



# SERVICE MANUAL

TRUCKS

**L 385**

*Export Service Department*

AKTIEBOLAGET

**VOLVO**

GÖTEBORG, SWEDEN

is carried out after every 10,000 km (6,000 miles). If the vehicle is being run on dusty roads, however, cleaning must be carried out more often.

First remove the complete air cleaner and then unscrew the butterfly nut. When this is being done, the cover is removed and the filter element taken out. Empty out the oil and remove sludge by rinsing with gasoline or kerosene. The filter is then washed in gasoline which should be allowed to run off. Then refill up to the "Level" mark with oil of the same type being used in the engine.

## LUBRICATING SYSTEM

### Oil Pan

#### Inspection .....

The oil pan should be checked for cracks and dents. If the plating is buckled at the bolt holes it must be flattened out so that the contact surface against the cylinder block is absolutely level. Check that the threads on the drain plug and the hole in the oil pan are undamaged. The drain plug is fitted with a magnet.

Check that the magnetic affect on this is unchanged.

#### Fitting .....

New gaskets should always be used when the oil pan is fitted. Make sure that the contact surfaces are free from dirt. Tighten the bolts carefully a little at the time.

The cork gaskets should be smeared on one side with sealing compound so that they fasten on one of the sealing surfaces. The other side of the gasket should be smeared with grease which facilitates removal the next time this is carried out.

### Oil Strainer

The oil strainer which is attached to the oil pump can be reached after removing the cover in the bottom of the oil pan.

On early production engines with the floating oil strainer, the cotter pin in the pump cover suction channel is removed and then the strainer can be taken out.

On late production engines the strainer is fixed and consists of a strainer housing which is bolted to the pump cover as well as a strainer net which is retained in the housing by a circlip.

To clean this strainer, remove the circlip and then take out the strainer net. The best way of cleaning the net is in a degreasing bath and then rinsing it with warm water and blowing it dry with compressed air. After cleaning, check that the strainer net is in good condition.

## Lubricating Oil Pump

### Removing

1. Remove the oil pan.
2. Loosen and remove the pressure pipe between the pump and the cylinder block.
3. Remove both the bolts retaining the pump on the cylinder block and then pull out the pump downwards.

### Disassembly

1. Remove the circlip retaining the strainer net in the strainer housing.  
On early production engines remove the cotter pin retaining the strainer in position and then pull it off the pump.
2. On late production engines remove the bolts retaining the strainer housing and remove the housing.
3. Remove the bolts on the cover and remove the cover.
4. Remove the gear drive.
5. If the drive shaft is loose in the bushings drive the lock pin out and remove the shaft, the bushings being pressed out with a suitable tool.
6. Release the cotter pin retaining the safety valve in the cover, take out the washer and spring and then remove the ball. This valve is only fitted on oil pumps with a fixed oil strainer (late production D 67 A engines).

### Inspection

Check the housing for scratches and wear in general and check the seals between the cover and the pump housing. The surfaces will be black if leakage has occurred.

The cover should not be scratched or twisted in any way. Small scratches can be removed by using an emery paper on a flat plate and rubbing the cover with this. If the scratches are deep or the cover is twisted it should be discarded.

The drive gears should be inspected for wear on the tooth flanks, the outer diameter and the end surfaces. Worn or damaged drive gears should be replaced. If there is evidence to show that the tooth surfaces have been running against the walls of the housing, the bushings and the drive shaft or the journal for the driven gear should be replaced.

If the housing also should sign of heavy wear, the complete pump should be replaced. When the new bushings are being reamed to push fit, a reamer with a pilot should be used.

On late production pumps (from engine No. 5390 onwards) there is an oil relief valve built-in the cover. This valve opens when the oil pressure is excessively high and releases the oil back into the oil pan.

This valve should be checked, attention being paid to the spring tension and the condition of the ball and seat. Make sure that the seat is even, that the ball is sealing properly and that it is not damaged. In an unloaded condition the spring should have a length of 62 mm (2.7/16") and a length of 38 mm (1.1/2") with a loading of  $6.3 \pm 0.2$  kg ( $14 \pm 1/2$  lb.).

#### Assembly .....

1. Fit the ball, the spring and the washer for the relief valve in the cover and secure the spring with the cotter pin. Make sure that the ball fits properly on its seat. This valve is only fitted on late production pumps.
2. Fit the drive shaft in the housing, press the drive gear on to the shaft and secure it with a pin. Insert new cross keys and then press on the driving gear.
3. Fit the driven gear in the housing. Rotate the gears to make sure that they are running easily. If they chafe at any point, carry out adjustment.
4. Measure the tooth flank clearance (Fig. 1-97). This should be 0.15-0.35 mm (0.006"-0.014").
5. Measure the axial clearance which should be 0.02-0.10 mm (0.001"-0.004"). See Fig. 1-98.
6. The radial clearance (teeth-housing) may not exceed 0.10 mm (0.004"). See Fig. 1-99.
7. After these points have been checked, the cover is fitted and the bolts are tightened. Make sure that the same tightening torque is applied to all the bolts. Do not forget to fit the spring washers.

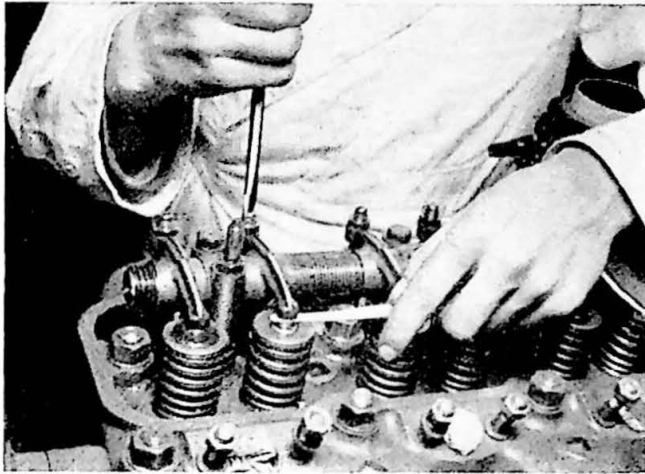
#### Fitting .....

The oil pump is fitted in the reverse order to that used when removing.

#### Oil Relief Valve

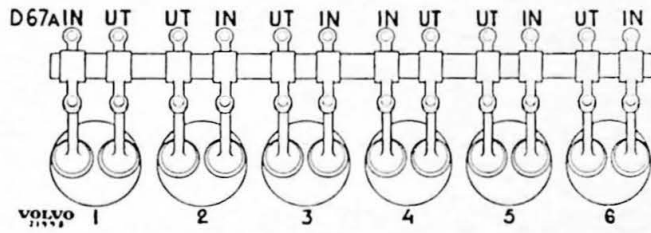
The oil relief valve is accessible from the left side of the engine. To remove, take out the plug and its copper washer and then pull out the spring and the plunger. If the plunger chafes it can be pulled out with tool SVO 1195 A (Fig. 1-100).

Wear on a plunger should be checked as well as the spring tension. The test values are shown in the specification. A heavily worn plunger or a spring which does not satisfy the specifications should be replaced. If the relief valve bushing is worn this should be replaced. The bushing is removed by using tool SVO 2081 (Fig. 1-100) in the following way:



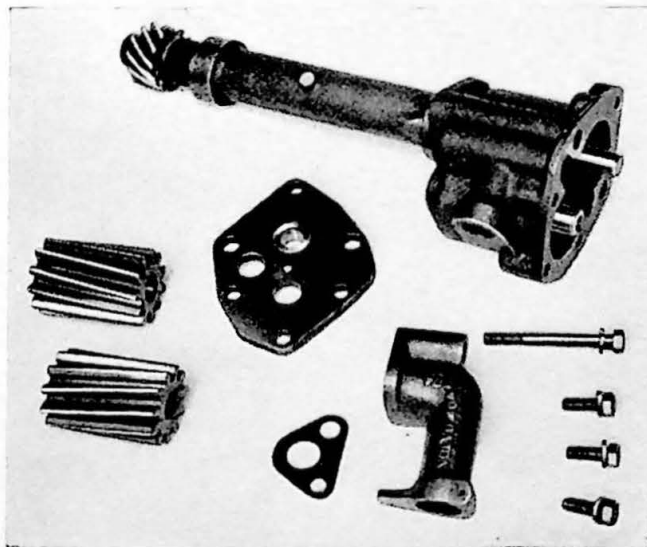
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Fig. 1—93. Adjusting valve clearance.



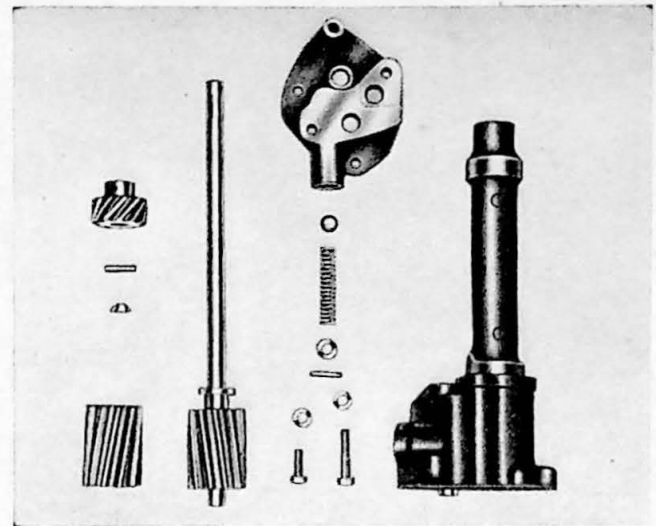
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Fig. 1—94. Location of valves.



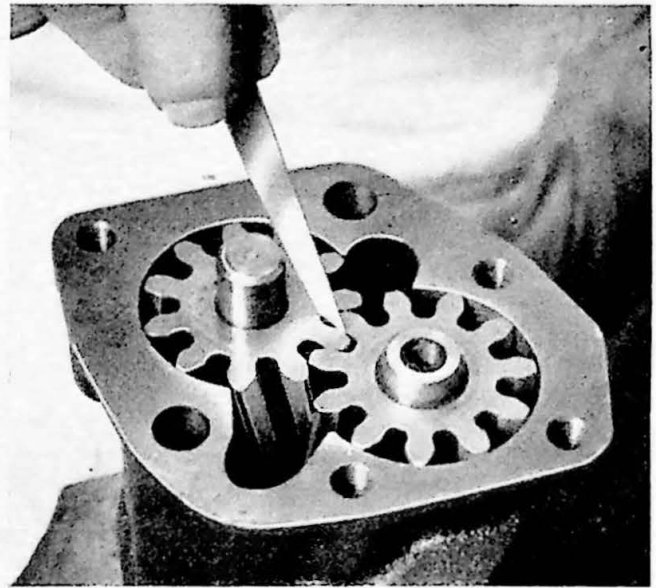
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Fig. 1—95. Lubricating oil pump,  
early production.



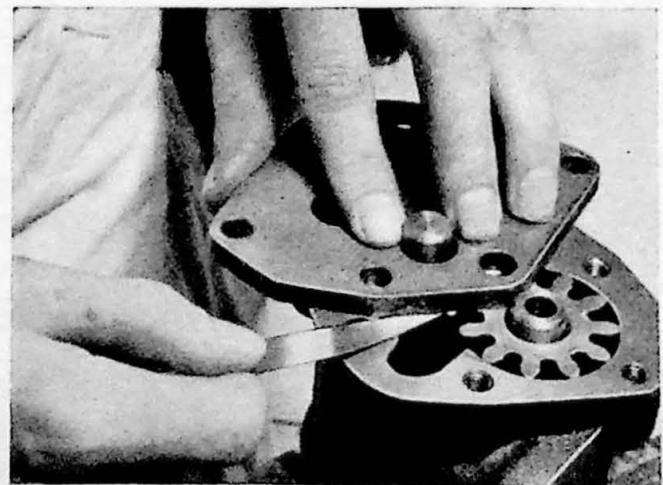
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Fig. 1—96. Lubricating oil pump,  
late production.



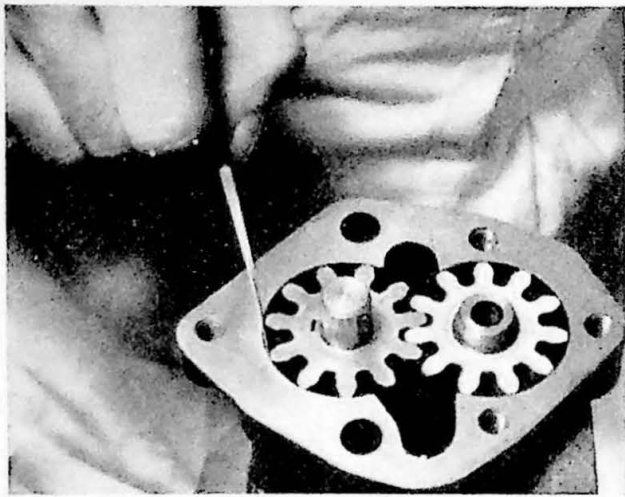
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Fig. 1—97. Checking tooth flank clearance.



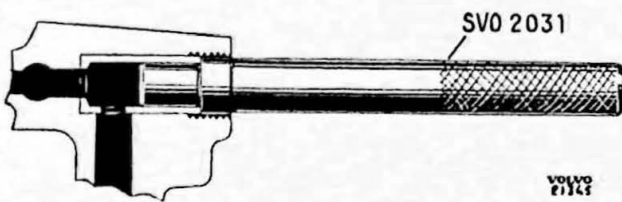
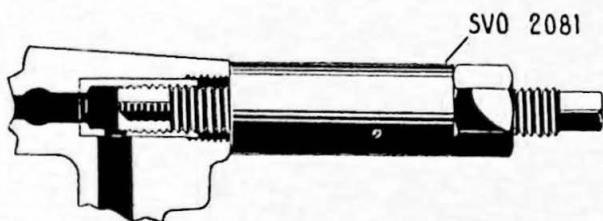
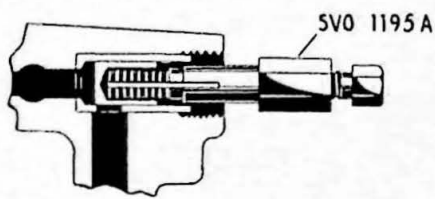
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Fig. 1—98. Checking axial clearance.



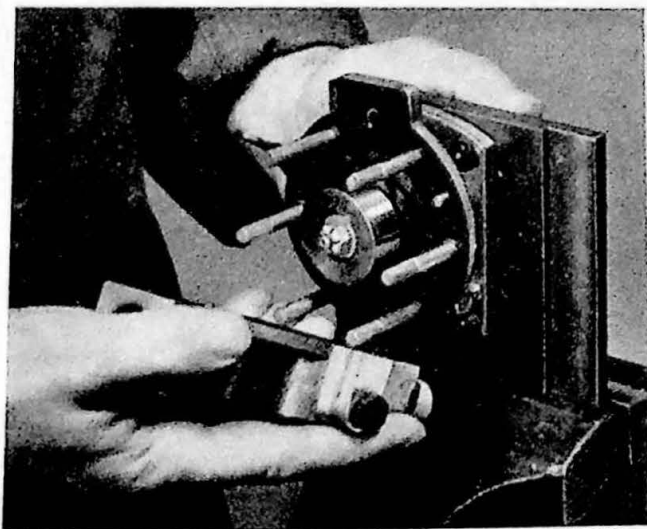
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Fig. 1—99. Checking radial clearance.



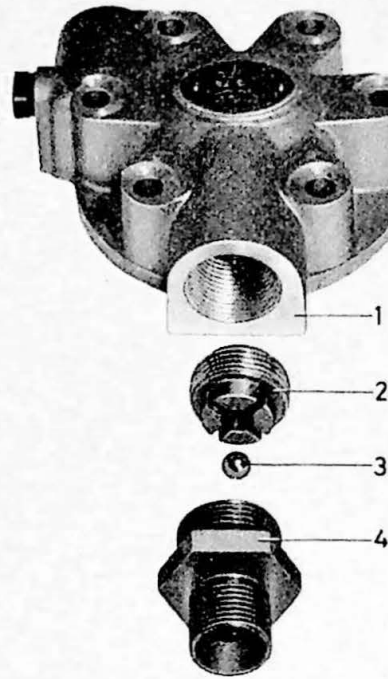
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Fig. 1—100. Tool for removal and fitting of oil relief valve.



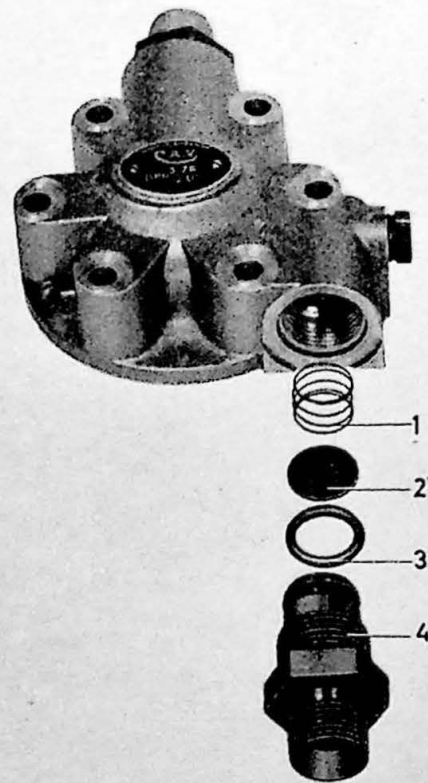
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Fig. 1—101. Removing cover.



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Fig. 1—102. Pressure valve.



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Fig. 1—103. Suction valve.

1. Fill the oil channels in the bushing with grease.
2. Thread in the tool screw in the bushing.
3. Fit the tool sleeve and nut and then tighten the nut. The bushing will then be drawn out.
4. Carefully remove all grease and filings from the oil channels.

The new bushing is fitted by using tool SVO 2031 (Fig. 1-100) which fits in the bushing. Make sure that the oil holes in the bushing come into their correct position. After fitting, ream the bushing with tool SVO 2159.

If the oil pressure is too low and the relief valve appears to be in good condition, it is not permissible to tension the spring or insert shims. The correct procedure is to examine the oil pump, the main bearings and connecting rod bearings since it is possible that these might be worn. Leakage or breakage and cracks on the main oil channels or other internal oil channels can also cause reduced oil pressure but such faults can easily be localized.

#### Oil Channels

The oil channels in the cylinder block must be cleaned and flushed with cleaning fluid and then blown out with steam or flushing oil at a pressure of 3-4 kg/cm<sup>2</sup> (42-56 p.s.i.).

The oil channels drilled in the cylinder block, the crankshaft and the connecting rods should be scrubbed and cleaned out with a brush of the type used for cleaning rifles. Make sure that all sealing plugs are being removed so that all the channels can be thoroughly flushed out.

All deposits can form in the most unexpected places, prevent the flow of oil and cause particles of dirt to come into the bearing. For this reason cleaning of the oil channels should be carried out with extreme care.

#### Lubricating Oil Filter

After every 30,000 km (20,000 miles) and each time the engine is reconditioned, the lubricating oil filter should be completely disassembled and thoroughly cleaned in gasoline. All component parts should be checked and damaged parts replaced.

A clean oil filter that works effectively is essential if the bearings are to have a long lifetime of effective service.

#### Crankcase, Ventilation

If the evacuating pipe or the breathers are blocked, there will be excess pressure in the crankcase with consequent oil leakage. The crankcase ventilating system must therefore