VOLVO 1800E 1800ES

OWNER'S MANUAL

Personal Information

Name .....

Address .....

Tel. No. .....

Driving License No. .....

Insurance Company .....

Insurance Policy No. .....

Nearest Volvo Dealer

Name .....

Address .....

Tel. No. .....

Garage Manager.....

Tel. No. .....

Car Information

Type Designation .....

Chassis No. .....

Engine No. .....

License Plate No. .....

Ignition Key No. .....

Door Key No. .....

VOLVO 1800E 1800ES

Operating Instructions

Technical Description

Servicing

AB VOLVO GÖTEBORG SWEDEN

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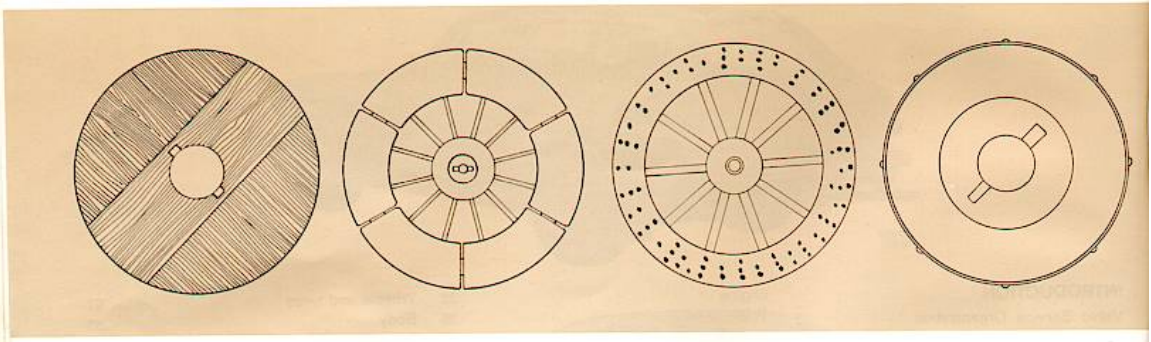


Before you start driving your new Volvo please read through this manual carefully. It contains all the information you need to be able to drive and service your vehicle in the best possible way. By following the instructions given in this manual you will find that your Volvo will come up to all the expectations concerning economical operation and excellent performance that you have every right to expect of a top-quality vehicle.

This is not intended to be a comprehensive technical manual and does not claim to make the reader a perfect car mechanic. It will, however, show you how to look after your vehicle so that trouble in the future can be avoided. The better you know your Volvo, the better service it can give you. Even for an experienced motorist it can contain some valuable information.

For a more detailed mechanical description and repair procedures, we refer you to the special Service Manual for the car which can be purchased from the dealer.

Volvo Service Organization

To get the most out of the invested capital represented by a car, it must be looked after and serviced regularly. Volvo has gone to a great deal of trouble in the design and selection of material to ensure that the car in question only requires a minimum of servicing. We rely, however, on your co-operation with regard to the future maintenance of your vehicle. To help you with this, Volvo has built up a world-wide service organization. All Volvo dealers have specially trained personnel and receive a continuous supply of technical information from the Volvo Service Organization concerning repairs and adjustments. They have also special tools, designed at the Volvo factory. Moreover, all Volvo dealers have a comprehensive stock of parts which is a guarantee that the part you get is genuine Volvo. That is why our dealers are in the best possible position to give your vehicle first-class service concerning both mintenance operations and repairs. You should also refer to your dealer for any information about your Volvo that is not included in this instruction book.

Volvo not only has workshops within easy reach in your own country, it has also a widely distributed service network in other countries.

Warranty and Service Booklet

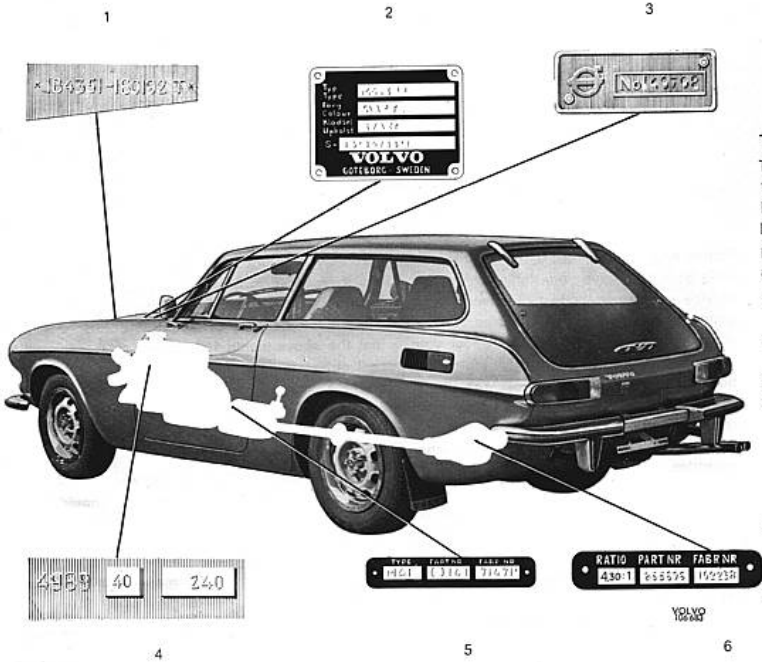
A warranty and service booklet accompanies each vehicle when it is delivered. This booklet contains a coupon entitling you to a service inspection after 2 500 km (1 500 miles). If possible, let the dealer who supplied the vehicle carry out this service inspection. Any of our dealers, however, can do this if required.

If **our six-month guarantee** is to apply, we make one absolute condition and that is that the above-mentioned inspection is carried out at roughly the mileage shown and that the vehicle has been looked after in accordance with the instructions given in this book.

Service Inspections

After the 2 500 km (1 500 miles) service inspection has been carried out, **you should come to some arrangement with your dealer concerning continued, regular service inspections in accordance with the suggestions made in our Service Book.** Thorough and regular servicing is of vital importance for the performance and length of life of the vehicle.

Always use genuine Volvo parts.

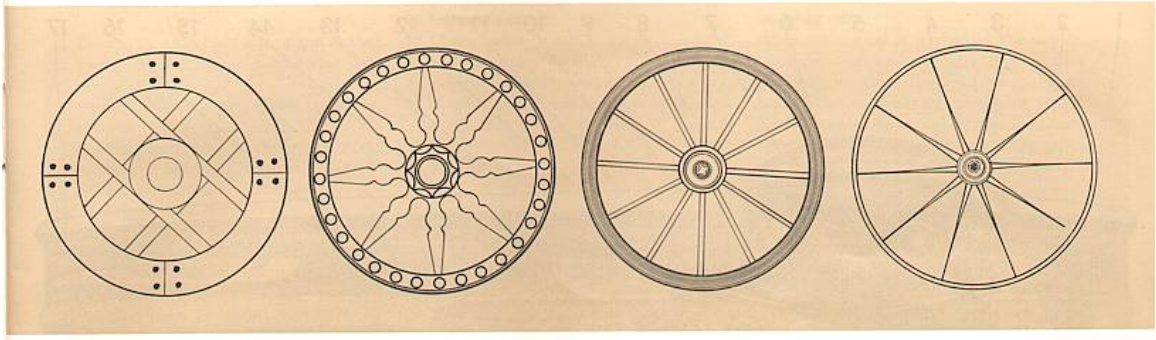


Type designations

This manual deals with the Volvo 1800 E and 1800 ES with model year designation W.

In all correspondence concerning your vehicle with the dealer and when ordering parts, the V.I.N. and engine number should always be quoted.

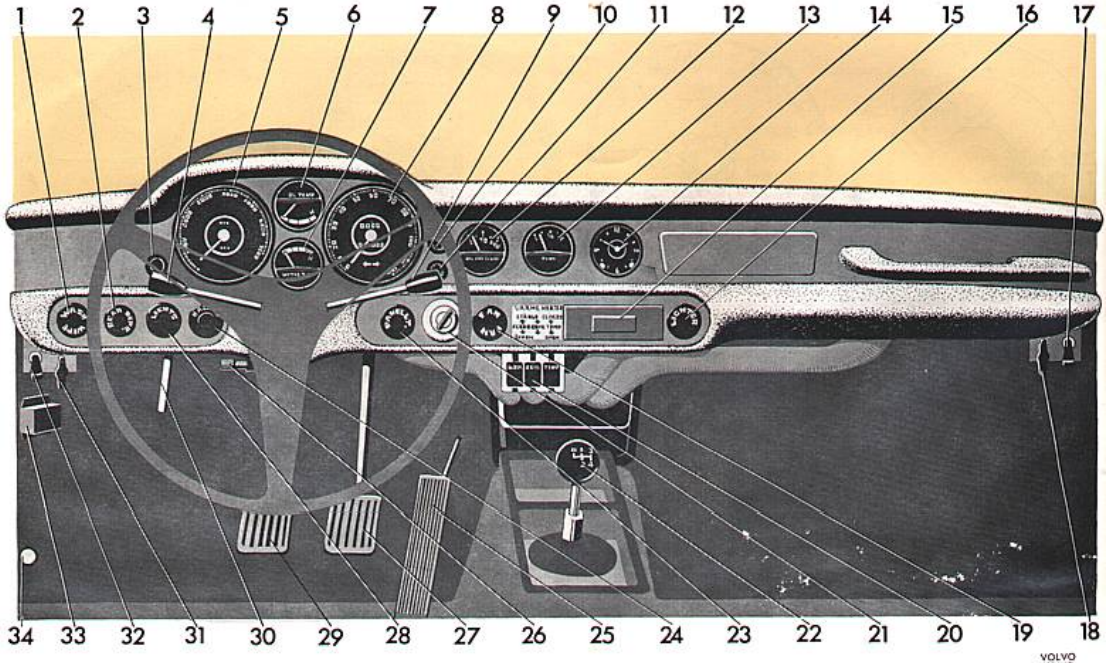
1. Type, model designation and chassis number stamped on body plating.
2. Vehicle identification number (V.I.N.), code number for colour and upholstery.
3. Body number.
4. Type designation, serial number and part number of engine: stamped on engine left-hand side. The final figures of the part number are stamped on a plate. The serial number then follows with all its figures stamped on the block.
5. Type designation, serial number and part number of transmission: underneath transmission.
6. Final drive reduction ratio, part number and serial number: on a plate at inspection cover.



OPERATING INSTRUCTIONS

Before starting to drive your car get to know where the instruments and controls are located.
After starting the car and now and again during driving always make a habit of checking to see that the instruments are functioning normally.

The chapter OPERATING INSTRUCTIONS contains the following: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INSTRUMENTS AND CONTROLS

1 Control for windshield wipers and washer
2 Switch for electrically heated rear window
3 Warning lamp, parking brake and brake systems
4 Control for turn indicators, lighting switch and headlight fullbeam flasher
5 Revolution counter
6 Oil temperature gauge
7 Coolant temperature gauge
8 Speedometer (combined instrument)
9 Control for overdrive
10 Warning lamp for overdrive
11 Warning lamp for safety belt
12 Oil pressure gauge
13 Fuel gauge
14 Clock
15 Ashtray
16 Cigarette lighter
17 Switch for map reading lamp
18 Control for direct ventilation
19 Fan switch
20 Controls for heating and ventilation
21 Ignition switch and steering wheel lock
22 Gear lever
23 Panel light switch
24 Switch for emergency warning flashers (4 signals flash simultineously)
25 Accelerator pedal
26 Trip meter reset knob
27 Brake pedal
28 Lighting switch
29 Clutch pedal
30 Bonnet release handle
31 Control for direct ventilation
32 Dimmer for fullbeam and overdrive warning lamps
33 Fuses
34 Parking brake

The instruments and controls are described in more detail in the following pages with a reference to the numbers in the picture opposite. Note that variations may occur from market to market.

1 Control for windscreen wipers and washers

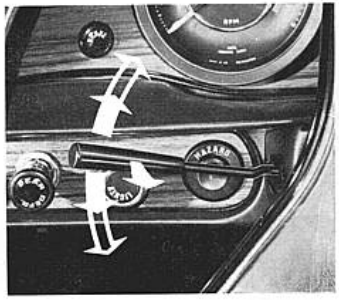
The windscreen wipers are operated electrically and can be set to two different speeds. Normal speed is achieved by pulling the switch out to the first notch. This speed is recommended for normal driving in rainy weather or snow. If the control is pulled out to the second notch, the wipers operate at full speed. This is recommended only when driving in the rain or driving at high speed.
The windscreen washers are operated by turning the control clockwise. They can also be used even when the wipers are switched off.
When the control is pushed all the way in, the wipers automatically return to their park position and stop. The fluid container for the windscreen washers is located to the right in the engine compartment and contains about 1½ litres (2¾ Imp. pints = 3¼ US pints).

2 Switch for electrically heated rear window

The Volvo 1800 E/ES are fitted with an electrically heated rear window in order to provide clear vision rearwards in cold and damp weather.
Heating is done by means of wires on the inside of the rear window. **Avoid placing anything near the wires that could possibly damage them.**
The switch has one, pulled-out position. Pulling it out to this position switches on about 150 Watts. As long as the electric heating is on, a warning lamp lights in the switch.
As soon as the rear window is free from misting and ice, push in the switch in order not to overload the battery unnecessarily.

3 Warning lamp, parking brake and brake circuits

This lamp goes on with a steady red light when the parking brake is applied and the ignition switch is on.
The lamp also functions as a warning lamp if one of the brake circuits should stop functioning. If the lamp lights up while the car is being driven, take it to a workshop without delay for a check on the brake system. Drive carefully under such conditions.



4 Control lever for turn indicators, lighting switch and headlight fullbeam flasher

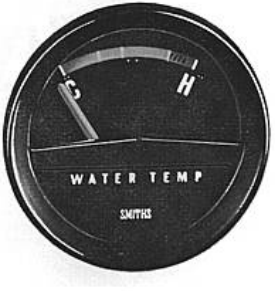
All the above-mentioned functions are operated by means of the lever to the left in front of the steering wheel. Moving the lever upwards operates the right-hand turn indicator, and moving it downwards will operate the left-hand turn indicator.
The lever has a stop point for lane changing. This means that with small swings on the steering wheel (when, e.g., changing lanes, passing, etc.) the lever can be moved up or down to this point and kept there. Right or left indicator will then start flashing. When the switch is released, it automatically returns to its off position. For normal swings, see above.
To switch from fullbeam to dipped beam and vice-versa, move the lever backwards towards the steering wheel and then release it. Here the lighting switch (28) should be pulled out fully.
The lever is also used for flashing with main beam when the headlights are not switched on. The headlight fullbeam is operated by moving the lever towards the steering wheel and it will remain switched on until the lever is released.

5 Revolution counter

The revolution counter indicates engine speed in revolutions per minute. The marked area between 6 000 and 6 500 rpm means that this engine speed is permitted only for very short periods. The engine speed range 6 500—7 000 rpm, which is marked completely in red, should not be used.

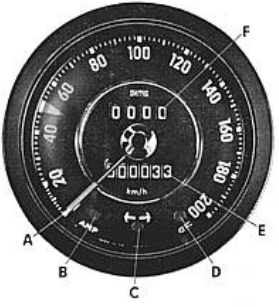
6 **Oil temperature gauge**

The oil temperature depends on engine speed and loading and can vary to a great extent. While the car is being driven, the pointer should remain within the green area and should not be permitted to go into the red area.
During cold weather and for short drives when the engine has not reached a high temperature, it may happen that the gauge pointer does not swing into the green sectors.



7 **Coolant temperature gauge**

The temperature gauge shows the temperaure of the coolant and thus indicates the working temperature of the engine.
During driving the pointer should normally stay within the two central green areas.
During town driving and idling when the weather is particularly hot it is permitted for the temperature gauge pointer to enter the red-lined field.
If the pointer should enter the completely red field repeatedly, check the coolant level and fan belt tension.



8 **Speedometer (combined instrument)**

A Speedometer
B Warning lamp for battery charging
C Control lamp for turn indicators
D Control lamp for headlight fullbeams
E Mileometer
F Tripmeter

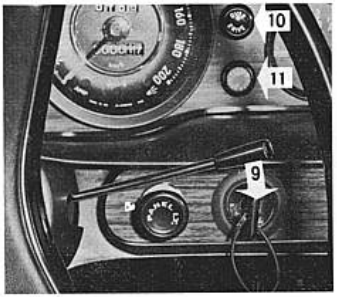
The warning lamp for battery charging (B) goes on with a steady red light when the battery is discharging. If this lamp should light up during driving, either there is something wrong with the electrical system or there is insufficient fan belt tension so that the belt slips on the alternator pulley, causing poor charging.

The control lamp for the turn indicators (C) flashes with a green light when the turn indicator lever switch is moved upwards or downwards.

The control lamp for headlight fullbeams (D) gives a steady blue light when the headlights are switched to fullbeam.

The mileometer (E) shows the total distance covered in miles. After 999999 miles it returns to zero and starts to go round again.

The tripmeter (F) indicates distances of up to maximum 999 miles. The window furthest to the right is graduated in tenths of a mile and can thus be used to measure short distances. The tripmeter is set to zero by pushing in the reset knob (26) under the dashboard.



9. 10 **Control/warning lamp for overdrive**

The overdrive is engaged by moving downwards the lever to the right of the steering column. This switches on the warning lamp (10), which remains on as long as the overdrive is engaged. To disengage the overdrive move the lever upwards. Concerning driving with overdrive, see page 28.

11 **Warning lamp, safety belt**

The light goes on as soon as the ignition key is turned. Its function is to remind the driver that he has not fastened his safety belt. The warning lamp goes out as soon as the driver has fastened his safety belt.

12 **Oil pressure gauge**

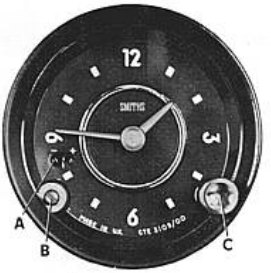
A Warning lamp for oil pressure

The oil pressure gauge indicates the pressure of the oil in the engine lubricating system. Oil pressure is dependent upon engine speed and the temperature of the oil as well as its viscosity.

Normally oil pressure can vary during driving between 2.5 and 6.0 kp/cm² (35 and 85 psi). After very hard driving the oil pressure at idling speed can go down to about 0.5 kp/cm² (7 psi) and the warning lamp in the oil pressure gauge lights up. This is quite normal providing the pressure goes up again when engine speed increases. If the warning lamp should light up during driving, stop the engine immediately and find out the reason for this.

13 Fuel gauge

The fuel gauge indicates approximately the amount of fuel in the tank. The red field at "R" (reserve) is a reminder that the tank should be filled. When the gauge pointer is on "Reserve" there are approx. 6 litres (1.3 Imp. galls = 1.6 US galls) left in the tank. The fuel tank has a capacity of approx. 45 litres (10 Imp. galls = 11 US galls). The gauge functions when the ignition is switched on.



14 Clock

A Indicating scale
B "Inching" screw
C Setting knob

The clock is electrically driven. If the battery has been disengaged, the clock must be started by pulling out the setting knob (see C). If it is necessary to set the clock, first pull out the setting knob and then turn the clock hands to the right time.
If the clock shows a tendency to run too fast or too slow, this can be corrected by means of the special "inching" screw (B). Turning it to the right causes the clock to run more slowly, and turning it to the left makes the clock run more quickly. One graduation on the indicator scale (A) corresponds to about 5 minutes per day.

15 Ashtray

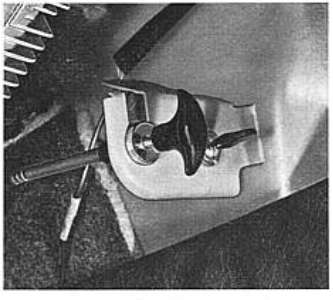
To empty the ashtray push down the spring and draw out the ashtray.

16 Cigarette lighter

To use the cigarette lighter, push it in. The lighter releases automatically when it attains sufficient heat.

17 Switch, map reading lamp

The map reading lamp is located to the right under the dashboard and is switched on by flicking the switch upwards.



18, 31 **Controls for direct ventilation**

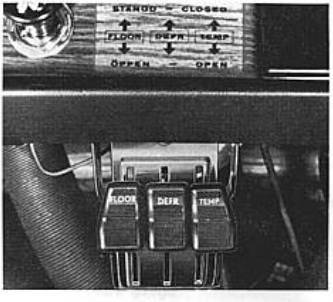
For direct ventilation there is a louver on the right-hand side and also one on left-hand side. To open one of the louvers, pull out the handle horizontally and lock it in the desired position by giving it a quarter of a turn.

19 **Fan switch**

The fan is operated by means of a push-pull switch. Pushing the switch fully in stops the fan, pulling it out to the first notch operates the fan at full speed, and with the switch pulled out fully, the fan operates at half speed.
Due to the aerodynamic design of the car, the overpressure in the air intake is relatively small. Therefore, at lower speeds the fan should be allowed to operate at full speed if maximum air capacity is desired.

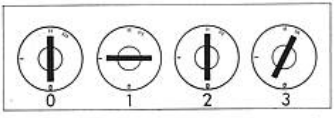
Mist on windows

Normally the through-ventilation takes good care of the de-misting of the rear window and side windows. However, should misting arise during cold and damp weather, this can be removed very easily in the following way: Set the fan switch and defroster control to full output and shut off the control FLOOR. Switch on the heating for the rear window. Especially during the wintertime also make sure that water does not collect on the floor and under the mats as this increases the humidity which will eventually cause misting.



20 **Heater and ventilation controls**

The left-hand control "FLOOR" controls the flow of air to the floor. The central control "DEFR" controls the flow of air to the windscreen. The right-hand control "TEMP" controls the temperature of the incoming air.
When in their upper positions, these controls are completely closed. Moving them down opens them gradually. They are fully open in their bottom position.
NOTE. A brief moment will elapse before the desired temperature has been reached after adjustment of the controls.



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21 **Ignition switch and steering wheel lock**

The key has four positions: (0) **Locked** position, (1) **Intermediate** position, (2) **Driving** position and (3) **Starting** position. The key can only be inserted and taken out in the **locked** position. The steering wheel automatically locks when the key is removed.

In the **intermediate** position, the electrical system of the car is switched on with the exception of the ignition system. The steering wheel is not locked.

The **driving** position is the position in which the key is when the car is being driven.

To start the engine, turn the key to the **starting** position and this automatically engages the starter motor. As soon as the engine starts, release the key which will then automatically return to the **driving** position.

If the car is parked in such a way as to make it difficult to unlock the steering wheel, unlocking can be made easier by slightly turning the steering wheel one way and then the other.

23 **Panel light switch**

Turning the knob to the right increases the lighting on the instrument panel, turning to the left decreases it. The lighting switch (28) must be pulled out.

24 **Switch for emergency warning flashers**

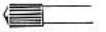
All the four warning lights starts flashing simultaneously when the switch is pushed in. A warning lamp mounted in the switch blinks in unison. The warning lights are not connected across the ignition and these operate irrespective of whether the ignition is switched on or not.

Pushing in the switch again will switch off the warning flashers.

These warning lights should be used only when you have to park the car where there is possible danger to other traffic.

Note that regulations governing the use of these lights may vary in different countries.

26 **Tripmeter reset knob**



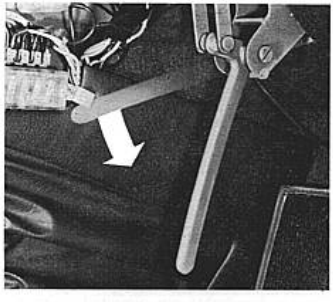
To zero-set the tripmeter turn the knob clockwise. Turn until the figure 0 is in all the windows.

28 **Lighting switch**

The car headlights are operated by means of a push-pull type switch on the dashboard as well as a lever (4) on the steering column. All the lighting is switched off when the dashboard switch is pushed in all the way. Pulling it out to the first notch, switches on the parking lights, and when it is fully out, the full or dipped headlights are switched on. Switching from full to dipped headlights is done by means of the lever (4).

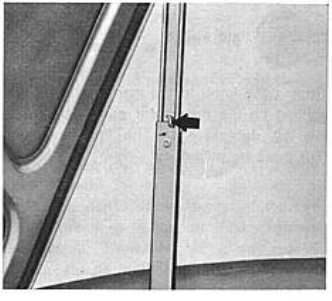
The lighting is not wired over the ignition switch. So the lighting will function whether or not the ignition key is in position.

A headlight warning buzzer starts buzzing when any of the front doors is opened and the headlights have been left on with the lighting switch pulled out.

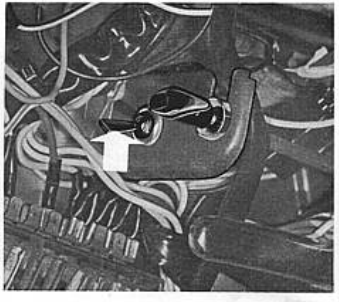


29 **Bonnet release handle**

The bonnet is fitted with a locking catch which is released from the driving seat by means of a handle to the left under the dashboard. Moving this handle forwards and downwards will release the bonnet. The hood is retained in its lifted position by a rod which automatically locks through a built-in retainer when the bonnet is lifted all the way up.

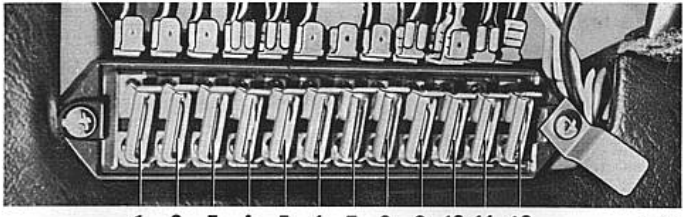


To lower the bonnet, press in the retainer, lift the bonnet to its outer position and let it drop down.
The level of the bonnet can be adjusted if necessary by screwing out or in the rubber plugs on brackets in front of the windshield.



Dimmer for fullbeam and overdrive warning lamps

During long trips in darkness, the warning lamp for fullbeams and overdrive can be irritating. The glare from these can be dimmed by moving the control to the upper position. The dimmer is off when the control is in the lower position.



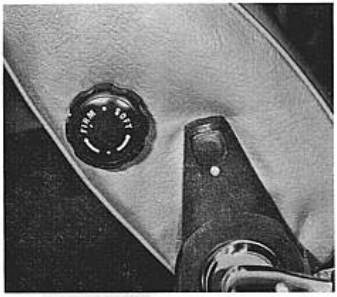
33 Fuses

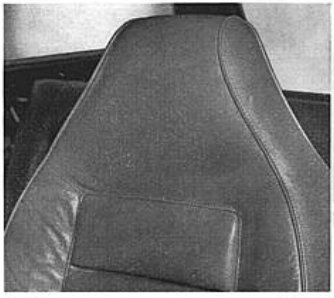
The electrical equipment is protected by means of a number of fuses in a fusebox. If a fuse has to be replaced, always make sure that you use the right type of fuse. If fuses blow repeatedly, do not replace with a fuse of higher rating but have a workshop check the electrical system. Always have spare fuses in the car.

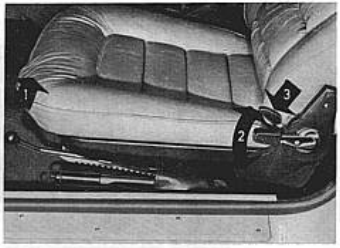
1 Booster fan 8 A
2 Windscreen wipers — washers 8 A
3 Cigarette lighter 8 A
Overdrive (M41)
4 Switch for emergency warning flashers 5 A
Warning lamps, brakes, charging, oil pressure
Rev counter
light, safety belts
5 Switch, elec. heated rear window 8 A
Relay for fuel pump
6 Horn relay 8 A
Relay for reversing lights (M 41)
Starter relay (BW 35)
Control, reversing lights (M 41)
7 Spare 16 A
8 Elec. heated rear window 16 A
Relay for elec. heated rear window
9 Brake lights, brake contact 8 A
Electric clock
10 Map reading lamp 5 A
Warning buzzer
Interior light
Dimmer relay
11 Instrument panel light 5 A
Rear light, left and side marking light
License plate light
Parking light, left, and side marking light
12 Rear light, right, side marking light 5 A
Parking light, right, side marking light
Shift positions light (BW 35 autom. trans.)

34 Parking brake

The parking brake lever is located immediately to the left of the driving seat. It operates on the rear wheels only. When the parking brake is applied and the ignition is on, a red warning lamp lights on the instrument panel. Remember that the footbrake warning system is also connected to this lamp. Should it light when the parking brake is not on, this may be due to a failure in one of brake circuits. In such a case drive immediately (but with due care) to a workshop for a check.







INTERIOR AND BODY

Front seats

Lumbar supports

Both front seats are fitted with adjustable lumbar supports. Adjustment is carried out by means of a knob on the inside of the backrest. To tension the lumbar support, and thus exert more pressure against the small of the back, turn the knob clockwise, "FIRM", and to relieve the pressure against the small of the back, turn the knob anti-clockwise, "SOFT".

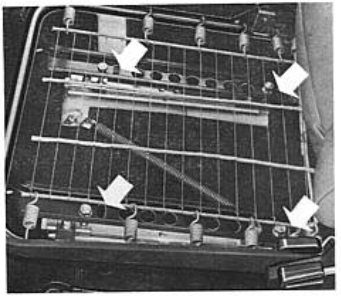
Head restraints

The front seats form one piece with the head restraints, which are there to protect the neck when abrupt stops are made.

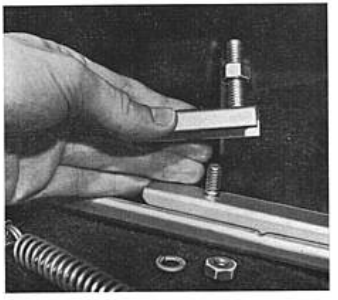
Front seat adjustment

The front seats can be adjusted backwards and forwards by moving the handle (1) sideways towards the centre of the car. Brace the feet against the floor and adjust the seat to the most comfortable position. Backrest inclination is infinitely adjustable by means of the arm (2).

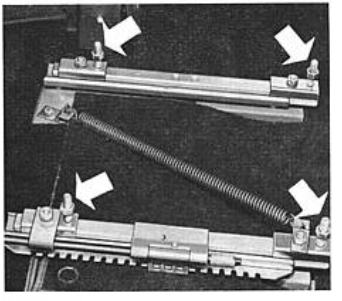
The easiest way to adjust the backrest is to ease the pressure of the back against the backrest before adjusting with the arm. There is also a latch (3) for the backrest. Releasing this latch enables the backrest to be folded forwards, e.g., to get into the rear seat. The seat can also be adjusted length-



wise over and above that allowed by the latch fittings. This is done by using the extra holes in the seat frame (see picture). First remove the seat cushion to get at the four nuts securing the seat frame. Thereafter it is possible to move the seat to one of the other holes.

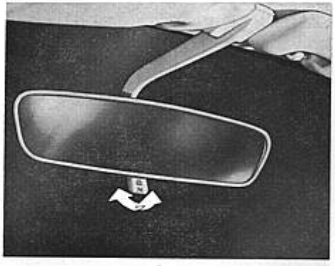


The seat can also be adjusted still further lengthwise with the help of the spacer sleeves on the slide rails. To do this, first remove the seat. Then release the nuts securing the spacer sleeves, lift up the spacer sleeve slightly and turn it half a turn.



Seat height adjustment

The seat can be adjusted vertically by means of the bolts and nuts on the slide rails. First, remove the seat cushion. Then release the upper nuts on the top side of the steel frame and adjust to the desired position with the nuts underneath.
The picture shows the seat removed. The arrows point to the lower adjusting nuts.



Rear seat

The rear seat has room for two children. It can also be used for extra luggage.
In the 1800 E, the backrest for the rear seat is folded down by releasing the stop which holds the backrest in position and by folding down towards the cushion. Leather belts under the cushion can be used to secure the luggage in position.
The backrest in the 1800 ES can also be folded down by lifting the handle on the rear side of the backrest. For a more detailed description, see page 25.

Rearview mirror

The interior rearview mirror is fitted with an anti-glare knob located at the lower edge of the mirror. To switch to anti-glare push back the knob.

Stow compartments

The 1800 E is provided with two stow pockets, one on each of the doors. There is also a lockable stow compartment between the front seats.
The stow compartment has separate keys.

Safety belts

Always use the safety belts **every time** you drive. Remember that even in slow city traffic serious injuy is possible in the case of a sudden and unexpected stop.

Automatically retracting safety belts

Your car is fitted with automatically retracting inertia safety belts.

To fasten the belt, pull out the strap slowly to prevent the mechanism from locking. Normally the belt roller is "unlocked". The roller will lock automatically if pulled out quickly, or if the car brakes or inclines to an angle greater than 10—15° or when taking a bend rather sharply.

Do not let the belt lie on the floor of the car otherwise it will get entangled and dirty as well as hinder getting in and out of the vehicle.

Now and again check that the bolts anchoring the belts are properly tightened and that the belt is otherwise in good condition. Use water and synthetic washing agent for cleaning the belt. If the belt is exposed to violent stretching, for example in connection with a collision, it should be replaced even though it may appear to be undamaged. Also replace the belt if well worn or damaged.

Never modify or repair the belt on your own but have this done by a Volvo workshop. The practical design of the belt makes it very easy to use. To fasten the belt, lay one of the belt straps round your waist and the other over your shoulder and chest. Then fasten it securely by inserting the buckle tongue into the lock between the seats. A definite click indicates that it has locked.

Make sure that the parts of the belt in contact with the body are not twisted. To unfasten the belt, pull the lever concerned on the locking device.

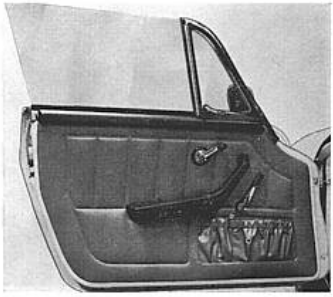
Extending

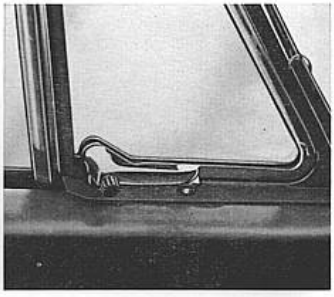
Shortening

Always make sure that the length of the belt has been adjusted so that it makes good contact with the body. If it is necessary to extend the belt, make sure that the upper part of the waist strap is loose, hold the adjuster with one hand and pull out the belt to the required length. Tidy up the belt stretch by pulling the upper part.

If it is necessary to shorten the belt, pull the upper part of the waist strap. After a little practice, all adjustments can be carried out with the one hand.

Concerning safety belt warning lamp, see page 12.





Keys

Three pairs of keys belong to the car: the ignition key, the key for the doors, which can also be used for the trunk and the fuel filler cap, and the key for the stow compartment between the seats. If you should happen to lose your car keys, contact the nearest Volvo dealer for new ones and quote the code number of the keys which have been lost.

Doors and locks

The car is fitted with key locks on both doors.

The doors can be locked from the inside by moving the handle forwards.

They are also locked from the outside by first moving the handle on the inside forwards and then shutting the door. **Do not leave the keys in the car.**

The locks have been designed with a view to providing maximum possible protection against freezing during the wintertime. As an extra precaution, however, you should lubricate the locks regularly during very cold weather with a suitable anti-freeze agent. If the lock is already frozen, be careful not to break the key in the lock. Instead, heat the key and immediately insert it in the lock.

Ventilation window lock

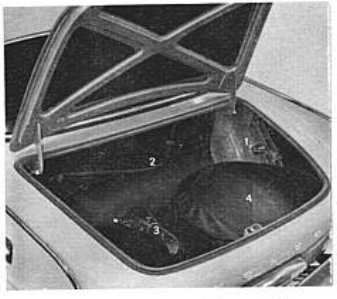
To open the ventilation window, first slacken the small lock screw a couple of turns, push it in and then turn the handle upwards.

On certain markets the window is opened merely by pressing in the button and turning the handle.

Tank filler cap

The 1800 E and ES are fitted with a lockable tank filler cap. The keys for this cap are the same as the ones used for the doors.

The belts are fastened, released and maintained as described on page 21.



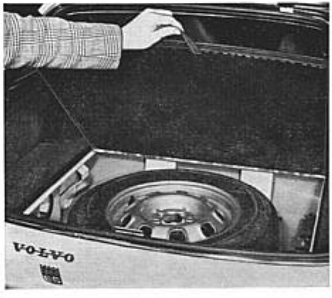
Luggage compartment lid 1800 E

The door keys can also be used for opening and locking the luggage compartment lid.

1 **Jack,** secured by means of a wing nut to the right rear wheel arch.
2 **Lever for jack.** Secured to rubber blocks.
3 **Tool kit.** Contains: box spanner with lever, wrench, 2 open-end spanners and Philips screwdriver.
4 **Spare wheel,** located to the right in compartment and secured by means of a rubber strap.

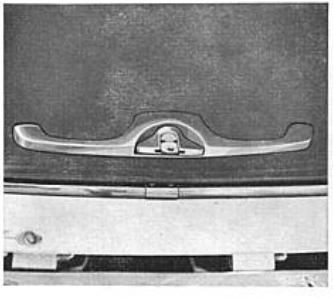
Luggage compartment 1800 ES

The glass tailgate is opened with the same key as used for the doors.
The luggage compartment is accessible by raising the tailgate. This is made of glass so that a certain care should be observed when opening and closing it.
The luggage compartment has a light which goes on when the tailgate is opened.



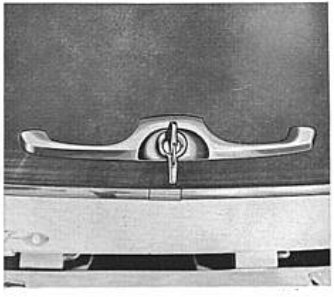
Spare wheel and tools

The 1800 ES has the same type of tools as the 1800 E, but they are located under the luggage compartment floor. To get at **spare wheel, tool kit** and **jack** with accessories remove the cover by taking hold of the eyelet and lifting up.



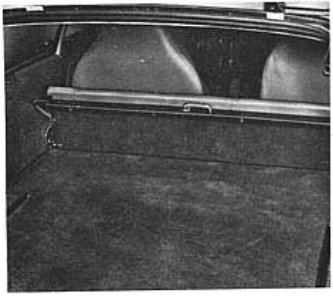
Opening tailgate

To open the tailgate on the 1800 ES, place the door key in the lock as shown in the picture. Turn the lock a quarter turn. This opens the tailgate.
Gas springs will the hold the tailgate open in the desired position.



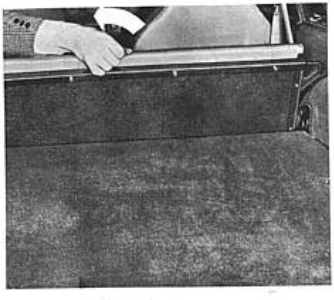
Closing tailgate

The tailgate must not be banged shut, since it is made of glass and since it does **not** lock automatically. Close it carefully and lock by turning the key a quarter turn and removing it.



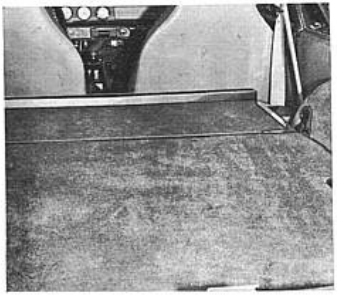
Folding down rear seat backrest

To provide room for more luggage, the rear seat backrest can be easily folded down. Make sure when doing this that the wires for heating up the tailgate window are not damaged or deformed.



Releasing backrest latch

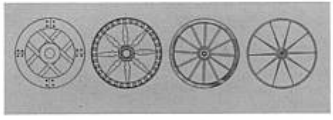
Releasing the backrest latch requires only a simple manipulation. Take hold of the handle and turn it upwards as shown in the picture. The latches can now be released.



Folding down backrest

The rear seat backrest is carefully folded forwards and this provides a spacious, flat cargo space.

It should be remembered that the front seat backrest should not be inclined too far backwards, otherwise there is risk of the rear seat backrest scraping against the front seat backrest when being folded down.



STARTING AND DRIVING

Running-in instructions

A new car should be run-in during the first period of use. During this time the moving parts of the car wear in together and obtain smooth and resistant friction surfaces.
During the running-in period the following maximum speeds should be observed:

During the first 1 000 km (600 miles):		Between 1 000 km (600 miles) and 2 000 km (1 200 miles):	
1st gear	30 kmph (20 mph)	1st gear	50 kmph (30 mph)
2nd gear	55 kmph (35 mph)	2nd gear	75 kmph (45 mph)
3rd gear	80 kmph (50 mph)	3rd gear	100 kmph (60 mph)
4th gear	110 kmph (70 mph)	4th gear	130 kmph (80 mph)

Avoid driving at low speed in high gear during the first 2 000 km (1 200 miles).

Inspections during running-in

After 2 500 km (1 500 miles), the vehicle should be taken to a Volvo workshop for the free warranty inspection. The control procedures and adjustments carried out at this time include engine oil change. It is very important to ensure that this oil change is carried out since during the first period the engine oil usually collects a lot of impurities.
After 5 000 km (3 000 miles), the oil in the engine, gearbox and rear axle should be changed. On this occasion both the gearbox and rear axle should be flushed with the same type of oil to be subsequently used. After this oil change, future changes should be carried out at approximately those intervals indicated in the maintenance scheme on page 42 and in the lubricating chart at the end of this book.
All Volvo engines are test-run before being delivered. This ensures us that all clearances and fits are satisfactory and we can therefore accept no responsibility for any damage due to careless running-in.

Your first drive

Before starting to drive your new Volvo, we would advise you to become acquainted with your car and the various instruments and controls required for the driving. When you are seated comfortably and can find the various controls without bother you are ready to start driving — but don't forget to fasten your safety belt.

Starting the engine

1 Check that the parking brake is on and move the shift lever to neutral (position N or P, autom. transmission).
2 Make a habit of always pressing down the clutch pedal until the engine fires.
3 Turn the ignition key to the starting position. Release the key as soon as the engine starts.

NOTE. Do not depress the accelerator if the engine is cold. If the engine stops, start it again without depressing the accelerator pedal.

If the engine is **hot,** the accelerator pedal should be pressed down about half-way. Avoid repeated **short** attempts to start. (In the case of **each** new attempt, the starting valve functions, that is, it injects fuel into the intake manifold.) Instead, allow the starter motor to operate for a rather longer time (not more than 15—20 seconds, however) each time.

Never race an engine to high speed immediately after a cold start but run it at a moderate speed and load.

Starting in a garage

Always open the garage doors all the way if you are going to start your car inside. The exhaust gases from the engine include the poisonous gas carbon monoxide which is particularly dangerous since you can neither see nor smell it.

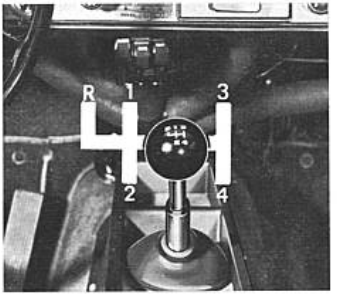
Warming up the engine

Experience has shown that engines in vehicles used with frequent stopping and starting are subject to abnormally rapid wear. The reason for this is that the engine is not given a chance to reach its normal working temperature. When the engine is cold, it should just be taken up to its normal working temperature as quickly as possible. Therefore, do not idle the engine too long but start driving with a light load on the engine as soon as the oil pressure light has gone out.

Driving with the luggage compartment lid open

When the car is driven with the luggage compartment lid more or less open, som exhaust gases including carbon monoxide can be sucked into the car through the luggage compartment. Normally this involves no risk to the passengers. However, the following advice should be followed on such occasions:

1 Keep all windows closed.
2 Move the fresh air and defroster controls to their fully open position and run the fan at full output.

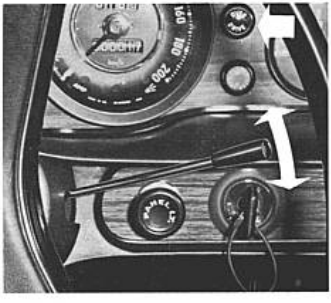


Gear-changing, manual gearbox

The gearbox is synchronized on all forward gears. If this synchronization is to operate reliably, the clutch pedal must be depressed fully.

The normal engine speed range while the car is being driven is 1 500—6 000 rpm. The range between 6 000 and 6 500 rpm can be used for very short periods of time. Never exceed 6 500 rpm.

Never let the engine labour in high speed but instead change down to a lower gear in good time. If, on the other hand, you do not need any particularly great tractive effort and the engine is operating smoothly with the throttle only partly open, this does not prevent you from running the car with engine speeds below 1 500 rpm.



Overdrive

The overdrive, which can be used on fourth gear, is operated by means of a lever to the right under the steering wheel. Moving the lever downwards or upwards engages and disengages the overdrive. No extra operation of the clutch pedal or accelerator is normally necessary but engagement of overdrive is facilitated if the accelerator position is maintained steady. When disengaging the overdrive, light pressure on the clutch pedal helps to make this operation more smooth.

The overdrive should not be used at speeds below 70 kmph (45 mph).

Automatic transmission

The shift positions for the selector lever are marked on the console next to the control.

P = Parking
R = Reverse
N = Neutral
D = Driving
2
1 = Low speed positions

The selector lever can be moved freely between positions **N and D** where the other positions are blocked with an inhibitor which is opened by means of the push button in the knob of the selector lever.

P-position

Engage the selector lever in position **"P"** for parking, whether the engine is stopped or running. When parking on a steep gradient, the parking brake should also be applied. in the **"P"** position the transmission is mechanically locked.

The "P" position may only be selected when the car is standing still.

R-position

The "R" position may only be selected when the car is standing still.

N-position

The **"N"** position is for neutral, that is, no gear is engaged.

D-position

This position is the normal one for driving. Start is in 1st gear and the transmission automatically shifts up in accordance with road speed and accelerator position. Downshifting takes place automatically with decreasing speed.

2-Position

In position "2" the transmission can change up or down automatically between 1st and 2nd gear.

In this position there is no shifting up to 3rd gear.

"2" position can be used to obtain immediate downchanging (to 2nd gear) and also when changing up from 2nd to 3rd gear is not desired, for example, at the following times:

— during certain types of highway driving
— during crawling town driving
— when driving in hilly country
— when overtaking
— in order to increase engine braking

Do not select "2" position for speeds exceeding 115 kmph (72 mph).

1-Position

With "1" position there is automatic downshifting but no upshifting.

If "1" position is selected at high speed, 2nd gear is engaged. It is only when the speed has dropped to about 10 kmph (6 mph) that 1st gear engages. The 1st gear can also be engaged by kick-down below about 55 kmph (35 mph). If you want to drive in 1st gear without intending to shift up, use "1" position.

Do not choose "1" position for speeds exceeding 115 kmph (72 mph).

Kick-down

When the accelerator pedal is depressed past full throttle position, kick-down is obtained, that is, there is an immediate shifting down to the next lower gear. As soon as maximum speed for this gear has been reached or if the accelerator pedal is eased from the kick-down position, automatic shifting takes place to the next higher gear.

	Gear	Speed
Gear speeds at full throttle (kick-down), upshifting	1—2	65 kmph (40 mph)
	2—3	112 kmph (71 mph)
Max. speed when "Kick-down" downshifting can be obtained	3—2	105 kmph (65 mph)
	3—1	55 kmph (35 mph)

Driving

Starting the engine

Move the selector to **"P"** or **"N"**. An inhibitor prevents the engine from starting if the selector is moved to any of the other positions.

Carry out the following procedure **when starting:**

1 Check to make sure that the parking brake is on or depress the brake pedal (otherwise the car will start creeping when the selector is moved to any of the driving positions.)
2 Move the selector to the intended driving position.
3 Release the brake and drive off.

The car is **stopped** in the usual way by releasing the accelerator pedal and depressing the brake pedal. It is not necessary to move the selector lever.

If the car gets stuck in snow, loose sand, etc., it can be "rocked" loose by moving the selector alternately between the **"D"** and **"R"** positions during continuous light accelerator pressure.

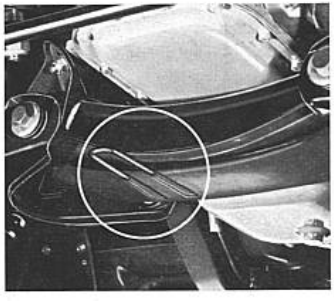
Important

Do not select "P" or "R" when the car is moving.

Do not select "D", "2", "1" or "R" at an engine speed higher than idling when the car is stationary.

Do not select **"2"** or **"1"** at speeds above 115 kmph (72 mph).

Never over-rev the engine. The speed reached at the red-lined field on the rev. counter is only temporarily permitted. The engine speed must never be allowed to reach the completely red field.



Towing

General

If the car is to be towed, the tow line must not be tied directly to the bumper. Use instead the towing loop (see picture above) attached to the front axle member.
During towing, the tow line should be evenly streched.

Starting by towing (manual transmission)

Turn on the ignition. Depress the clutch pedal and engage 3rd gear. The towing car should be driven at even speed in 2nd gear. When speed has reached 15—25 kmph (10—15 mph), slowly release the clutch in the towed vehicle. Concerning starting on a downhill grade, see page 68.

Towing (automatic transmission)

If necessary, the car can be towed with the selector lever in **"N"** position providing that the transmission is properly adjusted and the oil is at the approved level. Maximum permissible speed when towing is 30 kmph (20 mph) and the longest distance towing can take place is 30 km (30 miles). If your car has to be towed longer than this or if you suspect that the transmission is faulty, raise the rear wheels or disconnect the propeller shaft in order to avoid damage to the transmission.

Cars with automatic transmission cannot be started by towing.

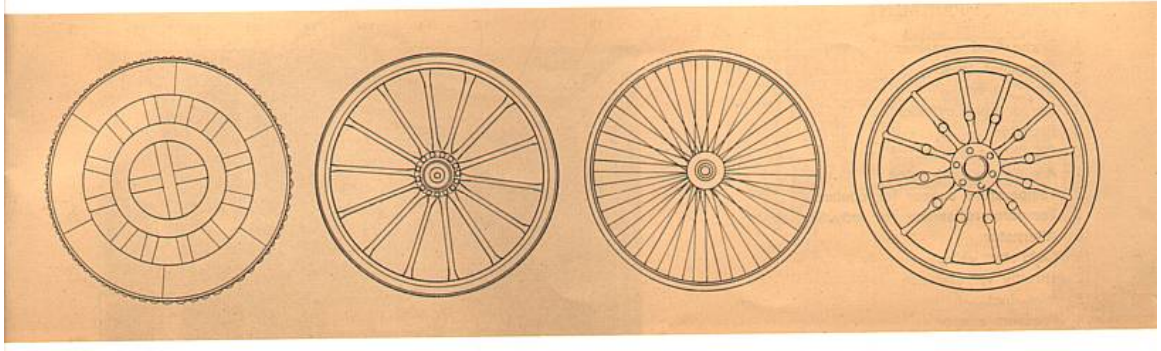
If the battery is flat, the cables of the assist starter battery should be used instead for starting.

IMPORTANT. Always connect the plus cable of the assist starter battery to the plus pole on the car battery and the minus cable to the minus pole.

Current legislation concerning max. speed during towing should be observed.

Braking

When you drive your car in the rain or through pools of water, also when washing the car, water can spash on the brake discs and linings and thereby alter the friction properties of the brake linings so that a certain delay in braking effect can sometimes be noticed.
If you drive some 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.



TECHNICAL DESCRIPTION

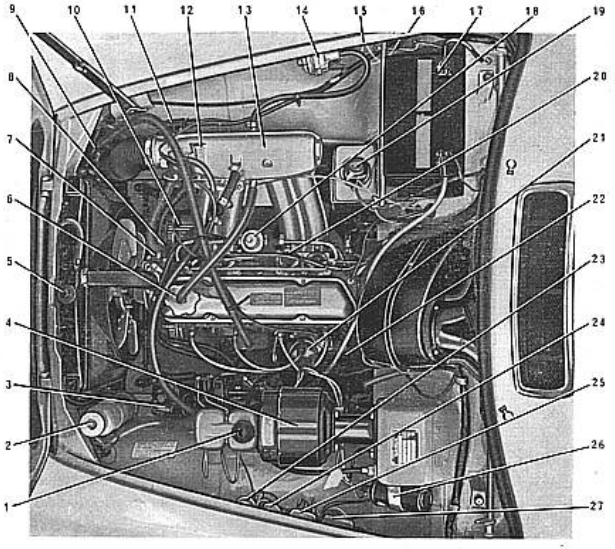
GENERAL

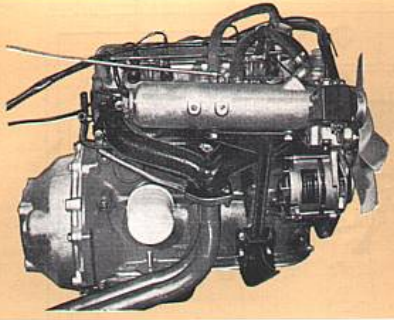
The Volvo 1800 E has a self-supporting body and for this reason there is no chassis frame. The front and rear suspension, also the engine and gearbox, are directly attached to the body.

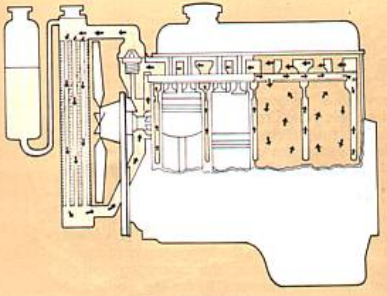
The following pages contain a description of the main components of the vehicle.

ENGINE COMPARTMENT

1 Brake fluid container
2 Expansion tank
3 Steering box
4 Servo brake cylinder
5 Radiator
6 Oil filler cap
7 Auxiliary air regulator
8 Temperature sensor for coolant
9 Temperature sensor for induction air
10 Alternator
11 Cold start valve
12 Throttle valve switch
13 Inlet duct
14 Pressure sensor
15 Relay for fuel pump
16 Main relay for fuel injection
17 Battery
18 Windscreen washer motor and fluid
19 Pressure regulator
20 Injectors
21 Distributor
22 Starter motor
23 Relay for horn
24 Relay for back-up lights
25 Step relay for fullbeam and dipped headlights
26 Ignition coil
27 Relay for electrically heated rear window







ENGINE

General

The B 20 E engine is a straight, four-cylinder, water-cooled overhead valve unit with a five-bearing crankshaft. The cylinder block is made of special cast iron in one piece. The cylinder liners are machined directly in the block.

Lubricating system

Engine lubrication is taken care of by a gear-type pump under the crankshaft in the oil sump. This pump is driven through a gear from the camshaft.

From the pump the oil is forced through the oil cleaner and then through drillings to the various lubricating points. A relief valve built into the oil pump prevents oil pressure from reaching excessively high values. The oil filter is of the full-flow type, that is the oil passes through the filter before continuing on to the engine lubricating points.

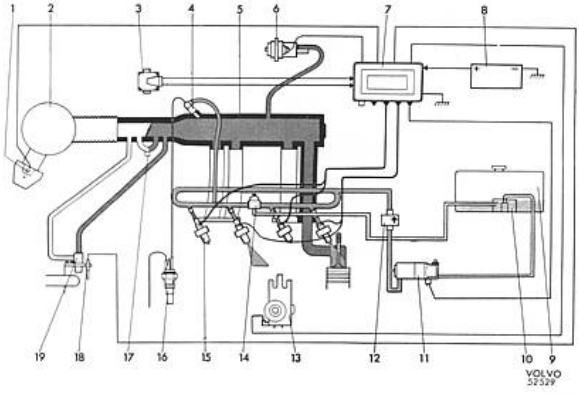
Cooling system

The cooling system is of the sealed pressure type and incorporates a circulation pump. When the engine is cold, the coolant circulates only inside the engine. As the engine warms up, a thermostat valve starts opening the outlet to the radiator. A special expansion tank prevents air from circulating with the coolant as this would cause corrosion in the cooling system.

The fan on the B 20 E is driven via a slip-coupling which keeps the fan speed at a max. 3 000—3 500 rpm, this resulting in a lower noise level and somewhat increased output.

Fuel system, B 20 E

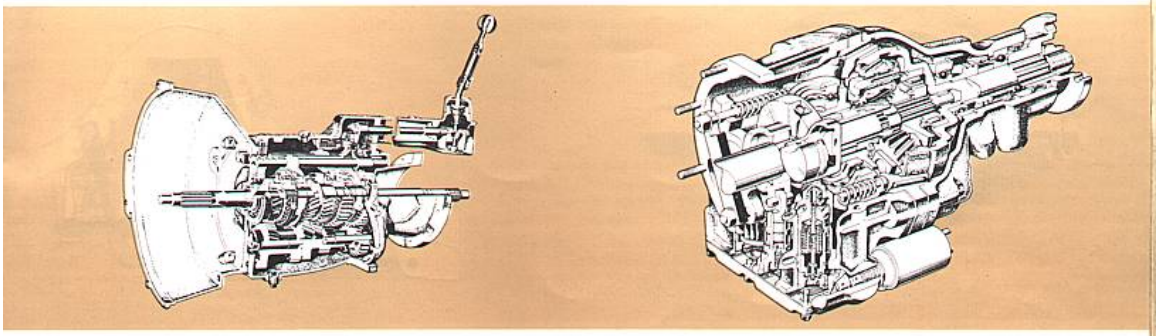
The B 20 E engine is fitted with an electronic fuel injection system.
This system includes an electronic control unit (7) which converts the impulses from the various sensors in the engine to control signals which regulate the four solenoid-actuated fuel injectors (15). The control signals influence the opening times of the injectors and thereby the amount of fuel injected.
The mixture of fuel and air is modified the whole time according to the conditions under which the engine is running. Engine speed is governed by the triggering contacts (13) in the distributor, the operating temperature by the sensor (18) for the coolant, the temperature of the induced air by the sensor (1) and the engine load by the pressure sensor (6) which is connected to the inlet duct. In addition, the control unit is provided with information concerning the position of the throttle valve by means of the throttle valve switch (3). This information is "computerized" in the control unit and retransmitted in the form of control impulses to the injectors.
Fuel is injected into the inlet ports in the cylinder head just before the intake valves. The fuel is delivered to the injectors via an electric fuel pump (11) which maintains a constant pressure of 2 kp/cm² (28 psi) in the fuel line with the help of a pressure regulator (14).



Principle of operation, fuel injection system B 20 E

1 Temperatur sensor for induction air
2 Air cleaner
3 Throttle valve switch
4 Cold start valve
5 Inlet duct
6 Presure sensor
7 Control unit (electronic)
8 Battery
9 Fuel tank
10 Fuel filter, suction side
11 Fuel pump
12 Fuel filter, discharge side
13 Triggering contacts in distributor
14 Pressure regulator
15 Injectors
16 Thermal timer contact
17 Idling adjusting screw
18 Temperature sensor for coolant
19 Auxiliary air regulator

Partial vacuum in inlet duct
Fuel at atmospheric pressure
Fuel under 2 kp/cm² (28 psi) overpressure



POWER TRAIN

Clutch

The clutch is of the single dry plate type. Pressure on the diaphragm plate is obtained from a diaphragm spring which in turn is controlled mechanically by the clutch pedal via the throw-out yoke.

Manual gearbox

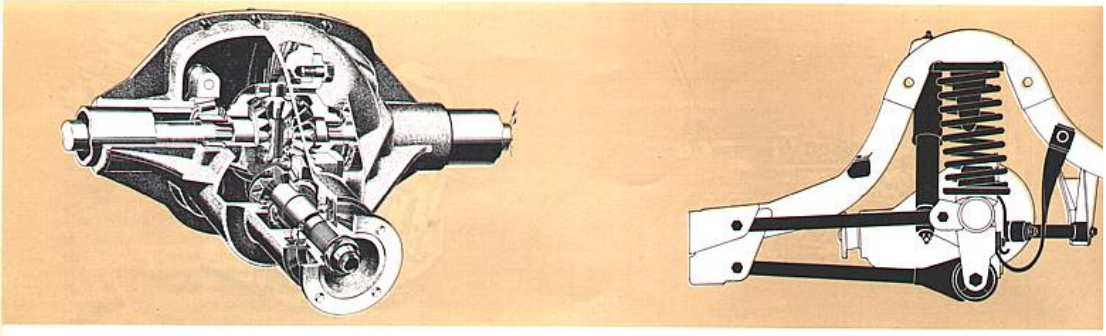
The manual gearbox is a four-speed unit with overdrive and is synchronized on all forward gears. Robust synchronizing rings makes for smoother gear-changing.

Overdrive

The overdrive is engaged by means of a lever under the steering wheel. The overdrive makes it possible to reduce engine speed while retaining road speed, this resulting in a lower noise level and lower fuel consumption.
It can only be engaged when fourth gear is engaged.

Automatic transmission

As alternative, the 1800 E and ES can be fitted with an automatic transmission, type BW 35. In principle, the automatic transmission consist of two main components — a hydraulic torque converter and a hydraulically operated planetary gearbox with control system. The converter acts as a clutch and extra gear between engine and transmission.



Propeller shaft

The propeller shaft is divided in two sections. At its rear end, the front section is journalled in a bearing housing consisting of a rubber ring.

Final drive

The final drive is of the hypoid type, that is, the input shaft is located below the centerline of the output shafts.

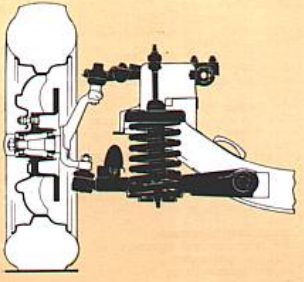
Limited slip differential

On certain markets, a limited slip differential can be obtained as extra equipment. A rear axle with a limited slip automatically transmits the tractive power to the wheel having the best road grip when a wheel begins to skid. Except for the differential, the rear axle is similar in design to a conventional rear axle. **Warning.** Do not rotate a jacked-up rear wheel with limited slip differential if the other rear wheel is still on the ground. Due to the differential there is still drive on the wheel in contact with the ground. Rotating the jacked-up rear wheel will thus move the other rear wheel and may cause the car to topple off the jack.

REAR AXLE

The Volvo 1800 E and ES have a rigid rear axle, coil springs and double-operating, hydraulic telescopic shock absorbers. The rear axle is carried in support arms and torque rods. The support arms are journalled at the rear axle casing and body. The tie rods are journalled in the body and with levers in the rear axle casing. The torque rods prevent the rear axle from twisting during acceleration and braking.

A track bar prevents the body and rear axle from moving sideways in relation to each other.



FRONT END AND STEERING

Front end

The front wheel suspension components are mounted in a robust box profile member which is bolted to the front section of the body.

The front wheels are journalled in taper roller bearings.

The front springs consist of coils springs inside of which telescopic shock absorbers are fitted.

The car is provided with stabilizers attached to the lower control arms and the body.

Steering system

The car is fitted with a cam and roller type steering gear. Movements of the steering wheel are transmitted via the worm on the steering column to the roller on the pitman arm shaft, which in its turn, actuates the wheels through a linkage system.

The steering column is divided and the upper and lower sections are linked by means of a universal joint. With this arrangement it is possible for the steering column to give way in a frontal collision. The column is also provided with a connection which permits axial displacement at powerful impact.

HEATING SYSTEM

The heating system is a combined warm-air and fresh-air system. Incoming fresh air is blown by means of a fan through the cell system of the element and out into the vehicle. By means of the various controls, the fresh air can be both heated up and directed to suitable places in the vehicle. From there the air passes out through the compartment through a louver in the rear, upper side panels, then via the non-return valves and ducts to the evacuation vents in the rear mudguards. This arrangement makes for good coupé ventilation as well as effective de-misting of rear and side windows.

ELECTRICAL SYSTEM

The electrical system has a voltage of 12 V and includes an alternator.

The starter motor is operated by means of the ignition switch. This switch also switches on and off the rest of the electrical equipment. However, the cables to the headlights, parking lights and interior lighting are not connected across the ignition switch and so can be switched on and off without the ignition key being in position.

Lighting

The front lighting consist of headlights (full and dipped beam), turn indicators and parking lights which are all enclosed as one unit. A warning buzzer is wired to the lighting. It goes on when a front door is opened and the headlights are still on. The rear lamps house the turn indicators, rear and brake lights, also back-up lights 1800 ES). The license plate light fitting also houses the back-up lights (1800 E).

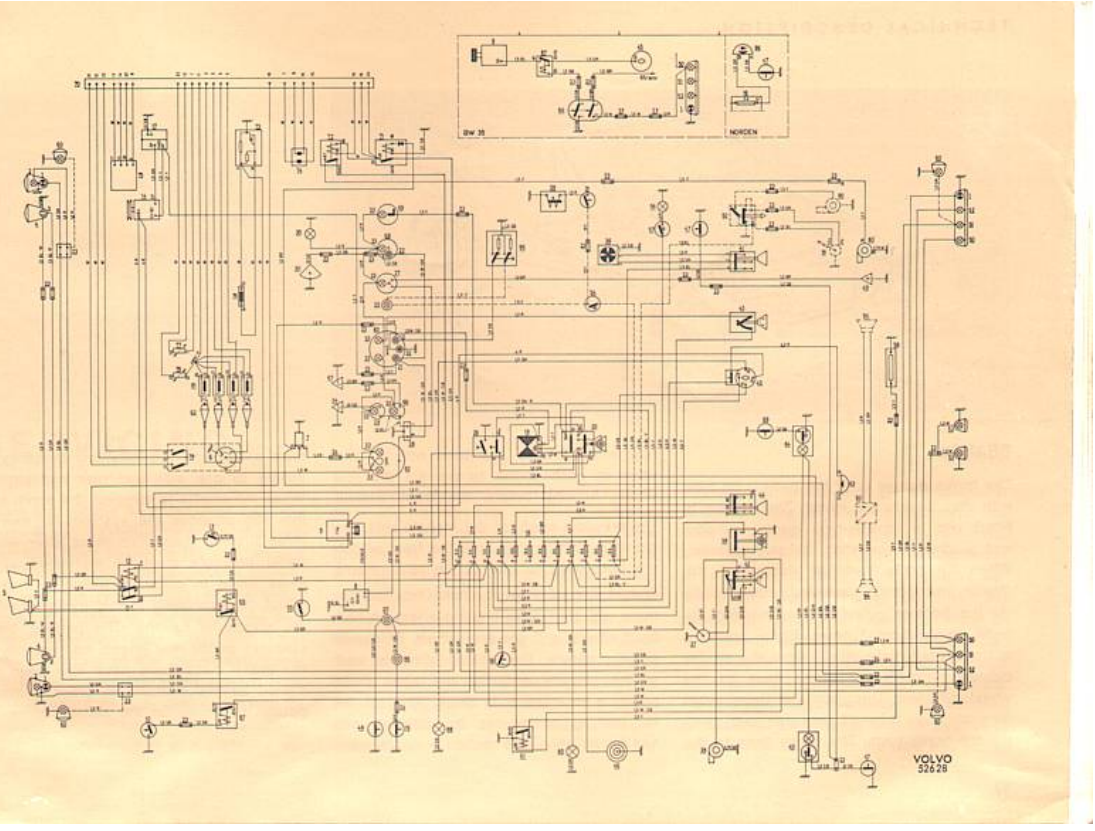
The interior lighting consists of two roof lamps and a map reading lamp.

Concerning changing bulbs, see pages 56—59.

Wiring diagram

SV	Black	BR	Brown
W	White	W-SV	White-Black
Y	Yellow	W-GN	White-Green
GN	Green	BL-R	Blue-Red
GR	Grey	BL-W	Blue-White
BL	Blue	BL-Y	Blue-Yellow
R	Red	GN-R	Green-Red

1. Turn indicators 32 cp
2. Parking lights 4 cp
3. Dipped headlights 40 W
4. Fullbeam headlights 45 W
5. Horn
6. Distributor firing order 1-3-4-2
7. Ignition coil
8. Battery 12 V 60 Ah
9. Starter motor 1.0 h.p.
10. Switch for back-up lights (M 41)
11. Warning lamp for headlight fullbeam 3 W
12. Step relay for fullbeam and dipped headlights and headlights flasher
13. Horn ring
14. Alternator 35 A
15. Switch for safety belts
16. Fusebox
17. Charging regulator
18. Brake stop light contact
19. Warning safety hazard flasher
20. Warning lamp for brakes 2 W
21. Warning lamp for battery charging 3 W
22. Warning lamp for oil pressure 2 W
23. Connector
24. Connector (only right-hand drive)
25. Warning lamp for overdrive (M 41) 2 W
26. Switch for turn indicators and headlight flasher
27. Fuel gauge
28. Voltage stabilizer
29. Temperature gauge
30. Oil pressure sensor
31. Switch for overdrive, on transmission (M 41)
32. Warning lamp for turn indicators 3 W
33. Instrument panel lighting
34. Temperature sensor
35. Lighting for heater control panel 3 W
36. Car heater
37. Windscreen wipers
38. Windscreen washers
39. Control solenoid for overdrive, on transmission
40. Interior lighting
41. Switch for car heater 2×6 W
42. Switch for windscreen wipers and washers
43. Rheostat for instrument panel lighting
44. Lighting switch
45. Ignition switch
46. Cigarette lighter
47. Door switch
48. Switch for parking brake control
49. Fuel gauge sender
50. Back-up lights
51. Brake stop lights 32 cp
52. Tail-lights 4 cp
53. License plate light 2×4 cp
54. Switch for overdrive (M 41)
55. Brake warning contact
56. Map reading lamp
57. Switch for map reading lamp
58. Electrically heated rear window 150/40 W
59. Switch for electrically heated rear window
60. Side marker lights (USA) 5 W
61. Relay for electrically heated rear window
62. Spark plugs
63. Warning buzzer
64. Contact on transmission (BW 35)
65. Horn relay
66. Oil temperature gauge
67. Oil temperature sender
68. Oil pressure gauge
69. Clock
70. Control unit (electronic)
71. Main relay for fuel injection
72. Relay for fuel pump
73. Thermal timer contact
74. Pressure sensor
75. Throttle switch
76. Cold start valve
77. Temperature sensor I
78. Temperature sensor II
79. Triggering contacts
80. Fuel pump
81. Injectors
82. Rev. counter
83. Speedometer
84. Cargo space light (1800 ES)
85. Light, safety belts
86. Warning lamp, safety belts
87. Relay for reversing lights (starter relay on BW 35)
88. Gear positions light, BW 35 autom. trans.
89. Tailgate switch (1800 ES)
90. Tailgate window washer (1800 ES)
91. Tailgate window wiper (1800 ES)
92. Switch, tailgate wiper-washer (1800 ES)
93. Radio
94. Loudspeaker
95. Dimmer switch for overdrive warning lamp, M 41
96. Warning buzzer, headlights
97. Warning lamp, brakes


BW 35
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VOLVO
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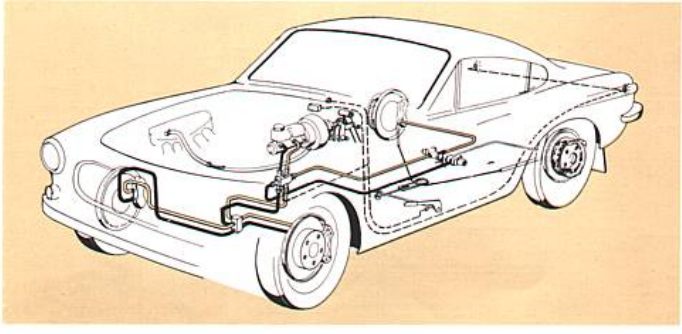
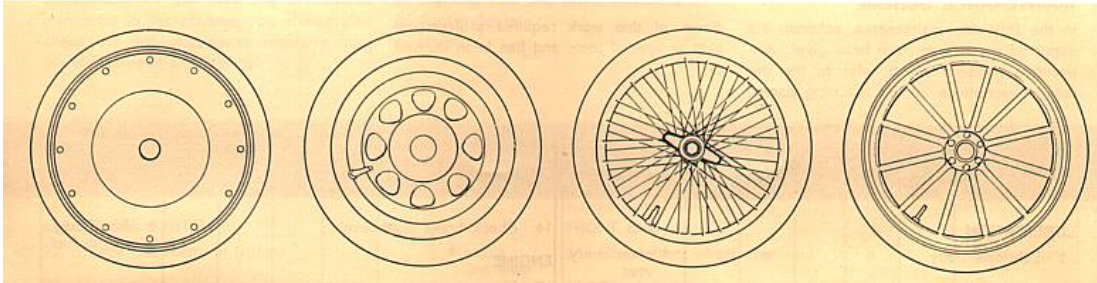


BRAKES

The brake system is of the two-circuit type with disc brakes all round. The system is fitted 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 boosting the pedal force about 3 times. Brake pressure is transmitted hydraulically from the master cylinder through the brake lines to the wheel cylinders. The pistons in these cylinders are then pressed outwards and operate the brake pads. The brake lines to the rear wheel brakes are fitted with a relief valve in each circuit to prevent the rear wheel locking before the front wheels.

The principle used for the triangle-split dual circuit system is that both the front wheels are connected to one of the rear wheels. Should one of these systems not function, there will always be braking effect on both front wheels and one rear wheel. At normal pedal pressure, the braking effect of each of the circuits is 50 %, but when pedal pressure is increased, about 80 % of the full braking power can be obtained with one circuit only. This system provides maximum safety and prevents any tendency of pulling to one side and rear end jazzing. When the engine is stopped, the servo system still provides the systems for two or three braking operations more after which pedal pressure must be increased about three times in order to obtain a braking effect corresponding to that available while the engine is running. The parking brake operates on the rear wheels mechanically as the brake discs there have also been designed as brake drums in order to incorporate the shoes for the parking brake.



SERVICING

GENERAL

Before the vehicle was delivered from the factory it was subjected to a very thorough inspection. Your dealer, in his turn, carried out a further delivery inspection in accordance with the requirements of the Volvo Factory. In addition to this there is the free service inspection after 2 500 km (1 500 miles). Servicing of the car should thereafter follow the routine in the service book which is based on a system of service inspections after every 10 000 km (6 000 miles). The simplest way to provide the vehicle with the servicing it requires is to have all the servicing done by a Volvo workshop. You will then have the work specified in the service book carried out in accordance with recommended prices and the workshop stamp in the service book will show when the vehicle was serviced. When the car was being designed, particular attention was given to the "safety" details (e.g. front end, brakes and steering). They are calculated to withstand the severest stresses with a wide safety margin. However, if you use your car for hard driving, you should take the precaution of checking these parts during the useful lifetime of the car, for instance, when front-end components are being reconditioned. If you prefer to carry out the simpler servicing procedures yourself or if you are sometimes obliged to have them done by a workshop outside the Volvo organization, this chapter contains some advice as to when and how they should be carried out. For the sake of convenience, the servicing procedures have been summarized in a maintenance scheme in the next two pages.

MAINTENANCE SCHEME

In the following maintenance scheme, the servicing procedures have been given consecutive numbers which refer to the detailed descriptions on the following pages.

Some of this work requires professional skill or special tools and has been marked O.

Operation	carried out every: 10 000 km 6 000 miles	40 000 km 24 000 miles	See note below
LUBRICATION			
1 Lubricate body	•		• once every year
2 Check oil level in engine			• when filling up with fuel
3 Change oil in engine	•[1]		see also page 46
4 Check oil level in transmission and overdrive	•		
5 Change oil in gearbox		o[2]	
6 Check oil level in overdrive			
7 Change oil in overdrive			
8 Check oil level in autom. trans.			
9 Check oil level in final drive	•		
10 Change oil in final drive			•[3]
11 Check oil level in final drive with limited slip differential			
12 Change oil in final drive with limited slip differential			
13 Check oil level in steering box	•		
14 Check brake fluid level			• when filling up with fuel
ENGINE			
15 Clean crankcase ventilation		•	
16 Change oil filter	o		
17 Change fuel filter, B 20 E			o 20 000 km (12 000 miles)
18 Change air cleaner, B 20 E		•	
19 Check valve clearances	o		
20 Carry out compression test	o		
21 Check fan belt tension	o		
22 Check cooling water level			• when filling up with fuel
23 Change coolant			• every second year
24 Check spark plugs	o		
25 Check ignition distributor contacts	o		
26 Check ignition timing	o		

[1]) Also after the first 2 500 km (1 500 miles) during the running-in period.

[2]) Also after the first 5 000 km (3 000 miles) during the running-in period.

[3]) Only after the first 5 000 km (3 000 miles).

*) Only on certain markets

In addition to the servicing procedures mentioned in the scheme, you should also check the following points regularly from the viewpoint of road safety:

a: Lighting, including brake stoplights
b: Turn indicators
c: Horn

Operation	carried out every: 10 000 km 6 000 miles	40 000 km 24 000 miles	See note below
ELECTRICAL SYSTEM			
27 Check electrolyte in battery			• every 2nd week
28 Check state of charge of battery	o		
29 Check headlight alignment	o		
POWER TRANSMISSION			
30 Check free travel on clutch fork	o		
31 Check propeller shaft	o		o once every year
BRAKES			
32 Check brakes	o		
33 Change servo cylinder air filter and inspect brakes			o every 3rd year
FRONT END			
34 Check front wheel alignment	o		o once every year
35 Check ball joints, steering rods, etc.	o		o once every year
WHEELS AND TYRES			
36 Check air pressure in tyres			• every 2nd week
BODY			
37 Washing			see page 63
38 Polishing			see page 63
39 Anti-rust treatment			see page 64
40 Cleaning			see page 64

WHEN FILLING THE TANK

The only servicing required between the 10 000 km (6 000 miles) inspections are the checks listed opposite, which should be carried out when filling the tank. We give here a brief summary of these checks. A more detailed description is to be found in the following pages in the chapter "SERVICING".

Check to make sure that the fuel you use for the B 20 E has the **proper octane rating, that is, at least 97** octane.

Also check:

1 **Oil level in the engine.**
The oil level should be between the two marks on the dipstick.
If necessary top up with multigrade oil, see also page 46.

2 **Coolant level.**
The level should be between MAX and MIN on the expansion tank.
If necessary fill up with a mixture of 50 % anti-freeze and 50 % water.

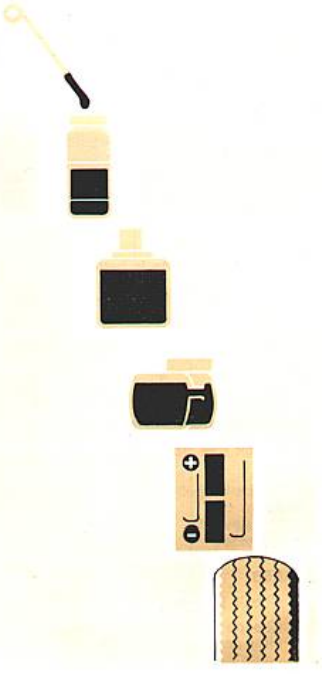
3 **Level in windscreen washer container.**
This container should always be well filled. (In wintertime with water and anti-freeze.)

4 **Brake fluid level.**
Check without removing the brake fluid container cap that the level is above the MIN mark.
If necessary top up with brake fluid SAE 1703.

Also check the following at every second visit to the filling station:

1 **Acid level in battery.**
The level should be up 5—10 mm (5/16") above the cell plates.

2 **Air pressure in tyres.**
Front wheels 1.7 kp/cm² (25 psi), rear wheels 1.9 kp/cm² (27 psi). For long-distance driving at speeds near the maximum for the car, the air pressure should be increased by 0.3 kp/cm² (4.3 psi).

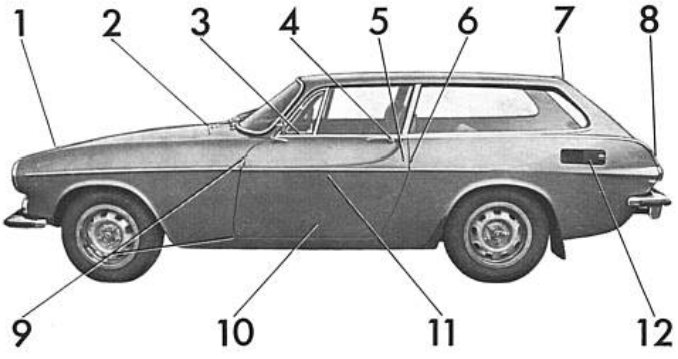


LUBRICATION

Always use only first-class lubricants of well-known make. The right lubricants in the right quantity at the right time will increase both the lifetime and the reliability of your car.

Chassis maintenance

To make it easier to maintain your Volvo, the vehicle has been equipped with ball joints, steering rods and propeller shafts of such a construction that they do not require regular lubrication. This has been possible due to the fact that points normally requiring lubrication have been packed with very durable grease at the factory and then carefully sealed, thus obviating the need for subsequent lubrication.

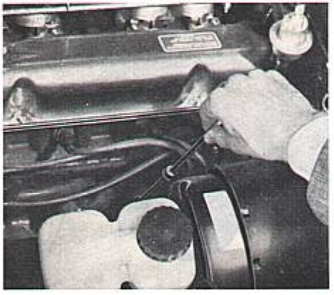


Lubricate body

In order to avoid squeaking and unnecessary wear, the body should be lubricated once every year. The hinges on the bonnet, doors and boot lid as well as door stops should be lubricated every 10 000 km (6 000 miles)*). Moreover, during the winter months the locks on the doors and boot lid should be given some anti-freeze to prevent them from freezing up.

No.	Lubricating point	Lubricant
1	Bonnet hinges	Oil
2	Bonnet catch	Paraffin wax
3	Ventilator window catches and hinges	Oil
4	Door handle lock buttons	Paraffin wax
	Key holes	Lock oil
5	Door lock lubricating hole	Oil
6	Catches	Paraffin wax
7	Tailgate hinges (1800 ES)	Oil
8	Luggage compartment lid hinges (1800 E)	Paraffin wax
	Tailgate lock (1800 ES)	Oil
	Luggage compartment lid lock (1800 ES)	Paraffin wax
	Key hole	Lock oil
9	Door hinges	Oil
	Door stops	Paraffin wax
10	Front seat slide rails	Paraffin wax
	Seat catches	Oil
11	Window lifts	Oil and grease
	Locks (Accessible after door upholstery panels have been removed)	Silicon crease
12	Fuel filler cap hinges	Oil
	Lock	Lock oil

*) Included in 10 000 km (6 000 miles) inspection.



2 Check oil level engine

The oil level in the engine should be checked each time the fuel tank is filled. The check should be carried out with the engine switched off but warm and, in order to obtain comparable values, about 1 minute after the engine has been stopped. Wipe the dipstick before measuring. The oil level should be between the two marks on the dipstick. It must never be permitted to go down below the lower mark but, on the other hand, it should not be above the upper mark since oil consumption will then be abnormally high. If necessary, top up by filling through the oil filler hole on the rocker-arm casing with new oil of the same type already in the engine.

3 Change engine oil

When the engine is new or has just been reconditioned, the oil should be changed after the first 2 500 km (1 500 miles). Subsequent oil changing is according to the intervals given below. These intervals will depend to a great extent on the type of oil used. For engine lubrication, oil grade "For Service MS", is to be used. As far as viscosity is concerned, **multigrade oil** is recommended. These oils are better suited for demanding driving conditions, for example, continuous driving in city with continuous stopping and starting and also long periods of running at idling speed.

For engine oil with viscosity SAE 10 W-30 (multigrade), 10 W-40 or 20 W-50, the oil should be changed every 10 000 km (6 000 miles), or at least once a year.

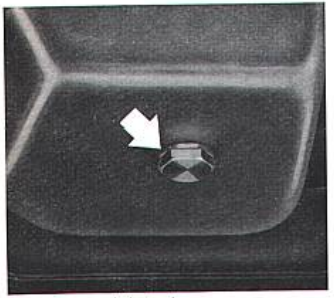
If engine oil with viscosity SAE 10 W (singlegrade), 20/20 W or 30 is used, the oil should be changed every 5 000 km (3 000 miles), or at least twice a year.

At very low temperatures (below —20° C = —4° F) multigrade oil SAE 5 W-20 is recommended. However, this oil should not be used when the temperature is continuously above 0° C (32° F).

The old oil is drained off by removing the drain plug on the sump. Drainage should take place after driving when the oil is still warm.

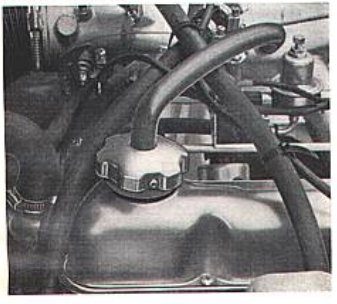
Viscosity Oil grade	Temperature range	Oil change intervals km (miles) [1]	Oil capacities
SAE 10 W-30 SAE 10 W-40 SAE 20 W-50 "For Service MS"	all year round at all temperatures above —10° C (14° F)	10 000 (6 000) or at least twice a year	No oil filter 3.25 litres (5.7 Imp. pints = 6.9 US pints)
SAE 10 W 20/20 W 30 "For Service MS"	below —10° C (14° F) between —10° C and +30° C (14 and 90° F) above 30° C (90° F)	5 000 (3 000) or at least twice a year	With oil filter 3.75 litres (6.6 Imp. pints = 7.9 US pints)

[1]) Change the oil after the first 2 500 km (1 500 miles) during running-in.



Above: Engine oil drain plug

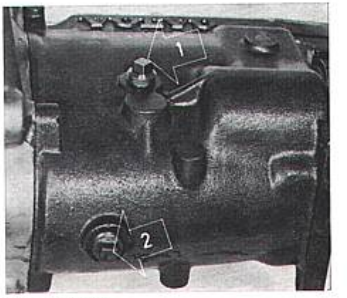
Below: Oil filler cap



6—7 Gearbox with overdrive (M 41)

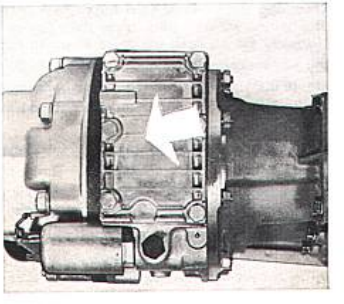
The oil level of the gearbox with overdrive should be checked after every 10 000 km (6 000 miles). The overdrive has the same oil system as the gearbox. The oil level should be up to the gearbox filler hole. The oil is to be changed after every 40 000 km (24 000 miles). In the case of a new or reconditioned gearbox with overdrive the oil should be changed after the first 2 500 km (1 500 miles) and the gearbox with overdrive should also be thoroughly flushed with the same type of oil used later. The oil should be drained off immediately after the car has been driven while the oil is still warm. The oil is drained out by removing the drain plug and also the cap for the overdrive oil strainer. Each time the oil is changed, the overdrive oil strainer must be cleaned and this should be done by a Volvo workshop.
When filling up with new oil, make sure that the oil runs over into the overdrive.

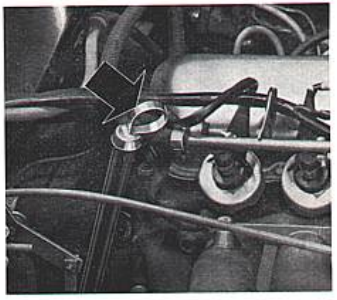
Oil grade	Viscocity	Oil capacity
Engine oil	SAE 30 or Multigrade SAE 20 W-40	1.6 litres pints 2.8 Imp. pints 3.4 U.S.



Above: Gearbox
1. Level and filter plug 2. Drain plug

Below: Overdrive





Checking the oil level (BW 35)

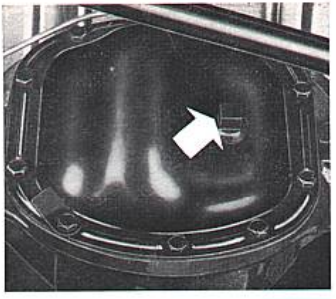
Normally the oil need not to be changed but the oil level should be checked every 10 000 km (6 000 miles). The filler pipe with the marked dipstick is under the bonnet just in front of the cowl.

Note. The dipstick has different markings for hot and cold transmission. The car should be on level ground when checking the oil level. With the engine idling in "P", the level should be between the upper and lower marks on the dipstick. When topping up is necessary, use only Automatic Transmission Fluid, type F.

The dipstick should be wiped with a nylon cloth, paper, etc. Rags which can leave fluff on the dipstick must not be used.

For vehicles used for hard driving or in hilly country, an authorized Volvo workshop should be allowed to carry out preventive service every 40 000 km (24 000 miles).

Oil grade	Oil capacity
Automatic Transmission Fluid, Type F	6.4 litres 11.3 Imp. pints 13.5 US pints



Final drive

The oil level in the final drive should be checked after every 10 000 km (6 000 miles). The oil level should be up to the filler hole. If necessary, add new oil. The final drive oil is to be changed after the first 2 500 miles (1 500 km). The old oil is drained out by removing the cover on the rear side of the final drive housing and this should be done immediately after the car has been driven while the oil is still warm. (The oil

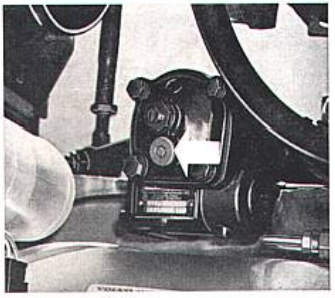
Oil grade	Viscocity	Oil capacity
Rear axle oil acc. to MIL-L-2105 B	SAE 90 or SAE 80 if temperature continuously below —10°C (14°F)	1.3 litres 2.3 Imp. pints 2.7 US pints

can also be removed by sucking it up through the filler hole with an oil syringe. The final drive is to be thoroughly flushed with the same type of oil used in the drive before the new oil is added. After this only the oil level need be checked and topping-up with the recommended oil carried out if required. Vehicles with BW-35 have final drive reduction ratio 3.9:1, others 4.3:1.

11—12 Limited slip differential

Cars fitted with a limited slip differential are delivered from the factory with a transmission oil according to the American Military Standard MIL-L-2105 B provided with an additive for final drives with limited slip differential. A similar type of oil should be used for subsequent topping-up and changing. Oil level checking and oil changing are to be carried out at the same intervals and in the same way as for a final drive without a limited slip differential.

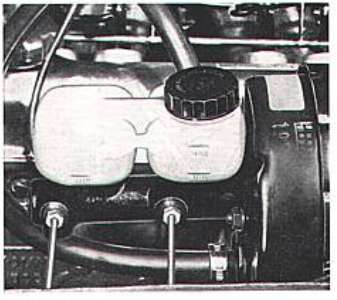
Transmission oil MIL-L-2105 B with additive for limited slip differential.



Steering box

The oil level in the steering box is to be checked after every 10 000 km (6 000 miles. The oil level must reach the filler plug. If necessary, add new oil. Usually it is not necessary to change the oil in the steering box except when carrying out reconditioning. If it has to be changed, the old oil can be sucked up with an oil syringe which is inserted through the filler hole.

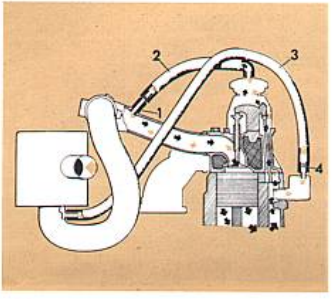
Oil grade	Viscosity	Oil capacity
Hypoid oil	SAE 80 All year round	0.25 liter 0.4 Imp. pint 0.5 US pint

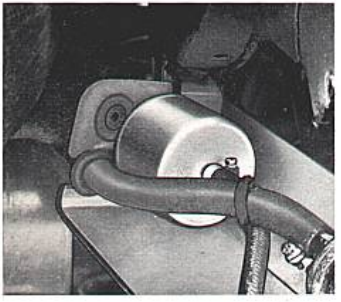


Brake fluid

The brake system is fitted with a tandem-type brake fluid container in two sections, one for each circuit, but with the same filler hole. Check each time you visit a filling station that the brake fluid level is above the minimum mark.

Use only brake fluid conforming to specification SAE J 1703 for the hydraulic brake system. Brake fluid with designations DOT3 or DOT4 can also be used.





ENGINE

15 Crankcase ventilation

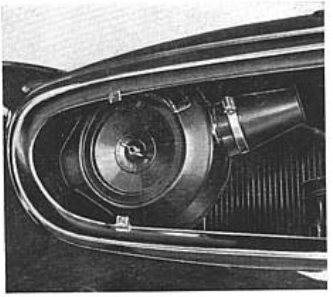
The engine is provided with positive crankcase ventilation which prevents the gases in the crankcase from being released into the atmosphere. Instead, they are sucked into the intake manifold and take part in the combustion process whereupon they are blown out through the exhaust pipe together with the other combustion gases. Every 40 000 km (24 000 miles) remove and clean the nipple (1), the hoses (2 and 3) and the flame protector (4). Rubber hoses should also be replaced if they are in a poor condition.

16 Oil filter

The engine is fitted with a full-flow type oil filter, which means that all the oil passes through the filter on its way from the oil pump to the various lubricating points. Impurities in the oil are collected in the filter and gradually block it. For this reason, the filter must be changed every 10 000 km (6 000 miles). Scrap the old filter then.
If the oil filter is replaced without the engine oil being changed, the engine should be topped up with 0.5 litre (1 pint) of oil.

17 Fuel filter

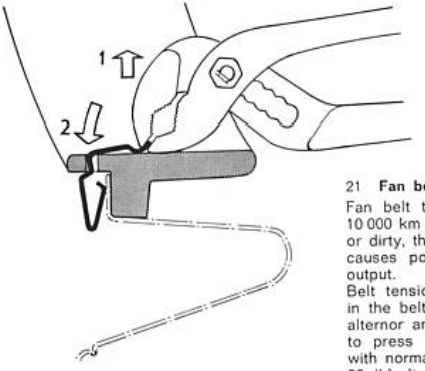
The fuel filter is located under the car close to the fuel tank. This filter is to be changed after every 20 000 km (12 000 miles). The filter is replaced as one complete unit.
Clean the fuel lines and the surrounding components before carrying out the change. When changing the filter, clamp the fuel lines to prevent fuel from running out. Notice when fitting the new filter that the arrow on the filter housing is to point in the direction of flow. Filter replacement should be carried out by an authorized Volvo workshop.



18 **Change air cleaner paper filter**

The air cleaner paper filter is to be changed after every 40 000 km (24 000 miles). When driving often on dusty roads, replacement should be carried out more frequently. The air cleaner is located at the front behind the radiator grille.

The radiator grille must first be removed. Then the butterfly nut on the air cleaner cover is loosened and the cover and the paper filter can be taken out. Clean the container and fit a new paper filter.



19 **Check valve clearance**

The valve clearance should be checked every 10 000 km (6 000 miles).

The check can be carried out with the engine hot or cold.

Concerning valve clearances, see "Specifications" on page 70.

This check should be done by a workshop.

20 **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 should preferably be carried out by a workshop.

21 **Fan belt**

Fan belt tension is to be checked every 10 000 km (6 000 miles). If it becomes worn or dirty, the belt can start slipping and this causes poor engine cooling and alternor output.

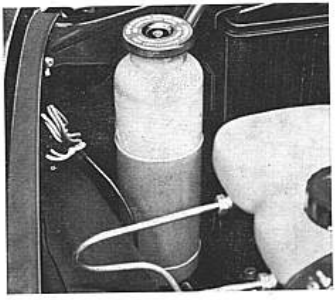
Belt tension can be checked by pressing in the belt at a point midway between the alternor and the fan. It should be possible to press in the belt about 10 mm (½") with normal pressure (F = 7.5—10 kp/16—22 lb). It is advisable to have this check done by a Volvo workshop.

To adjust belt tension, slacken both the attaching bolts. The belt is then tensioned by levering at the front of the alternor.

Remove radiator grille

To remove the radiator grille, first take off the clips holding the grille in position. This is done as follows:

1 Insert pliers (see illustration) between the grille ribs and lift up the front end of the clips.
2 Push the clip down in its hole.
3 When all the clips have been removed in this way, the grille can be taken out.



22 **Check coolant level**

If the cooling system is to work with maximum efficiency, it must be well filled and free from leaks. Check the coolant level each time the fuel tank is filled. The level should be between the "Max" and "MIN" marks on the expansion tank.

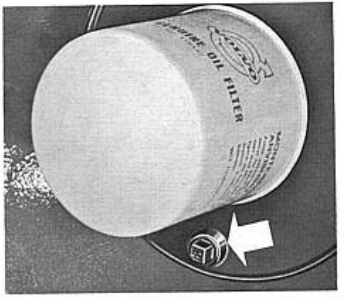
Make doubly sure that this check is carried out when the engine is new or after the cooling system has been empty.

Do not remove the filler cap except when adding or filling up with coolant. This is to avoid hindering the circulation between the engine and expansion tank during warming up and cooling down.

Topping-up coolant

Top up the coolant by filling the expansion tank when its level has gone down to the "Min" mark. Use 50 % good quality anti-freeze mixed with 50 % water all the year round and top up to the "Max" mark.

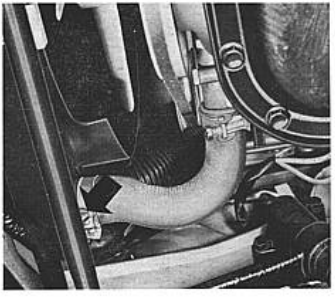
NOTE. Do not top up with water only, particularly during the winter. Water by itself reduces both the rust-protective and anti-freeze qualities of the coolant. It can also cause damage to the cooling system if ice should form in the expansion tank.



23 **Change coolant**

The coolant retains its properties for approx. 2 years when it should be changed. To drain the cooling system, remove the drain plug on the oil cooler and disconnect the hose attached to the bottom of the radiator. The expansion tank is emptied by removing it from its brackets and lifting it to a sufficient height so that the coolant flows into the radiator. Before filling with new coolant, flush the entire system with clean water.

The cooling system is filled with coolant through the filler opening on top of the radiator. When this is being done, the heater control should be set to max. heat to ensure that the entire system is filled.



Fill the radiator to the top and fit on the cap. Then fill the expansion tank to the "Max" level or slightly above this.
Run the engine warm and then check that the radiator is full and the coolant in the expansion tank is at "Max". If necessary top up the system.

24 **Spark plugs, adjust electrode gap, change spark plugs**

The spark plugs are to be removed after every 10 000 km (6 000 miles) and the electrode gap is to be measured. This gap should be 0.7—0.8 mm (0.028—0.032"). After every 20 000 km (12 000 miles) the spark plugs are to be changed. The spark plug should preferably be tightened by using a torque wrench (tightening torque 3.5—4.0 kpm = 25—30 lbft). When changing the spark plugs, check to make sure that the right type of spark plug is obtained. Bosch W240 T 35 or corresponding spark plugs of another make is recommended for the B 20 E.

When changing the spark plugs, also check that the spark plug shields are in good condition. Cracked or damaged shields are to be replaced.

25—26 **Ignition system**

The ignition contact breaker points and the engine ignition timing should be checked every 10 000 km (6 000 miles).
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.

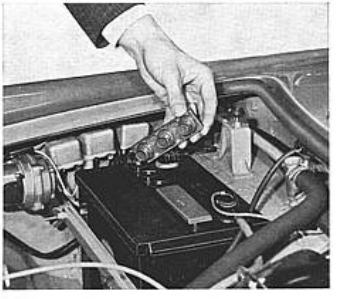
Fuel

Fuel with an **octane value of at least 97** (Research Method) is recommended. Knocking can occur if too low an octane fuel is used.

Special instruction when working on the electronic fuel injection system

1 **Never** let the engine run without the battery being connected.
2 **Never** use a high speed battery charger as a starting aid.
3 When using a high speed charger to charge the battery in the vehicle, the battery should be disconnected from the rest of the electrical system.
4 The control unit **may not** overheat above +85° C (185° F). The control unit must not be connected up (the engine started) when ambient temperature exceeds +70° C (158° F). (With paintwork, etc., when the vehicle is being stove-heated, it may not be driven out of the oven, it must be conveyed out. If there is risk of temperatures exceeding 85° C [185° F], the control unit must first be removed.)
5 The ignition should be switched off before connecting up or disconnecting the control unit.
6 For all work with fuel lines, **great** care must be taken to ensure that no dirt enters the system. Even small dust particles can jam injectors.

Any work to be done on the electronic fuel injection system should be carried out by an authorized Volvo workshop which has the proper equipment for doing this.



ELECTRICAL SYSTEM

27 Check battery electrolyte level

If the battery is to give you good service, the electrolyte level should be checked regularly. A convenient time for doing this is when filling the tank. The electrolyte level should be 5—10 mm (5/16") above the cell plates. If the level is too low, top up with distilled water. Never add too much distilled water as this can cause the acid to splash over and possibly damage the engine compartment. Never check the electrolyte level by lighting a match. The gases formed in the cells are highly explosive.

28 Check 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 a hydrometer which shows the specific gravity of the battery acid (this varies with the state of charge of the battery). See page 72.
At the same time check the lead terminals and terminal studs to make sure that they are tight and smeared with rustproofing and that the battery is firmly fixed. If necessary, wipe the lead terminals and terminal studs clean with a cloth or brush them with a wire brush and re-grease them.

29 Check headlight alignment

The alignment of the headlight should be checked in a workshop after every 10 000 km (6 000 miles). Remember that the section of the road lit up the headlights can vary according to the load in the vehicle.

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 If the battery is connected up the wrong way, the rectifiers will be damaged. Before connecting up, check the polarity of the battery with a voltmeter.

2 If extra batteries are used for starting, they must be properly connected to prevent the rectifiers from being damaged.
The negative cable from the auxiliary starter battery must then be connected to the negative terminal on the car battery and the positive terminal on the auxiliary starter battery to the positive terminal on the car battery.

3 If a rapid charger is used for charging the battery, the car battery cables should be disconnected. The rapid charger must never be used as an auxiliary unit for starting.

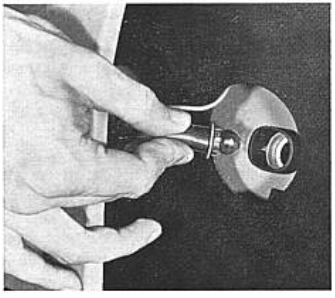
4 Never disconnect the battery circuit (for example, to change the battery) while the engine is running. This would ruin the alternator immediately. Always make sure that all the battery connections are properly tightened.

5 If any electrical welding work is to be carried out on the car, disconnect the battery earth connection and all the cables on the alternator. The welding machine used is to be connected as close to the welding point as possible. Isolate well if necessary.

Replace bulbs

To obtain maximum lighting effect and to forestall the chances of lights going out, the headlight bulbs should be changed every year, suitably during the autumn. The following pages explain how the bulbs in the various lighting units are replaced. Make sure when fitting the bulbs that the guide pin on the socket fits into its corresponding recess.

When installing bulbs, do not touch the glass with your fingers. The reason for this is that grease, oil or any other impurities can be carbonized on to the bulb and this could damage the reflector.



Replace bulb for map reading light

The bulb is located to the right under the dashboard. To remove it, first press it in slightly and then turn it anti-clockwise.

Replace bulbs for instrument panel and heater control lights

Because of the location of the above lights, a Volvo workshop should be given the job of replacing the bulbs.

Replace bulbs for interior lighting

The bulb is accessible after the lamp cover has been removed. This is done by bending the cover loose with a screwdriver. Insert the screwdriver between the rim and glass and slightly turn to loosen.

The following sections deal with bulb replacement. Bulbs in the 1800 E differ from those in the 1800 ES. The 1800 E is dealt with first.

Replace bulbs for license plate light and tail-lights (1800 E)

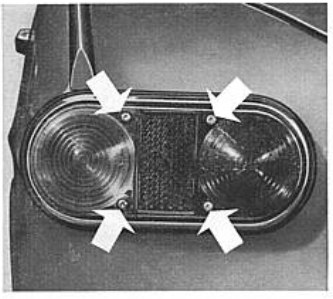
The bulbs for the license plate light and tail-lights are accessible from inside the cargo compartment.

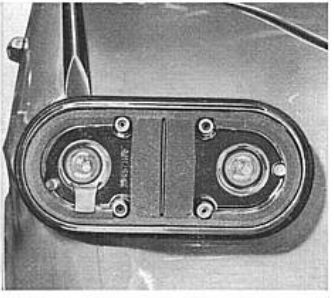
The bulb holder is released by moving it to the one side. The bulb can then be removed from its bayonet fitting.

Note when fitting the bulb that a tab must fit in between the tongues on the holder.

Replace bulbs for rear turn indicators flashers, tail-light and brake stop-lights (1800 E)

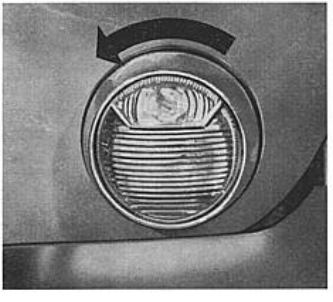
Loosen the screws with a Philips screwdriver and remove the glas.
The bulbs are now accessible for replacement. The outer lamp is the turn indicator, the inner lamp the stop-light and tail-light.

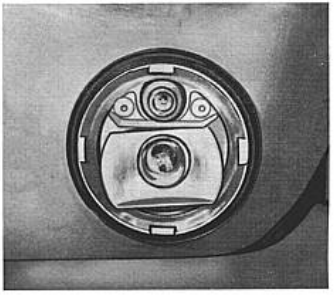




Replace bulbs in front parking lights/ turn indicator flashers (1800 ES)

First remove the glass and the rim by turning in an anti-clockwise direction. The bulb is now accessible for replacement.
The upper bulb is for the parking light, the lower for the flasher.





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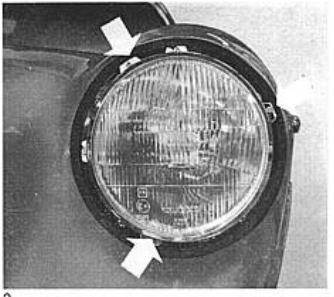

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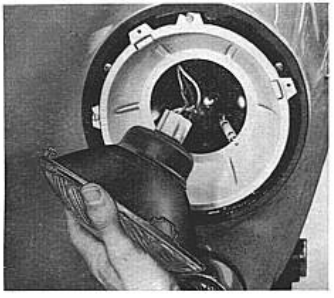

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Change bulbs for headlights

Applies both to 1800 E and 1800 ES.

1 Remove the screw at the bottom of the rim with a screwdriver.
Pull out the bottom of the rim a bit and at the same time lift upwards in order to release the catch.

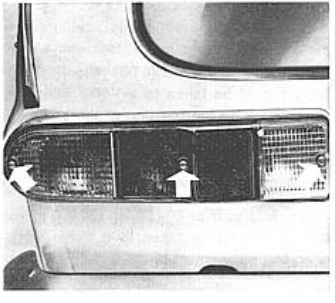
2 Remove the three crosshead screws securing the inner ring. Then lift out the insert.

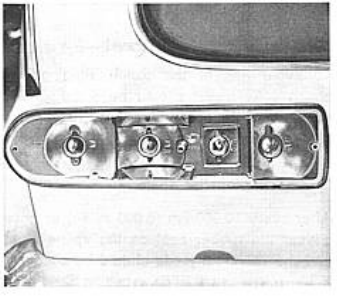
3 Disconnect the contact to the bulb holder and remove the rubber cover.

4 Remove the spring holding the bulb holder in proper position.
Take out the bulb holder with bulb and replace complete. When re-installing insert, make sure that the small catch hooks onto its notch.

Change bulbs for turn indicators, stop-lights, tail-lights and reversing lights (1800 ES)

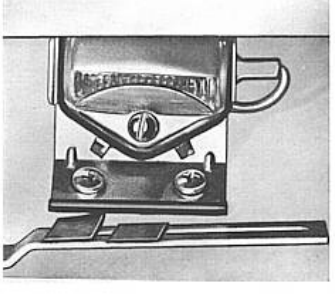
Release the three screw securing the glass with a Philip screwdriver. Remove the glass. The bulbs are now accessible for replacement.
From left to right (see picture opposite), the lamps are for: turn indicators, stop-lights, tail-lights and reversing lights.

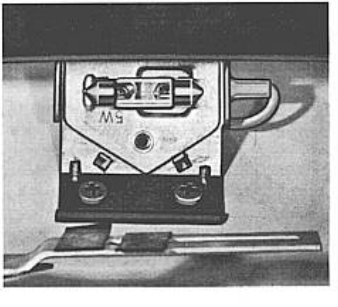




Change bulbs for license plate lighting (1800 ES)

Both the bulb cables are wired underneath the body just inside the bumper. The bulb glass is released by an ordinary screwdriver and the glass removed. The bulbs are now accessible for replacement.





POWER TRANSMISSION

30 Check clutch yoke travel

To avoid risk of the clutch slipping, the clutch yoke travel should be checked and adjusted if necessary every 10 000 km (6 000 miles).

31 Check propeller shaft

After every 10 000 km (6 000 miles) or once a year the rubber seal on the spline shaft and the universal joints should be checked. If the rubber seal is damaged, it should be replaced and the new seal filled with molybdenum disulphide grease.

BRAKES

32 Check brakes

After every 10 000 km (6 000 miles) the vehicle should be taken to a Volvo workshop for a check on the function of the brakes.

33 Replace booster cylinder air filter and overhaul brakes

Every third year or 60 000 km (36 000 miles) the car should be taken to a Volvo workshop for replacement of the booster cylinder air filter.
The brake system seals should also be replaced at the same time.

FRONT END

34 Check front wheel alignment

Correct front wheel alignment is of vital importance for the steering of the vehicle. Faulty adjustment can mean heavy wear on the tyres. For this reason, have the front wheel alignment checked regularly at your local Volvo workshop every 10 000 km (6 000 miles). If the vehicle has been in collision involving heavy impact and it is suspected that the front end may have been affected, take the vehicle to a Volvo workshop for a check on the front wheel alignment as soon as possible. Volvo workshops have special measuring equipment for this purpose and can carry out this control very quickly. The front wheel alignment angles are shown on page 73.

35 Check ball joints, steering rods, etc.

After every 10 000 km (6 000 miles) the vehicle should be taken to a workshop for a check on the front end concerning excessive play in the ball joints, steering gear, etc.
After every 10 000 km (6 000 miles) or at least once a year, the ball joint seal should also be checked for damage and leakage. When new seals are fitted they should be filled with the recommended grease.

WHEELS AND TYRES

General

The car is fitted with pressed steel wheels. All wheels are accurately balanced. The tyres are 185/70 HR 15 tubeless, low-profile, radial tyres and are intended for speeds up to 210 kmph (130 mph).
Rim size: 5½ J 15 FH.
Recommended as winter tyres are 165 F 15 (165 R 380) radial tyres with or without snow studs.
Snow chains may only be fitted on the rear wheels and, for reasons of space, have a wire diameter which does not exceed 4 mm (5/32").
Rapid links cannot be fitted since the space between the calipers on the disc brakes and rims does not permit this.

Snow tyres should also have a running-in period of between 500—1 000 km (300—600 miles). During this period, try to avoid taking bends at high speed, high speeds and abrupt braking and acceleration.
Most tyres have a wear indicator in the form of a number of sections in the wear tread where the tyre pattern is about 15 mm $^{19}/_{32}$") firmer than the rest of the wear tread. The wear on this indicator warns the driver in good time about the state of the tyres. **Remember that there must be a pattern depth of a least 1 mm (1/32") over the entire wear tread.**

36 Check tyre pressure

Make a habit of checking the tyre pressure regularly. The simplest way to do this is to check the pressure at a service station while filling up with fuel. See page 44 for the correct air pressure. Do not forget the spare wheel when checking the air pressure.

During driving, the temperature of the tyres rises and also the air pressure in relation to the speed on the vehicle and its load. **Normally the air pressure should only be checked when the tyres are cold.** When the tyres are warm, a change in pressure should take place only when air must be pumped into the tyres.

Too low air pressure is one of the most common reasons for tyre wear. Tyres which are insufficiently inflated also result in difficult steering and high fuel consumption. Too high air pressure means tyre wear along the centre of the tread. It also tends to make travelling less comfortable.

Check tyre wear pattern

At regular intervals check the tyres for damage, abnormal wear and for any small stones which may have fastened in the tread pattern. Check also that the tread pattern is not less than 1 mm (1/32"). If it is less than this, the tyre must be changed. Be careful when parking the car next to the pavement not to damage the tyres against the pavement curb.

Changing a wheel

Before jacking up the car, apply the parking brake. If possible, place blocks or stones in front of and behind the wheels which are on the ground as a further safety measure. Remember that the parking brake only operates on the rear wheels.

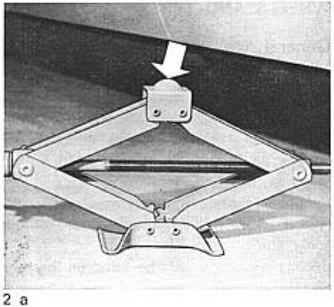
Removing

1 Loosen the wheel nuts slightly with the socket wrench. All the wheels have right-hand thread nuts which are loosened in an anti-clockwise direction.
2 Fit the jack into the jack recess nearest the wheel which is to be changed. Jack up the side of the car so high that the wheel rotates freely.
3 Remove the wheel nuts completely and lift off the wheel. Be careful when lifting off the wheel to avoid damaging the wheel stud threads.

Installing

1 Fix the hub cap on the rim from inside the rim according to the picture on next page and clean the contact surfaces between wheel and hub.
2 Lift on the wheel. Tighten the wheel nuts so that the wheel is secure against the flange.
3 Lower the vehicle and final-tighten every other nut at a time.

1



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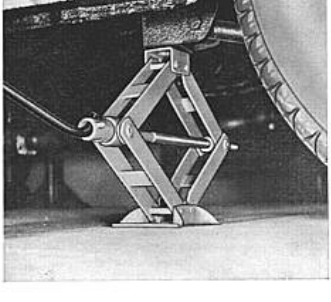

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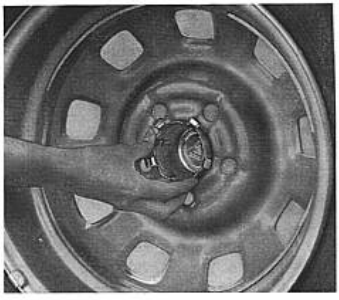


Never rotate a raised rear wheel if the car is fitted with a limited slip differential. Turning the jacked-up rear wheel also move the other rear wheel on the ground, and probably cause the cart o topple off the jack.

BODY

37 Washing

The car is to be washed frequently since dust, dirt, dead insects, tar spots, etc. adhere firmly to the body and may damage the paintwork. Washing is also important to counteract rusting. During the winter, special care should be taken to ensure that all road salt residue is washed off as soon as possible, otherwise corrosion can occur.

A vehicle, the bodywork of which has been well taken care of, has of course a higher trade-in value, should the owner consider selling it.

When washing the car, make sure that it is not exposed to direct sunlight since this can cause drying patches. Begin by softening up the dirt on the underside of the body with a jet of water and use if necessary a soft brush. Then rinse down the whole body with a light jet until the dirt has loosened up. After this, wash off the dirt with a sponge using plenty of water. Start at the roof of the vehicle and work down the body.

Use preferably lukewarm but not hot water. To facilitate washing we recommend a reliable car washing agent. Even a normal liquid dish-washing agent can be used. A suitable dosage is 5—10 cl (1½—3½ fl. ozs.) dish-washing agent. to 10 litres (2.2 Imp. galls/2.6 US galls) of water. Tar spots and asphalt can be removed with white spirit or similar. This should be done after washing.

When a washing agent is used, the car should be well rinsed down with clean water afterwards. Begin with the roof of the car and work down the body. Then dry carefully with a soft clean chamois leather. Use different leathers for the windows and the remainder of the car, since using the same leather can cause greasy smears on the windows. When washing the car, remember to clean the drainage holes in the doors and bottom rail.

Note. When washing the car in a washing bay, the ventilation controls should be closed. In certain cases, the air intake for the car heater should be covered.

38 Polishing (waxing)

The car does not need to be polished until the surface appears to be a little dull and normal washing is no longer sufficient to make it shine again. Under normal conditions it is sufficient to polish the vehicle a couple of times a year on condition that it is carefully looked after and thoroughly washed as soon as it has become dirty.

Before the vehicle is polished, it should be carefully washed and dried to avoid scratches on the paintwork.

When about to apply wax, make sure that the surface is absolutely clean before application. It is often necessary to use cleaning naphtha for the cleaning.

Waxing is no substitute for polishing. Nor is it necessary as a protection for the paintwork again unfavourable weather. Very often waxing should first be carried out at the earliest one year after delivery of the car.

Touch-up paintwork damage

The synthetic finish makes great demands on workshop equipment as well as technical skill and therefore you should take the car to a Volvo workshop for the repair of more extensive damage. Minor damage caused by flying gravel, etc., and small scratches can, however, be attended to by the owner himself. Damage caused by flying stones requires immediate treatment if rusting is to be avoided. Always make a habit, therefore, of checking the finish regularly and touch-up if required. Volvo dealers can supply you with suitable touching-up paint in tins or spray bottles. Always make sure that you get exactly the right color. Touching-up is as follows:

1 If the damage has penetrated down to the bare metal, the damaged surface must be scraped absolutely clean with a pen-knife or some other similar tool. If there is still an undamaged coat of paint at the bottom of the damaged patch, then a light scraping to remove dirt is sufficient.
2 In the case of more extensive damage caused by flying gravel, it may be necessary to carry out treatment with rust-proofing primer. The primer must cover the whole of the scraped area and the rubbed-down edges.
3 When the rust-proofing primer has dried, genuine Volvo paint is applied. Stir up the paint well if it is in a can or shake it properly if it is in a spray bottle before use. Apply the paint in several thin coats and allow each coat to dry thoroughly.

Chromed parts

The chromed and anodized parts are to be washed with clean water as soon as they have become dirty. This is particularly important if you often drive on dirty roads on which chemicals have been spread to bind the dust or during the winter when salt is used to get rid of snow and ice. After washing, wax or rust-proofing agent can be applied.

39 Rust-proofing

The Volvo 1800E and ES are rust-proofed at the factory. On the underside of the body, sealing compound is applied in the wheel housings and rust-proofing compound to the entire floor plate and under the edges of the door sills. Rust-proofing fluid is sprayed on to chassis parts.

Inspection and possible touching-up of the rust-proofing should be carried out at regular intervals and at least once every year. At least once every year, rust-proofing should also be carried out in closed body sections by means of oil mist spraying.

If the rust-proofing at any point is in need of improvement, this should be done immediately so that moisture does not have time to force its way in under the rust-proofing and thus destroy it.

40 Cleaning

Cleaning upholstery

The upholstery consists leather and vinyl-coated fabric.

The leather parts are cleaned with a damp cloth or possibly a mild soap solution. Consult a cleaning expert concerning the choice of a suitable cleaning agent in the case of more extensive or heavy stains. The vinyl-coated fabric is washed with a tepid soap solution or, in difficult cases, with a household detergent.

Do not use petrol, white spirit, carbon tetrachloride or similar cleaning agents since these can damage both the leather and the vinyl-coated fabric.

Clean floor mats

The floor mats should be gone over with a vacuum cleaner or brushed clean regularly. During the winter the mats should be taken out for drying now and then.

A mild washing agent can be used for removing any spots.

BEFORE A LONG-DISTANCE TRIP

If you are thinking of taking your car abroad or on a long journey, have it well checked at a Volvo workshop. You will enjoy your journey better if you know that your car is in perfect trim. Irritating incidents can be avoided as well as expensive and time-absorbing stoppages. Wherever you go there should be a Volvo workshop within easy reach to attend to your car if required. However, it is always a good idea before making such a trip to ensure that, at least on a minor scale, you have with you a comprehensive touring kit. This is particularly the case if you anticipate widely varying conditions as regards climate, roads and the prevalence of much dust. Many workshops stock special kits for this purpose. Remember when filling up with fuel to observe the existing fuel recommendations.

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

1 Check the brakes, wheel alignment and steering gear.

2 Check the engine and drive units with regard to leakage of fuel, oil or coolant.

3 Examine the tyres carefully. Replace worn tires.

4 Check that the engine is running satisfactorily and that fuel consumption is normal.

5 Examine the state of charge of the battery and clean the terminals.

6 Look over the tool equipment and check the spare wheel.

7 Check that the lighting functions properly.

COLD WEATHER

When cold weather is on the way, it is time to think of the winter servicing of your car. The first night of frost can come as a very unpleasant surprise unless preventive precautions have been taken.

Engine lubricating system

During the winter multigrade oil SAE 10 W-30 is used for the engine lubricating system. At very low temperatures (—20° C = —4° F) multigrade oil SAE 5 W-20 is recommended. These oils reach the lubricating points in the engine more easily at low temperature and also facilitate cold starting. See page 46.

Engine cooling system

A good quality anti-freeze should be used all the year round. Thus, the cooling system should always contain water plus anti-freeze and rust inhibitor, even during the summer.

The coolant keeps it properties for approximately two years, when it should be changed. A suitable time for doing this is in the autumn. This will ensure against possible damage from frost during the winter months. When the coolant is being changed, the cooling system should be flushed out with clean water. For further details, see page 52. If the coolant has to be topped up during the winter, do not add only water as water by itself weakens both the anti-frost properties as well as the rust-proofing effectiveness of the coolant. Experience has also shown that extremely weak anti-freeze solutions (10—20 %) are very unfavourable from the point of view of rust protection. For this reason, the quantity of anti-freeze should amount to about 50 % of the coolant, that is, 4.3 litres (7.5 Imp. pints = 9.0 U.S. pints) this lowering the freezing point to —35° C (—31° F).

Radiator spirit is not recommended as an anti-freeze agent since it evaporates at normal engine temperature.

Engine fuel system

During the winter with large variations in temperature, condensation water can form in the fuel tank, and this might have a disturbing effect on the running of the engine. This can be eliminated by putting winter fuel additive or similar in the tank. There will also be less risk of condensation if the fuel tank is well filled as often as possible.

Electrical system

The electrical system in the car is subjected to greater stresses during the winter than during the warm summer months. The lighting and starter motor are used more often so that more current is consumed. Also the capacity of the battery is considerably lower at low air temperature. Therefore, the state of charge must be checked more often then and, if necessary, the battery charged. If the battery voltage is excessively low, there is risk of the battery being damaged by frost.

Brake system

During very cold weather the brakes are subjected to splash and condensation water which can result in the parking brake freezing up if left on. Therefore, when you park your car, do not apply the parking brake but engage the first gear or reverse and if possible place blocks behind the wheels.

Windscreen washers

Just as we add anti-freeze to the cooling system during the winter to prevent frost damage, anti-freeze should also be added to the water container for the windscreen washers. This is particularly important because the windscreen during the winter frequently becomes dirty and is often splashed with water which rapidly freezes, so the windscreen washers and wipers have to be used very often. Your dealer can supply you with suitable anti-freeze for this purpose.

Anti-freeze for door locks

A frozen door lock is one of the most irritating things that can happen to a car owner. Many valuable minutes early in the morning can be wasted warming up keys and melting ice in locks. Remember this in good time and lubricate the locks in advance with some suitable anti-freeze agent. These are now available in small handy tubes which can easily find room in a handbag or coat pocket.

The information given below is intended only to serve as a guide in localizing and temporarily correcting minor faults. After having carried out any such measures, have them checked and adjusted by an experienced mechanic.

Engine does not start although starter motor turns it over at normal speed

1 Check there is fuel in tank.
2 Check that the fuel pump is operating. This is done by switching the ignition switch to driving position. The pump should be heard turning during 1 to 1.5 seconds. If the pump does not function, check to make sure that the pump fuse is not blown.
3 NOTE: Do not touch the accelerator pedal if the engine is cold.
If the engine is hot, try starting with the accelerator pedal depressed halfway.
Avoid repeated short attempts at starting. Instead, let the starter motor run a little longer (max. 15—20 seconds) at each try.
4 With damp weather, when flashover might occur, wipe the plug insulators clean. Remove and dry the distributor cap.
Check to make sure that the contact surfaces on the ignition points are clean.
Check to make sure that the ignition cables are firmly inserted in the distributor and ignition coil.
5 Check to make sure that all the contacts to the sender and injectors are firmly fitted.
6 If the engine turns round for a moment without having started, the cylinders may have too much fuel, so that the spark plugs have become moist. Screw out the spark plugs and dry them. Check the plug gap.
Important! A car with automatic transmission must not be started by pushing or towing. Use instead an assist battery. See page 30.

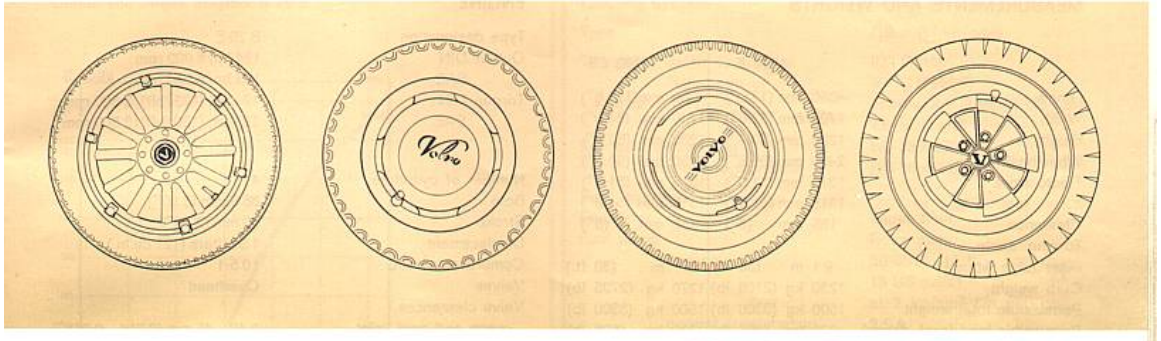
If engine misfires the reason may be:

1 That one of the ignition leads has loosened in the distributor cover or from a spark plug.
2 That one or more of the spark plugs is coated with soot or oiled up. Replace or clean plug concerned and adjust the plug gap.
3 That the distributor cap and rotor arm are cracked or damp.
4 That one of the ignition leads is in poor condition.
5 That the ignition points gap in the distributor is insufficient or non-existent.
6 That the ignition points are badly burnt.
7 That there is fault in the electronic unit for the fuel system (must be examined by a workshop).

How to start your car downhill

Switch on the ignition. Engage 3rd or 4th gear and let the car roll downwards with the clutch pedal depressed. When the speed is up to 15—25 kmph (9—15 mph), and not before, release the clutch pedal slowly.

Being towed: Secure the tow line to the towing loop. The car is towed at an even speed in 2nd gear. Try starting as suggested in the previous paragraph.



SPECIFICATIONS

MEASUREMENTS AND WEIGHTS

	1800 E	1800 ES
Length	4350 mm (171.")	4385 mm(172.6")
Width	1700 mm (67.0")	1700 mm (67.0")
Height	1280 mm (50.4")	1280 mm (50.4")
Wheelbase	2450 mm (96.5")	2450 mm (96.5")
Track, front	1315 mm (51.6")	1315 mm (51.6")
rear	1315 mm (51.6")	1315 mm (51.6")
Clearance	155 mm (6")	155 mm (6")
Turning circle, outer edge wheels	9.1 m (30 ft)	9.1 m (30 ft.)
Curb weight	1230 kg (2706 lb)	1270 kg (2795 lb)
Permissible total weight	1500 kg (3300 lb)	1500 kg (3300 lb)
Permissible load (excl. driver)	270 kg (595 lb)	230 kg (505 lb)
Permissible axle pressure, front	700 kg (1540 lb)	700 kg (1540 lb)
rear	800 kg (1760 lb)	850 kg (1870 lb)
Maximum permissible trailer weight	750 kg (1650 lb)	750 kg (1650 lb)

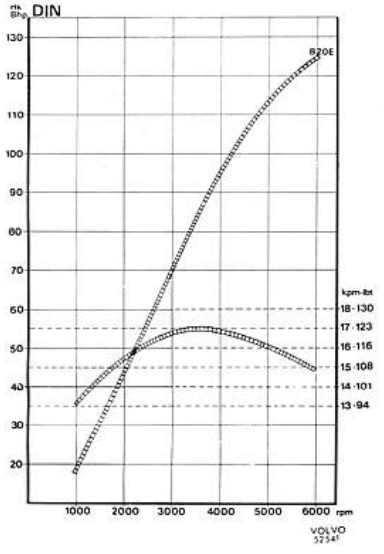
Cargo space 1800 ES (Acc. to SAE standards)

Height (immediately above rear axle W_{201})	570 mm (22.4")
Length (meas. from lower edge of side windows with rear seat folded down L_{204})	1440 mm (56.7")
Width (shoulder height in rear seat W_4)	1250 mm (49.2")
Cargo volume index	1020 c.c. (3.65 cu.in.)

ENGINE

Type designation	B 20 E
Output DIN	124 hp/6 000 rpm
SAE	135 hp/6 000 rpm
Torque DIN	17 kpm (123 lbft)/3 500 rpm
SAE	18 kpm (130 lbft)/3 500 rpm
Number of cylinders	4
Bore	88.9 mm (3.50")
Stroke	80 mm (3.15")
Displacement	1.99 liters (121 cu.in.)
Compression ratio	10.5:1
Valves	Overhead
Valve clearances, warm and cold, inlet	0.40—45 mm (0.016—0.018")
exhaust	0.40—45 mm (0.016—0.018")
Idling speed	900 rpm
Maximum permissible speed	6 500 rpm
Average piston speed at 6 500 rpm	17.3 m (57 ft.)/seconds

Output and torque diagram B 20 E



Cooling system	Sealed pressure system
Type	(10 = 0.7 kp/cm²)
Thermostat starts to open at	82° C (180° F)
fully open at	90° C (195° F)
Capacity	approx. 8.6 litres (9 US qts/ 7.5 Imp. qts)
Fan belt, designation	HC-38×888
right-hand drive car	HC-38×988
Fuel system	
Fuel filter	Paper filter
Fuel pump	Rotor pump
capacity	50 litres (11 Imp. galls/h = 13 US galls) at 2 kp/cm² (28 psi)
current consumption	2.5 A
Pressure regulator, setting value	2.0 kp/cm² (28 psi)
Air cleaner	Paper filter
Fuel	97 octane (Research Method)
Ignition system	
Order of firing	1-3-4-2
Ignition timing, stroboscope setting at 600—800 rpm, vacuum regulator disconnected	10° before TDC
Spark plugs, type	Bosch W 240 T 35 or corresponding
gap	0.7—0.8 mm (0.028—0.032")
tightening torque	3.5—4.0 kpm (25—29 lbft)
Distributor, ignition points gap	0.4—0.5 mm (0.016—0.020")

ELECTRICAL SYSTEM

Voltage	12 V
Battery, type	Tudor 6 EX 4 F
capacity	60 Ah
electrolyte, specific gravity	1.28
when re-charging is necessary	1.21
Alternator, type	Bosch K 1 (R) — 14 V 55 A
rating	770 W
maximum current	55 A
Starter motor, type	Bosch GF 12 V 1 PS
rating	1 hp
Fuses, number	5 A (four) 8 A (seven) 16 A (one)

The vehicle has anti-radio interference from the factory as follows:

Spark plugs, suppressor resistor	Bosch 0356 100 022 800—1400 ohms Bosch 1234 322 074 4000—7000 ohms

When replacing the suppressor resistor, resistor with same rating should be used

Lamp bulbs		**Rating**	**Base**	**Qty**
Headlights		45/40 W	P 45 T	2
Parking lights, front		4 cp	Ba 9 s	2
Brake stop-lights and tail-laghts	1800 E	34/4 cp	BAY 15 d	2
	1800 ES	20 W/5	Ba 15 s	2
Turn indicators		32 cp	Ba 15 s	4
Back-up lights		32 cp	Ba 15 s	1
License plate lighting		4 cp	Ba 9 s	2
Interior loghting		5 W	SW 8.5	2
Map-reading lamp		2 W	Ba 9 s	1
Instrument lighting, without clock		3 W	W 2.1 d	8
clock		2 W	Ba 7 s	1
Lighting, heating control panel		3 W	W 2.1 d	1
Safety belts				2
Warning lamps, headlight full-beams		3 W	W 2.1 d	1
battery charging		3 W	W 2.1 d	1
turn indicators		3 W	W 2.1 d	1
oil pressure		2 W	Ba 7 s	1
overdrive		2 W	Ba 9 s	1
brakes		2 W	Ba 9 s	1
electrically heated rear window		1.2 W	W 1.8 d	1
emergency warning flashers		1.2 W	W 1.8 d	1

POWER TRAIN

Clutch

Clutch yoke free travel	3 mm (1/8")

Transmission

Type designation	M 410	BW 35	
Ratios, 1st	3.13:1	2.39:1	× converter ratio
2nd	1.99:1	1.45:1	
3rd	1.36:1	1:1	
4th	1:1	—	
Overdrive	0.797:1	—	
Reverse	3.254:1	2.09:1	

Final drive

Type	Spiral bevel (M 41)	(hypoid) (BW 35)
Ratio	4.3:1	3.9:1

Speeds in kmph (mph) at 1000 engine rpm

1st speed	8.8 (5.5)
2nd speed	13.7 ((8.5)
3rd speed	20.0 (12.5)
4th speed	27.2 (17.0)
4th speed + overdrive	34.2 (21.3)
Reverse	8.4 (5.3)

FRONT WHEEL GEOMETRY

(Unloaded car, but including fuel, water and spare wheel)

Toe-in	0—3 mm (1/16")
Camber	0 to + ½°
Caster	0 to + 1°
King pin inclination (with 0° camber)	7.5°

WHEELS AND TYRES

Wheel size	5½ J15 FH
Tyre type	Radial ply with inner tube
Tyre size	185 HR 15
Tire pressure (cold tyres), front	1.7 kp/cm² (25 psi)
	1.9 kp/cm² (27 psi)

The pressure should also be increased by 0.3 kp/cm² (4 psi) for long-distance driving at a speed near that of maximum for the vehicle.

CAPACITIES

Fuel tank	approx. 45 litres (10 Imp. galls = 12 US galls.)
Cooling system	approx. 8.6 litres (2 Imp. galls. = 2.3 US galls.)
Engine, excl. oil filter	approx. 3.25 litres (5.7 Imp. pints = 6.9 US pints)
incl. oil filter	approx. 3.75 litres (6.6 Imp. pints = 7.9 US pints)
Transmission M 41	approx. 1.6 liters (2.8 Imp. pints = 3.4 US pints)
BW 35	6.4 liters (11.3 Imp. pints = 13.5 US pints)
Final drive	approx. 1.3 litres (2.3 Imp. pints = 2.7 US pints)
Steering box	approx. 0.25 litre (0.4 Imp. pint = 0.5 US pint)

TOOL KIT

Jack with lever	Two open-end spanners
Box spanner with lever	Philips screwdriver

Symbols

Brake fluid
Grade: SAE J 1703
SAE 70 R 3 can also be used

Final drive oil
Grade: Hypoid oil
Viscosity: See page 48

Special lubricants
See notes

Light engine oil

Engine oil
Grade: "For Service MS"
Viscosity: Multigrade oil
See also page 46.

Lubricating chart notes

Note 1. The wheel bearings are packed at the factory with special grease intended to last for the entire lifetime of the bearings. Normally this means that no replacement or filling of grease is required. In connection with any workshop operations involving uncovering the wheel bearings, the bearing should be cleaned and then lubricated with high-class, lubricating grease according to the instructions in the service manual. Except for this, no adding or replacement of grease is to be carried out.

Note 2. Check that the oil level is up to the filler plug. Use hypoid oil SAE 80 all the year round.

Note 3. Make sure that the fluid is up to the MAX mark.

Note 4. Lubricant the felt wick under the rotor and add a few drops of light engine oil to the lubricator.

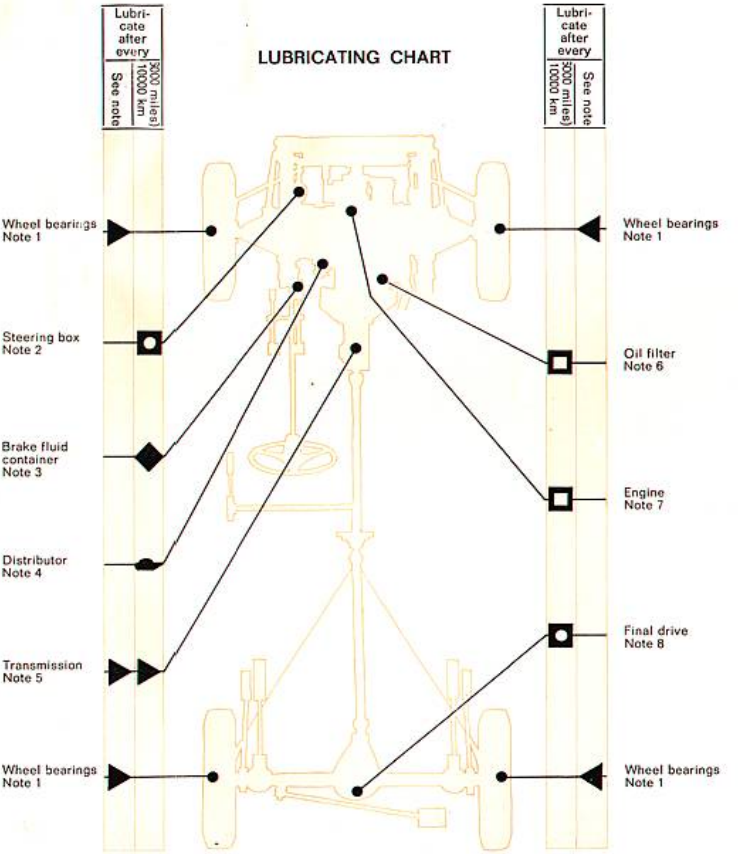
Note 5. Check every 10 000 km (6 000 miles) that the oil reaches up to the filler plug. Concerning oil changes, see pages 47, 48.

Note 6. Change the oil filter after every 10 000 km (6 000 miles). See page 50.

Note 7. Check the oil level when filling the tank with fuel. See page 46 concerning oil changes.

Note 8. Check after every 10 000 km (6 000 miles) that the oil level is up to the filler plug.
See pages 48, 49 concerning lubricant for a final drive fitted with limited slip differential.

LUBRICATING CHART



Fuel: 97 octane (ROT)

Air pressure (cold tyres, front: 1.7 kp/cm² (25 p.s.i.)
rear: 1.9 kp/cm² (27 p.s.i.)

For long-distance driving at a speed near that of maximum for the vehicle the pressure should be increased by 0.3 kp/cm² (4.5 p.s.i.).

The specifications and constructional details given in this book are not binding.

We reserve the right to carry out modifications without previous notice.

AB VOLVO GÖTEBORG SWEDEN

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