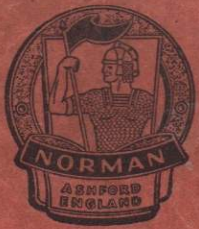


# NORMAN MOPED

## VILLIERS 3K UNIT

## OPERATING INSTRUCTIONS

NORMAN CYCLES LTD., ASHFORD, KENT

2/-

## CONTENTS



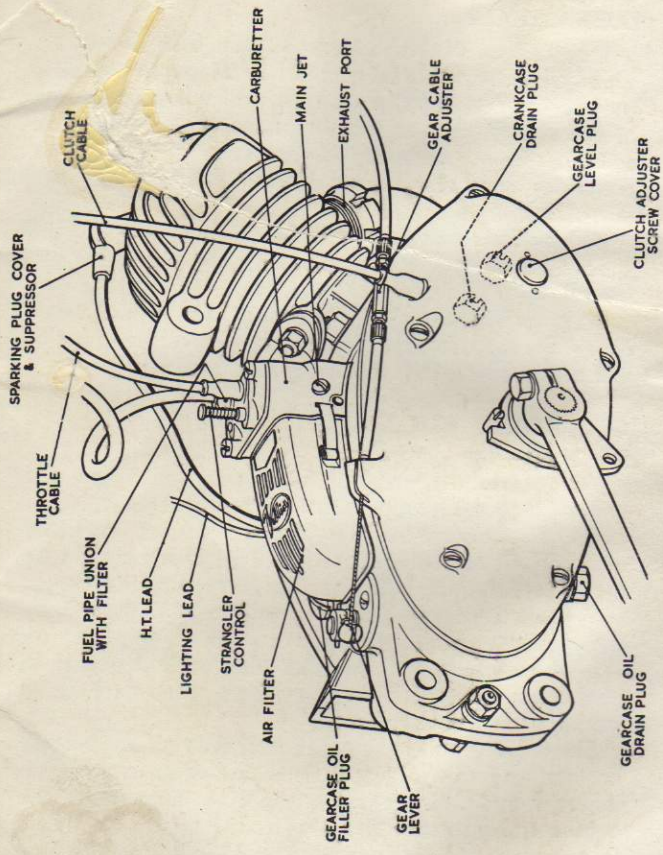


Fig. 1

# RUNNING INSTRUCTIONS

## LUBRICATION

The Villiers 3K Moped unit is designed to run on a petroil mixture : one part oil to 24 parts petrol is the correct ratio of the mixture, and when using one of the straight oils as recommended (see inside back cover), the mixture should be made in a separate container and well shaken before pouring into the petrol tank.

If lubrication is preferred by using one of the special self mixing two-stroke oils, the petrol can be poured directly into the petrol tank.

A precaution, however, should be taken when filling the tank to first turn off the petrol tap, pour in the oil first and follow this by the petrol.

## GEARBOX LUBRICATION

**Read in conjunction with Fig. 1**

The gearbox is usually filled with oil when the engine is tested at the factory. The oil level must be checked occasionally and topped up as required using an oil of S.A.E. 30 rating. This check should be made at 500-mile intervals. To carry out the check, the gearcase level plug (refer Fig. 1) should be unscrewed and also the gearcase oil filler plug ; oil should be inserted at the filler plug until it begins to over run at the level plug when the machine is standing on level ground.

Every 1,000 miles the gearbox should be completely drained and this is best carried out when the engine is warm, and the removal of the drain plug under the engine and also the filler plug at the top to admit air is necessary. Allow to drain for 15 minutes. Replace



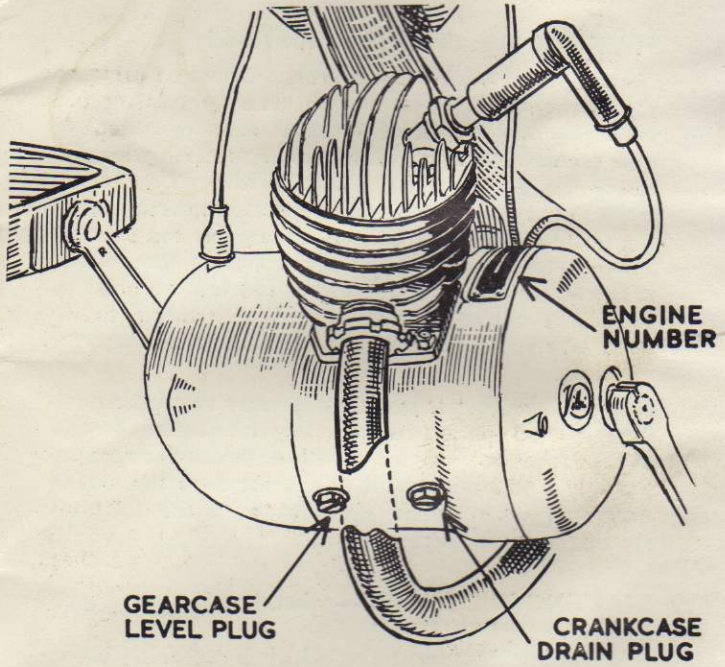


Fig. 1a

drain plug. Remove level plug and refill to correct level. **Note :** The vent hole in the filler plug should be kept clean and unobstructed.

## STARTING THE ENGINE — when cold

Turn petrol tap on and close the choke by pressing the choke knob. Open the throttle by turning the twist grip one-quarter of its travel. Ascertain that the gear control twist grip is in neutral position with the arrow pointing against "O". With the pedalling crank at the top of its stroke depress it smartly, when the engine should start. Once the engine has started, allow it to run slowly for about one minute, when it should be ready to ride away. There is no need to touch the choke control as this will automatically open when the throttle is turned beyond one-third of its travel.

In cold weather it may be necessary to prolong the warming up period without opening the throttle beyond the one-quarter travel mentioned above to possibly 2 or 3 minutes. If this is not done the engine may stall when called upon to take the load on starting away from rest.

## STARTING THE ENGINE— when hot

**Read in conjunction with Fig. 1a**

When starting the engine which is still fairly warm after a previous run, the choke control will not be needed. If at any time you inadvertently use the choke when the engine is hot and it refuses to start after a few attempts, the reason will undoubtedly be due to it having sucked too much petrol into the crankcase. The crankcase, therefore, must be drained



of this surplus and to do this remove the crankcase drain plug, open the throttle as far as possible, and turn the engine over smartly a few times with the pedalling crank. Now replace the drain plug and start all over again as given under this heading : Starting the Engine — when hot. (Refer Fig. 1a.)

## STOPPING THE ENGINE

The throttle adjustment is set to allow the engine to nicely tick over when in its apparent closed position. Therefore, to stop the engine it is necessary to use the ignition short-circuiting switch which is combined with the main headlamp switch. To stop the engine close the throttle as far as possible and turn the main lighting switch fully to the left. Hold it in this position until the engine stops.

**NOTE :** There is no need to switch on when starting the engine again as the cut-out switch automatically returns to its **on** position.

When you have stopped the engine, and if it is being left for a few hours or more, always make a practice of turning the fuel tap off.

## RUNNING IN

All new engines have to cover a certain distance before they will develop their full power output. The engine, therefore, should be run carefully for 600 miles during which period it should never be allowed to race and never should you make heavy demands upon it and cause it to labour. It is recommended that a speed of 15 m.p.h. in bottom gear or 25 m.p.h.

in top should not be exceeded for the first 200 miles and it is advisable to change from bottom into top gear at around 12 m.p.h. After this initial 200 miles, maximum speed may be used safely for short bursts. Care in running the engine in as described will be well repaid by its future service.

## IMPORTANT

Never attempt to engage the gears whilst stationary with the engine stopped. Excessive force will be needed to engage them under these conditions and serious damage may be caused to your gearbox by the use of such force. It is, of course, quite in order for the gear to be shifted into neutral as this will cause no damage.

## CLUTCH

### 1. Clutch Cable

There must always be approximately 1/16" to 1/8" free movement of the clutch lever and this is obtained by means of the cable adjuster screws; this setting will, however, only be effective if the clutch unit in the engine has been correctly set.

### 2. Clutch Unit Adjustment

With the engine in **neutral,** slacken off the clutch cable by means of the adjusters. Remove the rubber plug in the right-hand cover exposing the clutch adjuster screw. Turn the screw to the right, loosening the clutch plates, until the pedals can be made to slip without rotating the engine — very little movement only is necessary. Next take up cable slack completely by means of the cable adjusters, then rotate the clutch



screw to the left, anti-clockwise, 1/4 turn. Replace the rubber sealing plug and adjust the clutch cable to allow 1/16" to 1/8" free movement of the lever.

### 3. Gear Change Cable

This cable should be just slightly slack when **top** gear is engaged. This will ensure that both gears and neutral are correctly engaged when the control lever is shifted into these positions. The adjustment is made at the handlebar end of the cable, just beneath the gear-change twist grip.

### 4. Carburetter Cable

This cable must be adjusted by the adjuster on the carburetter cap to allow the engine to just tick over when the twist grip control is turned to the closed position.

## SILENCER AND EXHAUST PIPE

The Villiers silencer incorporated in the exhaust system is readily detachable for cleaning. The silencer as a whole can be removed from the exhaust pipe by slackening the clamping bolt on the silencer clip, unbolting the silencer from the frame of the machine and withdrawing from the pipe.

If the small screw at the extreme rear end of the silencer is removed, the internal part of the silencer can be gripped with a pair of pliers and withdrawn for cleaning. This cleaning is then undertaken by washing all parts in petrol or paraffin, or one of the special detergents can be used. Scrubbing with a wire brush will also facilitate the removal of excess carbon deposit.

Blocking up of the exhaust system is one of the most usual causes of loss of power on two-stroke

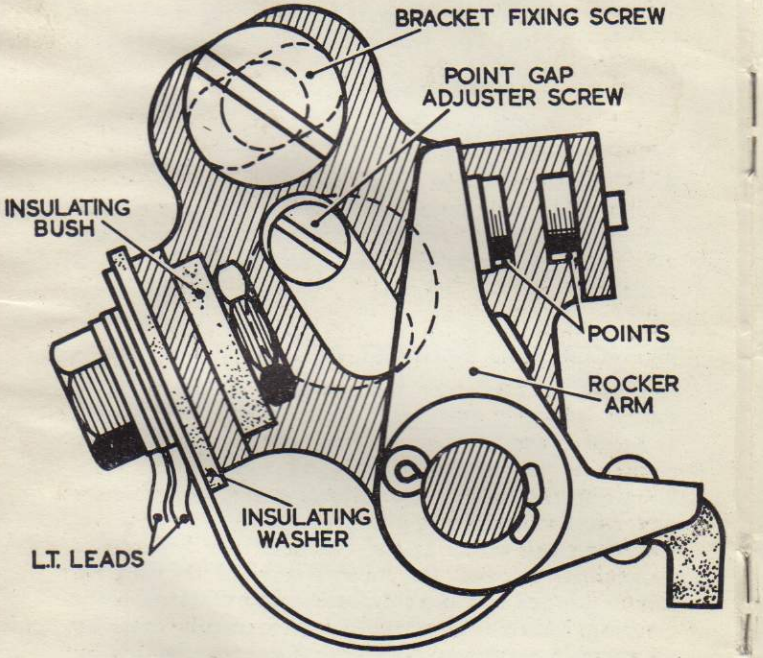


Fig. 2



engines and quite apart from cleaning the silencer periodically, the exhaust pipe itself should be cleaned out and also the exhaust port on the cylinder barrel. Any build up of carbon at any of these points will impair the power output of the unit.

## FLYWHEEL MAGNETO

**Read in conjunction with Fig. 2**

The flywheel magneto fitted to this engine supplies both the low-tension current for lighting and the high-tension current for ignition. The only attention required to this unit is the cleaning and adjusting of the contact-breaker points periodically. This operation should only be needed every 2,000 miles or so.

To obtain access to the contact breaker, remove firstly the left-hand pedal crank, followed by the left-hand engine casing. This latter is held in position by three screws. Turn the engine by hand until the contact breaker is exposed by one of the apertures in the flywheel and with the points fully open. The points should be cleaned with a petrol moistened rag (not petroil mixture) held over the blade of a pen-knife or similar implement. Fig. 2 shows the contact breaker clearly. The gap should then be checked with a feeler gauge to ensure a gap of .012" — .015". If adjustment is required slacken by 1/8" of a turn the bracket fixing screw, the points can now be adjusted by turning the point-gap adjuster screw either in a right- or left-hand direction as required. Turning in a right-hand direction will increase the gap and turning in a left-hand direction will close it. Take care to completely tighten the bracket fixing screw after making the adjustment. Make no attempt to remove the flywheel from its shaft as a special

extractor is required for this operation which should be left in the hands of a competent workshop.

**NOTE :** When replacing cover, the rubber sealing ring must first be inserted into the pedal shaft housing and carefully worked over the shaft with the cover.

## SPARKING PLUG

The sparking plug will require cleaning from time to time. It is advisable to remove it from the engine every 500 miles and clean off all carbon deposit and re-adjust the point gap to between .018" — .022". When adjusting the gap this must always be done by moving the fixed point which is attached to the body of the plug. Never bend the centre electrode. The outside insulation of the sparking plug must always be kept clean and free from moisture. The plug type recommended for this engine is Lodge BN.

## CARBURETTER

This instrument should require no major attention under normal service conditions except periodical cleaning and re-oiling of the air filter. This filter is readily detachable from the carburetter by prising open two spring clips, one on each side. On removal of the unit it will be observed that there is a plastic plug covering two drain holes on the under side. This plug should be prised out.

To clean the filter dip it bodily in clean petrol, thoroughly rinse it, allow to dry out for a few minutes, and then dip the whole unit once more in a petroil mixture. Wipe off any of this from the



external part of the filter, replace the plastic drain plug and refit to carburetter. The period between cleaning this filter depends a great deal on the conditions under which the machine is used, but for all practical purposes, 2,000-mile intervals should prove satisfactory.

**NOTE :** Ensure that the rubber ring sealing the joint between the filter and carburetter is in place when refitting filter.

Now despite two fuel filters (one on the petrol tap and one on the banjo connection at the carburetter) it may be found after some time that very fine impurities have managed to pass through them and have settled in a fine deposit at the bottom of the float chamber or in one of the fuel ducts. These impurities may find their way into the jets thus starving the engine completely of its fuel. The carburetter as a whole can be readily dismantled for rinsing out in clean petrol but it is as well to note that the main jet screws into the right-hand side of the carburetter body and can be easily removed for cleaning without recourse to further dismantling of the instrument. A choked jet can be cleared by blowing through it. The throttle slide has attached to it a taper needle. This is located in one of the five grooves provided by a small cranked plate. The position of this needle, which is set by the manufacturers, generally should not need altering.

## DECARBONISING

Depending upon the conditions under which the machine is used the period between decarbonising

will vary between 1,500 to 3,000 miles. When the machine is in need of decarbonising this will be indicated by loss of power and general sluggishness combined in some instances by overheating. When this time comes it is recommended that you arrange with your dealer to have the engine decarbonised. If, however, you feel competent to undertake this job yourself, the following notes will be found useful.

1. First obtain from your dealer a new exhaust gasket.
2. Get together the necessary tools comprising: a tubular plug spanner, a special "C" spanner, pliers, an old knife or scraper, and a screwdriver. Some clean rag will also be useful.
3. Disconnect the H.-T. lead from the sparking plug.
4. With the "C" spanner remove the exhaust pipe attachment nut and take off exhaust pipe.
5. Unscrew the lower bolt, washer and nut of the silencer rear support clip and remove exhaust pipe and silencer from the machine in one piece.
6. With the tubular plug spanner unscrew sparking plug from cylinder head.
7. With the $\frac{1}{2}$" a.f. tubular spanner remove the four cylinder head nuts and washers and lift head from cylinder barrel.
8. By turning the rear wheel of the machine with the clutch engaged, bring the piston to its lowest position. This will be just below the exhaust port.
9. Carefully scrape away the carbon deposit from within the port, finishing off by drawing a narrow strip of cloth through it to remove any loose carbon.
10. Now turn the engine to bring the piston to the very top of its stroke.
11. Carefully scrape away carbon deposit from the top of the piston, finishing off by wiping it clean.
12. Now take the cylinder head and scrape the carbon deposit from inside of this and wipe clean.
13. The silencer and exhaust pipe should be cleaned as indicated earlier in this book.
14. Re-assemble the silencer and exhaust pipe.
15. Re-assemble cylinder head to barrel.
16. Replace exhaust pipe on the front of the cylinder barrel using the new exhaust gasket.
17. Screw the sparking plug firmly back into cylinder head after having cleaned off all carbon and reset points gap to .018" — .022".
18. Reconnect H.-T. lead.
    The engine is now ready for starting up.

## MAINTENANCE SUMMARY

**Every 500 miles:**
Check oil level in gearbox and clutch housing.

**Every 1,000 miles:**
Clean sparking plug and check gap. Drain gearbox and clutch housing, flush and refill. Clean air filter if necessary.

**Every 3,000 miles :**

Lubricate control cables. Clean carburetter, fuel pipe, and filter. Clean air filter. Decarbonise engine and silencer.

**After first 600 miles :**

Drain gearbox and clutch housing and refill.

## FAULTS AND THEIR CORRECTION

**If the engine will not start**

1. See that there is fuel in the tank.
2. See that the fuel tap is open.

**If it still does not start it may be due to any of the following :**

**Carburetter blocked** — unscrew jet and clean by blowing through it.

**Fuel pipe blocked** — clean fuel pipe, tap, screen filter and strainer.

**Ignition cable disconnected or faulty** — adjust or renew the cable.

**Sparking plug defective** — Remove the plug and clean it and check the gap. If the plug is faulty, renew it.

**If the engine starts but quickly stops again**

**Fuel pipe blocked** — clean fuel pipe, tap, and filter by blowing through it.

**Sparking plug dirty** — clean or replace plug.

**Blocked air hole in tank filler cap** — remove the filler cap and clean the vent hole.

**If the engine runs at reduced power**

**Carburetter jet blocked** — unscrew jet, and clean by blowing through it.

**Sparking plug fouled** — clean and reset or replace.

**Air filter block** — clean and oil air filter.



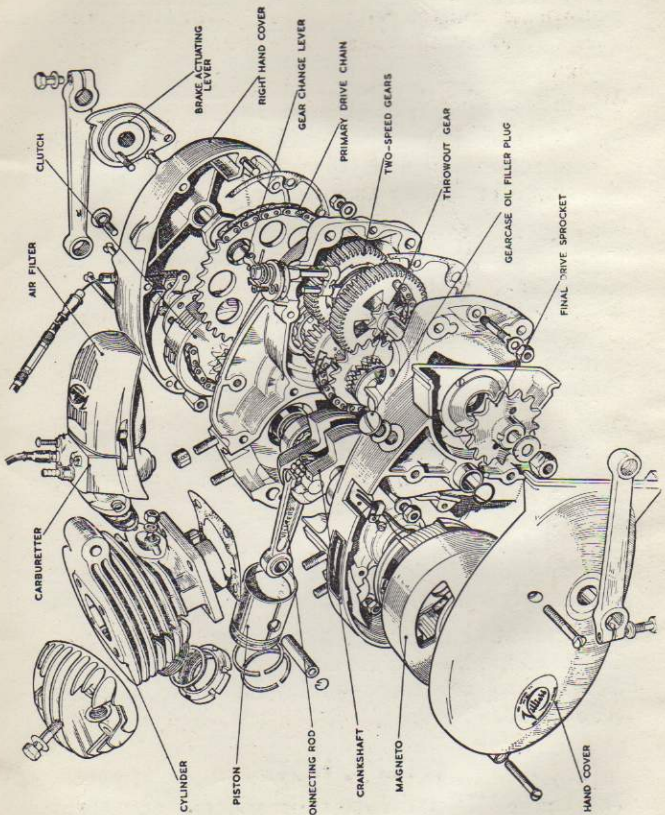


Fig. 3 Exploded view of engine unit

**Exhaust blocked** — clean exhaust port and silencer.
**Contact breaker not adjusted** — correct the gap and clean contacts.

**If the engine runs unevenly**
**Sparking plug dirty** — clean or replace plug.
**Ignition system faulty** — check ignition cable and connection. If this is all right, have the ignition system checked by your dealer.

**If the engine "four-strokes" and pulls badly**
**Exhaust blocked** — decarbonise exhaust port and silencer.
**Carburetter flooding** — remove the float casing cover, clean, and check needle seating. If the float leaks fit a new one.
**Carburetter jet loose** — tighten jet.

**Engine pulls poorly**
**Fuel supply inadequate** — check and clean fuel pipe. and tap.
**Carburetter jet blocked** — clean jet.

**Engine "Back-fires"**
**Sparking plug fouled** — clean and reset or replace
**Fuel supply insufficient** — check and clean fuel pipe.

**Engine cannot be started or clutch slips**
**Clutch slipping** — adjust clutch unit and cable.
**Gearcase oil too thick** — fill with oil of viscosity S.A.E. 30.

## SPECIAL NOTE

The Unified Thread System is adopted at various points on the Villiers engine. It is most important, therefore, to ensure that any spare parts you obtain are genuine Villiers spares.



# RECOMMENDED LUBRICANTS

## VILLIERS UNIT

| ENGINE : | GEARBOX : |
|---|---|
| Petrol/Oil ratio 24 : 1 unless otherwise stated. | |
| Shell 2T Petroiler Mix or Shell 2T Two-Stroke Oil. | Shell X-100 30 |
| Esso Two-Stroke Motor Oil (20 : 1) or Essolube 30. | Essolube 30. |
| Castrol Two-Stroke Oil (20 : 1) or Castrol XL. | Castrol XL. |
| BP-ZOOM or Energol Two-Stroke Oil. | Energol S.A.E. 30. |
| Mobilmix TT (20 : 1) or Mobiloil A. | Mobiloil A. |

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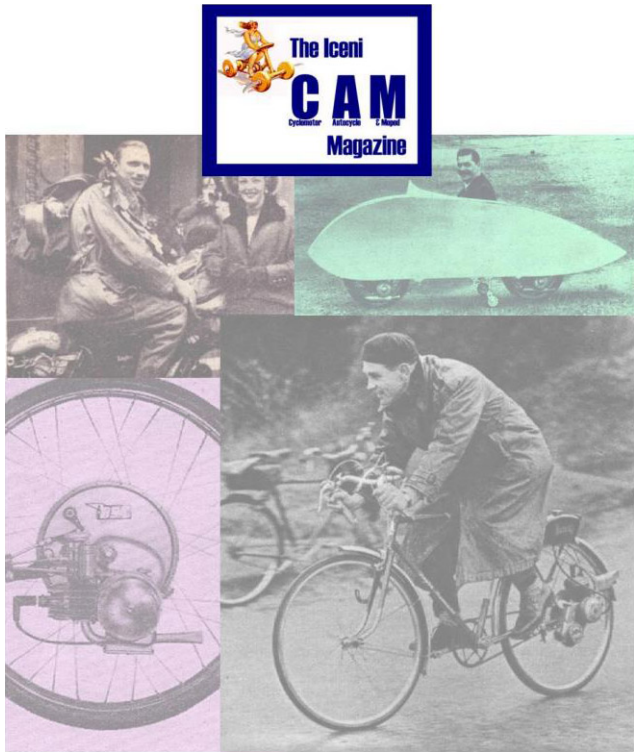


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