



USA/Canada
1974



OWNER'S MANUAL VOLVO 164

Notice to Owner: Your Volvo has been built to comply to all North American safety and anti-pollution regulations and evidence of this can be seen from the certification label attached on the firewall in the engine compartment. For further information regarding these regulations, please talk to your selling dealer.

Personal Information

Name

Address

Tel. No.

Car Information

Vehicle Identification Number (VIN)

Ignition Key No.

Door Key No.

VOLVO 164

Operating Instructions • Description • Servicing

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

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

The specifications and constructional details given in this book are not binding. We reserve the right to carry out modifications without previous notice.

AB VOLVO • GÖTEBORG, SWEDEN

Reproduction permitted if source quoted

CONTENTS

INTRODUCTION

Volvo Service Organization	3
Warranty and Service Booklet	3
Service Maintenance	3

OPERATING INSTRUCTIONS

Instruments and controls	4
Interior and body	14
Starting and driving	21
Running-in	21
Starting the engine	22
Shifting	23
Towing	26
Braking	27
Seat/Ignition Interlock System	8, 16, 22

TECHNICAL DESCRIPTION

Engine compartment	28
Engine	29
Power transmission	31
Front end and steering	33
Electrical system	34
Brakes	36

SERVICING

General	37
Maintenance schedule	38
Lubrication	42
Oil changes	43
Engine	46

Electrical system	52
Power transmission	56
Brakes	56
Front end	57
Wheels and tires	57
Body	59
Long-distance trip	61
Cold weather	61
Lubricating chart	76

SERVICE DIAGNOSIS 63

SPECIFICATIONS

Type Designations	68
Measurements and weights	69
Engine	69
Electrical system	70
Power transmission	71
Front wheel alignment	71
Wheels and tires	71
Capacities	72
Tools	72

CONSUMER INFORMATION 73—75

INDEX 78

WHEN FILLING THE TANK 80



VOLVO SERVICE

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-operating 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 also have special tools, designed at the Volvo factory. Moreover, all Volvo dealers have a comprehensive stock of parts which is a guarantee that the part

you get is genuine Volvo. That is why our dealers are in the best possible position to give your vehicle first-class service concerning both maintenance operations and repairs.

You should also refer to your dealer for any information about your Volvo that is not included in this manual.

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

Warranty and Service Booklet

A warranty and service booklet accompanies each vehicle when it is delivered. This booklet contains a coupon entitling you to a service inspection after 1 500 miles (2 500 km). If possible, let the dealer who supplied the vehicle make this service inspection.

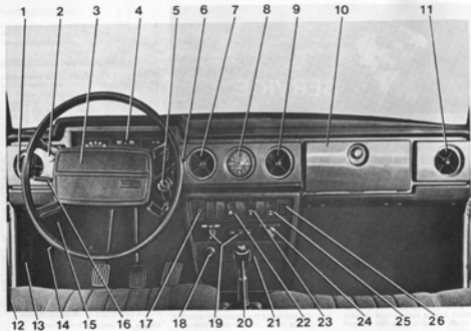
Any of our dealers, however, can do this if required. If our guarantee is to apply, we make one absolute condition and that is that the above-mentioned inspection is made at roughly the mileage shown and that the vehicle has been looked after in accordance with the instructions given in this manual.

Service Maintenance

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

Always use genuine Volvo parts.

OPERATING INSTRUCTIONS



INSTRUMENTS AND CONTROLS

The instruments and controls are described in more detail in the following pages with a reference to the numbers in the picture opposite.

1. Air vent
2. Headlight switch
3. Horn
4. Combined instrument
5. Ignition switch and steering wheel lock
6. Windshield wiper/washer control lever
7. Air vent
8. Clock
9. Air vent
10. Glove locker
11. Air vent
12. Parking brake
13. Fuse box (fuse replacement, see page 56)
14. Fresh-air control
15. Hood release handle
16. Turn signal switch lever, dimmer and mainbeam flasher
17. Rheostat for instrument panel lighting
18. Cigarette lighter
19. Heater and ventilation controls
20. Gear lever
21. Ash tray
22. Switch, electrically heated rear window
23. Switch, emergency warning flashers
24. Fan switch
25. Switch, air conditioner
26. Seat belt reminder light



1, 7, 9, 11 Air vents

Air is supplied to the compartment by means of the four air vents. Air is blown through these vents by the blower fan which is operated by switch (24). The vents can be shut off completely by turning the button in the center of each vent a 1/4 turn anti-clockwise. The vents can also be adjusted to point to any particular place in the compartment. The two outer vents can even be used for demisting the front door windows.

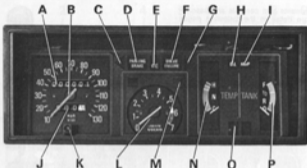
2 Light switch

The headlights are operated by a push-pull type switch on the dashboard as well as a lever (16) on the steering column. All the lights are extinguished when the light 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 low or high beams are switched on, depending on the position of the lever (16). 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. Your car is equipped with side marker lights. These are located on the sides of the mudguards and are switched on by pulling out the switch knob for the headlamp lighting.

3 Horn

The horn blows when the pad in the center of the steering wheel is pushed in and the ignition has been switched on.

OPERATING INSTRUCTIONS



4 Combined Instrument

- A Odometer
- B Speedometer
- C Left turn indicator light (green)
- D Parking brake warning light (red)
- E Upper beam control light (blue)
- F Brake circuit warning light (red)
- G Right turn indicator light (green)
- H Oil pressure warning light (red)
- I Battery charge warning light (red)
- J Trip odometer
- K Trip odometer reset knob
- L Tachometer
- M Bulb Integrity Sensor warning light (yellow)
- N Temperature gauge
- O Overdrive control light (green)
- P Fuel gauge

A Odometer

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

1 2 3 4 5 6

**PARKING
BRAKE**

D Parking brake warning light

This light gives a steady, red light when the ignition is on and the parking brake applied.

**BRAKE
FAILURE**

F Brake circuit warning light

This light gives a steady red light should a failure arise in one of the brake circuits. If the light goes on during driving, the car should be driven to a workshop to check the brake system.

Observe due care when driving under these conditions.

OIL

H Oil pressure warning light

This lights red 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.

I Warning light, battery charging

AMP

This lights red when the battery is discharging. Should it light 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.

J Trip odometer

1234

The trip odometer measures distances of up to maximum 999 miles. The window furthest to the right shows tenths of a mile and is therefore useful for measuring short distances.

K Trip odometer reset knob



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

L Tachometer



The tachometer indicates the engine speed per minute. The amber-colored area between 5500 and 6000 rpm covers a temporary speed range and can be used, for example, for rapid acceleration. The speed range 6000—7000 rpm is marked in solid red and must not be used.

M Bulb Integrity Sensor warning light



The light gives a steady yellow light should any of the bulbs for lower beam, tail light or license light go out. If any one of the stop lights is out, the warning light comes on when the brake pedal is applied. The light comes on when the ignition is switched on and goes out when the engine starts.

N Coolant temperature gauge



The temperature gauge shows the temperature of the coolant and thus indicates the working temperature of the engine. The gauge pointer should normally remain within the green sector. During town driving and idling when the weather is particularly warm, the temperature gauge pointer may enter the solid amber-colored field. Should the pointer repeatedly point to the red field, coolant and fan belt tension should be checked.

O Warning lamp, overdrive



The lamp gives a steady green light when the overdrive is engaged. Concerning engaging and disengaging overdrive, see page 23.

OPERATING INSTRUCTIONS

P Fuel gauge

The fuel 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. 2 1/2 US galls/2 Imp. galls (8 liters) in the tank. The gauge pointer registers when the ignition is switched on.

TANK



5 Combined ignition switch and steering wheel lock

The switch has four positions: (0) Locking, (1) Intermediate, (2) Driving and (3) Starting. The key can be taken out of the lock only in the **Locking** position.

The ignition switch is provided with a buzzer to remind the driver should he forget to remove the ignition key when his door is opened.

Removing the key automatically locks the steering wheel.

With the key in the **Intermediate** position, the steering wheel is not locked and some

electrical components are switched on. To start the engine, turn the key to the **Starting** position. This engages the starter motor. As soon as the engine starts, release the key, which automatically returns to the **Driving** position.

Note: If this vehicle is equipped with an ignition interlock system as required by US Safety Standards, the engine cannot be started unless the driver and front seat passenger have fastened their seat belts. Because of a special sequencing circuit in the belt interlock control, the seat belts must be fastened after the occupant is seated and before the key is turned to the starting position. If the proper sequence is not followed, the seat belt reminder light and buzzer are actuated and the engine will not start (see Engine Starting Instructions on page 22).

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

When the ignition is switched on, but before the engine has started, the following lights will be on:

- Oil pressure warning light
- Battery charge warning light
- Bulb Integrity Sensor warning light
- Parking brake warning light
- Brake circuit warning light

This is an indication that the lights function. When the engine has started, all lights should be out (except the Parking brake warning light if the parking brake should be applied).



6 Windshield wiper/washer control lever

The windshield wipers have two speeds. Moving the lever downwards one stage operates the wipers at normal speed. This speed is recommended for normal driving in rain or snow. Pushing the lever down fully operates the wipers at full speed. This is recommended only when driving in heavy rain or when driving at high speed in the rain.

The windshield washer is switched on by moving the control lever towards the steering wheel. The washer can be used even when the wipers are not switched on.

For adjustment of water jets, see page 81. The washer container is located in the engine compartment and holds approx. 6.4 qts. (5.8 liters).



8 Clock

The clock is operated electrically. To reset it, push in the re-setting knob and turn the hands.

12 Parking brake



The parking brake lever is on the outside of the driver's seat and operates on the rear wheels only. When the parking brake is applied and the ignition is on, a red warning light (4D) shows on the instrument panel.



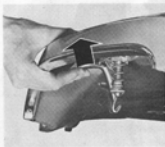
15 Hood release handle

The hood is released by pulling out the handle situated to the extreme left under the dash. This releases the hood which is still held by the safety latch.

14 Fresh-air control

Pushing the control forwards opens fresh-air intake vents on the driver's side. Note that the fan should not be operating if cool air is desired through this intake.

OPERATING INSTRUCTIONS



The hood is opened by inserting the fingers under the front edge and pressing up the latch as shown in the picture. Check that it shuts properly when closed. The location of the hood when closed can be adjusted if necessary by screwing in or out the rubber plugs underneath the hood at the front end and on the mudguards below the windshield.



16 Turn signal lever, dimmer and headlight flasher

The lever on the left-hand side of the steering column just below the steering wheel controls turn signals, changing between upper and lower beams and headlight flasher. The lever has a stop point for lane changing. This means that with small swings on the steering wheel (when e.g. changing lanes, passing, etc.) the lever can be moved up or down to this point and kept there. The right or left signal will then start flashing. When the switch lever is released, it automatically returns to its off position. For normal swings on the steering wheel, the lever is moved past this stop point to the end position. Straightening up the steering wheel will return the lever to its off position.

Switching from upper beams to lower beams and vice versa is made by moving the lever towards the steering wheel and then releasing it. Here the lighting switch (2) should be pulled fully out.

The lever is also used for flashing with upper beams 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.

17 Rheostat for instrument panel light

Rotate knob clockwise to turn on panel light and anti-clockwise to dim it.

18 Cigarette lighter

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

19, 24, 25 Heater/ventilation controls

The heating system is a combined warm air and fresh air system with air conditioner.

The system comprises the following controls:

1. TEMP (temperature)
2. FLOOR (floor)
3. DEF (defroster)
4. REC (recirculation)
5. FAN (fan)
6. AIR COND (air conditioner)
and partly also the four air vents, see page 5.

1. **TEMP** controls the incoming air temperature.
Counter-clockwise **COOL**.
Clockwise **WARM**.

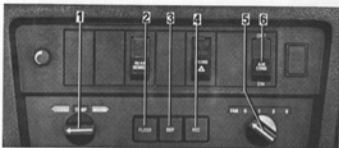
2, 3, 4. The three push buttons **FLOOR**, **DEF** and **REC** provide well-balanced standard settings.

No buttons pushed in: No air to floor and very little to defroster. Air can be obtained through the four air vents.

Only FLOOR pushed in: Full air flow to front and rear floor, very little to defroster.

Only DEF pushed in: Full defroster, no air to floor.

Push button REC is intended to be used in combination with air conditioner and should not be used for heating.



Do not switch for emergency warning function.

Air flow warning/warning lights start flashing when the lower part of the engine is blocked in. A warning lamp in the engine compartment will flash with them.

This warning system is not intended to replace the engine compartment warning lamp.

Do not touch the engine compartment warning lamp.

Do not touch the engine compartment warning lamp.

5. **FAN** controls the fan speed.
0 = Off.
3 = Full speed (mainly intended for air conditioner).

6. **AIR COND** engages the air conditioner.

Do not touch the engine compartment warning lamp.

If a fault occurs, the engine compartment warning lamp will flash. The engine compartment warning lamp will flash when the engine compartment is blocked in. A warning lamp in the engine compartment will flash with them.

This warning system is not intended to replace the engine compartment warning lamp.

In order to obtain high temperature fast, adjust:

- TEMP** fully clockwise.
- FAN** position 2 (use pos. 3 in extreme cases, only).
- FLOOR** pushed in, only.
- Air vents half way open.

This adjustment reduces the defroster efficiency.

OPERATING INSTRUCTIONS



The hood is opened by turning the key clockwise to the first stop and pushing up the hood release lever. Push the hood latch down to close the hood when closed.

This is how you engage air conditioner:

1. Switch on the compressor with **AIR COND.**
2. Turn control **TEMP** to **COOL**(fully counter-clockwise) for rapid cooling. Thereafter, choose desired temperature.
3. Push in button **REC** for rapid cooling. When desired temperature has been ob-

tain, the signal lever, driver and frontlight heater.

The lever on the left-hand side of the steering column will allow the steering wheel to rotate turn signals, changing between forward and rear beams and headlights.

4. Select suitable fan speed with control **FAN.**

The best cooling effect is reached by keeping all windows closed and none of the buttons **FLOOR** or **DEF** pushed in. Most of the cooled air will then enter the four dash air vents which should be fully open.

If you want to avoid or rapidly remove mist inside the windows, adjust:

- TEMP** fully clockwise.
- FAN** position 2 (use pos. 3 in extreme cases, only).
- DEF** pushed in, only.
- The outer air vents half way open.

When starting a snow-covered car, any snow covering the heater air intakes should be removed to avoid misting.

A good tip: For rapid removal of mist, the air conditioner can be switched on also at temperatures when it normally not should be used.

1. **AIR COND** pushed in.
2. **REC** pushed in.
3. **FAN** position 2 (use pos. 3 in extreme cases, only).
4. **TEMP** regulated to desired temperature.

Run the air conditioner a few times every month, also in wintertime when it is not used, in order to lubricate the compressor seals. Check the air conditioner yearly at a Volvo shop.

21 Ash tray

To empty the ash tray, pull it straight out all the way while pressing down the tongue inside.

22 Switch for electrically heated rear window

In order to obtain a clear rear view during cold and damp weather, the car is equipped with an electrically heated rear window. Heating is provided by wires on the inside of the rear window. **Avoid placing anything near the wires that might damage them.** Observe due care when cleaning the window inside, as rings etc may damage the wires.

The heating is switched on by pushing in the lower part of the switch. This lights up a warning lamp mounted in the switch.

Pushing in the upper part of the switch switches off the heating.

Switch off the heating when the rear window is clear of mist and ice in order not to overload the battery unduly.

**23 Switch for emergency warning flashers**

All four emergency warning lights start flashing when the lower part of the switch is pushed in. A warning lamp in the switch blinks in union with them.

This warning light is not wired across the ignition and therefore functions irrespective of whether the ignition is switched on or not.

Pushing in the switch upper part cancels the flasher lights.

The emergency warning lights should only be used when the car must be stopped where there is danger to other traffic. Note that regulations concerning the use of these lights may vary from place to place.

**25 Seat belt reminder light**

If either front seat belt is unfastened after the engine has been started with the gear selector in any forward gear, the seat belt reminder light and buzzer will actuate.

Note: If this vehicle is equipped with an ignition interlock system and the ignition key is turned to the starting position without first fastening the front seat belts, the seat belt reminder light and buzzer will actuate and the starter will not engage. Should the light and buzzer actuate while the engine is running, even though the seat belts are fastened, it is an indication that the belt interlock control is out of sequence, and the starter will not engage should the engine stop. In this case, release and re-fasten the front seat belts at each occupied position which should turn off the reminder light and buzzer.

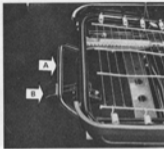
OPERATING INSTRUCTIONS



INTERIOR AND BODY

Front seats

The front seat inclination is adjustable by the hand wheel on the outside of the seat. A comfortable sleep or rest position is obtained by reclining the seat back completely.



Length and height adjustment driver's seat

The driver's seat can be moved forwards and backwards after the loop handle A on the seat front has been pulled upwards. Exert leverage with your feet on the floor and slide the seat to position desired. Height adjustment can be obtained by lifting the latch B upwards and selecting one of the heights. Slide the seat to a forward/backward position afterwards, if desired.

Certain markets have electrically heated seat cushions and seat backs. The seat cushion is provided with a thermostat which cuts in when the cushion temperature is below 57°F (+14°C) and cuts out at 78°F (+26°C). The heater pad is energized only when the ignition is on.

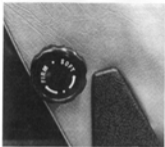
When starting a preheated car, and when starting the heater, air should be changed to fresh air.

A good grip on the right handle of each of the doors can be obtained by using the door grip when it is fully open and closed.

Head restraints are provided with adjustable head restraints. To adjust slacken the plastic nuts on the head restraints retainers. After adjusting lock the head restraints by turning the plastic nuts clockwise.

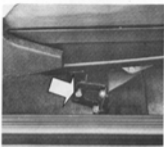
Head restraints

The front seats are provided with adjustable head restraints. If the head restraint is to fulfil its function properly, it is important that it is correctly adjusted, that is, it supports against the head and against the neck. To adjust slacken the plastic nuts on the head restraints retainers. After adjusting lock the head restraints by turning the plastic nuts clockwise.



...the bolts in rear seat
 ...the seat of the vehicle's frame with steel
Lumbar support

The front seats are provided with an adjustable lumbar support. This is operated by the knob on the right side 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 anticlockwise, "SOFT".



Length and height adjustment front passenger's seat

The front passenger's seat can be adjusted forwards-backwards by lifting the latch on the front end 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 re-install the bolts in the suitable holes.



...the seat
 ...the seat of the vehicle's frame with steel
 ...the seat of the vehicle's frame with steel
 ...the seat of the vehicle's frame with steel

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. Re-lock securely the eyelet screw with the lock nut.

OPERATING INSTRUCTIONS



Seat belts

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

Note: If this vehicle is equipped with an Ignition Interlock System as required by U.S. Safety Standards, the engine cannot be started unless the driver and front seat passenger have fastened their seat belts. The seat belts must be fastened after the occupant is seated and before the key is turned to the starting position (see engine starting Instructions on page 22).

There is a buzzer and a warning light on the instrument panel which both remind the driver that the seat belts have to be fastened. See page 13.

Your car is equipped with automatically retracting inertia seat belts.

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

The practical design of the belt makes it very easy to use. Place the belt with one strap over the lap and the other across the shoulder — chest and fasten it by pushing the buckle tongue into the slot of the locking device located between the front seats.

A clearly audible clicking sound indicates that the belt is locked. Make sure that those parts of the belt against the body are not twisted.

The belt is released from the lock by pushing in the square red button on the lock. Always make a habit of letting the belt roller pull in the belt strap when the belt is unfastened.

If the belts cannot retract fully, this may be due to the fact that they are twisted inside the cover casing. This is remedied by pulling out the belt **fully** and then allowing it to be drawn into the casing.

Note that small children (up to the age of 8—10 years) should not use the seat belts.



Seat belts in rear seat

The seat belts at both sides of the rear seat are also of the automatically retracting type. When fastening these belts pull them out rather slowly to prevent them from locking before being fastened. These belts are fastened by pushing the tongue at the end of one strap into the lock on the other. To unfasten just press in the square red button.



Center belt

The belt in the middle of the rear seat is manually adjusted. It is fastened and unfastened in the same way as the side belts in the rear seat.

To lengthen the center belt, turn the buckle and pull it out as shown in the picture.

To shorten the belt pull the upper belt strap.



Maintenance

Check now and then that the bolts are secure and the belt in good condition. Use water and a detergent for cleaning. As the seat belts lose much of their strength when exposed to violent stretching, they should be replaced after collision, even though they may appear to be undamaged. Never modify or repair the belt on your own, but have this done by a workshop.

OPERATING INSTRUCTIONS



Doors and locks

The car is equipped with a lock and key-hole on each of the front doors.

The front doors can be locked from the outside by pressing the lock button on the window ledge down and shutting the door while holding the outside handle pulled out as shown in the picture.

To lock the rear doors, push down the inside lock button. It is not necessary to keep the outside handle pulled out.

Do not leave the keys in the car.



All the doors can be locked on the inside by pressing down the lock button on the window ledge. On the front doors this lock button lifts automatically when the door is opened from the inside. On the rear doors, however, the lock button must first be pulled up before the doors can be opened from the inside.

Note that the front doors are not better closed if the lock buttons are pressed down since this only prevents the door from being opened from the outside.

During driving the lock buttons should not be pushed down as this would only prevent anyone from opening the door on the outside should an accident occur.



The door locks have been designed to provide 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 antifreeze 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.



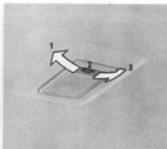
STARTING AND DRIVING

Front

Child safety lock

On the Volvo 164 there is a small red button located at the very back on the inside of the rear doors. Move this button down to lower position (A). When the door is then closed, it cannot be opened from the inside but, however, from the outside, providing the lock button on window ledge is not depressed.

If the red button is at the upper position (B), the rear door lock will function normally.



Interior light

1. Lamp is always on.
2. Lamp is always out.
3. Lamp lights when front door is opened.

Vehicles equipped with sun-roof have another type of interior light housing.

Rear View



1. Sun-roof Service Information

After 1:30 pm (EST) and the vehicle is in a "light" or "dark" state, the sun-roof will automatically open or close.

Sun-roof

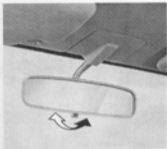
Certain models are equipped with a sun-roof. The sun-roof is opened and closed by a winding handle. When not in use, the handle is folded in the recess in the roof between both the sun visors.

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.

When the sun-roof is open, the sun-roof motor will stop automatically. The sun-roof motor will stop if the sun-roof is fully open and the sun-roof is not closed. The sun-roof motor will stop if the sun-roof is not closed. The sun-roof motor will stop if the sun-roof is not closed. The sun-roof motor will stop if the sun-roof is not closed.

When driving at high speeds in the "dark" and using the four-wheel drive transmission, the sun-roof will stop automatically.

OPERATING INSTRUCTIONS

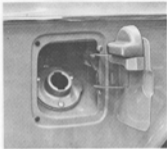


Rear view mirrors

The inside rear view mirror is provided with an anti-dazzle knob at the bottom of the mirror. The mirror is switched to anti-dazzle by pushing the knob. The outside rear view mirrors can be adjusted sideways by moving the mirror arm and up and down by moving the mirror itself.

To lock the rear doors, push down the interior lock button. It is not necessary to lock the exterior handle pushed out.

The anti-theft alarm is set on.



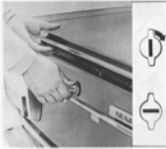
Fuel tank

The door for the fuel tank filler cap is located on the right rear fender. When filling, it is advisable to let the cap rest in a recess on the inside of the door, see the picture.

Note: if the tank cap is replaced, the new one should be of the non-ventilated type.

Note that the fuel filler cap and neck should be cleaned if the fuel filler cap is removed down where the only difference is that the fuel filler being removed with the rubber.

During driving the fuel filler should not be pushed down as this will stop driving engine from operating the door on the left side should an accident occur.



Trunk

The trunk lid is locked with the same key as that used for the doors. It is opened by turning the knob clockwise and lifting the lid at the same time. **Note that the key must be taken out of the lock in order to turn the knob and open the lid.** The lid is balanced and will remain stationary in its opened position.

The spare wheel is securely held in position to the left. The jack and tool kit are located next to the spare wheel.

Always use the same key and insert the code number of the keys which have been lost.



STARTING AND DRIVING

Running-in

The maximum permissible speeds given below must not be exceeded in the beginning when the moving parts of the car are in the process of adaption in order to achieve overall smooth function:

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

Avoid driving at high speed in low gear and using the kick-down (automatic transmission) during the first 1 200 miles (2 000 km).

1 500-mile Service Inspection

After 1 500 miles (2 500 km) the vehicle should be taken to a Volvo workshop for an inspection. Included with the checks and adjustments then made is a change of oil in the engine, transmission and rear axle. It is very important to ensure that the engine oil and filter change is made since during the running-in period the engine oil usually collects a lot of impurities. Subsequent oil changes should be made at approximately those intervals indicated in the maintenance schedule on page 38 and in the lubricating chart at the end of the book. Before being delivered, all Volvo engines are test-run on test benches and in the vehicles on test tracks. We are therefore assured that all clearances are satisfactory and we thus accept no responsibility for damage caused by careless running-in (see Volvo Warranty and Maintenance Record Book).

OPERATING INSTRUCTIONS

Your first drive

Before starting to drive your new Volvo, we would advise you to become acquainted with your car and the various instruments and controls required for the driving. When you are seated comfortably and can find the various controls without bother you are ready to start driving.

Start the engine as follows:

1. Enter the car and fasten the seat belts. If this vehicle is equipped with an ignition interlock system, the engine can not be started unless the driver and front seat passenger have fastened their seat belts. The belts must be fastened after the occupant(s) are seated and before turning the key to the starting position. The seat belt reminder light and buzzer are actuated and the starter will not engage if this sequence is not followed. (See combined ignition switch and steering wheel lock, page 8).
2. Check that the parking brake is on and the gear lever is in neutral (position N or P, autom. transmission).
3. Always make a habit of depressing the clutch pedal until the engine starts.
4. Turn the ignition key to the starting position. Release the key as soon as the engine has started.
5. Avoid repeated **short** attempts to start. (In the case of **each** new attempt, the cold start injector functions and causes

fuel to be injected into the inlet duct). Instead, allow the starter to operate for a rather long time (not more than 15—20 seconds, however) each time.

Do not race the engine up to high speed immediately after starting from cold.

6. If this vehicle is equipped with an ignition interlock system and the seat belt reminder light and buzzer actuate after the engine has started, even though the seat belts are fastened, it is an indication that the belt interlock control is out of sequence, and the starter will not engage should the engine stop. In this case, release and refasten the front seat belts at each occupant position to turn off the light and buzzer (see seat belt reminder light, page 13).

Note: If the vehicle is parked on a steep incline the seat belts cannot be pulled out and, if the vehicle is equipped with an Ignition Interlock System, the engine can not be started as long as either front seat is occupied. If this occurs, or if the Interlock System malfunctions, open the fuse box cover (see page 56) and remove fuse No. 9. This will allow the engine to be started in an emergency. While fuse No. 9 is removed, the seat belt reminder light will remain lit, even if the seat belts are fastened. When the car is on level ground reinstall the fuse and fasten seat belts or see a Volvo Dealer to have the interlock system checked if malfunctioning.

Starting in 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 odorless.

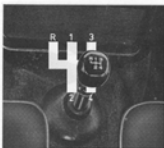
Warming up the engine

Experience has shown that engines in vehicles used for 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 on light throttle as soon as the oil pressure light has gone out.

Driving with the trunk lid open

While driving with the trunk lid partly or fully open, exhaust gases can be sucked into the car through the trunk. 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 blower switch to full speed.



Floor-mounted shift lever

Shifting with a floor-mounted shift lever is quite conventional and the different shift positions are shown in the picture above.



Overdrive

The overdrive, which can be used in fourth gear, is operated by a lever to the right under the steering wheel. Moving the lever downwards engages and upwards disengages the overdrive. No extra operation of the clutch pedal or accelerator is normally necessary but engagement of overdrive is facilitated if the accelerator pedal position is maintained steady. When disengaging the overdrive, light pressure on the clutch pedal helps to make this operation smoother. The overdrive should not be used at speeds below 40 mph (60 kmph).

SHIFTING

The Volvo 164 may have a manual transmission with an overdrive, or it may be equipped with an automatic transmission. The transmission is synchronized on all forward gears. If synchronization is to function satisfactorily, the clutch pedal must be fully depressed. Never let the engine drag in high gear. Shift down in good time.

OPERATING INSTRUCTIONS



2-position

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

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

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

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

Do not select 2 position for speeds exceeding 80 mph (125 kmph).

Automatic transmission

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

P = Parking

R = Reverse

N = Neutral

D = Driving

2 = Low speed

1
The selector lever can be moved freely between positions **D** and **2** where the other positions are blocked with a gate which is opened by means of the push button in the knob of the selector lever.

To shift from **D** and **2** to positions **N** or **1** all that is required is a light push on the button with the palm of the hand. With the push button in this position, the selector lever can be moved between the four positions, **1**, **2**, **D** and **N**.

To shift to position **R** and **P** more force is required to press down the button. This can be done with the thumb. Similar force is also required to move the selector lever out of the **P** position. In other words, with the push button fully depressed, the selector lever can be moved freely between the various shift positions in the transmission.

1-position

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

If **1** position is selected at high speed, 2nd gear is engaged. It is only when the speed has dropped to about 6 mph (10 kmph) that 1st gear engages. The 1st gear can also be engaged by kick-down below about 30 mph (50 kmph). If you want to drive in 1st gear without intending to shift up, use **1** position, e.g., when driving in hilly country where maximum engine braking can be obtained in **1** position.

Do not choose 1 position for speeds exceeding 80 mph (125 kmph).

Kick-down

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

Driving

Move the selector to **P** or **N**. The starting switch will be put out of function if the selector is moved to any of the other positions.

Important

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

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

Do not select **2** or **1** at speeds above 80 mph (125 kmph).

STANDARD TRANSMISSION

Recommended max. and min. speeds mph (kmph) for the different gears

Engine	1st gear	2nd gear	3rd gear	4th gear
B 30 F	0-35 (0-55)	10-55 (20-90)	22-85 (35-140)	27- (45)-*

*) 40 mph (80 kmph) with overdrive engaged.

AUTOMATIC TRANSMISSION

Gear speeds at full throttle, kick-down, mph (kmph)

Gear	B 30 F
1-2	40 (65)
2-3	80 (125)

Max. speed when kick-down downshifting, mph (kmph)

Gear	B 30 F
3-2	70 (110)
3-1	30 (50)

OPERATING INSTRUCTIONS

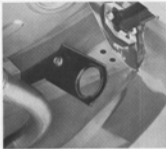


EMERGENCY TOWING (PULLING)

The line should be attached to one of the towing eyelets installed underneath the car.

At the front, the eyelet is situated at the right-hand side (left picture) on the front axle member, and the rear eyelet on the right side (right picture). During pulling, the line should be kept stretched to avoid unnecessary jerking.

The bumper must not be used for lifting (as for towing or transportation by fork lifts etc).



Towing, automatic transmission

If necessary, your car can be towed with the selector lever in position N, providing that the transmission is properly adjusted and that the oil level is correct. The maximum permissible speed when towing is 20 mph (30 kmph) and the longest distance your car ought to be towed is 20 miles (30 km).

If the car has to be towed longer than this or if you suspect that there is some fault in the transmission, the rear wheels should be raised or the propeller shaft disconnected in order to avoid possible damage to the transmission.

Check your state laws on towing!

Starting by pulling

The towing car should start smoothly and be driven at even speed in 2nd gear. Switch on the ignition.

Standard transmission: Engage 3rd or 4th gear and gradually release the clutch pedal. Once the engine starts running, depress the clutch pedal.

Attention!

Remember that a car with automatic transmission can not be started by pulling. If your car can not be started because of a flat battery, an assist battery with cables must be used instead.

NOTE. Always connect a plus cable from the assist starter battery to the plus pole on the car battery and the minus cable to the minus pole.

Trailer hauling

Driving with a trailer involves no particular difficulties provided you follow the recommendations of the trailer manufacturer concerning equipment and loading.

The hitch must be approved for trailers of at least 2 000 lbs gross loaded weight.

Your Volvo dealer will certainly give you tips about suitable hitches for your Volvo.

The lighting for the trailer and car as well as the car's rear view mirrors must conform to the requirements of the federal and local authorities.

The load in the trailer should be so distributed that there is a certain pressure on the car's hitch tongue, but max. 160—200 lbs (75—90 kg).

Remember to increase the rear wheel tire pressure when the hitch load approaches the maximum allowed.

However, do not exceed the maximum permitted load (see page 69).

IMPORTANT ABOUT BRAKING

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

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

When the brake servo is not functioning, e.g., on rolling the car with the engine switched off, pressure on the brake pedal must be 3 to 4 times greater if the same braking effect is to be achieved as when the servo is functioning.

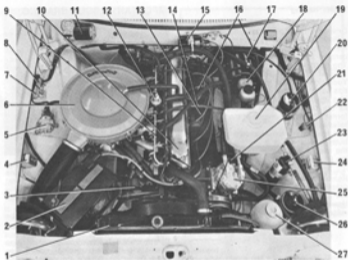
Note that the brake pedal travel will be short and stiff.

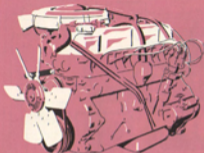
If one of the brake circuits should stop functioning (the red warning lamp F, see page 6, lights) double pressure on the brake pedal is required in order to achieve approx. 80% of the normal braking effect. About 50% braking effect is achieved with normal pedal pressure. **Note that here the pedal stroke will be long but the pedal will then feel stiff and hard in the braking position.** The car should be taken as soon as possible to a workshop for a check on the brake system.

TECHNICAL DESCRIPTION

ENGINE COMPARTMENT

1. Radiator
2. Battery
3. Alternator
4. Voltage regulator
5. Pressure sensor
6. Air cleaner
7. Relay for fuel pump
8. Main relay for fuel injection
9. Injectors
10. Oil filler cap
11. Windshield wiper motor
12. Pressure regulator
13. Starter motor
14. Oil dipstick
15. Ignition coil
16. Distributor
17. Brake servo
18. Brake fluid container
19. Windshield washer container
20. Canister, evaporative control system
21. Steering gear, power steering
22. Main relay for ignition
23. Receiver-drier (Air conditioner)
24. Step relay for high and low beams
25. Compressor (Air conditioner)
26. Oil container for power steering
27. Expansion tank





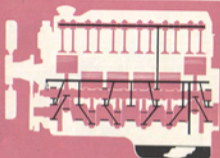
ENGINE

The engine is a six-cylinder, water-cooled 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 pan. 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.



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.

An expansion tank prevents air from circulating with the coolant as this would cause corrosion in the cooling system. The fan is driven via a slip coupling which permits a max. fan speed of approx. 2500 rpm, resulting in a lower noise level.

TECHNICAL DESCRIPTION

Fuel system

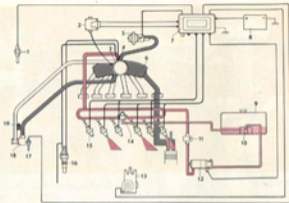
The engine is equipped with an electronic fuel injection system.

This system includes an electronic control unit (7) which converts the impulses from the various sensors in the engine to control signals which regulate the six solenoid-actuated fuel injectors (15). The control signals influence the opening times of the injectors and thereby the amount of fuel injected.

The mixture of fuel and air is modified the whole time according to the conditions under which the engine is running. Engine speed is governed by the triggering contacts (13) in the distributor, the operating temperature by the sensor (17) for the coolant, the temperature of the induced air by the sensor (1) and the engine load by the pressure sensor (5) which is connected to the inlet duct. In addition, the control unit is provided with information concerning the position of the throttle valve by the throttle valve switch (2). This information is "computerized" in the control unit and re-transmitted in the form of control impulses to the injectors.

Fuel is injected into the inlet ports in the cylinder head just before the intake valves. The fuel is delivered to the injectors via an electric fuel pump (12) which maintains a constant pressure of 30 psi (2 kp/cm²) in the fuel line with the help of a pressure regulator (14).

The car is equipped with a system to check fuel evaporation from the fuel tank.

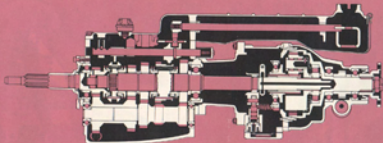


Principle of operation, fuel injection system

1. Temperature sensor for induction air
2. Throttle valve switch
3. Throttle housing
4. Cold start valve
5. Pressure sensor
6. Inlet duct
7. Control unit (electronic)
8. Battery
9. Fuel tank
10. Fuel filter, suction side
11. Fuel filter, discharge side

12. Fuel pump
13. Triggering contacts in distributor
14. Pressure regulator
15. Injectors
16. Thermal timer contact
17. Temperature sensor for coolant
18. Auxiliary air regulator
19. Idling adjusting screw

- Partial vacuum in inlet duct
- Fuel at atmospheric pressure
- Fuel under 30 psi (2 kp/cm²) overpressure



POWER TRANSMISSION

Exhaust emission control

Your Volvo is equipped with exhaust emission control, that is, a system which as a result of better mixing and distributing of fuel and air provides a more complete combustion and thereby cleaner exhaust gases.

The exhaust emission control is provided by the electronic fuel injection system.

Clutch

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

Manual transmission

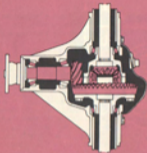
The transmission has synchromesh on all forward gears. Since it is equipped with helical gears and the gear lever is rubber-insulated, excellent sound insulation is obtained.

With the overdrive it is possible to reduce engine speed while maintaining road speed. This is less wearing on the engine and reduces fuel consumption at the same time.

Automatic transmission

As an alternative, your Volvo can be equipped with a BW 35 automatic transmission. In principle it consists of two main components — a hydraulic torque converter and a hydraulically operated epicyclic gearbox with a control system. The converter serves as a clutch and as an extra gear between engine and transmission.

TECHNICAL DESCRIPTION



Propeller shaft

The propeller shaft, which is the link between transmission and rear axle, is divided into two sections. The forward section is journaled at its rear end 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 center line of the drive shafts.



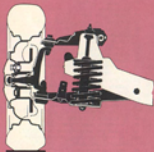
Limited slip differential

A limited slip differential can be obtained as extra equipment. A rear axle with a limited slip automatically transmits the tractive power to the wheel having the best road grip when a wheel begins to spin. Except for the differential, the rear axle is similar in design to a conventional rear axle.

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

Rear axle

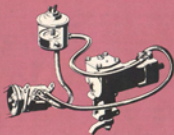
The rear axle is carried on two trailing arms which front ends are bolted to the body. The rear axle casing is secured to the trailing arms by levers. Two torque rods are journaled on the casing and the body. A "Panhard" rod prevents lateral movement of the body and rear axle in relation to each other.



FRONT END AND STEERING

Front end

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 journaled 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.



Power steering

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

TECHNICAL DESCRIPTION

ELECTRICAL SYSTEM

The electrical system is of the 12-volt type and equipped with a voltage-regulated alternator. The starter motor is operated by the ignition switch. This switch is also the main switch for the rest of the electrical system. The headlights, parking lights and interior lighting, however, are not wired via the ignition switch so they can be switched on and off without the ignition key being in position.

Concerning replacement of bulbs and fuses, see pages 52—55.

Note: The Bulb Integrity Sensor, (page 7) is designed for a certain current flow and it is therefore not possible to make extra current taps for auxiliary tail lights and stop light for trailers etc at any place in the electrical system.

These taps should therefore be made at the firewall where the possibilities exist to make the electrical connections.

Wiring diagram

1. Battery 12V 60 Ah
2. Connection plate
3. Ignition switch
4. Ignition coil
5. Distributor, Firing order 1-5-3-6-2-4
6. Spark plugs
7. Starter motor
8. Alternator
9. Voltage Regulator
10. Fuse box
11. Light switch

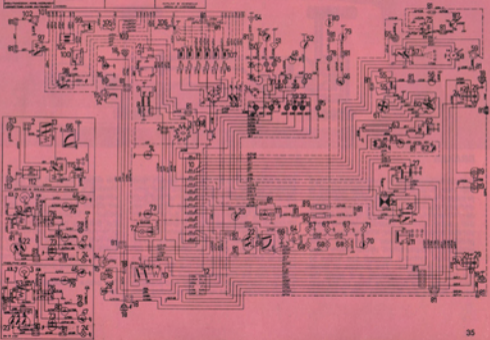
12. Bulb Integrity Sensor
13. Relay for upper and lower beams and headlight flasher
14. Sealed Beam unit
15. Sealed Beam unit
16. Position lamp SW
17. Tail lamp SW
18. Side marker light 2W (USA only)
19. License plate lamp SW
20. Stop light switch
21. Stop light, 32 cp
22. Contact on transmission, M 400, M 410
23. Contact on transmission, SW 35
24. Back-up light, 32 cp
25. Flasher unit
26. Turn signal switch
27. Hazard warning signal switch
28. Front turn signal, 32 cp
29. Rear turn signal, 32 cp
30. Cam, at instrument
31. Cam, at instrument
32. Brake failure pilot light 1.2W
33. Cam, at instrument
34. Tachometer
35. Thermometer
36. Fuel gauge
37. Voltage stabilizer
38. Turn signal indicator, 1.2W
39. Diode
40. Upper beam pilot light, 1.2W
41. Lamp failure pilot light, 1.2W
42. Charging pilot light, 1.2W
43. Parking brake pilot light, 1.2W
44. Choke pilot light, 1.2W
45. Oil pressure pilot light, 1.2W
46. Contact, passenger's seat
47. Contact, driver's seat
48. Parking brake contact
49. Choke control contact
50. Temperature gauge
51. Oil pressure guard
52. Brake failure contact
53. Starter cut-out relay (USA only)
54. Fuel lever plunger
55. Horn
56. Horn ring
57. Windshield wiper/washer switch
58. Windshield wiper
59. Windshield washer
60. Blower switch
61. Fan
62. El. heated rear window switch
63. El. heated rear window
64. Clock
65. Cigarette lighter
66. Instrument lighting rheostat
67. Instrument lighting 2W
68. Control panel lighting, 1.2W
69. Gear selector lighting, 1.2W
70. Glow comp. contact
71. Glow comp. light, 2W
72. Interior light, 10W
73. Door contact driver's side
74. Door contact passenger's side
75. Relay for headlamp wiper
76. Belt interlock unit (USA only)
78. Safety belt pilot light, 1.2W
79. Safety belt contact, pass. seat
80. Safety belt contact, driver's seat
81. Junction
82. Overdrive switch M 410
83. Overdrive contact on gearbox M 410
84. Overdrive solenoid on gearbox M 410
85. Overdrive pilot light, 1.2W
87. Headlight wiper (certain markets)
88. Heating element with thermostat, driver's seat 30W
90. Heating element, driver's seat 30W
91. Light buzzer (certain markets)
93. Switch for compressor
94. Thermostat
95. Solenoid on compressor
96. Solenoid valve
97. Relay, fuel pump
98. Main relay, fuel injection
99. Cold start injector
100. Temperature-time contact
101. Electronic control unit
102. Fuel pump
103. Throttle switch
104. Pressure sensor
105. Temperature sensor I
106. Temperature sensor II
107. Injectors
108. Release contact
109. Resistor
111. Engine comp. lighting, 18W
112. Fuse box, fog lamp (certain markets)
113. Fog lamp SW (certain markets)
114. Fog lamp relay (certain markets)
115. Fog lamp switch (certain markets)

NOTE: variations may occur.

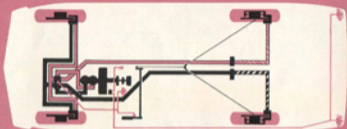
TECHNICAL DESCRIPTION

Color code:

SB	= Black	BL-Y	= Blue-yellow	R	= Red	W	= White
Y	= Yellow	BL-R	= Blue-red	GN	= Green	BR	= Brown
BL	= Blue	GN-R	= Green-red	W-R	= White-red	GR	= Gray



TECHNICAL DESCRIPTION



BRAKES

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

valve which prevents the rear wheels from locking before the front wheels. The principle of the two-circuit system is that both the front wheels are connected to one 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. So at normal pedal pressure the braking effect of one of the circuits is 50%, but when pedal pressure is increased, about 80% of the full braking power can be obtained in the one circuit. This provides maximum safety and prevents lateral dragging and rear-end lurching. With

the engine stopped, the booster assists the braking a further two or three times after which the pedal pressure must be increased about three times as much in order to obtain a braking power corresponding to the braking power available with the engine running. The parking brake operates the rear wheels mechanically as the brake discs have also been designed as brake drums in order to incorporate the shoes for the parking brake.

For brake maintenance, see pages 45 and 56.



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 a service inspection after 1 500 miles (2 500 km) when the oil in the engine, transmission and rear axle is changed. Subsequent

servicing of the vehicle should follow the routine in the service book which is based on service maintenance every 6 000 miles (10 000 km). The simplest way to provide the vehicle with the servicing it requires is to have all the servicing done by a Volvo workshop. The workshop stamp in your Warranty and Maintenance Record Book will show when the vehicle was serviced.

If you prefer to make 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 same advice as to when and how they should be done. For the sake of convenience, the servicing procedures have been summarized in a maintenance schedule on the following pages.

SERVICING

THE FEDERAL CLEAN AIR ACT (USA)

The Clean Air Act requires vehicle manufacturers to furnish written instructions to the ultimate purchaser to assure the proper functioning of those components that control emissions.

The maintenance instructions listed below represent the minimum maintenance required.

These services are not covered by the warranty. You will be required to pay for labor and material used. Refer to your warranty and Maintenance Book for further details.

MAINTENANCE	Months Miles	12		18		24		30		36		42		48		Description on page
		or	12,000	or	18,000	or	24,000	or	30,000	or	36,000	or	42,000	or	48,000	
EMISSION CONTROL SYSTEMS																
I ENGINE MECHANICAL COMPONENTS																
Torque Engine Cylinder Head		A					R							R		45
Engine Coolant							A			A				A		45
Valve Clearance		A	A													45
Engine Drive Belts		A	I	I		I	I		I	I		I		I		45, 46
Engine Oil and Filter		R	R	R		R	R		R	R		R		R		45
Torque Manifold Bolts		A	A	A		A	A		A	A		A		A		45
Cooling System Hoses and Connections		I		I		I			I			I		I		51
Vacuum Fittings, Hoses and Connections		I		I		I			I			I		I		45
Compression Test				I		I			I			I		I		45
II ENGINE FUEL SYSTEM																
Idle RPM and Mixture Ratio		A		I		I			I			I		I		51
Air cleaner Filter							R							R		47
Throttle Valve Switch (California)				I		I						I		I		48
Fuel (Line) Filter														R		47
Fuel (Tank) Filter				I		I			I			I		I		47
Fuel System Cap, Tank, Lines and Connections		I				I			I			I		I		47
Fuel Injection Electrical Connections and Fuel Lines				I		I			I			I		I		48

A=Adjust (Correct if necessary)

R=Replace

I=Inspect (Correct or Replace if necessary)

L=Lubricate

MAINTENANCE	Months Miles	12	18	24	30	36	42	48	Description on page
		or 1,500	or 6,000	or 12,000	or 18,000	or 24,000	or 30,000	or 36,000	
III ENGINE IGNITION COMPONENTS									
Ignition Timing and Dwell Angle		A		A		A		A	40
Distributor Breaker Points and Condenser				I		I		I	40
Spark Plugs			I	R		I	R	I	40
Ignition Wiring				I		I		I	40
Distributor Cap and Rotor				I		I		I	40
Distributor Advance Mechanism				I		I		I	40
Spark Control Advance Regulator, Hoses and Connections					I			I	40
IV ENGINE CRANKCASE VENTILATION SYSTEM									
PCV Nipple (Drill)				I		I		I	46
Ventilation Hoses				I		I		I	46
Oil Filter Breather Cap and Flame Arrester				I		I		I	46
V ENGINE EXTERNAL EXHAUST EMISSIONS									
Exhaust Gas Recirculation Components				I		R		I	48
VI ENGINE EVAPORATIVE EMISSIONS									
Evaporative Control Filter								R	48

SERVICING

MAINTENANCE SCHEDULE (You will be charged for these services)

More frequent service intervals will be required if the vehicle is operated in extremely dusty conditions or low temperatures or

for extended periods of idling, short runs or trailer hauling. It is beneficial to you to discuss your particular type of operation with

your Volvo Dealer's Service Manager so that he can tailor this maintenance schedule to best suit your particular operation.

MAINTENANCE	1,500 miles	3,000 miles	12,000 miles	18,000 miles	24,000 miles	30,000 miles	36,000 miles	42,000 miles	48,000 miles	Description on page
ELECTRICAL SYSTEMS										
Battery Charge	I	I	I	I	I	I	I	I	I	52
DRIVETRAIN										
Manual Transmission Oil (Aut. see page 44)	R	I	I	I	R	I	I	I	R	44
Rear Axle Oil	R	I	I	I	R	I	I	I	R	44
Drive shafts and U-joints	I	I	I	I	I	I	I	I	I	56
Clutch Free Play	I	I	I	I	I	I	I	I	I	56
BRAKES										
Brake Operation and Brake Linings	I	I	I	I	I	I	I	I	I	56
Brake Booster Cylinder Air Filter									R	56
Overhaul the brakes and change brake fluid									R	46
STEERING										
Ball Joints and Seals, Steering Rods and Seals	I	I	I	I	I	I	I	I	I	57
Tire Wear (Align Front End if needed)	I	I	I	I	I	I	I	I	I	57
Check power steering fluid level	I	I	I	I	I	I	I	I	I	46
BODY										
Trunk, Door and Hood Hinges and Latches	L	L	L	L	L	L	L	L	L	42

A=Adjust (Correct if necessary)

R=Replace

I=Inspect (Correct or Replace if necessary)

L=Lubricate

The following items should be checked weekly by driver	Description on page	The following should also be carried out regularly	Description on page
Engine oil level	43	Washing	59
Brake fluid	45	Polishing	59
Radiator coolant level	49	Cleaning	60
Battery water level	52	Rust protection	60
Tire pressure, all five tires	57		
Operation of all lights			
Horns			
Windshield wipers			
Level of windshield washer fluid			

SERVICING

MAINTENANCE SCHEDULE

Check engine oil level & change if necessary
Check & adjust tire pressure as recommended
Check & adjust front & rear suspension

Check & adjust front & rear suspension
Check & adjust front & rear suspension
Check & adjust front & rear suspension



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, this obviating the need for subsequent lubrication.

Engine oil should be changed and oil levels checked after every 6000 miles (10 000 km) 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 brand. The right lubricants in the right quantity at the right time will increase both the lifetime and the reliability of your car.

Lubricate body

To avoid rattle and unnecessary wear, the body should be lubricated once a year. The hinges on the hood, doors and trunk lid as well as door stops should be lubricated every 6000 miles (10 000 km). During the wintertime, the locks in the door handles and trunk lid should also be given reliable anti-freeze to prevent them from freezing up.

No. Lubricating point

1. Hood latch
2. Hood hinges
3. Key hole
4. Striker plate
5. Door lock outer slide surfaces
6. Trunk lid hinges
7. Trunk lid lock
Key hole
8. Door hinges
9. Door stop
10. Window regulator
Lock mechanism
(Accessible after door upholstery panels have been removed)
11. Front seat slide rails and latch devices

Lubricant

Paraffin wax
Oil
Lock oil
Paraffin wax
Paraffin wax
Oil
Oil
Lock oil
Grease
Paraffin wax
Oil and grease
Silicon grease
Paraffin wax



be abnormally high. If necessary, top up by filling through the oil filler hole in the valve cover with new oil of the same type already in the engine.

The distance between the dipstick markings corresponds to about 2.1 US qts./1.8 Imp. qts. (2.0 liters).

Check oil level in engine

The oil level in the engine should be checked each time the fuel tank is filled. The check should be done with the engine switched off but warm and, in order to obtain comparable values, about one minute after the engine has been stopped. Wipe 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

Change engine oil and filter

With a new or reconditioned engine, the oil should be changed after the first 1 500 miles (2 500 km). Subsequent oil changing is according to the intervals given below. For engine lubrication, oil grade "For API Service SE" (API Service MS) is to be used. Change the oil in the engine every 6 000 miles (10 000 km). For cars used in city traffic, the oil should however be changed every 3 000 miles (5 000 km). Irrespective of the distance, the oil must be changed at least twice a year. For added protection, the oil filter should be replaced at each oil change.

At very low temperatures below -18°C ($= -0^{\circ}\text{F}$) 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 pan. Draining should take place after driving when the oil is still warm.

Viscosity	Temperature range	Oil change interval miles (km)*	Oil capacity
SAE 20 W-40 SAE 20 W-50	SUMMER (above $-12^{\circ}\text{C} = +10^{\circ}\text{F}$)	every 6000 miles (10 000 km) or twice a year	Without oil filter: 5.5 US qts./4.5 Imp. qts. (5.2 liters) With oil filter: 6.3 US qts./5.3 Imp. qts. (6.0 liters)
SAE 10 W-30	WINTER (below $-12^{\circ}\text{C} = +10^{\circ}\text{F}$)	(Cars in city traffic: every 3000 miles)	

At very low temperatures:
SAE 5 W-20. This oil should not be used at continuous temperatures above $\pm 0^{\circ}\text{C} = 32^{\circ}\text{F}$

*] During running-in the oil should also be changed after the first 1500 miles (2500 km).

SERVICING

Transmission with overdrive M 410

The oil in the transmission should be checked after every 6 000 miles (10 000 km). The oil level should be up to the filler hole. If necessary top up with recommended oil. The overdrive and the transmission have a common oil level and oil filler hole. Make sure when topping-up that the oil runs over into the overdrive.

After every 24 000 miles (40 000 km) the oil in the transmission should be changed. 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 filler of the overdrive should be cleaned. This should be done by a workshop.

In a new or reconditioned transmission the oil should also be changed after the first 1 500 miles (2 500 km). The old oil should be drained off immediately after the vehicle has been run while the oil is still warm.

Automatic transmission BW 35

The oil level should be checked every 6 000 miles (10 000 km). The filler pipe with graduated dipstick is to be found under the hood just in front of the firewall.

Note: 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 Automatic Transmission Fluid, Type F (FLM).

The oil in the automatic transmission should be changed every 24 000 miles (40 000 km). The dipstick should be wiped with a cloth, paper, etc., but not with anything that leaves fluff on the dipstick.

Rear axle

The oil level in the rear axle should be checked after every 6 000 miles (10 000 km). 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 1 500 miles (2 500 km). The old oil is drained off by removing the bottom plug. After this the oil should be changed every 24 000 miles (40 000 km). The oil should then be warm and the magnetic plug must be well cleaned. It is of great importance to the lifetime of the final drive that particles and impurities from running-in are removed.

Oil grade	Viscosity	Oil capacity
Engine oil	SAE 30 or Multigrade SAE 20 W-40	1.35 US qts. 1.25 Imp. qts. 1.4 liters

Oil grade	Oil capacity
Automatic Transmission Fluid, Type F (FLM)	6.0 US qts. 7.25 Imp. qts. 6.2 liters

Oil grade	Viscosity	Oil capacity
Rear axle oil acc. to MIL-L-2105B	SAE 90	1.75 US qts. 1.4 Imp. qts. 1.6 liters

Limited slip differential

Cars equipped with a limited slip differential are delivered from the factory with a rear axle oil MIL-L-2105B provided with an additive for rear axles with differential. A similar type of oil should be used for subsequent topping-up and changing. Oil level checking and oil changing are made at the same intervals and in the same way as for a rear axle without a limited slip differential.

Power steering

The oil level in the power steering should be checked every 6 000 miles (10 000 km). 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 1/4" (5—10 mm) 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. Stop the engine. The oil level should now be about 1/4" (5—10 mm) above the mark. The oil and filter in the power steering do not need replacing other than during repairs or reconditioning.

Brake fluid

The brake system is provided 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. Every 3rd year or 48 000 miles (80 000 km), the brake system should be drained and the brake fluid replaced. Seals should also be replaced. This service could conveniently be performed at the same time as the brake booster cylinder air filter is replaced, see page 56. At continuous hard driving, slip driving or similar where the brakes are used extensively, the brake fluid should be changed annually. Extremely humid climates warrant the same recommendation.

Rear axle oil MIL-L-2105B which should have additive for limited slip differential

Oil grade	Oil capacity
ATF Type A or Dexron	1.3 US qts. 1.6 Imp. qts. 1.1 liters

Brake fluid with designations DOT 3 or DOT 4 should be used (previous designation SAE J 1703).

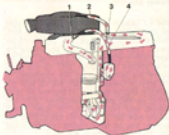
SERVICING

ENGINE

Manifold and cylinder head bolts

The manifold bolts should be torqued at 1 500 mile inspection and then checked every 6 000 miles (10 000 km). Loose manifold could alter air/fuel ratio and cause an increase in emission and/or poor drivability.

The cylinder head should normally be torqued at 1 500 mile inspection and then not touched. However, loose cylinder bolts will effect sealing properties and to some degree the valve tappet adjustment.



Crankcase ventilation system

Drive belts

The belt tension can be checked by pressing in the fan belt at a point midway between the alternator and the fan. It should be possible to press down the belt there about 3/8" (10 mm) with normal pressure (20—26 lbs = 9—12 kp).

The check can suitably be made in a workshop.

Also check the tension on the drive belt for the power pump. It should be possible to depress the belt about 3/16" (5 mm).



Oil filter

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 12 000 miles (20 000 km) remove and clean the nipple (1) and the hoses (2 and 4). Rubber hoses and the flame arrester (3) should also be replaced if they are in poor condition.

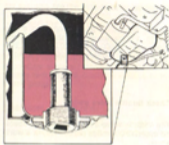
The engine is equipped with a full-flow type oil filter, which means that all the oil passes through the filter on its way from the oil pump to the various lubricating points. Impurities in the oil are collected in the filter and gradually block it. For this reason, the filter must be changed at 1 500 miles and thereafter every 6 000 miles (10 000 km). If the oil filter is replaced without the engine oil being changed, the engine should be topped up with 1.7 US pints/1.4 Imp. pints (.8 liter).



Fuel filter

The fuel filter is located in front of the fuel tank. This filter is to be changed after every 45 000 miles (80 000 km). The filter is replaced as one complete unit.

Filter replacement should be done in a workshop.



Filter in fuel tank

A filter is installed in the suction line in the fuel tank. Its function is to prevent any dirt in the tank from being sucked up to the fuel pump.

The filter should be cleaned every 12 000 miles (20 000 km).

Fuel system cap, tank and lines, and connections

The effectiveness of the fuel system to contain hydrocarbons is largely dependent upon a leak free system. Check for proper sealing of gasoline filler cap which contains "O" ring type seals. Check all evaporative hoses in vehicle for tightness and freedom from leaks. Check fuel lines under vehicle and repair if necessary.

Air cleaner

The air cleaner consists of a container with replaceable paper insert. Replace the insert every 24 000 miles (40 000 km). Replace more often when driving regularly on dusty roads. No other servicing is required outside the interval just stated.

Filter replacement should be done in a workshop.

SERVICING

Evaporative control system

Vehicles intended for the U.S.A. market are equipped with a gas evaporative control system, which prevents gas fumes from being released into the atmosphere. The system consists of an expansion container and a venting filter, which is filled with active carbon.

When the engine starts, air is drawn through the venting filter and into the engine via the inlet duct. Gas fumes stored in the active carbon are drawn by the air flow into the engine where they take part in the combustion.

Evaporative control filter

The carbon filter unit should be replaced after 48 000 miles (80 000 km). This work should be done in a workshop.

Valves

The valve clearance should be checked after every 12 000 miles (20 000 km). The check should be done in a workshop.

Compression test

To get some idea of the condition of the engine, a compression test should be made after every 12 000 miles (20 000 km). This test should preferably be made in a workshop.

Check throttle valve switch

The throttle valve switch should be checked every 12 000 miles (20 000 km) in a workshop.

Inspection of electrical connections and fuel lines

The electrical connections and fuel lines in the injection system should be inspected for chafing and corrosion every 12 000 miles (20 000 km) in a workshop.

Exhaust gas recirculation system (EGR)

Vehicles with a B30 F engine in combination with automatic transmission are equipped with an exhaust gas recirculation system. This makes for cleaner exhaust gases when driving on half throttle. The system consists of an EGR channel and an EGR valve operated under a vacuum.

Check function of Exhaust Gas Recirculation valve

The exhaust gas recirculation valve should be checked every 12 000 miles (20 000 km) in a workshop.

Clean Exhaust Gas Recirculation manifold port

The exhaust gas recirculation manifold port should be cleaned every 12 000 miles (20 000 km) in a workshop.

Replace Exhaust Gas Recirculation valve

The exhaust gas recirculation valve should be replaced every 24 000 miles (40 000 km) in a workshop.

Clean and adjust spark plugs

Remove the spark plugs after every 6 000 miles (10 000 km) and adjust the electrode gap. The gap should be .028—.032" (.7—8 mm).

Change spark plugs

The spark plugs should be changed every 12 000 miles (20 000 km).

Tightening should preferably be done with a torque wrench. When fitting new plugs, be sure to fit the right type (see page 70). When changing the plugs, check that the suppressor connectors are in good condition. Cracked or damaged suppressors should be replaced.

When changing spark plugs, clean the cables and cable terminals, also the rubber seals. If the car is driven on roads where salt has been placed to counteract skidding, spray the cables with suitable water-resistant spray.

Ignition timing and dwell angle

Distributor breaker points and condenser
Distributor advance mechanism

The distributor breaker points and condenser should be checked and the dwell angle and ignition timing should be adjusted every 12 000 miles (20 000 km). All adjusting work should be done by a workshop with the proper equipment. The distributor is one of the most sensitive units in the engine and careless handling can lead to decreased engine output and high fuel consumption or even serious damage to the engine. The distributor advance mechanism should be checked every 24 000 miles (40 000 km).

Ignition wiring

Ignition wiring system is composed of primary and secondary systems. The second-

ary systems are the high tension leads connecting the distributor cap with the spark plugs and the coil.

These wires should be inspected at each engine tune-up, and should be replaced if cracked, frayed or damaged from abrasion. It is important to clean all parts of this secondary system thoroughly because dirt greatly reduces the available voltage to the spark plugs.

Distributor cap and rotor

Check the distributor cap and rotor for cracks, carbon formation, dirt and erosion.

Vacuum fittings, hoses and connections

Unstable idle, misfiring or poor emission control is often caused by leaking vacuum hoses or connections. Check hoses and connections on distributor vacuum unit, EGR valve and part if so equipped, heater control servo systems and hydraulic brake servo.

Spark control vacuum regulator, and associated hoses and connections:

Check vacuum retard regulator and associated hoses and connections. The advance or retard characteristics can be measured with a stroboscope.



Check 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 made 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 may prevent coolant circulation between the engine and the expansion tank during engine warming up and cooling.



Top up with coolant

Top up with coolant by filling the expansion tank when its level has gone down to the "Min" mark. Use all the year round a mixture of 50% reliable anti-freeze/summer coolant and 50% water. Top up to the "Max" mark.

NOTE. Do not top up with water only, particularly during the wintertime. 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 very warm parts of the country where there is little risk of frost, water can be used without anti-freeze.

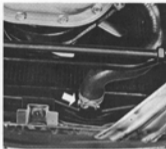
We recommend, however, that rustproofing agent is added.



Change coolant

The coolant retains its properties for approx. 24 000 miles (40 000 km) when it should be changed. A suitable time to do this would be in the autumn to preclude any damage by frost during the coming winter. To drain the cooling system, open the drain tap located on the right-hand side of the engine and disconnect the hose connected 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 can flow into the radiator.

Before filling with new coolant, flush the entire system with clean water.



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

Fill the radiator to the top and tighten the cap. Then fill the expansion tank to the "Max" level or slightly above this.

Run the engine for a short period, switch off the ignition and allow the engine to cool. Check that the radiator is full and that the coolant in the expansion tank is at "Max". If necessary, top up the system.

Cooling system, hoses and connections

Check all cooling system hoses and connections for defects or deterioration of hoses, clamps or fittings.

Checking and adjusting idling speed and mixture ratio

These checks should be made every 12 000 miles (20 000 km) in a workshop.

Fuel

Regular grade of leaded or low-leaded fuel (with an octane rating of at least 91 RON*) should be used.

* Research method

Special instructions for work on the electronic fuel injection system

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

Any work to be done on the electronic fuel injection system should be carried out by a shop which has the proper equipment for doing this.

SERVICING

ELECTRICAL SYSTEM

Check battery electrolyte level

Check the battery electrolyte level when filling the tank with fuel. The level should be between $3/16$ — $3/8$ " (5—10 mm) above the top of the cell plates. If the level is too low, top up with distilled water.

Never check the electrolyte level by lighting a match. The gases formed in the cell are highly explosive.

Check state of charge of the battery

The state of charge of the battery should be checked after every 6 000 miles (10 000 km). See page 70 for battery data. At the same time, check the lead terminals and terminal studs to make sure that they are tight, coated with grease and that the battery is firmly in position.

Check headlight alignment

The alignment of the headlights should be checked in a workshop periodically. Remember that the section of the road lit up by the headlights can vary depending on the load in the vehicle.

This car is equipped with an alternator.

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

1. A battery connection to the wrong terminal will damage the rectifiers. Before connections are made, check the polarity of the battery with a voltmeter.
2. If assist batteries are used for starting, they must be properly connected to prevent the rectifiers from being damaged. The negative lead from the assist battery for starting must be connected to the negative terminal stud of the car battery and the positive lead from the assist battery for starting to the positive terminal stud.

3. If a fast charger is used for charging the battery, the car battery leads should be disconnected.

A fast charger may not be used as an aid in starting.

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

5. If any electrical welding work is made on the vehicle, the ground lead and all the connecting cables of the alternator must be placed as near the welding point as possible.

Replace bulbs

The replacement of bulbs in the various lighting units is shown on the following pages. Make sure when installing bulbs that the guide pin on the socket fits into its corresponding recess.

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



Changing headlights (Sealed Beam)

Sealed Beam headlights are changed as a complete unit.

1. Remove the outer rim by pulling it upwards — forwards.

2. Slacken the screws for the inner rim a couple of turns. Turn the inner rim and lift it off.

3. Remove the headlight contact by pulling it backwards. Lift out the headlight.

4. Install the new headlight and make sure that it is installed properly.

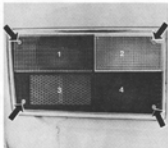
Check headlight alignment.

SERVICING



Replace bulbs for front turn signals and parking lights

Remove the two Phillips screws which hold the glass. The bulbs can now be removed by pressing them inwards and then turning them a little counter-clockwise. The inner bulb (1) is for the parking light, the outer (2) for the turn signal.



Replace bulbs for rear turn signals, parking lights, stop lights and back-up lights

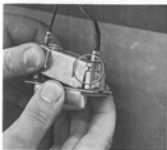
Remove the four Phillips screws which hold the glass. The bulbs can now be removed by pressing them inwards and turning them slightly counter-clockwise at the same time.

1. Turn signal
2. Back-up light
3. Tail light
4. Stop light



Replace bulbs for side marker lights

Remove the two Phillips screws which hold the glass. The bulb can now be removed by pressing it inwards and turning it slightly counter-clockwise.



Replacing the bulbs for the license plate light

The license plate light is provided with two bulbs. Should any of them require replacing, proceed as follows:

1. Press in the tab catch in the bulb housing by inserting a screwdriver in the opening on the left-hand side of the housing. Pull the bulb housing out of its attachment.
2. Pull out the housing end not provided with a guide pin.

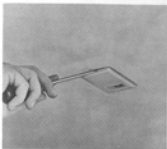
3. The bulb is now accessible for replacing. When installing the unit, first insert the guide pins in the sockets (see picture) and then press on the housing. Check that the rubber strip fits properly in position and press the lamp housing securely into position.

Replace bulb for engine compartment light

Release the screw holding the lamp globe. The bulb is then accessible for replacement.

Replace bulb for glove locker

Pull the light glass straight down for access to the bulb.



Replace bulb for roof light

To replace the bulb for the roof light, remove the light glass by pressing in the catch with a narrow screwdriver which is inserted in the opening on the right-hand side. Then pull off the glass. The bulb is then accessible for replacement.

Replace bulbs for instrument lighting and heater control lighting

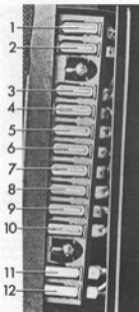
Owing to the location of the bulbs, their replacement should be made by a shop.

SERVICING

Fuses

There are 12 fuses located at the bottom of the dashboard near the left front door. Reading downwards the fuses protect the following:

- | | |
|--|------|
| 1. Cigarette lighter | 8 A |
| 2. Windshield wiper/washer
Horn
Blower | 16 A |
| 3. El. heated rear window
Overdrive | 16 A |
| 4. Heater element driver's seat
Back-up light
Seat belt pilot light | 8 A |
| 5. Turn signals
Instruments, Warning lights | 5 A |
| 6. Hazard warning
Engine comp. lighting
Starter cut-out relay | 8 A |
| 7. Fuel pump
Clock
Glove box light | 8 A |
| 8. Stop light
Interior light | 5 A |
| 9. Ignition Interlock
Buzzer, seat belt | 5 A |
| 10. Instrument lighting | 5 A |
| 11. Tail light, left
Side marker light, front (left), rear
License plate light, left | 5 A |
| 12. Tail light, right
Side marker light, front (right)
License plate light, right | 5 A |



Note: Fuse No. 9 controls the Seat Belt Ignition Interlock System if the vehicle is so equipped. See page 22 for instructions on removing fuse No. 9 to facilitate emergency starting.

POWER TRANSMISSION

Check clutch free play

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

Check propeller shaft

After every 6 000 miles (10 000 km) 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

Check brakes

After every 6 000 miles (10 000 km) the vehicle should be taken to a shop for a check on the function of the brakes. Also check the brake pads.

Replace booster cylinder air filter and overhaul brakes

Every third year or 48 000 miles (80 000 km) the car should be taken to a shop for replacement of the booster cylinder air filter. The brake system seals should also be replaced at the same time. See also page 45 "Brake fluid".

FRONT END

Check ball joints, steering rods, etc.

After every 12 000 miles (20 000 km) the vehicle should be taken to a shop for a check on the front end concerning excessive play in the ball joints, steering gear, etc. After every 12 000 miles (20 000 km) or at least once a year, the ball joint seal should also be checked for damage and leakage. When new seals are installed they should be filled with the recommended grease.

WHEELS AND TIRES

General

The wheels have size 5 1/2 J 15" F.H. All wheels are accurately balanced. The tires are 175 R 15 radial tubeless.

With the 175 R 15 tire, the maximum permissible speed is 115 mph (180 kmph).

If possible, radial tires should always be used, even in the wintertime.

The wheels should always be used on the same side throughout their use. This is particularly important for studded snow tires, otherwise it can happen that the studs loosen.

Studded snow tires should also have a running-in period of between 300—600 miles (500—1 000 km). During this period try to avoid driving hard round bends and at high speeds, also hefty braking and acceleration.

Tire chains can be used on all the car's four wheels providing that the chains are **fine-linked** and do not project so much from the tire that they can chafe against the brake caliper or other components.

Strap-on emergency chains must not be used since the space between the brake calipers and wheel rims does not permit this.

Check tire wear pattern

Check the tires at regular intervals for damage and abnormal wear, also for particles which can fasten in the tread. Have the wheels balanced if necessary. Poorly balanced wheels will rapidly increase the wear on tires as well as make for poor travelling comfort and driving characteristics. The tires have a so-called "wear indicator" in the form of a number of narrow strips running across or parallel to the tread. When about 1/16" (1.5 mm) is left on the tread, these strips show up and warn the car owner in good time that the tire is showing signs of wear.

Check tire pressure

Make a habit of checking the pressure in the tires regularly. The simplest way to do this is to check the pressure at a service station while filling up with fuel. Do not forget the spare wheel when checking the tire pressure.

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

Excessively low tire pressure is one of the most common reasons for tire wear. Tires which are insufficiently inflated also result in difficult steering and high fuel consumption. Too high tire pressure tends to make for poor travelling comfort.

Be careful when parking the car next to the pavement not to damage the tires against the curb stone.

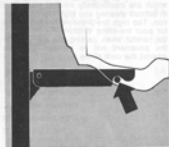
SERVICING



1



2



3



4

Changing a wheel

The spare wheel, jack and tool kit are stowed in the cargo compartment. When the car is to be jacked up, the jack should be on level, firm ground. **Avoid creeping under the car when it is jacked up since there is risk that the car might topple off the jack, especially if the ground is soft.**

Before the vehicle is jacked up, the parking brake should be applied and one of the gears engaged. **Also block one of the wheels which is standing on the ground.**

Removing

1. Unscrew and take off the wheel cap.
2. Loosen the wheel nuts 1/2—1 turn with the help of the wrench. All the nuts have right-hand threads which are loosened by turning them counter-clockwise.
3. Insert the lifting arm of the jack in the appropriate jack attachment of the wheel to be changed. Make sure the jack fits well in the attachment. Jack up the side of the car far enough to lift the wheel off the ground.
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.



Installation

1. Clean the contact surfaces between wheel and hub. Install the hub cap on the wheel rim from the inside of the rim.
2. Lift on the wheel.
3. Tighten the nuts until the wheel makes good contact with the flange.
4. Lower the vehicle and tighten the nuts alternately.
5. Install the wheel cap.

Do not rotate the raised wheel if the car is equipped with a limited slip differential as this will also move the other rear wheel on the ground, so that the car may topple off the jack.

BODY

Washing

The car should be washed often since such things as dirt, dust, insects, tar spots etc. adhere firmly to the body and may damage the paintwork. During the winter, special care should be observed to wash off all road salt residue as soon as possible in order to prevent corrosion.

When washing the car, do not expose it to sunlight. Soften up the dirt on the underside with a water jet and then rinse the whole body with a light jet until the dirt has loosened. After this, wash off the dirt with a sponge, using plenty of water. Use preferably lukewarm but not hot water.

A detergent can be used to facilitate washing. Special detergents are now available on the market — even household detergent can be used. A suitable mixture is about 1 1/2—3 1/2 fl. ozs. (5—10 cl) of fluid dish washer to 2.6 US galls = 2.2 Imp. galls (10 liters) of water. Asphalt spots and tar pit-lings can easily be removed with Kerosene or Tar Remover but this should be done after the washing.

When a detergent is used, the car should be well rinsed down with clean water afterwards. Then dry carefully with a soft clean chamois leather. Use different leathers for the windows and the remainder of the car, otherwise using the same leather can cause greasy smears on the windows.

When washing the car, remember to clean the drain holes in the doors and bottom rails.

Chromed parts

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, apply wax or anti-rust preparation.

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

Before applying wax, make sure that the surface is absolutely clean.

It may often be necessary to use kerosene for cleaning.

Waxing should neither be considered as a substitute for polishing nor as a necessary protection for the paintwork against unfavorable weather. For the most part waxing is not necessary until one year after delivery of the car.

SERVICING

Cleaning the upholstery

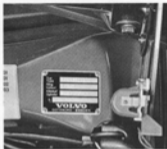
The leather upholstery is cleaned with a damp cloth, possibly with a mild soap solution. For removal of difficult spots, consult an expert concerning choice of cleaning agent.

The fabric-plastic in the upholstery is cleaned with a mild detergent. For more difficult spots, use a good household detergent.

On no account must gasoline, naphtha, carbon tetrachloride or similar cleaning agent be used on the upholstery, since these can damage both leather and fabric-plastic.

Rust protection

Your Volvo is anti-rust treated at the factory. Inspection and any touching-up of the 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 spray application at least once a year. If any touching-up of the rust protection is necessary, this should be done immediately to prevent moisture from seeping in and consequently damaging it.



Paint touch-up

Paint damage requires immediate attention to avoid rusting. Make it a habit to check the finish regularly and touch-up if necessary, for instance when washing the car. Paint repairs require special equipment and skill and you should contact your Volvo dealer for any extensive damages. However, minor scratches are a "nuisance job" for a paint shop and you can save a lot by repairing yourself. Volvo dealers can supply touch-up paint in tins or spray cans.

NOTE: Use the paint code which you will find on the Vehicle Designation Plate on the bulkhead.

Cleaning floor mats

The floor mats should be hoovered or brushed clean regularly, especially during the winter when they should be taken out for drying. Take the opportunity of cleaning thoroughly at the same time where the mats have lain.

Spots on textile mats can be removed with a mild detergent.

Scars on the surface where the paint has not been completely penetrated, can be made directly after light scraping to remove dirt.

Deeper scars, down to the bare metal:

1. Scrape or sand the damaged surface lightly and break the edges of the scar.
2. Thoroughly mix the primer and apply it with a small brush or a match.
3. When the primed surface is dry, the paint can be applied by a brush. Mix the paint thoroughly, apply several thin paint coats and let flush after each application.

NOTE: The vehicle should be well cleaned, dry and have a temperature exceeding 60°F (+15°C).

BEFORE A LONG-DISTANCE TRIP

If you are thinking of traveling abroad with your car or taking a long journey, you should have the car checked at a shop. 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 call 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 shops 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 tips are worthwhile noting:

1. Check brakes, front wheel alignment and steering gear.
2. Check engine and drive units with regard to fuel, oil, coolant leakage.
3. Examine tires carefully. Replace worn tires.
4. Check engine is running satisfactorily and that fuel consumption is normal.
5. Examine state of charge of the battery and clean terminals.
6. Check tool equipment.
7. Check lighting.

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 unpleasant surprise unless preventive precautions have been taken.

Engine cooling system

A good quality anti-freeze/summer coolant 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. Experience has also shown that extremely weak anti-freeze solutions (10—20%) are very unfavorable from the point of view of rust protection. For this reason, the quantity of anti-freeze/summer coolant should amount to about 50% of the coolant, that is, 6.5 U.S. qts. = 5.5 Imp. qts. (8.2 liters), this lowering the freezing point to —30°F (—35°C). Alcohol is not recommended as an anti-freeze agent since it evaporates at normal engine temperature.

SERVICING

Engine fuel system

During the wintertime with its wide variation in temperature, condensate forms in the fuel tank and this can impair the running of the engine. This can be eliminated by adding a suitable gas-line anti-freeze (but not methylated spirit) to the fuel. Also, there is less risk of condensate forming if the tank is kept well-filled.

Engine lubricating system

During the winter, multigrade oil SAE 10 W-30 should be used for the engine lubricating system. At very low temperatures (below -0°F = -18°C) 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 43.

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 recharged. 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 condensate which can result in the parking brake freezing up if left on.

When you park the car, do not apply the parking brake but engage first gear or reverse and if possible place blocks behind the wheels. See also page 27.

Windshield washer

Just 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 windshield washer. This is particularly important because the windshield during the winter frequently becomes dirty and is often splashed with water which rapidly freezes and thus necessitates the frequent use of the windshield 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 find room in a handbag or coat pocket.

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.

Note: An asterisk "*" following the item under the Corrective action in the chart indicates the point to be serviced by an authorized Volvo dealer.

Condition: Starter fails to operate (or operates very slowly)

Possible cause	Correction
Seat belt not fastened.	If the vehicle is equipped with an Ignition Interlock System, check to see if the front seat belts have been fastened after the occupants have been seated and before the ignition key is turned to the starting position. See page 22 for instruction on emergency starting.
Weak battery or dead cell in battery.	With the ignition switch in the "Driving" or "On" position, check to see if the warning lights on the dashboard come on and if they go out when the starter is engaged. If the lights do not come on or if they go out when the starter is engaged, the battery is discharged, or see below.
Loose or corroded battery cable terminals.	Check battery terminals and clamps, clean or replace if necessary. Check that the starter cable is tightened. A ground strap, which connects the body and the rear end of the engine, should also be checked for corrosion and looseness.
Open circuit between ignition/starter switch and ignition terminal on starter.	The circuit is closed if a clicking sound is heard from the starter when it is engaged. If no clicking sound is heard, check that the blue wire at the starter is tightened. If still no clicking sound is heard, the ignition lock or the wire are defective.*

SERVICE DIAGNOSIS

Condition: Starter motor operates but engine does not start.

Possible cause	Correction
No fuel reaching engine.	Check for fuel in the tank. Check that the fuel pump operates approx. 2 seconds when the ignition is switched on. If the fuel pump does not operate: Check fuse No. 7. Check that the fuel pump relay is operating. (A clicking sound should be heard when the ignition is switched on.) Check that the fuel pump wires and wire connections are in order (also the fuel pump ground wire). If fuse and relay are in order, fuel pump, control box, wiring harness or fuel lines might be defective.*
No spark, or insufficient spark at spark plug.	Remove the high tension leads at one of the spark plugs and screw out the radio interference suppressor. Hold the lead approx. 3/4" from the valve cover and run the starter. If there is no spark, check: High tension leads and distributor cap for cracks and dirt. Rotor and distributor cap center contact for dirt or defects. Breaker points for burn and misadjustment. Coil, ignition lock or wires for defects.*
Spark plugs defective.	Check the spark plugs for dirt and wear.
Trigger contacts defective.	Use tri-chloro-ethylene to clean the trigger contacts and lubricate sparingly.*
Misc.	If no fault is found according to above, see a Volvo dealer as the fault might be: Incorrect fuel pressure. Injectors defective. Cold start injector, thermal time switch, auxiliary air valve, temperature sensors or control box defective. Imperfect wire contacts.

Condition: Erratic running

Possible cause	Correction
Defective wire connections.	<p>Check that the battery ground strap at the battery shelf is clean and tight.</p> <p>Check the fuel pump fuse for corrosion.</p> <p>Check that the fuel pump ground connection is clean and tight.</p> <p>Check wires in connection box, wires at trigger contacts, air pressure sensor and temperature sensors for imperfect connections. Check connectors and receptacles.</p>
Throttle and throttle switch defective.	<p>Check that the throttle plate is tight and adjusted correctly.</p> <p>Check that the throttle switch is adjusted correctly.*</p>
EGR valve defective.	<p>Disconnect the hose, connecting the intake manifold and the EGR valve, at the intake manifold.</p> <p>Apply a vacuum to the hose (by mouth or other convenient method).</p> <p>The engine should now stop or run very erratically.</p> <p>If this does not happen, the valve is defective and should be replaced.*</p>
Incorrect idle.	<p>Check idle RPM and CO.*</p>
Defective ignition system.	<p>Check high tension leads and cap for cracks and dirt.</p> <p>Check the rotor for defects.</p> <p>Check breaker points for defects and mis-adjustment.</p> <p>Check distributor shaft and breaker point plate for play.</p> <p>Check spark plugs for corrosion and wear.</p> <p>Check the timing.*</p>
Uneven compression.	<p>Test the compression of each cylinder.*</p>
Misc.	<p>If no faults have been found acc. to above, see a Volvo dealer as the fault might be.*</p> <p>Incorrect fuel pressure.</p> <p>Leaking injectors.</p> <p>Cold start injector, temperature sensors, air pressure sensor or control box defective.</p>

SERVICE DIAGNOSIS

Condition: Engine stalls at irregular intervals

Possible cause	Correction
Defective wire connections.	Check that the battery ground strap at the battery shelf is clean and tight. Check the fuel pump fuse for corrosion. Check that the fuel pump ground connection is clean and tight. Check wires in connection box, wires at trigger contacts, air pressure sensor and temperature sensors for defective connections. Check connectors and receptacles.
EGR valve defective.	Disconnect the hose, connecting the intake manifold and the EGR valve, at the intake manifold. Apply a vacuum to the hose (by mouth or other convenient method). The engine should now stop or run very erratic. If this does not happen, the valve is defective and should be replaced.*
Incorrect idle.	Check idle RPM and CO.* Check that the idle compensating valve is functioning when the Air Conditioner is switched on.*
Fuel lines or fuel filter clogged.	Check that fuel hoses, tank ventilation line and line from tank to carbon canister not are clogged or damaged.*
Misc.	If no faults have been found acc. to above, see a Volvo dealer, as the fault might be: Air pressure sensor, temperature sensors or control box.

Condition: Low top speed, loss of power

Possible cause	Correction
Throttle or throttle switch defective.	Check that the throttle is opened completely when the throttle pedal is floored. Check that the throttle and throttle switch are adjusted correctly.* Check that the throttle switch acceleration contacts are in order.*
Defective ignition system.	Check high tensions leads and distributor cap for cracks and dirt. Check the rotor for defects.

(cont.)

(cont.)

Uneven compression.

Air filter or exhaust pipe clogged.

Fuel lines or fuel filter clogged.

Misc.

Check the breaker points for defects and misadjustment.
 Check the distributor shaft and breaker point plate for play.
 Check spark plugs for corrosion and wear.
 Check timing and spark advance mechanism.*

Check the compression of each cylinder.*

Check that the air filter is not clogged.
 Check that the exhaust pipe is not clogged or damaged.

Check that fuel hoses, tank ventilation line, or line from tank to carbon canister not are clogged or damaged.*

Check that the tank fuel filter not is clogged.*

Check the fuel tank for impurities.*

Check that fuel filter or fuel pump not are clogged.*

If no faults have been found acc. to above, see a Volvo dealer, as the fault might be:*
 Coil, alternator, voltage regulator, fan belt, fuel pressure, injectors, temperature sensors, air pressure sensor or control box.

Condition: Excessive fuel consumption

Possible cause

Correction

Spark plugs defective.

Ignition system defective.

Engine operating temperature incorrect.

Fuel leaks.

Misc.

Check the spark plugs for corrosion and wear.

Check timing and spark advance mechanism.*

Check for correct engine operating temperature.
 Check wires and wire connections of temperature gauges and senders.

Check that the fuel lines are in order.

If no faults have been found acc. to above, see a Volvo dealer, as the fault might be:*
 Incorrect fuel pressure
 Incorrect compression
 Leaking injectors
 Air filter clogged
 Temperature sensors, cold start injector, thermal time switch, air pressure sensor or control box defective.

SPECIFICATIONS

Type Designations

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

1. V.I.N. (Vehicle Identification Number)

V.I.N. plate located at the foot of the left door post. The V.I.N. is also stamped on right door pillar.

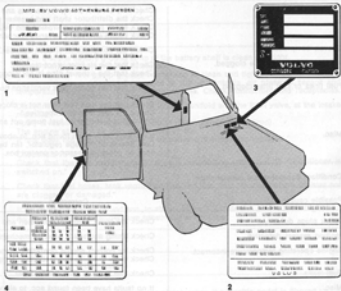
2. Safety Certification Label

Your Volvo has been built to comply to all North American safety and anti-pollution regulations and evidence of this can be seen from the certification label attached on the firewall in the engine compartment. For further information regarding these regulations, please talk to your selling dealer.

3. Model Plate

Vehicle type designation, code number for color and upholstery; on bulkhead.

4. Tire Information Plate



MPG BY VOLVO MOTORING SWEDEN

Model: SA

Model	Year	MPG (City)	MPG (Highway)	MPG (Combined)
460 GLE	1980	20	28	23

SALE: VOLVO MOTORING SWEDEN INC. 10000 W. 10th Street
 10000 W. 10th Street, Minneapolis, Minnesota 55426, U.S.A.
 VOLVO MOTORING SWEDEN INC. 10000 W. 10th Street, Minneapolis, Minnesota 55426, U.S.A.
 VOLVO MOTORING SWEDEN INC. 10000 W. 10th Street, Minneapolis, Minnesota 55426, U.S.A.

VOLVO

SALE: VOLVO MOTORING SWEDEN INC. 10000 W. 10th Street, Minneapolis, Minnesota 55426, U.S.A.

SALE: VOLVO MOTORING SWEDEN INC. 10000 W. 10th Street, Minneapolis, Minnesota 55426, U.S.A.

Model	Year	MPG (City)	MPG (Highway)	MPG (Combined)
460 GLE	1980	20	28	23

SALE: VOLVO MOTORING SWEDEN INC. 10000 W. 10th Street, Minneapolis, Minnesota 55426, U.S.A.

Model	Year	MPG (City)	MPG (Highway)	MPG (Combined)
460 GLE	1980	20	28	23

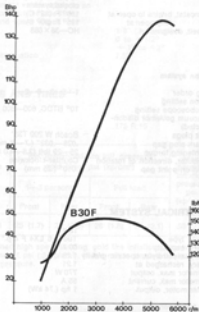
MEASUREMENTS AND WEIGHTS

Length	192"	(487 cm)
Width	67.1"	(171 cm)
Height, curb weight	56.7"	(146 cm)
Wheel base	107"	(272 cm)
Ground clearance, full load	4.9"	(12.5 cm)
Track, front	53.2"	(135 cm)
rear	53.2"	(135 cm)
Turning circle, between curbs	34'	(10.3 m)
Curb weight	3160—3240 lbs	(1430 kg—1465 kg)
	depending on vehicle type	
Gross vehicle weight (GVW)	4260 lbs	(1930 kg)
Vehicle capacity weight	900 lbs	(420 kg)
Permissible axle pressure, front	2020 lbs	(915 kg)
rear	2300 lbs	(1040 kg)
Permissible roof rack load	220 lbs	(100 kg)
Max. permissible trailer weight	2000 lbs	(910 kg)
Max. hitch load	160—200 lbs	(75—90 kg)

ENGINE

Type designation	B 30 F
Output (SAE J 245)	138 hp/5500 rpm
Max. torque (SAE J 245)	154 lbf/3500 rpm
Number of cylinders	6
Bore	3.50" (88.9 mm)
Stroke	3.15" (80 mm)
Displacement	2.978 liters
Compression ratio	8.7:1
Valve clearance, warm and cold	
inlet	.020—.022"
exhaust	(.50—.55 mm)
	.020—.022"
	(.50—.55 mm)
Idling speed (warm engine)	900 rpm
	(800 rpm with BW 35)

Output and torque diagram



SPECIFICATIONS

Cooling system

Type	Positive pressure 10 psi = (.7 kpc/m ²) closed system
Thermostat, begins to open at	180° F (82° C)
fully open at	195° F (90° C)
Fan belt, designation	HC—38 X 688

Ignition system

Firing order	1—5—3—6—2—4
Ignition setting	
stroboscope setting (vacuum governor disconnected)	10° BTDC, 600—800 rpm
Spark plugs	Bosch W 200 T35*
spark plug gap	.028—.032" (.7—8 mm)
tightening torque	25—29 lbf (3.5—4.0 kpm)
Distributor, direction of rotation	Counter-clockwise
ignition point gap	.010" (.25 mm)

ELECTRICAL SYSTEM

Voltage	12 V
Battery, type	Tudor 6 EX4 F o.p.*
Battery, capacity	60 Ah
Battery, electrolyte, specific gravity	1.28
Battery, recharged at	1.21
Alternator max. output	770 W
Alternator max. current	55 A
Starter motor, output	1 hp (.74 kW)

* or corresponding

Lights, 12 volt

	US bulb No.	Power	Socket	No. of bulbs
Headlights	7" Type 2 Sealed Beam			2
Parking Lights, front	67	5 W	Ba 15 s	2
Turn Signals	1073	32 cp	Ba 15 s	2
Tail Lights	67	5 W	Ba 15 s	2
Brake Stop Lights	1073	32 cp	Ba 15 s	2
Back-up Lights	1073	32 cp	Ba 15 s	2
Side Marker Lights	57	3 W	Ba 9 s	4

The following bulbs may be obtained from your nearest Volvo dealer:

License Plate Light	5 W	S 8.5	2
Interior Light	10 W	S 8.5	1
Engine Comp. Light	16 W	S 8.5	1
Glove Locker Light	2 W	Ba 9 s	1
Instrument Panel Light	2 W	W 2.2 d	3
Lighting, Control Panel	1.2 W	W 1.8 d	3
Shift Positions,	1.2 W	W 1.8 d	1
Autom. Transm.			

Warning Lamps:

Charging	1.2 W	W 1.8 d	1
Turn Signals	1.2 W	W 1.8 d	2
Brakes	1.2 W	W 1.8 d	2
Headlights	1.2 W	W 1.8 d	1
Oil Pressure	1.2 W	W 1.8 d	1
Overdrive	1.2 W	W 1.8 d	1
Emergency Warning Flashers	1.2 W	W 1.8 d	1
EL Heated Rear Window	1.2 W	W 1.8 d	1
Seat Belts	1.2 W	W 1.8 d	1
Bulbs	1.2 W	W 1.8 d	1

Fuses (number and size)

6	5 A
4	8 A
2	16 A

POWER TRANSMISSION

Clutch

Release lever free travel approx. 3/16" (4—5 mm)

Transmission

Type designation	M 410	BW 35	
Reduction ratios:			
1st speed	3.54:1	2.39:1	} X the con- verter ratio
2nd speed	2.12:1	1.45:1	
3rd speed	1.34:1	1:1	
4th speed	1:1	—	
(with overdrive)	0.797:1	—	
Reverse	3.54:1	2.09:1	

Rear axle

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

Speed in mph (kmph) at 1 000 engine rpm

Rear axle	3.73:1
Transmission	M 410
1st speed	5.9 (9.5)
2nd speed	9.8 (15.5)
3rd speed	15.2 (24.5)
4th speed	20.5 (33.0)
4th speed + overdrive	25.5 (41.0)
Reverse	5.9 (9.5)

FRONT WHEEL ALIGNMENT

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

Toe-in	1/8" (2—5 mm)
Camber	0 to + 1/2°
Caster	+ 1° to + 2°
King pin inclination	7.5°

WHEELS AND TIRES

Rim size	5 1/2 J 15 F.H.
Tire size	175 R 15

Tire size	Recommended tire infl. pressure cold tires, psi (kp/cm ²)				Max. permitted inflation pressure psi (kp/cm ²)
	1—3 persons		Full load		
	Front	Rear	Front	Rear	
175 R 15	25 (1.7)	26 (1.8)	26 (1.8)	30 (2.1)	36 (2.5)

For sustained high speed driving, cold tire inflation pressure must be increased 4 psi (.3 kp/cm²), but is not to exceed the maximum permitted pressure.

SPECIFICATIONS

CAPACITIES

Fuel tank	15.8 US galls./13.2 Imp. galls. 60 liters
Cooling system	13 US qts./11 Imp. qts. 12.4 liters (of which expansion tank 1.5 US qts./ 1.3 Imp. qts./1.5 liters)
Oil capacity, engine, at oil change engine, incl. oil filter transmission (M 410) transmission (BW 35) rear axle power steering	approx. 5.5 US qts./4.5 Imp. qts. (5.2 liters) approx. 6.3 US qts./5.3 Imp. qts. (6.0 liters) approx. 1.55 US qts./1.25 Imp. qts. (1.4 liters) approx. 9.0 US qts./7.25 Imp. qts. (8.2 liters) approx. 1.75 US qts./1.4 Imp. qts. (1.6 liters) approx. 1.3 US qts./1.0 Imp. qts. (1.1 liters)

TOOL KIT

The tool kit contains:
wheel nut and spark plug wrench,
tommy bar,
Phillips screw driver
open end wrench

Item	Part No.	Qty.	Weight (lb.)	Weight (kg.)
Wheel nut and spark plug wrench	1210	1	1.2	0.5
Tommy bar	1211	1	1.5	0.7
Phillips screw driver	1212	1	0.5	0.2
Open end wrench	1213	1	1.0	0.4

Item	Part No.	Qty.	Weight (lb.)	Weight (kg.)
Headlight	1214	2	2.5	1.1
Turn Signal	1215	2	1.5	0.7
Oil Pressure	1216	1	1.0	0.4
Overdrive	1217	1	1.5	0.7
Emergency Warning Lamp	1218	1	1.0	0.4
Cl. Master Floor Window	1219	1	1.5	0.7
Rear View Mirror	1220	1	1.0	0.4
Bulbs	1221	1	1.0	0.4
Tools (hammer and screwdriver)	1222	1	1.0	0.4
Tools (screwdriver and screwdriver)	1223	1	1.0	0.4
Tools (screwdriver and screwdriver)	1224	1	1.0	0.4
Tools (screwdriver and screwdriver)	1225	1	1.0	0.4
Tools (screwdriver and screwdriver)	1226	1	1.0	0.4
Tools (screwdriver and screwdriver)	1227	1	1.0	0.4
Tools (screwdriver and screwdriver)	1228	1	1.0	0.4
Tools (screwdriver and screwdriver)	1229	1	1.0	0.4
Tools (screwdriver and screwdriver)	1230	1	1.0	0.4

CONSUMER INFORMATION

Acceleration and passing ability

Vehicle stopping distance

Tire reserve load

The information about the 1974 Volvo 164 shown in the following pages is presented in accordance with Federal requirements for comparison with other makes and models. The exacting test procedures established by the National Highway Traffic Safety Administration were followed to obtain the figures.

Notice: The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions and the information may not be correct under other conditions.

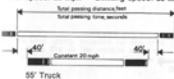
Acceleration and Passing Ability

This chart indicates passing times and distances that can be met or exceeded by 1974 Volvo 164 in the situations diagrammed below.

LOW SPEED

The low-speed pass assumes an initial speed of 20 mph and a limiting speed of 35 mph.

Initial speed: 20 mph Limiting speed: 35 mph

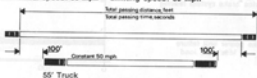


Model Description of Vehicle	Low Speed (20-35 mph)	
	Feet	Seconds
164 Overdrive	390	8.1
164 Automatic	405	9.3

HIGH SPEED

The high-speed pass assumes an initial speed of 50 mph and a limiting speed of 80 mph.

Initial speed: 50 mph Limiting speed: 80 mph



Model Description of Vehicle	High Speed (50-80 mph)	
	Feet	Seconds
164 Overdrive	1200	12.8
164 Automatic	1273	13.6

CONSUMER INFORMATION

Vehicle Stopping Distance

This chart indicates braking performance that can be met or exceeded by 1974 Volvo 164 without locking the wheels, under different conditions of loading and with partial failures of the braking system.

Fully operational brake



Emergency service brakes (with partial service brake system failure)

238

Brake power unit failure Maximum load

243

Stopping distance in feet from 60 mph

Tire Reserve Load

This chart lists the tire size designations recommended by Volvo for use 1974 164 with the recommended inflation pressure for maximum loading and the tire reserve

load percentage for each of the tires listed. The tire reserve load percentage indicated is met or exceeded by each vehicle to which the chart applies.

Model	Manufacturer's Recommended Tire Size	Recommended psi Cold Inflation Pressure		Tire Reserve Load (%)
		Front	Rear	
164	P175 R 15	26	30	24

The difference, expressed as a percentage of tire load rating, between (a) the load rating of a tire at the vehicle manufacturer's recommended inflation pressure at

the maximum loaded vehicle weight and (b) the load imposed upon the tire by the vehicle at that condition.

WARNING. Failure to maintain the recommended tire inflation pressure or to increase tire pressure as recommended when operating at maximum loaded vehicle, weight, or loading the vehicle beyond the capacities specified on the tire placard affixed to the vehicle, may result in unsafe operating conditions due to premature tire

failure, unfavorable handling characteristics, and excessive tire wear. The tire reserve load percentage is a measure of tire capacity not of vehicle capacity. Loading beyond the specified vehicle capacity may result in failure of other vehicle components.

LUBRICATING CHART

Symbols

- Engine oil**
 Grade: "For API Service SE"
 (API Service MS)
 See also page 43

- Rear axle oil**
 Grade: MIL-L-2105B
 Viscosity: See page 44

- Brake fluid**
 Grade: DOT 3 or DOT 4 should
 be used

- Special lubricants**
 See resp. note

- Light engine oil**

Wheel bearings
 Note 1

 Power steering
 Note 2

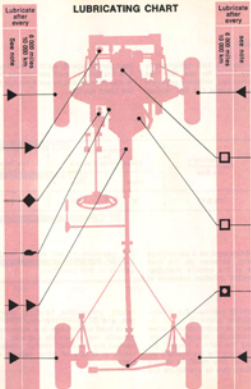
 Brake fluid
 container
 Note 3

 Distributor
 Note 4

 Transmission
 Note 5

 Wheel bearings
 Note 1

LUBRICATING CHART



Wheel bearings
 Note 1

 Engine
 Note 7

 Oil filter
 Note 6

 Rear axle
 Note 8

 Wheel bearings
 Note 1

Notes to lubricating chart

Note 1. The wheel bearings are packed at the factory with a special type of grease intended to last the entire lifetime of the bearings. 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.

Note 2. Power steering: Check that the level in the power steering oil container is 1/4" (5—10 mm) above the level mark. Use Automatic Transmission Fluid, Type A, or Dexron.

Note 3. Check that the fluid reaches up to the MAX mark.

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 6 000 miles (10 000 km) that the oil reaches up to the filler plug. Concerning oil change, see page 44.

OBSERVE. The type of transmission will decide the type of lubricant to be used.

Note 6. Change the oil filter every 6 000 miles (10 000 km). See page 46.

Note 7. Check the oil level when filling the tank. Concerning oil changing, see page 43.

Note 8. Check every 6 000 miles (10 000 km) that the oil reaches up to the filler plug. Concerning lubricant for rear axle with limited slip differential, see page 45. Change the oil every 24 000 miles (40 000 km).

Oil capacities

Engine excl. oil filter	approx. 5.5 US qts./4.5 imp. qts. (5.2 liters)
Engine incl. oil filter	approx. 6.3 US qts./5.3 imp. qts. (6.0 liters)
Transmission M 410	approx. 1.55 US qts./1.25 imp. qts. (1.4 liters)
Transmission BW 35	approx. 9.0 US qts./7.25 imp. qts. (8.2 liters)
Rear axle	approx. 1.75 US qts./1.4 imp. qts. (1.6 liters)
Power steering	approx. 1.3 US qts./1.0 imp. qts. (1.1 liters)

A		D		H	
Air cleaner	47	Differential, description	32	Headlight adjustment, check	52
Air conditioner	11	Differential, oil	45	Headlights, changing	53
Air pressure	71	Doors and locks	18, 62	Heater and ventilation controls	11
All-round lubrication	76—77			Hood, hood release	9
Alternator	52	E		I	
Anti-rust	60	Electrical system, description	34	Ignition interlock system	8, 22
Automatic transmission, oil capacity	44	Electronic fuel injection	51	Ignition switch and steering wheel lock	8
Automatic transmission, oil changing	44	Elec. heated window	13	Ignition system	49, 70
Automatic transmission, operation	23	Electrolyte level, check	52	Injectors	30
Auxiliary air regulator	30	Emergency warning lights	13	Instrument panel	6
		Engine, description	29	Instrument light	10
		Engine, oil	43	Instruments	5
		Evaporative Control System	48	Interior light	19
		Exhaust emission control	31, 48		
		Exhaust Gas Recirculation	48	K	
B				Keys	18
Battery, level check	52	F			
Battery, state of charge	52	Fan belt	70	L	
Body, lubrication	42	Fan switch	11	License plate light	55
Body, washing	59	Federal Clean Air Act	38	Lighting	5
Brake fluid, level check	45	Front end, description	33	Light controls	5
Brakes, description	36	Front end, wheel alignment	33, 57, 71	Locks	18
Brakes, servicing	45, 56	Front seats	14	Lubrication	42
Bulbs	52—55, 70	Frozen locks	62	Lubricating chart	76—77
Bulb Integrity Sensor	7	Fuel	51	Lubricating system	29
		Fuel filter	47	Lumber support	15
		Fuel gauge	8		
		Fuel system	30, 47	M	
		Fuel tank, capacity	72	Maintenance schedule	38—41
		Fuses	56, 70	Measurements and weights	69
C					
Capacities	72	G			
Charging warning light	7	Glove locker light	55	O	
Cigarette lighter	10	Glycol	49	Odometer	6
Cleaning	59	Guarantee inspection	3	Oil capacities	44
Clutch	31, 56, 71				
Cold weather	61				
Compression test	48				
Consumer Information	73—75				
Coolant	49, 61				
Coolant change	50				
Cooling system, description	29				
Crankcase ventilation	46				

Oil change, automatic transmission	44	\$		Trailer hauling	27
Oil change, differential	44	Seat belts	13, 16, 17	Triggering contacts	51
Oil change, transmission, overdrive	44	Seat	14	Trip meter	7
Oil change, engine	43	Service inspections	3	Trunk	20, 55
Oil change, rear axle	44	Servicing before a long-distance trip	61	Turn signals	10, 54
Oil change, power steering	45	Service Diagnosis	63-67	Type designations	68
Oil filter	46	Servicing, wintertime	61		
Oil pressure	6	Shifting	23	U	
Output and torque diagram	69	Shift positions	24	Underbody treatment	60
Overdrive, description	23, 31	Spare wheel space	20	Upholstery	60
Overdrive, oil	44	Spark plugs	48, 49		
		Specifications	70	V	
P		Speedometer	6	Valve clearances	48, 69
Paintwork	60	Starting in the garage	22	Ventilation controls	9
Paintwork, damage	60	Starting the engine	22	Viscosities	43-44
Parking brake	9	Steering	33		
Parking lights	54	Steering gear, oil check	45	W	
Polishing and waxing	59	Steering unit	33	Warming up engine	22
Power steering	33, 45	Sun-roof	19	Warning buzzer, ignition key	13, 16
Power transmission	71			Warning flashers	13
Pressure sensor	51	T		Washing	59
Pressure regulator	51	Tachometer	7	Waxing	59
Propeller shaft	32	Temperature gauge, coolant	7	Weights	69
		Throttle valve switch	30, 48	Weights and measurements	69
R		Tires	57, 71	Wheels and tires, air pressure	57, 71
Rear axle, description	32	Tire pressure	57, 71	Wheels and tires, changing	58
Rear axle oil	44	Tools	72	Wheels and tires	57
Rear seat belts	17	Torque diagram	69	Windshield wiper and washer	8, 62
Rear window	13	Touching-up	60	Wiring diagrams	34, 35
Rear view mirror	20	Touching	26		
Running-in	21	Transmission, description	23, 24, 31		
Rust-protection	60	Transmission, oil	44		

WHEN FILLING THE TANK

Regular grade of leaded or low-leaded fuel (with an octane rating of at least 91 RON) should be used.

Engine oil level

The oil level should be between the marks on the dipstick. Top up with multi-grade oil. The distance between the dipstick marks is equivalent 2 quarts (2 liters).

Coolant level

The level should be between the MAX. and MIN. marks on the expansion tank. Top up with a mixture of 50% anti-freeze/summer coolant and 50% water.

Washer fluid level

The washer fluid container should always be adequately filled (wintertime with water and an anti-freeze solvent).

Brake fluid level

The level can be checked without removing the cap. The level should be above the MIN. mark on the transparent fluid container. Top up with brake fluid, designation DOT 3 or DOT 4 (previously SAE J 1703).



Check every second time you fill the tank:

Battery electrolyte level.

The level should be $3/16$ — $3/8$ " (5—10 mm) above the cell plates. Only distilled water may be filled.

Recommended tire pressures.

Recommended tire infl. pressure cold tires, psi (kp/cm ²)	Front	Rear
1—3 persons	25 (1.7)	26 (1.8)
Full load	26 (1.8)	30 (2.1)

For sustained high speed driving, cold inflation pressures should be increased 4 psi (0.3 kp/cm²). However, total pressure must not exceed 36 psi (2.5 kp/cm²).

The washer jets must sometimes be adjusted

The jets should meet the windshield 4—6 inches from the upper edge and approx. 6 inches from the windshield pillar.



AB VOLVO • GÖTEBORG, SWEDEN