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INDUSTRIAL ENGINES

MODELS 4/2, 4/3, 5 & 6
TYPE 1

Reference Book, Diagrams,
Spare Parts Lists

SB/P/04
6/60

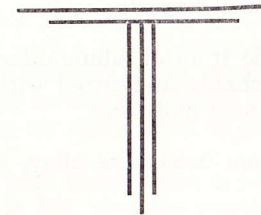


MODELS

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 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.
IMPORTANT.—Always pull starting handle up smartly to start; do not attempt to start by continuous turning.
- (f) When engine has started release the slow running lever.
- (g) 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.
- Piston.**—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.
- Carburetter.**—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, .0006" to .0014".
- Piston.**—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.
- 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.
- Piston.**—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.
- Carburetter.**—Make, Zenith. Type 24 T-2.
- 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, .0006" to .0014" Gudgeon pin and piston, .0002" to .0009".
- Piston.**—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.

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

Piston.—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.

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

Ignition.—Magneto. 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".

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 .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".

Piston.—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.

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

Piston.—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.

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

Ignition.—Magneto. 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".

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

Undersize 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".

Piston.—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

WINTER —CASTROLITE

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) Piston.

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 splitpin 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.

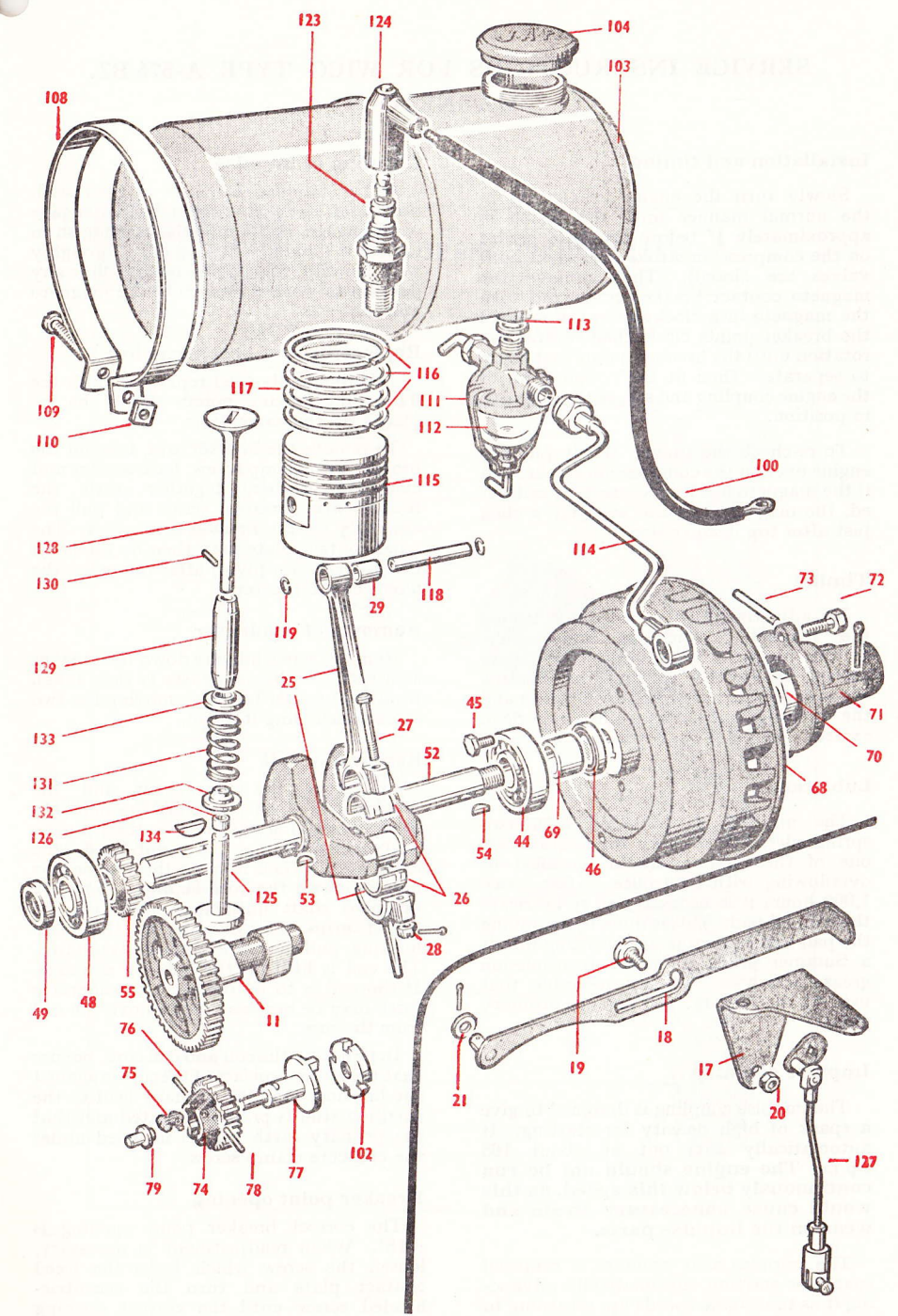
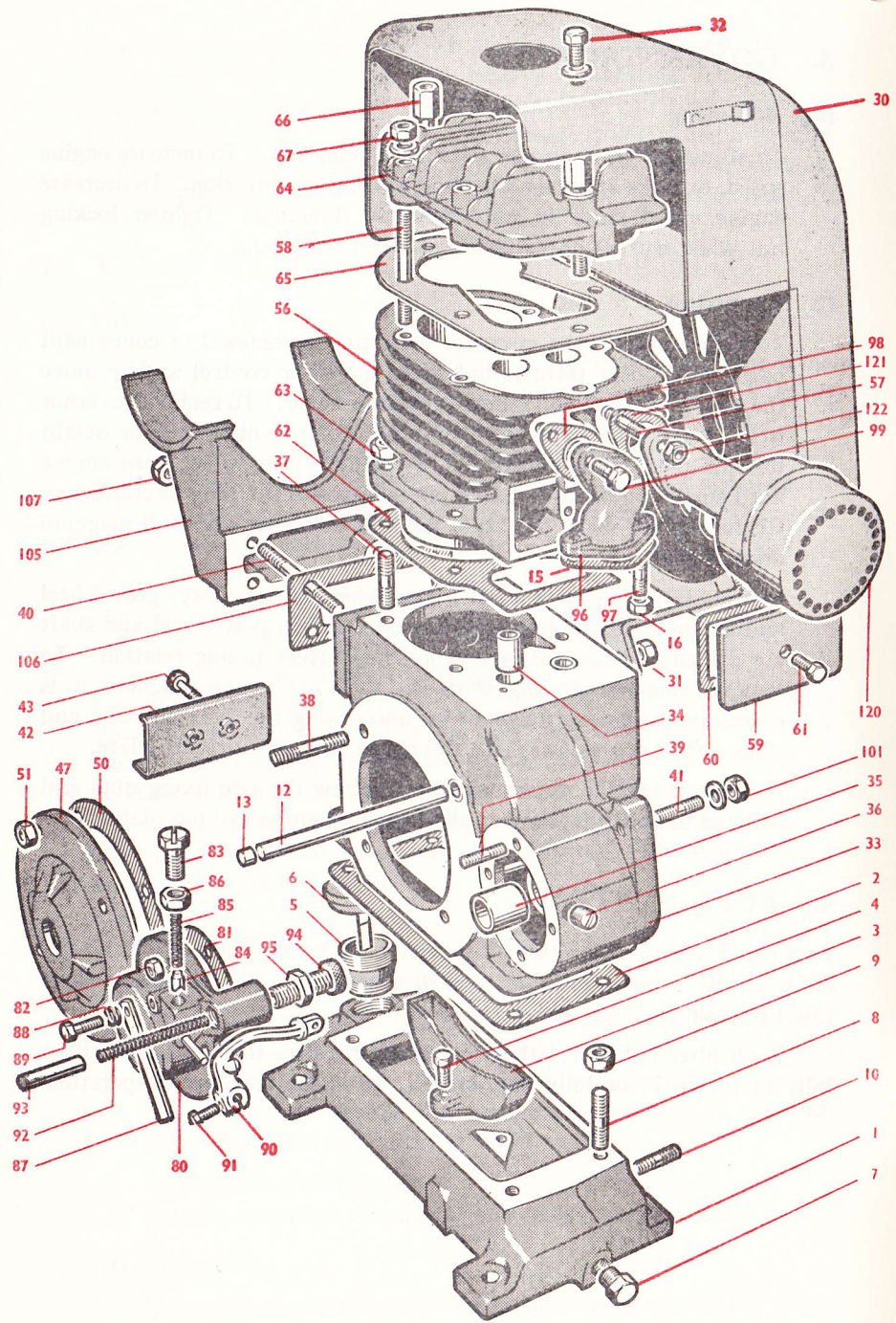
NOTE.—If replacement of the gear wheel is necessary, gear wheel and magneto shaft complete must be fitted as gear wheel and shaft are drilled and reamed in position for correct timing relation. To remove magneto driving shaft on the "A" type magneto it is necessary to remove magneto by unscrewing the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



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 coil 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 & SETS	PARTS IN EXPLODED VIEW
16X12IC H.T. LEAD GROUP (State Length)		
X2089 Breaker Box Cover Unit		
X1589 Cam Unit	06407 Cam Fixing Set	
	1373 Cam	
	06401 Contact Set	
X2088 Breaker Box Unit	06402 Box Screws and L.W. Set	
	06524 Cover Fixing Set	
	06400 Condenser Set	
	X2175 Breaker Box	
X1407 Cover Unit	16-463 H.T. Lead Terminal	
	06406 Fixing Set	
X1411 Coil Unit	06399 Coil Fixing Set	
	X1410 Coil Group	
	X1409 Core Group	
B140X Stop Button Unit		
X1638 Main Housing Unit (Rotor not incl.)	06390 Ground Lead Set	
	06393 Oil Instruction Plate Set	
	06391 Oiler Set	
	06392 Bearing Set	
X1592 Rotor		
X1649B Oiling Disc Unit		
X1260 End Plate Unit	06395 Stop Set	
	06396 Plate Fixing Set	
X1635 Impulse Unit	01421 Driven Flange Set	
	06180 Drive Spring	
	00783 Drive Cup Set	
	06398 Lock Nut Set	

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 spark occurs 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 an 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 $\frac{1}{32}$ ". 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.

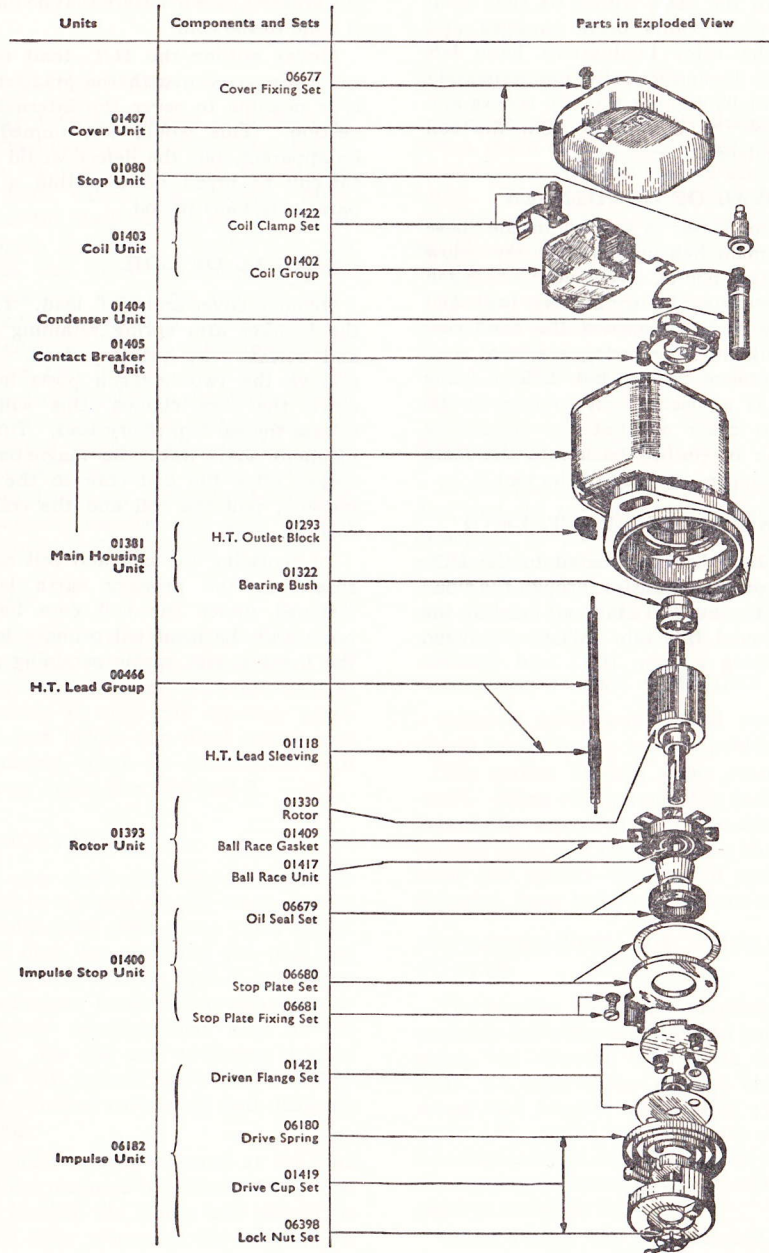
Never solder the H.T. lead to the tab because even with the greatest care it is possible to sever the internal connection. This would not immediately be apparent, but the defect would cause the coil to break down within a comparatively short period.

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

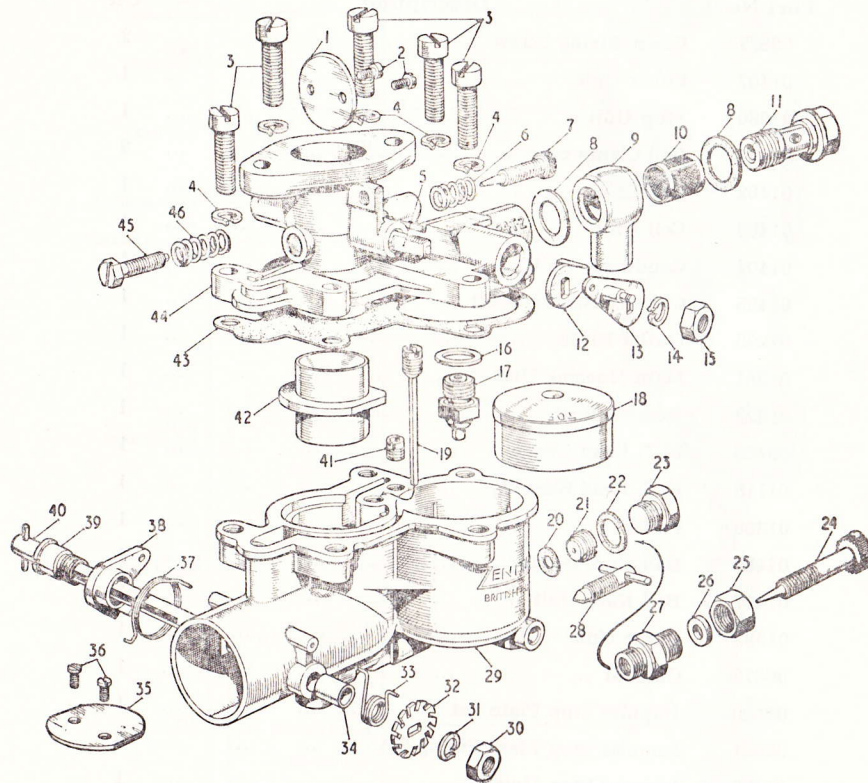


Part No.	Description	No. Off
06677	Cover Fixing Screw	2
01407	Cover Unit	1
01080	Stop Unit	1
01422	Coil Clamp Set	2
01402	Coil Group	1
01403	Coil Unit... ..	1
01404	Condenser Unit... ..	1
01405	Contact Breaker Unit	1
01293	Outlet Block	1
01381	Main Housing Unit	1
01322	Bearing Bush	1
00466	H.T. Lead Group	1
01118	H.T. Lead Slewing	1
01330	Rotor	1
01409	Ball Race Gasket	1
01417	Ball Race Unit	1
01393	Rotor Unit	1
06679	Oil Seal	1
06680	Impulse Stop Plate Set	1
06681	Impulse Stop Plate Fixing Set	3
01400	Impulse Stop Unit	1
01421	Driven Flange Set	1
06180	Drive Spring	1
01419	Drive Cup Set	1
06398	Locknut Set	1
06182	Impulse Unit	1

EXPLODED DRAWING OF WIPAC CJ 936 MAGNETO

ZENITH CARBURETTER

24T-2 53 m/m. flange centres



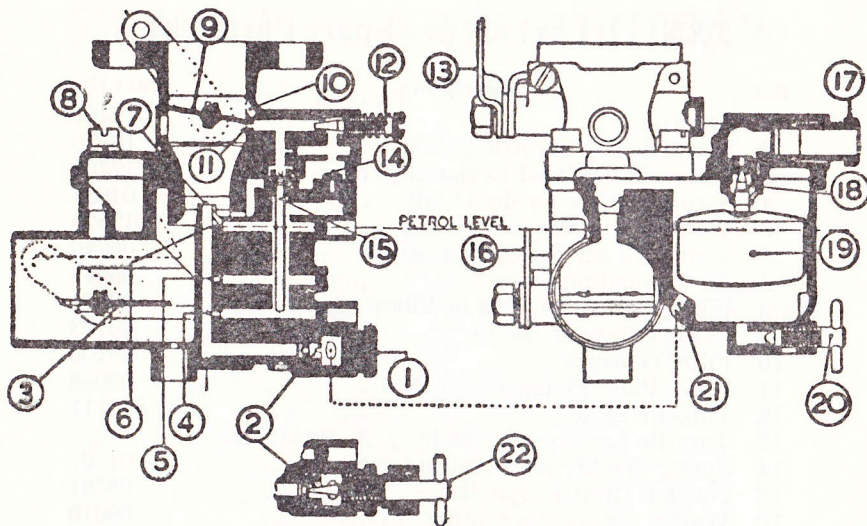
STANDARD SETTING

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 Carburetter 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	06098
12	Throttle Stop	013111
13	Throttle Lever (Supplied by J. A. Prestwich)	
14	Spring Washer for Throttle Lever	04691
15	Nut for Throttle Spindle	05581
16	Washer for Needle Seating	09619
17	Needle and Seating (1.5 m/m)* (State size)	09121
18	Float	012318
19	Slow Running Tube* (State size)	015408
20	Washer for Main Jet	06167
21	Main Jet* (State size)	013121
22	Washer for Plug over Main Jet	04625
23	Plug over Main Jet (used for c/s 1406 and 1407 only)	012650
24	Needle Valve for Main Jet Adjustment	013603
25	Packing Nut for Main Jet Adjustment	P-12803
26	Packing for do.	P-1503
27	Adaptor for Main Jet Adjustment	012850
	(Items 24 to 27 used for c/s 1425 and 1426 only).	
28	Drain Valve Plug (used for c/s 1425 and 1426 only)	F-1410
29	Carburetter Bowl (Ass'mb'd with items 37, 38 & 39)	016314
30	Nut for Strangler Spindle	05581
31	Spring Washer for do.	04691
32	Spring Anchor Plate	013110
33	Spring for Strangler Spindle (Automatic)	013109
34	Sleeve for Strangler Spindle	013108
35	Strangler Flap	012449
36	Screw Fixing Strangler Flap (2 off)	16776
37	Spring for Strangler Lever	013107
38	Strangler Lever	014335
39	Bearing for Strangler Lever	013104
40	Strangler Spindle	013114
41	Air Jet* (State size)	012713
42	Choke Tube* (State size)	013119
43	Gasket (Bowl to Barrel)	012631
44	Carburetter Barrel	013073
45	Throttle Stop Screw	05923
46	Spring for do.	04611

* IMPORTANT.—State size required



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

GENERAL DESCRIPTION

The 24T-2 Carburettor 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 off-set 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 carburettor 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 carburettor as simple as possible we have used one principle jet and a slow running jet. Suitable air bleeding is arranged to atomise the fuel and to maintain a correct mixture strength under all conditions of engine operation. The drawing shows 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), (5) and (6), 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 atomised by an air supply taken through the main air intake and controlled by the screw (12). 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 screwdriver when removing the main jet in order to prevent damage to the thread in the carburettor 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, if 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 carburettor.

SLOW RUNNING ADJUSTMENT

This should be carried out when the engine is hot, the minimum running speed is usually set around 550/600 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, as the engine warms up the control operating the strangler must be moved to the fully open position.

HOT STARTING (see also page 3)

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 carburettor 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 carburettor 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 spindle 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 carburettor take care to use a thin flange gasket as a thick gasket may tend to squeeze out causing the flange on the carburettor to bend and this would allow an air leak to occur. When dealing with a flange in this way it can be trued up in the usual manner with a file. Before attempting to start the engine, subsequent to refitting the carburettor, 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 carburettor 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 carburettor. In any case of difficulty our own Service Department or the nearest Zenith Carburettor Service Station should be consulted.

MODEL 4/2 SPARE PARTS LIST

Illus. No.	Part No.	Title	No. Off
1	18572	Base—Engine ...	1
2	13054	" Gasket ...	1
3	19926/1	" 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	" " " Nut ...	4
10	13962	" Stud—Cowl Fixing ...	2
11	16894	Camshaft ...	1
12	19671	" Spindle ...	1
13	13023	" End Cap ...	1
—	MA3142	Carburetter ...	1
15	13961/1	" Flange Gasket ...	1
16	285	" Fixing Nut ...	2
17	19517	" Choke Lever Bracket ...	1
18	SA2912	" " Lever ...	1
21	19435	" " " Washer ...	1
19	19749	" " " Screw ...	1
20	6731/1	" " " Locknut ...	1
25	18479	Conrod ...	1
26	18474	" Liner—Big End ...	1 pr.
27	18546/1	" Bolt— " ...	2
—	22748/2	" " Locking Washer ...	2
28	22842	" " Nut—Big End ...	2
29	6527	" Bush—Small End ...	1
30	18674/2	Cowl ...	1
31	285	" Base Fixing Nut ...	2
32	14555	" Top Fixing Bolt ...	1
—	18316	" " " Washer ...	1
33	18540	Crankcase ...	1
34	18611	" Tappet Bush ...	2
35	14669	" Bush—Magneto Drive ...	1
36	6627	" Plug... ...	1
37	12222	" Stud—Cylinder Fixing ...	4
38	16163	" " —Cover Plate Fixing ...	4
39	6933	" " —Governor Cover Fixing ...	4
40	12864	" " —Tank Bracket Fixing ...	4
—	6374	" Vacuum Valve Grating ...	3
—	4085	" " " Disc ...	3
42	19137	" " " Shield ...	1
43	10010	" " " Fixing Screw ...	2
—	17690	" " " Washer ...	2
44	18346	" Bearing—Flywheel Side ...	1
46	14630	" " Seal ...	1
—	14662	" " " Cup ...	1
47	14605/1	" Plate—Driving Side ...	1
48	18346	" Bearing—Driving Side ...	1
49	14630	" " Seal ...	1
—	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. No.	Part No.	Title	No. Off
50	14664	Crankcase Bearing Plate Gasket ...	1
—	14629	" " Recess Washer ...	1
51	285	" " Plate Fixing Nut ...	4
52	14603	Crankshaft ...	1
53	16729	" Key—Pinion Fixing ...	1
54	16712/1	" " —Flywheel Fixing ...	1
134	18621	" " —Driving Side ...	1
55	16895	" Pinion ...	1
56	14602	Cylinder Barrel with Valve Guides ...	1
57	16163	" " Stud—Manifold Fixing ...	2
58	10080	" " " —Head Fixing ...	5
—	14785	" " " —Valve Box Cover Fixing ...	1
59	14624	" " Valve Box Cover ...	1
60	14625	" " " " " Gasket ...	1
—	3574	" " " " " Fixing Nut ...	1
—	SA3437	" Manifold with Release Tap & Washer ...	1
—	22394	" " Inlet Release Tap ...	1
—	18317	" " Washer ...	1
—	14626	" " Gasket ...	1
—	4082	" " Fixing Nut ...	2
—	16163	" " Carburetter Fixing Stud ...	2
62	14621	" Base Gasket... ...	1
63	284	" " Fixing Nut ...	4
64	14609/4	Head ...	1
65	21635	" " Gasket... ...	1
66	18675	" " Fixing Bolt ...	1
—	18316	" " " and Stud Washer ...	6
67	285	" " " Stud Nut ...	5
68	18607	Flywheel Fan ...	1
70	16684	" " Fixing Nut ...	1
—	14076/1	" " Extractor Bolt ...	1
71	14613	" Starter Boss... ...	1
72	7998	" " Fixing Bolt ...	2
73	12893	" " Drive Rod ...	1
—	SA2511S	Governor Gear Assembly Comprising Items 74 to 79	1
74	16896	Governor Gear (Not Supplied Separately) ...	1
75	13059/1	" Weight ...	2
76	12899	" " Fulcrum Pin ...	2
77	14668	" Driving Spindle (Not Supplied Separately)	1
78	13449	" Gear Taper Peg ...	1
79	22554	" Actuating Rod ...	1
80	SA2645	" Cover Assembly ...	1
81	12840	" " Gasket ...	1
82	3574	" " Fixing Nut... ...	4
83	14770/1	" Friction Plug ...	1
84	18625/1	" " Plunger ...	1
85	14772	" " Spring ...	1
86	14771	" " Locknut ...	1
87	14762	" Lever—Start and Running ...	1
88	16620	" " Washer ...	1
89	14758	" " Fixing Screw ...	1
90	SA2926	" Control Arm Includes Item 91 ...	1
91	16692	" " Fixing Screw ...	1
92	18744	" " Spring ...	1
93	14096	" " Plunger ...	1
94	14097	" " Adjusting Screw ...	1
95	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.

Illus. No.	Part No.	Title	No. Off
—	MA3227	Magneto	1
100	18957	H.T. Lead Complete, 13½"	1
—	14325	Fixing Bolt	3
—	18315	" Washer	3
102	12861	Driving Coupling	1
—	18865	" " Shield	1
—	14941/1	" " " Fixing Screw	1
103	SA3362	Petrol Tank with Cap	1
104	SA3370	" " Filler Cap	1
—	22284	" " " Sealing Washer	1
105	SA3469	" " Fixing Bracket	1
106	12905	" " " Gasket...	1
107	285	" " " Nut	4
108	SA3427	" " Fixing Strap Assembly	2
111	MA3129	" Filter and Tap	1
113	18617	" Washer	1
114	SA2592	" Pipe with Unions	1
—	SSA25	Piston Assembly, Includes items 115 to 119	1
115	19540	Piston	1
116	6633/3	" Ring—Compression	2
117	22499	" " —Compression, Top Groove	1
—	14183	" " —Oil Scraper, Bottom Groove...	1
118	9900	" Pin—Gudgeon...	1
119	11676	" " Circlip	2
120	19104	Silencer...	1
—	5512	Spanner—Engine— $\frac{1}{8}$ " x $\frac{3}{8}$ "	1
—	16579	" —Cylinder Head	1
—	14967	" —Sparking Plug	1
—	16811	" Tommy Bar	1
123	18593/2	Sparking Plug	1
124	21267/2	" " Suppressor & Protector	1
—	SA3493	Starting Handle Complete	1
125	16071	Tappet	2
127	SA3310	Throttle Lever & Link Assembly	1
—	19379	Throttle Lever and Link Fixing Screw (Bottom)	1
128	14622	Valve	2
126	7451	" End Cap	2
—	13090	" " Shim	2
129	5408	" Guide—Inlet and Exhaust	2
130	12930	" Cotter	2
131	7720	" Spring	2
133	6337	" Collar—Top	2
132	5502	" " —Bottom	2

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

—	MA3144	Air Filter (Oil Bath Type)	1
—	16925	" " Clip	1
—	19109	" " Elbow	1
—	19130	" " Elbow Clip	2
—	21306/1	" " Support	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.

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Customer's Patterns not returned unless specially requested.

MODEL 4/3 SPARE PARTS LIST

Illus. No.	Part No.	Title	No. Off
1	18572	Base—Engine	1
2	13054	" Gasket	1
3	19926/1	" 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	" " Nut	4
10	13962	" Stud—Cowl Fixing	2
11	16894	Camshaft	1
12	19671	" Spindle	1
13	21608	" " End Cap	1
—	MA3142	Carburettor	1
15	13961/1	" Flange Gasket	1
16	285	" Fixing Nut	2
17	19517	" ChokeLever Bracket	1
18	SA2912	" " Lever	1
21	19435	" " " " Washer	1
19	19749	" " " Screw	1
20	6731/1	" " " Locknut	1
25	18479	Conrod	1
26	18474	" Liner—Big End	1 pr.
27	18546/1	" Bolt— " "	2
—	22748/2	" " Locking Washer	2
28	22342	" " Nut—Big End	2
29	6527	" Bush— Small End	1
30	SA3482S	Cowl complete	1
—	21692	Cowl Side Plate	1
—	14941	Cowl Side Plate Fixing Screw	2
31	285	" Base Fixing Nut	2
32	19705	" Top Fixing Bolt	1
—	18316	" " " Washer	1
33	21546	Crankcase	1
34	18535	" Tappet Bush	2
35	14669	" Bush—Magneto Drive	1
36	6627	" Plug	1
37	12222	" Stud—Cylinder Fixing	4
38	16163	" " —Cover Plate Fixing	4
39	6933	" " —Governor Cover Fixing	4
40	12864	" " —Tank Bracket Fixing	4
41	16361	" " —Magneto Fixing	2
—	6374	" Vacuum Valve Grating	3
—	4085	" " Disc	3
42	19137	" " " Shield	1
—	17690	" " " Fixing Washer	2
43	10010	" " " Fixing Screw	2
44	19612	" Bearing—Flywheel Side...	1
45	16269	" " Retaining Screw	3
46	21548	" " Seal—Flywheel Side	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. Off
47	21545	Crankcase Bearing Plate—Driving Side	1
48	19612	" Bearing—Driving Side	1
49	21547	" Seal—Driving Side	1
50	14664	" Plate Gasket	1
51	285	" Fixing Nut	4
52	21934	Crankshaft	1
53	16729	" Key—Pinion Fixing	1
54	18431	" —Flywheel Fixing	1
134	18431	" —Driving Side	1
55	19633	" Pinion	1
56	16447	Cylinder Barrel with Valve Guides	1
57	16163/1	" Stud—Silencer Fixing—Top	1
57	16163	" —Silencer Fixing—Bottom	1
—	16163	" —Inlet Pipe Fixing	2
58	12864	" —Head Fixing	6
59	14624	" Valve Box Cover	1
60	14625	" " " " Gasket	1
61	14502	" " " " Fixing Bolt	1
62	16455	" Base Gasket...	1
63	284	" Fixing Nut	4
64	16448/1	" Head	1
65	16449	" Gasket...	1
—	18316	" Fixing Stud Washer	6
67	285	" Nut	4
—	19704	" Nut—Long	2
68	16443	Flywheel Fan	1
69	16531	" Distance Piece	1
70	12859	" Fixing Nut	1
—	14076/1	" Extractor Bolt	1
71	14613	" Starter Boss	1
72	7998	" " " Fixing Bolt	2
73	12893	" " " Drive Rod	1
—	SA2511S	Governor Gear Assembly, comprising items 74 to 79	1
74	16896	Governor Gear (not supplied separately)	1
75	13059/1	" Weight	2
76	12899	" Fulcrum Pin	2
77	14668	" Driving Spindle (not supplied separately)	1
78	13449	" Gear Taper Peg	1
79	22554	" Actuating Rod	1
80	SA2645	" Cover Assembly	1
81	12840	" Gasket	1
82	3574	" Fixing Nut	4
83	14770/1	" Friction Plug	1
84	18625/1	" Plunger	1
85	14772	" Spring	1
86	14771	" Locknut	1
87	14762	" Lever—Start and Running	1
88	16620	" Washer	1
89	14758	" Fixing Bolt	1
90	SA2926	" Control Arm—includes item 91	1
—	18315	" Washer	1
91	16692	" Fixing Screw	1
92	18744	" Spring	1
93	14096	" Plunger	1
94	14097	" Adjusting Screw	1
95	14098/1	" Locknut	1

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Customers' Patterns not returned unless specially requested.

Illus. No.	Part No.	Title	No. Off
96	SA3438	Inlet Pipe with Release Tap & Washer	1
—	22394	" Release Tap	1
—	18317	" Release Tap Washer	1
97	16163	" Stud—Carburettor Fixing	2
98	14872	" Gasket	1
—	285	" Fixing Nut	2
—	MA3143	Magneto	1
100	—	" H.T. Lead Complete, 13 $\frac{1}{2}$ "	1
—	18316	" Fixing Washer	2
101	285	" Nut	2
102	12861	" Driving Coupling	1
103	SA3362	Petrol Tank with Cap	1
104	SA3370	" Filler Cap	1
—	22284	" " " Sealing Washer	1
105	SA3469	" Fixing Bracket	1
106	12905	" " " Gasket...	1
107	285	" " " Nut	4
108	SA3427	" Fixing Strap Assembly	2
111	MA3129	" Filter and Tap...	1
113	18617	" Washer	1
114	SA2592	" Pipe with Unions	1
—	SA3108	Piston Assembly, including items 115 to 119	1
115	19541/1	Piston	1
116	22202	" Ring—Compression	1
117	19276	" —Compression, Top Groove	1
—	21656	" —Oil Scraper, Bottom Groove...	1
118	9902	" Pin	1
119	11676	" Circlip	2
120	19105/1	Silencer	1
121	14871	" Gasket	1
122	285	" Fixing Nut	2
—	5512	Spanner—Engine— $\frac{1}{4}$ " x $\frac{1}{2}$ "	1
—	16579	" —Cylinder Head	1
—	14967	" —Sparking Plug	1
—	16811	" Tommy Bar	1
123	18593/2	Sparking Plug	1
124	21267/2	" Suppressor & Protector	1
—	SA3493	Starting Handle Complete	1
125	16491	Tappet	2
127	SA3310	Throttle Lever and Link Assembly	1
—	19379	Throttle Levers and Link Fixing Screw (Bottom)	1
128	14202	Valve	2
126	16721	" End Cap	2
—	13090	" " Shim	2
129	5408	" Guide—Inlet and Exhaust	2
130	12930	" Cotter	2
131	7720	" Spring	2
133	16720	" Collar—Top	2
132	5502	" —Bottom	2

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

—	MA3144	Air Filter (Oil Bath Type)	1
—	16925	" Clip	1
—	19109	" Elbow	1
—	19130	" Elbow Clip	2
—	21306/1	" Support	1
—	19687	" Steady	1
—	13961/1	Carburettor Gasket (Extra)	1

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Customers' Patterns not returned unless specially requested.

MODEL 5 SPARE PARTS LIST

Illus. No.	Part No.	Title	No. Off
1	18564	Base—Engine ...	1
2	14119	" Gasket ...	1
3	19805	" Oil Trough ...	1
4	10341	" " " Fixing 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	" " Nut ...	4
10	13962	" Stud—Cowl Fixing ...	2
11	16897	Camshaft ...	1
12	13972	" Spindle ...	1
13	11957	" End Cap ...	1
—	MA3142	Carburetter ...	1
15	13961/1	" Flange Gasket ...	1
—	7998	" Fixing Bolt ...	2
16	285	" Nut ...	2
17	19517	" Choke Lever Bracket ...	1
18	SA2912	" " Lever ...	1
21	19435	" " " Washer ...	1
19	19749	" " " Screw ...	1
20	6731/1	" " " Locknut ...	1
25	18480	Conrod ...	1
26	18473	" Liner—Big End ...	1 pr.
27	18546/1	" Bolt— " ...	2
—	22748/2	" " Locking Washer ...	2
28	22842	" " Nut—Big End ...	2
29	13945	" Bush—Small End ...	1
30	16581/4	Cowl ...	1
—	18316	" Base Stud Washer ...	2
31	285	" Base Fixing Nut ...	2
32	18308	" Top Fixing Bolt ...	2
—	9682	" " " Washer ...	2
33	19753/4	Crankcase ...	1
34	18610	" Tappet Bush ...	2
35	12888/1	" Bush—Magneto Drive ...	1
36	6627	" Plug ...	1
37	7544	" Stud—Cylinder Fixing ...	4
—	11960	" " —Flywheel Bearing Plate Fixing ...	4
38	18662/2	" " —Driving Bearing Plate Fixing ...	4
39	6933	" " —Governor Cover Fixing ...	4
40	19621	" " —Tank Bracket Fixing ...	4
41	16361	" " —Magneto Fixing ...	2
—	6374	" Vacuum Valve Grating ...	3
—	4085	" " Disc ...	3
42	16732	" " Shield ...	1
—	17690	" " " Fixing Washer ...	2
43	10010	" " " Fixing Screw ...	2
—	12836	" Bearing Plate—Flywheel Side ...	1

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Customers' patterns not returned unless specially requested.

Illus. No.	Part No.	Title	No. Off
44	19728	Crankcase Bearing—Flywheel Side ...	1
46	12838	" Seal—Flywheel Side ...	1
—	12837	" " Cup ...	1
—	12841	" " Plate Gasket—Flywheel Side..	1
—	285	" " Fixing Nut ...	4
47	19644	" Bearing Plate—Driving Side ...	1
48	19728	" Bearing—Driving Side ...	1
49	12906	" Seal ...	1
—	12907	" " Cup ...	1
50	12842	" " Plate Gasket ...	1
51	284	" " Fixing Nut ...	4
52	19963	Crankshaft ...	1
53	16729	" Key—Pinion Fixing ...	1
54	16712/1	" " —Flywheel Fixing ...	1
134	16072	" " —Driving Side ...	1
55	19643	" Pinion ...	1
56	14869/2	Cylinder Barrel with Valve Guides ...	1
57	16163	" Stud—Silencer Fixing ...	2
—	16163	" " —Inlet Pipe Fixing ...	2
58	16199	" " —Head Fixing ...	4
59	14853	" Valve Box Cover ...	1
60	12847	" " " " " Gasket ...	1
61	10341	" " " " " Bolt ...	1
62	12845	" Base Gasket... ..	1
63	303	" Fixing Nut ...	1
64	12884/4	Head ...	1
65	14825	" Gasket ...	1
66	16872	" Fixing Bolt ...	2
—	9682	" " " and Stud Washer ...	6
67	284	" " Stud Nut ...	4
68	12852	Flywheel Fan ...	1
70	12859	" Fixing Nut ...	2
—	14076/1	" Extractor Bolt ...	1
71	13920	" Starter Boss ...	1
72	5165	" " Fixing Bolt ...	2
73	12893	" " Drive Rod ...	1
—	SA3027S	Governor Gear Assembly Incorporates Items 74 to 79	1
74	19850	Governor Gear (Not Supplied Separately) ...	1
75	13059/1	" Weight ...	2
76	12899	" Fulcrum Pin ...	2
77	12872	" Driving Spindle (Not Supplied separately)	1
78	13449	" Gear Taper Peg ...	1
79	22554	" Actuating Rod ...	1
80	SA2645	" Cover Assembly ...	1
81	12840	" Gasket ...	1
82	3574	" Fixing Nut ...	4
83	14770/1	" Friction Plug ...	1
84	18625/1	" Plunger ...	1
85	14772	" Spring ...	1
86	14771	" Locknut ...	1
87	14762	" Lever—Start and Running ...	1
88	16620	" Washer ...	1
89	14758	" Fixing Bolt ...	1
90	SA2930	Control Arm Includes Item 91	1
91	16692	" Fixing Screw ...	1
92	18723	" Spring ...	1

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Customers' Patterns not returned unless specially requested.

Illus. No.	Part No.	Title	No. Off
93	14096	Governor Control Spring Plunger ...	1
94	14097	" " Adjusting Screw ...	1
95	14098/1	" " " " Locknut ...	1
96	SA3439	Inlet Pipe with Release Tap & Washer ...	1
—	22394	" " Release Tap... ..	1
—	18317	" " " " Washer ...	1
98	14872	" " Gasket ...	1
—	285	" " Fixing Nut ...	2
—	MA3143	Magneto ...	1
100	—	" H.T. Lead Complete, 16" ...	1
—	18316	" Fixing Washer ...	2
101	285	" Nut ...	2
102	12861	" Driving Coupling ...	1
103	SA3362	Petrol Tank with Cap ...	1
104	SA3370	" " Filler Cap ...	1
—	22284	" " " " Sealing Washer ...	1
—	19620	" " Fixing Bracket Distance Piece ...	1
105	SA3470	" " Fixing Bracket ...	1
106	12905	" " " " Gasket... ..	2
107	4082	" " " " Nut ...	4
108	SA3427	" " Fixing Strap Assembly ...	2
111	MA3129	" Filter and Tap... ..	1
113	18617	" " Washer ...	1
114	SA2583	" Pipe with Unions ...	1
—	SSA17	Piston Assembly, Including items 115 to 119 ...	1
115	20987	Piston ...	1
116	6637/2	" Ring—Compression ...	1
117	19275	" " —Compression, Top Groove ...	1
—	21502	" " —Oil Scraper, Bottom Groove... ..	1
118	12886	" Pin ...	1
119	11677	" Circlip ...	2
120	19105/1	Silencer ...	1
121	14871	" Flange Gasket ...	1
122	285	" Fixing Nut ...	2
—	5512	Spanner—Engine— $\frac{1}{8}$ " x $\frac{3}{8}$ " ...	1
—	5210	" —Engine— $\frac{1}{4}$ " ...	1
—	12353	" —Cylinder Head ...	1
—	14967	" —Sparking Plug ...	1
—	16811	" Tommy Bar ...	1
123	18593/2	Sparking Plug ...	1
124	21267/2	" " Suppressor & Protector ...	1
—	SA3493	Starting Handle Complete ...	1
125	14994	Tappet ...	2
126	16001	" Head ...	2
—	16000	" Disc ...	2
127	SA3072	Throttle Lever and Link Assembly ...	1
—	19379	" " " " Fixing Screw (Bottom) ...	1
128	14818	Valve ...	2
129	14816	" Guide—Inlet and Exhaust ...	2
130	12856	" Cotter ...	2
—	16092	" Spring—Inner ...	2
131	12854	" " —Outer... ..	2
132	12855	" " Collar... ..	2

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

—	MA3144	Air Filter ...	1
—	16925	" " Clip ...	1
—	19109	" " Elbow ...	1
—	19130	" " Elbow Clip ...	2
—	21306/1	" " Support ...	1
—	22574/1	" " Steady ...	1
—	13961/1	Carburetter Gasket (Extra) ...	1

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MODEL 6 SPARE PARTS LIST

Illus. No.	Part No.	Title	No. Off
1	18563	Base—Engine ...	1
2	13934	" Gasket ...	1
3	19927	" Oil Trough ...	1
4	10341	" " Fixing Bolt ...	2
5	16590	" " Filler Tube ...	1
6	SA2766	" " Cap and Dipstick ...	1
7	16583	" " Drain Plug... ..	1
8	18727	" Fixing Stud—Short—Rear ...	2
—	18895	" " —Long—Front ...	2
9	5005	" " " " Nut ...	4
10	13962	" Stud—Cowl Fixing ...	2
11	16916	Camshaft ...	1
12	13940	" Spindle ...	1
13	11957	" " End Cap ...	1
—	MA3142/2	Carburetter ...	1
15	13961/1	" Flange Gasket ...	1
—	7998	" Fixing Bolt ...	2
16	285	" Nut ...	2
17	19517	" Choke Lever Bracket ...	1
18	SA2912	" " Lever ...	1
21	19435	" " " " Washer ...	1
19	19749	" " " " Screw ...	1
20	6731/1	" " " " Locknut ...	1
25	18481	Conrod ...	1
26	18475	" Liner—Big End ...	1 pr.
27	18609/1	" Bolt— " " ...	2
—	22748/4	" " Locking Washer ...	2
28	22843	" " Nut—Big End ...	2
29	6526	" Bush—Small End ...	1
30	16582/2	Cowl ...	1
—	18316	" Base Stud Washer ...	2
31	285	" " Fixing Nut ...	2
32	18308	" Top Fixing Bolt ...	2
—	9682	" " " " Washer ...	2
33	19743	Crankcase ...	1
34	13872	" Tappet Bush ...	2
35	12888/1	" Bush—Magneto Drive ...	1
36	6627	" Plug ...	1
37	7544	" Stud—Cylinder Fixing ...	4
—	11960	" —Flywheel Bearing Plate Fixing ...	4
38	12222	" " —Driving Bearing Plate Fixing ...	4
39	6933	" " —Governor Cover Fixing ...	4
40	19621	" " —Tank Bracket Fixing ...	4
41	16361	" " —Magneto Fixing ...	2

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Customers' Patterns not returned unless specially requested.

Illus. No.	Part No.	Title	No. Off
—	6374	Crankcase Vacuum Valve Grating ...	3
—	4085	" " " Disc ...	3
42	16732	" " " Shield ...	1
—	17690	" " " Shield Fixing Washer ...	2
43	10010	" " " Fixing Screw ...	2
—	13923	" " Bearing Plate—Flywheel Side ...	1
44	18339	" " —Flywheel Side ...	1
46	13928	" " Seal—Flywheel Side ...	1
—	13926	" " " Cup—Flywheel Side ...	1
—	12841	" " Plate Gasket—Flywheel Side... 1	1
—	285	" " Plate Fixing Nut ...	4
47	13957	" " Bearing Plate—Driving Side ...	1
48	18339	" " —Driving Side ...	1
49	13927	" " Seal ...	1
—	13925	" " " Cup ...	1
50	13933	" " Plate Gasket ...	1
51	284	" " Fixing Nut ...	4
52	16735	Crankshaft ...	1
53	16729	" " Key—Pinion Fixing ...	1
54	16712/1	" " —Flywheel Fixing ...	1
134	16072	" " —Driving Side ...	1
55	16917	" " Pinion ...	1
56	14831	Cylinder Barrel with Valve Guides ...	1
57	16163	" " Stud—Silencer Fixing ...	2
—	16163	" " —Inlet Pipe Fixing ...	2
58	16203	" " " —Head Fixing ...	6
59	14855	" " Valve Box Cover ...	1
60	13943	" " " " " Gasket ...	1
61	10341	" " " " " Screw ...	1
62	13935	" " Base Gasket... ..	1
63	303	" " Fixing Nut ...	4
64	13916/6	" " Head... ..	1
65	14827	" " Gasket ...	1
66	16873	" " Fixing Bolt ...	2
—	9682	" " " " and Stud Washer ...	8
67	284	" " " " Stud Nut ...	6
68	13918	Flywheel Fan ...	1
70	13929	" " Fixing Nut ...	1
—	14076/1	" " Extractor Bolt ...	1
71	13920	" " Starter Boss ...	1
72	5165	" " " Fixing Bolt ...	2
73	12893	" " " Drive Rod ...	1
—SA3028.S		Governor Gear Assembly Comprising Items 74 to 79	1
74	19851	Governor Gear (Not Supplied Separately) ...	1
75	13059	" " Weight ...	2
76	12899	" " Fulcrum Pin ...	2
77	12872	" " Driving Spindle (Not Supplied Separately) ...	1
78	13449	" " Gear Taper Peg ...	1
79	22554	" " Actuating Rod ...	1
80	SA2647	" " Cover Assembly ...	1
81	13938	" " Gasket ...	1
82	3574	" " Fixing Nut... ..	4
83	14770/1	" " Friction Plug ...	1
84	18625/1	" " Plunger ...	1
85	14772	" " Spring ...	1
86	14771	" " Locknut ...	1
87	14762	" " Lever—Start and Running ...	1
88	16620	" " Washer ...	1
89	14758	" " Start and Running Bolt... ..	1

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Illus. No.	Part No.	Title	No. Off
90	SA2930	Governor Control Arm—Includes Item 91 ...	1
91	16692	" " Fixing Screw ...	1
92	19609	" " Spring ...	1
93	14096	" " " Plunger ...	1
94	14097	" " Adjusting Screw ...	1
95	14098/1	" " Spring Adjusting Screw Locknut ...	1
96	SA3440	Inlet Pipe with Release Tap & Washer ...	1
—	22394	" " Release Tap ...	1
—	18317	" " " Washer ...	1
98	14836	" " Gasket ...	1
—	285	" " Fixing Nut ...	2
—	MA3143	Magneto ...	1
100		" " H.T. Lead Complete, 16" ...	1
—	18316	" " Fixing Washer ...	2
101	285	" " Nut ...	2
102	12861	" " Driving Coupling ...	1
103	SA3362	Petrol Tank with Cap ...	1
104	SA3370	" " Filler Cap ...	1
—	22284	" " Cap Sealing Washer ...	1
—	19620	" " Fixing Bracket Distance Piece ...	1
105	SA3470	" " Fixing Bracket ...	1
106	12905	" " " " Gasket... ..	2
107	4082	" " " " Nut ...	4
108	SA3427	" " Fixing Strap Assembly ...	2
111	MA3129	" " Filter ...	1
113	18617	" " Washer ...	1
114	SA3087	" " Pipe with Unions ...	1
—	SSA24	Piston Assembly, Includes items 115 to 119	1
115	19543	Piston ...	1
116	6638/2	" " Ring—Compression ...	2
117	19274	" " —Compression, Top Groove ...	1
—	21607	" " —Oil Scraper, Bottom Groove... ..	1
118	9910	" " Pin ...	1
119	11677	" " Circlip ...	2
120	19106/1	Silencer ...	1
121	14826	" " Flange Gasket ...	1
122	285	" " Fixing Nut ...	2
—	5512	Spanner—Engine— $\frac{7}{16}$ " x $\frac{1}{8}$ " ...	1
—	5210	" " Engine— $\frac{7}{16}$ " ...	1
—	12353	" " Cylinder Head ...	1
—	14967	" " Sparking Plug ...	1
—	16811	" " Tommy Bar ...	1
123	18593/2	Sparkling Plug ...	1
124	21267/2	" " Suppressor & Protector ...	1
—	SA3493	Starting Handle Complete ...	1
125	14995	Tappet ...	2
126	16001	" " Head ...	2
—	16000	" " Disc ...	2
127	SA3079	Throttle Lever and Link Assembly ...	1
—	19379	" " " " " Fixing Screw—Bottom ...	1
128	14828	Valve ...	2
129	14816	" " Guide—Inlet ...	1
—	14816/1	" " —Exhaust ...	1
130	12856	" " Cotter ...	2
131	16092	" " Spring—Inner ...	2
—	12854	" " —Outer ...	2
132	12855	" " Collar ...	2

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

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

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Guarantee

WE give the following guarantee with J.A.P. Engines and Accessories in place of any implied guarantee by statute or otherwise, all such guarantees being in all cases excluded. No statement or representation contained in this catalogue shall be construed as enlarging or varying this guarantee. In the case of engines and accessories which have been used for "hiring out" purposes, or from which our trade mark, name, or manufacturing number has been removed, no guarantee of any kind is given or is to be implied.

We guarantee subject to the conditions mentioned below, that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, but this guarantee is to extend and to be in force for six months only from the date the engines or accessories are despatched by us, and the damages for which we make ourselves responsible under this guarantee are limited to the replacement of a part manufactured by us which may prove defective. We cannot accept responsibility for the replacement of any proprietary articles or parts not manufactured by us, unless the makers of these parts agree to replacement.

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 lie 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 authorised 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 authorised 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.

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