

Starting M-14 Engines

These engines are totally different to Western engines, and all too often pilots have problems on them, simply because they do not understand the principles involved:

- The engine starts with compressed air whereby air is fed into the cylinders in order of their normal firing, and this air forces the piston down causing the engine to rotate.
- The engine does not start on magnetos. It only starts with a “booster coil”, as the magnetos have too much advance for the aircraft to start on them.
- The priming lever has two positions, ‘System’ and ‘Cylinder’. The ‘System’ position feeds fuel to the carburettor. In this position one cannot put too much fuel in, since excess will return to the fuel tank. ‘Cylinder’ where fuel is put into the supercharger, and then distributed to the cylinders. It is advisable not to over-prime, mainly because of the chance of fire, since raw fuel will go down the lower intake tubes; through the cylinder and then out of the exhaust, but also to a limited extent, in that the very rich fuel vapour in the lower cylinders can begin to wash the oil off the walls.
- The total amount of priming will vary from a minimum of three full priming strokes for some engines in summer to seven full primes for some engines in winter. You will find the correct amount by trial and error for your engine.
- It is important, however, that each prime is actually pumping fuel. It is easy to feel this, since if one is pumping air the primer is much easier to pump.
- The starting procedure is therefore to begin by clearing the engine of oil—by using whatever system for draining the intake manifolds, and then also turning the propeller (with everything closed/off) for at least seven revolutions. If oil comes out of an exhaust, continue turning longer.
- It is not then necessary to do anything outside the aeroplane. If, however, air pressure is low, the aircraft will start more easily by manual turning of the propeller after priming (with, of course, everything off) and throttle closed.
- In the cockpit normal electrical switches should be switched on, and then the engine primed on ‘system’ until good fuel pressure is seen.

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- Then the engine should be primed on “cylinder”. Practice will give the best amount, but initially one should use (say) four full pumps.
- It is then important that the throttle is set correctly. One can only do this by removing the throttle friction, and then advancing the throttle by about 1½” after the slack is taken up in the throttle movement.
- The magnetos should be off, and the priming handle out, to enable a quick prime after starting, but on the “cylinder” side.
- The starter button should be pressed, and if the engine starts, then push the priming handle in (remember on cylinder) to give enough fuel to keep it going. At the same time switch the magnetos to on.
- Remember the principle of starting by pushing the air into the cylinders. This means that once the engine has gone through 1½ revolutions, with the only air going into it, if it hasn’t started then it won’t ever. There is therefore absolutely no point in continuing to hold the starter button down, and indeed in doing so will damage the booster coil and possibly the magneto cap (apart from running out of air!).
- There are only three things which the engine will do:
 - Start
 - Turn backwards in which case there is too much fuel, and you can either switch everything off: get out of the aircraft and manually turn the blade through 2-3 revolutions only, or do this from inside the cockpit.
 - Not fire, which means there is insufficient priming. In this case give the engine a further (say) 1½-2 primes and then begin again.
- Once the engine has started, increase revolutions with the throttle to 44% and of course push the primer in and lock it centrally.
- Therefore absolutely critical points are:
 - The engine starts with the magnetos off.
 - The correct amount of priming has been used.
 - That air is pushed into the cylinders once the engine has gone through 1 – 1½ revolutions the mixture is completely changed and it will never start.

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