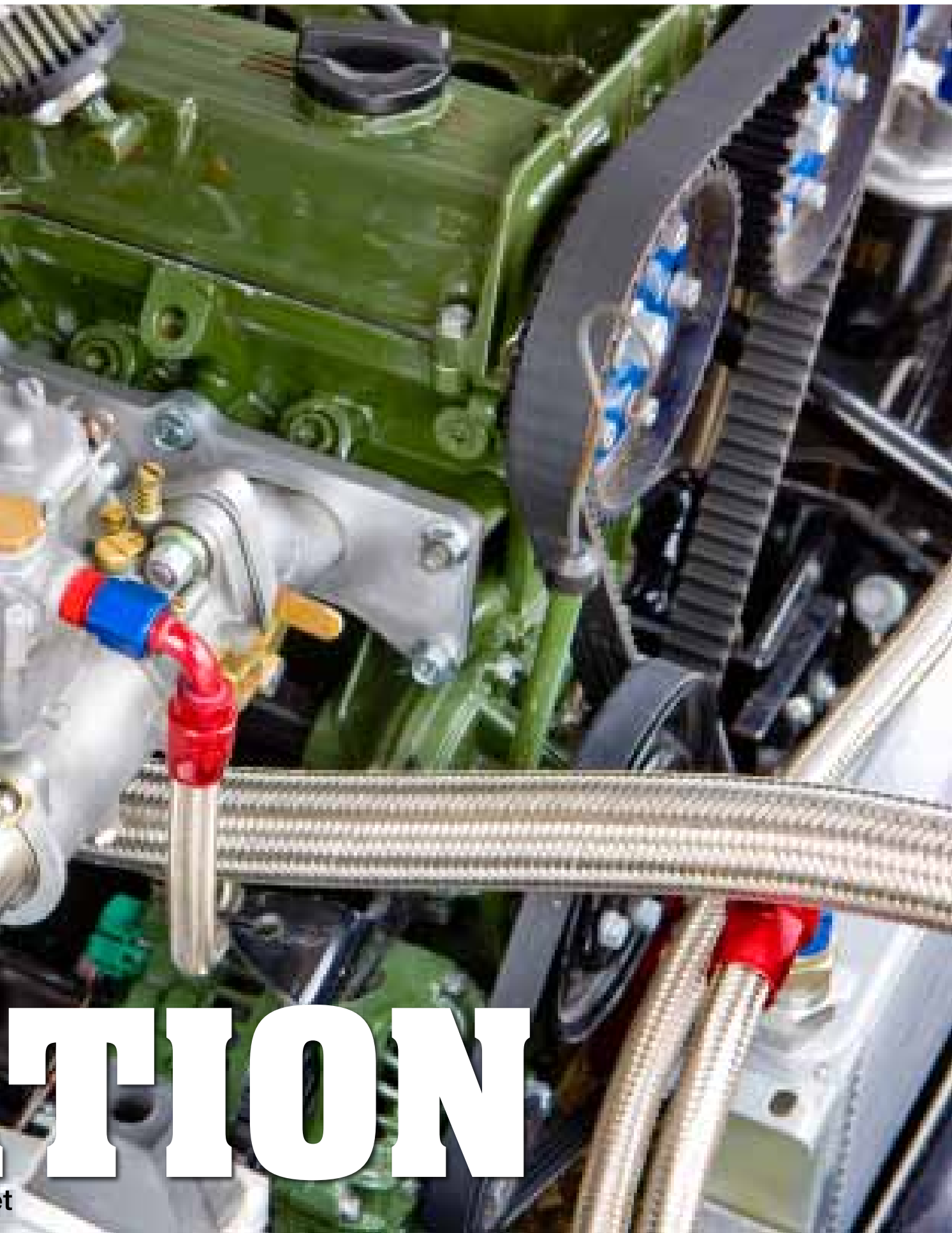
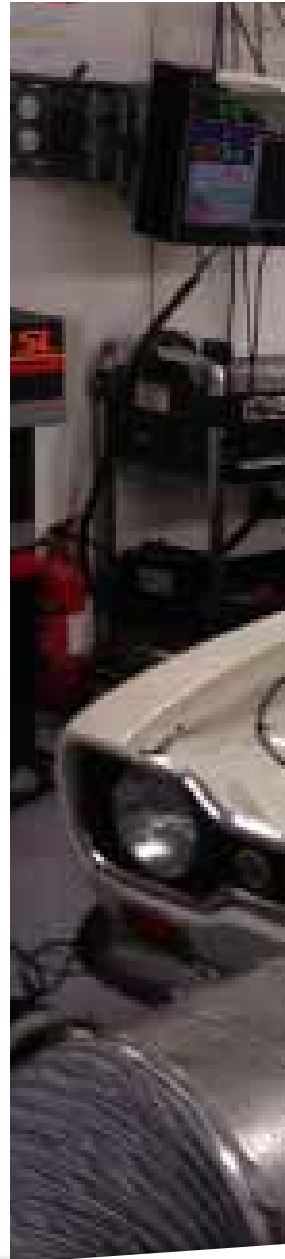


CARB CALIBRA

How to get your twin sidedraughts singing from the same hymn sheet



TION



For many Retro Ford owners, the idea of a rolling road tune is an unnecessary luxury, when twiddling with some screws and ‘tuning by ear’ in your garage can make things run smoother. But a proper rolling road tune is a very different exercise, especially if the job is carried out at a place where they know their stuff. Weber calibration engineer and owner of Atspeed Racing’s Alan Thorndyke shows us how it’s done on Terry Sawyer’s immaculate MK1 Escort.

Atspeed come recommended from the highest of sources, including Webcon UK themselves. It’s quickly apparent Alan Thorndyke knows his way around a carburettor. ‘When fuel injection first came in I was a bit of a dinosaur, but now anybody who first started in the trade when carburettors were first phased out for fuel injection is either very old or retired, so carb specialists are in demand again – there will always be carburettors and always be classic cars.’

The session starts with a lot of checks and preparation work before testing even begins. Alan likes to weld a lambda probe boss into the car’s exhaust if it doesn’t already have one. This way mixture readings can be read instantly and displayed on the dyno’s screen.

Next, a general overview of the installation is carried out, making sure the carburettors are correctly mounted, and both are the same – Atspeed have seen cars with one 40 and one 45. Float level, fuel pressure, spindle alignment and full throttle are also checked, as well as the general condition of throttle linkage and cables. Alan always sets the fuel pressure to between 4 and 4.5 psi.

‘Next I adjust the idle speed and balance the carburettors,’ says Alan. ‘On this Escort I adjusted the main balance linkage between the two carbs as the rear carburettor (cyl. 3+4) wasn’t working. The idle fuel mixture instantly became richer. A few quick revs of the engine also show the pump jet is a little rich.’

“The car had just had a full nut and bolt rebuild before I bought her 4 months ago. It drove well but it was clear the carburettors needed a little work. After the rolling road session it was like driving a different car – I’m very pleased with the difference.”

Terry Sawyer, 37, Ford Maintenance Engineer from Essex.



Adjusting the main balance linkage

‘The idle mixture screws are then adjusted for finer control – in this case roughly 1.5 turns out from fully in. We don’t worry about being too accurate at this stage as we may have to replace the idle jets and have to redo all this, but getting a good base calibration can help get a better picture of what’s happening.’

‘Sometimes if the carbs are a bit old it’s common for things to be worn out, shafts, spindles, butterflies for instance, and problems caused by this are further exaggerated with larger camshafts.’

‘Carburettors have no rules, they make them up as they go along. Fuel injection is active

ABOVE: Ignition timing was set once a smooth idle was achieved.

ABOVE LEFT: This synchronometer used to measure carbs’ airflow.

RIGHT: Strategically placed mirror shows main jet working.





Company Spotlight: Atspeed Racing

Atspeed Racing is based in Rayleigh, Essex, and is run by father and son team of Alan and Colin Thorndyke. While Alan specialises in carburettored cars, Colin focus's on modern engine management and turbocharger systems, Colin tuned our very own "Goldmember" back in the (???) issue. The fully soundproofed and ventilated dyno test cell houses a 2WD rolling road capable of testing cars to over 1000bhp. Atspeed set up all kinds of cars from all eras, vintage to modern, road to race.

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whereas carburettors are reactive – they're a living, breathing thing. You have to give the carburettor what it wants, not what you think it wants.'

Idle mixture screw

'Now the engine's running much smoother we check the ignition advance with a timing light. At this stage we notice that at higher revs the mixture goes lean, so it's obvious an idle jet change is necessary.

'For now the actual idle mixture is ignored, as we can fine tune this later – it's the progression we are working on now. Many people don't understand the importance of the idle jet, they assume its all done on the main jets and emulsion tubes – it isn't. You can sometimes be driving at 50-60 mph on light cruise and still be on the idle jet. It's crucial for proper calibration, fuel economy and real world driving pleasure. A mirror glass can

be a handy tool to see when the main system actually starts working – try doing that in your garage.

'With the idle jets changed the car now drives nice and smoothly at light throttle and cruise conditions. So, happy with the idle jets, we can now fine tune the base idle mixture on the idle mixture screws and also reset the idle speed.

'Ten to 20bhp is all that's really needed to drive a car at motorway speeds – this is the area you spend most of your time driving in a road car – light throttle. So this is the area Atspeed insist on getting spot on.

'We now start focusing more on the wider throttle openings where the main system comes into play, and the AFR rapidly shows the car's way too rich, in the 10s. Firstly, we try a smaller main jet. This made a small improvement, but the mixture now goes lean further up the rev range so we also try changing the emulsion



tubes to try and correct for this by bleeding air in at different engine speeds and loads. The first change made it better, but made it worse elsewhere, eventually after a handful of changes we find an emulsion tube that gave the best overall result.'

Atspeed carry a huge range of jets and spares for most types of carburettor including Weber, Dell'Orto, SU, Pierburg, Holley and Edelbrock. They also tune motorbike carburettors.

'We can now start focusing on tuning for maximum power,' says Alan. 'A typical power run lasts around 10 seconds, and this is enough for us to retrieve all the information we need in order to make changes. The first power run shows good strong power and torque, but a loss at the top end where the mixture starts lean.'

'So first we try a smaller air corrector to try and improve this. The air corrector makes a marginal gain and improvement on the mixture. So we also try a slightly larger pump jet, which can start to bleed in extra fuel at the top end also, although not too large that it causes any problems with acceleration or transient fueling. It's important to remember that at full chat all the jets are being used to form to overall calibration, so they all come into play – its not just about the main jet.'

'Happy with the mixture, its now just a case of optimising the ignition timing for maximum torque and power – this ends up at 30 degrees BTDC.'



The end result

124.4BHP @ 5531 rpm // 130.1 lb-ft @ 4218 rpm
Red line = BHP
Blue line = LB-FT
Orange line = AFR
Green line = Driveline loss (hp)