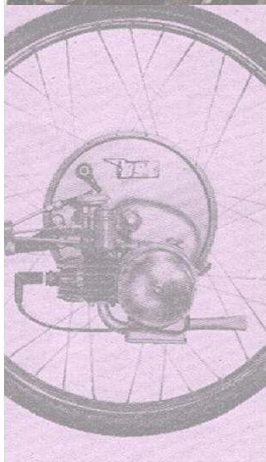


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# POWER PAK

*HAND BUILT 49 C.C. BICYCLE MOTORS*

## instruction book

R. G. SINCLAIR.

Date 25<sup>TH</sup> OCTOBER, 1969...

No. ....



Do not attempt to fit or ride the machine  
without thoroughly reading this book.

**You are earnestly requested  
to carefully read this booklet  
in order that you may obtain  
maximum performance and  
pleasure from your Power  
Pak Motor.**

## FOURTH EDITION

### Applicable for Engine Nos. from 2700

THE ENGINE NUMBER MUST ACCOMPANY ALL ENQUIRIES.

This number is stamped on the side of the Crankcase immediately below the Casting number- 1/178, opposite the Petrol Tap.

### INDEX

INTRODUCTION	...	...	...	...	...	2
WORKING INSTRUCTIONS	...	...	...	...	...	2
FILLING UP INSTRUCTIONS	...	...	...	...	...	3
STARTING INSTRUCTIONS	...	...	...	...	...	4
MAINTENANCE	...	...	...	...	...	5
FITTING INSTRUCTIONS	...	...	...	...	...	8
FAULT FINDING	...	...	...	...	...	13
DATA SHEET	...	...	...	...	...	Inset
SPARES LIST	...	...	...	...	...	18

The 'POWER PAK' Bicycle Motor is designed and built with a view to motorising the bicycle in a simple and economical way. The motor does not cause the cyclist any inconvenience whatsoever, and as the bicycle is not fundamentally altered it can be used at any time as a standard pedal cycle, retaining all the advantages thereof (e.g., pedalling in cold weather in order to keep oneself warm).

With regard to the fixing of the motor on to the bicycle, its working and maintenance, this will be an easy matter providing one observes the few simple rules as given in this booklet.

### WORKING INSTRUCTIONS

Every 'POWER PAK' Bicycle Motor is individually tuned and set before leaving the factory. It should therefore NOT be necessary to make any further adjustments, other than given herein.

Before using your 'POWER PAK'ED' Bicycle, re-check the following items :

Is the Motor in the correct position, with a clearance of  $\frac{1}{8}$  in. between the tyre and the Driving Roller, or does it require an Extended "L" Bracket? (See fitting instructions, page 10, marked \*).

Re-check the Decompressor and Carburettor Slide adjustments (page 12, marked \*).

Re-check the position of the Carburettor Jet Needle (page 15, marked \*).

Re-check the fitting of the Silencer (page 9, marked \*).

The three main subjects which should be given careful attention are :—

(a) CARBURATION AND IGNITION.

These subjects are extensively dealt with under the heading of 'Fault Finding,' also in the Maintenance Instructions.

(b) DECARBONIZING.

This subject is very important and is also extensively dealt with under the heading "Maintenance every 1,000 Miles," also under the heading "If the Motor Lacks Power."

(c) TYRE MAINTENANCE.

1. The only tyre now recommended for use with the Power Pak is the Dunlop Motorette (one of these is issued with every motor). In conjunction with this tyre it is strongly advisable to fit an inner tube with a schraeder type valve so that you can test the air pressure in the tyre and you will be able to use the air pump at any filling station. Your gauge-set should be used when checking the clearance of  $\frac{1}{8}$  in. between the Driving Roller and the Tyre. This check should be made in several positions round the tyre. At the first sign of "slip" check that your Motor is correctly fitted (re the  $\frac{1}{8}$  in. clearance) and immediately pump the tyre. The tyre should be pumped daily to a pressure of 50 to 60 lbs. per square inch. Equip yourself with an air pressure gauge.

2. The wheel must be TRUE. This can be checked by rotating the wheel, making sure that the distance between the Driving Roller and the tyre is the same ALL THE WAY AROUND THE TYRE; also the wheel must not be twisted or buckled.
3. The distance between the Driving Roller and the wheel must be  $\frac{1}{8}$ -inch. This is approximately the thickness of two unworn halfpennies, which should JUST pass through. See Fitting Instructions. Check frequently.
4. From the rear view the Motor MUST be horizontal, so that the Driving Roller and the wheel form a perfect T. See Fitting Instructions.
5. The Tyre MUST be kept inflated VERY HARD. Check frequently.

After some running, serations may appear across the tyre. This is caused by the Driving Roller (R. Fig. 2) gripping the tyre, and should not be mistaken for "Tyre Wear." If however, the rear wheel is not running at right angles to the Driving Roller, considerable tyre wear may occur.

It is necessary that the cyclist should keep in mind the fact that his motorised bicycle is not a motor cycle and should therefore not be subjected to excessive strain. When travelling over bad roads, the speed should be reduced accordingly, and the cyclist's full weight put on the pedals.

The Motor is bench driven and tested before delivery, but needs to be RUN IN. Therefore, one should take great care for the first 350 miles, not to travel at high speeds (a top speed of 20 m.p.h. is recommended) and not to STRAIN the motor in any way. This is achieved by assisting the Motor with pedalling WHENEVER it may appear necessary (e.g., low speeds and hill climbing). If these instructions are conscientiously observed during the running in period, your Motor will be exceedingly robust, powerful and reliable.

### FILLING UP INSTRUCTIONS

Turn off the Petrol Tap. Fill the tank with a mixture of petrol and recommended lubricating motor oil in the following proportions: one part oil to sixteen parts of petrol, which is equal to half a pint of oil to one gallon of petrol.

NOTE.—The Tank Filler Cap capacity is 1 oz. Therefore use 5 measures of oil to half a gallon of petrol. These proportions MUST be maintained.

Do NOT add 'a little more for luck' as it is equally harmful to add "too much" oil as it is to add "too little."

The petrol and oil should be mixed in a CLEAN container and filtered before pouring into the Tank.

ONLY use the following recommended oils:—

Castrol XL	Energol SAE 30
Essolube 30	Double Shell
Mobiloil A	

## STARTING INSTRUCTIONS

Rock the Motor, to mix petrol and oil. Turn on the Petrol Tap. If the Motor is cold close the Choke (V Fig. 2) and/or "tickle" the Carburettor Plunger. It is up to the individual driver to find the best method for easy starting, using either the Choke or the Carburettor Plunger, or a combination of the two, bearing in mind that more choking is required in colder weather.

Note.—Overchoking and flooding may cause oiling Plugs.

Engage the Lever (K Fig. 3) in the Driving Notch (Q Fig. 3).

Mount the bicycle, place the Control Lever in the "Decompressor" position (right-hand direction). In this position the Decompressor Valve (located at the underside of the Cylinder Head) opens, thus releasing the compression and facilitating easy pedalling when starting the Motor. This becomes easier when the Motor has been well run in.

Note.—The Control Lever is for "Finger Tip" handling, and should NOT be used with force.

Still holding the Control Lever in the Decompressor position, pedal the bicycle until speed has been gathered, a matter of a few yards. Move the Control Lever to the "Half Throttle" position (left-hand direction). The Motor will commence running. CONTINUE TO PEDAL BRISKLY until you are SURE that the Motor is running smoothly. When the motor is warm this should only need one or two BRISK revolutions. When cold, however, more assistance may be necessary.

Speed may now be controlled entirely by the Control Lever. It should only be necessary to travel a short distance with the Control Lever in the Decompressor position. The Motor is highly sensitive to the throttle and after a little practice it will be appreciated that very low speeds can be maintained without lifting the Decompressor Valve which should be used ONLY for the purpose of starting and stopping. If the Decompressor Valve is used for slowing down, the braking power of the Motor is entirely lost and the rider becomes solely dependent upon the brakes of the bicycle.

Note.—A loud hissing noise is heard when the Decompressor Valve is in use.

After travelling a short distance, open the Choke. If the Motor falters, again close the Choke for a further short period. Use of the Choke should be restricted to a minimum.

Once the driver has got the "feel" of the throttle he will find that a high performance is obtained WITHOUT using "full throttle." In order to obtain peak petrol consumption, the Throttle Control should be "nursed."

## To Stop.

Move the Control Lever to the Decompressor position and apply the brakes. When the Motor is not in use, turn off the Petrol Tap.

## MAINTENANCE

Oil the Control Cables frequently.

Inspect the Crank Case End Cap (O Fig. 1) for signs of leaks and tighten if necessary.

Keep rear tyre inflated VERY HARD.

Inspect frequently the Crankcase Roller Housing and the grooves of the Driving Roller (R Fig. 2), and keep them clean.

Inspect frequently the Engine Barrel Cooling Fins, and remove any mud, etc.

The following maintenance work should be carried out only by skilled operators and preferably by approved 'POWER PAK' dealers.

It may be found necessary to re-adjust the Decompressor Control Inner Cable, in order to take up "stretch." This is done as follows:—

Place the Control Lever in the "Full Throttle" position. Release the Cable Securing Screw (X Fig. 3), pull the Cable through the Decompressor Clip until the Decompressor Valve is on the point of opening, but NOT open. Re-secure the screw (X). Where a Cable Adjuster is fitted, this should be used for the FINAL adjustment only.

## After the First 250 Miles ONLY.

Check and if necessary adjust the Magneto Contact Breaker Points.

For Engines fitted with Wico Magneto : See separate lighting coil data sheet— Paragraphs headed "Checking the points gap" and "To set the points."

Engines fitted with other types of Magnetos : rotate the Flywheel in a clockwise direction, and observe the contact breaker points closing, and subsequently opening. When the points are in their MAXIMUM OPEN position, check and set to .015 inch. In all cases re-check the gap after locking. Hereafter check every 5,000 miles as per maintenance instructions.

Check Cylinder Head Nuts, and where necessary, tighten same. Beware of using brute force.



## Every 1,000 Miles.

Repeat the aforementioned instructions.

Remove the Sparking Plug, clean and inspect the gap between the points (correct setting .022 inch to .025 inch).

Remove the Cylinder Head and decarbonize same, using a blunt scraping tool. Take care to remove all the carbon from the Decompressor Valve and its vicinity. The continual pressure of the Decompressor Clip may create a "burr" on the extreme end of the Decompressor Valve. This "burr" must be removed before dismantling the Valve. Use a fine file. Remove the Split Pin retaining the Decompressor Valve. Dismantle the Decompressor Valve and thoroughly clean both seatings with petrol using a soft brush. If necessary reseal the Decompressor Valve using a small quantity of FINE Grinding Paste. Thoroughly wash with petrol before refitting.

Decarbonize the head of the Piston. Remove the Cylinder Barrel and carefully clean all carbon deposits from the CUTAWAY SECTION and the bore of the Exhaust Port. Carefully remove the Piston Rings. Clean all carbon deposit from the Rings and the Piston Ring Grooves. Note.—If the Piston Ring Grooves are damaged in ANY WAY WHATSOEVER, the performance of the Motor will deteriorate. A broken piece of ring is the best tool for cleaning the Ring Groove. Beware of scraping the "edges" of the Grooves. When re-assembling, fit the Rings in their respective Grooves. Piston Rings MUST be free fitting in the Grooves and must not "stick." Assure that all parts are thoroughly clean before refitting. When refitting the Cylinder Barrel the Piston Rings must locate so that the Pegs in the Piston Ring Grooves are situated in the Piston Ring Gap.

If the Piston is removed from the Connecting Rod for decarbonizing, after re-assembling, remove the End Cap (O Fig. 1) and thoroughly inspect the Circlip retaining the Big End Bearing, to ascertain that any side thrust from the Connecting Rod has not dislodged the Circlip from its groove, fractured or broken same. In addition, if the Connecting Rod is removed when decarbonizing, on re-assembly the Circlip MUST be correctly seated. If it is not CORRECTLY SEATED there is a danger of it coming off and breaking up, and the resultant pieces passing down the transfer port, causing great damage to the Piston and Barrel, making these parts unserviceable. When you are SURE the Circlip is correctly seated in its groove, LIGHTLY squeeze with a pair of pliers.

When fitting this Circlip, only open just sufficient to clear the Throw-Pin. If the Circlip is over-stretched, it will not remain in the groove, therefore DO NOT STRETCH.

The correct tool for this operation is "Circlip Pliers, Type S.E.S.", obtainable from Messrs. Automotive Engineering Co. Ltd., of The Green, Twickenham, Middlesex.

If the Needle Rollers (Part No. 169) need replacing, a full set must be used, as these are matched. Also, the Big End Outer Track and Inner Track must be used as a pair.

Note.—Use a new gasket when refitting the Cylinder Barrel or the Crankcase End Cap. Only use 'POWER PAK' Gaskets, which are obtainable from your local 'POWER PAK' Dealer.

Whilst jointing compound is not recommended, if used, only use VERY sparingly.

Great care must be taken at all times not to SCRATCH or DAMAGE any of the machined parts.

When re-assembling the Cylinder Head, the nuts should be tightened gradually and progressively. Re-check the nuts when the Motor is warm. Beware of brute force.

Examine the Driving Roller position (R Fig. 2) and when necessary re-adjust giving a clearance of  $\frac{1}{8}$ -inch from the tyre, as per fitting instructions.

Thoroughly clean the Carburettor Float Chamber. Inspect the Jet before re-assembling and blow out if necessary, e.g., with a bicycle pump. Assure, when refitting the Carburettor Float Chamber Top, that the needle is seating correctly.

Check tightness of all nuts and bolts. Beware of brute force.

### **Every 2,000 miles.**

Repeat aforementioned instructions.

Dismantle and thoroughly clean the Exhaust Silencer; all apertures must be free from carbons.

### **Every 5,000 miles.**

#### **● See additional instructions for Synchronomatic Drive.**

Check, clean and re-adjust the Magneto Contact Breaker Points, as per instructions for the first 250 miles. To remove the Magneto Flywheel, anchor the Crankshaft by placing a bar between the Driving Roller and the rear end of the Crankcase in order that the Driving Roller will NOT turn. Remove the Holding Nut by turning in anti-clockwise direction. To fit the Magneto Flywheel EXTRACTOR (available on demand), screw the four screws EVENLY into the four threaded holes in the Flywheel, hold the Flywheel firmly, and turn the Centre Bolt of the Extractor in a clockwise direction. The Flywheel should then spring off. If not, LIGHTLY tap with a hammer. When refitting, make certain that the Woodruff Key is CORRECTLY seated in the keyway of the Crankshaft, also in the keyway of the Flywheel. Replace the Holding Nut and before finally tightening, place the bar between the Driving Roller and the FRONT of the Crankcase. Beware of brute force.

## ● See Amendments for Synchronomatic Drive

Insert, with a motor-cycle type grease gun three injections of grease, using the grease nipple situated on the underside of the Crankcase.

Note.—This instruction **MUST** be strictly observed as **OVERLOADING** the grease chamber is detrimental to the performance of the Motor and will dislocate the Engine Oil Seals.

Recommended greases :—

Castrolase Heavy.      Shell Retinax RB.  
Price's Belmoline C.    Mobilgrease No. 4.  
Esso Grease.

Remove the Crankcase End Cap (O Fig. 1), and thoroughly clean the Cap and the Crankcase Compression Chamber, using petrol and non-fluffy rag. Keep the Roller Bearing completely clean whilst carrying out this operation.

Inspect the Piston Rings, clean and replace when necessary.

### **Removal of Driving Roller.**

Remove the Magneto Flywheel as per Maintenance Instructions for 5,000 miles. Remove the Magneto Stator Plate, the Woodruff Key and the Wire Clip retaining the Magneto Timing Cam. Remove the Magneto Mounting Endplate. The Driving Roller is now visible. Remove the Split Pin and the Locking Washer from the Driving Roller Locking Screw. Unscrew the Locking Screw (a square key from an oxyacetylene bottle is an ideal tool). Using a flat-ended punch, tap the Driving Roller off the Shaft from the opposite side. Rotate the Driving Roller whilst doing this. The Magneto Timing Cam will be removed with this operation. When refitting, ascertain that the Driving Roller is fully "home." **FULLY TIGHTEN** and secure the Locking Screw. This is most important. When replacing the Magneto Timing Cam, it is most **IMPORTANT** that the small "nick" is correctly located in the groove which is cut in the Crankshaft. When refitting the Magneto Flywheel, see Maintenance Instructions for 5,000 miles.

### **Removal of Crankshaft.**

Do not attempt to remove the Crankshaft. This operation can only be carried out with the use of a press. Do not attempt to use a hammer or other means.

## **FITTING INSTRUCTIONS**

### **How to Fit the Motor.**

Before fitting the Motor, it is advisable to true the wheels, adjust the cones and the front steering column, in order to obviate any "play" in the bicycle. Well inflate the rear tyre. For convenience remove the saddle and the saddle pillar.

Fit the Carburettor as shown in Fig. 2, making sure that it is both horizontal and vertical.

Fit the Petroflex.

Fit the Carburettor Slide with the cut-away section facing the rear of the engine, making sure that the Jet Needle enters the Jet and that the Slide Guiding Groove is located by the Guide Screw. Do not loosen the Guiding Screw before fitting the slide. The Motor will not function correctly without this screw, as the Carburettor Slide will revolve.

\* Fit the Silencer, making sure that it is "well home" on the manifold and **TIGHTEN THE BOLT SECURELY.**

Note.—The Silencer should not actually touch the Carburettor.

Remove the Back Plate Securing Nuts and Bolts (A and B Fig 1) and fit the Rubber Tubes (C) to the rear bicycle forks, with the openings towards the inside.

Offer up the Motor to the bicycle forks, and mark the mudguard in line with the forward section of the Crankcase.

Remove the Motor and part the mudguard at this mark. The mudguard should be fitted snugly against the Crankcase in order to block the passage of water. To avoid "splashing" in wet weather, fit a deeply "Valanced Roadster" mudguard.

Remove the rear portion of the mudguard.

Remove the offside Spindle Nut (D Fig. 2), and the nut and washer (E Fig. 2) from the Motor Stay Rod (F). Fit the Motor Stay Rod (F) to the spindle, with the mudguard Stay Hole (G) to the rear (as shown in Fig. 1), using the appropriate fixing hole. The top hole to be used in conjunction with a 26-inch wheel, the bottom hole with a 28-inch wheel. For use with a 24-inch wheel the top hole should be used and it will be necessary to remove one inch of the threaded portion of the Stay Rod, and to add a further inch of thread thereto. Replace the spindle nut (D Fig. 2) finger-tight.

Hold the Motor in the fixing position with the Motor Stay Rod (F) entering into the Silentbloc Clip (N Fig. 2). This steadies the Motor whilst fixing.

Fit the Back Plate (J Fig. 3) by inserting the top bolt and tightening the Securing Nut (A) enough to hold the Motor in position.

Note.—If the protruding section of the Back Plate (J) will not enter between the bicycle saddle forks, an alternative Flat Back Plate, together with longer Securing Bolts (A & B), are available on demand.

Whilst the Motor fittings have been designed to facilitate all makes of bicycles, alternative arrangements may have to be found when the rear brake is of the caliper type with the cable down the centre of the forks. It sometimes occurs that a rear side-pull caliper brake touches the side of the Mounting Tray enough to make the brake-block foul the wheel. This can be overcome by removing this brake and refitting it in front of the bicycle forks. With this arrangement, anchor clips should be used.

★ It may be found impracticable to fit the Mounting "L" Bracket Assembly (P. Assembly) low enough to bring the motor to the correct position (described hereunder). An alternative assembly known as "Extended 'L' Bracket Assembly" is available for use in this case.

This Assembly is changed by removing the Mounting Tray Securing Screws (Part No. 109) and the two front Petrol Tank Securing Nuts. When using this Assembly it may be necessary to reset the Motor Stay Rod in order that it should not foul the Cylinder Head. Also ascertain that the front edge of the Crankcase does not touch the bicycle tyre when the Motor is engaged in the bottom Driving Notch. A small section may be filed away to clear, if necessary. In this position, the Petrol Tank Rear Securing Nut must not foul the tyre.

Lift the Motor to the vertical position and fit the bottom Back Plate Securing Bolt (B) finger-tight.

Lower the Motor with the Stay Rod (F) entering the Silentbloc Clip (N Fig. 2). Fit the Motor Stay Rod Top Washer and Securing Nuts (E).

★ The correct position for the Motor is :—

- (1) The cylinder is vertical when the Engaging Lever (K Fig. 3) is in the "drive" position, middle notch (Q Fig. 3), in the Engaging Gate (L). The Mounting Tray (P) will be horizontal as shown in Fig. 1.
- (2) When the Motor is in the "free" position—Engaging Lever (K) in the top notch of the Engaging Gate (L) as shown in Fig. 3—there MUST be  $\frac{1}{8}$ -inch clearance between the tyre and the Driving Roller (R) as shown in Fig. 2. Note.—This is approximately the thickness of two unworn halfpennies, which should JUST pass through.
- (3) From the rear view, the Motor must be horizontal. From this view the Carburettor must be vertical as shown in Fig. 2.

## DATA SHEET (STANDARD MODEL)

SINGLE CYLINDER 49 c.c. TWO-STROKE.

BORE—39 m.m.      STROKE—41 m.m.

NORMAL REVS.—3,000 r.p.m.

TOTAL WEIGHT (including Petrol Tank and Fittings), 22 lbs.

### CARBURETTOR

Needle Jet Size—Amal .106.

Normal Jet Needle Setting—2nd Groove from top.

Main Jet—No. 45.

Throttle Slide—No. 5.

### PISTON

Deflector Type.

Two Rings.

Ring Gap—Min. .008 inch.

Max. .015 inch.

### CONNECTING ROD

Small End—Bronze Bush Bearing.

Big End—Needle Roller Bearing.

### SPARKING PLUG

Size—14 m.m.

Gap—Min. .022 inch.

Max. .025 inch.

### PETROL

Consumption—200 m.p.g. at Cruising Speed.

Petrol/Oil Ratio—16 to 1 (1 Gal. Petrol to  $\frac{1}{2}$ -pint Oil).

### IGNITION

Flywheel Magneto.      Clockwise Rotation.

Contact Breaker Gap—.015 inch.

Ignition Advance—33°.

Note.—A small adjustment of the Ignition Timing is given by loosening the two screws securing the Stator Plate, through the Inspection Holes of the Magneto Flywheel, and then turning the Stator Plate in a clockwise direction to Retard and anti-clockwise to Advance. Re-tighten screws after setting.

### LUBRICATION OF BEARINGS

The Connecting Rod, Big End and Main Bearings are lubricated by the Petroil Mist.

The Driving Roller Housing Bearing is lubricated by grease (see Maintenance Instructions for 5,000 miles).

Gap between Driving Roller and Tyre— $\frac{1}{8}$ -inch (in disengaged position).

FIG. 1.

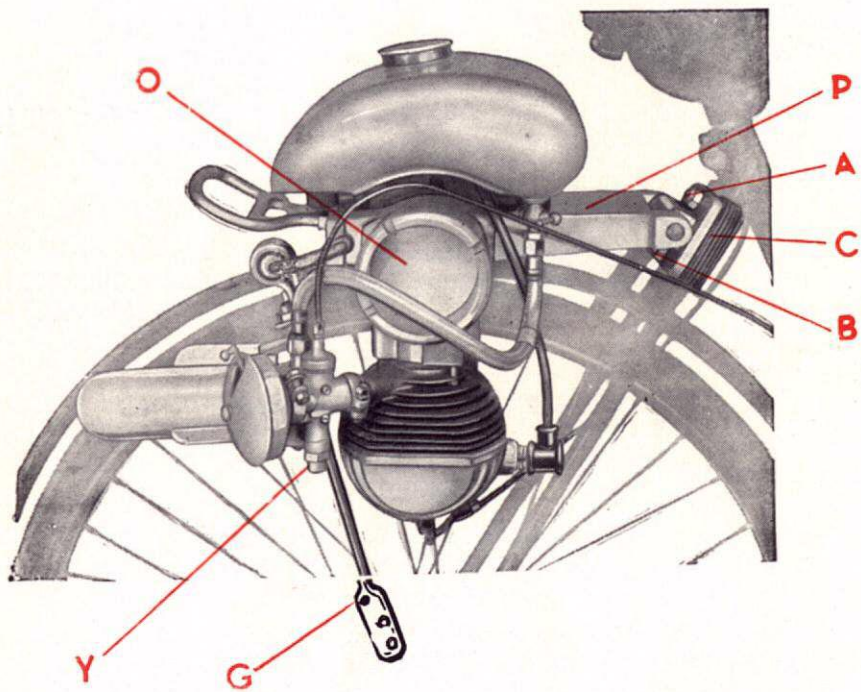


FIG. 2.

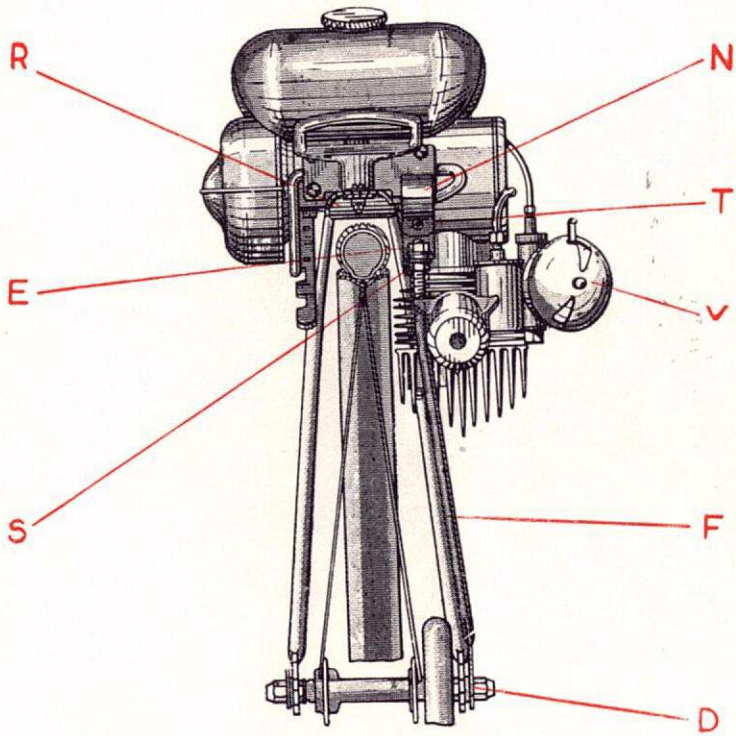
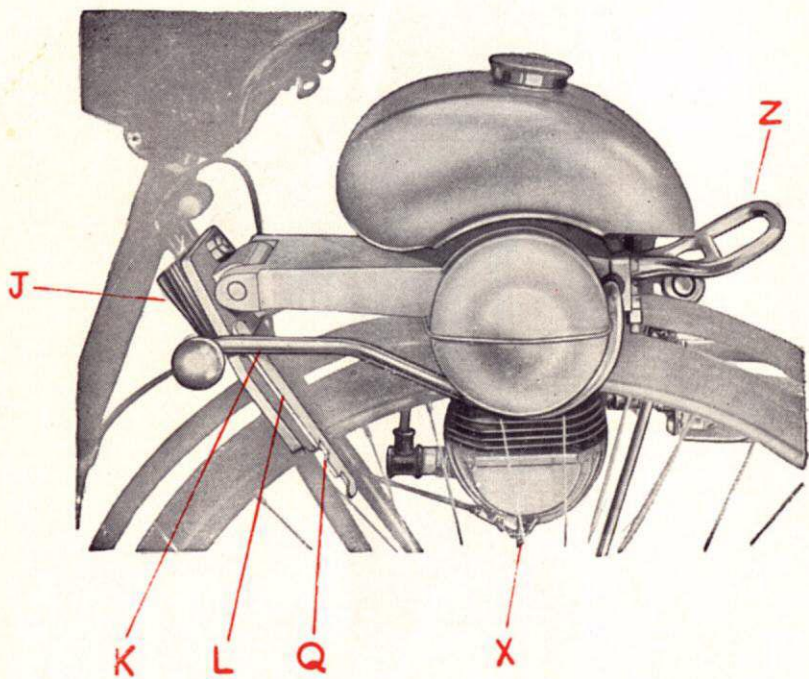




FIG. 3.



The lower driving notch is now no longer supplied

This position is achieved by adjusting the height of the front clamp together with the Stay Rod Securing and Locking Nuts (E and S). The Carburettor must always be both horizontal and vertical to avoid flooding. Furthermore, the clearance of  $\frac{1}{8}$ -inch between the Driving Roller (R) and the tyre, MUST be maintained.

When you are satisfied that the correct position has been achieved, tighten the Back Plate Top Bolt Securing Nut (A). Remove the Stay Rod Top Securing Nut and Washer (E). Lift the Motor into the vertical position and tighten the Back Plate Bottom Bolt Securing Nut (B). Lower the Motor into its previous position, replace the Stay Rod Washer and Nut (E) and tighten same. Tighten the Silentbloc Clip Securing Screw (T Fig. 2).

If it is not possible to achieve the VERTICAL position, use the Extended "L" Bracket Assembly.

### **To Fit the Rear Portion of the Mudguard.**

Cut away approximately 4 inches from the parted end. Drill two holes down the centre of the mudguard  $\frac{1}{2}$ -inch from the parted end,  $1\frac{1}{16}$ -inch apart, with  $\frac{5}{32}$ -inch drill.

Fit the rear Number Plate, e.g., picking up the two screws securing the mudguard to the mudguard stays. Note.—The Number Plate must be fitted in a position allowing the exhaust gases a free passage.

Fit the mudguard to the Rubber Hinge Mounting, using the Washers, Screws and Nuts as supplied. The mudguard should be fitted preferably below the Rubber Hinge Mounting. Fit the mudguard stays. If fitted to lugs, a hole is provided in the Motor Stay Rod Plate (G Fig. 1). In this case, it will be necessary to remove the mudguard stay and reset it to suit.

Note.—If the rear bicycle forks are of the bolted type, fit the mudguard stay behind the Motor Stay Rod Plate, which will then clear the bolt.

Tighten the spindle nuts and square up the rear wheel.

Fit the Control Lever on the nearside handlebar. THE FOLLOWING INSTRUCTIONS ARE ESSENTIAL.

#### **● See separate instruction for fitting Synchronomatic Drive Twistgrip.**

Level up the Control Cables from the Control Lever, towards the Motor, leaving sufficient play on the handlebars, so that the Cables are not stretched when turning. These Cables should be firmly secured to the DOWN TUBES of the bicycle, and along the CROSS-BAR in the case of Tandems. If fitted in these positions, there should be no necessity to alter the lengths of the Control Cables.

In order to obviate ALL movement of the Outer Cables, the Holding Clips or rubbers should be numerous on all bends and TIGHTLY secured

in such a way that the cable follows the angle of the bend. If the Outer Cables are allowed to move, the "adjustments" will continually alter.

Bending the Control Lever will result in breakage.

★ Check the Decompressor Control Inner Cable and readjust if necessary as per Maintenance Instructions.

The Decompressor Valve should NOT operate until the Control Lever is in the extreme Decompressor position (full right-hand direction).

Check the Carburettor Slide as follows : Remove the Carburettor and hold it as near as possible to the Cylinder Barrel Manifold in line with same, in an equivalent position as when normally fitted.

In this position observe the Carburettor Slide and "set" same by using the Carburettor Adjustor, so that the Slide JUST closes the aperture when the Control Lever is in the decompressor position (right-hand direction).

With this setting, the aperture should be completely open when the Control Lever is in the Full Throttle position (left-hand direction).

This position may be re-checked as follows :—

Place the Control Lever in the Full Throttle Position. Gently try to raise the Throttle Cable where it enters the Carburettor. Take up any slack by unscrewing the Carburettor Cable Adjuster. You are now assured that the Motor is functioning on Full Throttle. Now check that the Motor will run slowly. To do this, drive the machine and slowly close the Throttle. Just BEFORE the Decompressor Valve operates the Motor should cut out. If the Decompressor Valve opens whilst the Motor is still driving, lower the Carburettor Cable Adjuster until the desired setting is achieved, namely, that the Motor cuts out JUST BEFORE the Decompressor Valve opens.

Note.—If the position of the Control Lever is altered, re-check the Carburettor Slide setting, as described above.

Refit the saddle.

Replace the Engaging Lever (K) in the top notch of the Engaging Gate (L).

Note.—If any part of the Fixing Clamp comes into direct contact with the bicycle, vibration will be transmitted to the frame, and the benefit of the Rubber Mounting will be lost.

In wet conditions the Sparking Plug terminal should be turned so that the H.T. Lead enters the terminal from the underside.

If, when operating the Engaging Lever, this Lever appears to be a little too "stiff" for manipulating, the side pressure should be reduced. To do this, place the Engaging Lever in the bottom notch of the Engaging Gate, grip

the ball of the Engaging Lever, and slowly and firmly, pull it away from the engine, thus slightly off-setting same. Beware of "over-setting" as the Lever *must* engage securely in the top notch of the Engaging Gate.

## FAULT FINDING

### If the Motor will not Start.

Ensure that the petrol is reaching the Carburettor Float Chamber. To do this, remove Nut Y (Fig. 1) and turn on the Petrol Tap. The Petrol should then trickle out.

Check, and if necessary, clear the Air Vent Holes in the Petrol Filler Cap.

Remove the Petrol Jet and blow out (using a bicycle pump).

If this has not cured the trouble, remove the Petroflex, the Petrol Tap, and the Carburettor Float Chamber Top and thoroughly clean them. Note.—Clean the air vent hole in the Carburettor Float Chamber Top. Beware of brute force when refitting Nut Y.

Check that the Jet Needle Clip has not become dislodged or broken, and is correctly seated in the Jet Needle. Check that the Carburettor Slide Guide Screw is locating in the Carburettor Slide Groove and not allowing the Slide to revolve.

When you are sure that the trouble is not "carburation," proceed to check the spark between the Points of the Sparking Plug as follows:—

Remove the Sparking Plug from the engine, and the Terminal from the end of the H.T. Lead. Engage the Motor in the driving position, and lift the bicycle by the Rear Lifting Handle (Z Fig. 3). Hold the end of the H.T. Lead  $\frac{3}{16}$  to  $\frac{1}{4}$  of an inch away from the engine, and briskly rotate the pedals with the foot. A spark should then jump the gap between the H.T. Lead and the engine. The spark should be blue-white, and when firing, should crack sharply. A convenient way of carrying out this test, is to hold the H.T. Lead between the thumb and first finger of the hand which is holding the Handle, and before rotating the pedals, adjust the H.T. Lead so that it is  $\frac{3}{16}$  to  $\frac{1}{4}$ -inch away from the curved part of the Handle. In this position it will be quite easy to observe the full results of the test.

Some experience is necessary to know the difference between a GOOD spark and a POOR spark. The first indication of a poor spark is distinct traces of RED. A GOOD spark must jump at least  $\frac{3}{16}$  of an inch. Remember, a high quality spark is needed to fire the Sparking Plug UNDER COMPRESSION. Do not be misled by assuming that the spark you see jumping the Sparking Plug Points OUT of the engine is the same as when the Sparking Plug is operating under the compression of the engine. Under this condition, the spark needed is much greater.

If a satisfactory spark occurs, the fault lies either in the Sparking Plug Terminal or in the Sparking Plug itself.

If the spark is unsatisfactory, or no spark occurs, we give you hereunder six points to check. These tests should be made in the order they are given.

1. Make sure that the H.T. Lead is not damaged or chuffed, by closely examining same. Do not attempt to repair or add to this Lead, as once the coating is broken the insulation is lost and the voltage drops away.

The H.T. Lead of the Magneto is replaceable on motors after Engine No. 2900 and is carried out as follows, preferably by 'POWER PAK' Agents. Remove the Flywheel and Stator Plate Unit. Remove the two screws securing the metal Gland Cover (situated where the H.T. Lead enters the rear of the Stator Plate Unit). Remove the Gland Cover, the Gland, the Rubber Washer, the Fibre Collar and the H.T. Lead.

To refit the new H.T. Lead, slide the removed parts on to the Lead in the following rotation. Gland Cover, Gland, Rubber Washer and Fibre Collar. Press the Lead on to the protruding Coil Wire **MAKING SURE THAT THIS WIRE COMES INTO DIRECT CONTACT WITH THE H.T. LEAD WIRE** (and is not embedded in the insulating rubber). Slide the various parts back into position and re-secure the screws. Check this contact if the spark is poor or non-existent.

2. Remove the Magneto Cover, check and reset the Contact Breaker Points (as described in the Maintenance Instructions).
3. Clean the Contact Breaker Points as follows : Gently open the Points with a screwdriver. Damp a piece of non-fluffy rag (linen) in petrol and place this between the Points. Allow the Points to close, and withdraw the rag. Open the Points again and "blow out," making sure that no fluff has remained between them.
4. Remove the Magneto Flywheel (see Maintenance Instructions for 5,000 miles). Carefully examine the Woodruff Key (Part No. 160) for signs of shearing or breaking. At the slightest sign of shearing replace this Key.
5. Remove the Condenser. Remove the Plate situated immediately beneath the Condenser (where applicable). Remove the Rocker Arm and the Contact Breaker Points Assembly. Thoroughly clean the Contact Breaker Points with Petrol and, if necessary, reface same using a fine oilstone. Make sure to keep these faces absolutely square. Thoroughly clean ALL other "Contact" surfaces, using petrol and a fine file. Re-assemble all parts, making certain to replace the small washer each side of the fibre Rocker Arm. Make certain that the Coil Earth Connection is tight.

6. If the trouble is still not cured, alternately change the Condenser and the Coil.

### **If the Motor is Running Unfavorably.**

\* If the Motor falters, appears to be running weak or is slow to respond to the Throttle, raise the Carburettor Jet Needle one notch as follows: Place the handlebar Control Lever in the "Decompressor" position. Unscrew the Carburettor Mixing Chamber Top (where the Control Cable enters the Carburettor) and slide out the Carburettor Slide Assembly. Pull back the Slide Spring and take out the Jet Needle. Remove the Jet Needle Clip from the second notch from the top and replace it in the third notch from the top. Refit the Assembly, making sure to locate the Slide Guide Groove correctly in the Locating Screw. Re-check that the Carburettor Slide is correctly adjusted by using the Carburettor Adjustor as previously described on page 12.

Having carried out this alteration, a little more fuel will now enter the Mixing Chamber, but not enough to affect the "Miles per Gallon." If the Needle Clip is lowered unnecessarily, the mixture will be too rich and the Motor will tend to four-stroke and run unevenly.

If the Motor will only run with the Choke closed and will only start after flooding, in all probability the Main Jet is partly blocked. It sometimes occurs that a hair becomes lodged therein, which is not easily visible. To remove this obstruction, blow out the Jet, e.g., with a bicycle pump.

If the Motor is four-stroking or running erratically, check that the Carburettor is in a vertical position, as per Fitting Instructions. The Carburettor will flood if it is not in the horizontal and vertical position, when in the "driving position." Do not confuse these symptoms with the four-stroking which is caused by the lack of decarbonizing which is explained later. Check that the Jet Needle Clip has not become dislodged or broken, and is correctly seated in the Jet Needle. Check that the Carburettor Slide Guide Screw is locating in the Carburettor Slide Groove and not allowing the Slide to revolve.

In the case of **POOR MILES PER GALLON OR FLOODING**, thoroughly clean the Carburettor. Re-seat the taper of the Float Needle by entering it into the seating in the Float Chamber Cover, and rotate the Needle and Float **LIGHTLY**, clockwise and anti-clockwise between the thumb and forefinger. Make sure the Needle and the Float Chamber Cover form a perfect T whilst rotating. Check that the Jet Needle Clip has not become dislodged or broken and is correctly seated in the Jet Needle. Check that the Carburettor Slide Guide Screw is locating in the Carburettor Slide Groove and not allowing the Slide to revolve. Ascertain that the Petrol Filler Cap is screwed all the way down, so that the internal washer seals against the Tank Collar.

Re-check that the Motor is correctly fitted and if the Motor is sloping acutely towards the rear, use the EXTENDED "L" BRACKET ASSEMBLY (see Fitting Instructions).

Remove the Silencer and ascertain that the Exhaust Port is free from carbon deposit. This check is not necessary before 500 miles. If necessary, however, clean the Silencer and decarbonize as per Maintenance Instructions.

Note.—Oiling Sparking Plugs is not necessarily an indication of a flooding Carburettor, but in most cases this fault lies either with the Plug itself, or with the Magneto spark not being strong enough (as previously described).

If the recommended Sparking Plug becomes "oiled up," it should only be necessary to dip it in petrol, shake the surplus off, dry the centre electrode, check the gap (.022-inch to .025-inch) and refit. To clean "carboned" Sparking Plugs, sand-blast with garage equipment.

### **If the Motor Lacks Power.**

Check as above.

Ensure that the Sparking Plug is securely fitted (using a Sparking Plug Washer), and not leaking.

Inspect the joints between the Cylinder Barrel and the Crankcase, also the Crankcase End Cap (O) for leaks. Tighten where necessary.

Note.—When renewing, only use original 'POWER PAK' gaskets. Whilst jointing compound is not recommended, if used, only use VERY sparingly.

Check that the Decompressor Valve is seating correctly. To do this, place the Control Lever in the "half throttle" position, rotate the Magneto Flywheel in a clock-wise direction. If the Decompressor Valve is leaking, there will be an absence of compression and a hissing noise will be heard.

To cure this, remove the Cylinder Head, clean and reseal the Valve as per Maintenance Instructions for 1,000 miles.

Ascertain that the Motor does not need decarbonizing. A good indication will be obtained by removing the Silencer and inspecting the bore of the Cylinder Barrel Exhaust Manifold (from which the Silencer has been removed). This bore should NOT be smaller at its extreme end (Port End) and if it is so, or in any way blocked, the carbon deposit must be removed as per Maintenance Instructions.

A further indication of the necessity to decarbonize is as follows. After the Motor is warm, it may be found that the throttle needs to be continuously opened because, in any one position, the Motor will not run evenly but four-

strokes and runs erratically. This is temporarily cured when the throttle is opened a little further, but the trouble re-occurs after a short period of running. Check that the Piston Rings are not broken, are free fitting, and not "sticking" in their grooves.

The Big End Bearing has been manufactured to allow a good working tolerance. This will account for a slight "knock" when the bicycle is moved along with the Motor in the driving position. This "knock" is not detrimental to the functioning of the Motor.

If ANY Screws, Bolts, Pins, etc., are lost, ONLY replace with genuine 'POWER PAK' parts. The use of substitutes may be detrimental.

101	Engine Oil	101	Engine Oil
102	Spark Plug	102	Spark Plug
103	Valve Gear	103	Valve Gear
104	Valve Spring	104	Valve Spring
105	Valve Seal	105	Valve Seal
106	Valve Shim	106	Valve Shim
107	Valve Spring Retainer	107	Valve Spring Retainer
108	Valve Spring Retainer Pin	108	Valve Spring Retainer Pin
109	Valve Spring Retainer Lock Washer	109	Valve Spring Retainer Lock Washer
110	Valve Spring Retainer Lock Nut	110	Valve Spring Retainer Lock Nut
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200	Valve Spring Retainer Lock Nut	200	Valve Spring Retainer Lock Nut



## SPARE PARTS LIST

Please quote Part Number and Description.

Part No.	Description	Part No.	Description
98	Crankcase	138	Decompressor Valve Spring
99	Crankcase End Cap	139	Decompressor Valve Cap
99/B	Crankcase End Cap Securing Bolt	140	Decompressor Valve Split Pin
99/W	Washer for 99/B	141	Driving Roller
100	Crankcase End Cap Gasket	142	Driving Roller Locking Screw
101	Grease Nipple	143	Driving Roller Locking Screw Washer
102	Grease Nipple Washer	144	Driving Roller Locking Screw Split Pin
103	Engine Stud	145	D.R.H. Main Bearing
104	Rear Handle	146	D.R.H. Mild Steel Washer (where applicable)
105	Rear Handle Securing Screw	147	D.R.H. Oilseal (large)
106	Washer for 105	148	D.R.H. Oil Seal Housing (where applicable)
107	Rubber Packing Piece for 104	149	D.R.H. Large Circlip
108	Mounting Tray	150	D.R.H. Distance Collar
109	Mounting Tray Securing Screw	151	Magneto (see also dealer's list)
110	Washer for 109	152	Magneto Retaining Screw
111	Mounting 'L' Bracket	153	Washer for 152
112	Hinge Pin	154	Magneto Holding Nut
113	Taper Pin for 112	155	Magneto Mounting Endplate
114	Engaging Gate	156	Magneto Mounting Endplate Felt Washer
115	Engaging Gate Packing Piece	157	Magneto Mounting Endplate Retaining Screw
116	Rivet for 115	157/P	Magneto Mounting Endplate Locating Pin
117	Mounting Backplate	158	Magneto Timing Cam
117/F	Flat Mounting Backplate	159	Magneto Timing Cam Circlip
118	Mounting Backplate Securing Bolt	160	Woodruff Key
118/X	Extended Bolt for 117	161	Crankcase Main Bearing
119	Nut for 118	162	Crankcase Mild Steel Washer
120	Rubber Stay Tubes	163	Crankcase Oilseal
121	Cylinder Barrel	164	Crankshaft
122	Cylinder Barrel Gasket	165	Big End Bearing Outer Track
125	Cylinder Head	166	Big End Bearing Inner Track
126	Cylinder Head Securing Nut	167	Big End Bearing Thrust Washer ('O' Type)
127	Washer for 126	168	Big End Bearing Thrust Washer ('D' Type)
128	Cylinder Head Cable Holding Clip	169	Big End Bearing Needle Rollers
129	Securing Rivet for 128	170	Big End Bearing Small Circlip
130	Decompressor Clip	171	Connecting Rod
131	Decompressor Clip Pivot Pin	172	Little End Bearing
132	Split Pin for 131	173	Piston
133	Decompressor Clip Cable Holding Nipple	174	Piston Ring
134	Cable Securing Screw for 133	175	Piston Ring Peg
135	Decompressor Tension Spring	176	Piston Gudgeon Pin
136	Decompressor Valve		
137	Decompressor Valve Seat		





**Do not misplace this book, as you may need to refer to it in the future. Any problem with which you are faced should be solved for you herein. Please take advantage of this, and assure yourself many happy Power Pak'ed miles.**

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