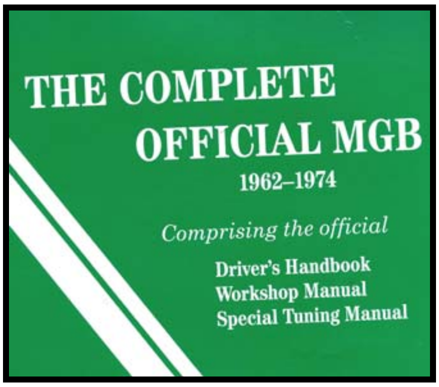
MGB ENGINE MAINTENANCE & TUNING

I have written this manual and compiled the additional information to assist owners of MGBs, and in particular my car MGB 973 to carry out basic maintenance and tuning functions. Hard copies of the *MGB Electrical Systems Manual, the Haynes Manual* , the "*Complete Official MGB Driver's Handbook ,and Workshop Manual and Special Tuning Manual*", sometimes called "*The Bentley Manual"* are provided with the car. The "General Data" on the engine specifications and part 4, the fuel system in the Bentley Manual provides more detailed information.

The car also comes with my tuning kit which includes all the special tools and instruments to effect the tuning and timing procedures referenced in this paper.



The "Bently" Manual

My Tuning Kit

Also, in pdf format, the SU Manual "*Tuning SU Carburettors*" Manual is provided with all the electronic records of the car.

This paper summarises my input on the tuning of the engine and includes the specific differences and changes that I have made.

Before embarking on the tuning of the twin SU HS4 carburettors and the associated timing on the car, it is worthwhile reviewing the operating principles of a petrol engine together with the issues of air / fuel mixture and timing.

Engine Operation Principles

The MGB is a 4 cylinder 4 stroke "Otto" cycle petrol engine. The "4 stroke" name is given because in any single operation of any one of the cylinders, a piston moves 4 times in a cylinder, each stroke representing 180^o in a rotation of the crank shaft.

Figure 1 below shows a single cylinder with each stroke (180^o).

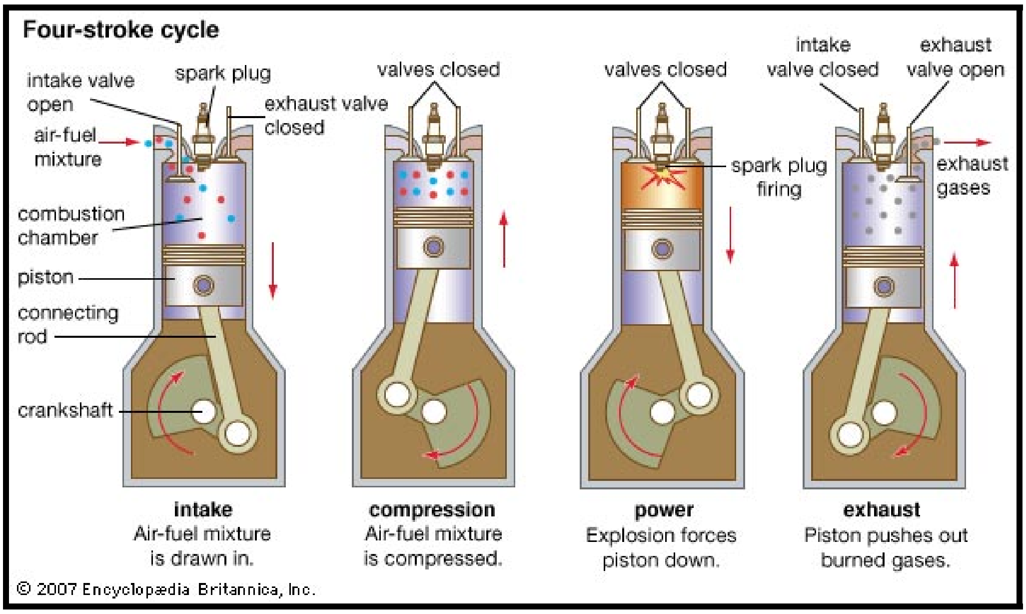


Figure 1 – Four Stroke Cycle

Figure 2 below shows a 4 cylinder engine at a single point in time when No.1 cylinder (at left) is firing, No. 2 is the "power" stroke. No. 3is the induction stroke and No. 4 is the "exhaust" stroke. Note that this is diagrammatic only and in the MGB, the firing order is 1 – 3 – 2 – 4. Note also that Figure 2 shows an overhead cam system whereas the MGB has its chain driven camshaft lower down in the engine block with push rods acting on rocker arms as shown in Figure 3.

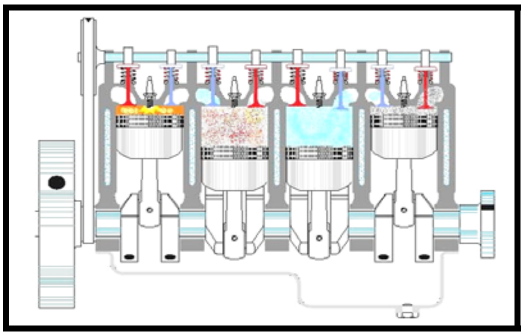


Figure 2 – 4 Cylinder Operation

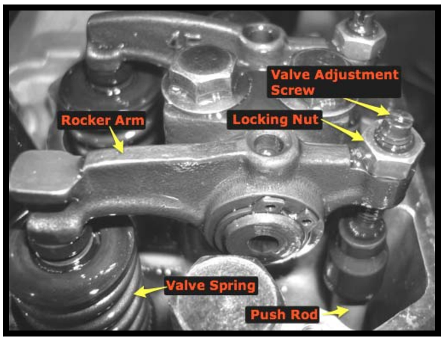


Figure 3 – Push Rod Valve Operation

General

Before embarking on the descriptions and procedures, it is worthwhile to identify the key elements of the fuel and ignition systems.

More than 500,000 MGBs were manufactured with 350,000 being left hand drive for the US market and ~150,000 being right hand drive for the UK market. Additionally ~9,000 were assembled from CKD packages in Australia.

Consequently not only will many variants be found but also many parts were transferred fro cars to badly corroded from “donor” cars from the USA and elsewhere. The USA cars invariably incorporated different carburettors, distributors and anti-pollution equipment which have very probably been removed.

Fuel System

The carburettor specifications below may be useful in determining the build date of the car although and as discussed above, parts with part numbers may have been sourced from other cars.

The fuel is delivered into the appropriate cylinder when the inlet valve is opened by the action of the rocker arm / push rod / camshaft.

Fuel is delivered in conjunction with the appropriate quantity of air by the two carburettors as shown in Figure 4, these are connected to an inlet manifold and whilst the manifold cross connects both carburettors, Cylinders 1 and 2 (from the front) are supplied by the front carburettor and cylinders 3 and 4 by the rear carburettor. Note that because cylinders 1 and 2 do not draw in fuel at the same time; and likewise cylinders 3 and 4, the result is that there is a good balance of fuel delivery.

The ideal air / fuel mixture is called the “stoichiometric” ratio and for gasoline (petrol) is 14.7:1. i.e. 14.7 units of air to 1 unit of petrol – measured in mass – usually kilogrammes.

Figure 5 below shows the relationship of air / fuel with notations for “rich” and “lean” mixtures. For the MGB which has not been converted to run on unleaded fuel (by replacement of the valve seats and valves with hardened units); I would suggest that the mixture be on the “rich” side because running “lean: will result in a hotter burn with associated damage to the valves and seats.

Later in this paper I discuss methods of adjusting the fuel mixture.

Figure 4 – Twin Carburettors

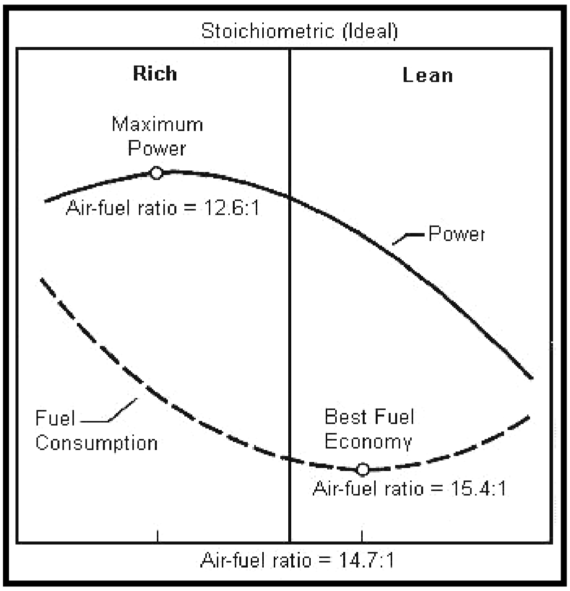


Figure 5 – Air / Fuel Ratio

Firstly, In order to identify the model of carburettor, Table 1 lists the carburettors fitted to MGBs from 1968 to 1976 Table 1 below includes details of the SU HS4 (1 ½") throat carburettor.

For the carburettor on my MGB, the SU Model is shown as ADU 492 – with suffixes F and R being the front and rear carburettor respectively. Examination of Table 1 and Figure 6a, indicate a 1972 build.

HS4/HIF4 Carburettors as fitted to MG B Series engine

Dual 1-1/2" throat carbs on the 1800cc engine

model year	model name	Carb model	Std. needle	rich needle	weak needle	needle mounting	Needle Guide	Needle Screw	Piston spring	Throttle disk
1968	MGB (USA)	AUD265 (HS4)	AUD1530 (FX)			fixed		AUC2057	AUC4387 (red)	
68-69	MGB MKII (USA)	AUD326 (HS4)	CUD1004 (AAE)			biased	AUD4288	AUD4251	AUC4387 (red)	WZX1329
70-71	MGB MKII (USA)	AUD405 (HS4)	CUD1004 (AAE)			biased	AUD4288	AUD4251	AUC4387 (red)	WZX1329
71	MGB MKII (USA)	AUD465 (HS4)	CUD1010 (AAL)			biased	AUD4288	AUD4251	AUC4387 (red)	WZX1329
72	MGB	AUD492 (HS4)	CUD1018 (AAL)			biased	AUD4288	AUD4251	AUC4387 (red)	WZX1323
72	MGB MKII (USA)	AUD493 (HS4)	CUD1018 (AAL)			biased	AUD4287	AUD4251	AUC4387 (red)	WZX1329
72-74	MGB MKII (USA)	AUD550 (HS4)	CUD1027 (ABD)			biased	AUD4287	AUD4251	AUC4387 (red)	WZX1329
74	MGB (USA)	AUD630 (HS4)	CUD1027 (ABD)			biased	JZX1039	AUD4251	AUC2107 (lt blue & blk)	WZX1329
65-66	MGB & GT	AUD135 (HS4)	AUD1004 (#5)	AUD1005 (#6)	AUD1008 (#21)	fixed			AUC4387 (red)	WZX1323
67-68	MGB & GT	AUD278 (HS4)	AUD1530 (FX)	AUD1004 (#5)	AUD1473 (GZ)	fixed			AUC4387 (red)	WZX1323
69-71	MGB	AUD325 (HS4)	AUD1530 (FX)	AUD1004 (#5)	AUD1473 (GZ)	fixed			AUC4387 (red)	WZX1323
72	MGB	AUD434 (HIF4)	CUD1018 (ABD)			biased	AUD4287		AUC4387 (red)	WZX1323
73-74	MGB (ECE)	AUD616 (HIF4)	CUD1018 (ABD)			biased	AUD4287		AUC4387 (red)	WZX1329
74-76	MGB (ECE)	FZX1001 (HIF4)	CUD1051 (ACD)			biased	AUD4287		AUC4387 (red)	WZX1329
76	MGB	FZX1229 (HIF4)	CUD1051 (ACD)			biased	AUD4287		AUC4387 (red)	WZX1329

Note: 1.) ## signifies throttle valve has a poppet valve on it
2.) Rich/Lean needles are elevation/atmosphere changes not

Table 1 – SU Carburettors by Date & Model

Figure 6a - Carb identification

Figure 6b - Fuel Hose

Note Figure 6b indicating fuel grade hose used. Note also that apart from this hose, it is unknown if the elastomers and hoses in the fuel system are compatible with unleaded fuel.

Referring to Figure 7 below, SU carburettors work on the constant depression or constant vacuum principle. The body (1) of the carburettor includes a domed cover (2) housing a spring loaded piston (3) which reacts to the air flow (9) into the engine. Attached to the piston is a tapered needle (5) which alters the fuel delivery as it rises and falls. This tapered needle is housed within a brass jet (6) which is adjustable, up and down by the adjusting nut (7). As the throttle disc (8) is opened, the piston rises by the partial vacuum formed above; the rising if the piston and needle increases the annular space between the needle and the jet allowing more fuel (10) to be drawn into the air / fuel flow (11) into the engine. The oil filled “damper” (4) controls the speed of opening thus giving more even acceleration providing variable amounts of fuel and air to cope with the changing demands of the engine – see below.

On the rear carburettor there is a small port (12) drilled into the body which aligns with the throttle disc. This is connected to the Distributor diaphragm by a hose (13) and Figure 8. When the throttle is opened, the disc edge uncovers the port and the vacuum caused by the increase in engine speed is sensed by the distributor and the timing is advanced, this is known as “vacuum advance” – see below.

At this point I would like to mention the use of Weber carburettors. Many drivers consider that the equivalent size (twin 40mm) provides an increase in horsepower. Having used both types of carburettors on my previous race cars (1650cc 105E Ford Cortinas), I can vouch that neither properly set up SUs nor Webers have any significant advantage. The Weber however has a separate high rate fuel delivery feature on hard acceleration compared to the SU feature of even acceleration mentioned previously.

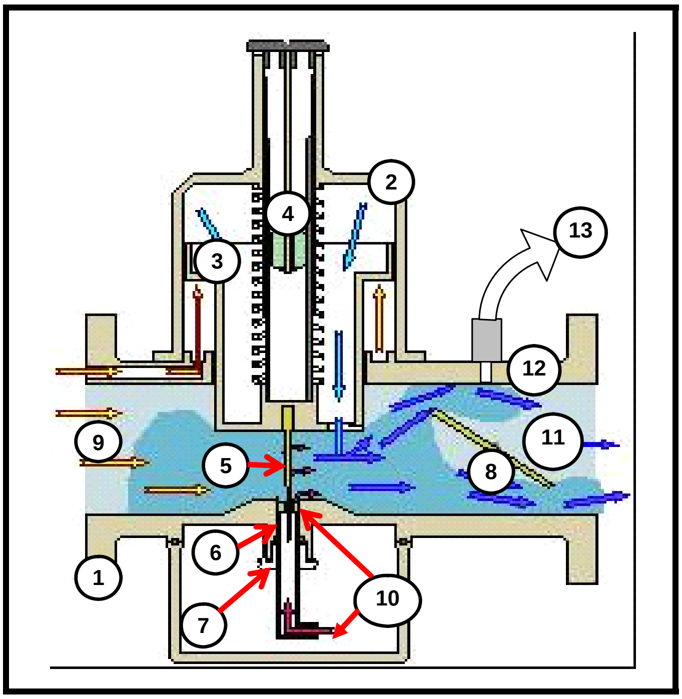


Figure 7 – SU Carburettor Principles

Figure 8 – SU Carburettor Vacuum Advance Connection

Figure 9 below is an exploded diagram of the HS… SU carburettor.

Note that on a twin SU set up, the front and rear carbs are NOT interchangeable because the rear unit has a vacuum advance connection and the front not!

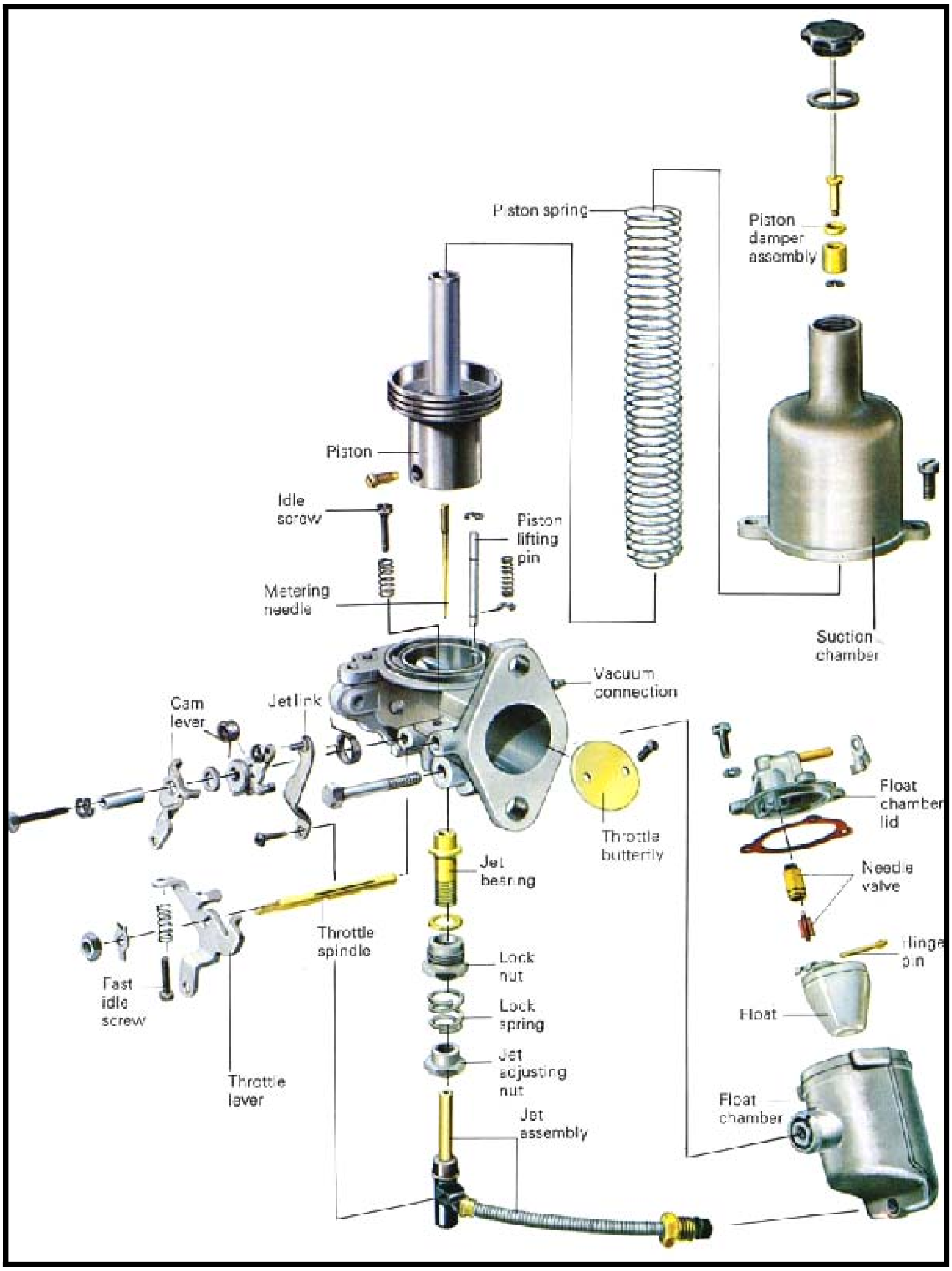


Figure 9 – HS4… SU Carburettor

COMPRESSION TEST

The condition of the engine can readily be ascertained by doing a compression test. This shows if there are issues with the cylinder head gasket, piston rings or valve seats. It is recommended that a compression test prior to buying the car and every year subsequent to that.

In the first instance you should take the car for a run for about 15 minutes in order t warm the engine up. This makes the tuning and timing process – especially the tappet adjustment and plug condition more accurate.

On returning to “base” immediately stop the engine without letting it idle, you want to retain the heat and prevent excessive fuel delivery which will mask the condition of (oil up) the plugs.

Next, being careful not to burn your fingers, remove all the spark plugs – noting their condition and “store” them in the purpose built rack as shown in Figure 10 below.

Figure 10 – Plug Rack

Next open remove the air cleaner filters so that you can see the pistons within the carburettor body and, using a small rubber wedge, hold the throttle assembly open so you an see the carburettor piston open about half way.

1. Set up the tachometer as shown in Figure 11 below with the red wire to +ve, the brown wire to earth and the yellow lead to the –ve post on the coil.

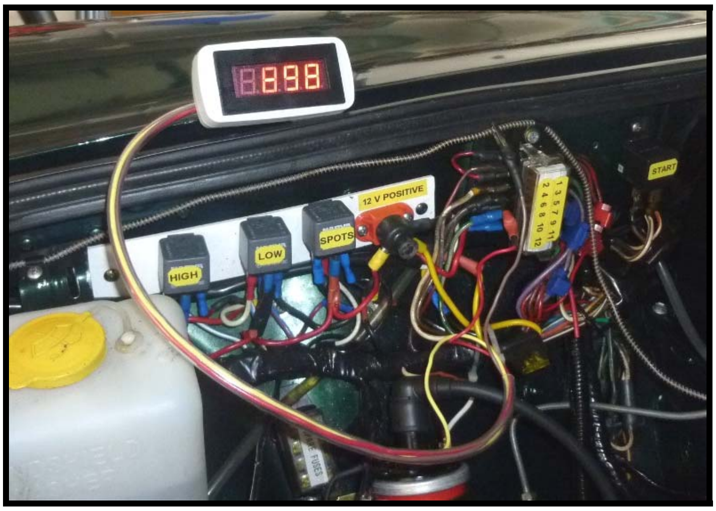


Figure 11 – Tachometer

2. Remove the high tension (HT) (centre) lead from the coil, this will prevent the engine from starting.
3. Set up the tachometer as shown in Figure 11 above with the red wire to +ve, the brown wire to earth and the yellow lead to the –ve post on the coil.
4. Now remove the safety plug labeled “CRANK” from the bracketed socket next to the starter relay and insert the matching plug from the remote starter cable as shown in the green circle in Figure 12. This will allow you to crank the engine so you can get compression readings.

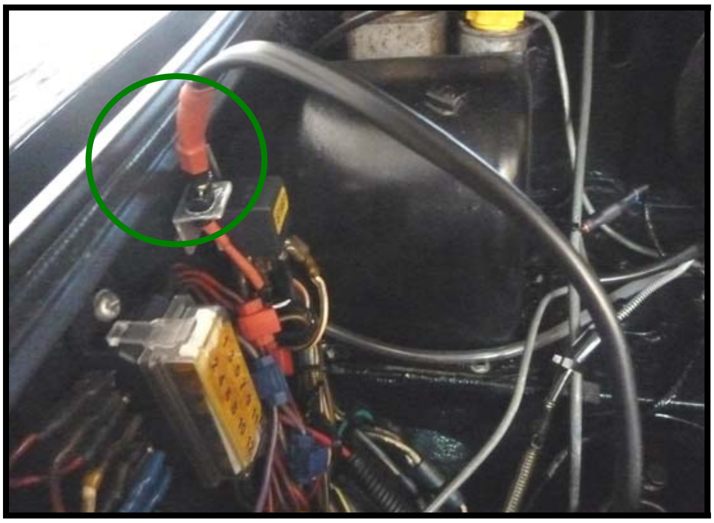


Figure 12 – Remote Starting

5. Now, using the correct adaptor, screw the compression test hose into No. 1 cylinder plug hole and tighten it up.
6. Now crank the engine at as close to 600rpm as possible so that you can get a consistent reading on the compression tester pressure gauge. See Figure 13 below. This reading is 165psi. For the *18V 582F* and *18V 583* 8.0:1 low compression engines, the minimum should be 160psi and for the 9.1 high compression engines, 170 psi. These figures are for the specified engines and it is important to note that settings for timing will vary for different engines in a model range and also for special stages of tune.
7. Note that before unscrewing the hose, de-pressure the tester by pushing the button shown in Figure 13.

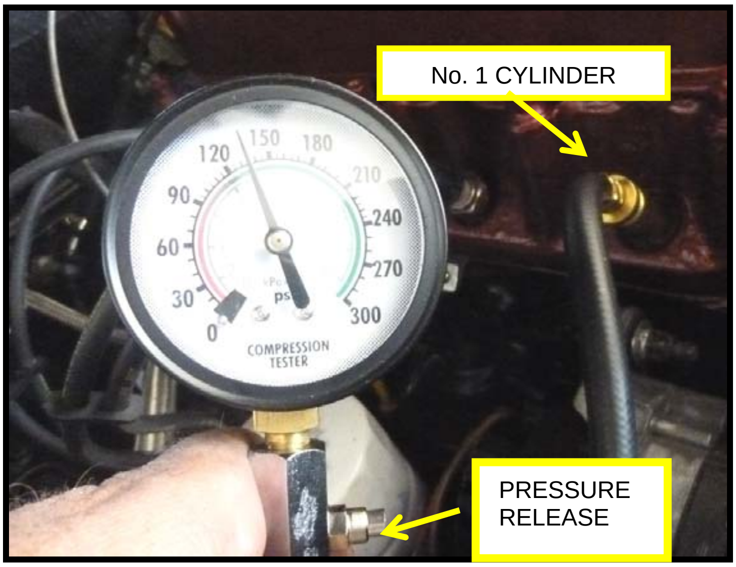


Figure 13 – Pressure Reading

Continue with all other cylinders noting the pressures on the plug rack.

When complete, replace the plugs and HT lead on the coil and remove the tacho and cranking push button lead.

What if the readings are low? This indicates that there is a "leak" somewhere in the cylinder head or valve.

- If the low pressure is only in one cylinder, remove the test hose and pour a small amount (~1cc) of light machine oil into the cylinder. Retest the cylinder. If the pressures comes up to near those of the other cylinders, it indicates that there are worn or broken piston rings.
- If the low pressure is in two adjacent cylinders, it indicates that there is a cylinder gasket leakage between the two cylinders as shown in the blue circle in Figure 14 or to the water jacket as shown in Figure 14.

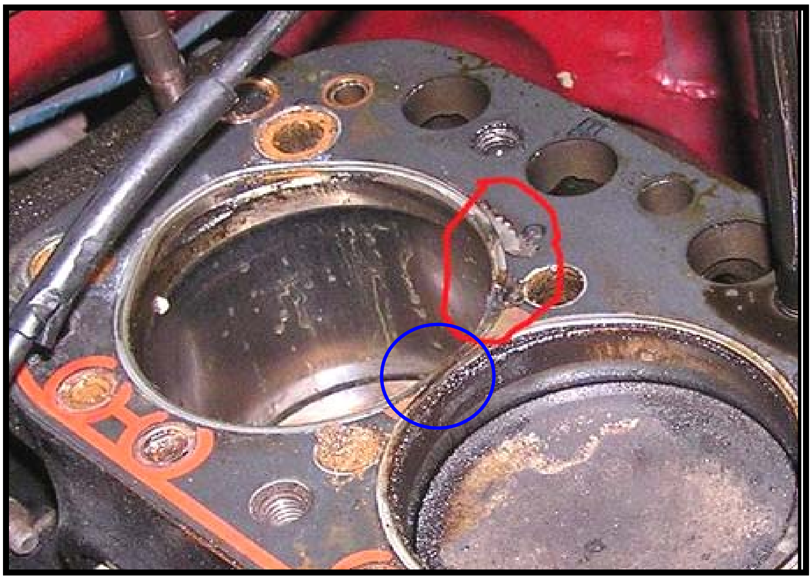


Figure 14 – Leak Points

If the leak is between the cylinder and the water ports, this will manifest itself by blowing bubbles in the cooling water with the radiator cap off. Be careful not to scald yourself.

None of the symptoms will be evident if the leak is past the valve seats meaning that a top end rebuild is necessary

Any of these issues require new piston rings (and therefore an engine rebuild) or a replacement head gasket, again necessitating a top end rebuild.

IGNITION TIMING

Subsequent to carrying out a compression test,, and assuming that all is ok, getting the ignition timing correct is the first stage in my tuning regime, if the timing is out, no amount of carburettor and / of fuel balancing will have any effect. See the timing details and procedure on page 9 onwards.

Distributor

Please refer to the separate paper entitled “MGB 973 Distributor Parts from Bosch”. This details the BOSCH distributor fitted to the car and their installation, instead of the normal LUCAS45D unit.

Remove the distributor cap and examine the surfaces of the contact breaker points. If the points are severely pitted or indented with tiny craters they should be replaced. If they appear to be in good order then check the contact breaker gap. With the spark plugs removed, rotate the engine manually by the fan blades or, put the car in gear and push it forward to turn the engine until the cam of the distributor drive fully opens the points, now you can insert a feeler gauge to measure the gap.

To adjust the gap it will be necessary to slacken the set screw in the centre of the points so that some movement of the assembly is possible. Then insert the flat blade of a screw driver into the slot at the end of the points just before the condenser and to open or close the contact breaker gap.

Using a feeler gauge to measure the gap when the points are fully open on the cam, it should be between .014 to 0.15in (.35 to .40mm) for most MGB engines.

Contact breaker points

Removal and replacement is quite straightforward but take careful note of how the points are fitted and the position and route of the wiring. When the new set is in position, make sure the distributor cam is holding them in the fully open position, and adjust the gap as described above.

Points are fitted onto the base plate of the distributor with a centre screw.

Points are opened as the cam pushes against the sprung contact breaker arm.

Distributor cap and rotor arm

Carefully examine the distributor cap and rotor arm for hairline cracks, if any damage is found the cap must be replaced. Although barely visible, hairline cracks will cause misfiring and poor starting.

Check the inside of the distributor cap for wear and cracks.

Ignition leads

Always ensure that your leads are not cracked or damaged.

Make sure that you replace the ignition leads in the correct firing order of 1- 3- 4 - 2. When working out the order of the leads note that rotor arm rotates in anti-clockwise direction.

Mechanical Advance

The lower base plate in the distributor houses a set of weights which, as the engine speed increases, move outwards by centrifugal force advancing the ignition timing.

Vacuum advance

The vacuum advance mechanism advances the ignition timing at part throttle to improve economy and performance. You can check if it is operating correctly by disconnecting the pipe which connects it to the rear carburettor and sucking hard on the end; you will hear a click as the base plate moves. The movement is only very slight and is best detected by listening for the noise it makes. If sucking hard produces no response then the diaphragm is probably faulty and replacement will be necessary.

Timing Settings

To achieve the best and most complete combustion or burn, the spark plug should fire just before the piston reaches top dead centre. It is for this reason that ignition timing is described in terms of advance or degrees before top dead centre (BTDC). At low rpm the piston speed is relatively slow and there is more time for combustion to occur, so for example an initial setting for an MGB high compression engine the *static* timing should be 10^{o} before top dead centre and 13^{o} BTDC at 600 rpm using a *stroboscope*. As the revs rise and the piston speed increases there is less time for the burn to occur, therefore to produce the best cylinder pressure the spark must initiate the burn much earlier. So that at 3000 rpm for example, the spark should occur at around 20 degrees earlier, making a total advance of 13 degrees plus 20 degrees of mechanical advance before top dead centre. These figures are for 18V 582F and 18V 583 engines and it is important to note that settings for timing will vary for different engines in a model range and also for special stages of tune.

Stroboscopic timing

This method of dynamic timing involves using a hand held timing light connected up to the spark plug in number one cylinder. First identify the timing marks, pointer and on the notch on the crankshaft pulley.

Setting up the timing light for the stroboscopic timing is straightforward as follows, with firstly setting up the tachometer as shown in Figure 15.

1. Set up the tachometer as shown in Figure 15 below with the red wire to +ve, the brown wire to earth and the yellow lead to the –ve post on the coil.

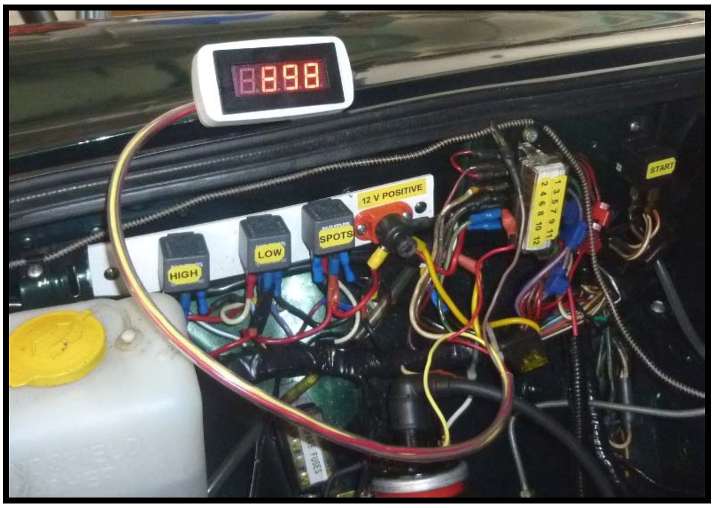


Figure 15 – Tachometer

2. Set up the timing light as shown in Figure 16 connected to the accessory socket on the right hand side of the radiator and the pulse clip around the No. 1 spark plug – not the directional arrow on the clip.

Figure 16 – Timing Light Setup

3. With the engine running as near as you can get to 600rpm, aim the timing light at the crankshaft pulley. You will see that the strobe effect of the light will illuminate the mark on the pulley against one of the pointers on the engine block. See Figure 17 below.

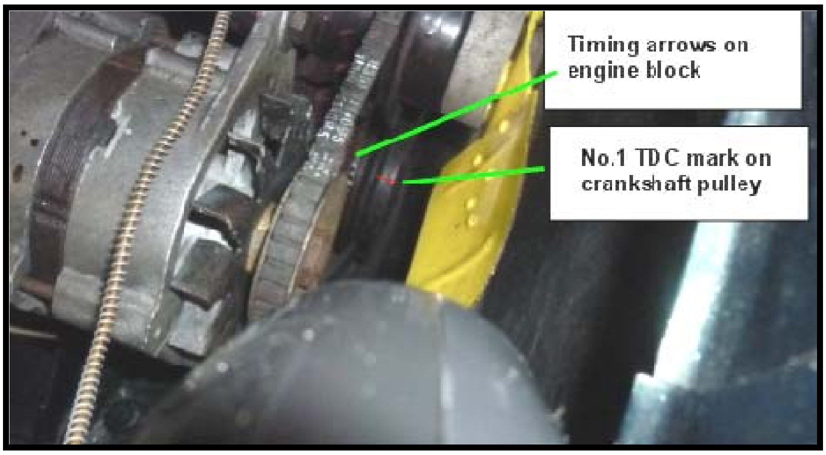


Figure 17 – Timing Arrows

Figure 18 shows the timing arrows on the block with, in this instance, the notch on the flywheel at 10°BTDC.

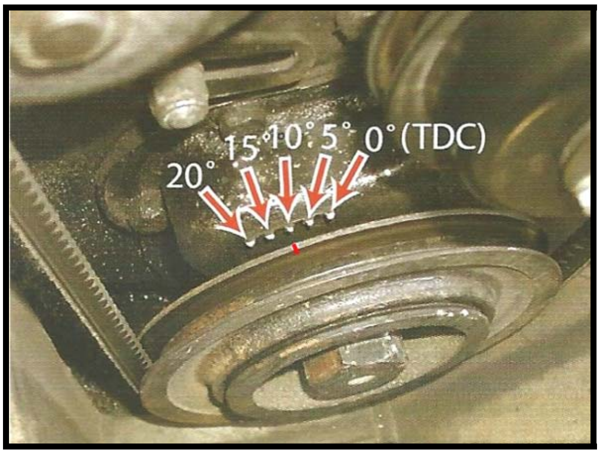


Figure 18 – Timing Marks

Unlike the LUCAS distributor which has a vernier screw adjustment, the Bosch adjustment is made by switching off the engine, slackening the pinch bolt on the clamp that holds the distributor and rotating it by a very small amount. This is usually a matter of fractional twisting in either direction until the marks line up.

Whilst this stroboscopic timing method at idle speed is acceptable for most stages of engine tune, it is sometimes advantageous to check / set the timing at higher engine speeds.

As the engine speed increases, the centrifugal force on the weights in the distributor cause the base plate to rotate such that the ignition timing is further advanced. Typically for an MGB this should be about 20^{o} at between 2,000 and 3,000 rpm. Therefore the total advance will be 13 plus 20 being 33^{o}BTDC. Checking this setting confirms or otherwise, the condition of the distributor advance mechanism.

With the timing light aimed at the pulley, increase the engine speed to 2,500 rpm, it should be observes that the pulley marker will rotate anticlockwise to a point where you can estimate its reading (about half the distance from 0 to the 20^{o} mark). If this occurs, then the distributor advance mechanism is working correctly.

If you want, you can override the 13^{o}BTDC setting and set the timing at 33^{o}BTDC, this will give the most consistent power at cruising speed, albeit with some roughness at idle.

TUNING

Carburettor Balancing

Balancing the twin carburettors is the next stage in my tuning regime; it is also repeated at the end of the process if the fuel mixture is to be adjusted. Whilst there are a number of commercial balancing "tools" available, mostly being devices that measure the "suction pressure" at the air inlet, two are shown in Figures 19 and 20, the first being a "Syncro-Meter which measures kilogrammes per hour and the second, being a manometer, measuring inches of mercury suction.. Some mechanics favour a stethoscope or piece of plastic tube and listen for the intake "hiss".

Figure 19 - Syncro-meter

Figure 20 - Manometer

I have found that the use of an air velocity meter is very accurate and, with the engine at idle of approx 800rpm and the linkage loosened, they can be adjusted so that they exhibit the same inlet velocity and therefore balanced.

The tools to be used are shown in Figure 20, being the air velocity meter and two plastic plugs with 45^{o} bends glued on to them, these act as adaptors so that the inlet diameter is the same as the propeller housing on the air velocity meter. Adaptors are fitted to both carburettors so that the friction losses at the inlets are equal, making for more accurate balancing.

Figure 20 – Tools for Balancing

1. Remove the two air cleaners as shown in Figure 21 to reveal the two air cleaner backs and the carburettor throats. Figure 21 also shows the air venturi plates which are removed from the original Coopers air cleaners (cans) and reused behind the new air filters. Note in Figure 22 you can just see the piston in the throat of the front carburettor which rises in conjunction with the

opening of the butterfly as the throttle is opened thus opening up the annular space between the piston and the needle increasing both the fuel and air flow If you are only balancing the carbs, there is no need to remove the air cleaner backing plates. At this stage fit the adaptors into each venturi stub as shown in Figure 23 and read the air velocity for each carburettor.

Figure 21 – Dual SU HS4 (1½") Carburettors

Figure 22 – Venturi Subs

2. It is preferable that the shaft connecting the throttle butterfly valves in each carburettor is disconnected at this stage. Loosen the shaft lock nuts shown in Figure 23 and insert the plastic plugs into each carb throat taking care not to foul the pistons. Both plugs are needed because each carburettor needs to have the same air inlet (friction loss) characteristics.

Figure 23 – Loosen Throttle Shaft Clamps

Figure 24 – Plugs Inserted

3. Measure the velocity – (Figure 25) at each carb throat and adjust the idle adjuster screw(s) Figure 26 so that both carb velocity readings are the same at the idle speed of 800rpm. This will probably be about 4.0 to 5.0 metres/second but the actual figure is not important, being equal is what matters.

Figure 25 Reading Air Velocity

Figure 26 – Adjust Idling

When the idle adjuster screws have been set so that each carburettor exhibits the same air inlet velocity and the idle speed is satisfactory, tighten the throttle shaft lock nuts and replace the air cleaners.

Now using the digital tachometer as shown in Figure 15, you can do the same at higher revs if desired at say 2,500 rpm with either someone in the car pressing the throttle achieving a constant speed or wedging the throttle lever open.

Fuel Mixture Adjustment

If the fuel mixture is to be checked and adjusted, you will have to remove the air cleaner backing plates as follows

1. Remove the air cleaners as before then using a ½" AF spanner, loosen and remove the hex bolts holding the backs of the air cleaners in place to threaded connections in the "U" shaped brackets behind the carburettor flange. Note that the fuel line overflow pipe is clipped to the back of the air cleaner rear plates (Figure 27), unclip, remove hoses from float chamber and put to one side.

Figure 27 – Carburettor Overflow Pipes

2. Hold and retain the front "U" shaped bracket (see Figures 28 & 29) and restore in place using the shorter hex bolts in the kit. This is needed because it forms the static part of the choke adjuster cable.

Figure 28

Figure 29

3. Put to one side the "U" shaped bracket from the rear carburettor – Figure 30.

Figure 30

4. One good indicator of the fuel / air mixture is the condition of the spark plugs. It is recommended that before embarking on the process of disconnecting the carburettor air cleaners to access the jets, you take the car out for a drive until temperatures are indicated as normal, don't just idle the car because this will not give an indication of plug condition.

   A traditional method is that if the plug ends are white and the electrode is pitted, then the mixture is too lean (Figure 31). On the other hand if the plug is sooty (Figure 32), then the mixture is too rich. The optimum colour is a "biscuit brown (Figure 33). If the plug is oily (Figure 34), it indicates that there is oil contamination possibly from valve stem or piston ring wear.

Figure 31

Figure 34

Figure 32

Figure 33

5. Figure 35 shows the internal arrangement of an HS4 carburettor (*reproduced from the "Bentley" Workshop Manual*" with the following parts identified:-

   1 Jet locking nut
   2 Jet adjusting nut
   3 Jet head
   4 Feed tube
   5 Piston lifting pin (see also Figure 26)
   6 Needle securing screw
   7 Oil damper reservoir
   8 Needle

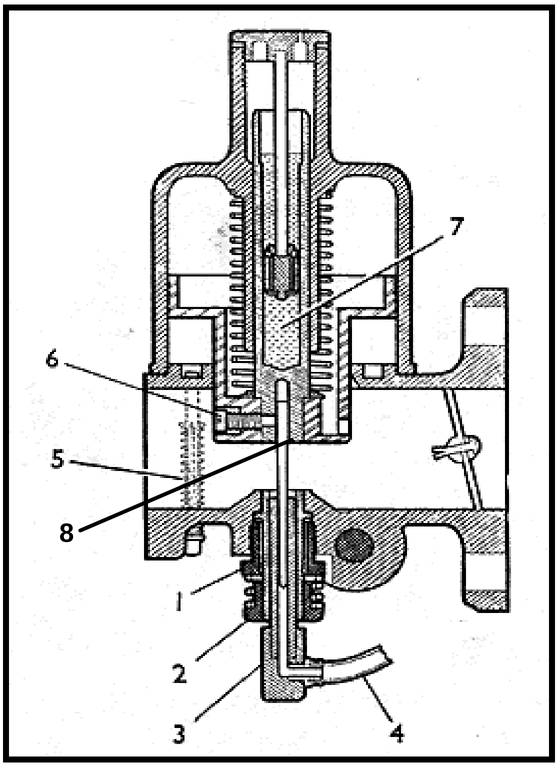


Figure 35 – HS4 Carburettor details

Now referring to Figure 31, the jet head (item 3) has a parallel bore into which the needle (item 8) fits. The needle has a tapered diameter with the smallest diameter being at the bottom. Accordingly as the needle is raised (turning the jet clockwise), the annular space between the needle and jet increases thus allowing an increased quantity of fuel to flow into the carburettor throat, i.e. enriching the mixture.

Lowering the needle reduces the annular space thus leaning the mixture.

6. Beginning with the front carburettor, lift the piston using the lift button shown in Figure 35. If the engine increases speed momentarily, and then settles back to the preceding speed, then the mixture is ok. If the engine increases speed and remains at a higher speed, then the mixture is too rich. If the engine increases speed and then drops back to a slower speed with hesitation and / or roughness, then the mixture is too lean. Remembering the response of each carburettor, adjust the mixture by following the procedure set out in point 7 below.
7. Now disconnect the throttle shaft and choke shaft lock nuts as shown in Figure 23. The jet adjusting nut (Figure 37) can be moved without loosening the locking nut which is only loosened when centering the jet, otherwise DO NOT loosen it.

   Now remembering the response when lifting the piston pin shown in Figure 36 and beginning with the front carburettor, turn the jet adjusting nut (Figure 37 up (clockwise) to weaken (lean) the mixture until the engine speed starts to fall. Then turn the jet adjusting nut (Figure 37) down (anti-clockwise) to richen the mixture until the increase in engine speed steadies. Then repeat the process on the rear carburettor and tighten the locking nut. Then repeat for the rear carburettor.

   Finally check the idle speed and readjust it as necessary with the throttle adjusting screws – Figure 26 turning each by the same amount.

Figure 36 – Piston Lift

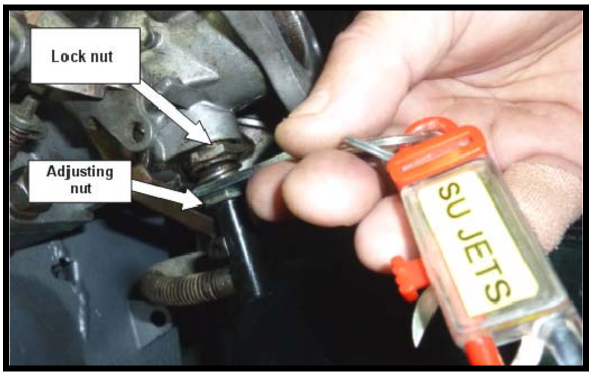


Figure 37 – Jet Adjustment

8. Now adjust the choke throttle adjuster so that there is a "40 (thou) $^{40}/_{1,000}$" or 1mm clearance when the choke is in and when the choke is pulled, the screw end bears on the throttle cam thus increasing engine speed. The jet movement should not occur until at least one quarter of the choke is out and at that point, with the engine warm the revs should be even.
9. Next readjust each carburettor balance using the air speed meter and the idle screw.
10. Lock the throttle and choke shafts before replacing the air cleaner back plates, the fuel overflow pipes and the air cleaners.
11. At some time it is good practice to clean and adjust the fuel bowl floats. Figure 38 (*reproduced from the "Bentley Workshop Manual*" shows the details.

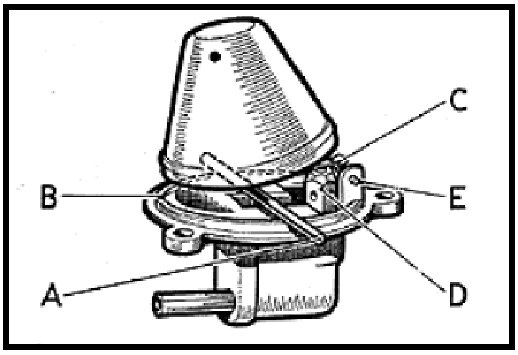


Figure 38 – Fuel Float (from Bentley manual)

A – 1/8" or 3/16" drill bit

B – Machined lip

C – Float lever resetting point

D – Needle valve assembly

E – Hinge pin

Remove the float bowl covers, clean the float bowls, remove old sediment, and check/adjust the float setting (turn the cover upside down, and get a 1/8" or 3/16" drill bit, set the drill bit across the cover, the float tab should just touch the bit. Don't press down on the float; let it rest under its own weight). Make sure the needle is moving and seating properly. Replace the cover.

If available, use compressed air to blow through the fuel entry port with the float in the down position to clear any debris from under the needle.

Note: You can check for matching float settings, after setting the mixture and after the car has been run, by removing the pistons, and peering down at the jets. The fuel level should be about the same on both carbs, a little below the top surface of the jet.

Additional Reading

Note that there is an excellent article on the MGB Throttle and Choke linkages provided as part of this manual.

Model Specifications

MGB Tourer and MGB GT - produced from May 1962 to Nov 1967 (GT from Sep 1965). Roadster; GHN3, GT; GHD3.

Production of the first MGB Tourer (also known as a Roadster) on 22 May 1962 and MGBGT production started in Sep 1965.

Engines:	Variants: 18G - May 1962 to Feb 1964, 18GA - Feb 1964 to Oct 1964, 18GB - Oct 1964 to Nov 1967. The 18G and 18GA engines are fitted with a 3 bearing crankshaft and from 18GB onwards the engines are all fitted with a 5 bearing crankshaft. 4 cylinder 80.26 x 88.9mm, 1798cc, 2 x 1½in HS4 SU Carbs, 95bhp (net) at 5,400rpm. Maximum torque 110lbs. ft. at 3,000rpm. Compression ratio: as per engine number prefix, H (high compression) 8.8:1, L (low compression) 8:1.
Electrical System:	From May 1962 to Nov 1967 - Positive earth electrical system with two six-volt batteries connected in series to give twelve volts output. The batteries are located behind the driver's and passenger's seats under an access panel in the floor.
Transmission:	Axle ratio 3.909:1. Overall gear ratios 3.909:1 (overdrive 3.14:1), 5.369:1 (overdrive 4.31:1), 8.656:1, 14.214:1, reverse 18.588:1. Gearbox with synchromesh on 2nd 3rd and 4th gears only. Optional Laycock de Normanville D Type overdrive with a ratio 0.802:1 from January 1963. 17.9mph/1,000rpm in top gear, 22.3mph/1,000rpm in overdrive.
Suspension and Brakes:	Independent front suspension (IFS), coil springs, wishbones, Anti-roll bar (optional on tourer until Chassis No 108039), live rear axle, half-elliptic leaf springs, lever-arm dampers. Rack and pinion steering. 10.75in. front disc brakes, 10 x 1¾in. rear drums. 4.0in. rims (Tourer disc), 4.5in. rims (centre-lock wire) or 5.0in. rims (GT disc).
Dimensions:	Wheelbase 7ft 7in; front track 4ft 1in; toe-in 1/16th to 3/32nd in. (1.5 to 2.3 mm.) (unladen); rear track 4ft 1.25in. Length 12ft 9.3in; width 4ft 11.7in; height (Tourer) 4ft 1.4in, (GT) 4ft 1.75in. Unladen weight 2,030lb. (Tourer), 2190lb. (GT).
Exterior Door Handles:	From April 1965 Body 57986 - change from 'pull' type exterior door handles to the 'push-button' type handles when anti-burst door locks were introduced.
Performance:	Top speed: 105 mph. 0 - 60 mph: Roadster 12 seconds GT 13.5 seconds. Fuel consumption: 22 - 28 mpg.

MGB Mk II Tourer and GT - produced from Nov 1967 to Aug 1971. Roadster; GHN4, GT; GHD4 to Sep/Oct 69 then Roadster; GHN5, GT; GHD5 from there to Aug 1971.

Specification as for Mk I MGB models except for:

Engines: Variants: 18GD - Nov 1967 to Oct 1968 for home market cars, 18GF - Nov 1967 to Oct 1968 for North American cars. 18GG - Oct 1968 to Aug 1971 home market, 18GH - Oct 1968 to Aug 1970 North America, 18GJ - Oct 1969 to Aug 1970 California cars, 18GK - Aug 1970 to Aug 1971 North America.
(Federal markets) 1971 model-year, 2 HIF4 SU carbs, 82bhp (DIN) at 5,400rpm. Maximum torque 97lb ft. at 2,900rpm. Home market cars continued to use the HS4 carbs.
Compression ratio: as per engine number prefix, H (high compression) 8.8:1, L (low compression) 8:1.

Electrical System: From Nov 1967 to Aug 1971 - Negative earth electrical system with two six-volt batteries connected in series to give twelve volts output.

Transmission: From Nov 1967 new gearbox with all-synchromesh gears. Axle ration 3.909:1, overall ratios 3.909:1 (overdrive 3.2:1), 5.4:1 (overdrive 4.43:1), 8.47:1, 13.45:1, reverse 12.098:1. Optional Laycock Type LH overdrive introduced with ratio of 3.14 . From 1970 model-year (Sep/Oct 69) wheels 4.5in. rims, Rostyle sculptured steel pattern or optional centre-lock spoked (wire) wheels as before.
Borg-Warner Type 35 three speed epicyclic automatic gearbox offered as an optional extra from Nov 1967 with overall ratios 3.909:1, 5.668:1, 9.34:1, reverse 8.17:1.

Dimensions: As above but with unladen weight 2,140lb. (Tourer), 2,260lb. (GT).

Performance:

Top speed:	Roadster 107 mph	GT 104 mph.
0 - 60 mph:	Roadster 11 seconds	GT 14 seconds.
Fuel consumption:	22 - 28 mpg.	

MGB Mk III Tourer and MGB GT - produced from Aug 1971 to Oct 1980.

1972 model-year (Aug 71) to 1974 model-year (Aug 73) inclusive, specification as for MGB Mk II except for:

155-14 (Tourer), 165-14 (GT) radial-ply tyres standardized on British market from start of 1973 model-year (Aug 72): all markets 1974 model-year (Aug 73). Brake vacuum-servo standardized (British market) from start of 1974 model-year (Aug 73).
Sep 1974 start of Rubber bumper production.
Dec 1974 MGB GT no longer available in North America.
1975 model-year (Dec 74) and 1976 model-year (Sep 75) inclusive, specification as for Mk II and earlier Mk III models.

Engines: Variants: 18V - Aug 1971 to Oct 1980. There were an number of variations of this engine depending on carburation and emission controls.
British models now have a recalibrated power output of 84bhp (DIN) at 5,250rpm. Maximum torque 104lb. ft. at 2,500rpm. HIF4 carbs were introduce on the home market cars from Nov 1973.
Federal models: Zenith-Stromberg carburettor. 65bhp (DIN) at 4,600rpm. Maximum torque 92lb. ft. at 2,500rpm.
Overall gear ratios unchanged except optional overdrive 3.21. 21.8mph/1,000rpm in overdrive.
The Zenith-Stromberg carb was introduced in Dec 1974.
Compression ratio: as per engine number prefix, H (high compression) 9:1, L (low compression) 8:1.

Transmission: Optional automatic gearbox discontinued in Aug 1973.

Electrical System: From Aug 1971 to Sep 1974 - Negative earth electrical system with two six-volt batteries connected in series to give twelve volts output. From Sep 1974 on with the introduction of the 'rubber bumper' cars this was changed to a single twelve volt battery.

Dimensions: Overall length 13ft 2.25in; height 4ft 2.9in. Otherwise as before. Unladen weight not affected.

From the start of 1977 model-year, specification as for earlier MGB models except for:

Suspension: Front and rear anti-roll bars now standard.

Dimensions: Unladen weight 2,253lb. (Tourer) 2,260lb. (GT).

Performance:

Top speed:	Roadster 107 mph	GT 104 mph.
0 - 60 mph:	Roadster 11 seconds	GT 14 seconds.
Fuel consumption:	22 - 28 mpg.	

MGB production ceased on 23 October 1980.

ENGINE TUNING DATA

18V 581F, 18V 582F and 18V 583F ENGINES

ENGINE		
Type	..	18V.
Displacement	..	109·8 cu. in. (1798 c.c.).
Firing order	..	1, 3, 4, 2.
Compression ratio: H.C.	..	9·0 : 1.
L.C.	..	8·0 : 1.
Cranking pressure	..	Nominal 170 lbf./sq. in. (11·95 kgf./cm.²) at 275 r.p.m.
Idle speed	..	750 to 800 r.p.m.
Valve rocker clearance: Set cold	..	·015 in. (·38 mm.).
Set hot	..	·013 in. (·33 mm.).
Static ignition timing: H.C.	..	10° B.T.D.C.
L.C.	..	10° B.T.D.C.
Stroboscopic ignition timing: H.C.	..	13° B.T.D.C. at 600 r.p.m.
L.C.	..	13° B.T.D.C. at 600 r.p.m.
Timing mark location	..	Pointer on timing case, notch on crankshaft pulley.
DISTRIBUTOR		
Make/Type	..	Lucas/25D4.
Contact breaker gap	..	·014 to ·016 in. (·35 to ·40 mm.).
Contact spring tension	..	18 to 24 oz. (510 to 680 gm.).
Rotation of rotor	..	Anti-clockwise.
Dwell angle	..	60° ±3°.

Centrifugal advance

		Serial number 41288 (*H.C.*)
Crankshaft degrees/Speed (vacuum pipe disconnected)	..	0 to 6° at 600 r.p.m.
		4 to 9° at 700 r.p.m.
		7 to 11° at 900 r.p.m.
		13 to 17° at 1,600 r.p.m.
		18 to 22° at 2,200 r.p.m.