GasResearch Australia Pty Ltd

TUNE UP SEQUENCE

The GRA 'Gold' series carburetors should be looked at in their operation in three stages. Tuning the unit should encompass the three stages. ***The order which the tune should be established is listed below***. Follow these guidelines and you will find the tuning of the unit easy and straightforward. The use of an Engine Gas Analyzer and chassis dyno is recommended for accurate measurement of exhaust emissions. The figures in these instructions reflect the use of this equipment.

1. IDLE MIXTURE AND SPEED

BASIC FUEL MIXTURE SETTINGS SHOULD START WITH A 2.2MM JET IN THE PROGRESSION HOSE.

The Idle Mixture Screw controls air bleeding through the Idle Circuit.

Mixtures at idle are adjusted via two controls, Idle Mixture Screw and/or Fuel Feed Hose.

If the Fuel Mixtures require "Leaning" out, the screw is turned anti clockwise to open up the Air Bleed Circuit.

If the Fuel Mixtures require "Richening" up, the screw is turned clockwise to close the Air Bleed Circuit.

The Fuel Feed Hose can be restricted via Idle Jets. This operation can be done if the Fuel Mixtures cannot be reduced to the desirable setting using the idle mixture screw.

The "Gold" Series Carburetors are preset at the Idle Port with a 1.2mm hole. Light "Trimming" of the Idle Mixtures can be obtained by fitting a 1.2mm Jet to the Hose. For more aggressive adjustment, 1mm to .8mm Jets can be fitted. This procedure will lean out the idle fuel mixtures.

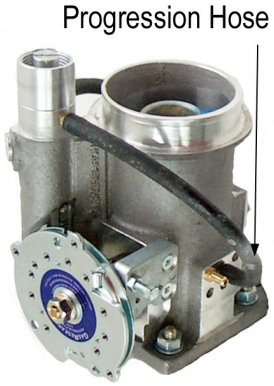
GENERAL POINTS:

1. Use Idle Mixture Screw for fine-tuning of fuel mixtures.
2. Idle Jets used for aggressive tuning of fuel mixtures.
3. 1.2mm port preset from factory.
4. "Rich" = Screw In - "Lean" = Screw Out
5. Idle speed adjusted via Throttle Stop Screw.

2. PROGRESSION CIRCUIT

The Progression Circuit is the transition fuel feed port between the Idle Circuit and the Main Metering Circuit. This Progression Circuit overlaps the Idle Mixture Circuit and so will effect the Idle settings if the Jet size is change.

The Progression Hose Jet will also effect Cruise Mixtures if changed and can be used as a means of Trimming the Cruise Mixtures if needed. It is recommended jet sizes no less then 2mm are used. This applies to GRA systems where no CTI units are fitted.



GENERAL POINTS:

1. Start with 2.2mm Jet.
2. Will effect Idle Mixtures if jet is changed (reset Idle if changed).
3. Can be used to fine trim Cruise Mixtures.
4. Do not use jets with sizes less than 2.0 mm on non-CTI systems.

3. MAIN METERING CIRCUIT

For Mixture Control and Adjustment at Cruise through to wide open throttle (W.O.T.), the Metering Rod Controls fuel mixtures by offering a restriction in the vapour fuel stream. Directly linked to throttle opening. It is stepped from a larger diameter at Cruise to a smaller diameter at WOT.

The diameter of the rod determines fuel mixtures at all points in the throttle opening. A larger diameter will restrict fuel flow to the carburetor diffuser while a smaller diameter will allow a greater flow of fuel to the diffuser. Metering Rods come in two types of steps, 2 or 3. This allows a greater control of fuel mixtures through Cruise and Midrange. 3 step rods will provide leaner, more progressive mixtures and so are recommended in all single carburetor applications.

Run the vehicle through all points from Cruise to WOT. Mixtures should progressively enrichen from Cruise setting to WOT setting. Changing size of Metering Rod alters Lean or Rich mixtures.

Remember that if Cruise is too Rich or Lean, trimming can be performed via Progression Circuit.

If mixtures are to lean through the driving range, decrease the size of the metering rod. Generally, one size change will alter the fuel mixtures by approximately 1% of CO. This is not always the case, but is certainly a good starting point. For example, a 49 3 step metering rod in a S400 carburetor. If the W.O.T mixtures are approx. 1.5% CO, then to richen this condition off to a figure of approx. 3.5% CO then we would install a 47 3 step metering rod.

The same example would apply in reverse if a rich condition were encountered. Increase the size of the metering rod to lean the fuel mixtures until the desired level is achieved.

GENERAL POINTS:

1. Diameter of Metering Rod controls fuel mixtures. Larger Diameter is Lean. Smaller Diameter is Rich.
2. Steps in metering rod affect mixtures at Cruise and Midrange.
3. Always ensure that mixtures progressively enrich throughout throttle opening.
4. Trimming of Cruise mixtures can be done through Progression Circuit (change jet size).

C.T.I PROCESSOR TUNING

The processor unit needs to be adjusted initially by turning the trimpot clockwise until the LED lamp illuminates. Back the screw off one to two turns from this position until desired sensitivity is achieved. The screw position controls the setting at which the closed loop operation starts. Sensitivity The CTI unit has two functions. Taking a

value off the TPS switch, the injector is pulsed at a fixed cycle to offer enrichment on acceleration. The second function is to control fuel mixtures at cruise and light throttle. The value is maintained by the CTI system is lambda 1.00. The fuel mixtures set through the metering and progression circuits can be set at a leaner setting to accommodate the injector operation at cruise and light throttle.

TWIN CARBURETTOR TUNING

Twin carburetor systems follow the same fundamentals as tuning a single carburetor system. Progressive enrichment across the operating range of the fuel system is very important. The vehicle tune is simply checked by running the vehicle through stages of the throttle opening.

Check the fuel mixtures at all points particularly when the secondary carburetor is opened. At this point, it is critical to analyze the fuel mixtures and make a comparison both before and after the secondary carburetor is opened.

For example, lets say that just before the second carburetor opens, the fuel mixtures are at 1.5% CO. As the second carburetor opens the mixtures change to 6% CO. This would mean that the mixtures are to rich at the secondary carburetor and must be altered at the metering rod to lean them back. We would change the metering rod in the secondary carburetor to a larger diameter to lean the fuel mixtures back.

Remember that if the metering rod is changed that the W.O.T mixtures will also be altered and so must be rechecked.

The same applies if the mixtures fall to 0.5% CO when the secondary carburetor opens. The metering rod at the secondary carburetor should be decreased in diameter to allow more fuel flow.

To simplify changes in fuel mixtures beyond where the secondary carburetor opens, it is advisable to make these mixture adjustments at the secondary carburetor-metering rod. Changes that are necessary before the secondary carburetor is opened should be made at the primary carburetor. These points would generally be at cruise or at part throttle. Idle mixtures can be changed at either carburetor or both.

Carburetors do not need to be balanced as they both feed into the same intake flow.

GENERAL POINTS

1. Maintain progressive enrichment through the operating range of the engine.
2. Fuel mixtures before secondary carburetor is opened are controlled by the primary carburetor.
3. The fuel mixtures beyond the secondary carburetor opening are adjusted easily at the secondary carburetor.
4. Idle speed and mixtures can be altered/adjusted by either of the two carburetors.
5. ***NO*** progression jet should be fitted to the secondary carburetor progression port.

FORCED INDUCTION TUNING

Fuel Mixtures are critical with a Turbo or Supercharged type engine combination. Ensure that progressive enrichment occurs through the engines operating range from Cruise to WOT.

Fuel mixtures of .95 to .90 are recommended through the operating range from after cruise to W.O.T. (approx. 2.2 – 3.5% CO). Ensure cruise mixtures are set at around Lambda 1.00 (approx. 0.8 – 1.2% CO).

A 13mm balance line should be fitted between the Intake pipe and converter lid on blow thru applications.

It is recommended that the Barb fitted in the Intake Pipe be cut/linished on an angle so as to scoop the air.

Mixtures are set in accordance with single Carburetor tuning.

GASRESEARCH
Gas Performance Systems

AIR FUEL RATIO CHART

PETROL	L.P.G	LAMBDA	
11.0	11.6	.75	POWER
11.8	12.4	.80	POWER
12.5	13.2	.85	POWER
13.2	14.0	.90	POWER
14.0	14.7	.95	POWER
14.7	**15.5**	**1.00**	**EMISSIONS**
15.4	16.3	1.05	ECONOMY
16.2	17.1	1.10	ECONOMY
16.9	17.8	1.15	ECONOMY
17.6	18.6	1.20	ECONOMY
18.4	19.4	1.25	ECONOMY