# 250 - 990cc 1939

**G2, G2M, G2MC**
**G7, G3, G3C, G4**
**G80, G90, G90C, G5, X**
**CLUBMAN. SUPER CLUBMAN & SPECIAL TOURIST MODELS**

# INSTRUCTION BOOK

**FOR**

## 1939 MODELS

## 250 - 990cc

**Models**
**G2, G2M, G2MC**
**G7, G3, G3C, G4**
**G80, G90, G90C, G5, X**
**Clubman, Super, Special, Tourist**

**REF No. Ml 139**

# LUBRICATION.

(11). **LUBRICATION,**

Efficient lubrication is of vital importance, and it is false economy to use cheap oils and greases. The cost of exclusively using the best and most suitable lubricant will be repaid many times by long wear and good service.

We recommend the following oils and greases for use in "MATCHLESS" Motor Cycles :

**ENGINE LUBRICATION.**

In Summer : Patent Castrol "XXL."
Golden Shell " Extra Heavy."
Mobiloil " D " (or " B " if " D" is not obtainable).
Essolube "Racer."
Motorine " B de Luxe."

In Winter : Patent Castrol " XL."
Golden Shell " Extra Heavy."
Mobiloil " BB " for " B " if " BB " is not obtainable.
Essolube "Racer."
Motorine " B de Luxe."

The oils mentioned above flow freely when cold and, at the same time, have good heat resisting properties.

**GEAR BOX LUBRICATION AND ALL FRAME PARTS USING GREASE.**

Castrolease " Medium."
Shell " Retinax " Grease.
Mobilgrease " No. 2."
Esso Grease.
Belmoline " D."

When buying oils and greases it is advisable to specify the brand as well as the grade, and, as an additional precaution, to only buy in sealed containers or from branded cabinets.

(12). **ENGINE LUBRICATION SYSTEM.**

The engine is lubricated by the DRV SUMP system. In this, the main bulk of oil is carried in a tank from which it feeds by gravity to a pump. The pump forces the oil through a series of channels to the various parts requiring lubrication, and is then allowed to drain into the crankcase sump, from which it is extracted and returned to the oil tank by the pump. This process is continuous while the engine is revolving, and, because the oil pump is designed so that it is capable of exhausting a greater amount of oil than it is capable of injecting into the engine, it will be obvious that the crankcase sump is kept free of excess oil.

(31). **CONTROL CABLE LUBRICATION.**

Control cables are very susceptible to the influence of dryness and rust, and they should be kept flooded out with lubricant. The effect of efficiently lubricating a dry control cable has to be tried to believe the immense difference it causes. In order to do this, we fit in a convenient position, a small metal clip to each control cable. These clips cover small bared patches on the outer casings through which lubricant can be injected by means of a specially constructed oil gun. (Special oil gun, for control cables. Part number B.G.G., price each 5s. 9d., postage 4d. extra.) This gun is not supplied with the standard tool kit. The operation of flooding a control cable only takes a few minutes. It is necessary to slide the clip along the casing to enable the gun to be clamped to the casing so that the bared patch occupies a central position on the rubber pad that is on the nozzle of the gun. The clamping pressure is provided by the large, milled-edge disc just under the rubber pad. The screwed plunger of the gun is then given a few turns (in a clockwise direction), which action forces oil through the metal spiral of the outer casing, and floods the entire length of the cable with lubricant.

Avoid oiling the ignition control cable to excess, because, if this is done, there is a danger of oil collecting inside the contact breaker cover and thereby causing misfiring.

To fill the oil gun, unscrew the barrel from the end cap nearest to the nozzle. Unscrew the operating handle as far as it will go and then pour the lubricant into the barrel. (Engine oil or a very light grease may be used). Then replace the end cap and nozzle assembly and the gun is ready for use.

(32). **CONTROL LEVER LUBRICATION.**

A drop or two of engine oil should be placed on all the moving parts of the various control levers every 1,000 miles.

(33). **BRAKE PEDAL LUBRICATION.**

A grease nipple is provided in the heel of the foot brake pedal to lubricate the bolt and bush on which the pedal is hinged. a small quantity of grease should be injected every 1,000 miles.

(34). **MAGNETO LUBRICATION. (All Models except G2, G2M and G7.)**

The magneto bearings are packed with grease during assembly, and at least once every 10,000 miles the magneto should be dismantled for cleaning, adjustment and repacking the bearings with grease. This is preferably carried out at a Lucas Service Station.

(35). **DYNAMO LUBRICATION. (Miller Separate Dynamo.)**

On Models G2 G3 and G7 (which are fitted with coil ignition), oil and grease are used as lubricants for the dynamo. There is an oil lubricator on the driving end of the dynamo, and a few drops of thin oil should be inserted through this every 500 miles.

Using a stout screwdriver, or other suitable lever, raise the valve spring bottom collar, at the same time, holding the valve down on its seat, and withdraw the valve cotter. This action will free the valve so that it may be extracted.

To replace a valve, reverse the procedure described above.

(55). **TO REFIT A PISTON AND CYLINDER BARREL.**

All parts should be clean. Place the rings on the piston (see paragraph 56).

Smear the gudgeon pin with clean engine oil, and, placing the piston over the connecting rod so that the slit in the piston faces to the FRONT of the machine, and so that the holes for the gudgeon pin are in line with the bush in the rod, introduce the gudgeon pin in the piston and centralise it.

Then fit the gudgeon pin circlip (or circlips, if both have been removed). To do this, the rounded ends of the special pliers should be inserted In the holes in the circlip and the pliers gently compressed. The circlip should then be Introduced into the piston, with a rotary movement, until the whole of the circlip lies snugly in the groove which is machined in the gudgeon pin boss in the piston. This is most essential, because. if the circlips are not fitted properly, there is a possibility of the gudgeon pin working out of position and scoring the wall of the cylinder.

A paper washer is fitted between the base of the cylinder and the crankcase, and it is best to stick this to the base of the barrel with liquid jointing compound. Make sure none of the jointing compound closes the holes for lubricating the cylinder.

| | | |
|---|---|---|
| Paper washer, Models G2, G2M, G2MC ... | 37-12-E3 | 2d. each. |
| Paper washer, Model G7 ... ... ... | 37-G7-E3 | 2d. each. |
| Paper washer, Model G5 ... ... ... | 37-9-E3 | 2d. each. |
| Paper washer, Models G3, G3C, G4 ... | 37-8-E3 | 2d. each. |
| Paper washer, Models G80, G90, G90C ... | 37-8-E3 | 2d. each. |
| Paper washer, Model X (2 used) ... ... | 37-2-E3 | 2d. each. |

Postage 2d. extra.

Next, smear the cylinder wall and the piston with clean engine oil, fit and space the three piston rings so that the gaps are evenly spaced at approximately 120 degrees to each other and proceed to fit the cylinder barrel, taking care that the piston rings are fully compressed into the grooves, in turn, as the barrel passes over them.

When the barrel is down on to the crankcase, replace the holding down nuts, screwing down each, bit by bit, in turn, until all are fully home.

On Models G2M and G2MC the rear holding down nut on the right hand side of the engine is longer than the other three

Remove the knurled adjusting nut from the rear end of the rear brake rod.

Slacken the nut on either side of the rear wheel axle, undoing each nut two or three turns, and this will leave the rear wheel free to be withdrawn, towards the rear, till it is clear of the machine.

To replace the rear wheel reverse the procedure described above, taking care, after replacing it to check the rear brake adjustment as detailed in paragraph 87.

(79). **TO REMOVE THE REAR WHEEL. (Models G2MC, G3, G3C, G4, G5, G80, G90, G90C and X).**

The rear wheel is of the quick detachable type and, in order to remove it, there is no need to disturb any part of the rear brake and final drive.

To remove the rear wheel, proceed as follows :—

Place the machine on the rear stand and disconnect the rear lamp cable connector that is inserted in the cable at a point just above the rear wheel centre solid spindle on the right hand side.

Take away the two nuts and washers that retain the back half of the mudguard to the fixed front half, and slacken the two nuts that retain the rear tubular arch to the studs in the rear fork ends. This will enable the rear half of the rear mudguard with the tubular arch to be taken away from the machine.

Remove the three square headed sleeve nuts that secure the hub flange to the brake drum. (A tubular spanner is included in the tool kit).

Remove the nut on the wheel centre solid spindle (left hand side of the machine), and withdraw the spindle from the right hand side of the machine. This action will free the distance piece fitted on the centre solid spindle and located between the inside of the right fork end and the hub.

Then, by moving the wheel to the right, in order to disengage it from the driving studs in the brake drum, it is free to be taken away from the machine.

To refit the rear wheel, reverse the procedure described above.

IN NO CIRCUMSTANCES MUST THE CENTRE SOLID SPINDLE BE REMOVED UNTIL THE MACHINE IS PLACED ON THE REAR STAND, AND THE SPINDLE MUST ALWAYS BE IX POSITION BEFORE THE MACHINE IS TAKEN OFF THE STAND.

Screw these nuts right home as far as they will go, and then slacken each, in turn, five complete revolutions.
Finally, replace the clutch plated dome with its six fixing screws.

(94). **FRONT CHAIN ADJUSTMENT.**

To provide front chain adjustment, the gear box hinges on its lower fixing bolt, while the top fixing bolt can slide in slots cut in the engine plates to allow the hinging movement.

This movement Is controlled by an eyebolt which encircles the top fixing bolt, and the threaded end of which, passes through a block that is secured to the right side engine plate.

By altering the position of the eye bolt in the block, the gear box top fixing bolt can be moved in its slots. This action swings the gear box, and, according to the direction of the swing, the front chain can be tightened or loosened. The gear box must be swung backwards to tighten the chain.

The movement of the eyebolt in the block is controlled by two nuts that are threaded on it and are located on either side of the block.

(95). **TO ADJUST THE FRONT CHAIN. (Models G2, G2M and G7.)**

To tighten the front chain, remove the inspection cap from the front chain case, and proceed as follows:—

Slacken the nuts on the right-hand ends of the top and bottom fixing bolts of the gear box and unscrew the forward nut that is on the eyebolt two or three complete turns.

Then, unscrew the rear nut that is on the eyebolt until, by testing through the front chain case inspection cap orifice, it is felt the front chain adjustment is correct.

If the chain can whip, or move, about 3/8in. as it is pressed up and down, midway between the sprockets, the adjustment is correct.

Check the whip in more than one position. (See paragraph 100.)
Finally, tightly screw down the forward nut on the eyebolt, tighten the nuts on the top and bottom gear box fixing bolts, recheck the amount of whip and replace the chain case inspection cap.

(96). **TO ADJUST FRONT CHAIN. (Models G2MC, G3, G3C, G4, G5, G80, G90, G90C and X.)**

To tighten the front chain, remove the inspection cap Irani the front chain case, and proceed as follows :—

(Continued on Page 53).

A throttle stop screw, that can be locked in position by a nut, is located in the side of the mixing chamber. This screw runs obliquely into the chamber and is situated above the pilot jet air adjusting screw.

The position of the throttle stop screw determines the position of the throttle when " closed."

Some riders prefer to set this so that when the throttle control (twist grip) is in the closed position, the throttle is completely closed and the engine cannot run. Others prefer to set it so that when the throtle control is " closed " the throttle is prevented from completely closing and the engine can therefore continue to run at ildling speed.

Before concluding that incorrect carburation is responsible for heavy petrol consumption, and before carrying out any of the tests and adjustments described above, it is most important to make sure the ignition is set correctly. (See paragraph 126 for correct settings). Late ignition usually causes a great increase in petrol consumption,

## (108). POSSIBLE CARBURATION TROUBLES.

**Poor idling may be due to :—**

Air leaks. (Either at the junction of the carburetter and the engine, or by reason of a badly worn inlet valve stem or guide |.
Faulty valve seatings. (Engine valves).
Faulty sparking plug or the points set too closely.
Ignition advanced too much.
Contact breaker points dirty, or set too closely.
Defective high tension cable.
Pilot jet not operating correctly. (May be choked).
Tappets adjusted too closely.

**Heavy petrol consumption may be due to:—**

Late ignition setting.
Bad air leaks. (Probably at carburetter and engine joint).
Weakened valve springs.
Leaky float. (Causing flooding).
Taper needle extension insufficient.
Poor compression, due to worn piston rings or defective valve seatings. (Always test compression with throttle wide open).

## (109). TWIST GRIP ADJUSTMENT.

A screw is provided in one half of the twist grip body to regulate the spring tension on the twist grip rotating sleeve. This screw is locked by a nut and must be screwed into the body to increase the tension.

Each of these nuts (four on all Models except X, which has five) should be screwed in exactly one half of a complete turn, when a retrial should be made. If necessary, repeat, but be careful to adjust each of the nuts a similar amount. (See paragraph 93 to obtain details of the standard setting of these nuts).

If it Is necessary to nearly completely screw home the clutch spring: adjuster nuts in order to remedy clutch slip this is a clear indication the springs have lost their strength and/or the fabric inserts in the friction plates have worn so they are past further useful service. The obvious remedy then is to replace with new. (Clutch springs cost 6d. each, and new fabric inserts can be fitted to your plates at a cost of 3s. 0d. per plate, postage is extra).

It is very important, to obtain the full gripping power of the clutch, that the inserts are perfectly flat and to size. It is for this reason we recommend the clutch friction plates are returned to us when new inserts are needed.

(124). **DISMANTLING AND ASSEMBLY.**

We do not recommend the dismantling of gear boxes to any but those who have had a mechanical training. Though dismantling, in itself, is not a difficult task, the reassembly calls for accuracy in positioning and fitting that can easily lead a novice astray. To the latter we recommend the despatch of the box to ourselves or a competent mechanic.

All the nuts and bolts used in the box have right hand threads. When fitting the kickstarter return spring, it is best to tightly coil it up and bind with string or wire and then to release-it after it is in position. Otherwise, attach each end of the spring to its pins and then, with the kickstarter axle only partly home " wind up " the axle two to two and a half complete turns, after which, push the axle right home.

On H.P. type gear boxes the two centralising springs on the foot change mechanism should be mounted in such a way that the two arms of each spring lie on either side of each pin. In no circumstances should the arms of a spring be crossed, although, a new spring will have the arms crossed, due to the natural tend of the spring.

On C.P. and B.A.P. gear boxes, when assembling the toothed sector of the foot change mechanism it is important to see that the sector meshes with the small pinion on the end of the camshaft so that the marks on each part are in mesh.

It is advisable to complete the inspection by measuring the specific gravity of the acid in each cell, as this gives a very good indication of the state of charge of the battery.

An instrument known as a "Hydrometer" is employed for this purpose. This can be bought at any Lucas Service Station and from most garages.

The specific gravity figures are:—

1.285 to 1.300 when fully charged.
About 1.210 when half discharged.
About 1.150 when fully discharged.

These figures are given assuming the temperature of the solution is about 60 degrees F.

Take readings of the acid in each cell. The readings should be approximately the same for all of the cells. If one cell gives a reading very different from the rest it may be that the acid has been spilled or has leaked from this particular cell, or there may be a short between the plates. In this case we advise the owner to have the battery examined by a service depot to trace the cause and to prevent the trouble from developing.

If the equipment is laid by for several months, the battery must be given a small charge from a separate source of electrical energy about once a fortnight, in order to obviate any permanent sulphation of the plates. In no circumstances must the electrolyte be removed from the battery and the plates allowed to dry, as then certain changes take place which result in loss of capacity.

(141). **DYNAMO.**

The dynamo is fitted with two brushes, the positive is insulated and the negative is earthed.

Before removing the dynamo cover for any reason, disconnect the positive wire from the battery, otherwise there is a danger of reversing the polarity of the dynamo or short circuiting the battery, either of which might cause serious damage.

Occasionally examine the dynamo brushes. They can be removed from their holders when the spring lever is held aside. They should slide freely in their holders and make good contact with the commutator. If the brushes are dirty or greasy, clean them with a cloth moistened with petrol. Replace the brushes in their original position.

After long service, when the brushes have become so worn that they will not bear properly on the commutator, they should be replaced with new. Brushes are sold in complete sets.

If a difficulty is found in making a gas tight joint between the plug centre and the body, the copper washer should be annealed.

This can be done by holding the copper washer in a flame till it is bright red hot and then dropping it into cold water. (Hold the washer on a piece of wire when heating it.)

If the plug points are set too closely there will be a tendancy to misfire and this may be accompanied with explosions in the silencer.

If the plug points are set too far apart, starting will be difficult and, in any case, an undue strain will be placed on the insulation of the magneto armature, or, in the case of coil ignition, on the coil

# GENERAL INFORMATION.

(159). **MECHANICAL TROUBLES.**

Sudden failures are generally due to one definite thing. Gradual failure may be due to a combination of circumstances.

In any case of failure in operation no adjustments should be made, nor should any part be tampered with, until the cause of the trouble has been located. Otherwise adjustments which are correct may be deranged.

In paragraphs 160 to 165, inclusive, are particulars of failures and troubles that can occur together with the probable reasons. These troubles are arranged in the order of possibility.

(160). **ENGINE FAILS TO START OR IS DIFFICULT TO START.**

May be due to:—

Throttle opening too large.
Petrol tap closed.
Air lever in open position.
Ignition not set just off the fully advanced position.
Not enough petrol in the tank.
Lack of fuel because of insufficient flooding.
Lack of fuel because of pipe or tap obstruction.
Excessive flooding of carburetter.
Pilot jet choked.
Oiled up or fouled sparking plug.
Stuck up engine valve.
Valve stem sticky with burnt oil.
Weak valve spring.
Valve not seating properly.
Contact points dirty.
Incorrect contact point gap.
Water on high tension pickup.
Water on sparking plug.
Vent hole in filler cap choked.