



ENHANCED FUELLING: FITTING BIKE CARBS

Forget expensive throttle bodies, fuel injection or big fat Webers - here's an effective alternative solution to performance fuelling: a set of four motorbike carburettors.

Upgrading the fuelling has got to be one of the best engine modifications, but gone are the days when you could pick up a cheap pair of Webers, bolt them to an equally cheap inlet manifold and get some impressive results. Nowadays, a new pair of 40 mm carbs and an inlet manifold can almost reach a four-figure sum, which is fast approaching throttle-body territory.

A small garage in North Yorkshire, situated between York and Scarborough, has developed one alternative solution to this fuelling crisis. Known simply as Bogg Brothers, this family-run business occupies a workshop in the village of East Lutton, which is packed with a vast assortment of highly tuned motors. Father Bogg (Dave), is 71 years old and still capable of tuning and tweaking a DCOE with his eyes shut. His sons, Steve and Pete, have also picked up the family trade.

Dave started to look into the idea of using motorbike carburettors as an effective way to fuel car engines some three years ago. Bogg Brothers hasn't kept count, but they reckon they've sold over 250 kits and conversions for engines ranging from the A-series to the Rover V8. A wide

range of motorbike carburettors have been fitted to various car engines, including those from the Honda Fireblade, Blackbird, Kawasaki ZX range and Suzuki Bandit. In this workshop, we're concentrating on the four carbs fitted to the Yamaha R1. These have 40 mm chokes with 1.3 mm diameter main jets. They can't be used to properly fuel a car engine until the main jets have been opened up (see the step-by-step stripping guide for full details).

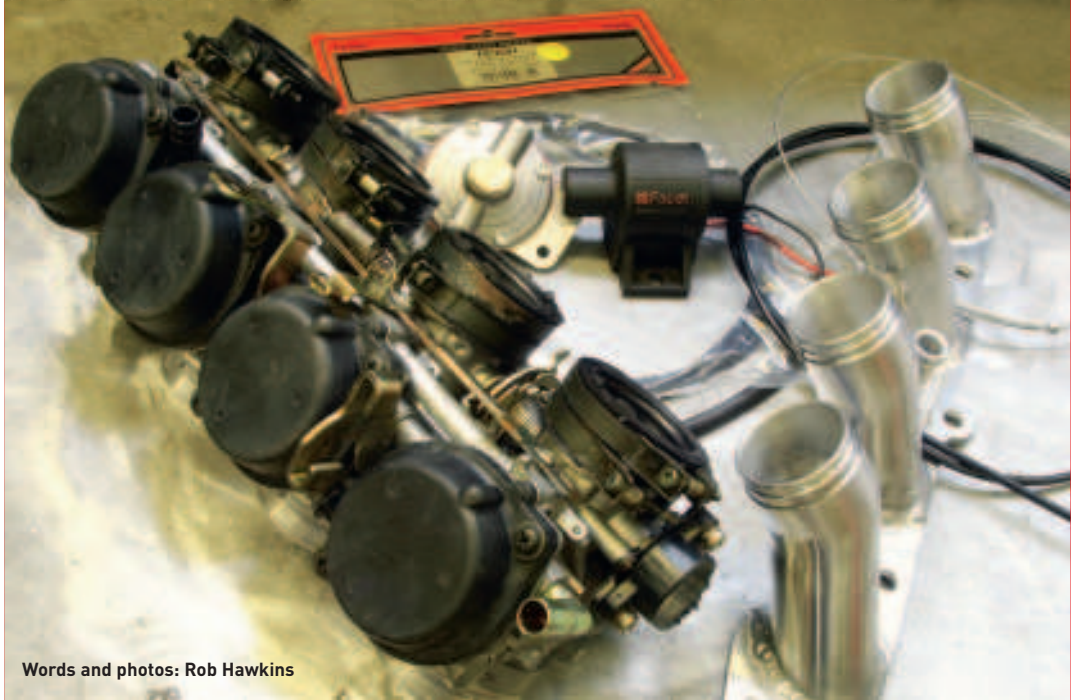
Bogg Brothers has designed and manufactured a full range of aluminium inlet manifolds for the 8V and 16V Vauxhall engines. Every four-cylinder inlet manifold costs £176.25, even if a design hasn't previously been made before.

The parts required for an R1 conversion include the aforementioned inlet manifold and carbs along with a throttle and choke cable, air filter and fuel pump (fuel pressure regulator required for non-bike fuel pumps to restrict pressure to maximum of 3 psi). We've included a full list of all the prices in the box. If you want to do as much of the conversion as possible and shop around for most of the parts, all you need to buy from Bogg Brothers is an inlet manifold. A full set of R1 carbs can be bought from motorbike breakers for as little as £50 and the remaining parts can usually be sourced on eBay or at motorbike shows. If you're willing to wait for the bargains, you could complete this

conversion for under £300 - that's practically the same amount of budget you'll need to buy one brand new 40 mm Weber carburettor!

The benefits of using a bank of four motorbike carbs include a more responsive throttle pedal, relatively straight forward maintenance and trouble free cold starting with a manual choke. Don't expect any more power than you'd get from a pair of Webers, but this method is cheaper, just as reliable, more fuel efficient and easier to set up.

The following pages show what's involved in fitting Yamaha R1 carbs to a car engine, including stripping and inspecting, modifying and sourcing all the necessary parts.



Words and photos: Rob Hawkins

ENGINE MANAGEMENT

The R1 carbs use a throttle position sensor, which acts like an electronic version of a vacuum advance and retard for the ignition. It needs to be connected to the ECU, but the carbs will still work properly if not. Therefore, if you don't have an engine management system, don't connect anything to it. If however you have a standard engine management system, it can be connected - but better results are achieved using an aftermarket system from the likes of MBE, DTA, Omex and Emerald. Use the R1 connector plug and connect the appropriate ECU wiring to it.



COIL PACKS AND DISSYS

The R1 carbs are compatible with the whole range of ignition systems, ranging from points and condensers to electronic ignition and coil packs. These carbs are also compatible with aftermarket ignition systems, such as the Megasquirt (injection compatible) and Megajolt.



INLET MANIFOLDS AND ENGINES

Bogg Brothers has already created templates for all the 8V Vauxhall engines from the 1.3 to the 2-litre. It's also created templates for the C16/C20XE and X20XE. However, the company is also willing to make a manifold for any engine providing the customer supplies a standard inlet manifold gasket.

While all the manifolds will fit onto the respective engine, some cars have limited engine bay space, making the conversion a real finger-cruncher. The Corsa 16V 1.4 and 1.6-litre models are particularly difficult. The alternator and tensioner need to be repositioned and another drivebelt fitted, and the carbs need to be split due to a lack of space between the bulkhead and engine. The inlet manifold is supplied as four straight pipes, and fitting requires some machine work and takes Bogg Brothers up to a couple of days labour.



LINKAGE

A bicycle brake cable can be used for the throttle cable with a solderless nipple to connect to the pedal. The sleeving needs to run from the bulkhead to the throttle connection at the carburettor. Bogg Brothers also stocks a throttle cable kit for £10.

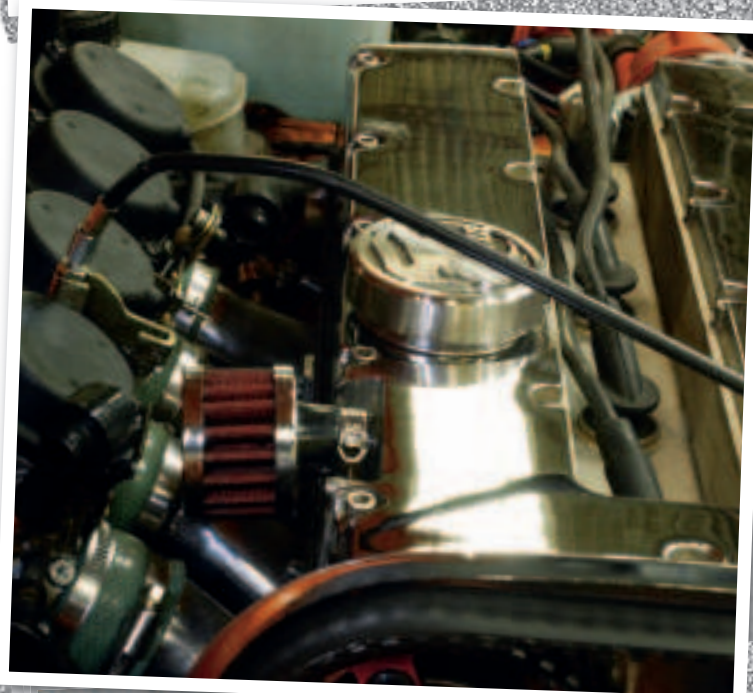
Where the throttle cable is connected to the carburettors, the angle of the connection points upwards, which may result in fouling when the bonnet is closed. This can be fixed by fitting a 90-degree throttle linkage connection from the R1 (available from motorbike breakers yards or a Yamaha dealer). A manual choke cable needs to be fitted with a lever mounted inside the car. The carbs need choke to start, unlike Webers that have pump jets. Use an old choke cable and sleeving, or Bogg Brothers can supply a universal choke cable with lever for £12. Run the sleeving from the bulkhead to the choke connection.



THE FULL KIT

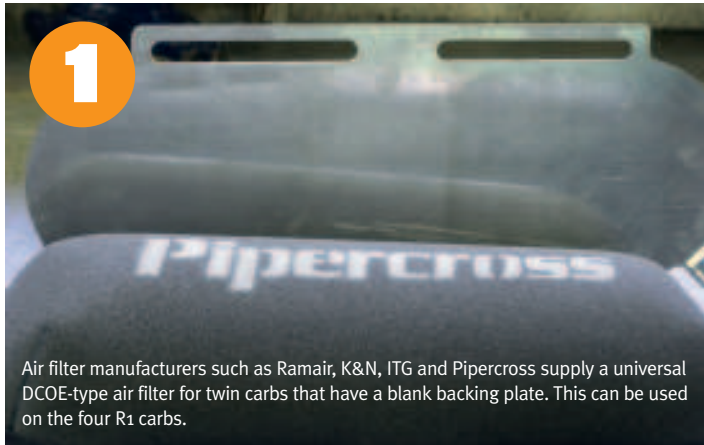


Inlet manifold	£176.25
Overhaul customers carbs	£78.75
Manifold and R1 carbs	£320
Facet fuel pump and Filter King regulator	£69
Universal choke cable kit	£12
Throttle cable kit	£10
Full cost of kit	£411
Full kit fitted and rolling road tuned for XE engined Nova/Corsa	£750
Extras	
Air filter	£100
Inlet manifold gasket	£10





STEP-BY-STEP: INSTALLING AIR FILTERS



1

Air filter manufacturers such as Ramair, K&N, ITG and Pipercross supply a universal DCOE-type air filter for twin carbs that have a blank backing plate. This can be used on the four R1 carbs.



2

To fit the air filter backing plate, you need the standard R1 backing plate from the air box - or you can make one using a piece of cardboard. You'll also need a set of air box rubbers and clips from a bike breakers or Yamaha dealer.



3

Place the R1 backing plate or cardboard template over the new blank backing plate. Make sure the four holes are central on the plate, then use a marker pen to draw the holes.



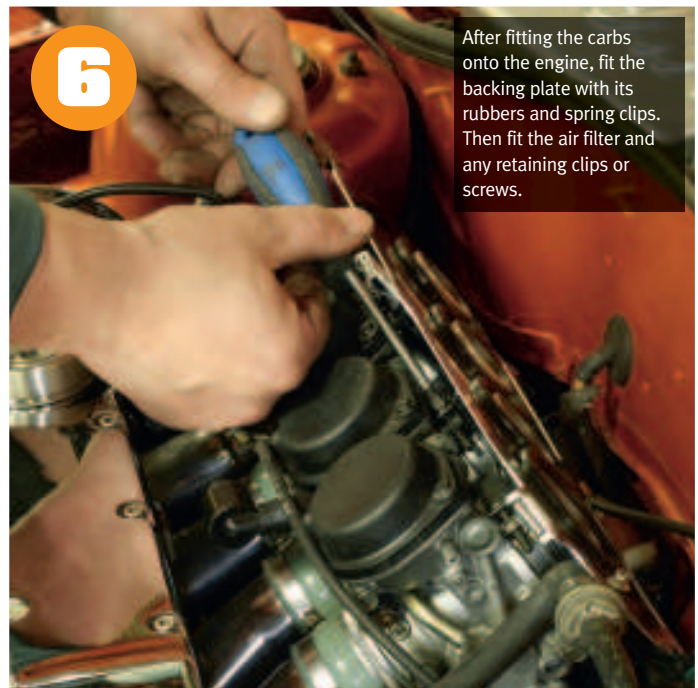
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Use a 65 mm hole cutter to cut out the four holes in the blank backing plate (Bogg Brothers uses a plasma cutter). Finish off with a file to remove the rough edges left by the hole cutter.



5

Fit the air box rubbers into the holes in the backing plate. The narrower groove needs to fit into the backing plate, whereas the wider groove fits over the carbs with the spring clips.



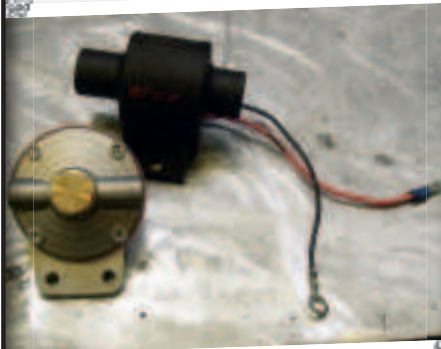
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After fitting the carbs onto the engine, fit the backing plate with its rubbers and spring clips. Then fit the air filter and any retaining clips or screws.

FUEL PUMPS

The R1 fuel pump is best suited to the carburettors. It contains an interrupter pump, which stops the fuel supply if the carbs are full so that you don't need a fuel pressure regulator. Motorbike breakers usually sell these pumps for around £30 each. Use an inline filter between the petrol tank and fuel pump. The electrical connection on the pump requires a live feed and an earth.

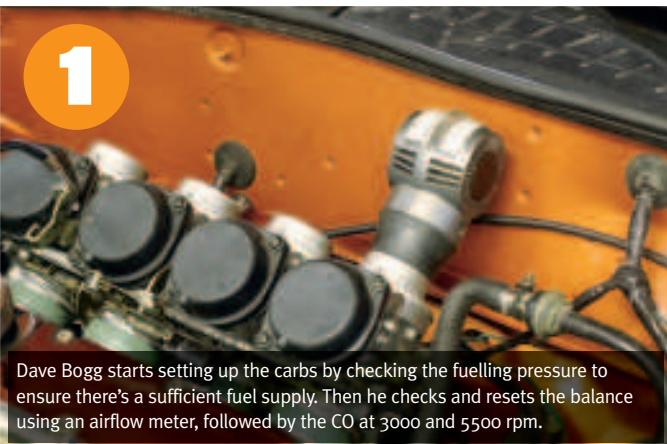
If you can't find an R1 motorbike fuel pump, try using another motorbike fuel pump. Alternatively, Bogg Brothers stocks a Facet fuel pump and Filter King pressure regulator for £69. The maximum fuel pressure required for the R1 carbs is 3 psi.



STEP-BY-STEP: TUNING UP



1



Dave Bogg starts setting up the carbs by checking the fuelling pressure to ensure there's a sufficient fuel supply. Then he checks and resets the balance using an airflow meter, followed by the CO at 3000 and 5500 rpm.

2



If any adjustments are required, the carbs can be removed by undoing four jubilee clips to access the mixture screws and main jets. The mixture screws need to all be set the same. The main jets can be changed for larger or smaller boreholes.

3



After refitting the carburettors, Dave removes the diaphragms and checks the needles. These can be altered by removing and refitting the circlips at the top of each needle (fit the circlip lower down for a richer mixture).



STEP-BY-STEP: QUICK FITTING GUIDE

- 1 Remove the existing fuel system and inlet manifold and clean gasket faces on the cylinder head.
- 2 Fit new inlet manifold with new gasket and tighten all respective nuts or bolts. Check the bolts don't bottom out.
- 3 Connect the choke and throttle cables to the carbs and fit the carbs onto the manifold. Tighten the retaining clips.
- 4 Fit a fuel pump and filter with the filter between the petrol tank and pump. Set the fuel pressure to a maximum of 3 psi if using a non-bike pump.
- 5 Route 8 mm fuel pipework from the tank to the filter, pump and carbs. Connect the fuel pipe to the carbs and secure with a jubilee clip.
- 6 Attach the throttle cable to the accelerator pedal and route the choke cable to the lever inside the car. Start engine, allow float bowls to fill with fuel and check for leaks.
- 7 Measure-up and make backing plates for the air filters, then fit the air filter assembly. Test-run the car and check again for fuel leaks. Arrange a rolling road tune-up.



STEP-BY-STEP: STRIPPING GUIDE

How to dismantle and inspect a Yamaha R1 bike carb

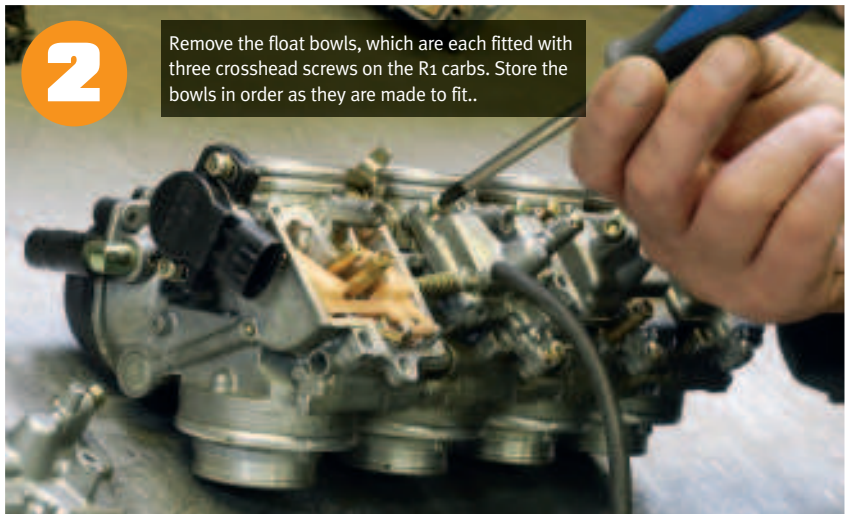
1

Inspect the body of the carburetors for cracks and repairs, particularly around the float bowls and fuel inlet. Operate the butterflies. If they've seized, spray penetrating fluid around the spindles to work them free.



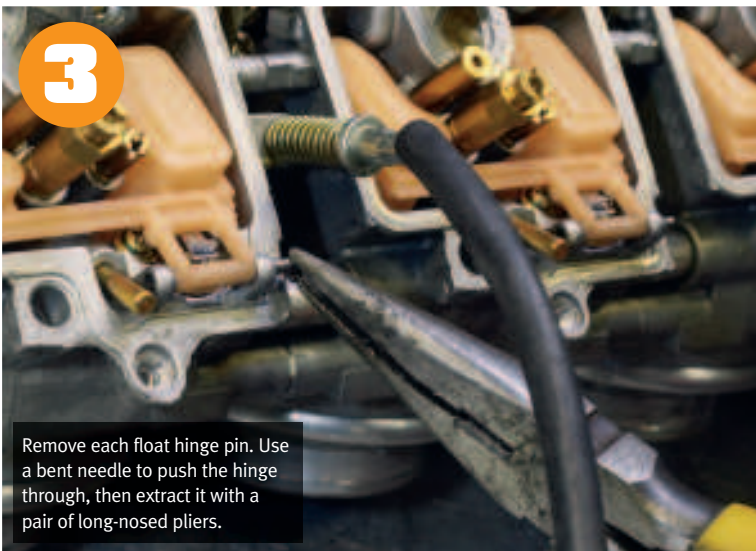
2

Remove the float bowls, which are each fitted with three crosshead screws on the R1 carbs. Store the bowls in order as they are made to fit..



3

Remove each float hinge pin. Use a bent needle to push the hinge through, then extract it with a pair of long-nosed pliers.



4

Remove each float with long-nosed pliers and store in order. Make sure the needle valve is still attached to the float when removing it.



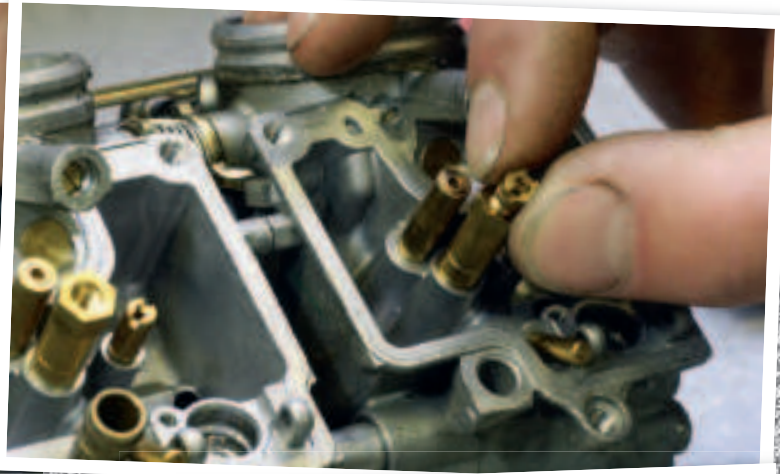
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Undo the retaining screw for the small filter on each carburetor. Remove the screw, then extract the filter and store in order. Clean these with carb cleaner.



6

Slacken each main jet with a flat-blade screwdriver. These are usually very tight, so be careful not to slip. Remove each main jet with your fingers.



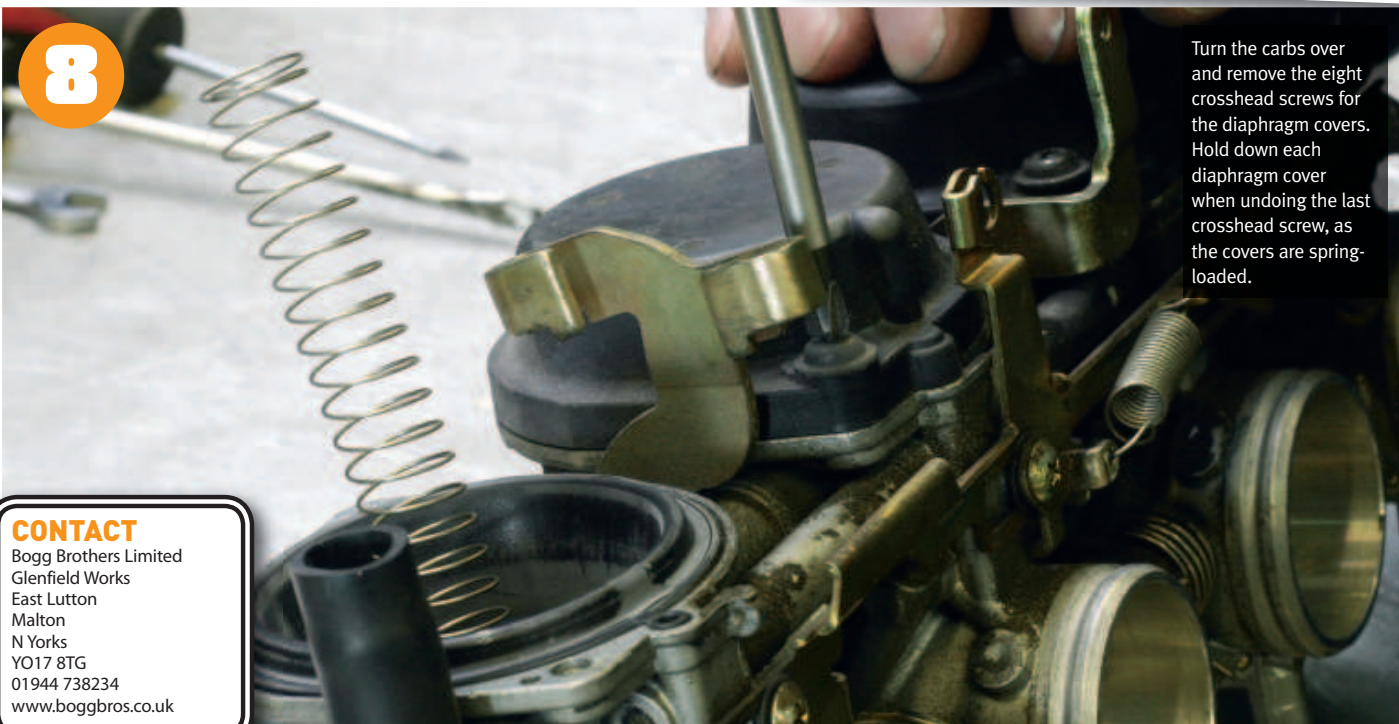
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Remove each main jet holder using an 8 mm spanner and store in order. Remove the pilot/idler jets with a flat-blade screwdriver and check they're not blocked (blow through if they are).



8

Turn the carbs over and remove the eight crosshead screws for the diaphragm covers. Hold down each diaphragm cover when undoing the last crosshead screw, as the covers are spring-loaded.

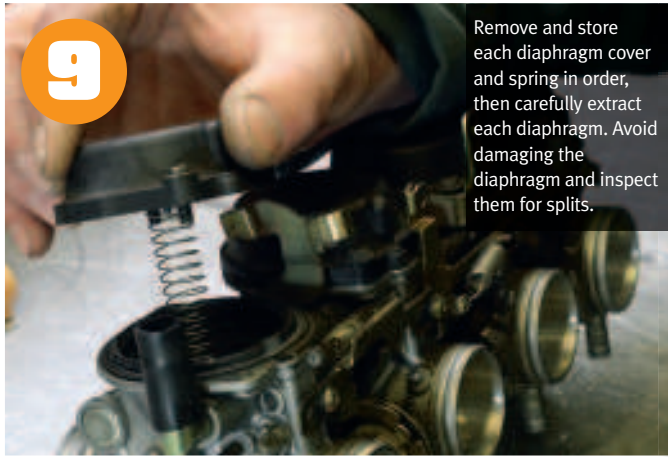


CONTACT

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TECH NOTE



9

Remove and store each diaphragm cover and spring in order, then carefully extract each diaphragm. Avoid damaging the diaphragm and inspect them for splits.



10

Wash the carbs in degreaser and agitate with a brush to remove any varnish and other dirt. Then wash through with water and dry with a heater.

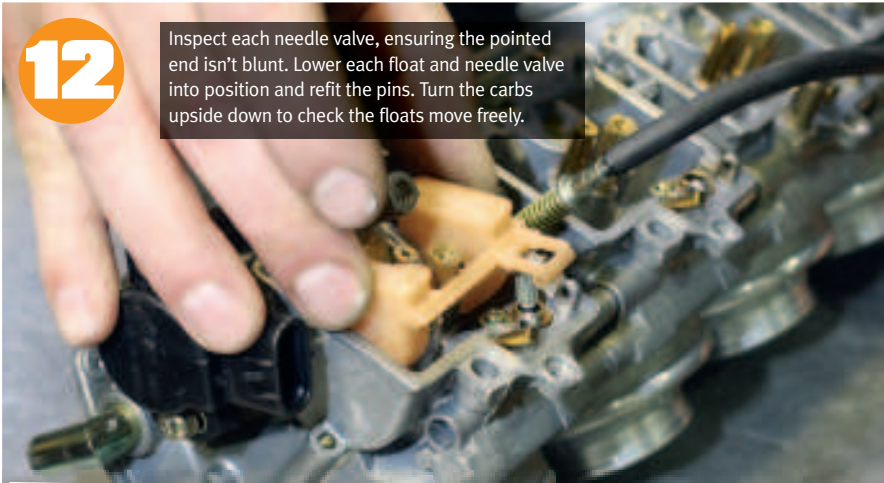


11

Rebuild the carbs, starting with the filters from step 5, the main jet holders and pilot jets. Don't over tighten any of the fittings for these parts.

12

Inspect each needle valve, ensuring the pointed end isn't blunt. Lower each float and needle valve into position and refit the pins. Turn the carbs upside down to check the floats move freely.



13

Drill out the main jets. For a 2-litre XE, use a 1.8 mm drill bit (1.65 mm for a 1.6). Alternatively, a set of similarly sized main jets from the Weber DGAV can be fitted.



15

Check the seal on the float chamber covers and clean with carb cleaner. Refit, then turn the carbs over and refit the diaphragms, springs and covers. Don't over-tighten any of the retaining screws.



14

Use a flat-blade screwdriver to fully wind in the idle mixture screws, then turn them out three-and-a-half turns. These can be fine-tuned when setting up on a rolling road.



MORE MODIFICATIONS

If you've got a seriously modified engine boasting performance camshafts, Vernier pulleys and similar upgrades, a full set of R1 carburetors can be fitted to help deliver the power. Bogg Brothers can enlarge the main jets and modify the position of the circlip on the needle to supply more fuel if required.

BUYING USED BIKE CARBS

Expect to pay between £50 and £150 for a set of R1 carburetors. Motorbike breakers are a good source for these carbs, but also look through the classifieds of Motorcycle News and your local papers. On the internet, auction sites such as eBay usually have R1 carbs for sale. When buying, try to get the hose clip retainers that secure the carbs to the manifold. These cost around £12 each from Yamaha dealers. Also, try to get the backing plate for the air filter box, so you can use it as a template to make your own air filter. Look out for accident damage and signs of rough removal when buying a set of carbs. Make sure the throttle and choke linkage operates freely. All the butterflies should close together. If they don't, the spindle may be bent. Check the plastic diaphragm covers are not cracked, because a cracked cover will affect the operation of the diaphragm and needle inside, resulting in uneven fuelling.

