

# Carburettor PART 2. G4 AND LM CARBURETTORS

## 1. THE VICTA G.4 CARBURETTOR

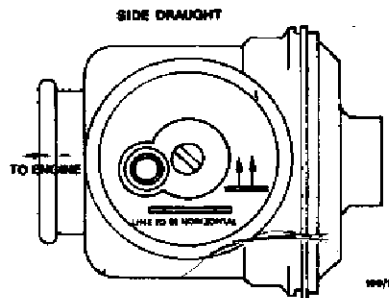
This section includes information about the new G.4 Carburettor which has been developed after much basic research and is a new concept in carburation that offers simplicity, durability and easy maintenance.

The theory of operation, dismantling and assembly procedures are fully detailed and illustrated in this section.

### DESCRIPTION

The G.4 carburettor is made of engineering quality, thermoplastic material. It controls and governs the engine speed under all conditions of loading.

All connections to it are flexible, the fuel float and needle valve are incorporated in the fuel cap, which in turn is positioned, according to the horizontal line and vertical arrow directions moulded on the face of the cap.



Mounting position of the G4 carburettor.

### THEORY OF OPERATION

The engine speed is controlled mechanically by the throttle lever and cable actuating a cam in the carburettor. The cable assembly is fitted inside the snorkel tube to protect it against kinking, snagging on bushes and other obstructions.

In the G.4 carburettor instead of a butterfly valve the flow of air/fuel mixture is controlled by the movement of a poppet valve.

A spring loaded lifter inside the carburettor moves on a cam to increase or decrease spring tension against a diaphragm which operates a poppet valve controlling the flow of the air/fuel mixture to the engine. Two arms of the cam open and close slots in the annular air chamber above the poppet valve seat and regulates the volume of air through the carburettor at each setting of the throttle lever.

The movement of the poppet valve is also governed by a vacuum applied on the diaphragm inside the cap of the carburettor. A partial vacuum is created when the flywheel fins pass a vacuum control button, which is an angled vane positioned in the subcowl, this reduced pressure is routed by a tube to the carburettor cap.

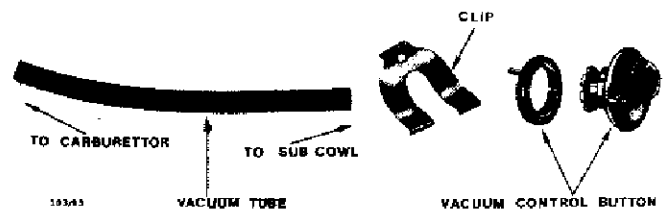
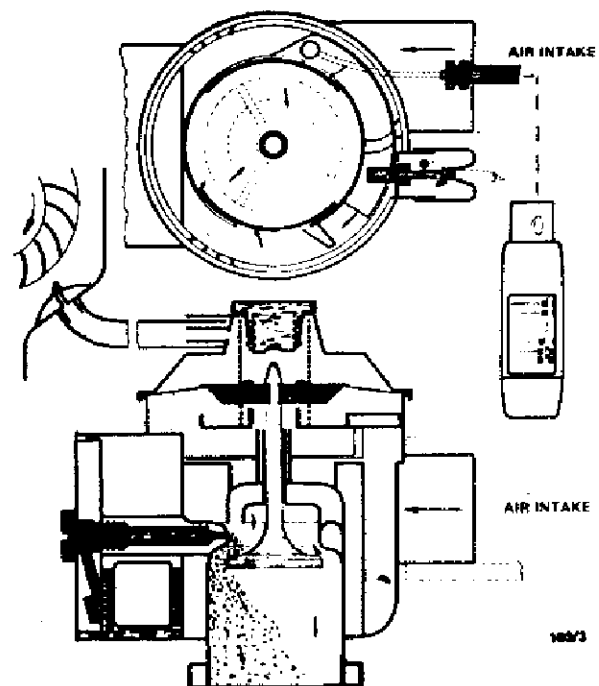


Illustration showing component parts of the vacuum control button.

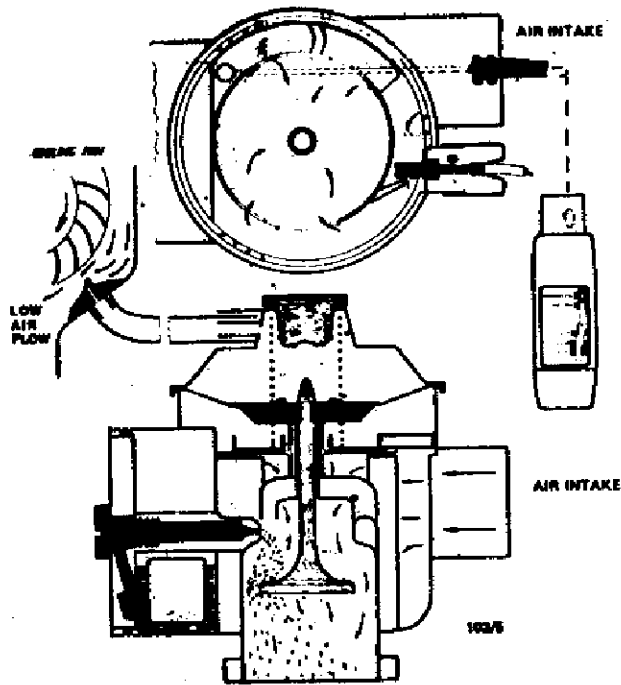
The control button position is set at the factory so as to govern the engine at a predetermined speed at full throttle with a load imposed by the cutting blades only. Adjustment of the control button is not normally required in service, see To Set Engine Governed Speed.

When a work load is imposed on the engine it slows down so reducing the vacuum in the carburettor cap above the diaphragm. The spring in the cap above the diaphragm then acts to force the diaphragm, down and open the poppet valve. This action allows a greater volume of air/fuel mixture to pass into the combustion chamber increasing the speed of the engine. An increase in engine speed in turn increases the vacuum in the cap above the carburettor so that the diaphragm lifts and partly closes the poppet valve reducing the engine speed to the preset throttle position.

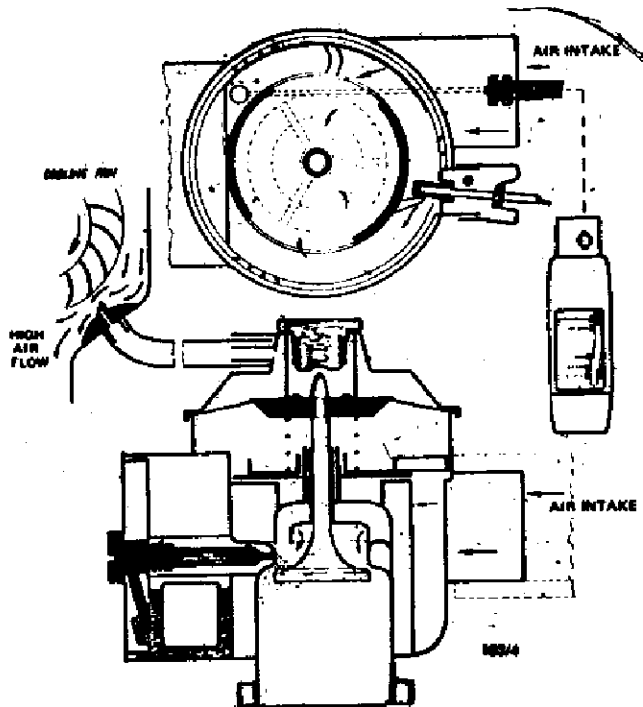


Schematic drawing of the G4 carburettor in the 'COLD START' position.

## Carburettor



Schematic drawing of the G4 carburettor in the GRASS-CUTTING/GRASSCATCHING position, work loaded 3,500 rpm.



Schematic drawing of the G4 carburettor in the 'GRASS-CUTTING/GRASSCATCHING' position, governed without work load 3,800 rpm.

Conversely, removing the work load also increases the engine speed which in turn increases the vacuum applied above the diaphragm in the carburettor cap. The spring below the diaphragm then lifts the diaphragm against the tension of the spring above the diaphragm to partially close the poppet valve and reduce the engine speed.

From the above it can be seen that the vacuum control button mounted in the subcowl controls the speed of the engine in conjunction with the diaphragm and springs in the carburettor.

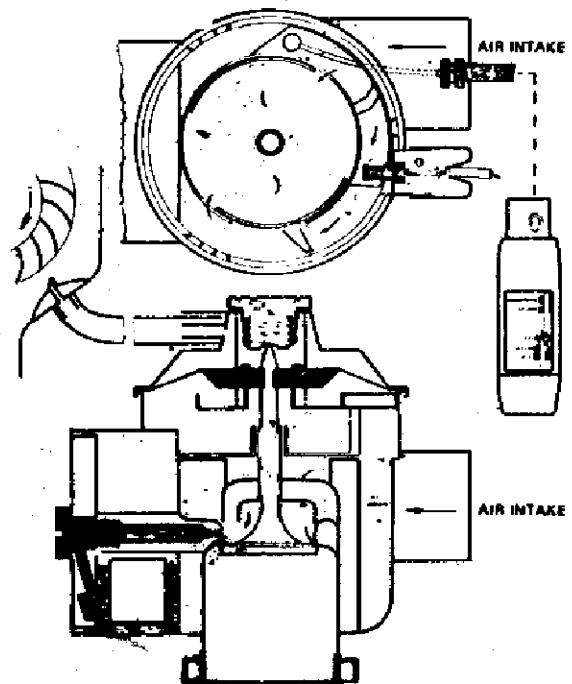
*NOTE: Should the engine speed be greater than the specified governed speed at full throttle then the vacuum is insufficient above the diaphragm which may be due to a number of causes. See the Trouble Shooting Guide for G4 and LM Carburettors.*

### AT THE COLD START POSITION

The movement of the cam from STOP to COLD START is anti-clockwise and raises the lifter, the diaphragm and partially closes the poppet valve. It also closes the slots in the air chamber to provide a rich starting air/fuel mixture which is the choke position.

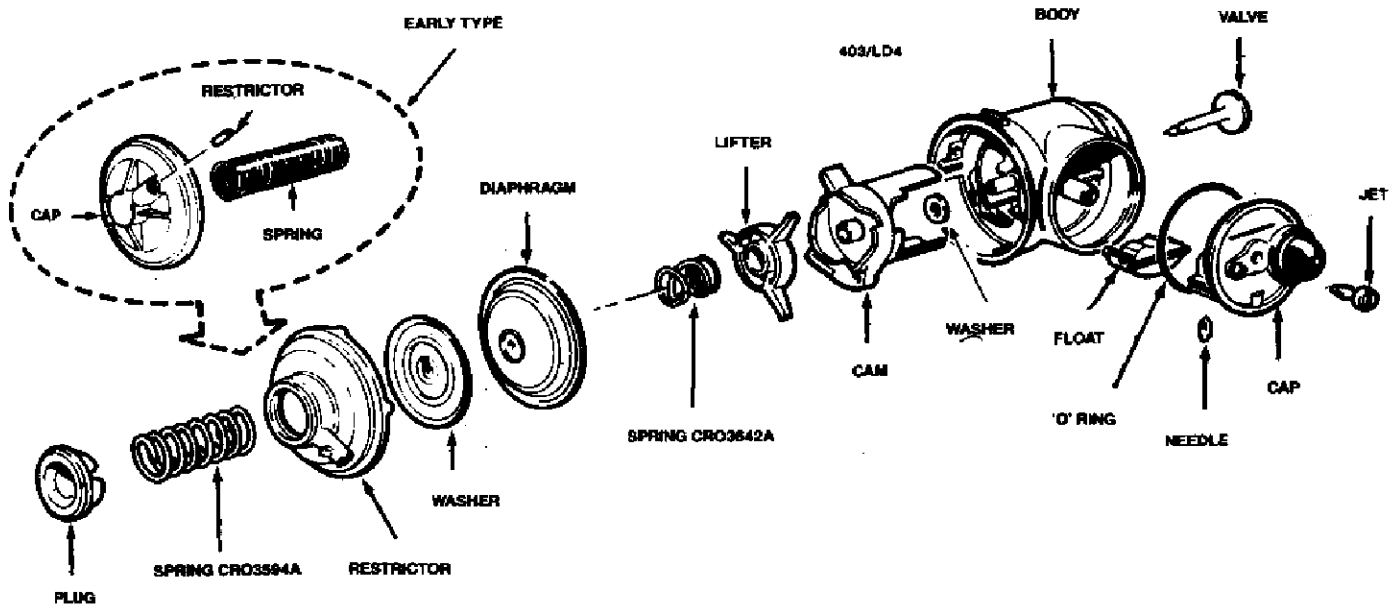
### AT THE GRASSCUTTING/GRASSCATCHING POSITION

The lifter drops into a valley on the cam and the action of the poppet valve is now controlled by the diaphragm, springs and balance of vacuum on each side of



Schematic drawing of the G4 carburettor in the 'SLOW' or 'IDLING' position.

## Carburettor



Line drawing of the LM carburettor fitted to the Power Torque engine showing the different types of end caps for early and late models.

*If fitting a late model inlet manifold to an early model block it will be necessary to fit thin washers to each manifold retaining screw to achieve a satisfactory mounting and seal.*

### Late Type

Some changes have been made to the late type LM carburettor. A removable plug is incorporated in the centre of the diaphragm cap to allow easy removal and installation of the top spring. When installing the diaphragm and cap on this model carburettor it is important to ensure that the diaphragm is correctly positioned and retained by the cap before installing the top spring and plug.

The lifter spring (part no. CRO 3642A) is now universal on both the standard engine and engines governed to a lower rpm, i.e. Vortex and those with a turbo blade disc.

The diaphragm is thinner to give much faster response to retain engine speed.

Adjustments to the governed speed of the engine can be made by changing the top spring. Spring pressure ranges from 1.5 to 3 newtons in 0.5 N increments and each spring is colour coded for easy identification. Each 0.5 N change in spring pressure changes engine speed by approximately 100–150 rpm. The lighter the spring pressure the lower the engine rpm.

### Optional top springs for LM carburettor:

CRO 3417A	150 g–1.5 N	Red
CRO 3643A	200 g–2.0 N	Yellow
CRO 3594	250 g–2.5 N	Natural
CRO 3638	300 g–3.0 N	Green

Vortex and turbo blade disc models which are governed to 2700–3250 rpm have a restrictor installed in

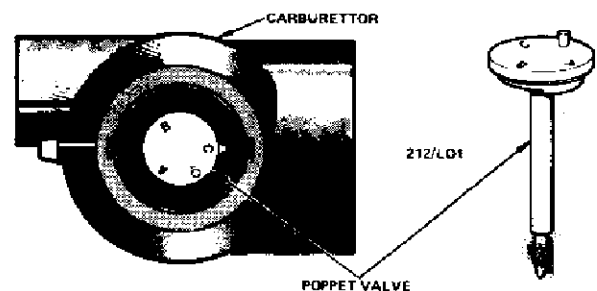
the governor vacuum line where it is attached to the carburettor end cap. This restrictor reduces the engine speed approximately 150 rpm. In addition to the restrictor, the poppet valve in these carburettors must be set with the letter A facing the spray hole. Refer to the heading Adjustable Poppet Valve if necessary.

The final engine speed adjustment is preset in the factory to ensure that the engine noise level does not exceed the decibel reading requirement. During normal service it is not necessary to change the colour coded springs.

### ADJUSTABLE POPPET VALVE

A new poppet valve has been introduced for replacement on carburettors that were originally fitted with a white poppet valve.

*NOTE: The new poppet valve must not be used in any carburettor that was originally fitted with a black valve unless a new body and valve are fitted as on assembly. This includes the Vortex mower.*



View of adjustable poppet valve installed removed from carburettor. Note that letter 'C' is aligned with spray hole for standard engines.

## Carburettor

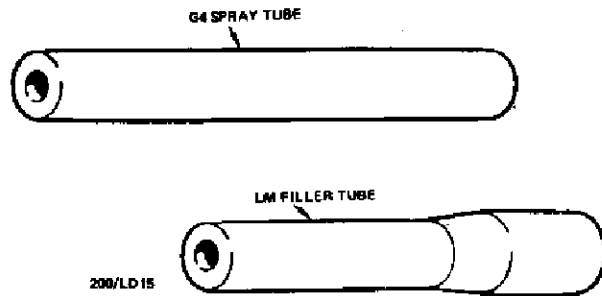


Illustration showing the difference between the G4 spray tube and the LM filler tube.

- (4) Instal the carburettor as previously described.

*NOTE: Operating the carburettor priming bulb does not supply any fuel to the carburettor float chamber. After the float chamber has been filled by gravity, pressing the priming bulb injects a measured quantity of air into the float chamber. This displaces sufficient fuel to start the engine.*

*The vent hole in the bulb must be covered by the finger tip.*

In the carburettor body, provision is made so that the once loose spray tube, now called the "filler tube", is pressed into and remains always a part of the body assembly. This filler tube cannot be assembled into existing G4 bodies.

Additionally, the float chamber cap and the carburettor cap may need to be rotated to suit the layout of the mower concerned. The following table details the changes to the carburettor jets, part no CRO3499A, required to suit the various mowers and engines concerned.

On HI-Arch baseplates, the access to the primer bulb is so restricted that it is not recommended that this change be carried out on these mowers.

A redesigned jet improves fuel flow to improve fuel

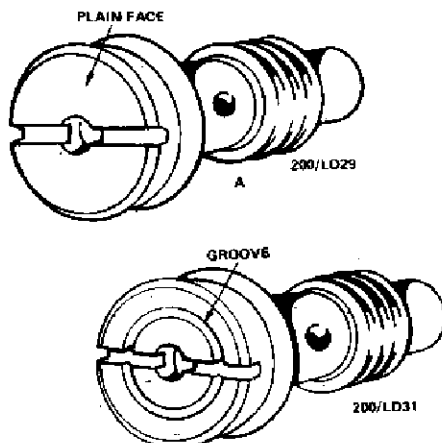


Illustration showing the jet assemblies installed to 125cc and 160cc engines fitted with LM carburetors. A = 160cc, B = 125cc engine.

economy. The jets are not interchangeable between G4 and LM.

To cater for various engine used, two sizes of jet assemblies are used.

For 125cc engines, the jet can be identified by a groove on the head of the jet.

For 160cc engines, the jet can be identified by the plain head of the jet.

### LM CARBURETTOR POWER TORQUE ENGINE

#### Early Type

Some changes were made to the standard LM type carburettor with the introduction of the Power Torque engines.

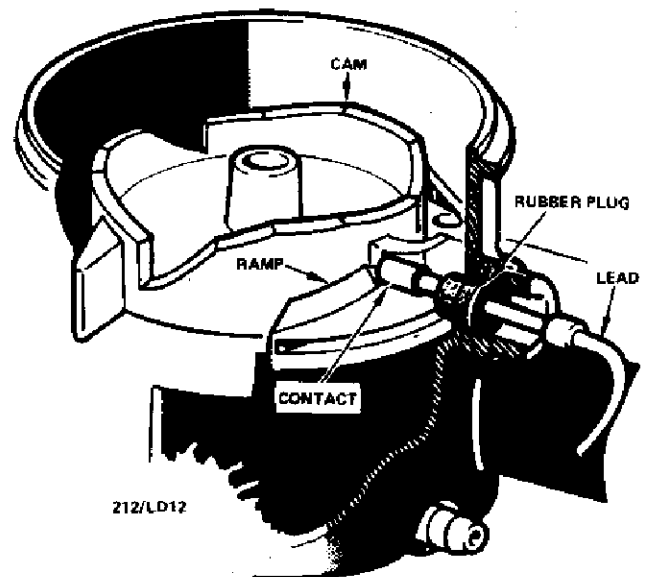
A heavier lifter spring is employed on engines governed to a lower rpm, to provide better governing control.

The standard governed speed of 3400-3800 rpm is preset by the non adjustable vacuum control button which is installed in the lower engine block.

The stop switch has been modified to give a more positive stop and to prevent the throttle lever moving off the stop position. A ramp has been added to the cam to lift the brass contact into a notch.

The idle adjustment screw has been deleted or made inoperable on some carburetors by installing two 'O' rings under the head of the screw.

*NOTE: Should the inlet manifold be removed for inspection, the 'O' ring between the inlet manifold and the cylinder block should always be renewed. In addition late model inlet manifolds have a longer spigot to improve sealing. The inlet port on late model cylinder blocks is machined deeper to accept this spigot.*



Cutaway view of Modified LM carburettor showing the modified stop switch, cam and rubber plug.

## 2. THE VICTA LM CARBURETTOR

The LM carburettor although being based on and similar in appearance to the G4 carburettor, has in its construction several important changes to improve reliability, serviceability and fuel economy.

The theory of operation is that of the G4 carburettor except that the engine operating temperatures are slightly higher because of the slightly leaner air/fuel mixture.

The LM carburettor replaces that of the G4 carburettor in its entirety with only the fitment, jet assembly and the upper spring varied between the models.

Except for the float chamber cap on some models, the interchanging of components between the G4 and LM carburettor is not possible. For identification purposes the float chamber cap is produced in a white coloured material.

### TO CHANGE FLOAT CHAMBER CAP. G4 TO LM

#### To Dismantle

- (1) Remove the carburettor as previously described.
- (2) Screw the main jet emulsion tube assembly out from the centre of the float chamber cap.

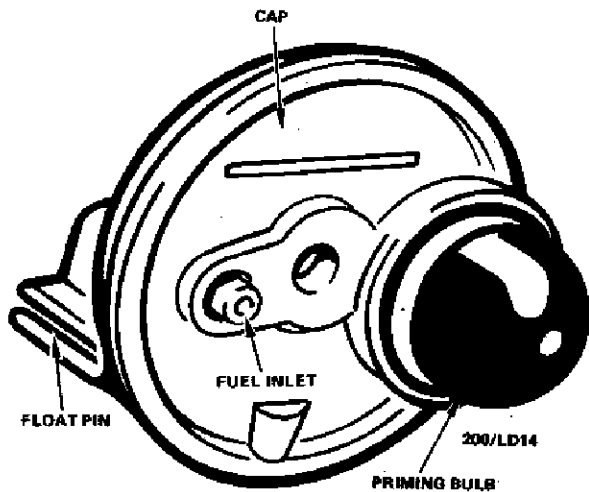
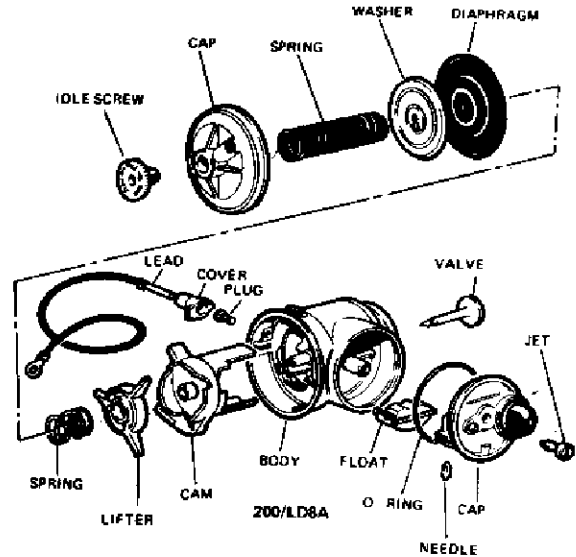


Illustration showing LM carburettor float chamber cap.

- (3) Remove the float chamber cap note that the hooks on the float, pivot on a plastic stud. The upper surface of the float arm acts on the needle valve which seats against the brass inlet port of the fuel intake.
- (4) Remove the "O" ring.
- (5) Lift the float off the pivot stud and tip the needle out of the seat.

#### To Assemble and Instal

- (1) Using the new white coloured float chamber cap instal the needle valve. Ensure that the needle valve is correctly seated and fit the float.
- (2) Ensure that the "O" ring is on the fuel chamber cap and present the carburettor to the cap. Ensure

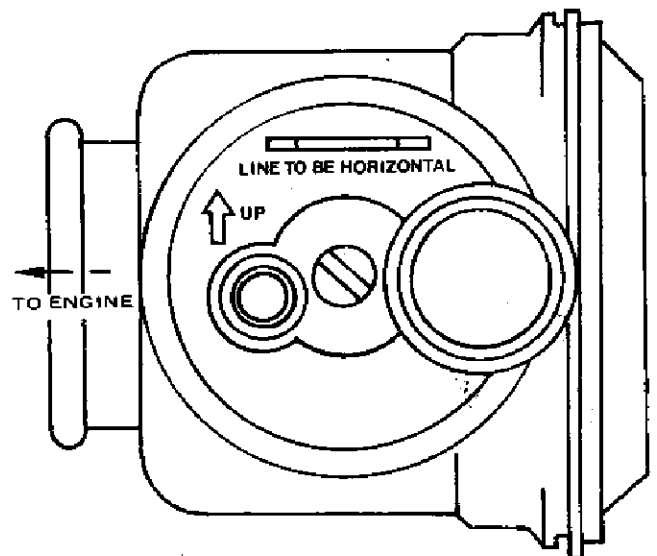


Dismantled view of LM carburettor.

that the float chamber cap will be in the correct attitude when the carburettor is in its working position on the mower, note the instructions moulded on the fuel chamber cap.

(3) The emulsion tube must be separated from the jet each time the jet is removed. When installing the emulsion tube the larger bore end of the tube must be just entered into the jet body, this ensures that as the jet assembly (brass jet and emulsion tube) is screwed into the carburettor the end of the emulsion tube it will be automatically seated correctly into the bottom of its recess in the carburettor body.

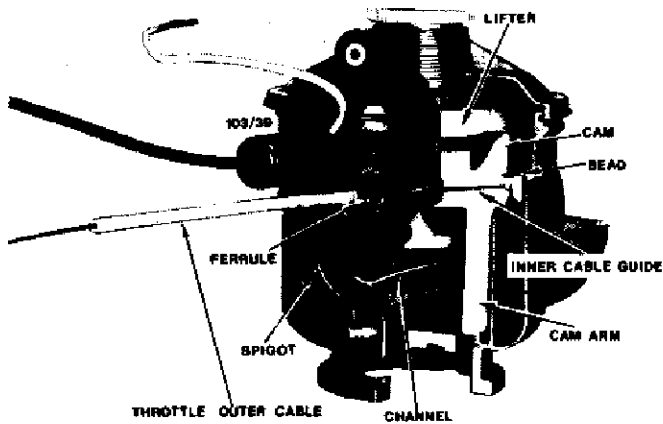
*NOTE: If the emulsion tube is loose in the jet it must be replaced.*



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Mounting position of the LM carburettor.

## Carburettor



Cut away view showing the throttle cable in working position with the ferrule of the outer cable located in the socket of the carburettor spigot and the inner cable and bead located in the cable guide of the cam.

body as possible to prevent the entry of dust through the cable slot.

(9) Connect the vacuum control tube to the carburettor.

(10) Connect the decompressor tube to the base of the carburettor.

(11) If a primer is fitted, fit the primer assembly tube to the fuel cap of the carburettor.

(12) Fit the earth wire from the sub cowl through the switch cover. Using super glue, glue a new rubber plug to the bayonet of the earth wire. Insert the rubber plug and bayonet in the switch boss on the carburettor body and ensure that the head of the rubber plug is fully seated. Position the switch cover so that the holes in the cover and the switch boss are aligned. Then insert the cut out lead completely through these holes.

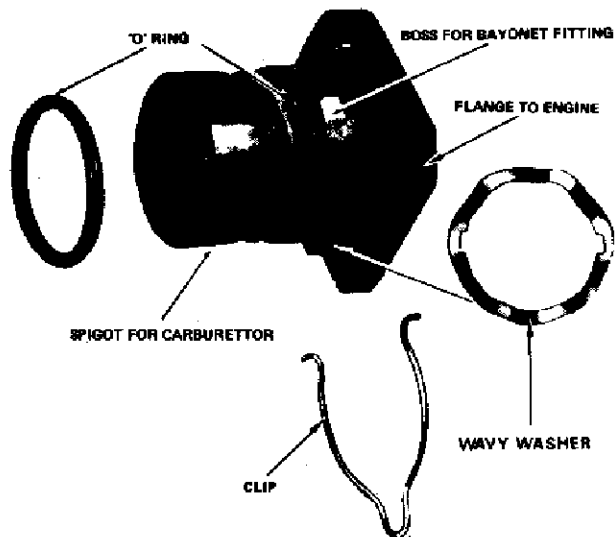


Illustration of the mounting sleeve assembly, the wavy washer is fitted to later models, the 'U' clip was fitted to earlier models.

(13) Fit the fuel tank brackets on the sub cowl and then the fuel tank. Connect the fuel line to the fuel cap so that it is in a horizontal position which will minimise fuel vapour lock.

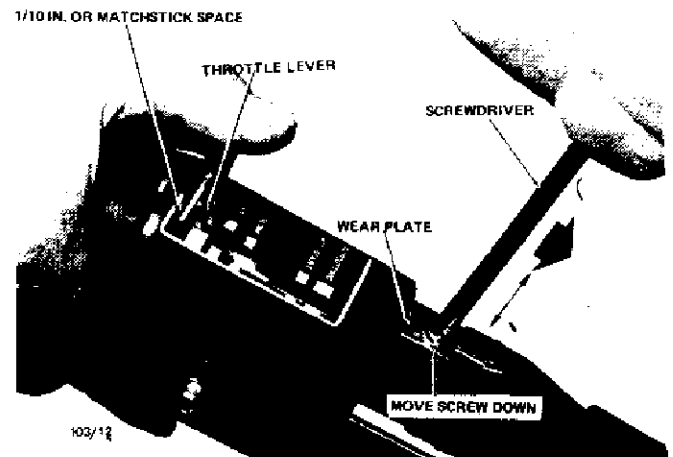
(14) Fit the spark plug and then connect the high tension lead to the plug.

### To Adjust Throttle Cable

(1) Loosen the screw on the wear plate and pull the throttle lever back to the end of the slot.

(2) Hold the throttle lever lightly and move the adjustment screw down on the filter body to allow a matchstick gap between the throttle lever and the end of the slot in the filter body. Tighten the screw.

(3) Start the engine at COLD START and check that it stops at the STOP position.



Against light thumb pressure on the throttle control lever move the adjusting screw down until the throttle lever is pulled 2.5 mm ( $\frac{1}{10}$  in) away from the end of the slot. Secure the adjusting screw at this position. Start the engine and check that ignition cut out occurs after the throttle control lever has passed the 'COLD START' position but before it reaches the upper end of the slot. Re-adjust as necessary.

### TO SET THE ENGINE GOVERNED SPEED

#### Using a Rev. Counter

Inexpensive Rev counters with operating instructions are available from Victa agents.

Recommended Governed Engine Speeds are as follows:

Mowers equipped with grass catchers 3500–3800 rpm

Non grass catching mowers . . . . . 3500–4200 rpm

Slow speeds are indicated by erratic cutting performance and poor grass catching.

Fast speeds are indicated by excessive noise judged by the ear.

Adjust the speed by pushing the vacuum control button in and turning it slightly clockwise or anticlockwise to obtain the recommended speed.

*NOTE: To gain access to the control button it is necessary to remove the dress cowl.*

## Carburettor

in the snorkel attachment spigot to permit assembly of the throttle cable bead to the carburettor cam at a later stage of assembly.

(2) Fit the lifter. The three arms of the lifter must be positioned and move freely up and down in the three slots moulded inside the body of the carburettor. Take note of the instruction moulded under the lifter.

(3) Insert the poppet valve. Support the head of the poppet valve with a finger tip. Fit the short spring which acts between the lifter on the cam and the diaphragm.

(4) Moisten the diaphragm and fit with the raised section face down on the lifter spring. A slotted diaphragm washer at the necked end of the poppet valve secures the poppet valve to the diaphragm.

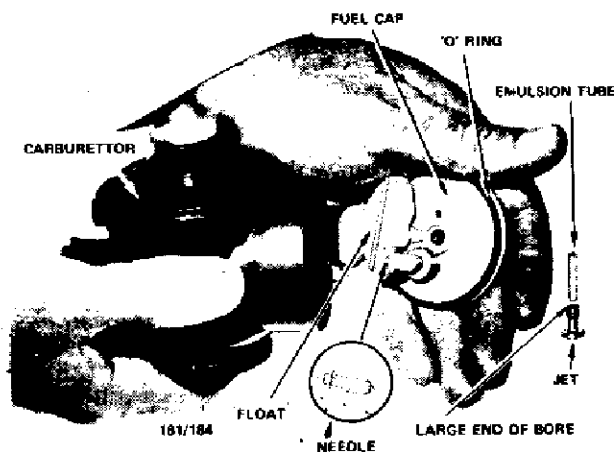
(5) Fit the long spring. The long spring acts between the diaphragm and the carburettor cap. Be sure that the diaphragm is not wrinkled or crimped when fitting the cap. A simple test, to ensure a seal on the diaphragm, can be done by fitting a tube to the cap and sucking on it. Remember to align the marks made on the carburettor cap and body.

(6) Ensure that the needle valve is correctly seated and fit the float.

(7) Ensure that the 'O' ring is on the fuel chamber cap and present the carburettor to the cap. Ensure that the float chamber cap will be in the correct attitude when the carburettor is in its working position on the mower, note the instructions moulded on the fuel chamber cap.

(8) The emulsion tube must be separated from the jet each time the jet is removed. When installing the emulsion tube the larger bore end of the tube must be entered into the jet body, this ensures that as the jet assembly, (brass jet and emulsion tube) is screwed into the carburettor the end of the emulsion tube will be automatically seated correctly onto the bottom of its recess in the carburettor body.

*NOTE: If the emulsion tube is loose in the jet it must be replaced.*



Fitting the fuel cap. Note the positions and direction of the needle valve as shown in the insert and the large bore end of the emulsion tube.

## TO INSTAL THE CARBURETTOR

### To Connect the Throttle Cable

The following procedure must be followed to ensure ease of assembly:

(1) Assemble the throttle cable and throttle lever in the air filter assembly. See Air Filters and Snorkel Assemblies – To Assemble and Instal.

(2) Rotate the cam in the carburettor clockwise as far as it will go. Ensure that the cable slot in the cam and the cable slot in the spigot of the carburettor are in line.

(3) Move the throttle lever to 'STOP'. Hold the inner and outer cables at right angles to the slot in the carburettor spigot, slide the cable into the slot so that the inner cable is touching the end of the slot.

(4) Adjust the throttle lever so that the ferrule on the outer cable contacts the outside diameter of the carburettor spigot and the bead on the end of the inner cable rests on the raised channel in the spigot.

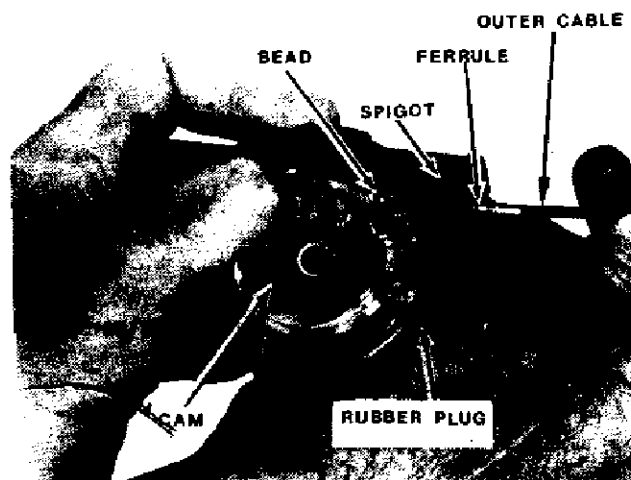


Illustration showing the throttle cable fitted in its working position in the carburettor with the ferrule of the outer cable in the slot of the spigot and the bead of the inner cable located in the cam. The cap and other components of the carburettor have been removed for illustrative reasons.

(5) Move the throttle cable assembly through 90 deg. to engage the bead on the end of the inner cable with the cam in the carburettor and the ferrule on the outer cable with the socket in the spigot. Hold the cable in position.

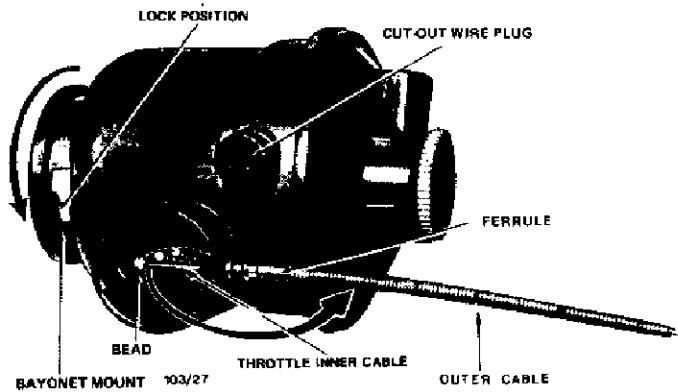
(6) Move the throttle control lever to GRASS-CUTTING/GRASSCATCHING. In this position the inner cable bead is held in place and cannot fall out.

(7) Fit the wavy washer and a new 'O' ring over the spigot of the carburettor mounting flange and press the carburettor firmly on the spigot and turn slightly clockwise to lock in the horizontal position.

(8) Fit the snorkel tube adaptor and clamp on the carburettor spigot.

*NOTE: Ensure that the snorkel adaptor and clamp are fitted as close to the carburettor*

## Carburettor



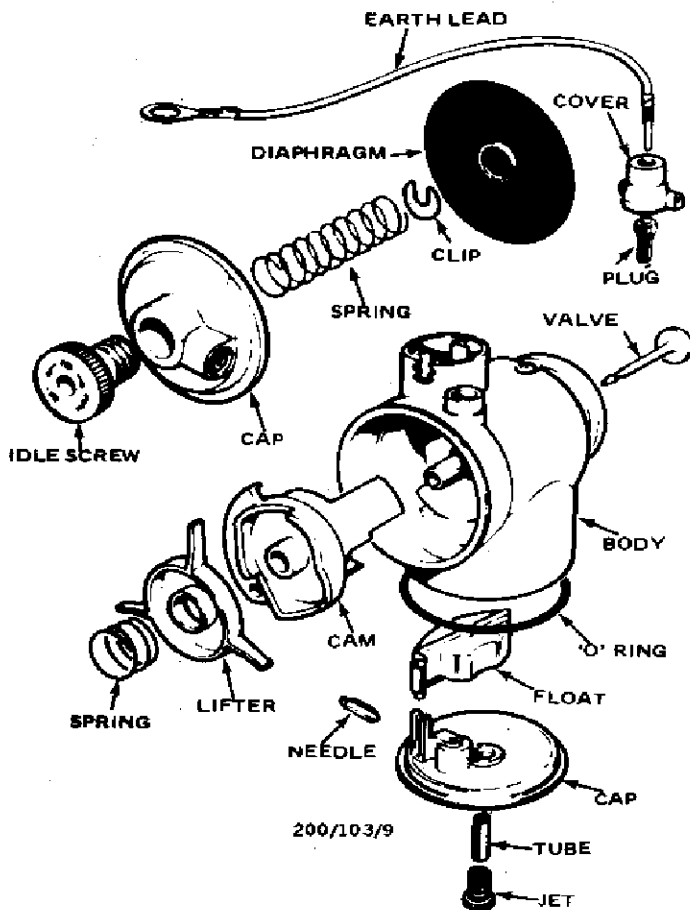
**Removing the outer cable, ferrule, inner cable and bead from the carburettor.**

finger tip inside the carburettor. Depress the diaphragm and remove the slotted diaphragm washer.

(4) Carefully remove the diaphragm from the end of the poppet valve and remove the lower control spring and lifter off the cam.

(5) Remove the rubber plug.

(6) Ensure that the throttle lever is at the STOP position. Move the throttle cable 90° to the snorkel



**Dismantled view of G4 Carburettor.**

spigot to release the outer cable. The bead on the end of the inner cable will disengage from the cam.

### TO DISMANTLE THE CARBURETTOR

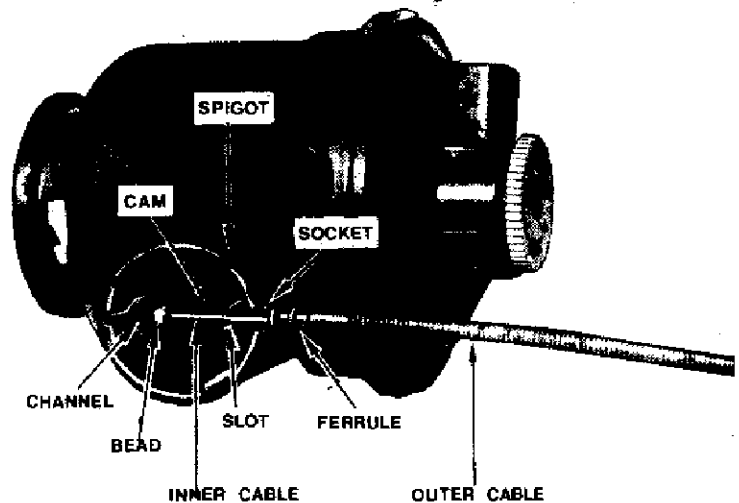
- (1) Remove the cam from the carburettor body.
- (2) Remove the poppet valve.
- (3) Screw the main jet/emulsion tube assembly out from the centre of the float chamber cap. The emulsion tube is moulded plastic with a slightly tapered bore, the larger bore end fits into the jet.
- (4) Remove the float chamber cap with the float attached. When removing the float chamber cap note that the hooks on the float, pivot on a plastic stud. The upper surface of the float arm acts on the needle valve which seats against the brass inlet port of the fuel intake.
- (5) Remove the 'O' ring.
- (6) Lift the float off the pivot stud and tip the needle out of the seat.

### TO CLEAN AND INSPECT

- (1) Clean all parts in clean petrol and blow dry with compressed air, used a bike pump or tyre pump.
- (2) Inspect the main jet, if a gauze bandage filter is not fitted, replace the jet.
- (3) Ensure that there are no blockages in the main jet and/or emulsion tube.
- (4) Ensure that the fuel passage which is moulded in the fuel bowl cap is clear.

### TO ASSEMBLE THE CARBURETTOR

- (1) Insert the cam in the carburettor body and ensure that it moves freely. When the cam is in position, rotate it as far as possible clockwise. This action ensures that the throttle cable anchor slot will align with the slot.



**Illustration showing the method of installing the ferrule of the outer cable on the outside of the carburettor spigot and the bead of the inner cable on the raised channel inside the spigot. When the cable is turned 90 deg. in the slot the bead engages with the cable guide in the cam.**



## Carburettor

the diaphragm. The illustrations of grasscutting, grass-catching show the movement of the poppet valve under different load conditions. Note the air flow made by the cooling fan fins which create the vacuum in the carburettor cap. Note the position of the lug on the grey coloured cam which neutralizes the cut out switch.

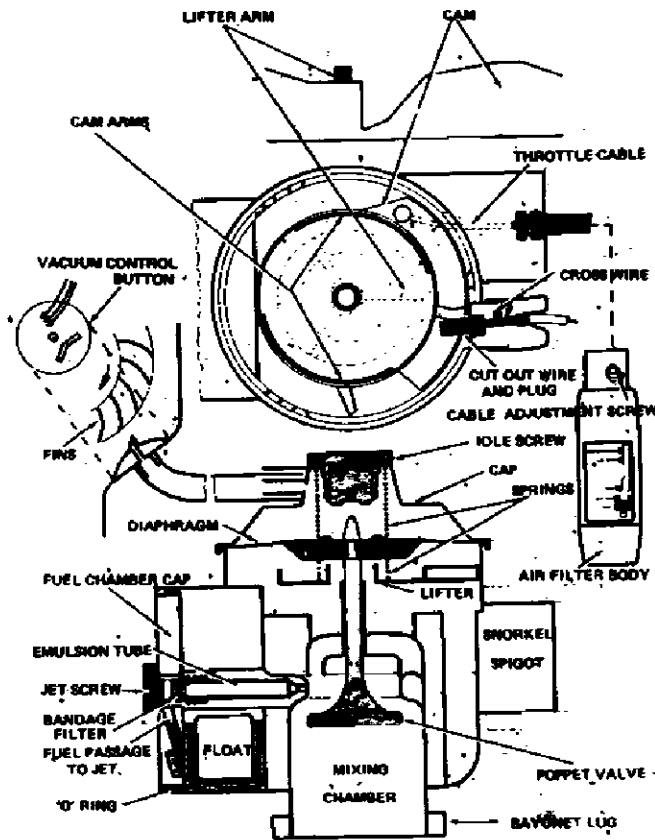
### AT THE SLOW (IDLING) POSITION

The action of the diaphragm is cancelled by the lifter, the tip of the poppet valve is brought into contact with the idle control screw, which can be adjusted manually. The engine idles on an air/fuel mixture through a notch or idling port in the poppet valve seat.

*NOTE: Earlier models were not fitted with an idle screw. The carburettor can be fitted with a modified cap, idle screw and valve.*

### AT THE STOP POSITION

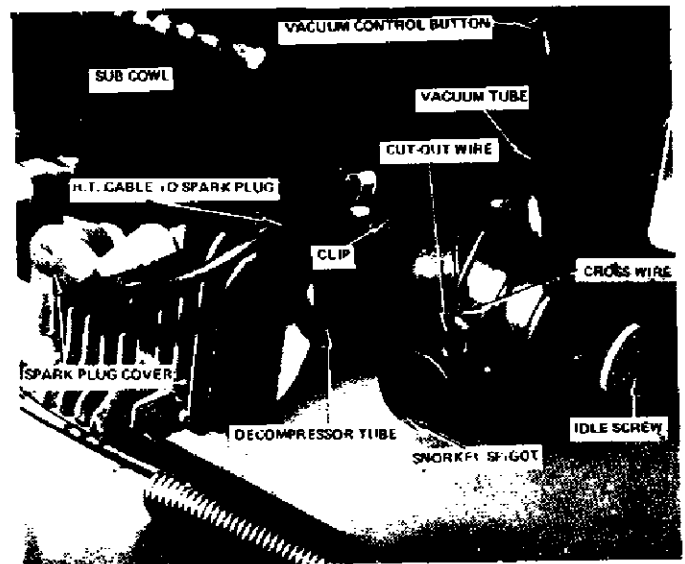
The cam rotates clockwise and a projection on it pushes the rubber plug of the cut out wire so that the cross wire and the cut out wire make contact shorting out the primary circuit of the magneto.



Schematic drawing of the G4 carburettor and component parts in the 'STOP' position.

### TO REMOVE THE CARBURETTOR

- (1) Move the throttle level to SLOW.
- (2) Disconnect the spark plug lead.
- (3) Turn off the fuel tap.
- (4) Remove the vacuum tube from the carburettor cap.
- (5) Remove the cross wire cut out lead.
- (6) Remove the cut out wire, cover and rubber plug.
- (7) Remove the decompressor tube from the base of the carburettor.
- (8) Remove the retaining clip between the carburettor flange and the mounting spigot.



The carburettor attached to the engine showing the position of the clip between the engine inlet flange and the carburettor. Early models.

- (9) Press the carburettor against the engine and turn it anti-clockwise (less than a quarter of a turn) and withdraw it from the 'bayonet' fitting on the mounting spigot.
- (10) Remove the fuel line from the float chamber cap.
- (11) Remove the snorkel clamp, using a pair of pliers.
- (12) Remove the lower snorkel adaptor from the spigot on the carburettor body.
- (13) Release the retaining clip and remove the snorkel assembly from the carburettor.

### TO REMOVE THE THROTTLE CABLE

- (1) Mark the position of the vacuum tube inlet on the carburettor cap against the carburettor body for reference on reassembly.
- (2) Carefully prise the carburettor cap off the body using a five cent coin. Do not lose the spring fitted above the diaphragm.
- (3) Support the head of the poppet valve with a

## Carburettor

All current engines that have a governed engine speed of 3400–3800 rpm must be set with the letter 'C' aligned with the spray hole in the carburettor venturi. It is important that the poppet valve does not turn after installing the diaphragm and end cap.

Vortex and models which are governed to 2700–3250 rpm (all mowers fitted with a turbo blade

disc) should be set with the letter 'A' aligned with the spray hole in the carburettor venturi.

Should the letter 'A' or 'B' be aligned with the spray hole on a standard engine it will cause a richer mixture, reduce the governed engine speed of the engine and result in higher fuel consumption.

### 3. TROUBLE SHOOTING GUIDE

#### *Fault and Possible cause*

#### *Remedy*

#### **ENGINE HARD TO START OR WILL NOT START**

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| <ul style="list-style-type: none"><li>(1) No high tension spark.</li><li>(2) Contaminated fuel.</li><li>(3) Blocked filter in fuel tap.</li><li>(4) Blocked jet filter</li><li>(5) Needle valve sticking closed.</li><li>(6) Carburettor flooding.</li><br/><li>(7) Throttle cable out of adjustment, affecting the choke position.</li></ul> | <ul style="list-style-type: none"><li>- Throttle cable out of adjustment. See To Adjust Throttle Cable, check for shorting out of cut out switch.</li><li>- Drain and clean out the fuel tank, always use clean fuel of the specified mixture and take particular care to exclude water, dust, chaff, etc. when refuelling.</li><li>- Disconnect the fuel line from the chamber cap, turn the fuel tap ON and check that fuel is being delivered to the carburettor, if not, clean the filter in the bronze filtered fuel tap assembly. Remove and clean out the fuel tank.</li><li>- Clean the filter and the jet. Check that a filter is fitted to the jet, if not, replace the jet.</li><li>- Free up or replace the needle.</li><li>- Remove the float chamber cap and float. If fuel is in the float, replace the float.</li><li>- Fuel needle not seating, remove the needle and blow out the fuel inlet, replace needle if damaged.</li><li>- Fuel needle sticking replace the needle or free up.</li><li>- See To Adjust Throttle Cable.</li></ul> |
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#### **ENGINE OVER REVVING GRASS-CUTTING/GRASSCATCHING**

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| <ul style="list-style-type: none"><li>(1) Insufficient vacuum above the diaphragm.</li><br/><li>(2) Crankcase air leaks.</li></ul> | <ul style="list-style-type: none"><li>- Check the vacuum tube connections at the control button on the engine block and carburettor. Check and replace damaged tube. Check for blockage of the control button.</li><li>- On early type engines check for air leaks at the carburettor joint, the snorkle and the upper and lower oil seals.</li><li>- On Power Torque engines check for air leaks at the inlet manifold to crankcase joint 'O' ring, the inlet manifold to carburettor joint, the starter housing 'O' ring and the lower oil seal. If no air leaks are apparent and the engine is still over revving, instal a different top spring in the carburettor.</li></ul> |
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#### **ENGINE LACKS POWER**

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| <ul style="list-style-type: none"><li>(1) Over rich mixture.</li><br/><li>(2) Throttle cable jammed or broken.</li></ul> | <ul style="list-style-type: none"><li>- Clean the air filter by tapping it against the hand. Do not clean with any liquid. Replace if in a dirty condition.</li><br/><li>- Free up or renew cable.</li></ul> |
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