

BSA SERVICE SHEET No. 414

August 1954

Models C10L and C11G

RE-ASSEMBLING THE ENGINE

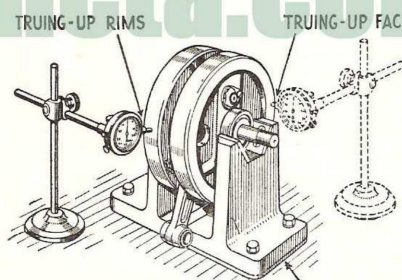
The need for absolute cleanliness cannot be over-emphasized. Parts should be thoroughly cleaned, and all traces of any anti-rust preparation with which new parts may be coated must be removed. All bearings should be smeared with fresh engine oil before re-assembly.

Flywheels

If the big-end assembly is to be renewed it is as well to check the weight of the new components against those which have been removed. A slight variation in weight is inevitable, but if it does not exceed $1\frac{1}{2}$ ozs. no action need be taken; otherwise the flywheel assembly should be re-balanced. This tolerance should not be exceeded since, when first assembled, the flywheels were carefully balanced to suit the original parts, and the balance may be adversely affected if the weights of the new components differ considerably from those originally fitted.

Fit the flywheels to the crankpin, making sure that the key on the drive side is properly engaged in its keyway, and tighten the crankpin nuts by hand.

In order to tighten the crankpin nuts properly, the whole flywheel assembly must be held rigidly, preferably with the aid of a flywheel bolster. Alternatively, fix two $\frac{9}{16}$ in. diameter posts rigidly to the bench with their centres $3\frac{7}{8}$ in. apart. Midway between these posts a hole of 1 in. diameter should be bored to receive the mainshaft. The flywheel assembly can be mounted on these posts so that they pass through the holes bored in the flywheels. Tighten the drive side crankpin nut very firmly, using a tubular extension piece on the spanner, and punch over the edge of the crankpin with a centre punch to lock the nut.



Suitable packing under timing side 'vee' block to compensate for smaller diameter bearing.
Fig. C38. Checking flywheel alignment.

Now turn the assembly over, so that the gearside flywheel is on top and tighten the crankpin nut lightly. The grub screw in the end of the crankpin must be riveted over or centre-punched to prevent it unscrewing. If it unscrews, serious damage may result to the engine. Check that the side clearance of the connecting rod in the flywheels does not exceed .012 in. and is not less than .010 in.

The flywheels will now be aligned only very approximately and further steps must be taken to ensure that the wheels are as true as possible. Two of the actual (or similar) bearings to be used in the engine should be fitted to the mainshaft and the latter mounted

B.S.A. Service Sheet No. 414 (cont.)

on vee-blocks. The flywheels must be trued up, both on faces and rims, for which purpose a dial micrometer is necessary (Fig. C38), and after the wheels are trued to within at least .005 in., tighten the timing side crankpin nut fully. A mallet or lead hammer applied to the flywheels will provide a sufficiently heavy blow for final truing, and will not harm the flywheels (Fig. C39). The shafts should be finally trued to within .002 in. maximum. The shafts must not be struck.

All parts must be thoroughly clean and free from paraffin, grit or other foreign matter, and all traces of old jointing compound should be removed. If any bushes have been replaced then they must be reamed out to the correct dimensions.

The mainshaft bearing should be reamed with the aid of Service Tool, Part No. 61-1932, as shown in Fig. C40. The reamer holder should be passed through the drive side ballrace before engaging the reamer in the bush, thus ensuring correct alignment. Clear the case of any swarf resulting from the reaming operation and commence re-assembly.

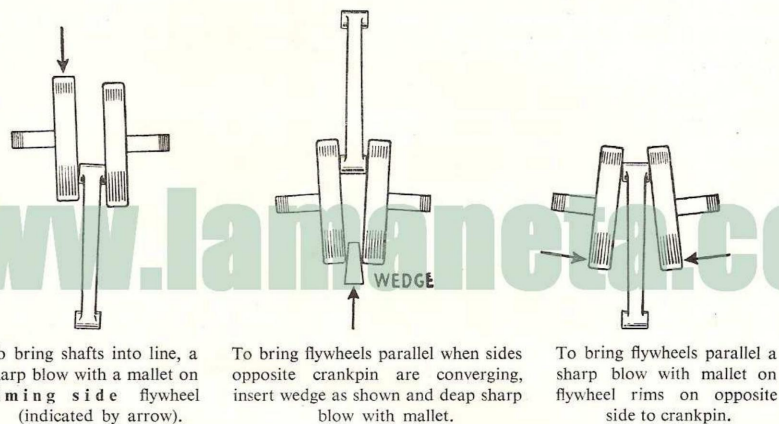


Fig. C39. Method of correcting flywheels out of alignment. Note that above illustrations are exaggerated.

Place the oil finger washer on the drive side mainshaft and push the flywheel assembly into position in the drive side crankcase half. Thinly coat the mating faces of the crankcase with jointing compound and slide the gear side half into position. The two halves must be perfectly mated and the flywheel assembly must rotate freely when the halves are bolted firmly together.

Replace the oil pump and bolt it into position making sure that the spring washers beneath the bolt heads are not omitted. Slide the pump driving spindle into position and retain it with its pin. Make sure that the blade of the pin is fully engaged in the spindle groove, and if necessary a small washer should be placed over the end of the pin to prevent its moving away from the spindle, but ensure that it does not force the pin too tightly into the groove when the timing cover is replaced.

B.S.A. Service Sheet No. 414 (cont.)

Replace the key and push the small timing pinion into position on the mainshaft. Tighten the retaining nut and turn over the lockwasher.

Fit the cam followers, also the tappets in the case of the C10L, then replace the camshaft, ensuring that the mark on the camshaft gear coincides with the marked tooth on the mainshaft pinion. (See Fig. C41.).

Apply clean engine oil to the pinions and cams, then replace the timing cover using a new joint washer. Make sure that the oil seal passes easily over the shaft, or if a new oil seal is to be fitted, it can be pushed into position after the timing cover has been replaced.

Replace the advance and retard mechanism, making sure that, as the taper is engaged, the peg on the advance and retard spindle locates in the groove in the camshaft, then tighten down the retaining bolt.

Finally time the engine as described in Service Sheet No. 404.

Assembly from this point is the same as after decarbonising. Replace the engine in the frame and tighten the engine and gearbox plate stud nuts.

Replace the primary chain case as indicated in Service Sheet No. 409. Make sure that the ported mainshaft sleeve which passes through the drive side oil seal is correctly positioned with the ports nearest the flywheel. It is immaterial which of the mainshaft grooves engages with the peg on the inside of the sleeve.

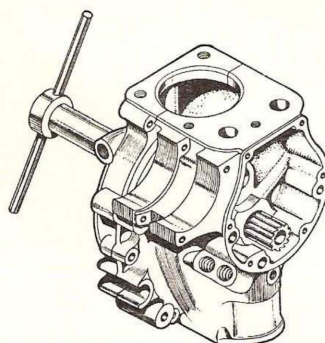


Fig. C40. Main Bearing Reamer.

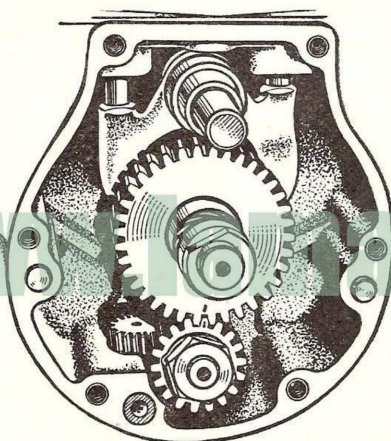


Fig. C41. Timing Gear Marks.

BSA SERVICE SHEET No. 415

September, 1954
Reprinted March, 1955
Revised December, 1957

Models C10L and C11G

USEFUL DATA

	C10L	C11G & C12
Cylinder bore (mm.)	63	63
Engine stroke (mm.)	80	80
Engine capacity (c.c.)	249	249
Standard compression ratios	5-1	6.5-1
1954 Camshaft, Part No.	29-1993	29-2025
Tappet clearance, Inlet	.004 in.	.003 in.
Exhaust	.006 in.	.003 in.
Valve timing, Inlet opens before T.D.C.	25°	25°
Inlet closes after B.D.C.	70°	70°
Exhaust opens before B.D.C.	70°	70°
Exhaust closes after T.D.C.	25°	25°
1955-56 Camshaft, Part No.	29-2075	29-2076
Tappet clearance, Inlet	.012 in.	.010 in.
Exhaust	.015 in.	.012 in.
Valve timing, Inlet opens before T.D.C.	29°	29°
Inlet closes after B.D.C.	84°	84°
Exhaust opens before B.D.C.	80°	80°
Exhaust closes after T.D.C.	28°	28°
Piston ring gap, Compression	.010 in.	.010 in.
Oil control	.010 in.	.010 in.
Piston ring side clearance	.002 in.	.002 in.
Piston clearance at base of skirt	.0045/.0065 in.	.0035/.0055 in.
Contact breaker gap	.015 in.	.015 in.
Ignition setting, Fully advanced before T.D.C.	$\frac{5}{16}$ in.	$\frac{1}{4}$ in.
Fully retarded before T.D.C.	$\frac{1}{16}$ in.	T.D.C.
Plug type, Champion	N8B	L10S
Plug gap	.018/.020 in.	.018/.020 in.
Carburetter, Standard type	274BT/3EG	274BU/1EH
Choke size	$\frac{3}{16}$ in.	$\frac{3}{16}$ in.
Throttle slide	4/4	4/4
Needle position	2	3
Needle jet	.1055	.1065
Main jet	90	80
Carburetter, Monobloc type	375/2	375/4
Choke size	$\frac{3}{16}$ in.	$\frac{3}{16}$ in.
Throttle slide	375/3 $\frac{1}{2}$	375/3 $\frac{1}{2}$
Needle position	2	3
Needle jet	.1055	.1055
Main jet, without air cleaner	120	140
Main jet, with air cleaner	85	100

B.S.A. Service Sheet No. 415 (contd.)

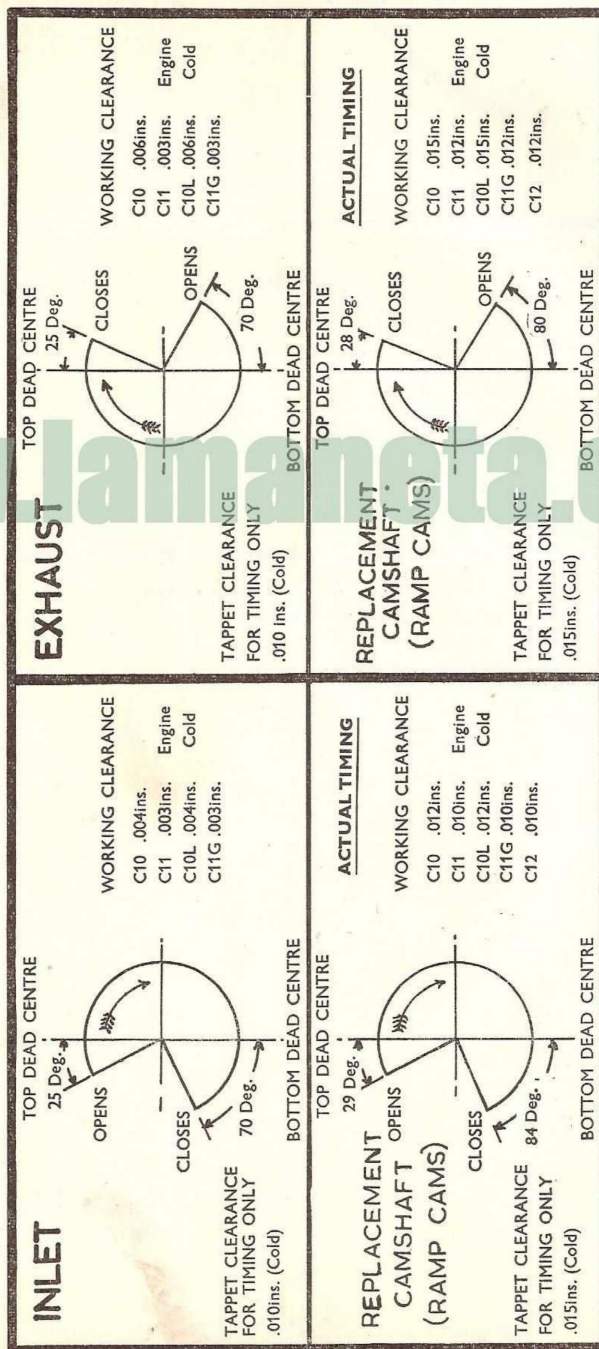
	C10L	C11G & C12
Petrol tank capacity (galls.)	2½	2½
Oil tank capacity (pints)	4	4
Gearbox capacity (pints) 1954-55	½ (3 speed)	½ (3 speed) 1 (4 speed)
Standard gear ratios 4th	—	6.2
3rd	6.6	6.2 7.6
2nd	9.8	9.25 11.1
1st	14.5	14.1 16.15
Gearbox capacity (pints) 1956 4 speed	½	½
Standard gear ratios, 4th	6.6	6.26
3rd	8.0	7.64
2nd	11.7	11.1
1st	17.1	16.15
Engine sprocket	16T	17T
Clutch sprocket	43T	43T
Gearbox sprocket	19T	17T (C12 19T)
Rear wheel sprocket	47T	42T (C12 47T)
Primary chain size	½ × .305 in.	½ × .305 in.
No. of links	69	69 (C12 70)
Rear chain size	½ × .205 in.	½ × .305 in.
No. of links, Rigid frame 1954-55	—	104
No. of links, Spring frame 1954-55	110	107
No. of links, Spring frame 1956	111	115
Front fork movement, 1954-55	3¾ in.	6 in.
Front fork movement, 1956	6 in.	6 in.
Rear suspension movement	2 in.	2 in. (C12 2¾ in.)
Front fork capacity (engine oil) 1954-55	Grease	¼ pint (142 c.c.)
Front fork capacity (engine oil) 1956	¼ pint (142 c.c.)	¼ pint (142 c.c.)
Front brake size, 1954	5½ × 1 in.	5½ × 1 in.
Front brake size, 1955-56	5½ × 1 in.	7 × 1½ in.
Rear brake size	5 × ½ in.	5½ × 1 in.
Rim sizes	WM1 × 19	WM1 × 19
Standard tyre sizes	2.75 × 19	3.00 × 19
Tyre pressures, p.s.i. Front	18	18
Rear	27	26
Wheelbase	52½ in.	53½ in. (C12 54 in.)
Ground clearance	5 in.	4½ in. (C12 4 in.)
Saddle height	29½ in.	29½ in.
Dry weight (Rigid frame) 1954	—	301 lbs.
(Spring frame) 1954	256 lbs.	316 lbs.
(Spring frame) 1955	256 lbs.	304 lbs.
(Spring frame) 1956	260 lbs.	312 lbs.

B.S.A. MOTOR CYCLES LTD.,
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BSA SERVICE SHEET No. 415A

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Fig. 1. 'C' GROUP MODELS VALVE TIMING CHART



NOTE: Ramp type camshafts bear the following part numbers:—
C.10—29-2078; C.11—29-2079; C.10L—29-2075; C.11G—29-2076, and can be used to replace the original camshafts in early models.

They are fitted as standard on and after Engine numbers:—
BC.10L—3562 and BC.11G—40438.

When ramp cams are fitted, the inlet valve clearance must be checked or adjusted when the inlet valve is about to open. The exhaust valve clearance must be checked or adjusted when the inlet valve has just closed.

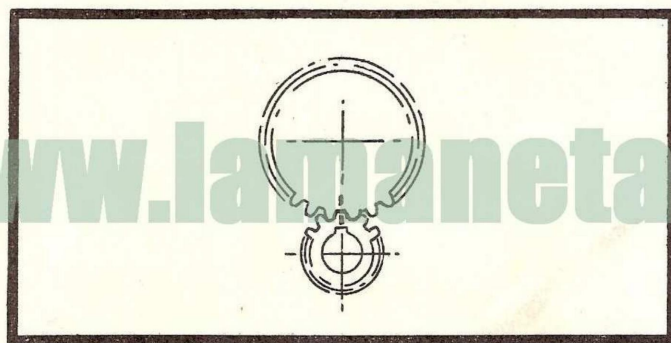


Fig. 2. VALVE TIMING MARKS

BSA SERVICE SHEET No. 514

This sheet supersedes No. 814
Reprinted Jan. 1958

"D" and "C" Group Models PLUNGER TYPE REAR SUSPENSION

DISMANTLING.

First remove the rear wheel, see Service Sheet No. 410 for "C" Group Models and No. 508 for "D" Group Models. "C" Group Part Nos. are shown in brackets where they differ from "D" Group Part Numbers.

Disconnect the rear mudguard stays, and take out the pinch bolts at the top and bottom of the rear suspension columns. The centre column, Part No. 90-4117, Fig. D27, can now be driven out using a soft drift so as to avoid damage to the end of the column.

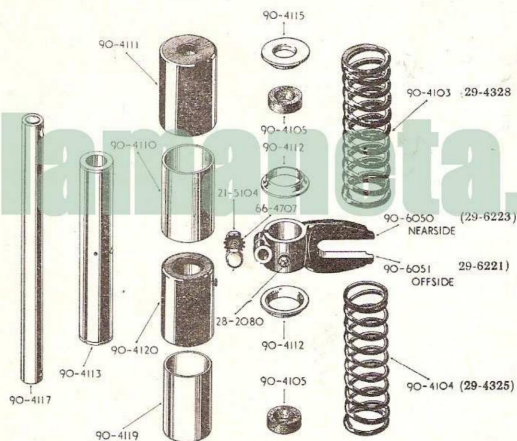


Fig. D27.

Grip the upper and lower shrouds firmly with both hands, compress the springs and lift out the suspension assembly.

Remove the shroud and springs from the sliding member, Part No. 90-4113. Carefully note the position of the steel washers and rubber bushes for subsequent assembly.

The bushes in the sliding member can now be examined for wear. If they require renewal, the tube complete with bushes must be replaced.

Unscrew the pinch bolt locknut, Part No. 21-5104, and take out the bolt. Insert a screwdriver into the slot, in the fork end 90-6051 (29-6221), the tube can then be withdrawn.

When replacing the tube ensure that the hole in the side of the tube lines up with the grease nipple in the fork end.

Note that the nearside fork end carries an anchor lug for the brake cover plate. On "C" Group Models the head of the right hand fork end clamping bolt is employed to secure the brake cover plate.

REASSEMBLY.

Replace the shroud and springs on the sliding member in the reverse order to that of dismantling.

Take up the assembly and place the lower shroud in the frame lug. Press down on the upper shroud to compress the springs, and slide the assembly between the lugs (Fig. D28).



Fig. D28.

Use the Chamfer on the lower end of the centre column to locate the assembly correctly in the frame top and bottom lugs. Insert the column from the top, ensuring that the slots are in line with the pinch bolt hole.

Replace the pinch bolts mudguard stays and rear wheel, couple up the brake and adjust.

Finally check over all nuts and bolts for tightness.

BSA SERVICE SHEET No. 603

"B" "C" and "M" Group Models

October, 1948
Reprinted July 1957

THE LUBRICATION SYSTEM

The engine lubrication system is of the dry sump type operated by a double gear pump, situated in the bottom of the crankcase on the right-hand side. The only external oilways are the supply and return pipes to the tank and the rocker feed and drainage pipes on the B Group. The oil drawn from the oil tank to the supply side of the pump first passes through a close mesh filter. This filter is not fitted to M Group machines as a felt filter is incorporated in the oil return pipe.

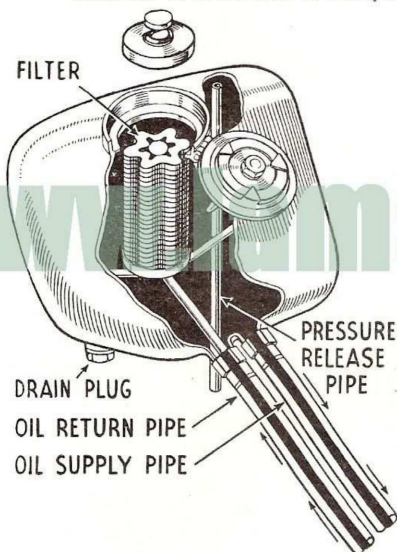
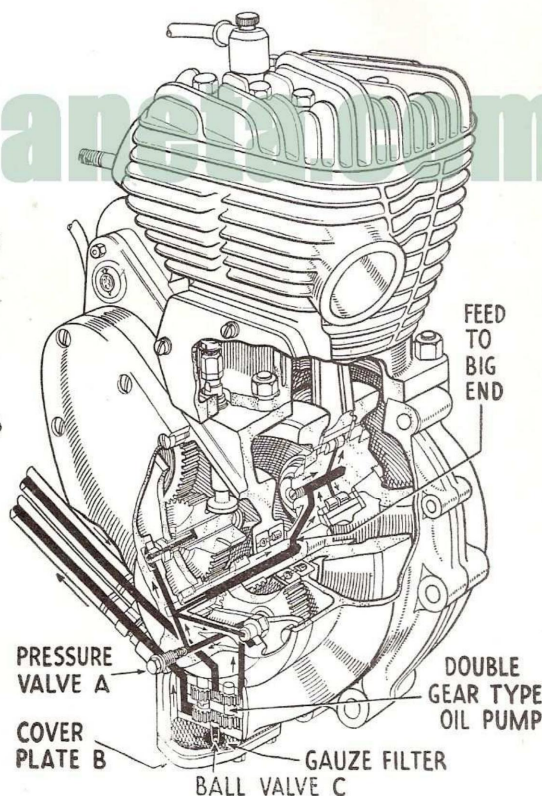


Fig. M3. The Lubrication System
Models M20 and M21



From the supply side of the pump the oil passes through a ball valve A, and is then transferred to the hollow drive side mainshaft to supply the big end roller bearing. On B and M Models the transfer is made via a nozzle fitted in the timing cover which projects into the end of the drilled mainshaft and additional oilways in the timing cover

provide positive lubrication to the cam pinion spindles. In the case of the C Group models, the oil passes through a hole in the main bearing bush, round an annular groove in the journal and thence via a radial drilling to the hollow centre of the shaft. (See Fig. M4.). On C10L and C11G Models a fine bleed hole from the main bearing meters a supply of oil to the camshaft and cam followers.

B.S.A. Service Sheet No. 603 (continued)

After lubricating the big-end and circulating throughout the engine in the form of oil mist, the oil drains down, through a filter to the bottom of the crankcase from which it is drawn by the return pump past ball valve C and delivered up the return pipe to the tank.

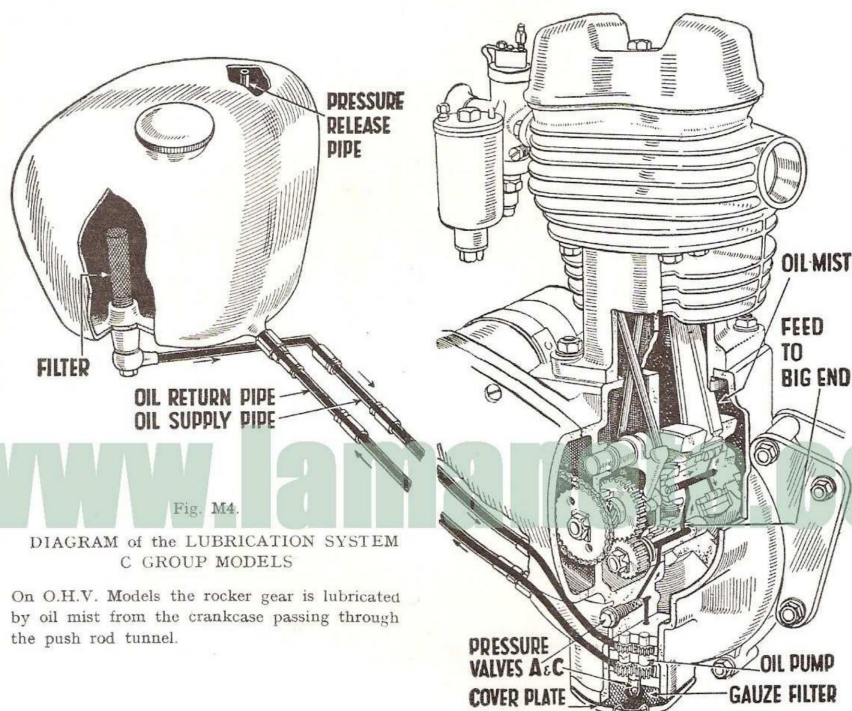


Fig. M4.

DIAGRAM of the LUBRICATION SYSTEM
C GROUP MODELS

On O.H.V. Models the rocker gear is lubricated by oil mist from the crankcase passing through the push rod tunnel.

On "B" group machines oil is fed through a union situated in the pipe between the return pump and the tank, to the rocker spindles, and after lubricating the rockers and enclosed valves, is returned to the crankcase through an external oil pipe attached to the base of the inlet valve spring housing (see Fig. M5). An internal oilway connects the two valve spring wells.

Incorrect seating of the ball valve A will allow oil to transfer from the tank to the engine, whilst the machine is stationary. In this event, unscrew the plug over the valve, and remove spring and ball. Clean the ball and its seating and replace. If the ball valve C should get stuck in its seating, there will be no return of oil to the tank. To correct, remove the cover plate below the pump and insert a piece of wire into the valve orifice, and lift the ball off its seating to free it. To check the flow of oil in the lubricating system, remove the tank filler cap whilst the engine is running. Oil should be seen issuing from the return pipe from the crankcase. The tank and crankcase should be drained periodically, and replenished with clean oil (see Periodical Maintenance).

B.S.A. Service Sheet No. 603 (continued)

Any restriction in the pressure release pipe in the tank will cause an increase in pressure inside the oil tank, and will result in leakage of oil at the filler cap. This can be put right by inserting a length of flexible wire into the pipe at its lower end (just in front of the rear mudguard) and pushing the wire right up the pipe, thus clearing obstruction.

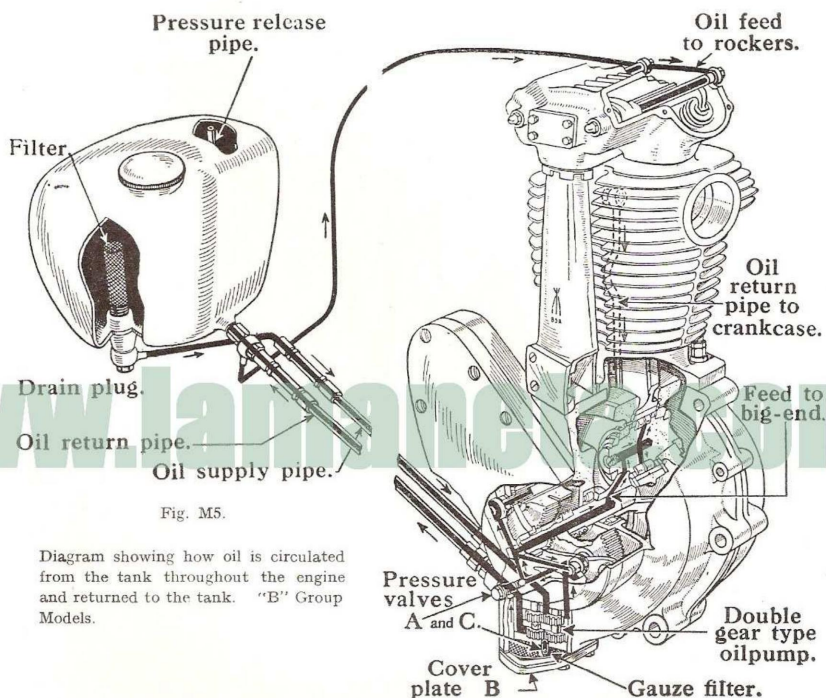


Fig. M5.

Diagram showing how oil is circulated from the tank throughout the engine and returned to the tank. "B" Group Models.

To remove the "B" and "C" Group oil tank filter for cleaning, remove the oil pipe banjo union plug at the bottom of the tank. The filter will come out with the plug.

On models with the Swinging Arm type frame the oil tank is of slightly different construction but the system is the same. The oil tank filter is attached to the large hexagon nut in the outside of the tank and its removal does not entail interfering with the oil pipes.

To remove the "M" Group filter for cleaning, release the tank filler cap, release the filter cap thus exposed, and lift the filter out. In all cases the filter should be placed in a can large enough to cover it with petrol, and thoroughly washed. Before replacing make sure that it is quite dry of petrol.

The pump filter can be withdrawn after removing the cover plate B and should be thoroughly washed with petrol, dried and replaced.

On no account try to remove the oil pump unless it requires attention. (See Service Sheet on Complete Dismantling of Engine.)

B.S.A. Service Sheet No. 603 (continued)

THE CRANKCASE BREATHER VALVE.

The Crankcase Air Release Valve is of similar construction on all models although its position in the crankcase is dependant on the model and the year of manufacture.

On all "C" Group models the breather is situated on the left-hand side of the crankcase behind the primary chaincase. 1946 and 1947 "B" and "M" machines have the breather positioned at the rear of the drive side bearing boss. Later "B" and "M" Group models have the breather positioned in the lower edge of the timing chest cover.

In each case, its purpose is to allow free release of air from the crankcase as the piston descends, and to prevent air being drawn back into the crankcase as the piston ascends. A crankcase breather valve which is faulty, or partially blocked, will result in oil leakage from the engine.

Before the breather valve can be withdrawn the air release pipe must be removed by unscrewing the union nut. The complete breather valve can then be unscrewed from the crankcase. To dismantle the breather, undo the large hexagon on the outer end of the valve, the valve retaining collar can then be unscrewed with the aid of a large screwdriver thus allowing the fibre disc valve to fall free. Before reassembling, wash the components thoroughly in petrol to free them from any oil residue that may cause the valve to stick.

Before replacing the breather valve on "C" Group models the movement of the disc valve should be checked to ensure that it does not exceed .010in. If excessive clearance is found and the disc valve is undamaged the face of the retaining collar should be ground so as to reduce the depth of the recess in which the disc valve lies. Take care not to grind too much away so that the disc valve has no clearance.

If the breather valve is fitted into the timing case cover, ensure that it is positioned so that the hole drilled in the side of the pipe inside the cover is facing towards the cover and slightly towards the rear. Failure to observe this precaution may result in excessive oil loss. Correct positioning of the hole may be effected by varying the thickness of the fibre washer fitted between the air release valve and the timing case cover.

MODELS C10L and C11G.

Instead of the pressure operated clack valve, a mechanically timed breather is employed. This takes the form of a hollow drive-side engine Mainshaft with a radial drilling which, at the appropriate piston position, is brought in line with a drilled port in the crankcase thus allowing the gases to exhaust freely to the atmosphere. The engine sprocket distance sleeve, which fits over the portion of the mainshaft with the radial drilling, has six transfer ports so that it is immaterial which of the six spline-grooves locates the internal peg of the sleeve.

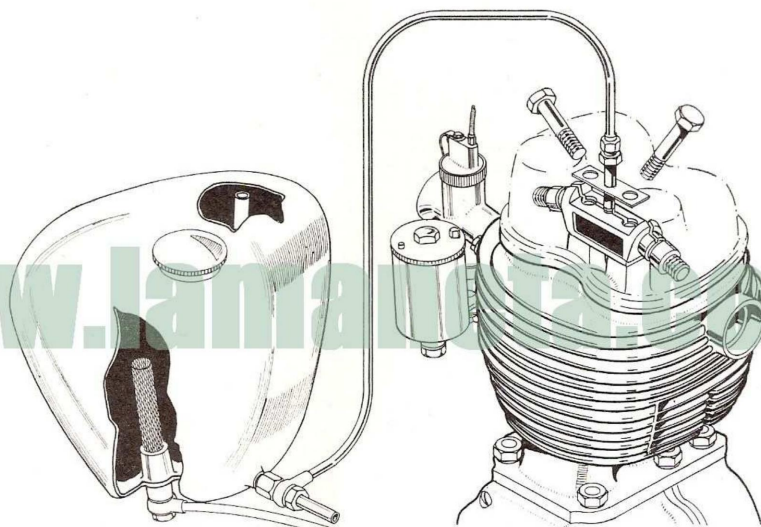
This type of breather is completely automatic and requires no adjustment or other maintenance whatsoever.

MODEL C12, 1956.

The Model C12 engine is identical with the C11G model. However, the lubrication system has been modified to provide positive lubrication to the valve rocker gear. The take off is from the oil tank return pipe, as on the "B" group plunger models and the oil is fed through a rocker feed pipe to the rocker cover securing bolt which is drilled to allow the oil to pass to the trunnion. This trunnion incorporates oil grooves direct to each rocker fulcrum. After lubricating, the oil drains to the sump down the push rod tunnel, providing extra lubrication for the cams and cam followers in the process.

This modification can be adopted on the C11 and C11G engines at very low cost. The parts required are listed overleaf, and they can be obtained through your dealer.

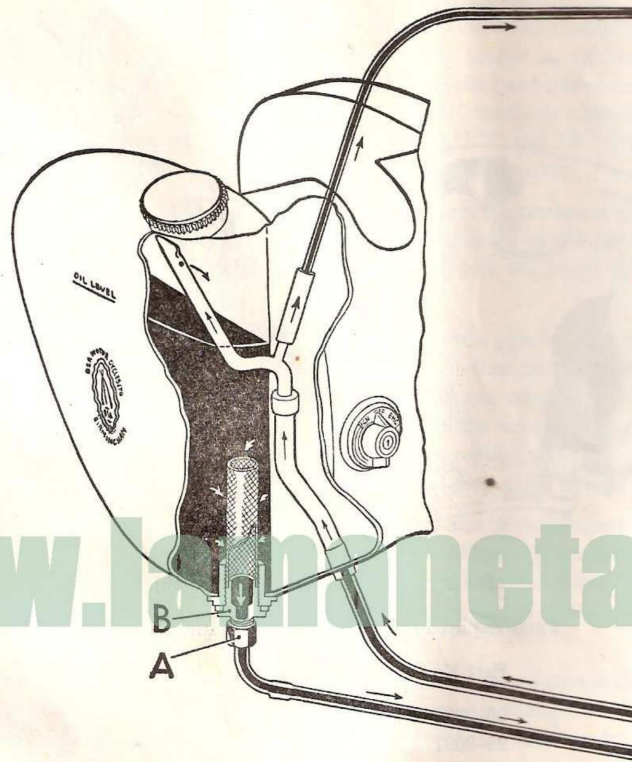
B.S.A. Service Sheet No. 603 (continued)



Rocker Gear Lubrication C12 (1956)

Parts required for conversion of C11 and C11G engines.

Part No.	Description.
29-2086	Rocker Oil Feed Pipe
29-2091	Rocker Trunnion
29-2092	Bolt
45-2454	Locking Plate
65-8420	Connection
65-8421	Washer
65-8424	Nut

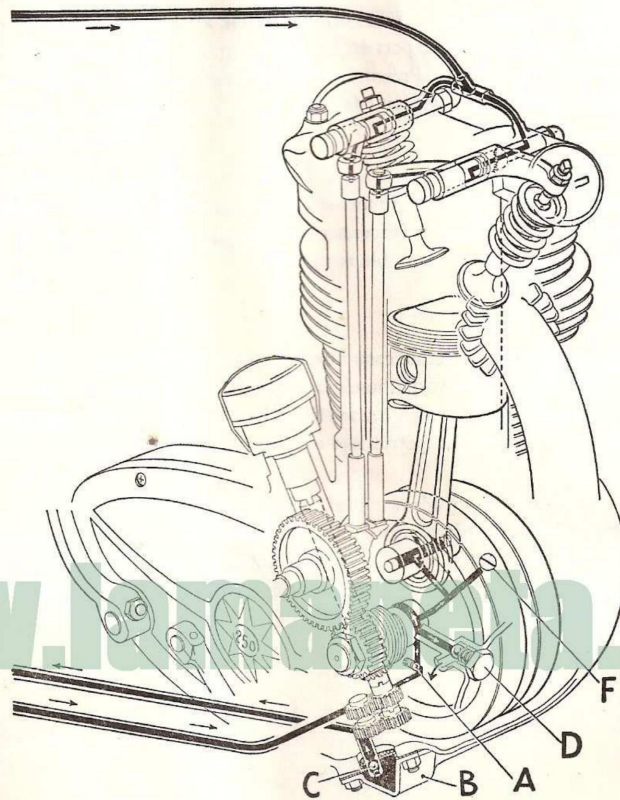


The Oil Tank C15.

MODEL C15

The lubrication system is of the dry sump type and is operated by a double gear pump situated in the bottom of the crankcase on the right-hand side. The oil tank capacity is four pints and oil is drawn from the oil tank to the supply pump (top set of gears). It is then pumped past the non-return valve *A*, and along the hollow mainshaft to the big end.

After lubricating the engine the oil flows down through a filter to the bottom of the crankcase from which it is drawn by the return pump (lower set of gears) past the non-return oil valve *C*, and delivered up the return pipe to the tank. At the junction of the return pipe to the tank a by-pass pipe leads a supply of oil to the rockers, push-rod ends, etc.



Lubrication System C15.

The valve *A* prevents oil transfer from the tank to the crankcase while the machine is standing, and together with the sludge trap *F*, does not require attention until such time as the engine is completely dismantled.

A by-pass valve *D* ensures a constant pressure in the system. Surplus quantities of oil are discharged into the crankcase.

If the ball valve *C* should be stuck in its seating there will be no return of oil to the tank. In this event remove the cover plate *B* below the pump, insert a piece of wire into the valve orifice and lift the ball off its seating to free it.

B.S.A. SERVICE SHEET No. 603 (contd.)

Crankcase Breather C15.

The breather is mechanically timed as on the C10L and C11G models but takes the form of a hollow camshaft with a radial drilling which, at the appropriate piston position, is brought in line with a drilled port in the inner timing cover, this port has its outlet inside the outer timing cover. Pressure is then released through a small radial cut-away at the rear end of the outer cover joint face.

Changing the Oil C15.

This should preferably be done immediately after running, so that the oil is warm and will, therefore, flow more freely. Disconnect the oil pipe union nut *A*, at the base of the tank and collect the old oil in a suitable receptacle.

Filters.

Remove the oil tank and crankcase filters for cleaning at regular intervals, this can be carried out in conjunction with the change of oil. After releasing the oil pipe at *A* unscrew the hexagon plug *B*, which carries the filter in the tank, and wash thoroughly in petrol. Make sure that all the petrol has evaporated before replacing. Refill with the correct grade of oil.

The pump filter can be withdrawn after removing the crankcase cover plate and should be thoroughly washed with petrol, dried and replaced. The oil pump is extremely reliable and it is most unlikely that it will give trouble therefore it should not be disturbed unnecessarily. The pump is held in position by three bolts. The two other bolts hold the sections of the pump together.

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PISTON CLEARANCES

The following are the recommended total clearances between the bottom of the piston and the cylinder wall.

	MODEL	Tolerances
D1	.. .. .	.0027"/.0045"
D3	.. .. .	.0025"/.004"
C10, C10L	.. .. .	.0045"/.0065"
C11, C11G, C12	.. .. .	.0035"/.0055"
B31	.. .. .	.004"/.0055"
B31 (Split skirt)	.. .. .	.0005"/.0016
B32A	.. .. .	.002"/.004"
BB32. Gold Star	8 : 1 6.5 : 1 7.5 : 1 9 : 1	.003"/.0045" .004"/.0055" .002"/.004" .003"/.0045"
CB32. Gold Star	6.5 : 1 8 : 1 8.5 : 1 9 : 1 12.25 : 1 13 : 1	.002"/.004" .003"/.0045" .003"/.0045" .003"/.0045" .004"/.0055" .004"/.0055"
DB32. Gold Star	7.25 : 1 8 : 1 9 : 1	.0025"/.004" .003"/.0045" .003"/.0045"
B33	.. .. .	.0045"/.0065"
B33. (Split skirt)	.. .. .	.0006"/.00275"
B34A	.. .. .	.0045"/.0065"
BB34. Gold Star	7.5 : 1 Std. 8 : 1 9 : 1 6.8 : 1 11 : 1	.0045"/.0065" .0025"/.0045" .0025"/.0045" .0045"/.0065" .0025"/.0045"
CB34. Gold Star	7.25 : 1 8 : 1 9 : 1	.003"/.0045" .003"/.0045" .003"/.0045"
DB34. Gold Star	8 : 1 8.75 : 1	.003"/.0045" .003"/.0045"
M20	.. .. .	.004"/.006"
M21	.. .. .	.004"/.006"
M33	.. .. .	.0045"/.0065"
M33. (Split skirt)	.. .. .	.0006"/.00275"

B.S.A. Service Sheet No. 704 (continued)

A7	.. .. .	6.7 : 1	..	..	..	..	..	.002"/.004"
	(Split skirt)	6.7 : 1	..	..	..	..	..	.0011"/00.31"
		7.25 : 1	..	..	..	..	..	.002"/.004"
	(Split skirt)	7.25 : 1	..	..	..	..	..	.0011"/.0031"
A7	(Star Twin)	.. .. .	..	..	..	..	..	.002"/.004"
A7	(Split skirt)	(Star Twin and Shooting Star)	..	..	..	..	..	.0011"/.0031"
A10	(Golden Flash)	6.5 : 1	..	..	..	..	..	.003"/.0045"
	(Split skirt)	6.5 : 1	..	..	..	..	..	.0025"/.0045"
	(Split skirt)	7.25 : 1	..	..	..	..	..	.0025"/.0045"
A10	(Super Flash and Road Rocket).	8 : 1	..	..	..	..	..	.003"/.0045"
Dandy 70		7.25 : 1	..	..	..	..	..	.003"/.0048"

BSA SERVICE SHEET No. 705

All Models

October, 1948
Reprinted Jan. 1958

PERIODICAL ATTENTIONS.

HUBS. Every 1,000 miles.

Inject grease through the nipples located in the centres of the hubs. Do not overdo this, otherwise grease will penetrate to the brake linings and cause ineffective brakes. Three or four strokes of the gun should be ample. Where no grease nipple is provided the bearings should be removed and packed with grease when the machine is in need of complete overhaul.

BRAKE CAM SPINDLES.

Grease sparingly. Two or three strokes of the gun only, or if no grease nipple is provided, apply a few drops of engine oil between the brake arm and the spindle.

SPEEDOMETER DRIVE.

Grease well. Three or four strokes of the gun regularly.

ENGINE OIL. Every 2,000 miles (except 2-stroke models).

The oil tank and sump should be drained (preferably when the engine is warm after a longish run), and the tank refilled with fresh oil.

In case of new or re-conditioned engines, the oil should be drained and renewed after the first 250 miles, and again after 1,000 miles.

REAR CHAIN.

Remove the rear chain, clean thoroughly in paraffin, and soak in engine oil or molten grease and graphite.

CONTACT BREAKER (except A and C Group Models).

A very small quantity of thin oil should be injected into the lubrication wick, and the face cam smeared with oil. The wick is accessible after removing the spring contact arm (held by the round-headed screw at the opposite end to the contact point) and is located in the hollow end of the round-headed screw which is revealed when the spring arm is removed.

When replacing the arm, it is important that the small curved backing spring is refitted correctly, i.e., with the bent portion facing outwards.

DYNAMO ARMATURE BUSH (A and C Group Models fitted with lubricator).

A few drops of oil injected through the lubricator are sufficient.

Every 5,000 miles.

Drain the gearbox and refill with new oil up to the level of the filler plug.

Drain the telescopic forks and refill each leg with correct amount of new oil.

In the case of new or re-conditioned gearboxes, change the oil after the first 1,000 miles.

New Machines.

CYLINDER HEAD BOLTS (except B and M O.H.V. engines).

Examine the cylinder head joint daily, and if leakage becomes apparent, tighten the bolts, working diagonally so as to pull the head down evenly. Do not over-tighten otherwise there is a possibility of distortion or bolt stretch.

CYLINDER BASE NUTS (except B and M O.H.V. engines).

There are five of these—one at each of the four corners outside, and one inside the tappet chest on the single cylinder models. A Group Models have eight cylinder base nuts and Model C11 six nuts. Tighten after the first 100 miles.

CYLINDER BARREL AND HEAD FIXING (B and M O.H.V. engines).

The barrel and head are both secured to the crankcase by four long bolts coupled to bushes screwed into the latter. Apply a spanner to the upper hexagon for tightening. These bolts have right-hand threads, and, being inverted, are tightened by turning the spanner to the right.

B.S.A. MOTOR CYCLES LTD., Service Dept., Birmingham, 11.
(PRINTED IN ENGLAND).

BSA SERVICE SHEET No. 706

Printed December, 1961

TELESCOPIC FORKS

"A", "B" AND "M" GROUP, C10, C11G AND C12 MODELS

Of robust design B.S.A. telescopic forks require the minimum of maintenance it being necessary only to replenish the oil occasionally between major overhauls.

For normal use each fork leg should contain a quarter pint of oil (142 c.c.) or three-eighths of a pint (213 c.c.) according to model as detailed below.

Quarter-pint Capacity

Models C10, C10L (1956 onwards), C11, C11G, C12, B31/33 (up to 1956), B32/34 and Gold Stars (up to 1952), M20, M21, M33, "A" group (up to 1952).

Three-eighth Pint Capacity

Models B31/33 (1956 onwards), B32/34 and Gold Stars (1952 onwards), "A" group (1952 onwards).

Oil Changes

To replenish the oil remove the drain plugs at the base of the fork tubes and remove the fork top nuts. Allow the oil to drain off. Replace the plugs and pour either a quarter or three-eighths pint of oil into the hollow tubes revealed when the top plugs are removed.

Dismantling

Before beginning to overhaul the forks have the following tools and replacement parts available in case they are required:—

61-3001	Fork top nut spanner.
61-3003	Fork plug spanner.
61-3005	Oil seal holder assembly tool.
61-3006	Oil seal extractor.
61-3007	Oil seal assembly tool.
61-3350	Fork leg assembly and removal tool.
29-5334	Packing shim (.005 in.).
29-5335	Packing shim (.010 in.).
29-5336	Packing shim (.020 in.).
29-5337	Packing shim (.030 in.).
65-5424(2)	Fork top bush (A and B group).
29-5347(2)	Fork bottom bush (A, B, C11G and C12).
29-5346(2)	Fork top bush (C10L, C11G and C12).
29-5313(2)	Fork oil seal (all models).
	Number five twine (approx. 18 in.).

B.S.A. SERVICE SHEET No. 706 (contd.)

Remove the front wheel and front mudguard. Take out the fork top cap (A) Fig. X1, screw Service Tool part number 61-3350 into the thread at the top of the fork shaft using the larger of the fine threads.

Slacken off the pinch bolt (B) Fig. X1.

Take a firm grasp of the lower fork sliding tube and strike the top of the tool smartly with a hammer. This will release the shaft from its taper and the complete fork leg can be drawn down and removed from the machine.

Repeat the operation on the other leg.

To dismantle the lower section of the fork hold the fork sliding tube by gripping the wheel spindle lug in a soft jawed vice and lift off the spring (see Fig. X2).

Enter Service Tool part number 61-3005 until the dogs on the tool engage in the slots at the bottom of the oil seal holder (D) Fig. X2. Pressing the tool down and turning at the same time unscrew the oil seal holder. Slide the holder up the shaft until it becomes tight on the tapered section of the shaft. Do not use excessive force or the oil seal may be damaged.

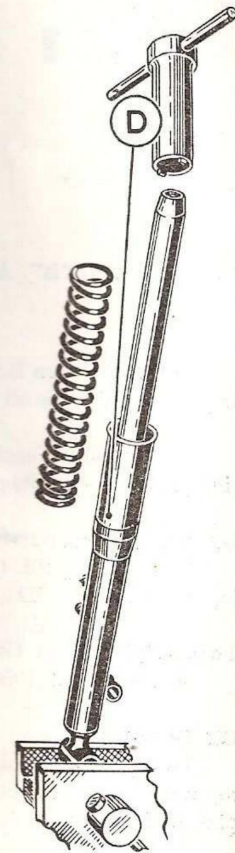


Fig. X2.

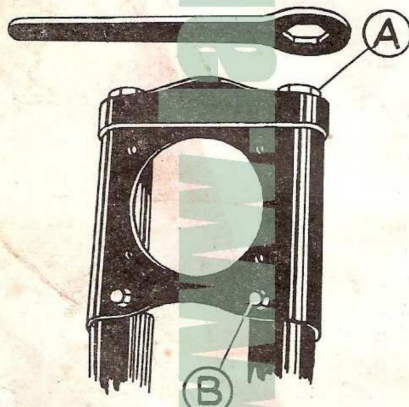


Fig. X1.

The top fork bearing is retained in the fork leg by a circlip (E) Fig. X3, which can be prised out with a sharp tool such as the tang end of a file. There may be a number of shims fitted between the circlip and the top bearing. These must be replaced if the bushes are not renewed when assembling.

Grip the shaft in a vice using soft jaw clamps on the unground portion of the shaft and unscrew the gland nut (F) Fig. X4. Service Tool part number 61-3003 is designed for this purpose. Remove the gland nut which secures the lower bearing and both bearings, shims, circlip and oil seal holder will then slide off the shaft.

B.S.A. SERVICE SHEET No. 706 (contd.)

If it is necessary to remove the oil seal place the lower edge of the holder on a soft wooden block and enter Service Tool part number 61-3006 into the top of the holder. Give this tool a sharp tap with a hammer and the oil seal will be driven out.

Reassembly

Reassembly is carried out in the reverse order. Cleanliness is essential and before attempting to reassemble clean all parts thoroughly and clean down the bench on which the forks have been dismantled.

If the oil seal is to be replaced care must be taken that the feather edge of the seal is not damaged. Enter the oil seal (I) Fig. X6 into the holder, metal part first, and drive home using B.S.A. Service Tool part number 61-3007 (H) Fig. X6. Place the oil seal holder over the shaft and pass it up the shaft until it is firmly held on the tapered section. Do not use excessive force or the oil seal may be damaged. Place the circlip over the shaft followed by the shims and top bearing and then the bottom bearing. Place the steel washer over the thread of the gland nut, screw up the gland nut and holding the shaft firmly in a soft jawed vice as described in dismantling procedure firmly tighten the gland nut.

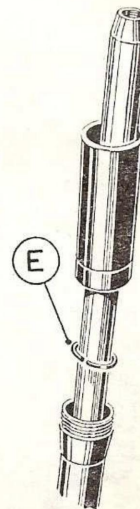


Fig. X3.

Place the lower sliding tube in a vice and enter the fork shaft with parts assembled into the lower sliding tube. Fit the circlip and check for up and down movement on

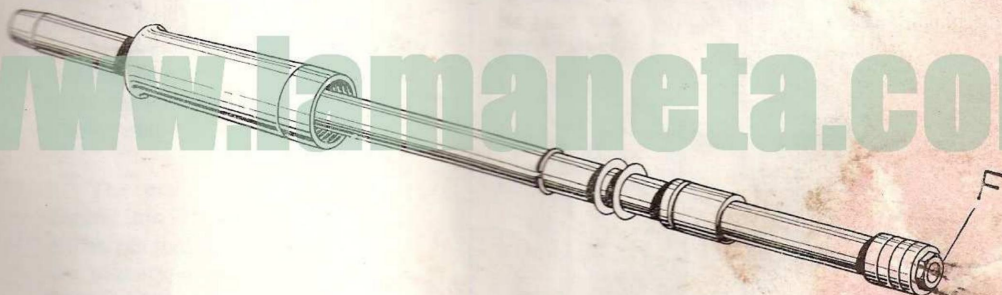


Fig. X4.

the top bush. If a new bush has been fitted it may be necessary to add to, or take from, some of the existing shims. Packing shims are available in the following sizes:—

- .005 in. Part Number 29-5334.
- .010 in. Part Number 29-5335.
- .020 in. Part Number 29-5336.
- .030 in. Part Number 29-5337.

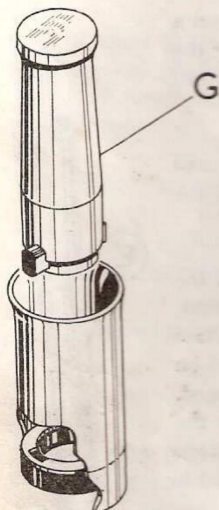


Fig. X5.

If the bush is not properly shimmed a tapping noise may be heard when the machine is ridden.

Having shimmed up the bush correctly and fitted the circlip firmly in position, screw down the oil seal holder and take one turn of number five twine around the base of the thread to provide an additional seal. Screw down the oil seal firmly using B.S.A. Service Tool part number 61-3005.

To fit the main tubes to the fork yokes screw B.S.A. Service Tool part number 61-3350 into the top of the tube and pass it up through the two yokes, then fit the collar and nut and draw the tube firmly home into the yokes. When the tube is fully home the pinch bolts on the lower yoke should be tightened.

The tool may then be removed and after filling the legs with the correct amount of oil the top plugs can be replaced and fully tightened. Finally slacken the pinch bolt, position the top outer shroud centrally over the lower leg. Check that the top nuts are completely tight and retighten the pinch bolts.

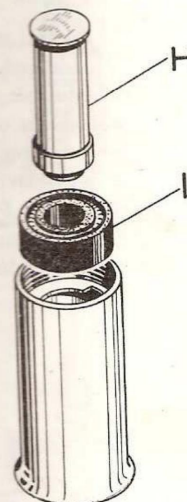


Fig. X6.

BSA SERVICE SHEET No. 708

Reprinted Aug. 1958

All Models

CARBURATION. Monobloc and Separate Float Chamber Type

How the Carburettor Works

The function of the carburettor is to atomise the petrol and proportion it correctly with the air drawn in through the intake on the induction stroke. The action of the float and needle in the float chamber maintains the level of fuel at the needle jet, and when the engine is stopped and no further fuel is being used the needle valve cuts off the supply.

The twist grip controls, by means of a cable, the position of the throttle slide and the throttle needle and so governs the volume of mixture supplied to the engine.

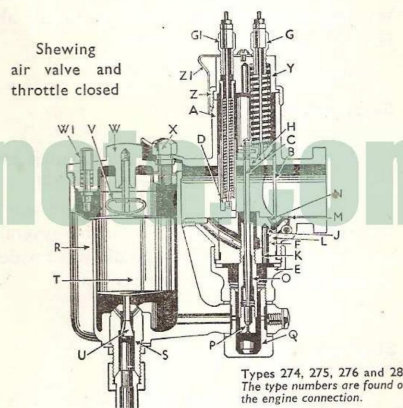
The mixture is correct at all throttle openings, if the carburettor is correctly tuned.

The opening of the throttle brings first into action the mixture supply from the pilot jet, then as it progressively opens, via the pilot by-pass the mixture is augmented from the needle jet. Up to three-quarter throttle this action is controlled by the tapered needle in the needle jet, and from three-quarters onwards the mixture is controlled by the main jet.

The pilot jet 'J', which in the older type of carburettor is embodied in the jet block, has been replaced in the Monobloc carburettor by a detachable jet (9) (Fig. X5) assembled in the carburettor body and sealed by a cover nut.

The main jet does not spray directly into the mixing chamber, but discharges through the needle jet into the primary air chamber and goes from there as a rich petrol/air mixture through the primary air choke into the main air choke.

Although the maintenance and tuning instruction contained in this Service Sheet apply equally well to the Monobloc and separate float chamber types of carburettor, the new instrument has been designed with a view to giving improved performance, and certain constructional changes have been made.



- | | |
|-------------------------------|-------------------------------------|
| A. Mixing Chamber. | P. Main Jet. |
| B. Throttle Valve. | Q. Float Chamber Holding Bolt. |
| C. Jet Needle and Clip above. | R. Float Chamber. |
| D. Air Valve. | S. Needle Valve Seating. |
| E. Mixing Chamber Union Nut. | T. Float. |
| F. Jet Block. | U. Float Needle Valve. |
| G. Gl. Cable Adjusters. | V. Float Needle Clip. |
| H. Jet Block Barrel. | W. Float Chamber Cover. |
| J. Pilot Jet. | Wl. Tickler. |
| K. Passage to Pilot. | X. Float Chamber Lock Screw. |
| L. Pilot Air Passage. | Y. Mixing Chamber Top Cap. |
| M. Pilot Mixture Outlet. | Z. Mixing Chamber Lock Ring. |
| N. Pilot By-pass. | Zl. Mixing Chamber Security Spring. |
| O. Needle Jet. | |

Fig. X4. A Sectioned illustration of needle jet carburettor

B.S.A. Service Sheet No. 708 (cont.).

The float chamber is a drum-shaped reservoir, die cast in one piece with the mixing chamber. The material used being zinc-alloy. The float is designed to pivot instead of rising and falling, as in the separate float chamber type, and as it does so, it impinges on a nylon needle controlling the inflow of fuel.

Variations of up to 20° in the angle of the carburettor when fitted, do not affect the working of the float, therefore it lends itself to use for down draught carburation and is not so greatly effected by the degree of lean when cornering. Access to the float (Fig. X6) is gained by removing a plate held in place by three screws.

Compensation for over-rich mixture which results from snap throttle openings, is provided by bleed holes in the needle jet (Fig. X5). A compensatory air bleed is provided, this is the larger of the two holes at the mouth of the air intake, which leads to the space around the needle jet. (Fig. X5).

The pilot intake is the smaller of the two holes, and operates in conjunction with the detachable pilot jet. (Fig. X5). This pilot mixture is adjusted as before, by an adjusting screw. (Fig. 8a.)

Hints and Tips. Starting from Cold

Flood the carburettor by depressing the tickler and close the air control, set the ignition, say, half retarded. Then open the throttle about $\frac{1}{8}$ ", then kick start. If the throttle is too far open, starting will be difficult.

Starting. Engine Hot

Do not flood the carburettor, but it may be found necessary with some engines to close the air lever, set the ignition to half-retarded, the throttle to $\frac{1}{8}$ " open and kick-start. If the carburettor has been flooded and won't start because the mixture is too rich—open the throttle wide and give the engine several turns to clear the richness, then start again with the throttle $\frac{1}{8}$ " open, and air valve wide open. Generally speaking it is not advisable to flood at all when an engine is hot.

Starting, General

By experiment, find out if and when it is necessary to flood, also note the best position for the air lever and the throttle for the easiest starting. Excessive flooding, particularly when the engine is hot, will make starting more difficult. It is necessary only to raise the level of petrol in the float chamber, by depressing the tickler.

STARTING, SINGLE LEVER CARBURETTORS, OPEN THE THROTTLE VERY SLIGHTLY FROM THE IDLING POSITION AND FLOOD THE CARBURETTOR MORE OR LESS ACCORDING TO THE ENGINE BEING COLD OR HOT RESPECTIVELY.

SECTIONAL ILLUSTRATIONS OF CARBURETTORS. Types 375, 376 and 389

(MONOBLOC)

(FOR KEY TO DIAGRAM NUMBERS SEE BELOW.)

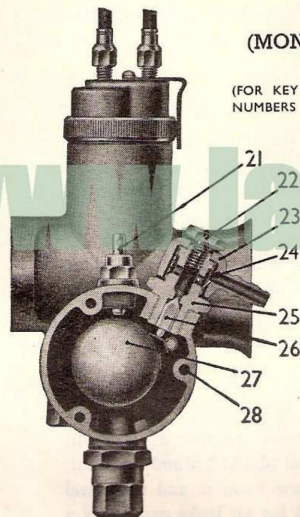


Fig. X6—Section through float chamber

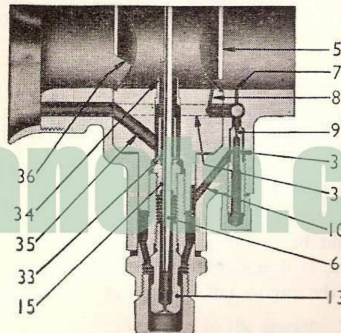


Fig. X5

Diagrammatic section of Carburettor showing only the lower half of the throttle chamber with the throttle a little open—and the internal primary air passages to the main jet and pilot system.

FOR KEY TO DIAGRAM NUMBERS SEE BELOW.

- | | |
|-------------------------------|--------------------------------|
| 1. Mixing Chamber Top. | 18. Mixing Chamber Cap Spring. |
| 2. Mixing Chamber Cap. | 19. Cable Adjuster (Air). |
| 3. Carburettor Body. | 20. Cable Adjuster (Throttle). |
| 4. Jet Needle Clip. | 21. Tickler. |
| 5. Throttle Valve. | 22. Banjo Bolt. |
| 6. Jet Needle. | 23. Banjo. |
| 7. Pilot outlet. | 24. Filter Gauze. |
| 8. Pilot by-pass. | 25. Needle Seating. |
| 9. Pilot Jet. | 26. Needle. |
| 10. Petrol feed to pilot jet. | 27. Float. |
| 11. Pilot Jet Cover Nut. | 28. Side Cover Screws. |
| 12. Main Jet Cover. | 31. Air to pilot jet. |
| 13. Main Jet. | 32. Feed holes in pilot jet. |
| 14. Jet Holder. | 33. Bleed holes in needle jet. |
| 15. Needle Jet. | 34. Primary Air Choke. |
| 16. Jet Block. | 35. Primary air passage. |
| 17. Air Valve. | 36. Throttle valve cutaway. |

Fig. X7—Section through mixing chamber, showing air valve and throttle closed

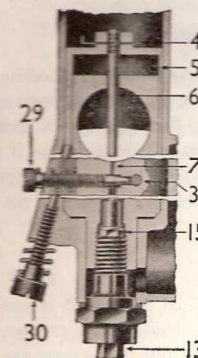
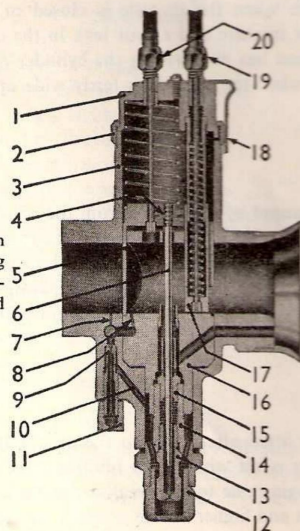


Fig. 8a

30 THROTTLE ADJUSTING SCREW

Set this screw to hold the throttle open sufficiently to keep the engine running when the twist grip is shut off.

29 PILOT AIR ADJUSTING SCREW

This screw regulates the strength of the mixture for 'idling' and for the initial opening of the throttle. The screw controls the depression on the pilot jet by metering the amount of air that mixes with the petrol.

Cable Controls

See that there is a minimum of backlash when the controls are set back and that any movement of the handlebar does not cause the throttle to open; this is done by the adjusters on the top of the carburettor. See that the throttle shuts down freely.

Petrol Feed

Verification. Detach petrol pipe union at the float chamber end; turn on petrol tap momentarily and see that fuel gushes out. Avoid petrol pipes with vertical loops as they cause air locks. Flooding may be due to a worn or bent needle or a leaky float, but nearly all flooding with new machines is due to impurities (grit, fluff, etc.) in the tank—so clean out the float chamber periodically till the trouble ceases. If the trouble persists the tank might be drained, swilled out, etc. Note that if the carburettor, either vertical or horizontal, is flooding with the engine stopped, the overflow from the main jet will not run into the engine but out of the carburettor through a hole at the base of the mixing chamber.

Fixing Carburettor and Air Leaks

Erratic slow running is often caused by air leaks, so verify there are none at the point of attachment to the cylinder or inlet pipe—check by means of oil placed around the joint, if there are leaks the oil will be sucked in, and eliminate by new washers and the equal tightening up of the flange nuts. Also in old machines look out for air leaks caused by a worn throttle or worn inlet valve guides.

Explosions in Exhaust

May be caused by too weak a pilot mixture when the throttle is closed or nearly closed—also, it may be caused by too rich a pilot mixture and an air leak in the exhaust system; the reason in either case is that the mixture has not fired in the cylinder and has fired in the hot silencer. If the explosion occurs when the throttle is fairly wide open the trouble will be ignition—not carburation.

Excessive Petrol Consumption

On a new machine may be due to flooding, caused by impurities from the petrol tank lodging on the float needle seat and so preventing its valve from closing. If the machine has had several years use, flooding may be caused by a worn float needle valve. Also excessive petrol consumption will be apparent if the throttle needle jet 'O' (Fig. X4), or (15) (Fig. X5) has worn; it may be remedied or improved by lowering the needle in the throttle, but if it cannot be, then the only remedy is to get a new needle jet.

Air Filters

These may affect the jet setting, so if one is fitted afterwards to the carburettor the main jet may have to be smaller. If a carburettor is set with an air filter and the engine is run without it, take care not to overheat the engine due to too weak a mixture; testing with the air control will indicate if a larger main jet and higher needle position are required.

B.S.A. Service Sheet No. 708 (cont.).

Faults

The trouble may not be carburation; if the trouble cannot be remedied by making mixtures richer or weaker with the air control, and you know the petrol feed is good and the carburettor is not flooding, the trouble is elsewhere.

Fault Finding

There are only TWO possible faults in carburation, either RICHNESS of mixture or WEAKNESS of mixture, so in case of trouble decide which is the cause, by:

- | | | |
|---|---|---|
| 1. Examining the petrol feed .. | { | Verify jets and passages are clear
Verify ample flow
Verify there is no flooding |
| 2. Looking for air leaks .. | { | At the connection to the engine
Or due to leaky inlet valve stems |
| 3. Defective or worn parts .. | { | As a slack throttle-worn needle jet
The mixing chamber union nut not tightened up, or loose jets |
| 4. TESTING WITH THE AIR CONTROL to see if by richening the mixture the results are better or worse. | | |

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Indications of

Richness

Weakness

Black smoke in exhaust.
Petrol spraying out of carburettor.
Four strokes, eight-stroking.
Two strokes, four-stroking.
Heavy, lumpy running.
Heavy petrol consumption.
? If the jet block F is not tightened up by washer and nut E richness will be caused through leakage of petrol.
? Air cleaner choked up.
? Needle jet worn large.
Sparkling plug sooty.

Spitting in carburettor.
Erratic slow running.
Overheating.
Acceleration poor.
Engine goes better if:
Throttle not wide open, or Air Control is partially closed.
? Has air cleaner been removed.
? Jets partially choked up.
Removing the silencer or running with a racing silencer requires a richer setting and large main jet.

Note

Verify correctness of fuel feed, stop air leaks, check over ignition and valve operation and timing. DECIDE BY TEST WHETHER RICHNESS OR WEAKNESS IS THE TROUBLE AND AT WHAT THROTTLE POSITION. See throttle opening diagrams, Fig. X6.

Procedure

If at a particular throttle opening you partially close the air control, and the engine goes better, weakness is indicated; or on the other hand the running is worse, richness is indicated. THEN YOU PROCEED TO ADJUST THE APPROPRIATE PART AS INDICATED FOR THAT THROTTLE POSITION.

Fault at Throttle Positions indicated on Fig. X9

To Cure Richness

Fit smaller main jet.
Screw out pilot air screw.
Fit a throttle with larger cut-away.
Lower needle one or two grooves.

1st
2nd
3rd
4th

To Cure Weakness

Fit larger main jet.
Screw pilot air screw in.
Fit a throttle with smaller cut-away.
Raise needle one or two grooves.

Notes

It is not correct to cure a rich mixture at half throttle by fitting a smaller main jet because the main jet may be correct for power at full throttle: the proper thing to do is to lower the needle.

Information on throttle slides and needle position is given in paragraphs (f) and (e) respectively in the next section entitled TUNING.

Changing from standard petrols to special fuels

Such as alcohol mixtures will, with the same setting in the carburettor, certainly cause weakness of mixture and possible damage from overheating.

TUNING

(a) Figs. X8 and 8a are two diagrammatic sections of the carburettor to show:

1. The throttle stop screw.
2. The pilot air screw.

(b) Throttle stop screw

Set this screw to prop the throttle open sufficiently to keep the engine running when the twist grip is shut off.

(c) Pilot air screw

This screw regulates the strength of the mixture for 'idling' and for the initial opening of the throttle. The screw controls the suction on the pilot petrol jet by metering the amount of air that mixes with the petrol.

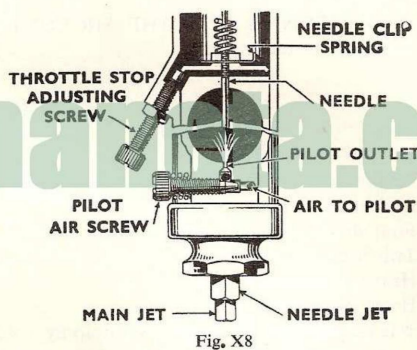


Fig. X8

Note. The air for the pilot jet may be admitted internally or externally according to one or other of the designs, but there is no difference in tuning.

(d) Main Jet

The main jet controls the petrol supply when the throttle is more than three-quarters open, but at smaller throttle openings although the supply of fuel goes through the main jet, the amount is diminished by the metering effect of the needle in the needle jet.

Each jet is calibrated and numbered so that its exact discharge is known and two jets of the same number are alike.

Never reamer a jet out, get another of the right size

The bigger the number the bigger the jet. Spare jets ARE SEALED.

To get at the main jet, undo the float chamber holding bolt Q (Fig. X4) or Main Jet Cover No. 12 (Fig. X7). The jet is screwed into the needle jet so if the jet is tight, hold the needle jet also carefully with a spanner whilst unscrewing the main jet.

(c) **Needle and Needle Jet**

The needle is attached to the throttle and being tapered either allows more or less petrol to pass through the needle jets as the throttle is opened or closed throughout the range, except when idling or nearly full throttle. The needle jet is of a defined size and is only altered from standard when using alcohol fuels.

The taper needle position in relation to the throttle opening can be set according to the mixture required by fixing it to the throttle with the needle clip spring in a certain groove (see illustration above), thus either raising or lowering it. Raising the needle richens the mixture and lowering it weakens the mixture at throttle openings from quarter to three-quarter open (see illustration, Fig. X9).

(f) **Throttle Valve Cut-away**

The atmospheric side of the throttle is cut away to influence the depression on the main fuel supply and thus gives a means of tuning between the pilot and needle jet range of throttle opening. The amount of cut-away is recorded by a number marked on the throttle, viz.: 6/3 means throttle type 6 with No. 3 cut-away; larger cut-aways, say 4 and 5, give weaker mixtures, and 2 and 1 richer mixtures.

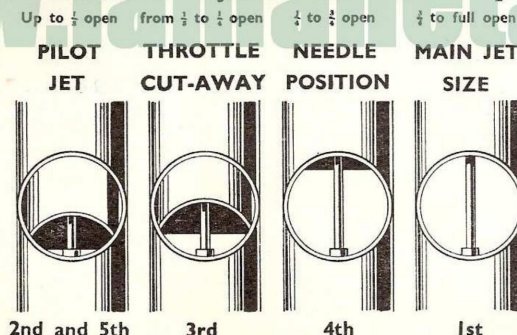
(g) **Air Valve**

Is used only for starting and running when cold, and for experimenting with, otherwise run with it wide open.

(h) **Tickler**

A small plunger located in the float chamber lid. When pressed down on the float, the needle valve is pushed off its seat and so 'flooding' is achieved. Flooding temporarily enriches the mixture until the level of the petrol subsides to normal.

Phases of Amal Needle Jet Carburettor Throttle Openings



SEQUENCE OF TUNING

Fig. X9

Sequence of Tuning

Tune up. In the following order only, by so doing you will not upset good results obtained.

Note. The carburettor is automatic throughout the throttle range—the air control should always be wide open except when used for starting or until the engine has warmed up. We assume normal petrols are used.

Read remarks on Fault Finding and Tuning for each tuning device and get the motor going perfectly on a quiet road with a slight up gradient so that on test the engine is pulling.

1st Main Jet with throttle in position

Test the engine for full throttle; if when at full throttle, the power seems better with the throttle less than wide open or with the air valve closed slightly the main jet is too small. If the engine runs 'heavily' the main jet is too large. If testing for speed work note the jet size is rich enough to keep engine cool, and to verify this, examine the sparking plug by taking a fast run, declutching and stopping engine quickly. If the plug body at the end has a bright black appearance, the mixture is correct; if sooty, the mixture is rich; or if a dry grey colour, the mixture is too weak and a larger jet is necessary.

2nd Pilot Jet with throttle in positions 2 and 5

With engine idling too fast with the twist grip shut off and the throttle shut down on to the throttle stop screw, and ignition set for best slow running: (1) Loosen stop screw nut and screw down until engine runs slower and begins to falter, then screw the pilot air screw in or out to make engine run regularly and faster. (2) Now gently lower the throttle stop screw until the engine runs slower and just begins to falter, then lock the nut lightly and begin again to adjust the pilot air screw to get best slow running; if this second adjustment makes engine run too fast, go over the job again a third time. Finally, lock up tight the throttle stop screw nut without disturbing the screw's position.

3rd Throttle Cut-away with throttle in position

If, as you take off from the idling position, there is objectionable spitting from the carburettor, slightly richen the pilot mixture by screwing the air screw in about half a turn, but if this is not effective, screw it back again and fit a throttle with a smaller-cut-away. If the engine jerks under load at this throttle position and there is no spitting, either the throttle needle is much too high or a larger throttle cut-away is required to cure richness.

4th Needle with throttle in position 4

The needle controls a wide range of throttle opening and also the acceleration. Try the needle in as low a position as possible, viz., with the clip in a groove as near the end as possible; if acceleration is poor and with air valve partially closed the results are better, raise the needle by two grooves; if very much better try lowering needle by one groove and leave it where it is best.

Note. If mixture is still too rich with clip in groove No. 1 nearest the end—the Needle Jet probably wants replacement because of wear. The needle itself never wears out.

5th Finally go over the idling again for final touches.

BSA SERVICE SHEET No. 708B

*November 1950.
Reprinted June, 1958.*

ALL MODELS CARBURATION AT HIGH ALTITUDES

The carburetter settings of all B.S.A. Motor Cycles are designed to give the best all round performance at altitudes of a few thousand feet.

At greater altitudes the air becomes rarefied with the result that the mixture is incorrect.

To overcome this difficulty it is necessary to reduce the size of the main jet, the reduction depending on the altitude at which the machine is mainly used.

The table below shows the percentage of reduction at given altitudes, but it must be emphasised that while the alteration to jet size will correct the mixture, it will not replace the lost power. This can only be corrected by "Blowing" or super-charging.

It may also be advisable to retune the carburetter for smaller throttle openings and this should be done in accordance with Service Sheet 708.

Altitude.							Percentage of reduction in jet size.
3,000 feet	...	...	...	...	...	...	5%
6,000 feet	...	...	...	...	...	...	9%
9,000 feet	...	...	...	...	...	...	13%
12,000 feet	...	...	...	...	...	...	17%

B.S.A. MOTOR CYCLES LTD.,
Service Dept., Birmingham, 11.
(PRINTED IN ENGLAND)

BSA SERVICE SHEET No. 710

Oct., 1948
Reprinted Nov., 1957

All Models CHAIN ALTERATIONS AND REPAIRS

A chain rarely breaks if it is kept properly lubricated and adjusted. Usually it is worn out long before it reaches breaking point. The rear chain is the most heavily stressed and is therefore the one most likely to give trouble. Spare parts should be carried to enable the rider to carry out a repair on the road with the aid of a chain rivet extractor (see Fig. X7). The front chain will probably be worn out before it requires shortening.

How to use the chain rivet extractor

First press down lever A (Fig. X7) to open the two jaws (B). Insert the link to be removed so that the jaws grip the roller and support the uppermost inner side plate. The punch (C) is then screwed down on to the rivet head until the rivet is forced through the outer plate.

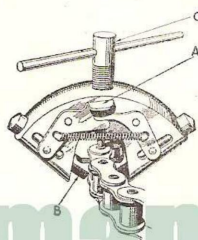


Fig. X7.

To shorten a worn rear chain

After a big mileage, the rear chain may have stretched so that no further adjustment is possible by the usual method. In this case it is possible to shorten the chain by one link or pitch, so increasing its useful life. First remove the single connecting spring link (A) securing the two ends of the chain (Fig. X8). If the chain terminates in two ordinary links as in Fig. X8 (in which case the chain will be of an even number of pitches) extract the third and fourth rivets (B) from the end and replace the detached three pitches by a single connecting link (C). The connection is made with an additional spring link (D). If one end of the chain has a double cranked link (Fig. X9)—in which case the

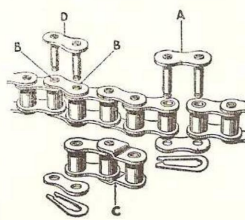


Fig. X8.

B.S.A. Service Sheet No. 710 (cont.)

chain will have an odd number of pitches—extract the second and third rivets (A), releasing the cranked link unit complete, which can be retained for further use. Replace with one inner link (B) and again connect up with an additional single connecting link (C).

To repair a damaged chain

If a roller or link has been damaged (X, Fig. X9) remove rivets (D), take out the damaged link and replace with one inner link, secured by two single connecting links.

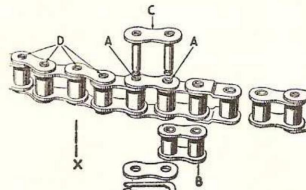


Fig. X9.

It is important that the spring clip fastener should always be put on so that the CLOSED end faces the direction of travel of the chain—i.e., when clip is on top run of chain, closed end is towards front of machine—when clip is on bottom run, closed end is towards rear of machine.

It should be noted that once a rivet has been extracted it must not be used again, so that it is important to check that the correct rivet is being removed before actually removing it. In the case of double cranked links, the complete unit comprises an inner link and the cranked outer link—three rollers in all—and these must never be separated.

Fitting rear chain

To fit a new rear chain, turn wheel until the spring link of the old chain is located on rear sprocket. Disconnect, and allow the lower run to drop down. Join the top run of the old chain to the new chain by means of the connecting link, and then by pulling on the bottom run of the old chain the new one will be carried round gearbox sprocket. Then the old chain can be disconnected and the ends of the new one joined together.

When the rear chain breaks and falls from its sprockets, the new or repaired chain can be replaced without taking off the chainguards. One end of the chain must be fed (from the rear) under the front end of the rear top chainguard on to the gearbox sprocket. A long bladed screwdriver or a piece of stiff wire may assist this operation. When the chain has located on the sprocket teeth, engage a gear and gently turn gearbox over with the kick-starter. This will feed chain round gearbox sprocket. When sufficient length of chain is hanging below sprocket, disengage gear and chain can then be pulled round until both runs can be fed inside rear chainguard and engaged on rear wheel sprocket.

BSA SERVICE SHEET No. 713

This sheet supersedes No. 411

Revised Nov., 1958

Reprinted Sept., 1961

ALL MODELS EXCEPT D GROUP AND C15 DISMANTLING OF STEERING HEAD

Remove the headlamp from the forks after undoing the two retaining bolts, and allow it to hang in a position where it cannot be damaged. If a headlamp cowl is fitted, it should be removed complete with the headlamp.

On later models of the type shown in Fig. C31A the lamp is not removed, but it is necessary to take off the lamp front by unscrewing pin *F* and to disconnect the speedometer cable and the leads to the switch.

Detach the handlebars complete with controls, and lay them on top of the petrol tank, using a piece of rag to protect the enamel. Remove the chromium plated top caps *A* and *B* (Fig. C31). Slacken the pinch bolt *C* and remove the adjusting sleeve *D* or *E*, Fig. C31A. Tap off the fork top yoke by striking it with a mallet underneath its two sides alternately.

The steering column can now be drawn downwards from the head, and the top ballrace removed. Note: If the bearings are dry a means of catching the steel balls should be arranged as they will fall as the column is drawn out.

The cups which remain in the head can be withdrawn by means of extractor No. 61-3060 for "C" Group, and 61-3063 for "A," "M" and "B" Groups. This is screwed firmly into the cup, then extractor and cup are driven out from the opposite end with the aid of a suitable bar.

If the cups and cones are pitted to even a slight degree, they must be replaced, otherwise steering will be adversely affected and will rapidly become worse.

Pitting is invariably due to "hammering" of the balls in their tracks, caused by slack adjustment.

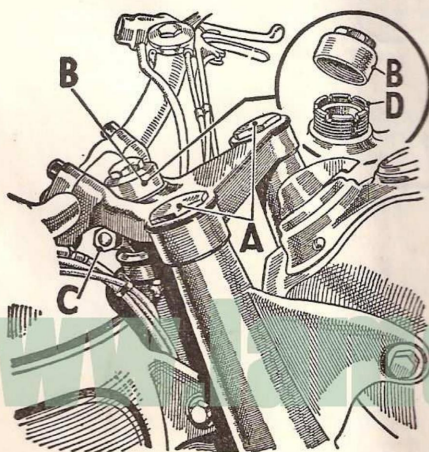


Fig. C31. The front fork and steering head.

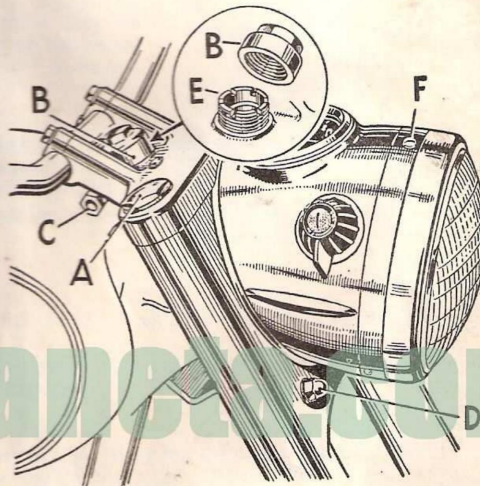


Fig. C31A.

Reassembly of Steering Head

When fitting new ballrace cups make sure that they are driven in squarely and that they are pressed well home. Replace the steering column balls, cone, adjusting sleeve and top-yoke. If any difficulty is experienced in retaining the balls in position, smear the tracks heavily with grease.

Adjust the column so that it turns freely without play and tighten the pinch bolt *C*. Finally replace headlamp and handlebar controls.

B.S.A. MOTOR CYCLES LTD.,
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BSA SERVICE SHEET No. 805

Reprinted March 1958

All Models

BATTERY — LEAD-ACID TYPES

The range of Lucas batteries listed here covers those models fitted to B.S.A. motor cycles in recent years.

PU5E and LVW5E Small capacity batteries for lightweight machines.

PU7E Standard battery for cradle mounting.

GU11E Larger capacity battery for sidecar machines.

SC7E Large capacity lightweight battery for machines fitted with starting motors or two-way radio equipment, e.g. police machines.

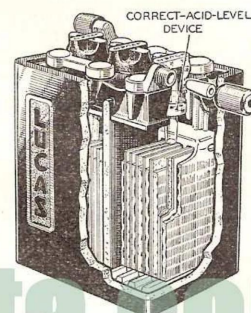


Fig. Y18. Sectioned battery, model PU7E/9

All current Lucas motor cycle batteries are 'dry charged', and do not require initial charging. Except that these batteries have porous rubber separators, they are identical with earlier models supplied wet or uncharged and require the same routine maintenance when in service.

STORAGE

Used batteries must be fully charged before storing. In temperate climates they should be examined fortnightly, or weekly in the case of model LVW5E and all models when stored in the tropics. If necessary, give them a short refreshing charge.

After a long period of storage, the condition of the battery will often improve if it is put through a 'cycle', as described on page 4.

MAINTENANCE

Every fortnight, or more frequently in hot climates, examine the condition of the battery. Examine five-plate batteries every week.

Never use a naked light when examining the condition of the cells, as there is a danger of igniting the gas coming from the active materials.

Cleaning

Remove the battery cover and clean the cell tops. Examine the connections. If they are loose or dirty, remove them and scrape the contact surfaces clean. Coat them with petroleum jelly before replacing.

Remove the filler plugs and check that the vent holes are clear and that the rubber washer fitted under some plugs is in good condition.

Topping-up

During charging, water is lost by gassing and evaporation. Examine the electrolyte level in each cell and, if necessary, add distilled water to raise the electrolyte level with the top edges of the separators.

SC7E batteries have a woven glass pad fitted in each cell to reduce splashing when the battery is gassing during charging. When 'topping-up' this type of battery it is useful to note that the correct electrolyte level is reached when moisture appears through the porous glass pad.

The Lucas Battery Filler

The use of a Lucas motor cycle Battery Filler will be found helpful in this 'topping-up' process, as it ensures that the correct electrolyte level is automatically attained and also prevents distilled water from being spilled over the battery top.

Correct-Acid-Level-Devices

The correct-acid-level-device fitted to some Lucas batteries consists of a central tube with a perforated flange which rests on a ledge in the filling orifice.

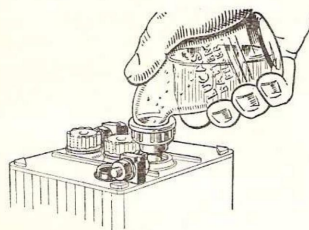


Fig Y19. The Lucas battery filler

When 'topping-up' a battery fitted with these devices, pour distilled water round the flange (not down the tube) until no more drains through into the cell. This will happen when the electrolyte level reaches the bottom of the central tube and prevents further escape of air displaced by the 'topping-up' water. Lift the tube slightly to allow the small amount of water in the flange to drain into the cell. The electrolyte level will then be correct.

If a battery requires 'topping-up' too frequently, the voltage regulator (on machines fitted with d.c. generators) may be out of adjustment, i.e. set too high, and should be checked. Conversely, a persistently low state of charge may be due to a regulator being set too low.

If one cell in particular needs 'topping-up' more than another, it is likely the container is cracked, in which event replace the battery and clean the carrier, using a solution of ammonia or bi-carbonate of soda in water. After cleaning and drying, paint the battery carrier and other surfaces affected by the electrolyte with anti-sulphuric paint.

TABLES OF SPECIFIC GRAVITIES AND CHARGING RATES

Battery	Plates per cell	Amp. Hr. Capacity		Electrolyte to fill one two-volt cell		Home Trade and Climates Ordinarily below 90°F. (32°C.) Specific Gravity of Acid (corrected to 60°F.)		Climates frequently over 90°F. (32°C.) Specific Gravity of Acid (corrected to 60°F.)		Initial Charge Current	Re-charge Current
		At 10 hour rate	At 20 hour rate	Pint	c.c.	Filling	Fully Charged	Filling	Fully Charged	Amp.	Amp.
LVWSE	5	5	5.7	1/8	71	1.270	1.270-1.290	1.210	1.210-1.230	0.3	0.5
PUSE	5	8	9	1/6	94	1.270	1.270-1.290	1.210	1.210-1.230	0.6	1.0
PU7E	7	12	13.5	1/5	113	1.270	1.270-1.290	1.210	1.210-1.230	0.8	1.5
GU11E	11	20	22.8	1/3	189	1.270	1.270-1.290	1.210	1.210-1.230	1.3	2.2
SC7E	7	22.5	26	—	250	1.270	1.270-1.290	1.210	1.210-1.230	1.5	2.5

The maximum permissible electrolyte temperature during charging is given below. Should the temperature of the electrolyte exceed this value interrupt the charge and allow the battery temperature to fall at least 10°F. (5.5°C.) before charging is resumed.

Climates normally below 80°F. (27°C.)	Climates between 80°-100°F. (27°-38°C.)	Climates frequently above 100°F. (38°C.)
100°F. (38°C.)	110°F. (43°C.)	120°F. (49°C.)

The specific gravity of the electrolyte varies with temperature. For convenience in comparing specific gravities, they are always corrected to 60°F., which is adopted as the reference temperature. The method of correction is as follows:

For every 5°F. below 60°F., deduct 0.002 from the observed reading to obtain the true specific gravity at 60°F. For every 5°F. above 60°F., add 0.002 to the observed reading to obtain the true specific gravity at 60°F.

The temperature must be that indicated by a thermometer having its bulb actually immersed in the electrolyte, and not the ambient temperature.

SERVICING

Battery Persists in Low State of Charge

First consider the conditions under which the battery is used. If the battery is subject to continuous discharge, e.g. long periods of night parking with lights on without suitable opportunities for recharging, a low state of charge is inevitable.

A fault in the dynamo or regulator, or neglect during a period out of commission, may also be responsible.

Vent Plugs

See that the ventilating holes in each vent plug are clear, and that the rubber washer fitted under the plug is in good condition.

Level of Electrolyte

The surface of the electrolyte should be level with the tops of the separators. If necessary, top-up with distilled water. Any loss of acid from spilling or spraying (as opposed to normal loss of water by evaporation) should be made good by dilute acid of the same specific gravity as that already in the cell.

Cleanliness

See that the top of the battery is free from dirt or moisture which might provide a discharge path. Check that the battery connections are clean and tight.

Hydrometer Tests

The space between each separator is not wide enough to permit the nozzle of an hydrometer to be inserted. Before taking a sample, tilt the battery to bring sufficient electrolyte above the separators. If the level of the electrolyte is so low that an hydrometer reading cannot be taken, no attempt should be made to take a reading after adding distilled water until the battery has been on charge for at least 30 minutes.

Measure the specific gravity of the acid in each cell in turn. The reading given by each cell should be approximately the same; if one cell differs appreciably from the others, an internal fault in that cell is indicated.

Specific gravity readings and their indications are as follows:

Climates under 90°F.

1.270—1.290	..	Cell fully charged
1.190—1.210	..	Cell about half discharged
1.110—1.130	..	Cell fully discharged

Climates over 90°F.

1.210—1.230
1.130—1.150
1.050—1.070

The appearance of the electrolyte drawn into the hydrometer when taking a reading gives a useful indication of the state of the plates; if it is very dirty, or contains small particles in suspension, it is possible that the plates are in a bad condition.

Discharge Test

Motor-cycle batteries must *not* be subjected to the heavy discharge test, as recommended for motor-car and commercial vehicle batteries.

RECHARGING FROM AN EXTERNAL SUPPLY

If the hydrometer test indicates that the battery is merely discharged, and is otherwise in a good condition, it should be recharged, either on the motor-cycle by a period of daytime running, or on the bench from an external supply.

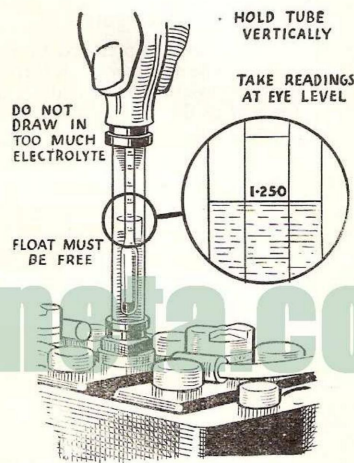


Fig Y20. Taking hydrometer readings

B.S.A. Service Sheet No. 805 (continued)

If the latter, the battery should be charged at the rate given in the table until the specific gravity and voltage show no increase over three successive hourly readings. During the charge the electrolyte must be kept level with the tops of the separators by the addition of distilled water.

A battery that shows a general falling-off in efficiency, common to all cells, will often respond to the process known as 'cycling'. This process consists of fully charging the battery by passing through it from an external source the appropriate re-charge current given in the table. The battery is then discharged by connecting to a lamp board, or other load, taking a current equal to the normal re-charge current. The battery should be capable of providing this current for at least 7 hours before it is fully discharged, as indicated by the voltage of each cell falling to 1.8. If the battery discharges in a shorter time, repeat the 'cycle' of charge and discharge.

PREPARING BATTERIES FOR SERVICE

All new batteries are supplied without electrolyte but with the plates in a charged condition. When they are required for service it is only necessary to fill each cell with sulphuric acid of the correct specific gravity. No initial charging is required.

Preparation of Electrolyte

The electrolyte is prepared by mixing together distilled water and concentrated sulphuric acid. The mixing must be carried out either in a lead-lined tank or in suitable glass or earthenware vessels. Slowly add the acid to the water, stirring with a glass rod. *Never add water to acid*, as the resulting chemical reaction causes violent and dangerous spurting of the concentrated acid. The specific gravity of the filling electrolyte depends on the climate in which the battery is to be used.

The approximate proportions of acid and water are indicated in the following table:

To obtain Specific Gravity (corrected to 60°F.) of	Add 1 vol. of acid 1.835 S.G. (corrected to 60°F.) to
1.270	2.8 vols. of water
1.210	4.0 vols. of water

Heat is produced by the mixture of acid and water, and the electrolyte should be allowed to cool before pouring it into the battery.

The total volume of electrolyte required can be estimated from the figures quoted in the table on page 2.

Filling the Battery

Carefully break the seals in the cell filling holes and fill each cell with electrolyte to the top of the separators, *in one operation*. The temperature of the filling room, battery and electrolyte should be maintained between 60°F. and 100°F. If the battery has been stored in a cool place, it should be allowed to warm up to room temperature before filling.

Putting into Use

Batteries filled in this way are 90 per cent charged. If time permits, however, a freshening charge of four hours at the normal recharge rate given in the table would be beneficial.

During the charge the electrolyte must be kept level with the top edge of the separators by the addition of distilled water. Check the specific gravity of the acid at the end of the charge; if 1.270 acid was used to fill the battery, the specific gravity should now be between 1.270 and 1.290; if 1.210, between 1.210 and 1.230.

Maintenance in Service

After filling, the battery needs only the recommended attention.

B.S.A. MOTOR CYCLES LTD.
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BSA SERVICE SHEET No. 806

Reprinted March 1958

All Models

LAMPS

LUCAS LIGHTING

Headlamps

Although the headlamps fitted to individual models may vary in detail, they remain similar with regard to the general features described below. All headlamps are fitted with a double filament main bulb and a pilot bulb. One of the double filaments provides the main riding beam while the second, brought into operation by means of the dipper switch, provides the dipped beam.

On some models the headlamp incorporates a panel containing the ammeter and lighting switch but if a cowl is fitted then it carries these components externally to the headlamp shell.

Other headlamps contain wire wound resistances for the purpose of reducing the charging rates under certain conditions and these are described under the appropriate lighting circuit.

Setting and Focusing

The best way of checking the setting of the lamp is to park the motor cycle in front of a light coloured wall at a distance of about 25 feet. If necessary, slacken the bolts securing the headlamp and move the lamp until, with the main driving light switched on, the beam is projected straight ahead and parallel with the ground. With the lamp in this position, the height of the beam centre from the ground should be the same as the height of the centre of the headlamp from the ground.

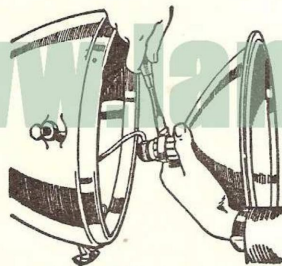


Fig. Y.22 Headlamp Focusing.

The headlamp must be focused so that, when the main driving light is switched on, a uniform beam without any dark centre is given. If the bulb needs adjusting, remove the lamp front and reflector, as described below, and slacken the bulb holder clamping clip at the back of the reflector. Move the bulb holder backwards and forwards until the correct position is obtained, and then tighten the clamping clip.

More sealed beam light units are fitted with the pre-focus type of bulb and therefore no focusing is necessary.

Removal of Front and Reflector, pre-1948 models

Press back the fixing clip at the bottom of the lamp. The front and reflector can now be taken off. The bulb holder is secured to the reflector by means of two fixing springs. When replacing the front, locate the top of the rim first, then press on at the bottom and secure with the fixing clip.

1948 Models (Fig. Y.23)

Press back the fixing clip at the bottom of the lamp, and remove the lamp front. The reflector is secured to the lamp body by means of a rubber bead. When refitting the rubber bead, locate its thinner lip between the reflector rim and the edge of the lamp body. To replace the front, locate the metal tongue in the slot at the top of the lamp, press the front on, and secure by means of the fixing catch.

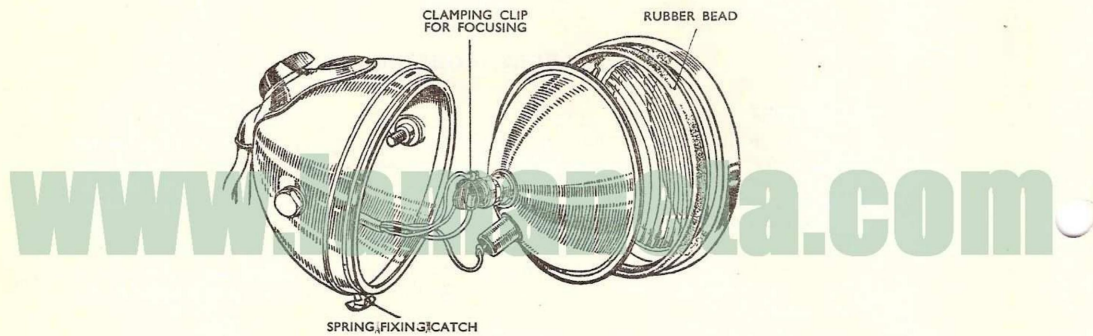


Fig. Y.23.

Sealed Beam Headlamps

Later models are fitted with a sealed light unit having the reflector and glass sealed together. After slackening the securing screw on the top of the headlamp, the rim, complete with light unit, may be removed. To replace, locate the rim on the lip at the bottom of the lamp body, press the light unit assembly and rim into position and tighten the securing screw. The main headlamp bulb in some of these headlamps is of the pre-focus type and is held in position by a cap with bayonet type fitting. In all cases access to the main or pilot bulbs is obtained by removal of the light unit assembly.

Breakage of the headlamp glass with this type of unit involves replacement of the glass and reflector complete. The light unit may be removed from the headlamp rim after prising out the retaining clips.

Replacement of Bulbs

When the replacement of a bulb is necessary, it is important not only that the same size bulb is fitted, but that it has a high efficiency and will focus in the reflector. Cheap and inferior replacement bulbs often have the filament of such a shape that it is impossible to focus correctly; for example, the filament may be to the one side of the axis of the bulb resulting in loss of range and light efficiency.

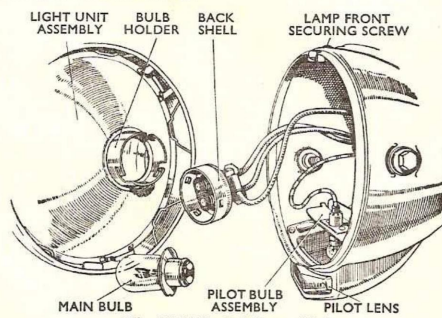


Fig. Y.24 Sealed Beam Unit.

Lucas Genuine Spare Bulbs are specially tested to check that the filament is in the correct position to give the best results with Lucas lamps. To assist in identification, Lucas bulbs are marked on the metal cap with a number. When fitting a replacement, see that it has the same number as the original bulb.

B.S.A. Service Sheet No. 806 (cont.)

When fitting a main headlamp bulb, care must be taken to insert it the correct way round, i.e. with the dipped beam filament above the centre filament.

The pre-focus type bulb is located by a flange and there is a notch which engages on a raised portion of the bulb holder to ensure correct positioning.

Where the pilot bulb is contained in an underslung cowl, the metal strip on which the bulb is mounted should be pushed to the rear and lifted away in order to provide access to the bulb.

Tail Lamps

Where the tail lamp is of the metal type the body or back should be removed by pushing it in, rotating to the left, and pulling away, thus providing access to the bulb. The moulded plastic type of rear lamp can be dismantled by unscrewing the two screws in the cover.

When a stop lamp is fitted, a two-filament type of bulb is employed with offset bayonet type fixing pins to ensure that it can only be fitted correctly.

MAIN BULBS

Models A7, A10, B31, 32, 33, 34, C12 and M20, M21.

Lucas No. 168, 6v. 24/24w. (with E3H Dynamo). Lucas No. 169, 6v. 30/30w. (with E3L Dynamo). Lucas No. 312, 6v. 30/24w. (Pre-focus type Bulb).

Models C10 and C11.

Lucas No. 180, 6v., 18/18w. (with E3H Dynamo). Lucas No. 168, 6v. 24/24w. (with E3L Dynamo).

Models C11G and D1 (early) Lucas

Lucas No. 312, 6v. 30/24w. (Pre-focus type Bulb).

PILOT

Lucas No. 200, 6v. 3w. Lucas No. 988, 6v. 3w. (with Sealed Beam Light Unit).

TAIL

Lucas No. 205, 6v. 6w.

Lucas No. 384, 6v. 6/18w. (Stop/Tail Lamp).

BSA SERVICE SHEET No. 807

Reprinted March, 1958

All Models

ELECTRIC HORN—HIGH FREQUENCY MODELS

General

Electric horns are adjusted to give their best performance before leaving the Works, and will give long periods of service without any attention.

Servicing

If the horn becomes uncertain in action or does not vibrate, it does not follow that the horn has broken down. The trouble may be due to a discharged battery or a loose or broken connection in the horn wiring.

The performance of the horn may be upset by the fixing bolt working loose, or by the vibration of some part adjacent to the horn. To check this, remove the horn from its mounting, hold it firmly in the hand by its bracket and press the push. If the note is still unsatisfactory, the horn may require adjustment, but this should only be necessary after a very long period of service.

Method of Adjusting

The adjustment of a horn does not alter the characteristics of the note but merely takes up wear of vibrating parts.

If the horn is used repeatedly when badly out of adjustment, due usually to unsuccessful attempts at adjustment, the horn may become damaged, due to the excessive current which it will take. When testing, do not continue to operate the push if the horn does not sound. If, when the push is operated, the horn does not take any current (indicated by an ammeter connected in series with the horn) it is possible that the horn has been adjusted so that its contact braker is permanently open.

After adjusting, note the current consumption, which must not exceed 3—4 amperes. A horn may give a good note, yet be out of adjustment and taking an excessive current. When adjusting do not attempt to unscrew the nut securing the tone disc or any other screw in the horn.

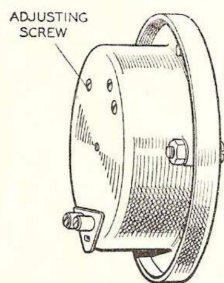


Fig. Y 26

Typical electric horn, showing adjustment screw.

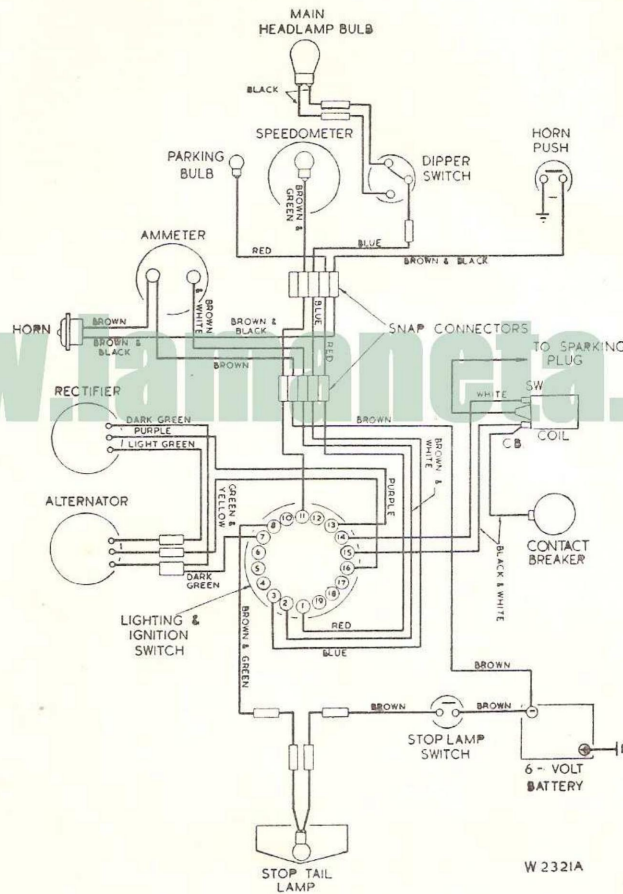
The adjustment is made by turning the adjustment screw, usually in a clockwise direction. The underside of the screw is serrated, and the screw must not be turned for more than 2 or 3 notches before retesting. If the adjustment screw is turned too far in a clockwise direction, a point will occur at which the armature pulls in but does not separate the contacts.

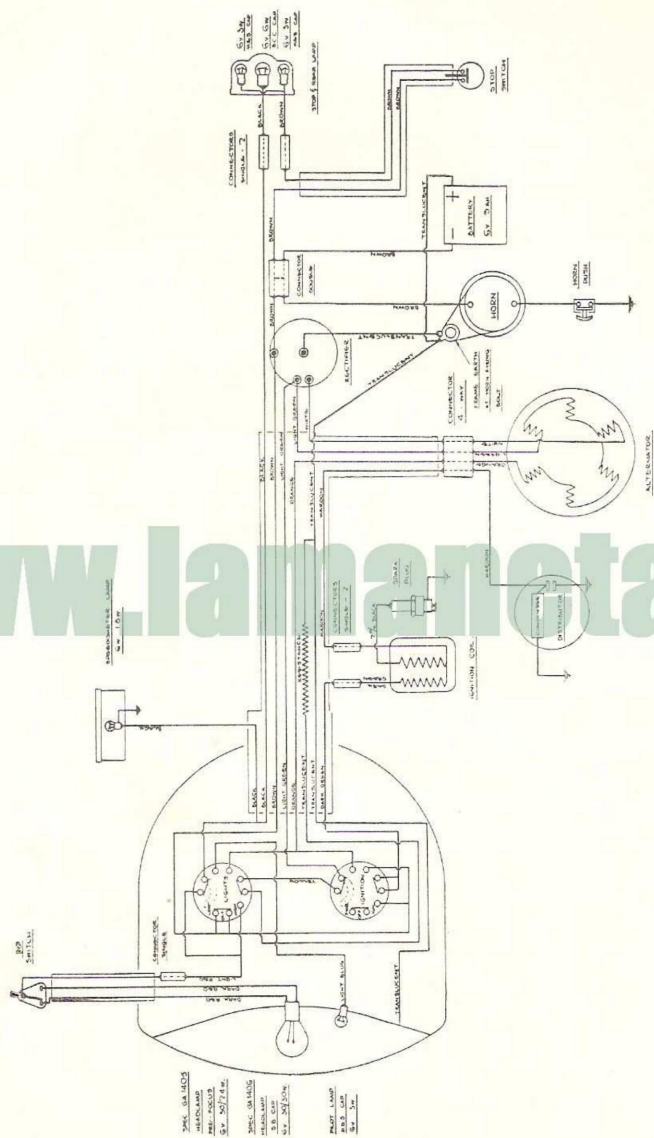
BSA SERVICE SHEET No. 808D

1956 C Group Models

WIRING DIAGRAMS

C12





BSA SERVICE SHEET No. 813

Revised, June 1960

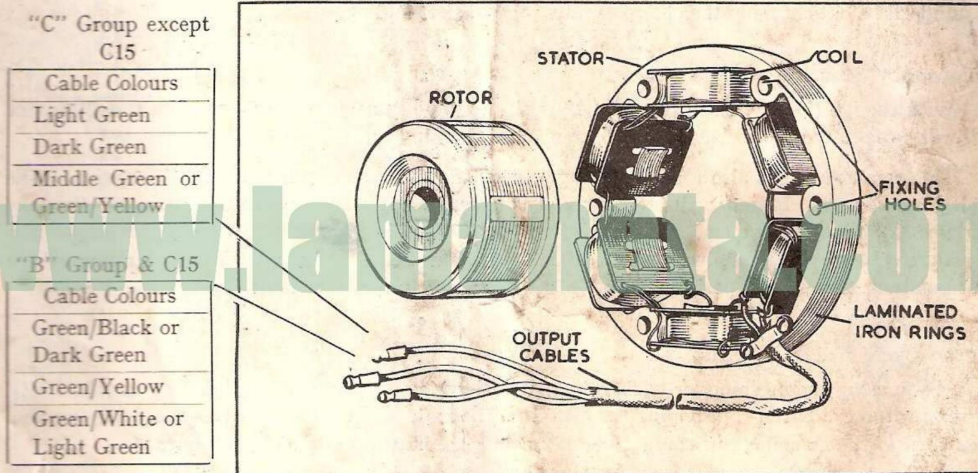
"C" AND "B" GROUP MODELS (EXCEPT C15 COMPETITION)

FITTED WITH CRANKSHAFT MOUNTED ALTERNATORS

LUCAS LIGHTING

The electrical system used on these models provides D.C. for the battery, ignition coil and lights, by passing the A.C. output of the generator through a bridge type rectifier.

The alternator is connected to a section of the headlamp switch so that the output is automatically matched to the demands of the lighting circuit and the characteristics of the alternator prevent overcharging.



Stator and Rotor of Lucas Motor Cycle Alternator
(RM 13 on C11G and C15, RM 13/15 on C12, and RM 15 on new series "B" group machines)

Output Control

The standard circuit has the output wires from the generator connected by their snap connectors to similarly coloured wires on the wiring harness and provides the following output control.

Lighting Switch in "OFF" Position

The output is taken from one pair of coils by means of the Light Green and Dark Green wires, and the remaining coils (Light Green and Middle Green wires) (Light Green and Green/Yellow on "B" group) are open-circuited.

Lighting Switch in "PILOT" Position

Output taken from one pair of coils by Light Green and Dark Green wires as before and the remaining coils are on open-circuit.

B.S.A. SERVICE SHEET No. 813 (contd.)

Lighting Switch in "HEAD" Position

All three pairs of coils are connected in parallel and the maximum output is obtained. **Note.**—To provide an increased charging rate with the lighting switch in the "OFF" position, some models will be found to have the wire joining terminals 5 and 6 of the headlamp switch removed. This means that no coils are shorted out in this switch position and the charging rate is slightly increased.

In circumstances where a considerable amount of low speed running is necessary or there are long periods of parking with the lights on, it is possible to increase the charging rate with the lighting switch in the "OFF" and "PILOT" positions by connecting the Medium Green alternator cable (Green/Yellow for C15) by its snap connector to the Dark Green harness cable and the Dark Green alternator cable to the Medium Green harness cable (Green/Yellow for C15).

The Light Green cables should not be disturbed. These alternative connections considerably increase the charging rate in these switch positions, and the connections should be returned to standard for normal conditions of use or long runs.

Owing to the effects of the above modifications it is essential that the wiring circuit is returned to standard before checking the charging rates during fault finding.

Emergency Starting

With the ignition switch in the "EMG" position, the battery is not isolated from the alternator and will, in fact, receive a charge whilst the machine is being run.

This arrangement is also a safeguard against continuous running in the "EMG" position. The back pressure of the battery will increase as it is charged, until it is sufficiently strong to affect the working of the ignition system. When this happens misfiring will occur, resulting in poor engine performance. In view of this, always check that the machine is not being run with the ignition switch continually in the "EMG" position, before testing the system for other faults.

Motor Cycle Trials Events, etc.

When using the machine for trials riding, the alternator can be used continuously in the "EMG" position without a battery, providing the lead from the main harness to the battery negative terminal is earthed to the machine, but contact breaker points are liable to become badly burned.

Test Procedure

As the lights and other equipment are operated on a normal D.C. circuit they can be checked by normal continuity tests with a battery and bulb.

The following equipment is required to satisfactorily test the charging circuit. The meters used should be accurate moving coil instruments.

A.C. voltmeter scale 0–15 volts.
D.C. ammeter scale 0–15 amps.
D.C. voltmeter scale 0–15 volts.

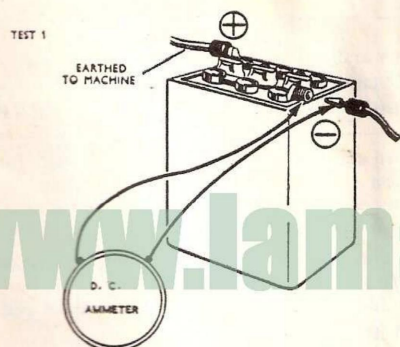
1 ohm. load resistance.
12 volt battery and 36 watt bulbs.

When checking the alternator output the engine should be run at approximately 3,000 r.p.m.

If the performance of the alternator has proved unsatisfactory, it is advisable to first check the wiring to make sure that good contact is being made at the various connections and that none of the wiring of alternator coils are shorting to the frame.

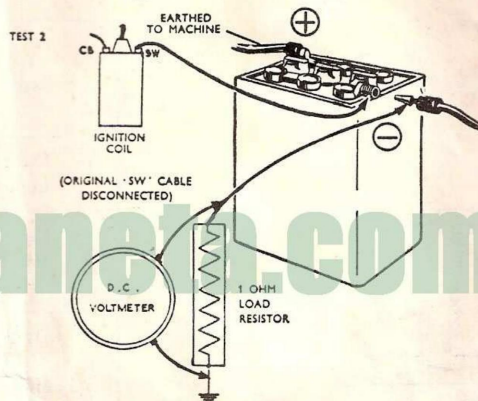
CHECKING D.C. INPUT TO BATTERY

Test 1. Ammeter connected in series with main lead and battery.



If the battery is in poor condition or low state of charge use Test 2.

Test 2. Disconnect main lead from battery. Connect 1 ohm resistor in place of battery. Feed ignition coil separately from battery. Turn ignition switch to IGN position.



Test	Switch Position	Reading Amps. at 3,000 r.p.m.		
		RM13	RM13/15	RM15
1	OFF	1.5 (min.)	1.75 (min.)	2.5 (min.)
	PILOT	0.5 (min.)	0.75 (min.)	1.5 (min.)
	HEAD	0.25 (min.)	0.5 (min.)	2.5 (min.)

Test	Switch Position	Reading Volts at 3,000 r.p.m.		
		RM13	RM13/15	RM15
2	OFF	1.5 (min.)	1.75 (min.)	2.5 (min.)
	PILOT	1.5 (min.)	1.75 (min.)	2.0 (min.)
	HEAD	3.0 (min.)	3.25 (min.)	3.0 (min.)

Conclusion from these Tests

Test 1. If meter readings are as stated, the charging circuit and alternator are satisfactory. No reading; check the generator.

A low reading can be caused by a faulty battery.

Proceed with Test 2. If readings still low check battery with hydrometer and discharge tester.

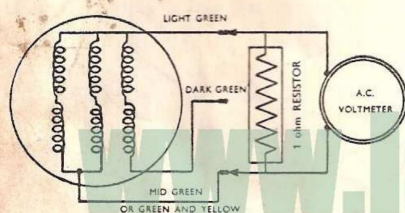
Test 2. If meter readings are lower or higher than values stated, check the generator. No reading on meter; check the rectifier.

Important

Inaccurate readings can be due to faulty wiring, bad connections at the snap connectors or poor earths. Make a quick visual check of all connections before proceeding with the tests.

Remember it is no use carrying out Test 1 if the battery is faulty or in a low state of charge; if in doubt proceed with Test 2.

Testing the RM13 Alternator on the Machine, using an A.C. Voltmeter and 1 Ohm Load Resistor



Test	Voltmeter and Resistor Connected Across	Reading Volts at 3,000 r.p.m.		
		RM13	RM13/15	RM15
1	Dark Green and Light Green	3.0 (min.)	3.25 (min.)	4.25 (min.)
2	Light Green and Mid Green or Green/Yellow	6.0 (min.)	6.25 (min.)	6.75 (min.)
3	Dark Green and Light Green (with Mid Green or Green/Yellow connected to Dark Green).	8.5 (min.)	8.75 (min.)	9.25 (min.)
4	Any one lead and Generator Stator (Earth)	No Reading	No Reading	No Reading

Conclusions from these Tests

Low reading on any group of coils indicates shorted turns.

Zero reading will indicate open-circuit coil.

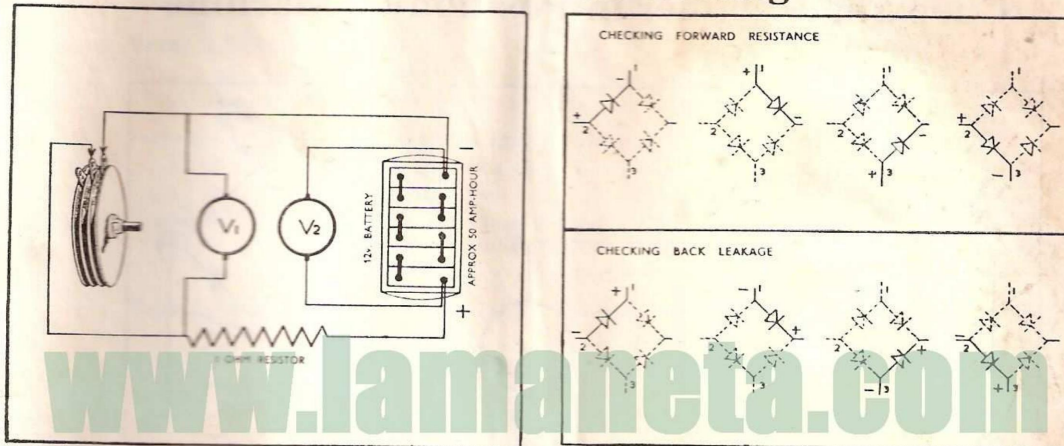
If all coils read low, partial de-magnetisation of rotor may have occurred as a result of faulty rectifier. Check rectifier, and battery earth polarity before replacing rotor.

A reading between any one lead and the generator stator indicates an earthed coil. Replace stator or locate earth by isolating and testing individual coils.

Note

With the engine running at 3,000 r.p.m. (approx.) the output voltages are steady, and even if the engine is running a few r.p.m. faster or slower the values stated will be obtained from a good generator.

Rectifier—Bench Testing



V1—will measure the volt drop across the rectifier plate.

V2—must be checked when testing the rectifier plate, to make certain the supply voltage is the recommended 12 volts on load.

It is essential that the supply is kept at 12 volts for these Tests.

Forward Resistance Test

Test 1. Connect test leads in turn to terminals 2 and 1, bolt and 1, bolt and 3, 2 and 3. Reading in all positions should not be greater than 2.5 volts. Keep the testing time as short as possible to avoid overheating the rectifier cell. **Note.**—If the later type of rectifier, which has no terminal markings, is fitted, the same test procedure is followed. The same voltage values also apply.

Back Leakage Test

Test 2. Proceed as for Test 1, and test each cell in turn, but reverse the test leads. Reading on V1 should not be less than 2 volts below the open-circuit reading on voltmeter No. 2, i.e., 10 volts.

Conclusion from these Tests

Test 1. If the voltage reading on V1 is more than 2.5 volts, on any cell, it is aged and the rectifier should be replaced.

Test 2. If the voltage reading on V1 is less than 10 volts, on any cell, the rectifier is shorted and should be replaced.

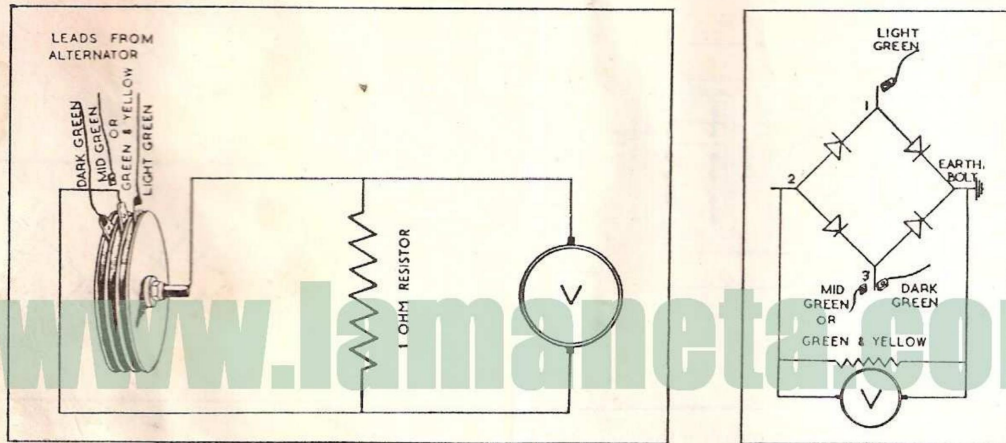
Important

Before fitting a replacement rectifier check the following points:—

1. Check that battery is correctly connected, **Positive to Earth.**
2. Check rectifier visually for signs of damage.

Never disturb the tension of the nut which holds the elements together on the through bolt. The efficiency of the rectifier depends upon the correct tension of the plates. The tension of the nut is set before leaving the works, and cannot be adjusted correctly in service.

Checking Rectifier in Position on Machine



Voltmeter and Resistor Connected Across	Reading with Leads Connected as Shown
Terminal No. 2 (or centre terminal on latest type) and frame of machine	6.5 (min.) RM13 7.0 (min.) RM13/15 7.75 (min.) RM15

Procedure

Connect the alternator leads as detailed direct to the rectifier terminals No. 1 and No. 3.

(Note.—On the latest type rectifiers the terminals are not numbered, so connect the alternator leads to the outer cranked terminals).

Connect the test leads which must have a D.C. voltmeter with 1 ohm load shunted across, between earth (frame of machine) and terminal No. 2 (centre terminal on latest type rectifier) when the values stated should be obtained with engine running at 3,000 r.p.m.

Conclusions from these Tests

If the alternator passes its individual test, but it fails on this test it indicates that either the rectifier is faulty or it is not properly earthed.

Connecting the test leads to the centre bolt will eliminate the possibility of faulty earth connection.

Testing the External Wiring Circuit

Using D.C. Voltmeter only

1. All cables, including battery, to be connected as normal.
2. Connect voltmeter Red test lead to earth.

Testing Charging Circuit through Ignition Switch

3. Connect Black test lead to No. 2 terminal on rectifier.
4. Switch ignition to IGN position.
5. Battery volts, i.e., six, should register on voltmeter.
6. If there is zero reading on voltmeter in the above condition, check circuit back through ignition switch, ammeter, etc., to the battery.

Testing Emergency Start Circuit (Single Cylinder Machine)

7. Connect Red test lead to earth.
8. Connect Black test lead to C.B. terminal on ignition contact breaker.
9. Open ignition contacts.
10. Switch ignition switch to EMG position.
11. Battery volts should register on voltmeter.
12. Transfer Black test lead to alternator Mid-Green lead.
13. Battery volts should register on voltmeter.

Note

These tests are to be carried out in the case of "No Charge" or "No Emergency Start" if previous tests have been carried out and all is in order.

It is important that both the ignition timing and the rotor timing is correct for efficient operation of Emergency Start.

Testing the 'Low,' 'Medium' and 'High' Charge Positions

Using D.C. Voltmeter only

1. Connect Red test lead to earth.
2. The set, including battery connected as normal, with the exception of the alternator Middle Green cable which should be disconnected at the snap connector under the saddle
3. Connect Black test lead to Mid-Green cable coming from headlamp (i.e., not coming from alternator).
4. With ignition switch in IGN position and lighting switch OFF.
5. A low voltage (i.e., 1—2) should register on voltmeter.
6. With lighting switch in PILOT, zero voltage should register on voltmeter.
7. With lighting switch in HEAD position a low voltage should register on voltmeter.

Note

Incorrect switching of these cables will cause incorrect charging rates, i.e., failure of Mid-Green and Dark Green linking together in HEAD position will result in a low charge rate with headlight switched on.

In the case of incorrect switching it is necessary to check the wiring and the switch for correct connections, etc.

B.S.A. SERVICE SHEET No. 813 (contd.)

Headlamp Switch

If both the rectifier and alternator appear satisfactory the wiring and switch contacts must be checked most carefully to eliminate any possible faults. The correct headlamp switch connections are shown in Service Sheets

No. 808D ...	...	C12.
No. 808C ...	...	C11G.
No. 808H ...	...	"B" models.
No. 808J ...	...	C15.

Alternator Removal and Replacement

The procedure for removing and replacing the alternator is described in Service Sheets No. 314 for "B" group machines and 409 for C11G and C12, and No. 422 for C15. Note that the stator should be assembled with the clip retaining the output cables on the side of the stator next to the engine on C11G and C12 but on C15 and "B" group machines the clip should be on the side away from the engine.

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