HINTS AND TIPS for AMAL CARBURETTER
Series 600 and 900

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HOW THE CARBURETTER WORKS

The carburetter proportions and atomises the right amount of petrol with the air that is drawn in by the engine because of the correct proportions of jet sizes and the main choke bore. The float chamber maintains a constant level of fuel at the jets and cuts off the supply when the engine stops.

The throttle control from the handlebar controls the volume of mixture and therefore the power, and at all positions of the throttle the mixture is automatically correct. The opening of the throttle brings first into action the mixture supply from the pilot jet system for idling, then as it progressively opens, via the pilot by-pas the mixture is augmented from the main jet, the earlier stages of which action is controlled by the needle in the needle jet. The pilot jet system is supplied by a pilot jet (10) which is detachable on removal of the float chamber. On certain other models no pilot jet is fitted but a pilot bush is inserted in the continuation of the pilot air adjusting screw passage. The main jet does not spray directly into the mixing chamber, but discharges through the needle jet into the primary air chamber, and from there into a rich petrol-air mixture through the primary air choke into the main air choke.

The carburettors usually have a separately operated mixture control called an air valve, for use when starting from cold, and until the engine is warm: this control partially blocks the passage of air through the main choke.

This design of carburettor offers perfectly simple and effective tuning facilities.

1. Mixing Chamber Top.
2. Air Valve Spring.
3. Air Valve.
5. Float Needle.
7. Filter Gauze.
8. Barbs.
10. Cable Adjuster (Air).
11. Cable Adjuster (Throttle).
12. Cable Adjuster Locknut.
14. Throttle Valve Spring.
17. Pilot Bypass.
18. Float Chamber Body.

19. Float.
20. Mixing Chamber Top Screws.
21. Throttle Valve.
23. Choke Tube.
25. Tickler.
27. Float Chamber Washer.
29. Main Jet.
30. Pilot Jet.
31. Pilot Jet Feed Passages.
32. Feed Passage from Pilot Jet.
33. Pilot Air Feed Passage.
34. Pilot Air Adjusting Screw.
35. Fuel Filter (positioned over Main Jet). Not illustrated.

* Pilot Jet is replaced by a Pilot Bush positioned here on certain models.

Section showing Pilot Jet and Pilot Jet Feed Passages.
HINTS AND TIPS

STARTING (from cold). Turn on fuel supply, set ignition (if manually operated) for best slow running, depress tickler to flood float chamber, close air valve, open throttle slightly and start engine. When engine starts open air valve and close the throttle; if engine begins to ficker, partially close the air valve until engine is warm, then set in fully open position.

STARTING, engine hot. Open throttle slightly and start engine. It should not normally be necessary to flood the float chamber or close the air valve when starting a warm engine.

STARTING, engine hot. Experience will show when it is necessary to flood the carburetor for use as air valve and also the best setting of the throttle. If the carburetor has been one-handled or improperly, which would result in a weak engine and uneven starting mixture—fully open the throttle valve and air valve, give the engine several turns to clear the mixture, then start again with the air valve fully open and the throttle valve slightly open.

STARTING, SINGLE LEVER CARBURETTERS. OPEN THE THROTTLE VERY SLIGHTLY FROM THE IDLING POSITION AND FLOOD THE CARBURETTER MORE OR LESS ACCORDING TO THE ENGINE BEING COLD OR NOT RESPECTIVELY.

CARBURETTER CONTROLS. See that there is a minimum of backfire when the controls are not back and that any movement of the handwheel does not close the throttle too much. This is done by the adjustment on top of the carbureter, after releasing the adjustment locknut. See that the throttle valve shuts down freely, then reset locknut.

PETROL FEED. A filter gauge is fitted at the inlet to the float chamber, to remove the gauze unscrew the baffle bolt (1) the baffle and filter gauge can then be removed. Before replacement ensure that the filter gauge is both clean and undamaged and check fuel supply by wiping gently turning on fuel tap. Vertical loops in petrol pipes must be avoided to prevent air locks. Float chamber flooding may be due to a worn float needle but nearly all flooding and blockage of the filter gauge with new machines is due to impurities from the tank. Periodically clean the filter gauge and float chamber until the trouble ceases or alternatively the tank may be drained and refilled out, etc.

FIXING CARBURETTER 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 intake pipe. A sealing ring is fitted into the attachment flange of the carbureter. Also an oil inlet looks out for air leaks caused by a worn throttle or worn intake valve guide.

BANGING IN EXHAUST may be caused by too weak a pilot mixture when the throttle is closed or nearly closed—when it may be caused by too rich a pilot mixture and an air leak in the exhaust system. In either case the mixture has not fired in the cylinder and has fired in the hot exhauster. If the banging happens when the throttle is fairly wide open the trouble will be ignition—bad carburation.

BAD PETROL CONSUMPTION of a new machine may be due to flooding, caused by impurities from the petrol tank lodged on the float needle seat so as to prevent its valve from closing. Flooding may be caused by a worn float needle valve. Also bad petrol consumption will appear if the needle jet (24) is worn, it may be remedied or improved by stopping 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 once it is fitted afterwards to the carbureter the main jet may have to be smaller. If a carbureter is fitted with an air filter and the engine is run without it, take care not to over-load the engine due to too weak a mixture; testing with the air valve closed, will indicate if a larger main jets or higher needle position are required.

EFFECT OF ALTITUDE ON CARBURETTER. Increased altitude tends to produce a rich mixture. The greater the altitude, the smaller the choke or mixture. Carbureters now available are not suitable for altitudes up to 3,200 feet approximately. Carbureters used consistently at altitudes above 600 feet should have their main jets reduced 1/2 to 3/4, with the needle jet (24) and air valve, and 1,500 to 6,000 feet should be reduced by 3 per cent, and thereafter for every 1,000 feet in excess of 6,000 feet altitude further reductions of 4 per cent., should be made.
RE-ASSEMBLING

When replacing the valve assembly see that the jet needle goes into the hole in the chrome tube, needle jet and main jet so that both the throttle and air valve spring seats correctly in the mixing chamber top.

When refitting the float, engage the float needle recess in the hexagonal portion of the float and fit in float chamber. Check that the needle jet (24) jet holder (28) and main jet (23) are fully tightened together before screwing assembly into the body.

HOW TO TRACE FAULTS

There are only two possible faults in carburation, either richness or weakness of mixture.

INDICATIONS OF—

RICHNESS.

Black smoke in exhaust;
Petrol spraying out of carburettor.
Four strokes, eight-stroking.
Heavy, leisurely running.
Sparking plug sooty.

WEAKNESS.

Sparking back in carburation.
Error in slow running.
Overheating.
Acceleration poor.
Engine goes better if —
Throttle is not wide open or
Air Valve is partially closed.

If richness or weakness is present, check if caused by—

(1) Fuel feed.
Check that jets and passages are clear.
Check that the float chamber vacuum connection is not choked with foreign matter; and that there is ample flow of fuel.
Check there is no flooding.

(2) Air leaks.
At the connection to the engine or due to leaks in inlet valve areas.

(3) Defective or worn parts.
As a loose fitting throttle valve, worn needle jet, loose jets.

(4) Air cleaner being choked up.

(5) Air cleaner having been removed.

Removing the plechan or running with a straight through pipe requires a richer setting.

Having verified the correctness of fuel feed and that there are no air leaks, check over ignition, valve operation and timing. Now at throttle position shown on page 7, fig. 5, test so see if mixture is rich or weak. This is done by partially closing the air valve, and if engine runs better weakness is indicated, but if engine runs worse richness is indicated.

To remedy, proceed as follows—

To cure richness.

Position 1. Fit smaller main jet.

Position 2. Screw out pilot air adjusting screw.

Position 3. Fit a throttle with larger cutaway (page 6).

Position 4. Lower needle one or two grooves (page 6).

To cure weakness.

Position 1. Fit larger main jet.

Position 2. Screw in pilot air adjusting screw.

Position 3. Fit a throttle with smaller cutaway (page 6).

Position 4. Raise needle one or two grooves (page 6).

NOTE: In case it is necessary to cure richness, it may be necessary to replace the main jet with one that has a smaller diameter. However, the carburettor should not be set for full throttle; the proper thing to do is to lower the needle.
PARTS TO TUNE UP WITH

THROTTLE ADJUSTING SCREW (24). Set this screw to hold the throttle open sufficiently to keep the engine running when the twist grip is off. An "O" ring is fitted to the screw to hold its adjustment by friction.

MAIN JET (29). The main jet controls the normal 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 REAM A JET OUT, GET ANOTHER OF THE RIGHT SIZE, THE BIGGER THE NUMBER THE BIGGER THE JET.

To remove the main jet, remove the float chamber, the exposed main jet can then be unscrewed from the jet holder (28).

NEEDLE AND NEEDLE JET (22 and 24). The needle being taper either allows more or less petrol to pass through the needle jet as the throttle is opened or closed throughout the range except when idling or nearly full throttle.

The taper needle position in relation to the throttle valve can be set according to the mixture required by repositioning the jet needle stop in any of three positions thus tilting or bowing it. Raising the needle enriches the mixture and lowering it weakens it. The mixture at throttle openings from one quarter to three-quarters open can be set on certain models for both series 600 and 900 carburettors.

THROTTLE VALVE CUT-AWAY. The atmospheric side of the throttle is cut away so influence the depression in the main jet. Supply and carburettor will be seen on the throttle valve, etc., as the needle and needle jet in relation to throttle opening. The amount of cut-away is controlled by a number marked on the throttle valve, etc., 6229 means throttle valve type 6229 with No. 3 cut-away; larger cut-aways, say 4 and 5, give weaker mixture and 2 a richer mixture.

AIR VALVE (3) is used only for starting and running cold, and for experimenting with, otherwise run with it wide open.

TICKLER (25), a small plunger spring loaded, fixed in the carburettor body. When pressed down on the float, the needle valve is allowed to open and so a flooding is achieved. Flooding temporarily enriches the mixture until the level of the petrol subsides to normal.

ALCOHOL FUELS. When using alcohol fuels the following new components are necessary. A metallic bowl preferably double feed if not already fitted, float chamber 6229, bowl bolt washer 32/623, needle jet 6229/625, jet needle 6229/629 or 629/629 according to type of carburettor, filter gauze 37/629 and banjo washer 4/6172.

The main jets must be increased for straight alcohol by approximately 15%. The final setting must be a question of trial and error according to the nature of fuel used.

When using alcohol fuels it is advisable to run on the rich side to avoid engine overheating.
TUNE UP IN THE FOLLOWING ORDER.

NOTE. The carburettor is automatic throughout the throttle range—
the air valve 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 PAGES 6 AND 7 for each tuning device and
give 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 4 (fig 5).
If at full throttle the engine runs “heavily” the main jet is too large.
If at full throttle by slightly closing the throttle or air valve the engine
seems to have better power, the main jet is too small.
With a correct sized main jet the engine at full throttle should run evenly
and regularly with maximum power.
If testing hot speed work ensure that the main jet size is sufficient for the
mixture to be rich enough to keep the engine cool, and so verify the
exhaust system by an exhaust after taking a fast run, declutching and stopping the
engine quickly. If the plug body at its end has a cool appearance the
mixture is correct. If hot, the mixture is rich: if however there are
signs of incense heat, the mixture is too weak and a larger main jet is
necessary.

2nd. PILOT JET (fig 5) 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 adjusting screw, and ignition set for best slow
running:
(1) Screw out throttle adjusting screw until the engine runs
slower and begins to falter, then screw pilot air adjusting screw in or out,
to make engine run regularly and faster.
(2) Now gently lower the throttle adjusting screw until the engine runs slower and just begins to falter.
Adjust the pilot air adjusting screw to get best slow running:
If this 2nd adjustment make engine run too fast, go over the job again a third time.
Both the throttle adjusting screw and pilot air screw have an “O” Ring
fitted to hold the adjustment by friction.

3rd. THROTTLE CUT-AWAY with throttle in position 3 (fig 5)
If, as you take off from the idling position, there is objectionable spitting
from the carburettor, slightly richen the pilot mixture by screwing in the
air screw sufficiently, but if this is not effective, screw it back again, and
for a throttle with a smaller cut-away. If the engine jerks under load at
this throttle position and there is no spitting, either the jet needle is
much too high or a larger throttle cut-away is required to cure richness.

4th. NEEDLE with throttle in position 4 (fig 5).
The needle controls a wide range of throttle opening and also the acceler-
ation. Try the needle in the lower position, viz., with the clip in the
groove at the top. If acceleration is poor and with air valve partially
closed the results are better, raise the needle by one groove and leave it where it is.
If mixture is still too rich with clip in groove No. 1 nearest the top
—the needle jet probably wants replacement because of wear. If the
needle itself has had several years’ use replace it also.

5th. FINALLY go over the idling again for final touches.
TUNING TWIN ENGINES WITH TWIN CARBURETTORS

Where each cylinder has its own Carburettor.

First of all loosen the Thrusts stop screws and put the Twist Grip into the shut off position to allow the Thrusts to shut off. There should be a slight backlash in the cable which backlash can be obtained, if necessary, by screwing in the cable adjusting screws on the top of the Carburettor and tightening lock nut. Then, with the throttle in the normal position, and with the Thrusts closed, adjust the cable adjusting screws so that on the highest speed of the Twist Grip, both Thrusts begin to open simultaneously, then reset lock nut.

To set the Carburettors, follow the procedure as given on page 7, and bear in mind these "Hints" which may be useful: Main jet sizes are of course selected by checking the effect of the mixture on the Sparking plugs after making a run at full throttle over a straight piece of road: the smallest jet sizes that give the best maximum speed are usually correct, provided that the plugs do not show any signs of excessive heat. It might be that for really critical tuning, one Carburettor might require a slightly different jet size from the other.

For slow running, set the Twist Grip to make the Engine run slowly but just faster than the "kick-over": then gently screw in the Thrusts stops to just hold the Thrusts in this position, and return the Twist Grip into the shut position, leaving the Engine running on the Thrust Stagnes.

The next thing to do is to set each Carburettor according to paragraph 2, on page 7, to obtain the idling by screwing down the Thrusts Stop Screws and adjusting the Idle Air Screws accordingly.

Regarding the setting of the Idle, a fairly satisfactory method is to attach one Sparking Plug lead, and set the Pilot Air Adjusting Screw on the other Cylinder as a single unit, and then re-setting the process to the other Cylinder. It may be found that when both are connected to the Sparking Plugs, the Engine runs slightly quicker than desirable, in which case a slight readjustment of the Thrusts Stop Screws will put this right.

It is essential that the speed of idling on both Cylinders is approximately the same, as this will either make or mar the smoothness of the get-away on the initial opening of the Thrusts.

It is essential with Twin Carburettors that the Thrusts Slides are a good fit in the bores, and also that there is no suspicion of air leaks at either of the flange attachments to the Cylinder.

Regarding the lower end of the Thrusts range, which is always the more difficult to set, one can only take reasonable pains to make quite sure that the Central Gaskets are perfectly adjusted, without any excessive backlash or difference in the amount of backlash between one Carburettor and another: otherwise the Thrust Slides will be out of phase with the other, and go rough in jumping over.

To check the opening of the Thrusts simultaneously, set the Twist Grip back so that the Thrusts are resting on the Thrusts Stop Screws in their final position of adjustment; then insert the fingers into the air inlets and press them on the Thrusts and with the other hand, gently open by the Twist Grip and feel that the Thrusts lift off their stops at the same time.

SERVICE ARRANGEMENTS

There are many AMAL Service Stations in Great Britain and also in other countries where Motor-cycling is popular. They have information available on recommended settings for all standard machines and, you are strongly advised to purchase GENUINE AMAL SPARKS through them, at our List price.

ALL GENUINE JETS are stamped with the name AMAL and with the Calibration Number.

GUARANTEE

The Company take all possible reasonable care in the manufacture and the quality of their products. Purchasers are informed that any part proved to be defective in manufacture or quality, and returned to the works within six months of its purchase, will be replaced.

The Company must respectfully point out, however, that its responsibility and that of its agents, stockists and dealers, is limited to this Guarantee and that they accept, under any circumstances, be held responsible for any loss, or for any contingencies or resulting liability arising through any defect.

The circumstance of sale and use also arise when the Company's products form part of the original equipment of machines purchased new.

Priced in England.
CHECKING AND ADJUSTING THE AMAL CONCENTRIC FLOAT LEVEL

Occasionally you may encounter a machine which runs erratically due to an over-rich condition. You may also find that this problem machine is fitted with the proper size jets and has the same adjustments as a model which runs perfectly.

After many hours of investigation, we found that the normal cause for the problem outlined above is a high float level setting.

CHECK FLOAT LEVEL

Remove the float assembly from carburetor. Drain gas from float bowl. Using a small screwdriver or other suitable tool, depress the float tab which operates the float needle, until needle contacts seat. While holding the float in this position, measure the distance from the top of float bowl to the top of float. The proper measurement is .080 . If the measurement is less than .080 the float level will need lowering. SEE FIG. 1.

FIG. 1

PUSH ON TAB ONLY
NOT ON NEEDLE
ADJUSTING FLOAT LEVEL.

Remove all fittings from float bowl.

Using a propane torch, heat the bowl slightly. This will free the brass seat so it can easily be moved.

Using an 1/8 diameter rod, gently tap the brass seat until the proper setting is attained. SEE FIG. 2.

CAUTION: Do not attempt to move seat without heating bowl.

FIG. 2

NOTE: The .080 measurement is proper for current Single, Twin and Triple models.
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