SECTION AAA

ENGINE (APJM, 9M, and 10MA)
OF THE MORRIS MINOR 1000

General description.

Lubrication system.

Section No. AAA.1 Removal and replacement of the carburetter.

Section No. AAA.2 Removal and replacement of the engine or power unit.

Section No. AAA.3 Removal and replacement of the oil filter assembly.

Section No. AAA.4 Refitting the distributor drive gear.

Section No. AAA.5 Piston sizes and cylinder bores.

Section No. AAA.6 Modified piston assemblies and gudgeon pins.

Section No. AAA.7 Modified valve shrouds and oil seals.

Section No. AAA.8 Modified cylinder head gasket.

Section No. AAA.9 Modified oil pump.

Section No. AAA.10 Fitting flywheel starter rings.

Section No. AAA.11 Fitting valve seat inserts.

Section No. AAA.12 Fitting cylinder liners.

Section No. AAA.13 Pressed-steel valve rockers.

Section No. AAA.14 Removal and replacement of the inlet/exhaust manifold.

Section No. AAA.15 Camshaft bearings (10MA engines).

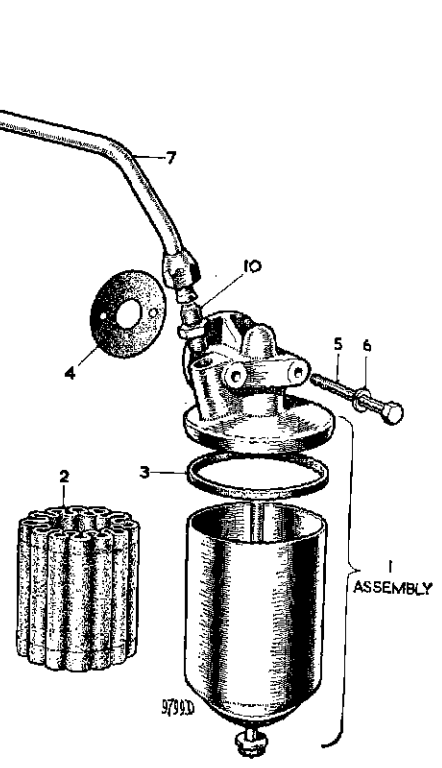
Section No. AAA.16 Pistons and connecting rods (10MA engines).

Section No. AAA.17 Piston sizes and cylinder bores (10MA engines).

●Section No. AAA.18 Modified timing cover.●

THE MORRIS MINOR 1000 FULL-FLOW OIL FILTER COMPONENTS

No.	*Description*
1.	Filter—oil.
2.	Element.
3.	Joint washer—filter to filter head.
4.	Joint—filter to cylinder block.
5.	Screw—filter to cylinder block.
6.	Spring washer—screw.
7.	Oil pipe complete.
8.	Screw—banjo union.
9.	Washer—copper.
10.	Connector.



GENERAL DESCRIPTION

The Morris Minor 1000 overhead-valve engine is of the same construction as the engine fitted to the Morris Minor (Series II), with the exception of the following.

The split-skirt pistons are of aluminium alloy with an alumilited finish. The connecting rods have steel-backed, lead-bronze, lead-indium-plated surface, or steel-backed, copper-lead, lead-tin-plated surface, renewable big-end bearings.

The centrifugal water pump is of a different construction, and the first and second and third and fourth cylinders do not have a water jacket between them.

The carburetter is of a similar construction but has a larger throttle opening, necessitating a larger mounting flange on the induction manifold. An oil bath air cleaner is fitted to all models.

The illustrations shown on pages AA.6 and AA.10 are correct for the Morris Minor 1000, with the exception of the water pump (page AA.6) and the oil filter and oil sump gauze strainer (page AA.10).

LUBRICATION SYSTEM

The lubrication system of the Minor 1000 engine is similar to that of the Series II engine, but the oil is delivered to a **full-flow oil filter** from the sump gauze strainer and then to the gallery on the right-hand side of the crankcase.

Situated at the rear end of the main oil gallery is the oil pressure switch which operates the oil pressure warning light located in the instrument panel.

Section AAA.1

REMOVAL AND REPLACEMENT OF THE CARBURETTER

Before removing the carburetter it is necessary to remove the air cleaner.

Disconnect the breather hose by removing the clip which attaches it to the breather pipe on the rocker cover. Slacken the throttle cable attachment nut on the carburetter and unthread the cable from the air cleaner bracket. Disconnect the throttle return spring. Take out the two bolts securing the air cleaner pipe to the carburetter flange and lift off the air cleaner and pipe as an assembly, withdrawing the support spigot from its rubber mounting on the engine bracket.

To remove the carburetter disconnect the suction advance pipe union from the carburetter. Disconnect the petrol flexible hose at the pump end. Slacken the choke cable attachment nut on the jet lever and loosen the outer casing attachment screw on the jet link. Remove the choke cable. Take out the nuts and washers securing the carburetter and distance piece to the inlet manifold and lift off the carburetter.

Replacement of the carburetter, followed by replacement of the air cleaner, is a reversal of the above procedure. It should be noted that the distance piece which fits between the carburetter flange and the flange on the induction manifold has a gasket fitted on either side of it. If either of these gaskets is damaged, the faces of the distance piece and the carburetter flange must be cleaned so that no trace of the old gasket remains, and a new gasket must be fitted.

Section AAA.2

REMOVAL AND REPLACEMENT OF THE ENGINE OR POWER UNIT

Disconnect the battery by removing the lead from the positive terminal and disconnect the lead from the oil pressure switch.

Remove the carburetter and air cleaner as detailed in Section AAA.1, and proceed as detailed in Section AA.25 or Section AA.26, omitting the paragraphs referring to carburetter, air cleaner, and oil gauge pipe removal.

Section AAA.3

REMOVAL AND REPLACEMENT OF THE OIL FILTER ASSEMBLY

Remove the banjo union bolt from the oil pipe, disconnect the oil pipe union from the filter connector, and remove the oil pipe. Detach the filter bowl.

Remove the two nuts and spring washers securing the filter assembly to the cylinder block and remove the assembly.

If the gasket is damaged as the filter assembly is withdrawn from the cylinder block ensure that all traces of it are removed before a new gasket is fitted and the assembly replaced by a reversal of the above procedure.

Section AAA.4

REFITTING THE DISTRIBUTOR DRIVE GEAR

Turn the engine until No. 1 piston is at T.D.C. on its compression stroke. When the valves on No. 4 cylinder are 'rocking' (i.e. exhaust just closing and inlet just opening) No. 1 piston is at the top of its compression

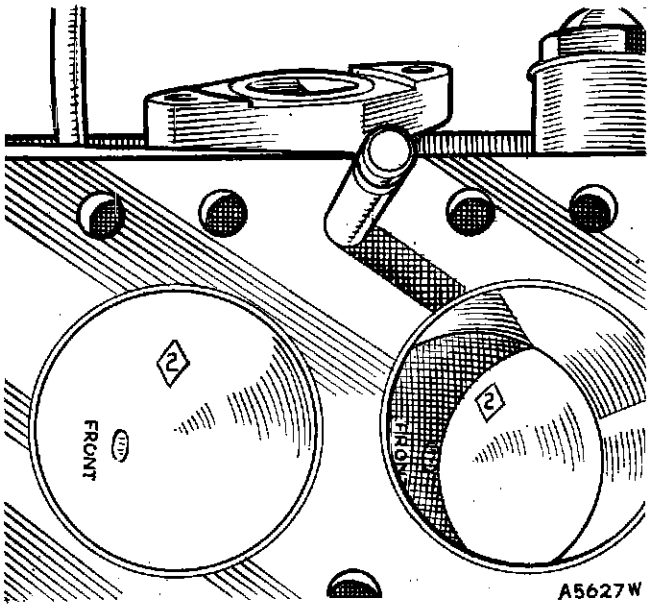


Fig. AAA.1

The pistons are marked on their crowns with a figure enclosed in a diamond to indicate their size, which should correspond with the similar size stamped on the cylinder block adjacent to the bore. The piston crowns are also stamped 'FRONT' to indicate which way they should be fitted, and 'oversize' pistons have their oversize dimension indicated by figures in a small ellipse

stroke. If the engine is set so that the groove in the crankshaft pulley is in line with the pointer on the timing chain cover, or the dimples in the crankshaft and camshaft gears are in line, the piston is exactly at T.D.C.

Screw one of the tappet cover bolts into the threaded end of the distributor drive gear and, holding the drive gear with the slot just below the horizontal and the large offset uppermost, enter the gear. As the gear engages with the camshaft the slot will turn in an anti-clockwise direction until it is approximately in the one o'clock position.

Remove the bolt from the gear and insert the distributor housing and secure it with the special bolt and washer. Ensure that the correct bolt is used and that the head does not protrude above the face of the housing.

Refit the distributor, referring to Section CC.7 if the clamp plate has been released.

Section AAA.5

PISTON SIZES AND CYLINDER BORES

In production, pistons are fitted by selective assembly, and to facilitate this the pistons are stamped with identification figures on their crowns.

A piston stamped with a figure 2 enclosed in a diamond is for a bore bearing a similar stamp.

In addition to the standard pistons there is a range of four oversize pistons available for service purposes. Oversize pistons are marked with the actual oversize dimensions enclosed in an ellipse. A piston stamped ·020 is suitable only for a bore ·020 in. (·508 mm.) larger than the standard bore and, similarly, pistons with other markings are suitable only for the oversize bore indicated.

The piston markings indicate the actual bore size to which they must be fitted, the requisite running clearance being allowed for in the machining.

After reboring an engine, or whenever fitting pistons differing in size from those removed during dismantling, ensure that the size of the piston fitted is stamped clearly on the top of the cylinder block alongside the appropriate cylinder bore (see Fig. AAA.1).

Pistons are supplied in the sizes indicated in the following table:

Piston marking	*Suitable bore size*	*Metric equivalent*
STANDARD	2·4778 to 2·4781 in.	62·935 to 62·940 mm.
OVERSIZE		
+·010 in. (·254 mm.)	2·4878 to 2·4881 in.	63·189 to 63·194 mm.
+·020 in. (·508 mm.)	2·4978 to 2·4981 in.	63·443 to 63·448 mm.
+·030 in. (·762 mm.)	2·5078 to 2·5081 in.	63·697 to 63·702 mm.
+·040 in. (1·016 mm.)	2·5178 to 2·5181 in.	63·951 to 63·956 mm.

Section AAA.6

MODIFIED PISTON ASSEMBLIES AND GUDGEON PINS

Commencing at Engine Nos. 9M–H117440 and 9M–L127575, new piston assemblies (Part No. 8G 688) with modified gudgeon pins (Part No. 2A 837) are fitted.

The gudgeon pins have a reduced internal diameter, and are therefore heavier, and can only be fitted in complete sets of four (i.e. complete sets of pistons and gudgeon pins, or a complete set of gudgeon pins).

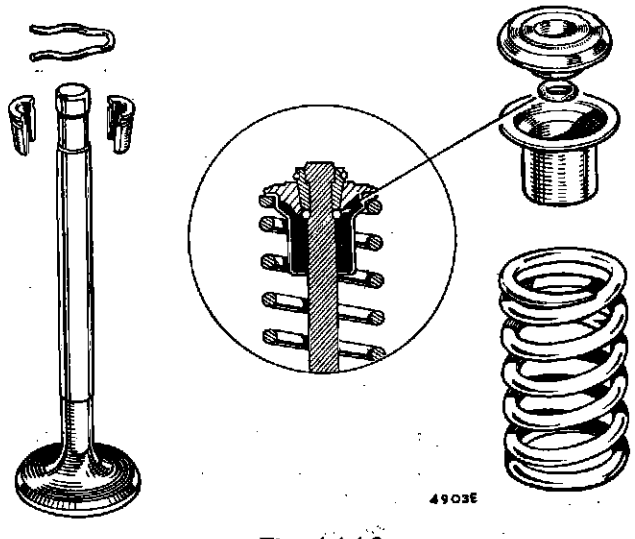


Fig. AAA.2

●*Parts of the valve assembly, showing the valve, cotters, circlip, spring, shroud (earlier models), packing ring, and spring cap. The inset shows the valve packing ring fitted correctly at the bottom of the cotter groove below the cotters*●

Section AAA.7

MODIFIED VALVE SHROUDS AND OIL SEALS

From Engine Nos. APJM–H190945 and APJM–L 179249 valve packing rings (Part No. 2A 879) of circular cross-section are fitted in place of the valve oil seals previously used. The oil seal retainer has been deleted from the valve guide shroud. The part number of the shroud without the oil seal retainer is 2A 545. This modification involves changes in the inlet and exhaust valves and the valve spring caps.

If it is desired to fit the new valve packing rings on earlier engines the modified shrouds (Part No. 2A 545), valves (Part Nos. 2A 877 [inlet] and 2A 878 [exhaust]), and valve spring caps (Part No. 2A 880) must be used.

These modifications necessitate certain differences in valve removal and replacement procedure as detailed in Section AA.16.

Removal

Remove the valve circlip. Compress the valve spring, using Service tool 18G 45, and remove the two valve cotters. Release the valve spring and remove the compressor, valve spring cap, shroud, and spring.

Remove the valve packing ring from the cotter groove and withdraw the valve from its guide.

Replacement

Place each valve into its guide and fit the springs, shrouds, and caps. Compress the valve spring and push a new synthetic rubber packing ring over the tip of the valve stem down to the bottom of the cotter groove (see Fig. AAA.2). Refit the two valve cotters and remove the compressor. Replace the valve circlip.

●From Engine Nos. 10MA–H181473 and 10MA–L183700 valve shrouds (Part No. 2A 545) are deleted from the valve assemblies.●

NOTE.—Do not fit old valve packing rings, or oil sealing may suffer. The rings are fitted more easily if they have been soaked in clean engine oil for a short period before use.

Section AAA.8

MODIFIED CYLINDER HEAD GASKET

From Engine No. 9M–U–H235983 to 236000 and then 236081 onwards and 9M–U–L233057 to 233100 and then 235547 onwards a modified cylinder head gasket (Part No. 2A 971) having ferrules around the water holes is fitted. The new gasket is interchangeable with that previously used and is introduced to improve water sealing.

Section AAA.9

MODIFIED OIL PUMP

On later engines the Hobourn-Eaton alternative oil pump (Part No. 2A 341) is replaced by a Hobourn-Eaton pump of modified construction (Part No. 2A 692).

The cover and body of the new pump are now dowelled together, being located in the correct position in relation to each other by a $\frac{3}{16}$ in. countersunk screw. The assembly is held securely together by the three cylinder block attachment bolts. The pump cover now embraces the outer rotor and the combined oil pump shaft and inner shaft.

The new oil pump can be identified by the fact that the manufacturer's name and the patent number are cast on the outer flange of the cover instead of appearing around the centre of the cover. It may be interchanged as a unit with the oil pump originally used.

To dismantle and assemble

When the pump has been removed from the engine (see Section AA.30) the $\frac{3}{16}$ in. countersunk screw can be removed from the engine side of the pump. It will now be possible to pull the body and cover of the pump apart, exposing the inner and outer rotors, which may be removed.

Reassembly is a reversal of the above procedure.

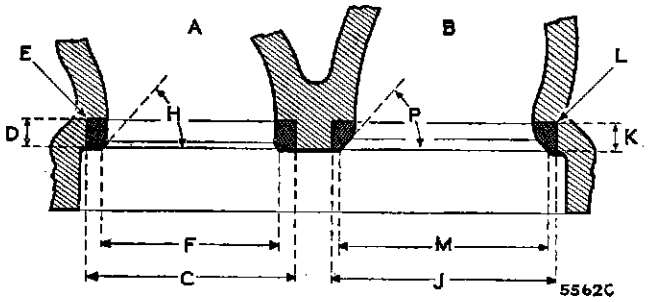


Fig. AAA.3

Valve seat machining dimensions

9M engines

Exhaust (A)	Inlet (B)
C. 1·124 to 1·125 in. (28·55 to 28·58 mm.).	J. 1·187 to 1·188 in. (30·16 to 30·17 mm.).
D. ·186 to ·188 in. (4·72 to 4·77 mm.).	K. ·186 to ·188 in. (4·72 to 4·77 mm.).
E. Maximum radius ·015 in. (·38 mm.).	L. Maximum radius ·015 in. (·38 mm.).
F. 1·0235 to 1·0435 in. (25·99 to 26·50 mm.).	M. 1·0855 to 1·1055 in. (27·58 to 28·07 mm.).
H. 45°.	P. 45°.

10MA engines

Exhaust (A)	Inlet (B)
C. 1·124 to 1·125 in. (28·55 to 28·58 mm.).	J. 1·3075 to 1·3085 in. (33·21 to 33·24 mm.).
D. ·186 to ·188 in. (4·72 to 4·77 mm.).	K. ·186 to ·188 in. (4·72 to 4·77 mm.).
E. Maximum radius ·015 in. (·38 mm.).	L. Maximum radius ·015 in. (·38 mm.).
F. 1·0235 to 1·0435 in. (25·99 to 26·50 mm.).	M. 1·1435 to 1·1635 in. (29·045 to 29·553 mm.).
H. 45°.	P. 45°.

Section AAA.10

FITTING FLYWHEEL STARTER RINGS

To remove the old starter ring from the flywheel flange split the ring gear with a cold chisel, taking care not to damage the flywheel. Make certain that the bore of the new ring and its mating surface on the flywheel are free from burrs and are perfectly clean.

To fit the new ring it must be heated to a temperature of 300 to 400° C. (572 to 752° F.), indicated by a light-blue surface colour. If this temperature is exceeded the temper of the teeth will be affected. The use of a thermostatically controlled furnace is recommended. Place the heated ring on the flywheel with the lead of the ring teeth towards the flywheel register. The expansion will allow the ring to be fitted without force by pressing or tapping it lightly until the ring is hard against its register.

This operation should be followed by natural cooling, when the 'shrink fit' will be permanently established and no further treatment required.

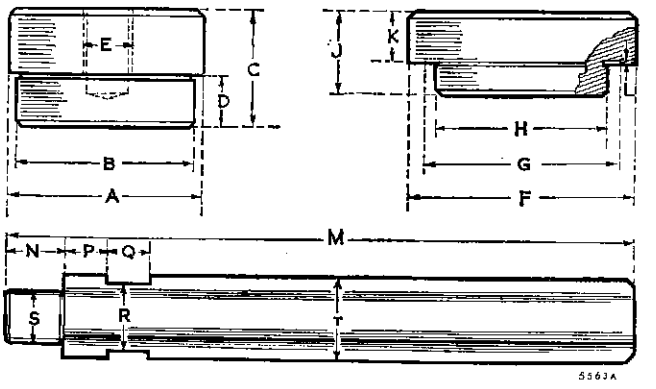


Fig. AAA.4

Cylinder liner pilots should be made to the above dimensions from case-hardening steel and case-hardened. The pilot extension should be made from 55-ton hardening and tempering steel, hardened in oil and then tempered at 550° C. (1,020° *F.*)

Dimensions for 9M engines

Pressing-out pilot

A. $2\frac{37}{64}^{+\cdot005}_{-\cdot000}$ in. ($65{\cdot}48^{+\cdot127}_{-\cdot000}$ mm.).
B. $2{\cdot}465^{+\cdot000}_{-\cdot005}$ in. ($62{\cdot}61^{+\cdot000}_{-\cdot127}$ mm.).
C. $1\frac{3}{4}$ in. (44·45 mm.).
D. $\frac{3}{4}$ in. (19·05 mm.).
E. $\frac{3}{4}$ in. B.S.W. thread.

Pressing-in pilot

F. 3 in. (76·20 mm.).
G. $2\frac{5}{8}$ in. (66·68 mm.).
H. $2{\cdot}455^{+\cdot000}_{-\cdot005}$ in. ($62{\cdot}35^{+\cdot000}_{-\cdot127}$ mm.).
J. $1\frac{1}{4}$ in. (31·75 mm.).
K. $\frac{3}{4}$ in. (19·05 mm.).
L. ·015 in. (·38 mm.).

Pilot extension

M. $14\frac{1}{2}$ in. (36·83 cm.).
N. $\frac{7}{8}$ in. (22·22 mm.).
P. $\frac{5}{8}$ in. (15·87 mm.).
Q. $\frac{5}{8}$ in. (15·87 mm.).
R. 1 in. (25·4 mm.) flats.
S. $\frac{3}{4}$ in. B.S.W. thread.
T. $1\frac{1}{4}$ in. (31·75 mm.).

Dimensions for 10MA engines

Pressing-out pilot

A. $2\frac{5}{8}^{+\cdot005}_{-\cdot000}$ in. ($66{\cdot}68^{+\cdot127}_{-\cdot000}$ mm.).
B. $2{\cdot}537^{+\cdot000}_{-\cdot005}$ in. ($64{\cdot}44^{+\cdot000}_{-\cdot127}$ mm.).
C. $1\frac{3}{4}$ in. (44·45 mm.).
D. $\frac{3}{4}$ in. (19·05 mm.).
E. $\frac{3}{4}$ in. B.S.W. thread.

Pressing-in pilot

F. $3\frac{1}{16}$ in. (77·79 mm.).
G. $2\frac{11}{16}$ in. (68·26 mm.).
H. $2{\cdot}515^{+\cdot000}_{-\cdot005}$ in. ($63{\cdot}88^{+\cdot000}_{-\cdot127}$ mm.).
J. $1\frac{1}{4}$ in. (31·75 mm.).
K. $\frac{3}{4}$ in. (19·05 mm.).
L. ·015 in. (·38 mm.).

Pilot extension

M. $10\frac{1}{2}$ in. (26·67 cm.).
N. $\frac{7}{8}$ in. (22·22 mm.).
P. $\frac{5}{8}$ in. (15·87 mm.).
Q. $\frac{5}{8}$ in. (15·87 mm.).
R. 1 in. (25·4 mm.) flats.
S. $\frac{3}{4}$ in. B.S.W. thread.
T. $1\frac{1}{4}$ in. (31·75 mm.).

Section AAA.11

FITTING VALVE SEAT INSERTS

Should the valve seatings become so badly worn or pitted that the normal workshop cutting and refacing tools cannot restore them to their original standard of efficiency, special valve seat inserts can be fitted.

The seatings in the cylinder head must be machined to the dimension given in Fig. AAA.3. Each insert should have an interference fit of ·0025 to ·0045 in. (·063 to ·11 mm.) and must be pressed and not driven into the cylinder head.

After fitting grind or machine the new seating to the dimensions given in Fig. AAA.3. Normal valve grinding may be necessary to ensure efficient valve seating.

Section AAA.12

FITTING CYLINDER LINERS

Should the condition of the cylinder bores be such that they cannot be cleaned up to accept standard oversize pistons, dry cylinder liners can be fitted. This operation may be carried out by the use of specialized proprietary equipment or with a power press using pilot adaptors to the dimensions shown in Fig. AAA.4. The press must be capable of 3 tons (3048 kg.) pressure to fit new liners and 5 to 8 tons (5080 to 8128 kg.) to remove old liners.

Remove the engine from the vehicle as detailed in Section AA.25. Dismantle the engine, and remove the cylinder head studs. If liners have not previously been fitted the bores must be machined and honed to the dimensions given in the table below.

To remove worn liners

Place the cylinder block face downwards on suitable wooden supports on the bed of the press, making sure that there is sufficient space between the block and the bed of the press to allow the worn liner to pass down. Insert the pilot in the bottom of the liner and carefully press the liner from the bore.

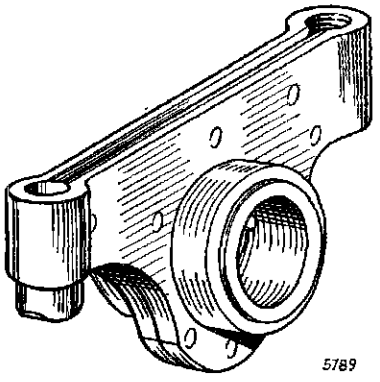


Fig. AAA.5

The pressed-steel type of valve rocker, which must not be rebushed

To press in new liners

Thoroughly clean the inside of the bores and the outside of the liners. Stand the cylinder block upright on the bed of the press, insert the pilot guide in the top of the liner, and position the liner with its chamfered end in the top of the bore. Make certain that the liner is square with the top of the block and that the ram of the press is over the centre of the pilot. Press the liner fully into the bore.

Each liner must be machined to the dimensions given in the table below after pressing into position.

Section AAA.13

PRESSED-STEEL VALVE ROCKERS

Valve rockers of pressed-steel construction (see Fig. AAA.5) have been introduced as alternatives to the forged type.

Rebushing pressed-steel valve rockers is not practicable and must not be undertaken. When bushes become worn new rocker assemblies must be fitted. It it becomes necessary to renew individual valve rockers, it is important to use those of the pattern already fitted. Pressed-steel and forged-type valve rockers are interchangeable only in sets of eight.

Engine type	*Liner Part No.*	*Machine bores of cylinder block to this dimension before fitting liner*	*Outside diameter of liner*	*Interference fit of liner in cylinder block bore*	*Machine liner bore to this dimension after fitting*
'A' (9M)	2A 784	2·6035 to 2·604 in. (66·128 to 66·14 mm.)	2·606 to 2·60675 in. (66·19 to 66·21 mm.)	·002 to ·00325 in. (·05 to ·08 mm.)	2·477 to 2·4785 in. (62·915 to 62·954 mm.)
'A' (10MA)	12G 164	2·64075 to 2·64125 in. (67·076 to 67·088 mm.)	2·64325 to 2·64400 in. (67·139 to 67·158 mm.)	·002 to ·00325 in. (·05 to ·08 mm.)	2·542 to 2·5435 in. (64·566 to 64·605 mm.)

This alternative type of valve rocker is fitted from the following engine numbers:

9M–U–H283721 onwards.

9M–U–L282038 to 282100 inclusive and then 282631 onwards.

Section AAA.14

REMOVAL AND REPLACEMENT OF THE INLET/EXHAUST MANIFOLD

The removal and replacement of the manifolding, detailed in Section AA.8, differs from Morris Minor 1000 cars, from Engine No. 9M–U–H425490, in that a one-piece inlet/exhaust manifold was introduced at this engine number.

Section AAA.15

CAMSHAFT BEARINGS (10MA Engines)

Should the camshaft bearing clearances be excessive new bearing liners must be fitted, and this will entail line-reamering after fitting.

Removing the liners

Worn liners can be removed and new liners pulled into the cylinder block with Service tool 18G 124 A together with adaptors 18G 124 K, 18G 124 B, and 18G 124 M.

Centre

Insert the pilot adaptor 18G 124 K into the camshaft liner front bore from the inside of the block and the adaptor 18G 124 B into the centre liner from the rear, small end first.

With the body of the tool positioned on the centre screw, pass the screw through the pilot adaptor and the adaptor in the centre liner.

Place the slotted washer on the flat at the rear of the centre screw and insert the tommy-bar into the screw behind the slotted washer.

Tighten up the wing nut to withdraw the liner.

Front and rear

Insert the small end of the adaptor 18G 124 K into the camshaft front liner from the inside of the cylinder block, thread the body of the tool onto the centre screw, and pass the screw through the adaptor from the front of the block. Place the slotted washer on the flat at the rear of the centre screw and insert the tommy-bar into the centre screw behind the slotted washer.

Tighten up the wing nut to withdraw the worn liner.

The rear liner is withdrawn by the same method, using the adaptor 18G 124 M and withdrawing the liner from the rear of the block.

Fitting new liners

Line up the oil holes in the liners and the cylinder block and make certain that they remain correctly positioned during the whole operation.

Front and rear

Place the new liner on the smallest diameter of the adaptor 18G 124 K and insert the adaptor into the camshaft front liner bore from the inside of the block, largest diameter first.

Thread the body of the tool onto the centre screw and pass the screw through the adaptor located in the front liner from the front of the block.

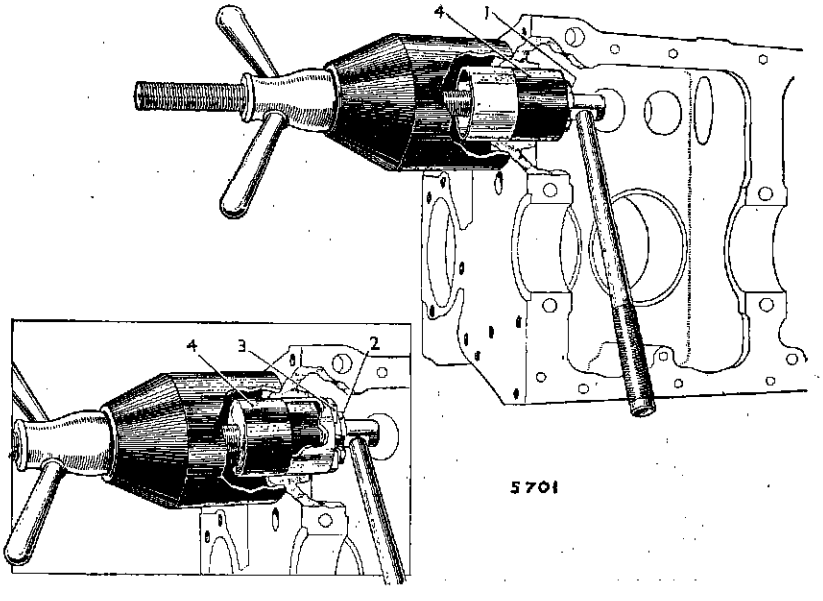


Fig. AAA.6

Removing a camshaft liner (10MA engines), using Service tool 18G 124 A and adaptor 18G 124 K. The inset shows the liner being replaced

1. 'C' washer.
2. 'C' washer.
3. 'D' washer.
4. Adaptor 18G 124 K.

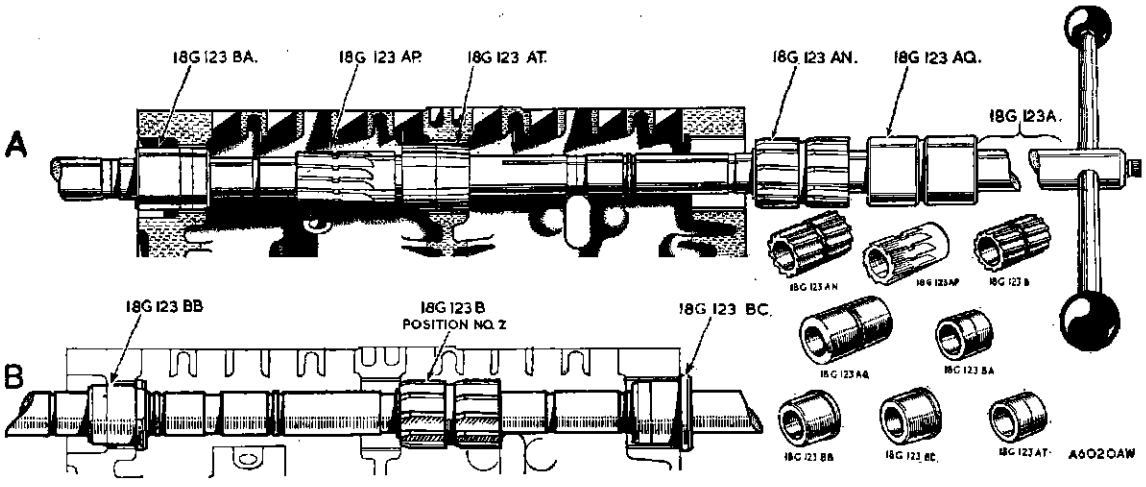


Fig. AAA.7

The camshaft liner reamer set up to line-ream (A) *the front and rear liners and* (B) *the centre liner* (10*MA engines*)

A. The cutters Part No. 18G 123 AP fitted to the No. 7 position and Part No. 18G 123 AN to the No. 10 position on the arbor.
B. The cutter Part No. 18G 123 B fitted to the No. 7 position on the arbor.

Position the larger of the two 'D' washers on the centre screw with the cut-away portion turned away from the butt joint of the liner: this joint **must** be covered by the washer.

Place the slotted washer on the flat at the rear of the centre screw and insert the tommy-bar into the screw behind the slotted washer.

Tighten the wing nut to pull the liner squarely into position.

The rear liner is replaced by the same method, using the adaptor 18G 124 M and pulling the liner into position from the rear of the block. The 'D' washer **is not** to be used when refitting a rear liner.

Centre

Insert the pilot adaptor 18G 124 K into the camshaft front liner from the inside of the block.

Place a new liner on the small end of the adaptor 18G 124 B and position the adaptor in the centre liner bore from the rear, largest diameter first.

With the body of the tool positioned on the centre screw insert the screw through the pilot adaptor and the adaptor in the centre liner bore.

Position the larger 'D' washer on the centre screw with the cut-away portion turned away from the butt joints of the liner; this joint must be covered by the washer.

Place the slotted washer and the tommy-bar in the centre screw and tighten up the wing nut to pull the liner into position.

Reaming the liners

It is essential that the cutter flutes are kept clear of swarf at all times during the cutting operation, preferably with air-blast equipment. The cutter should be withdrawn from the liner half-way through the cut and the swarf removed from the cutter and the liner.

Feed the reamer very slowly and keep the cutters dry.

The arbor should be lightly lubricated before assembling the cutters and pilots. All oilways should be thoroughly cleaned when the cutting operations have been completed.

Front and rear

Insert the taper pilots 18G 123 AT and 18G 123 BA into the centre and rear liners respectively.

Place the parallel pilot 18G 123 AQ in the arbor, followed by the cutter 18G 123 AN.

Thread the arbor through the front and centre liners, fit the cutter 18G 123 AP on the arbor, and thread the arbor through the taper pilot in the rear liner.

Secure the cutters and pilots in their respective positions; 18G 123 AN is located in No. 10 and 18G 123 AP is located in No. 7 on the arbor.

The cutter for the front liner will cut first with the arbor piloting in the centre and rear liners. The cutter for the rear liner will follow with the arbor piloting in the front and centre liners. Clear away all the swarf before the plain pilot is allowed to enter the front liner.

When the cut in the rear liner is finished free the cutters and withdraw the arbor.

Centre

Set up for the second part of the operation by inserting the pilots 18G 123 BC and 18G 123 BB in the front and rear liners.

Thread the arbor through the pilot in the front liner and place the cutter for the centre liner on the arbor. Thread the arbor through the centre liner and the pilot located in

the rear liner. Secure the cutter and pilots in position; 18G 123 B is located in No. 7 position on the arbor.

Ream the centre liner, release the cutter, and withdraw the arbor.

Section AAA.16

PISTONS AND CONNECTING RODS
(10MA Engines)

Should the piston or connecting rod suffer damage or the small-end bush or gudgeon pin require renewal, the piston/gudgeon pin and connecting rod/small-end bush can only be obtained as assemblies. Therefore, under no circumstances should the small-end bush or gudgeon pin be renewed separately.

Dismantling

The gudgeon pins are fully floating; remove the two circlips locating each pin and press the pins out. It is essential that the piston assemblies should be replaced in their own bores and fitted the same way round; they should be marked to facilitate this.

Reassembling

Assemble the pistons to the connecting rods with the gudgeon pin, which should be a hand push fit at a room temperature of 20° C. (68° F.). Secure each pin in its piston with two circlips, ensuring that they fit well into their grooves.

Section AAA.17

PISTON SIZES AND CYLINDER BORES
(10MA Engines)

In production, piston and connecting rod assemblies are fitted by selective assembly.

In addition to the standard piston and connecting rod assemblies there is a range of two oversize piston and connecting rod assemblies available for Service purposes.

Piston and connecting rod assemblies are supplied in the sizes indicated in the following table:

Piston marking	*Suitable bore size*	*Metric equivalent*
STANDARD	2·5424 to 2·5447 in.	64·576 to 64·635 mm.
OVERSIZE		
+·010 in. (·254 mm.)	2·5524 to 2·5547 in.	64·830 to 64·889 mm.
+·020 in. (·508 mm.)	2·5624 to 2·5647 in.	65·084 to 65·143 mm.

●Section AAA.18

TIMING COVER
(Modified Timing Cover and Oil Thrower)

A modified timing cover and oil thrower is fitted to later engines and must be used together if required for earlier engines.

Note the following when replacing or refitting:

(1) The oil thrower must be fitted with the face marked 'F' away from the engine.
(2) Fit the oil seal from inside the cover, with Service tool 18G 134 and adaptor 18G 134 BD.
(3) When refitting the cover ensure that it is centralized on the crankshaft, using Service tool 18G 1044.
(4) Lightly lubricate the oil seal and refit the crankshaft pulley.●