

Lambert Microturbines Kolibri

T15/T20/T25/T30/T35/T45/T50

Simplified User's guide 2.00



Lambert Microturbines Kolibri is a real turbojet engine specifically designed for model aviation. Even though it's small size it must be handled with respect. If handled wrong you might get injured. The engine contains parts rotating with speeds in excess of 240.000rpm, that equals a tip velocity of more than 900mph, parts of the engine can reach up to 600C/1100F , be careful! Make sure to read and understand the user's guide before attempting a start of your engine. Always use ear protection and have a CO2 fire extinguisher ready.

Technical spec and useful parts:

Fuel	JET-A1 (Hobby shop)
Oil/lube	Aeroshell 500 (Hobby shop)
On board fuel filter	Fine braided fuel filter for RC use (Hobby shop)
External fuel filter	Paper filter on the refueling line (Hardware store)
Gas for ignition	High quality propane (Hardware store)
Battery ECU	2S li-po min 350mAh 20C (50mAh per flight or so)
Idle rpm	~95.000rpm (individual for every engine)
Maximum rpm	~245.000rpm (individual for every engine)

Checklist before first startup:

- Make sure batteries are charged and in good condition.
- You have to use a separate battery for the ECU, not the same as for the Rx!
- Use only JET A-1 fuel with 5% turbine oil mixture.
- Make sure to use a high quality fuel filter between pump and the engine (see schematic below)
- Make sure to filter the fuel when fueling up the main tank, using a fuel filter from a lawn mower or chainsaw is good.
- Fuel tank must be resistant to Jet fuel. Silicone tubing and tanks meant for methanol engines will not work! We recommend using a PET-bottle with a large felt clunk and tygon tubing.
- The gas used for ignition must be high quality propane. Make sure the propane canister has at least 1/3 left when making a start attempt.
- Make sure nothing can get sucked in the engines air intake. We recommend no loose objects within 1meter (3ft) of the intake. Also make sure you have at least 20meters (60ft) of clearance behind the engine. A FOD guard is strongly recommended.



Data terminal:
Some come with a case some without, this is the key layout. Menu down/up to scroll through menus and Data down/Data up as ESC/Enter. Only thing needed to be changed is the Learn radio wizard found by going through the menus and entering it via Enter button.

ECU Setup:

The ECU is programmed from factory all you need to do is go through the “learn radio” wizard in the ECU. This is to learn the end points of your transmitter. It is common to use the throttle trim to activate and shut off the engine. As in trim up then making the start sequence, after the flight trim down to shut off the engine. You can also use a switch or slider, but the trim is easier to use while learning. Example: - 100% engine off, -80% engine ready to start +100% full throttle. How you solve this is up to you then the learn radio wizard remembers your exact values.

Starting the engine:

Turn on the Transmitter and make sure both throttle and trim is at min.

Connect battery to the ECU and switch on the receiver.

Put throttle trim at high, the display will show “ready”

Connect the gas line to the inlet marked “gas”, this is done via an extension so that you don’t have to fiddle next to the engine’s air inlet while it’s running.

Now move the throttle stick to 100% and back down to idle, this initiates the start sequence.

Optional priming the fuel lines: Before the first start you need to prime the fuel lines. This is done by moving the throttle stick to full power and wait a couple of seconds. Now the pump will run at 50% power and fuel will fill up in the filter/tubes. When the fuel is close to the engine stop the priming by lowering the throttle stick to idle. (This will also initiate the start sequence)

Air started engines: After initiating the start sequence open the gas canister and give the engine a brief spin with the starter fan. When the engine spins down you will hear the gas ignite. Now blow with the fan again and you will hear the blow torch sound increase as the gas burns and as the fuel ignites. At about 5000rpm shut the gas canister and keep blowing with the starter fan. At 7000rpm slowly remove the starter fan and watch the RPM increase to idle. When reached idle the display will show “running”.

Engines with auto start: After initiating the start sequence wait for the starter motor to give the engine a spin, now open the gas canister. You will hear the gas ignite and the starter will initiate and spin the engine to higher RPM. At 5000rpm shut the gas canister and watch the RPM increase to idle. When reached idle the display will show “running”.

Aborted start: If the start is aborted you need to manually cool the engine. First lower the trim then move the throttle stick to full power, this will initiate the starter motor and air will flow through the engine. 2sec starter then let the engine spin down, re do the sequence by moving the throttle stick until the display shows less then 100degrees Celsius.

With air started engine use the blower to cool below 100C.

When cooling is done reboot the ECU/Rx and make another try.

Shut down procedure:

To shut of the engine move the trim down. Auto start engines will make the cooling sequence them selves while air started engines need to be cooled by the blower until under 100C.

Henke's take:

Even if the engine is full auto start with all bells and whistles you still need to understand what you are doing and why. There are quite a bit of stress involved the first times. Take it slow and be careful, and all will be fine. Use only high quality hoses, connectors and keep all extra gizmos to a minimum. It's quite common to add extra manual valves, fancy see through filters etc, but all of this adds potential sources of leaks. Keep it simple and it will work. In absolutely most cases it's not the engines fault if something seems to not work.

Keep it clean! These small engines are more sensitive than the big ones, if having a fuel station, update it with new filters prior to running the Kolibri. Also make sure to use a good fuel filter in the airplane setup. Usually helicopter filters are good. Use a FOD guard, I always shop mine from Dirk <http://www.hobbyfraeser.de/>

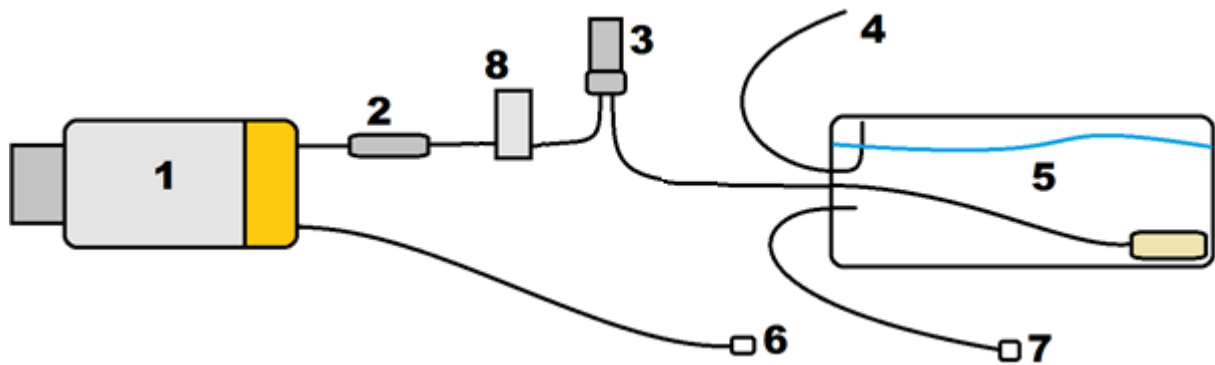
Use google and youtube. There are A LOT of videos showing the start and handling of the engines. Make sure to understand what is happening and why before trying. Run the engine in a test stand the first times to get the hang of it. Always keep the fire extinguisher within close reach!

The engine will run on many Kerosene based fuels and turbine oil such as Jet A1, Diesel, Kerosene etc. Oil can be DTE light, Kingtech, Jetcat etc. Some fuel already have oil in them and some don't. Base line is Jet A1 + 5% Aeroshell 500, start there.

One example, <https://www.youtube.com/watch?v=l4W5PplkGt0>

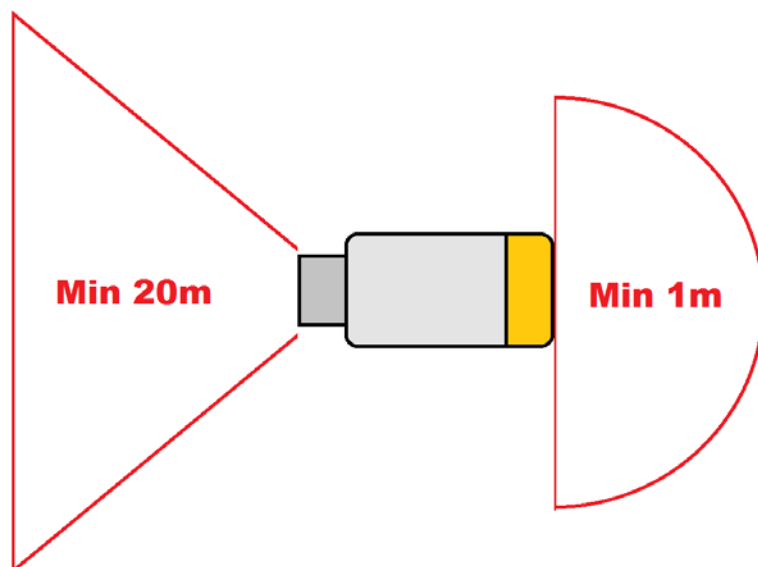
Fuel system schematics:

Please note that it's very important to feed the engine with clean fuel. This is important with all model turbine engines, but is even more important with these small engines containing super tiny fuel injectors.



1. Turbine engine
2. High quality fuel filter
3. Fuel pump
4. Air breather
5. Tank with large felt clunk
6. Ignition gas inlet. Gas valve goes here too.
7. Refueling tube
8. Solenoid fuel valve, controlled by ECU

Proposed safety clearance when starting the engine:



For further questions **contact your local dealer.**

Users guide created by Henrik Torphammar 2018-02-15