

SECTION 1

**SERVICE AND MAINTENANCE**

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## GROUP 12

# LUBRICATION

## OIL LEVEL CHECKS AND OIL CHANGES

### ENGINE

The oil level is checked with the dipstick, see Fig. 1-15.

With a new or reconditioned engine, the oil should be changed after the first 2 500 km (1 500 miles). Thereafter the oil should be changed every 10 000 km (6 000 miles), or at least twice a year, whichever comes first.

The oil should be drained immediately after the car has been driven and while the engine is still warm. To drain the oil, remove the oil drain plug, see Fig. 1-1.

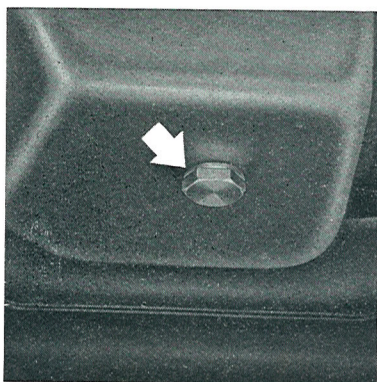


Fig. 1-1. Drain plug on sump

When the engine has been emptied of oil, check the washer and screw the plug tightly into position again. Oil is added through the rocker arm casing after removing the filler cap.

Oil with grade designation API "For Service SD, SE and CC" is used for the engine. The previous designation "For Service MS" can also be used. Choose a multigrade oil according to the following table:

Temperature range	Viscosity
SUMMER (above $-12^{\circ}\text{C} = +10^{\circ}\text{F}$ )	20 W-40 or 20 W-50
WINTER (below $-12^{\circ}\text{C} = +10^{\circ}\text{F}$ )	10 W-30

At very low temperatures (below  $-18^{\circ}\text{C} = 0^{\circ}\text{F}$ ) or when cold-starting difficulties are anticipated, mul-

tigrade oil SAE 5 W-20 is recommended. This oil should not be used when the temperature is continuously above  $0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ).

The quantity of oil changed is  $3.25 \text{ dm}^3$  (2.9 Imp. qts = 3.4 US qts.) With the oil filter included, the corresponding quantity is  $3.75 \text{ dm}^3$  (3.3 Imp. qts = 4.0 US qts.)

### Carburetors

Each time the oil in the engine is changed, check the oil level in the center spindle of the carburetors to see that it is about 6 mm ( $1/4''$ ) from the top of the spindle. If it is not, fill up with ATF oil.

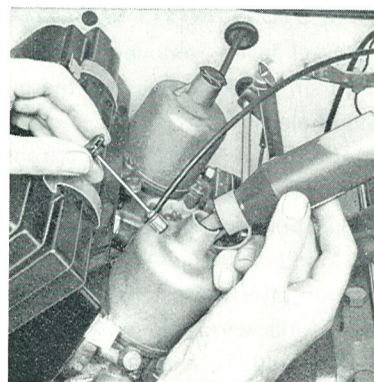


Fig. 1-2. Checking center spindle oil level

### TRANSMISSION (WITHOUT OVERDRIVE)

To check the oil level in the transmission, remove the filler plug (1, Fig. 1-3) and see whether the oil reaches up to the plug hole.

In the case of a new or reconditioned transmission the oil should be changed and the transmission flushed out after the first 2 500 km (1 500 miles). The oil should be subsequently changed after every 40 000 km (24 000 miles).

The oil should be drained immediately after the car has been driven and while the oil is still warm. When draining the oil, remove the plugs marked 1 and 2 in Fig. 1-3.

Fill new oil after the drain plug (2) has been screwed tightly back into position. The oil should reach up to the filler hole (1). Screw the filler plug tightly back into position.

Gear oil SAE 80 is used for the transmission all the year round. As an alternative, engine oil, with vis-

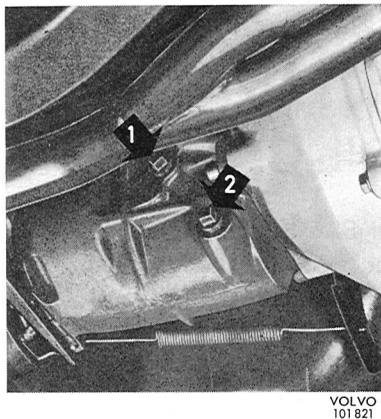


Fig. 1-3. Transmission

1. Filler plug 2. Drain plug

cosity SAE 30, can be used all the year round. The quantity of oil changed is  $.75 \text{ dm}^3$  (.7 Imp. qts = .8 US qts).

## TRANSMISSION WITH OVERDRIVE

To check the oil level, remove the filler plug (1, Fig. 1-3) and then check to see that the oil reaches up to the plug hole.

In the case of a new or reconditioned transmission, the oil should be changed after the first 2 500 km (1 500 miles). Subsequent oil changes should be every 40 000 km (24 000 miles).

Drain the old oil after the car has been driven and while the oil is still warm. Observe due care since the hot oil can scald. To empty the oil, remove the plugs (1 and 2, Fig. 1-3) and the cover (Fig. 1-4).

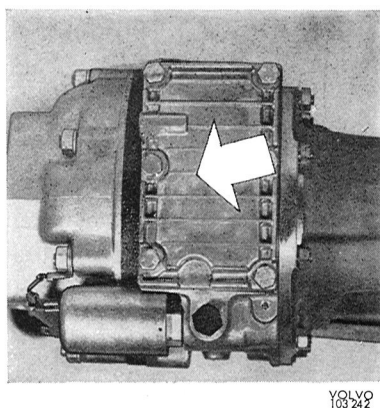


Fig. 1-4. Overdrive

Also clean the oil filters, see Group 43 B. Re-install the drain plugs and bolt on the cover securely. Fill new oil. Fill slowly to enable the oil to run over into the overdrive. The oil should be up to the filler hole (1, Fig. 1-3). Screw tight the filler plug. Engine oil with viscosity SAE 30 is used all the year round

for transmissions with overdrive. As an alternative, multigrade oil SAE 20 W-40 can be used. The oil change quantity is  $1.6 \text{ dm}^3$  (1.4 Imp. qts = 1.7 US qts).

## AUTOMATIC TRANSMISSION

Normally the oil in the automatic transmission only needs to be changed when the transmission is reconditioned. The oil level, on the other hand, should be checked after every 10 000 km (6 000 miles).

When checking the oil level, make sure that the vehicle is on level ground. Move the selector lever to position "P" and let the engine run at idle. The filler pipe with dipstick is located in front of the bulkhead on the right-hand side of the engine. Wipe off the dipstick with a cloth or piece of paper. Do not use waste or fluffy rags. Insert the dipstick, pull it up and check the oil level, see Fig. 1-5.

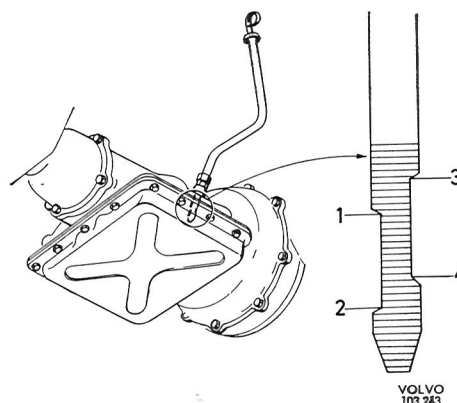


Fig. 1-5. Checking oil level

1. Max. oil level, cold transmission
2. Min. oil level, cold transmission
3. Max. oil level, warm transmission
4. Min oil level, warm transmission

**Note that there are different levels for a warm and cold transmission.** For a warm transmission, which is the case after driving about 8—10 km (5—7 miles) the upper section applies (3 and 4, Fig. 1-5). The lower section (1 and 2, Fig. 1-5) applies to a cold transmission. The text on the dipstick will also remind you of this.

If necessary, fill with oil up to the "Max" mark. Do not go above this mark, as this can cause the transmission to eventually overheat. The difference between the "Min" and "Max" marks is about  $.5 \text{ dm}^3$  (1 pint). For topping-up, use Automatic Transmission Fluid, ATF, Type F, that is, a fluid meeting Ford specification M2C 33F. Frequent filling up of the transmission indicates leakage which must be put right immediately.



## FINAL DRIVE

To check the oil level, remove the filler plug (1, Fig. 1-6) and then check to ensure that the oil reaches up to the hole for the plug.

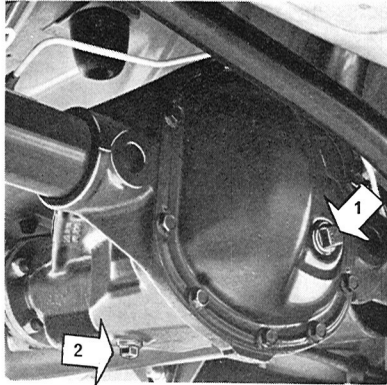


Fig. 1-6. Final drive

1. Filler plug 2. Drain plug

With a new or reconditioned final drive, the oil should be changed after the first 2 500 km (1 500 miles). Oil changing should thereafter be made only when overhauling is being done.

The oil should preferably be changed immediately after the vehicle has been driven and while the oil is still warm. When draining the oil, remove the plugs marked 1 and 2 in Fig. 1—6. Clean the magnetic plug (2) well. It is of great importance for the lifetime of the final drive that particles and other impurities accumulated during the running-in are removed.

Fill new oil after the drain plug has been screwed tightly back into position.

The oil should be up to the filler hole and the quantity of oil changed is about 1.3 dm<sup>3</sup> (1.2 Imp. qts = 1.4 US qts). Oil which meets the requirements of the American Military Standard MIL-L-2105 B, SAE 90, is used as changing oil in the final drive. A final drive fitted with a limited slip is filled at the factory with a transmission fluid which meets the requirements of the American Military Standard MIL-L-2105 B provided with an additive for final drives with limited slip. For subsequent topping-up and when changing, oil is according to MIL-L-2105 B having the above-mentioned additive. The oil level should be checked and the oil changed at the same intervals and in the same way as for a final drive without a limited slip.

## STEERING GEAR, MECHANICAL STEERING

To check the oil level in the steering gear, remove the filler plug (Fig. 1-7) and then check to ensure that the oil is up to the hole for the plug.

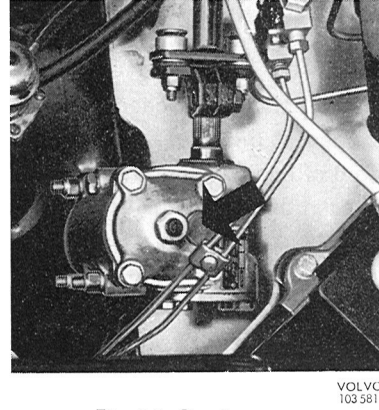


Fig. 1-7. Steering gear

Normally it is not necessary to change oil in the steering gear except after reconditioning. However, should the oil have to be changed for any reason, the old oil can be sucked out by using a suitable device, for example, an oil syringe, which is inserted through the filler hole. The steering gear can also be removed and emptied. Hypoid oil SAE 80 is used all the year round for the steering gear.

When empty, the steering gear can be filled with .25 dm<sup>3</sup> (1/2 pint).

## POWER STEERING

### OIL LEVEL CHECK

The oil level should be checked every 10 000 km (6 000 miles). First check the level with the engine stopped to check possible oil loss. The oil level

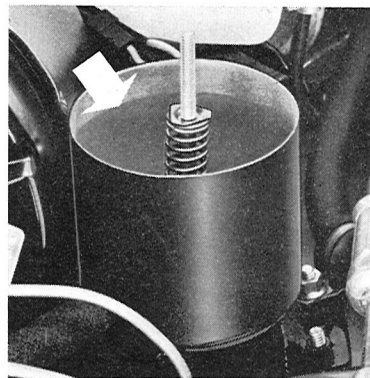


Fig. 1-8. Oil level

should then lie approx. 5—10 mm (5/8") above the level mark. If the level is lower than this, fill oil with the engine stopped to eliminate the risk of air being sucked in. Start the engine and re-check the oil level, which should now have fallen to the level mark, see Fig. 1-8. When the engine has stopped, the level should rise to approx. 5—10 mm (5/8") above the mark.

### OIL CHANGING

Normally the oil should be changed in connection with replacement of the power steering components, see Section 6 of this Service Manual. On this occasion, the filter in the oil container should be changed.

## CHECKING BRAKE FLUID LEVEL

This check can be made without removing the filler cap (Fig. 1-16). If the check is made in connection with a shop visit, brake fluid should be added if the level is lower than the "Max" mark. Under no circumstances may the level be allowed to remain below the "Min" mark.

If necessary, top up with first-class brake fluid which meets the requirements according to DOT 3 or DOT 4 (previously SAE J 1703).

Clean the brake fluid container cap before removal and observe maximum cleanliness when filling brake fluid. Avoid spilling fluid on the paint, since this will damage it. Check to make sure that the vent hole in the cap is not blocked.

## LUBRICATION

### DISTRIBUTOR

Lubricate the distributor after every 10 000 km (6 000 miles). The distributor shaft is lubricated by filling the oil cup (3, Fig. 1-9) with engine oil. After filling, close the cup. The contact surface of the cam (2) is lubricated with a thin coating of grease, Bosch Ft 1 v 4, or similar "Cam Grease". The ignition advance mechanism is lubricated by pouring 2—3 drops of light engine oil (SAE 10 W) on the wick (1) in the distributor shaft.



Fig. 1-9. Distributor

1. Lubricating wick    2. Cam disc    3. Oil cup

### BALL JOINTS

The upper and lower ball joints of the front end together with the ball joints of the tie rod and steering rod are plastic-lined. Therefore, they do not require lubricating and thus have no grease nipples.

As the sealing is extremely important for the service life of these ball joints, the rubber seals should be checked every 10 000 km (6 000 miles) to ensure that they are not damaged. If the seals are cracked or damaged the ball joints should be replaced, see Section 6.

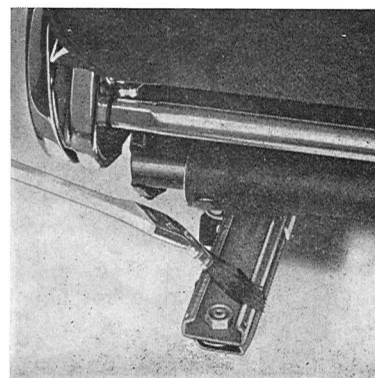
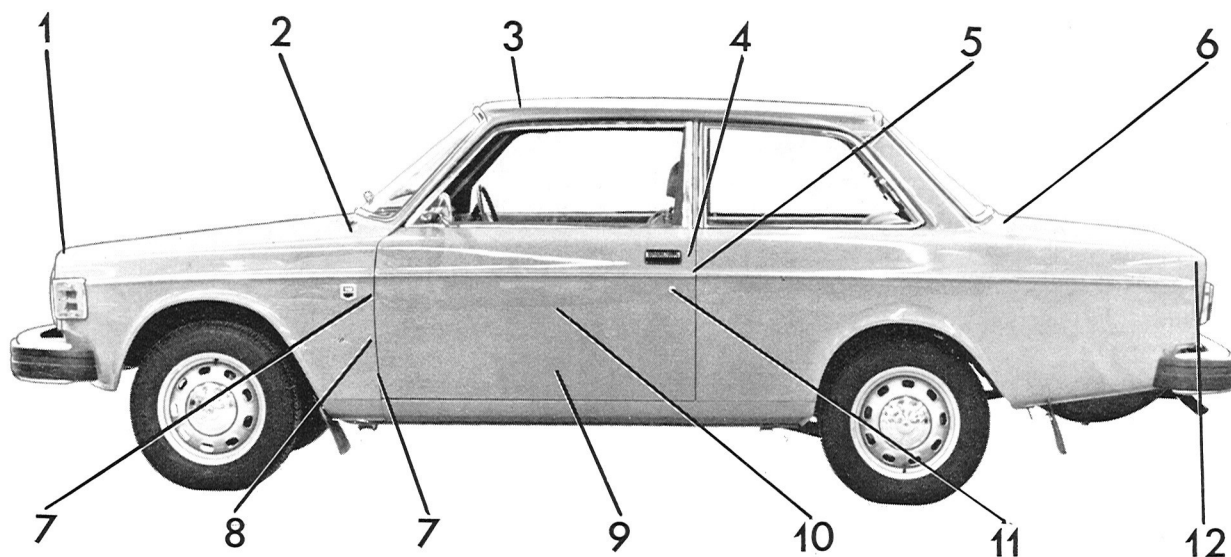


Fig. 1-10. Lubricating slide rails

### BODY

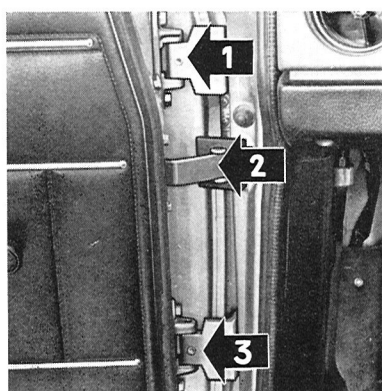
To avoid squeaking and unnecessary wear, the body should be lubricated as described in the lubricating schedule on next page. Nos. 2, 7, 9 and 10 of the schedule concern lubrication approx. every 10 000 km (6 000 miles) and other parts of the body about once a year. Moreover, during winter the door handles and trunk lid lock should be lubricated with a suitable lock oil which would prevent them from freezing up.



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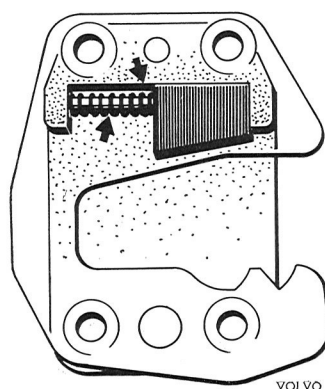
Fig. 1-11. Lubricating points on body

No. Lubricating point	Lubricant	No. Lubricating point	Lubricant
1 Hood catch .....	Paraffin wax	Locks .....	Silicon grease
2 Hood hinges .....	Oil	(Accessible after door upholstery panels have been removed).	
3 Sun roof wind deflector .	Oil		
4 Outer sliding surface of door lock .....	Paraffin wax	9 Front seat runners and catches	Paraffin wax and oil
5 Striker plate .....	See Fig. 1-13	10 Window winders .....	Oil and grease
6 Trunk lid hinges .....	Oil	11 Key holes .....	Lock oil
7 Door hinges .....	Grease	12 Trunk lid lock .....	Oil
8 Door stops .....	Paraffin wax	Key holes .....	Lock oil



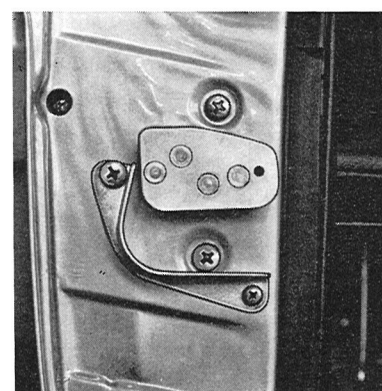
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Fig. 1-12. Hinges  
1. and 3. Hinges      2. Door stop



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Fig. 1-12. Striker plate  
Inner sliding surfaces, spring and pin lubricated with molybdenum disulphide grease



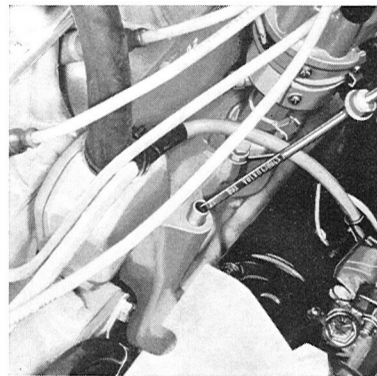
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Fig. 1-14. Door lock with guide plate  
Apply paraffin wax

## CHECKS WHEN FILLING TANK

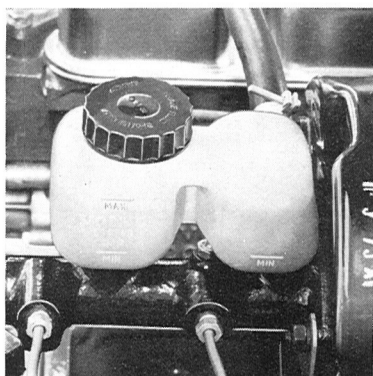
Make following checks when filling tank:

1. Check that oil level in engine is between "Max" and "Min" marks on the dipstick (see Fig. 1-15).
2. Without removing the cap, check that the level in the brake fluid container is above the "Min" mark (see Fig. 1-16).
3. Check that coolant level is between the "Max" and "Min" marks on the expansion tank (see Fig. 1-17).
4. Check that the fluid container for the windshield washer is filled (see Fig. 1-18).



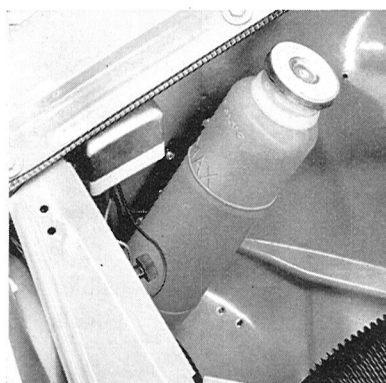
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Fig. 1-15. Oil dipstick



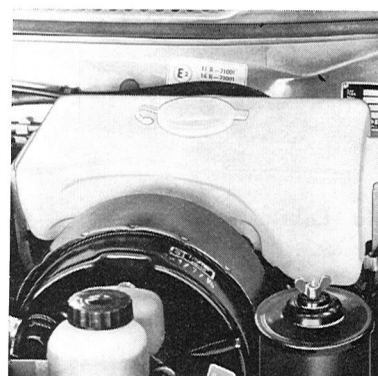
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Fig. 1-16. Brake fluid container



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Fig. 1-17. Expansion tank

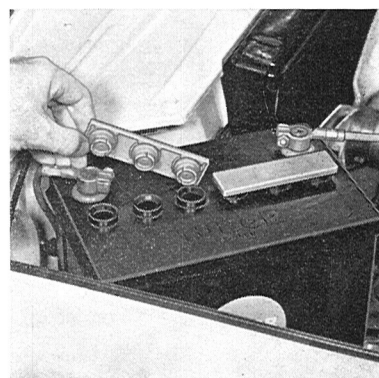


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Fig. 1-18. Fluid container

The following checks should be made every other week:

1. Check that electrolyte level in battery is approx. 5 mm (3/16") above the plates (see Fig. 1-19). If necessary top up with **distilled** water. Also check that the battery and battery terminals are secure.
2. Check that the tire pressure corresponds to the following values:



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Fig. 1-19. Battery

Recommended tire pressures

Model	Tire size	Recommended tire infl. pressure cold tires, kp/cm <sup>2</sup> (psi)				Max. permitt. inflation pressure kp/cm <sup>2</sup> (psi)
		1—3 persons		Full load		
		Front	Rear	Front	Rear	
142, 144	165R15 C78-15 (4PR)	1.8 (26)	1.9 (27)	1.9 (27)	2.2 (32)	2.5 (36)
		1.5 (21)	1.6 (23)	1.6 (23)	2.1 (30)	2.3 (32)
145	175R15 C78-15 (8PR)	1.7 (25)	1.8 (26)	1.8 (26)	2.8 (40)	2.8 (40)
		1.5 (21)	1.8 (26)	1.6 (23)	2.7 (38)	2.8 (40)






For sustained high speed driving over 120 kmph (75 mph), cold inflation pressure must be increased

.28 kp/cm<sup>2</sup> (4 psi), but not exceed the maximum permitted inflation pressure.



## INSTRUCTIONS FOR LUBRICATING CHART

### SYMBOLS

-  **Engine oil**  
 Grade: "For Service SD, SE and CC" (MS)  
 Viscosity: See page 1:1
-  **Final drive oil**  
 Grade: MIL-L-2105 B  
 Viscosity: SAE 90  
 Lubrication for final drive with limited slip: see page 1:3
-  Lubricant: see corresponding note.
-  Light engine oil
-  Brake fluid  
 Grade: DOT 3 or DOT 4  
 (previously SAE J 1703)

### OIL CHANGING QUANTITIES

Engine,	
oil	approx. 3.25 dm <sup>3</sup>
quantity	(2.9 Imp. qts = 3.4 US qts)
including oil	approx. 3.75 dm <sup>3</sup>
filter	(3.3 Imp. qts = 4.0 US qts)
Transmission,	
without	approx. .75 dm <sup>3</sup>
overdrive	(.7 Imp. qts = .8 US qts)
with overdrive	approx. 1.6 dm <sup>3</sup>
	(1.4 Imp. qts = 1.7 US qts)
Automatic	approx. 6.4 dm <sup>3</sup>
transmission	(5.6 Imp. qts = 6.8 US qts)
Final drive	approx. 1.3 dm <sup>3</sup>
	(1.1 Imp. qts = 1.4 US qts)
Steering gear	approx. .25 dm <sup>3</sup>
	(.2 Imp. qt = .25 US qt)

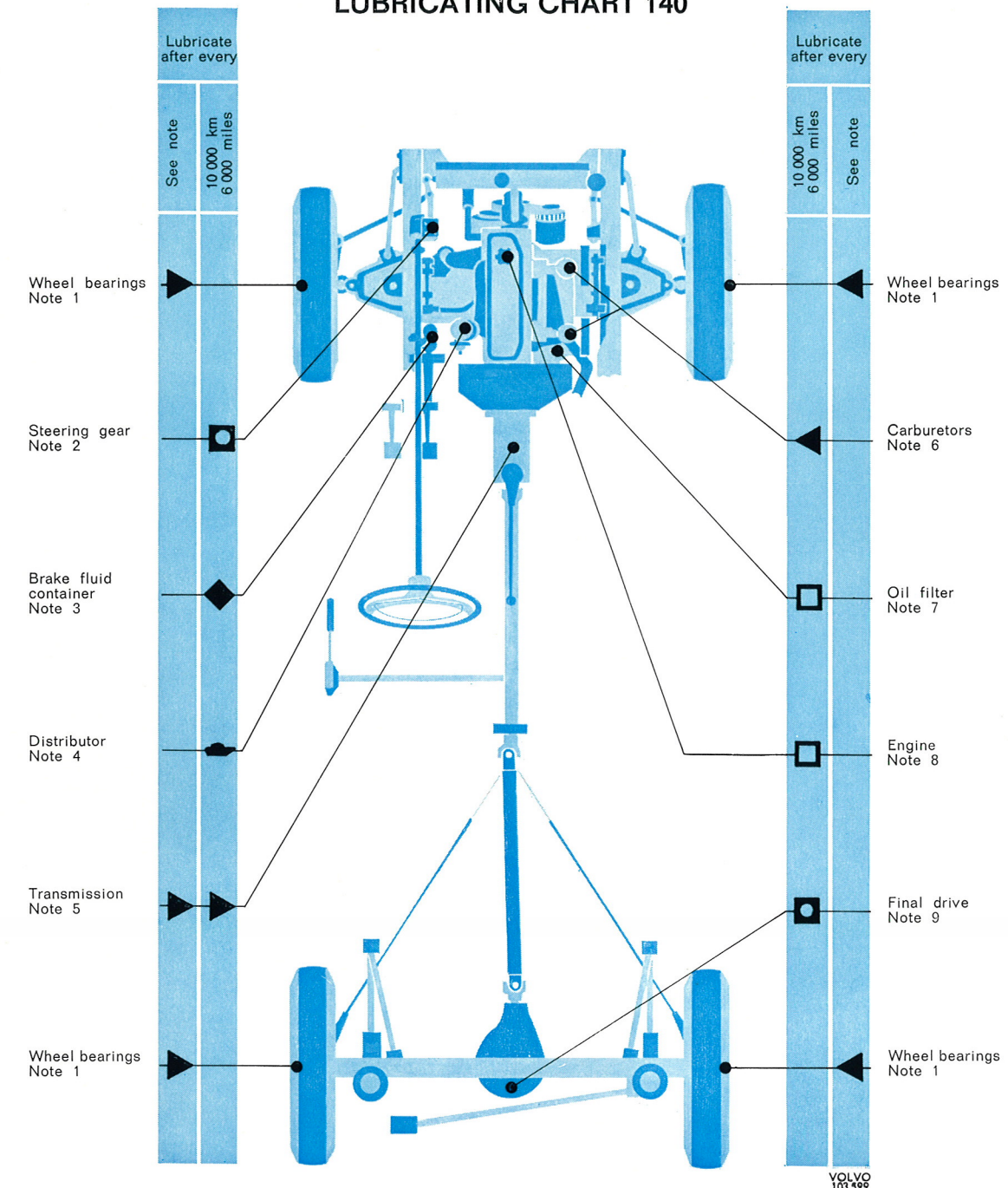
### OTHER LUBRICATING POINTS

In addition to the points indicated in the lubricating chart, the chassis should be greased about once a year at all the joints for throttle control linkage, parking brake, pedal linkages, etc. Certain checks should also be carried out when filling the tank, see page 1:6.

### NOTES

- Note 1. In connection with such shop operations involving uncovering wheel bearings, the bearings should be removed, cleaned and then lubricated with high-class durable grease according to the instructions in Groups 46 and 77 respectively. Additional filling or replacement of grease should not be made.
- Note 2. Check oil level. See page 1:3.
- Note 3. Check brake fluid level. See page 1:4.
- Note 4. Lubricate distributor in accordance with instructions on page 1:4.
- Note 5. Every 10 000 km (6 000 miles) check that the oil reaches up to filler plug. After every 40 000 km (24 000 miles) the oil should be changed (manual transmission). NOTE: The grade of oil to be used depends on the type of transmission, see pages 1:1 and 1:2.
- Note 6. Check oil level in the carburetors when changing the engine oil, see page 1:1.
- Note 7. Change oil filter completely according to instructions in Section 2.
- Note 8. Change oil according to instructions on page 1:1.
- Note 9. Every 10 000 km (6 000 miles) check that the oil reaches up to filler plug. Concerning lubricant for the final drive with limited slip, see page 1:3.

## LUBRICATING CHART 140







## GROUP 15

# SERVICING AND MAINTENANCE

## SERVICING B 20 WITH CI

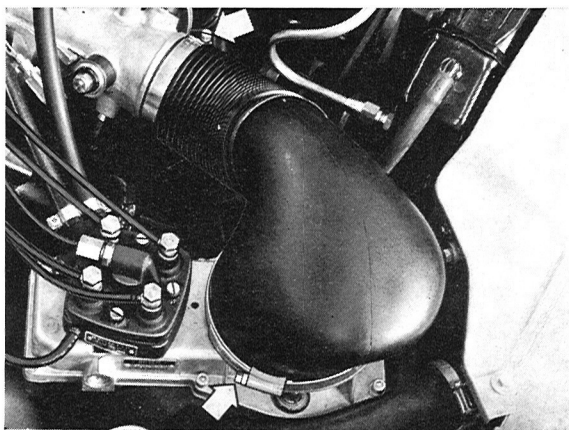
Inspection (major tuning), CI engine, Volvo Standard Times: Op. No. 15108:

Includes all inspection points, except corrections. Maintenance Inspection, CI engine, includes inspection points marked \*.

The Inspection (major tuning) is supposed to be performed when there is a problem which cannot be pinned down to a certain fault.

The Maintenance Inspection is supposed to be performed when a customer wants a check-up, like before a vacation trip.

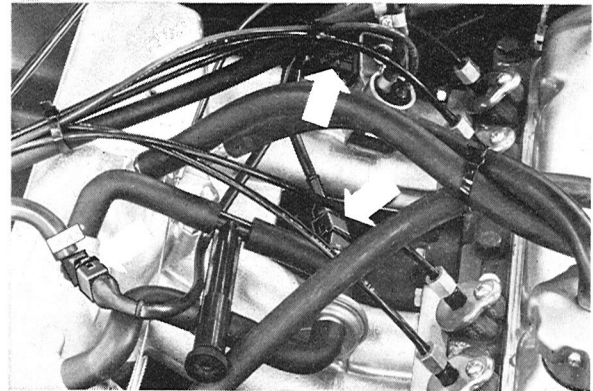
NOTE: The engine should before inspection, Op. No. 15108, have been shut off for so long time that it has cooled down and reached the ambient temperature.



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Fig. 1-20. Removing rubber bellow

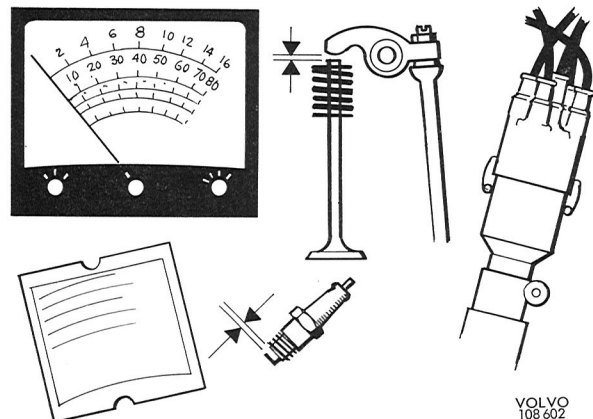
- \* 1. Remove the rubber bellow, see Fig. 1-20. Disconnect the wires at:  
cold start injector  
control pressure regulator  
auxiliary air valve
- \* 2. Remove, check and clean distributor cap with high tension wires and rotor. Replace defective parts.
- \* 3. Check breaker points and distributor shaft play and breaker plate play. Lubricate the distributor. Replace defective parts.



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Fig. 1-21. Disconnecting wires

- \* 4. Remove spark plugs and valve cover. Adjust valves.
- \* 5. Clean valve cover, check gasket, install gasket and cover.
- \* 6. Connect a remote control starter switch and make a compression test.
- \* 7. Switch on the ignition. Connect a dwell angle meter and check/adjust dwell angle. Switch off the ignition.
- \* 8. Check/adjust/replace spark plugs.
- \* 9. Install: spark plugs, rotor, distributor cap with ignition wires.



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Fig. 1-22. Inspection (points 2-9)

- \*10. Check the rest position of the air flow sensor plate, see Fig. 1-23. The upper surface should be in level with or not more than 1 mm below the air venturi lower edge. Adjust if necessary.

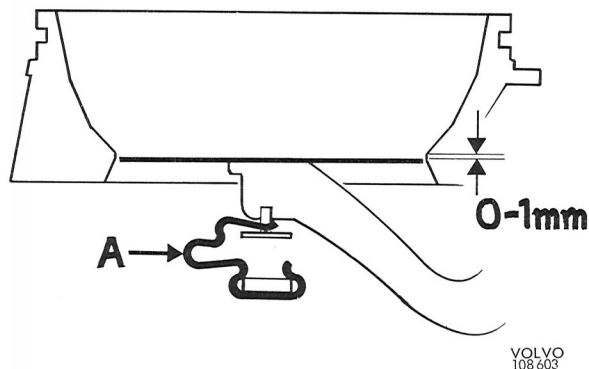


Fig. 1-23. Air flow sensor plate rest position  
A. Tool for adjustment

- \*11. Check that the air flow sensor plate is centered in the air venturi and does not touch the wall at any point. See Fig. 1-24.

**For adjustment:**

loosen the center screw and align the plate.

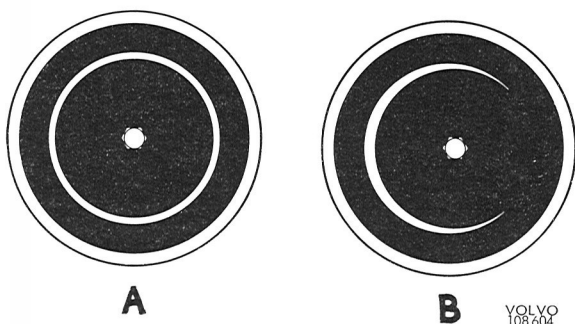


Fig. 1-24. Centering air flow sensor plate  
A. Correct B. Incorrect

- \*12. Remove the air cleaner upper part with the air-fuel control unit.  
\*13. Lift the air flow sensor plate to check for seizure, see Fig. 1-25.

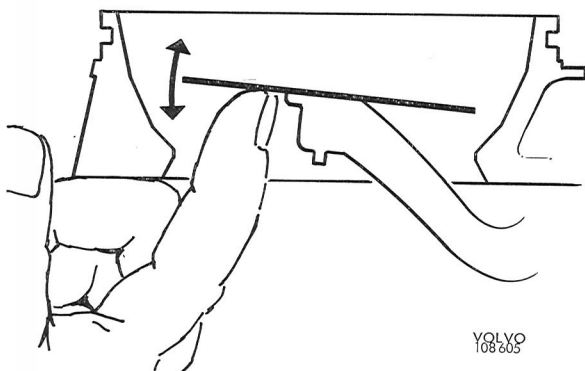


Fig. 1-25. Checking seizure

NOTE: The control pressure causes a resistance to movement which must not be confused with a seizure.

**Possible seizure causes:**

- A. The lever seizes in the housing
- B. The lever pivot shaft seizes in the housing
- C. Dirt in the fuel distributor (remove piston and clean).

- \*14. Check/replace air filter. Re-install air filter upper part.  
\*15. Check that the throttle plate:  
is tightened to the shaft  
does not seize  
closes completely  
touches the full throttle stop when the throttle pedal is fully depressed.  
Adjust if necessary, see Fig. 1-26:

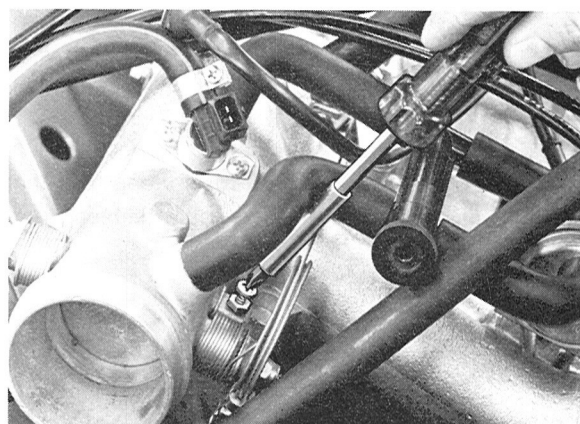


Fig. 1-26. Throttle plate adjustment

Loosen the lock nut.

Screw out the adjustment screw until it is free from the boss.

Screw it down again until it just touches the boss.

Screw down another 1/4 turn and lock the lock nut.

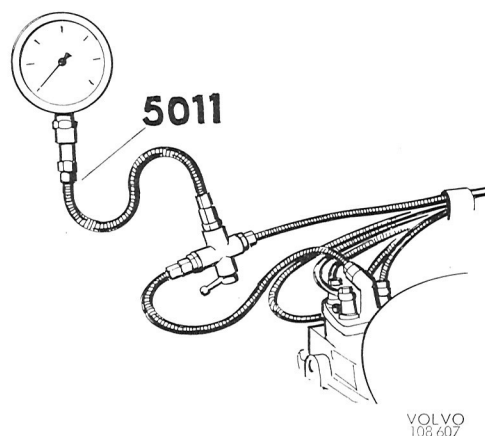


Fig. 1-27. Connection of pressure gauge

- \*16. Connect pressure gauge 5011 to the fuel distributor and the line to the control pressure regulator, see Fig. 1-27. Turn the valve lever to position 1 (pointing towards the fuel distributor) to test the line pressure. Switch on the ignition. Start the fuel pump by disconnecting the wires at the air flow sensor terminal, see Fig. 1-28.

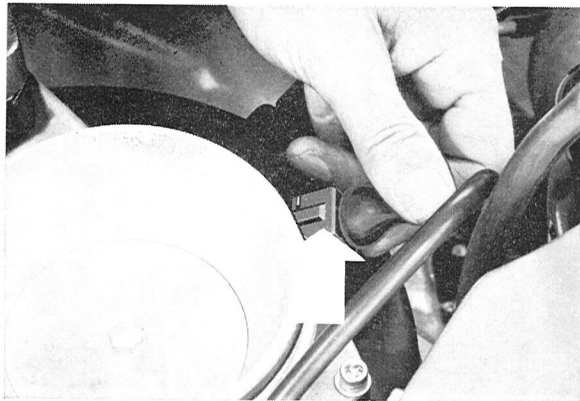


Fig. 1-28. Removing wire

- \*17. The line pressure reading should be  $4.5\text{--}5.2\text{ kp/cm}^2 = 64\text{--}74\text{ psi}$ .

**Incorrect pressure, too low:**

- A. Fuel line leakage. Check and correct.  
B. The pump pressure is too low. Check by slowly blocking the fuel return line until pressure increases to maximum  $5\text{ kp/cm}^2 = 71\text{ psi}$ . The pump is defective or the tank filter clogged if this pressure is not achieved.

NOTE: Be careful, as some components may get damaged at pressures in excess of  $5\text{ kp/cm}^2 = 71\text{ psi}$ .

- C. Line pressure regulator defective.

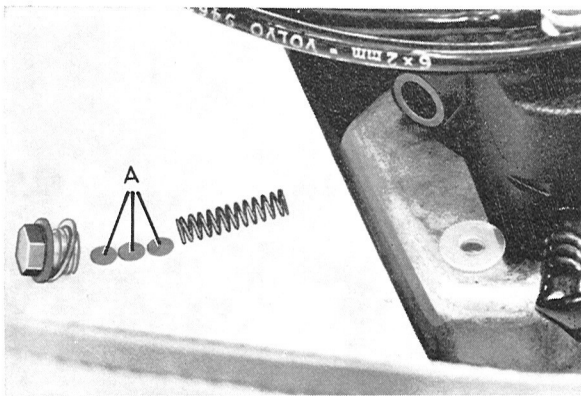


Fig. 1-29. Line pressure adjustment  
A. Shims

Adding a .5 mm shim increases the pressure approx.  $.3\text{ kp/cm}^2 = 4.3\text{ psi}$ , a .1 mm shim  $.06\text{ kp/cm}^2 = 1.4\text{ psi}$ . Note that also

the rest pressure is affected, see point 27. If addition of shims does not remedy the problem, the fuel distributor must be replaced.

**Incorrect pressure, too high:**

- A. Fuel return line clogged or kinked. The fuel return line is completely blocked between the control pressure regulator and the tank if line pressure = control pressure.

If these pressures are not equal, check the fuel return line from the fuel distributor to the control pressure regulator.

- B. Line pressure regulator defective. Remove shims, see C above. If this does not help, replace fuel distributor.

If the fuel pump runs but there is no line pressure, the cause may be clogged lines, filters or fuel distributor.

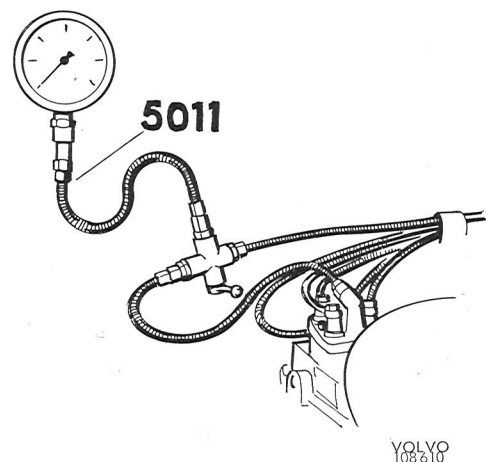


Fig. 1-30. Test of control pressure

- \*18. Turn the valve lever to position 2 (the valve lever in right angle to the fuel distributor) to test the control pressure, see Fig. 1-30.

Read the control pressure at cold engine (ambient temperature). Find the correct control pressure corresponding to the ambient temperature in the chart, Fig. 1-31.

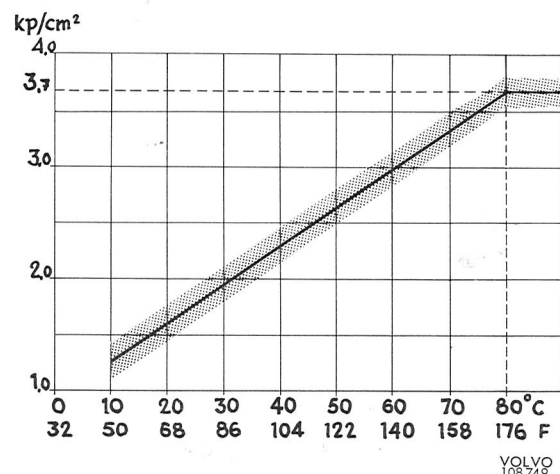
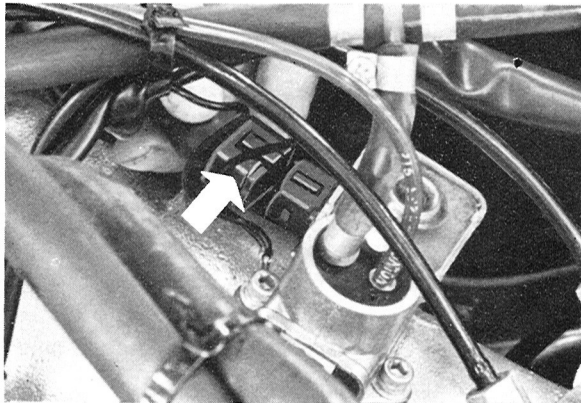


Fig. 1-31. Control pressure chart

The control pressure should, for instance, be  $1.6 \text{ kp/cm}^2$  ( $1.45\text{--}1.75$ )  $\text{kp/cm}^2$  at  $+20^\circ\text{C} = 68^\circ\text{F}$ .

**If the pressure is too low**, try a new regulator.

**If the pressure is too high**, check the fuel return line. If it is in order, try a new regulator.



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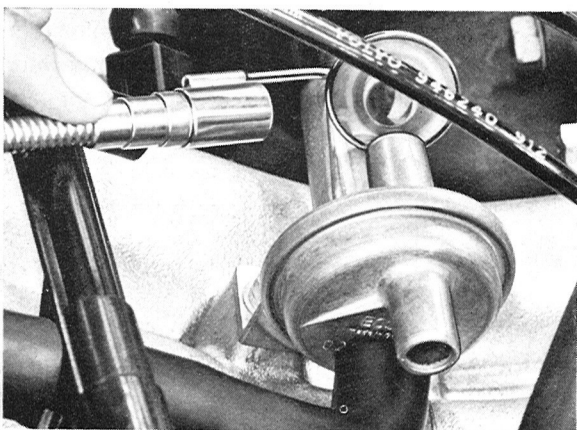
Fig. 1-32. Connecting terminal at control pressure regulator

19. Connect the wire at the control pressure regulator terminal. The control pressure should increase to  $3.7$  ( $3.5\text{--}3.9$ )  $\text{kp/cm}^2 = 50\text{--}55.4$  psi in three minutes.

In the meantime, continue with inspection points 20—23.

20. Remove the hoses at the auxiliary air valve. Check that the valve is open. The valve is half way open at  $+20^\circ\text{C} = 68^\circ\text{F}$ . The valve is completely closed when the engine is hot. Use a light and an inspection mirror for the check, see Fig. 1-33.

**Replace a defective valve.**



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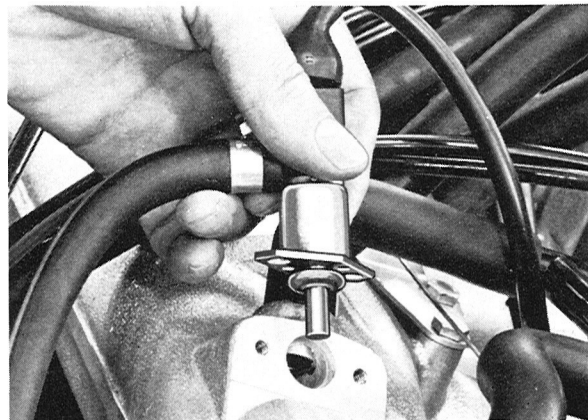
Fig. 1-33. Checking auxiliary air valve

21. Re-connect the auxiliary air valve terminals. The valve should be completely closed in 5 minutes.

In the meantime, continue with inspection points 22-24.

- \*22. Re-connect the cold start injector terminals. Then remove the cold start injector and check for leaks, see Fig. 1-34.

**Replace a leaking injector.**



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Fig. 1-34. Checking cold start injector

23. Remove the injectors and check for leaks in the fuel distributor. The injectors may get wet but are not allowed to drop, see Fig. 1-35.

**Leaking injectors:**

A fuel distributor plunger seizure causes all injectors to drop. Remedy: disassemble and clean the fuel distributor.

The cause may also be defective plunger O-rings. This warrants a replacement of the fuel distributor.

If only one injector drops, proceed to inspection point 28.



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Fig. 1-35. Checking the fuel distributor for interior leaks.

- \*24. Check that the control pressure has increased to  $3.7 \pm .2 \text{ kp/cm}^2 = 50\text{--}55.4$  psi.

**Incorrect control pressure:**

If the control pressure remains unchanged, use a test light to check that the wire connections are live. The wires are defective if not live.

If the wires are live but the pressure remains unchanged, replace the control pressure regulator.

If the control pressure has increased but is incorrect, replace the control pressure regulator.

25. Check that the auxiliary air valve has changed position, see inspection points 20 and 21.

**If the valve has not closed:**

A. Tap lightly on the valve. It is correct if it closes. The engine vibrations normally cause the valve to close. If it does not close when tapped, replace the valve.

B. Use a test light to check that the wire connections are live.

If not, the wires are defective.

If the wires are live but the valve does not close, replace the valve.

26. Re-connect:

1. The hoses at the auxiliary air valve.

- \* 2. The wires at the air flow sensor, which should cause the pump to stop., see Fig. 1-36.



Fig. 1-36. Connecting terminal, air flow sensor

**If the fuel pump does not stop:**

The terminal is defective if the pump stops when the terminal is grounded.

The safety relay is defective and should be replaced.

NOTE: do not confuse the relays. The safety relay is the one missing a black ground wire.

27. Check the rest pressure, which should be 1.7—2.4 kp/cm<sup>2</sup> = 24—34 psi.

If it is incorrect, but constant, the line pressure regulator should be adjusted, see inspection point 17. If the regulator cannot be adjusted to correct pressures, it should be replaced.

The rest pressure should remain unchanged for at least one minute.

**If the pressure declines, the cause may be:**

A. Defective control pressure regulator.

Turn the valve lever to position 3 (towards the control pressure regulator). If the pressure continues to drop, the valve or the line to it is leaking and should be replaced.

B. Defective line pressure regulator.

Block the fuel return line. If the pressure stops decreasing, the regulator or its O-ring is defective and should be replaced.

C. The fuel pump check valve leaks.

Turn the valve lever to position 2. Disconnect the terminal at the air flow sensor for a short while so that the pressure increases. Block the line from the tank to the pump. The fuel pump check valve is defective if the pressure drop stops.

D. Leaking fuel lines.

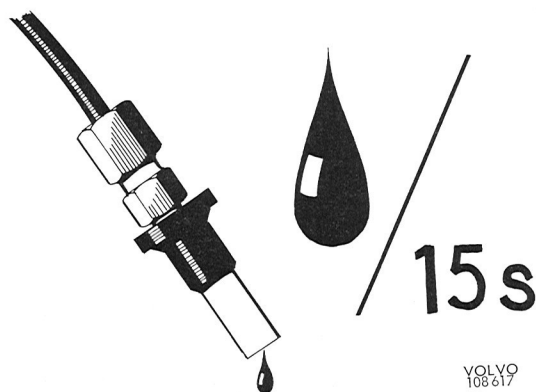


Fig. 1-37. Checking injectors for leaks

28. Switch off the ignition.

Check the injectors for leaks, see Fig. 1-37, at rest pressure by lifting the air flow sensor plate so that the fuel distributor slots are opened and fuel fed to the injectors.

The injectors may leak no more than 1 drop in 15 seconds.

**Replace injectors with excessive leaks.**

29. Switch on the ignition.

Place a pan under the cold start injector and check that the injector sprays when the starter operates, see Fig. 1-38.



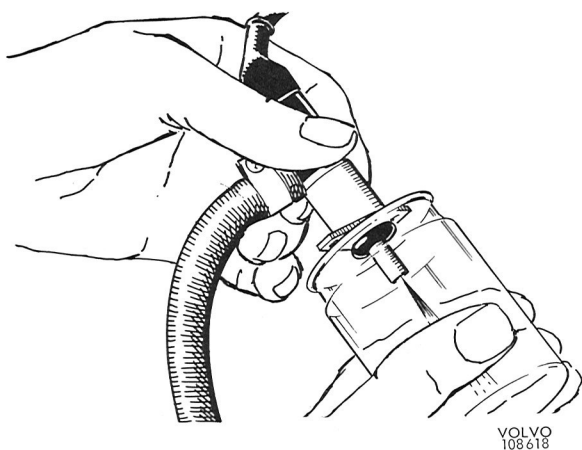


Fig. 1-38. Checking cold start injector

The cold start injector should spray for 12 seconds at  $-20^{\circ}\text{C} = -6^{\circ}\text{F}$ . The duration of the injection decreases when the temperature increases and there is no injection at all above  $+35^{\circ}\text{C} = +95^{\circ}\text{F}$ .

Re-install the cold start injector.

**If the cold start function is incorrect**, use a test light to check if the wire terminals are live when the starter operates.

If the function is incorrect, but the wires live, the injector is defective and should be replaced.

If the wires are dead, the wires or the thermal time switch may be defective, see Fig. 1-39.

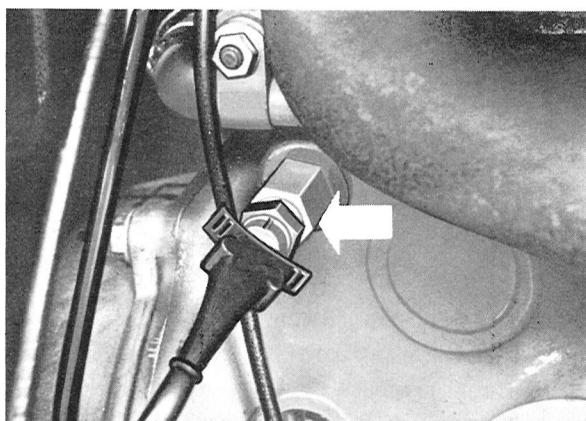


Fig. 1-39. Thermal time switch

30. Connect the injectors to the test equipment, see Fig. 1-40. Turn the valve lever to position 1.

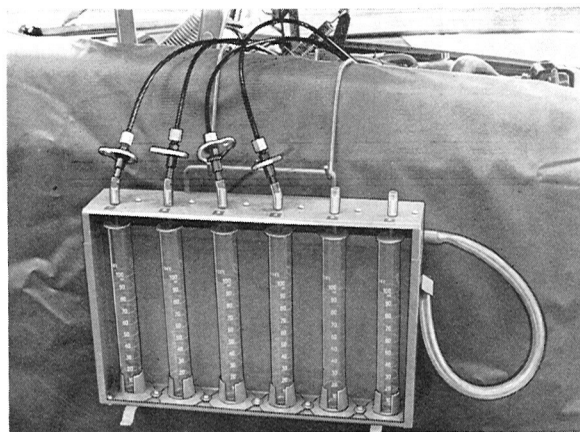


Fig. 1-40. Connection of test equipment

31. Check the fuel supply by lifting the air flow sensor plate to fully open position for 4 seconds, see Fig. 1-41. The line pressure may drop no more than  $.3 \text{ kp/cm}^2 = 4.3 \text{ psi}$ . Release the plate.

**Causes to a pressure drop** of more than  $.3 \text{ kp/cm}^2 = 4.3 \text{ psi}$ :

- A. Clogged or leaking fuel lines or line filter, or tank filter.
- B. Insufficient pump capacity. Try a new pump.

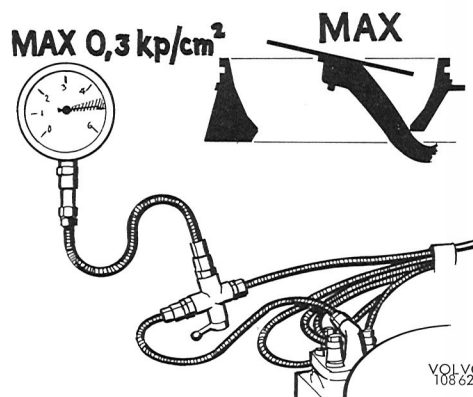


Fig. 1-41. Checking fuel supply

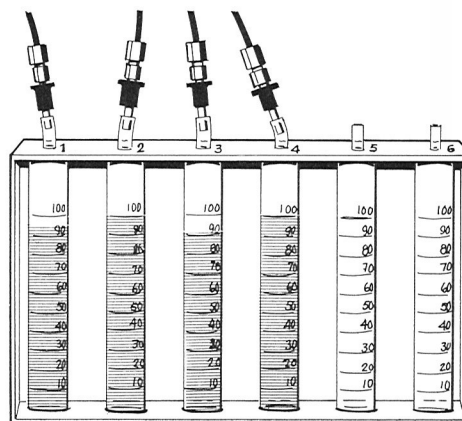
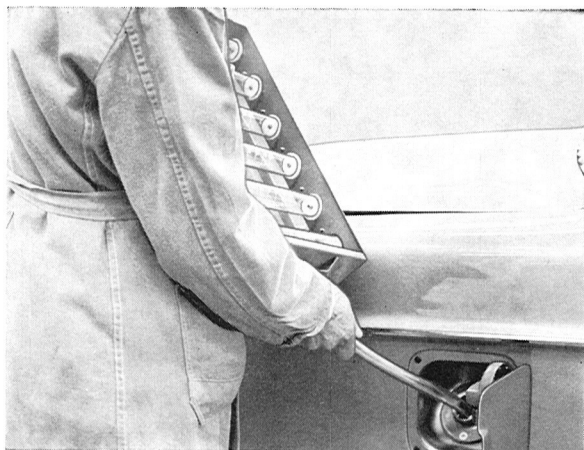


Fig. 1-42. Checking injected quantity



32. Lift the air flow sensor plate to an intermediate position and let the injectors spray until the level in one of the measuring glasses has reached the 100 cm<sup>3</sup> level. Then release the sensor plate so the injection ceases. The deviation in injected fuel quantity may not exceed 10—15 %, see Fig. 1-42. If one injector injects too little, swap its line from the fuel distributor (first check that the line is in order), and re-test.  
**The injector should be replaced** if the injected fuel quantity still is too small (and idle erratic). But it is more likely to find the fault in the fuel distributor if the other fuel injector injects too little at the re-test.
33. Disconnect the injectors from the test equipment and re-install them on the engine.
34. Remove the test equipment and re-fill the test fuel in the tank, see Fig. 1-43.



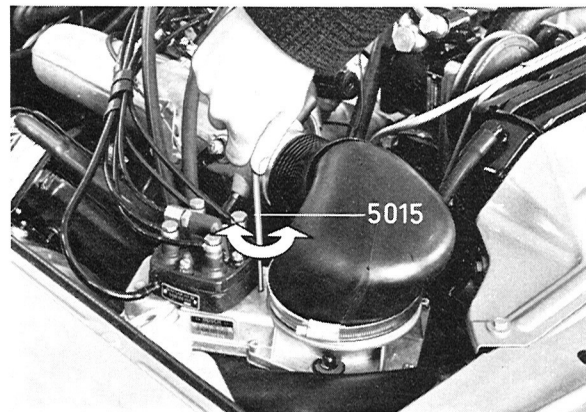
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Fig. 1-43. Restoring test equipment

- \*35. Re-install the rubber bellow (first check that rubber bellow and O-rings are in order).
- \*36. Disconnect the pressure gauge.  
Connect CO-meter and exhaust hose. Start the engine.
- \*37. Connect tachometer and timing light.  
Set the timing.  
Disconnect the timing light.
- \*38. Run the engine hot and check:  
that engine hoses and electrical connections are in order and correctly installed  
that fuel lines are tight and correctly connected  
that all components are tightly installed.  
Stop the engine.
39. Remove the cold start injector and place a pan under it.  
Operate the starter.

The cold start injector should not function (as the engine now is hot).

**If it injects** the thermal time switch is defective and should be replaced. Re-install the cold start injector and start the engine.



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Fig. 1-44. CO adjustment.

- \*40. Adjust CO and idle, see Fig. 1-44.  
The idle RPM should be:  
800 rpm (13.3 r/s) for vehicles with automatic transmission  
900 rpm (15.0 r/s) for vehicles with manual transmission.  
Adjust Co to .5—3.0 % (USA 1.5 %).
- \*41. Stop the engine.  
Disconnect:  
Tachometer  
Remote control starter switch  
CO-meter  
Exhaust hose

