

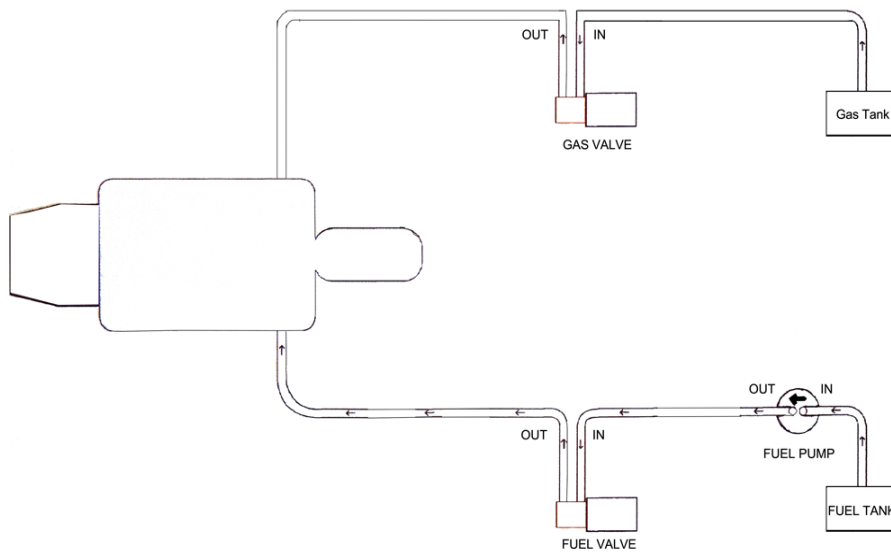
Jet Joe setup and installation:

Auto Start versions:

JJ 1400



GAS SYSTEM INSTALLATION



FUEL SYSTEM INSTALLATION

Preface

This manual is designed to assist a setup an operation of the JJ series of Auto Start turbines. This manual will not cover all instances and applications but provide a general overview to assist the conventional setup and operation of the JJ Turbine. Please read and heed all safety notes contained. Safety is paramount!

Congratulations!

On the purchase of your new Jet Joe turbine engine. Jet Joe is dedicated to the design and production of engines to the highest standards of quality and reliability to bring you the customer the very latest next generation engine designs. The Jet Joe 1400 is the result of an intensive effort. Through a process of technology and evolution to bring you an outstanding model jet engine for the money. Jet Joe produces technically proven turbine design concepts to bring you the best possible product.

PLEASE READ!

Jet Joe responsibility is limited exclusively to the repair of the engine and accessories which are outlined in the conditions of warranty. Before unpacking your engine please read the manual and agree to the conditions of warranty. Customer satisfaction is important to Jet Joe. Technical support is available and will respond to your needs as fast as possible. To find the most appropriate

turbine services in your area see:

www.jetjoe.com

Disclaimer

Jet Joe turbine engine is a sophisticated piece of machinery. Care should be taken at all times when using the engine. It should only be operated by those with the appropriate skills and knowledge to do so. This engine is not a toy. Incorrect operation or misuse can cause damage to property and bodily harm operators, and spectators. Jet Joe accepts no liability for any kind of damage which may occur. Jet Joe assumes no responsibility for any errors contained in this document and is not liable for any damages resulting from such errors.

Warranty

This warranty is good for 6 months regardless of how many starts or cycles **(Not including DIY products)**. In some instances this warranty maybe transferable upon resale according to the discretion of Jet Joe China. Warranty includes parts and labor and is limited to manufacturing and material defects only nor does it cover engine bearings.

The turbine serial number will need to be provided upon report of any warranty service. The serial number is used to track ownership and history.

Please do not disassemble this engine. You will breach your warranty agreement. Damage or defective operation covered under the warranty terms will be repaired and tested at no cost to the original owner (other than postage and packaging). All other repairs can be made by a Jet Joe servicing center.

Before returning the engine or equipment for service or repair please coordinate with servicing center to discuss terms and costs associated.

The only authorized disassembly of this engine is the front cover to replace spark, gas, lubrication, fuel, or to service/replace Hall Effect sensor.

This warranty is void if any one or more of the following conditions applies. In such a case Jet Joe will accept no responsibility for personal damages, loss or any other consequences caused by Jet Joe turbine operation.

1. The engine cover is dismantled except for the removal of the front (blue) cover to access service connections and the speed sensor.
2. If the product has been used with the incorrect fuel, oil, or incorrect ratios.
Miss routed or crimped plumbing and or lubrication lines
3. Not operating the turbine correctly
4. Damage to the engine where blockages in the fuel system have occurred by

unfiltered or contaminated fuel.

5. Foreign Object Damage

6. The turbine is damaged in a crash

7. The product has been misused, neglected or inadequately maintained.

8. Maintenance or modifications that are not authorized that have been made to any part of the product

9. Use only aircraft grade turbine oil. If any other oil has been used other than aircraft grade turbine oil. 2-Stroke oil is no longer accepted as an approved lubricating oil. Tell-tell signs are left in the engine when this type of oil is used and this oil can cause damage the bearings.

Jets Joe Service

To find the most appropriate Jet Joe service center see:

www.jetjoe.com

Safety Notes

Take note that this engine is not a toy. This is a no kidding turbojet engine. This

engine should be handled with the utmost respect and care. Contained inside this engine during operation is a lot of energy both in heat and mechanical form that is capable of extreme personal and property injury and damage. Do not operate this engine under the influence of alcohol!

The following guidelines should be read carefully and adhered to.

1. Use proper personal protective equipment to include ear and eye protection!
2. Always keep a CO₂ or similar fire extinguisher close when starting and operating the engine
3. Keep unauthorized persons, spectators, children and animals well away from the starting area radius of at least 25 feet away.
4. Never use the engine near to sources of flammable gases, liquids or materials.
5. Do not touch the engine while it is running. Turbines rotate at a very high rpm and the engine casing and exhaust can reach very high temperatures. Ensure anything affected by heat is kept well clear of the engine and exhaust during operation.
6. Always operate your engine in open air away from confined spaces as the engine exhaust contains gases which can cause asphyxiation.

7. Keep loose clothing, loose material and fingers away from the intake of the turbine and away from the rear of the turbine.

8. Ensure proper use and disposal of fuels for they are hazardous to the environment and they are flammable. Use proper and correctly marked containers for all flammable substance used for the turbines operation. It is a good idea to use fuel proof gloves when handling fuels.

Jet Joe Turbine Engine Specifications

JJ 1400

Outer Diameter 90mm; Length: 230 mm

Weight: 970 grams

Approx thrust: 14 lbs at 160,000 RPM

Idle RPM: 42,000

EGT @ max rpm: Approx 680DegC

Consumption: @ max RPM about 6-7 oz per min

Fuel/ oil: Kerosene and aircraft turbine oil

JJ 1800

Outer Diameter 110mm; Length: 300mm

Weight: 1560 grams

Nominal thrust: 20 lbs at 115,000 RPM

Idle RPM: 32,000

EGT @ max rpm: Approx 680DegC

Consumption: @ max RPM about 9 oz per min

Fuel/ oil: Kerosene and aircraft turbine oil

JJ 3000

Outer Diameter 110mm; Length: 300mm

Weight: 1670 grams

Nominal thrust: 30 lbs at 115,000 RPM

Idle RPM: 32,000

EGT @ max rpm: Approx 730DegC

Consumption: @ max RPM about 13 oz per min

Fuel/ oil: Kerosene and aircraft turbine oil

Note: Fuel consumption rates, thrust and exhaust gas temperatures for all turbine engines will vary depending on environmental factors such as elevation above sea level, air pressure and ambient temperature. Expect 1.2% loss in thrust for every 100 meters (385 feet) example: 3850 feet = 12% thrust loss at a constant temperature above sea level. In addition to elevation, temperature is a factor. Fact: .3% thrust is lost for every additional degree Celsius. The higher above sea level and hotter the ambient temperature the less thrust that will be produced at a given RPM.

Engine Description

Jet Joe turbines like most all model aircraft turbines are single stage, centrifugal flow gas turbine engines. Jet Joe turbines may come in two different configurations: Full-Auto and Semi Auto. Full-Auto configuration is where you would raise and lower the throttle stick and the turbine automatically starts and is managed by the FADEC/ECU by itself throughout the entire start, engine run, all the way through its cool down cycle.

A Semi-Auto configuration is a typically simpler installation and will weigh about 12-14 ounces lighter and will take up less room inside the aircraft. However, the user must turn on/off the start gas, spool the turbine and ignite the start gas then continue to assist the turbine with either a wand starter or blower until idle RPM is reached. This sounds complicated but it really isn't, great reliability and satisfaction can be found using this old school method. Additionally the weight savings is substantial. Instructions for this method are included as a supplement to this manual.

In either start method this engine uses a system of gas preheating (propane/butane) ignited by a glow plug located at the top of the turbine. After the initial start gas pre-heating the liquid fuel is gradually introduced under control of the ecu. The fuel should contain a small percentage (4-5%) of turbine oil and uses part of this fuel to lubricate its ceramic high speed bearings.

The fuel for the engine is provided from a fuel tank through a small fuel pump.

The engine speed between idle and maximum are controlled by varying the speed and pressure of the fuel pump through an electronic controller called an FADEC (Fully Automatic Digital Engine Control) also referred to as an ECU (electronic control unit).

Installation Notes

1. Use the supplied turbine mounting strap.
2. The temperature probe should be firmly fixed to the engine. The tip of the temperature probe should enter the exhaust cone by about 1 or 2 mm for correct operation.
3. The speed sensor is mounted in rubber grommets under the front cover of the engine. The signal cable from this must be carefully routed away from the engine intake so there is no possibility of accidental ingestion of the wire. Additionally route the RPM sensor wires away from the glow plug wires. The signal transmitted by the glow plug wires may be picked up by the RPM sensor lead during start up can give an erroneous RPM signal to the FADEC and show up on the display screen. You will notice the RPM spikes that can be seen on the digital display during glow plug ignition when there are relatively slow RPMs of the turbine. To prevent glow plug signal generation from being picked up on hall effect RPM sensor **ensure the red and black glow plug wires are twisted**

together (like rope) over their entire length from ecu to glow plug. This will prevent the glow plug signal from being picked up on the hall effect sensor.

Another precaution to protect the FADEC from damage is to make sure not to push down too hard on the glow plug driver rubber boot. Pushing too hard can cause the red and the black wire to short across the base of the glow plug. A short across the base of the glow plug short will damage the FADEC.

4. Fuel lines coming out of the turbine are identified by Fuel (clear) and start gas (orange) pipes should be routed similarly clear of the intake. Be careful not to get any plumbing or wiring into the turbine intake. The engine must not be run with the start gas pipe open to the atmosphere (your gas fitting may melt). In Full-Auto the solenoid will plug the vent. In Semi-Auto mode the use of a plug, or a . turn petcock valve, or spring loaded one-way check ball valve will suffice for this purpose.

5. The fuel pump should be mounted at least 3-4 inches away from the front of the engine and the 3-4 inches away from FADEC/ECU. It is best to mount the pump vertically with the motor up/pump down incase fuel seeps it will not seep into the electric motor and become a fire hazard. The Flight Works pumps are electrically suppressed to prevent any EMF signals from interfering with the radio system.

6. The centre of the fuel tank should be centered over the CG (Center of Gravity)

to avoid balance shift due to fuel consumption during flight.

7. Air ducting with a model does not have to be particularly clean but ensure that there is the same cross section of the intake of the turbine through out the entire aircraft. This cross section should begin at the aircraft's air intake all the way through to the turbine intake.

8. Avoid any loose items inside the aircraft that can come loose and FOD (Foreign Object Damage) your turbine engine or better yet use a FOD guard on your turbine.

It is highly suggested that you learn how to set up and run your turbine on a test stand prior the installation in/on an aircraft. If there is any reason to extend the RPM sensor or temperature probe use a high quality servo lead extension for this purpose.

Elements of the FADEC/ECU

The FADEC/ECU supplied with the engine is setup for the Jet Joe engine supplied. The FADEC/ECU and must not be changed with any other turbine, as this may result in improper control of the engine. Your engine has been set up and run with this ECU at the factory and the settings should be left as default. FADEC or Electronic Control Unit The ECU plugs into your receiver throttle

channel and is powered from the receiver battery. Once again this unit is preset for your turbine.

Speed Sensor

The speed sensor used by the FADEC/ECU to read the engine RPM is mounted in the front of the engine, this is underneath the blue cover. This sensor is a Hall Effect sensor that receives the magnetic impulses from a small magnet within the aluminum compressor nut.

Temperature Probe (thermocouple)

The probe should extend into exhaust jet nozzle and 3 or 5 mm or 1/6" of an inch. Avoid sharp bends if additional adjustments are required for installation onto engine. When connecting the temperature probe plug, be sure to get the plug in the correct orientation.

ECU Data Terminal

The data terminal plugs into the ECU via the lead supplied. The display should be used only for starting and test running. Do not fly the plane with the display connected as there is a potential for interference. Avoid leaving this unit out in the hot sun as it may damage the LCD display.

Optional onboard start fuel tank

If the white onboard start fuel tank is used fill the white bottle to 20-40% full of start gas in liquid form. To do this turn the start fuel bottle upside down allowing

the liquid form to come out of the camping bottle to flow into the white start fuel tank. This will provide many starts.

There will be more on this subject later in the manual.

Gas system

The Jet Joe starting gas system can use any suitable size of easily available gas canister, available from most camping/outdoor stores. A suitable on/off tap should be secured to the canister, is then fed to the inlet side of the gas valve via a suitable length of the supplied orange 4mm plastic tubing.

Fuel solenoid valve

The fuel valve can be connected to the respective ecu socket in any orientation, polarity will always be correct. Fuel feed line (clear 4mm tubing) from the pump outlet should be connected to inside inlet nipple nearest the electromagnetic coil of solenoid. (A solenoid diagram is in the back of this manual) Use the orange tubing for the start gas plumbing inside the aircraft. You may use a short section of clear tubing on the start bottle so that a visual can be made on the liquid butane/propane mix can be see flowing during start bottle refill.

Fuel filter

Place the fuel filter inline last just before fuel enters turbine. In case any material comes from the fuel pump during operation.

Optional onboard start tank

If the white onboard start fuel tank is used fill the white bottle to 20-40% full of start gas in liquid form. To do this turn the start fuel bottle upside down allowing the liquid form to come out of the camping bottle to flow into the white start fuel tank. This will provide many starts. Be sure to shut the gas off when done flying. There will be more on this subject later in the manual.

FADEC/ECU

The Auto start ECU/FADEC is made by Regal Electronics. It is a reliable unit and is supplied programmed for your Jet Joe. The engine has already been set up and tested using the FADEC/ECU so there is very little to adjust in order to get the engine running.

Confirm you have connected the ECU input to the throttle channel of your receiver and the Data Terminal is plugged into the ECU. Ensure no rates or curves are used with your transmitters throttle channel.

If you are using digital trims ensure you program an alternate transmitter switch to an immediate throttle cut for sake of safety.

Connecting glow plug and starter

Connect the green 6 pin connector from the ECU to the one on the engine.

Depending on the type of glow plug used, it could be necessary to modify the power that the ECU provides to the plug through the appropriate menu in the data terminal. The ECU has been factory set and tested for the glow plug supplied with your engine. **Do not to push down too hard on the glow plug driver rubber boot.**

Aligning transmitter with ecu

This must be accomplished for proper turbine control!

Make sure that your pump battery is disconnected prior to this procedure.

Below in bold are what you will see while aligning the transmitter to the FADEC/ECU. Turn on the transmitter and receiver. The opening screen should show as below: (If the temp” probe is not connected it will show as 0’C). “T” = ambient temp’.

Trim Low T=030 °C

RPM 00000 PW 000

The buttons are down, up, plus and minus.

Use the arrow up button and scroll through the menus until you find the one showing:

Transmitter yes adjust

It is imperative that each change be stored by pressing (+) button on the data display which will advance the next screen. Follow the directions again storing

the data with the (+) button and so on until complete.

Press the right hand button (+) and the screen will change to:

Stick Up Trim

Up (Full power)

On your transmitter, raise the throttle stick and trim to full. Ensure stick is firmly against the stop.

Now holding the stick against the stop, press the right button (+) to set the value into the ECU.

The screen will now change to:

Stick Down

Trim Down (Stop)

Move the trim and throttle stick back to zero and again press the right hand button (+).

The display will now change to:

Stick Down

Trim Up (Idle)

Leaving the throttle stick in the minimum position, raise the throttle trim to the full up position, and again press the (+) button.

FADEC/ECU setup is now complete.

This setup can be validated in screen 2. With the stick lowered and trim raised a value of 10-30% should be displayed in screen 2 on your LCD. With stick/trim full up 100% should be displayed. These settings should remain the same unless the receiver is changed out or settings in the transmitter regarding the throttle function are changed.

There are times when using a Futaba transmitter the servo reversing of the throttle maybe required.

Preparing the engine for operation

Select a clear area for running – keep clear of areas with loose debris that could be picked up or drawn towards the intake.

Confirm your test stand is securely fixed to a bench or heavy table. Keep your hearing protection within easy reach and a fire extinguisher available.

Ensure the fuel tank is position well clear of the exhaust area and secured. The same applies to the starting gas canister.

First engine runs.

Fill the start gas tank or use separated start gas fuel source and fuel tanks with filtered clean fuel.

Important! Confirm all batteries are freshly charged and connected up. Fresh batteries are imperative to the correct operation of the electronic components.

Check that there is a temperature reading on the data terminal. It should read ambient air temperature.

Ensure the running area is clear of onlookers – especially the zone of about 25' feet radius around the engine.

Verify that the fuel tubes are full of fuel and purged of all air, if not; carry out the fuel prime sequence as described below.

Priming the fuel system:

Purging the fuel line of air prior to turbine operation will make the turbine start easily. Take extra care when priming fuel line, ensure fuel line is primed only up to engine; too much fuel inside engine will cause excessive flaming during start sequence or worse the turbine may overheat shutting itself down trying to start.

Priming is achieved by raising the throttle stick to full throttle and pressing the menu up button (.) on the LCD display. The fuel pump will come on at about 25% power. Please observe the fuel line to engine very carefully and pull throttle back as soon as fuel reaches near the engine. Pulling the throttle back will stop the prime sequence.

The second the fuel reaches the vicinity of the engine pull the throttle stick down and the turbine will go into start sequence. If you are not ready for the turbine to go into start sequence just pull the throttle stick down partially. This process can be repeated if required by moving the throttle stick to the top again. Repeat this as needed by resetting the receiver.

IMPORTANT: The prime procedure should be done only to fill the fuel tubes and filters in the case of a first installation or in case of disassembly of the tubes. Also, prime if the aircraft has been stored and the fuel lines purged. Do not flood the turbine with fuel during priming this will cause excessive flames on start up and a hot start that may damage the turbine or worse dumping raw fuel into the fuselage of your aircraft. If you think you have a wet start condition it may be indicated by repeated hot starts it will be noticeable on the temperature display $>900^{\circ}\text{C}$ “overheat” during start up and the start will be exceptionally fiery. If this occurs, pack paper towels into the front of the turbine and raise the tail of the aircraft vertically so that the excess fuel goes into the paper towels. You may have to remove the starter and dry the starter if it gets wet with fuel. Be careful not to get fuel all over the inside of the aircraft as this will be a fire hazard and is likely to start fire when the engine is started. Lower the “start ramp” value one or two points then try to restart turbine to burn out excess fuel with adding more. The turbine may not arrive at idle until “start ramp” is adjusted back to +1 or +2. If turbine consistently wont reach idle, or is taking too long and is not overheating raise the “start ramp” value up one or 2 points.

Starting the Turbine

Set the throttle stick down and the trim up. “Idle” - Confirm that the green LED in the ecu is illuminated and the screen will show "Ready".

Ensure that the trim is moved well into the “Ready” zone. If the trim is set on the edge of “**Ready**” the ecu will teeter back and between “Stop” and “Ready” interfering with proper operation of the turbine.

Move the stick to 100% and then back to idle again. Then the FADEC/ECU will automatically check the glow plug circuit and if the plug is good and connected it will energize the plug, and say “**glow test**” wait 1 second then apply power to the starter and open the gas solenoid. In the screen of the Ecu it will show the word "**Ignition**"

The gas will ignite. You will hear a "**POP**" confirming this, the temperature indicated will rise.

When the FADEC/ECU detects an increase in temperature of 50 °C from the temperature read at the moment the start is initiated or when temp goes above 100 °C, the screen will change to "**preheating**". The fuel pump will begin to operate and power to the glow plug power will be turned off.

Next the screen will change to "**Fuel ramp**". In this phase the FADEC/ECU will be gradually increasing the starter power and the pump will begin to pump kerosene. When the preset RPM is reached the FADEC/ECU will automatically disconnect power to both the starter and gas solenoid valve.

When the rotor speed reaches idle, the screen will change to "**running**" and the engine speed will stabilize.

The Turbine is Running!

Control of engine power/rpm is now handed back to the transmitter and controlled by the position of the throttle stick. Raise the throttle to full power very slowly making the throttle stroke from idle to full power take at least 10 seconds. Let the turbine stabilize at full power. Pull the throttle back down to idle taking 10 seconds. Perform this procedure twice. This procedure will calibrate the FADEC/ECU for the current conditions. After that you should be able to move the throttle stick as fast as desired and the FADEC/ECU will manage the turbine as required and as fast as possible for the turbine. This setting will be stored in the FADEC/ECU after the correct shut down procedures are followed.

Engine shut down procedure

To shut down the engine lower the trim and the stick. It is recommendable that before shutting down raise the throttle stick to approximately 50%, allowing temperatures to stabilize for about 6 seconds, this can be witnessed on the FADEC/ECU display temperature display. Pull the trim down all the way then bring the throttle stick down and the engine will shut down and proceed into its cooling cycle. The starter motor will come on periodically. The cooling cycle

will continue until the engine temperature is below 100 °C. After that it is permissible to shut the aircraft power off.

What to do in case of an emergency

If there is a problem lower trim immediately. If the starter motor is free raise the throttle stick to full throttle and this will spin the starter motor to cool the turbine. If the turbine is unable to spin it is a good idea to use an external air source such as a battery operated leaf blower or even compressed air. If the fire remains inside the turbine use a fire extinguisher on the intake side of the engine (preferable a CO₂ type extinguisher. If a regular dry powder type extinguisher is used the turbine will have to be sent for service and cleaning. If your turbine is mounted internally go with the CO₂ extinguisher immediately. Note: the purpose of the cooling cycle is to prevent the heat from the turbine conducting down into the bearings and coking the fuel/oil into the ceramic bearings thus shortening the life of the bearings.

It is important that when you are finished flying that you are sure to turn off your aircraft receiver power shut the start gas valve off and unplug the pump battery. There are cases that the plane was left on another turbine operator on the same frequency has started their own plane and inadvertently starting the stored aircraft's turbine in the process. Thus, burning down the trailer of the stored aircraft.

Note

There is a comprehensive list of FADEC/ECU codes provided in a separate pamphlet. There is also a very good troubleshooting chart contained within the FADEC/ECU manual.

Additionally, if the turbine is mishandled and the starter gets misaligned the FADEC/ECU can be easily damaged. Always listen for a smooth starter engagement and disengagement during start sequence. Do not try to start a turbine with a misaligned starter. With that being said “do not pick up turbine by the starter as this can cause misalignment.”

Fuel System

Always use appropriate containers to store fuel.

It is a good idea to use some type of air trap or as a minimum a header tank that the main tank cascades into. Be sure to use a felt wrapped clunk as this prevents bubbles from entering the fuel system. If bubbles are introduced into the fuel system during operation they may cause a flame-out condition. At the same time it is important to have a relatively clean fuel plumbing system a strained fuel pump make for unstable turbine control.

Use the provided mounting flange to mount the fuel pump. The best orientation for the fuel pump is vertical. It is important to ensure any fuel seepage does not reach the motor brushes.

The fuel feed from the pump to the engine should have sufficient length of the clear tubing fitted to allow placement of the electronic fuel shut-off valve and the valve should always go on the pressure side.

Be sure to make square cuts when cutting the fuel in as it will be easier to release the push-fit connections.

To release a push-fit connector; push in on the tubing and blue flange then while continuing to keep the blue flange depressed pull the tubing out of the push-fit connector. This process may take practice.

Fuel and Oil

1. Use clean filtered fuel that is available from farm stores, hardware stores, etc. Jet A-1 and turbine oil can be found at airports. Beware when purchasing in small quantities of fuel from bulk type storage. Kerosene purchased in 5 gallon containers from the hardware store can be more expensive but very clean.

2. Ensure the fuel is clean and filtered at each stage of mixing and transfer to the model fuel tank.

Not using clean good quality fuel will result in blocked fuel needles (fuel needles are hypodermic needles that inject fuel into the turbine combustion chamber). Even if one or two needles get clogged the turbine may fail to operate properly.

4. Use quality aircraft grade turbine oil. Jet Joe is no longer condoning the use of two-stroke lubricant of any kind.

5. A fuel ratio of 4-5% is safe. Use one quart of oil per 5 gallons of kerosene/Jet fuel.

Fuel Lines

For the fuel lines use polyurethane or nylon fuel line. Do not use silicon anywhere in the fuel system because it is quickly broken down by the kerosene / Jet A-1. Tygon tubing for gasoline engines is acceptable but only to be used before the fuel pump. If you think you have suitable tubing soak it in kerosene for a couple of days and then check its properties for swelling, etc.

Start Gas

A start gas is required to preheat the combustion chamber during start up. There are various mixes of propane/butane mixes available and will work fine. Most common and the cheapest is propane from the camping/soldering bottles. However, straight propane will need to be regulated to prevent jamming of the solenoids especially in warmer weather when gas pressure is higher. A regulator needs to reduce gas pressure below 25 psi to avoid jamming the solenoid. Should jamming occur unhook the gas bottle to relieve the pressure in the line and the solenoid should become free again. Fresh batteries will help keep solenoids operating properly. The butane/propane mix is needed to get the gas into the small white start bottle in a liquid form. Coleman power max will put out liquid form in the up right position. The valve provided are for Coleman 70/30 mix, Self Sealing 250 short lightweight cans with rounded tops available in camping stores. The can will need to be inverted to let the liquid form out to fill the small white start bottle to be used as inboard start (optional). It helps the transfer of liquid butane/propane if the receiving bottle is chilled in an ice bath during this process. Otherwise use the Coleman can in the upright position, outside the aircraft during startup. The white bottle should be mounted up right in the aircraft. Liquid form of start fuel is not desired during startup. The upright position lets the start gas evaporate into gas form for turbine startup.



Maintenance

1. Your turbine will be due in for bearing change between the 25-30 hour mark. This is user responsibility to ensure that his/her turbine is sent off for servicing. In the event of catastrophic bearing failure your aircraft maybe damaged and certainly your turbine could receive severe mechanical damage.
2. Keep a close eye on all wiring, look for chaffing and fraying correct as necessary.
3. Always check for fuel leaks, because there is potential for a fire hazard.
4. Ensure the temperature probe it correctly sticking into the exhaust tailpipe.
5. Inspect entire aircraft for loose bolts/nuts and especially the turbine mounting.
6. Use clean filtered fuel

Glow Plugs

Glow plugs from time to time will wear out. When a plug is replaced be sure to tease out about 2 or 3 coils to expose the element to the start gas. A recommended glow plug is the cool type and a good one is the McCoy MC-9 or O.S. #8. Depending on the glow plug a different glow plug power setting may be needed depending on the type and brand used. To be safe, when plugs are changed out lower the plug power about 10 points and then raise the power 5 points during a trial and error process to get back the correct plug power to provide consistent reliable starts. **Be gentle when tightening the glow plug. It is very easy to break the glow plug embossment inside the engine. Just snug the plug down.**

Pump Battery

With your FADEC/ECU you will generally be provided with a 7.4v sub 1800 mah sub C NiCad rechargeable battery. It is important to use a quality peak detection charger to ensure the battery can provide correct power to run your turbine. Approximately 300-500 mah will be consumed during each 10 minute run time. After two flights or so it is a good idea to recharge your battery.

For Semi-Auto FADEC/ECU configurations only a 4 Sub 4.8v Sub C battery

may be required to run the fuel pump. The amount of cells needed depends on the fuel pump efficiency and plumbing.

It may be possible to use a 2 cell 7.4v Li Po battery. As of current time we have not tested this method. Other manufactures have done this and this seems to be a viable method. However, there is no voltage cutoff with the current FADEC/ECU as there should not be. It is better to ruin a \$50 Li Po battery than crash a model jet.

Jet Joe would like say “Thank you!” for using their product.

Mnemonic Codes During Normal Operation

TrimLow: Indicates that the signal received from the transmitter corresponds to the lowered trim, that is to say, engine OFF.

Ready: Indicates that the engine is ready for starting, and that the transmitter signal corresponds to IDLE, (green LED lit)

Stick Lo!: This indicates that the throttle stick is in a position above IDLE, the engine will not start with the stick in this position.

Glow Test: Looking for circuit continuity

Start On: Starter lightly spins the turbine

Ignition: Glow plug is attempting to light the start gas

Preheat: Pre heat of the combustion chamber

Fuel Ramp: Stepping the turbine RPM incrementally.

Running: Engine working correctly you have full control of engine power.

Stop: Engine off.

Cooling: Starter operating to cool the engine and will continue until temperature is less than 100 °C

Diagrams

- The fuel pump diagram indicates direction flow of fuel as viewed from the front. The direction of flow also applies to the 400 series of Flight Works pumps.
- Notice the solenoid has ports that are offset from one another. The input is closer to the coil than the out-put. There is no difference between the fuel valve

or the gas valve.

