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We do not undertake to refit or bear the cost of replacement or refitting such new part. We guarantee, subject to the conditions mentioned below, to make good at any time within six months any defects in these respects. As J.A.P. Engines and accessories are liable to derangement by neglect or misuse, this guarantee does not apply to defects caused by wear and tear, misuse and neglect.

CONDITIONS OF GUARANTEE

If a defective part should be found in our engines or accessories, it must be sent to us carriage paid and accompanied by an intimation from the sender that he desires to have it repaired free of charge, under our guarantee, and he must also furnish us at the same time with the number of the engine, and full particulars of purchase. Failing compliance with the above, no notice will be taken of anything that may arrive, but such articles will be here at the risk of the sender, and this guarantee or any implied guarantee shall not be enforceable.

THE TERM "AGENT" is used in a complimentary sense only, and those firms whom we style our agents are not authorized to advertise, incur any debts, or transact any business whatsoever on our account other than the sale of goods which they may purchase from us, nor are they authorized to give any warranty or make any representations on our behalf or sell subject to or with any conditions other than those contained in the above guarantee.

The guarantee becomes void if any parts not made or supplied by J. A. PRESTWICH INDUSTRIES, LTD., are fitted to a J.A.P. engine. To safeguard his own interests, the owner should always insist upon genuine J.A.P. parts.

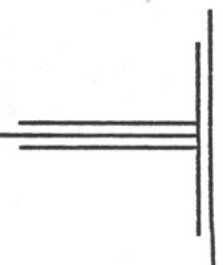
J.A.P.

MODELS

4/2, 4/3, 5 & 6

TYPE 1

**INDUSTRIAL
ENGINES**



*General Description,
Running and Maintenance
Instructions with Diagrams
and Spare Parts List.*

GENERAL DESCRIPTION

The crankcase is made from high-grade aluminium. It is mounted on a rigid aluminium base which forms the oil sump. In the base is fitted a trough into which the dipper on the end of the connecting rod dips at each revolution. This trough is kept at constant level by oil being fed through metering holes which connect to the main sump.

The crankshaft is made of high quality steel, and is carried on taper roller or ball bearings of large dimensions. The crankshaft and connecting-rod assembly are very carefully balanced.

The connecting-rod is steel with a phosphor bronze small-end bush. The big-end is split and fitted with white metal steel backed shells.

The piston is of die cast aluminium alloy. It is fitted with compression rings, one of which is a special taper chrome-plated ring and must be fitted in the top groove with the face marked TOP uppermost, and an oil scraper ring above the gudgeon pin. Drain holes are drilled in the bottom ring groove.

The gudgeon pin is located by a circlip at each end and is fully floating in the gudgeon bosses.

The cylinder is made from close grained cast iron and is provided with circumferential fins of special shape for cooling.

The cylinder head is made from an aluminium alloy, deeply finned to assist cooling. It is detachable and fitted with a gasket which forms the joint between the cylinder and head.

The camshaft is made from meehanite alloy, and is driven by heavy spur gears.

The pinion is machined from steel and meshes with the camshaft.

The inlet and exhaust cams operate directly on the tappets. Tappet adjustment is effected by the fitting of different thickness discs under tappet heads. The whole of the cam gear is enclosed and running in oil.

Lubrication is by JAP patented dipper system and is entirely automatic and very efficient, affording ample supply to all working parts. The crankcase is provided with the well-known JAP vacuum system and crankcase release, ensuring a clean engine and economy in oil.

The throttle is operated by a centrifugal governor. A hand operated choke is fitted to facilitate starting when engine is cold.

A centrifugal governor is driven by a spur wheel meshing with the camshaft and operates the throttle by simple mechanism. A slow running and starting lever is fitted, which is operated against the governor arm.

The flywheel fan is of cast iron and is fitted directly on the crankshaft. The cooling air is supplied by this fan, which creates a draught over the cylinder head and portions of the cylinder, which are correctly finned for this purpose. These fins should be kept clean for efficient cooling. The cowl is designed to give a cooling draught to the necessary portions of the cylinder and cylinder head.

The oil filler cap on the side of the crankcase is of the screwed type. Attached is a dipstick, having high level mark. **THE DIPSTICK BOTTOM END INDICATES DANGER LEVEL. ALWAYS KEEP OIL TO HIGH LEVEL MARK. DO NOT REMOVE THE CAP WHEN THE ENGINE IS RUNNING.**

The engine base must be standing level when checking or re-filling oil. A carburetter has been specially designed for each engine. The setting of the jets should not be interfered with except by an experienced engineer. It is correctly set at the works, and any slight alteration may upset the smooth running of the engine.

Jets, filters, etc., may occasionally require cleaning to remove dirt or water. This can be simply done by blowing air through them. See pages 22 to 25 for maintenance and carburetter parts list.

The damper on the governor arm is to prevent hunting by putting extra friction on the spindle. Great care, however, must be exercised in adjusting this, as too much friction will prevent the throttle opening fully.

When commercial petrol is used, it is advisable to add one table-spoon of engine oil with one gallon of fuel. This should be well mixed.

COLD STARTING.

- (a) Open petrol filter tap by turning in anti-clockwise direction. Each filter is fitted with a tap which requires to be screwed either fully in for OFF, or fully out for ON, to ensure leak proof operation.
- (b) Slip the slow running lever into position to partly close the throttle.
- (c) Push the carburetter air choke lever to close choke for cold-starting only.
- (d) Turn engine slowly until compression is felt.
- (e) When compression is felt, give the starting handle a sharp pull in *upwards* direction.
- (f) **IMPORTANT.**—Always pull starting handle up smartly to start; do not attempt to start by continuous turning.
- (g) When engine has started release the slow running lever.
- (h) When engine commences to pick up speed, pull the Carburetter air choke lever forward to open choke.

HOT STARTING.

To facilitate restarting a hot engine a release tap has been provided on the inlet pipe. When starting difficulty occurs, open the tap and rotate the crankshaft slowly a few times to clear the induction system of excessively rich mixture. During this operation the throttle should be left wide open. The air choke should be left open at all times for starting hot engines. With the tap still open, crank engine to start in the usual manner. After engine has started and is running evenly, close the tap to prevent weakening of the mixture.

GENERAL DESCRIPTION

The crankcase is made from high-grade aluminum. It is mounted on a rigid aluminum base which forms the oil sump. In the base is fitted a trough into which the dipper on the end of the connecting rod dips at each revolution. This trough is kept at constant level by oil being fed through metering holes which connect to the main sump.

The crankshaft is made of high quality steel, and is carried on taper roller or ball bearings of large dimensions. The crankshaft and connecting-rod assembly are very carefully balanced.

The connecting-rod is steel with a phosphor bronze small-end bush. The big-end is split and fitted with white metal steel backed shells.

The piston is of die cast aluminum alloy. It is fitted with compression rings, one of which is a special taper chrome-plated ring and must be fitted in the top groove with the face marked TOP uppermost, and an oil scraper ring above the gudgeon pin. Drain holes are drilled in the bottom ring groove.

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The pinion is machined from steel and meshes with the camshaft.

The inlet and exhaust cams operate directly on the tappets. Tappet adjustment is effected by the fitting of different thickness discs under tappet heads. The whole of the cam gear is enclosed and running in oil.

Lubrication is by JAP patented dipper system and is entirely automatic and very efficient, affording ample supply to all working parts. The crankcase is provided with the well-known JAP vacuum system and crankcase release, ensuring a clean engine and economy in oil.

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The oil filler cap on the side of the crankcase is of the screwed type. Attached is a dipstick, having high level mark. **THE DIPSTICK BOTTOM END INDICATES DANGER LEVEL. ALWAYS KEEP OIL TO HIGH LEVEL MARK. DO NOT REMOVE THE CAP WHEN THE ENGINE IS RUNNING.**

The engine base must be standing level when checking or re-filling oil. A carburetter has been specially designed for each engine. The setting of the jets should not be interfered with except by an experienced engineer. It is correctly set at the works, and any slight alteration may upset the smooth running of the engine.

Jets, filters, etc., may occasionally require cleaning to remove dirt or water. This can be simply done by blowing air through them. See pages 22 to 25 for maintenance and carburetter parts list.

The damper on the governor arm is to prevent hunting by putting extra friction on the spindle. Great care, however, must be exercised in adjusting this, as too much friction will prevent the throttle opening fully.

When commercial petrol is used, it is advisable to add one tablespoon of engine oil with one gallon of fuel. This should be well mixed.

COLD STARTING.

- (a) Open petrol filter tap by turning in anti-clockwise direction. Each filter is fitted with a tap which requires to be screwed either fully in for OFF, or fully out for ON, to ensure leak proof operation.
- (b) Slip the slow running lever into position to partly close the throttle.
- (c) Push the carburetter air choke lever to close choke for cold-starting only.
- (d) Turn engine slowly until compression is felt.
- (e) When compression is felt, give the starting handle a sharp pull in *upwards* direction.
- (f) IMPORTANT.—Always pull starting handle up smartly to start; do not attempt to start by continuous turning.
- (g) When engine has started release the slow running lever.
- (h) When engine commences to pick up speed, pull the Carburetter air choke lever forward to open choke.

HOT STARTING.

To facilitate restarting a hot engine a release tap has been provided on the inlet pipe. When starting difficulty occurs, open the tap and rotate the crankshaft slowly a few times to clear the induction system of excessively rich mixture. During this operation the throttle should be left wide open. The air choke should be left open at all times for starting hot engines. With the tap still open, crank engine to start in the usual manner. After engine has started and is running evenly, close the tap to prevent weakening of the mixture.

MODEL 4/2 INDUSTRIAL UNIT

Engine.—Petrol, four-stroke. Air cooled. Type, 4/2.

Main Dimensions.—Bore, 64.5 millimetres. Stroke, 75 millimetres.

Cubic capacity, 245 c.c.

B.H.P.—2.4 at 2,400 R.P.M.

Valves.—Type, Mushroom. Position, side valve. Tappet clearances :

EXHAUST .010" to .012", INLET .008".

Timing: EXHAUST OPENS 48° before bottom dead centre, CLOSES 9° after top dead centre.

INLET OPENS 17° before top dead centre, CLOSES 52° after bottom dead centre.

Camshaft.—Type, cast in one piece, driven by spur gear.

Platon.—Material, low expansion alloy. Number of rings, 4. Gudgeon pin fixing, circlips.

Connecting Rod.—Material, steel. Type of big end bearing, white metal, steel backed.

Crankshaft.—Number of bearings, 2. Type, ball.

Carburettor.—Make, Zenith. Type 24 T-2.

Ignition.—Magneto. Make, Wico. Type, A.576BZ. Timing, 25° before top dead centre. Drive, direct coupled. Sparking plug, size 14 millimetres. Gap, .025" LODGE-CN.

Lubrication System.—J.A.P. dipper. Sump capacity, 1 quart.

Fuel Tank Capacity.—1 gallon.

Fuel Consumption.—.8 pints per B.H.P. hour.

Engine Weight.—82 lbs. (37 Kilogrammes).

Rotation.—Looking at take-off shaft, anti-clockwise.

RECONDITIONING DIMENSIONS

Cylinder Bore.—Diameter 2.5635" or 2.5835".

Oversize Pistons Available.—+ .020" and + .040".

Undersize Bearings Available.—Connecting rod, 1.1150" to 1.1050".

RECOMMENDED CLEARANCES ON RECONDITIONING

Clearances.—Crankshaft and connecting rod, big end, .001" to .003".

Side clearances, connecting rod and crankshaft, .004" to .009".

Gudgeon pin and connecting rod, small end, .0008" to .0014".

Platon.—On diameter of piston: .0025" skirt, .0125" top land. Between piston rings and grooves, .0025" to .004". Between scraper ring and groove, .001" to .0025".

MODEL 4/3 INDUSTRIAL UNIT

Engine.—Petrol, four stroke. Air cooled. Type, 4/3.

Main Dimensions.—Bore, 70 millimetres. Stroke, 75 millimetres.

Cubic capacity, 288 c.c.

B.H.P.—3.5 at 2,400 R.P.M.

(CAT 0047)
(MAX 2000 RPM) IDLE 600 RPM.

Valves.—Type Mushroom. Piston, side valve. Tappet clearances :

EXHAUST .010" to .012"; INLET .008". Timing: EXHAUST OPENS 48° before bottom dead centre, CLOSES 9° after top dead centre. INLET OPENS 17° before top dead centre, CLOSES 52° after bottom dead centre.

Camshaft.—Type, cast in one piece, driven by spur gear.

Platon.—Material, low expansion alloy. Number of rings, 3. Gudgeon pin fixing, circlips.

Connecting Rod.—Material, steel. Type of big end bearing, white metal, steel backed.

Crankshaft.—Number of bearings, 2. Type, ball.

Carburettor.—Make, Zenith. Type 24 T-2. — *See of Extracts*

Ignition.—Magneto. Make, Wico. Type CJ. 936. Timing, 25° before top dead centre. Drive, direct coupled. Sparking plug, size 14 millimetres. Gap, .025" LODGE-CN.

Lubrication System.—J.A.P. dipper. Sump capacity, 1 quart.

Fuel Tank Capacity.—1 gallon.

Fuel Consumption.—.8 pints per B.H.P. hour.

Weight.—83 lbs. (38 Kilogrammes).

Rotation.—Looking at take-off shaft, anti-clockwise.

RECONDITIONING DIMENSIONS

Cylinder Bore.—Diameter 2.7705" or 2.7905".

Oversize Pistons Available.—+ .020" and + .040".

Undersize Bearings Available.—Connecting rod, 1.1150" to 1.1050".

RECOMMENDED CLEARANCES ON RECONDITIONING

Clearances.—Crankshaft and connecting rod, big end, .001" to .003".

Side clearances, connecting rod and crankshaft, .004" to .009".

Gudgeon pin and connecting rod, small end, .0008" to .0014" Gudgeon pin and piston, .0002" to .0009".

Platon.—On diameter of piston at right angles to gudgeon pin: .006" skirt, .015" top land. Between piston rings and grooves, .0035" to .0055". Between scraper ring and groove, .0015" to .0035".

MODEL 5 INDUSTRIAL UNIT

Engine.—Petrol, four-stroke. Air-cooled. Type, Model 5.

Main Dimensions.—Bore, 80 millimetres, Stroke, 82 millimetres.

Cubic capacity, 412 c.c.

B.H.P.—4.5 at 2,200 R.P.M.

Valves.—Type, Mushroom. Position, side valve. Tappet clearances:

EXHAUST .020"; INLET .010".

Timing: EXHAUST OPENS 48° before bottom dead centre,

CLOSES 9° after top dead centre.

INLET OPENS 17° before top dead centre, CLOSES

52° after bottom dead centre.

Crankshaft.—Type, cast in one piece, driven by spur gear.

Platton.—Material, low expansion alloy. Number of rings, 3. Gudgeon

pin fixing, circlips.

Connecting Rod.—Material, 40-45 ton steel. Type of big end bearing,

white metal, steel backed.

Crankshaft.—Number of bearings, 2. Type, taper roller.

Carburettor.—Make, Zenith. Type 24 T-2.

Ignition.—Magnet. Make, Wico. Type CJ, 936. Timing, 20° before

top dead centre. Drive, direct coupled. Sparking plug, size 14

millimetres. Gap, .025" LODGE-CN.

Lubrication System.—J.A.P. dipper. Sump capacity, 2 pints.

Fuel Tank Capacity.—1 gallon.

Fuel Consumption.—9 pints per B.H.P. hour.

Weight.—122 lbs. (55.5 Kilogrammes).

RECONDITIONING DIMENSIONS

Cylinder Bore.—Diameter 3.170" or 3.190".

Overize Platons Available.—+ .020" and + .040".

Underize Bearings Available.—Connecting rod, 1.1150" to 1.1050".

RECOMMENDED CLEARANCES ON

RECONDITIONING

Clearances.—Crankshaft and connecting rod, big end .001" to .0025".

Side clearances, connecting rod and crankshaft, .004" to .009".

Gudgeon pin and connecting rod, small end .0005" to .0014" Gudgeon

pin and piston, .0002" to .0009".

Platton.—On diameter of piston at right angles to gudgeon pin: .008"

skirt, .017" top land. Between piston rings and grooves, .0035" to

.0055". Between scraper ring and groove, .0015" to .0035".

MODEL 6 INDUSTRIAL UNIT

Engine.—Petrol, four-stroke. Air cooled. Type, Model 6.

Main Dimensions.—Bore, 85.7 millimetres. Stroke, 102 millimetres.

Cubic capacity 588 c.c.

B.H.P.—5.5 at 1,800 R.P.M.

Valves.—Type, Mushroom. Position, side valve. Tappet clearances:

EXHAUST .020"; INLET .010".

Timing: EXHAUST OPENS 48° before bottom dead centre;

CLOSES 9° after top dead centre.

INLET OPENS 17° before top dead centre; CLOSES

52° after bottom dead centre.

Crankshaft.—Type, cast in one piece, driven by spur gear.

Platton.—Material, low expansion alloy. Number of rings, 4. Gudgeon

pin fixing, circlips.

Connecting Rod.—Material, steel. Type of big end bearing, white

metal, steel backed.

Crankshaft.—Number of bearings, 2. Type, taper roller.

Carburettor.—Make, Zenith. Type 24 T-2.

Ignition.—Magnet. Make, Wico. Type, CJ, 936. Timing, 20° before

top dead centre. Drive, direct coupled. Sparking plug, size 14

millimetres. Gap, .025" LODGE-CN.

Lubrication System.—J.A.P. dipper. Sump capacity, 3 pints.

Fuel Tank Capacity.—1 gallon.

Fuel Consumption.—9 pints per B.H.P. hour.

Weight.—172 lbs. (88 Kilogrammes).

RECONDITIONING DIMENSIONS

Cylinder Bore.—Diameter, 3.3955" or 3.4155".

Overize Platons Available.—+ .020" and + .040".

Underize Bearings Available.—Connecting rod, 1.3655" to 1.3555".

RECOMMENDED CLEARANCES ON

RECONDITIONING

Clearances.—Crankshaft and connecting rod, big end, .001" to .003".

Side clearances, connecting rod and crankshaft, .004" to .009".

Gudgeon pin and connecting rod, small end, .0005" to .0015".

Gudgeon pin and piston, .0002" to .0009".

Platton.—On diameter of piston: .006" skirt, .0185" top land. Between

piston rings and grooves, .0035" to .0055". Between scraper ring and

groove, .0015" to .0035".

ROUTINE MAINTENANCE.

1. DRY TYPE AIR FILTER (Where fitted)

It is essential to periodically clean the element by removing and shaking the felt pad, also dry if necessary. Carefully replace the element.

1A. OIL BATH AIR FILTER (Where fitted)

It is essential to fill and maintain oil to the indicated level on the filter bowl using clean engine lubricating oil. Occasionally remove the filter and wash the element in petrol or paraffin, allow to drain, clean out the filter bowl and replenish with fresh lubricating oil.

2. FLYWHEEL FAN CASING

Never operate the engine with any part of the fan casing removed, as this will allow the engine to overheat and the piston to score. This part is absolutely necessary to direct the air flow so that the engine may be properly cooled.

3. COVER FOR ENGINE.

An engine which is exposed to the weather must always be covered up when not in use.

4. OVERLOADING THE ENGINE.

Do not overload a cold engine. Always allow it to run light for a minute or two.

5. CLEANLINESS OF SPARKING PLUG.

Keep the sparking plug clean and a gap of .025".

6. DECARBONISING.

Decarbonise every 400 working hours. (See paragraph (a), Page 10).

7. LUBRICATION OF ENGINE.

It is important to use good lubricating oil, and the most suitable oils for these engines are:—

SUMMER—CASTROL XL (S.A.E.30)
WINTER—CASTROLITE (S.A.E.20)

The oil circulation is maintained by splash from a dipper on the connecting rod, and works with a minimum of attention. One point of vital importance is to see that the engine never runs with the oil level in the sump below the bottom end of the dipstick, otherwise serious damage may be caused to the engine. In the case of an engine working at an excessive angle due to uneven or sloping ground, it is most important to keep the oil sump topped right up, so that there is no danger of the dipper missing the oil and starving the engine.

It is important that the engine base is standing level when checking or re-filling oil.

Check the oil level with the filler cap unscrewed, remove cap and wipe dipstick, rest the cap on top of the oil filler boss to obtain correct reading.

All parts are lubricated, including tappets and valves; these are sealed in a dust-tight cover.

After every 50 hours' running, but more frequently under dusty conditions, and preferably when the engine is hot, drain the oil, flush out the oil sump with flushing oil (paraffin should not be used), then refill with fresh lubricating oil after a small quantity of fresh oil has been run through, to make sure there are no traces of the flushing oil left in the sump.

8. TAPPET ADJUSTMENT.

For method of adjustment see paragraph (a), Page 12 (Valve Gear).

9. IF COMPRESSION IS POOR.

- (a) Check tappet clearances.
- (b) Check cylinder head nuts, and tighten if necessary.
- (c) Examine valve seatings.
- (d) Inspect piston and piston rings.

10. TO INSPECT PISTON AND RINGS.

See that rings move freely in their grooves and are not cracked, worn or broken, that all ring grooves are clean, also see that the oil drain holes in the bottom ring grooves are clear.

When replacing see that the piston and rings are replaced as they were fitted before removal.

11. MAGNETOS.

Type A. 576 BZ. (Ref. Pages 16 and 17). Type CJ. 936. (Ref. Pages 18 to 21).

MAINTENANCE OF ENGINE

1. DISMANTLING OF ENGINE.

(a) Decarbonising.

Remove H.T. lead. Remove sparking plug. Remove petrol pipe by unscrewing the carburetter banjo. Remove cowl by unscrewing top bolts, washers and base nuts. Detach throttle link from bottom joint. Remove nuts and bolts holding down cylinder head. Lift off cylinder head. Remove gasket. NOTE.—When replacing gasket, see that this is replaced the correct way, *i.e.*, to conform to inside shape of cylinder head, and not overlapping on one side. Take off inlet pipe with the Carburetter. Remove cylinder base nuts and remove cylinder, taking care to draw cylinder off evenly, and that in removal, piston does not foul side of connecting rod. Remove valve cover by unscrewing fixing bolt. Hold valve down on seat, press up spring collar and remove cotter.

NOTE.—It is advisable to mark the valves, so that they are ground on their correct seatings. Clean carbon deposit from valves, valve ports and cylinder head. Also remove carbon deposit from piston crown and clean, taking great care not to scratch, or otherwise damage the surface. Apply a small quantity of fine carborundum paste to the valve seat and place in position for "grinding in." Twist valve in a semi-rotary motion, using a very light pressure, for a short while, occasionally lifting valve and turning to a fresh position. Remove valve and wipe face and seat clean. Thoroughly wash with clean paraffin and dry. Replace valve and turn on seating a few times. Withdraw and see if both valve and seat show a bright line all round. If not, repeat the process until this result is obtained. Make sure that valves and their component parts are replaced correctly. Replace cylinder on engine and check clearances between tappet head and valve stem. For correct clearances see Pages Nos. 4 to 7, and method of obtaining them, see valve gear, Page 12, paragraph (a).

(b) Pleton.

Inspect piston rings and see that they are free to move in their respective grooves, that they are not worn, cracked, or broken. Inspect piston ring grooves and carefully clean if necessary. Also see that oil drain holes in piston are clear.

To remove piston from connecting rod, first remove circlip as follows: Insert a sharp pointed tool, such as a scriber or similar tool, into one end of the transverse slots in gudgeon pin boss and under tail of circlip. Lever circlip from its groove, holding a piece of rag in front to prevent circlip flying out and causing any personal injury. Push out the gudgeon pin in the direction of removed circlip. Lift piston clear of connecting rod.

Removal and Replacement of Piston Rings.

To remove piston rings from their grooves, a piston ring expanding tool may be used. If this is not available, obtain several thin and narrow strips of metal and insert these between back of piston rings and piston. Work these strips round until all rings stand clear of their respective grooves. The rings may now be easily removed by sliding in an upward direction, clear of piston. If rings are serviceable, or if a new ring or rings are fitted, reverse the procedure of removal.

(c) Big and Small Ends.

The small-end bush is a press fit in the connecting rod and is reamed to size after fitting to connecting rod. It may be removed by using a special drawbolt or by pressing out with hydraulic or hand press. Reverse the above procedure when fitting new bush.

The big-end is steel backed. The 2 halves of bearing are secured in working position by bolts and self-locking nuts.

(d) Main Bearings.

The main bearings are situated on either end of crankshaft. The centre portions, which carry the rollers and cages are a press fit on crankshaft journals.

The outer races are carried in housing plates on either end of crankcase and are a press fit.

NOTE.—The centre portion of main bearings are not easily removable from crankshaft journals, and should not be removed unless replacement is necessary.

(e) Crankshaft.

To remove crankshaft from crankcase proceed as follows: Remove from driving end of crankshaft any coupling device, also its key. Withdraw splint pin from starting pin and knock out starting pin. Unscrew bolts and remove starting boss. Next remove flywheel securing nut. Replace starting boss and fixing screws. Screw the special draw bolt into centre of starting boss and continue to screw in until flywheel is free on taper, taking care not to lose the key. Remove flywheel clear of crankshaft. Now remove nuts holding

crankcase to engine base and lift top half of engine clear of base. Inspect top half of engine and remove connecting rod big end nuts and bolts, then remove big-end caps. Push connecting rod into cylinder as far as it will go. Next remove engine main bearing plate, first removing nuts and draw housing plate off crankshaft. Turn crankshaft until it will clear camshaft and withdraw crankshaft.

2. VALVE GEAR.

(a) Valves.

When valves have been "ground in" after decarbonising or when a new valve or valves are fitted, they must be adjusted as follows: With valves on their seats and cold engine, check clearances between end of valve stems and top of tappet caps with feeler gauge. The correct clearances are as Ref. Pages 4 to 7, and are obtained by fitting tempered steel shims between top of tappet and tappet cap. The shims are of various thicknesses.

Timing

Timing marks are stamped on crankshaft pinion, camwheel and magneto driving wheel when the engine is erected. After dismantling the engine, care must be taken to ensure that these marks coincide with each other. First mesh the camwheel and pinion with their marks corresponding, then revolve the crankshaft until the mark on the camwheel points towards the centre of the magneto driving wheel bush. Now insert the magneto driving wheel with its marks corresponding with the mark on the camwheel. For correct valve timing see Pages 4 to 7.

(b) Camshaft Drive.

(i) Removing and Replacing.

To remove camshaft, the crankshaft must first be removed; with crankshaft removed, proceed as follows: Drive out camshaft axle toward flywheel side of engine. This operation will remove the sealing disc and allow free exit of camshaft axle. Camshaft may now be withdrawn.

Replacement of Camshaft.

Reverse operation of removal and replace sealing disc.

(ii) Adjusting.

No means of adjustment between camwheel and driving pinion are provided, as both components work on fixed centres.

3. GOVERNOR.

(a) Adjusting.

To adjust governor spring, slack off locking nut. To increase engine speed, turn the knurled adjuster in a clockwise direction. To decrease engine speed, turn in anti-clockwise direction. Tighten locking nut when correct adjustment has been obtained.

(b) Repairing.

To gain access to the governor for repair or renewal of component parts, disconnect throttle link from governor control arm, remove the 4 securing nuts and remove governor cover. To remove governor weights withdraw governor actuating rod, drive out governor weight fulcrum pins, remove weights. To remove gear wheel, turn engine until small end of taper fixing pin is opposite the plug in crankcase. Remove plug, drive out taper pin and slide gear wheel off magneto driving shaft.

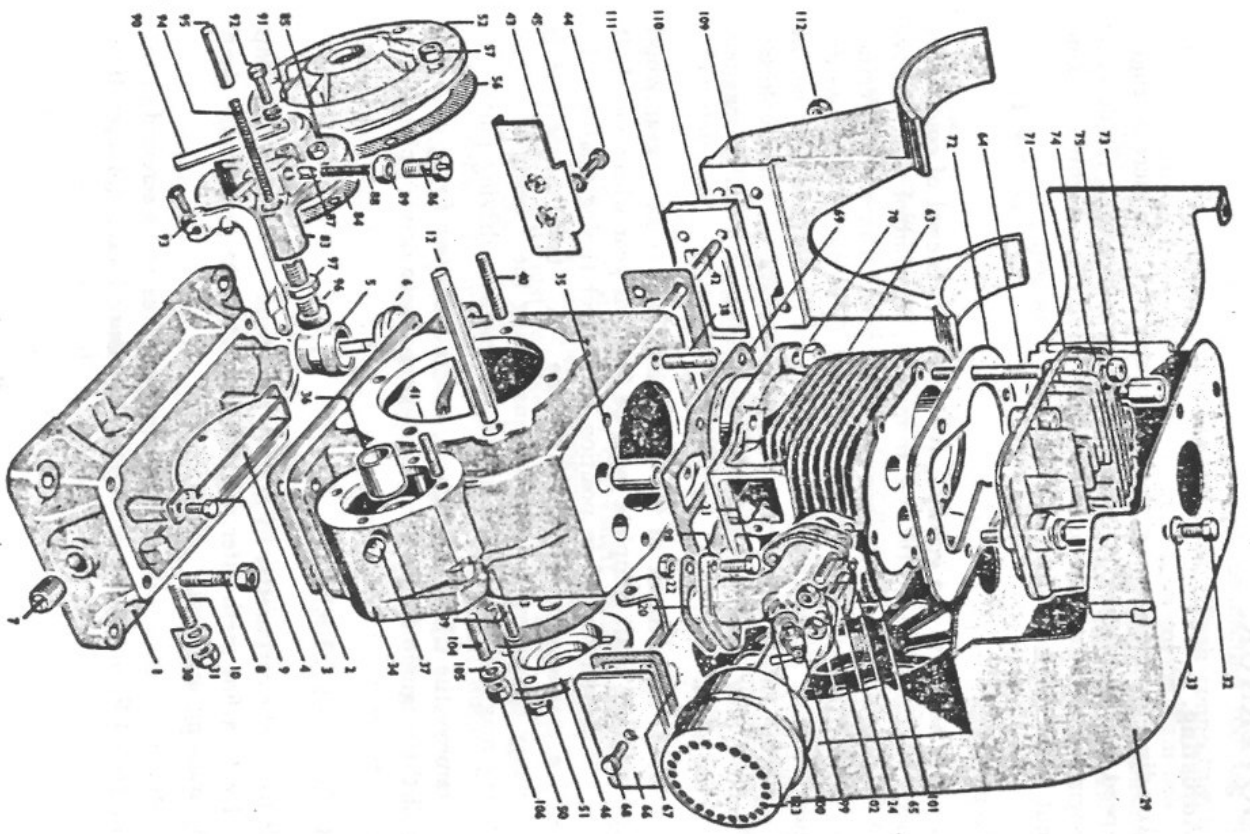
NOTE.—If replacement of the gear wheel is necessary, gear wheel and magneto shaft complete must be fitted as gear wheel and shaft are drilled and reamed in position for correct timing relation. To remove magneto driving shaft on the "A" type magneto it is necessary to remove magneto by unscrewing the 3 fixing bolts and sliding magneto sideways to disengage magneto driving plate.

To remove the C.J. type magneto, unscrew the two fixing nuts and pull the magneto forward to disengage magneto driving plate.

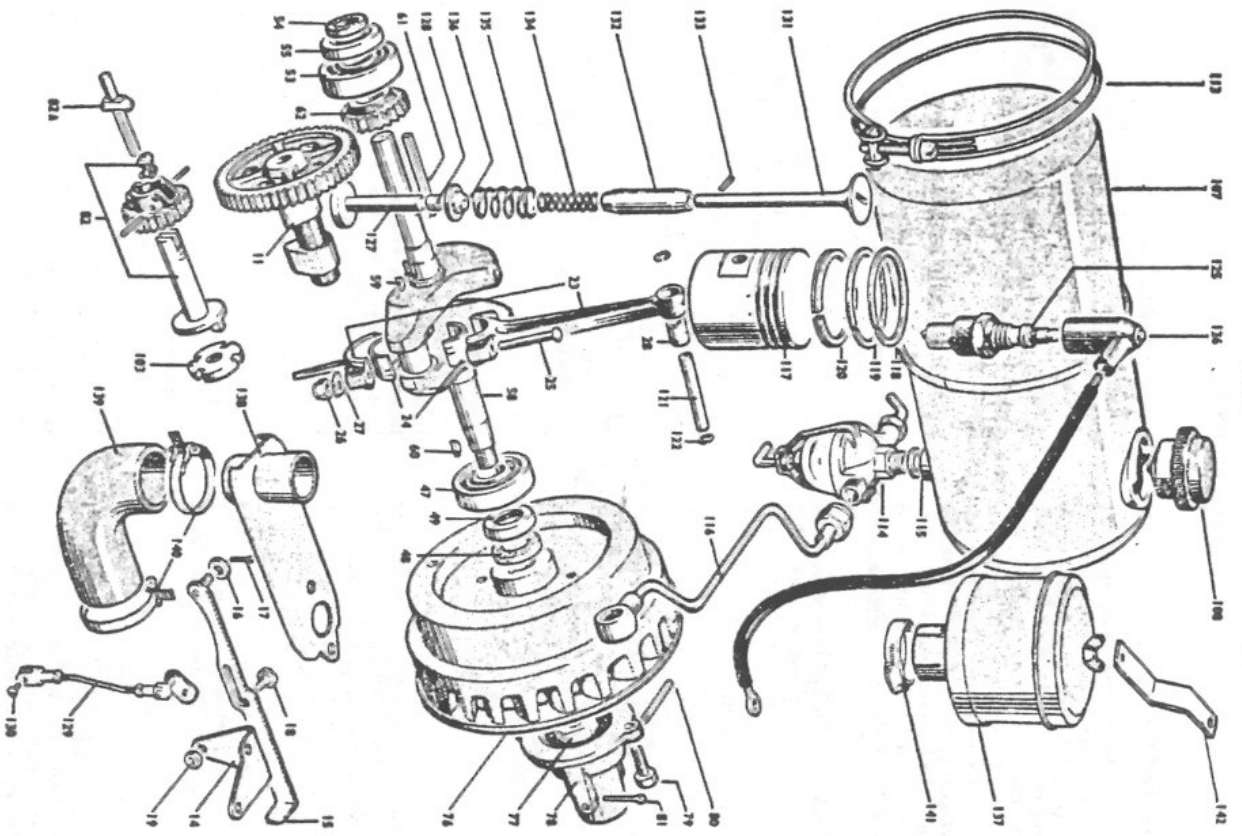
4. FUEL SYSTEM.

Fuel is fed to the carburetter by gravity from tank. The petrol filter tap is fitted with a fine mesh filter and it is important to periodically clean this by washing in petrol.

Each filter is fitted with a tap which requires to be screwed either fully in for OFF, or fully out for ON, to ensure leak proof operation.



SEE PAGES 26 TO 37 FOR DESCRIPTIONS



SEE PAGES 26 TO 37 FOR DESCRIPTIONS

SERVICE INSTRUCTIONS FOR WICO TYPE A-576 BZ. MAGNETO

Installation and timing

Slowly turn the engine crankshaft in the normal manner until the piston is approximately $\frac{1}{4}$ " before top dead centre on the compression stroke (i.e. when both valves are closed). Then remove the magneto contact breaker cover and turn the magneto in a clockwise rotation until the breaker points close, then reverse the rotation until the breaker points just begin to separate. Then fit the coupling on to the engine coupling and secure the magneto in position.

To re-check the timing, slowly pull the engine over on the compression stroke, and if the magneto has been correctly positioned, the magneto impulse will give a click just after top dead centre.

Timing

No adjustment is provided for timing the magneto, which is unnecessary, as the magneto is correctly set before leaving the works, so that the starting spark occurs just after top dead centre and the running spark 25° before top dead centre.

Lubrication

The magneto is provided with two spring oilers. Once every 200 hours either one of these oilers should be filled to overflowing with Castrolite. After every 1,000 hours it is necessary to re-lubricate the cam oil pad. This is done by removing the pad and squeezing and working into it a Summer grade of motor transmission grease which will closely resemble that used at the factory. Do not use ordinary grease.

Impulse coupling

The impulse coupling is designed to give a spark of high density for starting. It automatically cuts out at about 165 r.p.m. The engine should not be run continuously below this speed, as this would cause unnecessary strain and wear on the impulse parts.

The impulse also provides a retarded spark for starting, automatically advancing it as the engine speeds up, returning to the retarded position when the engine stops.

Cleaning of impulse

If the impulse becomes clogged with dirt, and the trip arm fails to engage or disengage, or the impulse is sluggish in action, it should be flushed out thoroughly with paraffin, taking care not to allow any paraffin to work its way into the magneto housing.

Replacement of breaker points

If the points need replacing, both the fixed and moving points should be replaced at the same time.

To remove the breaker arm, take off the breaker arm clamp screw, lock-washer and clamping washer, together with the breaker arm terminal screw and pull the assembly off the breaker arm pivot. The fixed contact plate may then be taken off the breaker arm pivot, after removing the fixed contact screw.

Removal of condenser

Remove screw holding down the breaker arm spring. The condenser is then taken from the breaker box by removing the two screws fastening it down.

Removal of coil

Remove the top cover and the breaker box cover. Viewing the magneto from the driving end, release the primary lead by loosening the right-hand side earth stud. Then remove the two screws holding down the core clamps. Turn the magneto shaft until the magnetism no longer grips the coil core to the main housing, pull the coil and the coil core free. The coil is held on the core by a wedge. If the coil is to be replaced, considerable force may be necessary to remove the core from the core.

In replacing the coil and coil core, be sure that the ground surface of the core is against the housing, that the primary lead to the earthing stud is properly located and that the primary earth lead is fastened under the coil core clamp screw.

Breaker point opening

The correct breaker point opening is .015". When readjustment is necessary, loosen the screw which locks the fixed contact plate and turn the eccentric-headed screw until the correct opening of points is obtained. Then lock the plate securely.

A 576BZ

SPARE PARTS LIST

UNITS	COMPONENTS & PARTS	PARTS IN EXPLODED VIEW
MAGNETO N.T. L&D GROUP (Type Large)		
Breaker Box Unit	21100 21101 21102 21103 21104 21105 21106 21107 21108 21109 21110 21111 21112 21113 21114 21115 21116 21117 21118 21119 21120 21121 21122 21123 21124 21125 21126 21127 21128 21129 21130 21131 21132 21133 21134 21135 21136 21137 21138 21139 21140 21141 21142 21143 21144 21145 21146 21147 21148 21149 21150 21151 21152 21153 21154 21155 21156 21157 21158 21159 21160 21161 21162 21163 21164 21165 21166 21167 21168 21169 21170 21171 21172 21173 21174 21175 21176 21177 21178 21179 21180 21181 21182 21183 21184 21185 21186 21187 21188 21189 21190 21191 21192 21193 21194 21195 21196 21197 21198 21199 21200 21201 21202 21203 21204 21205 21206 21207 21208 21209 21210 21211 21212 21213 21214 21215 21216 21217 21218 21219 21220 21221 21222 21223 21224 21225 21226 21227 21228 21229 21230 21231 21232 21233 21234 21235 21236 21237 21238 21239 21240 21241 21242 21243 21244 21245 21246 21247 21248 21249 21250 21251 21252 21253 21254 21255 21256 21257 21258 21259 21260 21261 21262 21263 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SERVICE INSTRUCTIONS FOR WIPAC

TYPE CJ 936 MAGNETO

INSTALLING MAGNETO

Slowly turn the engine crankshaft in the normal manner until the piston begins to rise on the compression stroke (i.e. when both valves are closed). Next assemble the steel floating coupling on to the engine coupling. Finally take the magneto and turn the magneto shaft anti-clockwise until the impulse pawl engages the impulse stop, then slowly turn the magneto shaft in the opposite direction until the two driving dogs are in line with the two free slots in the steel coupling and secure the magneto in position. To re-check the timing, slowly pull the engine over on the compression stroke, and if the magneto has been correctly positioned, the magneto impulse will give a click just before top dead centre.

TIMING

No adjustment is provided for timing the magneto, which is unnecessary, as the magneto is correctly set before leaving the works, so that the starting spars occur just before top dead centre and the running spark in accordance with details on Pages Nos. 5, 6 and 7.

LUBRICATION

The only part requiring attention in the field is the cam oil pad which should be re-lubricated after every 1,000 hours. This is done by removing the pad and squeezing and working into it a Summer grade of motor transmission grease which will closely resemble that used at the factory. Do not use ordinary grease as this will splash on to the breaker points causing misfiring and difficult starting.

The main bearing situated at the rear end of the magneto is packed with grease before leaving the works and should be renewed only whenever the magneto is serviced. The front main bearing is oil impregnated and should only require a few drops of lubricating oil at the same time.

IMPULSE COUPLING

The impulse coupling is designed to give a spark of high density for starting. It automatically cuts out at about 165 r.p.m. The engine should not be run continuously below this speed, as this would cause unnecessary strain and wear on the impulse parts.

The impulse also provides a retarded spark for starting, automatically advancing it as the engine speeds up, returning to the retarded position when the engine stops.

CLEANING OF IMPULSE

If the impulse becomes clogged with dirt, and the trip arm fails to engage or disengage, or the impulse is sluggish in action, it should be flushed out thoroughly with paraffin, taking care not to allow any paraffin to work its way into the magneto housing.

BREAKER POINT OPENING

Remove cover screws and cover to obtain access to the breaker points.

The correct breaker point opening is .015". When re-adjustment is necessary, loosen the screw which locks the fixed contact plate and raise or lower the plate until the correct opening of points is obtained, then lock the plate securely.

REPLACEMENT OF BREAKER POINTS

The breaker points are supplied as assembly including the fixed and moveable point, the die-cast back plate and oil pad. To remove the original assembly loosen the breaker arm spring retainer screw and release the two leads coming from the coil and condenser, then remove the two screws securing the die-cast back plate to the main housing.

When fitting the new breaker point assembly secure the die-cast back plate in an approximate position and adjust the breaker point opening to .015", then slightly loosen the two back plate screws

and turn the plate within its slots until the breaker points begin to open and when the rotor laminations have left the core laminations by approximately $\frac{1}{4}$ ". Finally tighten the two screws and reconnect the two leads from the coil and condenser.

REMOVAL OF CONDENSER

The condenser is housed in the base of the main housing immediately below the breaker points. Remove the hexagon nuts securing the connecting lead and earthing strip. Unscrew the condenser out of its housing, using a special tool, part number 00146, but before doing this it is advisable first to remove the magneto cover so that the connecting lead can be pushed back into the main housing out of the way of the tool.

REPLACEMENT OF H.T. LEAD

The H.T. lead is secured to the H.T. coil by passing the wire through the small hole in the coil H.T. tab and twisting the wire around this tab. When removing, or refitting a new H.T. lead exercise

the greatest care to ensure that no damage is done to the coil.

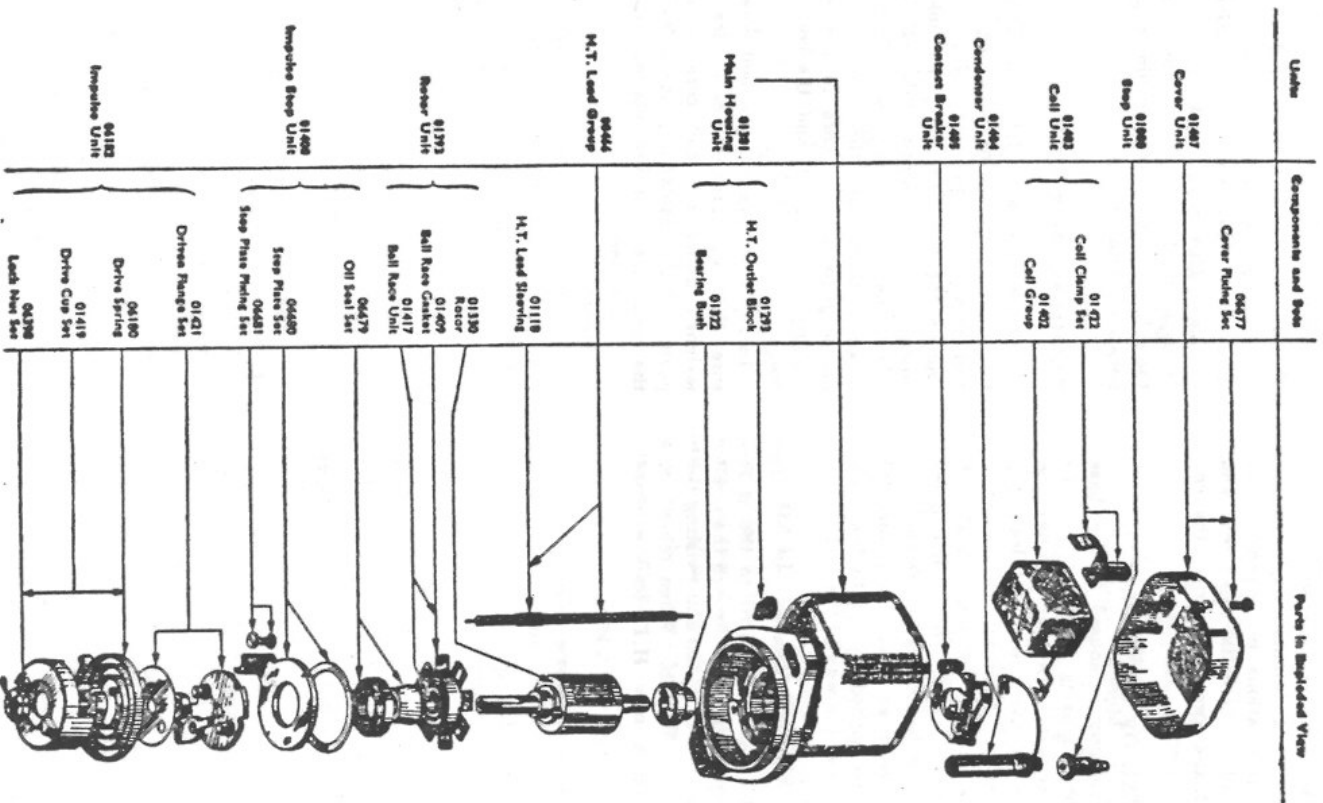
Never solder the H.T. lead to the tab because even with the greatest care it is possible to sever the internal connection. This would not immediately be apparent, but the defect would cause the coil to break down within a comparatively short period.

REMOVAL OF COIL

Remove cover and H.T. lead. Loosen the breaker arm spring retaining screw and release the primary lead. Then remove the two hexagon posts holding down the core clamps, this will also release the earth primary lead. Turn the magneto shaft until the magnetism no longer grips the coil core to the main housing, pull the coil and the coil core free.

In replacing the coil and coil core be sure that the primary earth lead is fastened under the coil core hexagon posts and the insulated primary lead to the breaker arm spring retaining screw.

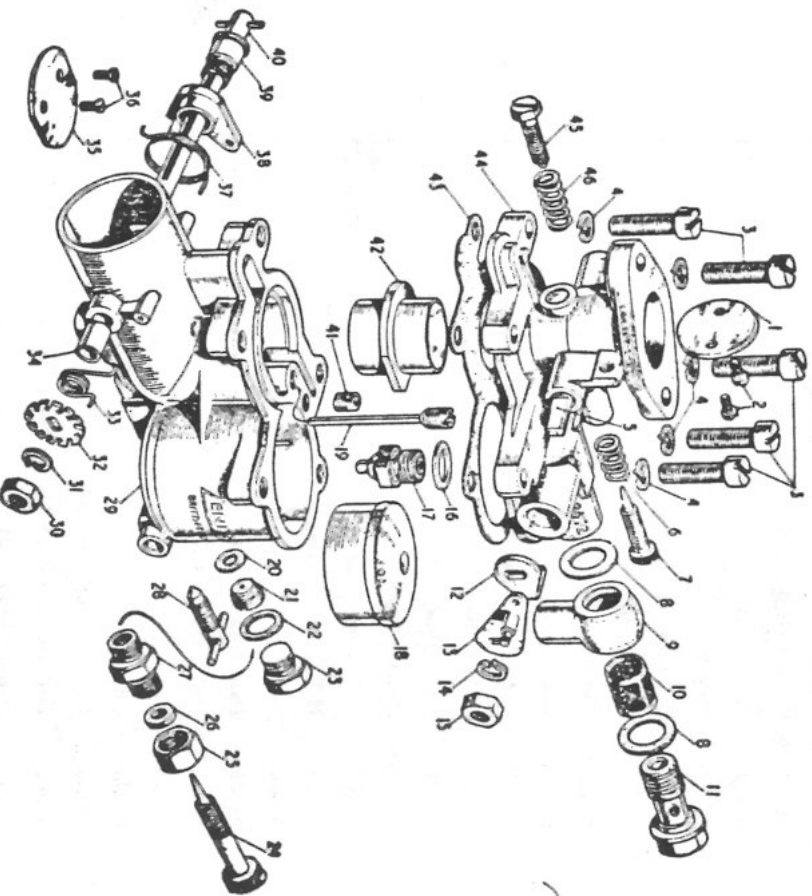
SPARE PARTS LIST FOR WIPAC C.J. 936 MAGNETO



Under	Components and Sub	Part No.	Description	No. Or
01407	Cover Unit	06877	Cover Fixing Screw ...	3
01408	Stop Unit	01407	Cover Unit ...	1
01402	Coil Clamp Set	01080	Stop Unit ...	1
01402	Coil Group	01422	Coil Clamp Set ...	2
01404	Condenser Unit	01402	Coil Group ...	1
01405	Contact Breaker Unit	01403	Coil Unit... ...	1
01293	Outlet Block	01404	Condenser Unit ...	1
01381	Main Housing Unit	01405	Contact Breaker Unit ...	1
01322	Bearing Bush	01293	Outlet Block ...	1
00466	H.T. Lead Group	01381	Main Housing Unit ...	1
01118	H.T. Lead Slewing	01322	Bearing Bush ...	1
01330	Rotor	00466	H.T. Lead Group ...	1
01409	Ball Race Gasket	01118	H.T. Lead Slewing ...	1
01417	Ball Race Unit	01330	Rotor ...	1
01393	Rotor Unit	01409	Ball Race Gasket ...	1
06679	Oil Seal	01417	Ball Race Unit ...	1
06680	Impulse Stop Plate Set	01393	Rotor Unit ...	1
06691	Impulse Stop Plate Fixing Set	06679	Oil Seal ...	1
01400	Impulse Stop Unit	06680	Impulse Stop Plate Set ...	1
01421	Driven Flange Set	06691	Impulse Stop Plate Fixing Set ...	3
06190	Drive Spring	01400	Impulse Stop Unit ...	1
01419	Drive Cup Set	01421	Driven Flange Set ...	1
06398	Locknut Set	06190	Drive Spring ...	1
06182	Impulse Unit	01419	Drive Cup Set ...	1
		06398	Locknut Set ...	1
		06182	Impulse Unit ...	1

ZENITH CARBURETTOR

24T-2 53 m/m. flange centres



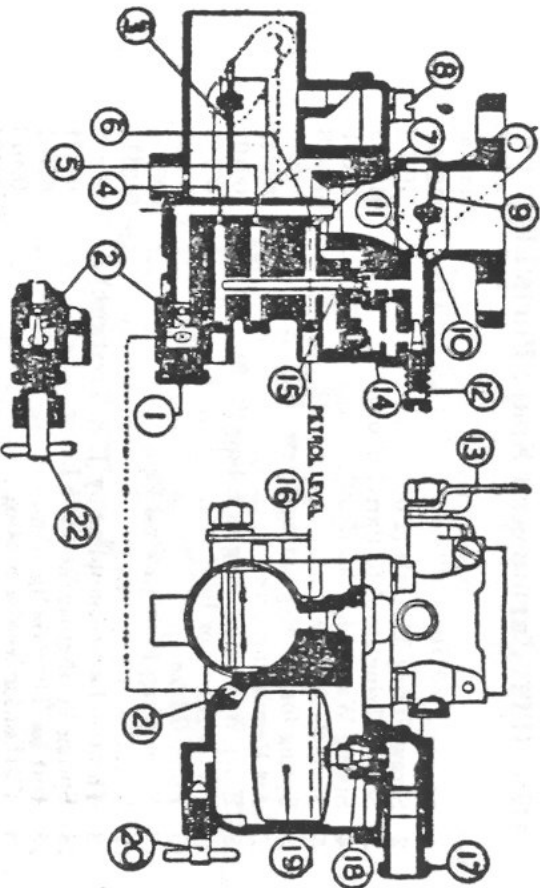
STANDARD SETTING

Engine Model	Choke Tube	Main Jet	Air Jet	S.R. Jet	Needle Seating
(Petrol) 4/2, 4/3, 5 c/s 1406	13	62	1.75	50	1.5 m/m
(Paraffin) 4/2, 4/3, 5 c/s 1425	13	70	1.75	50	1.5 m/m
(Petrol) 6 - - c/s 1407	16	82	1.50	50	1.5 m/m
(Paraffin) 6 - - c/s 1426	16	95	1.50	50	1.5 m/m

ZENITH Carburettor Spare Parts List

Ref.	Description	Part No.
1	Throttle ...	012465
2	Screw Fixing Throttle (2 off)	16776
3	Screw Fixing Bowl to Barrel (5 off)	012405
4	Spring Washer for do. (5 off)	04691
5	Throttle Spindle ...	012628
6	Spring for Air Regulating Screw	09846
7	Air Regulating Screw	09845
8	Fibre Washer for Plug or Elbow (2 off)	06101
9	Petrol Elbow or Banjo ...	06103
10	Filter Gauze	06100
11	Filter Plug, Fixing Petrol Pipe	08098
12	Throttle Stop	013111
13	Throttle Lever (Supplied by J. A. Prestwich)	04691
14	Spring Washer for Throttle Lever	05581
15	Nut for Throttle Spindle ...	09619
16	Washer for Needle Seating	09121
17	Needle and Seating (1.5 m/m) * (State size)	012318
18	Float	015408
19	Slow Running Tube* (State size)	06167
20	Washer for Main Jet	013121
21	Main Jet* (State size)	04625
22	Washer for Plug over Main Jet	012650
23	Plug over Main Jet (used for c/s 1406 and 1407 only)	013603
24	Needle Valve for Main Jet Adjustment...	P-12803
25	Packing Nut for Main Jet Adjustment...	P-1503
26	Packing for do. ...	012850
27	Adaptor for Main Jet Adjustment	
28	(Items 24 to 27 used for c/s 1425 and 1426 only).	F-1410
29	Drain Valve Plug (used for c/s 1425 and 1426 only)	016314
30	Carburettor Bowl (Ass'mb'd with items 37, 38 & 39)	05581
31	Nut for Strangler Spindle	04691
32	Spring Washer for do. ...	013110
33	Spring Anchor Plate	013109
34	Spring for Strangler Spindle (Automatic)	013108
35	Sleeve for Strangler Spindle	012449
36	Strangler Flap	16776
37	Screw Fixing Strangler Flap (2 off)	013107
38	Spring for Strangler Lever	014335
39	Strangler Lever	013104
40	Bearing for Strangler Lever	013114
41	Strangler Spindle ...	012713
42	Air Jet* (State size)	013119
43	Choke Tube* (State size)	012631
44	Gasket (Bowl to Barrel) ...	013073
45	Carburettor Barrel	05923
46	Throttle Stop Screw	04611
	Spring for do. ...	

* IMPORTANT.—State size required



ALTERNATIVE VARIABLE MAIN JET
SECTION CARBURETTER TYPE 24T-2.

GENERAL DESCRIPTION

The 24T-2 Carburetter shown above in cross section is a vertical instrument in general use on light Commercial Vehicles, Marine Engines Stationary Industrial Plant and various types of Mobile Agricultural equipment. The float chamber is offset in order to keep it as close as possible to the main discharge tube, thus ensuring high angle operation in any direction without flooding, or stalling. The instrument can be arranged to take all air through the main intake which is invariably protected by an air cleaner. This feature is called for when working under dusty conditions close to the ground, if long life and reliable service are to be obtained.

The carburetter consists of two main castings, the upper or barrel portion being secured to the lower bowl portion by five screws, one of which is shown (8). In order to keep this carburetter as simple as possible we have used one principle as simple as possible we have used one principle jet and a slow running jet. Suitable air bleeding is arranged to atomize the fuel and to maintain a correct mixture strength under all conditions of engine operation. The drawing above the principle, or main jet (2) covered by the large hexagon plug (1). The slow running jet is also shown (15). The air bleeding to the main jet system is controlled by the air jet (14), and this air supply is taken from the main air intake. It will be noticed that this air issues from the holes (4), (6) and (9), at high engine speeds when the fuel in the main discharge tube (7) falls to its lowest level. Fuel metered by the slow running jet (15) is atomized by an air supply taken through the main air intake and controlled by the screw (13). This mixture issues through the idle discharge channel (10) and the progression orifice (11). The float chamber contains a normal type float (19) and the

usual combined needle seating valve (18). The correct fuel level is automatically provided by the size of the float chamber and the float, together with the position of the needle seating, the latter part is usually fitted with one washer, but two washers can be used if it is desired for any reason to reduce the fuel level in the float chamber.

MAIN ADJUSTMENT

The combination of choke tube, main jet and air jet will be found correct for the engine to which the instrument is fitted and it should not be necessary to alter these parts when dealing with ordinary running trouble. Cleanliness is the keynote for good results. Take special care to use a suitable screw-driver when removing the main jet in order to prevent damage to the thread in the carburetter casting. The main jet adjuster (22), is a tapered needle passing into the main jet orifice and controlling the flow of fuel into the jet. When turned in a clockwise direction as far as possible, all fuel flow to the main jet will be completely cut-off. On the other hand, the adjuster (22) is opened up in an anti-clockwise direction more than about two complete turns, the full fuel flow of the main jet will be provided. Do not screw the needle into the jet with excessive force, as this will damage the taper of the needle and the correct setting specified will no longer apply. The packing nut of the adjuster should be tightened slightly if the fuel drips from the adjuster. A gasket must always be used between the two halves of the carburetter.

SLOW RUNNING ADJUSTMENT

This should be carried out when the engine is hot, the minimum running speed is usually set around 650/800 r.p.m. A spring-loaded adjusting screw is provided close to the throttle lever by

means of which the exact throttle opening can be adjusted for idling. The head of this screw should be turned clockwise to increase the idle speed and vice versa. The slow running mixture screw (12) will provide a richer idle mixture if turned in a clockwise direction by reducing the supply of slow running air. On the other hand if there is evidence of rich running, i.e., black smoke from the exhaust when idling, this screw should be given a quarter, or one-half turn in an anti-clockwise direction. The usual setting is about one complete turn open from the fully home position, but of course this varies slightly from one engine to another.

COLD STARTING (see also page 3)

The rich mixture necessary to meet this condition is provided by closing the choke or air strangler (3) and at the same time set the throttle to about one third of its full movement open. (See STARTING, page 3). As soon as the engine is running the strangler flap will open automatically to admit air; however, if the engine warms up the control operating the strangler must be moved to the fully open position.

HOT STARTING (see also page 8)

When the engine is hot or warm, the choke is not required, and the throttle position is not important. If the engine does not immediately respond check the usual details, such as petrol tap in "on" position, etc.

GENERAL

The carburetter is an accurate metering instrument. Consequently, absolute internal cleanliness is essential if satisfactory results are to be obtained. When the complete instrument is removed and dismantled for cleaning purposes, it is a good plan to clean the outside of the carburetter thoroughly before any dismantling takes place. The parts

should be carefully set out on a clean sheet of paper and the main castings blown out with compressed air if this is available. The strangler flap complete with its spring should move quite freely against the light anchoring spring when the strangler lever is held in the closed position and the flap is pushed with the finger. It will be noted that the light spring referred to is secured in one of the notches of the spring anchor plate, and the spring loading can be readily adjusted. The standard position is the top or "12 o'clock" notch. In common with all air intake choke valves the strangler flap must be completely closed against the air intake bore when the external lever is moved to the fully closed position. When replacing the carburetter take care to use a thin flange gasket as a thick gasket may tend to squeeze out causing the flange on the carburetter to bend and this would allow an air leak to occur. When dealing with a flange in this way it can be tried up in the usual manner with a file. Before attempting to start the engine, subsequent to refitting the carburetter, it is a good plan to check the throttle control and also the choke control to make quite sure these parts work correctly, giving the full amount of travel, etc.

The Maker's adjustment of the carburetter and setting for the main jet adjuster gives correct mixture strength for all conditions up to about 3,000 feet altitude above sea level. When operating at higher altitudes it may sometimes be necessary to deal with symptoms of rich running and possibly loss of power. In these cases, the main jet adjuster will be found most useful in obtaining a clean running exhaust. Turning the adjuster in a clockwise direction one-quarter of a turn at a time will be found effective in weakening the mixture delivered by the carburetter. In any case of difficulty our own Service Department or the nearest Zenith Carburetter Service Station should be consulted.

MODEL 4/2 SPARE PARTS LIST

Illus. Part No.	Title	No. OF
1 18572	Base—Engine ...	1
2 13054	Gasket ...	1
3 19928/1	Oil Trough ...	1
4 19915	Fixing Bolt ...	2
5 16590	Filler Tube ...	1
6 SA2765	Cap and Dipstick ...	1
7 3730	Drain Plug ...	1
8 14695	Fixing Stud ...	4
9 284	Stud—Cowl Fixing ...	2
10 13962	Stud—Cowl Fixing ...	2
11 16894	Carnahaft ...	1
12 19671	Splindle ...	1
13 13023	End Cap ...	1
14 MA3142	Carburettor ...	1
14 19517/2	Choke Lever Bracket ...	1
15 SA2912	Lever ...	1
16 19435	Pin Washer ...	1
17 13180	Split Pin ...	1
18 19749	Screw ...	1
19 6731/1	Locknut ...	1
20 13961/1	Flange Gasket ...	1
22 285	Fixing Nut ...	2
23 18479	Conrod—Includes Items 25 to 28	1 pr.
24 18474	Liner—Big End—(supplied separately)	1
25 18548/1	Bolt ...	2
26 22842	Nut—Big End ...	2
27 22748/2	Locking Washer ...	2
28 6827	Bush—Small End ...	1
29 22695	Cowl ...	1
— 21692	Side Plate ...	1
— 14941	Fixing Screw ...	2
31 285	Base Fixing Nut ...	1
32 14555	Top Fixing Bolt ...	2
83 18316	Washer ...	1
94 18540	Crankcase ...	1
85 18611	Tappet Bush ...	2
86 14669	Bush—Magneto Drive ...	1
87 6627	Plug ...	1
88 12222	Stud—Cylinder Fixing ...	4
40 16163	Cover Plate Fixing ...	4
41 6933	Governor Cover Fixing ...	4
42 12864	Tank Bracket Fixing ...	4
— 6374	Vacuum Valve Grating ...	8
— 4085	Disc ...	3
43 19137	Shield ...	1
44 10010	Fixing Screw ...	2
45 17690	Washer ...	2
47 18346	Bearing—Flywheel Side ...	1
48 14630	Seal ...	1
49 14662	Cup ...	1
52 14605/1	Plate—Driving Side ...	1
53 18346	Bearing—Driving Side ...	1
54 14630	Seal ...	1
55 14662	Cup ...	1

It is essential to quote the Engine Number with all symbols when ordering Spares owing to the different Engine parts fitted to various customers' equipment. Failure to do this may result with incorrect spares being supplied. Customers' Patterns not returned unless specially requested.

Illus. Part No.	Title	No. OF
56 14664	Crankcase Bearing Plate Gasket ...	1
— 14629	Recess Washer ...	1
57 285	Plate Fixing Nut ...	4
58 14553	Crankshaft ...	1
59 16729	Key—Pinion Fixing ...	1
60 16712/1	Key—Flywheel Fixing ...	1
61 18621	—Driving Side ...	1
62 16895	Pinion ...	1
63 14602	Cylinder Barrel with Valve Guides ...	1
64 10080	Stud—Head Fixing ...	5
65 16163	—Manifold Fixing ...	2
— 14785	Valve Box Cover Fixing ...	1
66 14624	Valve Box Cover ...	1
67 14625	Valve Box Cover ...	1
— 3574	Gasket ...	1
— SA3437	Manifold with Release Tap & Washer ...	1
99 22394	Inlet Release Tap ...	1
100 18317	Washer ...	1
101 14626	Gasket ...	1
102 4082	Fixing Nut ...	2
— 16163	Carburettor Fixing Stud ...	2
69 14621	Base Gasket ...	1
70 284	Fixing Nut ...	4
71 14609/4	Head ...	1
72 21635	Gasket ...	1
73 18675	Fixing Bolt ...	1
74 18316	and Stud Washer ...	6
75 285	Stud Nut ...	5
76 18607	Flywheel Fan ...	1
— 16684	Fixing Nut ...	1
77 14076/1	Extractor Bolt ...	1
78 14613	Starter Boss ...	1
79 7998	Fixing Bolt ...	2
80 12893	Drive Rod ...	1
81 19514	Split Pin ...	1
— 82SA2511/5	Governor Gear Assembly (includes following six items)	1
— 16896	Governor Gear (Not Supplied Separately)	1
— 13059/1	Weight ...	2
— 12899	Fulcrum Pin ...	2
— 14668	Driving Spindle (Not Supplied Separately)	1
— 13449	Gear Taper Peg ...	1
82A 22554	Actuating Rod ...	1
83 SA2645	Cover Assembly ...	1
84 12840	Gasket ...	1
85 3574	Fixing Nut ...	4
86 14770/1	Friction Plug ...	1
87 18625/1	Plunger ...	1
88 14772	Spring ...	1
89 14771	Locknut ...	1
90 14762	Lever—Start and Running ...	1
91 16620	Washer ...	1
92 14758	Fixing Screw ...	1
93 SA2926	Control Arm Includes 16692 Screw ...	1
— 16692	Fixing Screw ...	1
94 18744	Spring ...	1
95 14096	Plunger ...	1
96 14097	Adjusting Screw ...	1
97 14098/1	Locknut ...	1

It is essential to quote the Engine Number with all symbols when ordering Spares owing to the different Engine parts fitted to various customer's equipment. Failure to do this may result with incorrect spares being supplied. Customers' Patterns not returned unless specially requested.

MODEL 4/3 SPARE PARTS LIST

Illus. Part No.	Title	No. OF
MA3227	Magneto	1
18957	H.T. Lead Complete, 13g'	1
14325	Fixing Bolt	3
18315	Washer	1
12861	Driving Coupling	1
18865	Shield	1
14941/1	Fixing Screw	1
SA3362	Petrol Tank with Cap	1
SA3370	Filler Cap and Sealing Washer	1
22284	Sealing Washer	1
SA3469	Fixing Bracket	1
12905	Gasket	1
285	Nut	4
SA3427	Fixing Strap Assembly	2
MA3129	Filter and Tap	1
18617	Washer	1
SA2592	Pipe with Unions	1
SSA25	Piston Assembly, Includes Items 117 to 122	1
19540	Piston—4 Ring Type	1
22499	Ring—Compression, Top Groove	1
6633/3	Ring—Compression	2
14183	Oil Scraper, Bottom Groove	1
9900	Pin—Gudgeon	1
11676	Circlip	2
19104	Silencer	1
5512	Spanner—Engine— $\frac{1}{2}$ " x $\frac{1}{2}$ "	1
16579	Cylinder Head	1
14867	Sparkling Plug	1
16811	Tommy Bar	1
18593/2	Sparkling Plug	1
21267/2	Suppressor & Protector	1
SA3493	Starting Handle Complete	1
16071	Tappet	2
SA3310	Throttle Lever & Link Assembly	1
19379	Throttle Lever and Link Fixing Screw (Bottom)	1
14622	Valve	2
7451	End Cap	2
13090	Shim	2
5408	Gulde—Inlet and Exhaust	2
12930	Cotter	2
7720	Spring	2
6337	Collar—Top	2
5502	Bottom	2

When Oil Bath Air Filter is fitted the following parts are necessary :

137 MA3144	Air Filter (Oil Bath Type)	1
138 21306/1	Support	1
139 19109	Elbow	1
140 19130	Elbow Clip	2
141 16925	Clip	1
13961/1	Carburettor Gasket (Extra)	1

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Failure to do this may result with incorrect spares being supplied.

Customer's Patterns not returned unless specially requested.

Illus. Part No.	Title	No. OF
18572	Base—Engine	1
13054	Gasket	1
19926/1	Oil Trough	1
19915	Fixing Bolt	2
16590	Filler Tube	1
SA2765	Cap and Dipstick	1
3730	Drain Plug	1
14695	Fixing Stud	4
284	Nut	4
13962	Stud—Cowl Fixing	2
16894	Camshaft	1
19671	Splindle	1
21608	End Cap	1
MA3142	Carburettor	1
19517	ChokeLever Bracket	1
SA2912	Lever	1
19435	Pin Washer	1
13180	Split Pin	1
19749	Screw	1
19 6731/1	Locknut	1
13961/1	Flange Gasket	1
285	Fixing Nut	2
18479	Conrod—includes Items 25 to 28	1 pr.
18474	Liner—Big End—(supplied separately)	1 pr.
25 18546/1	Bolt—	2
22842	Nut—Big End	2
22748/2	Locking Washer	2
6527	Bush—Small End	1
SA34625	Cowl complete	1
21692	Cowl Side Plate	1
14941	Cowl Side Plate Fixing Screw	2
285	Base Fixing Nut	2
19705	Top Fixing Bolt	1
18316	Washer	1
21546	Crankcase	1
18535	Tappet Bush	2
14669	Bush—Magnetto Drive	1
6627	Stud—Cylinder Fixing	4
12222	Cover Plate Fixing	4
16163	Governor Cover Fixing	4
6833	Tank Bracket Fixing	4
12864	Magnetto Fixing	2
16361	Vacuum Valve Grating	2
6374	Disc	3
4085	Shield	1
19137	Fixing Screw	2
10010	Shield	2
17690	Bearing—Flywheel Side	1
19612	Retaining Screw	1
16269	Seal—Flywheel Side	1
21548	Seal—Flywheel Side	1

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Customer's Patterns not returned unless specially requested.

Illus. Part No.	Title	No. Of
52	Crankcase Bearing Plate—Driving Side	1
53	Bearing—Driving Side	1
54	Seal—Driving Side	1
56	Plate Gasket	1
57	Fixing Nut	4
58	Crankshaft	1
59	Key—Plinon Fixing	1
60	—Flywheel Fixing	1
61	—Driving Side	1
62	Plinon	1
63	Cylinder Barrel with Valve Guides	1
64	Stud—Head Fixing	6
65	—Silencer Fixing—Top	1
66	—Inlet Pipe Fixing	2
67	Valve Box Cover	1
68	Gasket	1
69	Base Gasket	1
70	Fixing Nut	4
71	Head	1
72	Gasket	1
74	Fixing Stud Washer	6
75	Nut	4
76	Nut—Long	2
77	Flywheel Fan	1
78	Distance Piece	1
79	Fixing Nut	1
80	Extractor Bolt	1
81	Starter Boss	2
82	Fixing Bolt	1
83	Drive Rod	1
84	Split Pin	1
85	SA2511S Governor Gear Assembly (includes following six items)	1
86	Governor Gear (not supplied separately)	1
87	Weight	2
88	Fulcrum Pin	2
89	Driving Spindle (not supplied separately)	1
90	Gear Taper Peg	1
91	Actuating Rod	1
92	Cover Assembly	1
93	Gasket	1
94	Fixing Nut	4
95	Friction Plug	1
96	Plunger	1
97	Spring	1
98	Locknut	1
99	Lever—Start and Running	1
100	Washer	1
101	Fixing Bolt	1
102	Control Arm—includes 16692 Screw	1
103	Washer	1
104	Fixing Screw	1
105	Spring	1
106	Plunger	1
107	Adjusting Screw	1
108	Locknut	1

It is essential to quote the Engine Number with all symbols when ordering Spares owing to the different Engine parts fitted to various customers' equipment. Failure to do this may result with incorrect spares being supplied. Customers' Patterns not returned unless specially requested.

Page 30

Illus. Part No.	Title	No. Of
98	SA3438 Inlet Pipe with Release Tap & Washer	1
99	22394 Release Tap	1
100	18317 Release Tap Washer	1
101	16163 Stud—Carburettor Fixing	2
102	14872 Gasket	1
103	MA3143 Fixing Nut	2
104	Magneto	1
105	H.T. Lead Complete, 13 $\frac{1}{2}$ "	1
106	Driving Coupling	1
107	Fixing Stud—(Case)	1
108	Fixing Washer	2
109	Fixing Washer	2
110	SA3362 Petrol Tank with Cap	1
111	22284 Filler Cap and Sealing Washer	1
112	SA3469 Sealing Washer	1
113	12905 Fixing Bracket Assembly	1
114	SA3427 Fixing Strap Assembly	4
115	MA3129 Filter and Tap	2
116	21931/3 Washer	1
117	19541/1 Pipe—Flexible—13"	1
118	19276 Nipple	1
119	22202 Nut	2
120	21656 Nut	2
121	9902 Ferrule	2
122	11676 Piston Assembly, Including items 117 to 122	1
123	19105/1 Piston—3 Ring Type	1
124	14871 Ring—Compression, Top Groove	1
125	5512 Spanner—Engine— $\frac{1}{2}$ " x $\frac{1}{2}$ "	1
126	16579 —Cylinder Head	1
127	14967 —Spark Plug	1
128	16811 —Tommy Bar	1
129	18593/2 Sparking Plug	1
130	21267/2 Starting Handle Complete	1
131	SA3493 Sparking Plug	1
132	16491 Tappet	2
133	SA3310 Throttle Lever and Link Assembly	1
134	19379 Throttle Lever and Link Fixing Screw (Bottom)	1
135	14202 Valve	2
136	16721 End Cap	2
137	13090 Shim	2
138	5408 Guide—Inlet and Exhaust	2
139	12930 Cotter	2
140	7720 Spring	2
141	16720 Collar—Top	2
142	5502 —Bottom	2

When Oil Bath Air Filter is fitted the following parts are necessary:

137	MA3144 Air Filter (Oil Bath Type)	1
138	21306/1 Support	1
139	19109 Elbow	1
140	19130 Elbow Clip	2
141	16925 Clip	1
142	19687 Steady	1
13961/1	Carburettor Gasket (Extra)	1

It is essential to quote the Engine Number with all symbols when ordering Spares owing to the different Engine parts fitted to various customers' equipment. Failure to do this may result with incorrect spares being supplied. Customers' Patterns not returned unless specially requested.

Page 31

MODEL 5 SPARE PARTS LIST

Illus. Part No.	Title	No. OF
1	18564 Base—Engine ...	1
2	14119 Gasket ...	1
3	19805 Oil Trough ...	1
4	10341 Filling Bolt ...	2
5	16590 Filler Tube ...	1
6	SA2764 Cap and Dipstick ...	1
7	16583 Drain Plug ...	1
8	18661 Fixing Stud ...	4
9	284 Stud—Cowl Fixing ...	2
10	13962 Stud—Cowl Fixing ...	2
11	16897 Canshaft ...	1
12	13972 Splindle ...	1
13	11957 End Cap ...	1
14	MA3142 Carburettor ...	1
15	19517 Choke Lever Bracket ...	1
16	SA2912 Lever ...	1
17	19435 Pin Washer ...	1
18	18180 Split Pin ...	1
19	19749 Screw ...	1
20	6731/1 Locknut ...	1
21	13981/1 Flange Gasket ...	1
22	285 Fixing Bolt ...	2
23	18480 Control—includes items 25 to 28 ...	1 pr.
24	18473 Liner—Big End—(supplied Separately)	1
25	18546/1 Bolt—	2
26	22842 Nut—Big End ...	2
27	22748/2 Locking Washer ...	2
28	13945 Bush—Small End ...	1
29	16581/4 Cowl ...	1
30	18316 Base Stud Washer ...	2
31	285 Base Fixing Nut ...	2
32	18308 Top Fixing Bolt ...	2
33	9882 Washer ...	2
34	19753/4 Crankcase ...	1
35	18610 Tappet Bush ...	2
36	12888/1 Bush—Magneo Drive ...	1
37	6627 Plug ...	1
38	7544 Stud—Cylinder Fixing ...	4
39	11960 Flywheel Bearing Plate Fixing ...	4
40	18662/2 Driving Bearing Plate Fixing ...	4
41	6933 Governor Cover Fixing ...	4
42	19621 Tank Bracket Fixing ...	4
104	16361 Magneto Fixing ...	2
—	6374 Vacuum Valve Grating ...	3
—	4085 Disc ...	3
43	16732 Shield ...	1
44	10010 Fixing Screw ...	2
45	17690 Fixing Washer ...	2
46	12836 Bearing Plate—Flywheel Side ...	1

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Customers' patterns not returned unless specially requested.

Illus. Part No.	Title	No. OF
47	19728 Crankcase Bearing—Flywheel Side ...	1
48	12838 Seal—Flywheel Side ...	1
49	12837 Cup ...	1
50	12841 Plate Gasket—Flywheel Side ...	1
51	285 Fixing Nut ...	4
52	19614 Bearing Plate—Driving Side ...	1
53	19728 Bearing—Driving Side ...	1
54	12906 Seal ...	1
55	12907 Cup ...	1
56	12842 Plate Gasket ...	1
57	294 Fixing Nut ...	4
58	19963 Crankshaft ...	1
59	16729 Key—Pinion Fixing ...	1
60	16712/1 Flywheel Fixing ...	1
61	16072 Driving Side ...	1
62	19643 Pinion ...	1
63	14869/2 Cylinder Barrel with Valve Guides ...	1
64	16199 Stud—Head Fixing ...	2
65	16163 Silencer Fixing ...	4
66	14853 Inlet Pipe Fixing ...	2
67	12847 Valve Box Cover ...	1
68	10341 Gasket ...	1
69	12845 Base Gasket ...	1
70	303 Fixing Nut ...	1
71	12884/4 Head ...	1
72	14825 Gasket ...	1
73	16872 Fixing Bolt ...	2
74	9682 and Stud Washer ...	6
75	284 Stud Nut ...	4
76	12882 Flywheel Fan ...	1
77	12859 Fixing Nut ...	1
78	14076/1 Extractor Bolt ...	2
79	5165 Starter Boss ...	1
80	12893 Fixing Bolt ...	2
81	19515 Drive Rod ...	1
82	SA30275 Governor Gear Assembly (includes following six items)	1
—	19850 Governor Gear (Not Supplied Separately)	1
—	13059/1 Weight ...	2
—	12899 Fulcrum Pin ...	2
—	12872 Driving Spindle (Not Supplied separately)	1
—	13449 Gear Taper Peg ...	1
82A	22554 Actuating Rod ...	1
83	SA2645 Cover Assembly ...	1
84	12840 Gasket ...	1
85	3574 Fixing Nut ...	4
86	14770/1 Friction Plug ...	1
87	18625/1 Plunger ...	1
88	14772 Spring ...	1
89	14771 Locknut ...	1
90	14762 Lever—Start and Running ...	1
91	16620 Washer ...	1
92	14758 Fixing Bolt ...	1
93	SA2930 Control Arm Includes 16692 Screw ...	1
—	16692 Fixing Screw ...	1
94	18723 Spring ...	1

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MODEL 6 SPARE PARTS LIST

Illus. Part No.	Title	No. Of
95	Governor Control Spring Plunger	1
96	Adjusting Screw	1
97	Locknut	1
98	Inlet Pipe with Release Tap & Washer	1
99	Release Tap	1
100	Washer	1
101	Gasket	1
102	Fixing Nut	2
MA3143	Magneto	1
103	Driving Coupling	1
14414/2	H.T. Lead Complete, 16"	1
22807	Clip	1
16361	Screw	1
104	Fixing Stud—(C-case)	2
105	Fixing Washer	2
106	Nut	2
107	Petrol Tank with Cap	1
108	Filler Cap and Sealing Washer	1
22284	Sealing Washer	1
109	SA3470	1
110	Fixing Bracket	1
111	Fixing Bracket Distance Piece	1
112	Gasket	2
113	SA3427	4
114	MA3129	2
115	Filter and Tap	1
116	Washer	1
117	SA2583	1
118	SSA17	1
119	20987	1
120	6837/2	1
121	21502	1
122	12886	1
123	11677	2
124	19105/1	1
125	14671	1
126	285	2
127	5512	1
128	5210	1
129	12353	1
130	14967	1
131	16911	1
132	18593/2	1
133	21267/2	1
134	SA3493	1
135	14994	1
136	16001	2
137	16000	2
138	SA3072	1
139	19379	1
140	14818	1
141	14816	2
142	12856	2
143	16092	2
144	12854	2
145	12855	2
146	13961/1	1
147	13961/1	1
148	21306/1	1
149	19109	1
150	19130	2
151	16925	1
152	22574/1	1
153	13961/1	1

When Oil Bath Air Filter is fitted the following parts are necessary:

Illus. Part No.	Title	No. Of
137	MA3144	1
138	21306/1	1
139	19109	1
140	19130	2
141	16925	1
142	22574/1	1
143	13961/1	1

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Illus. No.	Part No.	Title	No. of
—	6374	Crankcase Vacuum Valve Grating ...	3
—	4085	" " Disc ...	3
43	16732	" " Shield ...	1
44	10010	" " Fixing Screw ...	2
45	17690	" " Shield Fixing Washer ...	2
46	13923	" " Bearing Plate—Flywheel Side ...	1
47	18339	" " —Flywheel Side ...	1
48	13928	" " Seal—Flywheel Side ...	1
49	13926	" " Cup—Flywheel Side ...	1
50	12841	" " Plate Gasket—Flywheel Side ...	1
51	285	" " Plate Fixing Nut ...	4
52	13957	" " Bearing Plate—Driving Side ...	1
53	18339	" " —Driving Side ...	1
54	13927	" " Seal ...	1
55	13925	" " Cup ...	1
56	13933	" " Plate Gasket ...	1
57	284	" " Fixing Nut ...	4
58	16735	" " Crankshaft ...	1
59	16729	" " Key—Pinion Fixing ...	1
60	16712/1	" " —Flywheel Fixing ...	1
61	16072	" " —Driving Side ...	1
62	16917	" " Pinion ...	1
63	14831	" " Cylinder Barrel with Valve Guides ...	1
64	16203	" " Stud—Head Fixing ...	6
65	16163	" " —Silencer Fixing ...	2
—	16163	" " —Inlet Pipe Fixing ...	2
—	14855	" " Valve Box Cover ...	1
67	13943	" " Gasket ...	1
68	10341	" " Base Gasket ...	1
69	13935	" " Fixing Nut ...	4
70	303	" " Head ...	1
71	13916/6	" " Gasket ...	1
72	14827	" " Fixing Bolt ...	2
73	16873	" " and Stud Washer ...	8
74	9682	" " Stud Nut ...	6
75	284	" " Flywheel Fan ...	1
76	13918	" " Fixing Nut ...	1
77	13929	" " Extractor Bolt ...	1
—	14076/1	" " Starter Boss ...	1
78	13920	" " Fixing Bolt ...	2
79	5165	" " Drive Rod ...	1
80	12893	" " Split Pin ...	1
81	19515	" " Governor Gear Assembly (includes following six items) ...	1
82	SA3028 S	" " Governor Gear (Not Supplied Separately) ...	1
—	19651	" " Weight ...	2
—	13059	" " Fulcrum Pin ...	2
—	12899	" " Driving Spindle (Not Supplied Separately) ...	1
—	12872	" " Gear Taper Peg ...	1
—	13449	" " Actuating Rod ...	1
82A	22554	" " Cover Assembly ...	1
83	SA2647	" " Gasket ...	1
84	13938	" " Fixing Nut ...	4
85	3574	" " Friction Plug ...	1
86	14770/1	" " Plunger ...	1
87	18625/1	" " Spring ...	1
88	14772	" " Locknut ...	1
89	14771	" " Lever—Start and Running ...	1
90	14762	" " Washer ...	1
91	16620	" " Start and Running Bolt ...	1
92	14758	" " ...	1

It is essential to quote the Engine Number with all symbols when ordering Spares owing to the different Engine parts fitted to various customers' equipment. Failure to do this may result with incorrect spares being supplied. Customers' Patterns not returned unless specially requested.

Illus. No.	Part No.	Title	No. of
93	SA2930	Governor Control Arm—Includes 16992 Screw ...	1
—	16692	" " Fixing Screw ...	1
94	19609	" " Spring ...	1
95	14096	" " Plunger ...	1
96	14097	" " Adjusting Screw ...	1
97	14098/1	" " Spring Adjusting Screw Locknut ...	1
98	SA3440	Inlet Pipe with Release Tap & Washer ...	1
99	22394	" " Release Tap ...	1
100	18317	" " Gasket ...	1
101	14836	" " Fixing Nut ...	2
102	285	" " Magneto ...	1
—	MA3143	" " H.T. Lead Complete, 16" ...	1
103	12861	" " Driving Coupling ...	1
104	16361	" " Fixing Stud—(C case) ...	2
105	18316	" " Washer ...	2
106	285	" " Nut ...	2
107	SA3362	Petrol Tank with Cap ...	1
108	SA3370	" " Filler Cap and Sealing Washer ...	1
—	22284	" " Cap Sealing Washer ...	1
109	SA3470	" " Fixing Bracket ...	1
110	19620	" " Fixing Bracket Distance Piece ...	1
111	12905	" " Gasket ...	2
112	4082	" " Nut ...	4
113	SA3427	" " Fixing Strap Assembly ...	2
114	MA3129	" " Filter ...	1
115	18617	" " Washer ...	1
116	SA2583	" " Pipe with Unions ...	1
—	SSA24	" " Piston Assembly, Includes Items 117 to 122 ...	1
117	19543	" " Piston—4 Ring Type ...	1
118	19274	" " —Compression, Top Groove ...	1
119	6638/2	" " Ring—Compression ...	2
120	21607	" " —Oil Scraper, Bottom Groove ...	1
121	9910	" " Pin ...	1
122	11677	" " Circlip ...	2
123	19106/1	" " Silencer ...	1
124	14826	" " Flange Gasket ...	1
102	285	" " Fixing Nut ...	1
—	5512	" " Spanner—Engine—X ...	1
—	5210	" " Engine—X ...	1
—	12353	" " Cylinder Head ...	1
—	14967	" " Sparking Plug ...	1
—	16911	" " Tommy Bar ...	1
125	18593/2	Sparkling Plug ...	1
126	21267/2	" " Suppressor & Protector ...	1
—	SA3493	" " Starting Handle Complete ...	1
127	14995	" " Tappet ...	2
128	16001	" " Head ...	2
—	16000	" " Disc ...	2
129	SA3079	Throttle Lever and Link Assembly ...	1
130	19379	" " Fixing Screw—Bottom ...	1
131	14828	" " Valve ...	2
132	14818	" " Guide—Inlet ...	1
—	14816/1	" " —Exhaust ...	1
133	12856	" " Cotter ...	2
134	16092	" " Spring—Inner ...	2
135	12854	" " —Outer ...	2
136	12855	" " Collar ...	2

When Oil Bath Air Filter is fitted the following parts are necessary:

137	MA3144	Air Filter—Oil Bath Type ...	1
138	21306/1	" " Support ...	1
139	19109	" " Elbow ...	1
140	19130	" " Elbow Clip ...	2
141	16925	" " Clip ...	1
—	13961/1	Carburettor Gasket (Extra) ...	1

It is essential to quote the Engine Number with all symbols when ordering Spare owing to the different Engine parts fitted to various customers' equipment. Failure to do this may result with incorrect spares being supplied. Customers' Patterns not returned unless specially requested.