OPERATING & MAINTENANCE MANUAL

FOR THE

Spryt

ENGINE
KICK START
. MARK II .

Manufactured by
BROCKHOUSE ENGINEERING
(Southport) LTD.
CROSSENS
SOUTHPORT
ENGLAND

OPERATING AND MAINTENANCE MANUAL

for the **Spryt** ENGINE

KICK START MARK II.

This book has been prepared for the information and guidance of all owners of a "SPRYT" engine.

Each engine has been carefully tested and adjusted before it leaves the Factory, and will operate efficiently and economically for long periods.

The book is divided into three sections :

(1) General information regarding the principles of operation and design.
(2) Running instructions
(3) Spares List.

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GENERAL INFORMATION

The engine is a single cylinder air cooled two-stroke of 98 c.c. nominal capacity.

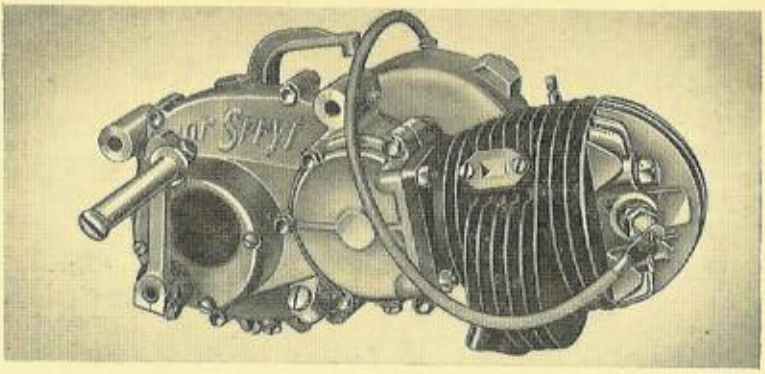
The two-stroke cycle, as the name suggests, has two strokes to a working cycle. In the first stroke the piston compresses the charge of air and fuel into the clearance space where it is ignited. During this stroke a fresh charge of air and fuel is drawn into the crankcase from the carburetter. In the second, or working, stroke the piston is forced downward by the pressure generated by the burning gases. Just before the end of this stroke the exhaust ports are uncovered in the wall of the cylinder by the downward moving piston, allowing the burnt gases to escape. At the same time the transfer ports are uncovered to allow the fresh charge already partially compressed in the crankcase, to be transferred to the cylinder. The new charge of air and fuel is prevented from escaping back through the carburetter by the skirt of the piston covering the inlet. The inlet port is therefore only open towards the top of the stroke and the exhaust port towards the bottom of the stroke.

This type of engine has several advantages over the usual type of four-stroke engine. The chief being :—

1. One working stroke to each revolution instead of one working stroke to every two revolutions as in the four stroke engine. This gives a more even torque and allows the two-stroke engine to be made much smaller than a four-stroke engine of corresponding horsepower.

2. There are no valves, the only moving parts being the piston, connecting rod and crankshaft. The engine is therefore very simple in construction and reliable in operation.

3. Lubrication is simpler, more reliable and efficient.



GENERAL DESCRIPTION OF ENGINE

With a volumetric capacity of just over 98 c.c. this two-stroke engine is probably one of the most efficient of its type. The excellent power output obtained is due to the admirable arrangement for gas flow and turbulence, resulting from the design of cylinder ports. A deep finned cylinder barrel of cast iron in conjunction with an aluminium alloy cylinder head also deeply finned, gives adequate heat radiation. Combustion takes place in the chamber formed by the convex dome of the piston and concave space in the head, this permits the high compression ratio of 6.25 : 1 to be employed. The resulting high temperature on the piston is kept to a minimum by passing the cool transfer gases over the underside of the domed crown. To enable this arrangement to be carried out satisfactorily, the aluminium alloy piston has a long skirt with transfer ports in the walls ; these are connected with integrally cast flow passages in the cylinder itself. Shaped deflector blocks fitted to the cylinder transfer passages give efficient gas turbulence in addition to a very effective scavenging action to expel exhaust gases.

The high-grade forged steel connecting rod, hardened and ground in the bores, is mounted to the piston gudgeon pin on a fully floating phosphor bronze bush. The other end is ground to form the outer

race of the fabricated big-end roller bearing, composed of alternate steel and phosphor bronze rollers running on the hardened and ground crank pin. The high tensile steel crankshaft runs in ball journal bearings mounted in one side of the crankcase, with the crankpin being a force fit in the crankshaft web. The volumetric capacity of the crankcase, always of importance with two-stroke petrol engines, has been carefully calculated in the design of the crankcase cover. Since the crankcase is the intermediate receptacle for the next charge of gaseous fuel, the moving parts therein are always subjected to the oil mist provided by the engine oil in the fuel mixture. The crankcase half carrying the crankshaft ball journal bearings is also one half of the primary drive chaincase. The crankshaft passes through this and also through the chaincase cover, with the primary drive sprocket mounted inside the chaincase and the flywheel magneto on the outside of the chaincase cover at the extreme end of the crankshaft. Oil seals are provided on the crankshaft to prevent loss of gas from the crankcase and also loss of oil from the chaincase into the flywheel magneto.

KICK START MECHANISM.

The engine has a kick start mechanism of the quadrant type. This design has the great advantage that while the engine is running the kick start is disconnected from it. The kick start lever is attached to a gear cut quadrant which will mesh with a gear mounted breaker on the clutch shaft and connected to it by a ratchet. The lever is returned to the riding position by means of an external spring. The lever must be depressed by a small amount to engage the quadrant with the gear wheel. If the lever is depressed further the engine will be rotated, and assuming the mixture and spark to be correct, it will start. As soon as the engine turns over under its own power, the ratchet disconnects the kick start mechanism from the moving parts of the engine. The lever will then return to the riding position and can be folded up. A free engine dog clutch is provided so that the engine may be disconnected from the load while it is started, or at any other suitable time.

LUBRICATION

Lubrication of the engine proper is by the petroil system—twenty-five parts of petrol and one part of oil, which should be well mixed before filling the tank. Never pour the oil directly into the petrol in the tank. If the engine has been stationary for several days the tank should be shaken to ensure a good oil distribution throughout the petrol. The oil mist is carried with the petrol through the carburettor into the crankcase where it lubricates all the moving parts. It will be seen that while the engine is running, the oil mist is retained and no further lubrication of this part of the engine is required.

The kick-start mechanism and the primary chain *i.e.*, the chain from the crankshaft to clutch, is run in an oil bath which can be filled and drained by the plugs provided.
The amount required is $\frac{1}{8}$ of a pint.
The correct oil to use for engine and primary chain :—

Castrol XXL
or Double Shell
,, Energol SAE 60
,, Mobiloil D
,, Essolube 40

On the Wico Pacy Magneto occasionally oil the pad 43-55, plate 8, which is covered by the breaker box cover 2074C, plate 8.

IGNITION.

The ignition system consists of a Wico Pacy flywheel magneto running at engine speed and a 14 m.m. sparking plug K.L.G. FE 70. The rotation is anti-clockwise and the spark should be timed to occur $\frac{3}{16}$" before top dead centre. No advance or retard is provided with this engine. A 6-volt lighting coil is incorporated with the magneto with a normal output of 9-watts A.C. The spark gap of the plug should be set at .018" (eighteen thousands of an inch).

CARBURETTER.

The carburetter is the type AMAL 259 with a normal jet size of 55.

CLUTCH

The clutch is of the single plate type, the frictional material being cork. This unit is mounted in the chaincase and runs in oil.

RUNNING INSTRUCTIONS

To start the engine :—

1. Shake tank to ensure an even oil distribution.
2. Open the petrol tap.
3. Flood the carburetter by pushing down the spring-loader plunger, on the top of the float chamber, until fuel is seen to drip from the bottom of the carburetter.
4. Close the choke-slide which restricts the flow of air through the carburetter. This is done by lifting up the choke lever.
5. Free the engine by pulling out the dog clutch.
6. Depress the kickstart lever until the quadrant engages the pinion, open the throttle a little and smartly depress the lever to spin the engine.
7. When the engine starts allow the kick start lever to return to the position of rest under the action of the spring.
8. When the engine has been running for a few seconds, open the choke slide. The speed of the engine is controlled entirely by throttle opening. If the engine is warm there is no need to use the choke or flood the carburetter. CARE should be taken not to flood the carburetter as a flooded engine will result and the engine will not start.
9. Withdraw the clutch and engage the free engine dog clutch.
10. Slightly engage the clutch and at the same time increase the throttle opening so that the engine takes the load gently.
11. Before stopping the engine cut off the petrol supply and allow the engine to run until the carburetter is emptied. This is not necessary where the engine is in constant use.

ADJUSTMENTS—Locating and Rectifying Possible Faults.

1. Failure to start

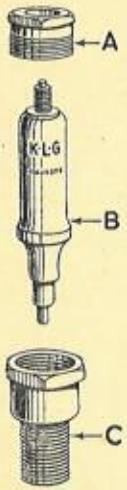
(*a*) NO PETROL.

Flood the carburetter by depressing the plunger 14/031, Plate 7. If the fuel drips from the bottom of the carburetter, petrol is flowing from the tank to the jet 4/042, Plate 7. If no petrol appears, clean out—

(i) the pipe from the tank to the carburetter.

(ii) the float chamber of the carburetter ensuring that no dirt is preventing the needle from dropping. Unscrew the plug 259/071, Plate 7, and clean the jet 4/042, Plate 7.

(*b*) FAULTY IGNITION due to a defective plug or to dirty magneto contact points. Remove the plug, replace the high tension lead and hold the plug sideways in contact with the cylinder head, rotate the engine. If a blue spark of fair intensity occurs the ignition system is satisfactory. If no spark occurs, remove the high tension lead and hold the end of it about $\frac{1}{8}$" from the cylinder head and rotate the engine. If a spark occurs the plug is faulty and should be cleaned as follows :—



Unscrew the gland nut A and remove the centre electrode B, clean this electrode with a petrol-soaked rag to remove any oil or carbon deposits. The body C should be scraped with a penknife or a small file and washed in petrol. Re-assemble the plug, reset the spark gap to the correct amount of .018" by bending the outside electrode. Never bend the central electrode. Test as before.

If no spark is observed from the high tension lead, check the magneto contact points. If they are dirty clean with petrol. Ensure they are opening to the correct gap of .015". The gauge should just slide between the points when they are fully open.

(c) WRONG MIXTURE.

The mixture is either too strong or too weak. If the carburetter has already been flooded the cause is most probably too strong a mixture. To correct this remove the drain plug BES.889, Plate 4, in the crankcase portion, empty any liquid out and replace the plug.

2. **Falling off in Performance.**

Raise the needle 259/070, Plate 7, *i.e.*, move spring clip 161/054, Plate 7, to a lower groove. This gives a richer mixture.

3. **Excessive petrol consumption.**

Lower the needle 259/070, Plate 7, *i.e.*, move spring clip 161/054, Plate 7, to a higher groove. This gives a weaker mixture.

NOTE.—The spring clip is normally engaged with the second groove from the top and the standard jet is No. 55. If the adjustment of the needle does not produce the required results, then it may be that the jet has worn and a new one is required.

4. **Erratic Running.**

This may be due to several causes :—

(i) too rich a mixture

or

(ii) too weak a mixture. Correct as before ;

and

(iii) the spark occurs too early or too late. Check the timing of the engine.

(iv) Dirty or pitted contact breaker points. Clean or trim with magneto file.

(v) Dirty sparking plug. Clean as described above.

TIMING AND MAGNETO.

Remove the cover plate to expose the contact breaker. Loosen the three bolts $\frac{1}{4}$" B.S.F. holding the magneto on to the adaptor BES.915, Plate 9. The magneto body can now be turned within a limited range. The contact points should just be breaking when the piston is $\frac{3}{16}$" before T.D.C. The gap between the points

should be checked with a feeler gauge of .015" when fully open. When this setting has been obtained the three bolts should be locked and the cover replaced. If the gap is incorrect loosen the contact locking screw 47-55, Plate 9, and turn the eccentric headed screw until the gap is 0.15" (fifteen thousandths of an inch) when fully open and then retighten the locking screw.

The above method of retiming necessitates the removal of the cylinder head. An alternative method of finding an approximate position is by having the H.T. lead at the top (the drain plugs should be at the bottom when the engine is mounted in a horizontal position) and the bolts holding the magneto to the adaptor plate BES.915, Plate 8, are in the centre of the slots.

DECARBONISING.

When the engine has been used for a considerable period of time, about 100 hours, an appreciable amount of carbon will have formed in the clearance space in the cylinder head under the piston rings and in the ports of the cylinder. This carbon deposit greatly reduces the efficiency of the engine and must be removed. To do this the engine need not be completely stripped, only the cylinder head, cylinder and piston need be taken off. The procedure is as follows :—

1. Remove the carburetter by loosening the Clip 52/083, Plate 7, and pulling off.
2. Remove the exhaust pipe fittings.
3. Remove KLG spark plug.
4. Remove cylinder head BES.904, Plate 2, which is held in position by four bolts, BES.901, Plate 2, fitted with plain and spring washers.
5. Remove the cylinder BES.891, Plate 2, held by four nuts BES.900, Plate 2. The deflector blocks BES.894 and 895, Plate 2, and induction stub BES.3471, Plate 2, should now be removed.
6. Remove the circlips BES.828, Plate 3, and gently knock out the gudgeon pin BES.826, Plate 3. Remove the piston BES.823, Plate 3.

7. Remove the piston rings if they are to be replaced. Scrape the carbon from :—

(i) the inside of the cylinder head.

(ii) the walls of the ports in the cylinder.

(iii) the top of the piston.

(iv) the grooves in the piston for the rings if the rings are to be replaced by new ones.

An old knife makes an excellent scraper for this work. Great care MUST be taken not to damage the metal or the sealing faces, this is very important in the case of the cylinder head and piston as they are made of aluminium alloy which scratches easily. Polish the faces of the deflector blocks after removing the carbon from them. Re-assemble in the following order :—

(i) fit the induction stub and deflection blocks to the cylinder. The deflector blocks MUST be replaced in the same position as they were before being removed.

(ii) if the piston rings have been removed fit them to the piston taking care not to expand them more than is necessary.

(iii) replace the piston on the connecting rod BES.834, plate 3, and push in the gudgeon pin. Replace the circlips.

(iv) there is a stop pin in the grooves of the piston to prevent the rings rotating and the ring must be so positioned that the small gap left when closed, coincides with the pin. After the rings have been positioned gently slide the cylinder on to the piston. A chamfer on the bore of the cylinder guides the piston in and closes the piston rings up as the piston advances. If necessary the piston rings may be compressed by the ends of the fingers to ensure easy assembly.

(v) Replace the nuts BES.900, Plate 2, and tighten the cylinder down. Fit the cylinder head and screw down.

STRIPPING.

Instructions are given here for stripping and reassembling the engine, but it should be emphasised that this action should only be undertaken if absolutely necessary. The engine is assembled and checked before it leaves the Factory and will run for sustained periods with complete satisfaction. If, however, the wear in the piston or clutch pad, etc., becomes excessive, it will be necessary to strip the engine to replace the worn parts.

TO DISMANTLE ENGINE.

1. Drain off the oil from the primary chaincase by removing BES.889, Plate 4.

2. Remove the carburatter by loosening the clip 52/083 Plate 7, and pulling off.

3. Remove the lead from the magneto to the spark plug.

4. Unscrew the three screws BES.874, Plate 5, holding the clutch bridge BES.1076, Plate 5, and lever BES.1083, Plate 5. Turn the engine upside down and shake out the $\frac{3}{16}$" dia. balls and push rods BES.856 and BES.1080, Plate 6.

5. Remove the magneto cover. Remove the cheese headed screw and washer holding on the timing bush of the magneto. Remove the screw 55-55, Plate 8, spring washer, lock plate and the cam 17-55, Plate 8. Remove the three $\frac{1}{4}$" B.S.F. magneto fixing screws and pull off the front portion of the magneto.

6. Remove the circlip retaining the sliding dog BES.1053 Plate 5, on the clutch shaft BES.1075, Plate 6. Remove this dog.

7. Remove this circlip retaining the final drive sprocket BES.1078, Plate 5, on the clutch shaft BES.1075, Plate 6. Remove the final drive sprocket and the 22 needle rollers.

8. Remove the special screw BES.1060, Plate 4, holding the kick start spring BES.1074, Plate 4.

9. Remove the kick start lever BES.1064, Plate 4, held in position on serrations by a $\frac{1}{4}$" B.S.F. screw.

10. Remove the kick start housing cover BES.1058, Plate 4, held by two screws BES.1059, and one screw BES.1942, Plate 4.

11. Remove the nut BES.854, Plate 4, and tab washer BES.3472, Plate 4.

12. Remove the kick start housing BES.1057, Plate 4, together with the ratchet boss BES.1055, Plate 4. Remove the kick start quadrant BES.1056, Plate 4.

13. Remove the kick start pinion BES.1054, Plate 4, and the ratchet spring BES.1077, Plate 4.

14. Remove the magneto flywheel locknut BES.917, Plate 3, and the flywheel. An extractor may be necessary for this operation and should be screwed on the threaded portion of the centre boss. This thread is $\frac{7}{8}$" dia. x 26 T.P.I.

15. Remove the adaptor plate BES.915, Plate 8, held by four 2 B.A. screws.

16. Remove the chaincase cover BES.916, Plate 5, held by five bolts $\frac{1}{4}$" B.S.F. and two screws $\frac{1}{4}$" B.S.F. This cover is sealed with a gasket. Two grooves are provided so that the casings can be levered apart without damaging the faces. During this operation knock the clutch and clutch shaft out of the chaincase cover BES.916, Plate 5, by small amounts to keep the crankshaft sprocket BES.870, Plate 5, and the teeth of the clutch in line so that the chain is not damaged.

17. Lift the clutch off the chain and remove it. The clutch can be stripped by removing the four screws holding the springs in position, and tapping out the shaft BES.1075, Plate 6.

18. Remount the flywheel on the crankshaft to prevent the crankshaft turning whilst loosening the nut BES.872, Plate 5. Remove the flywheel.

19. Remove the K.L.G. spark plug.

20. Remove the cylinder head BES.904, Plate 2, which is held in position by four bolts BES.901, Plate 2, fitted with plain and spring washers.

21. Remove the cylinder BES.891, Plate 2, held by four nuts on studs. The deflector blocks and induction stub can now be removed. Care MUST be taken in replacing the deflector blocks in the same position as they were before being removed.

22. Remove the crankcase cover BES.876, Plate 4, held by five bolts $\frac{1}{4}$" B.S.F. x 1" long, and remove the nut BES.872, Plate 5. Remove the washer BES.871, Plate 5.

23. Gently knock out the crankshaft BES.1231, Plate 3. The gudgeon pin BES.826, Plate 3, is held in position by two circlips BES.828, Plate 3.

TO RE-ASSEMBLE THE ENGINE.

Reverse the procedure used to dismantle. Faces which have been sealed either with gaskets or sealing compound must be sealed again with any proprietary sealing compound. The engine must be carefully re-timed; read the instructions given previously under the heading "Timing and Magneto."

SPARE PARTS LIST

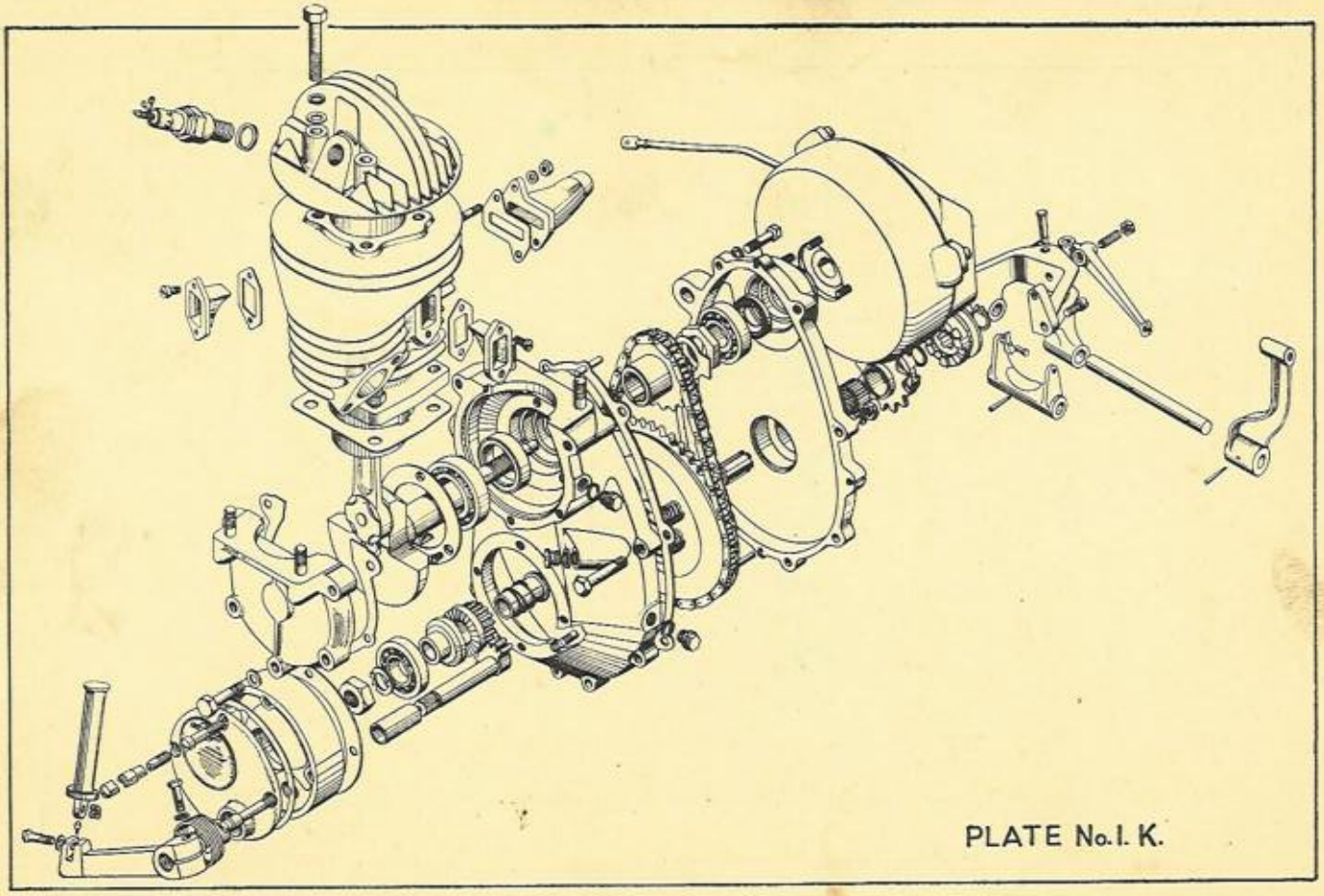


PLATE No. I. K.

HOW TO ORDER SPARE PARTS

If when ordering spare parts you will follow the instructions given below, it will enable our Service Department to give you a quicker and better service. These requirements are essential.

1. State the full serial number of the engine, including the letters appearing both before and after the number.

2. Give the description (or name) and the number of the part.

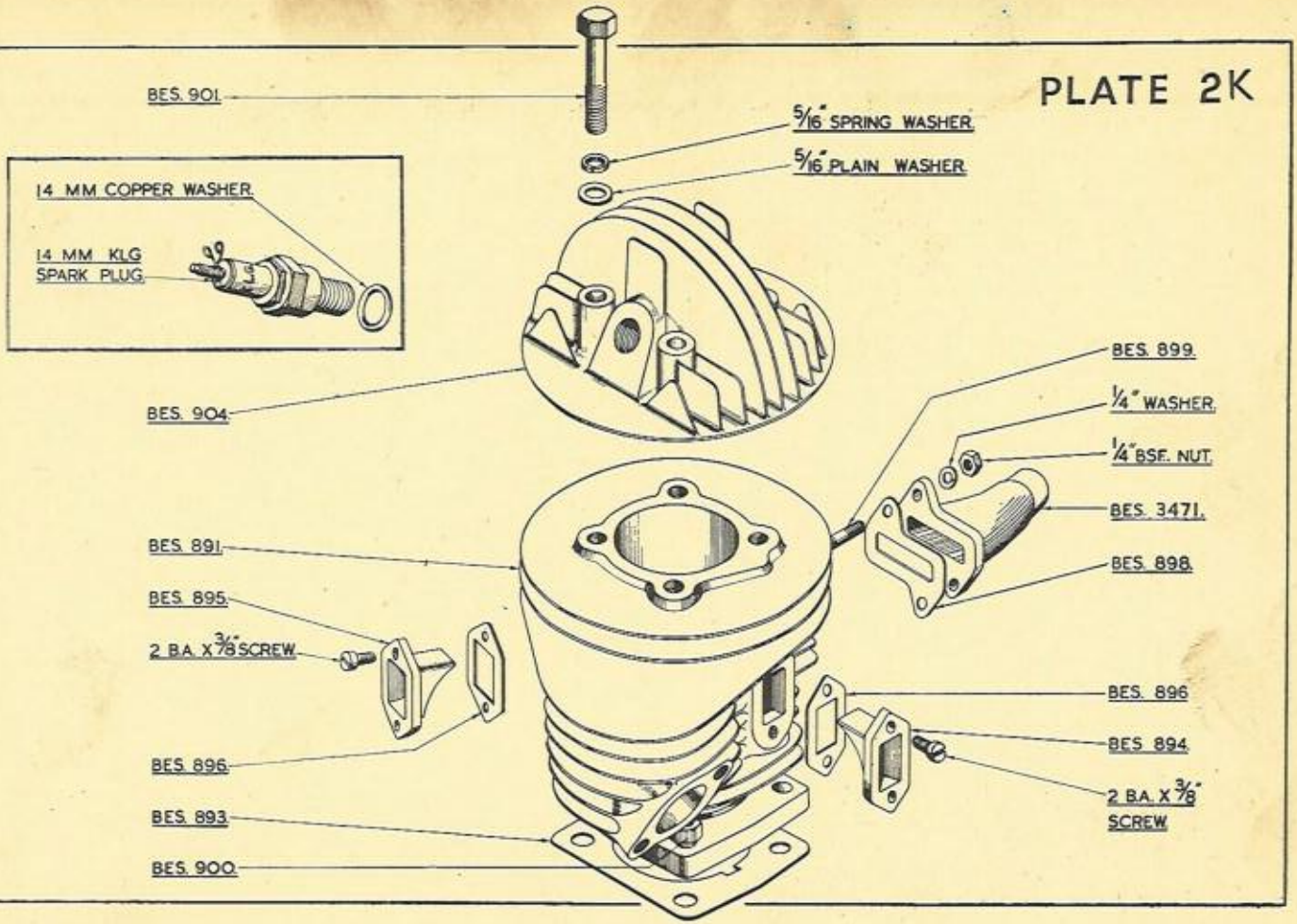
3. State the quantity required.

4. State how we are to despatch, *i.e.*, by Air Mail, Passenger Train, etc. Give your full address.

5. Send cash with order for the parts required, togetner with sufficient money to cover the cost of despatch by the service requested in item 4.

NOTE. In some cases it may be necessary for us to supply additional related parts especially if the part ordered is obsolete.

PLATE 2K


BES. 901
5/16" SPRING WASHER
5/16" PLAIN WASHER
14 MM COPPER WASHER
14 MM KLG SPARK PLUG
BES. 904
BES. 899
1/4" WASHER
1/4" BSF. NUT
BES. 3471.
BES. 898
BES. 891
BES. 895
2 B.A. X 3/8" SCREW
BES. 896
BES. 893
BES. 900
BES. 896
BES. 894
2 B.A. X 3/8" SCREW

CYLINDER GROUP

Item	Description.	No. Off
BES. 891	Cylinder	1
BES. 893	Cylinder joint washer	1
BES. 894	Transfer block (bottom)	1
BES. 895	,, (top)	1
BES.896	,, joint washer	2
BES.3471	Induction pipe	1
BES. 898	,, gasket	1
BES. 899	,, studs $\frac{1}{4}$" B.S.F. × $1\frac{1}{16}$" long ...	2
BES. 900	Cylinder Nut	4
BES. 901	,, head bolt	4
BES. 904	,, head	1
	2 BA. × $\frac{3}{8}$" screw	4
	$\frac{1}{4}$" BSF. nut...	2
	$\frac{1}{4}$" plain washers	2
	$\frac{5}{16}$" ,, ...	4
	$\frac{5}{16}$" spring washers	4
	14 mm. copper washer	1
	14 mm. spark plug, KLG. FE/70	1

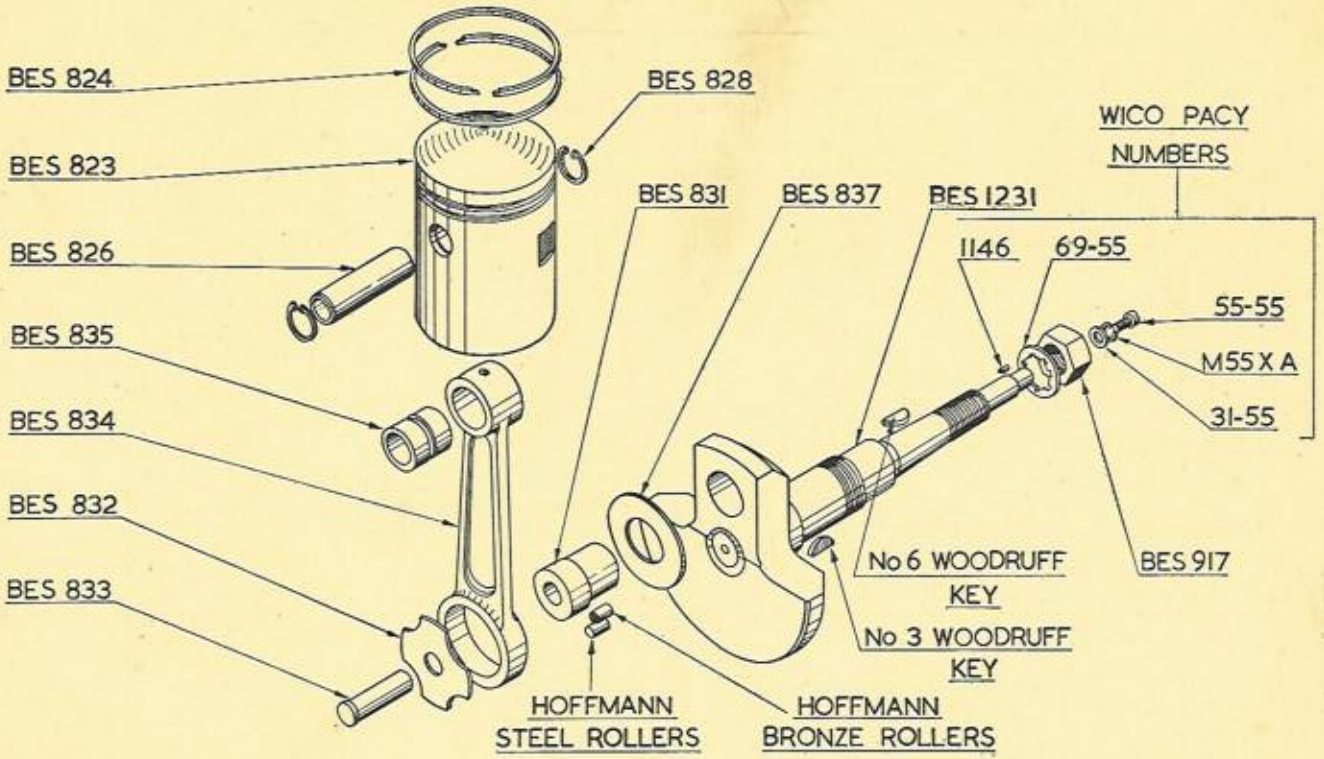

BES 824
BES 828
BES 823
BES 826
BES 835
BES 834
BES 832
BES 833
BES 831
BES 837
BES 1231
WICO PACY
NUMBERS
1146
69-55
55-55
M55 X A
31-55
BES 917
No 6 WOODRUFF
KEY
No 3 WOODRUFF
KEY
HOFFMANN
STEEL ROLLERS
HOFFMANN
BRONZE ROLLERS

PLATE No. 3. K.

CRANKSHAFT AND PISTON

Item	Description	No. Off
BES. 823	Piston	1
BES. 824	Piston rings	2
	Oversize rings	
BES. 826	Gudgeon Pin	1
BES. 828	Circlip	2
BES. 831	Crank Pin	1
BES. 832	Retaining washer	1
BES. 833	Rivet (special)	1
BES. 834	Connecting rod	1
BES. 835	Small end bush	1
BES. 837	Crankshaft cheek washer	1
BES. 1231	Crankshaft	1
BES. 917	Nut ¼" × 26 T.P.I.	1
1146	No. 6 Woodruff Key	1
	Hoffmann steel rollers	8
	Hoffmann bronze rollers	8
	No. 3 Woodruff key	1
	No. 6 Woodruff key	1
31-55	3 BA. Plain washer	1
M 55XA	3 BA. spring washer	1
55-55	3 BA. screw	1
69-55	Spring washer	1

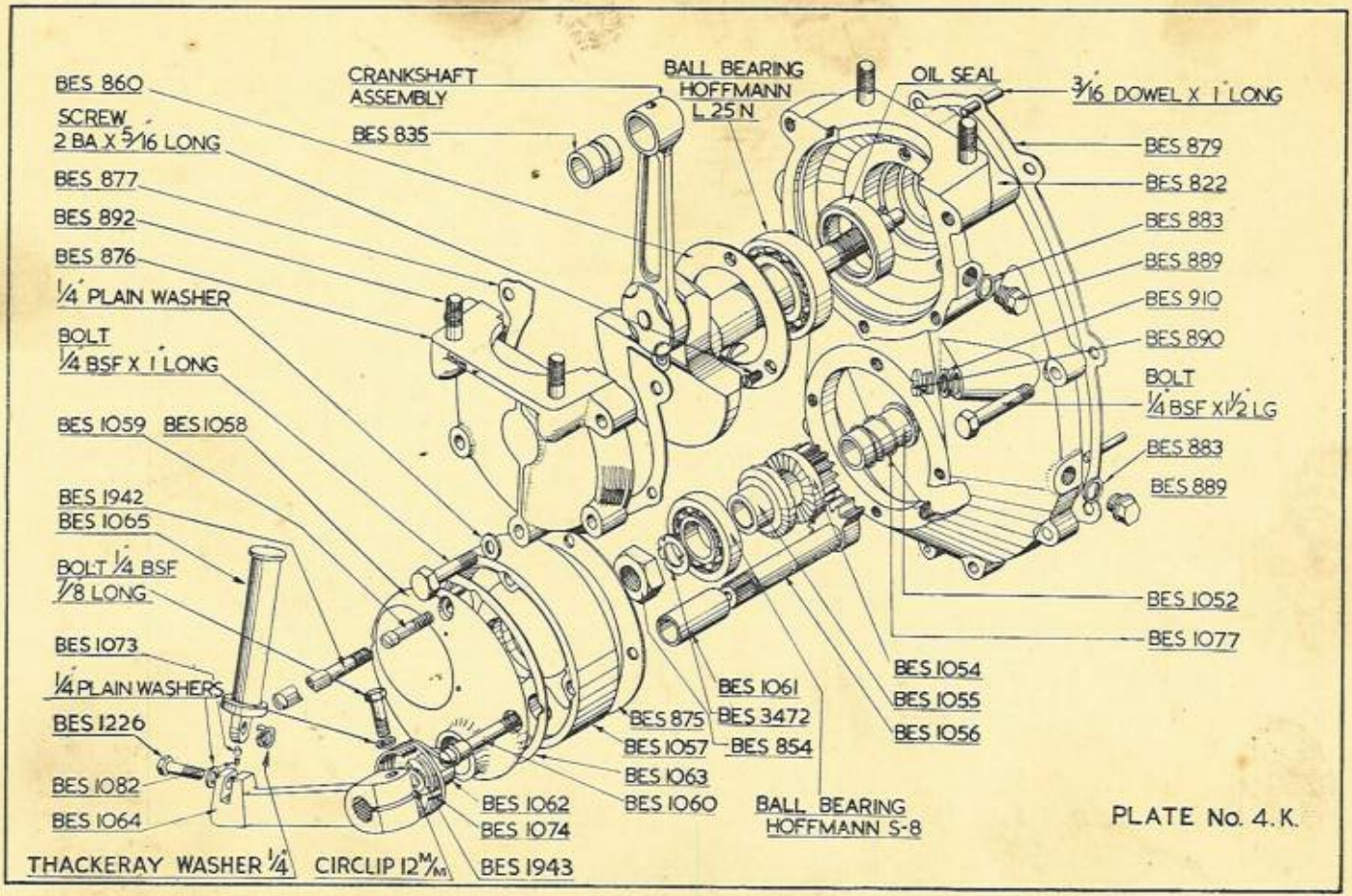

BES 860
SCREW 2 BA X 5/16 LONG
BES 877
BES 892
BES 876
1/4 PLAIN WASHER
BOLT 1/4 BSF X 1 LONG
BES 1059
BES 1058
BES 1942
BES 1065
BOLT 1/4 BSF 7/8 LONG
BES 1073
1/4 PLAIN WASHERS
BES 1226
BES 1082
BES 1064
THACKERAY WASHER 1/4
CIRCLIP 12 M/M
CRANKSHAFT ASSEMBLY
BES 835
BALL BEARING HOFFMANN L.25 N
OIL SEAL
3/16 DOWEL X 1 LONG
BES 879
BES 822
BES 883
BES 889
BES 910
BES 890
BOLT 1/4 BSF X 1 1/2 LG
BES 883
BES 889
BES 1052
BES 1077
BES 1054
BES 1055
BES 1056
BES 1061
BES 3472
BES 854
BES 875
BES 1057
BES 1063
BES 1060
BES 1062
BES 1074
BES 1943
BALL BEARING HOFFMANN S-8

PLATE No. 4.K.

CHAINCASE - CRANKSHAFT HALF

Item	Description	No. Off
BES. 822	Chaincase—Crankshaft half	1
BES. 835	Small end bush	1
BES. 854	Clutch shaft nut	1
BES. 860	Ball race retaining plate	1
BES. 875	Bearing cap gasket	1
BES. 876	Crankcase cover	1
BES. 877	Crankcase cover gasket	1
BES. 879	Chaincase cover gasket	1
BES. 883	Washer for drain plug	2
BES. 889	Drain plug	2
BES. 890	Filler plug	1
BES. 892	Cylinder stud	4
BES. 910	Filler plug washer	1
BES. 1052	Kick start pinion bush	1
BES. 1054	Kick start pinion	1
BES. 1055	Ratchet boss	1
BES. 1056	Kick start quadrant	1
BES. 1057	Kick start housing	1
BES. 1058	Kick start housing cover	1
BES. 1059	Kick start housing securing screw	2
BES. 1060	Kick start housing securing screw	1
BES. 1061	Kick start housing bush	1
BES. 1062	Kick start housing cover bush	1
BES. 1063	Kick start housing cover gasket...	1
BES. 1064	Kick start lever	1
	Thackeray washer	1
	Seegar Circlip 12 mm. external	1
BES. 1065	Kick start pedal	1
BES. 1074	Kick start spring	1
BES. 1077	Ratchet spring	1
BES. 1942	Kick start stop pin	1
BES. 1082	Kick start ball spring	1
BES. 3472	Tab washer	1
	2 B.A. Screw × $\frac{5}{16}$" long...	3
	Bolt $\frac{1}{4}$" B.S.F. × $1\frac{1}{2}$" long	5
	Bolt $\frac{1}{4}$" B.S.F. × 1" long	5
	Bolt $\frac{1}{4}$" B.S.F. × $\frac{7}{8}$" long	1
BES. 1226	Bolt $\frac{1}{4}$" B.S.F. × $\frac{3}{4}$" long	1
	$\frac{1}{4}$" plain washer	6
	$\frac{3}{16}$" dowel × 1" long	2
	Ball Journal Bearing Hoffman S8	1
	Ball Journal Bearing Hoffman L25N	1
	Oil Seal ($1\frac{1}{4}$" bore × $1\frac{3}{8}$" o/dia. × $\frac{5}{16}$" long) ...	1
	Crankshaft Assembly, see Plate 3	
BES. 1073	Kick Start Plunger	1
BES. 1943	Washer	1

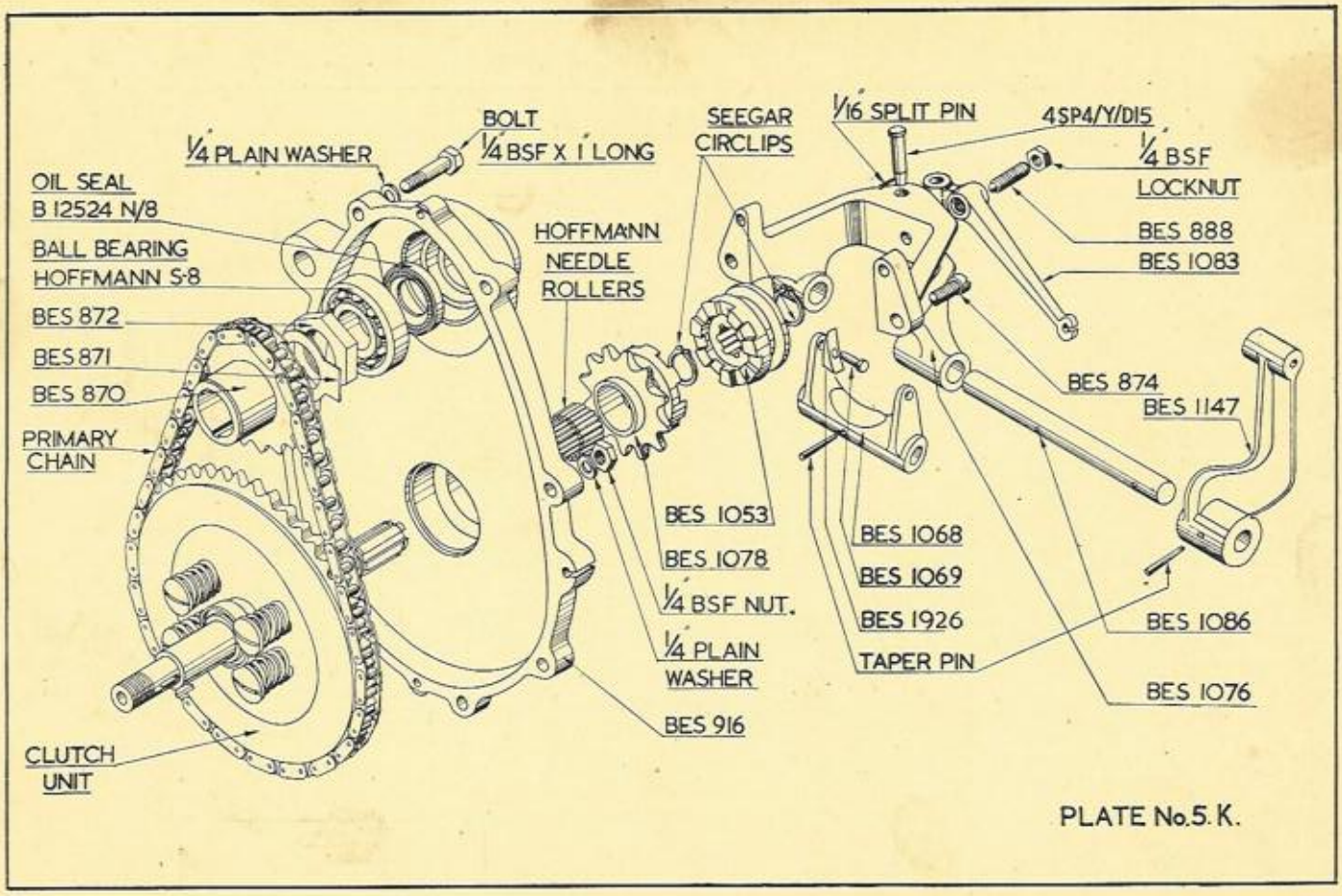

BOLT
¼ BSF X 1" LONG
¼ PLAIN WASHER
OIL SEAL
B 12524 N/8
BALL BEARING
HOFFMANN S-8
BES 872
BES 871
BES 870
PRIMARY CHAIN
CLUTCH UNIT
HOFFMANN NEEDLE ROLLERS
SEEGAR CIRCLIPS
BES 1053
BES 1078
¼ BSF NUT.
¼ PLAIN WASHER
BES 916
1/16 SPLIT PIN
4SP4/Y/D15
¼ BSF LOCKNUT
BES 888
BES 1083
BES 874
BES 1147
BES 1068
BES 1069
BES 1926
TAPER PIN
BES 1086
BES 1076

PLATE No.5.K.

CHAINCASE COVER

Item	Description	No. Off
BES. 870	Crankshaft drive sprocket	1
BES. 871	Tab washer	1
BES. 872	Crankshaft nut	1
BES. 874	Clutch bridge screw	3
4SP4/Y/D15	Fulcrum pin	1
BES. 888	Adjusting screw	1
BES. 916	Chaincase cover	1
BES. 1053	Sliding dog	1
BES. 1068	Operating fork	1
BES. 1069	Roller pin	2
BES. 1926	Shoes	2
BES. 1076	Clutch bridge	1
BES. 1078	Final drive sprocket	1
BES. 1083	Clutch operating lever	1
BES. 1086	Operating spindle	1
BES. 1147	Operating lever	1
	Bolt $\frac{1}{4}$" B.S.F. × 1" long	2
	Nut $\frac{1}{4}$" B.S.F.	5
	Plain Washer $\frac{1}{4}$"	7
	Seegar Circlip	2
	Hoffman needle rollers 2.5 mm. dia.	22
	$\frac{1}{16}$" dia split pin	1
	Primary chain, 56 pitches—$\frac{3}{8}$" pitch × .225 wide.	1
	Oil seal. B12524 N/8	1
	Ball journal bearing Hoffman S8	1
	Taper Pins 1" long × $\frac{5}{32}$" dia.	2
	Clutch unit, see Plate No. 6	

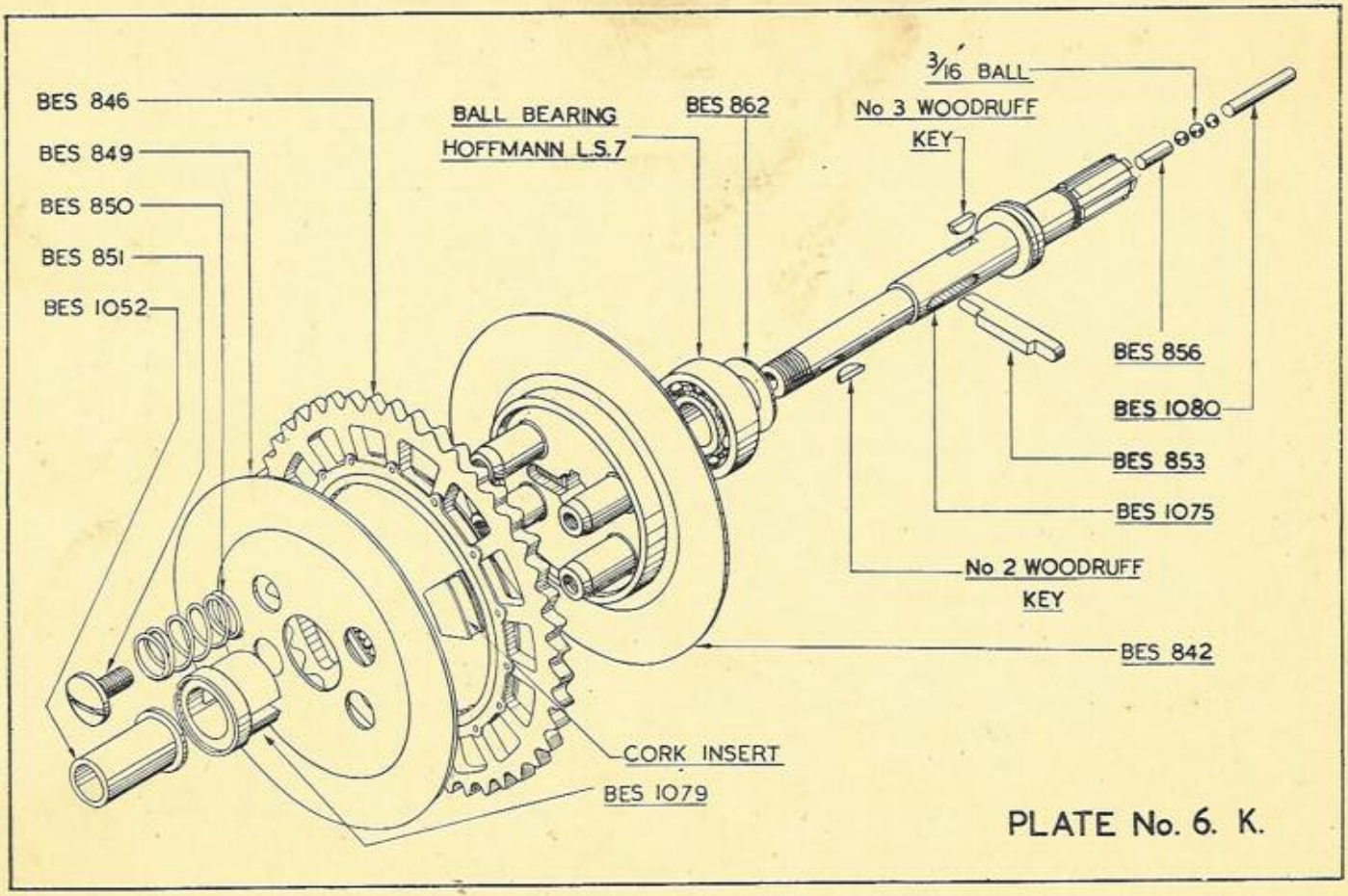

BES 846
BES 849
BES 850
BES 851
BES 1052
BALL BEARING
HOFFMANN L.S.7
BES 862
3/16 BALL
No 3 WOODRUFF
KEY
BES 856
BES 1080
BES 853
BES 1075
No 2 WOODRUFF
KEY
BES 842
CORK INSERT
BES 1079

PLATE No. 6. K.

ALBION CLUTCH

Item	Description	No. Off
BES. 842	Driven clutch plate	1
BES. 846	Driving sprocket	1
BES. 849	Sliding clutch plate	1
BES. 850	Clutch spring	4
BES. 851	Clutch spring screw	4
BES. 853	Cross piece	1
BES. 856	Push rod, short	1
BES. 862	Washer	1
BES. 1052	Kick start pinion bush	1
BES. 1075	Clutch shaft	1
BES. 1079	Distance bush	1
BES. 1080	Push rod, long	1
	Cork inserts	15
	No. 2 Woodruff key	1
	No. 3 Woodruff key	1
	$\frac{3}{16}$" dia. steel balls	3
	Ball bearing Hoffmann L.S. 7	1

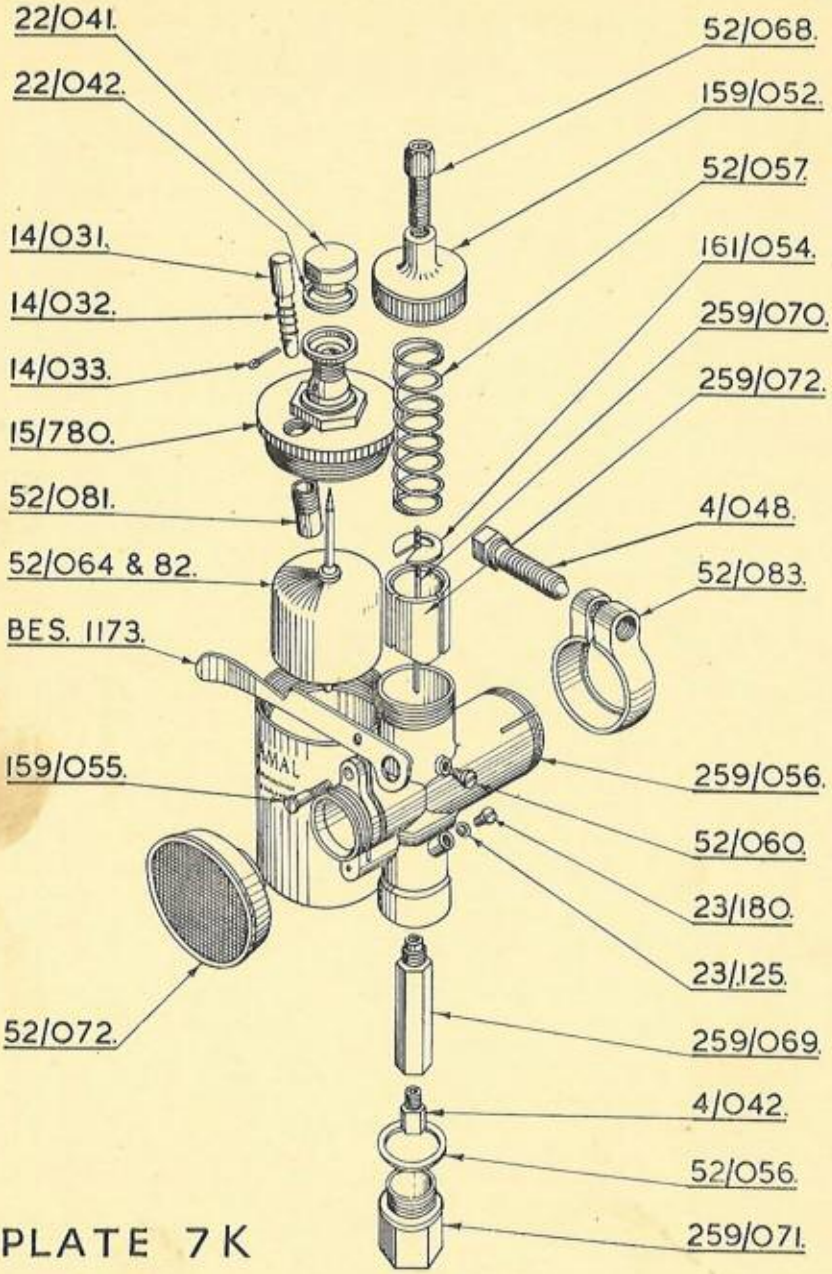


PLATE 7K

AMAL CARBURETTER TYPE 259.

AMAL CARBURETTER - TYPE 259

Item	Description	No. Off
259	Carburetter	1
4/042	Main jet	1
4/048	Outer clip screw	1
14/031	Float chamber tickler	1
14/032	,, ,, ,, spring	1
14/033	,, ,, ,, cotter	1
22/041	Special nut	1
22/042	Fibre washer	2
15/780	Float chamber cover	1
23/125	Washer for plug screw	1
23/180	Plug screw	1
52/056	Jet plug washer	1
52/057	Throttle valve spring	1
52/060	Valve location screw	1
52/064 & 82	Float and needle	1
52/068	Cable adiuster	1
52/072	Gauze intake complete	1
52/081	Float chamber cover bush	1
52/083	Outlet clip	1
159/052	Mixing chamber top cap	1
159/055	Strangler pin	1
161/054	Needle clip	1
259/056	Mixing chamber body	1
259/069	Needle jet	1
259/070	Jet needle	1
259/071	Jet plug	1
259/072	Throttle valve	1
BES. 1173	Choke lever (purchase from BES.)	1

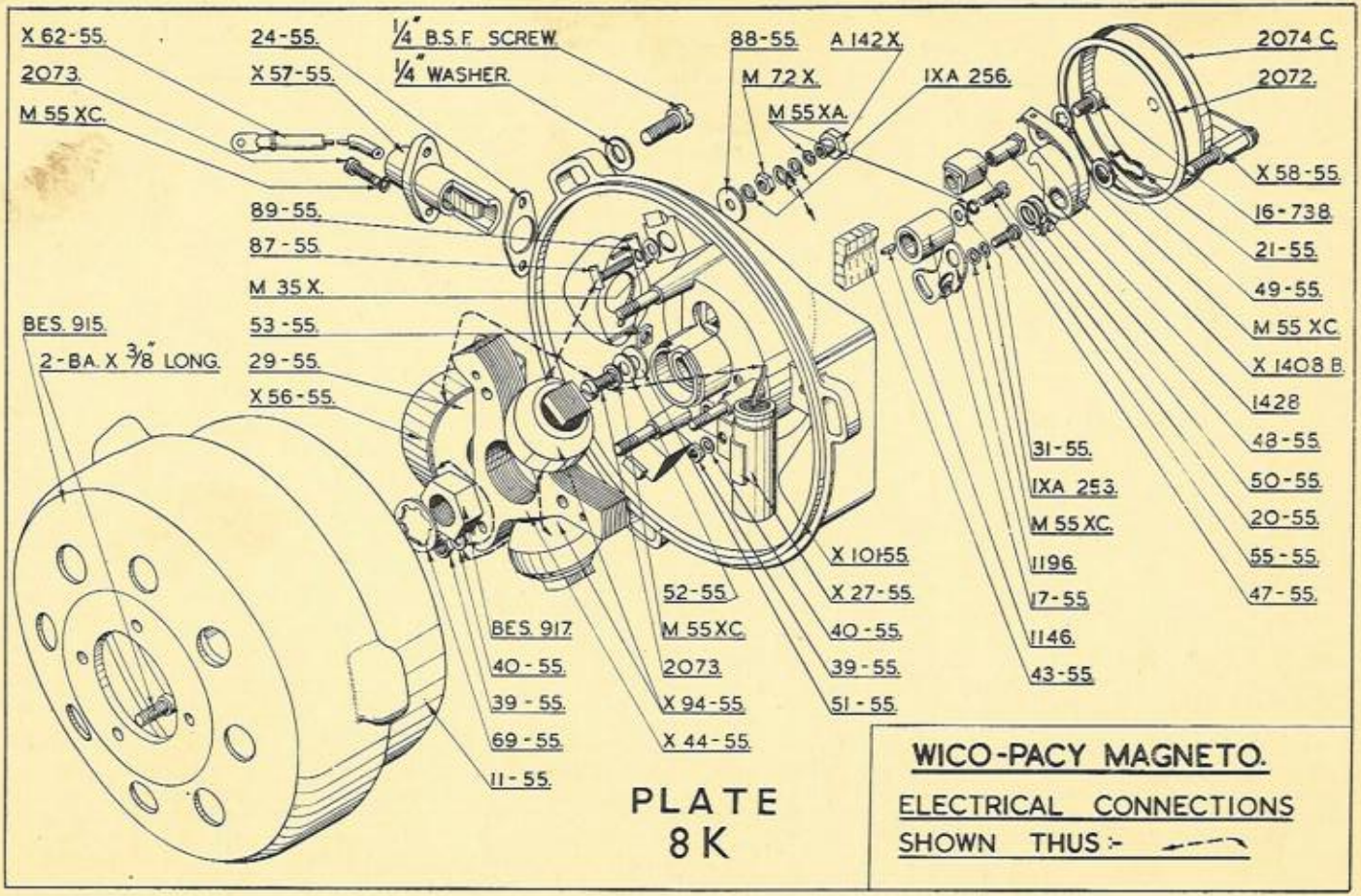


PLATE
8 K

WICO-PACY MAGNETO.

ELECTRICAL CONNECTIONS
SHOWN THUS :-

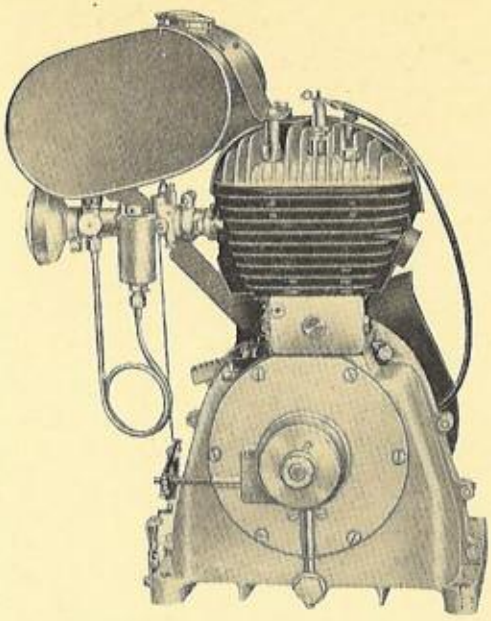
TYPE FW-5¼ dia. WICO PACY "GEN" FLYWHEEL MAGNETO

Item	Description	No. Off
11-55	Flywheel	1
17-55	Breaker Cam (CCW. parallel fitting)	1
20-55	Breaker arm spring block	1
21-55	Breaker arm lock	1
24-55	H.T. terminal gasket	1
X27-55	Capacitor group	1
29-55	Coil gasket	1
31-55	Breaker cam screw lock plate	1
M-35X	L.T. terminal screw bushing	1
39-55	Core stud nut	3
39-55	Capacitor fixing nut	1
40-55	Core Stud nut lock washer	3
40-55	Capacitor fixing nut lock washer	1
42-55	Flywheel locking nut	1
43-55	Cam oil pad	1
X44-55	Coil core group	1
47-55	Fixed contact screw	1
48-55	Breaker arm washer (1/32" thick)	1
49-55	Breaker arm washer (.020" thick)	1
50-55	Breaker arm shim (.005" thick)	1
51-55	Breaker arm insulating washer	1
52-55	Breaker arm spring block washer (steel)	1
53-55	H.T. terminal screw nut	2
55-55	Cam screw	1
M-55XA	Cam screw lock washer	1
M-55XA	L.T. terminal screw nut lock washer	1
M-55XC	Breaker arm bracket screw lock washer	1
M-55XC	Breaker arm spring block fixing screw lock washer	1
M-55XC	Fixed contact screw lock washer	1
M-55XC	H.T. terminal screw lock washer	2
X56-55	H.T. coil group	1
X57-55	H.T. terminal	1
X58-55	Breaker box cover clip assembly	1
X62-55	H.T. lead wire group	1
X63-55	Coil and core group	1
69-55	Flywheel nut lock washer	1
M-72X	L.T. screw fixing nut	1
87-55	L.T. terminal screw	1
88-55	L.T. terminal screw insulating washer	1
89-55	L.T. terminal screw insulating strip	1
X94-55	L.T. coil group	2
X-101-55	Stator plate unit	1
A-142	L.T. terminal screw nut	1
1XA-256	Fixed contact screw washer	1
1XA-256	L.T. terminal screw washer	3
16-738	Breaker arm spring screw	1
1146	Cam key	1
1196	Fixed contact	1
X1408B	Breaker arm group	1
1428	Breaker arm spring block screw nut	1
2072	Breaker box cover gasket	1
2073	H.T. terminal screw	2
2073	Breaker arm spring block screw	1
2074C	Breaker box cover	1
BES. 915	Adaptor	1
BES. 917	Nut ¼" × 26 TPI	1
	2BA × ⅜" screw	4
	¼" BSF. × ¼" long screw	3
	¼" washer	3

A new

BROCKHOUSE

engine



248 c.c.

4 CYCLE AIR COOLED ENGINE

Model	248.1
Bore	64½ m.m. (2.54")
Stroke	76 m.m. (3")
Cubic capacity	248 c.c. (15.15 c. ins.)
Weight of engine without fuel or oil	64½ lbs. (29¼ Kg.)
Direction of rotation—	anti-clockwise from drive side

Engineers will appreciate the sound, practical design of this power unit. It is built to give good reliable service under the most trying conditions and is backed by the reputation of a great engineering name

BROCKHOUSE ENGINEERING (Southport) LTD.

CROSSENS . SOUTHPORT . LANCS

The

Spryt

. ENGINE .
. KICK START .
. MARK II .

A

BROCKHOUSE

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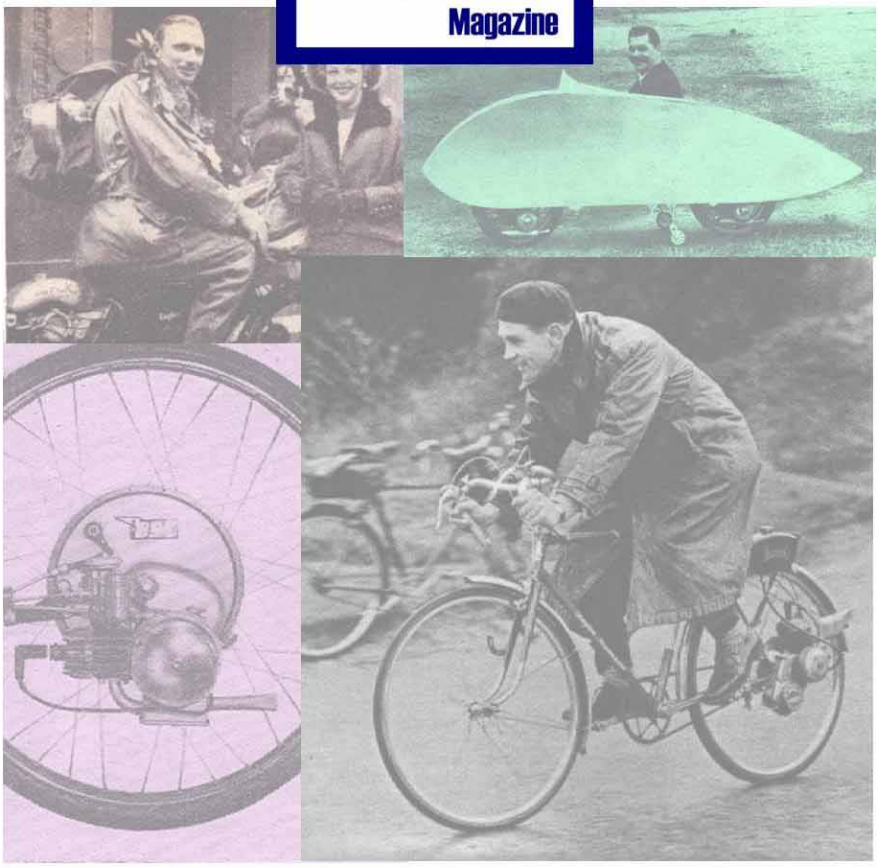

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