



An Easy Guide to Engine Set-up and Tuning

A publication
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Engine Set-up and Tuning.

Pre-amble

It is interesting to see how many people experience engine problems. Yet most of the time it is down to carburettor settings that causes an engine to run unreliably, albeit that other factors can affect running and performance. Most people buy an engine and sought of read the instructions, either misunderstand the instructions, or are lulled into a false sense of security by the statement "The carburettor has been factory set and should not need adjustment." At the end of the day a little understanding about the carburettor function and it's requirements can lead to a nice reliable engine.

Okay - so where do you start?



Engine Installation and Set-up

Assuming that you have installed the engine in your model according to the model manufacturers instructions, and that the fuel tank, and fuel lines has been similarly installed, let us look at the main area where problems may arise, and that is the carburettor operation by the throttle servo. Check that when the throttle is fully open that the carburettor barrel is fully open, and that when the throttle is closed, and the trim is slid back, that the carburettor barrel is also fully closed. Operation should be that with the throttle trim in either the centre position or fully forward the carburettor barrel is opened slightly. A handy tip here is that with the throttle stick in the idle position, open the main needle valve up 2 turns. Now insert a modelling pin into the body of the carburettor and adjust the throttle barrel so that it barely makes contact with the pin, before removing the pin. This gives a rough set-up gap for idle running. This is made easier if you have a modern computer set which gives you throttle adjustment setting control.

Okay so we are halfway to setting up the initial settings on the carburettor. Next we need to set the slow running needle. To do this, fit a piece of fuel tube to the fuel intake nipple on the carburettor, and gently blow down the tube. If you can just hear air escaping it is set about right. If it is easy to blow air through it, then the slow running needle needs to be screwed in a bit (clockwise). If however it is nearly impossible to blow air through, the slow running needle needs to be unscrewed (anti-clockwise). Only make these adjustments a little at a time and re-check after each adjustment. Ideally make increment or decrement adjustments of about 1/8th of a turn at a time.

Engine Running and Tuning

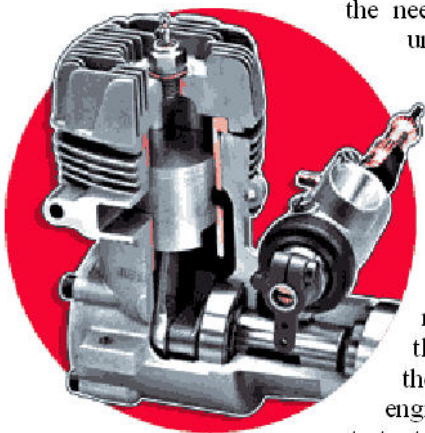
Okay so you have fuelled the model up, got a nice new glow plug fitted to the engine, and the glow battery is fully charged. You can now go and start the engine.

Main Needle (Top End) Adjustment

With the engine running at full throttle allow it to warm up for at least 30 seconds or so before removing the glow clip. It is quite likely that the engine is running too rich and if the engine is a 2-stroke, it will sound like a 4-stroke. This being the case, you will need to screw the main needle in (clockwise) slowly in 1/8 turn increments until the engine sounds crisp and of a constant note. You will also notice that the engine revs will rise until it peeks.

If it starts to decrease you have now gone too lean and will need to unscrew the needle (anti-clockwise) until it peeks again.

Now you will need to richen the mixture slightly by about 2-3 clicks of the main needle.



With the engine still running at full throttle, hold the nose of the model up. If the engine note changes i.e.

starts to die un-screw the needle another 1-2 clicks until holding the nose up does not affect the engine note. Right we are nearly there, all we have to do is set the bottom end up.

Slow Running (Bottom End) Adjustment

This is the hardest part as you usually have to make this adjustment using a screwdriver which is close to the propeller so take great care or shut down the engine and make very small adjustments re-starting the engine after each adjustment. This is a more lengthy process but is far the safest.

T u n i n g .

Having run the engine at full throttle, now close it so that the engine is at idle. If the revs slowly drop back to idle and the engine coughs and splutters, and slowly reaches full throttle when you open the throttle again having been at tick over for 20-30 seconds then the bottom end mixture is set too rich. Screw the slow running needle in (clockwise) 1/8th of a turn at a time repeating the test. If the engine dies when you open the throttle then the bottom end mixture is set too lean, so unscrew (anti-clockwise) the slow running needle. Adjust the needle so that the engine picks up cleanly from idle to peak revs, and similarly that the revs decay smoothly when returning to idle. Note: You will need to check the full throttle needle setting and may need to re-set it accordingly as this can sometimes change when setting up the bottom end.

Finally...

Having followed all the instructions you may find that the engine runs fine while you have the glow clip attached, yet when it is removed the revs drop, or the engine may even stop. This usually signifies that the glow plug either is old and needs replacing this usually occurs when an engine's mixture normally requires little adjustment suddenly requires a lot more attention. The other cause could be that the plug fitted is too cold. Follow the engine manufacturer's recommendations as to the type to use for the type fuel that you are using. Try fitting a "hotter" plug. However, fitting too hot a plug will cause pre-detonation and will be signalled by the engine misfiring.

Setting up an engine is not difficult, and once set up, an engine will give good reliable service. There are other factors which can affect the engine's reliability but these are beyond the scope of this article.

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