

M-L MAGNETOS

Types CMA and CMAK

This booklet describes the types CMA and CMAK magnetos which have been specially designed for single cylinder motor cycle work, the former for engines up to approximately 400 c.c., the latter up to 550 or 600.

The magnetos are generally similar, the difference lying in that type CMA is built for 35 mm. centre height, with a small tapered spindle (B.E.S.A. M dimensions), while the CMAK is fitted with a thicker base plate giving a centre height of 45 mm. and has a larger spindle to B.E.S.A. K standards.

The magnetos are made both for variable and fixed ignition.

The booklet, as written, is applicable to the variable ignition machine, but it will be understood that in the case of the fixed ignition machines certain paragraphs will not apply, and certain spare parts listed in connection with the control mechanism will not be required.

The general instructions for fitting, care and maintenance, will, however, be the same for both types.

The magnetos are small and compact (weight about $4\frac{1}{2}$ lbs.), with laminated pole shoes bridged by a pair of arc shaped cobalt steel magnets.

The magnet and pole shoes are covered by a light aluminium cover, which serves to exclude dirt, dust and water and also give an improved finish.

Owing to the use of laminated pole shoes and cobalt steel magnets the magnetos give excellent electrical performance.

The terminals and contact breaker are accessible, and adjustment of the contact breaker points can be readily carried out.

On variable ignition machines, the control mechanism, which is designed for direct attachment to the Bowden cable, is contained in a dustproof housing, so that there is no liability of its rusting, or sticking in wet weather.

FITTING TO ENGINE.

The engine manufacturers will have taken all necessary precautions in fitting the magneto to the engine, but we might call the user's attention to the following points :—

When a magneto is chain driven, see that the chain is not so tight as to put a bending moment on the magneto spindle. It should be perceptibly slack in all positions of the drive.

The pick-up terminal takes 7.5 mm. diameter H.T. cable, and is perfectly watertight. The terminal screw should enter the stranded core of the cable, and on screwing the cable down the rubber insulation will expand tightly against the hole in the terminal. Grease the end of the cable before fitting, as it will then enter more readily, and any risk of surface leakage is obviated.

On variable ignition machines see that the Bowden cable is properly fitted into the adjustable stop on the control. A rubber sleeve is supplied with the magneto, which fits over the Bowden cable, and also over the adjustable stop and sleeve. This rubber sleeve should not be omitted, as if this is done, there is a possibility, in wet weather, of water running down the Bowden cable, and getting access to the interior of the machine. Should the sleeve become damaged, lost or perished, it should be replaced immediately, or repaired by taping up the cable, so as to prevent access of water.

A cut-out terminal is not fitted as standard, but can be supplied when required.

TIMING.

The best timing of the spark varies with different engines. If the makers' instructions are not available, we recommend the following method :—

Time with the spark fully advanced. If timed with the lever retarded the spark may occur too early for normal running when the lever is fully advanced.

First find the "top dead centre" at the end of the compression stroke, and make a mark on the pulley or driving sprocket, and another on the crankcase to correspond with this. Then rotate pulley backwards about 30° for solo work, or 25° if used with sidecars. The contacts should break at this point when the timing lever is fully advanced. To find the exact point of break, place a cigarette paper between the closed points, and turn the armature forwards until the paper is just released, and no more, on pulling it gently. When first tightening the spindle nut the magneto should be held from rotating by means of the contact breaker until the taper in the sprocket bites on the spindle. Do not, however, hold by the contact breaker for final tightening or the contact breaker keyway may be sheared.

CARE AND MAINTENANCE.

Although a magneto should never be interfered with, or dismantled unnecessarily, a little periodical attention to the ignition system will be found well worth while, and this attention may be summed up in the words—Cleanliness, Adjustment and Lubrication.

FIRSTLY AS REGARDS CLEANLINESS.—A motor cycle magneto has, of course, to work under conditions which involve collection of a great deal of mud, dust and water on the outside of the magneto and high tension cable. The design of the magneto is such as to prevent this gaining access to the interior and harm is not likely to result to the magneto itself. At the same time an accumulation of mud and dirt on the insulating surfaces of the plug, cable and pick-up terminal will tend to cause bad starting. In particular cracking or perishing of the high tension cable will cause misfiring or bad starting in wet weather. The cable should, therefore, be replaced as soon as the rubber shews signs of cracking or perishing. About once a year, if the engine is in regular use, the pick-up terminal should be removed, and the portion which fits inside the machine should be cleaned of any accumulation of carbon dust with a piece of soft, clean, dry rag. Be careful not to break the carbon brush, or strain the spring. See also that the carbon brush can slide freely in its holder. A magneto run with a carbon brush absent, or sticking, produces nitric acid internally (due to the sparking), which destroys all the lubricant and attacks both the metal and insulating materials, of which the armature is composed. If the brush should be accidentally broken, care must be taken that no pieces are allowed to remain inside or serious damage may be done.

Should the flanges of the slip ring—visible when the pick-up is removed—show an accumulation of carbon dust they can be cleaned by means of a soft rag inserted through the terminal hole, the engine being slowly turned. This cleaning should be carried out only when absolutely necessary, and great care should be exercised, as the slip ring flanges are somewhat brittle, and easily broken.

The contact breaker should be examined periodically and any dirty deposit on the cam track removed. Should the cam appear dry a single spot of thin oil should be applied to the surface on which the tappet runs, as this will prevent rusting and wear. Do not, however, give more oil than this, as an excessive amount may get on the contact points and cause trouble and misfiring.

The points also should be examined, but should not be disturbed unless they are dirty or require adjustment. Any sign of incipient rusting on the contact breaker spring should be checked at once. Rust and corrosion are chiefly responsible for broken contact breaker springs.

LUBRICATION.—No lubrication of the main bearings is necessary. They are well packed with grease when sent out and will run indefinitely without attention. If at any time the magneto is taken down for general overhaul and cleaning, the bearings should then be repacked with high melting point grease such as Price's H.M.P. **DO NOT USE VASELINE**, or anything which melts when warm.

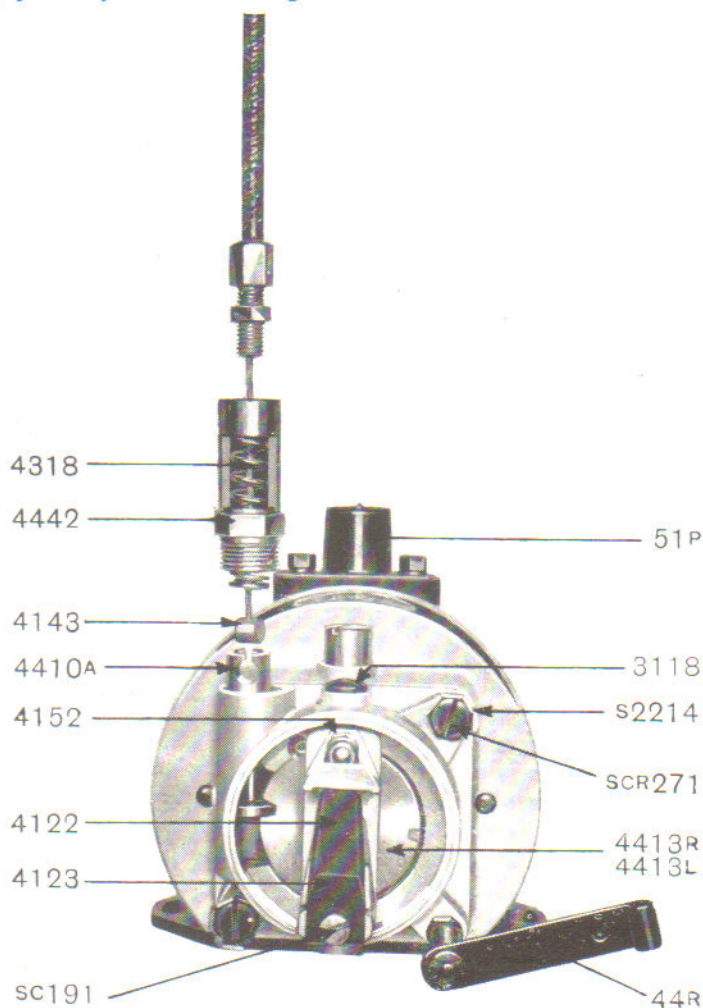
ADJUSTMENT.—The only portion of the magneto requiring adjustment is the contact breaker, and that very rarely. The gap between the points should be checked occasionally with the feeler on the magneto spanner, and if incorrect set to the gauge. After setting be careful to see that the lock nut on the long contact screw is tight.

The sparking plug will probably be found to require more frequent adjustment than the contact breaker, and its correct setting is just as important. The general tendency is for the plug points to burn wide; this increases the voltage required from the magneto and not only makes starting more difficult, but what is worse, causes brush discharge inside the machine. This discharge in time produces internal corrosion and the efficiency of the magneto is diminished, and ultimately breakdown may occur. The gap between the plug points should be normally 0.4 mm. and should never exceed 0.5 mm.

The plug should also be examined to see that the surface of the insulation is clean, and free from deposits of soot or charred oil, as these will cause leakage and bad running, while the insulation should be examined for cracks or flaws. In very damp weather the outside insulation should be cleaned or wiped with a dry rag before starting up, as starting will probably be rendered easier by so doing.

If it is desired at any time to remove the Bowden cable from the machine, do not attempt to remove the cam from its housing. It is only necessary to undo the hexagon nut which forms the abutment for the outer casing of the Bowden cable. If the cable and plunger to which it is attached is drawn upwards to its fullest extent, it will be found that the nipple into which the end of the cable is soldered comes above the top of the boss on the cam cage housing. The nipple may now be slipped sideways out of the hole in the plunger in which it fits, thus detaching the cable entirely.

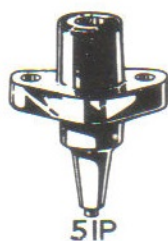
It is as well occasionally to examine the plunger and control spring, and to grease these thoroughly, as any rusting here may possibly cause binding of the control.



TROUBLES AND THEIR REMEDIES

If attention is paid to the foregoing points it is very unlikely that any trouble will be experienced with the magneto, and should misfiring or bad starting occur the carburation system.

(Continued on page 8.)



51P



4413R
4413L



4417



44R



4421



4122/6



46B



4123



4124



4125



4427



4128A



4136



4164



4152



52V



4420



Sc191



Sc219



44114



44113



1064



Sc175



4162



4461



4462



4442



4318



4143



4453



Sc166



Sc271



Sc278



Sc193

SPARE PARTS--CMA MAGNETO.

Price
s. d.

Component No.

ASSEMBLED COMPONENTS.

46B	Contact Breaker complete	...	...	11	6
51P	Pick-up complete	...	...	3	0
44R	Spring Pillar and Spring	...	...	...	8

Part No.

CONTACT BREAKER PARTS.

4420	Contact Breaker Base	...	...	...	10
4421	Brass Spring Carrier Block	...	...	...	10
4122/6	Flat Spring with Tungsten Contact	...	...	3	6
4123	Contact Breaker Backing Spring	...	...	...	2
4124	Insulating Strip	...	...	...	2
4125	Insulating Sleeve	...	...	...	4
4427	Tappet for Contact Breaker	...	...	1	0
4128A	Insulation Bush for Spring Carrier Block	...	...	...	4
4136	Stop for Contact Spring	...	...	...	2
4152	Adjustable Tungsten Contact Screw	...	...	3	0
52V	Locknut for 4152	...	...	...	1
4164	Felt Wick for Hollow Wick Screw	...	...	...	2
44114	Tabwasher for Contact Breaker Fixing Screw	...	...	...	2

SUNDRY PARTS.

49/60	Pick-up Carbon and Spring	...	...	...	6
1052/64	Earthing Carbon and Spring	...	...	...	6
4413R	Cam for Clockwise Rotation	...	...	4	6
4413L	Cam for anti-Clockwise Rotation	...	...	4	6
4417	Spring Ring for holding cam in position	...	...	...	2
4453	Contact Breaker Inspection Cover	...	...	...	6
4461	$\frac{3}{8}$ BSF Nut for Spindle (Large Taper)	...	...	...	2
4162	IBA Washer for Spindle (Small Taper)	...	...	...	1
4462	$\frac{3}{8}$ Washer for Spindle (Large Taper)	...	...	...	1
4354	Adj. Stop for Cam	...	...	...	6
44113	Earthing Carbon Holder	...	...	...	3

PARTS FOR BOWDEN CONTROL

(on Variable Ignition Models only).

4318	Spiral Spring for Control	...	...	...	2
4442	Control Barrel	...	...	...	6
4143	Nipple for Bowden Control	...	...	...	2

SCREWS.

Screw 166	Screw securing Pick-up Terminal	...	...	...	2
" 175	IBA Spindle Screw (Small Taper,	...	...	...	3
" 191	Screw Securing C.B. Spring	...	...	...	2
" 193	Safety Gap Screw	...	...	...	2
" 219	Hollow Wick Screw	...	...	...	2
" 271	Cam Housing Fixing Screw	...	...	...	2
" 278	Contact Breaker Fixing Screw	...	...	...	3

When ordering spare parts state the Type and Serial No of the Magneto, the direction of rotation as viewed from the driven end, and the part No. required.

Unless you already have an account with us, orders should be accompanied by cheque or postal order.

and H.T. cable and plug should be verified carefully before dismantling the magneto in any way. Bad starting and also poor slow running may be due to a partially choked jet or petrol system, to air leaks in the induction system at flanges or induction pipe unions, or to worn inlet valve guides. Bad starting will also occur if the plug points are set too wide, or if the plug is sooted or dirty, either externally or internally. It should, however, not be assumed, because a plug sparks satisfactorily when out of the cylinder, that it will do so when fitted into place. There is really only one satisfactory test for a plug, i.e., comparison with another one known to be in order.

A good way of discriminating between faults in the magneto and the rest of the circuit is to hold the end of the high tension wire about $\frac{1}{64}$ -in. from the plug terminal, while the engine is running slowly, or if it refuses to start, while it is revolved by means of the starting handle, motor or kick starter. If a bright spark is visible the magneto is certainly not at fault.

Should this test shew the magneto to be defective the contact breaker should be examined in the first instance. See that the contact faces are clean, that the tappet which operates the contact breaker is not sticking in its guide, and that the points open the correct distance under the action of the cam. Make certain also that the screw fastening the contact breaker to the armature is tight, as this screw carries current, and if loose will give a bad connection.

If no fault can be found in the contact breaker, remove the pick-up terminal, and examine this carefully to see if there is any sign of sparking over, or through, the insulation of which it is composed. If no spark can be obtained from the pick-up terminal, but can be obtained from the slip ring itself a fault in the pick-up is indicated. To check this it is best to remove the magneto from the engine, and rotate the spindle sharply by hand while a screwdriver with a wooden handle is placed in the terminal hole with the blade resting on the metal, and the points from $\frac{1}{8}$ -in. to $\frac{3}{16}$ -in. from the metal segment of the slip ring.

If no spark can be obtained the defect is an internal one in the armature or slip ring, although this is unlikely as the tests which these parts undergo at our Works are far more severe than any conditions likely to be met in service.

If this investigation does not show up the cause of the trouble the machine should not be further dismantled, but should be sent back to the Works or nearest Service Depot for repair. Addresses of the principal Service Stations will be found on the cover of this booklet.