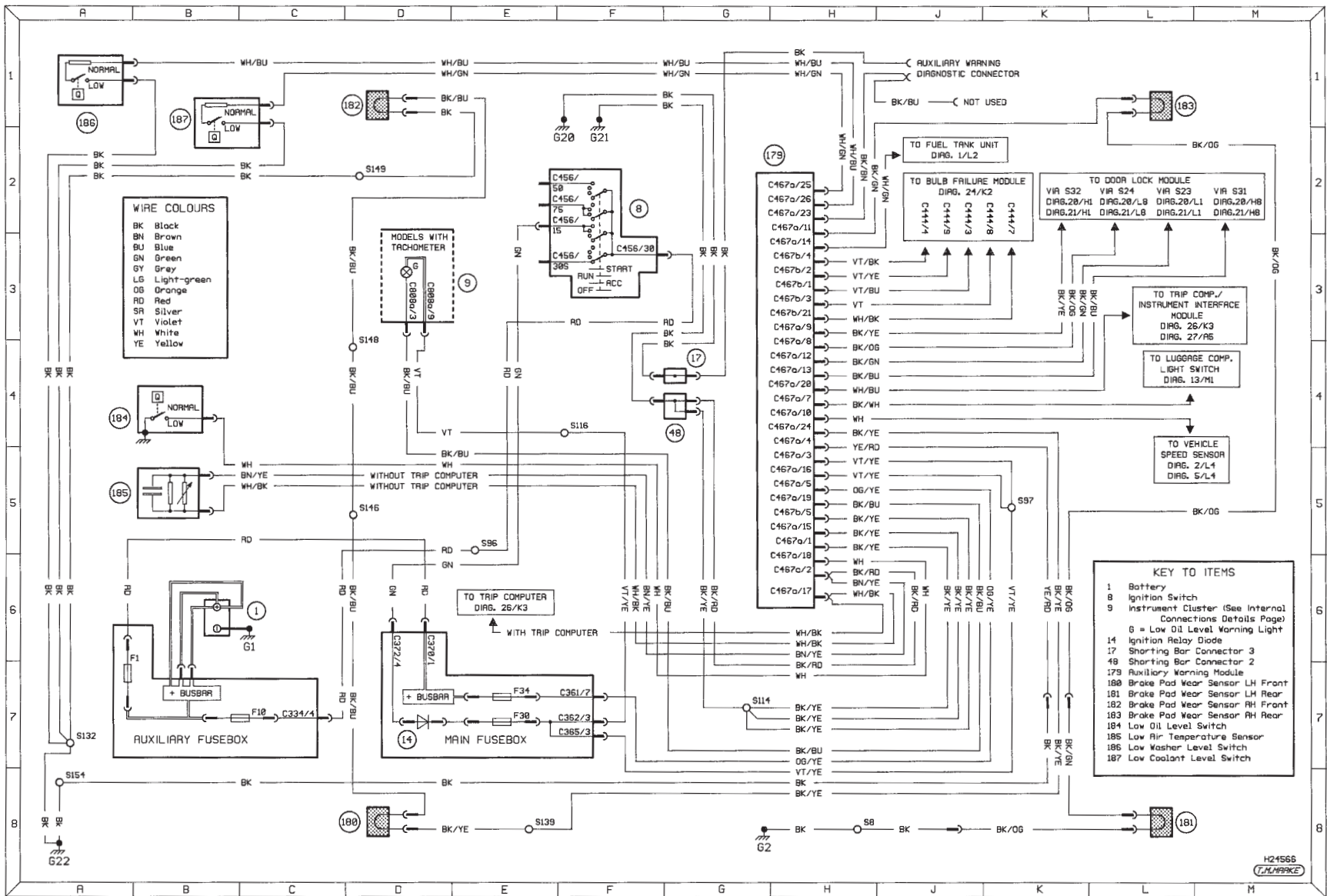


Diagram 24: Bulb failure warning system

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T.M.MARKE





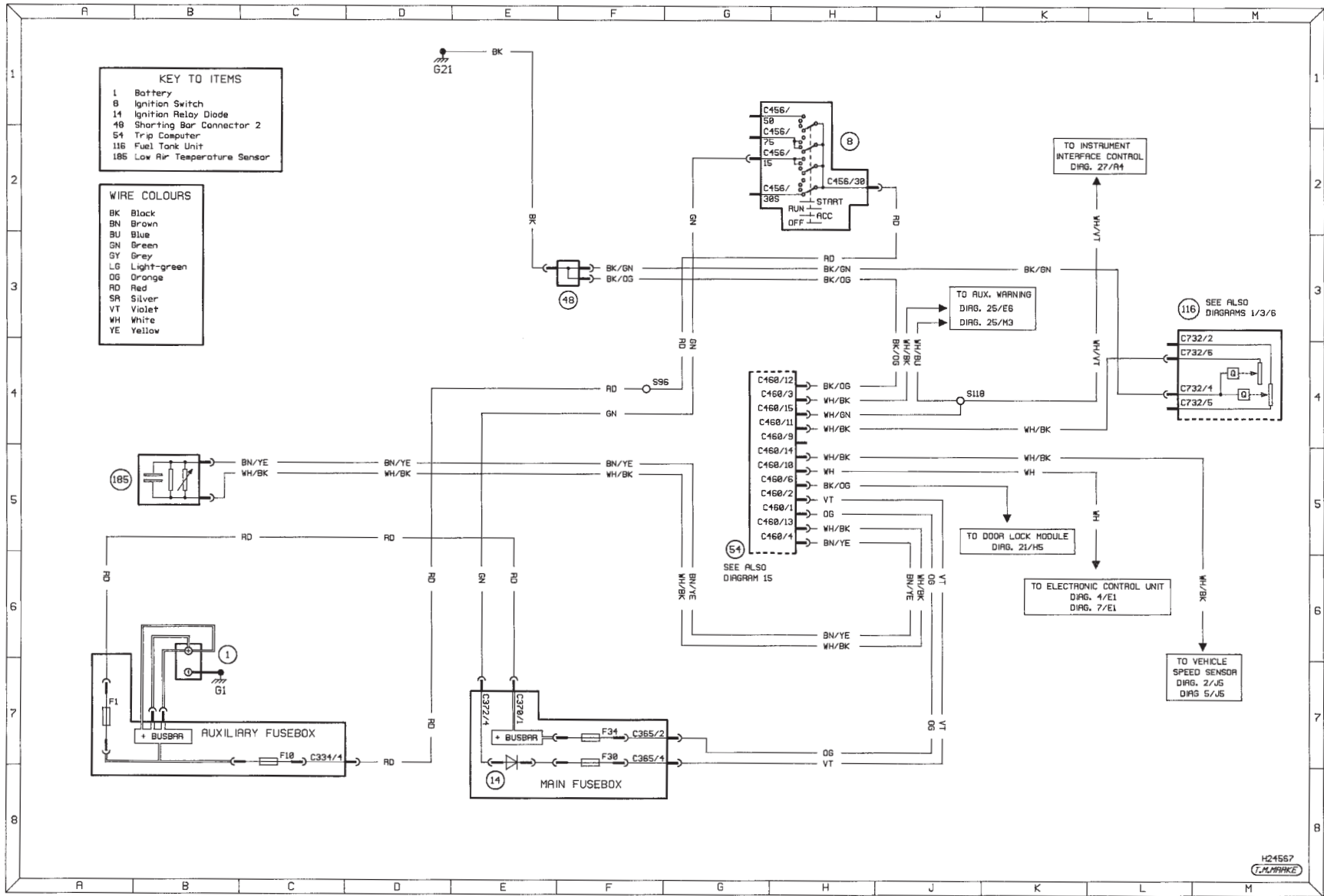


Diagram 26: Trip computer

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T.M. MARKE

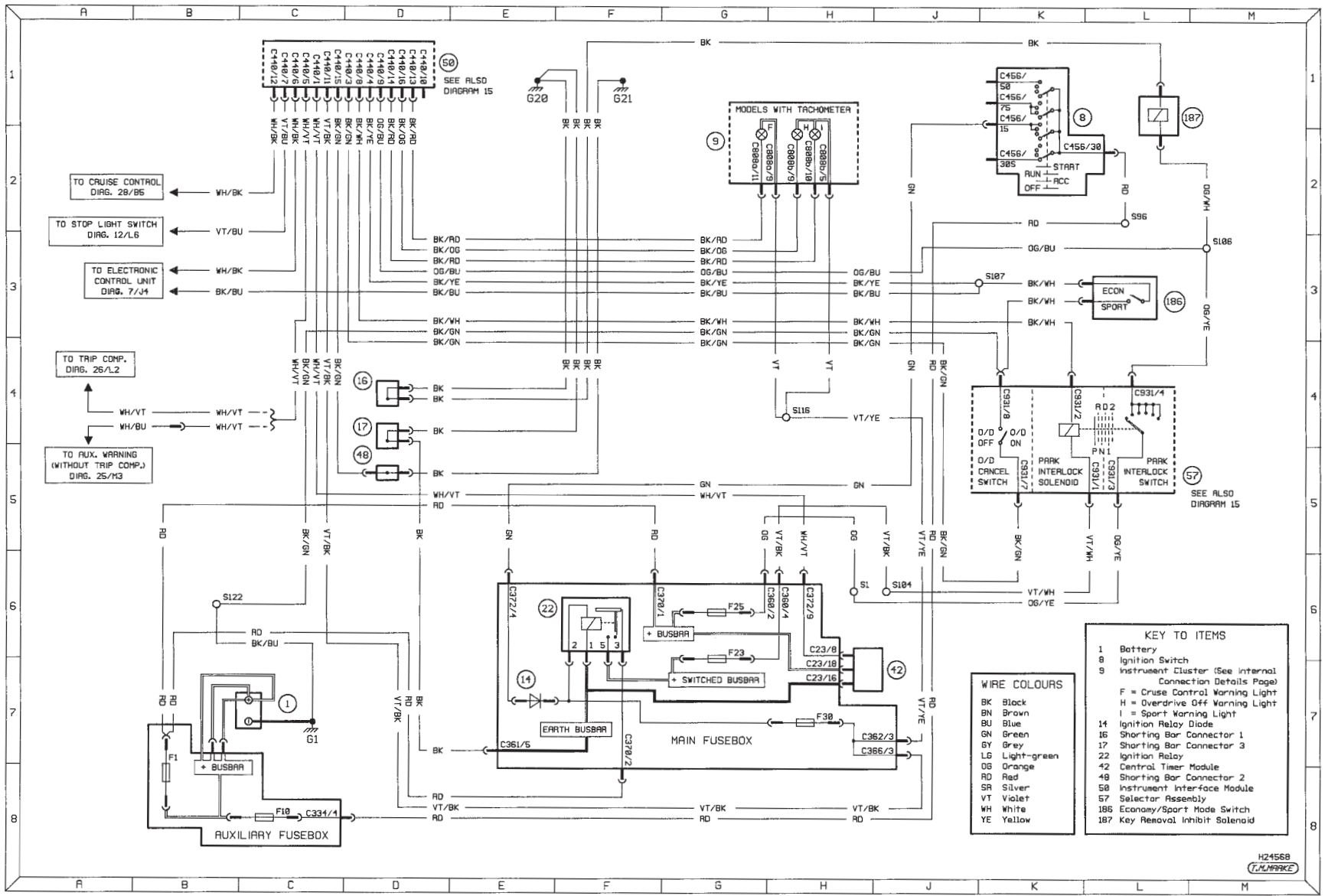


Diagram 27: Instrument interface control

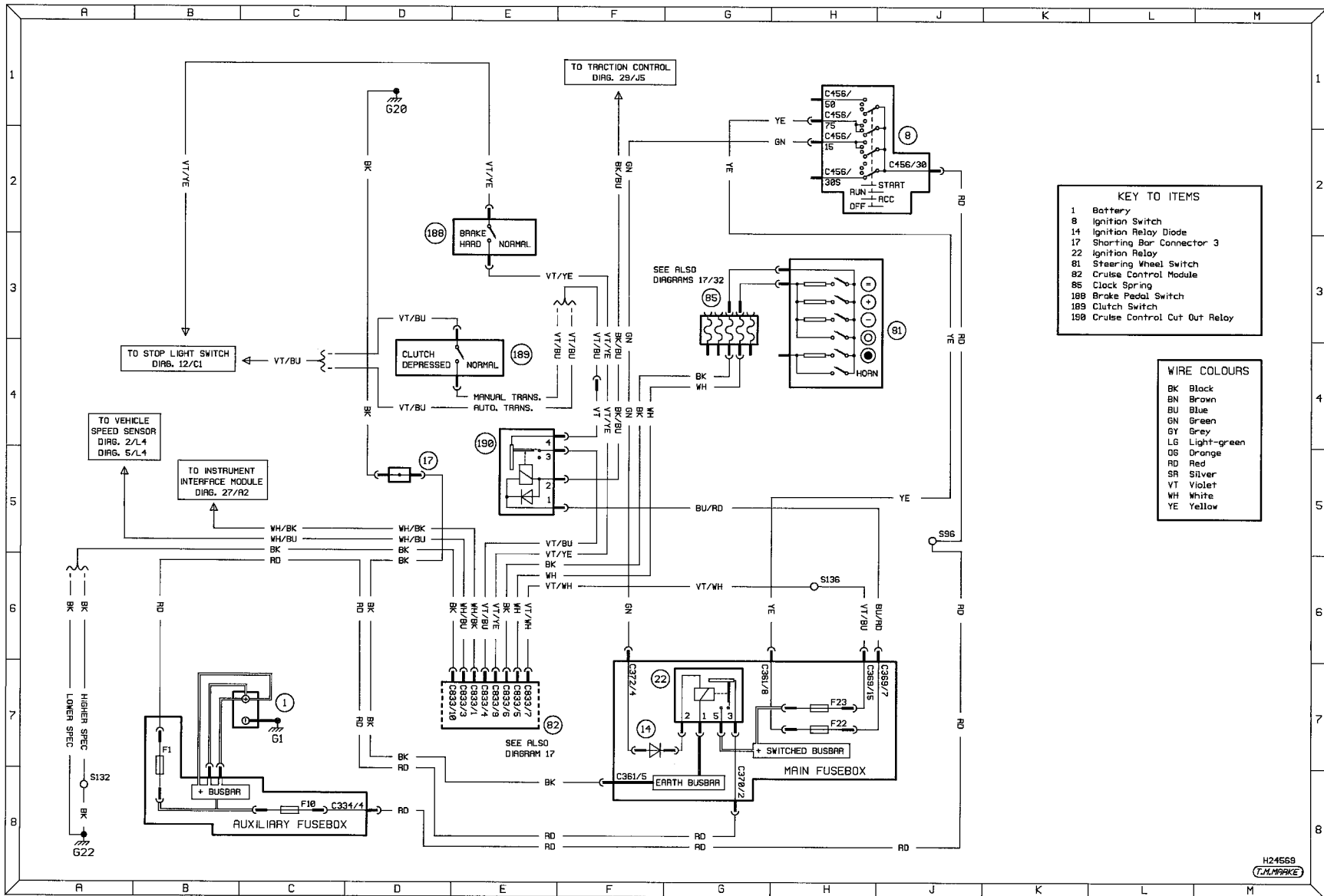


Diagram 28: Cruise control

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T.M. MARKER



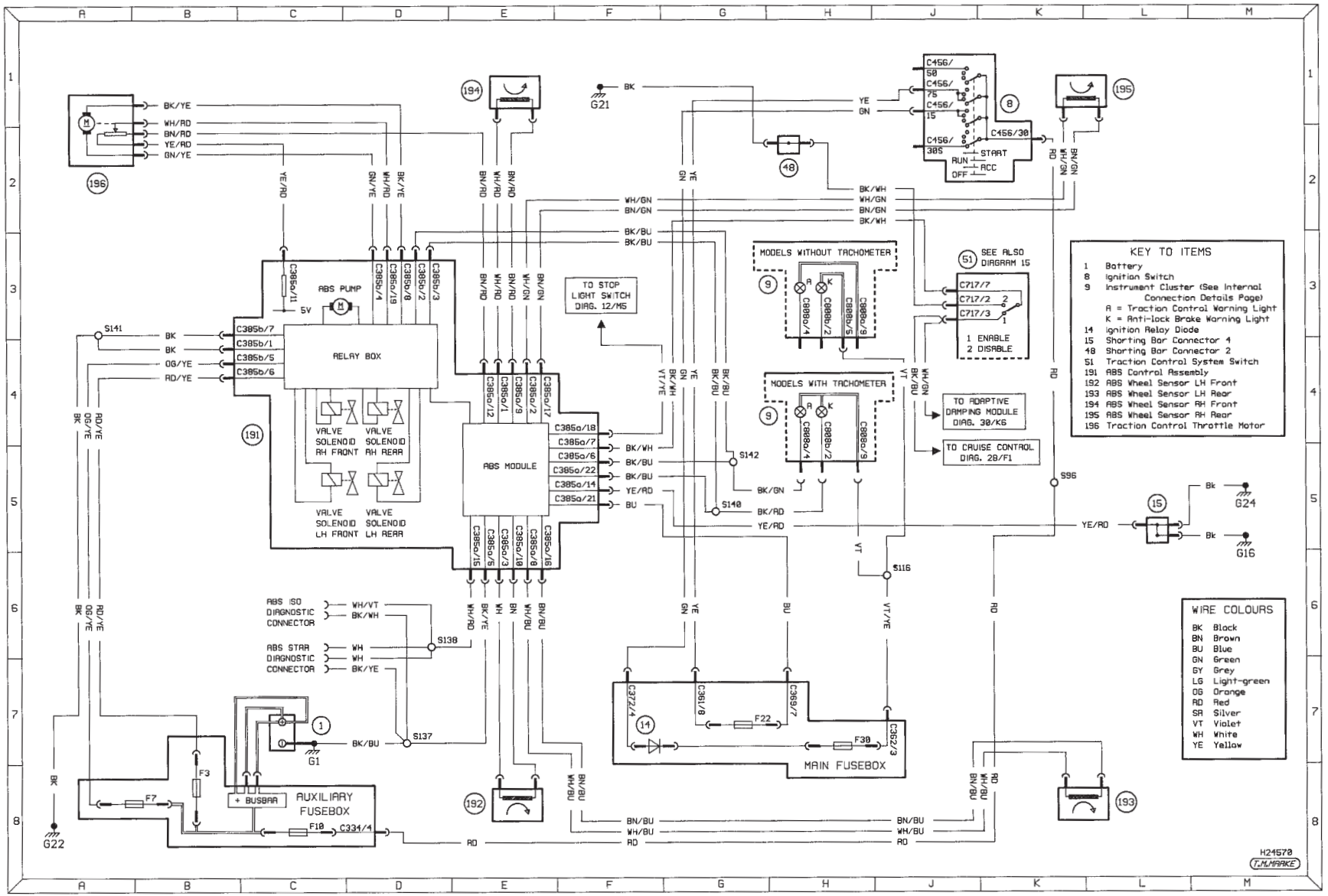


Diagram 29: ABS with traction control

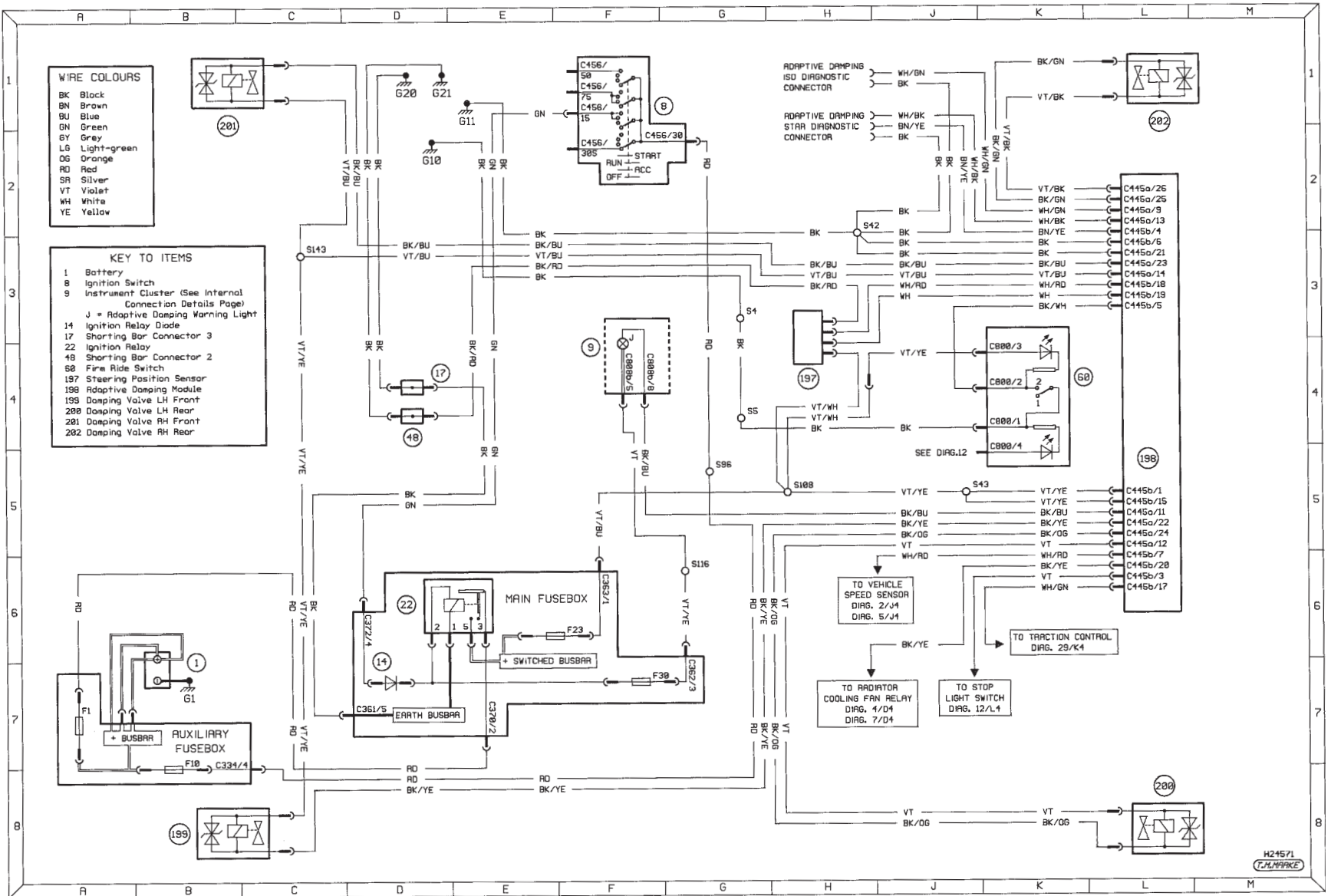


Diagram 30: Adaptive damping system

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T.M.P.A.R.K.E

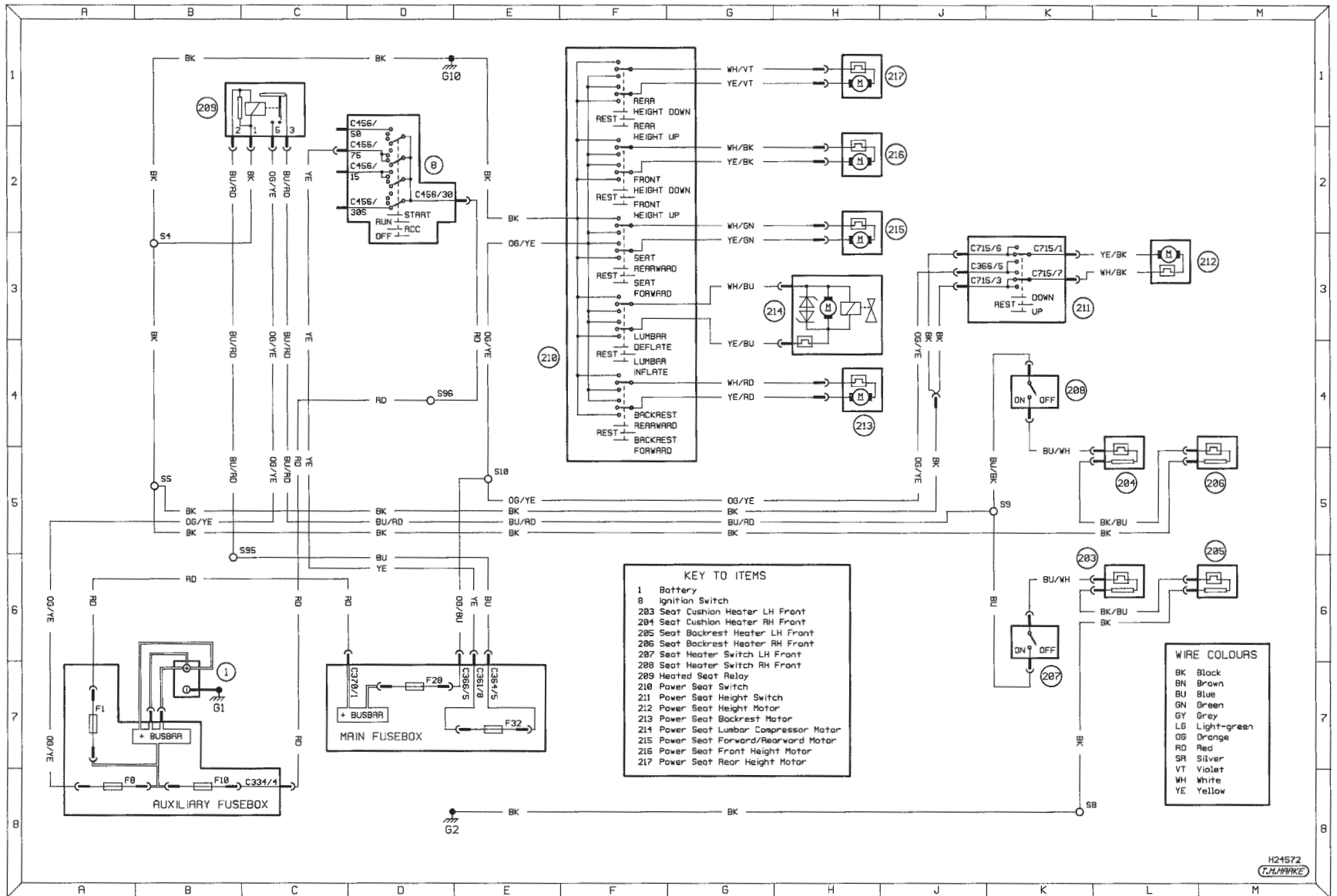


Diagram 31: Heated seats and driver's seat electric adjustment

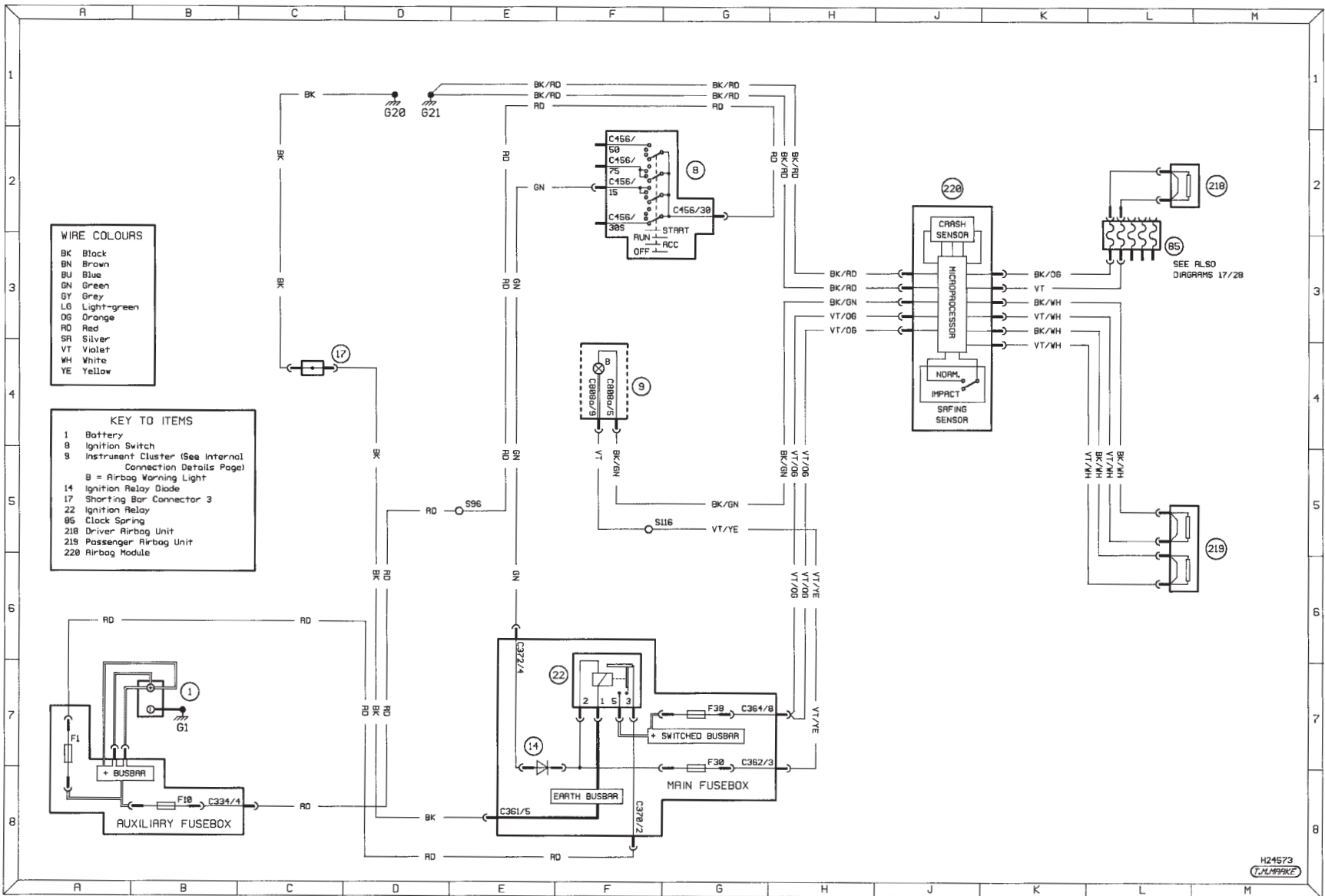


Diagram 32: Driver and passenger air bags





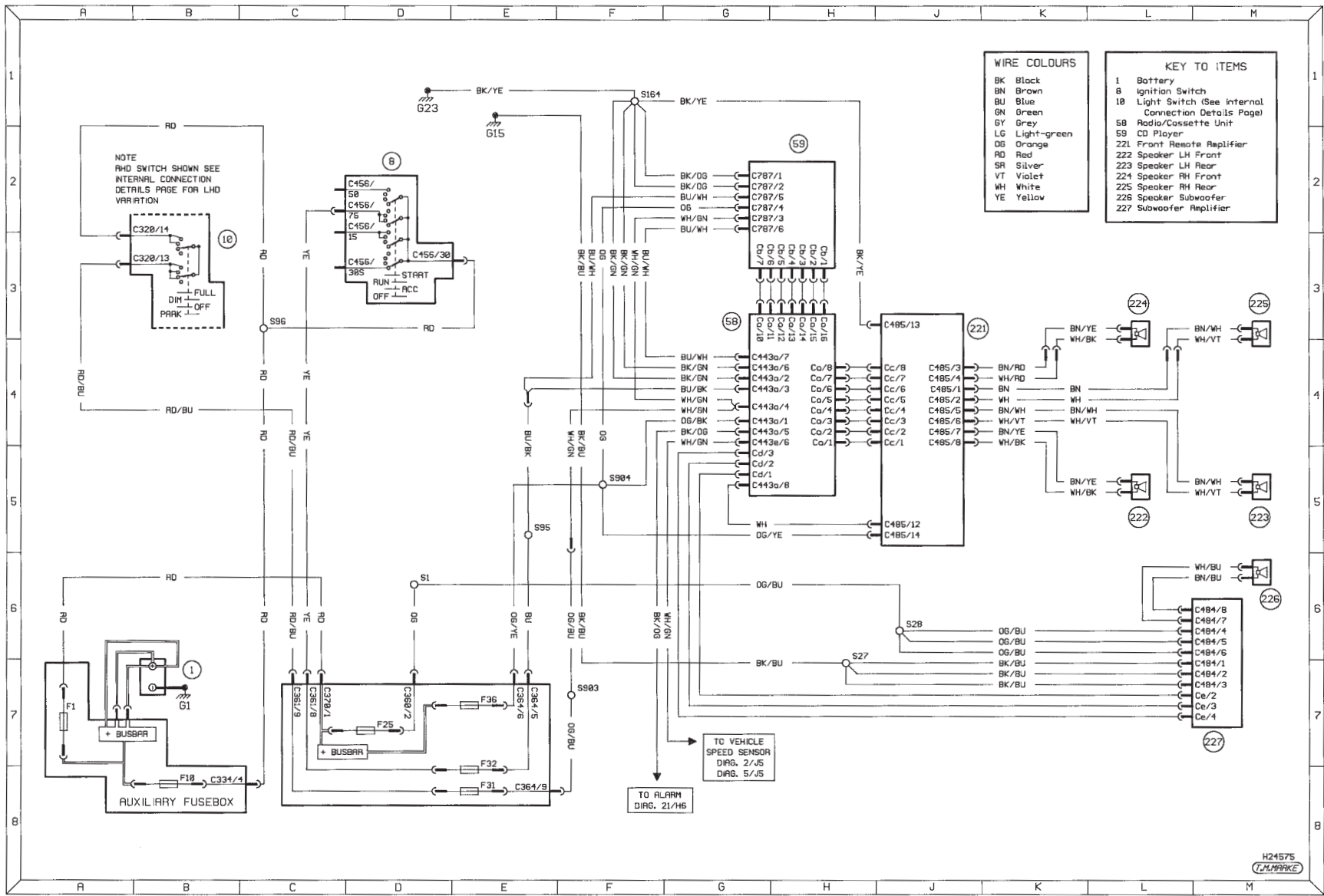


Diagram 34: Radio/cassette and CD player (with subwoofer)

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T.M. PARKE