

*The*  
**SUNBEAM**  
**ALPINE**



**OWNER'S HANDBOOK**

**SERIES II**

**SPECIAL TUNING**

A PRODUCT OF THE ROOTES GROUP

**THE**  
**SUNBEAM**  
**ALPINE SERIES II**  
**SPECIAL TUNING**

**ISSUED BY**  
**SUNBEAM-TALBOT LIMITED**  
**SERVICE DEPT.      COVENTRY      ENGLAND**

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## FOREWORD

This booklet has been produced in order to meet the demands from the many enthusiasts who wish to improve the performance of individual Sunbeam Alpine Series II cars.

If the recommendations in this publication are followed the reliability of the car will compare favourably with others of similar performance, but any increase in power output may reduce reliability.

It is for this reason that the terms of the warranty on new Sunbeam cars do not cover vehicles so modified.

The Company wish to bring to the notice of owners that in certain countries noise restriction regulations are in force, and we cannot, therefore, accept responsibility for any increase in the existing noise level of the car which may result after special tuning operations have been carried out.

We feel quite sure that those owners who take advantage of the hints and suggestions contained in this booklet will obtain worthwhile improvements and enjoy success in the field of motor sport.

A comprehensive workshop manual, WSM.124, covering Alpine cars may be purchased from Rootes Dealers under Part Number 6600865 or 6600802. Reference is made to this manual, where necessary, in this booklet.

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**TUNING KITS**

The following tuning kits are available :

Stage I engine tuning kit	Part No.	...	...	1206313
Stage II	"	"	"	1206314
Stage II	"	"	"	(U.S.A. only) 5220554
Oil cooler kit	...	...	...	1206318
Brake lining kit	...	...	...	1206319
Rear axle kit (Disc wheels only)	...	...	...	1206323
Suspension kit	...	...	...	1206315

Full details of the kit contents and the work involved in fitting these parts, are given in the following pages.

The fitting of the engine tuning kits should not be attempted before the engine has been progressively run in and has completed 4,000 miles. If it is necessary to fit these parts at a lower mileage the clearances of the pistons and piston rings must be checked as described.

**ENGINE PERFORMANCE**

	<b>Standard</b>	<b>After Tuning</b>
B.H.P. (Nett)	80 @ 5,000 RPM	94.1 @ 6,000 RPM
B.M.E.P.	146 @ 3,800 "	147 @ 4,500 "
Max torque (lbs.ft)	94 @ 3,800 "	94.9 @ 4,500 "

**ENGINE TUNING STAGES****Stage I**

- Modifying carburettor settings.
- Changing camshaft and distributor.
- Blanking off water flow to inlet manifold.
- Cleaning up inlet and exhaust ports in the cylinder head.
- Removing gauze from air intake silencers.
- Fitting Champion N3 sparking plugs.
- Renewing big end bolts and nuts.

**Stage II**

- Fitting lightened flywheel.
- Fitting competition clutch which has stronger springs to increase its 'clamping' load.
- Dynamically balancing crankshaft, flywheel and clutch assembly.
- Fitting engine stabiliser.

**Note.**—The oil cooler kit should be fitted after either Stage I or Stage II tuning if continuous use of high RPM is intended.

**CONTENTS OF KITS****Engine Tuning Kit (Stage I)**

<i>Item</i>	<i>No. per set</i>	<i>Part Number</i>
Complete kit	—	1206313
Camshaft	1	1208620
Camshaft thrust plate	1	P.103613
Distributor (Lucas dispatch No. 41763A)	1	1215139
Champion N3 sparking plug	4	P.43448
Air cleaner	2	1208711
Plug—cylinder head	1	9803045
Washer—cylinder head	1	9077039
Plug—water pump	1	9805031

**Carburettor parts**

Choke tubes 30 mm	2	5107836
Metering jet (150)	2	5102807
Main discharge tube (3.5 mm OE)	2	5039275
Blanking plug (By-pass)	2	5039274
High speed bleed (70)	2	5109683
Diaphragm gasket	2	K24718
Return spring—rear carb. choke lever	1	K26431

**Engine Tuning Kit (Stage II)**

Item	No. per set	Part Number
Complete kit ... ..	—	1206314
Complete kit (U.S.A. only) ... ..	1	5220554
Flywheel assembly (not in U.S.A. kit) ... ..	1	1208623
Clutch cover assembly ... ..	1	1800247
Clutch driven plate ... ..	1	1800259

Engine stabiliser comprising the following parts:

Torque restrictor arm ... ..	1	1206317
Torque restrictor rubber ... ..	1	P.113421
Washer—plain ... ..	1	9067037
Shakeproof washer ... ..	2	9664242
Nut—restrictor rubber ... ..	2	9510060

**Engine Oil Cooler Kit**

Complete kit ... ..	—	1206318
Adaptor Plate—Cylinder block ... ..	1	1201366
Union—Adaptor plate ... ..	2	9152007
Washer—Union ... ..	2	9077616
Joint—Adaptor plate ... ..	2	1207973
Bolt—Filter and Adaptor Plate to Cylinder block ... ..	4	19105221
Oil cooler ... ..	1	1201367
Bolt ... ..	4	19004045
Washer } Oil Cooler to Bracket ... ..	4	9067015
Washer } ... ..	4	9664162
Nut } ... ..	4	9600041
Support Bracket—Oil Cooler ... ..	2	1201368
Bolt ... ..	4	19004045
Washer } Bracket to Panel ... ..	4	9664162
Nut } ... ..	4	9600041
Hose—Filter to Cooler ... ..	1	1201369
Hose—Cooler to Engine ... ..	1	1201370

**Brake Lining Kit**

Item	No. per set	Part Number
Complete kit ... ..	—	1206319
Disc Brake Pad. Mintex M40 ... ..	4	1206320
Rear Brake Leading Shoe. Mintex M22 ... ..	2	1206321
Rear Brake Trailing Shoe. Mintex M22 ... ..	2	1206322

**Rear Axle Kit (Disc Wheels only)**

Complete kit ... ..	—	1206323
Axle Shaft c/w sleeve ... ..	2	5220527
Key ... ..	2	9213033
Hub Assembly ... ..	2	1215287

**Suspension Kit**

Complete kit ... ..	—	1206315
Front Springs ... ..	2	1206310
Front Anti-Roll Bar ( $\frac{2}{8}$ " dia.) ... ..	1	1206311
Roll Bar Rubbers (27/32" hole) ... ..	4	1206301
Shock Absorber—Rear R.H. ... ..	1	1206306
Shock Absorber—Rear L.H. ... ..	1	1206307

**DESCRIPTION OF KIT REPLACEMENT PARTS****Camshaft (Stage I Kit)**

This camshaft gives different valve opening periods which considerably improves the engine power output over the medium and high speed range, at some expense of low speed power and flexibility.

The cams have no quietening ramps and in consequence the valve gear is not so quiet in operation as with the standard camshaft.

A comparison of the valve timing is as follows:—

Standard Camshaft		Replacement Camshaft	
Inlet Valve opens	14° BTDC	Inlet Valve opens	25° BTDC
Inlet Valve closes	52° ABDC	Inlet Valve closes	59° ABDC
Exhaust Valve opens	56° BBDC	Exhaust Valve opens	63° BBDC
Exhaust Valve closes	10° ATDC	Exhaust Valve closes	21° ATDC

**Distributor (Stage I Kit)**

The replacement unit gives a modified advance curve which is suited to the engine performance obtained by the change of camshaft.

On a test rig this distributor gives the following advance figures while the distributor is decelerating or reducing vacuum.

Distributor R.P.M.					Distributor Advance
Run up to 2,250 RPM	...	...	...	...	13° — 15°
Decelerate to 1,900 RPM	...	...	...	...	12° — 14°
“ “ 800 “	...	...	...	...	9° — 11°
“ “ 500 “	...	...	...	...	5½° — 9°
“ “ 400 “	...	...	...	...	0° — 3½°
<i>Inches of mercury</i>					
Adjust to 8.25 ins.	...	...	...	...	4° — 6°
Reduce to 7.0 ins.	...	...	...	...	3° — 5°
“ “ 5.0 ins.	...	...	...	...	½° — 3°

**Carburettor Parts (Stage I Kit)**

The larger choke tube, metering jet, main discharge jet and high speed bleed, which are used to give more power, are alterations from the standard setting.

The vacuum operated by-pass valve, and by-pass jet, are replaced by a blanking plug when these items are removed from WIA type Zenith carburettors. These carburettors are used when cars are fitted with the export type micro-element air cleaner. If this filter is not fitted, and the carburettors have separate gauze type intakes, only the parts mentioned in the previous paragraph will be needed.

**Flywheel (Stage II Kit—see Contents of Kits, page 6)**

The flywheel has been lightened to reduce its inertia, and this gives improved acceleration.

**Clutch Unit (Stage II Kit)**

Stronger springs are fitted to the clutch pressure plate to ensure freedom from clutch slip.

A special competition type driven plate is also supplied.

**Oil Cooler Kit**

The oil cooler is not specified particularly for Stage I or Stage II tuning. Where, however, the engine is required to run at almost continuous high RPM, such as in circuit racing and long mountain climbs, THE OIL COOLER KIT SHOULD BE FITTED.

The oil cooler, when fitted, is mounted in front of the radiator so that it is in the air stream passing through the front grille. It

is connected by flexible piping to a special adaptor block fitted between the filter base and cylinder block.

All oil delivered by the oil pump is passed through the oil cooler and then passed to the filter unit and the oil gallery in the engine.

This means that all oil reaching the bearings, and returning to the sump from the relief valve will be cooled oil. The actual temperature reduction of the oil is approximately 35°F.

### Brake Lining Kit

These brake linings are more suited to frequent hard brake applications but require greater brake pedal pressure than the standard linings.

### Rear Axle Kit (*Disc Wheels only*)

The replacement axle shafts have their zone of hardening extended to further increase their strength.

The replacement hubs and driving keys are hardened similarly to the wire wheel type hubs.

This kit should be fitted when cars having disc wheels are tuned to Stage I or II performance, and where very high cornering forces will be encountered.

### Suspension Kit

The replacement front springs, anti-roll bar, and rear shock absorbers, are provided to give improved handling and cornering.

## FITTING KIT PARTS TO ENGINE

The extent to which the engine is dismantled depends upon what parts are being fitted, and each operation is described in the following pages.

Stage I tuning can be carried out with the engine in the car. Stage II tuning requires the removal of the engine. If both stages of tuning are undertaken at the same time it will be easier to remove the engine first.

Whilst, as is previously stated, special tuning should not be undertaken before 4,000 miles running, there may be special cases where it is necessary and details of piston requirements are given under, Pistons—checking clearances on page 13.

### Camshaft—to change

Remove front grille (*if engine is not removed*).

Remove radiator.

Remove crankshaft pulley and timing cover.

Remove timing wheels and chain. Note oil thrower in front of crankshaft sprocket.

Remove sump, oil pump and distributor.

Remove camshaft thrust plate.

Remove cylinder head, rocket shaft and push rods. The work to be carried out in the cylinder head and carburettors, whilst removed from the engine is described separately on pages 15 to 20.

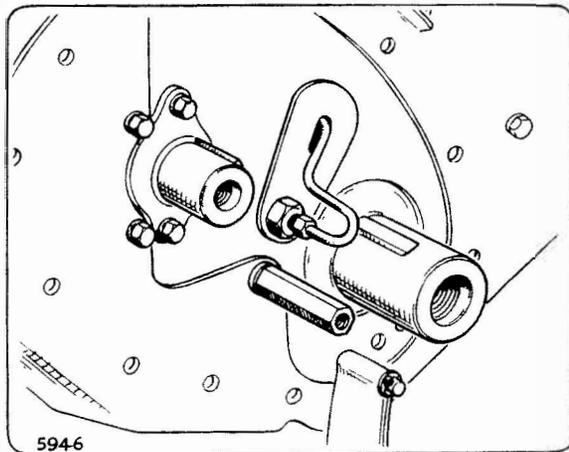
Remove tappet cover and tappets (cam followers) and fuel pump.

*Carefully examine tappet bottom faces. These faces should show a highly polished finish. Renew any that show signs of pitting or wear.*

Withdraw camshaft.

NOTE. The dark grey Parco-Lubrised finish on the replacement camshaft must not be removed and to ensure its retention ONLY PETROL may be used to clean it. This finish is used to assist in the running in of the cam faces and cam followers.

Place the new camshaft in position and bolt on the new camshaft thrust plate, provided with the Kit parts.



**Fig. 1.** Blanking off timing chain oil pipe hole.

Before replacing the timing wheels the hole in the cylinder block through which the timing chain oil feed pipe passes, should be blanked off. This is to prevent a pressure build-up in the timing case, which can cause oil leakage past the crankshaft pulley oil return scroll. This can be done as shown in Fig. 1. The blanking plate is made from 16 SWG ( $.064'' = 1.5$  mm) mild steel sheet and is held in place by the union. A small slot is cut into the plate to allow insertion of the bent end of the feed pipe.

When replacing the timing wheels and chain, the camshaft sprocket must be pulled on to the camshaft by using a nut, plate and a suitable length of threaded rod screwed into the front end of the camshaft. If this sprocket is driven on the camshaft, the camshaft will move backwards and remove the large core plate at the rear end of the rear bearing of the camshaft. Fig. 2 shows the timing wheels with the timing marks correctly positioned.

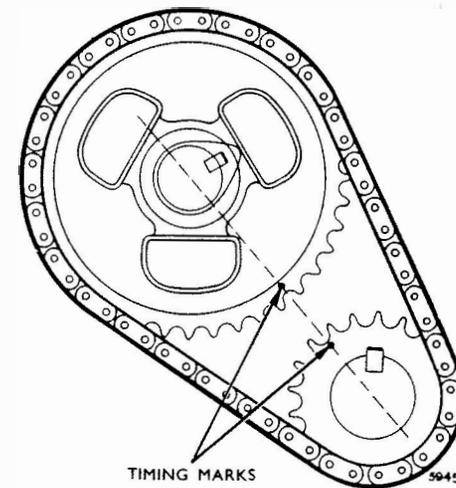
After re-fitting the timing chain, and timing wheels, the camshaft endfloat should be checked with a dial gauge. The endfloat should be  $.002'' - .003''$  ( $.05$  mm— $.07$  mm).

### Pistons—checking clearance

This check is only necessary when the engine mileage is below 4,000 miles (6,400 Km).

Pistons are fitted to new engines with a skirt clearance of  $.0010'' - .0018''$  ( $.02$  mm— $.04$  mm) but for engines in which the main requirement is maximum performance, pistons should have a skirt clearance of  $.0018'' - .0020''$  ( $.04$  mm— $.05$  mm). In the absence of suitable measuring equipment such as a ring gauge, cylinder bore clock gauge and external micrometer, piston clearance can be checked in the following manner:—

1. Pistons should be thoroughly cleaned.
2. Cylinder bores should be wiped dry from an oiled condition.
3. Insert piston upside down into the cylinder bore with a strip of  $\frac{1}{2}''$  (12 mm) wide x  $.0015''$  ( $.03$  mm) thickness feeler strip between the maximum thrust side of the piston and



**Fig. 2.** Timing wheels correctly fitted.

the cylinder bore. The piston should be at the bottom of the bore. A pull of  $\frac{1}{2}$  lb. to  $1\frac{1}{2}$  lbs. (on a spring balance) will be required to pull the feeler out if the clearance is  $\cdot0018''$ — $\cdot0020''$  ( $\cdot04$ — $\cdot05$  mm).

4. Any piston or pistons found with less clearance than that previously given should be replaced by fitting 'down graded' pistons. Piston clearances obtained by the grading system are:—

Bore grade	Piston grade	Piston Clearance
Same	Same	$\cdot0010''$ — $\cdot0018''$ ( $\cdot02$ mm— $\cdot04$ mm)
Same	Less one grade	$\cdot0014''$ — $\cdot0022''$ ( $\cdot03$ mm— $\cdot05$ mm)
Same	Less two grades	$\cdot0018''$ — $\cdot0026''$ ( $\cdot04$ mm— $\cdot06$ mm)

The possible difference of  $\cdot0008''$  ( $\cdot02$  mm) clearance when a piston is fitted in a bore of the same grade is of course due to the  $\cdot0004''$  ( $\cdot01$  mm) tolerance on bore and piston grade diameters.

5. If replacement pistons are fitted each piston must be of similar weight.

The fitting of 'down graded' pistons will probably give some increase in oil consumption.

Before fitting the new pistons with their new piston rings the glaze on the cylinder bores must be removed.

This can be done with No. 1 or  $1\frac{1}{2}$  grade emery paper wrapped around a dummy wooden piston, moved up and down the bore, and rotated first one way and then the other, to give crisscrossed abrasions.

### Top piston rings

Where it is necessary to remove the pistons for checking their clearance, the top piston ring gaps should be checked. These should not be less than  $\cdot025''$  ( $\cdot63$  mm).

### Flywheel and clutch

When fitting these items on Stage II tuning, the following procedure must be carried out:—

- Bolt flywheel on crankshaft and check flywheel run out with a clock gauge. This must not exceed  $\cdot003''$  ( $\cdot07$  mm) when measured at the outer diameter of the clutch lining face.
- The four flywheel fixing bolts must be tightened to 37—43 lbs. ft. (5.1—5.9 Kg./mm) torque.
- After bolting the replacement clutch pressure plate assembly to the flywheel, the crankshaft, flywheel, and clutch pressure plate should be checked for dynamic balance as a complete assembly.

### Cylinder head

Remove manifolds and carburettors as a complete assembly.

Remove valves.

File or grind away any casting roughness in the inlet and exhaust ports in the cylinder head. Also modify these ports by removing any surplus metal found in the places A and B shown in Fig. 3.

The valves should be faced up and the valve seats re-ground and checked for concentricity. Lightly grind in valves and check for seating.

The rating of the standard valve springs is quite satisfactory for competition work. After removal all springs should be checked to the following data:—

	Inner Spring	Outer Spring
Free length	1.93" (4.9 cms)	2.33" (5.66 cms)
Fitted length	1.58" (4.01 cms)	1.70" (4.32 cms)
Load at fitted length	25 lbs. (11.3 kgs)	56 lbs. (25.4 kgs)

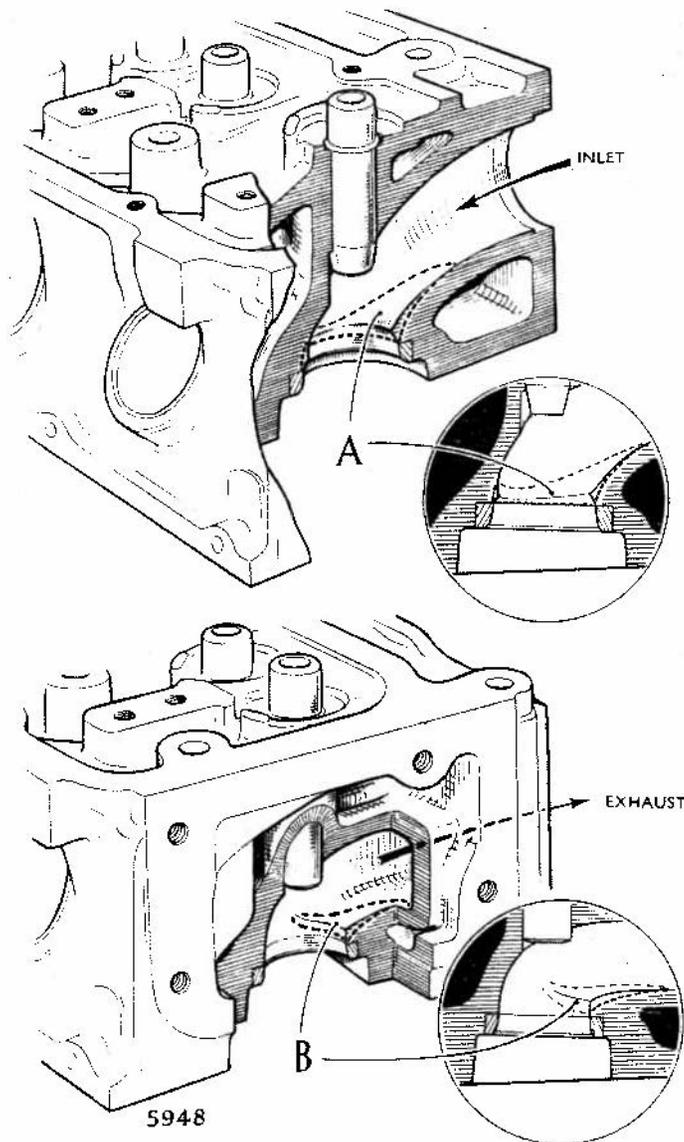


Fig. 3. Cylinder head inlet and exhaust port modification.

Defective valve springs can only be replaced in pairs.

While the cylinder head is off, a careful check should be made to ensure that the inlet and exhaust manifold ports line up to the cylinder head ports, as there must be no 'steps' or 'edges' to impede the incoming mixture or outgoing exhaust gas. This check can be made by making a thick paper template of the port holes while the paper is located on the manifold fixing studs. The template is then located to the manifold fixing holes and the port hole positions in the template compared with the portholes in the manifolds. Any misalignment of the ports will then be apparent and any steps or edges that could oppose gas flow should be carefully filed away.

A check should be made to see that the manifold to cylinder head joint does not protrude over the port holes. Blank off water feed to inlet manifold by fitting plugs provided in kit in place of the water pump and cylinder head union connections. Remove water connection pipes from inlet manifold. These should be retained as they may be needed for cold weather driving.

#### Carburettors (See Fig. 4)

While the manifolds are off, the carburettors should be removed and the carburettor flange faces and inlet manifold faces checked for flatness using a surface plate and marking. The use of a straight edge is not sufficient.

Remove carburettor throttle bodies and the screws locating the choke tubes.

Remove existing carburettor choke tubes and fit larger choke tubes supplied in kit. While the throttle bodies are removed, carefully scrape away any varnish deposit in the throttle body bores.

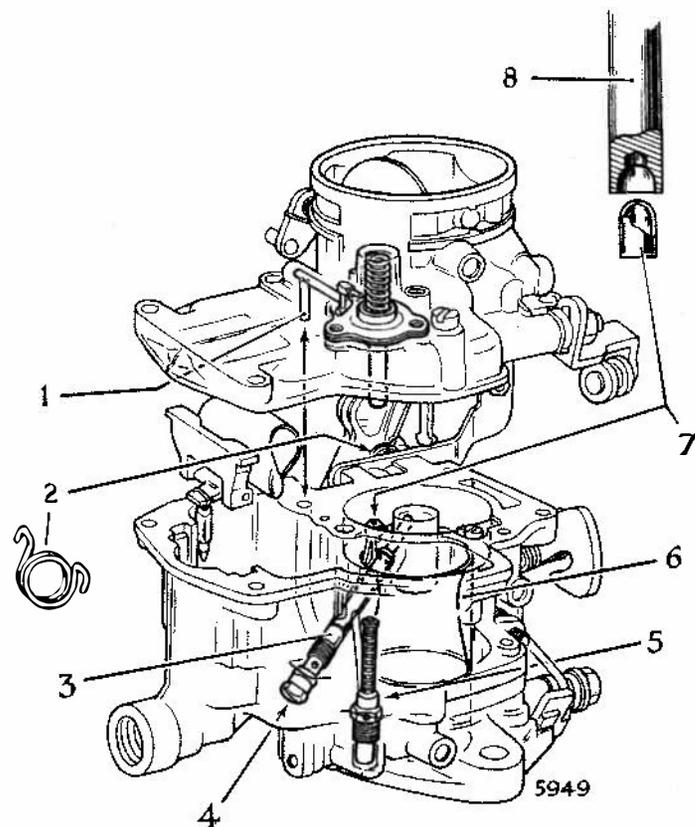


Fig. 4. Ghost view of carburettor passageways and jet positions.

Screw back the throttle stop screws and ensure that throttles are properly centralised in their bores. Fit new heat resisting joints between carburettor bodies and throttle bodies. A thin smear of jointing should be used on these faces and care is needed to prevent jointing from entering carburettor passage-ways. Due to the compression of the heat resisting joint the four cheese headed screws, holding the throttle body to the carburettor body, must be tightened by using a spanner on the screwdriver. The use of a screwdriver alone is not sufficient.

Remove items (3), (4), (5) if fitted, and (7). The high speed bleeds (7) should be pulled out with large pliers, pincers, or side cutting wire cutters, which of course destroys them. Replace all these items with the parts, or jets, supplied in the kit. If the main discharge jets (3) cannot be pushed out after removing the metering jets (4), a taper thread tap may be screwed into its lower end to allow the jet to be pulled out.

When fitting the replacement high speed bleed (2) a suitably recessed punch (8) must be used as shown in the illustration, Fig. 4.

The blanking plate and joint or diaphragm must effectively seal off the passage-way (1) which is always at inlet manifold vacuum. This is 18"—20" Hg on idling and even more under closed throttle over run conditions.

Fit choke control lever spring (2) to choke control lever on rear carburettor.

Ensure that the throttle on the front carburettor opens to a gap of .025" (.63 mm) when the strangler lever is pulled fully over. A No. 72 drill can be used to check the throttle gap between the throttle edge and throttle bore, and any adjustment needed is made by altering the throttle connecting rod position in the strangler lever. This throttle setting is made to bring the throttles into the correct position for cold starting when the choke control is pulled fully out.

Re-fit inlet and exhaust manifold to the cylinder head with a new joint.

Adjust both carburettors slow running speed screws so that each throttle is open .003" (.08 mm) at the maximum diameter at right angles to the throttle spindle axis.

Replace both carburettors without altering the slow running throttle screw settings. New joints should be fitted at the flange

joints between the carburettors and inlet manifold. When tightening the clamp bolt, adjacent to the flexible disc coupling, ensure that the two throttle stop screws are hard against their stops and that the throttles are absolutely free to move. Incorrect coupling of the carburettors can cause considerable binding and wear of the throttle spindle.

Adjust rod connecting choke levers so that both choke operating cams are against their off position stops together.

### Re-assembling engine

Replace crankshaft (if removed). Tighten main bearing bolts to 50/60 lbs./ft. (6.9/8.2 Kg.m). Check crankshaft endfloat which should be .002"—.004" (.05—10 mm). The higher limit is preferable for high performance running.

Replace pistons and connecting rods, (if removed). It is very easy to break the thin edges of the oil scraper rings if an improvised ring compressor is used. Extreme care should therefore be taken when replacing piston rings.

The recommended piston ring compressor is the Churchill Tool R.G.306.

Fit new big end bolts and nuts. Tighten these nuts to a torque loading of 25 lbs./ft. (3.45 kg/m). The threads must be perfectly clean and lightly oiled before the nuts are tightened.

Replace oil pump. To ensure correct engagement of the oil pump drive gear with its driving gear on the camshaft, the engine should be turned to the No. 1 firing TDC position and the oil pump gear positioned so that its distributor driving slots are as shown in Fig. 5 when the pump is bolted up.

Replace sump.

Replace distributor and fuel pump.

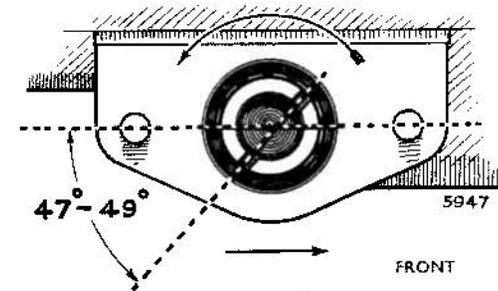


Fig. 5. Oil pump driving slots at No. 1 firing T.D.C.

Replace oil thrower on crankshaft and timing cover. The cover must be centralized to the crankshaft with the Churchill tool R.G.89. In the absence of this tool a hollow arbor should be made by turning its outside diameter to be a sliding fit in the timing case bore and boring its internal diameter to be a sliding fit on the crankshaft. The diameters must be perfectly concentric.

Replace cylinder head, tightening the fixing bolts to a torque loading of 45 lbs.ft. (6.22 Kg.m). The cylinder head bolts must always be tightened while the engine is COLD and the tightening sequence repeated until it is certain that each bolt carries the correct torque loading.

Replace engine (if removed).

Remove gauze from air silencers and refit.

Fit engine stabiliser (Stage II tuning) to cylinder head as shown in Fig. 6, using plate as a template to determine where the  $\frac{3}{8}$ " (10 mm) dia. hole in the bulkhead should be drilled. It may be necessary to move the choke operating cable slightly to the near (left) side.

### Sparking Plugs

Fit the new Champion N3 sparking plugs after setting gaps to .025" (.63 mm).

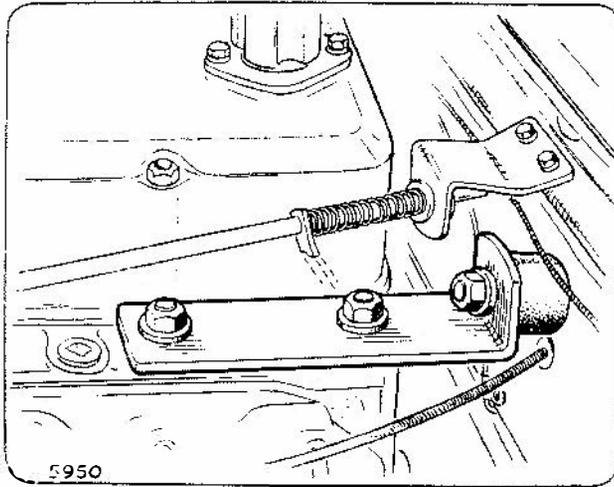


Fig. 6. Engine stabiliser in position.

### OIL COOLER KIT—Fitting (See Fig. 7)

This unit is fitted in front of the radiator and behind the front grille as illustrated. The oil cooler mounting bracket is bolted to the panel above the grille by four bolts and nuts and the cooler to the bracket by another four bolts and nuts.

The adaptor block, to which the oil pipes are connected, is fitted between the oil filter base and the engine cylinder block, using the new joints and longer bolts provided in the kit. These bolts must be tightened progressively and very evenly.

The two flexible oil pipes connecting the unions in the adaptor block, below the filter, to the oil cooler, pass through the large elongated hole in the radiator support panel. They should be suitably clipped to the wing valance to prevent excessive movement.

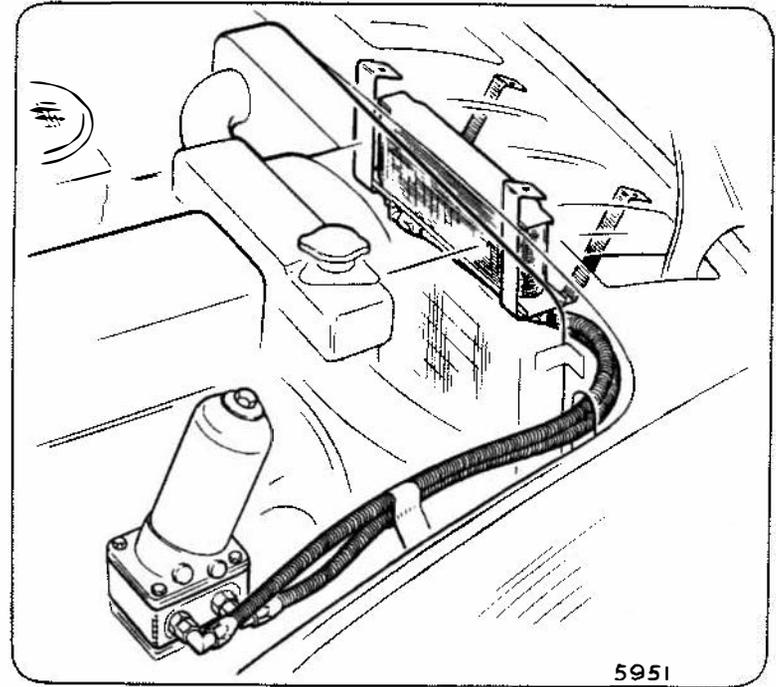


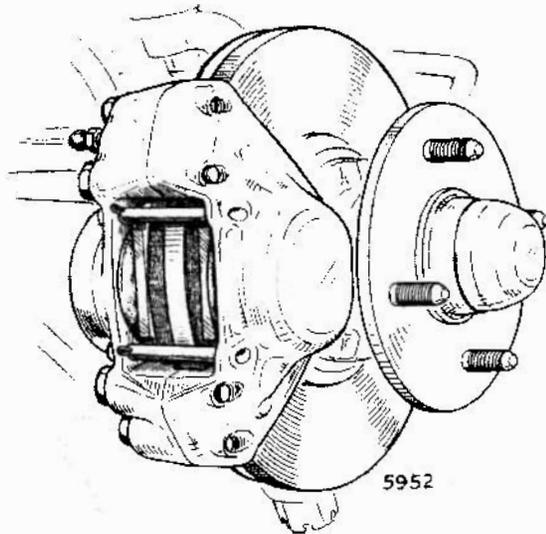
Fig. 7. Oil cooler fitted in position, oil cooler pipe connections and pipe run.

### BRAKE LINING KIT

Fig. 8 shows the clips and pins to remove to allow the brake shoe pads to be changed. Fig. 9 shows the rear brake shoes correctly installed. The full procedure is given in Section K of the Workshop Manual WSM.124.

### REAR AXLE KIT (For Disc Wheels only)

It is most important that the axle shaft bearings are correctly fitted. This requires the use of special tools and the correct procedure is fully explained and illustrated in Section (G) of the Work-



**Fig. 8.** Front wheel disc brake showing brake pad retaining pins and clips.

## FITTING KIT PARTS TO SUSPENSION

### Front Springs

Changing the front springs requires a suitable spring compressor and the removal and replacement of the lower link of the front suspension.

When fitting the new springs careful attention should be given to the following items.

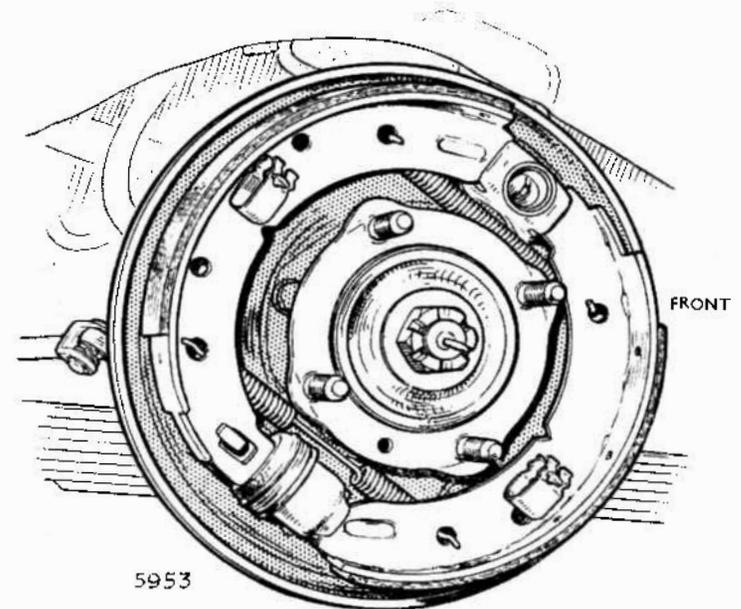
1. Ensure that the rubber insulating ring is correctly fitted when placing the spring in position.

2. Tighten the lower link fulcrum pin fixing bolts to a torque of 30-32 lbs. ft. (4.15--4.42 kgm).

Spring washers (Part No. 9660241) should be used under these bolt heads instead of the existing lock plates, which should be discarded.

3. Ensure that the sealing rings are correctly fitted when replacing the eye bolt at the outer end of the link.
4. Check front wheel camber and toe-in.

Section F in the Workshop Manual WSM.124 describes in detail how to change front springs, and how to check the camber angle and front wheel toe-in.



**Fig. 9.** Rear brake shoes assembled on brake back plate.

**Front anti-roll bar**

The heads of the rivets holding the spring pan to the lower link front arm should be reduced to a height of .12" (.3 mm) by means of a rotary file or portable grinder, to prevent fouling occurring when fitting the increased diameter anti-roll bar.

The bores of roll bar rubbers should be well graphited before fitting.

**Front bump rubbers**

The front bump rubbers should be cut down so that they are  $\frac{1}{2}$ " (12.7 mm) thick

**Rear shock-absorbers**

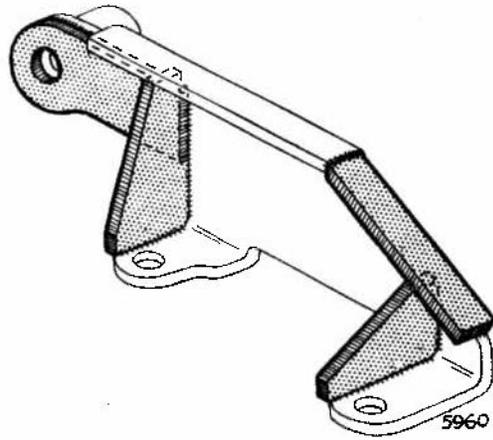
Both rear shock absorbers should be removed and the replacement units fitted.

**GENERAL RECOMMENDATIONS**

In addition to the work previously described the following items should be carefully checked or considered.

1. Front Hub Endfloat—This must be checked with a clock gauge. Correct endfloat is .002"—.006" (.05—.15 mm).
2. Rear hub nuts tightened.—Correct tightening torque is 160/180 lbs. ft. (22/25 Kg. m).
3. Propellor shaft—Condition of propellor shaft universal joints and tightness of rear universal joint bolts and nuts.

4. Tyres—Fit Dunlop racing R.5 tyres and inflate to 50 PS front and 40 PSI rear.
5. Wheel balance—After fitting tyres, wheels should be carefully balanced.
6. Engine RPM—This must not be allowed to exceed 6,000 RPM.
7. Weight reduction—In addition to the removal of all loose trim items such as carpets, and door trim pads it is suggested that the heater where fitted, should be removed.  
  
Lighter seat can be fitted if available. Perspex can be used to replace the door glasses.
8. NOTE. It is not permissible to lighten any engine parts by drilling.
9. Wire Wheels—These are preferable to disc wheels for speed events. Disc wheels can, however, be used provided the rear axle kit is fitted as previously referred too.
10. Cylinder Head—It is most important that this is pulled down correctly while the engine is COLD to the torque figure given under Reassembly on page 21. When this is done the tightening sequence must be followed several times to ensure that each cylinder head bolt is correctly tightened and remains so after tightening of all other bolts. The cylinder head should be pulled down after the engine has been run, and after it is allowed to become COLD.

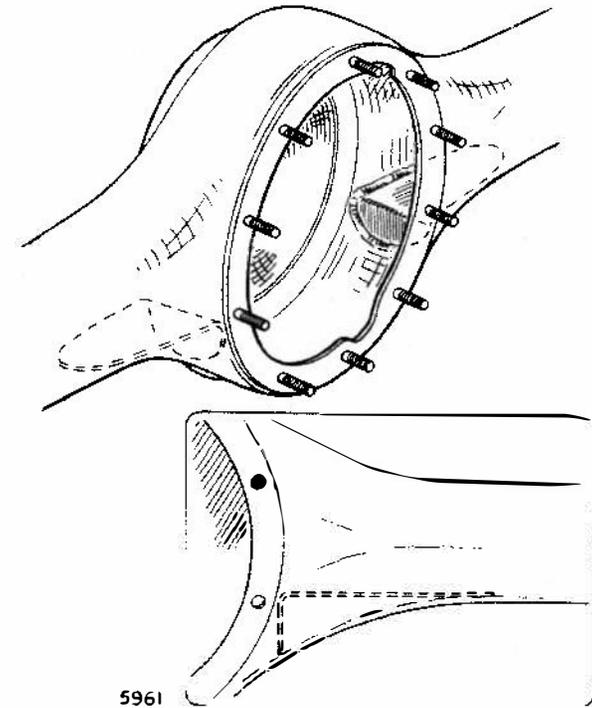


**Fig. 10.** Throttle shaft bracket on front carburettor—stiffening details.

11. Throttle Shaft Bracket—This bracket, which is mounted on the front carburettor should be stiffened up by welding on similar thickness mild steel as illustrated by the grey parts in Fig. 10.
12. Throttle linkage—A thorough examination should be made of all ball joints and linkage connection to ensure that these items are not worn or assembled incorrectly so as to impair their reliability. The ball end of the short throttle shaft above the carburettor is held in its bearing bracket, on the front by a 1/16" split pin. This pin must be removed and the hole drilled out to take a 3/32" split pin. No. 41 drill (.096"—2.4 mm) should be used as the split pin must be a good fit in the hole.
13. Engine oil pressure—If the car is to be run at continuous high speeds Shell X100—40 oil should be used. At 50 m.p.h. (80 k.p.h.) hot oil pressure should be 40—50 lb./sq. in. (2.8—3.5 kg/cm<sup>2</sup>).

14. Rear Axle casing modification—When cornering at very high speeds, such as occurs in circuit racing, the centrifugal force is high enough to force the rear axle oil up into the rear axle banjo tube. This considerably reduces the amount of oil that is lubricating the crown wheel and pinion, and tends to flood the oil seal. To overcome this difficulty the rear axle should be removed as a complete assembly, and, after completely dismantling, modified as shown in Fig. 11.

This illustration, which is self-explanatory, shows how two baffles are welded inside the banjo housing.



**Fig. 11.** Oil baffles fitted welded in position in rear axle housing.

These baffles prevent the oil from being thrown up into the banjo tubes. They should be made from 12 SWG (.104"—2.6 mm) sheet steel and welded into position.

This modification is only needed for high speed circuit racing.

## TUNING ADJUSTMENTS

### Ignition Timing

Clean contact breaker points and adjust point gap to .016" (.04 mm).

Check tension of contact breaker spring. This should be 18—24 ozs. taken at the point end of the moveable contact. The static ignition setting should be set to 10° BTDC and checked by means of a small 12v. bulb while turning the engine over by hand. 10° before TDC is equivalent to a distance of 13 mm. between the line on the crankshaft damper rim and the pointer on the timing case. As the idling speed of a specially turned engine is around 1,000 RPM the actual "static" ignition setting cannot be checked with a stroboscopic timing light. The final ignition setting is made by road test as described in a later paragraph.

### Sparking plugs

New Champion N3 plugs should be fitted. The correct gap setting is .025".

### Valve Rocker clearance

These should be set to .012" (.30 mm) inlet and .014" (.36 mm) exhaust with the engine VERY HOT because of the greater expansion of the aluminium head.

## Carburettor—adjustments

The throttles were synchronised as the carburettors were assembled and replaced on the inlet manifold. Some adjustment of BOTH throttle stop screws and slow running mixture control screws may be needed to obtain the correct slow running speed, which is around 900—1,000 RPM.

A careful check should be made to see that full opening of both throttles is obtained when the accelerator pedal is depressed to 1" (25 mm) from the floor covering and that the full throttle stops operate together. The rear carburettor full throttle stop MUST NOT operate first. If this occurs the stop boss on the rear carburettor should be filed so that both throttles reach their stops together.

### Ignition timing—Road performance test

After setting the static ignition timing a road performance test can be made by taking stop watch readings of the time taken to accelerate under FULL THROTTLE conditions from 30 to 60 MPH on a level road. Small adjustments are then made by advancing, or retarding, the ignition vernier adjustment on the distributor, until the lowest stop watch reading is obtained. Several test runs have to be made on the same road.

This test required a considerable amount of skill and ensures that the best possible ignition setting is obtained.

It is emphasised that this test can only be made when the distributor centrifugal advance mechanism is working correctly.

Only small alterations can be made to the static ignition setting and great care is needed not to over advance the engine.

If the distributor is in any way suspect it should be removed and checked on a reliable distributor analyser.

One vernier division on the distributor is equal to 4° of crankshaft movement and one turn of the knurled adjusting control to 3° movement of the crankshaft.

**SPECIAL ACCESSORIES**

The following special accessories are obtainable for Alpine Series II cars, and may be purchased from Rootes Dealers.

Item	Part No.
Seat Covers	Details on application
Touch-In Paints	" " "
Interior Cleaner	5240134
Liquid Polish	5240133
Rear Seat Cushion—Red	5240245
—Lake Blue	5240288
—Black	5240144
Safety Belt (Lap Strap)	H.111777
Petrol Locking Cap	P.103989
Under Bonnet Lamp	5220127
Switch—3 way kit	5220276
Tyre Inflator	1207928
Bonnet Mascot	5240256
Bonnet Motif	2201416
Clock	5220381
Cigar Lighter	5220054
Heater	1202166
Blower	1202168
Ammeter	5220146
Map Pocket Kit—Black	2207888
—Red	2207887
—Light Blue	2214858
Sun Visor interior	2214729
Aux. Driving Lamp c/w carrier	5220273
Aux. Fog Lamp	5220309
Badge Bar	1201420
Badge Clips	H.101100/1
Mounting Brackets...	1201417
Lamp Carriers	1201418
Windscreen Washers	1201615
Door Mirror	H.119754/5
Wing Mirror	H.119761
Luggage Grid	2214710
Multi-purpose Cushion	H.111728
Cockpit Cover LHD and RHD	2513362/3
Hardtop	2207886
Reverse Lamp Kit	5220149
Boot Floor Mat	2513082
Fire Extinguisher—10 oz.	P.48790
—20 oz.	2212925