

A Beginners Guide to Field Equipment

One of the initial costs of taking up RC flying is the cost of the ancillary equipment that is additional to the plane and radio covered in the guide to buying your first plane. The good news is that whatever you buy should last years and so the annual cost is small.

You will however have consumable costs such as fuel, glowplugs, batteries, and possibly planes (yes planes can be a consumable when your luck is down!).

The amount you need is dependant on whether you are a minimalist or a gadget freak. Remember whatever you buy for field use will need to be carried down the long path from the winter car park to the field, unless of course you are a true gadget freak and make, or buy, an off road trolley ... okay I admit that I have one!

Whichever approach you choose please do not forget a means of restraining the model when the engine is running (relying on a good soul at the field may not always work after you have covered them in glow fuel exhaust fumes a few times). A simple restraint is to use two suitable metal bars stuck vertically in the ground about 4 inches (10 cms) apart, the aircraft is then placed between these bars so that the front of tail plane rests against these bars, preventing it from moving forwards.

The true minimalist field kit typically consists of:

- A 1.5v glow starter stick ... the gadgetist will buy one anyway. This is an all in one unit that has a clip at one end that fits over the glowplug and a rechargeable battery at the other. More expensive types may have small ammeter at the battery end to indicate that current is flowing into the glowplug and how much.
- A hand held re-fuelling bottle that is squeezed to force fuel into the tank.
- A 'chicken finger' to flip over the propeller when starting. You can get by without one of these but as a beginner it will save you much pain. There are several proprietary types from the soft rubber (short life!) type that slides over your finger to the much better wooden stick with a firm rubber end.
- A Glow plug spanner
- Model restraint as described above.

If you go electric then you only need the restraint plus a method of recharging your battery at the field, or a supply of batteries.

What to buy next?

a) Flight box - Most RC flyers will own a flight box, either lovingly designed and built themselves, a flat pack kit, or a pre-built item. This then has or needs a flight panel which uses a 12v dc source. I use a sealed motorcycle battery but there are other sealed 12 volt lead acid battery packs around.

The flight panel then gives outputs for a 12 volt hand held starter motor and a variable current output for a glow plug lead, with a built in ammeter. You can buy flight panels that include a fuel pump but these will inevitably fail long before the flight panel and so it is better to buy an external unit.

My flight panel has a separate electrical output for an external fuel pump with a three position switch to fill, empty and turn off. The flight box has lots of nooks and crannies that will hold used and no longer wanted glow plugs and other rubbish for years and years ... at least mine does.

b) Glow Plug Lead – Required to connect the Flight box variable current output to the glow plug (always turn this output down before connecting to prevent accidentally burning out the filament on your glow plug (which are not cheap!).

Observe what current is required on the meter to make the glow plug glow orange when the plug is out of the engine (allow to cool before handling!) and then use this setting when the glow plug is refitted for starting.

c) Hand held starter motor – This again connects to the flight box. When the spinner end is pushed onto the spinner (that cone shaped thing that should be on the front of your engine) a switch on the starter motor is pressed to spin the propeller in the correct direction for starting. This is particularly useful for stubborn engines that refuse to start when being flicked over by hand.

d) A fuel pump – This will make your fuelling and emptying much easier. You can buy electric but these usually have limited life, so I use and recommend a hand pump that has a winder. Turning the winder one way fills the tank whilst turning the other way empties it.

A further advantage of the hand pump is that you can count the number of complete turns required to fill the tank and then do the same when you refill.

You can use these two different counts to calculate the fraction of the fuel capacity used in flight and then this ratio to adjust you flight timer to get the most out of a flight whilst still leaving enough reserve for several aborted landing attempts or redirection to another field in case of bad weather (smile!).

e) 'After Run' Oil – At the end of each flying session I drain the tank, run the engine until it stops, remove the glow plug and then drip 5-10 drips of 'after run' oil into the cylinder head. I then replace the glow plug and use the starter motor to spin then engine over to distribute the oil. For my Laser 4-stroke, I do not remove the glow plug but instead put about 3-4 ml into the breather tube using a plastic syringe.

Apart from one engine, which I fried due to insufficient cooling, I am still using every engine I have ever purchased. Enough said.

f) Charger – This is an important purchase for the RC flyer and it worth splashing out on this if you can. Even if you do not start with an electric plane you are likely to have one at some time in the future so it's worth buying an "intelligent" charger that will handle LiPo's, NiCAD's (less important these days as you cannot buy them), NIMH's, lead acid cells, and possibly even LiFE's. The charger must also have a discharge and a LiPo cell balancing capability - never charge multi-cell series LiPo packs without using a balancer. If you buy a charger that has mains and 12v power inputs then this will also double as a field charger.

You will find that some chargers can charge more series LiPo cells than others (common packs are 3 cells in series connection) so this choice will depend on how big an electric you intend to fly. You can also buy adapters to connect two packs in series when charging and balancing, which in turn will double the number of cells needing to be charged if using one of these.

g) Flight Battery Tester – This is used to test the state of the flight battery in the plane before flying and is especially useful if you are doing several flights in the same day. A new battery will normally cope with this well but a failing battery may use a significant proportion of the available charge on each flight.

The one I use has a switch to select between 4.8v and 6.0v batteries, 6 L.E.D.s (Light Emitting Diodes) and a press button which loads (i.e. takes current from) the battery when operated. The state of the battery should be measured with the button pressed. This also provides a simple test for black wire corrosion or a weak battery. When the button is pressed the led indication may drop by one LED but any more than this could indicate a problem with the battery or the wiring harness. Ted C. was so impressed with this function when it detected black wire corrosion in his model that he built his own

There are other more complex pocket size battery testers with LCD digital displays that can also test and balance LiPo batteries, giving individual cell voltages and allowing weak cells to be detected and it may be well worth purchasing one of these in addition to the type I have described.

For the serious gadgetist there are then:

h) A Servo tester – mine allows the width of the pulse in the PWM signal from the receiver to be measured, or alternatively can be used to provide PWM signal to activate a servo without needing to connect it to a receiver. It's useful when changing receivers and when testing servos or the servo wiring during a build or after a crash/storage.

i) A DC Clamp ammeter – A bit specialist but if you are into electric flight this gives quick and easy measurement of the current being drawn from the battery by the speed controller, hence ensuring that you are working within it's specification. This then allows you to experiment with propeller pitch and diameter to achieve the best results.

I have used an in-line power meter but the problem with these is that inserting the meter also affects the circuit that you are measuring, with leads to measurement errors.

j) A Propeller Tachometer – Probably my least used gadget but this measures the rpm of the propeller to allow tuning for peak speed, which you then need to adjust richer for safety. Useful for measuring the affect of different propeller sizes and to ensure that the tip of your propeller does not go supersonic by using the right formula!

Probably much more useful for flying multi-engine aircraft where after all the engines are individually tuned, the faster running engines are de-tuned (made richer) to the same rpm as the slowest ... at least according to what I have read! I haven't yet accomplished my schoolboy dream of a twin engine Mossie (a Mosquito).

That finishes the rummage through my flight box and this article.

Regards

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