



ELECTRICS

SECTION MO - ELISE 2001 M.Y. Onwards

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MO.1 - VEHICLE SECURITY ALARM

The Elise 2001 Model Year uses the same Meta vehicle security system as is used on 340R and Exige, being either an M36 T2 electronic immobiliser meeting Thatcham category 2 requirements, or, as an optional upgrade, a full M99 T2 alarm system incorporating M23 cockpit intrusion sensing and a self powered siren, which meets Thatcham 1.

Keys

A single key operates the doors, combined ignition switch/steering lock and fuel filler cap. The head of the key incorporates an electronic transmitter for operation of the engine immobiliser and security alarm system.

A duplicate key is supplied with the new vehicle and, on receipt, should be separated and kept in a safe place for use in an emergency. The electronic code number for the transmitter is printed on a plastic card which should be kept safe with the vehicle documents, along with a record of the mechanical key number which is stamped on the blade. If a key is lost, and/or if additional keys are required, a duplicate(s) should be ordered immediately. Dealers should ensure that customers are always in possession of spare keys. Additional spare mechanical keys may also be supplied with the new vehicle for emergency use.

Standard Immobiliser

In order to provide a measure of automatic vehicle security, independent of any driver initiative, the system will 'passively' immobilise the engine's cranking and running circuits about 20 seconds after the following sequence of events:

- The ignition is switched from on to off;
- The driver's door is opened.

The immobilised state will be indicated by an alarm tell tale in the tachometer upper face blinking once every 2 seconds. To mobilise the engine, press once the button on the transmitter key head (with ignition either on or off). Mobilisation will be acknowledged by the alarm tell tale being extinguished.

Upgraded Security System

For enhanced protection from theft and vandal damage, the Elise may be specified factory built with a Meta M99 T2 vehicle security system which incorporates the following features:

- Ingress protection using sensing switches on the front access panels and engine lid.
- Selectable cockpit intrusion sensing using a microwave sensor.
- Automatic (passive) engine immobilisation to prevent the engine from being started.
- Self powered siren to maintain protection if the vehicle battery is disconnected.
- 'Dynamic coding' of the transmitter keys; Each time the transmitters are used, the operating frequency is randomly changed to guard against the possibility of code copying.

Passive Immobilisation

In order to provide a measure of automatic vehicle security, independent of any driver initiative, the system will 'passively' immobilise the engine's cranking and running circuits about 20 seconds after the following sequence of events:

- The ignition is switched from on to off;
- The driver's door is opened.

The immobilised state will be indicated by an alarm tell tale in the tachometer upper face blinking once every 2 seconds. To mobilise the engine, press once the button on the transmitter key head (with ignition either on or off). Mobilisation will be acknowledged by the alarm tell tale being extinguished.

Arming the Alarm

Remove the ignition key, close (and lock) both doors, and check that the engine lid and front access panels are shut. Press the transmitter button for about 2 seconds. This command will be acknowledged by:

- Two flashes of the hazard warning lamps;
- The alarm tell tale lighting, and blinking off once a second. After a set-up period of 25 seconds has elapsed, the tell tale will go out, and blink on once a second. Check that these indications occur. If not, press the button a second time, as the first press may have only switched off the passive immobilisation (see above).

Note that if the system is armed when a door, engine lid or front access panel is not fully closed, four beeps will be heard as warning. If still open after 25 seconds, the alarm will be armed with that switch excluded



from the circuit.

After arming the system, a period of at least 25 seconds must elapse before all functions and sensors become fully active. After this time, the alarm will be triggered by any of the following actions:

- Opening a door, engine lid or front access panel;
- Movement detected within the cockpit;
- Energising the ignition circuit ('hot wiring');
- Interruption of the vehicle battery power supply.

When triggered, the electronic siren will sound and the hazard warning lamps will flash for a period of approximately 30 seconds before closing down and resetting, ready for any further triggering input. If a trigger is continuously present, the alarm will repeat after a short delay, and continue in this sequence for about ten cycles. To silence the alarm, disarm as described below.

Disarming the Alarm

To disarm the alarm prior to entering the vehicle, or if the alarm has been triggered, press once the button on the transmitter key. This command will be acknowledged by:

- One flash of the hazard warning lamps;
- Extinguishing of the alarm tell tale.

If the alarm had been triggered during the last armed period, the alarm tell tale will light and 'off blink' a code(s) for about 30 seconds to indicate which of the triggers was responsible:

- 1 blink off every 6 seconds - microwave sensor;
- 2 blink offs every 6 seconds - door switch;
- 4 blink offs every 6 seconds - engine lid or front access panel;
- 8 blink offs every 6 seconds - ignition input;

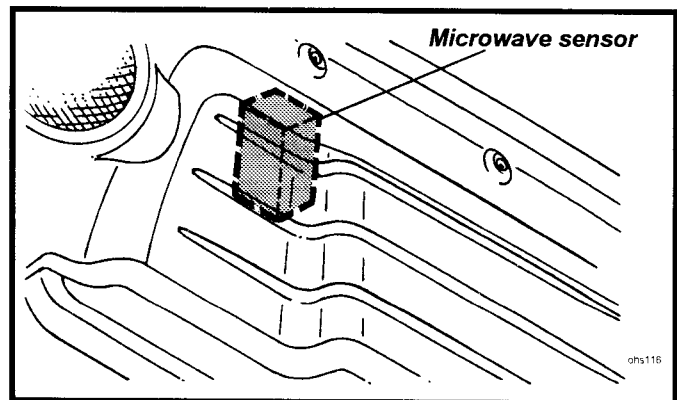
This coding will be repeated each time the alarm is disarmed until the memory is cleared by pressing the transmitter button with the ignition switched on.

Intrusion Sensing

A microwave sensor is mounted on the rear bulkhead, concealed by a trim panel, and is able to detect substantial physical movement within the cockpit, and trigger the alarm. The range and sensitivity of the intrusion sensor may be adjusted if necessary by turning an adjuster screw on the unit.

If desired, the alarm may be armed without the intrusion sensor or battery interruption circuits being active by:

- with the alarm disarmed, hold the transmitter button pressed for a 4 second period. This will be acknowledged by 3 flashes of the hazard lamps, and blinking of the alarm tell tale.



Note:

- # Intrusion sensing will automatically be reinstated the next time the alarm is armed.
- # Do not inhibit operation of the microwave sensor by placing bags or large objects against the cabin rear bulkhead.

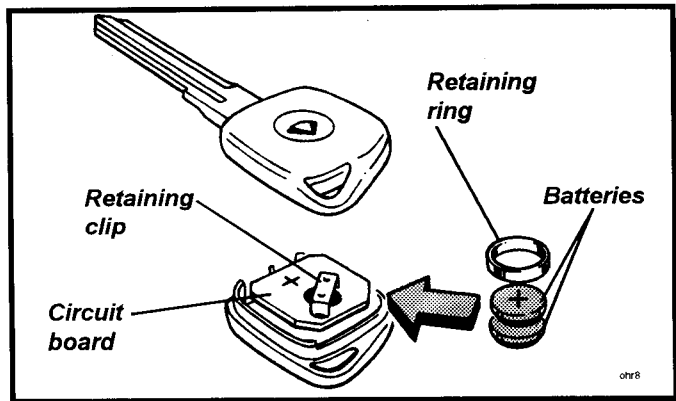


Transmitter Key Battery Replacement

The batteries for the key head transmitters should be renewed every 12 months to ensure continuity of operation.

To replace transmitter battery:

- a). Use a thin blade to prise apart the two halves of the transmitter key head, and withdraw the battery.
- b). The transmitters are powered by a 3v long life lithium battery type CR2032. With normal use, this should last between 3 and 5 years. After opening the new battery packaging, touch only the sides of the battery, and fit the battery into the key case with the positive side (+) upwards as shown.
- c). Press the battery case together.



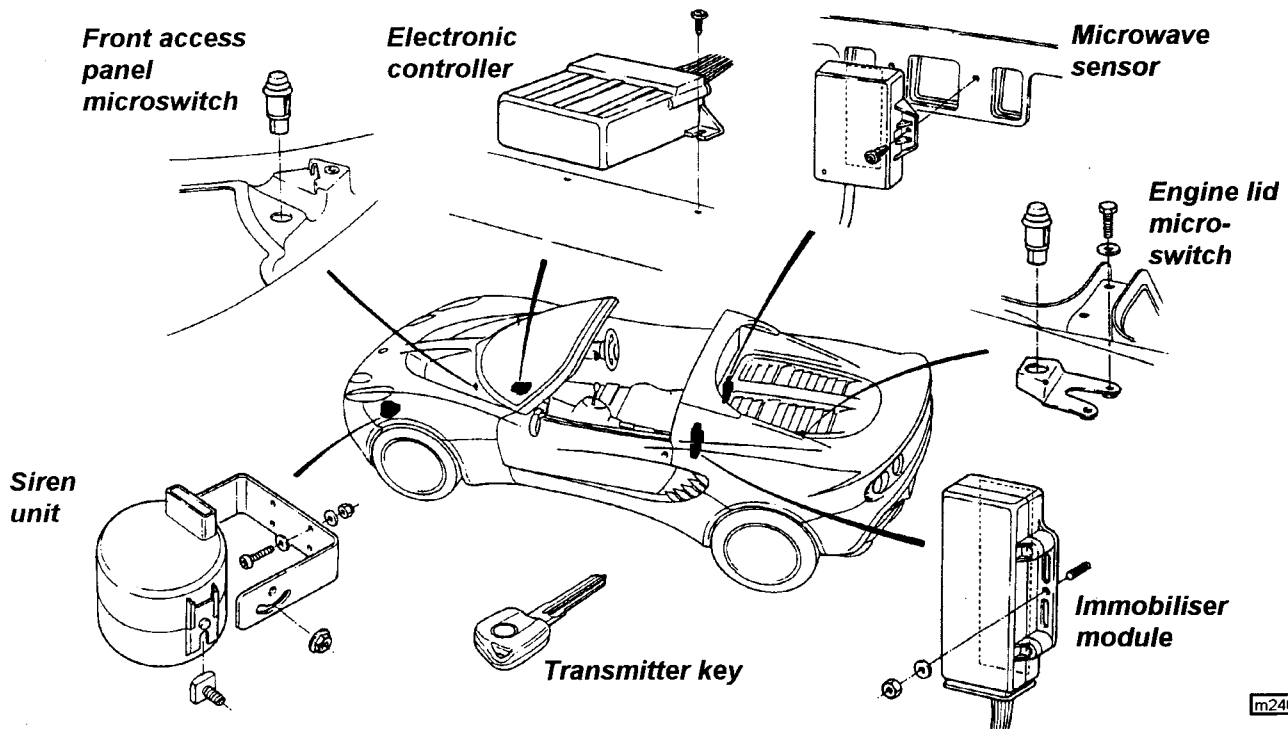
Disconnecting the Vehicle Battery

- Before disconnecting the battery, ensure that the alarm system is disarmed.
- On reconnection of the battery, the alarm will automatically be set. Have the transmitter ready to disarm.

Component Location

The alarm system components are located as follows:

- Electronic Controller: Mounted on top of scuttle beam at passenger's end. Accessible after removal of fascia top.
- Siren Unit: Mounted on front of radiator duct LH extension, beneath LHF turn lamp. Accessible only after removal of front clamshell.
- Immobiliser Module: Mounted on left hand end of cabin rear bulkhead. Accessible after removal of cabin rear corner trim panel.
- Microwave Sensor: Mounted centrally on cabin rear bulkhead, beneath trim panel.
- Engine Lid Sensor: Mounted on luggage compartment bulkhead, alongside the latch.
- Front Access Panel Sensors: Mounted on brackets fixed to topshell at outboard edge of aperture.



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**Replacement Transmitter Keys**

Additional keys may be added to a security system provided that there is at least one functioning transmitter. If all transmitter keys are lost, damaged or broken, the controller/immobiliser must be renewed, and will be supplied with two coded transmitter keys. Replacement keys must be ordered from Lotus against the electronic code number printed on the plastic card supplied with the new car. Note that the controller can accommodate a total of 7 key codings, including those supplied new with the vehicle, before the controller must be returned to the factory for memory clearing to allow any further key coding operations. When ordering the key, use form LSL419 and also quote the asterisk marking of the coding positions (1 to 7) as marked on the plastic card.

On receipt of a coded key(s), the mechanical key blade must be copy cut to the existing key, or to key code number by a locksmith, and two CR1220 batteries fitted. The controller must then be programmed to recognise each of the coded keys to be used by the following procedure:

- Using the existing functioning transmitter key, press the button 17 times, at which point the alarm system will cease to respond, and all other keys will be inhibited. The remote control enabling mode has been entered.
- Within an 8 second period, press once the button of any other original coded transmitter key, or of a coded replacement transmitter key. The controller signals that recognition has been accomplished by the alarm changing status (from on to off, or vice versa), after which it stops responding to that particular transmitter. An original transmitter button may need to be pressed twice.
- Within a further 8 second period, press the button of another replacement transmitter key, and continue this procedure for each of the keys to be used. Any keys not operated in this manner will no longer be recognised (e.g. any lost or stolen keys).
- After an 8 second period with no key button operation, the remote control enabling mode is exited, and normal operation resumed.

Replacement vehicle lock sets include two uncoded blank transmitter keys to allow copy cutting of the key blade, and transfer of the old transmitter printed circuit board into the head of the new key.



MO.2 - SWITCHES & INSTRUMENTS - DRIVER'S INFORMATION

Ignition Switch/Steering Lock

The switch/lock is located on the right hand side of the steering column.

- I - Insert the key into the slot, and turn clockwise to position 'I' to unlock the steering column. If the key is reluctant to turn, wriggle the steering wheel to ease the load on the steering lock.
- II - Turn to position 'II' to switch on the ignition and operate auxiliary equipment.
- III - Turn further clockwise to 'III' against spring pressure to operate the starter motor. As soon as the engine starts, allow the key to return to position 'II'. To stop the engine, turn the key back to 'I'.

Passive Immobilisation: If the ignition has been switched off for longer than 20 seconds, the passive immobilisation security feature will operate and disable the ignition and starter circuits, this condition being indicated by the alarm tell tale blinking once every 2 seconds. To mobilise the engine, press once the button on the transmitter key head (with ignition on or off), and check that the tell tale is extinguished.

- B - To remove the key, turn fully counterclockwise to 'B' and withdraw. The steering column lock will be activated when the key is withdrawn but may not engage until the steering is turned and the mechanism is aligned.

DO NOT leave the ignition switched on for long periods without the engine running, since although the ignition system itself draws no current when the engine is stopped, a battery drain will occur through other circuits even when auxiliary equipment is not being used.

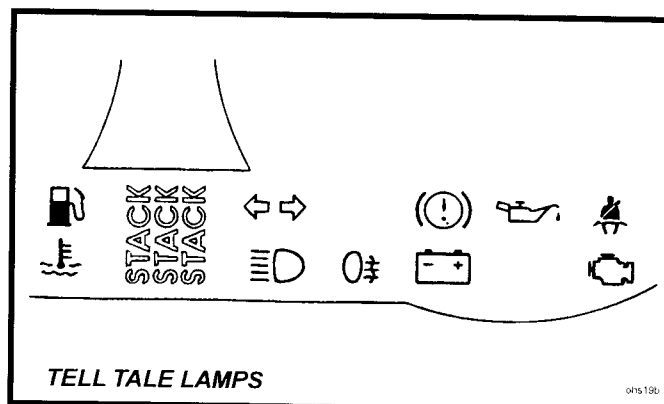
For security reasons, and to guard against battery drain, always remove the key when leaving the car.

WARNING:

- Do not push or tow the car unless the key is first used to unlock the column and is then left in the lock.
- Never withdraw the key until the vehicle is stationary.
- To reduce the risk of theft, or danger to a child remaining in the vehicle, always remove the key when leaving a parked car.

Tell Tale Lamps

A block of tell tale lamps is incorporated into the instrument cluster to indicate the operational status of various systems.



Bulb Check

In order to check that the warning systems are operative, all the tell tale lamps (except the 'Alarm' tell tale; see Vehicle Security Alarm) should light for about six seconds following ignition switch on. If any lamp should fail to light, it is possible that the bulb or warning circuit may be faulty.

Turn Tell Tale

When the left hand or right hand turn indicators are operating, this green tell tale flashes in unison. The flasher relay may also be heard to operate. If the tell tale fails to light, or flashes at an unusual or irregular rate, check the operation of the turn indicator lamps immediately.

***Brakes Tell Tale***

This tell tale will glow red with the ignition switched on whenever the parking brake is applied. Driving the car with the brake not fully released will cause overheat damage to the rear brakes. Each time the parking brake is released, check that the tell tale is extinguished.

With the parking brake released, if the tell tale should light at any time after the check period, stop the car immediately, as the circuit has detected a dangerously low level of brake fluid in the master cylinder reservoir, possibly caused by a hydraulic leak in one of the separate front or rear brake circuits. There is a danger that air may enter the hydraulic system and cause spongy operation and extended pedal travel. The divided brake circuit should ensure that emergency braking will remain, but the car should not be driven until the fault has been identified and rectified.

Oil Pressure Tell Tale

This red tell tale warns of low engine oil pressure. The lamp will be lit whenever the ignition is on and the engine is stopped, but should extinguish as soon as the engine is started. If the lamp fails to go out after engine start up, or comes on when the engine is running, stop the engine immediately and do not restart until the cause has been investigated and rectified. Continuing to run the engine with little or no oil pressure could cause major internal damage, possibly resulting in seizure.

Seat Belt Tell Tale

The red seat belt tell tale is provided as a reminder that both driver and passenger should always wear the seat belts, no matter how short the journey. The lamp will light for about 8 seconds following ignition switch on, before being extinguished.

Main Beam Tell Tale

This lamp glows blue whenever the headlamp main beams are operating.

Battery Charging Tell Tale

This red tell tale will light whenever the ignition is on and the engine is stopped. If it lights any time that the engine is running, the battery is not being charged, which may be due to a broken alternator drive belt, or an electrical fault. Urgent attention is required, but as the engine coolant pump is independently driven, the car need not be stranded, subject to battery condition and local circumstances.

Alarm Tell Tale

The alarm tell tale is located at the top of the tachometer display, and indicates the status of the immobiliser and alarm.

- Tell tale out; engine is mobilised, and the alarm is off.
- Blinking every 2 seconds; engine immobilised.
- Blinking once per second; alarm armed.

For full details of the security alarm system, refer to the earlier section 'Vehicle Security'. Note that the tell tale also functions as a high rpm warning - see 'Tachometer'.

Malfunction Indicator Lamp

The Malfunction Indicator Lamp (MIL) is provided to warn the driver that the engine management system has detected a fault which may result in increased toxic emissions from the exhaust.

- i) If the lamp lights steady whilst driving, dealer advice should be sought without delay, and all unnecessary journeys avoided.
- ii) If the lamp flashes, an engine misfire has been detected which is sufficiently severe to cause overheat damage to the catalytic converter. Slow down immediately and be prepared to stop.
 - If the MIL then stops flashing, and is lit steady, proceed with caution and seek dealer advice.
 - If the MIL continues to flash, stop the engine and seek dealer advice. Continuing to drive the car with a flashing MIL lamp may cause overheat damage to the exhaust catalyst and increased toxic emissions.



Instruments

Speedometer

This instrument displays road speed in either MPH (with a secondary scale in km/h), or km/h according to market.

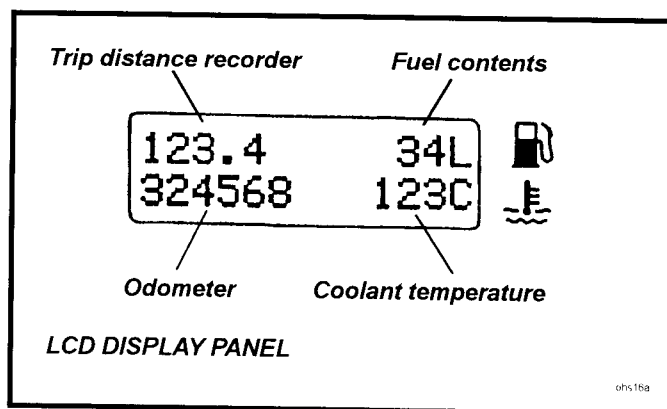
Tachometer

The tachometer indicates engine speed in revolutions per minute. A safeguard in the engine management system limits continuous engine speed to 6,950 rpm. Do not run the engine continuously at its maximum speed, or allow overspeeding to occur on the overrun by changing down through the gears too early, as this imposes very high loads on engine components, resulting in premature wear and possible failure. A red tell tale lamp in the top of the tachometer face lights at engine speeds over 6,500 rpm to warn that maximum engine speed is being approached. Note that this lamp also functions as an alarm system tell tale (see 'Vehicle Security').

Recalibration of the tachometer needle position will occur during a three second period following ignition switch on.

LCD Display Panel

A liquid crystal display (LCD) panel is provided below the instruments in order to display fuel level, coolant temperature, total mileage and trip functions. The panel is blank until the ignition is switched on.



Fuel Contents Display

The fuel tank usable capacity is approximately 32 litres (7.0 imp.gal), with the approximate available fuel quantity displayed at the top right hand corner of the LCD panel:

- 6 litres upwards: Displays available fuel quantity in litres.
- 0 - 5 litres: Display flashes 'Refill'.

When the fuel level drops to 5 litres, the display flashes 'Refill', and in order to ensure the vehicle is not stranded, and to protect against the potentially damaging effects of fuel starvation, it is strongly recommended to refuel at the first opportunity after 'Refill' is displayed..

Coolant Temperature Display

The engine coolant temperature will be displayed at the bottom right hand corner of the panel as soon as the temperature reaches 40°C. The running temperature will fluctuate a certain amount as the operating conditions change, and during periods of idling or in heavy traffic, the temperature may rise to over 100°C, with the cooling fan switching on at approximately 104°C. *The display will flash at temperatures over 110°C* in order to prompt closer monitoring of high temperatures, but as the pressurised cooling system has a boiling point of over 120°C, only if the temperature approaches this level need there be any cause for concern. If this should occur, allow the engine to idle for a few minutes whilst monitoring the temperature, and if it continues to rise, switch off and seek qualified assistance.

After a heavy snowfall, ensure that the radiator cooling outlet grilles in the front body are cleared of snow before driving the car, or overheating may occur.



Odometer

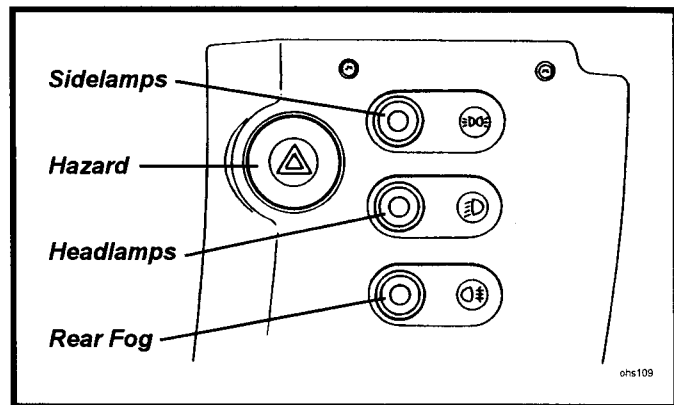
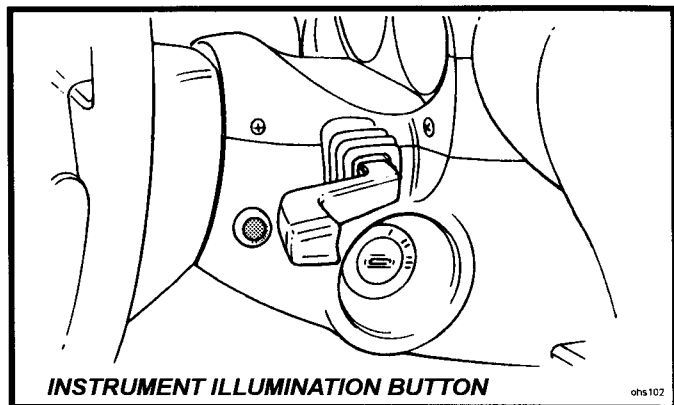
An odometer (total distance recorder) reading is displayed at the bottom left hand corner of the panel, and is calibrated in the same units (miles or kilometres) as is the speedometer.

Trip Recorder

A trip recorder is provided at the top left hand corner of the panel, calibrated in the same units as is the speedometer. In order to zero the trip display, switch on the ignition, and press for a moment (less than 1 second), the small button on the steering column shroud between the ignition switch and steering wheel. This dual function button also controls the panel illumination - see 'Instrument & Switch Illumination'.

Fascia Switches

Lighting functions are controlled by a vertical row of three push button switches mounted in the fascia outboard of the steering column. Each switch is pressed once to switch on, and pressed a second time to switch off. A symbol is positioned alongside each switch to indicate its function, and is backlit blue when the sidelamps are switched on.



Sidelamp Switch

The topmost switch functions with or without ignition, and switches on the sidelamps. A tell tale in the switch button lights up green to indicate when the circuit is active. Note that the headlamps must be off before the sidelamps can be switched off. A 'lights on' warning buzzer functions with lights on, ignition off, door open.

Headlamp Switch

The centre switch functions with or without ignition, and switches on the headlamps together with the sidelamps if not already selected by the sidelamps switch. A tell tale in the switch button lights up green to indicate when the circuit is active. The steering column lever switch (see later) is used to select main beam or dip. Pressing the switch a second time will switch off the headlamps, but leave the sidelamps on.

Rear Fog Lamp Switch

The lowermost switch controls the single rear fog lamp, and may be selected only after first switching on the ignition, and then the headlamps. A tell tale in the switch button lights up amber to indicate when the circuit is active. Note that the switch will default off whenever the headlamps or ignition are switched off, requiring re-selection when the operating conditions are once again met.

Hazard Warning Lamps Switch

The hazard warning switch is located outboard of the steering column, and has an icon in the switch button which is back lit when the ignition is switched on. The switch is operative at all times, and when pressed flashes all the turn indicator lamps, and the switch tell tale, in unison. Press a second time to switch off.

Instrument Illumination

A small button is provided on the steering column shroud, between the ignition switch and steering wheel, by which the brightness of the instrument illumination may be adjusted. To cycle through the four levels of brightness, press and hold the button, and release at the desired setting.

This dual function button also resets the trip distance recorder - see 'Trip Recorder'.



Auxiliary Power Socket

A n auxiliary power socket is fitted in the trim shroud ahead of the gear lever, and is operative at all times. The socket provides for electrical accessories using the format of a standard cigarette lighter element, and is fitted with a protective flap. Maximum current draw should not exceed 15 amps.

WARNING: Do not leave small children unattended in the car since careless interference with the power socket could be dangerous.

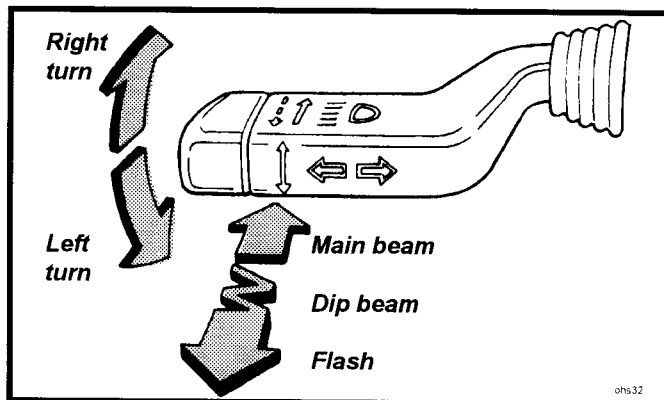
Column Switches & Horn

Headlamp Dipswitch/Flasher/Turn Indicators

The steering column left hand lever switch controls the headlamps main beam/dip, headlamp flash and turn indicators.

Headlamp Dipswitch: To switch on the headlamps, press the headlamp switch in the fascia outboard of the steering column. The left hand lever switch is then used to select main or dip beam. Main beam is obtained with the lever furthest forward, away from the steering wheel, and dip beam with the lever moved back towards the wheel. The main beam tell tale lamp in the instrument panel lights when main beam is operating.

Note that on cars equipped with the optional driving lamps mounted in the radiator air intake, the driving lamps operate in conjunction with the bonnet mounted headlamp main beams.



Headlamp Flasher: The headlamp flasher is operative at all times. If the lever is pulled towards the steering wheel against spring pressure, the headlamp main beams will light.

Turn Indicators: The turn indicators operate only with the ignition switched on. Move the lever down to indicate a left hand turn, and up for a right hand turn. The switch will be cancelled when the steering wheel is returned to the straight ahead position.

For convenience, when signalling a lane change, pressing the switch up or down only lightly, will allow it to return under spring action upon release.

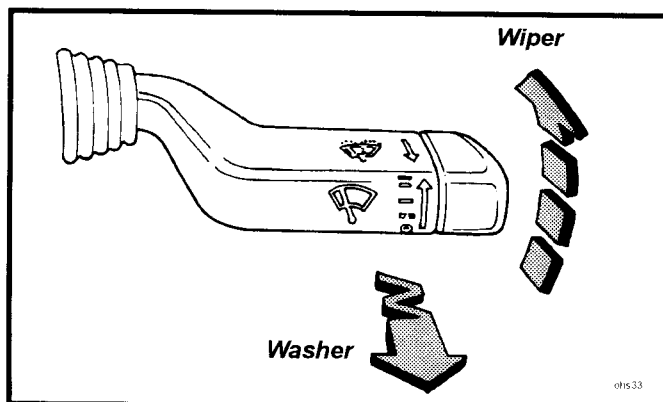
Windscreen Wiper/Washer

The steering column right hand lever switch controls the windscreen wiper and washer, and is operative only with the ignition switched on. Never use the wiper on a dry screen.

Windscreen Wiper: The wiper is controlled by the up/down position of the lever switch, which operates as follows:



- Moved fully down, the wiper is switched off.
- Move up to the first position for intermittent wipe. The wiper will make one sweep about every five seconds.
- Select the next position for normal wiper operation.
- Move fully upwards for quick wipe, to be used only in heavy rain.





Windscreen Washer: Two windscreen washer jets are provided, one each side of the wiper spindle. Pulling the control lever towards the steering wheel will operate both the washer pump and the wiper. When the switch is released, the wiper will continue for a further four sweeps.

Horn: The windtone horn, which functions at all times, is operated by a central button in the steering wheel.

Interior Lamp

An interior lamp is mounted above the climate controls, and is equipped with a three position rocking lens:

- Lens rocked forwards; lamp is switched on with or without ignition.
- Lens central; lamp is switched off.
- Lens rocked rearwards; a driver's courtesy mode applies, where the lamp is switched on whenever the driver's door is opened, and goes out when the door is closed.

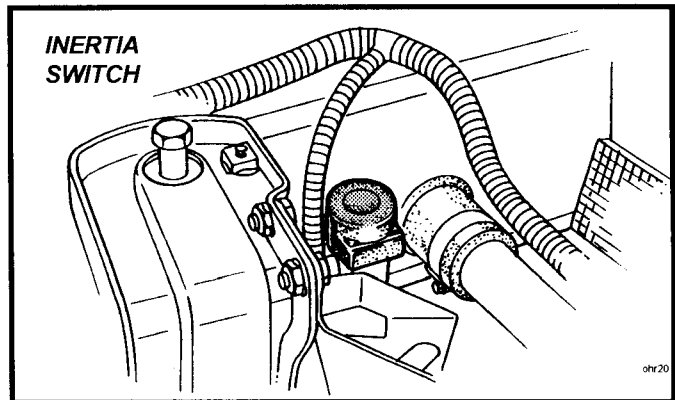
Interior Lamp

An interior lamp is mounted above the climate controls, and is equipped with a three position rocking lens:

- Lens rocked forwards; lamp is switched on with or without ignition.
- Lens central; lamp is switched off.
- Lens rocked rearwards; a courtesy mode applies, where the lamp is switched on whenever a door is opened, and goes out when both doors are closed.

Inertia Switch

The safety inertia switch is designed to operate on impact, typified by vehicle collision, to switch off the fuel pump, and thus minimise any fire hazard. The inertia switch is mounted at the left hand rear corner of the engine bay, and is reset by pressing the rubber diaphragm button on the top of the unit.





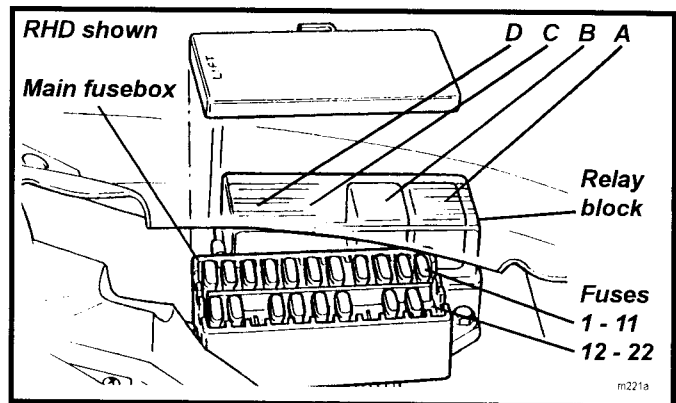
MO.3 - COMPONENT LOCATION & FUSE RATINGS

Main Fusebox

The main fusebox is located in the front services compartment, on the passenger side, and is protected by a clear plastic cover. For access, remove the passenger side front body access panel, followed by the radiator air deflector panel. Twenty two slots are provided for 'Littel' type fuses which are numbered, and coloured according to their amperage rating, and may be pulled out from their slots using the fuse extractor tool provided on the fusebox lid.

Fuses

Slot	Rating	Circuit
1	20A	Aux. power socket
2	2A	Alarm siren
3	20A	Interior fan
4	15A	Wiper motor
5	7.5A	Stop lamp
6	7.5A	Direction indicators.
7	10A	Ignition services
8	7.5A	Battery services
9	10A	Hazard lamps
10	7.5A	Horn
11	10A	Alarm pwr; interior lamp
12	25A	Cooling fan
13	7.5A	Audio ignition
14	-	
15	7.5A	Audio +ve; switch module
16	10A	Sidelamps; rear fog
17	10A	Dip beam LH
18	10A	Dip beam RH
19	-	
20	15A	Main beam LH
21	15A	Main beam RH
22	-	



Relays

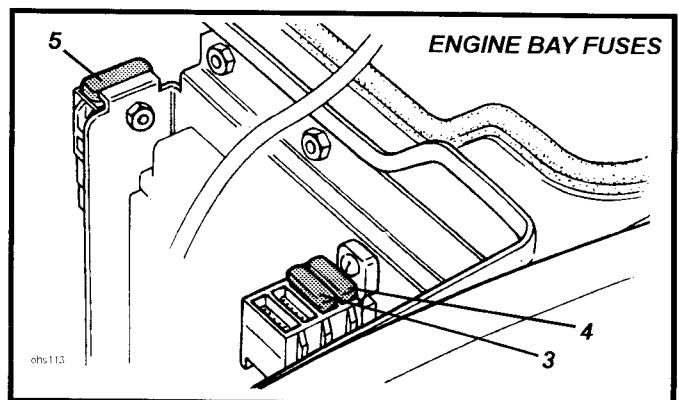
- A Horn
- B Cooling fan
- C -
- D -

Engine Compartment

Fuses and relays associated with the engine management system are located at the rear of the engine bay adjacent to the engine ECM. The multi-function relay unit containing the engine control relay, fuel pump relay and starter relay is mounted on the chassis rear subframe below the engine ECM.

Fuses

Slot	Rating	Circuit
1	-	
2	-	
3	20A	Start immobiliser
4	20A	Fuel pump
5	80A	Alternator output

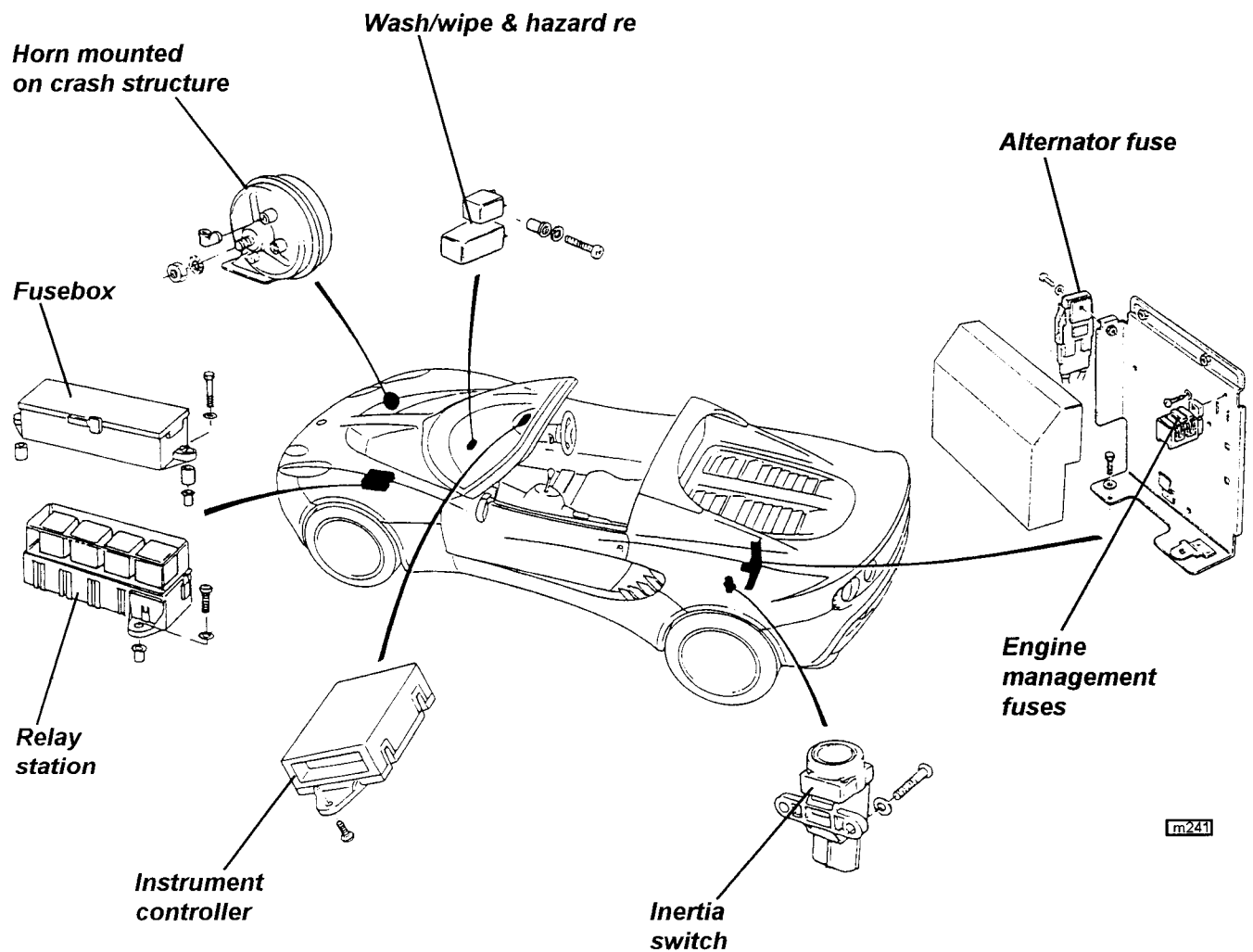




Fuse colours:

- | | | |
|--------------|---------------|-------------------|
| 2A - Black; | 5A - Orange; | 15A - Light Blue; |
| 3A - Violet; | 7.5A - Brown; | 20A - Yellow; |
| 4A - Pink; | 10A - Red; | 25A - Clear. |

The wash/wipe module, and hazard flasher relay are together mounted on the front of the passenger side chassis scuttle beam. For the location of the vehicle alarm system components, see sub-section MO.1. Engine management components are detailed in Section EMN.



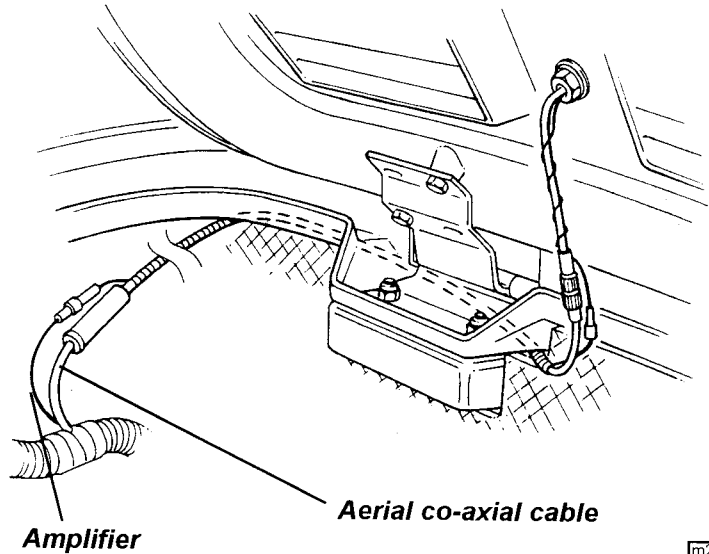


MO.4 - AUDIO EQUIPMENT

The Elise may be specified with various audio equipment options. All cars are fitted with a main wiring harness which includes: an ISO 16-way connector located behind the standard ISO size audio aperture in the dash panel; speaker wiring terminating behind the cabin LH rear corner trim panel; and an aerial co-axial cable terminating in the LH front corner of the engine bay.

Aerial

On cars equipped with a 'radio fitting kit' (RFK), a maintenance free, transformer type, flexible aerial is mounted on the engine cover, and features an antenna mast which may be unscrewed by hand from its base if necessary to guard against vandalism. All cars are fitted with an aerial co-axial lead routed between the radio plug and the LH front corner of the engine bay, from which point an aerial extension lead is used to connect with the aerial. The aerial amplifier lead is built into the main harness, and is tied back at the corner of the engine bay. The co-axial cable extension and the amplifier lead are routed along the top of the engine bulkhead before connecting with the aerial base.



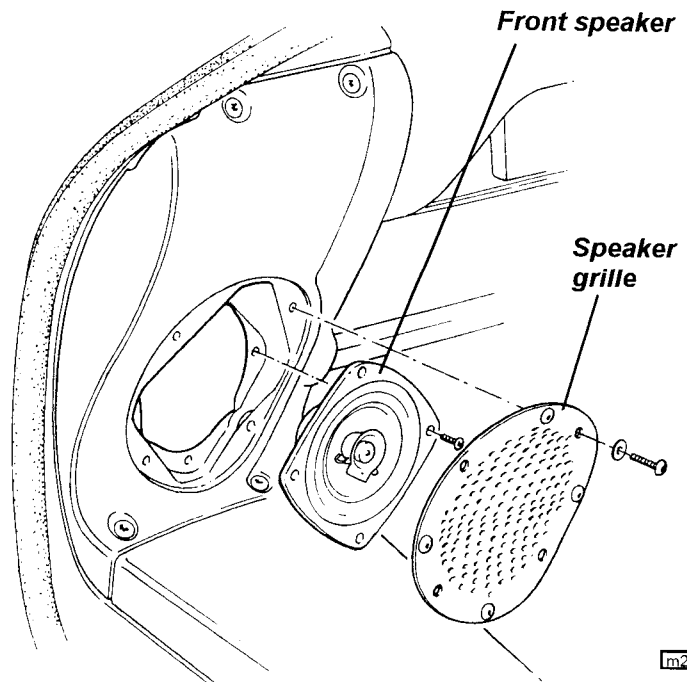
m242

Speakers

RFK cars are fitted with two rear speakers, one mounted in each cabin rear corner in a sound deadening full width rear bulkhead trim panel. An upgraded audio option uses the same rear speakers, in conjunction with a pair of front speakers, mounted one in each dash end panel.

Speaker specifications are as follows:
Rear: Alpine SPS 1329; 80W peak; 20W RMS; 130mm dia.; 4 ohms.
Front: Alpine SPS 1029; 60W peak; 15W RMS.

To remove the rear bulkhead trim panel, remove the four screws securing the top edge of the panel to the bulkhead plinth, and ease the panel from behind the roll over bar at each side.



m243



MO.5 - BATTERY, BATTERY CABLES & EARTHING POINTS

Battery

WARNING: POISON/DANGER - CAUSES SEVERE BURNS - KEEP OUT OF REACH OF CHILDREN.

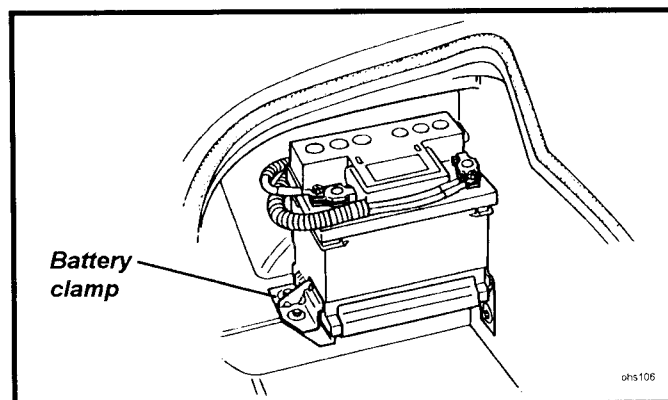
Contains sulphuric acid - avoid contact with skin, eyes or clothing. If in contact with skin or eyes; flush with copious amounts of water. Remove contaminated clothing. Seek immediate medical attention. If ingested; seek immediate medical attention. Do not induce vomiting or give fluids to drink. Batteries produce explosive gases. Keep sparks, flames and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.

Battery Access

The Tungstone Type 006 'maintenance free' battery is located at the left hand front of the rear luggage compartment. No routine inspection or topping up of the electrolyte is required, but at intervals specified in the Maintenance Schedule, the battery terminals should be checked for security and condition, and protected with petroleum jelly.

To remove the battery, pull back the carpet, disconnect both battery cables (see below), and pull off the breather pipe (if applicable). Release the single screw securing the clamp bracket at the rear base of the battery, and manoeuvre the battery from the base retaining shoes at the front and right hand side. When lifting out the battery, take all appropriate precautions to safeguard personal health.

Refit the battery, with its terminals inboard, by reversing the above procedure. Remember to push on the breather pipe (if applicable), and reconnect the battery cables as detailed below.



Disconnecting the Battery

If the battery is to be disconnected, the following precautions should be taken:

- Wait for at least ten seconds after switching off the ignition to allow the engine management system to adjust the setting of some components ready for re-starting.
- If the car is fitted with the upgraded security alarm, immediately before disconnection, mobilise the engine using the transmitter button with ignition **off**, and disconnect the battery within 25 seconds. If disconnected after this time, or when immobilisation is in effect, the alarm will be triggered.
- Ensure that all electrical loads (e.g. lights) are switched off.
- Disconnect the **negative** (earth; black; '-') battery cable first, and re-connect last. If the battery positive terminal is inadvertently earthed (e.g. when using a spanner) whilst the negative terminal is still connected, the resultant short circuit with heavy sparking and current flow could cause serious burns.
- If the vehicle is fitted with security coded audio equipment, check that the code is available for entering after battery reconnection.

Battery Reconnection

- Check again that all electrical loads are switched off.
- Connect the positive battery cable first, followed by the negative (earth) cable.
- Be aware that the vehicle security alarm may be triggered by the action of battery re-connection. Have the alarm transmitter key ready to disarm the alarm (see 'Vehicle Security Alarm').
- After reconnection, a change in the engine performance characteristics may be noted for a period whilst the computer controlled engine management system 're-learns' some of its settings.
- If necessary, enter the security code into audio equipment.

**Battery Charging**

Under conditions of normal daily use, it should not be necessary to use external battery charging equipment. In a low usage regime, however, it is important to maintain the charge state of the battery using a trickle charger, or an automatic battery management charger such as that available through Lotus After Sales. Such a device, when connected to a vehicle battery, is able to continuously monitor battery charge state and switch on and off automatically in order to maintain the battery in a fully charged state without danger of damage through overcharging.

If the battery becomes discharged to the extent that the vehicle cannot be started, the recommended course of action is to fit a substitute battery whilst the original battery is trickle charged. If, in an emergency, the vehicle has to be 'jump' started, the subsequent conditions of vehicle use may not allow for sufficient alternator charging of the battery to achieve a fully charged state. The battery should be trickle charged until 12.8 volts is recorded, which process may take 24 hours or longer. Putting the battery into service at a lower state of charge will reduce the time period for which the vehicle can be parked. A battery left in a fully discharged state for a prolonged period, may not be recoverable to its original condition.

Unless using an automatic battery management charger, the battery should be removed from the car for recharging, to a well ventilated area to avoid a build up of fumes in the luggage compartment and to prevent damage to the car's electrical system. Observe the safety precautions listed above when removing the battery and take care to avoid sharp knocks or shocks, keeping the battery as upright as possible. Beware of the considerable weight of a battery, and take necessary precautions against personal injury.

Check that the electrolyte level is between the upper and lower markers on the battery case, and if necessary add distilled water. The recommended bench charge rate is 4 amps. When the battery is fully charged (12.8 volts), allow the battery to stand for an hour before refitting into the battery well and reconnecting the leads - see above.

Quiescent Drain

With a fully charged battery, the current drain with all electrical equipment switched off (no radio fitted) should be as follows;

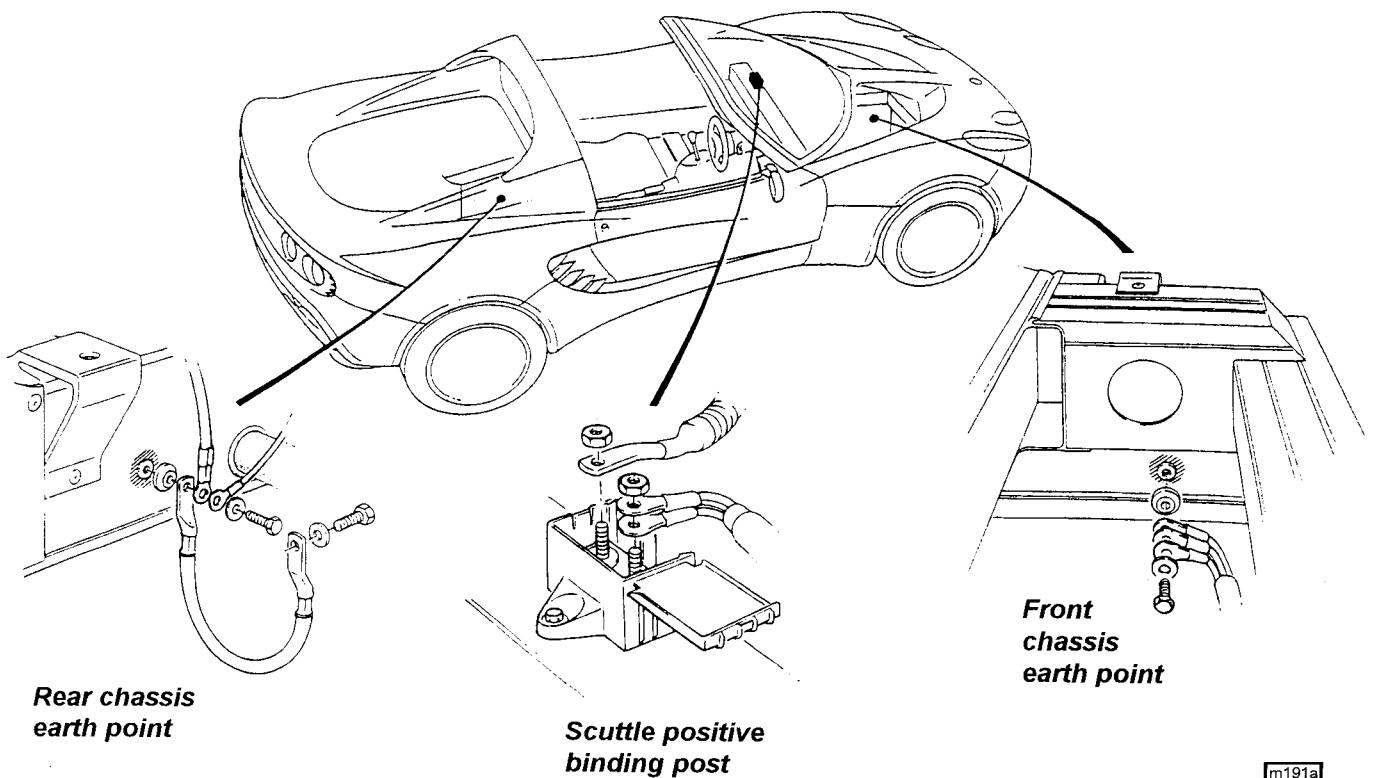
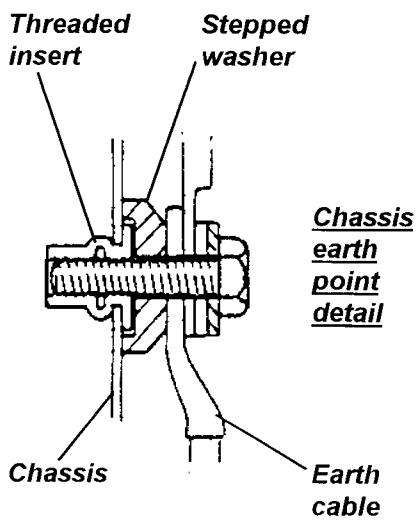
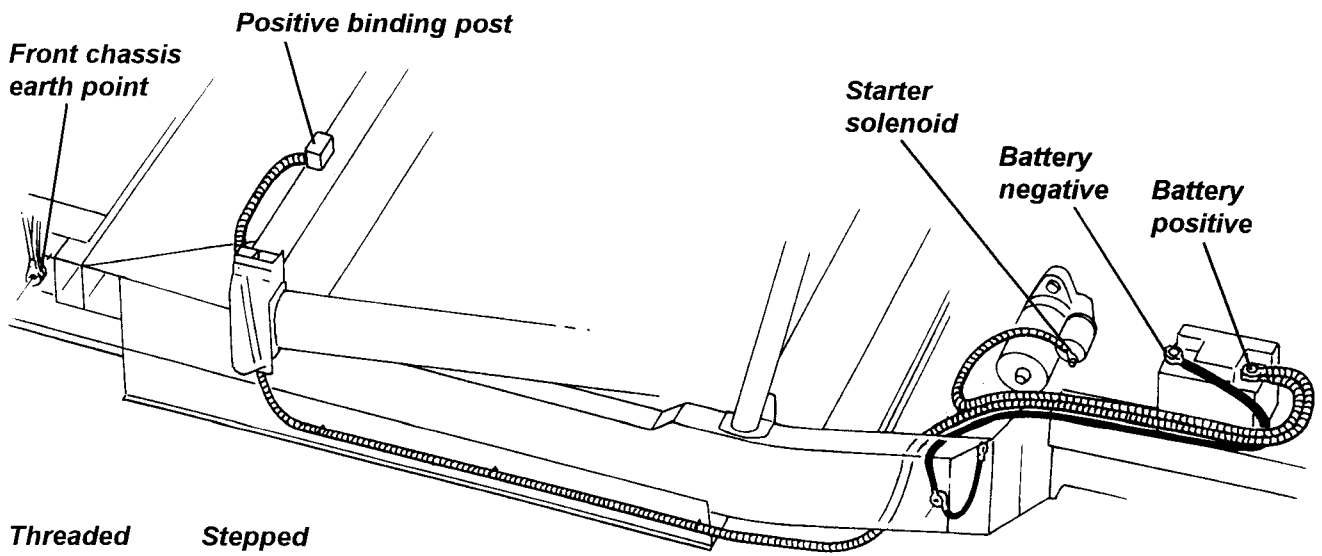
Immobiliser active	15 mA
Alarm set	20 mA

If current drain is found to be significantly in excess of these figures, the cause must be established by isolating components (e.g. at fusebox) and rectifying faults as necessary.

Battery Cables

Two main battery positive cables are used to connect to i) the starter motor solenoid, and ii) the front positive binding post. The starter solenoid terminal is used directly to supply the engine harness. The front positive post is mounted in an insulated box on the LH top of the scuttle beam, and is used to supply the main fusebox and other front mounted components with 12 volts. The supply cable runs from the battery, through the LH sill, fixed to the outside of the chassis LH side rail together with the heater return pipe and clutch hydraulic hose, and penetrates the scuttle baffle panel to the top of the scuttle beam.

The battery earth cable connects to a chassis earth point on the inside surface of the LH chassis rail at the side of the engine bay, accessible from beneath. From here, a second cable connects with the transmission casing to provide an engine earth. A second earth point is used at the front of the chassis to provide for front mounted components, and is located within the front services compartment on the inside surface of the chassis LH siderail. Each chassis earth point uses an M8 threaded insert and a special stepped washer which must be fitted the correct way round in order to contact the chassis (anodisation removed around insert). The chassis and cable earth terminals should be coated with petroleum jelly to protect from corrosion.

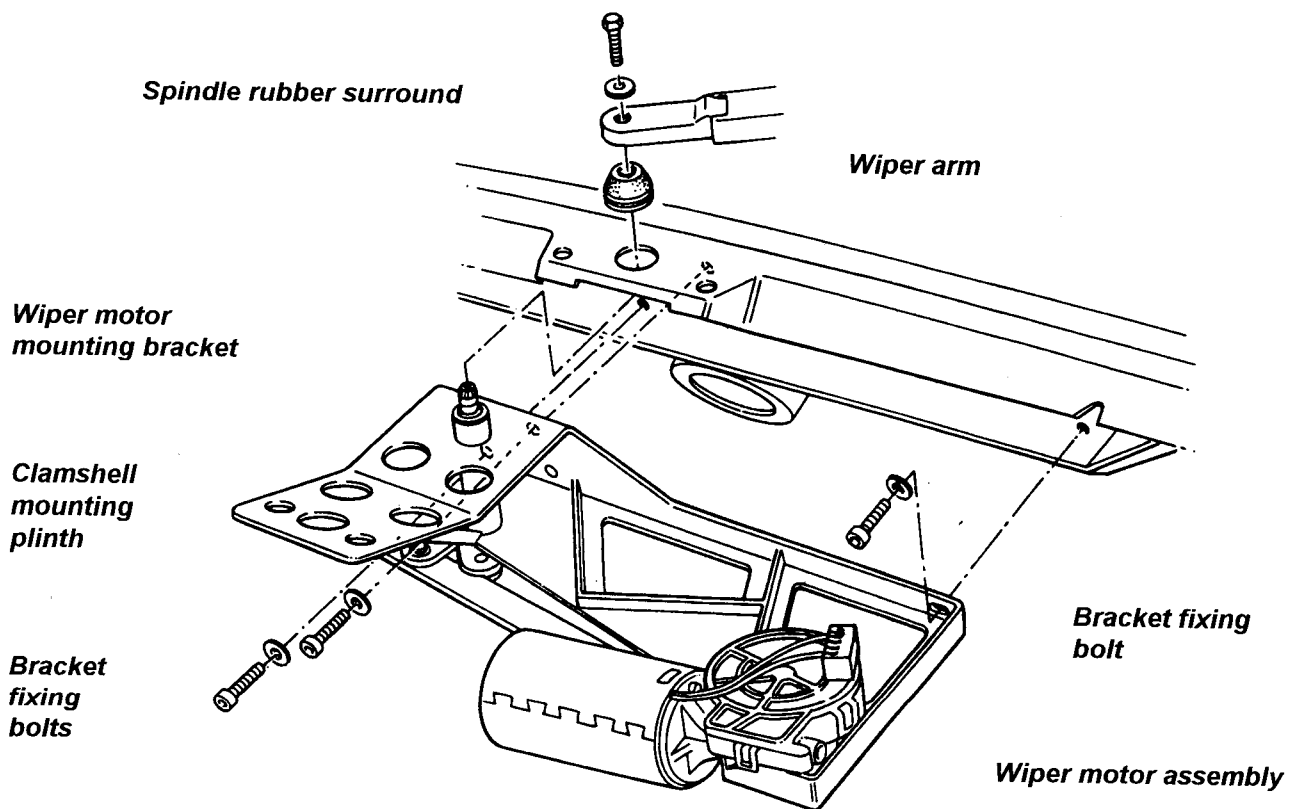


**MO.6 - WIPER MECHANISM**

The windscreen wiper mechanism comprises a uni-directional motor with an external rotary link, a connecting rod, and a pair of actuating links which join the connecting rod to the arms of the wiper spindle. This mechanism provides the wiper with a motion which is slowed at each end of its travel in order to ease the inertia loads during direction changes, to the benefit of refinement and durability. The motor and wheelbox are mounted on a single fabricated steel bracket which is bolted to the windscreen scuttle panel.

To remove the wiper mechanism:

1. Remove the front clamshell (see sub-section BP.5).
2. Remove the wiper motor protective cover by releasing the two screws into the windscreen buttress, and the patch of adhesive between the inboard end and the screen gutter. Disconnect the harness plug from the motor. Disconnect the washer tubing.
3. Remove the wiper arm from the spindle, and the spindle rubber surround.



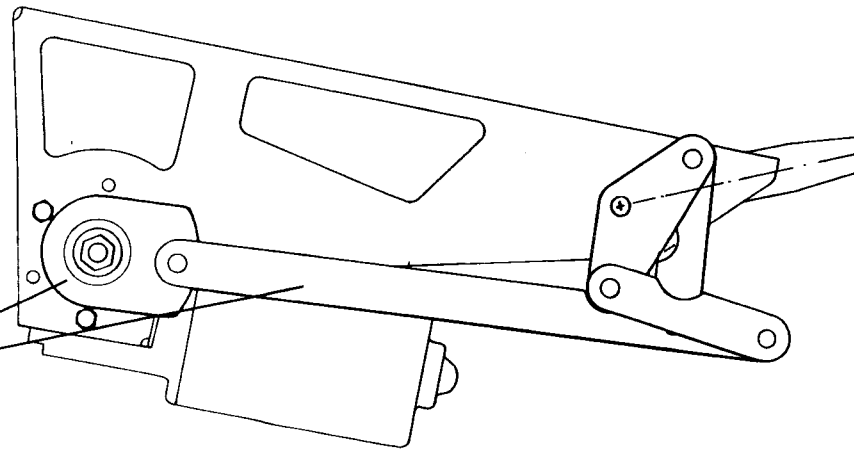
m208

4. Release the three screws securing the motor mounting bracket to the windscreen frame - one at each side of the spindle, one at the motor end, and withdraw the complete mechanism from the car.
5. If the motor is separated from the mechanism, the position of the rotary link should be marked against the motor shaft for reference when re-fitting. The motor should be in the 'park' position before fitting, and the mechanism at full travel so that the rotary link and connecting rod are aligned in the fully extended position.



RHD Shown
(LHD symmetrically
opposite)

Wiper linkage
in full travel
position

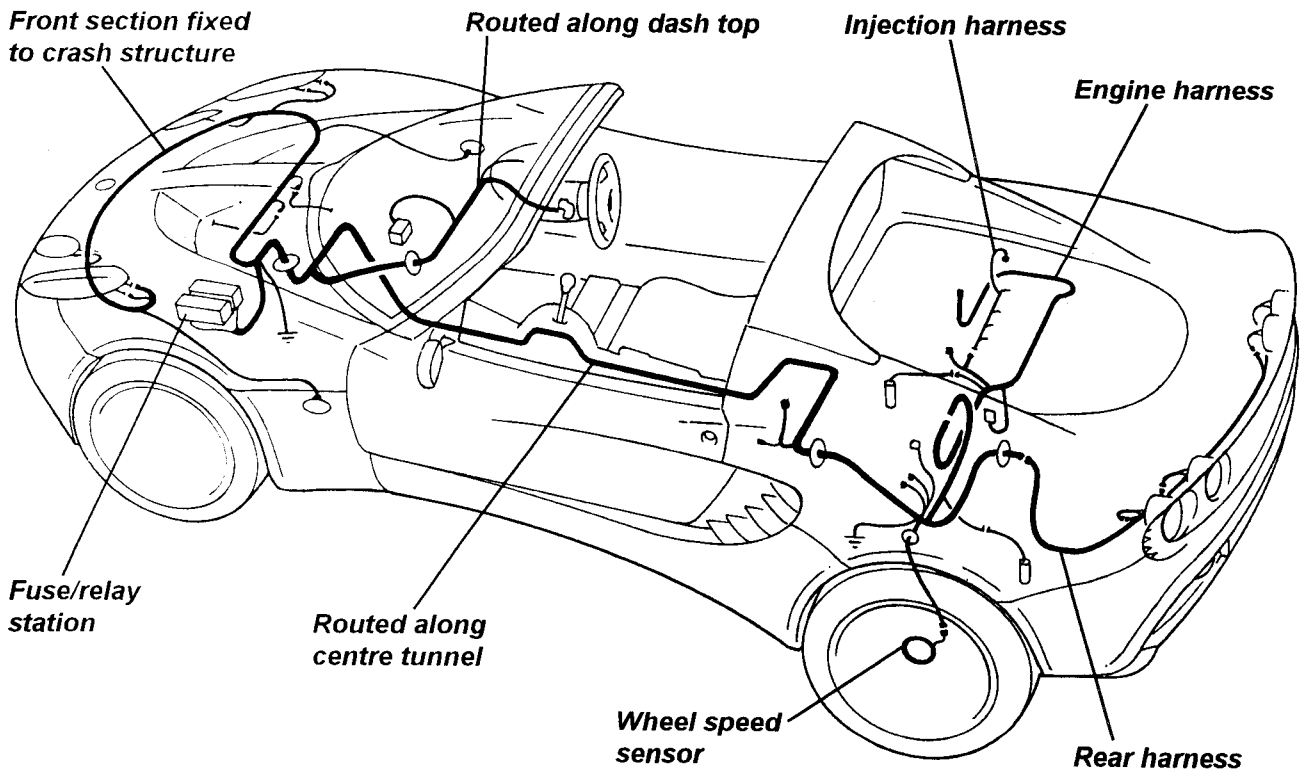


m209

6. Re-assemble in the reverse order to removal, torque tightening the bracket bolts to 20 Nm.

MO.7 - HARNESS ROUTING

The main harness runs from the main fusebox/relay station at the passenger side of the front services compartment, and divides into two branches; one running forwards across the front of the chassis well to feed the interior fan motor, horn and driving lamps, and then round the front of the crash structure to supply the front lights and horn, and ii) a second branch running rearwards through the scuttle where it divides again to run across the dash top for the instrument pack and switchgear, and along the cockpit centre tunnel to the rear of the car. At the rear of the tunnel the harness passes through the fuel tank bay to emerge at the left hand front of the engine bay. from where it runs to the engine ECM panel, and through a grommet into the rear luggage compartment to a rear harness connector. Separate harnesses are provided for the rear lighting, engine, and fuel injectors.



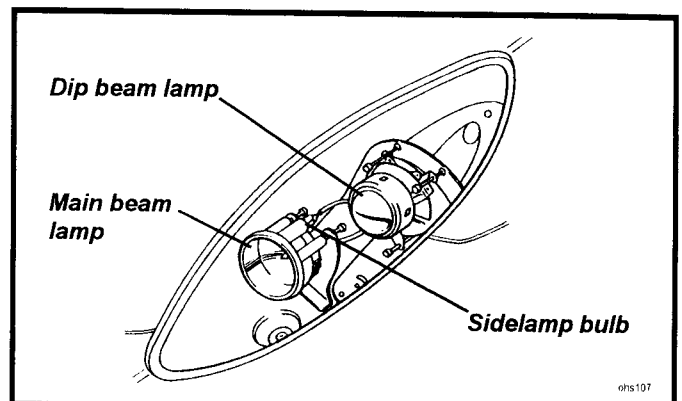
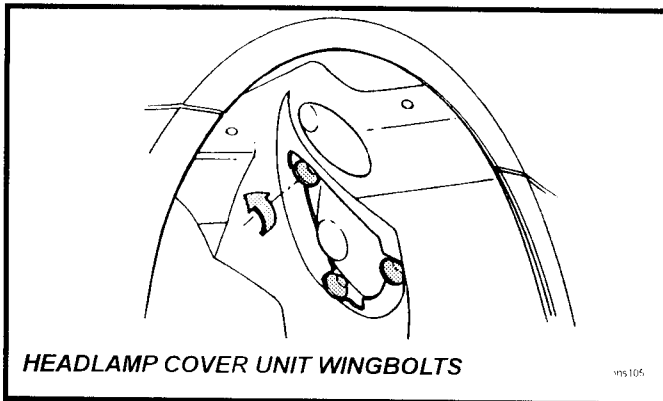
m244



MO.8 - FRONT LAMP ASSEMBLIES

Headlamp Units

The front clamshell incorporates, at each side, a headlamp housing, in each of which are mounted a halogen projector type dip beam lamp (upper), and a halogen main beam lamp (lower), which also incorporates the sidelamp bulb. A moulded plastic mask and clear acrylic cover are bonded together and are fitted over each headlamp housing, with a rubber surround finisher, with the unit retained by three slotted thumbscrews accessible from within the front wheelarch. For access to the headlamps, release the three thumbscrews and withdraw the headlamp cover assembly.



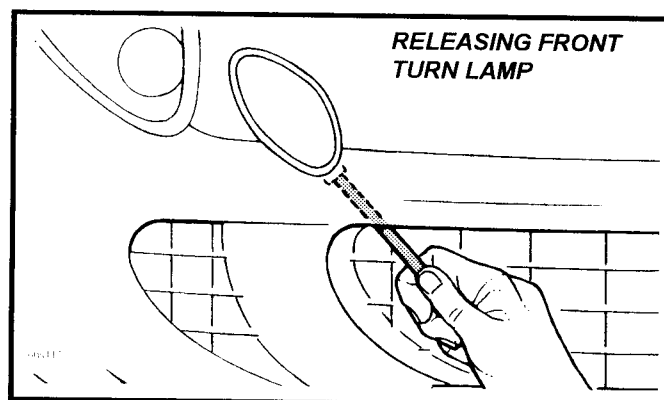
Headlamp bulbs may be replaced after disconnecting the cables (Dip; blue/yellow, black. Main; blue/black, black) and releasing the spring clip. Both the 55W H1 dip beam bulb, and the 55W H7 main beam bulb incorporate orientation features which must be correctly located on re-fitting. The holder for the T4W bayonet fitting sidelamp bulb may be twisted to release from the main beam headlamp.

If the car is to be used temporarily in an opposite drive hand territory, a masking lever incorporated in each dip beam headlamp should be moved to provide a horizontal cut off and prevent dazzle.

Front Turn Lamps

For access to the front turn indicator bulb, the lamp unit must be released from the body. Using the tool provided in the toolkit, or a suitable stiff rod, via an access hole in the outer top corner of the air intake aperture, compress the retaining clip at the front corner of the turn lamp, and withdraw the lamp from the body. Twist the bulb holder counterclockwise to release from the lamp, and replace the bayonet fitting amber bulb.

After replacing the bulb and holder, engage the lamp unit top corner lip in the body aperture, and press the bottom corner to engage the spring clip.



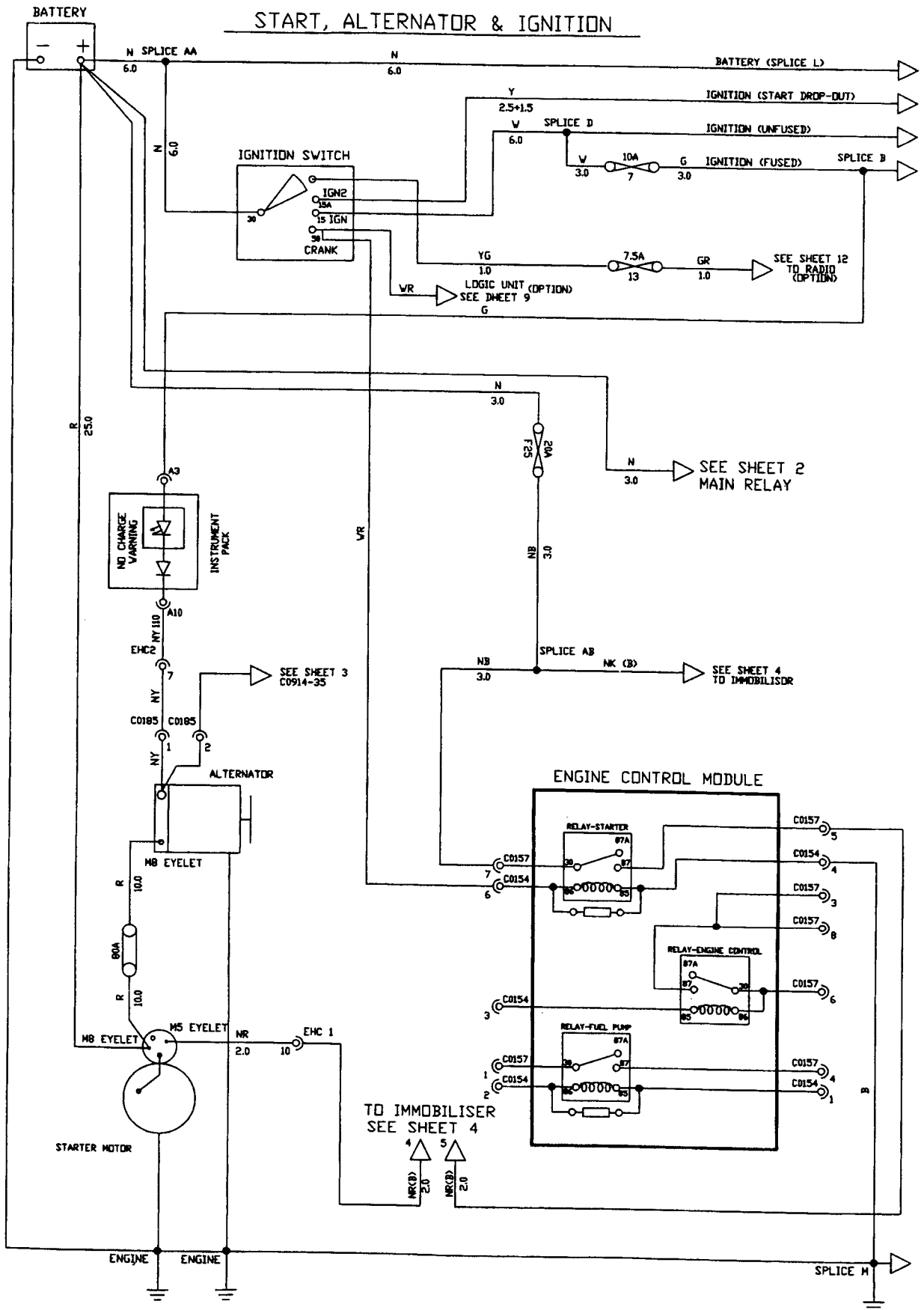


MO.9 - CIRCUIT DIAGRAMS

<i>Circuit</i>	<i>Sheet</i>
Start, Alternator & Ignition	1
Fuel Pump, Cooling Fan, Engine Management 1	2
Engine Management 2	3
Alarm & Interior Lamp	4
Stop & Reverse Lamps	5
Direction Indicators & Hazard Lamps	6
Headlamps, Sidelamps, Fog Lamp	7
Instruments	9
Windscreen Wipers	10
Interior Fan & Air Conditioning (Option)	11
Radio & Auxiliary Power Socket	12
Power & Ground Structure	13
Inter-Harness Connectors	14



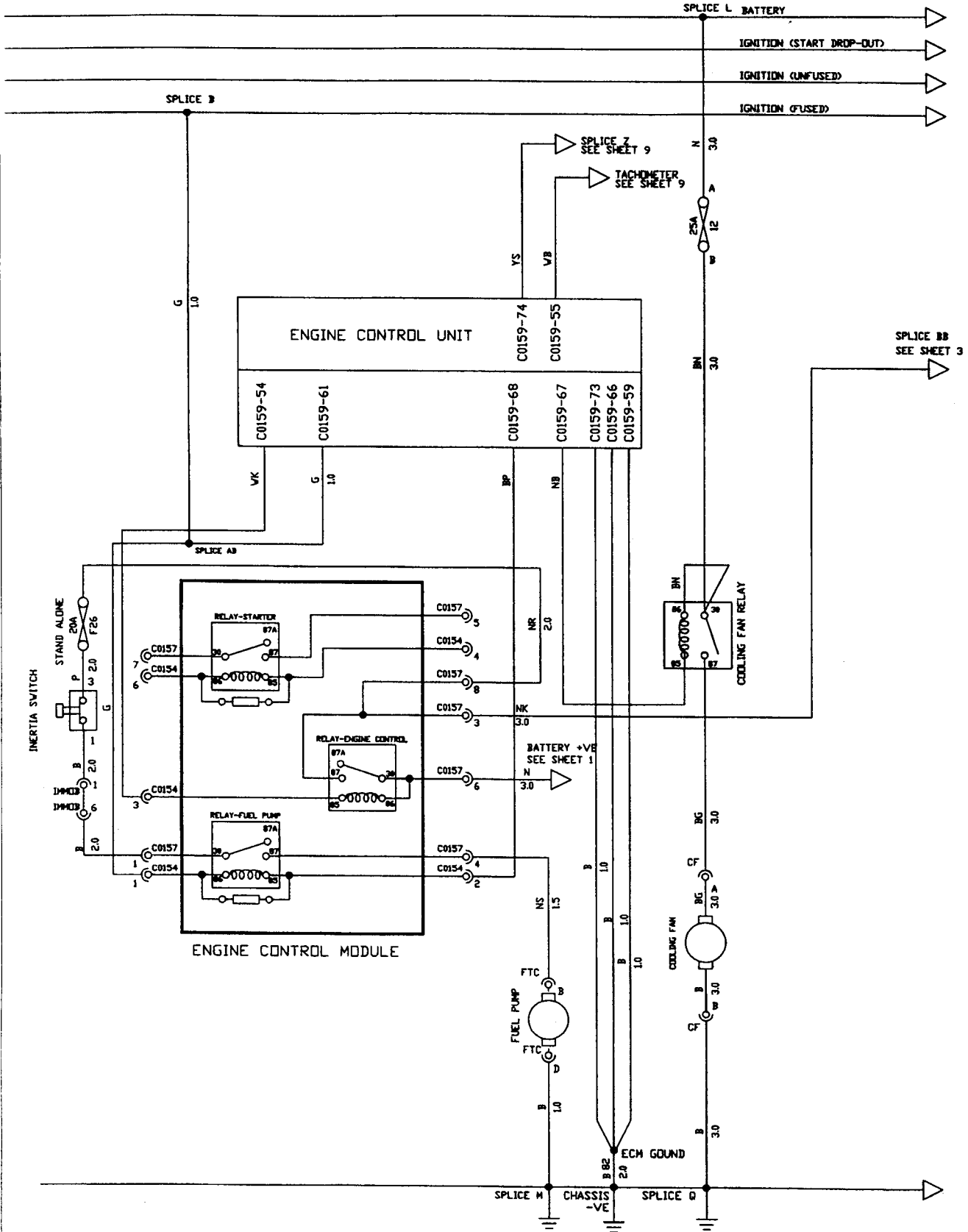
START, ALTERNATOR & IGNITION



SHEET 1

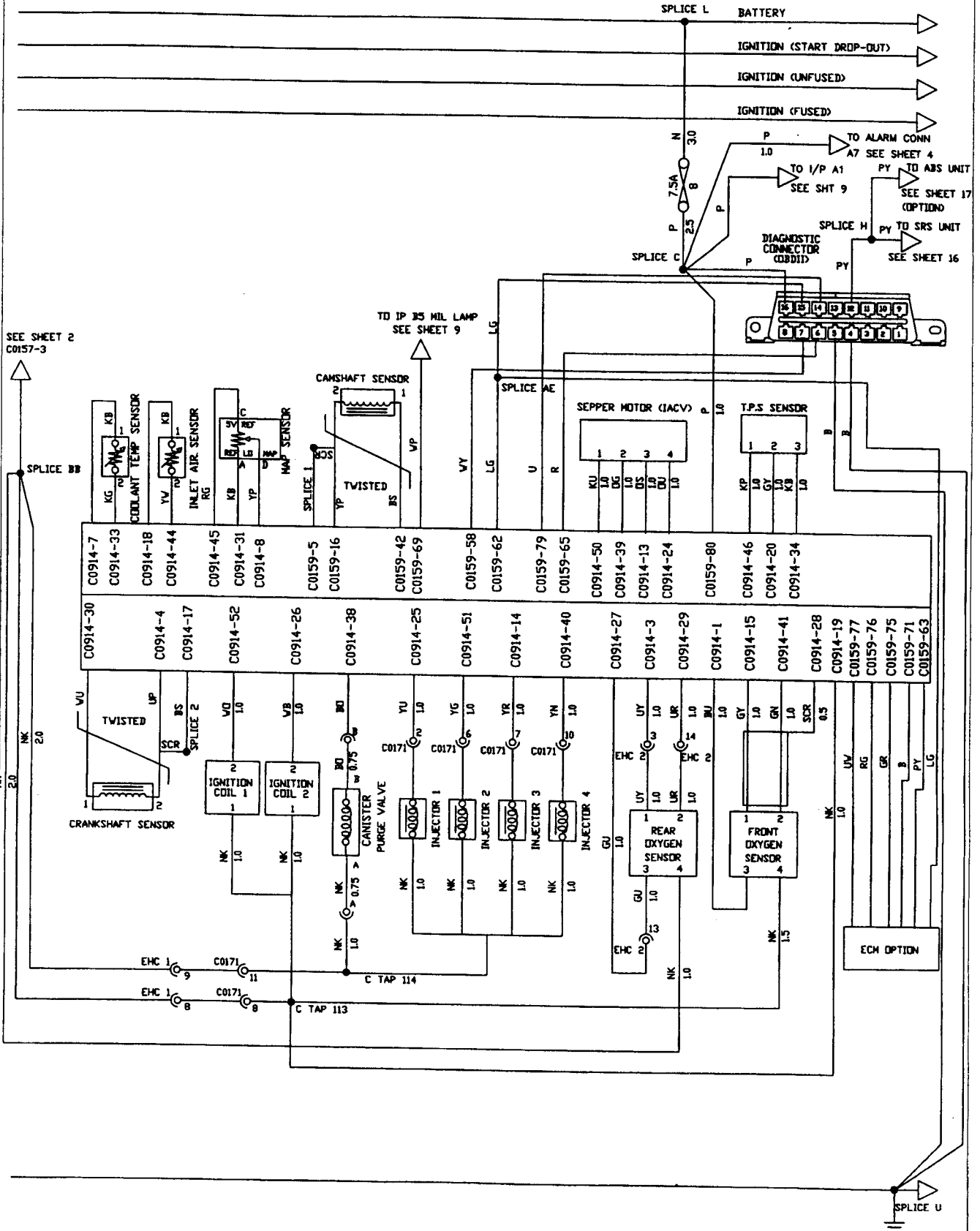


FUEL PUMP-COOLING FAN-ENGINE MANAGEMENT 1



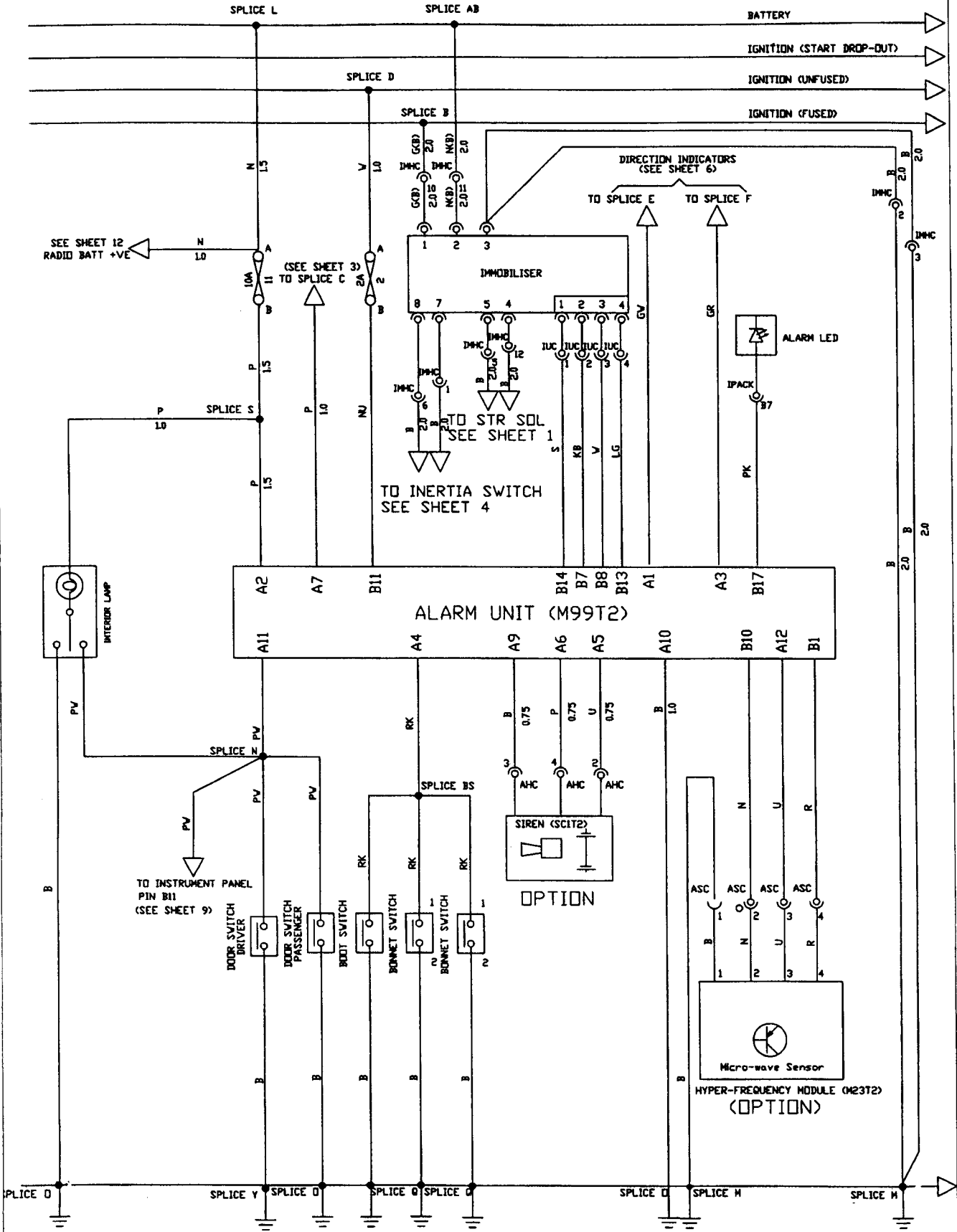


ENGINE MANAGEMENT SYSTEM PART 2



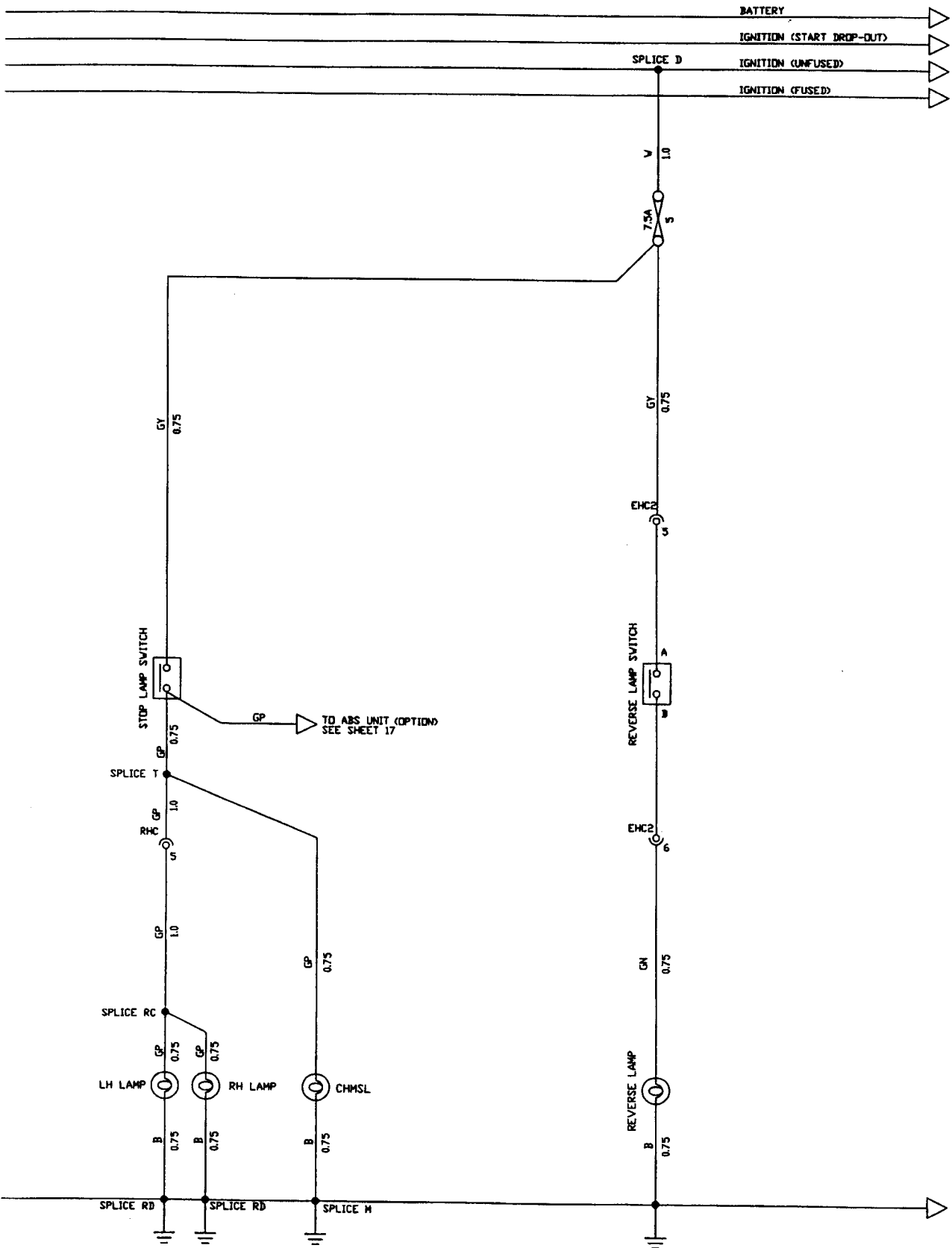


ALARM (OPTION) & INTERIOR LAMP





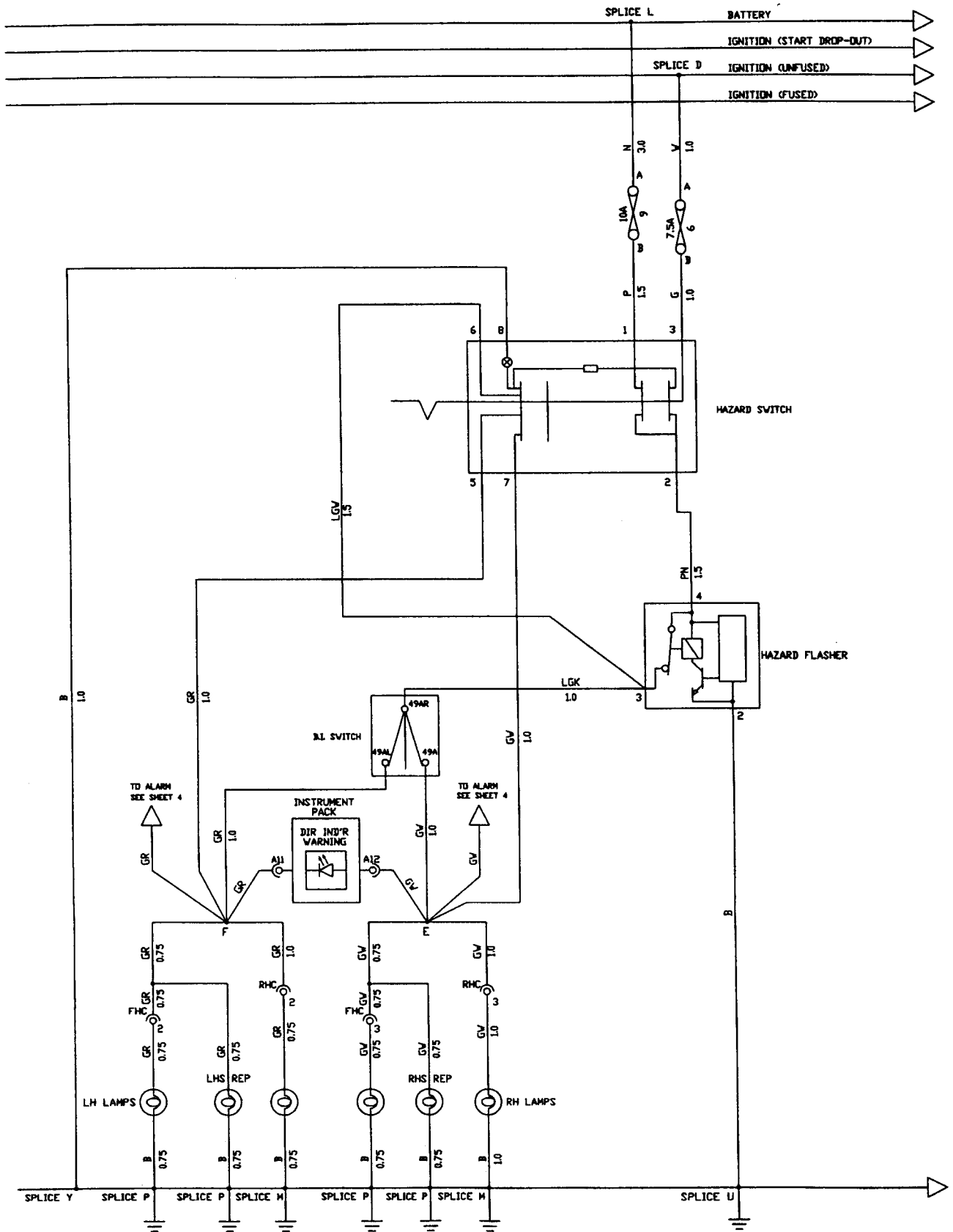
STOP & REVERSE LAMPS



SHEET 5

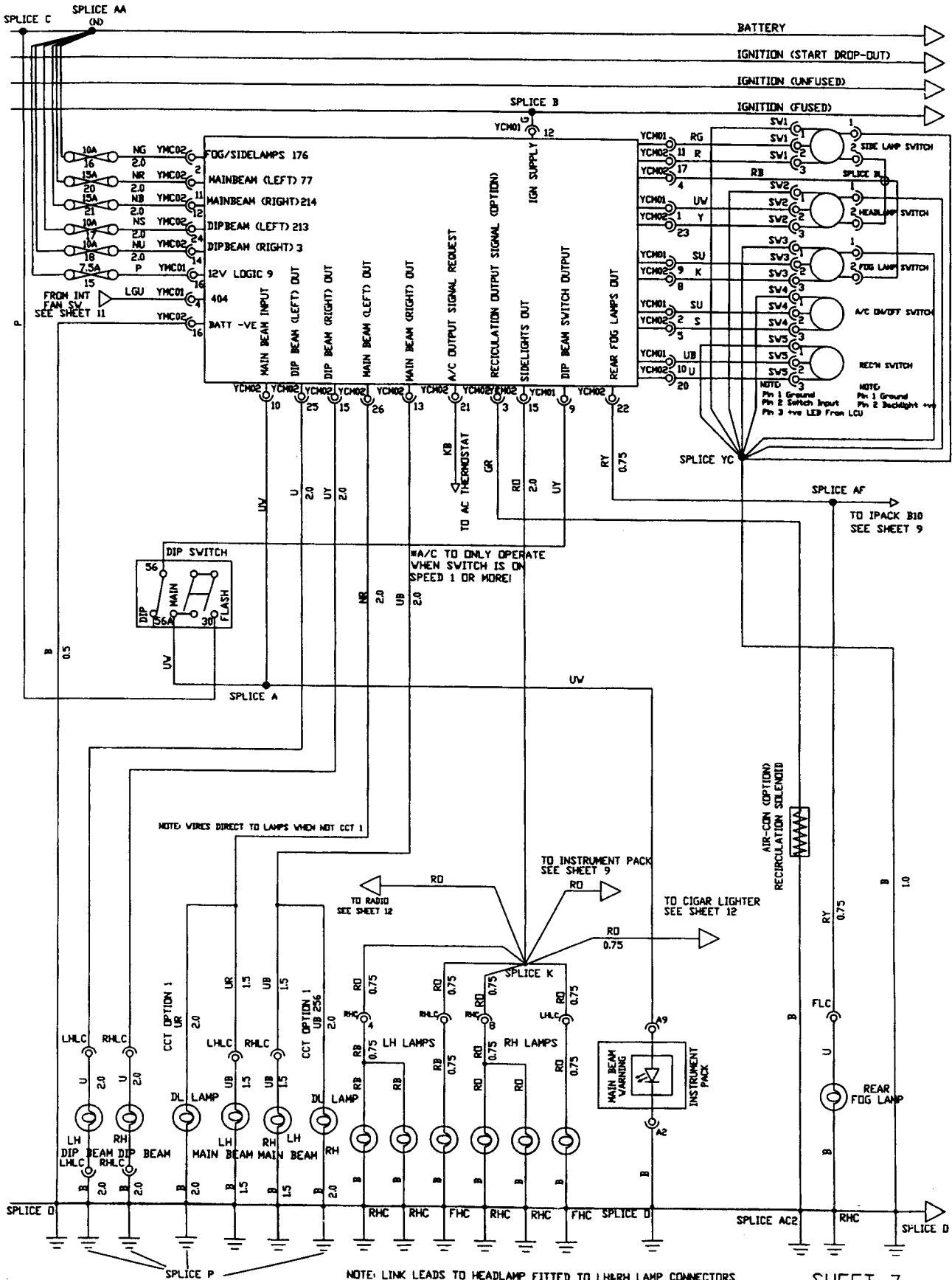


DIRECTION INDICATORS & HAZARD LAMPS





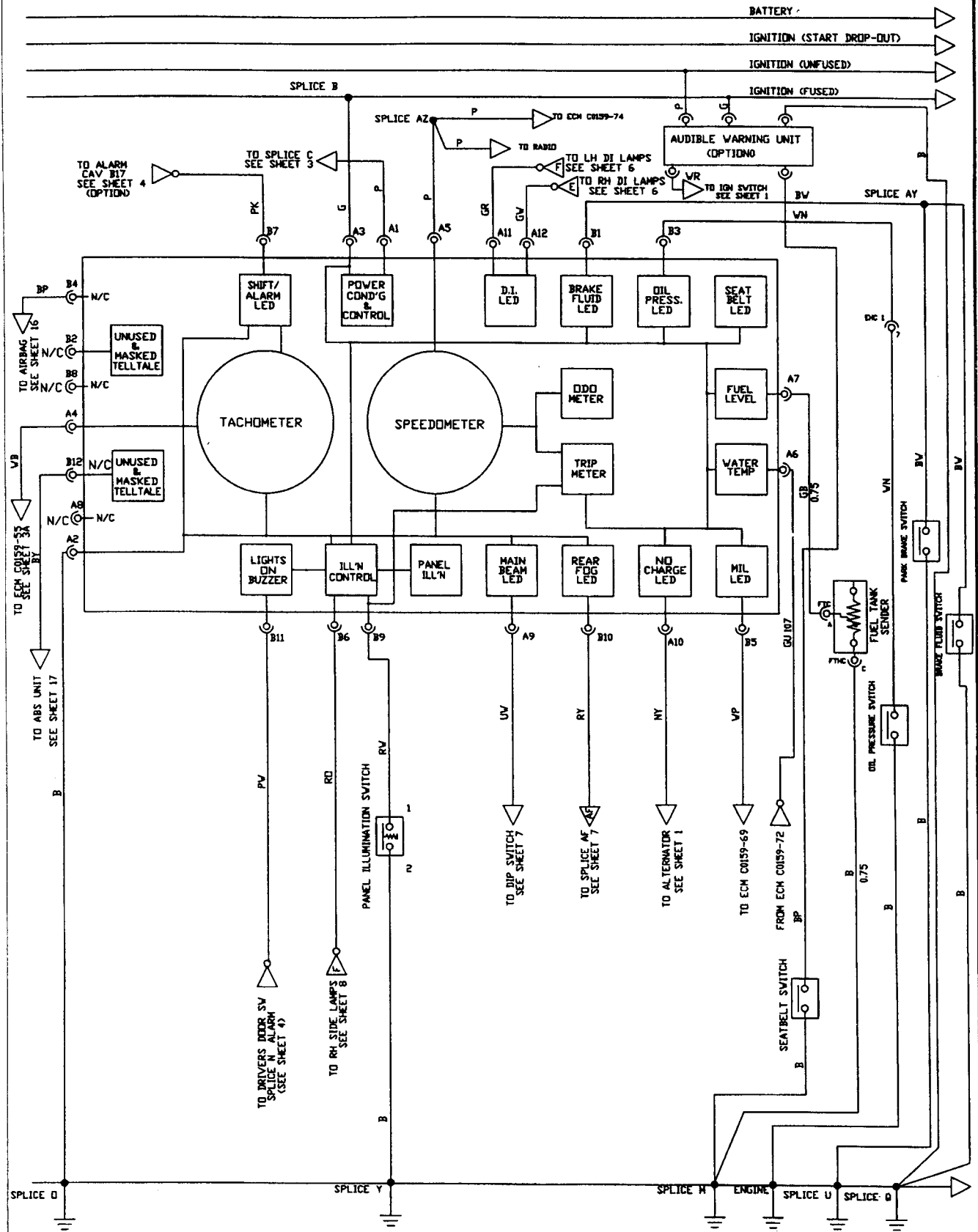
HEADLAMPS SIDELAMPS & FOG LAMP



NOTE: LINK LEADS TO HEADLAMP FITTED TO LH&RH LAMP CONNECTORS

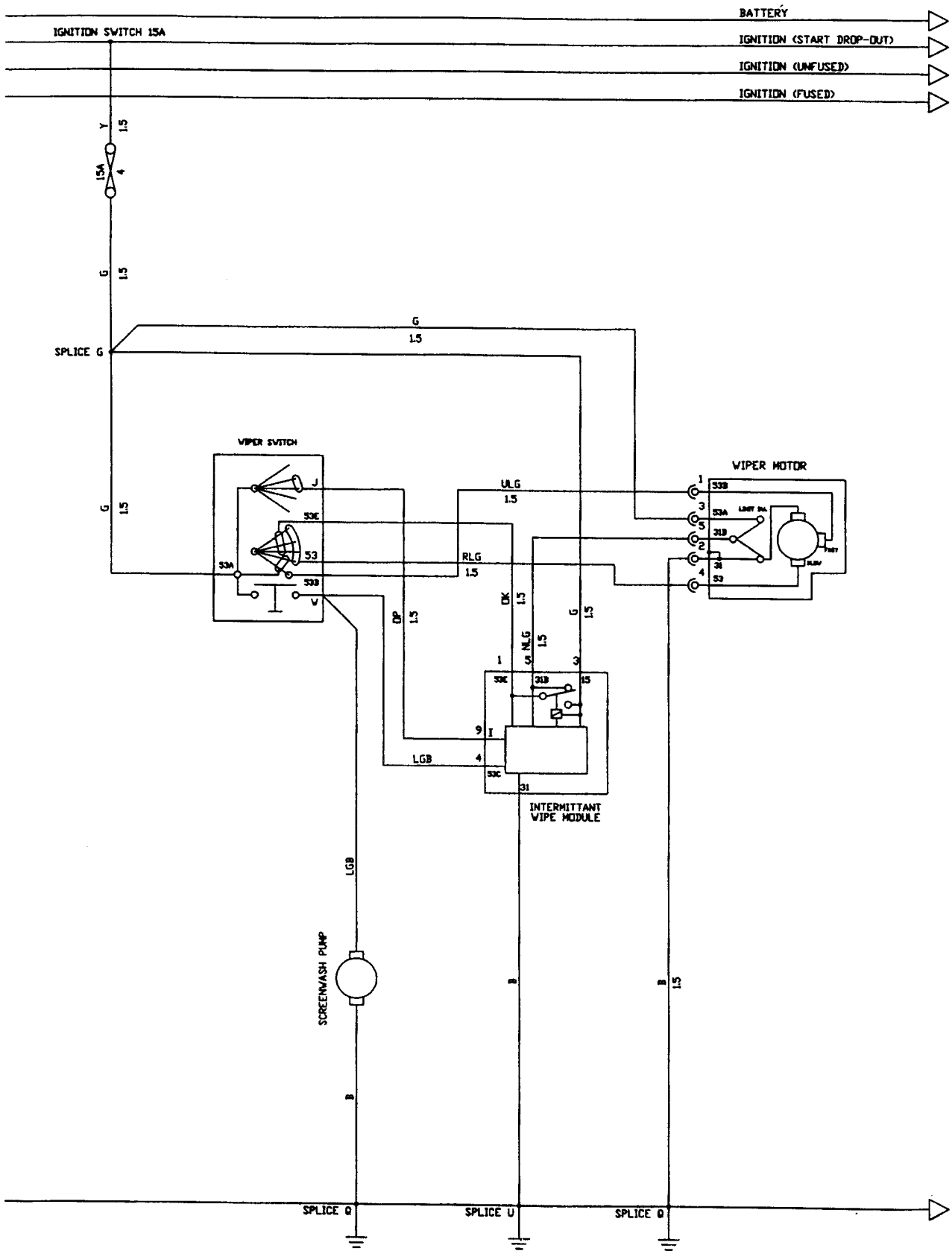


INSTRUMENTS



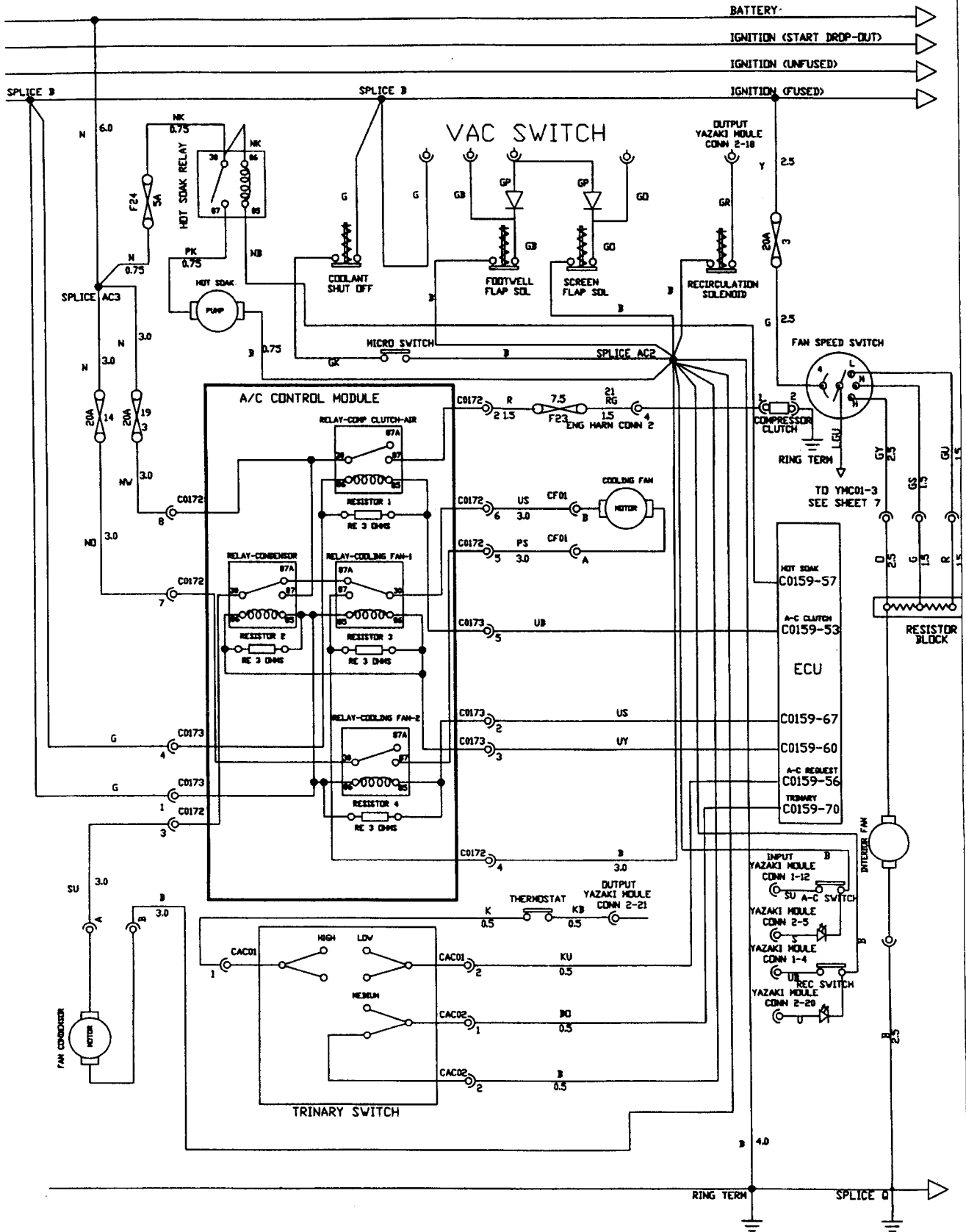


WINDSCREEN WIPERS



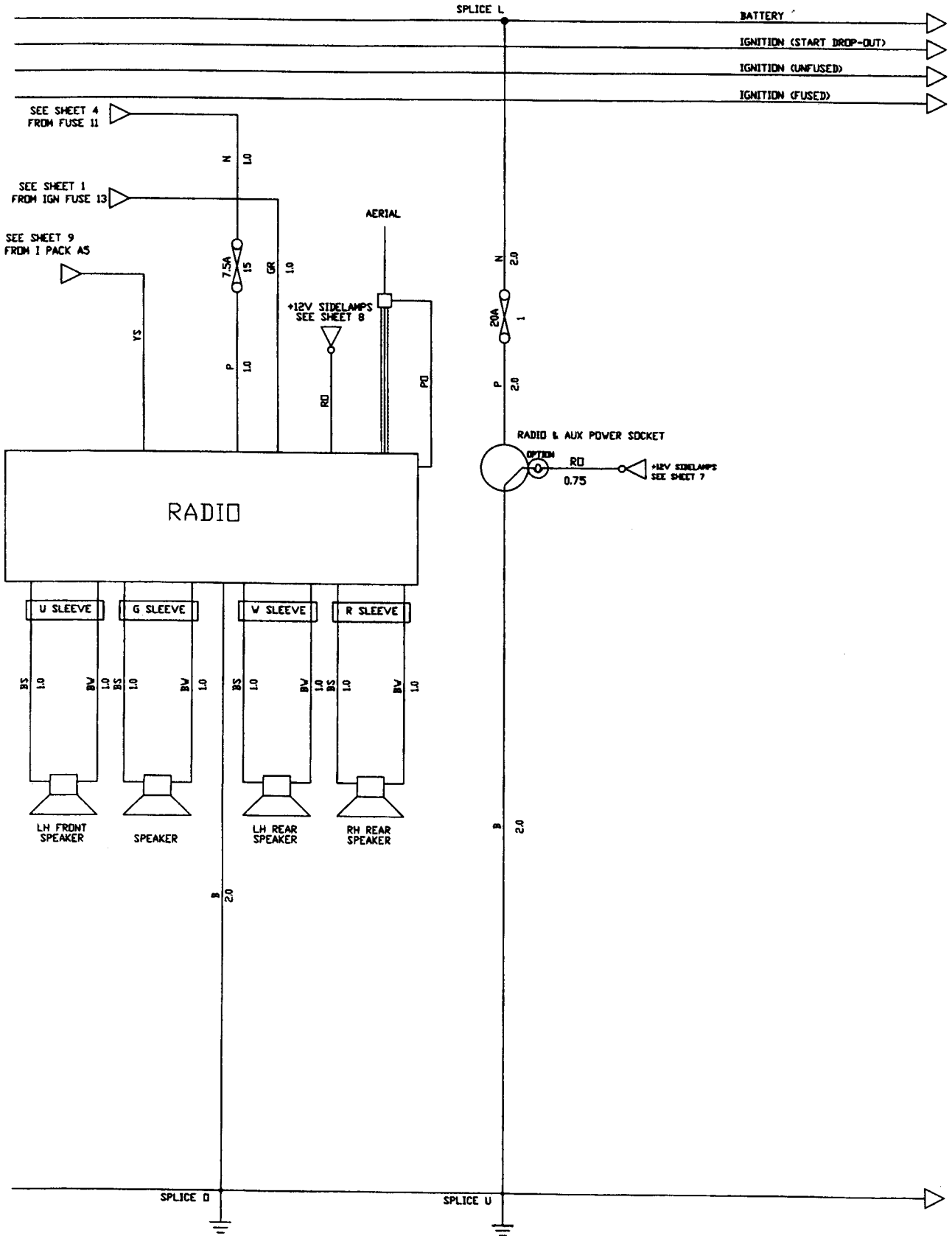


INTERIOR FAN / AIR CONDITIONING (OPTION)



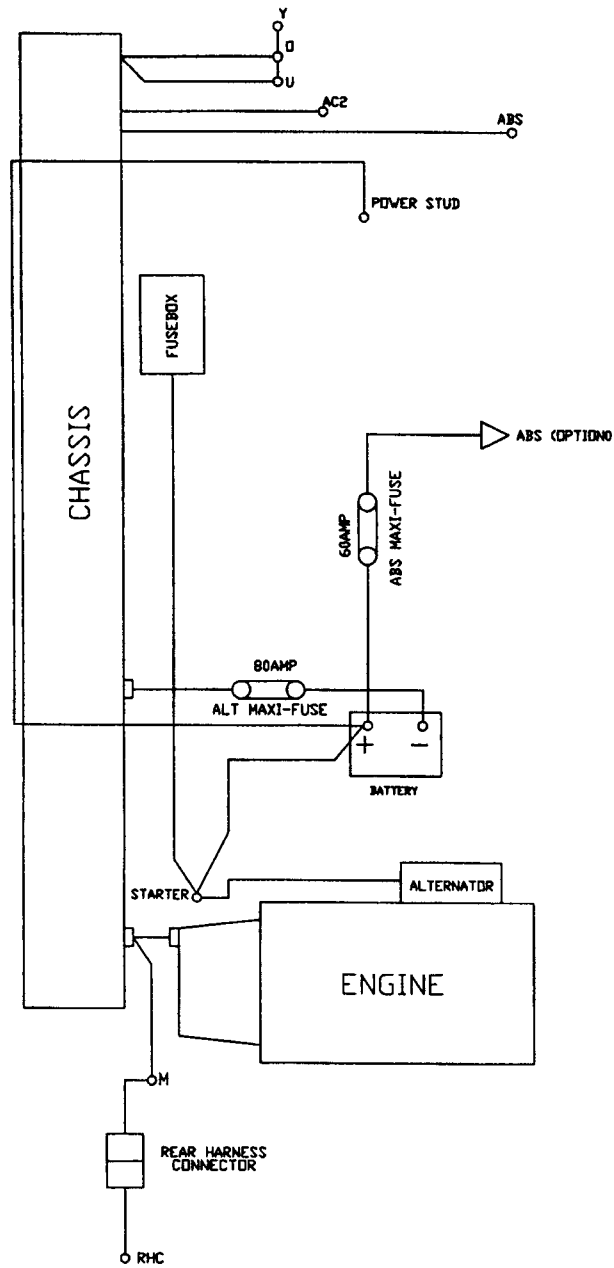


RADIO (OPTION) & AUX POWER SOCKET





POWER & GROUND STRUCTURE

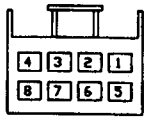




INTER-HARNESS CONNECTORS

CONNECTOR ON
MAIN HARNESS

CONNECTOR ON
MATING HARNESS



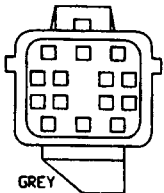
YAZAKI H 7283-5560-40

REAR
HARNESS CONNECTORS
(RHC)



GREY
SUMITOMO H 6189-0555 X 1

ENGINE HARNESS
CONNECTOR 1 (EHC 1)



GREY
SUMITOMO H 6189-0136 X 1

ENGINE HARNESS
CONNECTOR 2 (EHC 2)



AIR BAG (OPTION) & HORN

