Combustion Tuning

HENK KOMMERS · MAANDAG 7 JANUARI 2019

Credit to Andrew Ripley for this post, for setting up the diesel heater for best combustion:

Fuel map and setting up....

Well I was shocked and so glad I'm a finnicky person because I connected up my mates exhaust gas analyser which he uses to set up oil boilers that run on kero and gas oil (red diesel) and found my heater even on stock settings was downright dangerous.!!

And I thought mine was running sweet on the fuel map I'd set up..however the carbon monoxide was at a deadly state...!!!

Ok first things first...
There are two settings that matter, the min air and fuel and the max air and fuel... once you set these two points the ecu maps the rest automatically taking into account the temp of combustion.

Diesel needs plenty of air to combust though not too much air as this cools the combustion; my task was to get as little nasty Carbon Monoxide (CO) as possible and as high efficiency as possible as near to 85%

So I ran it flat out for ten minutes to soak and balance itself, tuned the fuel and air together at the top end settings.
I tuned the heater to a low ppm of 60 CO and nearly 78 % efficiency.

Next and the most important is the tuning of the min setting as this is mostly used.

Again I achieved now 86% and an incredible ppm of 30 Carbon monoxide And an exhaust that you could almost breath as the carbon monoxide was so low.

The heater works incredibly well now, lights after just over a minute after pressing on and glow plug off in less time and in full flat out heat mode in 3 minutes...which is faster than my erbaspacher would.

So... if you you don't want to die from carbon monoxide poisoning and have a heater that works as it should, get it set up with an analyser.

NOTE: these settings work on my heater, they may work on others but the heaters can be different. Pmin=1.9, Pmax=5.5, RPMmin=1680, RPMmax=4400
Mine is fitted as it should, running on red diesel..
Ps... all this run on flat out for ten minutes is claptrap... it's because there are not setup correctly in the first place.
If setup correctly there will be no soot or excess carbon as it will be all burned in combustion, or a much as possible...

Attached are tuning at various stages with the last video showing my settings.
This was not a quick task and took 3 hrs, it took some skill to eek out the best and lowest settings, air and fuel were adjusted depending on the analyser readings and response.

The heater again was run from cold and hot and tracked the new map perfectly, I was amazed myself how well it performed...


Flue Gas 3
13:47:08 07-Jan-2019
Heavy oil
O2 % 7.8
CO ppm 30
CO2 % 9.9
Ratio 0.0003
XS air % 60.0
Temp flue C 306
Efficiency % Gross 77.8
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