

**VOLVO**

*Competition  
Service*

Prod TUNING KIT FOR B 20	Avd Section 40
	Nr No 1
Datum Date November, 1969	

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## TUNING INFORMATION

### General

For this tuning kit, the installation instructions, clearances, timing values and tightening torques contained in the VOLVO Service Manual mainly apply. The tuning information in this bulletin concerns only deviations from the Service Manual.

When fitting the tuning kit, the clutch plates should be replaced simultaneously by harder ones of standard type. (The clutch should be of the Borg & Beck diaphragm type.) With extremely hard competition driving, however, clutch 418930 should be fitted.

### Technical Data

(Only that data deviating from that for the standard engine is described herewith. Other data: see the Volvo Service Manual for the B 20 engine.)

Output, h.p. at r.p.m. (DIN)	140/6000
Torque, kpm (lb.ft.) at r.p.m. (DIN)	19.6 (141.3)/4500
Compression ratio	11:1
Compression pressure (warm engine)	12-14 kp/cm <sup>2</sup> (170-200 p.s.i.)
Camshaft, marking	D
Valve clearance for checking the camshaft setting (cold engine)	1.4 mm (0.055")
Intake valve should then open at	5.5° B.T.D.C.
Valve clearance, intake and exhaust valve (warm engine)	0.40-0.45 mm (0.16-0.18")
Fuel pump, pressure (at 1000 r.p.m.)	0.15-0.25 kp/cm <sup>2</sup> (2.0-3.5 p.s.i.)
Carburettors (2)	Solex 45 DDH - 1
Jets:	
Outer venturi	36
Inner venturi	C 23352 NR 1
Main jet	185
Air jet	175
Idling jet	55
Idling jet, air	120
Emulsion tube	C 24186

Starting jet	125
Idling speed	900 r.p.m.
Spark plugs	Bosch W 240 T 1
Distributor	
Basic timing (at low idling speed)	10° B.T.D.C.
Max. pre-ignition (at 5800 r.p.m.)	38° B.T.D.C.

#### MEASURES TO BE TAKEN BEFORE FITTING THE TUNING KIT

##### On engine:

The principal features of the kit are: new cylinder head complete, 2 twin carburettors with controls, air cleaner, intake manifolds, exhaust manifold, fuel pump with hoses and connections, camshaft, flywheel, timing gear casing with hub for pulley, oil cooler, water pipe, coolant hose, ignition coil and spark plugs. These parts should thus be removed from the engine.

##### On tuning kit

Remove the centre straight pin, 950586, on the surface facing the exhaust manifold. Fit plug 422635 in the hole with  $\varnothing 3.2$  mm (0.126") on the connection flange of the intake manifold facing the cylinder head, see Fig. 2.

Move the connection nipples for brake servo, 943199, and crankcase ventilation, 430262, from the standard engine, see Fig. 4.

Fit the studs, 953461, on the intake manifold flanges facing the carburettors.

Fit bracket 460039 for the throttle control with 2 screws 955512 on the front intake manifold, see Fig. 3.

Clean off any unevenness in the intake manifolds. Grind the centre flange of the exhaust manifold.

##### Front carburettor

Remove the front lever and fit the new lever and return spring. The lever is turned so that it comes in the opposite direction to the rear lever (approx. 45° downwards - inwards towards the engine with closed throttle flap).

Rear carburettor

Remove the rear lever. Remove the bracket with the idle trimming screw and fit it at the front lever. Fit the new lever and return spring. The lever is turned so that it comes in the opposite direction to the front lever (approx. 45° downwards - inwards towards the engine with closed throttle flap). Lock the four nuts for the levers with the lock tabs.

Air cleaner

Fit rod 460047 for the air cleaner to the rubber suspension by means of screw 955536, 2 washers 960142, washer 940097 and Nyloc nut 950354. The other end of the rod must be attached later to the right engine mounting. See Fig. 4.

## FITTING THE TUNING KIT

Fit the parts in accordance with the Service Manual.

Carburettors with controls

Fit the rubber flanges 862463 with spacer gaskets 819769 against both intake manifolds and carburettors. Tighten the flanges with nuts 955847 and washers 955894. Install the carburettors and tighten union shaft 684901 with Nyloc nuts 950363 and washers 955894. The union shaft is fitted between the carburettor throttle flap shafts with the ball turned forwards. Make sure that the lever shafts fit into the holes in the carburettors, see Fig. 3.

Mount the upper throttle control shaft complete, 684899, in the corresponding way as for the standard engine (see Fig. 3). Connect it to the union shaft ball cup with control rod 943936, ball cup 959088, ball cup 942837, nuts 955780 and 942836. The control rod and ball cups should have a length of 129 mm (1 5/64") (centre - centre, ball cups).

Air cleaner

Fit the studs for the air cleaner.

Fit spacer gasket 419906 and the base plate of the filter and tighten with the aid of studs 953032 and Nyloc nuts 10591. Push the four air intakes 824708 into the respective carburettor throats and tighten with lock screws from the underside of the carburettor. Tighten the rod at the front engine mounting with the existing Nyloc nut and washer. Fit the cleaner insert and cover plate.

### Fuel pump

Fit nipple 943818 in the pump intake port. Fit the fuel pump and connect it to the fuel pipe from the tank. Install fuel pipe 825856 between pump and carburettors by means of inlet fitting screw 825857, gasket 957173 and strainer 825858.

### Oil cooler

When using an oil cooler, the existing expansion tank 673624 must be replaced by tank 676558 and pressure cap 673233 replaced by cap 673336 to reduce pressure in the cooling system. (The boiling point of the coolant is in this way reduced by approx. 8° C.) The spliced coolant hose and a water pipe are used for the oil cooler.

### Timing gear casing

When fitting the timing gear casing, the casing and sealing ring must be centred in relation to the crankshaft (hub for pulley). Should the centering sleeve of the standard engine not suit, the casing should be fitted as follows:

Fit on the hub for the pulley. Fit the casing and tighten the bolts by hand. Check that the sump gasket does not press the casing upwards. First tighten the bolts for the casing and then the sump bolts.

## SETTING

### Distributor

Set the timing (after having checked and adjusted the breaker points) to 10° B.T.D.C. at such a low idling speed that the centrifugal governor has not yet started to function. Check that max. pre-setting, 38°, is obtained at 5800 r.p.m.

### Carburettors

Before the carburettors are connected together, a basic setting should be carried out, with one carburettor at a time, that is, the throttle flap of the other carburettor should be completely closed. (Idle trimming screw screwed-out.)

1. Screw in both the idling air volume screws (1, Fig. 3) completely for the carburettor to be adjusted. Then unscrew them 1 1/4 turn. Start the engine and adjust the idle trimming screw so that 900 r.p.m. is obtained. Adjust the two idling air volume screws (4) until the most suitable idling speed is obtained.
2. Unscrew the idle trimming screw so that the throttle flap closes completely and repeat the procedure with the other carburettor.

3. Adjust the idle trimming screws by means of a synchro test, that is, the same throttle flap opening for both the carburettors. Set the idling speed to 900 r.p.m.

Adjust and tighten the carburettor union shafts so that the levers are actuated exactly at the same time.

#### Choke cable

If the basic engine was a B 20 A:

Replace the cable by a longer one and pare the sleeve so that the wire can be attached to the choke connections of both carburettors.

If the basic engine was a B 20 B:

Exclude one of the cables and pare the sleeve on the other so that it can be attached to the choke connections of both carburettors.

Pull out the knob on the dashboard approx. 10 mm (3/8"). Make sure that the choke levers on the carburettors are at their stop positions and tighten the choke cable.

#### Vacuum hoses

Connect the vacuum hoses as shown in Fig. 1.

#### RUNNING-IN

If the tuning kit is fitted on a new engine, the engine should be run with a certain amount of caution for the first period (up to approx. 2 000 km = 1 200 miles). Let the engine work between 2000 - 5000 r.p.m. Avoid driving at low speed in high gear. Avoid fierce acceleration. Driving for short periods with high speed and light load can be permitted, for example, when driving downhill or when accelerating for a short period up to approx. 6000 r.p.m. Keep an eye on the temperature gauge. The temperature must not rise too much.

#### ENGINE OIL

For lubrication of a tuned engine, Volvo's general recommendations apply, that is, use multigrade oil of a well-known make.

#### TYRES

Cars fitted with a tuning kit should be equipped with belt tyres, which are approved for speeds up to 180 km.p.h. (110 m.p.h.).

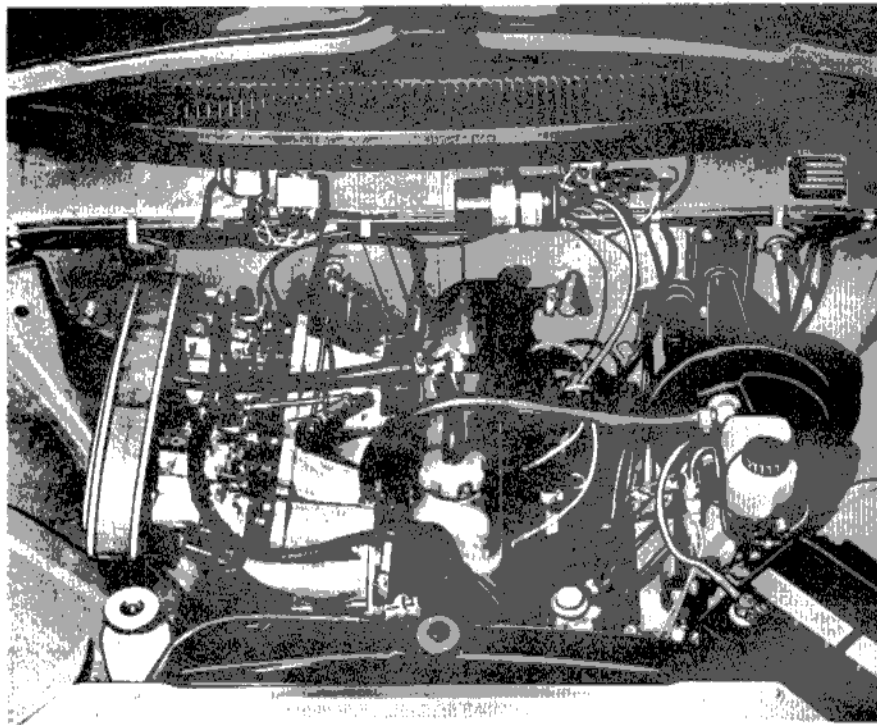


Fig. 1. Engine in car

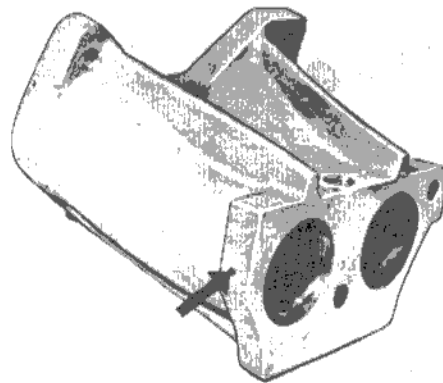


Fig. 2. Intake manifold  
(Location of plug)

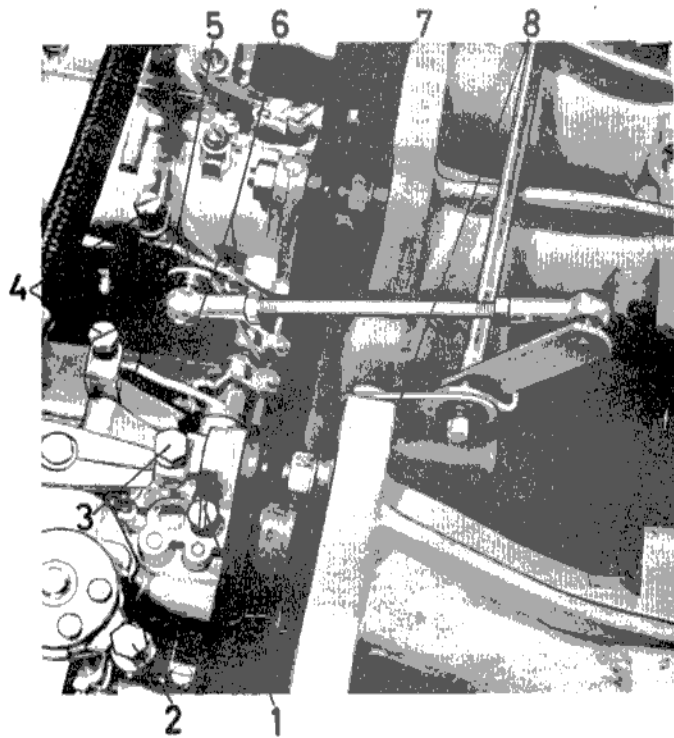


Fig. 3. Carburetors

1. Idling air volume screw
2. Screw for choke cable
3. Screw for sleeve
4. Idle trimming screw
5. Lever
6. Flange
7. Idling air volume screw
8. Bracket

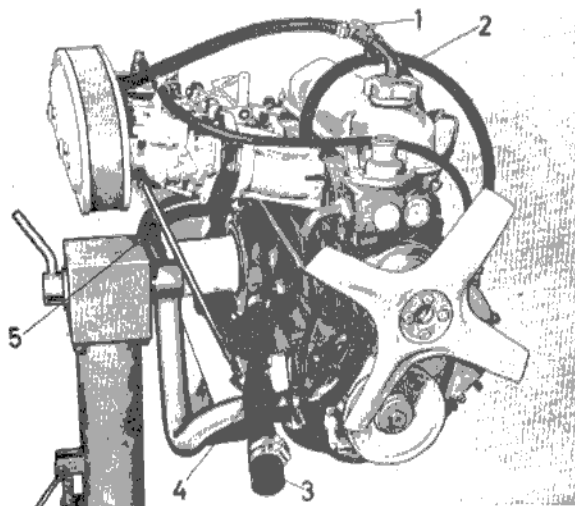


Fig. 4. Tuning kit fitted  
(except exhaust manifold)

1. 3-way union
2. Hose to brake servo
3. Extension pipe
4. Coolant hose
5. Rod for air cleaner

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FASTER EVACUATION OF BRAKE SERVO SYSTEM

For faster evacuation of the brake servo system, and thereby faster brake action, we recommend that vacuum outlets should be fitted to both branches of the induction manifold.

Fit screwed nipples to the manifold. From these, run hoses - securely clipped - to a T-piece, part no. 419446. The T-piece should then be connected to the brake servo unit.