EasiTune tuning lights.

These are the simplest method available today for keeping a two-stroke engine running at its peak. Easily fitted to any kart, a driver of any age or ability can very readily see the coloured lights display and tune their engine accordingly.

And now that I have used one myself - WOW what a snap of an idea. I can see why so many dad's think this is the greatest as the driver does not have to think about what the numbers mean when they see the temperature and relating which way to turn the jets when the numbers go up or down. It was so easy to understand and the lights are really bright even in full sunlight.

This is **FULLY RECOMMENDED** as a tuning aid for everyone from beginners to experienced drivers.

Only $POA for the whole kit, battery operated with all the connectors included (and Australian made).

All parts are available separately in case of damage or repairs.

Complete EasiTune kit	**$POA**
Display with lights/switch	$POA
Sensor	$POA
Sensor connector lead	$POA
Sensor weld-in adaptor	$POA

Welding of the sensor adaptor to header only $POA

The following instructions cover the operation, installation and troubleshooting for the unit.

These gauges are designed to make tuning of your 2-stroke race engine easier and more accurate, as they tell you the MIXTURE not the exhaust temp. With the advent of intake and exhaust mufflers/silencers, earplugs etc, the old "seat of the pants" tuning is now verging on the impossible for the average enthusiast. The colour coding is almost self-explanatory: in simple terms, green is go, red is danger, and orange is not good.

On a typical "ideal" acceleration run, at the start of acceleration, the rich green should illuminate, and then transition to the lean green. As peak revs become close, the transition should be back to the rich green, as this helps a "cool down", and the finish of the run should always be in the rich green, (or in the orange, if head temp is climbing too high). When the driver backs off, the lights go to the red. This is normal.

As carburetion is never perfect, variations to this occur, added to by the weather conditions. A typical problem is "lean out" as the engine comes off the power peak. This can be caused by destructive pulses, meeting in the carby, causing insufficient fuel to be discharged. Both the Yamaha S and ARC engines suffer from this at around 12-13,000 RPM's. To further complicate things, some days it's there, other days it's not. Changing the exhaust tuning, muffler type and length, and intake silencer can help and the improvement (or lack of) is immediately evident on the gauge. Rookie/midget J's suffer from a similar problem, and it is difficult to solve. The exhaust restrictor causes a drop in air speed thru the entire induction/exhaust cycles, making consistent fuel metering a nightmare. Easitune will help in solving or minimising the "leanout" thru the midrange.

With some motors, if this "lean out" is detected, the problem can be solved by addition of more fuel to the low speed circuit by:

Screwing out the low jet
Lowering the blowoff pressure
Enlarging one of the transition / idle circuit jet holes (CAREFULL!!)
Raising the lever height

A corresponding leaning of the high speed jet is necessary to adjust the mixture balance.

The lights come on singularly, but as one goes out and the next comes on, there is a short period where both are on together. This makes it easy to determine which direction the mixtures are heading. Used in conjunction with an Alfano , Mychron, etc, the combination of lap time, head temp (including the amount of head temp rise) and tuning light pattern can help determine the best "pattern" for your engine. Obviously an ideal pattern is one that gives a stable optimum head temperature (determined by best lap times versus head temp) for the duration of most of the race.

As engines vary in their head/crankcase temp rise the "ideal" tuning may not always be sustainable, and continuing to run the engine with that "pattern", will result in engine failure or loss of performance. Air cooled engines especially may require a richer mixture for longer races. Rising head temp, past the optimum, is indicative of a mixture that is too lean. We suggest starting RICHER and progressing leaner, keeping an eye on the head temp. (Slowly rising head temp can be caused by too lean a low speed mixture).

It should be noted that this is a tuning aid, and whilst it is very accurate, it utilizes electronic components which can fail. When first using the gauge it is suggested that the driver tunes in his normal manner first, without the gauge turned on, and then turns it on to see what is actually happening.

Fitting:

The sensor lead is made to go around the LEFT side of the kart i.e. across the rail behind the seat, and around and up to the steering. When fitting the gauge to the steering wheel, a simple method (as many karters have Alfano's etc) is to run a piece of 50mm wide aluminium, 2-3mm thick, across the two bottom steering spokes, or bolt a piece between the steering boss and the steering wheel, running vertically down towards the bottom of the steering wheel. Glue the Velcro to this aluminium and another piece to the bottom of the gauge. We suggest everyone glue the "fluffy" Velcro to the Easitune and then it is easy to interchange gauges between karts.

The sensor lead has an earth wire at the sensor end. This earth is to be attached to the engine (or engine mount), NOT the chassis.

The fitting for the sensor (18 x 1.5mm thread) should be welded to the header (or muffler for Rotax – see special fitting just for these, and Comer), 30 to 35 mm back from the "flex end". It is sited higher than horizontal, as it must point slightly upwards, to stop the advent of water / dust etc blocking the internal air sample ducts. Drill an 11mm hole in the header, place the "weld in" over the hole, centralise it, and weld. Brazing is the preferred method as a damaged weld-in is then easily removed for replacement (if a stainless header is used TIG with stainless). Care should be taken to not allow splatter to contaminate the threads, as the weld-in is a form of stainless steel which galls badly if all is not right.

The sensor is supplied with "anti-seize" on the threads, but if frequent removal is envisaged, a reapplication of nickel anti-seize would be advantageous.

On a **Rotax Max** the weld-in should be sited 290-300mm from the inlet end of the muffler, and above the seam as close as possible to the seam lip, but far enough away to allow for ease of welding. A 25mm hole cutter is used to make a hole, and the weld-in "drops in", then is brazed.

With the **Comer** exhaust, a 25mm hole is cut with a hole cutter, in the right hand top corner looking at the rear of the muffler. There is an indent above the right securing bolt, with the hole being cut out with this as the centre.

On the **KA100** and **X30 IAME** engines be aware that under KA racing regulations the sensor position is a tightly controlled. Read the particular engine homologation to see exactly where the sensor fitting must be welded.

The sensor should ALWAYS be fitted on the inside of the bend on mufflers or headers, so as to not interfere with exhaust gas flow. Also fitting the sensor in the direct exhaust stream can cause the sensor to "switch off" and eventually cause irreparable damage.

As the sensor needs to be heated to 300 degrees Celsius to operate, it may not work for a short period after starting the engine. Holding it up your cars exhaust pipe is not a way of checking that it operates!

WARNING:

At all times, the sensor lead to the gauge and the wires on the sensor, must be sited as far away as possible from the ignition and spark plug leads, as inductance from these can be in the thousands of volts. Inbuilt shielding and surge protection can only cope with "so much", and "misplacement" of wiring can lead to failure of the unit. Whereas repair and replacement is possible, the inconvenience and anguish of the driver dictates careful siting of all wiring.

The LED's are very bright, and can still be seen with the sun over your shoulder, and as such, are hard on batteries. Don't turn the unit on until you go out on the grid, and turn it off as you come in. Problems with the gauge are often caused by low battery voltage.

This unit has been developed over several years initiated by the frustration of many drivers who were unable to tune successfully. Extensive track and dyno testing, refinement both in presentation and reliability has led to a unit that if fitted correctly will give long, trouble-free use.