THE XPAG ENGINE

DATA

SERVICE

SUPERTUNING

W.K.F. Wood

FIRST EDITION

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CLUB 'T' MG AND GoF WEST '75' WISHES TO EXPRESS THEIR APPRECIATION TO MR. W.K.F. WOOD FOR ALLOWING US TO REPRINT THIS BOOK.

Edited 11/98 by Jerry Austin, Vintage MG Club of Southern California. Except for punctuation, spelling and grammar corrections, other changes and comments are in *italics*.

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INTRODUCTION

The XPAG was fitted to the M.G. models TB, TC, TD, TF, Y Saloon and Tourer, and to some models of Morris and Wolseley. In 1955, The XPEG was introduced, and it saw brief service in the TF.

This late-1930s design is by no means adequate for today's superhighways and sprint-type in-town traffic. Indeed, with the new expressways that carry traffic across our larger cities, in-town speeds are now greater than those on the highways of yesteryear when the XPAG was introduced.

In the years since, research and development have yielded designs and manufacturing techniques, such that today's engines meet today's needs. Many of these improvements can be incorporated into the XPAG in order to make it not only **50%** more powerful but **100%** more reliable and durable.

No attempt is made here to *make* obsolete the TC Owners Manual nor the TD-TF Workshop Manual. They cover many aspects of work not mentioned here. But these manuals tend to cover the how-to-do-it part of service. We cover in the following pages the why-to-do-it aspect of service. No time is spent on: "To remove the cylinder head, first drain the coolant, remove the valve cover, and disconnect..." This sort of trivia is overlooked here, and the owner who lacks such experience must take his or her courage in hand and begin on-the-job training. It is assumed that he or she has the normal complement of Whitworth hand tools and the will to use them.

Every effort has been made to make this manual as complete as possible for the enthusiast. To the seasoned technician, the detail may seem overbearing. However, this is prepared for the lay*person* owner who may wish to do his *or her* own work, or, at least, to know what needs to be done, and to direct its course. The identity of parts, where there might be a question, will be indicated by the part number in parentheses.

Since Nuffield and Austin combined to form BMC, some of the part numbers have changed, or are in the process of change. In an effort to find some firm reference, the last published TC parts manual (AKD856) and TF parts manual (AKD8O4) were chosen.

A shroud of anxiety covers us when we find that these are no longer being published, and copies are now rather dear. *(Reprints of these are now available. In addition, the latest Factory part numbers appear in a table at the end of this document.* Ed.*)* But we had to have some stable reference, and these were chosen as the most convenient to all concerned. Some of the units have had as many as three parts numbers, e.g., the crankshaft, which started as MG900/S, became 168828, and is now AAA3lO5.

The Moss Motors catalog, an excellent source of information, contains the latest numbers, which should be used when ordering. *(This information ended when Moss changed to their glossy, color catalogues and started their new numbering system.)*

This work was written around the XPAG as it was fitted to the TB-TC. It is certainly recognized that the TD and TF used the same power unit, albeit in slightly refined form. But the greater interest in proper maintenance and supertuning centers predominantly among TC owners (at least in the USA, where this was written). However, the basics of this material apply to all engines, TB to TF 1½ litre (*as well as Y-types* Ed.).

The information here is presented in three sections: Part I covers the general procedures to be followed; Part II contains service data and gives specific recommendations for types and methods of service; Part III discusses the extraction of greater power and its pleasures and pitfalls. Also included, is a listing of parts suppliers and service centers.

The writer makes no claim to being the final authority on matters related here. However, he likes to think that his experience is greater than that of others. Much of this was gained the hard way, with each failure carefully analyzed. Other times, he was fortunate enough to examine the mistakes of some others, thus saving himself some of the agony. New materials and techniques are constantly being developed that can outdate the work presented here. Any assistance from readers will be greatly appreciated and duly credited. Future conditions (when and if) will be revised in an effort to provide the very soundest of material.

Thanks are due the many who gave their suggestions, comments and critisisms for the preparation of this manual. Appreciation is given to Dick Knudson and Frank Churchill of the New England MG'T' Register, Eric Blower of Jaguar Cars North America, Angus Laidlaw of Leyland motors, Jay Lockrow, and Robinson Wright. Their interest and assistance contributed greatly to its completion.

GENERAL PROCEDURES

The thoroughness of our work must have the strongest emphasis. It is useless to rebore the block and fit new pistons, then to use a worn crankshaft, even with new bearings. The bottom end will not likely stay together 10,000 miles. And the $5.00 *(sic)* or so spent for the inspection for cracks might be compared to an insurance policy. Ignoring the possibility of cracks can lead to a rod through the side of the block, and this could spoil your whole day.

Now thoroughness does not mean that, should you have a burned valve, the complete engine must be rebuilt. But do a complete job on the head: new guides, valves, all machine work necessary. If the engine must be pulled for repairs in one aspect, then every possible point should be serviced. No one is sillier then the chap who pulls the engine first to cure oil burning, then to grind the shaft, next the clutch is gone, etc. Thoroughness is the order or the day.

Cleanliness is next to Godliness, and the author has the uneasy feeling that this is likely the closest he'll come. Therefore, he pays particular attention to the removal of all dirt, sludge, gasket material, and gasket compound from all surfaces, interior, as well as exterior. A good standard is to require the same degree of cleanliness in the engine as for kitchen utensils and tableware.

The head and block may be cleaned in a hot caustic soda bath (sodium hydroxide or other). Remove all possible core plugs and oil passage plugs so that we receive the full benefit of the bath. Aluminum parts cannot be placed in the caustic bath, as they would be dissolved. "Carburetter cleaner," although expensive, is excellent for all ferrous and nonferrous parts. This cleaner will quickly break down sludge, old paint, etc. The parts may be afterward rinsed in gasoline or hot water. Carb cleaner must never come in contact with the skin, so use a metal basket with which to submerge parts.

Gasoline is an excellent grease solvent, but some care should be exercised. Leaded fuel *(unleaded, too)*, when in prolonged contact, is harmful to the skin. It may be used to considerable advantage in cleaning smaller parts.

Should your *husband or* wife (roommate, etc.) be an understanding type, a strong solution of Wisk (the laundry detergent), brought to boiling on the kitchen stove, produces rather effective results. Rinse the parts afterward in warm water and dry them. For the cast aluminum sump, let it sit for a few days in a strong solution of Wisk and hot water. Just fill the sink, and change the bath every six or twelve hours, as it becomes cold. Some automotive service shops have a vapor degreasing bath that does the job more quickly, but no more effectively.

Exposed ferrous *(iron or steel)* surfaces should be primed and painted to prevent rusting, and to facilitate later cleansing. Rustoleum paint has proved very effective for this purpose. The author has an aversion to paint on brass or aluminum parts. It seems a shame to hide their beauty under paint.

The exhaust manifold, after being wire brushed can be treated with one of the extreme-high-temperature paints that are made for this purpose. Also, there are firms in larger cities that will porcelainize the manifold, à la XK Jaguar.

For proper sealing, all mating surfaces *must* be cleaned of old gasket materials and compound. Threaded holes in the block and head, sump, etc., should be cleaned with the appropriate taps and the edges on the face lightly touched with a file. Quite often, previous excessive tightening will have left a ridge here, as illustrated in Figure 1. Lightly file flat these high spots.

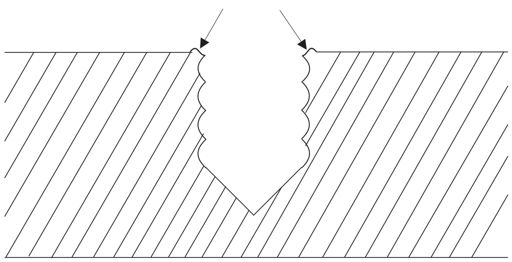

Figure 1. Ridges to be Removed

During assembly, nearly all gasket surfaces should be coated with a gasket cement, jointing compound, or whatever you might name it. Do not use the form-a-type, either hardening or non-hardening. Rather, use the #3 Aviation compound, which will allow later disassembly without ruining the gasket. #3 will remain tacky, and proves an effective sealant.

All threaded parts should be wire brushed and chased with tap or die as the case may be, prior to assembly. Use a good thread compound on all nuts, bolts, studs. Never-Seez is a thread compound that absolutely prevents binding and corrosion, even in salt water. LocTite and StaLok are antiseize compounds that might be called a liquid lock washer. A strong bond is formed that will securely hold threaded parts, and this bond may be broken only by the twisting action exerted by a wrench.

During assembly, all parts with rubbing contact, valve stems, rings, walls, gudgeon pins, bearings, cams and tappets, etc., should be liberally coated with Lubriplate. This is a lithium-based, synthetic grease that will supply boundary lubrication during the critical first revs. Oils of any type are not recommended because they have a tendency to run off the surfaces rather quickly, and they do not have the molecular sheer strength of a lithium grease. Lubriplate #105 is the preferred type, made especially for engine assembly. *(STP makes a good substitute here.)*

A light-viscosity oil (SAE 10), either detergent or nondetergent, is advised for running in (*the editor recommends breaking in with the oil that will be used during normal operation–except when breaking in is done in extremely cold weather*). Drain at 1000 miles, and change the filter, too. After this, use a high-quality detergent oil (DG rating), SAE 30 in *(or 40)* the warm or hot weather, SAE 20 or 10-30 during freezing conditions. Change the oil every 3000 miles and the filter with every second oil change (*felt filter elements are cleanable, therefore reusable* Ed).

The author has a slight preference for Pennsylvania-base oils, but in practice, it makes little difference. Do not use any racing or specialized-type oils. Exotic as they may seem, they are not suited to street or highway use. Certainly the car manufacturer and the oil refineries have a better knowledge of lubricating requirements than does the layman or backyard mechanic. It will be well to follow their recommendations.

The local automotive supply houses and machine shops can render considerable assistance. They usually have caustic soda baths (auto radiator shops do, too) and vapor degreasing baths, Magnaflux and Magnaglo facilities, as well as a stock of hand tools (*ring compressors, jacks, Plastigage, universal adjustable wrenches, etc., but no Whitworth* Ed.), lubricants, paints. Thread compounds are more likely to be found in ball and roller bearing supply houses (*as are some replacement ball and roller bearings for many–if not most–T-series applications*). The Yellow Pages can yield the names of many suppliers.

Considerable assistance can be had from other TC owners. Most are friendly types, eager to help their fellow nuts. Just ply them with a beer or two.

There are two types of heads and blocks. The TB, TC, and early TD (to XPAG TD2/17969) had banana-shaped water passages on the surface of the block. The later TD and all TFs have round water holes on the surface, and the passage behind the rear cylinder has a bridge across it. At XPAG TD2/22735, a cylinder head with round water passages was introduced. Future reference will be made to the earlier types as the banana block and banana head, and to the later types as the round block and round head. These heads and blocks are interchangeable, as are their gaskets.

PART II

ENGINE SERVICE DATA

XPAG Service Data

Table 1. XPAG General Specifications

Type	4-Cylinder, Overhead Valve, Push-Rod-Operated
Bore	66.5 mm (2.6181 in.)
Stroke	90 mm (3.5433 in.)
Bore/Stroke Ratio	1 : 1.353
Displacement	1250 cc
Firing Order	1-3-4-2
Piston Area	21.57 $in.^2$
Power	54 hp at 5200 rpm (*57 at 5500 TD 1250*)
Torque	63 ft-lbs at 2600 rpm
BMEP	125 at 2600 rpm
RAC Rating	10.97 hp
Bhp/Litre	43.5
Maximum Safe Speed	5700 rpm
Valve Crash Speed	6000 rpm
Power Unit Weight	323 lbs
Cylinder Head Depth	76.75 mm (3.022 in.)
Compression Ratio	7.25 : 1 (*TD–factory=8 : 1)*
Test Pressure	90–100 lbs/$in.^2$ Throttle Open, Cranking Speed
Combustion Chamber Capacity	200 cc
Chamber Size (Per Cylinder)	45.5 cc
Gasket Capacity (Per Cylinder)	4.5 cc
Gasket Thickness, Compressed-	0.045 in. (11.4 mm)
Octane Requirements	74 Minimum (82 Maximum)

Table 2. XPAG Piston Statistics

Type	Aerolite, Aluminum, Compensated Expansion, Solid-Skirt, Tin-Plated
Weight	9 oz
Compression Height	45 mm (1.7717 in.)
Clearance	0.0021–0.0029 in. at Thrust Face
Compression Ring Qty./Width	Two/2.25 mm (0.0885 in.)
Compression Ring Thickness	0.109 in (0.101 in. Minimum)
Oil Control Ring Qty./Width	One/4 mm (0.1575 in.), Eight-Slot
Oil Control Ring Thickness	0.105 in. (0.097 in. Minimum)
Groove Side Clearance	0.001–0.002 in.
Ring Gap	0.006–0.010 in.
Gudgeon Pin Diameter	18 mm (0.7087 in.)
Weight	2½ oz
Pin Fit	Two-Thumb Push

Table 3. XPAG Engine Bore Statistics

Bore Size	Capacity cc	Compression Ratio	Bore Size	Capacity cc	Compression Ratio
	1250	7.25 : 1	0.050	1299	7.50 : 1
0.010	1260	7.30 : 1	0.060	1309	7.54 : 1
0.020	1270	7.35 : 1	0.080*	1328	7.64 : 1
0.030	1280	7.40 : 1	0.100*	1348	7.74 : 1
0.040	1290	7.45 : 1	0.120*	1368	7.84 : 1

*Not recommended by the M.G. Car Co. Pistons for these bore sizes are supplied by independent piston makers.

Table 4. XPAG and XPEG Main Journal Dimensions

Journal Width, Front & Center	38 mm (1.496 in.)
Journal Width, Rear	40 mm (1.575 in.)
Radius	2.5 mm (0.100 in.)
Oil Clearance	0.0008–0.002 in.
Thrust Bearing	Integral with Center Main
End Float	0.0014–0.0037 in.
Main Bearing Bore in Block	56.54 mm (2.2181 in.)

Table 5. XPAG and XPEG Main Journal Sizes

Factory Package Oversize Number	**Undersizes**		**Journal Diameter**	
	mm	Inches	mm	Inches
Standard	—	—	52.00	2.0472
		0.002†	51.0095	2.0452
R.1	0.30	0.012	51.70	2.0354
R.2	0.50	0.020	51.50	2.0276
R.3	0.75	0.030	51.25	2.0187
R.4	1.00	0.040	51.00	2.0079
R.5	1.25	0.050	50.75	1.9980
*(R.6)**	1.50	0.060†	50.50	1.9882

*Not recommended by the M.G. factory. †These undersizes are furnished by independent manufacturers.

Table 6. XPAG and XPEG Crankpin Journal Dimensions

Journal Width	28 mm (1.102 in.)
Radius	2.5 mm (0.100 in.)
Oil Clearance	0.0005–0.001 in.

Table 7. XPAG and XPEG Crankpin Sizes

Factory Package Label	**Undersizes**		**Crankpin Diameter**	
	mm	Inches	mm	Inches
Standard	—	—	45.00	1.7717
		0.002†	44.0095	1.7697
R.1	0.300	0.012	44.70	1.7598
R.2	0.500	0.020	44.50	1.7515
R.3	0.750	0.030	44.25	1.7432
R.4	1.00	0.040	44.00	1.7323
R.5	1.25	0.050	43.75	1.7225
(R.6)	1.50	0.060	43.50	1.7126

*Not recommended by M.G. Car Co. †These undersizes are furnished by independent manufacturers.

Table 8. XPAG Connecting Rod Statistics

Type	I-Beam, Big End Split at Right Angles
Distance, Centers	178 mm (7.0078 in.)
Big End Diameter	48.67 mm (1.9159 in.)
Big End Width	*27.89 mm* (1.098 in.)
End Float	*0.10–0.015 mm* (0.004–0.006 in.)
Small End Bore	18 mm (0.7087 in.)
Small End Width	19 mm (0.7480 in.)
Pin Fit	By Clamp Bolt

Table 9. XPAG and XPEG Camshaft Statistics

Bearing, Front		White Metal, Steel-Backed
Bearings, Center & Rear		Zinc Alloy
Journal Sizes	Front	41 x 29 mm (1.6141 x 1.142 in.)
	Center	23 x 25 mm (0.9055 x 0.984 in.)
	Rear	23 x 29 mm (0.9055 x 1.142 in.)
Oil Clearance	Front	0.0016–0.0040 in.
	Center & Rear	0.0018–0.0037 in.
End float		0.005–0.013 in.
Bearing Bore in Block		43.5 mm (1.7126 in.)
Drive		Duplex Chain, Endless, 3/8-inch Pitch, 60 Roller Links
Tappet		One-Piece, Hollow Tappet
Bore in Block		23 mm (0.906 in.)
Working Clearance		0.0015 in.

Table 10. XPAG Valve Timing

Inlet Opens	11° BTDC
Inlet Closes	57° ABDC
Exhaust Opens	52° BBDC
Exhaust Closes	24° ATDC
Valve Lift	8 mm (0.315 in.)
Working Clearance	0.019 in. (4.82 mm) Hot[1]
	0.012 in. (3.05 mm) Hot[2]
Timing Measured Around Flywheel	
Inlet Opens	28.3 mm (1.122 in.) BTDC
Inlet Closes	119.5 mm (4.705 in.) ABDC
Exhaust Opens	108.9 mm (4.2874 in.) BBDC
Exhaust Closes	50.3 mm (1.980 in.) ATDC

[1]TCs and Early TDs
[2]Late TDs and All TFs

Table 11. XPAG Valve Statistics

Head Diameter	Inlet	33 mm (1.299 in.)
	Exhaust	31 mm (1.221 in.)
Stem Diameter		8 mm (0.315 in.)
Seat Angle		30 degrees
Seat Widths	Inlet	1.25 mm (0.049 in.)
	Exhaust	2.0 mm (0.079 in.)
Throat Diameters	Inlet	30 mm (1.181 in.)
	Exhaust	26 mm (1.024 in.)
Guide Type		Cast Iron, Pressed-In
Guide Diameter		15 mm (0.5906 in.)
Guide Lengths	Inlet	59 mm (2.333 in.)
	Exhaust	54 mm (2.126 in.)
Guide Height Above Head		24 mm (0.945 in.)
Stem Clearance		0.001–0.0015 in.
Valve Springs*		Coil, Double
Pressure Shut	Inner	31 lbs at 1.753 in.
	Outer	62 lbs at 1.847 in.
Pressure Open	Inner	43 lbs at 1.438 in.
	Outer	80 lbs at 1.532 in.

**See Table 18 for later valve spring statistics*

Table 12. XPAG Lubrication Statistics

Pump Type	Gear, running at half engine speed, externally mounted
Capacity	7 gal./min at 4000 rpm at crankshaft speed
Body Bore	52.5 mm *(2.067 in.)*
Depth	45.03 mm *(1.773 in.)*
Gear Diameter	32.2 mm *(1.258 in.)*
Gear Length	35 mm *(1.378 in.)*
Radial Clearance	0.0056–0.0064 in.
End Float	0.0016–0.0035 in.
Backlash	0.020–0.025 in.
Gear Shaft Diameter	13 mm (0.5118 in.)
Running Clearance	0.0007 in. Maximum
Pressure, Normal	60 lbs/in.^{2} Running Hot 40 lbs/in.^{2} Running Hot–Minimum
Relief Valve	Operates at 70 lbs/ in.^{2}
Oil Temperature	Normal 75 °C *(167°F)*; Maximum 86 °C *(187°F)*
Filter Type	Full-Flow, Separate
Sump Type	Wet, Aluminum Casting
Sump Capacity	5 qt U.S. (4 qt Imperial)

XPEG Service Data

Table 13. XPEG General Engine Specifications

Type	4-Cylinder, Overhead Valve, Pushrod-Operated
Bore	72.23 mm (2.8346 in.)
Stroke	90 mm (3.5433 in.)
Bore/Stroke Ratio	1 : 1.25
Displacement	1466 cc
Firing Order	1-3-4-2
Piston Area	25.23 $in.^2$
Power	68 hp at 5700 rpm (*factory=63 at 5000 rpm*)
Torque	8 lbs/ft at 3400 rpm
BMEP	131 at 3400 rpm
RAC Rating	12.86 hp
Bhp/Litre	46.4
Maximum Safe Speed	5700 rpm
Valve Crash Speed	6500 rpm
Power Unit Weight	323 lbs
Cylinder Head Depth	6.75 mm (3.022 in.)
Compression Ratio	8.33 : 1 (*factory=8 : 1)*
Test Pressure	145 $lbs/in.^2$, Throttle Open, Cranking Speed
Combustion Chambers Capacity	200 cc
Chamber Size (Per Cylinder)	44.75 cc
Gasket Capacity (Per Cylinder)	5.25 cc
Gasket Thickness, Compressed	0.045 in. *(11.4 mm)*
Octane Requirements	78 Minimum (90 Maximum)

Table 14. XPEG Piston Statistics

Type	Aerolite, Aluminum, Compensated Expansion, Solid Skirt, Tin-Plated
Weight	10 oz
Compression Height	45 mm (1.7717 in.)
Clearance	0.0021–0.0029 in. at Thrust Face
Compression Ring	Two, 0.0625 in.-Width
Compression Ring Thickness	0.109; 0.101 in. Minimum
Oil Control Ring	One, 4 mm-Width (0.1575 in.)
Oil Control Ring Thickness	0 105 in. (0.09 in. Minimum)
Groove Side Clearance	0.001–0.002 in.
Ring Gap	0.006–0.010 in.
Gudgeon Pin Diameter	18 mm (0.7087 in.)
Weight	2.7 oz
Pin Fit	Two-Thumb Push

Table 15. XPEG Engine Bore Statistics

BORE SIZE	CAPACITY	COMPRESSION RATIO
Standard	1466	8.33 : 1
0.010	1476	8.38 : 1
0.020	1486	8.43 : 1
0.030	1496	848 : 1
0.040	1506	8.53 : 1

Table 16. XPEG Connecting Rod Statistics

Type	I-Beam, Big End Split at Right Angles, Reinforced for 1½-Litre Displacement
Distance, Centers	178 mm (7.0078 in.)
Big End Diameter	48.67 mm (1.9159 in.)
Big End Width	1.0980 in.
End Float	0.004–0.006 in.
Small End Bore	18 mm (0.7087 in.)
Small End Width	19 mm (0.7480 in.)
Pin Fit	By Clamp Bolt

Table 17. XPEG Valve Timing

Inlet Opens	5° BTDC
Inlet Closes	57° ABDC
Exhaust Opens	45° BBDC
Exhaust Closes	24° ATDC
Valve Lift	8 mm (0.315 in.)
Working Clearance	0.012 in. Hot

Table 18. XPEG Valve Statistics*

Head Diameter	Inlet	36 mm (1.4173 in.)
	Exhaust	34 mm (1.3386 in.)
Stem Diameter		8 mm (0.3150 in.)
Seat Angle		30°
Seat Widths	Inlet	1.25 mm (0.0492 in.)
	Exhaust	2 mm (0.0787 in.)
Throat Diameters	Inlet	32.6 mm (1.284 in.)
	Exhaust	28.6 mm (1.126 in.)
Guide type		Cast Iron, Pressed-In
Guide Diameter		15 mm (0.5906 in.)
Guide Lengths	Inlet	59 mm (2.3328 in.)
	Exhaust	54 mm (2.126 in.)
Guide Height Above Head		24.5 mm (0.964 in.)
Stem Clearance		0.001–0.0015 in.
Valve Springs		Coil, Double
Pressure Shut	Inner	41 lbs at 1.753 in.
	Outer	73.3 lbs at 1.847 in.
Pressure Open	Inner	55 lbs at 1.438 in.
	Outer	95 lbs at 1.532 in.

*Also late XPAG with Cam 168553 (AAA3096)

Table 19. XPEG Lubrication Statistics

Pump Type	Gear, running at half-engine speed, externally mounted
Capacity	7 gal./min at 4000 rpm at crankshaft speed
Body Bore	52.5 mm *(2.067 in.)*
Depth	45.03 mm *(1.773 in.)*
Gear Diameter	32.2 mm *(1.258 in.)*
Gear Length	35 mm *(1.378 in.)*
Radial Clearance	0.0056–0.0064 in.
End Float	0.0016–0.0035 in.
Backlash	0.020–0.025 in.
Gear Shaft Diameter	13 mm (0.5118 in.)
Running Clearance	0.0007 in. Maximum
Pressure, Normal	60 lbs/ in.^{2} Running Hot
	40 lbs/in.^{2} Running Hot–Minimum
Relief Valve	Operates at 70 lbs/ in.^{2}
Oil Temperature,	Normal 75 °C (*167 °F*); Maximum 86 °C (*187 °F*)
Filter Type	Full-Flow, Integral with Pump Body
Sump Type	Wet, Aluminum Casting
Sump Capacity	5 qt U.S. (4 qt Imperial) (6 qt U.S. [4.25 qt Imperial] Commencing Eng. No. XPAG TF/33024)

Table 20. Nut & Bolt Tightening Specifications (All Engines)

	Foot Pounds	***Meters/Kilogram***
Cylinder Head Nuts	50	*6.9*
Main Bearing Caps	63	*8.7*
Con Rod Big End Bolts	27	*3.7*
Gudgeon Pin Clamp Bolts	33	*4.6*
Rocker Shaft 8 mm Bolts	29	*4.0*
Rocker Shaft 10 mm Bolts	43	*6.0*
Timing Cover Bolts	21	*2.9*
Flywheel-to-Crank Bolts	50	*6.9*
Clutch Cover Bolts	32	*4.4*
Sump Bolts	32	*4.4*
Manifold Clamping Nuts	19	*2.6*

XPAG/XPEG Changes

The triple valve springs of the TB were changed to double for the TC, and a timing chain tensioner was added. Otherwise, the XPAG is identical for the two cars.

The XPAG TD introduced the following changes:

a. Block drain tap is moved from its central position below the exterior water passage to a more forward location
b. Oil bath air cleaner and manifold
c. Ring gear with more teeth
d. New, smaller starter and generator units
e. Modified oil pump (for left-hand drive)
f. Carburetters changed slightly for combination choke/slow running control
g. Engine mounting: single point with stabilizer bar
h. Fan blades with new spacer hub
i. Water outlet neck, now ferrous, has a less acute angle

The XPAG TD2 had the 8-inch clutch *(Commencing at Eng. No. 9008)* with a new flywheel, ring gear (same number of teeth), and starter. The bell housing had to be enlarged to accept the larger clutch.

The XPAG TD3 offered larger valves *(TF)* and carburetters. The first few TD3s may have had 9.3 compression, later dropped to 8.6, and, finally, 8.1 became standard for this model. The XPAG TF is the same as the TD3 but with individual pancake-type air cleaners.

The XPEG required siamesed cylinders to accommodate the larger bore, connecting rods are heftier, new head gasket, 8.33 compression.

Engine Numbers Fitted to Beginning Chassis Numbers

XPAG.501 was fitted to TB/025l

XPAG 0883 was fitted to TD/0251

XPAG TF/30307 was fitted to TF/0501

XPEG 507 was fitted to HDE43 TF/6501

It should be noted that many small improvements were adopted that considerably changed the engine when we compare the first XPAG with the XPEG. These are listed below.

Table 21. T-Series Engine Changes

Engine Number	Change
XPAG TD/2985	New-Type Oil Filter and Wider Mounting Brackets
XPAG TD/6482	New Water Pump with Improved Seal
XPAG TD/9008 *(TD2)*	Revised Rocker Gear, New Arms and Shaft
XPAG TD2/9408	New Flywheel with 8-inch Clutch
XPAG TD2/14224	Integral Oil Pump and Filter Housing
XPAG TD2/14948	*Oil Sump Baffle Changed*
XPAG TD2/17298	Shorter Pushrods and Longer Adjusting Screws
XPAG TD2/17969	New-Type Block with Round Water Passage Holes
XPAG TD2/20942	Distributor Fixing Changed to Cotter Bolt
XPAG TD2/20972	Priming Plug Fitted to Oil Pump Cover
XPAG TD2/22251	Rod Replaces Clutch Actuating Cable
XPAG TD2/22735	New-Type Head with Round Water Holes; Longer-Reach Spark Plugs
XPAG TD2/24116	230° Camshaft with 8.3 mm Lift
XPAG TD2/26364	Six-Quart Sump*, with New-Type Pickup*
XPAG TD2/26635	Modified Oil Pump Body–Now Retains its Prime
XPAG TD2/27865	Valve Guide Height Increased to 24.5 mm
XPAG TF/31727	Last of the 1¼ Litres
XPAG TF/31263	Oil Pump Modified to be Self-Priming

MG T-SERIES ENGINE DETAILs

The XPAG Thread System

Considerable confusion exists as to the thread system employed on the TC. To set the record straight, the chassis, body, and proprietary fittings use the British Standard Fine *and British Standard Coarse* (Whitworth form) thread and hex head.

The XPAG and XPEG engines and their transmissions are the products of Morris Motors, Ltd., and they have a thread system unto their own. This is based on the French-form metric thread (not DIN), but the hex head dimensions are Whitworth. Thus, these nuts, bolts, studs, etc., are available only from BMC. *(Now from most any classic MG supplier.* Ed.*)*

Table 22. French Metric Thread Data

Thread	Hex Head	Tap Drill
6 mm X 1	3/16 W	5.0 mm
8 mm X 1	3/16, 1/4 W	7.0 mm
10 mm x 1.5	5/16, 3/8, W	8.6 mm
12 mm x 1.5	7/16, 1/2 W	10.5 mm

Of course, the use of an outdated metric thread with a Whitworth hex head is rather confusing to the lay*person*, but Morris Motors put the real challenge in the oil gallery fittings. Some of the patterns are listed in Table 23.

Table 23. Oil System Screw/Plug Data

Part Number	Location	Thread	Head
X19089	Oil Filter Bolt	1/2 x 19	1/2 W
X22924 X19520	Bolts for Line from Block to Head	3/16 x 28	3/8 W
X20247	Brass Plug Above Pump	3/16 x 16	3/16 W
X22732	Plugs for Main Oil Gallery	12 mm x 1.5	Slotted
X15393			Special Screw*

**When its hole is stripped, this screw may be replaced with a ¼-inch U.S. pipe plug (with a recessed square hole for installation), after retapping.*

A sure sign that an engine has been previously serviced is the haphazard manner in which the bolts are returned around the sump and bell housing. Below are the original patterns.

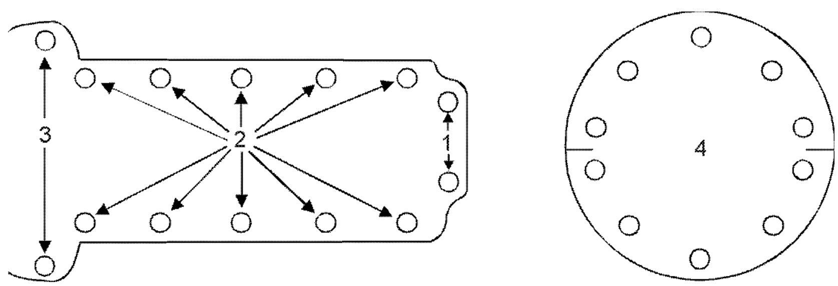

Figure 2. Sump and Bell Housing Bolt Installation

Table 24. Sump and Bell Housing Bolt Fitting

Reference #	Quantity Used	Part #	Description
1	(2)	X15268	Deep-head bolt, 3/16 W head
2	(10)	LA7431	Bolt, 3/16 W head
3	(2)	X15269	Deep-head bolt, slotted 3/16 W head
4	(10)	JA5052	Bolt, 1/4 W head

Oh yes, all the above bolts are the same thread pattern, 8 mm x 1, and they may be interchanged in any of the holes, but returning the bolts to the holes for which they are intended gives the engine a properly finished look, and brands its builder as “knowledgeable.”

For the timing chain cover, the longer bolts are located at either side of pulley, the three slightly shorter ones are above the pulley. On the rear the engine bearer plate, two short bolts (X15012), either 3/16 or ¼ Whitworth hex head size, hold the cover and plate tightly sealed.

Should a threaded hole in the aluminum castings (sump or chain cover) become damaged, it may be filled by welding, drilled, and re-tapped, to return the part to original specification. To retap these units to other than original thread is indeed shoddy *work*. Interchangeability of replacement parts is the very essence of our industrial revolution, and a nonstandard thread chafes this concept, branding the mechanic who performs such work as being too lazy or unconcerned to do the job the right way.

In the block or head, because we are dealing with a ferrous casting, it will be necessary to fit a helicoil. Because the only helicoils readily available will have UNC or UNF threads, we must "butcher" to some extent. For easy identification, it would be well to use brightmetal nuts or bolts here. (*Some metric size helicoils, including 8 x 1 and 12 x 1.5 are now available*. Ed.)

After installation, run the engine at least one minute, blipping the throttle a few times, so as to increase the stress on the head studs and nuts. Then, tighten the head once more to the full torque reading. This is MANDATORY. Adjust the tappet clearance after the head has been torqued down for the final time, and with the engine at normal running temperature.

The Cylinder Head

The face of the cylinder head must be flat within 0.001 in. No gasket sealing compound is necessary when fitting the head to the block. Note, however, that there is a front and a back to the gasket, and that it must be fitted so that the large water passage holes are to the rear of the block. Tighten the head nuts in the order shown below. *(Tighten all nuts gradually and equally before proceeding to the next sequence of tightening.* Ed.*)*

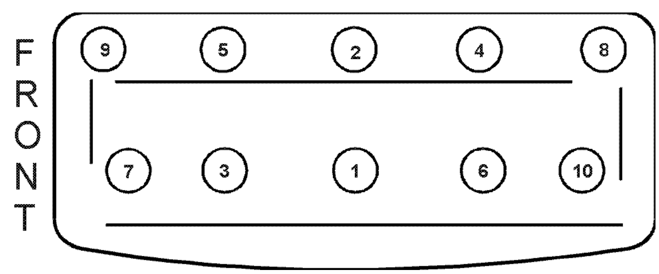

Figure 3. Cylinder Head Torquing Sequence

Valve Service

Compression pressure testing is performed in the usual manner, with the four *spark* plugs removed, throttle fully open, engine at normal running temperature.

An ordinary valve spring compressor is required to remove the springs and valves.

Valve guide wear is significantly higher than in most engines. Therefore it is better to replace when in doubt.

The preferred method is to press out the old guide, as hammering may crack the wall of the guide and make the task more difficult.

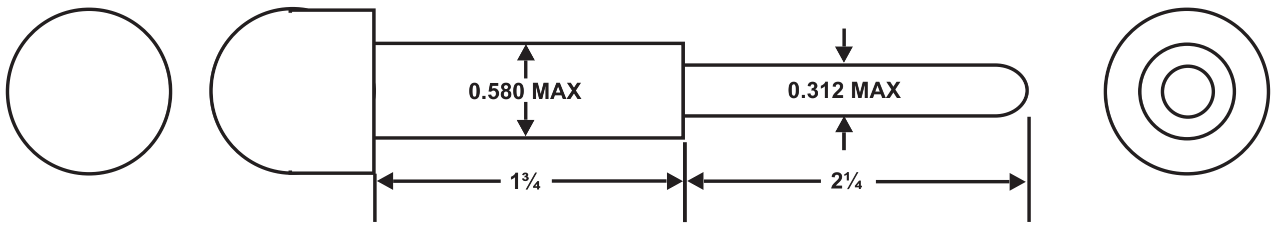

Figure 4. A Valve Guide Removal Tool

Always press in the new guides. Hammering is not permissible. Liberally oil the guide bore in the head as well as the guide itself to facilitate fitting. Guide height (above spring seat face) is 24 mm for the earlier engines, 24.5 mm for later ones. This change was introduced for the higher lift camshaft and it would be wise to use it for all heads.

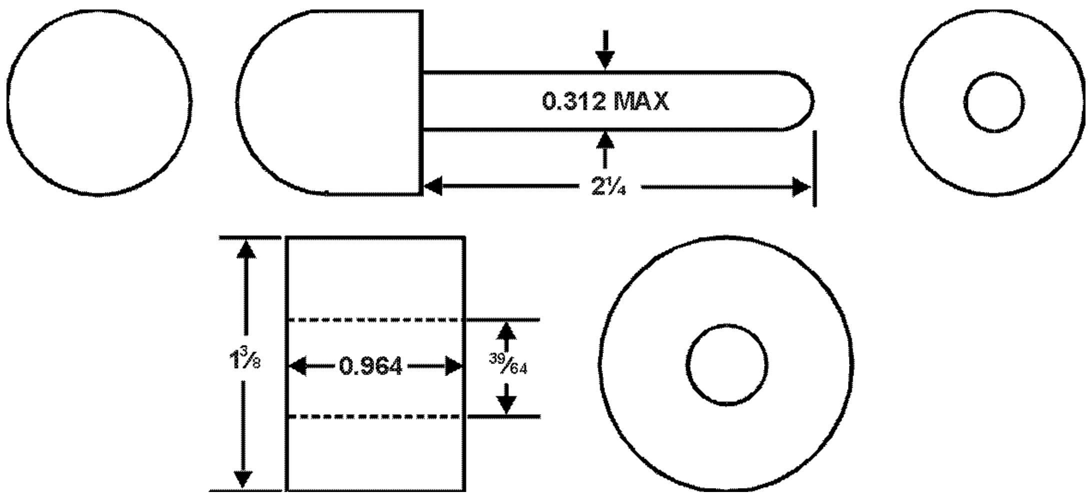

Figure 5. A Valve Guide Fitting Tool

Even with proper care in installation, it will be found on occasion that the upper end of the guide is peened inward, due to the installation process. This is checked by running a valve stem through the fitted guide. Any inward peen may be removed by using a three-edged hand deburring tool.

The centerline of the new guide will not likely coincide with that of the old one. Thus, the seat must be recut. The preferred method is with a refacer-grinder. *(Don't forget to remind the machinist that the seats are to be ground at 30 degrees.)*

The intake valves can likely be refaced, but the exhaust valves suffer most severely from the intense heat of the combustion process. Their replacement is strongly recommended.

With valve-grinding paste, hand-lap the valve to its newly ground seat. An accurate check for proper mating of the valve face and its seat can be made as follows:

1. Install the spark plugs and rest the valves in their seats, sans springs.
2. With the cylinder face upward, pour gasoline into the chambers.

Any seepage of gasoline past the valve seat indicates improper seating, and lapping the valve and seat is again in order until gas-checking indicates perfect sealing.

The importance of cleanliness in the above operation is obvious. Any speck of dirt between a valve face and seat will cause leakage. Before assembly, wash the parts in a warm Wisk solution. Rinse in warm water, and dry.

The life of valves and seats may be considerably extended (a superior seal assured) by doing a second “valve job” after new valves have been run in about 5000 miles. This running-in allows the valves to reach their final dimensions (effected by the heat and working stresses). Disassemble the head, and handlap the valves to their seats a second time. Refacing the valves and seats should never be required this time–if the work was done properly when these valves were newly installed. Gasoline-checking is again in order. Fit new valve stem seals (AEKll3) during assembly.

Rocker Gear

The rocker shaft (SA2232/l–*SA2232/2 from Eng. #9008*) will show wear (about 50,000 miles) on its under side and will be accompanied by wear in the rocker bushings (X20036). This condition can affect oil pressure, especially at idle, and it can also increase the quantity of oil to the valve stems, with smoke the result at the tail pipe.

The bushing can be replaced in each *rocker* arm, then honed to size. But, first, examine the rocker face where it contacts the stern tip. This surface wears (fatigues) at about the same rate as the shaft and bushings. This face can be resurfaced, but once appreciable wear has started, its life is short-lived. Thus, the preferred method is to replace the shaft and eight rockers (bushings included). All other parts in the assembly may be retained.

When fitting the rocker assembly to the head, it will often be noted that the rocker tip does not squarely attack the valve stem tip. This out-of-line contact can cause the premature demise of the rocker face and valve stem tip. The position of the rocker may be changed by fitting one or more washers (X20128), as necessary, between the rocker and its adjoining bracket (X22914). Should we have the rare case that the rocker bushing boss is too wide, then the offending side should be ground down, until it allows proper contact of the face and tip. *(Note that four shims must be fitted for the rocker shaft to remain unaffected.)*

Cylinder Block

After cleaning, the block should be checked for cracks by Magnaflux or other means. The surface (top) of the block must be flat within 0.001 in. Replace all core plugs and oil passage plugs, and prime and paint the block. *(Carefully choose the machine shop that does block resurfacing–some have been known to produce blocks that slope from front to back or side to side.* Ed.*)*

Cylinder out-of-roundness, taper, or size must not exceed 0.003 in. Otherwise, reboring is in order. When boring a cylinder, always bore to the exact oversize (the clearance is built into the piston). Thus, a block that is presently 0.020 in. oversize can quite likely be cleaned at 0.040 in. so that the finished bore size will be 2.6561 in. All imported pistons that have come to the author’s attention are very well controlled as to size. Boring is not a critical work, and any good automotive machine shop can do it to complete satisfaction. Hone the cylinders in a crosshatch pattern to a 25-microinch finish.

Should a block have been previously bored to an oversize such that a further rebore is not possible, then the block must be sleeved. The banana block may be processed to 72 mm bore for 1466 cc. (see SUPERTUNING section). A round block must be sleeved back to a smaller size *(Standard–which must then be bored to suit–standard or oversize)*.

Pistons

Of the many brands of pistons that have come to the author’s attention, he feels that the MOWOG (BMC) offers the greatest advantages. It is of solid-skirt design (strong), is among the very lightest, and has a very low coefficient of expansion. Its three ring construction yields minimum friction, its gudgeon pin is usually accurately fitted, and the piston is tin-plated for easy running-in.

The hard-chromium-plated top ring of American manufacture (Perfect Circle, *Hastings, Grant*, etc.) is available for most bore sizes, and the benefits gained are well worth the extra price. Before the rings are fitted to the pistons, check each in its bore for proper end gap, using a feeler gauge. Prior to installing the rings, put a quantity of Lubriplate in the grooves, fit the rings to the piston, and run them around their grooves a few times. Stagger the ring gaps at 120° from one another when fitting the piston to the bore. Also smear the walls with Lubriplate before assembly.

Gudgeon Pins

The gudgeon pin must have a proper fit in its piston bore, or drag and cocking of the piston can take place if it is too tight, while looseness will be audible, as wrist pin "rap." In either case, early failure is the result. With the piston at room temperature, two thumbs are required to push the pin through its bore. The pin bore finish should be 4 to 6 microinch*es*.

Make up two buttons per the illustration.

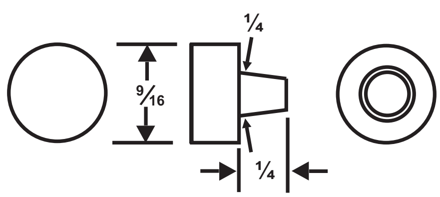

Figure 6. Wrist Pin Tools

If the piston is not correctly assembled to its connecting rod, twisting of the rod can result.

Assemble the piston, rod and pin, and finger-tighten the pinchbolt (AMK8O4). Fit the two buttons into the ends of the gudgeon pin and clamp them in a vise. The pinchbolt may now be tightened without fear of bending the rod.

(By angle trimming a 3/8-drive, ¼ Whitworth socket on a grinder, a handy tool is produced that makes proper torquing easy. Ed.*)*

The piston itself has no front or rear. Thus it can be installed on the rod in either position. But the connecting rod must always be installed with the gudgeon pin bolt on the offside, away from the camshaft. Otherwise, a jolly good vibration develops, and the bores are not properly lubricated.

Crankshaft, Connecting Rods, and Bearings

The bottom end of the XPAG *(and XPEG)* is its most fragile area, but technological advancement in recent years has given new hope here. It is emphasized that only careful, complete service will yield satisfactory results.

The crankshaft is made by forging. Original equipment had a tendency to break at the web between the front main and the first throw, but replacement shafts that have been available for the past ten years are made of more suitable steel, which seems to have eliminated the problem. The new shaft carries part number 168828 on its third web, and usually the designation EN-16, which is the British steel specification.

Examine the shaft for cracks by Magnaglo or other. Any scoring, or out-of-roundness greater than 0.001 in. calls for regrinding. Tolerance for the data given is +0.0000/–0.0001 in. Such accuracy in the machine tool industry is common, but today's automotive machinist, pushed by superiors for greater production, loses touch with precision, and this is reflected in poor grinding accuracy. It is strongly recommended that considerable time be spent searching for a qualified grinding service. The effort in this direction will be reflected in long bottom end life. *(At about $1800 dollars, currently, for a new shaft, this seems very reasonable.* Ed.)

The crankshaft grind sizes presented in the data are those recommended by M.G. Car Co. But it is suspected that even Morris Motors Rebuilding Service finds it expedient to remove an additional 0.0008 to 0.0014 in. on the diameter. This is because the recommended oil clearance requires too accurate work, both in grinding and in assembly. Again it is emphasized that the grinding tolerance is most important.

Should one or two journals be so severely undersized, that the worth of the shaft is questionable, build-up is possible by arc welding.

The cost is high, particularly if all four throws have to be done, and for all seven journals the cost could exceed that of a new shaft *(not any more)*. Second, no experience has been gained in heat treating a shaft with welded journals, so welding, by far the best way to salvage a shaft, is an expediency, not a solution. Very unhappy results are had from metallizing, or metal spraying. On big, low-revving engines, this is a get-by-for-now remedy, but on the high-revving XPAG, this sprayed metal is knocked off very quickly.

All XPAG shafts, original or replacement, new or reground, seem to have a short life. This life may be more than doubled through heat treatment by the Tufftride process, which introduces a surface hardness of Rockwell 52–68, and also increases the fatigue strength in the order of 50%. This is performed after the shaft has been machined, since the low temperature involved cannot effect the dimensions. Cost is moderate. Afterward, lightly polish the journals.

If the engine is to be subjected to frequent high revs, hard chromium plating of all journals might be considered. Cost is high, but the anti-scoring properties and infinite life are very desirable. On the debit side, claims have been made that chrome plating has an embrittling effect, thus weakening the shaft. But it should be noted that very good results in racing circles are achieved with plated shafts. Chrome does not hold an oil film too well, so oil pump and system must be of the first order. Some rebuilders resort to grinding a groove $^1/_{16}$ deep x $^1/_{16}$ in. wide around the center main and through the oil supply holes. This results in a slight oil pressure drop, indicating that a restriction did exist here. (Usually, bearing failure will take place at the third *(rod)* throw, or occasionally, the second.) Strictly speaking, grooving is considered poor practice, but, here, theory seems to have been proven wrong, while practice right.

BMC specifically recommend that the XPEG shaft not be reground. Rather, it should be exchanged through a BMC distributor or dealer for a new shaft. Practical experience, however, has shown no real reason for this attitude. Indeed, the author has run an RS *(reground)* shaft in his Stage II l½ litre TC for many miles and no adverse consequences.

There is much scuttlebutt to the effect that a reground shaft, whether XPAG or XPEG, does not wear as well as a new shaft, that it is not as strong, that after two or three regrinds its surface hardness is gone. Very little credit can be given to this greasepit talk. The loss of strength in a reground shaft is mathematically negligible, and all shafts are soft, standard or RS. Properly performed machine work, heat-treating, assembly procedures with the right parts, and reasonable running in will yield a completely satisfactory bottom end.

Connecting Rods

Quite likely no other major part of the engine is so neglected in rebuilding as is the connecting rod. And no other rod demands service as does the XPAG.

Examine for cracks by Magnaglo or other. The big end of the rod has a marked tendency to elongate. This produces an out-of-round bearing, even when new ones are installed. The author has seen rebuilt engines (done by conscientious shops) that have mild bearing rap after only 10,000 miles. This elongated big-end can be resized by most automotive service shops, but some caution should be observed to obtain a good job. Tolerance here should be held to +0.0002 / –0.0000 in. Federal Mogul Services, with branches in larger cities, seem to offer satisfactory service here.

The small end of the rod needs no attention, but carefully examine the threads in its clamp. Previous service may have produced damage. Replacement of the gudgeon pin bolt (CA1009) and the big end bolts (AEFl23) and nuts (AEF137) is a sound precaution.

The beam of the rod should be checked for straightness within 0.001 in. at 6-inch distances. Again, this work can be performed by any good shop, but preferably in your presence. Although the shop's reputation might be first class, an individual employee can rush a "half" job with "half" accuracy on your rods.

The reconditioned rod can be considerably enhanced by the Tufftride process. Hardness is not the concern here, but the increased fatigue strength.

New rods may seem like an easy solution. Let us discuss some of the points.

1. Newer rods (shown by the higher numbers on the beam) are usually lighter in weight.
2. The big end of the rod is already sized and the beam is straight. But the tolerance for size and roundness is usually much sloppier than that which we stated, and this will effect durability.
3. New bolts and nuts are supplied with the new rod.
4. No fatigue (but Magna*flux* new rods anyway).
5. A used rod has been stress-relieved by the working process. If it passes inspection and is properly serviced, it might even be preferable to a new rod.

The Bearings

The main and connecting rod bearings are steel-backed babbitt of the “thin-wall” or “micro” type. No hand fitting is permissible, nor should it be necessary if all machine work has been properly done. Vandervell also supplies a heavy-duty, copper-lead con rod bearing *(VP252)*, and its use raises the rev limit (as far as the bearings are concerned) from 6100 rpm to well over 7000. It will be noted, however, that these figures are mathematically derived, and sending the revs beyond the limits imposed by the characteristics of the camshaft can only be described as idiotic abuse. Running at normal superhighway speeds (and at working oil temperatures), the copper-lead bearing has about ten times the strength of the babbitt bearing. Against this, it produces rapid wear, so it must be used only with a heat-treated or hard-chromed shaft.

The main bearings are thin-wall babbitt, and no real troubles are experienced here.

Fitting the Crankshaft and Bearings

Prior to assembly, clean all oil passages in the crank with gasoline and a pipe cleaner. Also, clean the hole in the big end upper side of the connecting rod. If possible, blast through all these passages with compressed air. Then, wash everything in a warm Wisk solution, rinse and dry. This will remove all traces of grinding abrasive dust.

During the cleansing of the block, we will have checked that all oil passages are free of obstructions. When the main bearings are fitted to the block, be certain that all oil supply holes are present in the bearing upper halves. The author has seen a few rare instances in which a hole has been missing.

Some technicians like to line bore the main bearing saddles, on the theory that aging causes dimensional changes in the block. The author has never found this to be necessary. However, this does not rule out the exceptional case.

Fit the crankshaft, clean and free of lubricant, into the main bearing *halves in the block*, assemble the caps, and finger tighten the main cap nuts. The shaft should rotate without much effort. Then, lightly tighten the center cap, and check for ease of rotation. Then, lightly tighten the next cap, check the rotation, and then do the last cap. Next, fully torque the nuts of each cap, checking the ease of rotation before doing the next. The crank will turn in its bearings with a noticeable drag, but no heavy-handed twisting should be necessary. When lubricated, the shaft will spin freely, but this will not give us an indication of proper fit.

Should considerable drag be felt, every component must be checked for dimensions. Prussian bluing (Dykham's recommended) may be applied to the bearings to show the offending spot(s). Bluing, incidentally, will act as a lubricant, so some drag will disappear with its use, but the trouble spot will be shown by where the bluing is wiped away.

With the crank out of the block and standing upright and bolted to its flywheel, assemble the rods and their bearings to the shaft, again with everything clean and free of lubricant. One finger pressed against the smaller end of the rod should be able to turn the rod around the journal, again with the slight degree of drag evident.

NOTE

When using copper-lead bearings, the drag-feel method is not applicable, as the greater oil clearance of the harder bearing will tell us nothing. Here, it is best to use a device such as Plastigage. Correct clearance with the copper-lead bearing is 0.001 to 0.0015 in.

When the complete engine is assembled and properly lubricated, considerable effort will be necessary to turn the crankshaft. Most of this effort will be required to overcome the friction of the rings on the new cylinder walls.

Were the engine to be removed after proper running in, it would be found that the cylinder walls are polished to dull mirror finish, and that one finger, inserted in a clutch spring hole, would turn over the engine.

Flywheel and Clutch

The teeth of the TC ring gear are much more durable than those of the TD and TF.

However, replacement while the engine is being rebuilt is a sound precaution. The old gear may be drilled and chiseled in several places, then tapped off. The new gear is heated by an acetylene torch, when it will readily drop in place around the flywheel. Upon cooling, it will have shrunk to a secure fit. *(Do not overheat.* Ed.*)* The centerline of the crankshaft and the plane of the flywheel must be at right angles, and may be measured with a dial indicator. Maximum permissible runout is 0.002 in.

Should the clutch surface of the flywheel be scored, it must be resurfaced. Consider, also, the Cobb Clutch (see SUPERTUNING Section), as its additional torque-carrying capacity is highly desirable.

The clutch disc should be replaced if lining wear is obvious. Compare it to a new one when in doubt. Clutch servicing and rebuilding is thoroughly covered by the M.G. Workshop manuals, so there is little point in duplicating this material here. Secondly, the more common, and better, policy is to replace the old clutch with a new or rebuilt unit. The expense is not great.

Alignment of the clutch disc may be assured by use of an old first motion shaft. or make the tool shown below. *(Many suppliers now sell plastic clutch alignment tools.* Ed.)

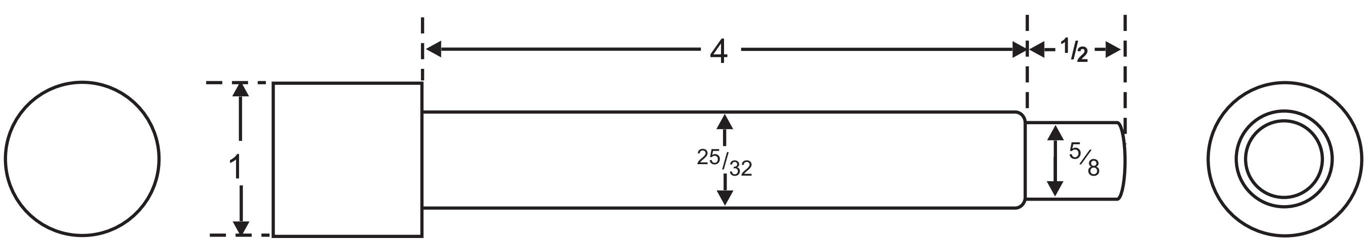

Figure 7. Clutch Alignment Tool Dimensions (All Models)

The Camshaft and Related Gear

Four “grinds” are available. (X24084) is the camshaft originally fitted. In the late TDs, 168553 was introduced, and this gave the same top end performance, with better acceleration and less tappet noise. The author strongly, recommends this new camshaft. The cams are further discussed in Section III. Note also, that a change in camshafts sometimes requires a change in the ignition advance curve.

The front cam bearing (X22542) is a steel-backed, babbitt-lined sleeve. The old one is easily chiseled out, but press in the new one carefully, with particular attention given to the alignment of the oil supply holes. The bearing must now be reamed to size, using the center and rear bearings as guides. Use MOWOG tool 18G351, or this work may be done by a local automotive machine shop with the use of their universal boring machine.

The rear cam bearing (X22546) is fitted after its core plug is in place. We must be careful this time to align both the oil supply hole and the locating hole which is fixed by a bolt (X22547).

The center cam bearing (SA2224/2) is split at its center, and must be fitted as the camshaft is assembled into the block. It is located and locked in place in the same manner as the rear bearing. The camshaft is now locked in the block by the thrust plate (X22543).

The timing chain tensioner is oil pressure-operated, and this oil pressure also supplies lubrication to the chain and sprockets. Examine closely to see that the supply hole in the tensioner block (X24138) is free of any obstruction. The author has frequently found blocks with no oil passage at all. This may be corrected by drilling a 1 mm *(0.394 in.)* hole per the illustration.

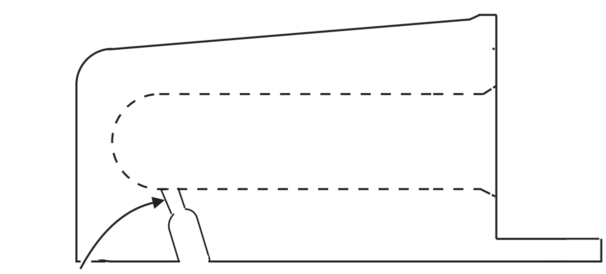

Figure 8. Oil Feed Hole in Timing Chain Tensioner Block

Camshaft timing is effected by alignment of the "T" marks on the sprockets with the light-colored links of the chain. Should you be using other than a Mowog chain, the illustration shows the proper alignment.

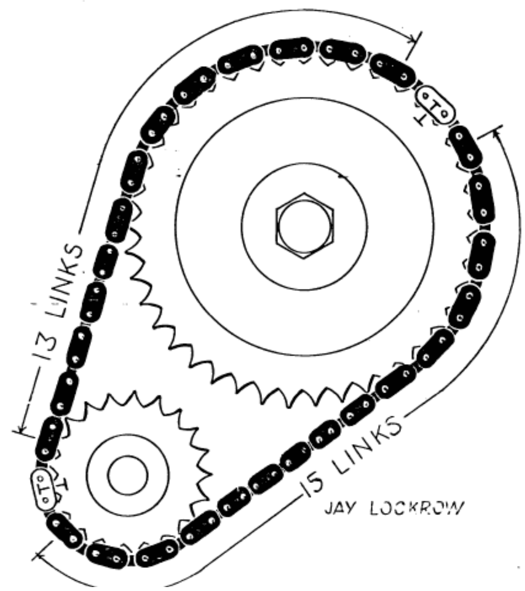

Figure 9. Timing Chain Alignment

Pushrods

No real wear takes place on the pushrods, nor are they subject to any great stress. But, occasionally, one is bent. A more common fault is the loosening of the ends. These loose ends can cause noise similar to excessive valve-to-rocker clearance, and no amount of adjustment will correct the clatter. There are methods of temporary repair to the pushrods, but replacement is the best policy.

Tappets

Tappet wear is a severe problem with the XPAG *(or XPEG),* and this wear may be found as early as 5000 miles. Scuffing, then pitting, takes place, and this in turn scores the cam lobe. Now, the damaged lobe quickens the demise of the tappet, and the severely damaged tappet then tears apart the lobe, and so on.

No certain solution has been found to this problem, but Tufftriding both the camshaft and the tappets has shown, so far (adequate testing has not been completed), to give completely satisfactory results.

The Ignition System

The Lucas distributor, because of its being driven on the side of its shaft, is prone to wear its bushing rather rapidly, thus producing shaft wobble. This wobble, in turn, leads to misfiring on one cylinder, usually on number three. Curiously, this misfiring becomes noticeable just after installing new contact points, but sometimes disappears above idle. Thus the mechanic tends to blame himself for the condition, and spends much time looking for his mistake. A new distributor makes the matter right.

The distributor can be rebuilt, but Lucas *(used to)* offer an attractive exchange program, and this is the suggested policy. The distributor types are listed in Table 25.

Table 25. T-Series Distributors

Camshaft	Distributor Type	TC	TD	TF
X24084	DKY4A	40048✹	40162	
168553	D2A4		40368	40367

NOTES

40048 is NLS, use 40162 and fit the micro adjuster in the same manner; use 40162 prior to XPAG TD2/20942, and 40368 after that engine number.

When increasing the compression ratio, changing the camshaft, or both. Refer to the SUPERTUNING section.

Distributor Installation

Turn the engine by hand crank (or put in top gear and roll *the car* forward) until the first *(#1 cylinder)* inlet valve just closes, then turn the engine just enough to line up the notch on the crank pulley and the arrow on the chain cover. This is TDC on the first cylinder. Install the, distributor so that the rotor points to the #1 spark plug lead *(in the distributor cap)*, with the points just opening **(counterclockwise rotation)**.

With the engine idling at 700 rpm or less, a strobe light may be used to set the spark to fire at TDC. Because of the better fuels now available, and because so many heads have had the compression increased, it may be necessary to advance the spark slightly. The correct setting will have to be determine by trial and error, looking for the best possible performance with no detonation (pinging).

A word about the setting of contact points. The correct gap (on all distributors built in the last ten years) is 0.014 to 0.016 in. Among pseudo-mechanics there is much talk of a “loose” or “tight” 0.015 in. The seasoned technician will not dally with this fuzzy type of thinking. Rather, he uses his 14- and 16-thousandths gauges to tell him he is within the required setting. Thus, the 14-thousandth gauge will be loose between the points, while the 16-thousandth gauge will drag. After 100 miles or so, adjust the points again, to compensate for the wear that has taken place on the rubbing block. Use a distributor cam lubricant, such as Blue Streak Lubricam, to minimize this wear.

The Coil

The coils originally supplied on T-series are now superseded by Lucas 45074 *(now CL1 Model 11P12* Ed.*)*. The characteristics of *the* types are shown below.

Table 26. Ignition Coil Statistics

Coil	Type	Primary Resistance @ 20 °C, Ohms	Low-Speed Spark Gap Test @ 100 rpm, w/5% Miss	High-Speed Test Distributor rpm w/No Miss	Maximum Test Voltage
45020 45053	Q12	4.3-4.5	9 mm	3000	12.5
45074	LAl2	3.2-3.4	10 mm	3000	12.5
45058	SA12	Sports Coil		7000	12.5

The capacity of the condenser is 18.23 microfarads.

Spark Plugs

Selection of the proper plug will depend on the condition of the engine and its stage of tune. A worn engine will need a hot plug to resist oil fouling, while a modified engine may require a colder plug to deter pre-ignition. Now, a plug needs a wide operating range to resist both these problems, and it is a great credit to automotive and plug engineers that their products perform so well. The following are general recommendations, because no two engines, even when built to the same specification, will have exactly the same plug heat requirements. So on occasion, some experimenting may be necessary. *(The letters in Table 27 refer to the right-hand column in Table 28, below.)*

Table 27. Heat Range Application

Head Type	Plug Reach	Smoker	Normal	High-Speed	Extra Cold
Banana Round	½-inch ¾-inch	B or C	D or E	F or G	H or J

Projected core plugs (*) offer a very wide heat operating range compared to the conventional type. It will be noticed, in the table below, that one manufacturer's plug may not have an exact counterpart in another brand. Like many others, the author was once carried away with the romance of the imported plug. Frequent troubles have been disillusioning, and he is now convinced the Yanks make the best product, with Champion taking his preference. KLG are also quite suitable, offering the widest range of plugs with different heat values. KLG ‘P’ (or ‘PS’ resistor) type waterproof covers are the best plug terminals available. *(It seems that many present day owners prefer the NGK plug, so that comparison has been added to this table*. Ed.*)*

Spark plug gap is 0.014 to 0.016 inches (*on all models*).

Table 28. Spark Plug Interchanges

14 mm ½-Inch Reach					
KLG	**CHAMPION**	**AC**	**AUTOLITE**	**NGK**	
F20	L-14			B-4HS	A
			AE82	B-4HS	
		47FF		BP-4HS	
		46FF		BP-4HS	
			AE6	B-4HS	
		46FFX*	AE52*	BP-4HS	
F50 (E80)	L-10S			***B-6HS****	D
F55P*	UL-15Y*			BP-4HS	
		45FF		B-4HS	
F65P*		45FFX*	AE42*	BP-4HS	E
F70		44FF	AE4	B-4HS	
	UL-12Y*	44FFX*		BP-7HS	
F75	L-7			BP-7HS	F
F80	L-5	42FF		B-7HS	G
F100				B-77HC	H
FE220				BP-77HC	J

***This is the editor's recommendation for 1250 engines with short-reach plugs*.

(Continued)

Table 28. Spark Plug Interchanges (Continued)

14 mm ¾-Inch Reach					
KLG	**CHAMPION**	**AC**	**AUTOLITE**	**NGK**	
FE20	N-21		AG9	B-4ES	A
			AG82	B-4ES	
		47XL		B-4ES	
		47XLS*		BP-4ES	
FE30	N-18		AG7	B-4ES	B
	N16Y*			BP-4ES	
		46XL		B-4ES	
FE45P*	N-14Y*	46XLS*		BP-4ES	C
			AG52*	BP-5ES	
FE50	N-8		AG5	B-6ES	D
FE55P*	UN-12Y*			BP-6ES	
		45XL		B-6ES	
FE65p*		45XLS*	AG42*	BP-6ES	E
FE70	N-6		AG4	B-6ES	
	N-9Y*	44XLS*	AG32*	BP-6ES	
FE75	**N-5****		AG3	***B-6ES*****	F
		43XL		BP-7ES	
			AG22*	B-7ES	
			AG2	B-7ES	
FE80	N-4			B-7EC	G
	N-6Y*	42XLS*		BP-8ES	
	N-3			B-8ES	
FE100				B-7EC	H
FE125P*					
FE220				B-77EC	J

***These are the editor's recommendations for 1250 and 1500 engines with long-reach plugs.*

The Oil Pump

Excessive clearance in the pump, due to wear, will cause loss of pressure, particularly at low revs. The pump is partially dismantled as it is removed from the block.

Remove the circlip that holds the gear to the shaft (X22730), and then tap the shaft downward about ½ inch. Now, place some nuts or other suitable spacers between the body and gear and drive the shaft outward another ½ inch. Continue this procedure until the gear is removed. This must be done because the woodruff key that positions the gear on the shaft would gouge the bushings were we to attempt to merely drive the shaft out of the gear and body without heightening the gear.

The bushings (X224O3) in the pump body should be driven out and new ones fitted and honed to 0.0007-inch clearance on the shaft. Now, the shaft may be returned to the body, and the key, gear, and circlip refitted.

Check the filter bypass components in the block for proper mating of the ball and its brass seat. Replace the driven gear shaft (0A10132), because wear takes place on its upper portion, allowing the gear to drop and wear the pump body. This shaft may be drawn out by using a piece of tubing 2.7 inches long, plus some washers and an 8 x 1 mm bolt (sump *or gearbox* bolt). The driven gear (SA1088), its bushing included, should be replaced, too.

The cover has likely become scored from the driven gear running on its surface. The cover may be ground and again lapped flat, or it may be replaced. In the cover, renew the oil pressure relief ball (AMK739), as this likely has a groove worn in it. Also inspect for grooving in the ball seat (X2O856) in the cover. Although this is rare, it is quite important. Should any appear, replacement is necessary. The relief valve spring may have been tampered with, so using a new one is wise. There is no gasket between the pump body and cover.

The Sump

Completely dismantle the sump before cleaning, even the plug on its side passage. The pickup strainer must be thoroughly cleaned, or should it be hard-clogged, replacement will be necessary.

The TC and early TD had the pickup on the left side of the sump so that some starvation took place in hard left corners. It is wise to replace this unit with the later type (168727). Build a vertical baffle plate around the scoop to minimize surge during acceleration. For five-quart sumps, this scoop should be shortened about one inch to ensure good circulation around its opening.

Balancing

A severe out-of-balance condition could shortly wreck an engine. For this reason, the manufacturers hold the weight variation of their products (pistons, gudgeon pins, con rods) within certain limits, which might be considered rather liberal by the specialized tuner. A good tolerance for static balance is 1 gram maximum variation; for dynamic balance, 1 oz/in. Much speculation has been ventured as to lost power due to imbalance. However, testing has shown that this is only about ½ hp. The balanced engine minimizes any adverse condition (which increases proportionally to the increase in revs) that conventionally exist. The high road speeds employed today place particular emphasis on minimizing imbalance. **It is strongly recommended.** *(This is a must today, with the very high expense of new engine components.* Ed.*)*

MOTOR MOUNTING *(TC)*

It will be noted that there is provision for adjustment of the motor mounts, so that there is no strain on them or on the frame. The engine and gearbox should be set on the frame with all bolts loose. Tighten first the four bolts that hold the rear mounts to the transmission, then the four nuts that hold the mounts to the frame. Next, tighten the four bolts and nuts that hold the front mounts to the frame. This procedure will avoid the stresses that misalignment might produce. Now, the two large front bolts (81878) may be fully tightened into the mounts and the rebound rubbers (83177) can be fitted to the bottoms. Do not tighten these too much or engine vibration will be introduced into the frame. Finally, fit the 5/16-22 lock nuts.

NOTE

> The motor mount protecting washer (X22106) should be fitted with its dish upward, otherwise it will dig into the rubber of the front mount.

It is also quite important to frequently observe the condition of the transmission mounts. When these become soft with age and oil deterioration, the condition prompts breakage of the aluminum rear mounting plate on the *expensive* transmission. To repair or replace this rear plate requires removing the engine and gearbox. Periodic inspection and prompt attention can avoid this ordeal.

TUNING

Tuning may be defined as adjusting the engine and its accessories to yield maximum power and smoothness. Our tuning procedure must be just as thorough as that which went into the rebuilding of the engine. Proper procedure seems nonexistent, even in the best of shops. Therefore, we must rely on our own abilities. A newly rebuilt engine may be more accurately tuned after 2000 miles or so running in, so that it may be revved to its maximum in order to test the desired results of the tuning.

Engine Tuning Procedure

1. With the engine at working temperature, torque the head to the proper setting.
2. With the engine at working temperature, check the compression pressure.
3. With the engine at working temperature, adjust the valve rocker clearances.
4. Clean or replace the spark plugs. Set the gaps.
5. Check the coil output and condenser capacity.
6. Remove the distributor, and clean thoroughly, replace the points. Check the distributor in a testing machine, looking for inaccurate spark distribution, incorrect advance, or shaft wobble. Refit the unit to car, and set the timing.
7. Remove the carburetters from the inlet manifold, disassemble them completely, and clean them thoroughly. Then, reassemble them, making such adjustments as float level, jet centering, needle height, etc. Fit them to the manifold, and set them for equal air draw. The best instrument to use here is the UniSyn, for this eliminates trying to interpret the hisses and gurgles and other silly sounds. Finally, adjust the mixture, and set the idle to 700 rpm with the headlamps on.

THE COOLING SYSTEM

Adequate cooling has been a feature, rather than a problem, in any T-series, but as a matter of caution, the radiator should be cleaned and tested by an auto radiator shop. Use a 70 °C *(160–180 °F)* thermostat. Were this removed, it would adversely effect oil circulation and detergent action, the expansion rates of engine components, and fuel-air mixture at low revs. TC and early TD water pumps were troublesome and, should you have the original type, exchange it for a new one. Later TD and TF pumps give completely satisfactory service.

ADDENDA TO PART II

Always replace the oil slinger cap *(oil seal) at the rear of the block above the crankshaft* (X22517) as this is the only source of oil leaking into the bell housing. *(See Moss catalog for replacement metal/rubber oil seal*. Ed.*)*

The crank pulley oil seals recently being supplied (in several makes of gasket sets) are rather short in length. allowing oil leaks here. Fit a new packing to the timing case cover, and fit the cover, with the bolts loose, to the block. Smear the seal running surface of the pulley with a lubricant and drive it home onto the crank. Now tighten the chain cover bolts. Into the sump, fit another top seal (AEGI25), not the AEGI26 supplied). With this packing firmly in place, cut off the excess material with a razor blade, leaving about 1/16 to 1/8 in. standing proud on each end. This will ensure proper compressing of the packing. With the gaskets and rear seal in place, fit the sump to the block, and tighten all bolts.

The engine need not be pulled with the transmission as a unit. Simply remove the ten bolts holding the block and sump to the bell housing. The block will pull forward, up, and out. A plate is shown below that will simplify the work. To its center hole is fitted an eyebolt and nut, slightly forward to tilt the engine. It is used with the head removed, fitted over the studs, and held by the head nuts. Trace the six center *head* stud holes from a head gasket onto a piece of 5/16-in. steel stock, and drill 7/16-in. holes.

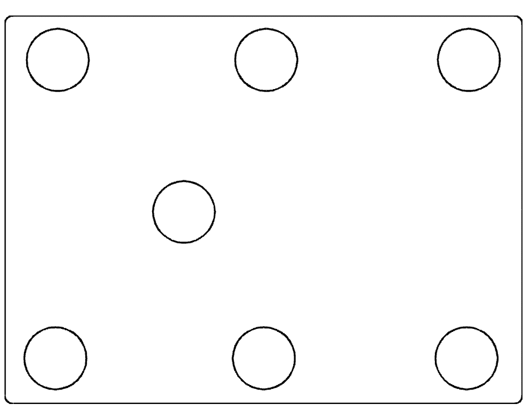

Figure 10. Tool for Removing the Engine

The very early TC engines were painted a medium green (about BRG) (*There were many shades of British Racing Green, so be careful which one is selected.* Ed.*)*, while the later ones were an unappealing gray-green. It should be noted that the entire engine compartment–bulkhead and bonnet undersides–was finished in this latter color for all later early cars. This policy changed about the time of the first EXUs. Then, the engine was painted a dark red, and the compartment took on the color of the car exterior. The dark red was used for all TDs and TFs.

Always replace the bushing in the end of the crankshaft (AMK804), and apply a small quantity of Lubriplate to the transmission shaft that fits into it.

Carburetion is not discussed here because it is so well covered in SU *literature*. The following are recommended:

AUC9600 Workshop Manual. Carbs and Fuel Pumps

AUC9537 Basic and Thermo-Type Carbs

AUC9593 Listing of Cars, Their Carbs and Fuel Pumps

AKD4789 *Carburetter and Pump Specifications*

AUC9618 *Needle Sizes*

AUA2II Construction and Functioning of Fuel Pumps

Carburetter parts lists are provided in the SUPERTUNING section for those who wish to fit the larger units of the TF.

Fan belts that are readily available from independent suppliers tend to be too long. Thus, there is not enough adjustment (especially on the TC) to keep the belt tight. The MOWOG belt (AAA5780 *12.5 x 975 mm*) eliminates this problem.

The three studs (X17052) on the exhaust manifold are often butchered because the wrong nuts have been fitted. These can be removed and replaced by a good blacksmith. Use only the stock brass nuts (CA1605). Never-Seez is absolutely necessary here, and tighten these nuts carefully and evenly.

PART III

SUPERTUNING

SUPERTUNING, and particularly supercharging, have received dubious reputations because of improper approach. We find in the *Special* Tuning Manual supplied by the M.G. Car Company that the guarantee is void on cars to which the recommended modifications are performed. Two reasons account for this:

1. The car, at its time of manufacture, was not built to have its power considerably increased. It was not built to be raced. It was not built to be driven even in the sporting manner for which it was designed. It was built to be driven in a very sane, conservative manner only.
2. The manufacturer's position is dictated by marketing and economic pressures. The M.G. Car Company is in business to make money, to show a profit. For the young rake who wishes to dash about the countryside in an improper *(sic)* manner, the company suppl*ied* certain suggested modifications, but he *or she* had better not bring to them (via guarantee) the troubles that these modifications might bring. Further, the company had no controls on the quality and testing of such work.

How, then, do we dare to mill a few thou off the head, or to send the revs above 3000? The durability of the XPAG has been proved by the many years and countless miles of racing. The M.G. Car Co. themselves prepared and sponsored the EX135 and EX179 record-breaking cars. The former used a blown TD engine, the latter an unblown XPEG that developed 95 hp at 6500 rpm. At one time the company had an XPEG blown to the modest pressure of 27 psi, and this gave 220 hp at 7000 rpm.

An intelligent approach to supertuning can give very satisfactory results. Ignorance and impulsiveness can yield only disaster. Never plan modifications on a well-worn or questionable engine. SUPERTUNING must be performed on an engine in prime condition only, and prepared with the greatest care according to Part II.

The durability of the properly prepared engine can easily be double that of its original form. Modifying, to take advantage of today's fuel potential, will not significantly diminish this great durability. Further, the car may now be driven in the sporting manner that matches its character. Certainly, occasional running through the gears against more modern 1½-litre cars would not be detrimental, but trying to show your tail to the 7-litre monsters would be folly.

Cruising on superhighways at 4000–5000 rpm is now within the scope of the XPAG. In a TC with high-speed axle (4.875), this means 70–85 mph.

The M.G. Car Company supertuning booklets offer stages of tune that mate together various modifications in order to achieve differing results, and are outlined below. These stages are not necessarily in numerical order for performance development. A Stage II car would likely tromp a Stage IV car and, from personal experience, the author knows that a Stage IA TC (1¼ litre) will gain a tenth of a mile on a Stage IVB TC (1½ litre) before reaching top gear, and the same car will edge a Stage IVA to about 90 mph—and only then, does the hotter car go by.

If in the rebuilding of a car we use Stage I and the 230 degree cam (168553), the torque curve will be favorably enhanced (better acceleration, less shifting) way out of proportion to the money expended. Top speed will go up one or two mph–not enough to talk about. The various stages of tune are for differing uses: rallying, circuit racing, long distance road racing.

Only mad Australians race their TCs today (Bravo, chaps), while the Yanks appease themselves with a few tours. But the social malcontents among us (such as the author) like nothing better than to run through the gears and slide corners on back roads. The wind in the face, the roar of the exhaust, trying to pass the TC in front of you while keeping a lead on those behind, all give idiotic reason to a highly illegal race to a pub halfway across the county. To those few, the following is recommended. In the hot rod vernacular, there ain't nuttin' like cubes: 1½ litres give us a 20% increase in torque and power.

From this point, all recommendations will apply to both engine sizes. Use the Laystall Lucas head, 1½-inch SUs and twin fuel pumps, extractor exhaust, retain the 230° camshaft, Mallory ignition, and Cobb Clutch. For reliability, chrome the crank journals, and use an integral pump-filter and six-quart sump. Remove the fan blades, unless you drive in moderate-to-heavy traffic. These modifications aim at a fairly flat torque curve just above the middle of the rev range, rather than at maximum horsepower. The result will be a car challenged only by the best 1½-litre machinery made today.

Stage I

Raise compression to 8.6:1. Clean and match *head* ports to the manifolds, fit the appropriate distributor. Any engine, during rebuilding, should have this work performed in order to take advantage of the potential in today's fuels.

Stage IA

Raise compression to 8.6:1. Install larger valves, clean and match the ports and manifolds. Fit the appropriate distributor, and use 1½-inch SUs with GJ *(AUD1214)* needles and 0.090 jets. This stage was standard in the TD Mark II and TF, and the results are outstanding for the moderate cost. The 1½-inch SUs are not essential, but they give a more balanced performance on the upper end of the revs.

Stage II

Raise compression to 9.3:1. Install larger valves and polish the combustion chambers quite well. Enlarge, match and polish the ports and manifolds. Fit the appropriate distributor, and use 1¼-inch SUs with GJ *(AUD1214)* needles, 0.090 jets. Twin fuel pumps are optional. The high cost of the handwork in this stage of tune gives only marginal improvement.

Stage III (1¼-Litre Only)

Raise compression to 12:1 with special pistons and standard head thickness. Polish head chambers thoroughly. Fit large valves, and enlarge, match, and polish the ports and manifolds. Fit appropriate distributor, use SUs with 0.125 jets and VE (*AUD1395*) needles (richer VO [*AUD1405*], weaker VA [*AUD1391*]). Fuel is 80% methanol (0.796 specific gravity at 60 °F) and 20% 100-octane gasoline, with needles VJ (*AUD1400*]) (richer VL [*AUD1402*], weaker *VG [AUD1397]*), or for a further slight increase in power, use 100% methanol VI and (*AUD1399*) needles. This stage of tune was recommended in the late 1940s when pool petrol was of poor quality in the British Isles. The high cost of this fuel and the poor mileage derived, plus the frequent cleaning of the fuel lines required, make it rather impractical today.

Stage IV

Fit a supercharger to an engine in standard tune. This is a quick bolt-on-and-take-off-anytime modification. The blower itself requires special care. Usually this cost may be better invested in another stage of tune to give comparable or superior performance with less maintenance problems.

Stage IVA (1½-Litre Only)

Raise compression to at least 10:1, and polish the chambers thoroughly. Fit large valves and stronger valve springs. Enlarge and match and polish the ports and manifolds, using an extractor exhaust system. Fit 1½-inch SUs, 0.090 jets, LS1 *(AUD1258)* needles and twin fuel pumps. Fit the AEGI22 camshaft and appropriate distributor. For the TC and TD1, use a Cobb Clutch. For the TD2 and TF, use a pressure *plate* assembly from the MGA 1600.

Stage IVB (1½-Litre Only)

Raise compression to at least 10.7:1, and polish chambers thoroughly. Install large valves and stronger valve springs. Enlarge and match and polish ports and manifolds, using an extractor exhaust system. Use 1¾-inch SUs with 0.100 jets, CV (*AUD1112*) needles (richer GK [*AUD1215*], weaker BC [*AUD1063*]or KTA [*AUD1248*]), and twin fuel pumps. Fit the 168551 camshaft. For the TC and TD1 use the Cobb Clutch Racing. For the TD2 and TF use a clutch from a double *(twin)* cam MGA.

Table 29 compares the stages of tune for power, torque, cost, and application. Cost is based on the owner removing and replacing the engine, and includes completely rebuilding the block, head, oil pump, clutch, distributor, carbs, starter *and*/or generator, but not the water pump. Cost of the higher stages of tune is basic, not including the extra work that would be required to increase reliability. Thus, a more realistic cost for Stages IVA and IVB would be about $1200. *(Quadruple that two or three times or more for 1998 prices–if you can get all the parts*. Ed.*)*

Table 29. Stage Attributes and Estimated Costs

Stage	HP at RPM	Torque	Cost ($)	Remarks
Standard	54 at 5200	63	625	Quite underpowered by today's standards.
I	57 at 5500	65	645	Noticeable improvement.
IA	63 at 5600		685	Strongly recommended for 1¼-litre. Brings car to acceptable level of performance.
IA (1½-Litre)	73 at 5600	78	830	Very pleasant to drive. Brings car to modern standard of performance. Use high-speed axle.
II	66 at 5700	68	725	Good performance. High-speed axle could be used.
II (1½-Litre)	78 at 5700	80	880	For hill climbs, use standard axle. For street ,use a high-speed axle.
III	76 at 6000	75	725	Rather impractical today.
IV	65 at 5500	72		Cost varies according to supercharger manufacture. Installation is fast, easy.
IVA	86 at 6000		9,500	For hill climbs, use standard axle. For fast track racing, use high-speed axle. Sluggish on street, OK for highway travel.
IVB	90 at 6300		10,000	For sustained high-speed racing only. No good on street. Use high-speed axle.

SUPERCHARGING

Supercharging is a quick way of gaining a noticeable improvement in performance. The supercharger, or blower, comes as a ready-to-install kit that even the novice should be able to install in less than a day's work. The blower is mounted on the intake manifold, and driven by twin belts from the crankshaft. Power increase is in the order of 20%. Even greater outputs can be achieved by use of limited supertuning to improve the gas flow. Larger valves and increased compression (8.3:1 maximum) could yield 70 hp, and 1½ litres would result in 85 hp and 93 lbs/ft torque. This would be a marvelously tractable car.

Supercharging augments the natural aspiration of the engine, or in simpler terms, it pushes the air into the *combustion* chambers under pressure much greater than atmospheric. The result is a greater charge of fuel-air *mixture* being compressed and ignited, with a proportional increase in power output, minus the power to drive the blower. More information may be had from the manufacturers of this type equipment.

To minimize hot spots, and pre-ignition, the combustion chambers should be cleaned and polished. This will discourage the buildup of carbon deposits. Be certain to always use premium fuel.

Use a high-energy coil, since the greater pressures mean greater resistance to sparking. The Mallory coil and distributor would be ideal under these conditions

Displacement

The Standard bore of the XPAG is 66.5 mm, and this may be overbored up to 0.120 in., if the casting is sound. On occasion, a block was cast with the core pattern slightly off center, leaving one side of a cylinder wall slightly thin. This block would suffer cracks when bored larger than 0.060 in. Unfortunately, we cannot tell if the block will take the larger bore until we have run the engine. Thus it might be wise to limit overbore to 0.060 in. The increase in power and torque is directly proportional to the increase in displacement.

The standard bore of the XPEG is 72 mm, which gives a 20% increase in power and torque over the older unit. As an alternative to the high cost of an XPEG block, the XPAG can be fitted with sleeves (Wakefield P2/102) for the same litres. This sleeving may be performed only on the banana block, for, at the level of the external water gallery, there is a support in the casting to give the sleeves the necessary rigidity. This support is missing in round blocks.

Nothing raises power, and more important, the torque, as does an increase in displacement. Acceleration and low-speed running are improved in direct proportion to the increase in displacement. An XPEG block is expensive, but Wakefield sleeves cut this cost about in half. Boring the XPAG 0.060 in. oversize costs no more than a modest rebore, while a 0.120 in. overbore costs about $20 (*sic*) more. The importance of displacement cannot be stressed too greatly. Whether we are after blinding speed or just driving ease, an increase in displacement is the place to begin. The other modifications are by comparison frosting on the cake. The benefits of greater displacement are most noticeable through the gears. A 1½ litre TC will take off more briskly and smoothly in 2nd gear than will a stock TC in first. A Stage II 1½ litre car will have torque such that first gear becomes much too low, so that a high-speed axle ratio should be fitted in order to take advantage of what has been gained. Even with this higher ratio, only the best cars (of similar displacement) can present a challenge in a run through the gears. Truly, a larger bore is our first consideration.

Compression Ratios

The compression ratio may be increased by removal of stock from the face of the head. Grind away any local sharp edges that this might leave at the combustion chambers and cut the ridge at the spark plug bosses to about 1/32 in. With the very high ratios (above 9:1), polish the chambers quite well to deter carbon deposits and consequent hot spots.

Table 30. Results of Planing the Cylinder Head

Remove	Head Finished Depth	Chamber Size	Compression Ratio	
			1¼-Litre	1½-Litre
Standard	76.75 mm (3.022 in.)	200 cc	7.25	8.33
1/16 in.	75.16 mm (2.959 in.)	175 cc	8.10	9.00
3/32 in.	74.37 mm (2.928 in.)	165 cc	8.60	9.90
1/8 in.	73.58 mm (2.898 in.)	150 cc	9.30	10.70

Additional material can be removed, but with some risk involved. Due to the slight variations in production casting, some heads may have thin faces. **Reducing the head depth below 73.58 mm (0.2898 in.) could render the head excessively weak**.

The graph below illustrates the gain in compression ratio, based on the amount of head removed. It is plotted against the reduction in valve chamber size.

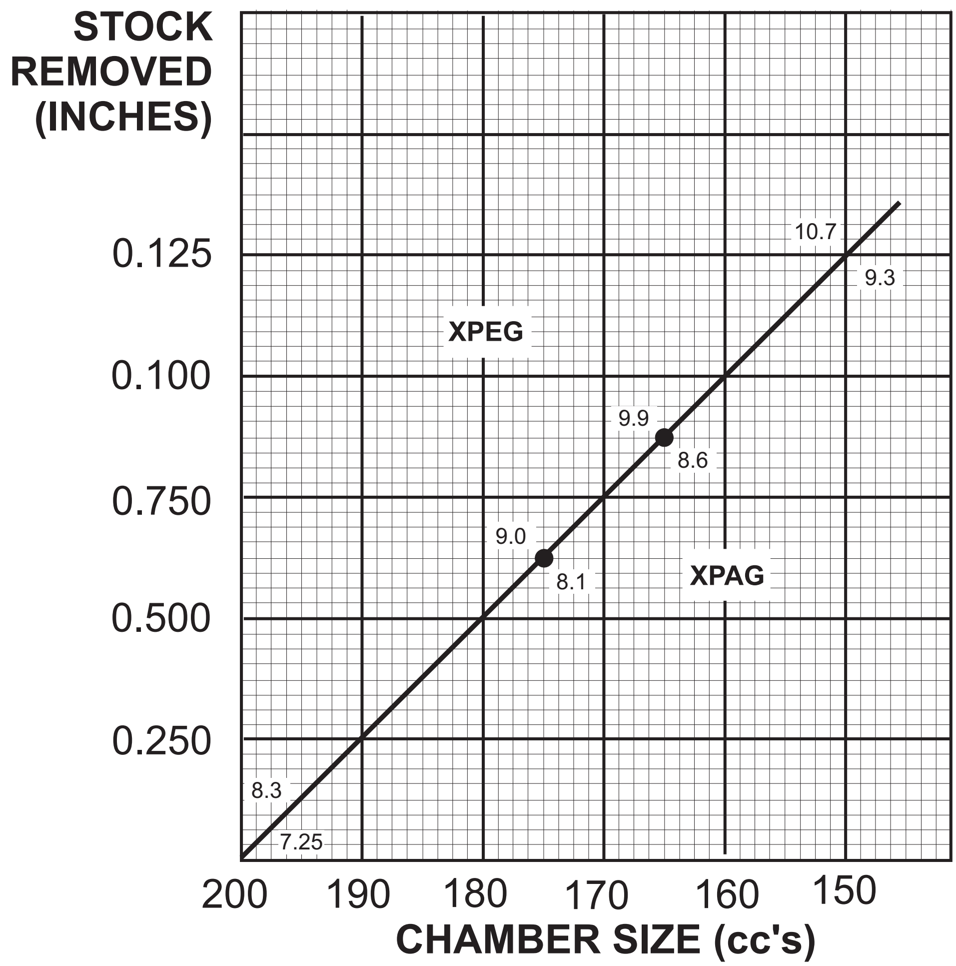

Figure 11. Compression Ratios Achieved with Head Planing

Special pistons (MG862/458) give a 12:1 ratio with the standard head depth and a special gasket (MG862/472). These are available for the 1¼ litre only, and a methanol-based fuel must be used. Also available are special domed pistons, in a variety of compression ratios, by Jahns, Hepolite, *etc*., but the extra weight of these pistons raises the reciprocating mass, thus limiting rpm.

Increasing the compression ratio is by far the cheapest way to gain power. With the use of premium fuel, no real problems arise. When combining the compression increase with a larger bore, take into account that the ratio goes higher still. Thus a 0.060 in. overbore and a 73.58 mm head depth would yield a ratio of 9.6:1, still quite practical for street use.

The Laystall-Lucas cylinder head is particularly desirable for ratios over 10:1. Its aluminum means greater heat dissipation (so ratios to 11.5:1 can be used), *which is* very important to reliability. And, with the larger valves and ports, the power increase is at least 25%. A word of caution when using this head: always use a thread compound on nuts, bolts, and studs. Torque 8 mm bolts and studs to 20 lbs/ft *(2.77 kg/m)*, 10 mm bolts to 25 lbs/ft *(3.5 kg/m)*, spark plugs to 20 lbs/ft *(2.77 kg/m)*. Use flat washers (Fiat part 12629871) under the head nuts, and torque the head first to 30 lbs/ft *(4.15 kg/m)* on all nuts, then to 40 lbs/ft *(5.5 kg/m)*. Run the engine for about one minute, blipping the throttle a few times to stress the hold of the head studs and nuts. Then re-torque to 40 lbs/ft *(5.5 kg/m)*. Torque the head a third time after driving the car about 25 miles. For this final tightening, be certain that the engine is stone cold. Aluminum cylinder heads are easily warped through unequal stress by the head nuts. Check the torque (cold) during the tuning procedure of normal maintenance (about every 10,000 miles).

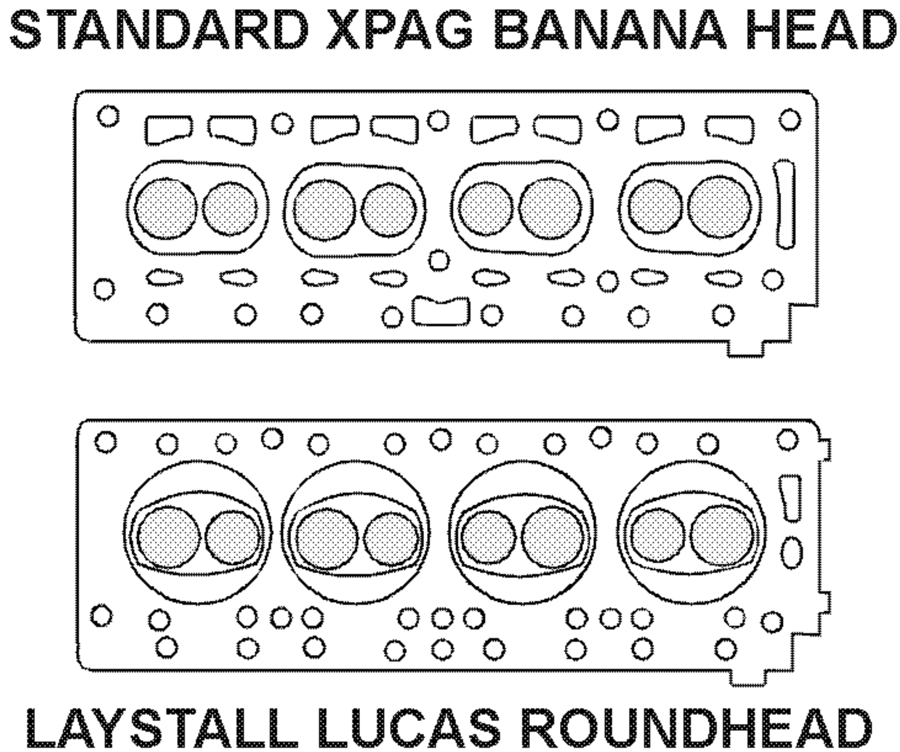

Figure 12. Banana and Laystall Lucas Heads

In earlier tuning booklets, the M.G. Car Co. advised the use of rocker stand shims (MG862/459) when removing stock from the face of the head. More recently, this suggestion has been dropped because it is so obviously wrong. These packing pieces serve only to adversely effect the angle of attack of the rocker on its valve stem tip. Usually the loss of head depth can be taken up by the adjustment screw (X20194). If a push-rod is too long for practical adjustment, draw off the end and shorten the rod an amount equal to that removed from the head. Be certain that the tube is deep enough for the end to go right home. It will be necessary to pinch the end of the tube somewhat to lock in the end.

Larger Valves

To increase the volumetric efficiency, larger valves (168426 intake, AJJ193 exhaust) may be fitted, and for these, the chamber walls must be slightly cut away and the valve chokes enlarged and contoured. A tool holder, piloted off the valve guide, is shown below. The ¼-inch tool is a side and face cutter having a 1 mm (0.040 in.) radius, adjustable for the four operations and locked by a l0-32 x 5/16 Allen set screw.

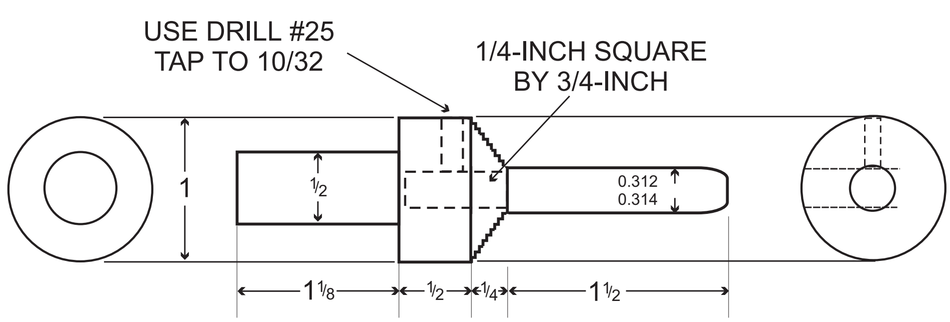

Figure 13. Special Tool for Enlarging Valve Chokes

NOTE

This tool is difficult to make. A local machine shop can do the job, using the illustration for dimensions and the instructions below.

Set the tool for 33 mm (1.299 in.), and enlarge the intake valve choke. Then reset the tool to 38 mm (1.496 in.), and cut away the chamber wall. With the tool set at 29 mm (1.142 in.), bore the exhaust valve choke. Then reset to 36 mm (1.417 in.) and cut away the chamber wall. Feather off by grinding any local ridges left in the ports. Recut the intake valve seat to 30 x 34.8 mm (1.374 in.) top diameter, the exhaust seat to 30 x 32.8 mm (1.291 in.) top diameter.

Porting

It is possible to grind off 1/32 in. from each side of the inlet port-separating stud boss. Do not remove the boss completely as this would adversely effect the gas flow, but it should be contoured to a streamlined shape. Also grind off 1/32 in. from the port walls (top, side, bottom), and taper this into the inner section to preserve the venturi effect.

Of particular importance is the matching of the ports and the manifolds, in order to promote a smooth gas flow, free of eddies and swirls. The cost is relatively small when compared to the gain. To accurately locate the manifolds on the head, drill and fit 1/8-in. pins, so that the manifolds fit in only one exact position. Polishing the ports and manifolds can slightly improve the gas flow, but the cost is high for a small benefit.

Stronger Valve Springs

To prevent valve float at high revs, fit the stronger valve springs (168248 outer, 168249 inner). These are good around 6500 rpm.

Stronger springs increase the tappet and cam lobe wear, already a plague in the XPAG. Thus, if the car is being used on the street, the standard springs are preferred. Stiffer springs should be used only with AEGI22 and 168551 camshafts, and when the revs are to be frequently sent above 6000. Cost is negligible.

To reduce the reciprocating valve weight, cut off the tubular portion of the valve stem shroud (X24086), leaving about 1/8 in. to locate the inner spring. These shrouds are cyanide-hardened, and must be cut with a grinding wheel.

To minimize rocker friction, replace their springs (X19206, X20428, X20429) with steel distance tubes, 19/32 in. ID, leaving 0.003–0.005 in. end float.

Fuel Delivery

Fit 1½-inch SU carburetters (AUC728) in conjunction with the bigger intake manifold (SA2440/1). Alternatively, the stock manifold may be enlarged, but a restriction on the outer sides will remain. Use needles GJ (*AUD1214*), but with the AEGI22 camshaft use LS1 (*AUD1258*) needles. A more even mixture may be had by replacing the rear float bowl (*AUC3496*) with a front one (*AUC3495*). For this, the throttle arm (*AUC3272*) must be relocated to the connecting spindle (*AUC2402*). This accomplishes two things. First, both carburetters will be slightly enriched when it is needed going uphill (slight leaning occurs downhill but this is not critical), whereas we previously had one enrichened and the other leaned when on inclines. Second, when the throttle arm is attached to a carburetter spindle, flexing of the couplings (*AUC4334*) would allow less air draw on the other carburetter. Moving the arm to the connecting spindle avoids this. To ensure adequate fuel delivery at speed, fit two SU fuel pumps (*AUA25*), with separate fuel lines from the tank to each pump. Each pump has its line to a carburetter, with a balance line connecting these. Do not use the high-pressure pump of the TF, as, due to its design (high pressure, low vacuum), it is not suitable for firewall mounting and, therefore, it will give inadequate delivery. Further, it is not as reliable as the *stock* low-pressure unit.

For full racing at continuous high speed, a further, slight increase may be had by fitting 1¾-inch SUs (*AUC723*) with CV (*AUD1112*) needles, but it is necessary to make a special manifold. Follow a design similar to the original, with boxes up from the head, inclined at 15 degrees, and with a 5/8 in.-ID balance pipe that has a restrictor with an 11 mm (7/16 in.) hole located in its center. Or a better solution is to use the special exhaust manifold available from V. W. Derrington. This has the intakes incorporated into it, but the bonnet cannot be closed with this unit because its intake necks are longer than standard, so the side panels must be altered or removed. Use air cleaners 11B621 *(Healey)* or make a cold air box per the illustration below.

From the fuel tank remove the drain plug (AJJ55) and replace it with a second feed adaptor (99612). Connect to this another fuel line (81869) to the second pump. To the forward carburetter fit a double banjo union (*AUC1832*), so that it will take two lines, the one from the pump as well as a balance line. Fit the pumps in positions such that the flex lines to the carbs are about the same length. The balance line may be as short as possible.

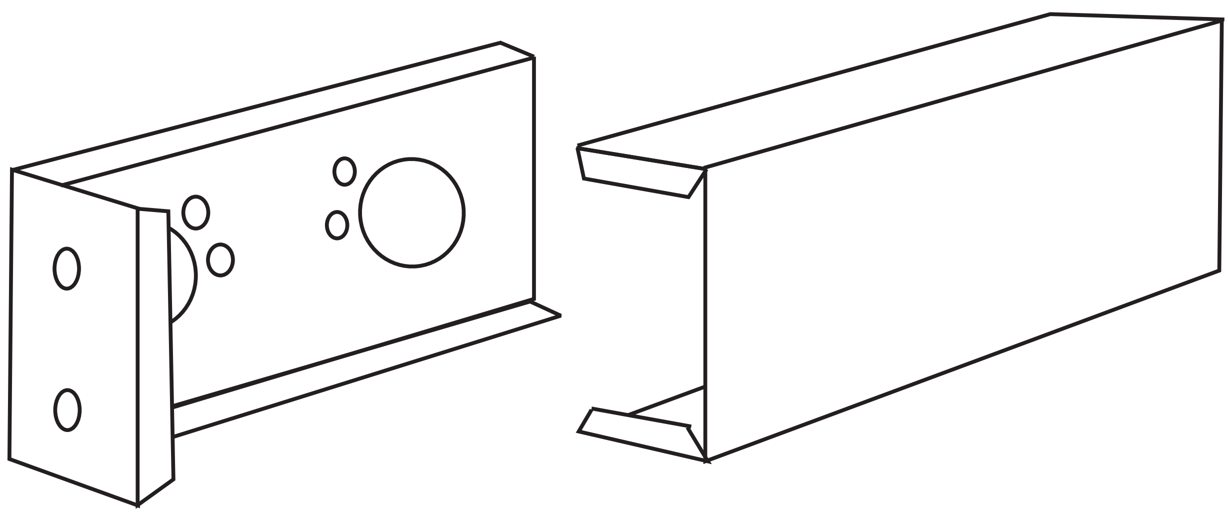

Figure 14. Special Cold Air Box

Illustrations and parts lists follow for the 1¼ and 1½ SUs. From these, the parts required to convert l¼ SUs to 1½ may be determined. These larger Carbs may also be had from wrecked MGA TR2s, older Volvos and Healeys, etc. Again, the lists show the parts necessary to convert to the TC (*or TD, TD MK II, TF, or Y-types*. Ed.).

Also added are illustrations and parts lists for Y-types, TD, and TD MK II.

The parts lists contain the latest SU part numbers, including assembly and kit numbers as indicated.

PAIR OF CARBURETTERS (Type H2)

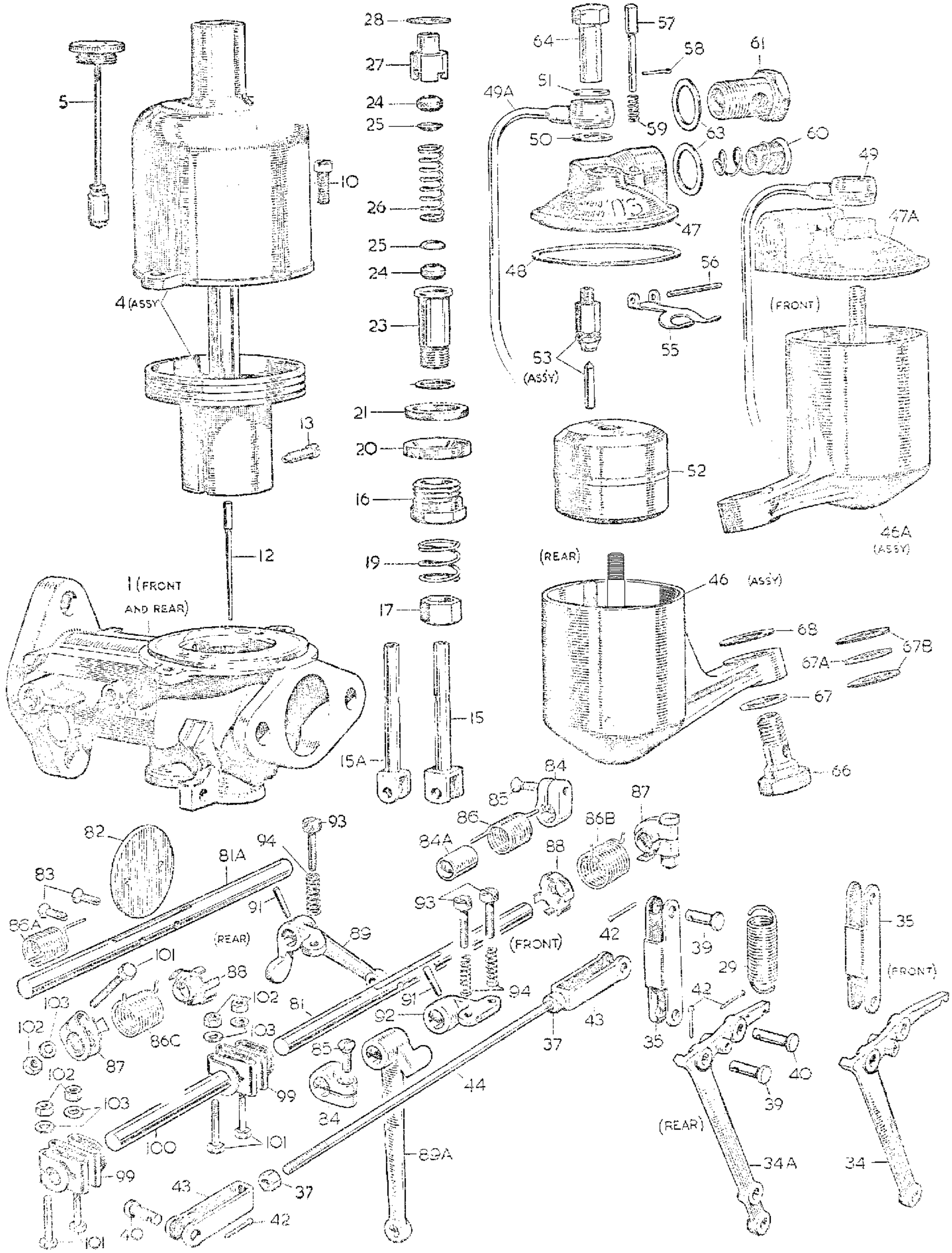

Figure 15. MG TC Dual Carburetters

Illus. #	Part No.	Qty	DESCRIPTION
--	Spec. No. AUC429	1	Carburetter Complete, Front
		1	Carburetter Complete, Rear
			BODY SUBASSEMBLY
1	AUD1324	1	Body, Bare, Front Carburetter
1A	AUD1325	1	Body, Bare, Rear Carburetter
			SUCTION CHAMBER/PISTON
4	AUD9033	2	Suction Chamber and Piston Assembly
5	AUC8100	2	Oil Cap and Damper Assembly
	AUC2141	2	Fiber Washer, Damper[1]
10	AUC2175	2	Suction Chamber Securing Screw
10A	AUC2246	2	Washer, Spring, Chamber Screw
12	AUD1166 (ES)	2	Jet Needle (Standard)
12A	AUD1046 (AP)	2	Jet Needle (Weak)
12B	AUD1160 (EM)	2	Jet Needle (Rich)
13	AUC2149	2	Jet Needle Locking Screw
			JET SUBASSEMBLY
15	AUC8182	2	Jet with Head
16	AUC5232	2	Jet Locking Screw[7]
17	AUC2121	2	Jet Adjusting Nut
19	AUC2214	2	Lock Spring, Jet Adjusting Nut
20	AUC2117	2	Sealing Ring, Metal[1-7]
21	AUC2118	2	Sealing Ring, Cork[1-7]
22	AUC3233	2	Metal Washer, Bottom Jet Bearing[1-7]
23	AUC3231	2	Jet Bearing, Bottom Half[7]
24	AUC2120	4	Jet Gland Seal, Cork[1-7]
25	AUC2119	4	Jet Gland Washer, Metal[1-7]
26	AUC1158	2	Jet Gland Spring[7]
27	AUC3230	2	Jet Bearing, Top Half[7]
28	AUC2122	2	Metal Washer, Top Jet Bearing[1-7]
29	AUC4667	2	Return Spring, Jet Lever (Choke)
			JET LINKAGE
34	AUC3007	1	Jet Lever, Front Carburetter
34A	AUC2097	1	Jet Lever, Rear Carburetter
35	AUC3419	2	Jet Link
37	AJD8106Z	1	Nut (2 B.A.), Jet Link
39	AUC2381	2	Pin, Jet Lever (Short)
40	AUC2108‡		Pin, Jet Lever (Long)
42	AUC2109	2	Split Pin (1/16")
43	AUC2156	2	Fork, Jet Connection
44	AUC1851	1	Connecting Rod, Jet Lever
			FLOAT CHAMBER SUBASSEMBLY
46	AUC3496	1	Float Chamber with Stud, Rear
46A	AUC3495	1	Float Chamber with Stud, Front
47	AUC3495		Lid, Float Chamber, Front
47A	AUC3496		Lid, Float Chamber, Rear
	AUD2284		Lid, Float Chamber, Front (Late Style)
	AUD2283		Lid, Float Chamber, Rear (Late Style)
48	AUC1147	2	Gasket, Float Lid[1] (GSU0551)
49	AUC3203	1	Pipe, Overflow, Front (Cut to Size)
49A	AUC3203	1	Pipe, Overflow, Rear
50	AUC1928	2	Fiber Washer (Serrated)[1]
51	AUC1557	2	Aluminum Washer (Plain)[1]
52	AUC1123	2	Float (WZX1303–Kit w/Lid + #s 48, 50, & 51)
53	AUC8170	2	Needle and Seat Assembly (WZX1100)
55	AUC1980	2	Hinged Lever, Float (Old Style)

Illus. #	Part No.	Qty	DESCRIPTION
55A	WZX1589	2	Hinged Lever, Float (Late Style), Kit w/Pin*
56	AUC1153	2	Pin, Hinged Lever or Piston Lifting
57	AUC1149	2	Pin, Float Tickler[2]
58	AUC1175	2	Split Pin, TicklerPin[2]
59	AUC1151	2	Spring, Tickler Pin[2]
60	AUC2139	2	Fuel Filter, Float Lid[3]
61	AUC2698	2	Banjo Bolt, Fuel Line[3]
63	AUC2141	4	Fiber Washer, Banjo Bolts[1-3]
64	AUC1867	2	Cap Nut (Long)
66	AUC1541	2	Bolt, Float Chamber Attaching (0.92" across flats)[5]†
67	AUC1542	2	Cork Sealing Washer[1]
67A	AUC5026	2	Copper Sealing Washer[1-4-5]
67B	AUC5027	4	Fiber Sealing Washer[1-4-5]
68	AUC2130	2	Fiber Sealing Washer[1-2]
			THROTTLE SPINDLE, COUPLINGS, AND LEVER SUBASSEMBLY
81	AUC3059	1	Throttle Spindle, Front Carburetter (RHD)
81A	AUC3054	1	Throttle Spindle, Rear Carburetter
82	AUC2169	2	Disc, Throttle
83	AUC1358	4	Screw, Throttle Disc
84	AUC1380	3	Collar, Return Spring (Loose Lever)
84A	AUC3350	3	Sleeve, Return Spring
85	AUC2542	2	Screw, Collar (4 B.A.)
86	AUC3352	1	Return Spring, Front Carburetter (1st Type)
86A	AUC3351	1	Return Spring, Rear Carburetter (1st Type)
86B	AUC4782	1	Return Spring, Front Carburetter (2nd Type)[6]
86C	AUC4781	1	Return Spring, Rear Carburetter (2nd Type)
87	AUC4771	2	Retainer Plate, Return Springs (With Bolt, Nut, and Washer)[2-6]
88	AUC4770	2	Anchor Plate, Return Spring[6]
89	AUC3507	1	Throttle Lever, Loose, Front Carburettor
91	AUC2106	2	Taper Pin, Levers
92	AUC3497	1	Throttle Stop, Front Carburetter
93	AUC2521	2	Screw, Throttle Stop Adjusting[8]
94	AUC2451	2	Spring, Throttle Stop Adjusting Screw[8]
99	AUC4334	2	Coupling (Folded Type)[3-9]
100	AUC2402	1	Connecting Rod[9]
101	AUC2669	2	Bolt, Coupling (4 B.A.)[9]
102	AUC2673	2	Nut, Coupling Bolt (4 B.A.)[9]
103	AUC4612	2	Plain Washer, Nut[9]
			[1]In Most Gasket Sets for H2 Carburettors
	WZX1107	*2*	*[2]Sets w/Pin, Spring, and Circlip*
	WZX1597 or	*2*	*[3]Sets w/Coupling, Screws, and Nuts*
68A	*AUE6*	*2*	*[4]Float Bowl Mounting Sealing Washer Set*
	WZX1596	*2*	*[5]Late-Type Kit*
	WZX1594	*1*	*[6]Throttle Ret. Spring Kit–Late-Style Only, Front*
	WZX1593	*2*	*[7]Jet Bearing Kit*
	WZX1588	*2*	*[8]Idle/Fast Idle Screw/Spring Kit*
	AUE490		*[9]Kit w/Bolts, Nuts, Coupling Bar*
			**For Late-Style Float Lids only*
			†See, also, the later-type float bowl mounting parts in Figure 19.

‡Used with solid jet head. Replaced by pivot pin—(P/N AUC2381) when pressed-head jet (P/N AUC8182) is used.

[5]The original type float bowl holding-up bolt had a large head (0.92" across flats), and can be used only in conjunction with the cork sealing ring AUC1542); which fits in a recess in the head.

A later holding-up bolt with 0.71" across the flats is used in conjunction with a single washer (AUC4642) or the later assembly of with cork sealing washer (AUC4642) or the later set of three special washers (AUE6). If the bolts are changed, it is essential to fit the correct washer(s).

Retaining clip (AUC4771) supersedes collar and screw (June 1950). Return spring (AUC4781 supersedes AUC3351 (June 1950). Anchor plate (AUC4770) was introduced June 1950.

PAIR OF CARBURETTERS (Type H2)

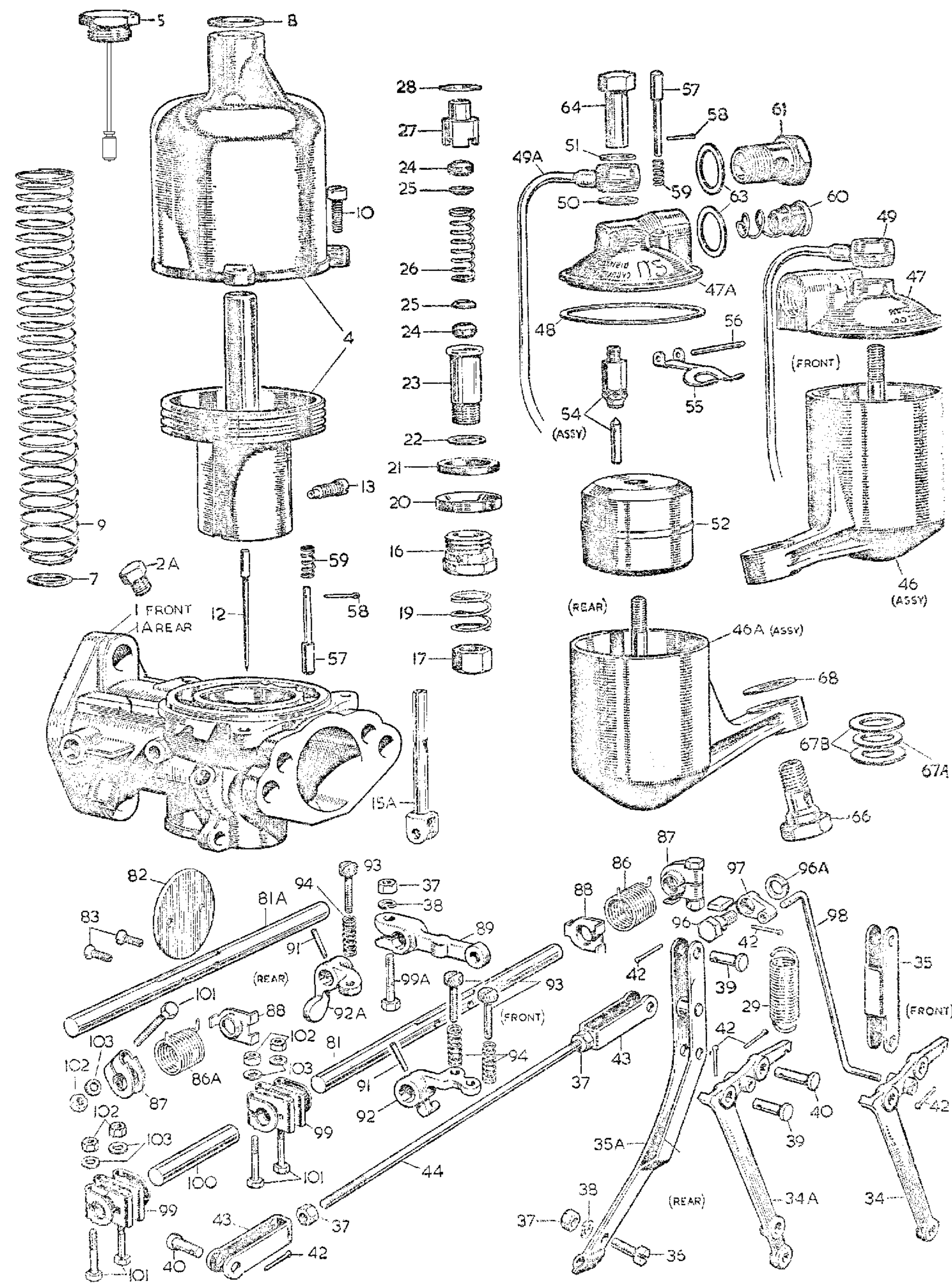

Figure 16. MG TD and Y-Tourer Dual Carburetters

PAIR OF CARBURETTERS (Type H2)

Illus. #	Part No.	Qty	DESCRIPTION	Illus. #	Part No.	Qty	DESCRIPTION
Spec. No.	AUC549	1	Carburetter Complete (Front)	50	AUC1928	2	Fiber Washer (Serrated)[1]
			Carburetter Complete (Rear)	51	AUC1557	2	Aluminum Washer (Plain)[1]
				52	AUC1123	2	Float (WZX1303–Kit w/Lid + #s 48, 50, & 51)
			BODY SUBASSEMBLY	54	AUD9096	2	Needle and Seat Assembly (WZX1101)
1	AUD9324	1	Body, Bare, Front Carburetter (AUC3478)	55	AUC1980	2	Hinged Lever, Float (Old Style)
1A	AUD9325	2	Body, Bare, Rear Carburetter (AUC3478)	55A	WZX1589	2	Hinged Lever, Float (Late Style), Kit w/Pin*
				56	AUC1152	2	Pin, Hinged Lever
				57	AUC1149	2	Pin, Float Tickler[2]
			SUCTION CHAMBER and PISTON	58	AUC1175	2	Split Pin, Tickler Pin[2]
			SUBASSEMBLY	59	AUC1151	2	Spring, Tickler Pin[2]
4	AUD9633	2	Suction Chamber and Piston Assembly	60	AUC2139	2	Fuel Filter, Float Lid[3]
			(Late Type)	61	AUC2698	2	Banjo Bolt, Fuel Line[3]
5	AUC8102	2	Oil Cap and Damper Assembly (GSU0320)	63	AUC2141	4	Fiber Washer, Banjo Bolts[1-3] (GSU0560)
7	AUC3071	2	Thrust Washer (Not Needed)	64	AUC1867	2	Cap Nut
8	AUC2141	2	Fiber Washer, Damper[1] (GSU0560)	66	AUC1541	2	Bolt, Float Chamber Attaching
10	AUC2175	4	Suction Chamber Securing Screw (JZX1394)				(0.92" across flats)[5]†
12	AUD1166 (ES)	1	Jet Needle (Standard)	67	AUC4642	2	Bolt Washer–Aluminum (Use 68)
12A	AUD1160(EM)	2	Jet Needle (Rich)	67A	AUC5026	2	Brass Sealing Washer[1-4-5]
12B	AUD1046 (AP)	2	Jet Needle (Weak)	67B	AUC5027	2	Fiber Sealing Washer[1-4-5]
13	AUC2149	2	Jet Needle Locking Screw	68	AUC2130	4	Fiber Sealing Washer[1-4-5]
							THROTTLE SPINDLE, COUPLINGS,
			JET SUBASSEMBLY				**AND LEVER SUBASSEMBLY**
15	AUC8182	2	Jet with Solid Head	81	AUC3217	2	Throttle Spindle
15A	AUC8182	2	Jet with Pressed Head	82	AUC2169	2	Disc, Throttle
16	AUC3232	2	Jet Locking Screw[7]	83	AUC1358	4	Screw, Throttle Disc
17	AUC2121	2	Jet Adjusting Nut	86	AUC4782	1	Return Spring, Front Carburetter[6]
19	AUC2214	2	Lock Spring, Jet Adjusting Nut	86A	AUC4781	1	Return Spring, Rear Carburetter
20	AUC2117	2	Sealing Ring, Metal[1-7]	87	AUC4771	2	Retainer Plate, Return Springs[6]
21	AUC2118	2	Sealing Ring, Cork[1-7]	88	AUC4770	2	Anchor Plate, Return Spring[6]
22	AUC3233	2	Metal Washer, Bottom Jet Bearing[1-7]	89	AUC3272	1	Throttle Lever, Rear Carburetter
23	AUC3231	2	Jet Bearing, Bottom Half[7]	91	AUC2106	2	Taper Pin, Throttle Lever
24	AUC2120	4	Jet Gland Seal, Cork[1-7]	92	AUC3437	1	Throttle Stop, Front Carburetter
25	AUC2119	4	Jet Gland Washer, Metal[1-7]	92A	AUC2198	1	Throttle Stop, Rear Carburetter
26	AUC1158	2	Jet Gland Spring[7]	93	AUC2521	2	Screw, Throttle Stop Adjusting[8]
27	AUC3230	2	Jet Bearing, Top Half[7]	94	AUC2451	2	Spring, Throttle Stop Adjusting Screw[8]
28	AUC2122	2	Metal Washer, Top Jet Bearing[1-7]	96	AUC3471	1	Pivot Bolt, Intermediate Jet & Throttle,
29	AUC4667	2	Return Spring, Jet Lever (Choke)	96A	AUC4848	1	Washer, Pivot Bolt[9]
				97	AUC3503	1	Rocking Lever, Front Carburetter[9]
			JET LEVER and LINK SUBASSEMBLY	98	AUC4600	1	Tension Link, Front Carburetter
34	AUC4763	1	Jet Lever, Front Carburetter	99	AUC4334	2	Coupling (Folded Type)[10]
34A	AUC3234	1	Jet Lever, Rear Carburetter	99A	AJD1042	2	Bolt, Throttle Lever (2 B.A.)[10]
35	AUC3419	1	Jet Link (Front) (AUE373)	100	AUC1851	1	Connecting Rod (AUC2870)[10]
35A	AUC3235	1	Jet Link (Rear) (AUE63)	101	AUC2669	2	Bolt, Coupling (4 B.A.)[10]
37	AJD8012Z	2	Nut (2 B.A.), Jet Link	102	AJD8014Z	2	Nut, Coupling Bolt (4 B.A.)[10]
39	AUC2381	6	Pin, Jet Lever (Short)	103	AUC4612	2	Plain Washer, Nut[10]
40	‡AUC2108	4	Pin, Jet Head (Long) for Solid Jet Head				
40A	AUC8396	4	Washer, Plain			*1/2*	*[1]In Most Gasket Sets for H2 & H4 Carbs*
42	CPS0204	12	Split Pin (1/16")		*WZX1107*	*2*	*[2]Sets w/Pin, Spring, and Circlip*
43	AUC2256	2	Fork, Jet Connection		*WZX1597/8*	*2*	*[3] Sets w/Coupling, Screws, and Nuts*
44	AUC1851	1	Connecting Rod, Jet Lever (AUC2870)		*AUE6*	*2*	*[4]Float Bowl Mounting Sealing Washer Set*
					WZX1596	*2*	*[5]Late-Type Kit*
			FLOAT CHAMBER SUBASSEMBLY		*WZX1594*	*1*	*[6]Throttle Ret. Spring Kit–Late-Style Only, Front*
46	AUC3495	1	Float Chamber with Stud, Front		*WZX1593*	*2*	*[7]Jet Bearing Kit*
46A	AUC3496	1	Float Chamber with Stud, Rear		*WZX1588*	*2*	*[8]Idle/Fast Idle Screw/Spring Kit*
	AUE0254	1	Lid, Float Chamber, Front (Late Style) (Kit)		*WZX1587*		*[9]Kit with Cam, Bolt, and all Washers*
	AUD2283	1	Lid, Float Chamber, Rear (Late Style)		*AUE0490*		*[10]Kit with Bolts, Nuts, Coupling Bar*
48	AUC1147	2	Gasket, Float Lid[1] (GSU0551)				**For Late-Style Float Lids only*
49	AUC3203	1	Pipe, Overflow, Front (Cut to Size) (AUC3200)				*†See, also, the later-type float bowl mount-*
49A	AUC3203	1	Pipe, Overflow, Rear (AUC3200)				*mounting parts in Figure 19.*

‡Used with solid jet head. Replaced by pivot pin—(P/N AUC2381) when pressed-head jet (P/N AUC8182) is used.

[5]The original type float bowl holding-up bolt had a large head (0.92" across flats), and can be used only in conjunction with the cork sealing ring AUC1542); which fits in a recess in the head. A later holding-up bolt with 0.71" across the flats is used in conjunction with a single washer (AUC4642) or the later assembly of with cork sealing washer (AUC4642) or the later set of three special washers (AUE6). If the bolts are changed, it is essential to fit the correct washer(s).

Retaining clip (AUC4771) supersedes collar and screw (June 1950). Return spring (AUC4781 supersedes AUC3351 (June 1950). Anchor plate (AUC4770) was introduced June 1950.

PAIR OF CARBURETTERS (Type H4)

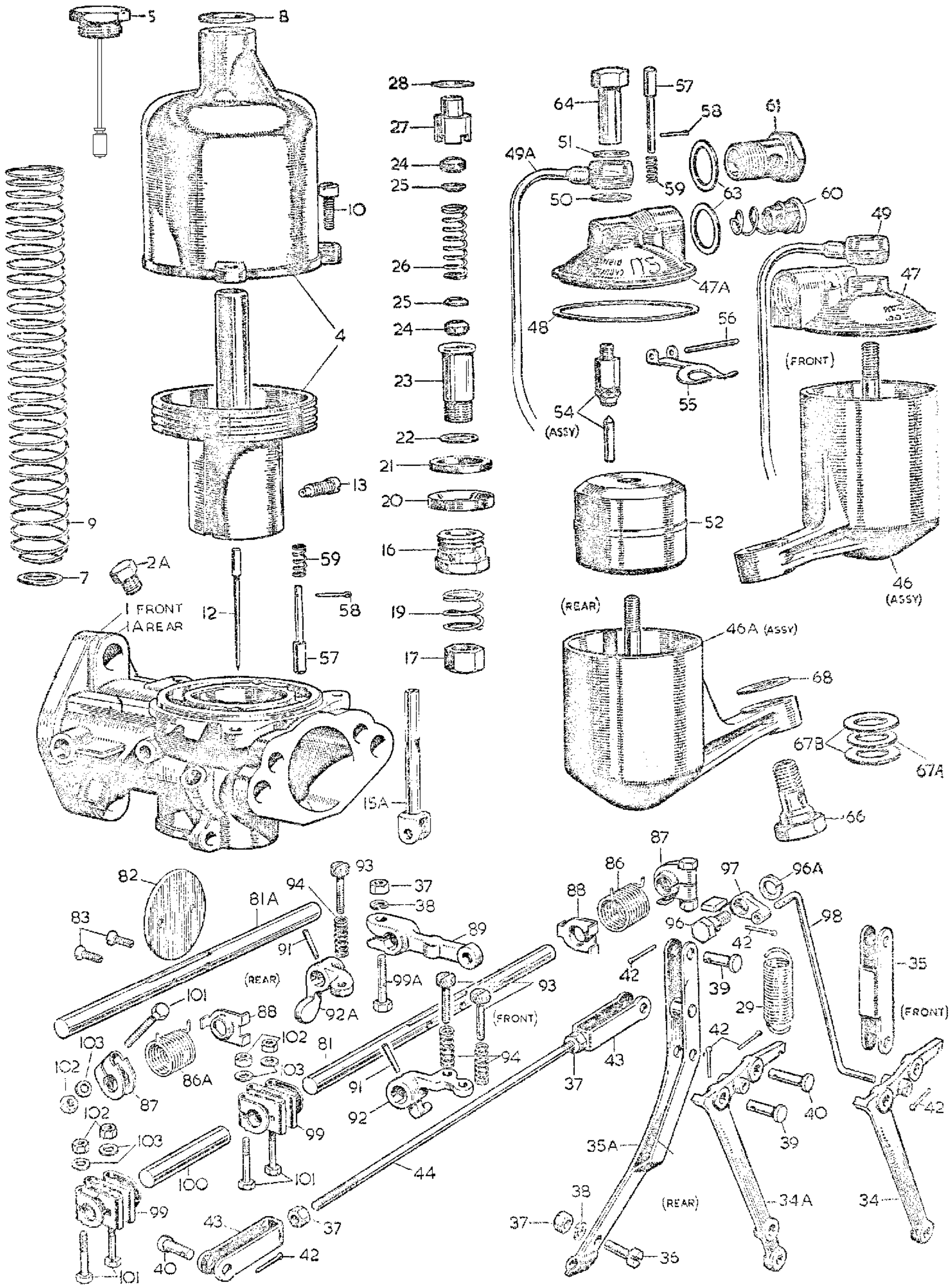

Figure 17. MG TD Mark II and MG TF Dual Carburetters

M.G. Midget (Series TD Mark II) Specification No. AUC578

Illus. #	Part No.	Qty	DESCRIPTION	Illus. #	Part No.	Qty	DESCRIPTION
Spec. No.	AUC578	1	Carburetter Complete (Front)	50	AUC1928	2	Fiber Washer (Serrated)[1]
			Carburetter Complete (Rear)	51	AUC1557	2	Aluminum Washer (Plain)[1]
				52	AUC1123	2	Float (WZX1303–Kit with Lid Gasket #48)
			BODY SUBASSEMBLY	54	AUD9096	2	Needle and Seat Assembly (WZX1101)
	AUC7052	1	Body, Bare, Front Carburetter	55	AUC1980	2	Hinged Lever, Float (Old Style)
	AUC7048	2	Body, Bare, Rear Carburetter	55A	WZX1589	2	Hinged Lever, Float (Late Style), Kit w/Pin*
				56	AUC1152	2	Pin, Hinged Lever
			SUCTION CHAMBER and PISTON SUBASSEMBLY	57	AUC1149	2	Pin, Float Tickler[2]
4	AUC8015	2	Suction Chamber and Piston Assembly (Late Type)	58 59	AUC1175 AUC1151	2 2	Split Pin, Tickler Pin[2] Spring, Tickler Pin[2]
5	AUC8102	2	Oil Cap and Damper Assembly (GSU0320)	60 61	AUC2139 AUC2698	2 2	Fuel Filter, Float Lid[3] Banjo Bolt, Fuel Line[3]
7	AUC3071	2	Thrust Washer (Not Needed)	63	AUC2141	4	Fiber Washer, Banjo Bolts[1-3] (GSU0560)
	AUC2141	2	Fiber Washer, Damper[1] (GSU0560)	64	AUC1867	2	Cap Nut
9	AUC4387	2	Piston Spring (Red)	66	AUC1541	2	Bolt, Float Chamber Attaching (0.92" across flats) [5]†
10	AUC2175	6	Suction Chamber Securing Screw (JZX1394)	67	AUC1542	2	Cork Sealing Washer[1]
12	AUD1258 (LS1)	1	Jet Needle (Standard)	67A	AUC5026	2	Copper Sealing Washer[1-4-5]
12A	AUD1047(AQ)	2	Jet Needle (Rich)	67B	AUC5027	4	Fiber Sealing Washer[1-4-5]
13	AUC2468	2	Jet Needle Locking Screw	68	AUC2130	2	Fiber Sealing Washer[1]
	AUC2149	2	Jet Needle Locking Screw (f/Late Types)				
			JET SUBASSEMBLY				**THROTTLE SPINDLE, COUPLINGS, AND LEVER SUBASSEMBLY**
				81	AUC3242	2	Throttle Spindle
15	AUC8182	2	Jet with Head	82	AUC2116	2	Disc, Throttle
16	AUC3232	2	Jet Locking Screw[7]	83	AUC1358	4	Screw, Throttle Disc
17	AUC2121	2	Jet Adjusting Nut	86	AUC4782	1	Return Spring, Front Carburetter[6]
19	AUC2214	2	Lock Spring, Jet Adjusting Nut	86A	AUC4781	1	Return Spring, Rear Carburetter
20	AUC2117	2	Sealing Ring, Metal[1-7]	87	AUC4771	2	Retainer Plate, Return Springs[6]
21	AUC2118	2	Sealing Ring, Cork[1-7]	88	AUC4770	2	Anchor Plate, Return Spring[6]
22	AUC3233	2	Metal Washer, Bottom Jet Bearing[1-7]	89	AUC3272	1	Throttle Lever, Rear Carburetter
23	AUC3231	2	Jet Bearing, Bottom Half [7]	91	AUC2106	2	Taper Pin, Throttle Lever
24	AUC2120	4	Jet Gland Seal, Cork[1-7]	92	AUC3437	1	Throttle Stop, Front Carburetter
25	AUC2119	4	Jet Gland Washer, Metal[1-7]	92A	AUC2198	1	Throttle Stop, Rear Carburetter
26	AUC1158	2	Jet Gland Spring[7]	93	AUC2521	2	Screw, Throttle Stop Adjusting[8]
27	AUC3230	2	Jet Bearing, Top Half [7]	94	AUC2451	2	Spring, Throttle Stop Adjusting Screw[8]
28	AUC2122	2	Metal Washer, Top Jet Bearing[1-7]	96	AUC3471	1	Pivot Bolt, Intermediate Jet & Throttle, Front Carburetter
29	AUC4667	2	Return Spring, Jet Lever (Choke)	96A	AUC4848	1	Washer, Pivot Bolt
				97	AUC3503	1	Rocking Lever, Front Carburetter
			JET LEVER and LINK SUBASSEMBLY	98	AUC4600	1	Tension Link, Front Carburetter
34	AUC4763	1	Jet Lever, Front Carburetter	99	AUC4334	2	Coupling (Folded Type)[10]
34A	AUC3234	1	Jet Lever, Rear Carburetter	99A	AJD1042	2	Bolt, Throttle Lever (2 B.A.)[9]
35	AUC3419	1	Jet Link (Font) (AUE373)	100	AUC1851	1	Connecting Rod (AUC2870)[10]
35A	AUC3235	1	Jet Link (Rear) (AUE63)	101	AUC2669	2	Bolt, Coupling (4 B.A.)[10]
37	AJD8012Z	2	Nut (2 B.A.), Jet Link	102	AJD8014Z	2	Nut, Coupling Bolt (4 B.A.)[10]
39	AUC2381	6	Pin, Jet Lever (Short)	103	AUC4612	2	Plain Washer, Nut[10]
40	‡AUC2108	4	Pin, Jet Head (Long) for Solid Jet Head			*1/2*	*[1]In Most Gasket Sets for H2 & H4 Carbs*
40A	AUC8396	4	Washer, Plain		*WZX1107*	*2*	*[2]Sets w/Pin, Spring, and Circlip*
42	CPS0204	12	Split Pin (1/16")		*WZX1597 or 8*	*2*	*[3] Sets w/Coupling, Screws, and Nuts*
43	AUC2256	2	Fork, Jet Connection	68A	*AUE6*	*2*	*[4]Float Bowl Mounting Sealing Washer Set*
44	AUC1851	1	Connecting Rod, Jet Lever (AUC2870)		*WZX1596*	*2*	*[5]Late-Type Kit*
			FLOAT CHAMBER SUBASSEMBLY		*WZX1594*	*1*	*[6]Throttle Ret. Spring Kit–Late-Style Only, Front*
46	AUC3495	1	Float Chamber with Stud, Front		*WZX1593*	*2*	*[7]Jet Bearing Kit*
46A	AUC3496	1	Float Chamber with Stud, Rear		*WZX1588*	*2*	*[8]Idle/Fast Idle Screw/Spring Kit*
	AUE254	1	Lid, Float Chamber, Front (Late Style)		*WZX1587*		*[9]Kit with Cam, Bolt, and all Washers*
	AUD2283	1	Lid, Float Chamber, Rear (Late Style)		*AUE0490*		*[10]Kit with Bolts, Nuts, Coupling Bar*
48	AUC1147	2	Gasket, Float Lid[1] (GSU0551)				*For Late-Style Float Lids only
49	AUC3203	1	Pipe, Overflow, Front (Cut to Size) (AUC3200)				†See, also, the later-type float bowl
49A	AUC3203	1	Pipe, Overflow, Rear (AUC3200)				mounting parts in Figure 17.

‡Used with solid jet head. Replaced by pivot pin—(P/N AUC2381) when pressed-head jet (P/N AUC8182) is used.

[5]The original type float bowl holding-up bolt had a large head (0.92" across flats), and can be used only in conjunction with the cork sealing ring AUC1542); which fits in a recess in the head. A later holding-up bolt with 0.71" across the flats is used in conjunction with a single washer (AUC4642) or the later assembly of with cork sealing washer (AUC4642) or the later set of three special washers

(AUE6). If the bolts are changed, it is essential to fit the correct washer(s).
Retaining clip (AUC4771) supersedes collar and screw (June 1950). Return spring (AUC4781 supersedes AUC3351 (June 1950). Anchor plate (AUC4770) was introduced June 1950.

M.G. Midget (Series TF) — Specification No. AUC728

Illus. #	Part No.	Qty	DESCRIPTION	Illus. #	Part No.	Qty	DESCRIPTION
Spec. No.	AUC728	1	Carburetter Complete (Front)	50	AUC1928	2	Fiber Washer (Serrated)[1]
			Carburetter Complete (Rear)	51	AUC1557	2	Aluminum Washer (Plain)[1]
				52	AUC1123	2	Float (WZX1303–Kit w/Lid + #s 48, 50, & 51)
			BODY SUBASSEMBLY	54	AUD9096	2	Needle and Seat Assembly (WZX1101)
1	AUC6020	1	Body, Bare, Front Carburetter	55	AUC1980	2	Hinged Lever, Float (Old Style)
1A	AUC6021	2	Body, Bare, Rear Carburetter (AUD9035)	55A	WZX1589	2	Hinged Lever, Float (Late Style), Kit w/Pin*
2A	AUC4627	2	Plug, Boss, Air Bleed	56	AUC1152	2	Pin, Hinged Lever
	AUC1055	2	Washer, Fibre, Plug (Not Illustrated)	57	AUC1149	2	Pin, Float Tickler[2]
			SUCTION CHAMBER and PISTON	58	AUC1175	2	Split Pin, Tickler Pin[2]
			SUBASSEMBLY		AUC1151	2	Spring, Tickler Pin[2]
4	AUC8015	2	Suction Chamber and Piston Assembly	59	AUC2139	2	Fuel Filter, Float Lid[3]
			(Late Type)	60	AUC2698	2	Banjo Bolt, Fuel Line[3]
5	AUC8102	2	Oil Cap and Damper Assembly (GSU0320)	61	AUC2141	4	Fiber Washer, Banjo Bolts[1-3] (GSU0560)
7	AUC3071	2	Thrust Washer (Not Needed)	63	AUC1867	2	Cap Nut
8	AUC2141	2	Fiber Washer, Damper[1] (GSU0560)	64	AUC1541	2	Bolt, Float Chamber Attaching
							(0.92" across flats)[5]†
9	AUC4587	2	Piston Spring (Blue)	66	AUC1542	2	Cork Sealing Washer[1]
10	AUC2175	6	Suction Chamber Securing Screw (JZX1394)	67	AUC5026	2	Copper Sealing Washer[1-4-5]
12	AUD1166 (GJ)	1	Jet Needle (Standard)	67A	AUC5027	4	Fiber Sealing Washer[1-4-5]
12A	AUD1166 (H1)	2	Jet Needle (Rich)	68	AUC2130	2	Fiber Sealing Washer[1]
12B	AUD1166 (GL)	2	Jet Needle (Weak)				
13	AUC2468	2	Jet Needle Locking Screw				**THROTTLE SPINDLE, COUPLINGS,**
	AUC2149	2	Jet Needle Locking Screw (f/Late Types)				**AND LEVER SUBASSEMBLY**
				81	AUC3242	2	Throttle Spindle
			JET SUBASSEMBLY	82	AUC2116	2	Disc, Throttle
15	AUC8182	2	Jet with Head	83	AUC1358	4	Screw, Throttle Disc
16	AUC3232	2	Jet Locking Screw[7]	86	AUC4782	1	Return Spring, Front Carburetter[6]
17	AUC2121	2	Jet Adjusting Nut	86A	AUC4781	1	Return Spring, Rear Carburetter
19	AUC2214	2	Lock Spring, Jet Adjusting Nut	87	AUC4771	2	Retainer Plate, Return Springs[6]
20	AUC2117	2	Sealing Ring, Metal[1-7]	88	AUC4770	2	Anchor Plate, Return Spring[6]
21	AUC2118	2	Sealing Ring, Cork[1-7]	89	AUC3272	1	Throttle Lever, Rear Carburetter
22	AUC3233	2	Metal Washer, Bottom Jet Bearing[1-7]	91	AUC2106	2	Taper Pin, Throttle Lever
23	AUC3231	2	Jet Bearing, Bottom Half[7]	92	AUC3437	1	Throttle Stop, Front Carburetter
24	AUC2120	4	Jet Gland Seal, Cork[1-7]	92A	AUC2198	1	Throttle Stop, Rear Carburetter
25	AUC2119	4	Jet Gland Washer, Metal[1-7]	93	AUC2521	2	Screw, Throttle Stop Adjusting[8]
26	AUC1158	2	Jet Gland Spring[7]	94	AUC2451	2	Spring, Throttle Stop Adjusting Screw[8]
27	AUC3230	2	Jet Bearing, Top Half[7]	96	AUC3471	1	Pivot Bolt, Intermediate Jet & Throttle,
28	AUC2122	2	Metal Washer, Top Jet Bearing[1-7]	96A	AUC4848	1	Washer, Pivot Bolt[9]
29	AUC4667	2	Return Spring, Jet Lever (Choke)	97	AUC3503	1	Rocking Lever, Front Carburetter[9]
				98	AUC4600	1	Tension Link, Front Carburetter
			JET LEVER and LINK SUBASSEMBLY	99	AUC4334	2	Coupling (Folded Type)[3-10]
34	AUC4763	1	Jet Lever, Front Carburetter	99A	AJD1042	2	Bolt, Throttle Lever (2 B.A.)
34A	AUC3234	1	Jet Lever, Rear Carburetter	100	AUC1851	1	Connecting Rod (AUC2870)[10]
35	AUC3419	1	Jet Link (Front) (AUE373)	101	AUC2669	2	Bolt, Coupling (4 B.A.)[10]
35A	AUC3235	1	Jet Link (Rear) (AUE63)	102	AJD8014Z	2	Nut, Coupling Bolt (4 B.A.)[10]
37	AJD8012Z	2	Nut (2 B.A.), Jet Link	103	AUC4612	2	Plain Washer, Nut[10]
39	AUC2381	6	Pin, Jet Lever (Short)				
40	‡AUC2108	4	Pin, Jet Head (Long) for Solid Jet Head				[1]In Most Gasket Sets for H2 & H4 Carbs
40A	AUC8396	4	Washer, Plain		WZX1107	2	[2]Sets w/Pin, Spring, and Circlip
42	CPS0204	12	Split Pin (1/16")		WZX1597 or	2	[3] Sets w/Coupling, Screws, and Nuts
43	AUC2256	2	Fork, Jet Connection		AUE6	2	[4]Float Bowl Mounting Sealing Washer Set
44	AUC1851	1	Connecting Rod, Jet Lever (AUC2870)		WZX1596	2	[5]Late-Type Kit
					WZX1594	1	[6]Throttle Ret. Spring Kit–Late-Style Only, Front
			FLOAT CHAMBER SUBASSEMBLY		WZX1593	2	[7]Jet Bearing Kit
46	AUC3495	1	Float Chamber with Stud, Front		WZX1588	2	[8]Idle/Fast Idle Screw/Spring Kit
46A	AUC3496	1	Float Chamber with Stud, Rear		WZX1587		[9]Kit with Cam, Bolt, and all Washers
	AUE0254	1	Lid, Float Chamber, Front (Late Style) (Kit)		AUE0490		[10]Kit with Bolts, Nuts, Coupling Bar
	AUD2283	1	Lid, Float Chamber, Rear (Late Style)				
48	AUC1147	2	Gasket, Float Lid[1] (GSU0551)				*For Late-Style Float Lids only
49	AUC3203	1	Pipe, Overflow, Front (Cut to Size) (AUC3200)				†See, also, the later-type float bowl
49A	AUC3203	1	Pipe, Overflow, Rear (AUC3200)				mounting parts in Figure 19.

‡Used with solid jet head. Replaced by pivot pin—(P/N AUC2381) when pressed-head jet (P/N AUC8182) is used.

[5]The original type float bowl holding-up bolt had a large head (0.92" across flats), and can be used only in conjunction with the cork sealing ring AUC1542); which fits in a recess in the head. A later holding-up bolt with 0.71" across the flats is used in conjunction with a single washer (AUC4642) or the later assembly of with cork sealing washer (AUC4642) or the later set of three special washers (AUE6). If the bolts are changed, it is essential to fit the correct washer(s).

Retaining clip (AUC4771) supersedes collar and screw (June 1950). Return spring (AUC4781 supersedes AUC3351 (June 1950). Anchor plate (AUC4770) was introduced June 1950.

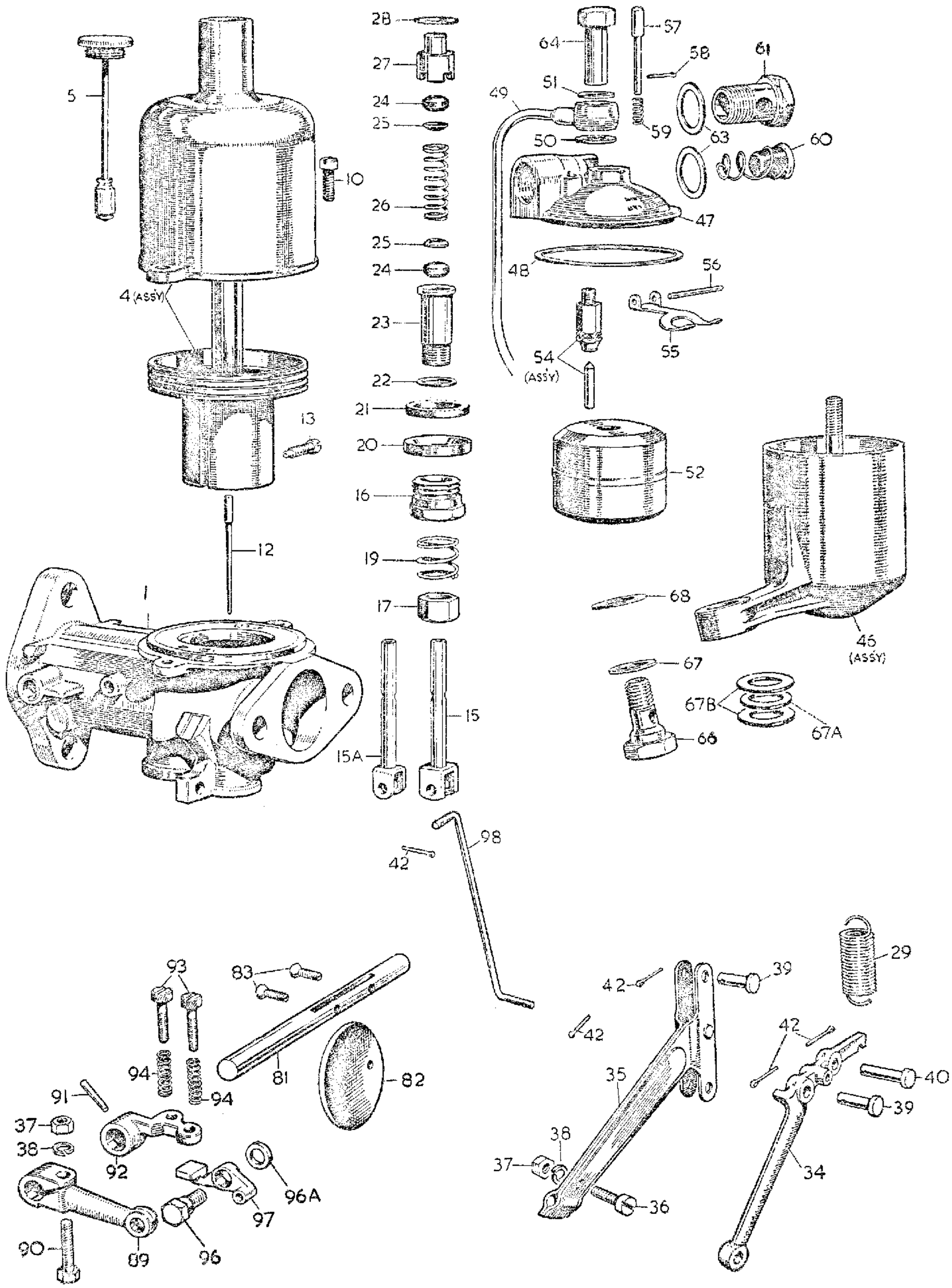

Figure 18. M.G. Y-Saloon Single Carburetter

M.G. 1¼-LITRE (Series Y) Specification Nos. AUC456 (Saloon)—AUC480 (Tourer)

SINGLE/DUAL CARBURETTERS (Type H2)

Illus. #	Part No.	Qty	DESCRIPTION	Illus. #	Part No.	Qty	DESCRIPTION
Spec. No.	AUC456	1	Carburetter Complete (Saloon)	52	AUC1123	1/2	Float (WZX1303–Kit with Lid Gasket #48)
	AUC480		Carburetter Complete, Front & Rear (Tourer)	54	AUC8170	1/2	Needle and Seat Assembly (WZX1100)
				55	AUC1980	1/2	Hinged Lever, Float (Old Style)
			BODY SUBASSEMBLY	55A	WZX1589	1/2	Hinged Lever, Float (Late Style), Kit w/Pin*
1	AUC9325	1	Body, Bare, (Saloon)	56	AUC1152	1/2	Pin, Hinged Lever
1	AUD9324	2	Body, Bare, (Tourer)	57	AUC1149	1/2	Pin, Float Tickler[2]
				58	AUC1175	1/2	Split Pin, Tickler Pin[2]
			SUCTION CHAMBER/PISTON	59	AUC1151	1/2	Spring, Tickler Pin[2]
4	AUD9633	1/2	Suction Chamber and Piston Assembly	60	AUC2139	1/2	Fuel Filter, Float Lid[3]
5	AUC8102	1/2	Oil Cap and Damper Assembly	61	AUC2698	1/2	Banjo Bolt, Fuel Line[3]
	AUC2141	1/2	Fiber Washer, Damper[1]	63	AUC2141	2/4	Fiber Washer, Banjo Bolts[1-3]
10	AUC4381	1/2	Suction Chamber Securing Screw (Short)	64	AUC1867	1/2	Cap Nut
	AUC2175	1/2	Suction Chamber Securing Screw (Long)	66	AUC1541	1/2	Bolt, Float Chamber Attaching
	AUC2246	2/4	Washer, Spring, Chamber Screw	67			(0.92" across flats)[5]†
12	AUD1166 (F1)	1	Jet Needle (Standard) (Saloon)	67A	AUC1542	1/2	Cork Sealing Washer[1]
					AUC5026	1/2	Copper Sealing Washer[1-4-5]
12	AUD1166 (ES)	2	Jet Needle (Standard) (Tourer)	67B	AUC5027	2/4	Fiber Sealing Washer[1-4-5]
12A	AUD1153(EF)	1	Jet Needle (Weak) (Saloon)				
12A	AUD1046 (AP)	2	Jet Needle (Weak) (Tourer)	68	AUC2130	1/2	Fiber Sealing Washer[1]
12B	AUD1128 (DK)	1	Jet Needle (Rich) (Saloon)				**THROTTLE SPINDLE, COUPLINGS,**
12B	AUD1160 (EM)	2	Jet Needle (Rich) (Tourer)				**AND LEVER SUBASSEMBLY**
13	AUC2149	2	Jet Needle Locking Screw	81	AUC1190	1	Throttle Spindle (Saloon)
				81	AUC3054	1	Throttle Spindle, Front Carburetter
			JET SUBASSEMBLY	81A	AUC3054	1	Throttle Spindle, Rear Carburetter
15	AUC8182	1/2	Jet with Head	82	AUC2169	1/2	Disc, Throttle
16	AUC3232	1/2	Jet Locking Screw[7]	83	AUC1358	2/4	Screw, Throttle Disc
17	AUC2121	1/2	Jet Adjusting Nut				**(For TOURER)**
19	AUC2214	1/2	Lock Spring, Jet Adjusting Nut	86	AUC3352	1	Return Spring, Front Carburetter (1st Type)
20	AUC2117	1/2	Sealing Ring, Metal[1-7]	86A	AUC3351	1	Return Spring, Rear Carburetter (1st Type)
21	AUC2118	1/2	Sealing Ring, Cork[1-7]	86B	AUC4782	1	Return Spring, Front Carburetter (2nd Type)[6]
22	AUC3233	1/2	Metal Washer, Bottom Jet Bearing[1-7]	86C	AUC4781	1	Return Spring, Rear Carburetter (2nd Type)
23	AUC3231	1/2	Jet Bearing, Bottom Half[7]	87	AUC4771	2	Retainer Plate, Return Springs
24	AUC2120	2/4	Jet Gland Seal, Cork[1-7]	88	AUC4770	2	Anchor Plate, Return Spring[6]
25	AUC2119	2/4	Jet Gland Washer, Metal[1-7]	99	AUC4334	2	Coupling (Folded Type)[3]
26	AUC1158	1/2	Jet Gland Spring[7]	100	AUC2402	1	Connecting Rod
27	AUC3230	1/2	Jet Bearing, Top Half[7]	101	AUC2669	2	Bolt, Coupling (4 B.A.)
28	AUC2122	1/2	Metal Washer, Top Jet Bearing[1-7]	102	AUC2673	2	Nut, Coupling Bolt (4 B.A.)
29	AUC4667	1/2	Return Spring, Jet Lever (Choke)	103	AUC4612	2	Plain Washer, Nut
							(For ALL)
			JET LINKAGE	89	AUC3507	1	Throttle Lever (Saloon)
34	AUC3504	1	Jet Lever (Saloon)	90	AUC2694	1/2	Bolt, Throttle Lever (2 B.A.)
34A	AUC3234	1	Jet Lever, Front Carburetter (Tourer)	91	AUC2106	1/2	Taper Pin, Lever
34A	AUC4763	1	Jet Lever, Rear Carburetter (Tourer)	92	AUC3437	1	Throttle Stop, Front Carburetter (& Saloon)
35	AUC3444	1	Jet Link	92A	AUC2198	1	Throttle Stop, Rear Carburetter (Tourer)
37	AJD8012Z	1/2	Nut (2 B.A.), Jet Link	93	AUC2521	1/2	Screw, Throttle Stop Adjusting[8]
39	AUC2381	2/4	Pin, Jet Lever (Short)	94	AUC2451	1/2	Spring, Throttle Stop Adjusting Screw[8]
40	‡AUC2108	1/4	Pin, Jet Head (Long)				**(For SALOON)**
42	CPS0204	2/4	Split Pin (1/16")	96	AUC3471	1	Pivot Bolt, Intermediate Jet & Throttle
43	AUC2256	2	Fork, Jet Connection (Tourer)	96A	AUC4848	1	Washer, Pivot Bolt
44	AUC1851	1	Connecting Rod, Jet Lever (Tourer)	97	AUC3503	1	Rocking Lever
				98	AUC3525	1	Tension Link
			FLOAT CHAMBER SUBASSEMBLY				
46	AUC3496	1	Float Chamber with Stud, Rear (Tourer)				**For Late-Style Float Lids only*
46A	AUC3495	1	Float Chamber with Stud, Front (& Saloon)			*1/2*	*[1]In Most Gasket Sets for H2 & H4 Carbs*
47	AUC3495	1	Lid, Float Chamber, Front (& Saloon)		*WZX1107*	*1/2*	*[2]Sets w/Pin, Spring, and Circlip*
47A	AUC3496	1	Lid, Float Chamber, Rear Tourer		*WZX1597 or*	*2*	*[3]Sets w/Coupling, Screws, and Nuts*
	AUD2284	1	Lid, Float Chamber, Front (Late Style)	68A	*AUE6*	*1/2*	*[4]Float Bowl Mounting Sealing Washer Set*
	AUD2283	1	Lid, Float Chamber, Rear (Late Style)		*WZX1596*	*2*	*[5]Late-Type Kit*
48	AUC1147	1/2	Gasket, Float Lid[1] (GSU0551)		*WZX1594*	*1*	*[6]Throttle Ret. Spring Kit–Late-Style Only, Front*
49	AUC3203	1	Pipe, Overflow, Front (Cut to Size)		*WZX1593*	*1/2*	*[7]Jet Bearing Kit*
49A	AUC3203	1	Pipe, Overflow, Rear (& Saloon)		*WZX1588*	*1/2*	*[8]Idle/Fast Idle Screw/Spring Kit*
50	AUC1928	1/2	Fiber Washer (Serrated)[1]				*†See, also, the later-type float bowl*
51	AUC1557	1/2	Aluminum Washer (Plain)[1]				*mounting parts in Figure 19.*

‡Used with solid jet head. Replaced by pivot pin—(P/N AUC2381) when pressed-head jet (P/N AUC8182) is used.

5The original type float bowl holding-up bolt had a large head (0.92" across flats), and can be used only in conjunction with the cork sealing ring AUC1542); which fits in a recess in the head. A later holding-up bolt with 0.71" across the flats is used in conjunction with a single washer (AUC4642) or the later assembly of with cork sealing washer (AUC4642) or the later set of three special washers (AUE6). If the bolts are changed, it is essential to fit the correct washer(s).

Retaining clip (AUC4771) supersedes collar and screw (June 1950). Return spring (AUC4781 supersedes AUC3351 (June 1950). Anchor plate (AUC4770) was introduced June 1950.

The next table and illustration show two other types of float bowl mounting. The pillar arrangement (1–6) was used on early Volvos, and the latter (4, 7, 8) on MGAs, etc.

Table 31. Alternate Float Bowl Fixing Parts

Illus. #	Part No.	Qty	Description
1	AUC1384	1/2	Washer for Pillar
2	AUC1387	1/2	Pillar
3	AUC1389	1/2	Washer, Inner
4	AUC1534*	2/4	Rubber Seal
5	AUC1388	1/2	Washer, Outer
6	AJD8206Z	1/2	Nut, Lock
7	AUC1336*	1/2	Bolt, Chamber to Body
8	AUC2130*	1/2	Washer, Fiber, for Bolt
9	AUC3495/6	1/2	Float Chamber
	*WZX1596	1/2	Float Bowl Holding Up Kit

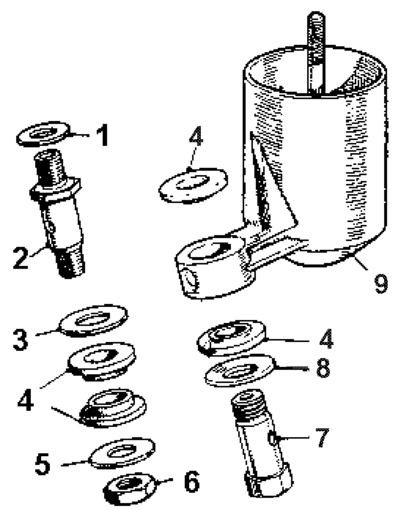

Figure 19. Alternate Float Bowl Mounting

Lubrication

Oil pressure may be increased by using a supplementary oil spring (MG706/266) and/or a spigoted washer (SKl039). Either will bring the pressure to about 80 lbs hot.

An oil pressure regulator may be fitted to the lower cover (X22951) by drilling (7 mm) and tapping (8 x 1 mm) its center, an adjustment bolt (X15268) and lock nut (X15117), and use the (SK1039) disc as a thrust washer.

The TD2- TF-type oil pump with its integral filter, eliminates the possible troubles due to exposed oil lines. Furthermore, the filter is much easier to replace and far less expensive. When fitting this later type pump/filter, it will be necessary to block the old oil entrance at the rear of the gallery. From one of the filter lines (X24358) or (X24359) cut off a banjo end. On the banjo, braze closed its side opening (at the cutting spot), and remove the excess braze with a file for a finished appearance. Now, fit the piece to the gallery inlet with the copper washers (X19090, AEG3122, and its bolt X19089). The oil now enters the gallery directly at the pump-filter assembly.

A six-quart sump (SA2411/5) and its pickup/scoop assembly (AEG119) will aid in keeping a low oil operating temperature. To prevent surge and consequent oil starvation during acceleration, make a vertical baffle plate and attach it to the horizontal plate (168249). Fit this new baffle about midway in the sump and so that it closely surrounds the scoop.

Camshaft

Four camshafts are listed below, all supplied by the M.G. Car Company. Old and newer part numbers are given to minimize confusion when ordering.

Table 32. Valve Timing for all Camshafts

Camshaft	Intake: Opens BTDC	Intake: Closes ABDC	Exhaust: Opens BBDC	Exhaust: Closes ATDC	Duration	Lift	Setting–Hot
MG862/171 X24084 AAA5776	11°	57°	52°	24°	248° 256°	8 mm	0.019 in.
168553 AAA3096	5°	45°	45°	5°	230°	8.3 mm	0.012 in.
AEG122	13°	59°	50°	22°	252°	8.3 mm	0.015 in.
168551 AAA3095	32°	58°	60°	30°	270°	8.3 mm	0.012 in. 0.019 in.

Cam X24084 was supplied originally in the TC and early TDs. Its characteristics are inferior to 168553 for acceleration and street use, and for higher revs, it is inferior to cam AEG122.

Cam 168553 was introduced after TD2/24116. It has very good low speed characteristics. Hence, good acceleration and pulling on hills. Its peak power output is equal to, or perhaps a bit better than, cam X24084. Use this cam in any street machine, whether standard or of fairly high tune.

Cam AEGl22 should be used with not less than 10:1 compression, larger valves and 1½-inch SUs, extractor exhaust, and preferably, 1½ litres. There is a noticeable loss of power below 4000 rpm, and it adds only one to two horsepower to the top end (above 5500 rpm). Therefore it is not suggested, except for the car that is going to be used frequently in the 4000 to 6000 rpm range.

Cam 168551 is a full-race camshaft, having erratic running below 2000 rpm. The usable range is well above 4000 rpm, making it totally unsuitable for running on the street. It is only acceptable for Mille Miglia-type courses, and must be fitted with the extractor system, as the stock manifold would seriously inhibit the gas flow, negating the effects of the camshaft.

Camshafts from independent grinders, with a wide variety of duration's and lifts, are readily available. Their use will depend on the engine characteristics desired, and on the ability of the technician to prepare and to test the engine for these desired results. Usually, those who suggest a "wild" cam are hot rodders who consider the camshaft some sort of magic wand, to be used but not understood. The 168553 camshaft is strongly recommended.

Please note that any change from the camshaft originally fitted to a given engine will likely require a change in the ignition advance curve. Otherwise, maximum performance will be slightly inhibited. This is discussed next.

Ignition

The standard coil is good to about 6000 rpm. For high revs, especially with high Compression, fit a *Lucas* sports coil (45038 [*45058*]), which is good to about 8000 rpm.

The type of block, compression ratio, and camshaft all influence the choice of distributor and its advance curve.

TC and TD to XPAG TD2/20942: These blocks use a DKY4A distributor. The TC distributor (Lucas 40048) is NLS, and is superseded by the TD distributor (Lucas 40162). For the TC, use this later distributor. but remove from the old unit the micro adjuster (Lucas part number 405903) and fit this to the new distributor. This advance curve is suitable for either X24084 or 168553 camshafts and standard compression. When using high compression, change to a 40348A distributor When using the AEG122 camshaft and high compression, fit the Lucas 40115H distributor.

Later TD and TF: These blocks use the D2A4 distributor because of the change in the method of mounting and locking. Distributor Lucas 40368 is suitable for the 168553 camshaft and standard compression, but change to Lucas 40367 distributor for high compression, and for AEGl22 camshaft and high compression, use Lucas 40441.

There are no recommended distributors for use with 168551 camshaft, nor are any advance curves available. The engine should be set on a dynamometer, and the curve tailored to suit the particular needs of the engine.

The American Mallory distributor offers great accuracy in its spark distribution, and the durability of the unit is considerably greater than that of a Lucas unit. The point sets (dual) will last tens of thousands of miles, unless the Mallory coil (MSl2VP) is used, but this is highly recommended for its intense spark, even at high revs, and cold starting ease. Use YAM-287A distributor with X24084 or 168553 camshafts and standard compression, and with high compression use YAM-287C. The last letter on a Mallory distributor type indicates the advance springs. For camshaft AEGI22, there is no recommendation, but the great variety of advance springs that Mallory makes available should allow the technician to tailor the distributor to a particular engine. Further slight adjustment can be made to the advance spring tension control after the cap is removed.

The *graphs* in Figure 20 show, the advance curves most suitable to the various stages of tune.

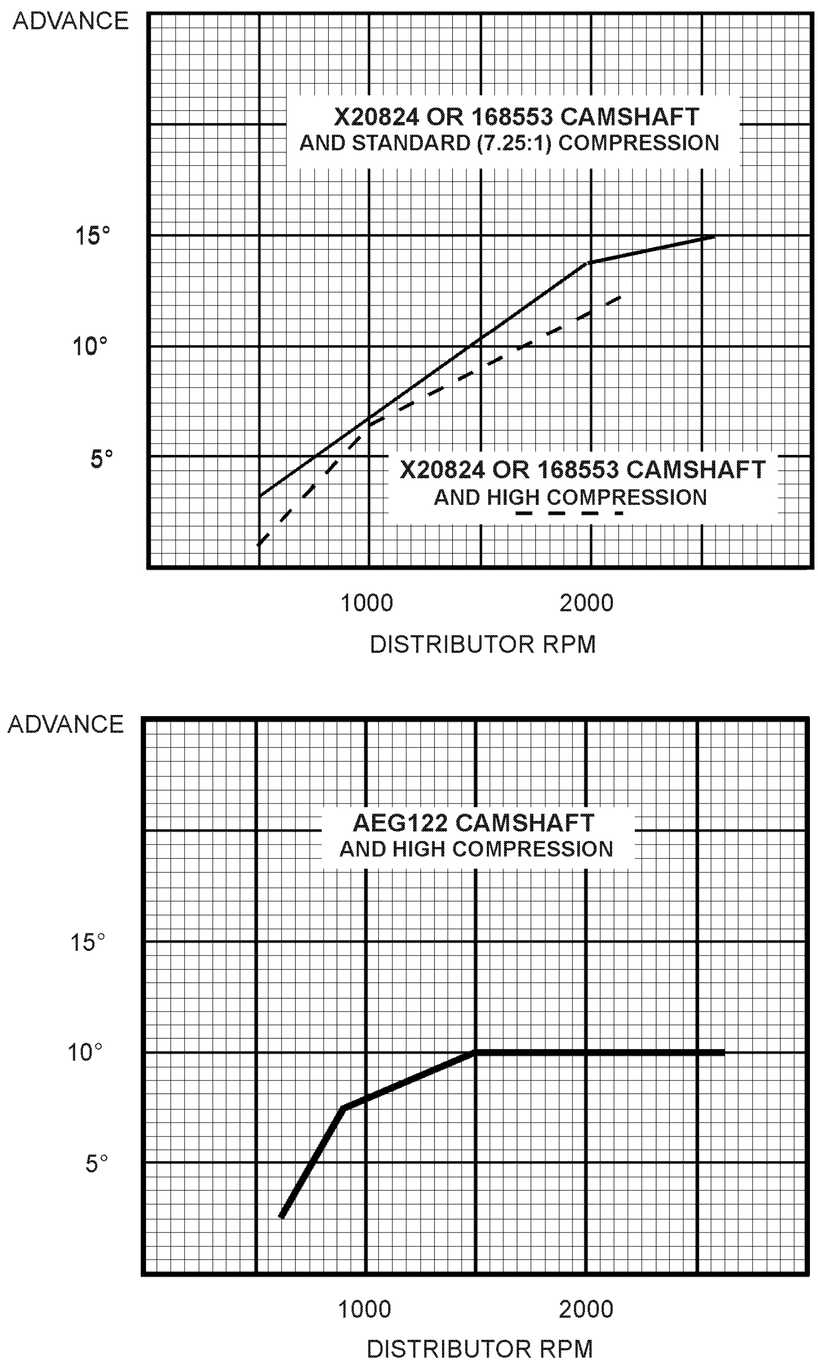

Figure 20. Various Cam Advance Curves

The TC micro adjuster cannot be used with the Mallory distributor. Rather, use a Lucas 404422 clamp from a TD. After XPAG TD2/20942, fit the shim that is on the Lucas unit to the Mallory distributor. This shim was found on all, but it has no part number, so it seems that new ones may not be ordered. The *illustration* below will help, should you find it necessary to make one. This shim is necessary in order to align the distributor gear with its driver on the cam.

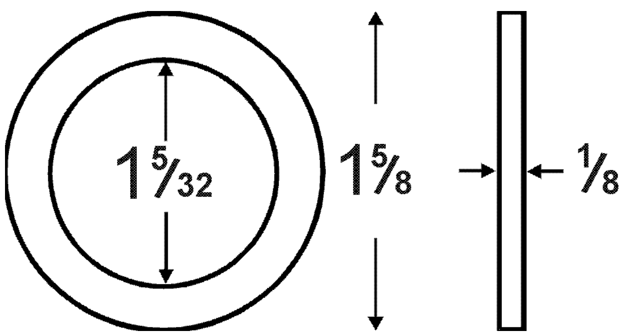

Figure 21. Distributor Shim

Clutch

The stock *7 1/4*-inch TC clutch is barely adequate for the car in standard tune, and a stiffer assembly (MG862/92) with 150-pound springs (light blue) is necessary in any modified engine.

For 1/2-litre machines, use the Cobb clutch assembly (Wakefield P4/101). This comprises the specially machined flywheel, with a 5-inch *(sic)* disc and cover similar to the TD2-TF. Its torque capacity is quite suitable for all stages of tune except IVB, when the racing Cobb clutch is advised. The Cobb clutch retains the TC bell housing without any modifications, and the TC ring gear and starter. Its weight is about the same as the stock unit. Therefore, it is most suitable to free-revving.

The TD2 and TF use an eight-inch clutch that is quite suitable for all stages of tune except IVB, for which a racing unit (MG862/99 disc and MG862/98 cover) is more suitable. The TD2-TF flywheel is much too heavy and some material can be removed from its front (block) side.

Table 33. Flywheel and Clutch Weights (lbs)

Clutch Type	Flywheel	Disc	Cover	Total
TC	20	1.5	7.12	28.62
TC Cobb	15.62	1.87	9.75	27.25
TC Cobb Rac-	15.62	2.12	12.12	29.87
TD2-TF	23.25	1.87	9.75	34.87
TD2-TF Racing	23.25	2.12	12.12	37.5

Exhaust System

The “bunch *of* bananas” cast iron exhaust manifold of the MG is a reasonably good design when compared to other 1930s designs, but its pain lies in the joint with the pipe leading to the muffler, for the gasket here deteriorates rapidly if the manifold and pipe do not mate perfectly.

An extractor-type system is lighter than stock, eliminates the troublesome gasket, and adds 3 to 4 hp all the way up the rev range. It, further, slightly improves fuel economy and exhaust valve life. The extractor system, due to its branching, uses the exhaust impulses of one cylinder to draw the gases from another.

The illustration *of a Derrington system* in Figure 22 will assist in fabricating one. The length of the pipe may be adjusted to suit the desired torque or horsepower peak, per the graph in Figure 23. For a street machine using the 230° camshaft, tune to the maximum torque.

With the 252° or 270° camshafts, adjust the length for maximum power. It may be necessary to bring the pipe out just below the running board. It is a very desirable item for any engine, standard or modified. An increase in power is had even at low revs. It may be used with either a muffler or just a straight pipe, though the latter may turn a head or two.

V.W. Derrington offer an extractor system that incorporates into it the intake manifold, and may be had for either 1 1/2-inch or 1 3/4-inch carbs. This is a very sound piece of equipment but it is unsuitable if a stock appearance must be maintained. The intakes are 1 1/2 inches longer than stock, so the bonnet cannot be closed, even if the air cleaners are omitted. We also see the excellent matching to the ports of the Laystall-Lucas head.

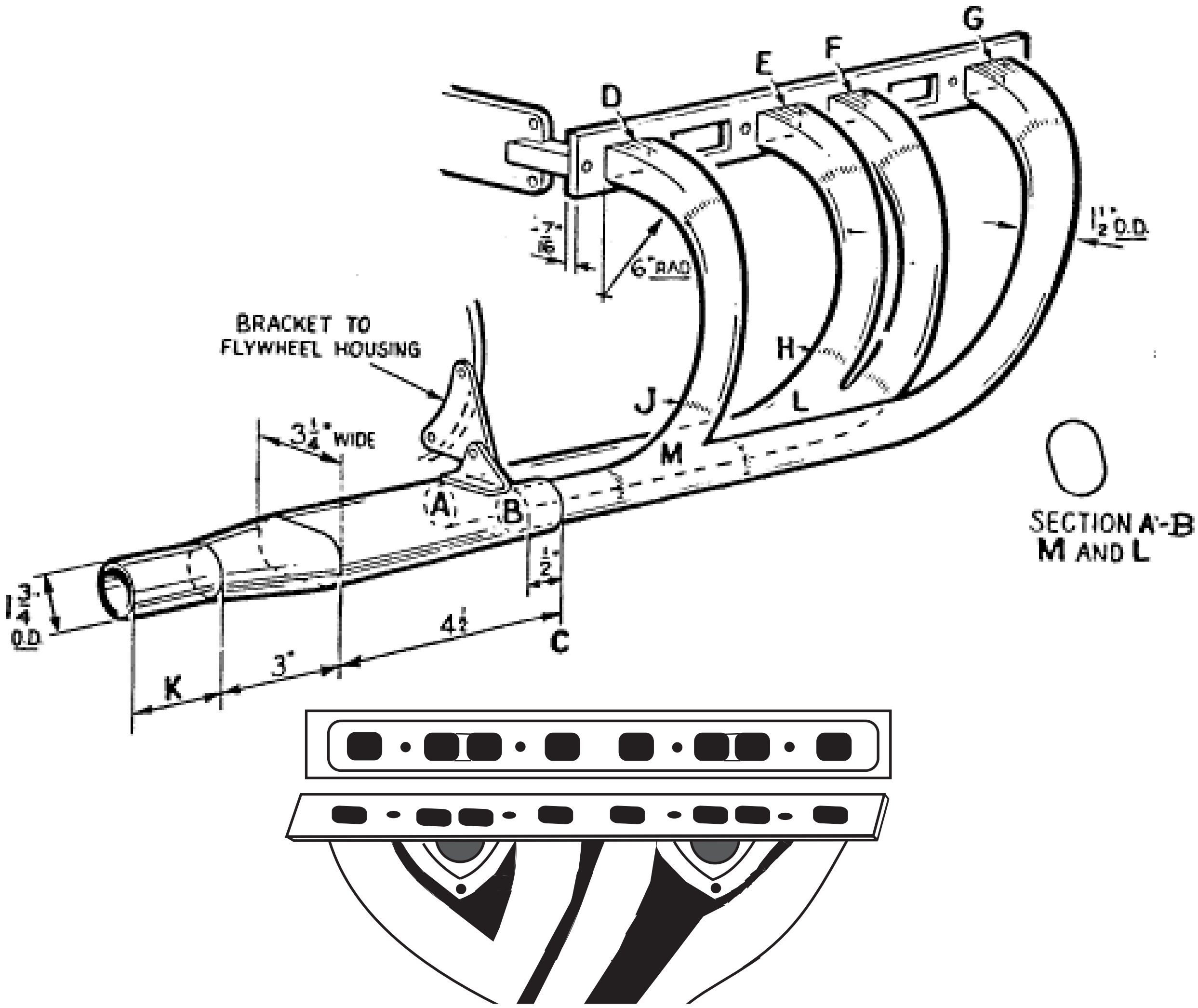

Figure 22. Derrington Header System

The graph below illustrates the effects that the length of exhaust tube-to-hp produced at specific revs.

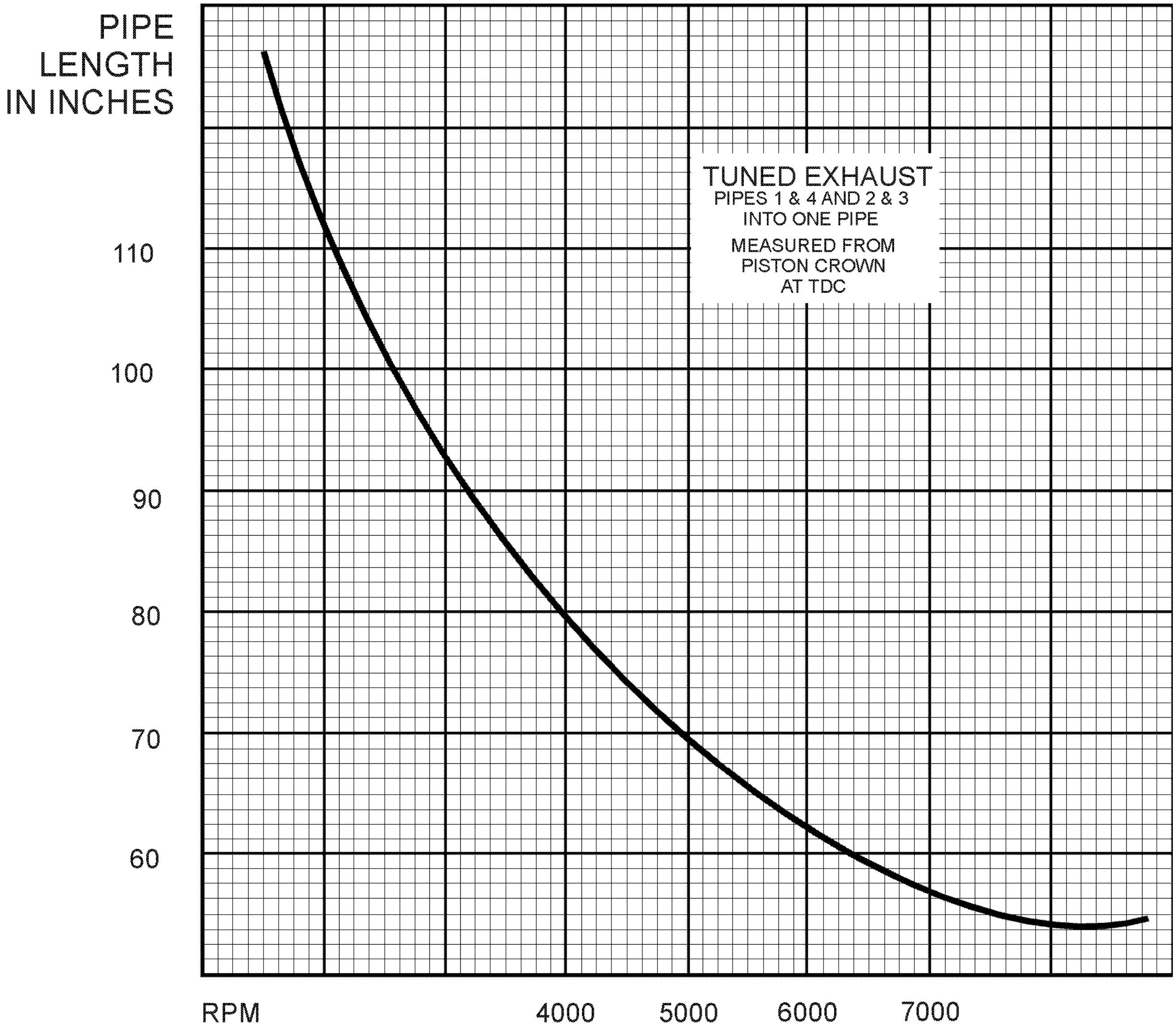

Figure 23. Tailpipe Length-to-Horsepower Ratios

ADDENDA TO PART III

The fan blades may be removed for a 1 hp gain, provided that close traffic is avoided. Removal of the thermostat in warm weather allows moderate in-town driving *(editor does not recommend this for street machines)*.

Lighter gudgeon pins, Hepolite GP-4729 for 66.5 mm Pistons, and G-1777 for 72 mm pistons, will help to reduce reciprocating weight.

Stronger connecting rods (AEF7) may be fitted to highly tuned engines. This rod's greater weight may make it desirable to lighten the piston by removing a part of the skirt (at right angles to the thrust face), in order to keep the reciprocating weight to a minimum.

For a stronger flywheel-crankshaft connection, remove the two locating pins and drill out to 13/32-in. Drill (8.6 mm) and tap (l0 x l.5 mm) the pinholes in the crankshaft. At right angles to these, add two more to make a total of eight retaining bolts (TA13079).

CONCLUSIONS

Obviously, there are holes in the information supplied here, as there are in any manual. But we have spent over fifty pages on a subject that is normally treated in twenty, so It is hoped that the holes left by others have been leveled, and those remaining are not nearly so deep. We cannot discuss every minute detail of theory, engineering, service and the pros and cons of each.

As an example, little is said of assembly itself. This is something that must be learned by doing, preferably with the assistance of a more experienced associate. It is hoped that these efforts are enough to stimulate the mind so that any problems are squarely faced, carefully examined, and intelligently solved.

Let us suppose that the rear oil return cap becomes NLS. Do we let the oil leak to the ground, make the dies to cast new ones, or sell the car by the pound? It should be a simple matter to babbitt the worn surface and hand scrape it to fit. And we haven't discussed the American practice of "blue printing" an engine, making certain that everything is ideal, bringing all chambers to exactly the same cc's, all ports identical, fitting the sprockets with offset keys for absolutely perfect valve timing, etc.

The author is frail to mistakes as is anyone, so the revelation of errors is solicited, as are suggestions to improve the material and its clarity. Any assistance by readers to upgrade future editions will be warmly received and acknowledged. *(The same goes for the editor.)*

EXTRA NOTES

In all but the XPEG and the last of the XPAG/TFs, the oil pump must be primed in order to obtain pressure in the first (critical) rev's of a new engine, pack the pump gears during assembly with a petroleum jelly (Vaseline) and fill the filter with engine oil, with the spark plugs removed and ignition off, run the engine on the starter until some pressure shows on the gauge. Then the engine may be fired.

(An alternate method is to coat the gears and fill the empty space in the pump body with STP [the stuff that barely flows], or equivalent, and crank the engine over a few times without the coil hooked up. This should quickly produce oil pressure. Immediately thereafter, hook up the coil and start the engine. Ed.*)*

Safety-wire the nuts on the main bearing caps, rather than use split pins, as the latter can allow the studs to turn out. Use aircraft lock wire, 0.032 or 0.040 AWG (obtainable at any airport), and follow the A & E practice of twisting the wire tightly between the nuts to minimize the possibility of their coming loose. Notice that the wire in the illustration is so laced that loosening of one stud will tighten the other.

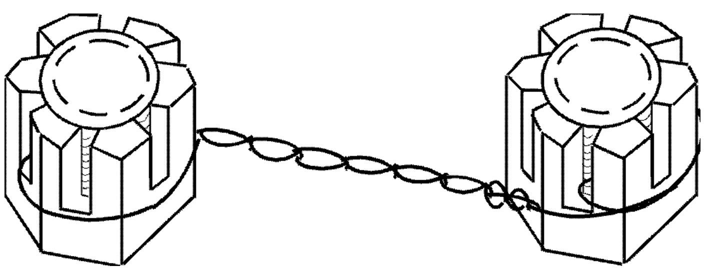

Figure 24. Correct Method of Safety Wiring

NOTE

This is the only correct way to do lockwiring. Where there are not two nuts as shown (as in the gearbox fork-locking bolts), the idea is the same. Twist the wire tightly, and trim any hanging ends. Ed.

Oil leaks at the rocker cover are common. Be certain that the cover's bottom surface is reasonably flat. Tack the gasket to the head with #*3* cement, but do not use any on the cover itself. Now, the cover can be removed anytime, and the gasket will not be damaged. The cast aluminum rocker cover and tappet side cover offer flat, machined surfaces that considerably assist in curtailing oil leaks.

Tufftriding the rocker shaft will extend the life of this part.

The better crankshaft was fitted as standard from XPAG TD2/27551 on.

Clutch disc runout must not exceed 0.020 in. Repair is not practical, for the disc will not respond to bending, so a new one must be fitted.

Should you be fitting another block to your car, remove the brass engine number plate from the old block and attach it to the new one. It is easily removed by lightly tapping on the brass pin from the inside of the block, then, by prying the head upward, the plate will come off. Failure to have an engine number plate that matches the maker's plate on the scuttle detracts from the value of the car.

When. the gearbox is left in the chassis, the block assembly must be properly aligned with it in order to mate them together. The seasoned mechanic "eyeballs" them together with a few friendly nudges in about three minutes. The novice can spend hours searching for the correct alignment of block to bell housing. Make four guide pins from rocker stand bolts (X22915*)* by cutting off their hex heads, then grinding a slight taper on the shanks. With two fitted in the block and two in the sump, proper alignment is much more easily achieved.

SOURCES OF INFORMATION

Instruction Manual for TC

TD-TF Workshop Manual

TC, TD, and TF Parts Manuals

Nuffield Press TC, TD, and TF Special Tuning Booklets

SU Parts and Service Manuals

Eric Blower: *M.G. Workshop Manual* (all M.G. models)

Colin Campbell: The Sports Car Engine: Its Tuning and Modification

Philip Smith: Design and Tuning of Competition Engines Scientific Design of Exhaust and Intake Systems; Valve Mechanisms for High-Speed Engines

Sir Harry Ricardo: The High-Speed Internal Combustion Engine

E. Malloy: Automobile Engineers' Reference Handbook

PARTS AND SERVICES

British Motor Corporation: Through its distributors and dealers MOWOG and SU Parts (original equipment) *(No longer a good source.)*

Lucas Electrical Services: Through British car and motorcycle distributors and dealers *(No longer a good source.)*

Lucas electrical units and parts (original equipment)

Nisonger Corp.:. 125 Main St. New Rochelle, NY

SU Carburetters, *instruments*, pumps, and parts (original equipment)

Beck Distributing Corp. *(Beck-Arnley)*: Melville, L.I., NY 11749 *Branch stores nationwide*

British Auto Parts *(BAP-GEON)*: *Branch stores nationwide*

Columbia Motor Corp.: 419 East ll0th St. N.Y., NY 10029 *(No longer a good source.)*

The above supply engine replacement parts (Vandervell, Borg & Beck, etc.). Some have original equipment.

Gerard *Goguen (Abingdon Spares):* *P.O. Box 27, South Walpole, NH 03608*

Jack Jeffries: Box J2, 110 Brooklyn Ave. Freeport, L.I.. NY *(Unknown?)*

Moss Motors Ltd.: *7200 Hollister Ave*. Goleta, CA 93117

The above specialize in T-series parts

V.W. Derrington Ltd.: 159 London Road. Kingston-on-Thames, Surrey

Lucas heads, extractor exhausts, special parts for T series

Wakefield Engineering: Box 255 Turnpike. Station, Shrewsbury, Mass. 01545

New address for Wakefield Engineering is Box 41, Greendale, Mass. 01606.

The editor has found two other alternatives for the name Wakefield Engineering in Massachusetts:

1. *Sykes Rd., Fall River 02720 (508) 672-2212)*
2. *Audobon Rd., Wakefield 01880 (617) 245-5900*

Whether any of the addresses is correct is unknown. Suggst trying them until a good one is found. Also, it is not known whether this firm supplies any of the author's listed parts.

1½-litre sleeves, Mallory ignition, Cobb Clutches, parts and service for XPAG and TC

Federal Mogul Corp.: Branches in larger cities

Kolene Corp.: 12890 Westwood Ave. Detroit, MI 48223

Tufftriding and other heat treating services

Metric & Multi-Standard Components Corp.: 197 So. Broadway, Yonkers, NY 10705

Metric taps and dies

Old M.G. Part Numbers and Their Latest BLM Ones

Old No	Next No.	Next No.
81869		
81878		
83177	AAA615	
99612	AAA851	
168248		
168249		
168426	AAA3077	
168551	AAA3095	
168553	AAA3096	
168727		
168828	AAA3105	
AAA5524	AAA5559	
AAA5776		
AAA5780		
AEF123		
AEFl37		
AEG119		
AEG122		
AEG125		
AEG126		
AEK113		
AJJ55		
AJJ193		
AKD804		
AKD856		
AMK739	BLS116	
AMK804		
CA1009		
CA1605		
JA5052		
LA7431		
MG706/266		
MG862/92		
MG862/98		
MG862/171		
MG862/458		
MG862/459		
MG862/472		
MG900/S	168828	AAA3105
OA10132	AAA5188	

Old M.G. Part Numbers and Their Latest BLM Ones

Old No	Next No.	Next No.
SA1008		
SA2224/2		
SA2232/1		
SA2411/5		
SA2440/1		
TA13079	AAA5609	
X15012		
X15117	AAA5306	
X15268	AAA5340	
X15269	AAA5341	
X15393	AAA5347	
X17052	AAA5419	
X19089	AAA5464	
X19090	AJJ2868	
X19206		
X19520	AAA5501	
X20036	AAA5516	
X20128	AAA5522	
X20194	AAA5524	AAA5559
X20247		
X20428		
X20429	AAA5535	
X2O856	AAA5546	
X22106		
X224O3	AAA5607	
X22517	AAA5613	
X22542	AAA5618	
X22543	AAA5619	
X22546	AAA5620	
X22547		
X22730	AAA5660	
X22732		
X22914	AAA5691	
X22924		
X22951	AEG127	
X24084	AAA5776	
X24086	AAA5777	
X24138	AAA5791	
X24358		
X24359	AAA5823	