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MOTOR CYCLE MECHANICS

THE
HOT BIKE
MAGAZINE

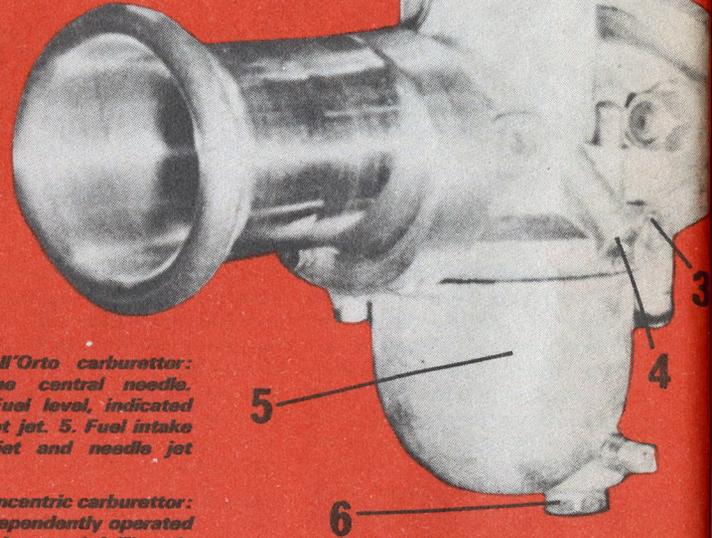
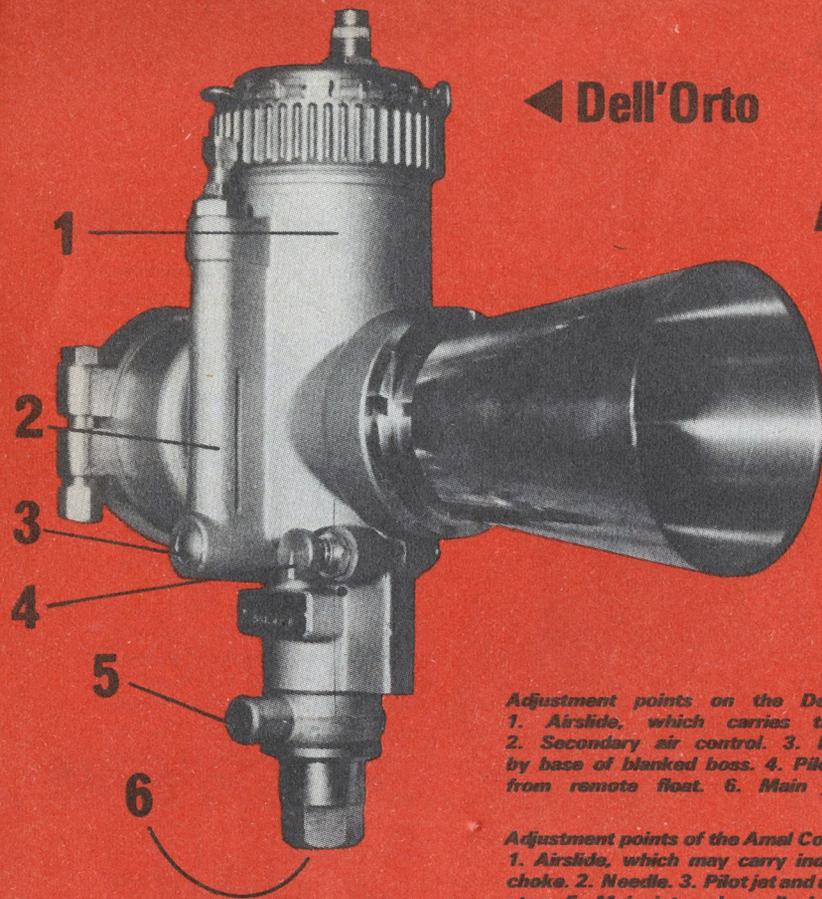
WANKEL- bikes of the FUTURE?



▶ MICK GRANT'S YAMS ON TEST!
NORMAN HANKS COLOUR ACTION
CARBURETTORS ON THE BRAKE!

◀ Dell'Orto

Amal Concentric ▶



Adjustment points on the Dell'Orto carburettor:
 1. Airslide, which carries the central needle.
 2. Secondary air control. 3. Fuel level, indicated by base of blanked boss. 4. Pilot jet. 5. Fuel intake from remote float. 6. Main jet and needle jet

Adjustment points of the Amal Concentric carburettor:
 1. Airslide, which may carry independently operated choke. 2. Needle. 3. Pilot jet and air control. 4. Throttle stop. 5. Main jet and needle jet. 6. Fuel supply to integral float

As a delicate, precision instrument, the carburettor is taken pretty much for granted, which is not a bad testimonial to its performance and reliability. On a stock machine there is little to be gained by messing about with the carburettor over and above keeping it in tune. In any event, its performance is largely dependent on the condition of the rest of the engine.

A competitions motor, or any special, gets rather different treatment though, and it's here that you have a choice of carburettor—a choice that's well worth thinking about.

For any given machine there are several factors which affect this choice: cost and availability, ease of installation and initial settings, adjustments and sensitivity, and performance. The order of importance depends upon the actual installation, but working within these parameters we've made a breakdown of each of the popular models of carburettor. The information comes from our own experience and that of several experts who have worked with these types, including a series of bench tests on a racing engine.

Amal Concentric

The big advantage of this model is its low cost and the extremely good availability of parts. The very compact unit with integral float chamber makes for easy installation and it will cope with downdraught angles of up to 30 deg. in any direction from the vertical. It is available in the following choke sizes—series 600: 22, 24 and 26 mm (£7.59). Series 900: 28, 30 and 32 mm (£7.92). Series 1000: 34, 36 and 38 mm (£11.55). Mounting flange centres are standardised, but often it needs rubber mounting as engine vibrations tend to cause flooding and fuel aeration. This is particularly true with low balance factors, where the vibrations are mostly in the vertical plane, as the vibration tends to lift the needle valve. This may often be remedied by fitting Amal's rubber-tipped

needle valve. The Concentric float chamber is not prone to flooding under other conditions (such as angle of lean) and cuts out the effects of "swilling".

Rubber mounting the instrument can have its drawbacks in that it may make the intake length longer than necessary—this has the effect of producing peak torque lower down the rpm scale.

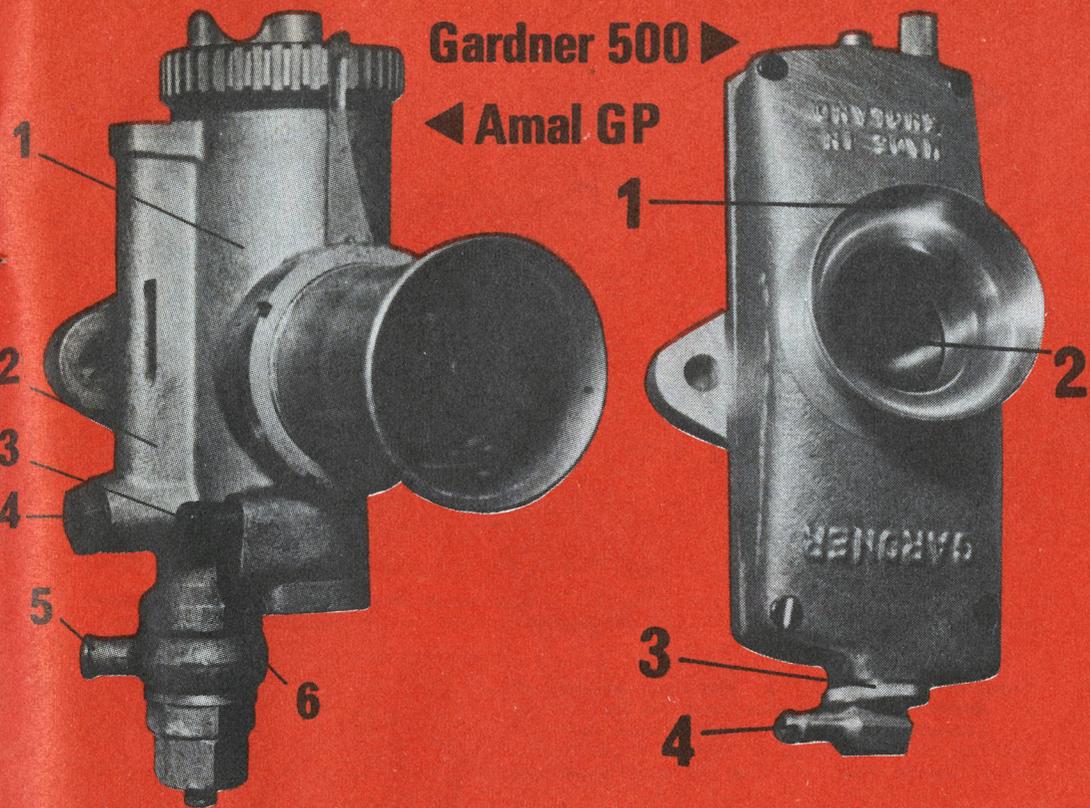
Initial settings may be obtainable from the engine manufacturer, or for special installations, Amal have a vast range of experience and are very helpful. Adjustments are straightforward, but you have to know what you're doing and stick to a set sequence as there are several variable factors (main jet, needle jet, needle, needle position, airslide, pilot jet and pilot air adjusting screw). While each of these mainly affects its own phase of throttle operation, the

phases do overlap and are interrelated, e.g. changing the airslide cutaway will probably necessitate needle or needle jet adjustment.

The instrument is not generally sensitive to small changes in the engine or ambient conditions and tends to remain in tune for long periods.

Performance—slightly less torque throughout range than racing types. Restricted, because aerodynamically it is not so good as the (more expensive) racing carburettors, especially around the intake area. The modified bellmouth—Amal's velocity stack or the Quaife conversion—improves this. Because the airflow and emulsion properties are not quite so good as on racing carburettors it usually means that the choke size needed is one or two millimetres smaller than could be used with these carburettors, so the Concentric

CARBBS IN



Gardner 500 ▶

◀ Amal GP

*Performance
is controlled
by these
mixture
meters!
See how
they compare
on test...*

Adjustment points on the Amal GP2 carburettor:
1. Airslide, carrying offset needle. 2. Secondary air jet
3. Pilot jet. 4. Blanking screw, base of scribed circle
indicates fuel level. 5. Fuel intake from remote float
bowl. 6. Main jet and needle jet

Adjustment points on the Gardner 500 carburettor:
1. Needle, carried in airslide. 2. Needle profile.
3. Jet adjustment screw. 4. Fuel intake from remote
float (level set to roughly $\frac{1}{4}$ in. below spray tube)

tends to lose out at the top end. Gives good, clean running at low speeds and partial throttle openings, along with good fuel consumption characteristics.

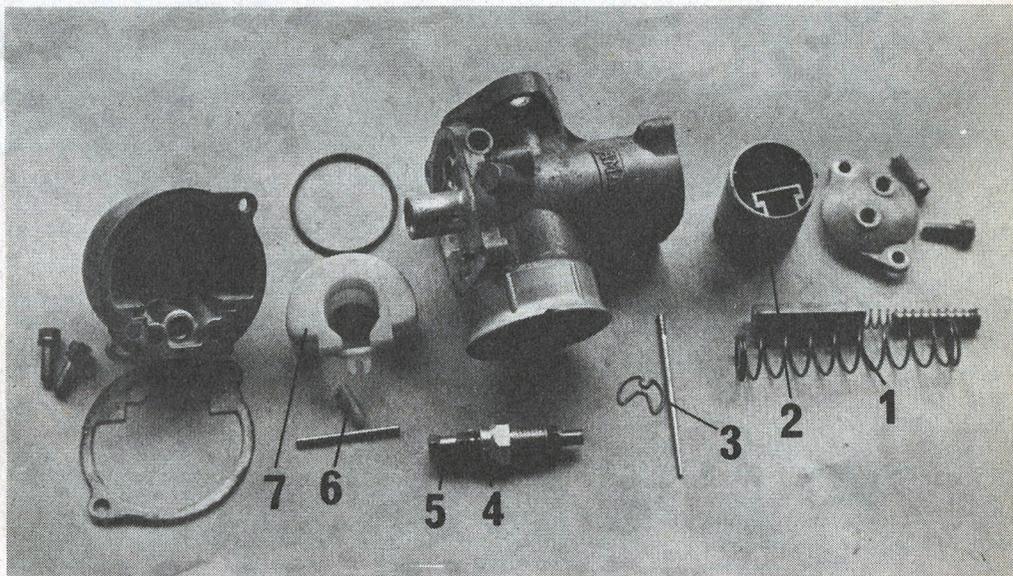
On a brake test the Concentric gave 4-6 hp less than a GP on an 80 hp motor. The velocity stack was worth 1-3 bhp, and the plastic screw-on versions proved worthless.

Amal GP2

Although this model is now obsolete and no longer in production, Amal still continue service and can supply parts.

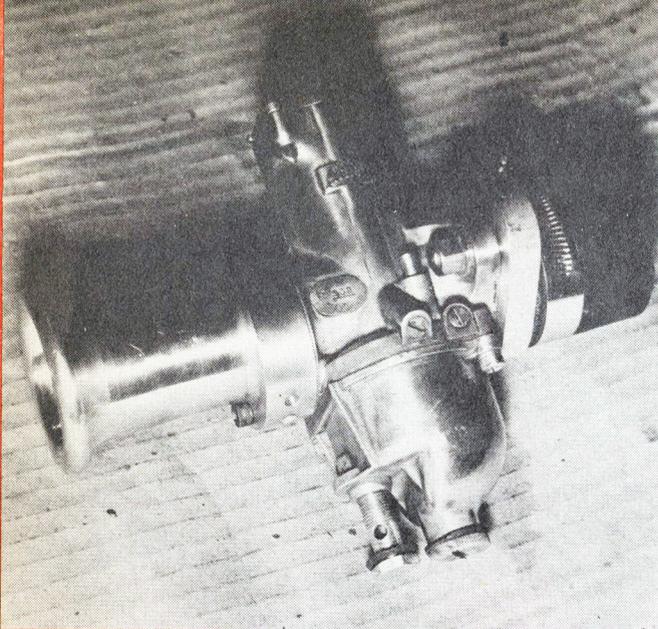
Originally one big disadvantage was the high cost, plus the cost of a remote float chamber and mountings. The availability of parts is not as good as for the Concentric, but is still reasonably good. The main jets are interchangeable between the two.

The carburettor, with float, is comparatively bulky and may

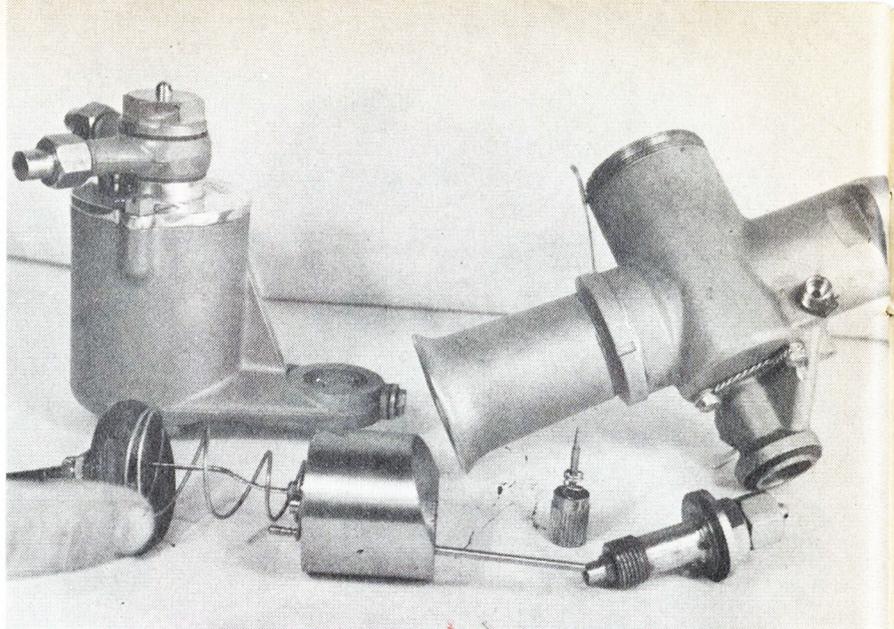


Exploded view of the parts of the Amal Concentric: 1. Choke. 2. Airslide. 3. Needle. 4. Needle jet. 5. Main jet. 6. Needle valve. 7. Float

COMPETITION!



Race-modified Concentric, fitted with modified bellmouth and rubber mounting flange



Components of the now obsolete GP carburettor (above) compared to the relative simplicity of the Gardner series 500 model (below)

COMP CARBS

continued

give problems by fouling the frame or cycle parts, especially on twin-cylinder installations or steep downdraught angles. There is no limit on the down-draught angle and choke sizes range from $\frac{7}{8}$ in. to $1\frac{1}{2}$ in. Again, Amal are helpful with advice on installations and have experience of a wide range of applications. Tuning is difficult as the Amal GP2 is a precision instrument, made by hand to very close tolerances. It is sensitive to small changes and to float level, or float position, which alters the effects of *g* forces, or "swilling".

The offset spray tube can present difficulties with split ports, as the mixture may be dumped into one port—whether it then mixes inside the engine can only be decided by experiment.

Aerodynamically it is very good, and has good emulsion properties—this generally means that a larger choke size can be used without sacrificing low-speed performance. On a dynamometer there is a noticeable increase over the performance of the Concentric.

Gardner series 400 and 500

Basically there are two versions to suit two-stroke and four-stroke applications. In both cases, up to a 30 mm choke there is only one bellmouth available, above this size there are two alternatives. The instrument

itself has a low cost, but the cost of a float chamber and mounting has to be added to this. Choke sizes 25 to 38 mm range from £10 to £16, sizes from 40 to 52 mm are only made to special order, price £40. The unit is very compact, has standardised flange centres, allowing it to be fitted very close to the cylinder head, or it may be rubber mounted. There is no limit to downdraught angles.

Availability is not quite so good as Amal, but the works are equally helpful with information.

The initial settings are less complicated than Amal as there are fewer variables (needle profile and position) and running adjustments are simply made by raising or lowering the jet relative to the needle, which governs the mixture over the entire range. The instrument is not sensitive to fuel level, or swirl but the feed to the jet must be unrestricted and free of air bubbles. Opening the throttle while the engine is not running may flood the engine. Tends to keep in tune and is not over-sensitive to small changes. Note that this carburettor is essentially a competition device, as there is no cold-start mechanism or provision for tickover.

Aerodynamically it is similar to the GP2 and can usually equal or better the GP's low-speed performance. As it can be mounted on a short intake tract and because of its good aerodynamic/emulsion properties, a larger choke size can be used,

giving better breathing at the top end, with an increase in bhp. The carburettor can also be run very lean without producing a misfire.

On the dynamometer it gave a similar torque curve to the GP, but allowed an extra 500 rpm at the top, giving an extra 1–3 bhp.

Dell'Orto

These instruments are very similar in appearance and size to the GP. Once again there is a disadvantage in the cost and the bulkiness of the unit. Choke sizes range from around 18 mm up to a huge 45 mm—prices vary in proportion, the 42 mm carburettor costs £38, including a rubber-mounted float chamber, while a 35 mm version costs £28.

The carburettor has a clip fixing, so an adaptor usually has to be made up to suit the engine's intake.

As with other remote-float types, there is no limit on the

downdraught angles.

Availability is not very good at the moment, but this may be improved in the near future. Initial settings and adjustments are similar to the procedure for Amal instruments, but the Dell'Orto is not so sensitive to small changes, and stays in adjustment longer. It is very sensitive to float height and position and may need swirl pots on some installations.

It gives very clean low-speed running and aerodynamically it compares very well with the GP2 or Gardner. Because of this, very large choke sizes can be used, for instance 42 mm, where normally 35 mm would be considered enough.

● As a reference point, it is interesting to see how the test engine's output varied. Changing from a street cam to a race cam gave an extra 6 bhp. Changing carburettors and slightly shortening the intake length eventually added another 9 bhp.