

OScar

DRIVERS INSTRUCTIONBOOK

Chassis no:

Please do not remove from car.

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Engine (Type 1)

See VOLVO-manual for type 240 under B23A engine.

A few points are different however, due to the twin-carburettor tuning kit, described in VOLVO R-sport manual.

Special camshaft: Part No. 1306167-6

Special distributor: Part No. 552594-4

Plugs: VOLVO Part No. 273596-7
 BOSCH Part No. 0241240407

Some adjustment-specs:-

- valve clearance (hot) 0.40 to 0.45 mm
- ignition tuning at 7-800 rpm: 7° advance +/- 1°
- CO-value in exhaust: 1.5 +/- 0.5%

Engine (Type 2)

Exactly as VOLVO B23ET from VOLVO 760 turbo

Plugs: BOSCH W7DC (VOLVO 273597-5)

Modifications (Type 1 and Type 2)

- shortened fan blades and fan hub
- generator mounted on l.h. side in special bracket

Exhaust system (Type 1)

Forward pipe shortened VOLVO 240

Two silencers: VOLVO 340 R-sport

Pipe under rear axle: special OScar pipe

Exhaust system (Type 2)

All special OScar, except for rear silencer, which is from VOLVO 760.

Engine-Air-Filter

Modified type R-sport from VOLVO 340.

NB: Shall be renewed at every 30,000 km.

Clutch

Standard VOLVO for the engine type in question

Pedals

- brake and clutch pedals specially made for OScar
- speeder mounting parts from 240
 - Type 1: pedal and rubber socket from 340
 - Type 2: - - - - - VOLVO 66

Instruments

All instruments are VDO standard issue, except engine rev.counter and speedometer, which are modified OScar-versions of standard VDO truck instruments.

Switches

LUCAS items (headlights, heater, air-condition and hazard light).

Headlamps and wiper motor

LUCAS

Rear lamps and number plate lights

Type 1: RENAULT Estaffette and R5 respectively

Type 2: RENAULT Estaffette and R5 (or Hella LKA001386281)

Lock for boot-lid

Electric version: VOLVO 240

Manual version : as on Morris 1000

Brakes

Type 1: - handbrake lever from VOLVO 140 (with modified cross-shaft)

Type 2: - handbrake lever from volvo 360

Type 1 & type 2:
 - handbrake cable from type 140 (1974) modified with special OScar end-adaptors for activating mechanism.

- front brakes from 140
- rear brakes from 240
- brake servo from 140 (1974)
- brake main cylinder from 240
- liquid reservoir from early 240
- rear brake pressure limiting valves from 245

Other items:

- sprinkler liquid container 340
- expansion tank 340
- cooling water hoses 360 (modified)
- engine radiator: special OScar.

Gearbox

VOLVO M46 with overdrive, see manual

Modifications (Type 1 only): shortened gear lever and lowered rubber mountings.

Prop.shaft

special out of VOLVO components

Rear axle (Type 1)

VOLVO type 240

Modifications: special brackets for leaf-spring welded on,

Rear axle (Type 2)

VOLVO type 240

Rear suspension (Type 1)

- leaf springs from MGB
- shock absorbers from VOLVO 140
- rear shackles for leaf springs from VOLVO 210

NB: Grease lubricate 2 nipples in each side every 5,000 km.

Rear suspension (Type 2)

From VOLVO 240 complete. Modification of lower mounting point for coil springs.

Both type 1 and type 2 use shortened VOLVO top linkarm.

Rear shock-absorbers: Type 1: 140
Type 2: 240

Front suspension and steering

Complete from VOLVO 140

Modifications:

- springs compressed
- lower steering column lengthened by
- top steering column from VOLVO 140 - 1973
- camber changed to $1/4^\circ \pm 1/8$
- castor changed to $2 1/2^\circ \pm 1/2$
- king pin inclination 8° to 9°
- toe-out on turns $2 1/2^\circ$
- toe-in straight ahead: 2 to 2 1/2 mm

Electrical system

See separate description. Mainly based on VOLVO 340 with addition of some separate relays for LUCAS equipment and air condition.

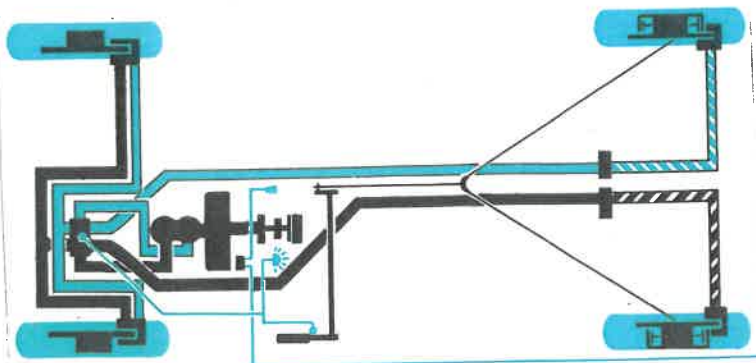
Cooling system

Type	Positive pressure (sealed system)
Thermostat, begins to open at	92°C (cert. markets 87°C)
Fan belts (two) designation	No. 958315 (used on B27 engine to 1976)
Capacity (incl. heating system)	Approx. 8 ltrs.
Fans:	One normal + one electric

DESCRIPTION

BRAKES

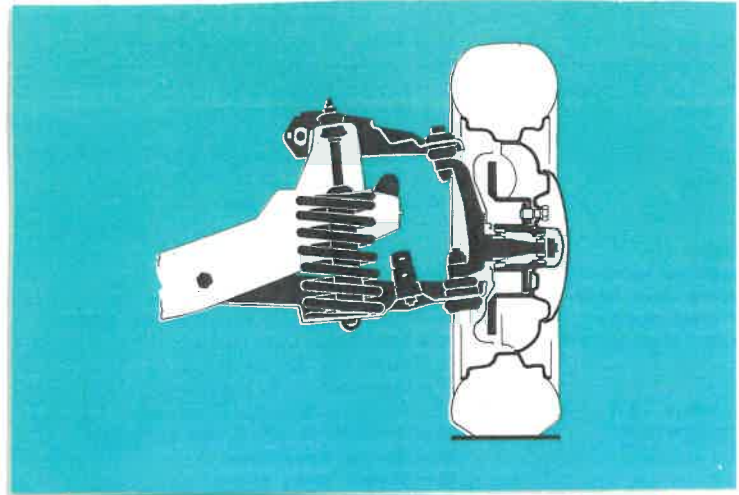
The brake system is of the two-circuit type with disc brakes all round. The system is provided with a tandem-type master cylinder and a directly operating booster cylinder. When the brake pedal is depressed, the master cylinder is operated mechanically via the booster cylinder, this increasing the pedal force about three times. The brake pressure is transmitted hydraulically from the master cylinder through the brake to the wheel cylinders. The pistons in these are then pressed outwards and apply the brake pads. The pressure lines to the rear wheel brakes are provided with a reducer valve which prevents locking of the rear wheels.



The principle of the two-circuit system is that both front wheels are connected to one rear wheel, e.g. should there be a failure in one of the circuits, there is always braking power on both front wheels and the other rear wheel. So at normal pedal pressure the braking effect of one of the circuits is 50%, but when pedal pressure is increased, about 80% of the full braking power can be obtained in the one circuit. This provides maximum safety and prevents lateral dragging and rear-end lurching. With the engine stopped, the booster assists the braking a further two or three times after which the pedal pressure must be increased about three times in order to obtain a braking power corresponding to the braking power available with the engine running. The parking brake operates the rear wheel mechanically as the brake discs have also been designed as brake drums in order to incorporate the shoes for the parking brake.

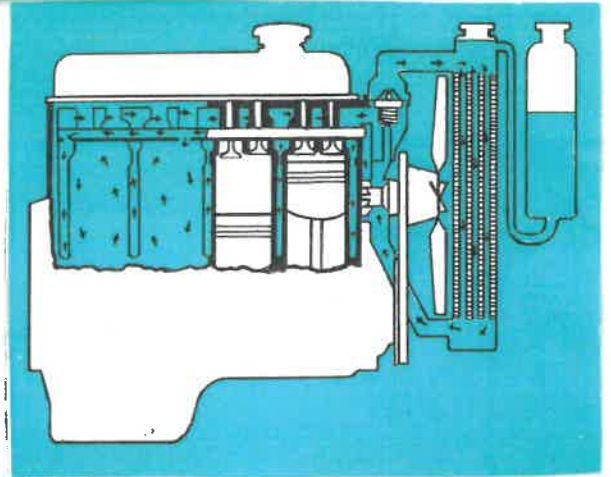
Front suspension

The front suspension units are mounted on a strong box member. The member is bolted firmly to the front section of the chassis. The front wheels are carried in tapered roller bearings. The front springs consist of coil springs in which telescopic shock absorbers are fitted. The car is provided with stabilizers secured to the lower control arms and to the chassis.



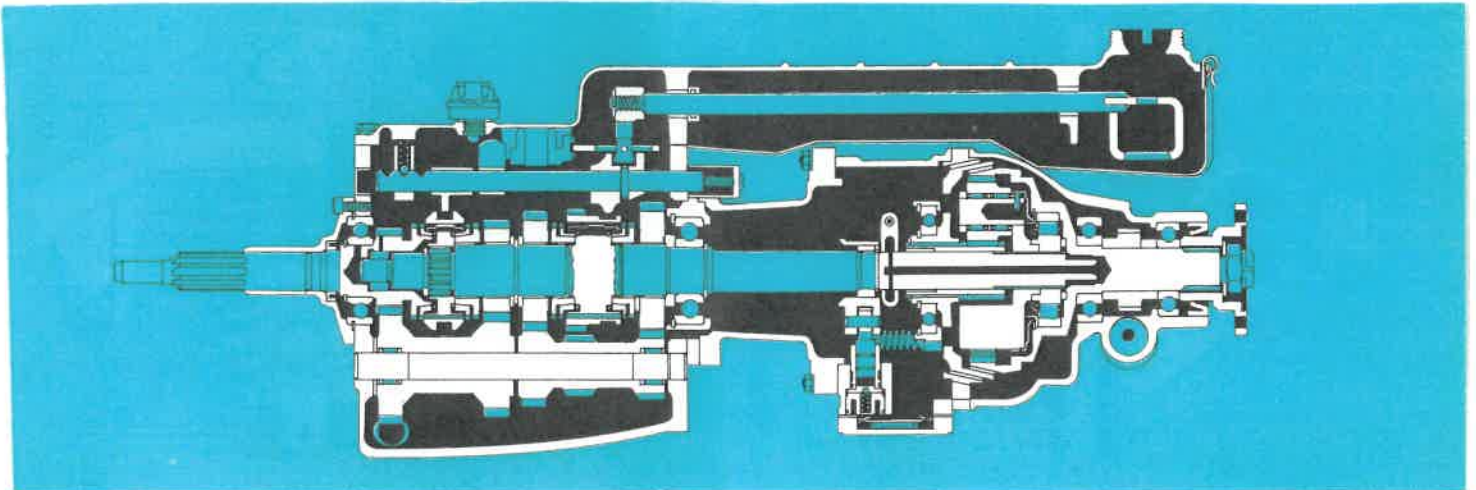
Steering

The steering is of the cam-and-roller type. Movements of the steering wheel are transmitted via the worm on the steering column to the roller on the pitman shaft, which in turn operates the wheels through a linkage system.



Cooling system

The cooling system is of the sealed pressure type and incorporates a circulation pump. A special expansion tank prevents air from circulating with the coolant as this would cause corrosion in the cooling system.

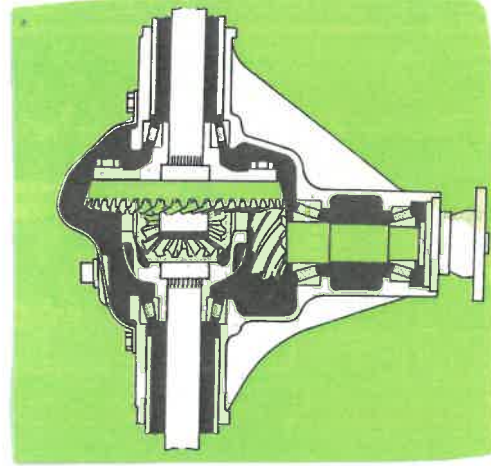


Gearbox

The gearbox has synchronesh on all forward gears. Since the gearbox is fitted with helical gears and gear lever is rubber-insulated, excellent sound insulation is obtained.

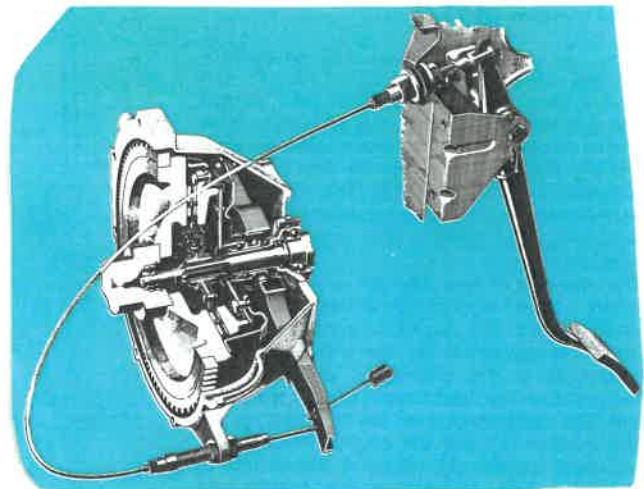
Final drive

Engine torque is transmitted via the propeller shaft to the rear wheels through the rear axle. The rear axle is of the hypoid type, e.g. the drive pinion lies below the centre line of the drive shafts.



Clutch

The function of the clutch is to transmit the power from the engine to the gearbox. The clutch is of the single dry plate type. Pressure on the pressure plate is obtained from a diaphragm spring which in its turn is controlled by the clutch pedal via the throw-out yoke.



8.

ENGINE

Four-cylinder, fluid-cooled, petrol engine.
Cylinder block of special cast iron.
Cylinder liners drilled directly in the block.
Cylinder head of aluminium with separate inlet and exhaust ports.
Single, overhead camshaft.

Lubrication via a gear pump driven from the crankshaft.

Oil filter of the full-flow type.

The cooling system is of the sealed, overpressure type.

Number of cylinders	4
Bore	96 mm
Stroke	80 mm
Displacement	2.32 dm ³ (2.32 l)
Compression ratio	9:0:1
Valve system	Overhead
Valve clearance	
- warm engine, inlet, exhaust	
when adjusting	0.40-0.45 mm
when checking	0.35-0.45 mm
Firing order	1-3-4-2

CAPACITIES

	Litre	Imp gal.
Fuel tank	60	13.2
Cooling system	9.5	2.0
	Litre	Imp Pint
Engine oil		
- incl. filter	3.85	6.8
- excl. filter	3.35	5.9
Turbo-engined cars add 0.6 litre (1 Imp pint) if oil cooler is drained.		
Transmission oil		
- 4-speed gearbox with overdrive (M46)	2.3	4.0
Final drive oil	1.5	2.6

STARTING AND DRIVINGRunning-in a new car

During the running-in period the following speeds should not be exceeded:-

During the first 1,000 km (600 miles):

1st gear	30 km/h (20 miles/h)
2nd gear	55 km/h (35 miles/h)
3rd	80 km/h (50 miles/h)
4th gear	110 km/h (70 miles/h)*

* 130 km/h (80 miles/h), overdrive engaged.

Between 1,000 and 2,000 km (600 and 1,200 miles)

1st gear	35 km/h (20 miles/h)
2nd gear	65 km/h (40 miles/h)
3rd gear	100 km/h (60 miles/h)
4th gear	130 km/h (80 miles/h)**

** 150 km/h (95 miles/h), overdrive engaged.

Warm up the engine as soon as possible

Experience has shown that engines in cars driven short distances with many stops in between wear abnormally quickly. This is due to the fact that the engine is never given opportunity to attain normal operating temperature.

When the engine starts, try to get it up to normal operating temperature as quickly as possible.

Do not let the engine idle for too long a period, but start driving under light load as soon as possible. (See also special instructions for start and stop of Turbo engine).

LIGHT SWITCHESMain lights

2-step tumbler-switch on instrument panel

1st step: Position lights

2nd step: Head lamps also

Left-hand stalk-switch below steering wheel activates the dip switch for the head lamps.

Instrument panel dimmer controls the small lamps in all the instruments.

Wiper

2-step tumbler-switch on instrument panel.

STARTING THE ENGINE

THIS IS HOW YOU START THE ENGINE:

Carburettor engine (OScar Type 1)

Cold engine:

1. Apply the parking brake (handbrake)
2. Gear lever in neutral
3. Turn the ignition key to start the engine. If the engine does not start immediately 'pump' with the accelerator pedal until the engine starts. Release the key when the engine has started.

NEVER RACE THE ENGINE IMMEDIATELY AFTER STARTING FROM COLD !

Hot engine (operating temperature):

1. Apply the parking brake (handbrake)
2. Gear level in neutral
3. Depress the clutch pedal
4. Slowly depress accelerator pedal fully
5. Turn the ignition key to start the engine. If the engine does not start immediately, keep the accelerator pedal to the floor until the engine starts. Release the key when the engine has started.

WARNING !

Before starting your car, always open the garage doors. The exhaust gases from the engine contain carbon monoxide which is poisonous and particularly dangerous since it is invisible and odourless.

OScar Type 2

1. Do not 'pump' with the pedal. The automatic choke takes care of all, both for cold and hot engine.
2. Do not 'race' a cold engine for the first 2. min. after starting, it is important for a Turbo-engine to be warmed up properly before any hard use.
4. Also remember always to let a Turbo-engine idle for a couple of minutes after any 'hard' trip, it is equally important to let the Turbo-unit cool down before stopping the flow of cooling oil by stopping the engine.

Driving and steering

At the specified kerb weight, your car has a tendency to understeer. This is counteracted when rounding bends by turning the steering wheel more.

This should ensure stable driving and reduce the risk of rear wheel skids.

Remember that these properties can alter depending on how the car is loaded.

The pressure in the tyres is also of the greatest importance with regard to the car's operation. We would advise you not to experiment too much with the air pressure but follow our recommendations.

We advise you not to fit different types of wheels, for example, radial and diagonal, or even tyre makes, since this can alter the handling of the car considerably.

Cooling system while driving

The risk for overheating is greatest, especially in hot weather, when:

- driving up steep inclines for prolonged periods at full throttle.
- slow stop-start driving in heavy traffic.

- stopping the engine suddenly after high-speed driving, so-called afterboiling.

To avoid overheating, the following rules should be followed:

- Reduce speed and change down when driving up long steep inclines. If the car is fitted with air conditioning, the risk of overheating can be reduced by switching off the air conditioning system for a short while.
- Do not let the engine idle unnecessarily.
- Do not stop the engine immediately after high-speed driving, but allow the engine to idle for 1/2-1 minute before switching off.

When the risk of overheating is imminent, or in the event of overheating (the temperature gauge goes repeatedly into, or stays continually in, the red field) the following precautions should be taken:

- Switch off the air conditioning system, if fitted.
- Stop the car and put the gear lever into neutral position
DO NOT STOP THE ENGINE !
- Increase the engine speed to approx. 2.000 r/min (twice idling speed).
- check level of coolant (see page 12)

GEAR CHANGE

Gear lever positions

Depress the clutch pedal fully when changing gear.

Reverse gear inhibitor

Reverse gear cannot be engaged until the ring under the gear lever knob is first pulled up towards the knob. The ring, therefore, prevents engaging reverse unintentionally.

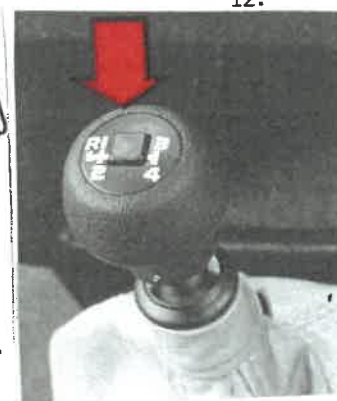
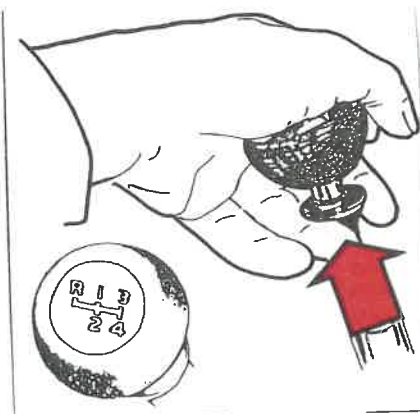
To engage (or disengage) overdrive

The overdrive can only be engaged in 4th gear. It is engaged by pressing the button on the top of the gear lever.

Overdrive light in upper part of instrument panel goes on when overdrive is engaged. If the button is pressed once again, the overdrive will be disengaged. Even though the overdrive is disengaged automatically when changing down, we do however recommend that you get used to disengaging it with the button, to avoid sharp 'jolt' at high speed.

THE CLUTCH PEDAL SHOULD BE DEPRESSED WHEN ENGAGING/DISENGAGING THE OVERDRIVE TO FACILITATE A SMOOTH CHANGE OVER.

The overdrive can be used as much as possible, at speeds in excess of 70 km/h (45 miles/h), for good fuel economy).



- NB 1: The overdrive will automatically disengage if the gear lever is moved out of 4th position.

(Only Type 1)

- NB 2: An outside hose connects on Type 1 the oil pump for the overdrive with the sump on the main gearbox. This is a special 'OScar' modification due to the slight forward inclination of the crankshaft line on Type 1.

The banjo-bolt in the main gearbox sump has to be removed if the oil has to be drained.

It is recommended to avoid removal of the rear banjo-bolt, or to do this with great care to avoid 'stripping' of the thread in the aluminium housing.

To open bonnet

Pull handle hidden underneath steering column.
Use support-rod to keep bonnet open.

To open luggage room ('boot')

1. Via electric remote control:
Switch on ignition and activate black push-button switch next to ignition key.
2. Via manual 'emergency system':
Pull hidden ring under left-hand rear wing.
3. Some OScar's have a manual locking-handle only on the boot lid).

Use support-rod to keep boot-lid open.

To close boot

First, use black handle to position lid correctly over the lock, then push down really hard with two hands on top of boot lid.

WARNING ! Do not use the two no.plate lamps as 'handles', they are not strong enough.

Hood and windows (Type 1)

- (1): Fit the two halves (right and left side) of the hood sticks together and stick the ends down in the two black plastic sockets, one behind each door opening.

The main-hood stick will incline towards the rear.

- (2): Hood has a steel bar sewn into the rear edge. Slide this steel bar under the two chrome 'hooks' on the 'rear deck' behind the cockpit. (To do it properly please look from inside while you slide the rear edge of the hood in position).
- (3): Button the hood onto the rear hood stick cross bar.
- (4): Button front of hood onto the top of the screen (start in the middle !).
- (5): Button the remaining buttons (on the rear deck).
- (6): Fix the side screens on the doors. When closing a door, please try slowly the first time, to ensure all fits well, do not 'bang' the door.

Do not use hood without sidescreens at high speed, if you do, the hood might blow off.

Removal of hood and side screens are carried out by repeating the above process in verse. Do remember to insert the side screens in the protective bag, and be carefully when folding the hood avoiding damage to the sewn-in 'windows'. The external push-buttons are opened by pulling the centre section only upwards.

Hood and windows (Type 2)

- (1): Assemble the hood-frame (which is divided in a right-hand and a left-hand section) and position it in the 'hood-frame-sockets' behind the seats (do not yet insert the chain-fastened crosspins!).
- (2): Position hood in front of the windscreen with the underside upwards.
- (3): Insert the thin and exposed steelstrip (which is attached to the forward edge of the hood material) in the downwards-pointing groove along the top edge of the windscreen frame.
- (4): Swing the hood back over the windscreen and frame. Position the heavy steel bar, which is sewn into the rear edge of the hood material, under the two chromed hooks on the top of the body behind the cockpit.

- (5): Fasten hood inside on the two hoodframe cross bars with the (many) push buttons. Afterwards position the two short (loose) lengthwise tubes running from the main-hoodframe to the top of the windscreen.
- (6): Press external buttons on the hood in position on the body behind the cockpit. First press down on outer part of each button and afterwards on center part of button.
- (7): Raise the hood frame sufficiently to insert the two chain-fastened crosspins above the sockets.
- (8): Fasten side screens using the big 'knurled' chromed nuts on the inside of the doors (make sure that you press the side screens well down in position, while you tighten the 'knurled' nuts).

Removal of hood and side screens are carried out by repeating the above process in verse. Do remember to insert the side screens in the protective bag, and be carefully when folding the hood, avoiding damage to the sewn-in 'windows'. The external push buttons are opened by pulling the centre section only upwards.

BRAKE SYSTEM while drivingIf the brake servo does not function

THE BRAKE SERVO ONLY FUNCTIONS WHEN THE ENGINE IS RUNNING. If you push-start your car or have it towed, you must depress the brake pedal 3 or 4 times harder than when the engine is running.

Driving with the choke out causes a deterioration in the power of the servo. THE BRAKE PEDAL IS STIFF AND HARD WHEN THE BRAKE SERVO IS NOT FUNCTIONING.

Failure in one of the brake circuits

THE BRAKE FAILURE WARNING LIGHT WILL THEN GO ON.

The brake pedal feels easier to depress and goes down slightly further. However, you do not need to depress the brake pedal harder in order to get normal braking.

IF THE WARNING LIGHT GOES ON : DRIVE TO A WORKSHOP AND HAVE THE BRAKE SYSTEM CHECKED.

Moisture on brake discs and brake linings alters the braking properties !

When you drive your car in heavy rain or through pools of water and when washing it, water can splash onto the brake linings. This

can alter the friction properties of the brake linings so that a certain delay in braking effect can sometimes be noticed.

If you drive long distances in rain or slush, you should depress the brake pedal lightly now and again, in order to heat up the brake linings and remove the moisture on them. This should also be done after washing the car and after starting in very damp weather.

How to avoid severe use of the brakes

Driving in the Alps or in other hilly country with corresponding differences in altitude exposes the car brakes to severe use. Since also the speed is often low at the same time, the brakes are not so effectively cooled compared to hard driving on a level road. To avoid unnecessary overloading of the brakes we recommend that, instead of using the foot-brake, you change down on downhills and use the same gears as you would use when driving uphill.

Parking brake (= handbrake)

The parking brake lever operates on the rear wheels only. When the parking brake is applied and the ignition is on, a red warning light shows on the instrument panel.

Remember that the footbrake warning system is also connected to this light.

SHOULD THE LIGHT SHOW WHEN THE PARKING BRAKE IS NOT ON, THIS MAY BE DUE TO A FAILURE IN ONE OF THE BRAKE CIRCUITS. IF THIS IS THE CASE, DRIVE IMMEDIATELY (BUT WITH DUE CARE) TO A WORKSHOP FOR A CHECK.

Starting the engine by towing :

The towing car is started and driven at an even speed. Towed car: switch on the ignition (pull out the choke if the engine is cold). Depress the clutch pedal, engage 3rd or 4th gear, wait until the car has picked up speed and gradually take your foot off the clutch pedal. As soon as the engine starts, depress the clutch pedal.

Always remember the following when about to tow !

- Unlock the steering wheel in order to steer the car!
- Bear in mind regulations concerning max. permissible speed when towing!
- Also bear in mind that the servo assistance provided by the footbrake does not function when the engine is not running! so you have to depress the brake pedal 3 or 4 times harder than is the case when the engine is running!
- Drive as smoothly as possible. Try to keep the towline stretched in order to avoid unnecessary jerking.

Changing wheels

Several types of wheel are available. The procedure for changing is, however, the same irrespective of type.

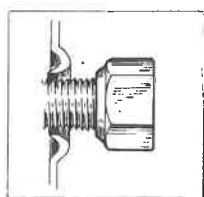
The jack and the tool kit are stored to the left in the luggage compartment. The spare wheel is in a well under the boot-floor.

Apply the parking brake and engage 1st gear or reverse. Place chocks in front of and behind those wheels which remain on the ground.

Remove the hub emblem with a screwdriver from the tool kit and then remove the ring plate by hand.

Slacken the wheel nuts 1/2-1 turn with the box wrench (slackened clockwise).

Tyre pressure: 30 ps front & rear



- Apply the parking brake , engage 1st gear or reverse
- Place chocks in front of and behind the wheels still on the ground! Use thick wooden blocks or large stones for this purpose.

If the car is hoisted with a workshop hoist or jacked up with a workshop jack, the four jack points (two on each side as illustrated)

must be used. They are specially reinforced for this purpose.

If a workshop jack is used, it can be placed under the rear axle casing or under the front axle member between the front wheels.

Make sure that the jack is securely positioned so that the car does not slide off it when jacked up.

Always use the jack supports or similar.

NOTE! NEVER PLACE A JACK UNDER A STEERING ROD OR THE ENGINE OIL SUMP.

WARNING !

- The jack must stand on firm ground level.
- Never crawl under the car when it is jacked up!
- The jack supplied with the car is only intended for use when changing wheels. With any other work requiring the car to be in a jacked-up position, use a garage jack and place axle stands or blocks under the car where it is to be raised.

Starting with an auxiliary battery

If for some reason the battery in your car has become discharged, it is possible, in order to start the engine, to "borrow" current either from a separate battery or from another car's battery.

In order to avoid any risk of explosion we recommend that you proceed exactly as follows:

1. Ensure that the auxiliary battery has a voltage rating of 12 V.
2. If the auxiliary battery is located in another car make sure that the cars do not touch each other.
3. Connect one end of the red cable to the +pole (red coloured, P or +) of the auxiliary battery. always check that the clamps are securely attached, so that no sparks can occur during the start attempts.
4. Connect the other end of the red cable to the +pole of the discharged battery.
5. Connect one end of the black cable to the -pole (coloured blue, N or -) of the auxiliary battery.

6. Connect the other end of the black cable to a point (earth point) which lies a short distance from the battery, i.e. the earth strap between the engine and the body.
7. Start the engine of the assisting car. Allow the engine to run for a few minutes at a higher idle speed than normal, approx. 25 r/s = 1 500 r/m.
8. Start the engine of the car which has the discharged battery.
NOTE ! Do not move the clamps during the start attempt (risk for sparks) and do not lean over the batteries !
9. Remove the cables in the exact reverse order to which they were attached.

Check the battery electrolyte level

The electrolyte level should be checked regularly. A suitable time to do this when the fuel tank is being filled. The electrolyte level should be 5-10 mm (3/16-3/8") above the top of the cell plates. If the level is too low, top up with distilled water. Never check the electrolyte level by lighting a match. The gases formed in the cells are highly explosive.

COLD WEATHER, LONG -DISTANCE TRIPSCold weather (below zero temp. risk)

If you yourself wish to check your car in order to avoid unnecessary trouble before the approach of the cold season, the following advice is worth noting:

1. Make sure that the glycol additive in the engine cooling system is approx. 50%. This provides protection against freezing down to about -35° C (-31°F).
See page 25 with regard to changing the coolant.
2. Try to keep the fuel tank well-filled as much as possible in order to prevent condensation water forming in the fuel tank.
Also use (if appropriate for your car engine) a suitable carburettor deicer, which should be added before filling with petrol.
3. Use less viscous oils for the engine lubricating system in order to avoid starting difficulties.
See oil recommendations on page 8.

4. The battery has to stand up to greater stresses during the winter than during the summer, since lighting, etc. is used more. In addition, the capacity of the battery decreases with the temperature.
Check the battery capacity and grease the battery terminals.
5. During the wintertime, never park with the handbrake applied, but engage first gear or reverse instead and preferably block the wheels.
6. To prevent icing in the windscreen reservoir, fill it with anti-freezing fluid (use Volvo washing fluid). This is important since dirt and water are often splashed up on to the windscreen during winter driving, and this requires frequent use of the washers and wipers.
Suggested washer fluid mixtures:
Down to -10°C 1 part washer fluid 4 parts water
- - -14°C 1 - - - 3 - -
- - -18°C 1 - - - 2 - -
- - -28°C 1 - - - 1 - -

To avoid being confronted with frozen door locks "lubricate" them in good time with anti-freezing lubricant.

Before a long-distance trip

If you are thinking of taking your car on a fairly long journey, have it fully checked. It is always a good idea to ensure that you have, at least on a small scale, the most essential spare parts. Many workshops have special kits for this purpose (bulbs, fuses, etc.).

If you prefer to look over your vehicle yourself, the following hints are worthwhile noting:

- Check that the engine is running smoothly and the fuel consumption is normal.
- Check the engine and drive with a view to oil, coolant and fuel leakage.
- Check the condition and tension on the drive belts. Replace worn belts.
- Check the condition of the battery and electrolyte level.
- Check the tyres thoroughly, including the spare tyre. Replace those that are unreliable.
- Have the brakes, front wheels and steering checked.

- Check the lighting

- Check the tool equipment.

A warning triangle is necessary when travelling in certain countries.

If you are going to travel abroad your OScar dealer will be pleased to supply you with a list of OScar and VOLVO dealers.

If you intend travelling to countries where it is difficult to obtain fuel with the recommended octane rating, the engine can be adapted accordingly to a certain extent.

ENGINE OIL

Checking the engine oil level

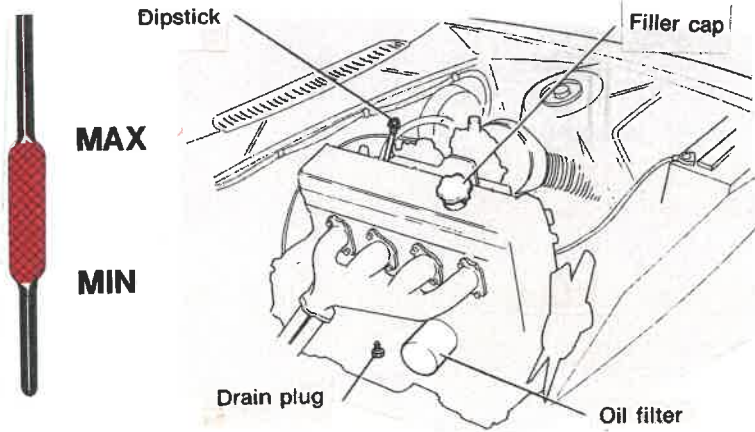
Check the oil level when refuelling. It should be between the marks on the dipstick. The distance between the marks corresponds to about 1 litre (2 pints).

NOTE! Always wipe the dipstick before checking the oil level.

Draining the engine oil

To drain the oil remove the plug in the bottom of the engine sump. The oil should be drained after driving when it is still warm.

OBSERVE DUE CARE SINCE THE OIL CAN BE VERY HOT.



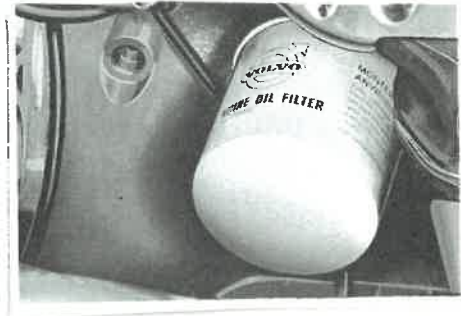
Topping-up with engine oil

When oil has to added, top-up with the same type of oil already used in the engine. Take care not to spill oil onto the exhaust manifold (especially turbo-engined vehicles).

NOTE! do not top-up too much, otherwise there will be abnormal oil consumption.

Changing the oil filter

Change the oil filter when changing the oil of the engine. Scrap the old filter. should only the filter need to be replaced, add about 1/2 litre (1 pint) oil to the engine.



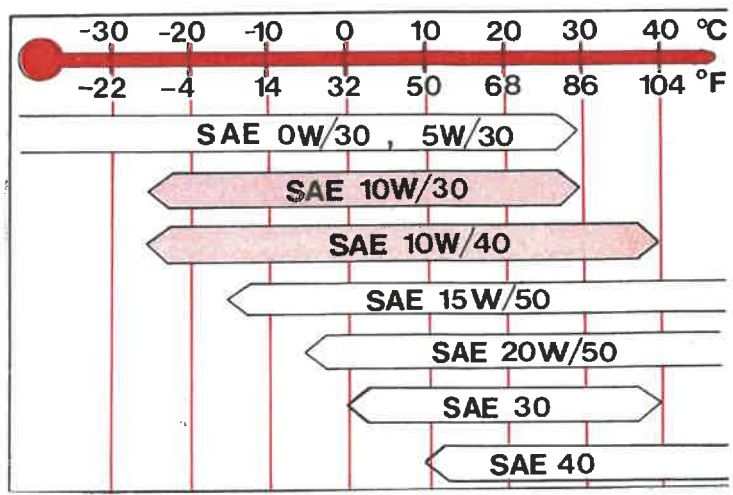
OIL QUALITY (engine)

According to APInot less than SE*
Oils designated SE, SF, SE/CC and SF/CD meet this requirement, but under no circumstances may SE/CD oils be used.
Synthetic or semisynthetic oils may be used if their specifications comply with the above.

Capacity 3.85 litres (6.8 UK pints)(excl. oil filter 3.35 litres 5.9 UK pints).
Turbo-engined cars add 0.6 litres (1 UK pint) if oil cooler is drained.

* SAE 15W/50 or SAE 20W/50 oils are recommended for use in extreme driving conditions which involve high oil consumption and high oil temperatures, e.g. mountain driving with frequent decelerations or fast motorway driving. (Note however the lower temperature limits.)

Viscosity: * Temperature range (stable ambient temperatures)

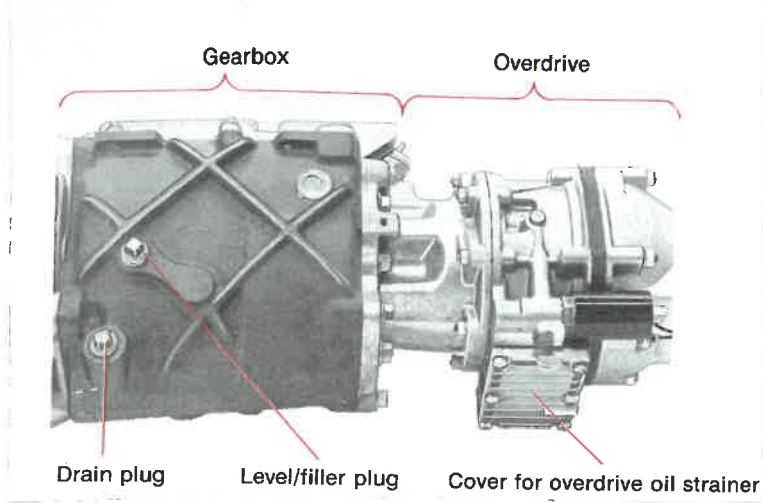


OIL CHANGE: (Mileage or monthly based intervals, whichever occurs first)

Driving conditions	Without turbo	With turbo
Unfavourable (see below)	Each 5,000 km (3,000 mls) or 6 months	Each 5,000 km (3,000 mls) or 6 months
Average	Each 10,000 km (6,000 mls) or 12 months	Each 5,000 km (3,000 mls) or 6 months

Unfavourable driving conditions

- long distance driving in dusty/sandy areas
- long distance driving in hilly terrain
- stop-start driving
- low temperatures below 0°C, driving short distances (less than
- sustained high speed driving



GEARBOX WITH OVERDRIVE (TYPE M46)

The oil should be up to the level plug.

The same oil lubricates both the gearbox and the overdrive.

The oil is drained by removing the drainplug. This should be done after driving when the oil is still warm.

OBSERVE DUE CARE SINCE THE OIL MAY BE VERY HOT.

Oil is added through the level/filter hole.

Additional for cars with overdrive: when changing the oil the oil strainer cover must be removed and the oil strainer cleaned.

WHEN TOPPING-UP MAKE SURE THAT THE OIL RUNS OVER INTO THE OVERDRIVE.

OIL QUALITY:

ATF type F or G (all the year round)

CAPACITY:

Gearbox with overdrive (M46): 2.3 litres (4,0 UK pints)

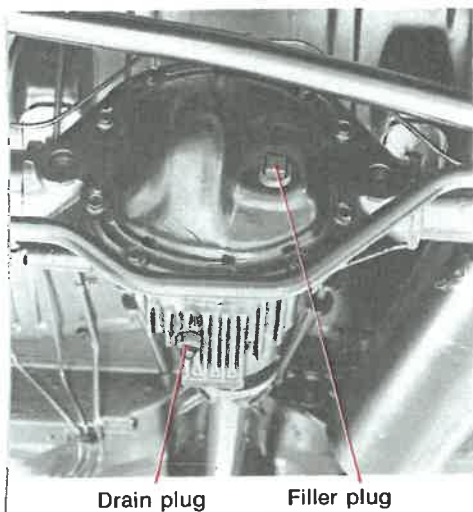
OIL LEVEL CHECK:

Every 10,000 km (6,000 miles)

OIL CHANGE:

Only after the first 1,000-2,000 km (600-1,200 miles)

NB: see page 12 for special oil-change-precaution on type 1.



REAR AXLE

Draining the oil and topping-up

Drain the oil by unscrewing the plug.

OBSERVE DUE CARE SINCE THE OIL MAY BE VERY HOT.

Fill with oil through the filler/level hole.

Checking the oil level - Topping-up with oil

The oil should be level with the filler hole.

Top-up if necessary.

VISCOSITY:

SAE 90 or SAE 80W/90

API-GL-5(MIL-L-2105 B or C)

CAPACITY:

1.5 litre (2.6 UK pints)

OIL LEVEL CHECK:

Every 10,000 km (6,000 miles)

OIL CHANGE:

Only after the first 1,000-2,000 km (600-1,200 miles)

COOLANT:Checking coolant

The coolant level should be between the MAX and the MIN marks on the expansion tank. Add coolant when the level has dropped to the MIN mark. Unscrew the expansion tank cap slowly if the engine is hot in order to allow any excess pressure to escape.

Coolant change:

The coolant must be changed every third autumn providing that the cooling system contains 50% VOLVO anti-freeze and 50% water. Otherwise it should be changed more often.

Draining:

1. Move the heater control to WARM
2. Remove the cap from the expansion tank
3. Open the drain cock on the engine block right-hand side.
4. disconnect the lower hose at the radiator.

Filling:

5. Close the drain cock (see point 3 above) and connect the lower hose (see 4 above)
6. Fill the expansion tank to MAX or a bit over
7. Warm up the engine and check that the cooling system is not leaking and continue adding coolant until the level reaches the MAX mark.

Coolant composition

Use all the year round a mixture of 50% Volvo antifreeze type C (blue-green) and 50% water. NOTE! Different types of coolant must not be mixed.

Never add only water!

The antifreeze prevents corrosion in summer-time and also freezing in the winter time. The car is supplied from the factory with coolant which protects against frost down to -35°C (-31°F).

NOTE !

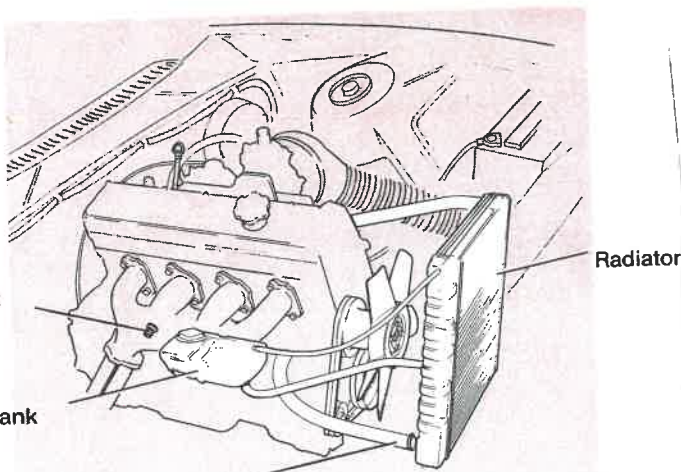
If you live in a warm climate where very cold spells (freezing point at night) do not occur, rustproofing can be mixed with the cooling water instead of anti-freeze.

Cooling system capacity:

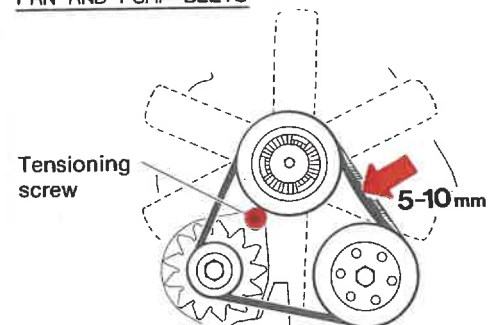
The cooling system holds 8 litres.

Level check:

Check the coolant level when refuelling.



Radiator lower hose

FAN AND PUMP BELTSBelt-tension check

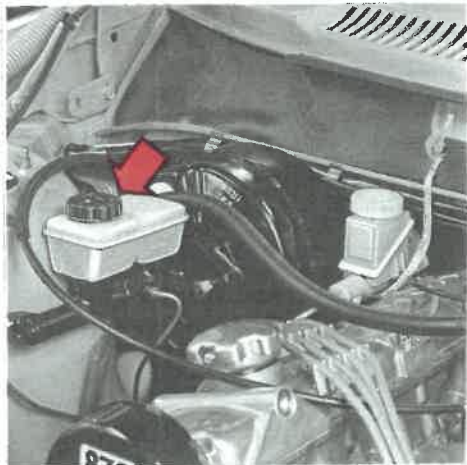
It should be possible to depress the belt 5-10 mm (5/16") midway with normal thumb pressure. The tension on new belts should be checked and if necessary adjusted after every 1000-2000 km (600-1200 miles).

Belt check

Check regularly the belts to make sure they are in good condition and are clean. Worn or dirty belts can cause poor cooling and alternator output as well as impair the power-assisted steering and the air conditioning.

Replacement and adjustment

The belts should be adjusted or replaced by a workshop. In the event only one belt has to be replaced, then both must be changed at the same time.



Brake fluid

The brake level should be above the MIN mark.

Fluid type: Brake fluid

Quality: DOT 4

Fluid volume: 0.4 litres (1 UK pint)

Fluid level check: When refuelling

Fluid change: Every 3rd year.

With continuous driving where the brakes are used very often and severely, e.g. driving in mountainous country, etc. the brake fluid should be changed once a year. This is not included in a 10.000 km (6.000 miles) service but should be done by a workshop in connection with such service.

Steering box

The oil level in the steering box should be checked after every 10.000 km (6.000 miles). the oil level should be up to the filler plug. If necessary, top up with new oil. As a rule, the oil in the steering box does not need to be changed except during overhauling. Should the oil for any reason need to be changed, the old oil should be sucked up by means of an oil syringe which is inserted down into the filler hole.

<u>Oil grade</u>	<u>Viscosity</u>	<u>Oil capacity</u>
	SAE 80	0,25 litre
Hypoid oil	All year round	0.4 Imp.pint 0.5 US pint

This car is fitted with an alternator

When changing the battery or when carrying out work involving the electrical system the following should be observed.

1. A battery connection to the wrong terminal will damage the rectifiers. Before connections are made, check the polarity of the battery with a voltmeter.
2. If assist batteries are used for starting they must be properly connected to prevent the rectifiers from being damaged. The negative lead from the assist battery for starting must be connected to the negative terminal stud of the car battery and the positive lead from the assist battery for starting to the positive terminal stud.
3. If a rapid charger is used for charging the battery, the car battery leads should be disconnected. A rapid charger may be used as an aid in starting (does not apply to B20F), but should be switched off when being fitted and the leads disconnected.
4. Never disconnect the battery circuit (for example, to change the battery) while the engine is running, as this will immediately ruin the alternator. Always make sure that all the battery connections are properly tightened.
5. If any electrical welding work is to be carried out on the vehicle, the ground lead and all the connecting cables of the alternator must be placed as near the welding point as possible.

SERVICINGDo-it-yourself

There is some servicing work which you can do yourself, e.g. checking oil levels, changing oils etc. These and those small repairs which every driver encounters, for example changing a bulb, a fuse, a wheel are subsequently described in this manual.

More detailed descriptions of repairs and adjustments are contained in our service manuals which you can

BEAR IN MIND

- A 10.000 km (6.000 miles) service is needed in order to keep your car in good trim both from a traffic and an operational point of view.
- A neglected 10.000 km (6.000 miles) service can result in your car emitting exhaust gases harmful to the environment.
- Servicing is best done by an OSCAR or a VOLVO workshop since it has personnel familiar with the products. VOLVO special tools and reliable service literature.

SOME OF THE SERVICE WORKValves

The valve clearance should be checked after every 10.000 km (6.000 miles).

The check should be carried out in a workshop.

Compression test

To get some idea of the condition of the engine, a compression test should be carried out after every 10.000 km (6.000 miles). This test should be carried out in a workshop.

Clean and adjust spark plugs

Remove the spark plugs after every 6.000 miles (10.000 km) and adjust the electrode gap. The gap should be 0.028-0.032" (0.7-0.8 mm).

Change spark plugs

The spark plugs should be changed every 12.000 miles (20.000 km).

Tightening should preferably be done with a torque wrench. When fitting new plugs, be sure to fit the right type (see page

Ignition system

The ignition contact breaker gap and the engine ignition timing should be checked every 6.000 miles (10.000 km). All adjusting work should be done by a workshop with the proper equipment. The distributor is one of the most sensitive units in the engine and careless handling can lead to decreased engine output and high fuel consumption or even serious damage to the engine.

Checking and adjusting idling speed, rapid idle and choke

These checks should be made every 12.000 miles (20.000 km) by an authorized workshop.

Air cleaner

The air cleaner consists of a replaceable paper insert, which should be replaced every 30.000 km. With continuous driving in dusty conditions, it may be necessary to change the cleaner more often. No kind of cleaning whatsoever should be carried out between the above intervals.

Check headlight alignment

The alignment of the headlights should be checked in a workshop after every 10.000 km (6.000 miles).

Fuel filter

The fuel filter should be cleaned after every 6.000 miles (10.000). Loosen the screw, remove the cover and the filter and clean them. Check that the gasket is not damaged and make sure that it seals properly when the cover with filter is refitted.

Check the state of charge of battery

The state of charge of the battery should be checked after every 10.000 km (6.000 miles). The check is made with the help of a hydrometer which shows the specific gravity of the battery acid. See page
At the same time, check the lead terminals and terminal studs to make sure they are tight, coated with grease and that the battery is firmly fixed.

ELECTRICAL WIRING & SYSTEMWIRES

- are all numbered (see enclosed list).
All Earth-connections have a zero (0) in front of the number and these wires are all BLACK.

Example: 35 (red) + to fan switch
035 (black) Earth to fan motor

Earth terminal: is positioned in centre of electrical panel under scuttle and in front of instrument panel.

Extra equipment: (f.inst. air-condition) has no numbers on the wires.

General:

The whole system is based on the fusebox and junction box from VOLVO 340 (1981 to 83), and all numbers refer to these units.

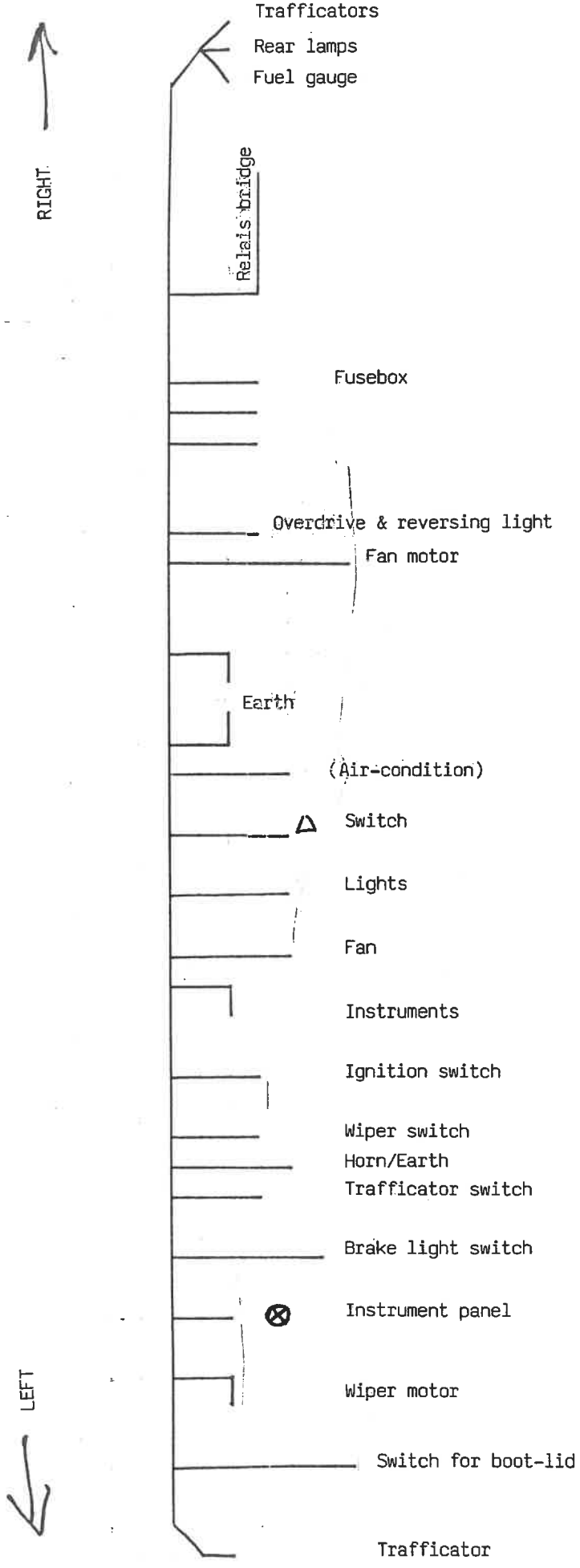
Arrows on wires always point towards Earth "through the consuming unit".

Oscar WIRING-SYSTEM

All wires are numbered after the following system:

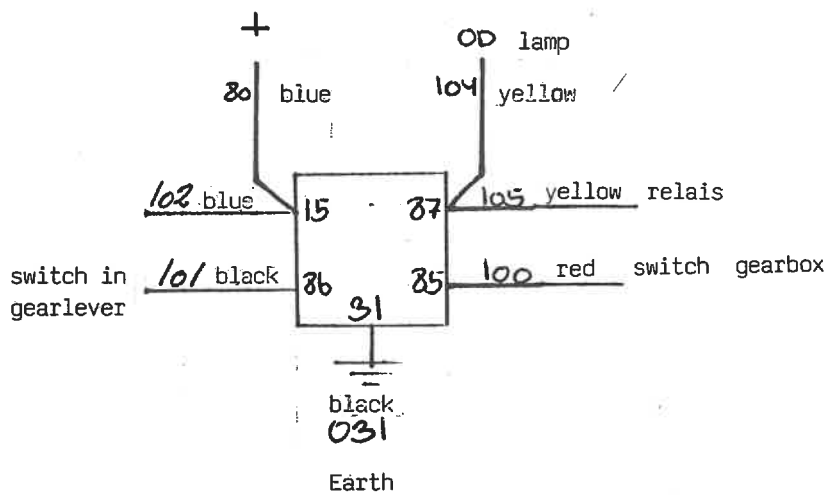
3 (green)	+ on coil	70 (green)	hazard-light-switch
4 (brown)	horn push -	71 (red)	water-temp-gauge *
7 (red)	generator D+	72 (red)	+ for instrument panel lamps
11 (yellow)	starter relais	73 (black)	gearbox-switch for reverse light
12 (black)	oil temp. pick-up	74 (yellow)	brake-lights
16 (white)	parking light LH side	78 (white)	rear lamp LH side *
17 (white)	rev.counter	79 (grey)	- - RH - *
18 (grey)	low headlight LH side	80 (blue)	+ to relais "bridge"
19 (red)	high - - -	81 (green)	trafficator LH side *
20 (blue)	oil pressure pick-up	84 (black)	earth to relais in fusebox
21 (green)	trafficators LH side	85 (red)	+ to fan switch (heater) *
24 (yellow)	+ to horn	86 (blue)	trafficator RH side *
28 (red)	water temp. pick-up	87 (blue)	wiper motor and switch *
31 (green)	wiper switch	88 (red)	+ to boot lock & luggage room light *
35 (grey)	low headlight RH side	98 (brown)	impuls for bootlid lock
36 (grey)	parking light	98 (green)	from 15 (R) on ignition switch to bootlid switch
37 (blue)	trafficators - -	100 (red)	earth for overdrive switch on gearbox
43 (red)	high headlamps RH side	101 (black)	overdrive switch in gearlever
47 (brown)	horn push *	102 (blue)	- - - -
48 (red)	+ to ignition key	104 (yellow)	- - lamp in panel
50 (black)	+ from ignition key	105 (yellow)	- relais in gearbox
52 (red)	amp.meter-lamp	107 (red)	fan motor
53 (yellow)	from ignition switch to starter	108 (yellow)	- -
54 (brown)	high headlamps signal *	109 (green)	fuel-gauge-units
55 (grey)	light-switch low/high	111 (white)	switch for instrument panel lamp
57 (blue)	- - +	115 (brown)	wiper motor
58 (white)	- - parking lights	200 (black)	generator B+
59 (green)	oil pressure warning light	201 (red)	starter B+
60 (blue)	ignition switch to relais	202 (red)	to "90" on fusebox
61 (white)	rev.counter *	207 (red)	+ to all instruments in panel
62 (black)	wiper switch *		
63 (white)	parking lights-lamp (in instr. panel)		
64 (yellow)	trafficator switch		
64 (white)	hazard light switch		
64 (red)	relais for overdrive *		
65 (green)	instrument panel light *		
67 (brown)	handbrake		
67 (blue)	brake failure warning lamp *		
69 (brown)	lighter *		

*) wire in question goes to fuse box.

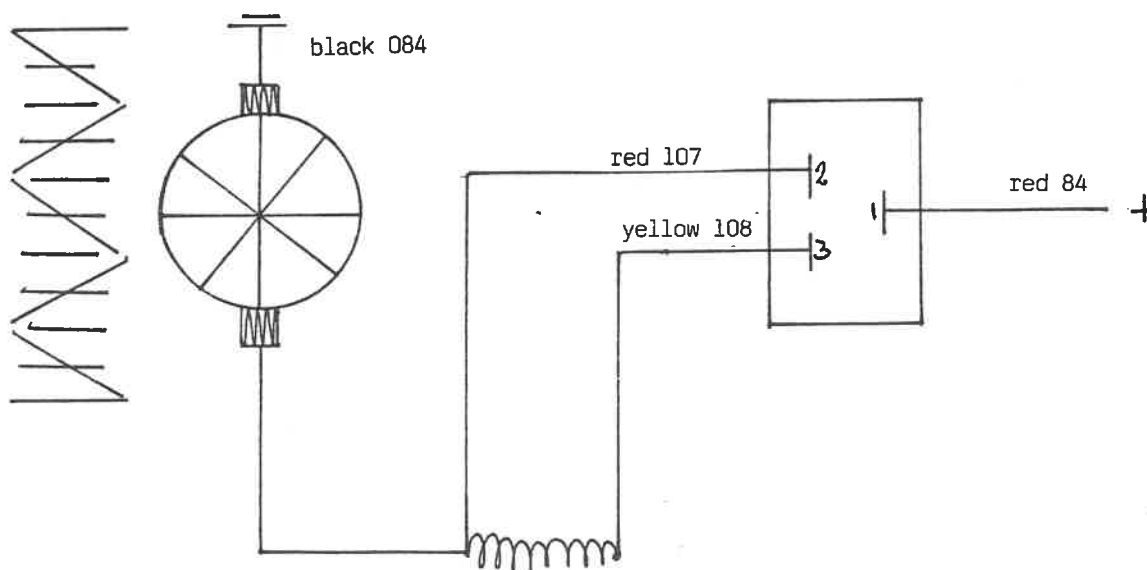


LAY-OUT OF ELECTRICAL PANEL UNDER SCUTTLE IN FRONT OF INSTRUMENT PANEL

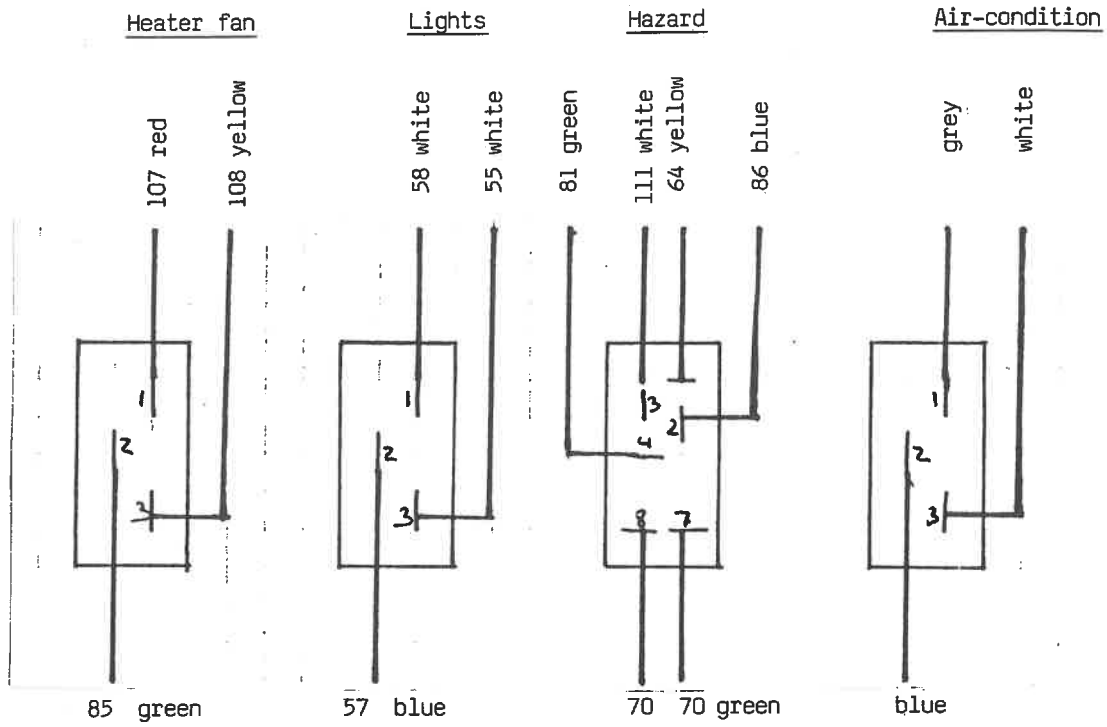
OVERDRIVE SYSTEM



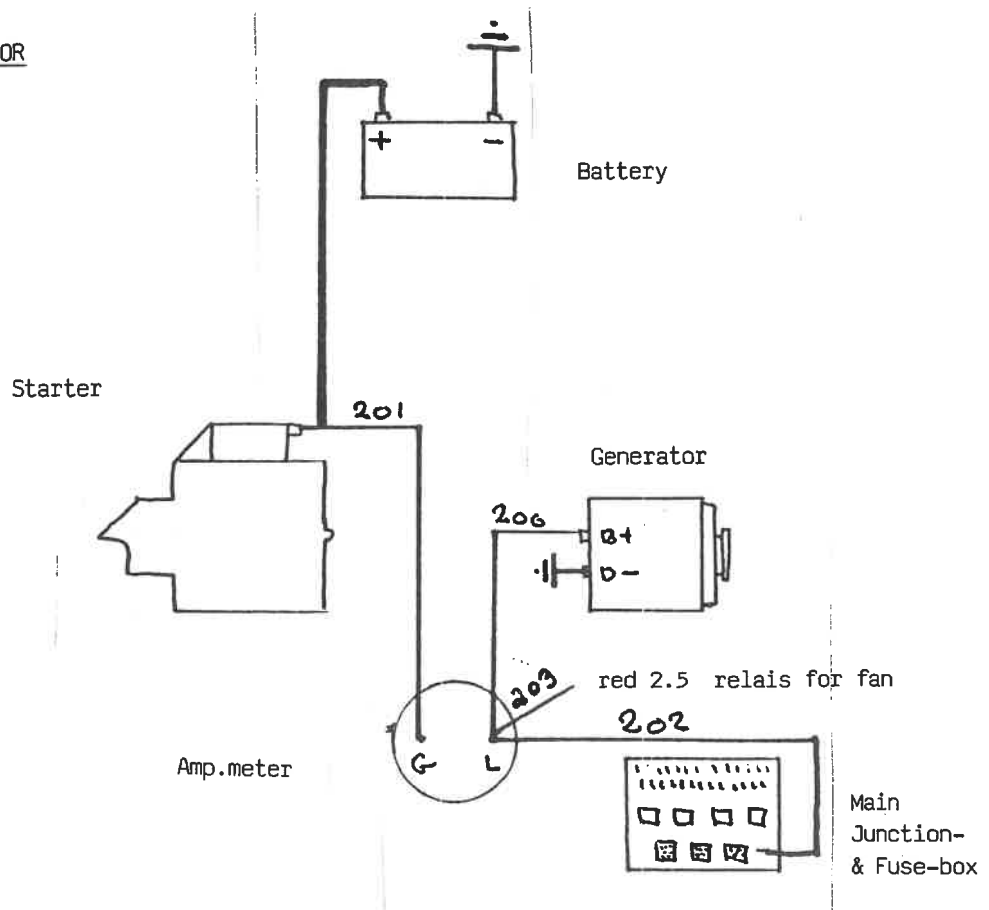
Heater Fan



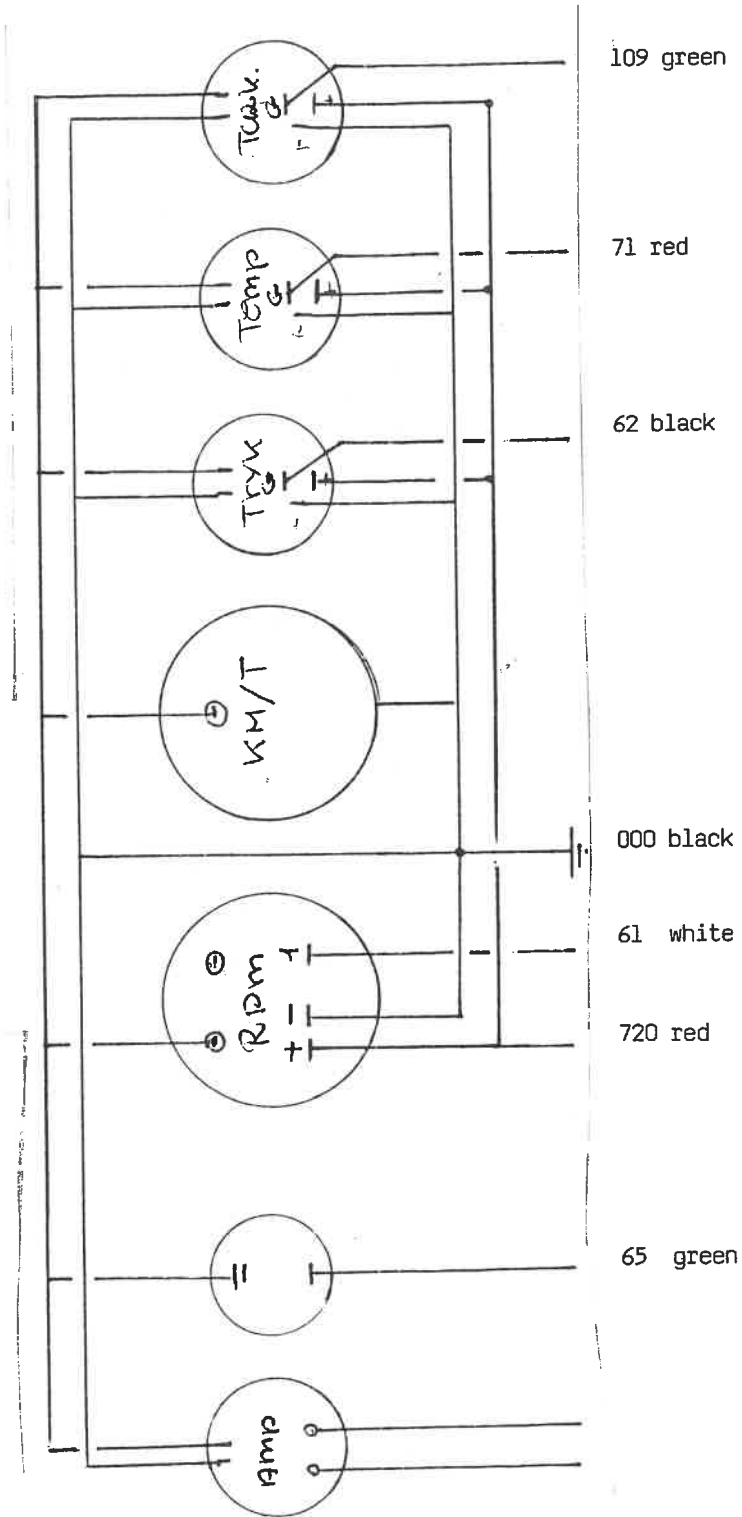
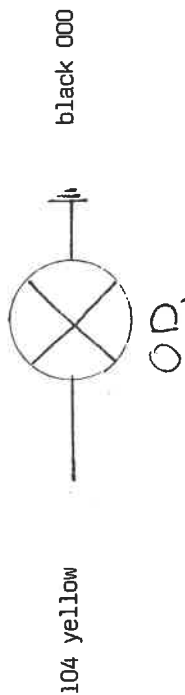
SWITCHES ON INSTRUMENT PANEL

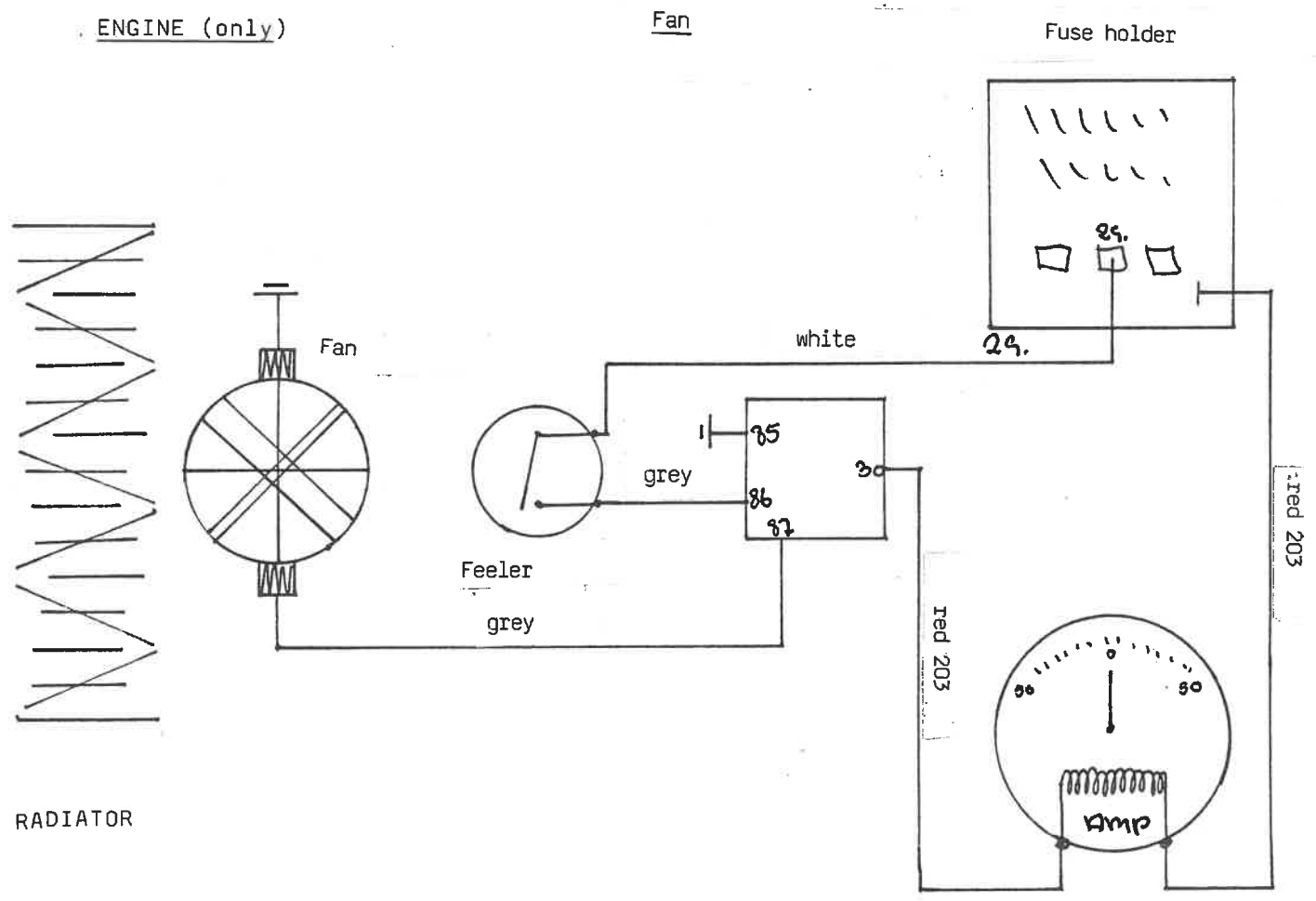


STARTER AND GENERATOR

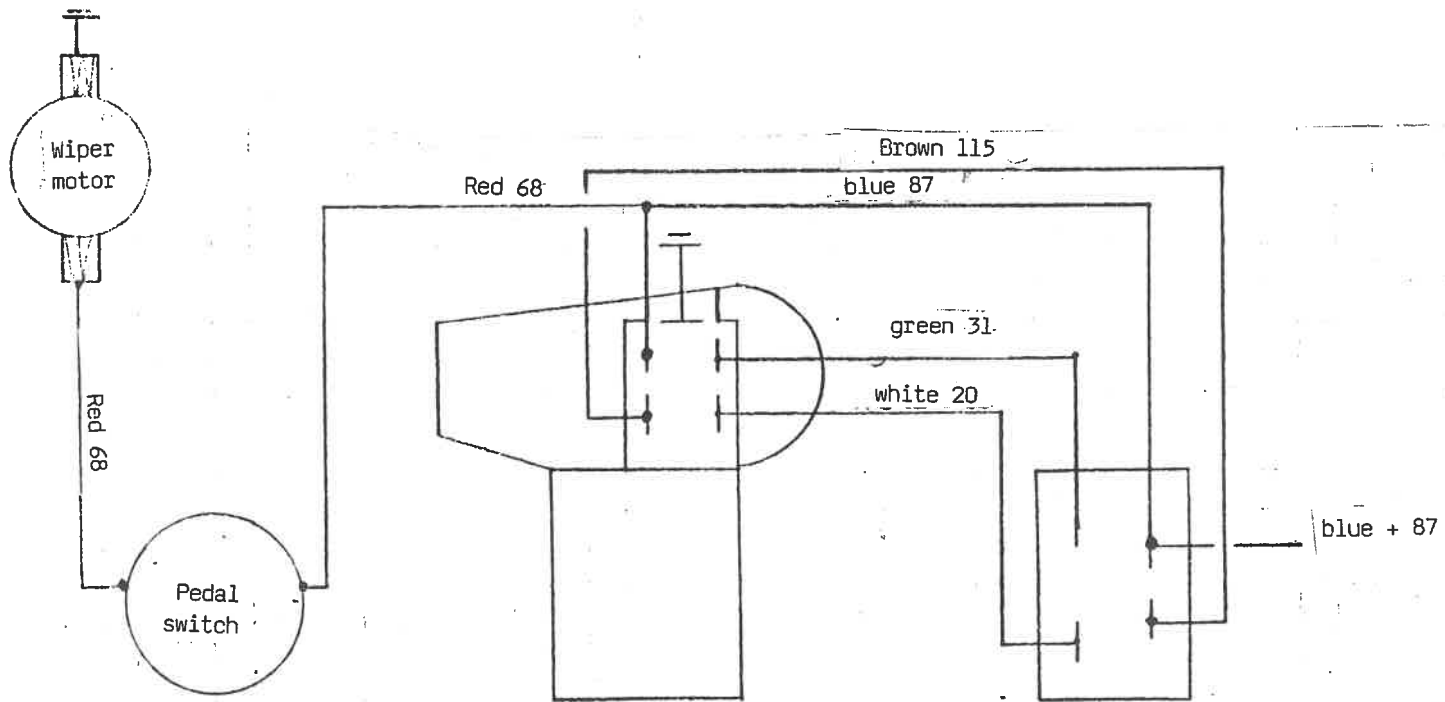


INSTRUMENTS



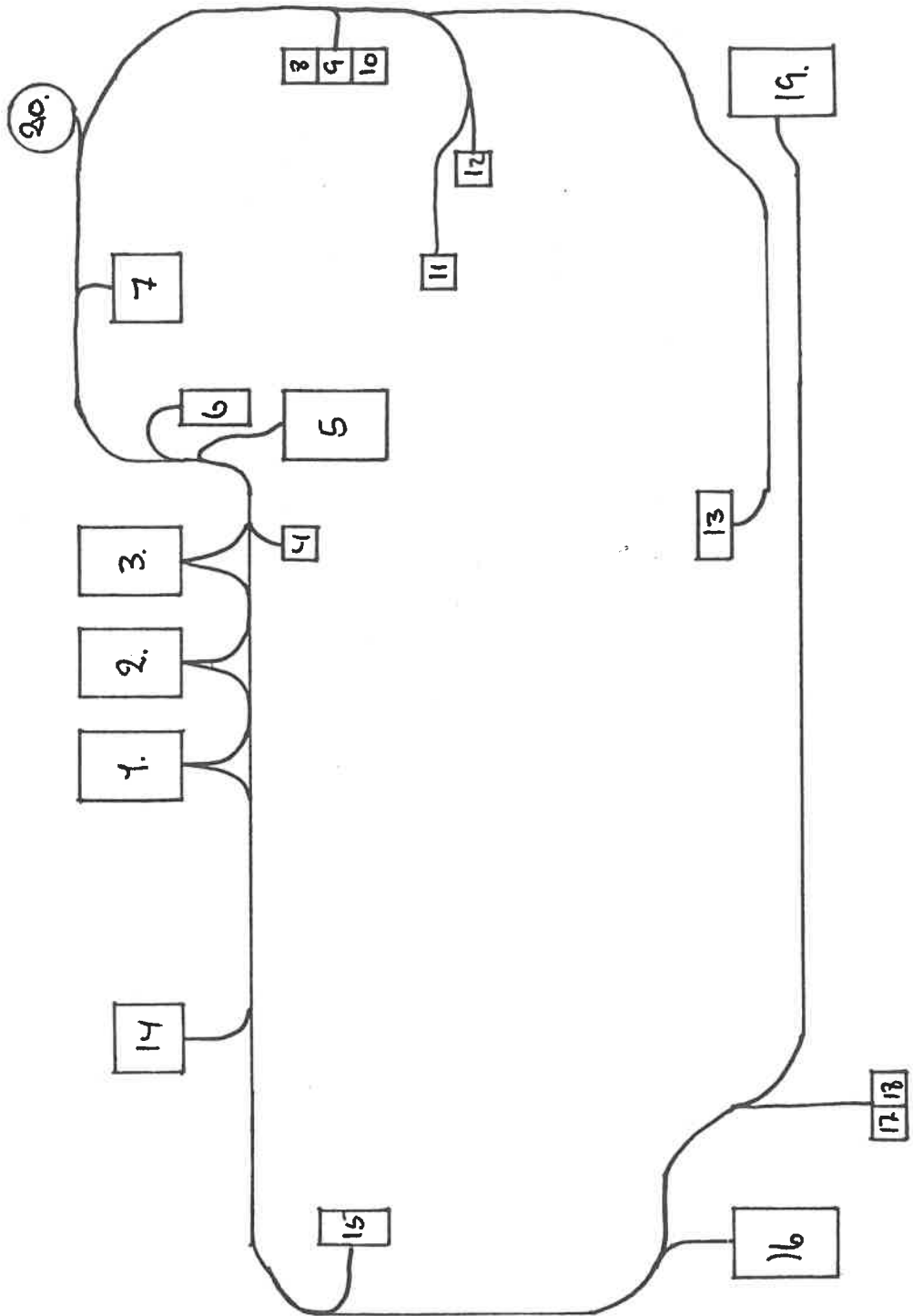


Wiper System 84 OScar Type 2



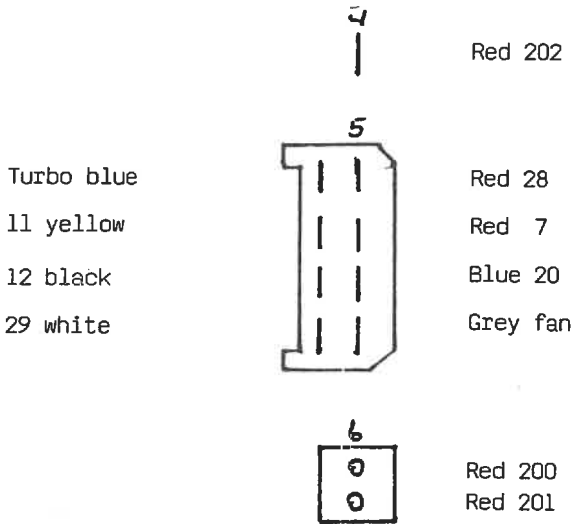
All wires 1.5 D

Wire-loom forward part of car

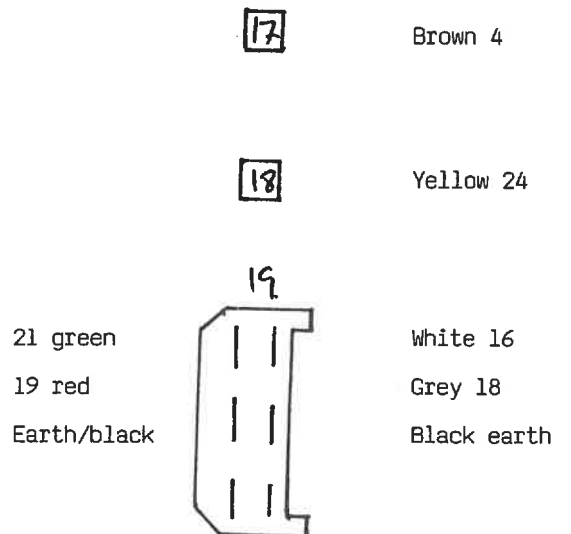
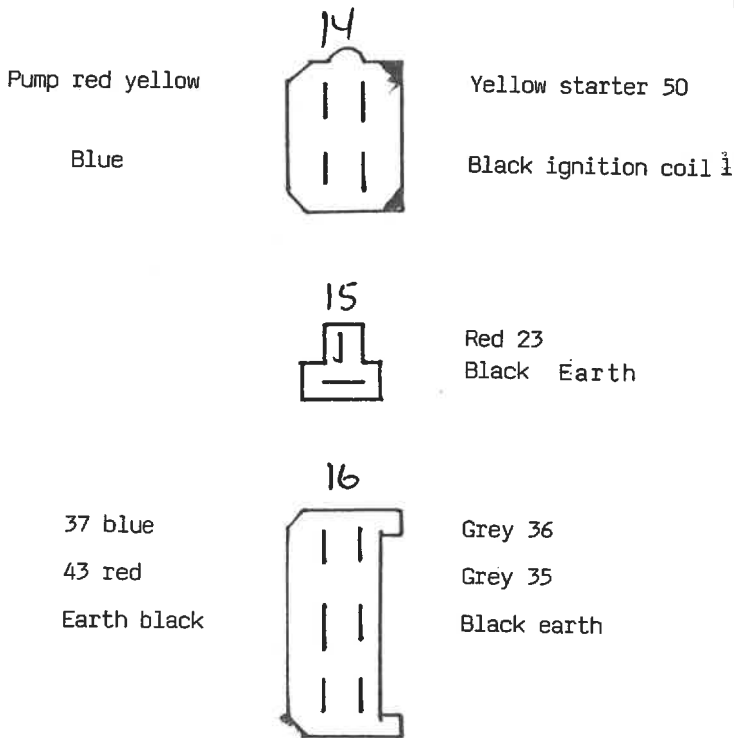
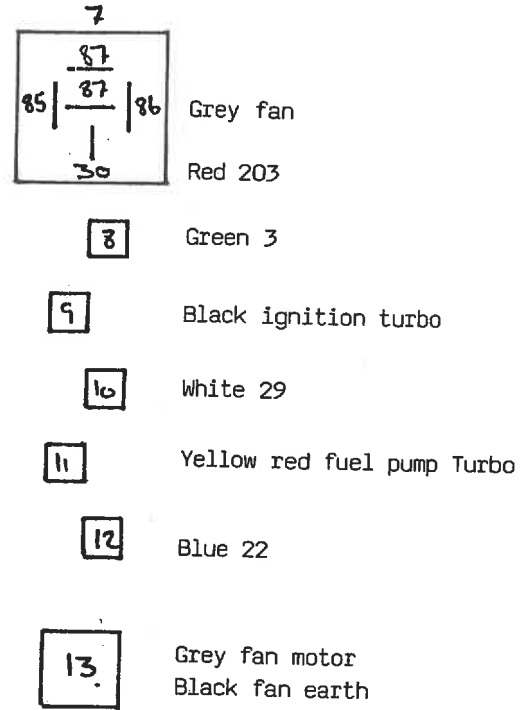


Sockets in forward part of car

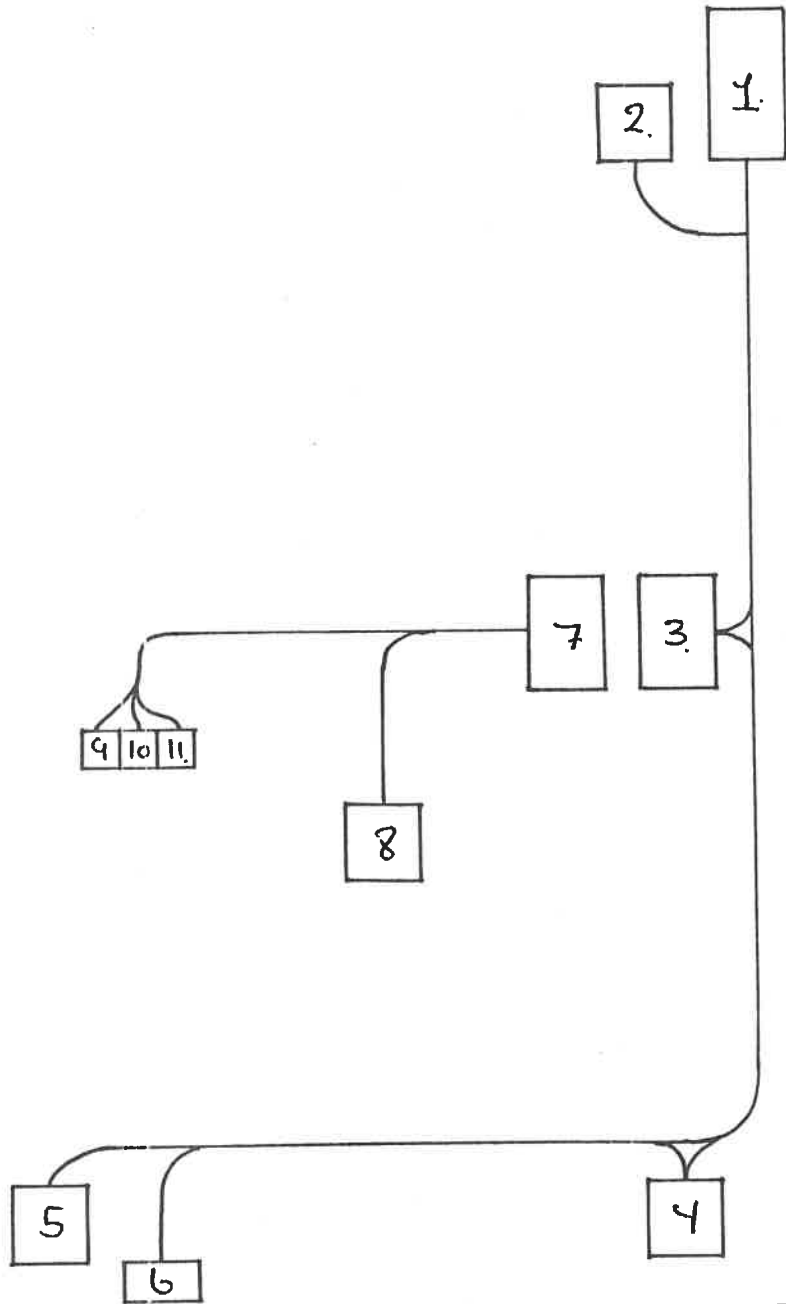
Sockets 1,2 & 3: See separate illustration



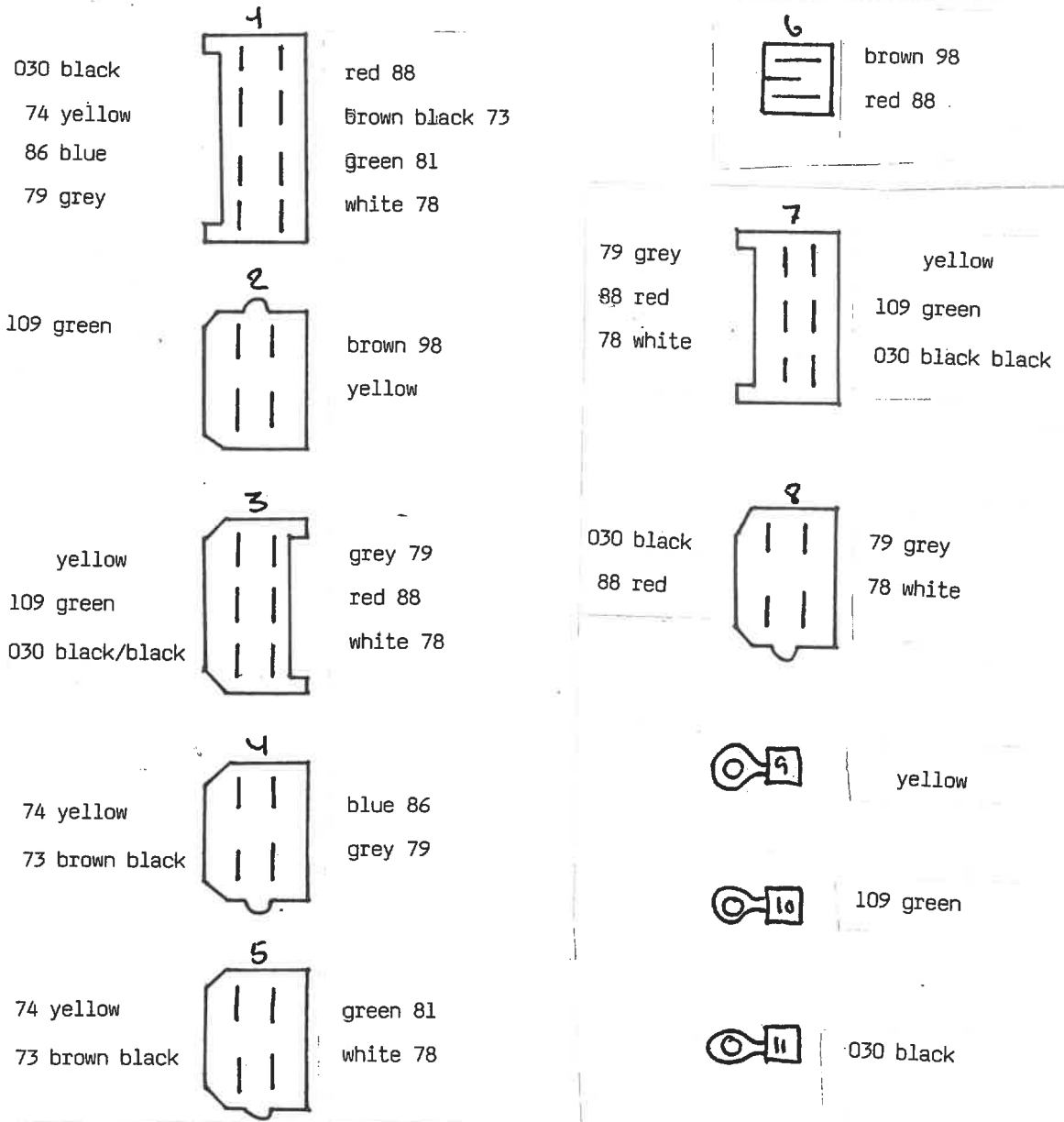
Fan motor, grey
Earth black



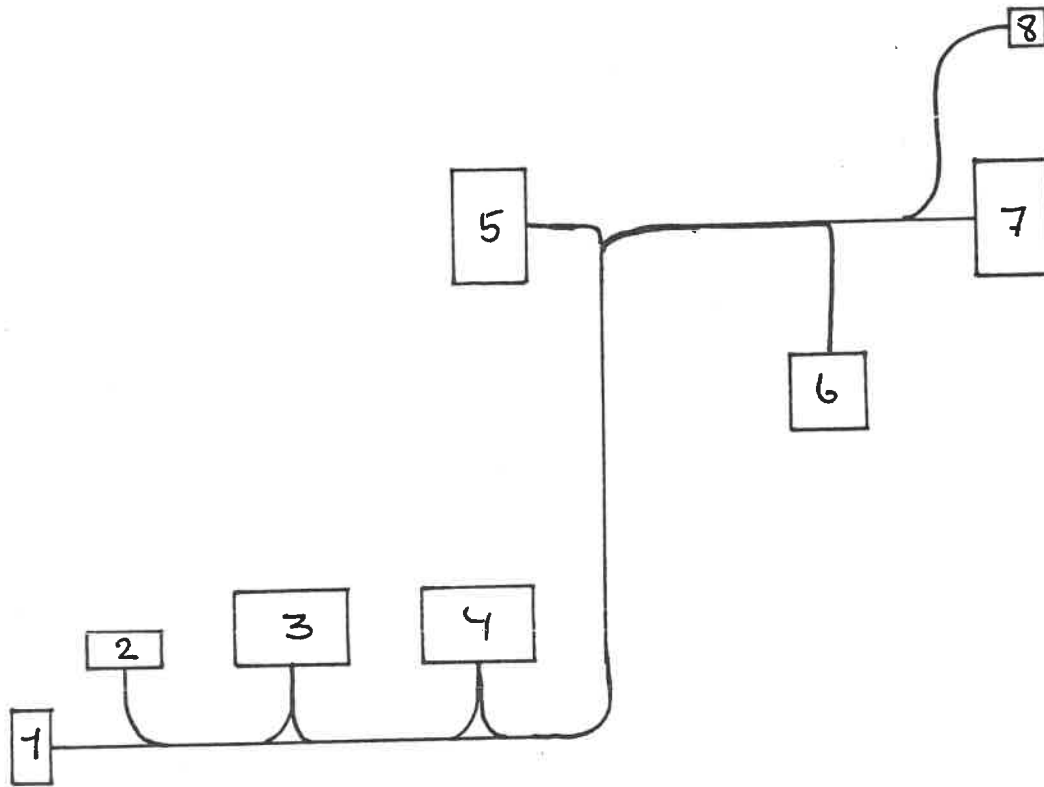
Wire-loom, rear of car



Sockets, rear of car



TURBO ADAPTOR



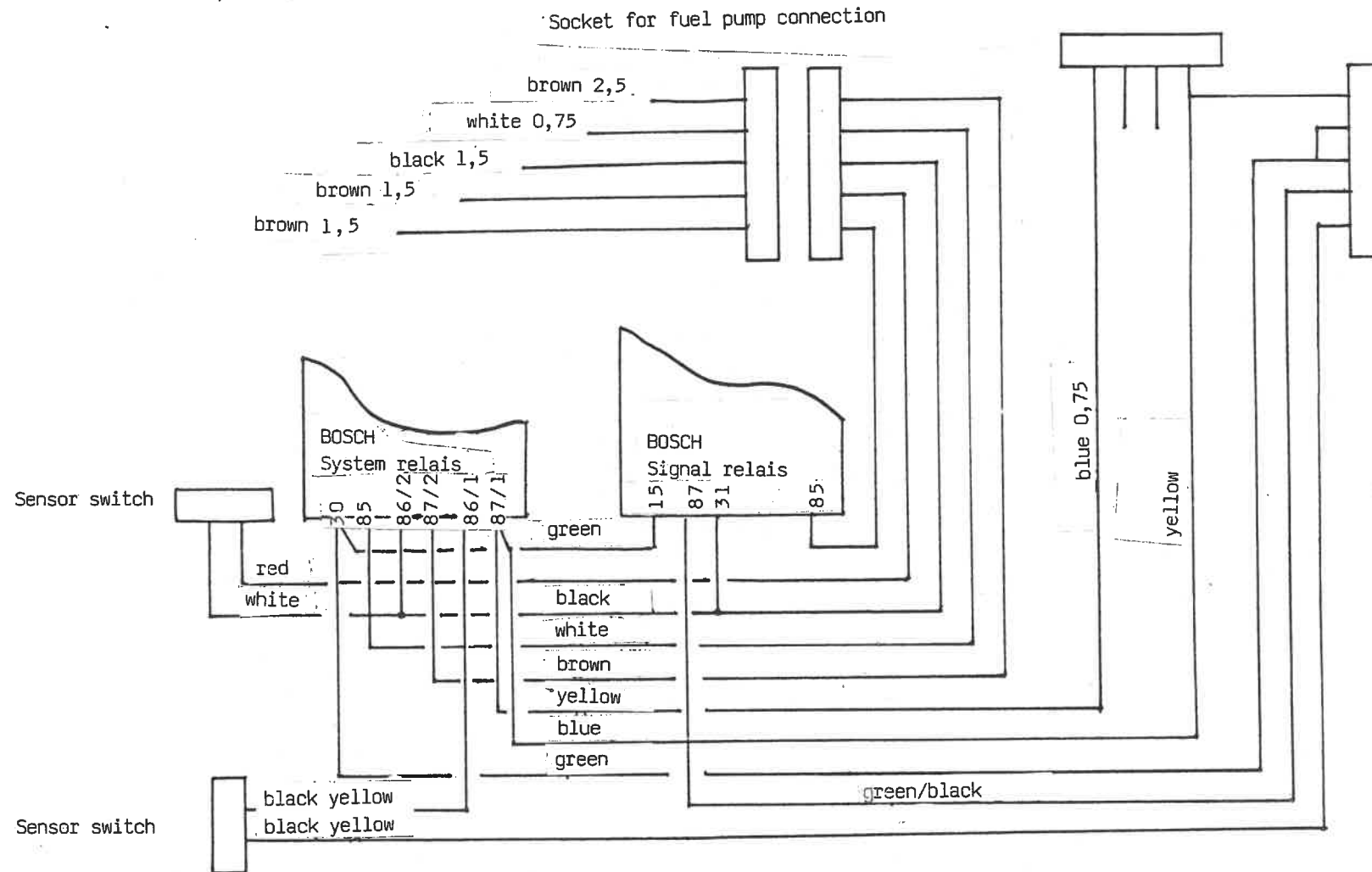
TURBO ADAPTOR

		yellow black yellow black	1)
		black brown	2)
blue/yellow black/black green/green		yellow black brown white	3)
green black		green black/black brown	4)
brown brown		brown black white	5)
blue yellow/red/x2		black yellow	6)
yellow green black green/green		black yellow black green	7)
		yellow red	8)

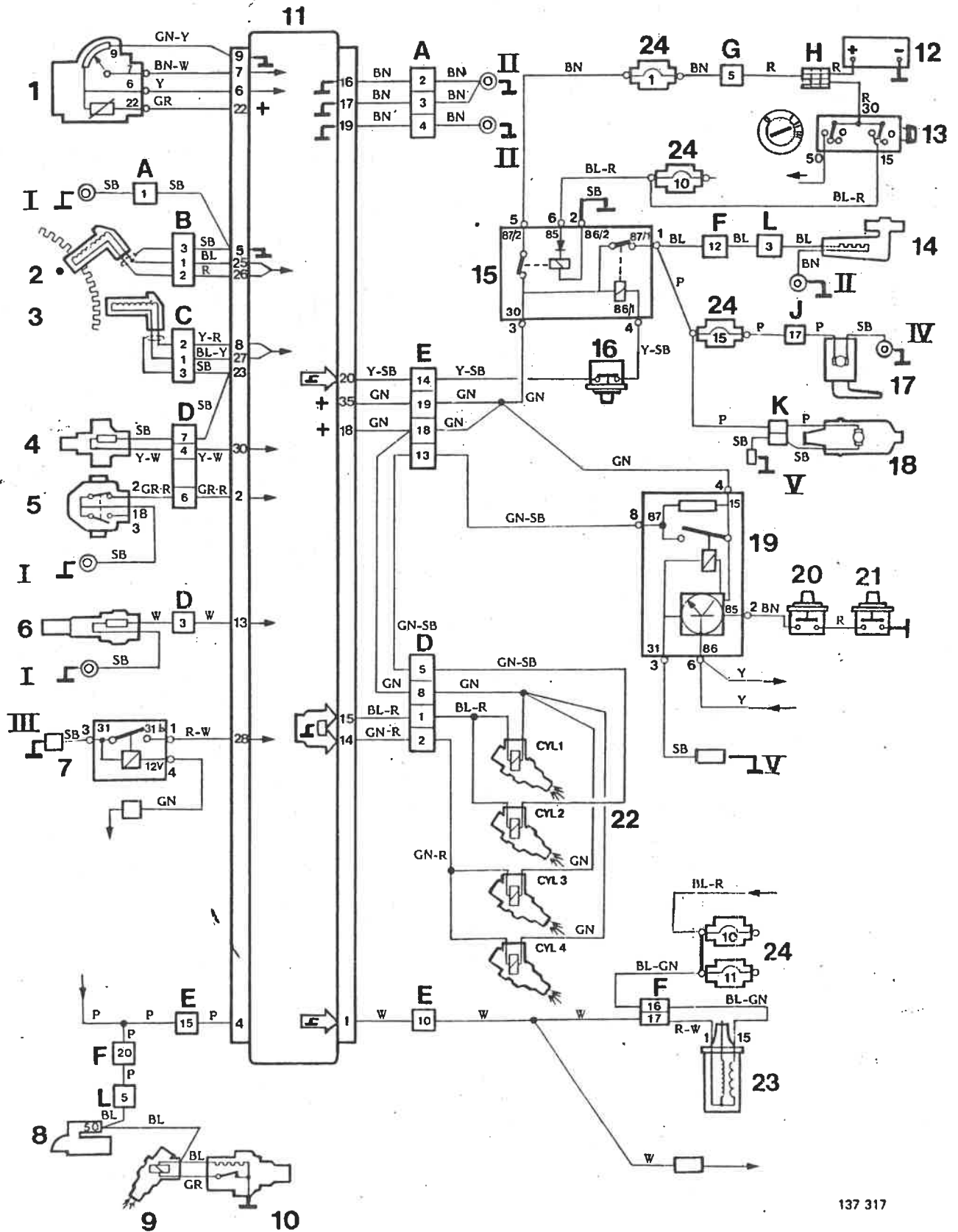
B23ET Turbo wire-loom (modified VOLVO loom)

			<u>Wire</u> <u>dim.</u>	<u>Length</u> <u>in cm</u>
System relais	87/2	brown	2,5 x	41
Signal relais	85	brown	1,5 x	36
Pressure switch	socket	brown	1,5 x	41
System relais	85	white	0,75 x	41
Signal relais	31)			36
System relais	86/2)	black	1,5 x	11
Sensor switch	socket)			8
Pressure switch	socket	yellow/black	1,5 x	69
System relais	86/1	yellow/black	1,5 x	11
Signal relais	87	green/black	1,5 x	60
System relais	30	green	2,5 x	65
Signal relais	15)			
System relais	30)	green	1,5 x	11
System relais	87/1	blue	1,5 x	64
System relais	87/1	yellow	1,5 x	64

System for combination of modified VOLVO turbo-wire-loom with original OScar wire system



"Brain" for petrol-injection turbo etc.



Code for wire colours

SB = black	BN = brown	GN = green
GR = grey	Y = yellow	OR = orange
W = white	P = rose	VO = violet
R = red	BL = blue	

Components

1. Air-flow-meter
2. Position indicator
3. RPM signal
4. Pressure air temp.
5. Throttle switch
6. Temp. signal (cooling water)
7. Signal relais
8. Starter motor
9. Starter valve
10. Thermo/time signal
11. Computer brain
12. Battery
13. Ignition key
14. Valve for supplementary air
15. System relais
16. Air pressure sensor
17. Priming pump
18. Fuel priming pump
19. Signal relais (over-drive)
20. Air pressure switch (over-drive)
21. Air pressure switch (charge air)
22. Injection valves
23. Ignition coil
24. Fuses

I To open boot lid:

- (a) via electric remote control:
- switch on ignition and activate black push-button switch next to ignition key.
- (b) via manual "emergency system":
- pull hidden ring under left-hand rear wing.

To close boot lid:

First, use black handle to position lid correctly over the lock, then push down really hard with two hands on top of boot lid (Do not use the two no.-plate lights as "handles", they are not strong enough).

II To circulate hot water in heaterunit:

Pull out black knob (marked "throttle") positioned to the left under the instrumentpanel, and twist it to the right to keep it open.

To regulate air flow from heater:

The amount of air flow to the feet is determined by flaps on the sides of the heater unit, which is positioned hidden behind the instrument panel.

III To erect hood & side screens:

- (1) Assemble the hood-frame (which is divided in a right-hand and a left-hand section) and position it in the "hood-frame-sockets" behind the seats (do not yet insert the chain-fastened crosspins!).
- (2) Position hood in front of the windscreen, with the underside upwards.
- (3) Insert the thin and exposed steelstrip (which is attached to the forward edge of the hood material) in the downwards-pointing groove along the top edge of the windscreen frame.
- (4) Swing the hood back over the windscreen and frame. Position the heavy steel bar, which is sewn into the rear edge of the hood material, under the two chromed hooks on the top of the body behind the cockpit.
- (5) Fasten hood inside on the two hoodframe cross bars with the (many) push buttons. Afterwards position the two short (loose) lengthwise tubes running inside from the main-hoodframe to the top of the windscreen.
- (6) Press external buttons on the hood in position on the body behind the cockpit. First press down on outer part of each button and afterwards on center part of button.
- (7) Raise the hood frame sufficiently to insert the two chain-fastened crosspins above the sockets.
- (8) Fasten side screens using the big "knurled" chromed nuts on the inside of the doors (make sure that you press the side screens well down in position, while you tighten the "knurled" nuts).

Removal of hood and side screens are carried out by repeating the above process in verse. Do remember to insert the side screens in the protective bag, and be carefully when folding the hood, avoiding damage to the sewn-in "windows". The external push buttons are opened by pulling the centresection only upwards

- IV To open bonnet: Pull hidden handle positioned parallel to lower edge of instrument panel, to the left of the steering column.