instruction book

VOLVO 164

VOLVO 164

Operating Instructions

Description

Servicing

AKTIEBOLAGET VOLVO GÖTEBORG SWEDEN

FOREWORD

Before you start driving your new Volvo please read through this instruction book 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 book, 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 instruction book is not intended to be a comprehensive technical manual and does not claim to make the reader into 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 this book can contain some valuable information. For a more detailed mechanical description as well as repair procedures, we refer you to the special Service Manual for the car.

INTRODUCTION

OPERATING INSTRUCTIONS

TECHNICAL DESCRIPTION

SERVICING

FAULT TRACING

SPECIFICATIONS

INTRODUCTION

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 spare parts which is your guarantee for genuine Volvo spares. That is why our dealers are in the best possible position to give your vehicle first-class service concerning both maintenance operations and repairs. You should also refer to your dealer for any information about your Volvo that is not included in this instruction book.

In addition to having a Volvo workshop within easy reach, in your own country, Volvo 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 free service inspection after 2,500 km (1,500 miles) running. 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 cost-free 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

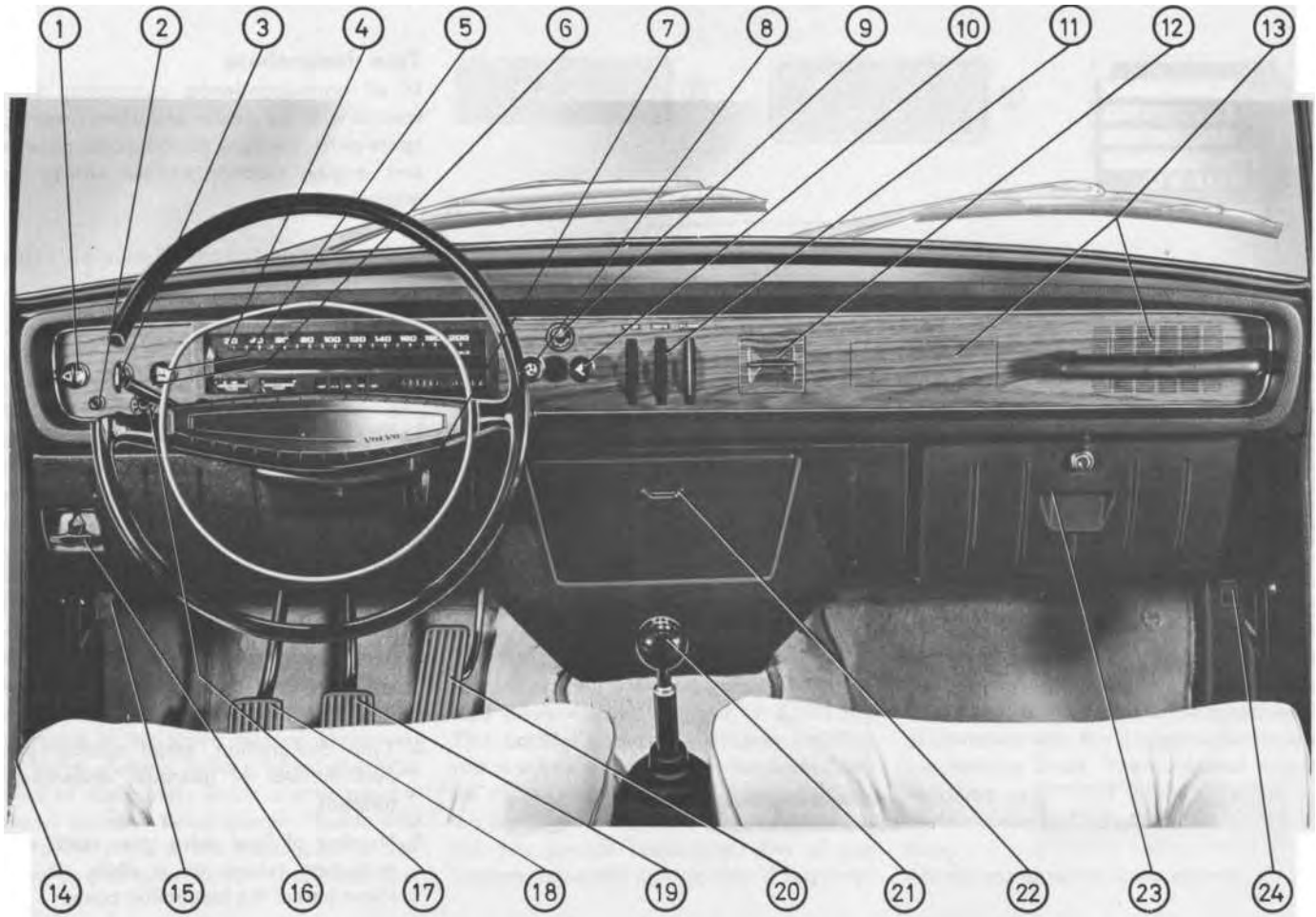
After the cost-free service inspection has been carried out, you should make an agreement with your dealer , concerning continued, regular service inspections in accordance with the suggestions made in our Service Book. Thorough and regular servicing is of vital importance for the performance and length of life of the vehicle.

Always use genuine Volvo spares.

Type designations

In all correspondence concerning your vehicle with the dealer and when ordering spare parts, the type designations, chassis and engine number should always be quoted.

1. Vehicle type designation, code numbers for colour and upholstery; on bulkhead.
2. Body number.
3. Type and model designation and chassis number; stamped on right door pillar.
4. Type designation, serial number and part number of engine; stamped on engine left-hand side.
5. Type designation, serial number and part number of gearbox; underneath gearbox.
6. Number of final drive gear teeth and reduction ratios; on a plate on the lower part of the inspection cover.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INSTRUMENTS AND CONTROLS

1. Windscreen wiper and washer switch
2. Fog light switch
3. Choke control
4. Instrument panel
5. Lighting switch
6. Turn indicator switch, dimmer and headlight flasher
7. Combined ignition switch and steering wheel lock
8. Fan switch
9. Warning hazard flasher switch
10. Cigarette lighter
11. Heater/ventilation controls
12. Ashtray
13. Place for radio and loudspeaker
14. Handbrake
15. Fresh-air intake, left
16. Bonnet release
17. Switch for elec. heated rear window
18. Clutch pedal
19. Brake pedal
20. Accelerator pedal
21. Gear lever
22. Fuses
23. Glove locker
24. Fresh-air intake, right

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 between different markets.

1 Windscreen wiper and washer switch

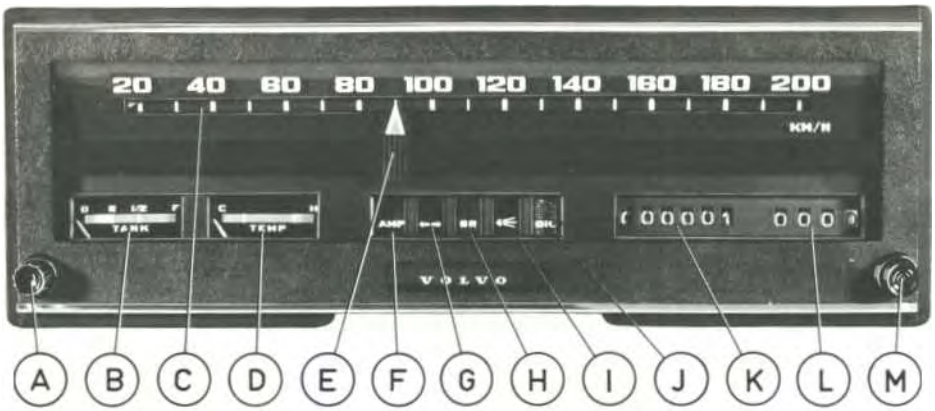
The windscreen wipers are operated electrically and can be adjusted to two speeds. Normal speed is attained by pulling the switch out to the first position. This speed is recommended for driving normally in rainy weather or snow.
When the switch is pulled out fully, the wipers operate at full speed. Full speed is only recommended when driving in heavy rain or when driving at high speed when it is raining.
When the switch is pressed in fully, the wiper blades stop in their parking position.
The windscreen washers are operated by turning the switch clockwise. When released, the switch automatically returns to its starting position and shuts off the washers. The washers can be used without the windscreen wipers. The fluid container for the washers is located in the engine compartment and holds about 1 1/2 litres (2 3/4 Imp. pints= 31/4 US pints).

2 Fog light switch

On certain markets the Volvo 164 is fitted with 2 extra fog lights. These are switched on by pulling out the fog light switch, providing that either the parking or dipped-beam lights are on.
Because of regulations on certain markets, the fog lights are connected across the parking and headlights or only the parking lights.

3 Choke control

The choke control is used when the engine is started from cold. When the control is pulled out about 10-15 mm (1/2"), the idling speed is increased. Pulling the control out further, enriches the fuel-air mixture. This steps up the idling speed.



4 Instrument panel

A Panel light 'switch

B Fuel gauge

C Speedometer

D Coolant temperature gauge

E Speed warning indicator

F Warning light, charging

G Turn indicator control light

H Handbrake warning light (functions also as warning light for both service brake circuits)

I Mainbeam control light

J Oil pressure warning light

K Mileometer

L Trip meter

M Trip meter reset knob

A Panel light switch

Turning the knob clockwise or anticlockwise increases or dims the lighting on the instrument panel.

B Fuel gauge

The fuel gauge indicates approximately the amount of fuel in the tank. The gauge is graduated "full", "half", "reserve" and "empty". The red field between "reserve" and "empty" is a reminder that the tank should be filled. When the gauge pointer is on "reserve" there are approx. 8 litres (2 Imp galls=21/2 US galls) in the tank.

C Speedometer

The speedometer consists of a horizontal scale marked in intervals of 20 m.p.h. The speed is indicated by a red ribbon.

D Coolant temperature gauge

The temperature gauge shows the temperature of the coolant and thus indicates the working temperature of the engine. The pointer on this should normally remain within the green sector.

It is permitted for the temperature gauge pointer to enter the red-lined field during town driving and idling when the weather is particularly hot.

E Speed warning indicator

The speed warning indicator is mounted in front of the speedometer and consists of a manually adjustable sliding arrow. Its purpose is to remind the driver of the particular maximum permissible speed in connection with speed limit regulations.

F Warning light, charging

This lights red when the battery is discharging, which is normal at idling speed. As soon as you accelerate a little, it should go out. Should it light up during driving, either there is some fault in the electrical system or the fan belt is not sufficiently tensioned and is thus slipping on the alternator pulley, causing poor charging.

G Turn indicator control light

This lamp flashes with a green light when the turn indicator switch is moved upwards or downwards and the ignition is on.

H Handbrake warning light (functions also as warning light for both service brake circuits)

This lights red when the handbrake is applied and the ignition is on.
The light also functions as a warning light should a failure arise in one of the brake circuits. If the light goes on during driving, the car should be driven without delay to a workshop for a check on the brake system. Observe due care when driving under such conditions.

I Mainbeam control light

This lights blue when the headlights are switched to mainbeam by the switch lever (6).

J Oil pressure warning light

This lights yellow when the engine oil pressure is too low. When the ignition is switched on, the light should go on and then go out again when the engine starts. Never start driving until the light goes out. If the light goes on during driving, stop the engine and find out the reason for this, In most cases it means that the oil level is too low. After hard driving it may happen that the warning light comes on when the engine is idling. This is normal providing it goes out again when engine speed is increased.

K Mileometer

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

L Trip meter

The trip meter measures 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.

M Trip meter reset knob

The trip meter is set to zero by pushing in the reset knob.

5 Lighting switch

The headlights are operated by means of a push-pull type switch on the dashboard as well as a lever (6) on the steering column.
All the lights are extinguished when the lighting switch is pushed fully in. Pulling it out to the half-way position, switches on the parking lights and when it is fully out, the full or dipped headlights are switched on, depending on the position of the lever (6).
Since the lighting system is not connected across the ignition switch, the lights will function irrespective of whether the ignition key is in position or not.
On certain markets the Volvo 164 is fitted with side lights. These are located on the sides of the mudguards and are switched on by pulling out the switch for the parking lights and headlights.

6 Turn indicator switch, dimmer and headlight flasher

The switch lever on the left-hand side of the steering column behind the steering wheel controls the turn indicators, dipped headlight and headlight flasher. Moving the lever upwards, operates the right-indicator, and downwards the left-indicator.
Switching from mainbeam to dipped beam and vice versa is carried out by moving the lever towards the steering wheel and then releasing it. Here the lighting switch (5) should be pulled out fully.
The lever is also used for flashing with mainbeam when the headlights are not switched. on. The headlight flasher is switched on by moving the lever towards the steering wheel and it remains switched on until the lever is released.

7 Combined ignition switch and steering wheel lock

The switch has four positions; (0) Locking position, (1) Garage position, (2) Driving position and (3) Starting position.
The key can only be inserted or taken out of the lock in the Locking position. Removing the key automatically locks the steering wheel.
On certain markets the ignition switch is provided with an acoustical warning buzzer. This buzzes to warn the driver when the driver's door is opened that the

key has been forgotten in the ignition switch.
Except for the engine ignition system, the electrical system is switched on with the key in the Garage position.
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 automatically returns to the Driving position.

8 Fan switch,

The fan is operated by means of a push-pull switch which can be set at two different positions. Pushing the switch fully in stops the fan, pulling it out to the first position operates the fan at full speed and when 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 speeds below 80 km.p.h. (50 m.p.h.), the fan should be allowed to operate at full speed if maximum air capacity is desired. On the other hand, however, the fan should not be used if cooling air is required on a hot summer's day. Instead, open both the fresh-air controls (15, 24), the defroster control "DEFR" and the ventilation control "FLOOR".

9 Switch for warning hazard flashers

All the four warning lights start flashing simultaneously when the switch is pulled out. A control lamp mounted in the switch blinks in unison. The warning lights are not connected across the ignition and therefore function irrespective of whether the ignition key is inserted or not.
These warning lights should be used only when you have to stop the car where there is possible danger to other traffic. Note that regulations governing the use of these lights may vary on different markets.

10 Cigarette lighter

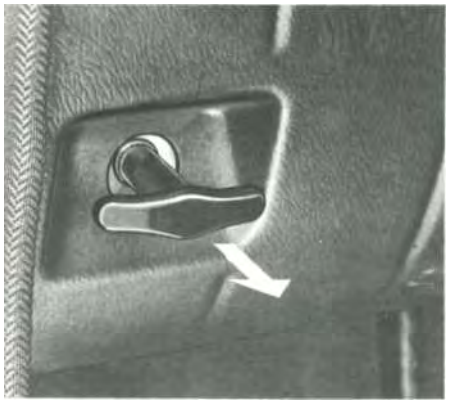
To use the cigarette lighter, push it in. The lighter releases automatically when it attains sufficient heat.

11 Heater/ventilation controls

The control on the left, TEMP, regulates the temperature of the incoming air. The middle control, DEFR, regulates the air flow to the windscreen. And the control to the right, FLOOR, regulates the air flow to the front seat and rear seat floor. The temperature, also the air flow, is increased by moving the controls downwards whereby a red strip marked down the middle of the control in question indicates the size of the opening. Note that when altering the temperature control, there will be a slight delay before the desired temperature is reached.
To avoid mist on the windows, set the fan and defroster controls at maximum output and close the FLOOR control. The fresh-air controls (15, 24) should be closed. Try to avoid water on the floor and under the mats as this increases the humidity and thereby misting, particularly during the wintertime.

14 Handbrake

the handbrake lever is on the outside of the driving seat and operates on the rear wheels only. When the handbrake is applied and the ignition is on, a red warning light (4, H) shows on the instrument panel.
Remember that the footbrake warning system is also connected to this light. Should the light show when the handbrake is not on, this may be due to a failure in one of the brake circuits. If this is the case, drive immediately (but with due care) to a workshop for a check.

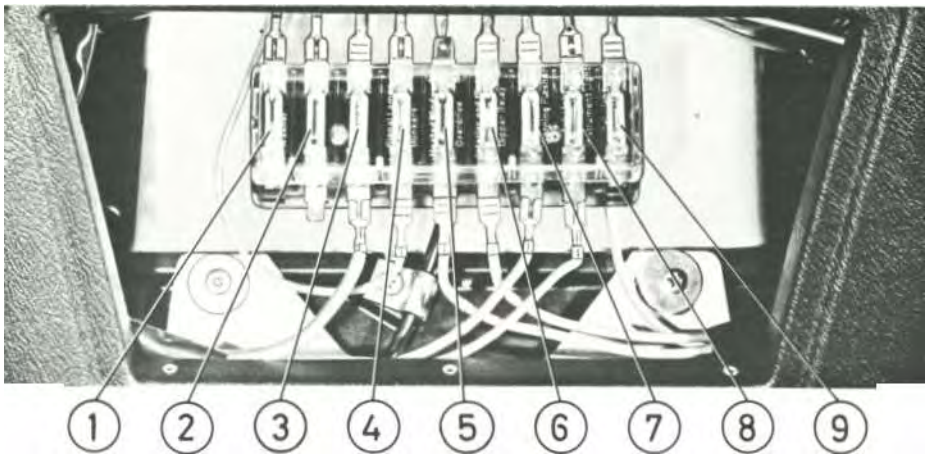


16 Bonnet release handle

The bonnet lock is released by pulling out the handle situated to the left of the steering column lower down on the dashboard.
This releases the bonnet which is still retained by the safety catch.
The bonnet is opened by inserting the fingers under its front edge and pressing in the catch as shown in the picture above. Raising the bonnet causes a light in the engine compartment to go on automatically. Make sure that the bonnet is locked properly when closed.
The level of the bonnet can be adjusted if necessary by screwing out or in the rubber plugs under the bonnet at the front and on the mudguards.

15, 24 Fresh-air controls

Sliding the control forwards opens a fresh-air intake on the driver's or passenger's side. Note that the fan should not be operating if cool air is desired through these intakes.



17 Switch, electrically heated rear window

In order to obtain a clear view through the rear window during cold and damp weather, the Volvo is fitted with an electrically heated rear window.

Heating is by means of wires on the inside of the rear endow. For this reason, avoid placing anything on the rear shelf which could damage the wires.

The switch has two positions. Pulled out to the first stop, there is an output of approximately 40 W, and when pulled out to second stop, the output will be about 150 W. As long as the electric heating is on, a warning lamp lights in the switch.

As soon as the rear window is free from moist and ice, push in the switch, either one stop or fully, in order not to overload the battery unduly.

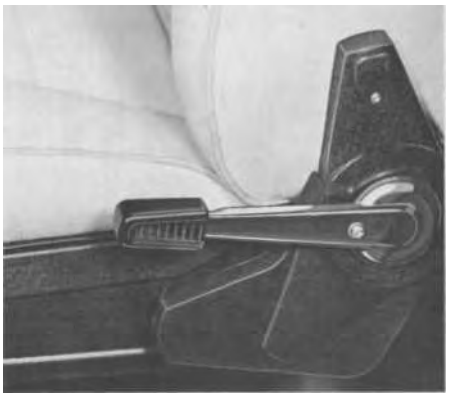
22 Fuses

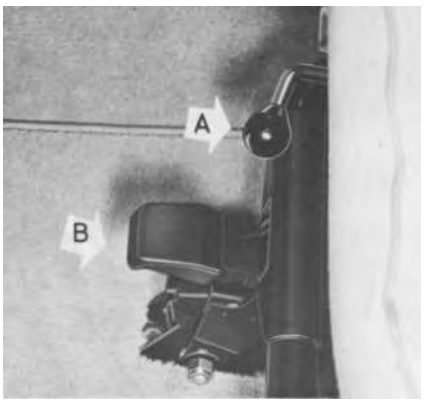
The electrical equipment is protected by a number of fuses housed in a compartment under the dashboard. If a fuse has to be replaced, always make sure that it is replaced with a fuse of the correct rating. If fuses burn out repeatedly, do not replace with a fuse of higher rating but have a workshop check the electrical system.

On the inside of the cover of the fuse compartment there is room for a number of spare fuses.

Both fuses (8A) for the fog lights are located in a box in front of the relays on the left wheel housing.

1.	Windscreen wipers, washer	8A
2.	Horn, reversing lights	8A
3.	Heater fan, control relay for elec. heated rear window	8A
4.	Warning lamps Instrument panel Flashers	5A
5.	Elec. heated rear window, overdrive	16A
6.	Interior lighting Glove locker Dimmer relay Engine compartment lighting Boot lighting Acoustical warning buzzer	5A
7.	Brake lights Safety hazard warning flashers	8A
8.	Left rear light parking light side light Instrument panel light Number plate light	5A
9.	Right rear light parking light side light	5A





INTERIOR AND BODY

Front seats

Lumbar support

The front seats are provided with an adjustable lumbar support. This is operated by means of the 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".

Bench-type front seats have the knob mounted on each side of the seat.

Backrest adjustment

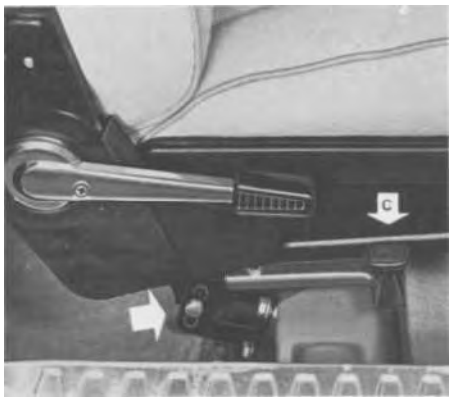
The front seat backrest is adjusted with the lever on the outside of the backrest (see picture). Lift up the lever, adjust to the desired angle, and lock the backrest there by pushing down the lever.

The backrest can be folded backwards to a comfortable rest or repose angle.

Length and height adjustment, driver's seat

The driver's seat can be adjusted forwards-backwards by lifting catch A upwards. Exert leverage with your feet on the floor and slide the seat to the most comfortable position. On bench-type front seats, the catch is located at the driver's seat.

Adjustment is made vertically by lifting catch B upwards and then setting the seat to one of the four height positions. If necessary, the seat can then be adjusted longitudinally.



Length and height adjustment,
front passenger's seat

The front passenger's seat can be adjusted forwards-backwards by pressing down catch C on the outside of the seat. Vertically the seat is adjustable to three different positions. Remove the seat cushion to get to the bolts in the seating bracket. Remove the two bolts holding the seating frame to the seating brackets. Place the frame in the desired position and refit the bolts in the suitable holes.

In connection with this adjustment, it may be desirable or necessary to adjust the inclination angle of the entire seat. This is done with the eyelet bolt at the front under the seat frame. Remove the bolt which goes through the eyelet screw and fold the seat backwards. Then release the lock-nut in the floor of the car and adjust the eyelet screw to the desired position. Relock securely the eyelet screw with the locknut.

On vehicles with a bench-type front seat, corresponding adjustments can be made vertically.

The passenger's seat can be used facing opposite the driving direction in order to hold a safety seat for a child. This is done by removing the four bolts holding the seat frame to the sliding rails. Lift off the seat, turn it back to front on the slide rails and retighten the nuts. Note that the lock fittings should remain on the right-hand side in order to be able to lock the seat.

Headrests

The front seats are provided with adjustable headrests. If the headrest is to fulfil its function properly, it is important that it is correctly adjusted, that is, it supports against the head and not only against the neck. The car is delivered with the headrests adjusted to standard height. To adjust slacken the plastic nuts on the headrest retainers. After adjusting lock the headrest by turning the plastic nuts clockwise.

Safety belts

Always use the safety belt for all types of driving. Remember that it is possible even in slow city traffic to incur serious injury from sudden, unexpected stopping.

Automatic safety belts with emergency locking retractors

The Volvo 164 is equipped with automatic safety belts with emergency locking retractors. The practical construction of the belt makes it extremely easy to use.

To fasten the belt, pull out the webbing slowly. If the webbing is pulled out too quickly, the emergency-locking retractor reacts and stops the withdrawal of the belt. Normally the safety belt retractor is "unlocked". Locking takes place when the webbing is pulled out rapidly or when the car is braked suddenly. The retractor also locks when driving on a gradient more than 10.5° or when taking a fast corner.

Should the webbing lock when being pulled out, slacken off slightly and then continue pulling out more slowly to the required length. Place one strap round the waist and the other across the shoulder - chest and secure the belt by pushing the buckle tongue into the locking slot in the lock between the seats. An audible clicking sound is a sign that the belt is locked.

Make sure that the webbing fits comfortably across the body and is not twisted.

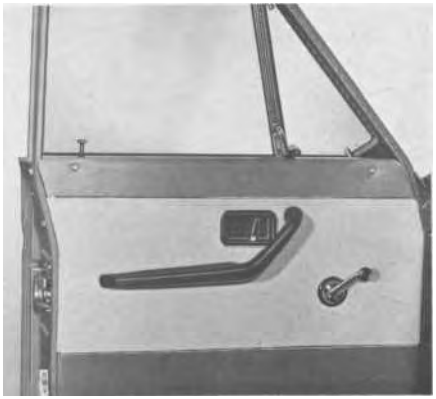
The belt is released by pulling up the nearest lever in the locking device. Keep hold of the buckle-tongue and let the webbing roll back towards the door post. Make a habit of letting the roller roll up the webbing on removing the belt.

Safety belts in rear seat

On certain markets safety belts for three passengers are installed in the rear seat. The belts are of the lap type.

The belts are fastened by pushing the buckle-tongue on one section of the belt into the lock on the other and are released by lifting up the "cap" on the lock. To shorten the belt, pull in the upper part of the lap strap, and to extend it, pull in the lower part.

Do not let the belt lie on the floor 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. Water mixed with some synthetic washing agent can be used 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.



Doors and locks

The car is fitted with a lock and keyhole on each of the front doors.
All the doors can be locked on the inside by pressing down the lock plunger on the window ledge. On the front doors this lock plunger lifts automatically when the door is opened from the inside. On the rear doors, however, the lock plunger must first be pulled up before the doors can be opened from the inside. This is an advantage if children are alone in the back of the car.
The front doors can be locked from the outside by pressing the lock plunger on the window ledge down and shutting the door while pushing in the outside door handle button. To lock the rear doors it is not necessary to push in the buttons.

Do not leave the keys in the car.

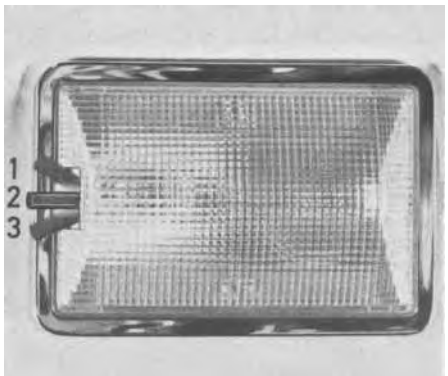
The door locks have been designed with a view to providing maximum possible protection against freezing during the wintertime. As an extra measure, however, you should lubricate the locks regularly during very cold weather with a suitable anti-freeze agent. If the lock is already frozen, be careful not to break the key in the lock. Instead, heat the key and immediately place it in the lock. This should unfreeze the lock. Should you lose the car keys, contact your nearest Volvo dealer for new ones and quote the code number of the keys which have been lost.

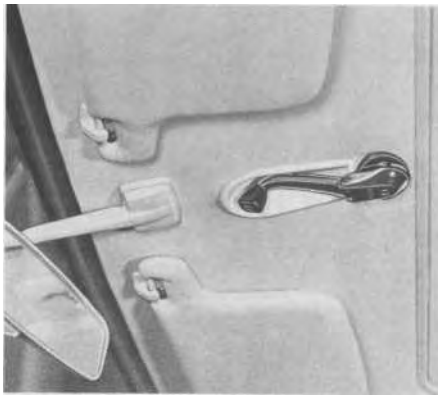
Ventilation window lock

To open the ventilation window first slacken the small lock screw a couple of turns, push it in and then turn the handle forwards. On certain markets the window is opened merely by pressing in the button and turning the handle.

Rearview mirror

The inside rearview mirror can be switched to anti-dazzle by pushing the knob at the bottom sideways.
If it is to fulfil its function well, the outer rearview mirror on the passenger side should be turned so that the arm is vertical.





Interior lighting

1. The light comes on when either front door is opened.
2. The light is always extinguished.
3. The light is always on.

Sun-roof

On certain cars, the Volvo 164 is available with a sun-roof.

The sun-roof is opened and closed by a winding handle. When not in use, the handle is folded in the recess in the roof between both the sun visors.

To close the sun-roof, wind it forwards fully, then wind back the handle a little and fold it into the recess in the roof.

Boot compartment

The boot lid is locked with the same key as that used for the doors. The lid is opened by turning its handle clockwise and lifting it at the same time. Note that the key must be removed from the lock in order to turn the lock knob. The lid is balanced and will remain stationary in its opened position.

The boot light goes on automatically when the lid is opened. The spare wheel is securely held in position to the right. The jack and tool kit are fastened to the spare wheel. Under the boot floor to the left there is space sufficient for an extra spare wheel, for stowing tools or a reserve fuel can.

STARTING AND DRIVING

Running-in instructions

When the vehicle is new, we recommend that a certain amount of caution be observed during the running-in period, for it is during this time that the movable parts of the car must be properly bedded in so as to obtain smooth and durable sliding surfaces. The maximum permissible speeds, therefore, should not be exceeded.

	during the first 1000 km (600 miles)	between 1000 and 2000 km (600 and 1200 miles)
1st speed	30 km.p.h. (20 m.p.h.)	50 km.p.h. (30 m.p.h.)
2nd speed	55 km.p.h. (35 m.p.h.)	75 km.p.h. (45 m.p.h.)
3rd speed	80 km.p.h. (50 m.p.h.)	100 km.p.h. (60 m.p.h.)
4th speed	110 km.p.h. (70 m.p.h.)	130 km.p.h. (80 m.p.h.)

Avoid driving at low speed in high gear and using the kick-down (concerns vehicles with automatic transmission) during the first 2000 km (1200 miles).

Warranty inspection

After 2500 km (1500 miles), the vehicle should be taken to a Volvo workshop for the free warranty inspection. The procedure then carried out includes an 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 if impurities. After 5000 km (3000 miles), the oil in the engine, gearbox and rear axle should be changed. After this oil change, future changes should be carried out at approximately those intervals indicated in the maintenance scheme on page 34 and in the lubricating chart at the end of the book. All Volvo engines are test-run before being

delivered. We are therefore assured that all clearances are satisfactory and we thus accept no responsibility for damage caused by careless running-in.

Before your first drive

Before you begin driving your new Volvo, we would advise you to become familiar with the vehicle and the various instruments and controls used during driving. Sit in the car, go through all the various instruments, test the controls and adjust the seats and rearview mirror to the position which suits you best. When you are comfortably seated and acquainted with the location of the various controls, you are ready to begin driving.

Start the engine

as follows:

1. Check that the handbrake is on and the gear lever is in neutral.
2. When the engine is cold, pull the choke control out fully.
3. Always make a habit of depressing the clutch pedal until the engine fires normally.
4. Turn the ignition key to the starting position. Release the key as soon as the engine has started.
5. Push in the choke until the best idling speed is obtained. As the engine becomes warmer, push in the choke more and more. Drive for as short a period as possible with the choke out.

When the engine is thoroughly warm, the choke should be pushed right in.

After starting a cold engine, do not race it immediately but run it at moderate speed and do not subject it to heavy loading until the engine temperature has reached normal level.

When starting with a warm engine, depress the accelerator pedal lightly.

If a warm engine does not start immediately, depress the accelerator pedal fully and keep is depressed until the engine starts.

Starting in a garage

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

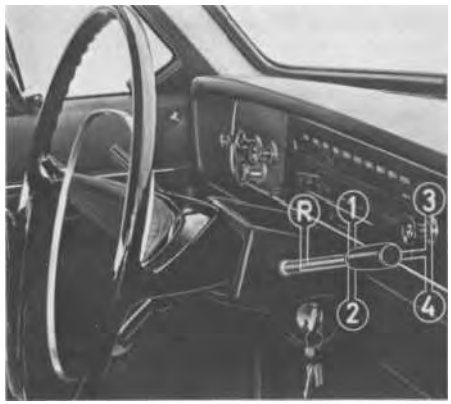
Warming up the engine

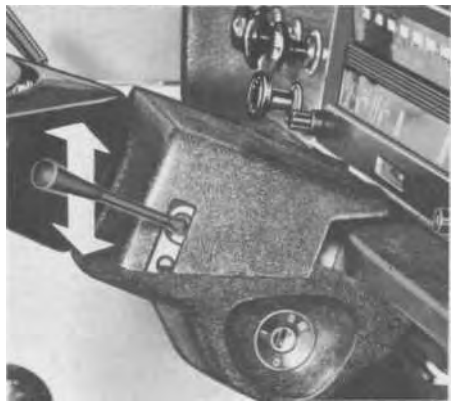
Experience has shown that engines in vehicles used with frequent stopping and starting are subject to abnormally rapid wear. The reason for this is that the engine is not given a chance to reach its normal working temperature. When the engine is cold, it should just be taken up to its normal working 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 boot lid open

While driving with the boot lid partly or fully open, exhaust gases can be sucked into the car through the boot. Normally, this involves no risk to the passengers. However, the following advice should be followed on such occasions:

1. Keep all windows closed.
2. Set the fresh air and defroster controls to the fully-opened position and the fan control to full speed.





GEAR-CHANGING

The Volvo 164 is fitted either with a floor-mounted gear lever, a steering column-mounted gear lever, a floor-mounted gear lever with overdrive or an automatic transmission.

Note that not all these types of transmissions or combinations are available on a number of markets.

Floor-mounted gear lever

Gear-changing with the floor-mounted gear lever is quite conventional and the different gear positions are shown in the picture above.

Steering column-mounted gear lever

Gear-changing with the steering column-mounted gear level is also quite conventional. The various gear positions are shown in the picture above.

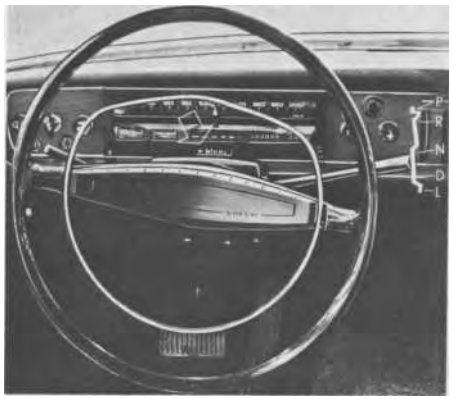
Overdrive

The overdrive is engaged by means of the lever under the steering wheel on the right-hand side of the steering column. When the overdrive is engaged, a red light shows on the dashboard. Any extra manoeuvring with the clutch pedal is normally not required.

Recommended speed ranges, km.p.h. (m.p.h.) for the different gears[1])

1st gear	2nd gear	3rd gear	4th gear
0-50 (0-30)	20-80 (15-50)	30-115 (20-72)	40- (25-)[2])

1) Applies after 2000 km (1250 miles). See page 19. 2) 70 km.p.h. (45 m.p.h.) with overdrive engaged.



Automatic Transmission

At the bottom of the instrument panel in the middle there is a quadrant for indicating the selector lever position. The selector lever has the following positions:

P = Parking
R = Reverse
N = Neutral
D = Driving
L = Low gear

Move the selector lever either to the "P" or "N" position. The starter inhibitor switch is automatically disconnected if the selector lever is moved to any of the other positions. The selector lever can be moved freely between the "N" and "D" positions, while the other positions are provided with a catch. For this reason, the selector lever must first be lifted towards the steering wheel before it can be moved into any of the other positions. If the car is temporarily stopped and the selector is moved to the "R", "D" or "L" position, apply the handbrake or the footbrake to stop any tendency for the car to "creep".

Selecting

Normally position "D" should be used for driving.The transmission then starts in first gear and automatic upchanges to second and third gear occur in accordance with road speed and accelerator position. Automatic downchanges from third to second and first occur with decreasing vehicle speed.

Low gear position "L" is used for

1. Obtaining immediate manual downchanging
2. Providing powerful engine braking when, for example, going down a steep gradient.
3. Obtaining a high engine speed, if so required

The "N" position is the neutral position, that is, no gear is engaged.
The "R" position is used for reversing.
The "P" position is selected for parking with or without the engine running. When parking on a hill, the handbrake should also be applied.

Driving

Select the position, release the brake and the car will start rolling slowly. The most rapid acceleration is obtained by depressing the accelerator fully. The car is stopped in the normal way by releasing the accelerator and applying the footbrake. No manoeuvring of the selector lever is required.

If the car has to be extricated from snow, loose sand or similar, it can be "rocked" loose by moving the selector alternately between the "R" and "D" positions under continuous, light accelerator pressure.

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

Do not select "D", "L" or "R" position at a higher engine speed than idling when the car is stationary.

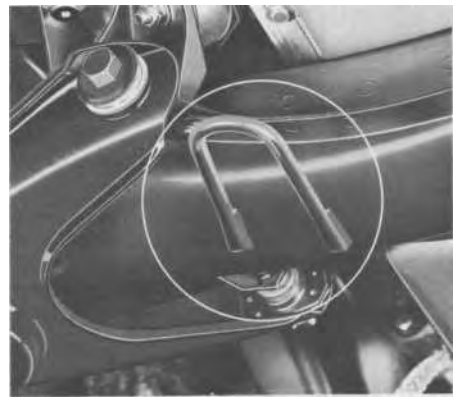
Do not select the "L" position at speeds above 90 km.p.h. (55 m.p.h.).

Starting with towing

Place the selector in the "N" position and pull out the choke slightly. Switch on the ignition when the car has obtained sufficient speed and move the selector to position "L". This will start the engine.

Towing

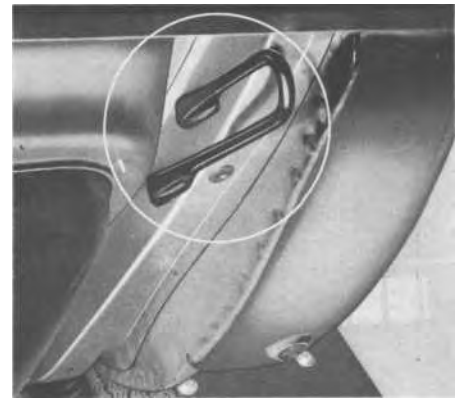
If necessary, the car can be towed with the selector lever in "N" position, providing the gearbox is properly adjusted and the oil at the correct level. If a fault in the gearbox is suspected, disconnect the propeller shaft before towing.



Towing loop, front

If the vehicle is to be towed, the tow line must not be attached directly to the bumpers, but should be attached to the towing loop on the front axle member according to the picture above.

During towing, the tow line should be kept evenly stretched.



Towing loop, rear

If the vehicle is to be used for towing, the tow line should be attached to the rear towing loop located under the spare wheel well. See the picture above.

BRAKING

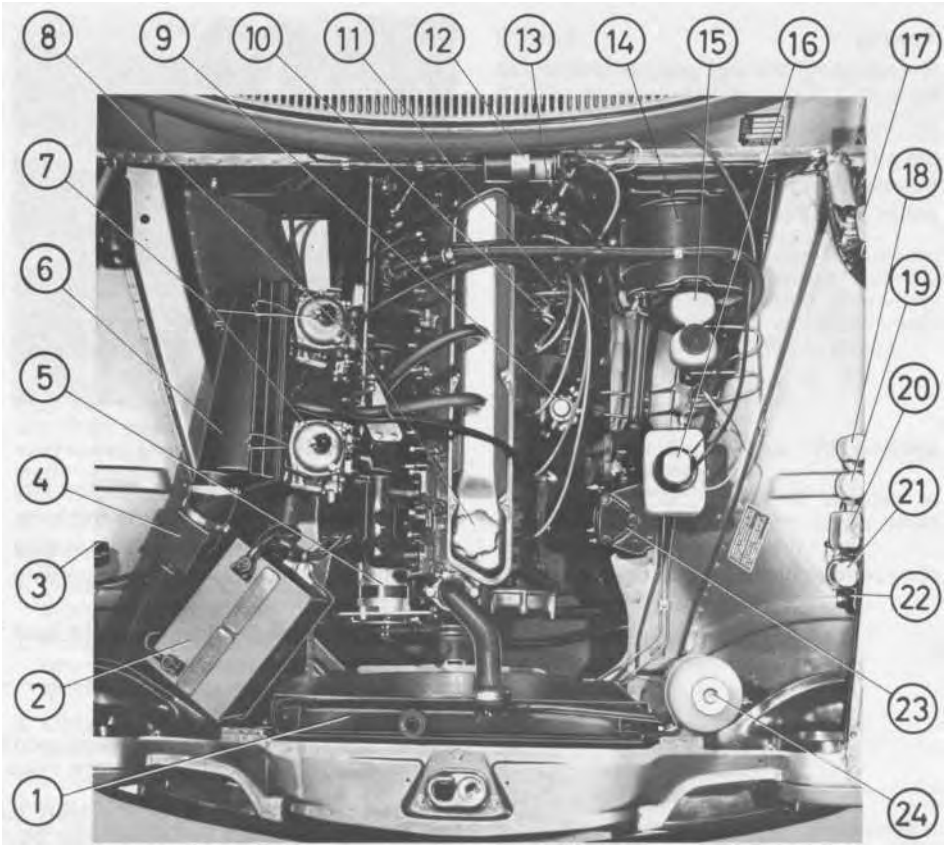
When driving in the rain or through pools of water, even when washing the car, water may splash up onto the brake discs and linings. This may alter the frictional properties of the linings.

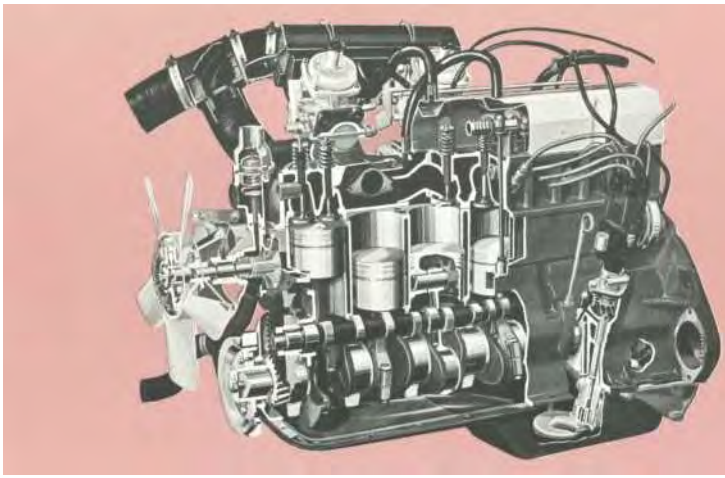
The brake linings, however, dry fairly quickly with braking, but a certain delay in the braking effect can sometimes be noticed.

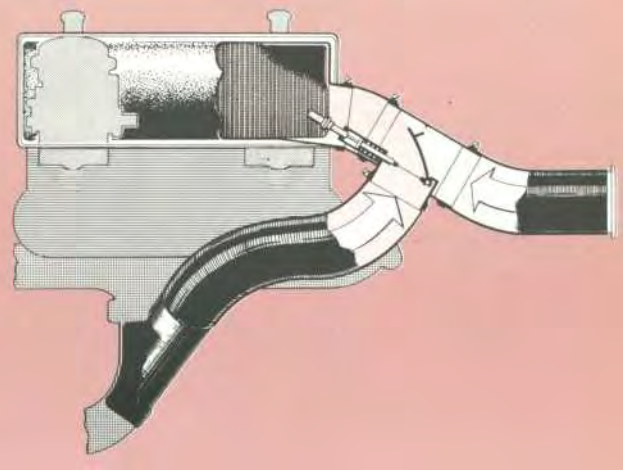
If you drive long stretches in the rain or slush, lightly depress the brake pedal now and again to warm up the linings and thus dry them. This should also be done when you drive your car immediately after washing it.

Engine compartment

1. Radiator
2. Battery
3. Voltage regulator
4. Air preheating unit
5. Alternator
6. Air cleaner
7. Carburettors
8. Oil filler cap
9. Fuel filter
10. Oil dipstick
11. Distributor
12. Ignition coil
13. Starter motor
14. Brake servo cylinder
15. Brake fluid container
16. Windscreen washer motor and container
17. Engine compartment lighting
18. Relay for rear lights
19. Relays for horn
20. Step relay for main beam and dipped lights
21. Relay for fog lights
22. Fusebox for fog lights
23. Steering box
24. Cooling system expansion tank







ENGINE

The B 30 A type engine is a six-cylinder, water cooled carburettor unit with overhead valves. The engine has a very rigid cylinder block made of special cast iron and is cast in one piece. The cylinder liners are machined directly in the block. The cylinder head has separate inlet and exhaust ports, one for each valve.

The statically and dynamically balanced crankshaft is carried in seven main bearings.

Lubricating system

Engine lubrication is taken care of by a gear pump located in the oil sump. The pump is driven by a gear from the camshaft. From the pump the oil is forced through the full-flow type oil filter and then along oilways to the various lubricating points. A relief valve is built into the oil pump and prevents the oil pressure from reaching excessively high values. The oil filter is of the full-flow type, that is, all the oil passes through the filter before continuing on to the engine lubricating points.

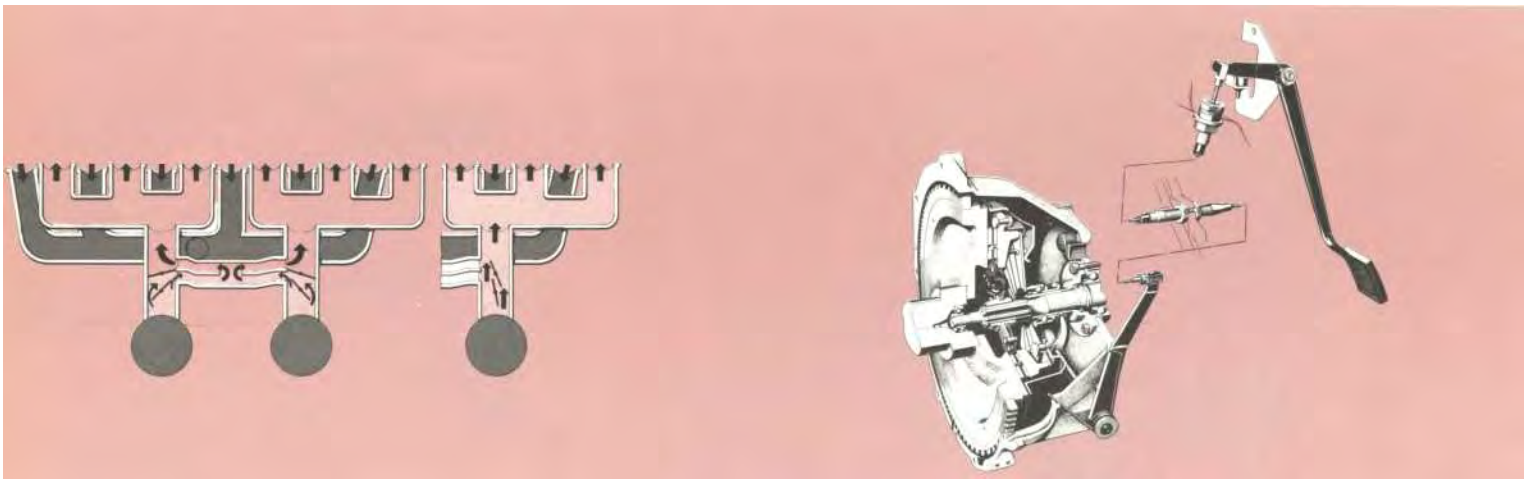
Fuel system

The engine is fitted with twin carburettors of type Zenith-Stromberg. The diaphragm-type fuel pump draws fuel from the tank and pumps it to the carburettors. A filter built into the fuel pump removes any impurities in the fuel.

On certain markets the vehicle is fitted with a gas fume evaporation control system which takes care of fumes from the carburettors and fuel tank.

Air preheating

The engine has thermostatically controlled air preheating. This keeps the intake air temperature constant and thus counteracts ice forming in the carburettors and makes for shorter warming-up after cold starting.



Exhaust emission control

The engine is fitted with an exhaust emission control system which produces a more exact and leaner mixture ratio between fuel and air resulting in a more complete combustion and thereby cleaner exhaust gases.

The system consists of specially adapted carburettors and an intake manifold provided with a preheating chamber and control throttles.

When driving at low speed, the throttles are closed so that the fuel-air mixture passes the preheating chamber. When higher output is required, the throttles open, so that fuel flows directly to the cylinders.

Cooling system

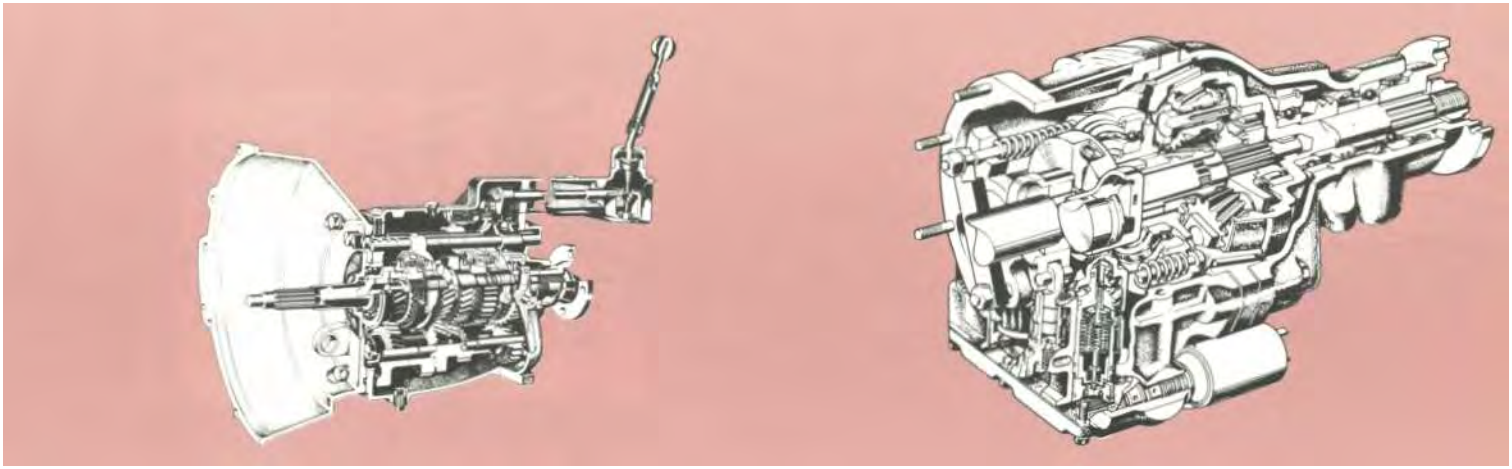
The cooling system is of the sealed pressure type and incorporates a circulation pump. When the engine is cold the coolant circulates only inside the engine. As the engine warms up, a thermostat valve starts opening the outlet to the radiator.

A special expansion tank prevents air from circulating with the coolant as this would cause corrosion in the cooling system. The fan is driven by a slip-coupling which keeps the fan speed at a max. of about 3500 r.p.m., this resulting in a lower noise level and somewhat increased output.

POWER TRANSMISSION

Clutch

The function of the clutch is to transmit the power from the engine to the gearbox. The clutch is of the single dry plate type. Pressure on the pressure plate is obtained from a diaphragm spring which in turn is controlled mechanically by the clutch pedal via the throw-out yoke. (Hydraulic operation for vehicles with right-hand steering.)



Gearbox

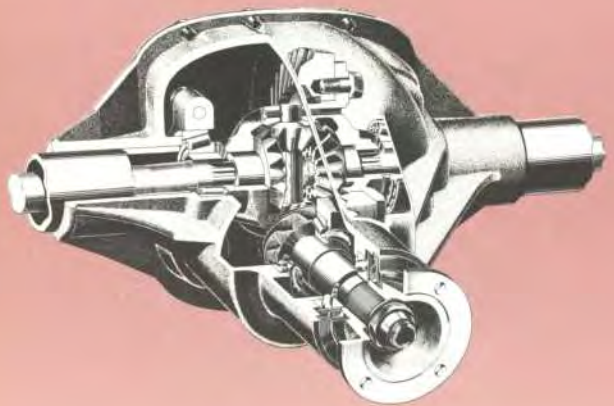
The gearbox has synchromesh on all the forward gears. Due to the generously dimensioned synchronizing rings the gearbox has smooth gear-changing.
As alternative the Volvo 164 can be fitted with a fully automatic transmission, BW 35.

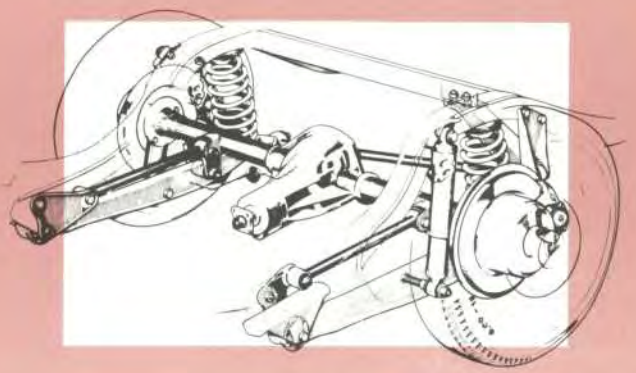
Overdrive

For certain markets, the Volvo 164 model is fitted with an overdrive (see upper right) which makes it possible to reduce engine speed while maintaining road speed. This is less wearing on the engine and saves fuel at the same time.

Propeller shaft

The propeller shaft, which is the connecting link between the gearbox and the rear axle, is divided into two sections. The forward section is flexibly mounted at its rear end in a bearing suspended in a rubberized ring.





Final drive

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

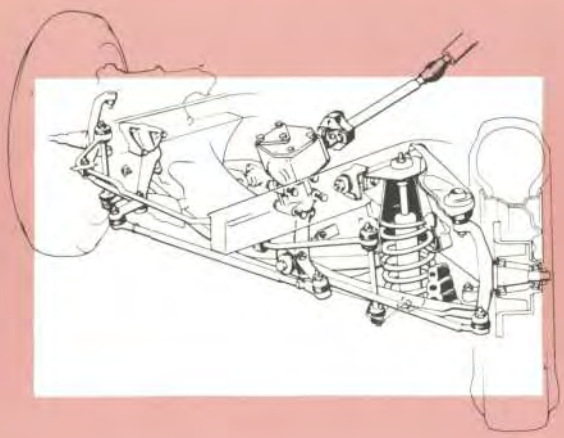
Differential brake

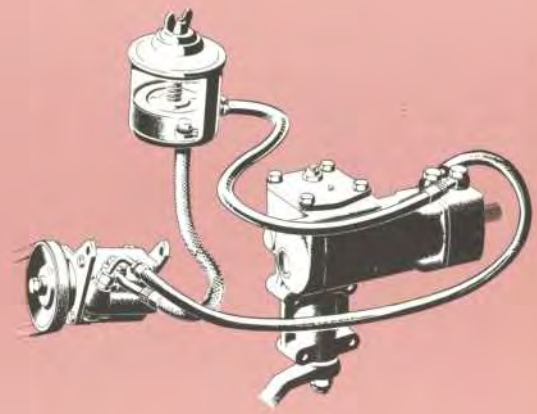
On certain markets, a differential brake can be obtained as extra equipment. A rear axle with a differential brake automatically transmits the tractive power to the wheel having the best road grip when a wheel begins to skid. Except for the differential unit, the rear axle is similar in design to a conventional rear axle.

Warning. Do not rotate a jacked-up rear wheel if the other rear wheel is still on the ground. Due to the differential unit, there is still drive on the wheel in contact with the ground. Rotating the jacked-up rear wheel would thus move the other rear wheel and may cause the car to topple off the jack.

Rear axle

The rear axle is carried on two support arms, the front ends of which are bolted to the body. The rear axle casing is secured to the support arms by means of levers. Two torque rods are journalled on the casing and the body. A torque rod prevents lateral movement of the body and rear axle in relation to each other.





FRONT END AND STEERING

Front end

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

Mechanical steering

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

Servo steering

Certain variants of the Volvo 164 are fitted with servo steering.
The servo cylinder and guide valves are built into the cam-and-roller type steering gear. When the steering wheel is turned, the guide valves direct the pressure oil from the servo pump to one of the sides of the piston in the servo cylinder. The resultant pressure on the piston side affected assists in turning the steering wheel.

ELECTRICAL SYSTEM

The electrical system is of the 12-volt type and is fitted with a voltage-regulated alternator. The starter motor is operated by means of the ignition switch. This switch is also the main switch for the rest of the electrical system. The cables to the headlights, parking lights, interior lighting, radio, engine compartments and boot, however, are not controlled by the ignition switch, but can be switched on and off without the ignition key being in position.

Lighting

The front lighting consists of two headlights (full and dipped beam), two extra fog lights (on certain markets) together with two turn indicators and a parking light. At the rear, the lighting consists of two tail lights, turn indicators, brake warning lights and reversing lights. There are also two lights for the rear number plate. The interior lighting consists of a roof light and one in the glove compartment. On certain markets the vehicle is fitted with side lights mounted on the sides of the mudguards. Both the engine compartment and boot are fitted with lights, which function automatically when the bonnet or boot lid is opened.

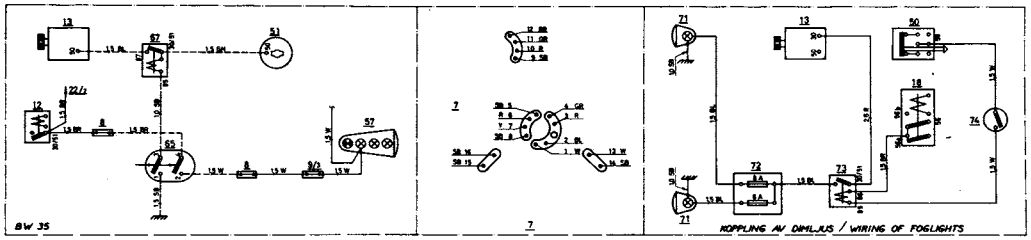
For replacement of bulbs, see pages 46, 47, 48 and 49.

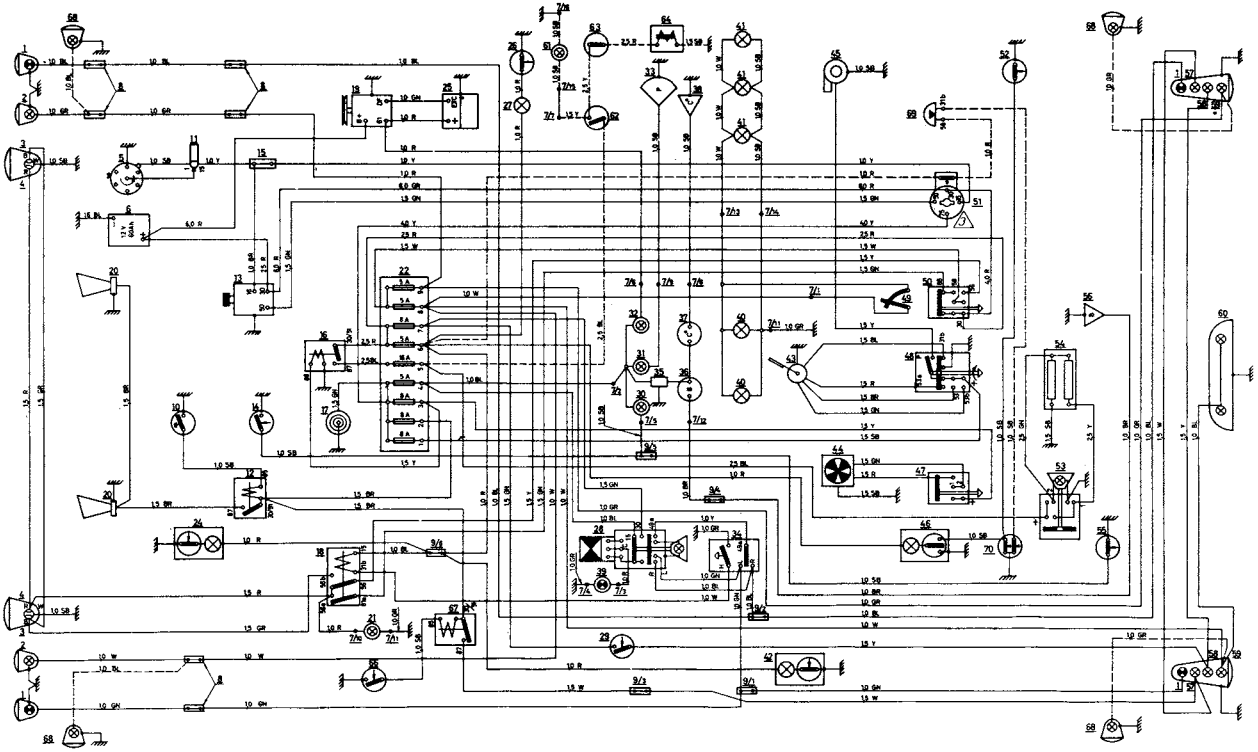
1. Direction indicator light 32 Cp
2. Parking light 5 W
3. Dipped light 40 W
4. Mainbeam light 45 W
5. Distributor
6. Battery 12 V 60 Ah
7. Connection to instrument
8. Terminal
9. Part of 6-pol. terminal block
10. Horn ring
11. Ignition coil
12. Horn relay
13. Starter motor 1 h.p.
14. Brake warning switch
15. Resistance
16. Relay for elec. heated rear window
17. Cigarette lighter
18. Step relay for manbeam/dipped lights and headlight flasher
19. Alternator 12 V 55 A
20. Horn
21. Control lamp for mainbeam 1.2W
22. Fusebox
24. Engine compartment lighting 18 W
25. Charging control
26. Switch for glove compartment lighting
27. Bulb for glove compartment lighting
28. Flasher unit and warning safety hazard light switch
29. Brake switch
30. Warning lamp for handbrake 1.2 W
31. Warning lamp for oil pressure 1.2W
32. Warning lamp for charging 1.2 W
33. Oil pressure sensor
34. Switch for turn indicators and light signal
35. Voltage regulator
36. Fuel gauge
37. Temperature gauge
38. Temperature pick-up
39. Control lamp, flashers 1.2 W
40. Instrument panel lighting 2X3 W
41. Lighting for heater controls 3X1.2 W
42. Luggage compartment lighting 18 W
43. Windscreen wipers
44. Heater
45. Windscreen washer
46. Roof light 10W
47. Heater switch
48. Rheostat for instrument and wiper switch
49. Rheostat for instrument lighting
50. Lighting switch
51. Ignition switch
52. Door switch
53. Switch for elec. heated rear window
54. Elec. heated rear window
55. Switch for handbrake control
56. Fuel level indicator unit
57. Reversing light 15 W
58. Brake light 25W
59. Rear light 5 W
60. Number plate light 2X5 W
61. Control lamp for overdrive 1.2 W
62. Switch for overdrive
63. Switch for overdrive on a gearbox
64. Solenoid for overdrive
65. Switch for automatic transmission BW 35
66. Switch for reversing light
    Only for M 400 and M 410 gearboxes
67. Relay for reversing light on M 400
    M 410 and starter relay on BW 35
68. Side lights 4 cp
69. Warning buzzer for ignition switch
70. Door switch, left
71. Fog lights 55W
72. Fusebox for fog lights
73. Relay for fog lights
74. Switch for fog lights

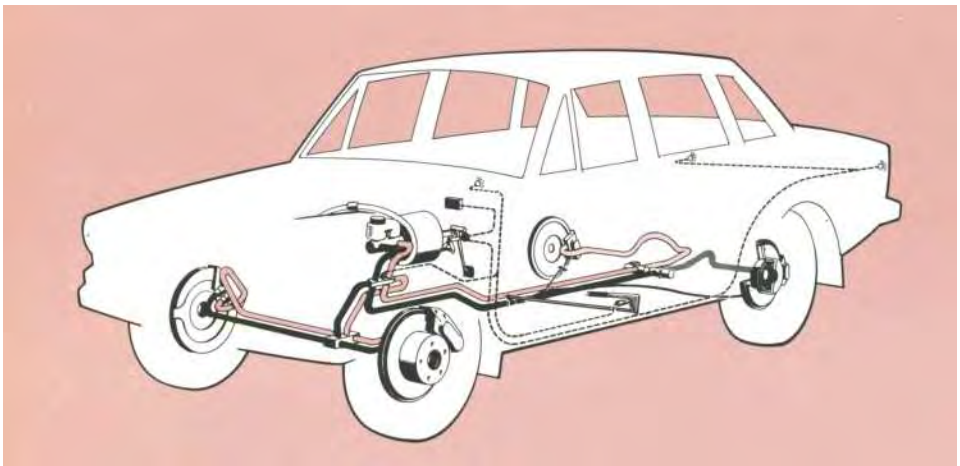
SB BLACK
W WHITE
Y YELLOW
GN GREEN
GR GREY
R RED
BR BROWN
BL BLUE

Differences may occur for different markets.

The wiring diagram shows the fog lights connected across the parking and dipped lights. On certain markets they are connected across the parking and main beam lights. On this occasion the brown lead between the fog light relay (73) and the stop relay (18) is connected to 56 b. If the fog lights are connected across only the parking lights, the lead goes to 56.


BW 35
7
KOPPLING AV DIMLJUS / WIRING OF FOGLIGHTS





BRAKES

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

The principle of the two-circuit system is that both the front wheels are connected to one rear wheel, that is, should there be a failure in one of the circuits, there is always braking power on both front wheels and the other 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 in the one circuit. This provides maximum safety and prevents lateral dragging and rear-end lurching. With the engine stopped, the booster assists the braking a further 2 or 3 times after which the pedal pressure must be increased about four times in order to obtain a braking power corresponding to the braking power available with the engine running.

The handbrake operates the rear wheels mechanically as the brake discs have also been designed as brake drums in order to incorporate the shoes for the handbrake.

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 specifications of the Volvo Factory. In addition to this there is the free service inspection after 2500 km (1500 miles). The oil in the gearbox and final drive should be changed after the first 5000 km (3000 miles). Servicing of the vehicle should thereafter follow the routine of the service book which is based on a system with a service inspection after every 10 000 km (6000 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.

SERVICING

MAINTENANCE SCHEME

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

Some of the work must be carried out by skilled mechanics or requires the use of special tools and these have been marked O.

Operation	Carried out every 10000 km 6000 miles	40000 km 25000 miles	See note below
LUBRICATION			
1. Lubricate body	●		● Once a year
2. Check oil level in engine			● When filling up with fuel
3. Change oil in engine	●[1]		See page 37
4. Carburettors, filling oil in the damping cylinders	●		
5. Check oil level in gearbox	●		
6. Change oil in gearbox		●[2]	
7. Check oil level in overdrive	●		
8. Change oil in overdrive		O[2]	
9. Check oil level in automatic transmission	●		
10. Check oil level in rear axle	●		
11. Change oil in rear axle			●[3]
12. Check oil level in rear axle with differential brake	●		
13. Change oil in rear axle with differential brake			●[3]
14. Check oil level in steering box	●		
15. Check oil level in servo steering	●		
16. Check brake fluid level (Also clutch fluid level, right-hand steered vehicle)			● When filling up with fuel
ENGINE			
17. Servicing of crankcase ventilation		●	
18. Replace oil filter	O		
19. Clean fuel filter	●		
20. Change air cleaner filter		●	
20a. Replace foam plastic filter for gas evaporation[4]		O	
21. Check valve clearances	O		
22. Carry out compression test	O		
23. Check fan belt	O		

1) Also after the first 2500 km (1500 miles) during running-in.

2) Also after the first 5000 km (3000 miles) during running-in.

3) Only after the first 5000 km (3000 miles).

4) Applies only to certain markets.

In addition to the servicing procedures mentioned in this scheme you should also check regularly the following from the point of view of traffic safety:

a) lighting, including brake warning light
b) direction indicator lights
c) horn

Operation	Carried out every 10000 km 6000 miles	Carried out every 40000 km 25000 miles	See note below
24. Check coolant level			● When filling up with fuel
25. Change coolant			● Every other year
26. Check sparking plugs	O		
27. Change sparking plugs			O 20 000 km (12 500 miles)
28. Check distributor contact breakers	O		
29. Check ignition timing setting	O		
ELECTRICAL SYSTEM			
30. Check electrolyte level in battery			● Every other week
31. Check state of charge of battery	O		
32. Check headlight alignment	O		
POWER TRANSMISSION			
33. Check release arm travel	O		
34. Check propeller shaft	O		O Once a year

Operation	Carried out every 10000 km 6000 miles	Carried out every 40000 km 25000 miles	See note below
BRAKES			
35. Check and overhaul brakes	O		
36. Replace booster cylinder air filter and overhaul brakes			O Every 3 years
FRONT END			
37. Check front wheel alignment	O		O Once a year
38. Check ball joints, steering rods etc.	O		O Once a year
WHEELS AND TYRES			
39. Check tyre pressure			● Every other week
BODY			
40. Washing			See page 52
43. Polishing			See page 52
42. Anti-rust treatment			See page 53
43. Cleaning			See page 53

LUBRICATION

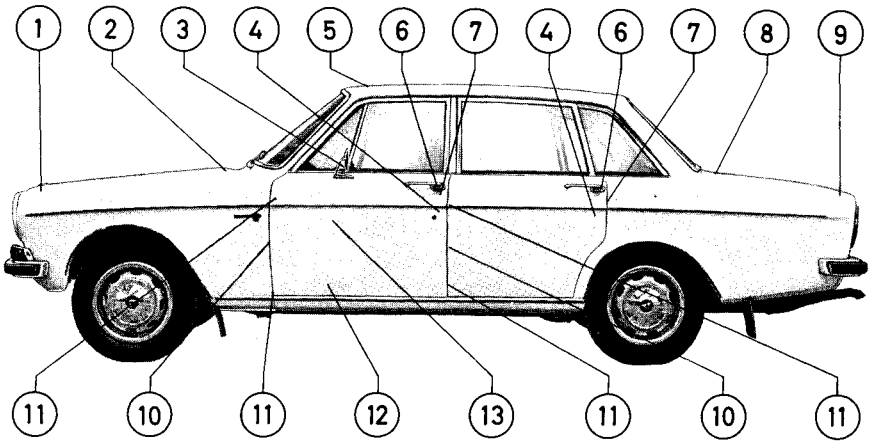
Chassis maintenance

To simplify maintenance of 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 that normally require lubricating have been packed with very durable grease at the factory and then carefully sealed, thus obviating the need for subsequent lubrication.

However, to ensure that these parts are functioning properly, it is necessary to inspect their seals and rubber sleeves thoroughly after every 10 000 km (6000 miles) or at least once a year.

Oil should be changed or the oil level checked after every 10 000 km (6000 miles) in accordance with the lubricating chart at the end of the book. The measures taken in this inspection are also to be found in the lubricating chart.

Always use only first-class lubricant of a 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.

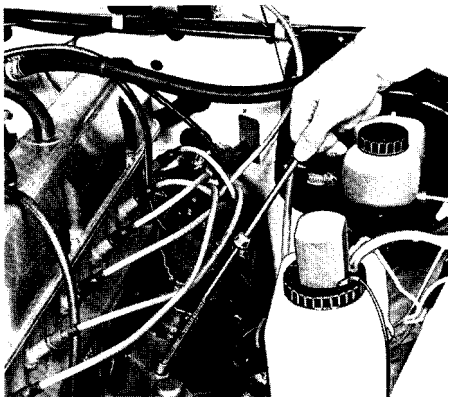


1 Body lubrication

In order to avoid rattle and unnecessary wear, the body should be lubricated once a year. The hinges on the bonnet, doors and boot lid as well as door stops should be lubricated every 10 000 km (6000 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.

*) Included in the 10 000 km (6000 mile) inspection.

No.	Lubricating point	Lubricant
1.	Bonnet catch	Paraffin wax
2.	Bonnet hinges*	Oil
3.	Ventilator window catches and hinges	Oil
4.	Catches	Molybdenum – disulphide grease
5.	Roof opening wind breaker	Oil
6.	Door handle lock buttons	Paraffin wax
	Key holes	Silicon wax
7.	Door lock outer sliding surfaces	Paraffin wax
8.	Luggage compartment hinges*	Oil
9.	Luggage compartment lock	Oil
	Key holes	Silicon oil
10.	Door checks*	Paraffin wax
11.	Door hinges*	Grease
12.	Driving seat slide rails and catches	Paraffin wax
13.	Window lifts	Oil and grease
	Locks (Accessible after door upholstery panels have been removed)	Silicon grease



2 Check the oil level in the 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 oil in engine

With a new or newly reconditioned engine, the oil should be changed after the first 2500 km (1500 miles). Subsequent oil changing is according to the intervals given below. The intervals will depend to a great extent on the type of oil used. For engine lubrication, oil quality "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 traffic with incessant stopping and starting and with lengthy idling periods.

For engine oil with viscosity SAE 10 W-30 (multigrade),10 W-40,10 W-50 or 20 W-50 the oil should be changed every 10 000 km (6000 miles), or at least once a year.

If engine oil with viscosity SAE 10 W single-grade), 20/20 W or 30 is used, the oil should be changed every 5000 km (3000 miles), or at least twice a year.

At very low temperature (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)	Oil capacities
SAE 10 W-30 10 W-40 10 W-50 20 W-50 "For Service MS"	all year round for all temp. above –10° C (14° F)	10 000 (6000) (or however at least once a year)	No oil filter 5.2 litres 9.2 Imp. pints 11.0 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)	5000 (3000) (or at least twice a year)	With oil filter 6.0 litres 10.6 Imp. pints 12.6 US pints

1) Change the oil after the first 2500 km (1500 miles) during running-in.

4 Carburettors

At each oil change check that the oil level in the centre spindle of the carburettors is about 6 mm (1/4") from the top of the spindle. If it is not, fill up with oil ATF Type A (Automatic Transmission Fluid).

The carburettors are adjusted and tested in a test bench at the factory with a CO-gauge. No adjustment of the carburettors is required other than when carrying out repairs to them.

5-6 Gearbox M 400

The oil in the gearbox should be checked after every 10 000 km (6000 miles). The oil level should be up to the filler hole. If necessary top up with the recommended oil.

After every 40 000 km (25000 miles) the oil in the gearbox should be changed. In the case of a new or reconditioned gearbox the oil should also be changed after the first 5000 km (3000 miles) and the gearbox thoroughly flushed with the same type of oil subsequently used. The old oil should be drained off immediately after the vehicle has been run while the oil is still warm.

7-8 Gearbox; with overdrive M 410

For cars fitted with an overdrive, the oil level should be checked and the oil changed parallel with similar procedure for the gearbox. The overdrive and the gearbox have a common oil level and oil filler hole. Make sure when topping-up that the oil runs over into the overdrive. The oil is drained out by removing the gearbox drain plug and the cap for the overdrive oil strainer. At each oil change the oil filter of the overdrive should be cleaned. This should be done by a Volvo workshop.

Oil, ATF Type A

Oil grade	Viscosity	Oil capacity
Gear oil alt.	SAE 90 At temperatures below –10° C (14° F) SAE 80	0.6 litre 1.1 Imp. pints 1.3 U.S. pints
Engine oil	SAE 40	

Oil grade	Viscosity	Oil capacity
Engine oil	SAE 30 or Multigrade SAE 20 W-40	1.4 litres 2.46 Imp. pints 2.95 U.S. pints

9 Automatic transmission BW 35

The oil in the automatic transmission should not be changed but the oil level should be checked every 10 000 km (6000 miles). The filler pipe with graduated dipstick is to be found under the bonnet just in front of the cowl.

N.B. The dipstick has different graduation marks for a warm and cold transmission.

When the oil level is being checked, the car should be standing level. With the engine idling in position P, the level should be between the upper and lower graduation marks on the dipstick. When topping-up is necessary, use only special oil for automatic transmissions, type A.

up is necessary, use only oil ATF, Type F. If this is not available, use Type A or Dexron.

The dipstick should be wiped with a nylon cloth, paper or chamois leather. Cloths which leave residues on the dipstick must be avoided.

10-11 Rear axle

The oil level in the rear axle should be checked after every 10 000 km (6000 miles). The oil level should be up to the filler hole. If necessary top up with the recommended oil. The oil in the rear axle should be changed after the first 5000km (3000 miles). The old oil should be drained off by removing the rear axle cover plate. This should be carried out immediately after driving while the oil is still warm. Oil can also be sucked up through the filler hole with a syringe. The rear axle should be thoroughly flushed with the same oil as used in the rear axle before being filled with new oil. After this only the oil level need be checked and topping-up with the recommended oil carried out if required.

12-13 Differential brake

Cars fitted with a differential brake are delivered from the factory with a transmission oil according to the American Military Standard MIL-L-2105 B provided with an additive for rear axles with differential brake. 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 rear axle without differential brake.

Oil grade	Oil capacity
ATF Type F (if unavailable, Type A or Dexron)	8.2 litres 14.4 Imp. pints 17.4 U.S. pints

Oil grade	Viscosity	Oil capacity
Hypoid oil	SAE 90 At temperatures continuously below –10° C (+14°F), SAE 80	1.6 litres 2.82 Imp. pints 3.38 U.S. pints

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

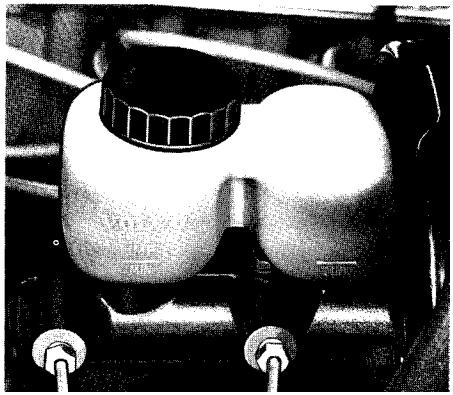
14 Steering box (mechanical steering)

The oil level in the steering box should be checked after every 10 000 km (6000 miles). The oil level should be up to the filler plug. If necessary, top up with new oil. As a rule, the oil in the steering box does not need to be changed except during overhauling. Should the oil for any reason need to be changed, the old oil should be sucked up by means of an oil syringe which is inserted into the filler hole.

15 Servo steering

The oil level in the servo steering should be checked every 10 000 km (6000 miles). Before checking wipe the oil container clean. Then remove the cap and check the level with the engine not running. The oil level should be about 5-10 mm (1/4") above the level mark in the container. If the level is lower than this, top up with oil, with the engine stopped to prevent air from being sucked into the container. Start the engine and recheck the oil level, which should now fall to the level mark. When the engine stops, the level should rise to about 5-10 mm (1/4") above the mark.

The oil and filter in the servo steering do not need replacing other than during repairs or reconditioning.



16 Brake fluid

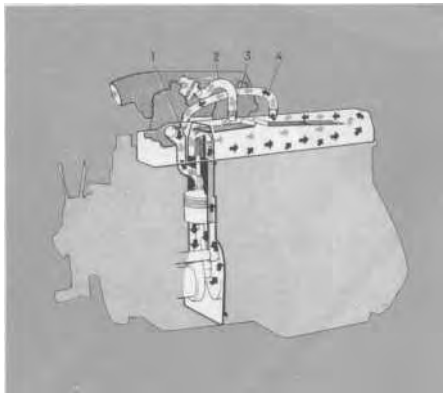
The brake system is fitted with a tandem-type brake fluid container with a section for each circuit but with the same filler hole. The brake fluid level should be between the "Max" and "Min" marks.

(On a right-hand steered vehicle the clutch fluid container should be filled almost to the top with brake fluid.)

Oil grade	Viscosity	Oil capacity
Hypoid oil	SAE 80 All year round	0.6 litre 1.1 Imp. pints 1.3 U.S. pints

Oil grade	Oil capacity
ATF Type A or Dexron	1.2 litres 2.11 Imp. pints 2.53 U.S. pints

Use only brake fluids conforming to specification 70 R 3 for the hydraulic brake system.



ENGINE

17 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 (25 000 miles) remove and clean the nozzle (1), the hoses (2 and 4) and the flame protector (3). Rubber hoses should also be replaced if they are in a poor condition.

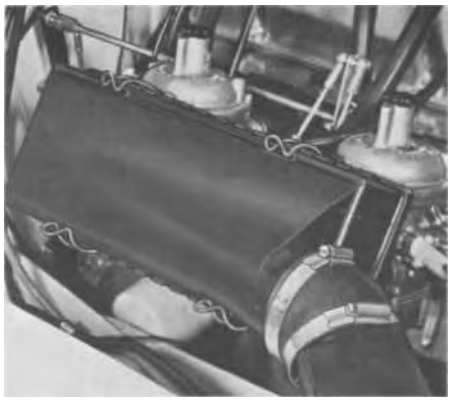
18 Oil filter

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 (6000 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 0.8 litre (1.4 Imp. pints=l.7 US pints) of oil.

19 Fuel filter

The fuel filter should be cleaned after every 10 000 km (6000 miles). Loosen the plug and clean the filter in the plug. Check that the gasket is not damaged and make sure that it seals properly when the plug with filler is re-fitted.



20 Replacing the air cleaner paper filter

The air cleaner consists of a plastic cover with replaceable paper filter insert. The insert should be replaced after every 40 000 km (25 000 miles). Replacement should be carried out more frequently if the driving conditions are often dusty. No other kind of servicing is required outside these intervals.

To replace release the tensioning clips securing the air cleaner cover. The cover can then be opened so much that the insert is accessible for replacement.

20 a Replacing foam plastic filter for gas evaporation unit

On vehicles fitted with a gas evaporation unit, the foam plastic filter in the holder on the cowl to the right in the engine compartment should be replaced every 40 000 km (25000 miles).

21 Valves

The valve clearances should be checked after every 10 000 km (6000 miles). This check should be carried out by a workshop.

22 Compression test

To get some idea of the condition of the engine, a compression test should be made after every 10 000 km (6000 miles). This test should preferably be carried out by a workshop.

23 Fan belt

The fan belt tension should be checked every 10 000 km (6000 miles). Due to wear or dirt, this belt can start slipping with poor cooling and poor alternator output as the result.

The check can be suitably carried out by a Volvo workshop.

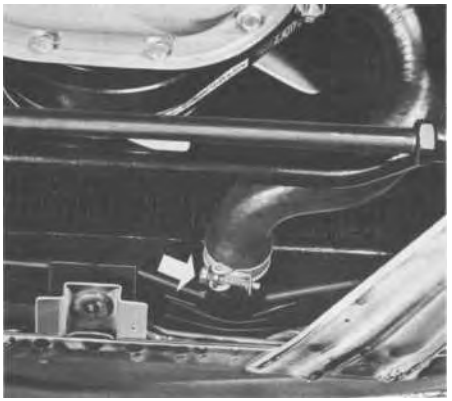
To test the tension provisionally press in the fan belt at a point midway between the alternator and the fan. It should be possible to press down the belt about 10 mm (3/8") with normal pressure (7-9 kp/cm ^{2} = 100-128 p.s.i.).

24 Check the coolant level

The cooling system must be well filled with coolant and not leak if it is to operate at maximum efficiency. Check the coolant level when filling up with fuel. The level should be between the "Max" and "Min" marks on the expansion tank.

The check should be carried out with particular thoroughness when the engine is new or the cooling system has been empty.

Do not remove the filler cap other than for topping-up with coolant. Frequent removal interferes with the coolant circulation between the engine and the expansion tank during engine warming up and cooling.



Top-up with coolant

lop up with 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. 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.

Note. In countries with very warm climate where risk of frost is rare, ordinary water can be used in the cooling system.

25 Change the coolant

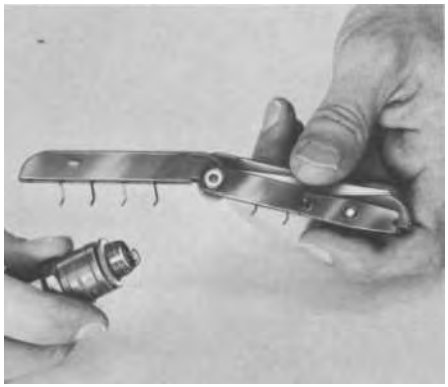
The coolant retains its properties for approx. 2 years when it should be changed A suitable time to make the change is during the autumn to ensure against any damage by frost during the coming winter months. To drain the cooling system, open the drain tap located at the right-hand side of the engine 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 will be 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 that the coolant in the expansion tank is at "Max". If necessary, top up the system.



26-27 Spark plugs, adjusting the electrode gap, changing the plugs

The spark plugs should be removed after every 10 000 km (6000 miles) and the electrode gap measured. The gap should be .7-.8 m m (.028-032").

After 20 000 km (12500 miles) the spark plugs should be changed. Tightening should preferably be done with a torque wrench. When fitting new plugs, be sure to fit the right type.

As standard use spark plug type Bosch W 200 T 35 or corresponding from other makers.

If the car is mostly used for town driving, Bosch W 175 T 35 spark plug, or corresponding from other makers, should be used.

When changing the spark plugs, check that the suppresser connectors are in good condition. Cracked or damaged connectors should be replaced.

28-29 Ignition system

The distributor contact breaker gap and the engine ignition timing should be checked every 10 000 km (6000 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 100 (ROT*) is primarily recommended for normal driving. Knocking or pre-ignition can occur if petrol with low octane value is used. However, if highway motoring is often involved, an octane value of at least 97 (ROT*) should be used.

ROT* =Research Method.

ELECTRICAL SYSTEM

30 Check the battery electrolyte level

To ensure that the battery functions properly, the electrolyte level should be checked regularly. A suitable time to do this is when the fuel tank is being filled. The electrolyte level should be up to the slit tubes. If the level is too low top up with distilled water. Never add too much distilled water since 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.

31 Check the state of charge of the battery

The state of charge of the battery should be checked after every 10 000 km (6000 miles). The check is made with the left of an hydrometer which shows the specific gravity of the battery acid (this varies with the state of charge of the battery). See page 58. At the same time, check also the lead terminals and terminal studs to make sure that they are tight, 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.

32 Check headlight alignment

The alignment of the headlights should be checked in a workshop after every 10 000 km (6000 miles). Remember that the section of the road lit up by 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. A battery connection to the wrong terminal will damage the rectifiers. Before the connections are made, 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 lead from the auxiliary battery for starting must be connected to the negative terminal stud of the car battery and the positive lead from the auxiliary battery for starting to the positive terminal stud.

3. If a rapid charger is used for charging the battery, the car battery leads should be disconnected.
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, as this will immediately ruin the alternator.
Always make sure that all the battery,connections are properly tightened.

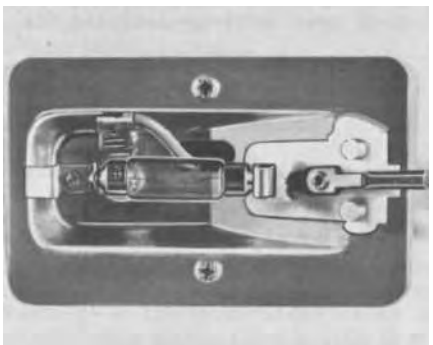
5. Before carrying out any electrical welding on the car, first disconnect the battery earth lead and all the cables to the alternator and voltage regulator. Make sure that the ends of the loose cables do not earth against the car framework. Insulate well if necessary.

Replacement of 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 lamps that the guide pin on the socket fits into its corresponding recess.

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



Replacing the bulb for the lights for the luggage and engine compartments

Slacken the screw holding the lamp shade. The bulb is now accessible for replacement.

Replacing the bulb for the glove compartment light

The bulb is mounted under the dashboard above the compartment lid. To remove the bulb, press it in a bit and then turn it anti-clockwise.

Replacing lamps for instrument panel and heater control lighting

Because of the location of the above lamps, a Volvo workshop should be given the job of replacing them.

Replacing the side light bulbs

Remove the two cross head screws holding the glass. Take out the bulb by pressing it in slightly while turning it anticlockwise at the same time.

Replacing the roof light bulb

When replacing the roof light bulb, the lamp shade is pulled straight out so that the bulb is accessible for replacement. See pictures opposite.

Replacing the bulbs for the front flashers and the parking lights

Remove the two Philips screws which hold the glass. The bulbs can now be removed by pressing them inwards and then turning them a little anti-clockwise. The inner bulb is for the parking light, the outer for the flasher.

Replacing the bulbs for the rear flashers, parking lights, stop lights and reversing lights

Remove the two Philips screws which hold the glass. The bulbs can now be removed by pressing them inwards and turning them slightly anti-clockwise at the same time. The top bulb is the flasher, the one under that is the reversing light, the next one under that the stop light and the one at the bottom the rear light. Make sure that the sealing strip fits well against the glass when it is refitted.

Replacing the bulbs for the number plate light

The two bulbs for the number plate light are mounted on a holder located under the luggage compartment locking device. Loosen the two screws which hold the glass and remove it. The bulb is now accessible for changing.

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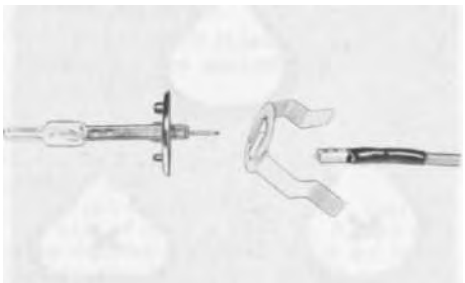
Replacing the headlight bulbs

The headlight bulbs are replaced from inside the engine compartment in the following way;

1. Remove the protective cover over the space behind the headlight.
2. Remove the contact for the bulb holder and rubber sleeve.
3. Remove the spring which fixes the lamp holder in the correct position.
4. Lift out the bulb holder with the bulb complete as one unit. Do not grasp the bulb glass with your fingers. When fitting the bulb holder spring into the insert make sure that the guide pin engages in its notch.



POWER TRANSMISSION

33 Check the release arm free travel

To avoid risk of the clutch slipping, the release arm free travel should be checked and adjusted if necessary every 10 000 km (6000 miles). For data see page 59.

The clutch should be checked and adjusted at a workshop which has the proper equipment.

34 Check the propeller shaft

After every 10 000 km (6000 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

35 Check the brakes

After every 10 000 km (6000 miles) the vehicle should be taken to a Volvo workshop for a check on the functioning of the brakes.

36 Replacing the booster cylinder air filter and overhaul of brakes

Every 60 000 km (36 000 miles) the car should be taken to a Volvo workshop for replacement of the booster cylinder air and damper filters.

Replacement should be more frequent when driving often on dusty roads. The brake system seals should also be replaced every 3rd year or 60 000 km (36000 miles).

Replacing the fog light bulbs

The bulbs for the fog lights are replaced from inside the engine compartment. Remove the protection covering the space over the headlight and fog light. Squeeze together the spring holding the bulb and lift out the spring and bulb. The bulb is now accessible for replacement.

Because of the two bosses on the bulb socket, the bulb can only be fitted in one way.

FRONT END

37 Check the 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 (6000 miles). If the vehicle has been in a 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 quickly and efficiently. The front wheel alignment angles are given on page 59.

38 Check the ball joints, steering rods, etc.

After every 10 000 km (6000 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 (6000 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

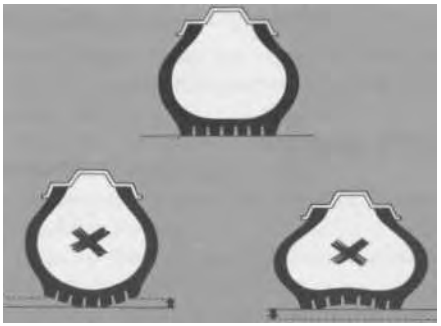
The car is fitted with pressed steel wheels with attachments for the hub caps. All wheels are accurately balanced. The tyres are tubeless with size 6.85-15 (on certain markets 165 SR 15). Size 165-15 (65-380) is recommended for use in the winter with or without studs. Snow chains can only be fitted on the rear wheels. Rapid links cannot be fitted on the Volvo 164 because of insufficient space between the disc brake pad holders and the rims.

39 Check the tyre pressure

Make a habit of checking the pressure in the tyres regularly. The simplest way to do this is to check the pressure at a service station while filling up with fuel. See page 59 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 of 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.

Excessively low air pressure is one of the most common reasons for tyre wear. If the pressure is too low, the tread shoulders bear the entire load and wear down very quickly. 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.



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 kerb.

Changing a wheel

Before the vehicle is jacked up, the hand-brake should be applied and one of the gears engaged.

Removal

1. Prise off the hub cap with the help of the removal lever.
2. Loosen the wheel nuts 1/2-1 turn with the help of the box spanner. All the nuts have right-hand threads which are loosened by turning them in an anti-clockwise direction.
3. Insert the lifting arm of the jack in the appropriate jack attachment of the wheel to be changed. Jack up the side of the car far enough for the wheel to turn freely.
4. Unscrew the wheel nuts completely and lift off the wheel. Be careful when lifting off the wheel that the threads of the studs are not damaged.

Fitting

1. Clean the contact surfaces between the wheel and hub and fit on the wheel. Tighten the nuts until the wheel makes good contact against the flange.
2. Lower the vehicle and tighten the nuts alternately, re-fit the hub cap.

Do not rotate a raised wheel if the car is fitted with a differential brake, since turning the jacked-up rear wheel will also move the other rear wheel on the ground, and this may cause the car to topple off the jack.

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BODY

40 Washing

The car should be washed often 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 second-hand 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.

Washing is facilitated with the help of a reliable car washing agent. Ordinary fluid dish washer can also be used. A suitable mixture is 5-10 cm (2-4") fluid dish washer to 10 litres (2.2 Imp. galls=2.6 US galls) of water. Asphalt spots and tar splash can be removed with white spirit or similar. This should be done after the 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.

41 Polishing (waxing)

The vehicle does not need polishing until the surface finish begins to lose its lustre and normal washing is no longer sufficient to make it shine again and remove the layer of dirt on the surface. 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 or dusty.

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 cleaning.

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

Touching-up surface finish damage

The touching-up of any extensive damage to the synthetic finish requires the use of special equipment and skill, so that the repairing of any such damage should be entrusted to a Volvo workshop. 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 damage from rust is to be avoided. Always make a habit, therefore, of checking the finish regularly and carrying out touching-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 colour. Touching-up is as follows:

1. If flying gravel should penetrate down to the metal, the damaged surface should be scraped completely clean with a penknife or similar.

If the paintwork has not been damaged by flying gravel, a light scraping will remove the dirt.

2. In the event of severe damage due to flying stones, it is necessary to treat the spot concerned with anti-rust primer. The primer should cover completely the scratched and "chamfered off" surface.

3. When the anti-rust primer has dried, genuine Volvo paint is applied. Stir the paint well or shake the spray bottle thoroughly before use. Apply several thin coats of the paint allowing it to dry thoroughly between each application.

Chromed parts

The chromium-plated and anodized parts should be washed with clean water as soon as they become dirty. This is particularly important if you drive on gravel roads which are treated with chemicals to keep the dust down or in the winter when salt is used to melt the snow. After the car has been washed, wax or anti-rust preparation can be applied.

42 Anti-rust treatment

The Volvo 164 is anti-rust treated at the factory. Underbody sealing compound is applied to the underbody on those places exposed to damage from flying stones thrown up by the wheels, i.e. the wheel arches, the entire floor plate and the underside of the sills. Anti-rust fluid is sprayed on the chassis parts. Inspection and any touching-up of the anti-rust protection should be done at regular intervals and at least once a year. The enclosed body sections should also be anti-rust treated by means of spray application at least once a year.

If any touching-up of the anti-rust protection is necessary, this should be done immediately to prevent moisture from seeping in and consequently damaging it.

43 Cleaning

Cleaning the upholstery

Stains on any leather and plastic parts of the upholstery can be removed with water or a mild washing agent.

The fabric upholstery can be cleaned with a vacuum cleaner or brush. Stains should be removed before they dry.

Wipe up as much of the stain as possible before treating it with spot remover. Use a damp cloth or similar. Use a dry cloth to suck up the spot remover and repeat the treatment. Normally many stains can be removed with soap and water or washing agent followed by washing with water. If carbon tetrachloride petrol (equal parts carbon tetrachloride and chemically pure petrol) is used, it should be allowed to evaporate before the stain is treated with water. Always work on the stain from the outside, in order to avoid spreading.

We give below some tips as to suitable spot removers for different types of stains.

Stains on plastic can be cleaned with water or a mild washing agent.

Water can be used to remove the following stains: blood (cold water), milk, tea, soft drinks, coca-cola, and beer.

For spots from berries, fruit, coffee and vomitings, water can be used if the stain is treated immediately.

Carbon tetrachloride petrol is used for the following stains: asphalt, oil, grease, chocolate, ice-cream, chewing gum, shoe polish, lipstick, butter and margarine.

Urine stains are treated with 5 % ammoniac and rinsed with water. This should be repeated when necessary.

Cleaning the floor mats

The floor carpets should be vacuum-cleaned or brushed clean regularly. Now and again, and specially during the wintertime, they should be taken out for drying. Mild washing agent will remove any spots.

SERVICING BEFORE A LONG-DISTANCE TRIP

If you are thinking of taking your car abroad or on a long journey, have it 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 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, front wheel alignment and steering gear.

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

3. Examine the tyres carefully. Replace worn tyres.

4. Check that the engine is running perfectly 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.

PROCEDURE IN 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 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 its properties for approximately two years, when it should be changed. A suitable time for doing this is in the autumn. This would 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 43. If the coolant has to be topped up during the winter, do not use only water as water by itself weakens both the anti-frost properties as well as the

rust-proofing effectiveness of the coolant. It is a good idea when topping up with coolant to have the concentration checked

Experience has also shown that extremely weak anti-freeze solutions (10-25 %) 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, 6.2 litres (11 Imp. pints=13 U.S. pints), this lowering the freezing point to -35° C (31 ^{0} F).

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

Engine lubricating system

During the winter multigrade oil or engine oil SAE 10 W should be used for the engine lubricating system. At very low temperatures (below -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 37.

Electrical system

The electrical system in the vehicle is subjected to greater stresses during the winter than during the warm summer months. The lighting and starter motor are used more and since the capacity of the battery is also considerably lower at low air temperature, the state of charge must be checked more often 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 handbrake freezing up if left on.

When you park the car, do not apply the handbrake but engage the first gear or reverse and if possible place blocks behind the wheels. See also page 23.

Windscreen washer

In the same way as anti-freeze is added 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 and thus necessitates the frequent use of the windscreen washer and wipers. Your Volvo 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. Such agents are now available in small handy tubes which can easily be placed in a handbag or coat pocket.

WHEN THE ENGINE STALLS OR WILL NOT START

The information given below is only intended 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.

The engine does not start although the starter motor turns it round at normal speed

1. Check that there is fuel in the tank.

2. If the engine is warm, starting should be done with the accelerator pedal slowly depressed as far as it will go.

3. In wet weather the sparking plug insulators should be wiped clean and the distributor cap removed and wiped dry if flashover is suspected.

4. Check that the fuel line connections on the pump and carburettor are not leaking and that fuel is supplied to the carburettor.

5. If the engine is turned round for a while without having started, too rich a fuel mixture can enter the cylinders so that the sparking plugs become wet. Blow the cylinders clean by screwing out the sparking plug and turning round the engine with the starter motor. Dry the sparking plugs before fitting them.

If the engine still does not start

1. Remove the ignition lead from each plug in turn. Hold the end of the lead about 1/4" from the cylinder block while turning round the engine with the ignition switched on. If there is a strong spark, the fault is probably in the sparking plugs, so these should be changed.

2. If only a weak spark is obtained or none at all, check to see whether the ignition leads are properly inserted in the distributor and ignition coil.

3. Remove the distributor cap, check and clean all contact surfaces. Check that the contact breakers close properly when the engine is turned round. If the contact breaker arm shaft binds, oil it very sparingly.

If the engine misfires, the reason can be:

1. That one of the ignition leads has loosened in the distributor cover or from the sparking plug.

2. That one or more of the sparking plugs is coated with soot or oiled up, in which case the plug concerned should be cleaned or changed and the sparking plug gap adjusted.

3. That the distributor cap and rotor arm are cracked or damaged.

4. That one of the ignition leads is in a poor condition.

5. That the contact breaker gap in the distributor is insufficient or non-existent.

6. That the contact breakers are badly burnt.

How to start your car downhill

Switch on the ignition, pull out the choke if required, engage 3rd gear or even 4th and let the car roll downwards with the clutch pedal depressed. When the speed is up to 15-20 km.p.h. (9-12 m.p.h.), and not before, release the clutch pedal slowly.

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

MEASUREMENTS AND WEIGHTS

Length	4705 mm (185″)
Width	1735 mm (68.3″)
Height unladen (ready to drive)	1437 mm (56.5″)
Wheelbase	2700 mm (106.3″)
Ground clearance, unladen	210 mm (8.3″)
(ready to drive) driver and 3 passengers	160 mm (6.3″)
Track, front	1350 mm (53.2″)
rear	1350 mm (53.2″)
Turning circle	9.6 m (31.6 ft.)
Kerb weight	1330–1370 kg (2926–3014 lb.)
Permissible total weight	1750 kg (3850 lb.)
Permissible load (excluding driver)	310–350 kg (682–770 lb.) depending on chassis type
Permissible axle pressure, front	820 kg (1804 lb.)
rear	960 kg (2112 lb.)
Permissible roof rock load	100 kg (220 lb.)
Max. permissible trailer weight	1200 kg (2640 lb.)

ENGINE

Type designation	B 30
Output (DIN) at r.p.m.	130 h.p./5000
Output (SAE) at r.p.m.	145 h.p./5500
Max. torque (DIN) at r.p.m.	21 kpm (152 lb.ft.)/2500
Max. torque (SAE) at r.p.m.	22.5 kpm (163 lb.ft.)/3000
Number of cylinders	6
Bore	88.90 mm (3.50″)
Stroke	80 mm (3.15″)
Displacement	2.98 litres
Compression ratio	9.3: 1
Valves	Overhead
Valve clearance, warm and cold, inlet	.50–.55 mm (.020–.022″)
exhaust	.50–.55 mm (.020–.022″)
Idling speed (warm engine)	800 r.p.m. (700 r.p.m. with BW 35)

Fuel system

Carburettor, type	Horizontal
designation	Zenith-Stromberg 175 CD 2 SE

Cooling system

Type	Positive pressure closed system approx. 0.7 kp/cm² (10 p.s.i.)
Thermostat, begins to open at	81–83° (178–182° F)
fully open at	90° C (194° F)

Ignition system

Firing order	1–5–3–6–2–4
Ignition setting	
stroboscope setting at 600–800 r.p.m. with both vacuum hoses disconnected	10° B.T.D.C.
Spark plugs, normal driving	Bosch W 200 T35*
mostly town driving	Bosch W 175 T35*
spark plug gap	.7–.8 mm (.028–.032″)
tightening torque	3.5–4.0 kgm (25–29 lb.ft.)
Distributor, direction of rotation	Anti-clockwise
contact breaker gap	.25 mm (.010″)

Electrical system

Voltage	12 V
Battery, type	Tudor 6 EX4 F o. p.*
capacity	60 Ah
electrolyte, specific gravity	1.28
recharged at	1.21
Alternator max. output	770 W
max. current	55 A
Starter motor, output	1 h.p.

* or corresponding

Lamp bulbs (12 V)	**Power**	**Socket**	**Number**
Headlights	45/40 W	P 45 T	2
Fog lights	55 W	P 14.5 S	2
Parking lights, front	5 W	Ba 15 s	2
Flashers, front and rear	32 cp	Ba 15 s	4
Side lights	4 cp	Ba 15 s	4
Stop lights	32 cp	Ba 15 s	2
Reversing lights	32 cp	Ba 15 s	2
Rear lights	5 W	Ba 15 s	2
Number plate light	5 W	SV 8.5	2
Interior lighting	10 W	SV 8.5	1
Glove compartment light	2 W	Ba 9 s	1
Engine and luggage compartment lights	18 W	SV 8.5	2
Instrument lighting	3 W	W 2.2 d	2
Lighting, heater controls	1.2 W	W 1.8 d	3
Warning lamp, charging	1.2 W	W 1.8 d	1
turn indicators	1.2 W	W 1.8 d	1
brakes	1.2 W	W 1.8 d	1
headlights	1.2 W	W 1.8 d	1
oil pressure	1.2 W	W 1.8 d	1
elec. heated rear window	1.2 W	W 1.8 d	1
overdrive	1.2 W	W 1.8 d	1
warning hazard flashers	1.2 W	W 1.8 d	1

Fuses

4	5 A
4*)	8 A
1	16 A

*) 6 fuses if vehicle is fitted with fog lights.

POWER TRANSMISSION

Clutch

Release lever free travel	4–5 mm (approx. 3/16″)
right-hand steering	2–3 mm (3/32″)

Gearbox

Type designation	M 400	M 410	BW 35	
Reduction ratios:				
1st speed	3.14:1	3.14:1	2.39:1	× the converter ratio
2nd speed	1.97:1	1.97:1	1.45:1	
3rd speed	1.34:1	1.34:1	1:1	
4th speed	1:1	1:1	—	
(with overdrive)	—	0.797:1	—	
Reverse	3.54:1	3.54:1	2.09:1	

Rear axle

Type	Hypoid bevel gear
Reduction ratio	3.73:1 3.31:1 (for BW 35)

FRONT WHEEL ALIGNMENT

The alignment values apply to an unladen car but include fuel, coolant and spare wheel.

Toe-in	0–4 mm (.157″)
Camber	0 to +1/2°
Caster	0 to +1°
King pin inclination	7.5°

WHEELS AND TYRES

Tyre size	6.85–15		165 SR 15	
Air pressure, cold tyres, kg/cm² (p.s.i.)	Front	Rear	Front	Rear
1–2 persons	1.6 (23)	1.7 (24)	1.7 (24)	1.8 (26)
Fully loaded	1.7 (24)	2.1 (30)	1.8 (26)	2.1 (30)

For prolonged driving at high speed, 140 km.p.h. (90 m.p.h.) with 6.85–15 tyres, the pressure should be increased by 0.3 kg/cm² (4.5 p.s.i.). Maximum pressure must not, however, exceed 2.1 kg/cm² (30 p.s.i.).
The pressure in the 165 SR 15 tyre should also be increased by 0.3 kg/cm² (4.5 p.s.i.) for long-distance driving at a speed near that of maximum for the vehicle.

CAPACITIES

Fuel tank	58 litres	(12.76 Imp. galls. = 15.31 US galls.)
Cooling system	12.4 litres	(2.73 Imp. galls = 3.27 US galls) (of which expansion tank 1.5 litres = 3.2 Imp. pints = 2.6 US pints)
Oil capacity,		
engine, at oil change	5.2 litres	(9.1 Imp. pints = 10.9 US pints)
incl. oil filter	6.0 litres	(10.6 Imp. pints = 12.6 US pints)
gearbox (M 400)	0.6 litre	(1.1 Imp. pints = 1.3 US pints)
(M 410)	1.4 litres	(2.46 Imp. pints = 2.95 US pints)
(automatic)	8.2 litres	(14.4 Imp. pints = 17.3 US pints)
rear axle	1.6 litres	(2.82 Imp. pints = 3.38 US pints)
steering gear	0.6 litre	(1.1 Imp. pints = 1.3 US pints)
servo steering	1.2 litres	(2.11 Imp. pints = 2.53 US pints)

TOOL KIT

Wheel nut spanner	Adjustable spanner
Tommy bar	Philips screwdriver
Pliers	Plain screwdriver

Symbols

Brake fluid
Grade: SAE 70 R3

Rear axle oil
Grade: Hypoid oil
Viscosity: See page 39

Special lubricants
See resp. note

Light engine oil

Engine oil
Grade: For Service MS
Multigrade
See also page 37

Check the following when filling the tank

1. Check the engine oil level.
2. Check without removing the cap that the level in the brake fluid container is above the MIN mark. (Right-hand steering: Check also the clutch fluid level.)
3. Check that the coolant level is between the MAX and MIN marks on the expansion tank.
4. Check that the fluid container for the windscreen washers is filled.

About every other week check the tyre pressure and the battery acid level.

Notes for lubricating chart

Note 1. The wheel bearings are packed at the factory with a special type of grease intended to last for the entire lifetime of the bearings. Normally, therefore, the sealed-for-life bearings do not require a change of lubricant or additional grease. In connection with such workshop operations involving uncovering the wheel bearings, the bearings should be cleaned and then lubricated with high-class, durable grease according to the instructions in the service manual. Except on the above occasion, subsequent adding or changing of lubricant is not required.
The rear wheel bearings are lubricated so replacement of grease is not required. However, if the bearings have been removed, they should be lightly greased with wheel bearing grease.

Note 2. Mechanical steering:
Check that the oil reaches up to the filler plug. Use hypoid oil SAE 80 all year round. Servo steering: Check that the oil level in the servo steering container is 5-10 mm (5/16") above the level mark. Use Automatic Transmission Fluid, Type A, or Dexron.

Note 3. Check that the fluid reaches up to the MAX mark. (Right-hand steering: Check also the clutch fluid level.)

Note 4. Lubricate the felt wick under the rotor and fill a few drops of light engine oil into the lubricating cup.

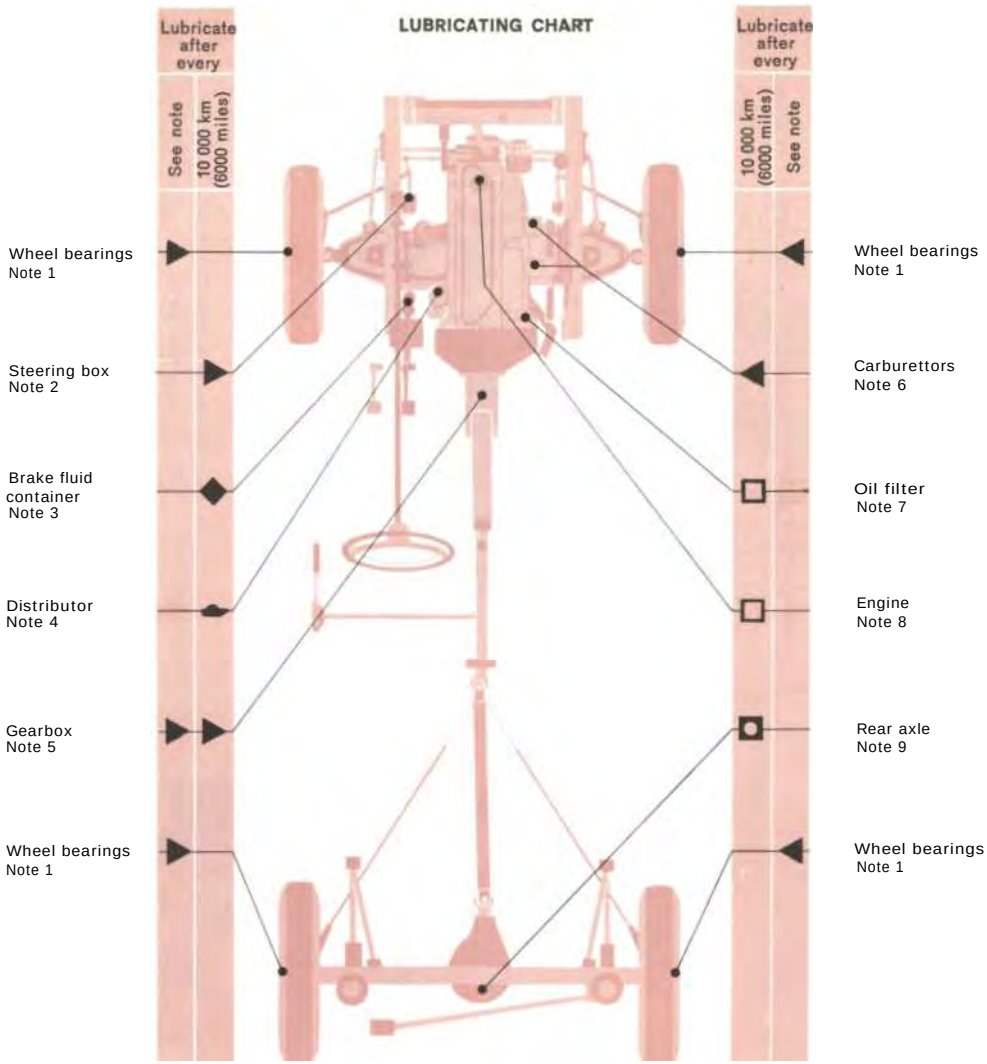
Note 5. Check every 10 000 km (6000 miles) that the oil reaches up to the filler plug. Concerning oil change, see page 38.
N.B. The type of gearbox will decide the type of lubricant to be used.

Note 6. At every engine oil change check that the oil level in the centre spindle of the carburettors reaches up to about 6 mm (1/4") from the edge of the spindle. Use oil ATF type A (transmission oil).

Note 7. Change the oil filter every 10 000 km (6000 miles). See page 41.

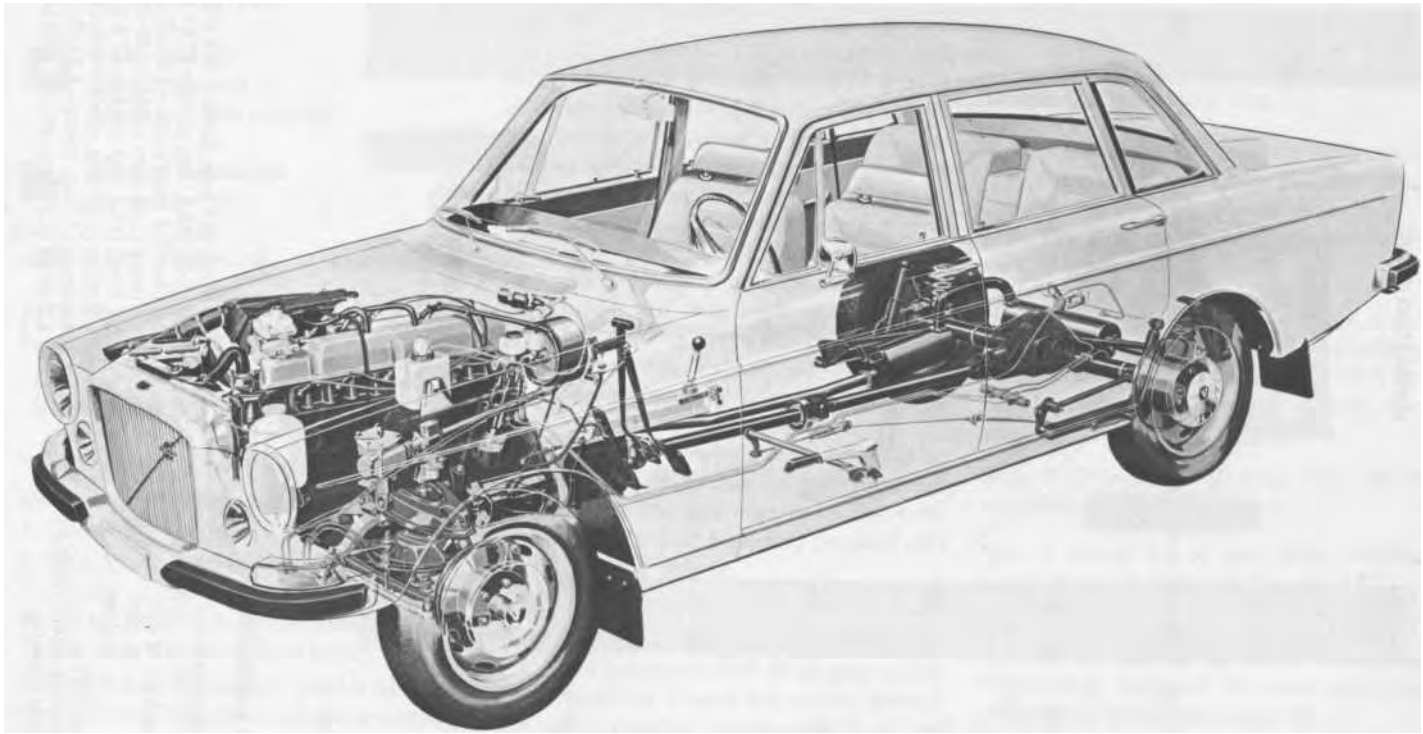
Note 8. Check the oil level when tanking. Concerning oil changing, see page 37.

Note 9. Check every 10 000 km (6000 miles) that the oil reaches up to the filler plug. Concerning lubricant for rear axle with differential brake, see page 39.



Oil capacities

Engine excl. oil filter	approx. 5.2 litres (9.1 Imp. pints= 10.9 US pints)
incl. oil filter approx.	approx. 6.0 litres (10.6 Imp. pints=12.6 US pints)
Gearbox, M 400	approx. 0.6 litre (1.1 Imp. pints=1.3 US pints)
M 410	approx. 1.4 litres (2.46 Imp. pints=2.95 US pints)
BW 35	approx. 8.2 litres (14.4 Imp. pints= 17.3 US pints)
Rear axle	approx. 1.6 litres (2.82 Imp. pints=3.38 US pints)
Steering gear (meth.)	approx. 0.6 litre (1.1 Imp. pints=1.3 US pints)
Servo steering	approx. 1.2 litres (2.11 Imp. pints =2.53 US pints)



Fuel with octane rating 100 (ROT) should be used for the B 30 A engine.

For mainly highway driving, however, fuel with an octane rating of minimum 97 can be used.

*) ROT=Research Method

RECOMMENDED TYRE PRESSURE

Tyre size	6.85—15		165 SR 15	
Air pressure, cold tyres, kg/cm² (p.s.i.)	Front	Rear	Front	Rear
1—2 persons	1.6 (23)	1.7 (24)	1.7 (24)	1.8 (26)
Fully loaded	1.7 (24)	2.1 (30)	1.8 (26)	2.1 (30)

For prolonged driving at high speed, 140 km.p.h. (90 m.p.h), with 6.85—15 tyres, the pressure should be increased by 0.3 kg/cm² (4.5 p.s.i.). Maximum pressure must not, however, exceed 2.1 kg/cm² (30 p.s.i.).

The pressure in the 165 SR 15 tyre should also be increased by 0.3 kg/cm² (4.5 p.s.i.) for long-distance driving at a speed near that of maximum for the vehicle.

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