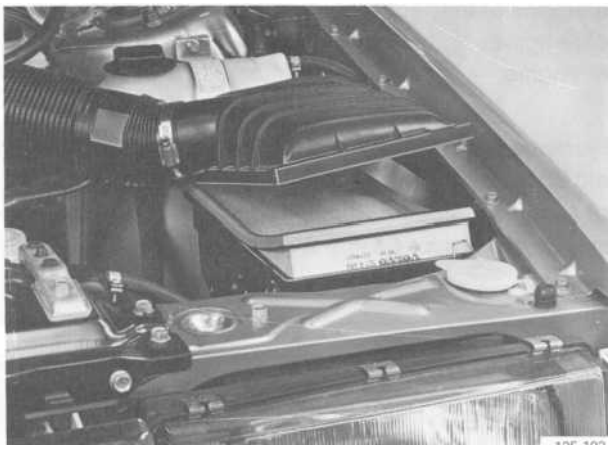
D1 - Air filter

replace



All

Remove the cover from the air filter housing. Remove the air filter. If necessary, clean the bottom of the filter housing.

Insert the new filter and refit the cover.

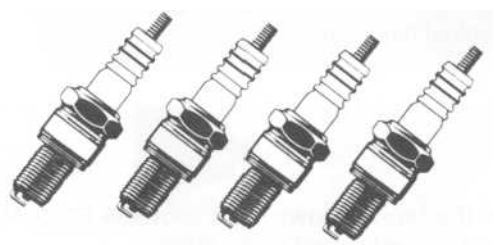
850: Replace the filter for the control unit box

Undo the quick-release fasteners and remove the air duct from the anchorage on the front member. Replace the filter and refit the air duct.

If the car is driven in adverse conditions, e.g. frequently on abnormally sandy or unpaved roads, the filter should be replaced more often.

D2 - Spark plugs

replace



Tightening torques for spark plugs, Nm (kpm)

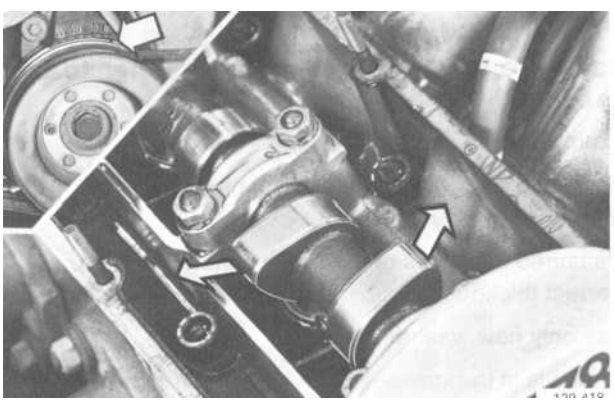
B 16/18/20	25 (2.5)
B200/230	25 (2.5)
B204/234	25 (2.5)
B 280	12 (1.2)
B 5204/5254, B 5202/5252	25 (2.5)
B 5204/5234 T	25 (2.5)
B 6254/6304	25 (2.5)

Electrode gap, spark plugs

400	0.8-0.9 mm
Others	0.7-0.8 mm

D3-Valves

check/adiust



B 200-230

*Special t*ool 999 *5022 - 5026*

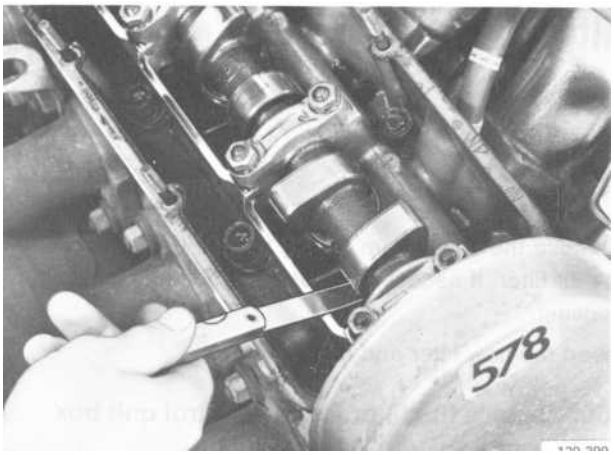
1

Undo the valve cover and remove it

Set the camshaft to TDC - combustion for cyl.1

The cams for cyl. 1 should be offset upwards and the pulley ignition marking should be at 0.

Note! Always rotate the crankshaft's centre bolt.

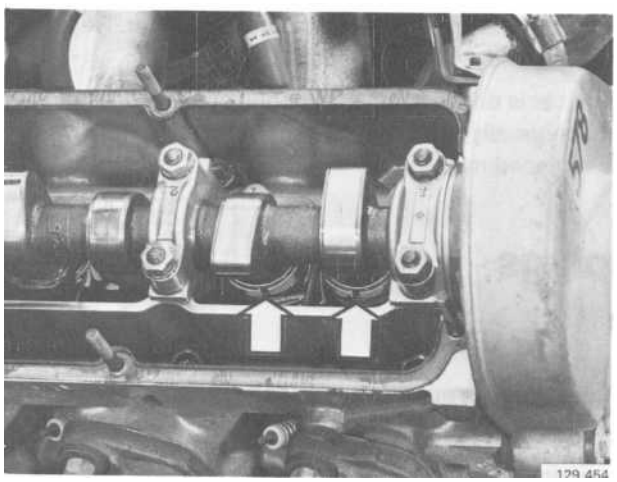


2

Measure and note the valve clearance for cyl.1

Clearance at inspection:
Cold engine: 0.30-0.40 mm
Hot engine: 0.35-0.45 mm

Clearance at adjustment:
Cold engine: 0.35 mm
Hot engine: 0.40 mm
Same clearance for inlet and exhaust.



For wrong clearance (3-6):

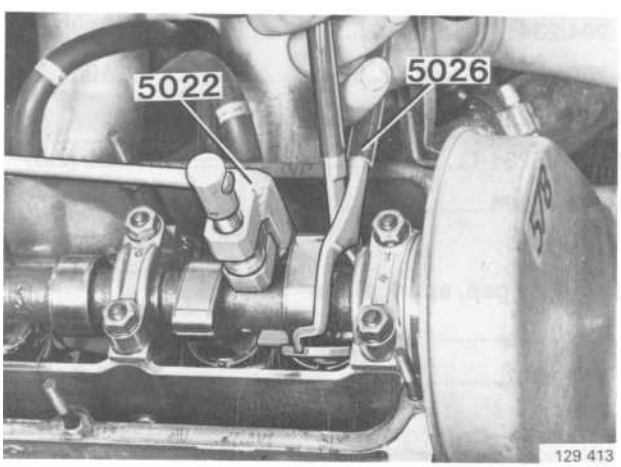
3

Turn the engine about another 1/4 revolution

Piston should NOT be at TDC when adjusting valves, otherwise valves may strike the piston when the tappets are pressed down.

Turn the tappet

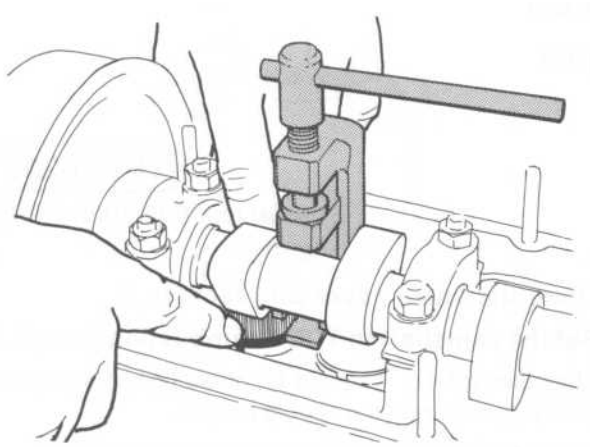
The grooves should be at right angles to the camshaft's longitudinal direction.



4

Press the tappet down with tool 999 5022. Remove the washer with 999 5026

The groove in the tappet should be located above the edge so that the washer is accessible with a pair of pliers.



5

Measure the washer's thickness with a micrometer

Calculate the thickness of the washer to be used

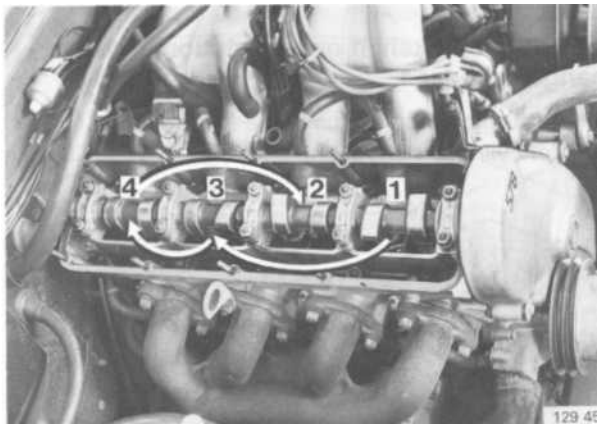
Example:

Measured play: 0.25 mm. Correct play: 0.40 mm.
Difference in play -0.15 mm.

Measured thickness of existing washer: 3.80 mm.
Correct thickness of new washer: 3.80-0.15=3.65 mm.

Use only new washers.

Available in thicknesses 3.30-4.50 mm in increments of 0.05 mm.



6

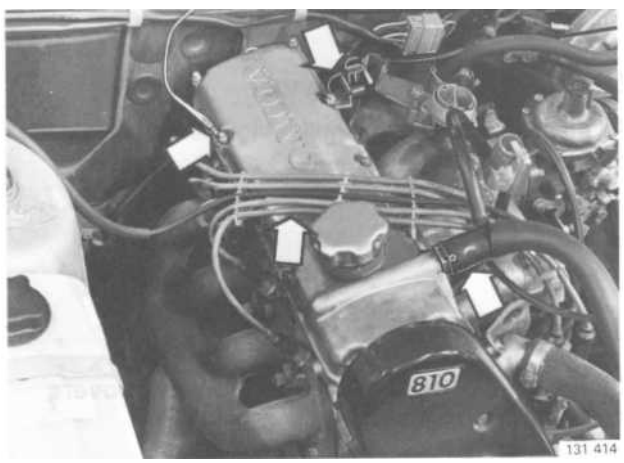
Lubricate and fit the new washer

Note! The washer should be fitted with the marking facing down.

Remove press tool 999 5022.

7

Check and if necessary adjust valve clearance for the other cylinders in sequence 3,4,2



8

Turn the engine over a few revolutions with the starter motor

Then check the clearance again. Adjust if necessary.

9

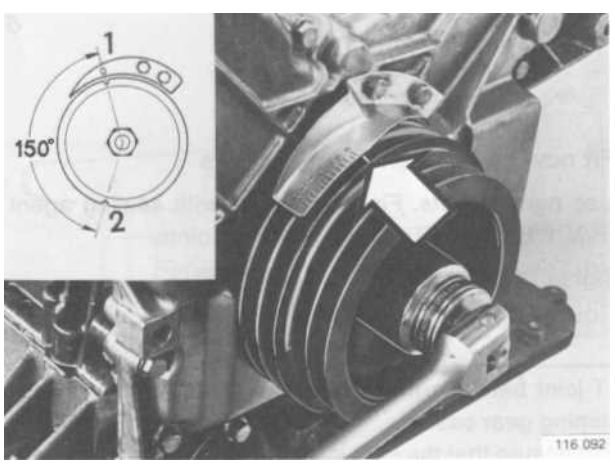
Fit the valve cover.

Use a new gasket.

10

Fit new hoses and ignition cables.

Refit all other parts which were removed.



B280

1

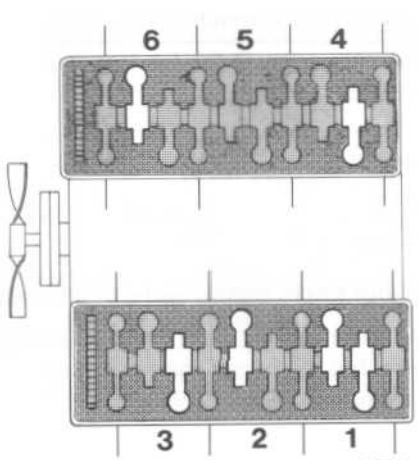
Remove the valve covers

Rotate the crankshaft to ignition position for cylinder 1

36 mm socket.

Marking 1 on the pulley should be opposite the 0-marking on the timing plate. Both the rocker arms for cylinder 1 should have adequate play.

Note! There are two marks on the pulley, 1 = TDC cyl. 1 and 2 = TDC cyl. 6.



2

Check/adjust valve clearance

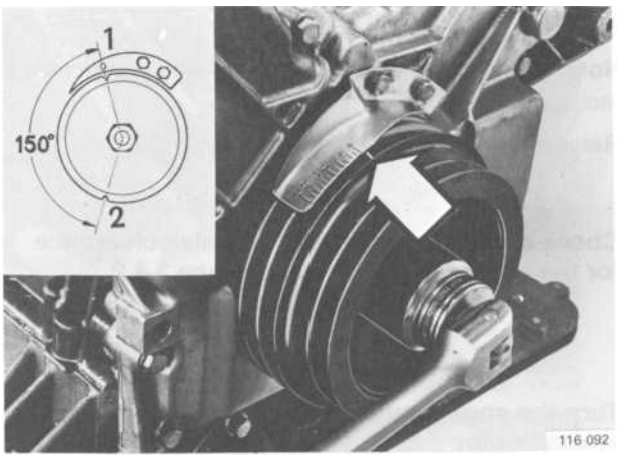
In the set position, the following valves are checked:

Inlet: cylinders 1,2 and 4
Exhaust: cylinders 1,3 and 6

Valve clearance (mm)

Inlet valve	cold engine	0.10-0.15
	hot engine	0.15-0.20
Exhaust valve	cold engine	0.25-0.30
	hot engine	0.30-0.35

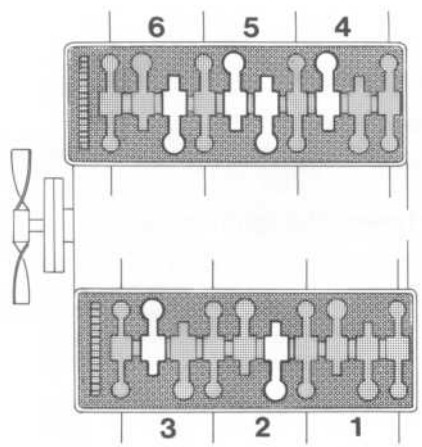
3



Rotate the crankshaft one revolution to gas exchange cylinder 1

Marking 1 should be opposite the 0-mark. The rocker arms for cylinder 1 should balance.

4



Check/adjust valve clearance

At the set position, the following valves should be checked:

Inlet: cylinders 3,5 and 6

Exhaust: cylinders 2,4 and 5

5

Clean the sealing surfaces of the valve covers and cylinder heads

6

Fit new gaskets and valve covers

Use new gaskets. Fix the gaskets with sealing agent (P/N 1 161 026-8) applied at a few points.

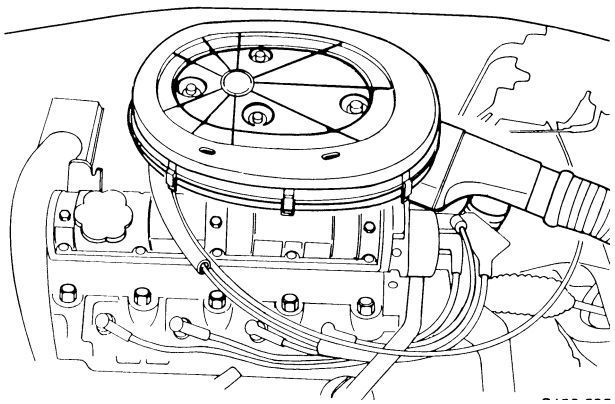
Tighten 10-15 Nm (1.0-1.5 kpm).

T-joint between the valve cover, cylinder block and timing gear casing.
To ensure that the joint is entirely sealed, apply a thin string of silicon (P/N 11 61 231-4) above the joint.
Note! Do not apply too much silicon, because of the risk that silicon may enter the lubrication system and clog the oil ducts.

7

Refit the other parts which were disassembled

Use a new O-ring (gasket) for the vacuum pump, if fitted. Ensure that the pump shaft is at the upper side of the camshaft.



B 16, B 18, B 20, D 19 T

Special tool 5989

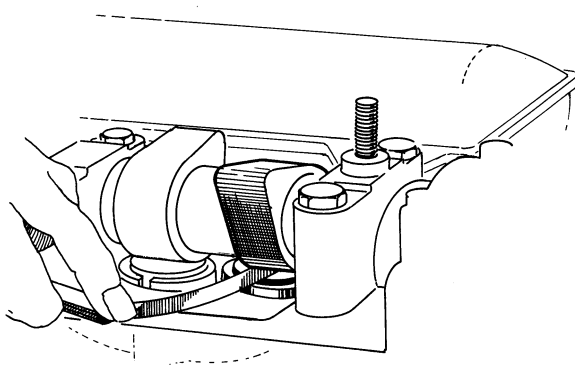
Note!
The valves can only be checked/tightened when the engine is cold.

1

Remove the valve cover

B18 K/KP/U, B 20: Remove the air cleaner.

B 16 F, B18 EP/FP/FT, B 20 F: Remove the inlet manifold bolts and the screw at the front of the cylinder head.
Remove the manifold and valve cover.



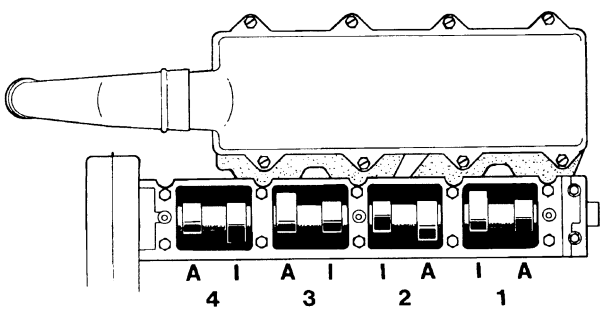
2

Set cylinder no. 1 at TDC

Note! Cylinder no. 1 is closest to the flywheel.

Always use the crankshaft centre bolt to rotate the crankshaft.

Both the cams on cylinder 1 should point offset upwards.



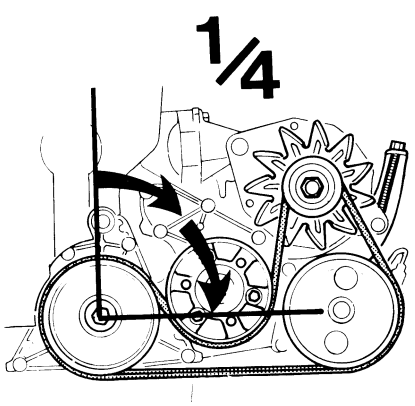
3

Check valve clearance for cylinder no. 1

Inlet valve	0.15-0.25 mm
Exhaust valve	0.35-0.45 mm
Exhaust valve (turbo)	0.45-0.55 mm

I = inlet valve
A = exhaust valve

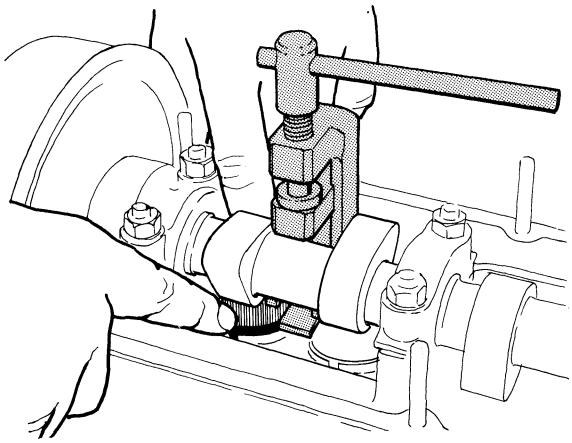
If adjustment is necessary (steps 4-9)



4

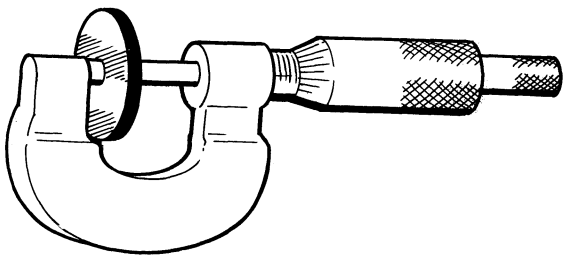
Rotate the crankshaft another 1/4 revolution

The piston should not be at TDC when valve clearance is adjusted, since the valves may otherwise strike the pistons when the tappets are pressed downwards.



Press the tappets downwards with tool *999 5989* and remove the shims

Turn the tappets to the correct position, the grooves run slightly inwards.
Press on the tappets with tool 5989.
Remove the shims.



Calculate the thickness of the shim to be used

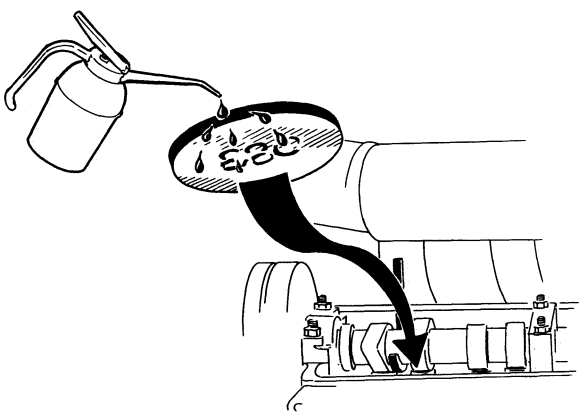
Adjustment

B 16, B18 without turbo, B 20

Inlet valve	0.20-0.25 mm
Exhaust valve	0.40-0.45 mm
Turbo engine	
Inlet valve	0.20-0.25 mm
Exhaust valve	0.50-0.55 mm

Measure shim thickness with a micrometer and calculate the thickness of the shim which is required.

Carburettor engines:
Remove the fuel pump for adjustment of cylinder no. 4.

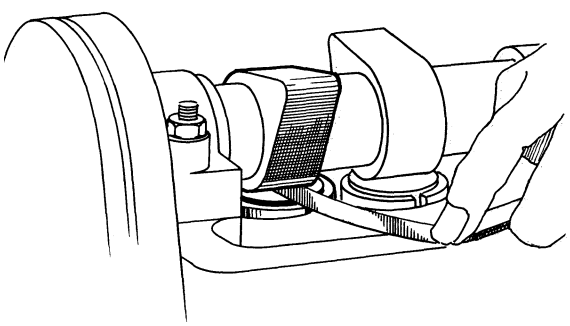


Fit a new shim and remove tool *999 5989*

Lubricate the shim and check that the assembly mark faces downwards towards the tappet.

Note! Always use new shims. Available in thicknesses from 3.25 mm to 4.25 mm in increments of 0.05 mm, and in thicknesses 4.30, 4.40 and 4.50 mm

Rotate the crankshaft 1 3/4 revolution and check valve clearance again.



Check/adjust valve clearance for the remaining cylinders

Check valve clearance in the following sequence:

1-3-4-2

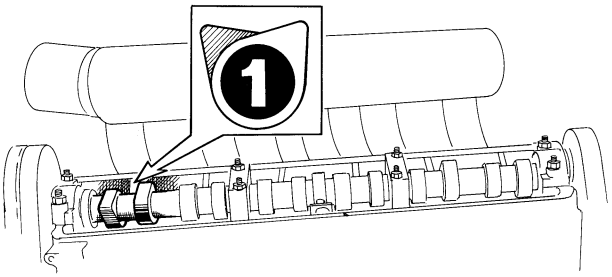
Important! Do not forget to rotate the crankshaft a further 1/4 revolution before valve adjustment.

Refit the valve cover

Fit new gaskets. Apply sealing agent at the four corners (Volvo P/N 11 61 231-4)

B18 K/KP/U: Fit the fuel pump and air cleaner.
B 16 F, B18 EP/FP/FT, B 20 F: Fit the manifold. Tightening torque: 12 Nm.

Special tool 999 5188, 5195, 5196



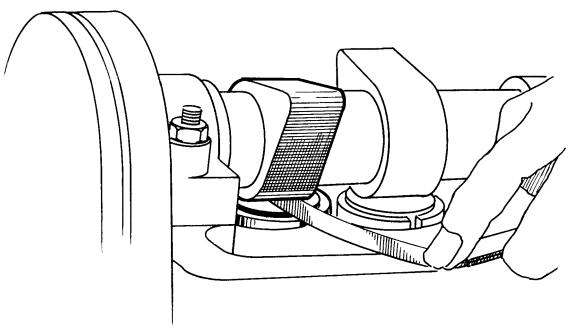
1

Set cylinder no. 1 at TDC - injection

Remove the valve cover

Always turn the vibration damper's centre screw, 27 mm socket tool 999 5188 if necessary.

Both cams on the camshaft for cylinder 1 should point offset upwards.



2

Check the valve clearance for cylinder no. 1

The following values are permitted at inspection:

Cold engine

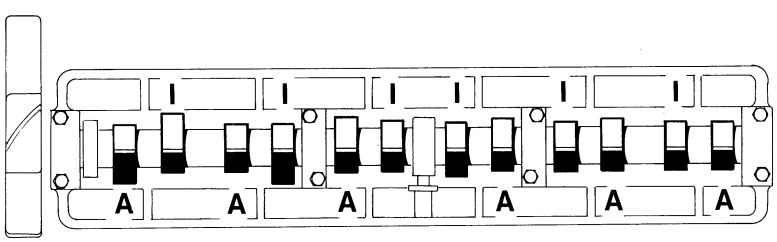
Inlet	0.15-0.35 mm
Exhaust	0.35-0.45 mm

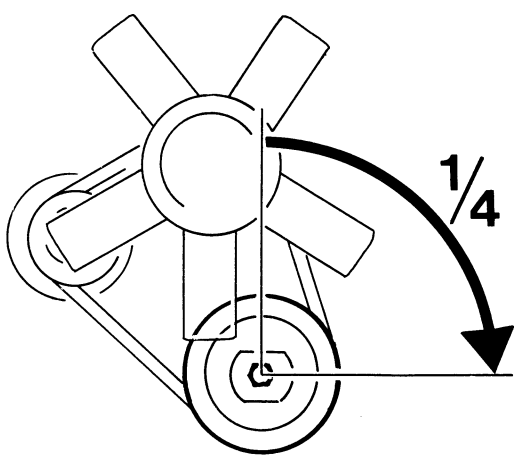
Hot engine

Inlet	0.20-0.30 mm
Exhaust	0.40-0.50 mm

I = inlet valves

A = exhaust valves



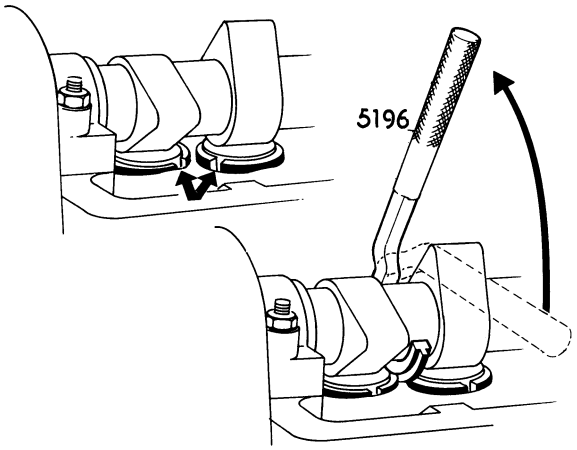


If clearance is incorrect (steps 3-8):

3

Rotate the engine another approx. 1/4 revolution

When adjusting the clearance, the piston should not be at TDC, otherwise the valves may strike the pistons when the tappets are pressed downwards.



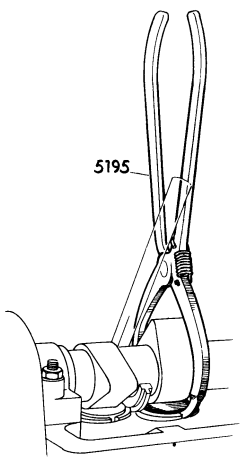
4

Press the tappets

Turn the tappets to the correct position, the grooves should point somewhat inwards.

Press the tappets downwards with tool 999 5196. The grooves in the tappets should be over the edge, so that the washer is accessible with a pair of pliers.

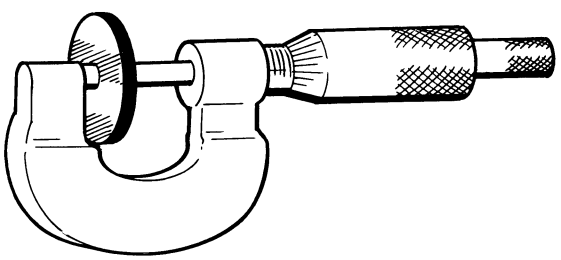
5



Lift off the washer

User pliers 999 5195.

6

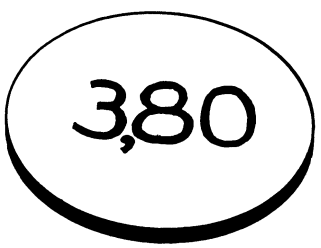


Calculate the thickness of the washer which gives the correct clearance

The following data applies for setting:

Cold engine	mm
Inlet	0.20
Exhaust	0.40
Hot engine	
Inlet	0.25
Exhaust	0.45

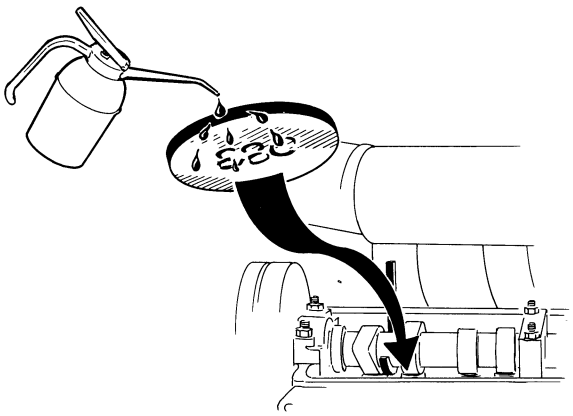
Measure the thickness of the old washer with a micrometer. Calculate the thickness of the washer which is to be used.



Examples:

If the valve clearance is 0.20 mm and the required valve clearance is 0.25 mm, the existing washer should be replaced with one which is 0.05 mm thinner.

Use only new washers. They are available in thicknesses from 3.00-4.25 mm in increments of 0.05 mm.



7

Fit the new washer and remove the tools

The washer should be lubricated and placed with the marking facing downwards, towards the tappet.

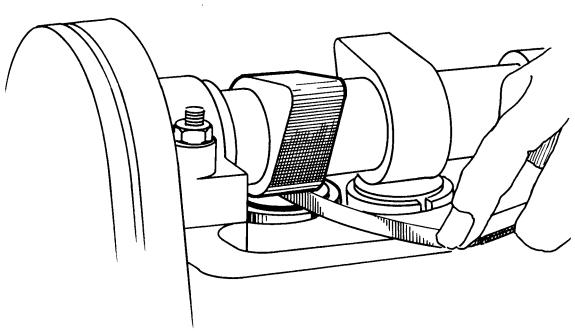
8

Check/adjust the valve clearance for the other cylinders

Check/adjust the valves in the following sequence:

1-5-3-6-2-4.

Important! Do not forget to rotate the crankshaft a further approx. 1/4 revolution before valve clearance is adjusted.



9

Recheck valve clearance for all the cylinders

Turn the engine a few revolutions prior to checking.

10

Fit the valve cover

Use new gaskets if necessary.

D4 - Fill engine oil

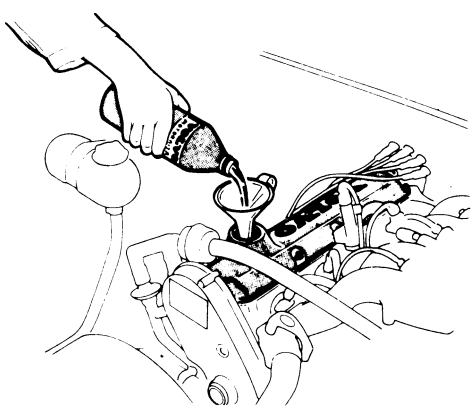
Oil quality

Engine type	Acc. to API-Service	Acc. to CCMC	Oil change interval
Petrol turbo engines	-------	min. class G5	15,000 km
Other petrol engines	min. class SG[1)]	min. class G4	15,000 km
Diesel engines	min. class CD[2)]	min. class D4	7,500 km[3)]

1) Oils with designation SG/CD meet this requirement.

2) Oils with designation SF/CD and SG/CD meet this requirement.

3) On all D 24 variants and D 19 T engine oil shall be changed every 7,500 km. Engine oil **and oil filter** every 15,000 km.



200/700/900/800		**400**		
Engine	Litres	Model year	Engine	Litres
B 200/230	3.85	–1992	All	5.3
B 204/234	4.00	1993	All *	5.0
B 5202/5252	5.30	1994–	B 16, B 18	4.6
B 5204/5234/5254	5.30		B 20	5.7
B 280	6.00		D 19 T	5.0
B &244/6254/6304	5.75	* Chassis no. 401000– (440/460) & 585000– (480):		4.6 litres.
D 24	6.00			

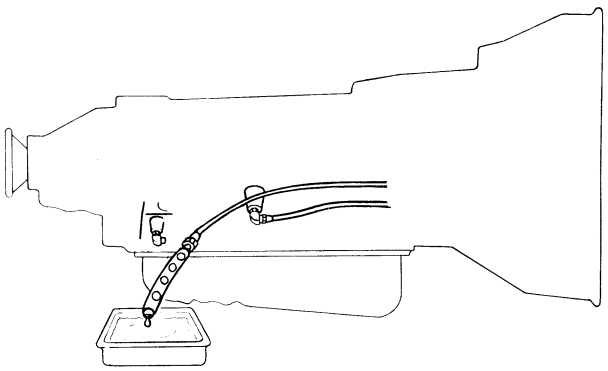
D5 - Automatic gearbox

fill oil

AW 70/71/72

Undo the rear connection for the oil cooler pipe

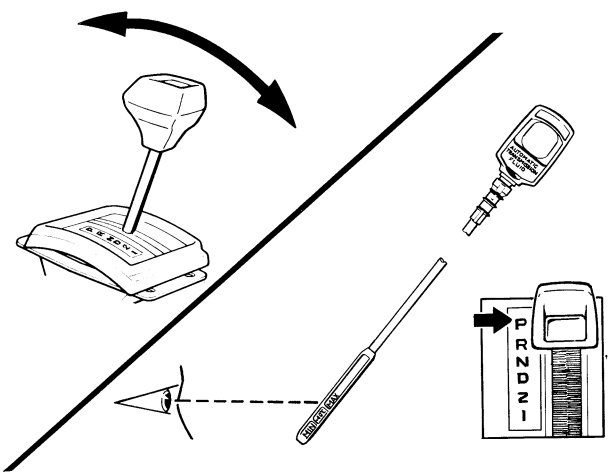
Connect a transparent plastic hose to the pipe



Fill about 2 litres of oil

1. Start the engine and let it run at idle speed.
2. Switch off the engine when air bubbles appear in the hose.
3. Fill about 2 litres of oil

Repeat steps 1 and 2 once. Reattach the pipe to the gearbox.



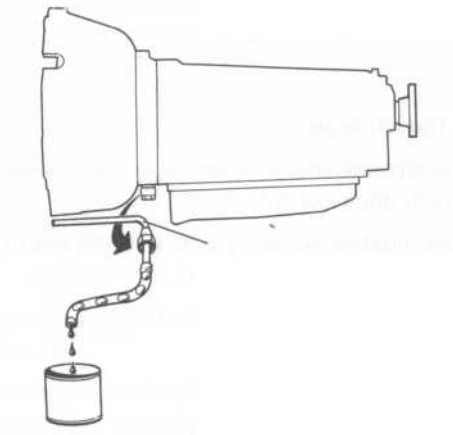
Fill about 2 litres of oil

Start the engine and let it run at idle speed
Move the gear selector lever between the different settings

Move the gear selector lever to P, wait 2 minutes, then check the oil level.

Top up if necessary.

ZF 4 HP 22



Remove the lower return pipe from the oil cooler on the gearbox.

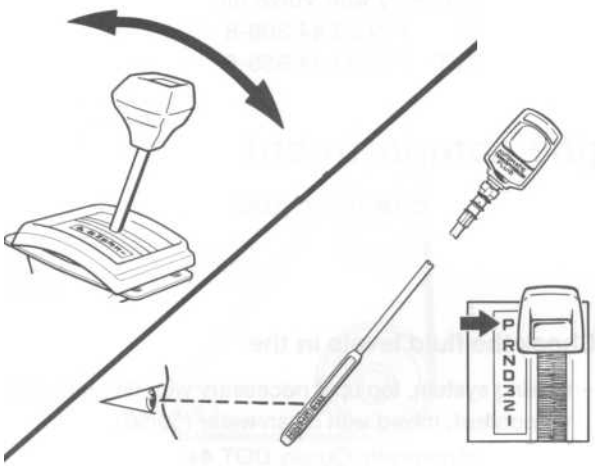
Connect a transparent plastic hose to the return pipe

Fill about 2.5 litres of oil (Dexron II D).

1. Start the engine and let it run at idling speed.
2. Switch off the engine when air bubbles appear in the hose.
3. Fill 2.5 litres of oil

Repeat steps 1 and 2 once and step 3 once.

Connect the return pipe to the gearbox.



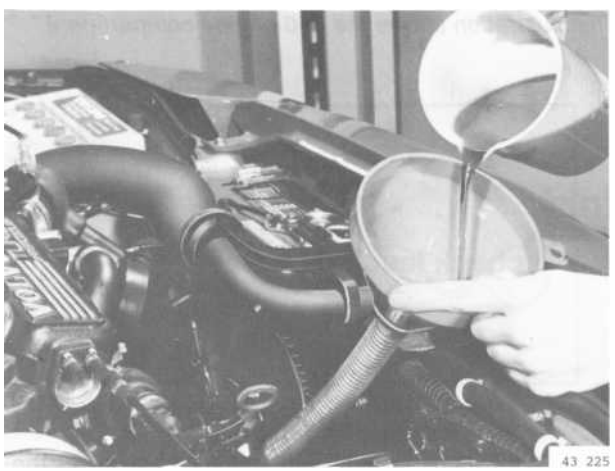
Fill about 2.5 litres of oil

Start the engine and let it run at idling speed. Move the gear selector lever between the various settings.

Check the oil level with the selector lever in P

Top up if necessary.

ZF 4 HP 14 Q and CVT



Warning! Top up oil with considerable care

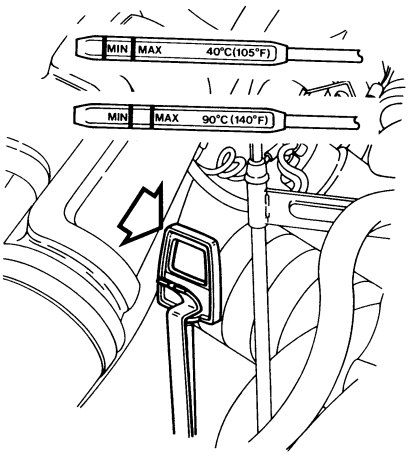
Fill oil

Fill slowly through the dipstick tube. If too much oil is filled, the excess may be pressed out, resulting in leakage. Do not check the oil level immediately after filling. The oil in the pipe must have sufficient time to flow down into the sump, which means that a hasty level check may be incorrect.

Note! The engine must run at idling speed with the gear selector lever is P before the correct oil level can be read off. If engine speed is increased while the level is too low, the oil will be whipped up into a foam and the wrong level will be registered.

The oil level on CVT cars should be measured when the gearbox has attained normal operating temperature.

Oil capacity, CVT = 3.8 l.
ZF = 3.3 l.



Move the gear lever back and forth between the various gear positions, and keep it in each position for at least 2 or 3 seconds. Select P and wait 2 minutes. Check the oil level.

Check the oil level

Wipe the dipstick with a nylon rag, chamois leather or a rag which does not fluff.

Insert the dipstick correctly (i.e. with the side marked "warm/cold" facing the gearbox).

The ZF unit has two measurement ranges: A = cold oil
B = hot oil

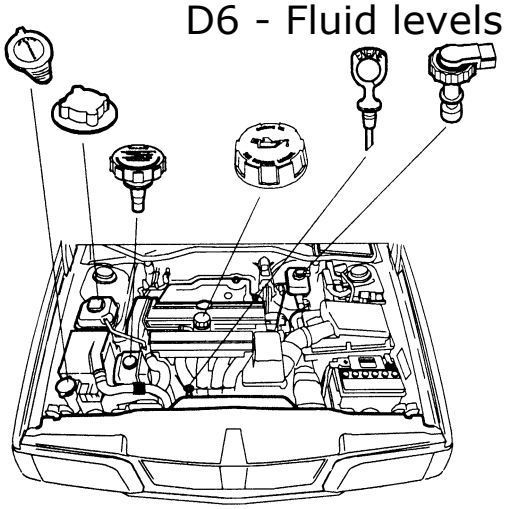
Pull up the dipstick after 4 seconds and read the level. The difference between max. and min. is: ZF, 0.3 l
CVT, 0.6 l

Top up if necessary with Volvo oil:
ZF P/N 33 44 208-8
CVT P/N 33 44 959-6

D6 - Fluid levels - engine compartment

check/adjust

All



Check the fluid levels in the

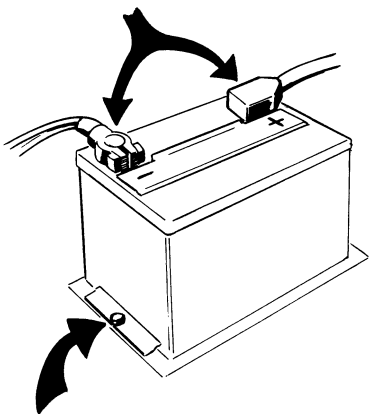
- cooling system, top up if necessary with Genuine Volvo coolant, mixed with clean water (50/50)
- brake fluid reservoir. Quality DOT 4+
- reservoir for power steering oil. If necessary, top up with ATF-oil, type F or G
- washer fluid reservoir.

The illustration shows the 850 engine compartment.

D7 - Battery

check level/anchorage

All



Check that there is sufficient battery acid in all the battery cells. Top up if necessary with distilled water. Check that the battery is properly anchored and connected.

Clean the battery terminals (do not disconnect the cables) and apply vaseline to them.