VOLVO

DIESEL

model year 1980

Supplement to Owner's Manual

Personal Information

Name _____

Address _____

City, State _____

Tel. No. _____

Car Information

Vehicle Identification Number (VIN) _____

Starting (Ignition)/Door Key No. _____

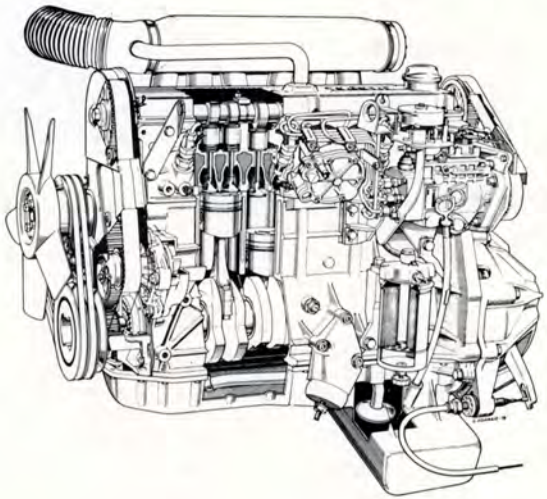
Trunk/Glove box Key No. _____

Delivery Date _____

Contents

When you need service: **authorized Volvo workshops** maintain and repair your car according to the instructions issued by the Volvo Factory. To keep your Volvo in top condition, specify time tested and proven Genuine Volvo Parts and Accessories.

VOLVO
DIESEL



The Owner's Manual, provided with this supplement, describes most of the features on your Volvo Diesel. Major differences between the Diesel and information contained in the Owner's Manual are covered in this supplement. For example: starting the engine, fuel system, servicing, engine oil, etc.

Volvo recommends that you read both the Owner's Manual and this supplement thoroughly before operating your vehicle.

For more detailed information regarding adjustments or repairs, contact your local Volvo dealer.

Notice: All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. Volvo reserves the right to make model changes at any time, or to change specifications of design, without notice and without incurring obligation.

Starting the engine

Starting switch/steering wheel lock

Lock position: Steering wheel is locked when the starting key is withdrawn from the lock.

Intermediate position: Certain electrical components (e.g., heater fan, cigarette lighter) can now be switched on.

Drive/Glow: The position of the starting key during driving and when preheating ("on glow") before starting the engine.

Start position: Release the key as the engine starts. It automatically returns to the "Drive/Glow" position.

If difficulty is encountered in turning the starting key due to the lock position of the steering wheel, turn the wheel a little to the left and then to the right.

A reminder buzzer sounds when the driver's door is open and the starting key is in the lock. It also sounds if the parking lights or headlights are on when the door opens.

Note: U.S.A. model speedometers indicate m.p.h. and km.

Pre-heating (glow) indicator light

When the starting key is turned to "Drive/Glow" the pre-heating light goes on. This indicates that the glow plugs (one in each engine cylinder) are switched on.
The engine can be started when the light goes out.
Glow time is determined by engine temperature. The colder the engine the longer the glow time. If the engine is warm, the light will remain on only for a few seconds or it may not go on at all.

Example:

- at 68°F (+20°C) engine temp.—light goes on for about 15 seconds
- at 32°F (0°C) engine temp.—light goes on for about 25 seconds
- −4°F (−20°C) engine temp.—light goes on for about 45 seconds

Before the glow plugs can be switched on again after an unsuccessful attempt at starting, the starting key must first be turned back to the "Intermediate position" and then to "Drive/Glow".
The glow plugs and the indicator light are wired via fuses No. 12 and No. 13 in the fusebox. (See section titled "Fuses" in the Owner's Manual).

Overdrive, automatic transmission, jump starting

Starting the engine

- Apply the parking brake (handbrake).
- Gear lever in neutral—position N or P for automatic transmission.
- Turn the starting key to "Drive/Glow".
- Watch the pre-heating indicator light. When it goes out . . .
- . . . depress the clutch pedal (manual transmission), depress the accelerator half-way and turn the starting key to "Start" and hold it there until the engine starts.
- Observe that during cold weather the key should **not be released until the engine is running steadily.**

Never rev-up an engine immediately after starting from cold!

Stopping the engine

The engine is stopped by returning the starting key to intermediate or lock position. This causes a solenoid valve to shut off the fuel supply to the engine.
If the engine does not stop, see section titled "Fault tracing".

Driving with overdrive (certain models)

For best fuel economy with your Volvo Diesel, you should use the overdrive for all normal highway driving above approx. 30 mph (50 km/h).

For instructions on engaging and disengaging overdrive, see Owner's Manual.

Automatic transmission

The information in the Owner's Manual concerning driving with the automatic transmission also applies to your Volvo Diesel with one exception:

- **60 mph (95 km/h) is the max. permitted speed when position 1 or 2 is selected during driving.**

Towing, jump starting

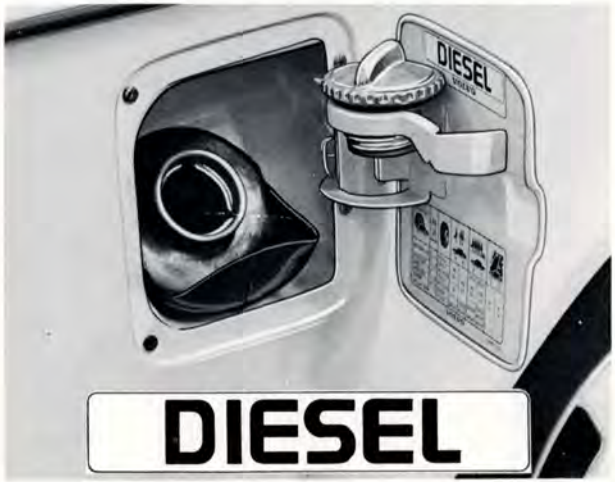
The general recommendations for towing in the Owner's Manual apply also to your Volvo Diesel.
However, if your car is equipped with an automatic transmission, it cannot be started by towing—a booster battery and jumper cables must be used instead.
Note that the battery terminals are placed differently compared with the battery terminals on a gasoline engine car. The positive terminal on diesel equipped cars is nearer the engine. You must never connect a positive terminal to a negative terminal as this would damage the alternator.

Defroster

Maximum defroster action

For maximum defroster capacity at very low ambient temperatures, use the recirculation control (button depressed).

On vehicles without air conditioning, the recirculation feature should **not** be used in humid climates and temperatures above +23°F (−5°C).



Diesel fuel

It is recommended that you use diesel fuel purchased from major suppliers. For proper operation diesel fuel systems must not be contaminated by using inferior quality fuel.

Special winter blends are available and should be used when ambient temperatures fall below +14°F (−10°C). These fuels reduce the potential of wax deposit formation in the system and the resulting fuel flow restrictions.

If the winter blends are not available, mix 25-40% pure kerosene with the diesel fuel being filled. (Refer to Specifications Section of this booklet.)

Keep the fuel tank well filled to prevent water condensation from forming.

Cleanliness of the fuel system is of major importance. Check the fuel filler cap area for cleanliness before filling with fuel. Remove all foreign matter.

When filling from a container always check that the container is clean and use a suitable filter.

Empty fuel tank

Should you run out of fuel (empty tank), no special procedures are required after refilling. The fuel system is self priming due to the design of the injection pump.

However, it may be necessary to operate the starter motor for a longer period to allow the fuel to reach the engine cylinders.

NOTE: The anti-tamper seals on the injection pump must not be broken.

Engine service

Engine servicing

After you have driven 600-1200 miles (1,000-2,000 km) your car should be taken to a Volvo dealer for a service inspection which includes changing engine oil and oil filter.

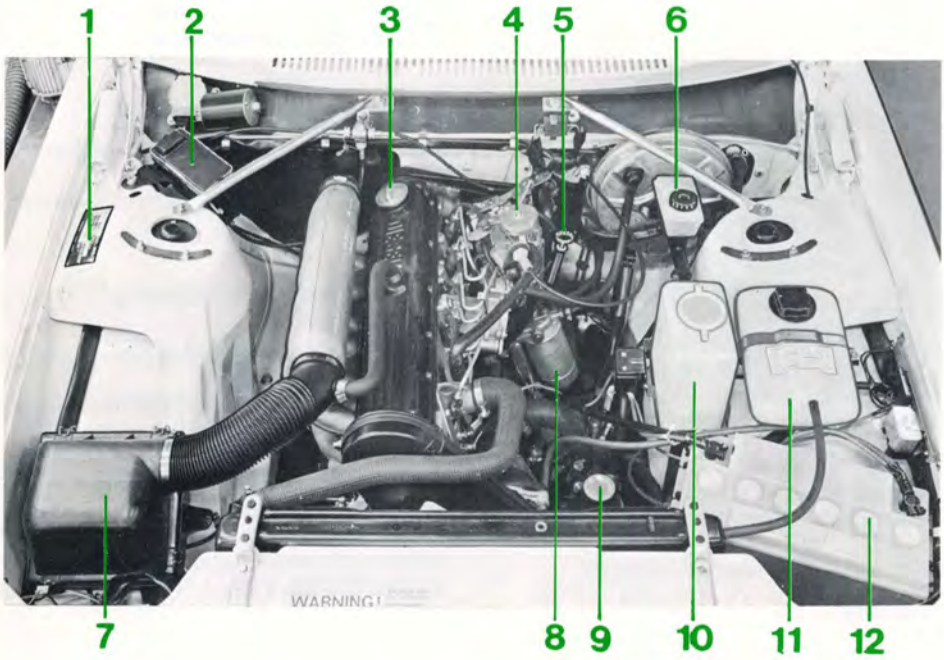
The next service interval for your car's engine is after it has been driven **7,500 miles (12,500 km).** At this time the **engine oil** must be changed. (See section titled "Engine oil".)

Subsequently, at each 7,500 mile (12,500 km) service the engine oil must be changed.

At the first 15,000 mile (25,000 km) interval the engine oil filter must also be replaced. This procedure must be repeated at each 15,000 mile (25,000 km) interval thereafter.

Replace oil filter more frequently than 15,000 mile (25,000 km) intervals when vehicle is driven under adverse conditions. (At least once a year is recommended.)

A complete 7,500 mile (12,500 km) Maintenance Service Chart is included in your Warranties & Maintenance Records Manual or as a separate supplement. Consult the chart for additional information.



D 24 Engine

1 Data plate
2 Not applicable
3 Filler cap, engine oil
4 Fuel injection pump
5 Oil dipstick, engine
6 Brake fluid reservoir
7 Air cleaner
8 Fuel filter
9 Oil reservoir, power steering
10 Washer fluid reservoir
11 Expansion tank, cooling system
12 Battery

Engine oil

Adding engine oil

When oil has to be added, use the same type of oil as already used in the engine.
NOTE! Over filling can result in high oil consumption.

Checking the engine oil level

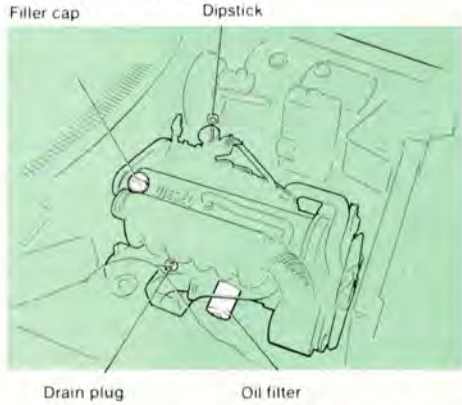
Check the oil level when refueling. It should be between the marks on the dipstick. The distance between the marks on the dipstick corresponds to about 1 quart (liter).
NOTE! **Always** wipe the dipstick before checking the oil level.

Draining the engine oil

To drain the oil, remove the plug in the bottom of the engine oil pan. The oil should be drained after driving when it is still warm.
CAUTION! The oil may be very hot The location of the drain plug is such that when it is removed the oil will pour towards the rear.

Changing the oil filter

See adjacent column for replacement intervals.



Discard the old filter. If only the filter is replaced, add about 0.85 US qts. = 0.8 liters/0.75 Imp. qts. oil to the engine.

Oil quality: For Service API-SE/CC

Viscosity:

Temperature range [1])

Below 14°F (−10°)	Between 14°F (−10°C) and 86°F (+30°C)	Above 86°F (+30°C)
SAE 10W-40 or 10W-30		
	SAE 15W-50 or 20W-50	
SAE 10W[2])	SAE 20W/20	SAE 30W

[1]) Refers to ambient temperature.
[2]) If you use SAE 10W oil you must avoid unnecessarily high engine revs and lengthy, heavy loading, as this will result in excessively high oil temperatures.

Capacity:

Excl. oil filter: 6.45 US qts. = 6.2 liters/5.5 Imp. qts.
Incl. oil filter: 7.25 US qts. = 7.0 liters/6.2 Imp. qts.

Oil-level check: When refueling

Change oil According to the following table:

1st time at 600-1200 miles (1,000-2,000 km) service—Oil + oil filter
2nd time after 7,500 miles (12,500 km)—Oil
3rd time after 15,000 miles (25,000 km)—Oil + oil filter (see "Engine Service" section).
and so on with an oil change every 7,500 miles (12,500 km) or at least twice a year and oil filter change every 15,000 miles (25,000 km).

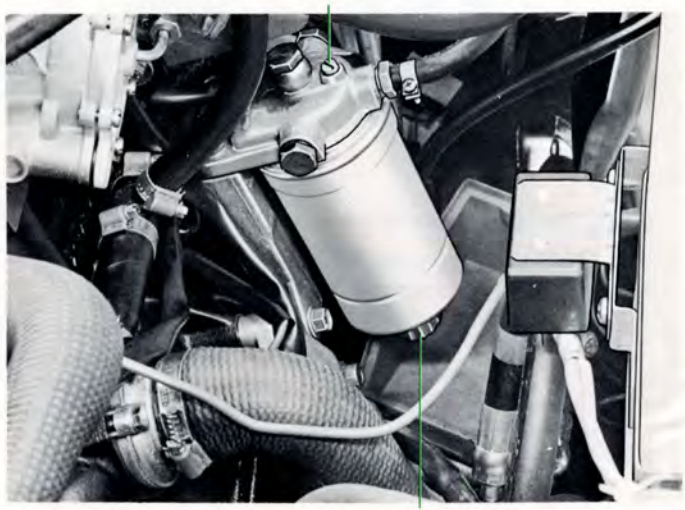
Driving under adverse conditions such as high ambient temperatures, trailer hauling, hill climbing, driving long distances at high speeds, extended periods of idling, low speed operation or short trip operation at freezing temperatures may require oil and filter changes more frequently (every third month under extreme conditions).

Draining water from fuel filter

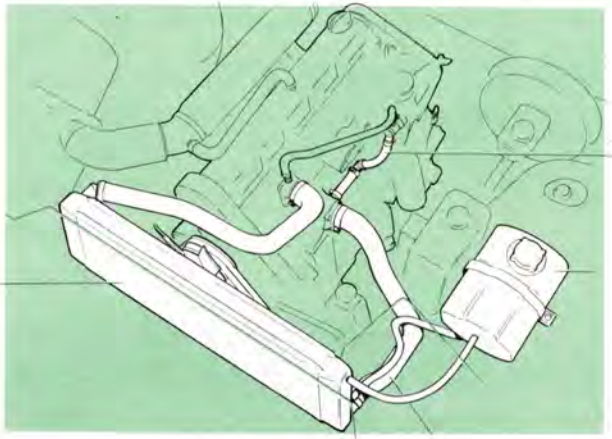
Condensation in the fuel tank is separated from the fuel in the fuel filter. If this water gets into the engine via the injection pump, it can cause a malfunction in the system. The water in the fuel filter must, therefore, be drained at 7,500 miles (12,500 km) and every 15,000 miles (25,000 km) thereafter.

Draining is very simple. Proceed as follows:

- Place a tray or similar container under the drain screw in the bottom of the filter.
- Loosen the bleed screw several turns with a screwdriver.
- Loosen the drain screw by hand.
  Drain until only fuel runs out.
  Tighten up the drain screw.
- Tighten up the bleed screw with a screwdriver.
- Remove the tray.



Coolant



Checking the coolant level

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

Note!

The cooling system must always be kept filled to correct level.
If it is not kept filled, there can be high local temperatures in the engine which could result in damage.

Changing the coolant

Draining

1 Move the heater control to WARM.
2 Remove the cap from the expansion tank.
3 Disconnect the radiator lower hose at the radiator.
4 Disconnect the coolant hose at the injection pump thermostat. Bend the hose downwards so that all the coolant runs out of the engine.

Re-filling

5 Connect and secure the radiator hose and the coolant hose mentioned in 3 and 4 above.
6 Fill the expansion tank to MAX or a bit over.
7 Run the engine warm and check that the cooling system does not leak. Top-up with coolant to MAX if necessary.

Coolant composition

Never fill the cooling system with only water! Use a mixture of 50% anti-freeze and 50% water all the year round.
The anti-freeze prevents rusting in the summertime and also freezing in the wintertime.
The car is supplied from the factory with a coolant which protects against freeze-up down to −31°F (−35°C).

Cooling system capacity:

The cooling system holds about 9.8 US qts = 9.3 liters/8.8 Imp. qts.

Level check:

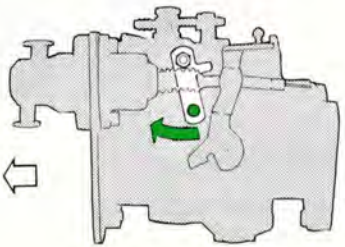
Check the coolant level when refueling.

Coolant change:

Change the coolant every 30,000 miles (50,000 km). **Maintain 50% anti-freeze and 50% water.** Check manufacturer's recommendations concerning more frequent changes.

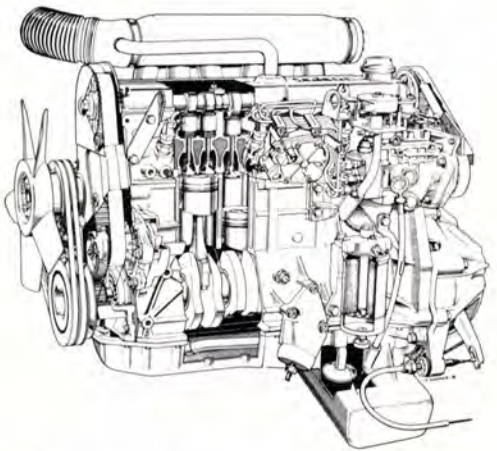
This fault tracing information applies specifically to the diesel engine and supplements the fault tracing information given in the Owner's Manual.

Possible cause	Corrective action
Engine does not start (although starter motor turns over engine at normal speed)	
Engine does not get any fuel.	Check to see if there is fuel in the tank and in the lines up to the engine.
The fuse for the injection pump solenoid valve is blown.	Check fuse 13 in the fuse box and replace if necessary. (See Owner's Manual, section titled "Fuses").
Water or dirt in the fuel.	Drain water from the fuel filter via the bottom plug.
Wax deposits in fuel filter (at low temperatures).	Place the car in a warm garage, replace the fuel filter and fill with winter fuel, see Section titled "Fuel system".
Injection system faulty.	Must be fixed by a workshop.
No power in engine	
Clogged air cleaner.	Check air cleaner. Replace if necessary.
Clogged fuel filter.	Drain water from fuel filter via bottom plug or replace filter.
Engine does not stop	
Shut-off valve has jammed.	Rev-up engine and switch off with the starting key. Cars with manual transmission: Engage 3rd or 4th gear, depress and hold footbrake and release the clutch pedal (while the engine is idling). Cars with automatic transmission: Use the emergency lever on the injection pump (see illustration). Note! Lever exists only on cars equipped with automatic transmission.



Specifications

Weights, in lbs (kg)	4-Door		Wagon	
Curb weight (depending on equipment)	3153-3241	(1430-1470)	3285-3330	(1490-1590)
Gross vehicle weight (GWV)	4079	(1850)	4410	(2000)
Capacity weight	838- 926	(380- 420)	1080-1125	(490- 510)
Permissible axle weight, front	1985	(900)	1985	(990)
rear	2183	(990)	2602	(1180)
Max. roof load	221	(100)	221	(100)
Max. trailer weight	2000	(908)	2000	(908)
Max. hitch load	200	(90)	200	(90)



Engine number

The engine serial number is stamped on left side of engine under the vacuum pump.

Engine

Straight, 6-cylinder liquid-cooled diesel engine.
The cylinder block is made of cast iron.
The cylinder bores are machined directly in the block.
The cylinder head is of light alloy and has swirl chambers.
Single overhead camshaft.
Lubricating system with gear pump driven from crankshaft. Full-flow type oil filter.
Injection pump consisting of high-pressure pump, feed pump, a governor and injection timing mechanism.
The injection pump is belt-driven from the camshaft.
The automatic cold-start device regulates the injection timing depending on engine temperature.
The cooling system is sealed and pressurized with an expansion tank.

Type designation D 24

Output DIN	78 hp at 4800 rpm (58 kW at 80 r/s)	
Torque DIN	102 ft. lbs. at 3000 rpm (138 Nm at 50 r/s)	
Number of cylinders	6	
Bore	3.012" (76.5 mm)	
Stroke	3.402" (86.4 mm)	
Displacement	2.383 liters (dm^3)	
Compression ratio	23.0:1	
Firing sequence	1-5-3-6-2-4	
Low idle	800 rpm (13.3 r/s)	
High idle	5200 rpm (87 r/s)	
Valve clearance	Checking in. (mm)	Adjusting in. (mm)
Inlet, warm engine	0.008-0.012 (0.20-0.30)	0.010 (0.25)
cold engine	0.006-0.010 (0.15-0.25)	0.008 (0.20)
Exhaust,		
warm engine	0.016-0.018 (0.40-0.50)	0.018 (0.45)
cold engine	0.014-0.018 (0.35-0.45)	0.016 (0.40)

Cooling system

Type	Positive pressure, closed system
Capacity	9.8 US qts. = 9.3 liters/8.8 Imp. qts.
Thermostat,	
starts opening at	189°F (87°C)
fully open at	216°F (102°C)
Fan belt (2)	HC 38—975 Volvo Part No. 958354

Fuel system

Injection pump	Bosch VE6/10 F 2400 L-32
Injector, assembly	Bosch KCA 30 SD 27/4
nozzle	Bosch DNO SD 193
opening pressure	1706—1849 psi (12—13 MPa)

Specifications

Fuel (diesel oil)

Standard	DIN 51, 601, CEC-ERF-DI or ASTM-D 975-No 2-D
Firing response (cetane number)	min 45
Sulphur content	0.5 max. weight % by volume

To counteract wax deposits and to ensure good starting in very cold weather, the special winter fuel brand, sold by most oil companies, should be used. If, for some reason you are unable to obtain this winter fuel you can mix 25%-40% kerosene with diesel fuel being filled (see section titled "Fuel system"). Greater quantities should not be added due to the unacceptable reduction in the lubricating quality of the diesel fuel.
In certain countries it may be illegal to use a kerosene additive in the fuel. If this is the case, use another suitable additive approved by the governing authority.

ELECTRICAL SYSTEM

A 12-volt system with a voltage regulated alternator. A single wire system where the chassis and engine are used as conductors. The battery negative terminal is wired to the chassis.

Voltage	12 volt
Battery	Volvo Part No. 1259360
Capacity	88 Ah
Electrolyte, specific gravity	1.28
Recharge at	1.21
Alternator, max. output	770 W
Starter motor, output	2 kW (2.7 hp)

Bulbs	Power	Socket	Number
The following additional bulbs are used:			
Indicator, pre-heating (glow)	1.2 W	W2x4.6d	1

POWER TRANSMISSION

Transmission

Type designation	M 45 D	M 46 D	BW 55 (auto.)
Reduction 1st gear	4.03:1	4.03:1	2.45:1
2nd gear	2.16:1	2.16:1	1.45:1
3rd gear	1.37:1	1.37:1	1.00:1
4th gear	1.00:1	1.00:1	—
overdrive	—	0.80:1	—
reverse	3.68:1	3.68:1	2.21:1

Speed in mph (km/h) at 1,000 engine rpm (17 r/s)

Transmission Rear axle ratio	M 45 D* 3.73:1	M 46 D* 3.73:1	M 46 D** 3.54:1
1st gear	4.8 (7.7)	4.8 (7.7)	5.0 (8.0)
2nd gear	8.9 (14.3)	8.9 (14.3)	9.4 (15.1)
3rd gear	14.0 (22.5)	14.0 (22.5)	14.8 (23.8)
4th gear	19.1 (30.8	19.1 (30.8)	20.1 (32.3)
Overdrive	—	23.9 (38.5)	25.2 (40.6)
Reverse	5.2 (8.4)	5.2 (8.4)	5.5 (8.9)

*Canada **U.S.A.

Note that tire pressure and wear can affect the specifications stated above.

Final drive

Reduction:
3.54:1 on cars with manual transmission (U.S.A.)
3.73:1 on cars with manual transmission (Canada)
3.54:1 on cars with automatic transmission.

Recommended minimum and maximum speeds in mph (km/h)

Engine variant	1st gear	2nd gear	3rd gear	4th gear
Diesel	-22 (35)	9-40 (15-65)	15-65 (25-105)	22- (35-)*

* approx. 30 mph (50 km/h) with overdrive engaged.

TIRES

Tire pressure

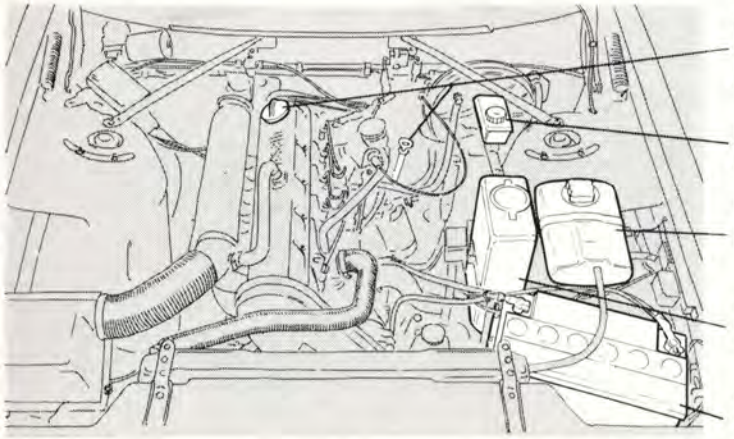
100 kPa (kilopascal) = 1 kp/cm² = 14 psi
The table figures in brackets are kPa

Car model	Tire type	Air pressure, cold tires, psi (kPa)			
		1-3 persons		Full load	
		Front	Rear	Front	Rear
4 door models	185/70 R14	27 (190)	27 (190)	27 (190)	32 (230)
Special Spare		32 (230)	32 (230)	32 (230)	32 (230)
Wagon models	185 R14	27 (190)	30 (210)	28 (200)	40 (280)
Special Spare		40 (280)	40 (280)	40 (280)	40 (280)

With lengthy driving at high speed (more than one hour above 75 mph = 120 km/h the air pressure should be increased by 4 psi (30 kPa).
"Special Spare" maximum speed is 50 mph = 80 kph.

NOTE! The above pressures apply to cold tires.

Check the following when refueling



Oil level—should be between the marks on the dipstick. Always wipe the dipstick before checking the oil level. The distance between the marks corresponds to about 1 quart (liter) of oil. If necessary fill with multigrade oil.

Brake fluid level—should be above the MIN mark. No need to remove the cap to check. If necessary fill with DOT 4 brake fluid.

Coolant level—should be between MAX and MIN marks on expansion tank. If necessary fill with a mixture of 50% anti-freeze and 50% water.

Washer fluid reservoir—fill with water and solvent (wintertime: windshield washer anti-freeze).

Battery acid level—should be 3/8" (5-10 mm) above the cell plates. If necessary top up with distilled water. Cars with "low maintenance" battery: check level in conjunction with normal service or once a year.

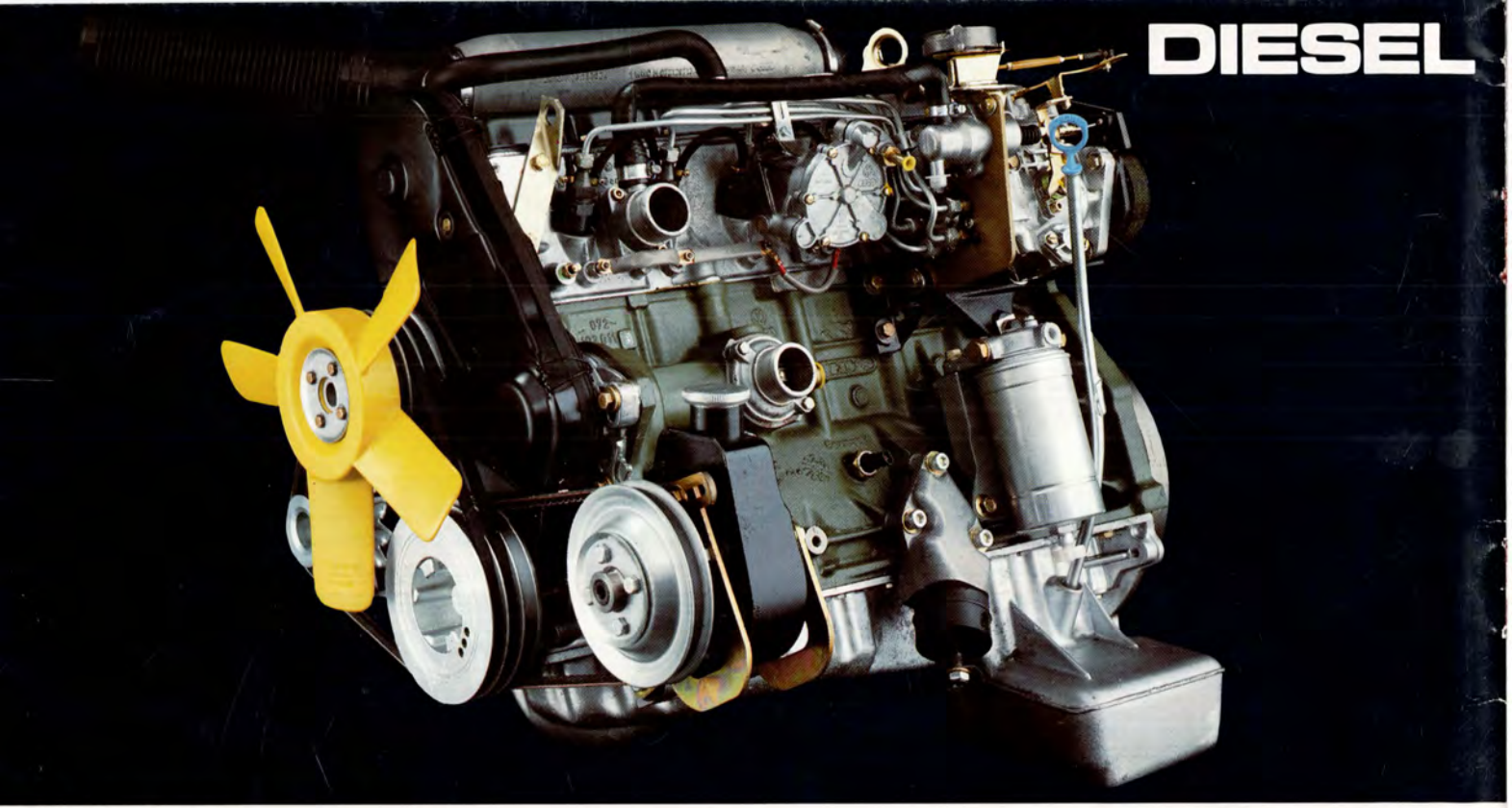
Tire pressure, psi (kPa), cold tires

Car Model	Tire	1-3 persons		Full load	
		Front	Rear	Front	Rear
4 door models	185/70 R14	27 (190)	27 (190)	27 (190)	32 (230)
Wagon models	185 R14	27 (190)	30 (210)	28 (200)	40 (280)

Fuel: Diesel fuel No. 2

See sections titled "Fuel system" and "Specifications".

Consult the Owner's Manual for additional information on changing bulbs, fuses, wheels, etc.



VOLVO

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