Instructions For Using Of Swiwin Turbines Engine

Limited Warranty
The turbines engine’s service life has a direct relationship between operating environment and operating practices. The turbines engine uses the most compact structure to achieve the most extreme working condition. Every component is designed and produced best. The working conditions are extremely strict. Please don’t dismantle the air inlet and the spindle structure by yourself, because if you dismantle the turbines engine, it must be reinstall critically according to the standard to get the original performance. Assembling the engine optionally will let the turbine itself lose balance. And operating the engine under the high speed will cause the serious consequences. The new buyers have a year or 50 hours natural damage warranty. If you have any question or problem of operation, please contact with the sales department.
Chapter One   Safety Instructions

Thank you for you purchasing Swiwin turbines engine of special miniature model aircraft!
Swiwin engine is the technology product which is excellent created by several years researching
and developing, using the latest processing technology and through the special alloy.
Our company provides comprehensive service and technical support/Users can communicate
through the sales page—www.ds-jets.com or QQ group—263100191. If you have any
question about the service products, please come into contact with the marketing
e-mail: 1034337024@qq.com.
Swiwin turbines engine can only use to the model aircraft. The turbines engine’s operating
status is the highly extreme mechanical work substantially. Because it has a certain risk, the
operator must be familiar with the operation points and understand the risks before using it.
Careless operating will be easy to cause damage to the turbines engine itself and the person
who is using it. Please read the operating instructions which are on the manual carefully, and
comply with the operating rules strictly. If you are the first time to operate the turbines
engine, please learn the operations under the guidance of someone who has experience.
Before the first time starting the turbines engine, please read this manual carefully.

1. Safe Distance.
Turbines engine operates at high rotational speed. When the engine is running, be sure to keep
the safe distance. You have to keep three meters from the front of the turbines engine, five
meters from left and right side, ten meters from rear.

2. Prepare A Fire Extinguisher And Earmuffs.
Ready to fire extinguishers. CO2 carbon dioxide fire extinguisher must be used. Using
earmuffs to cut off the huge sound pressure prevents hearing loss. Do not use dry powder
fire extinguishers! If the powder is injected into the engine, it will cause bearing abrading
seriously.
3. Use The Special Lubricating Oil.
You must blend 5% special lubricating oil in used kerosene or diesel. *Mobil Jet Oil 2* is recommended to use. To ensure that you buy the genuine lubricating oil, please contact with our sales staff.

4. Other Safety Matters.
When turbines engine running, the inlet suction like a vacuum. Do not let the hands near the engine’s inlet. Maintain clearance around the inlet, wires properly fixed, and install protective nets. Turbines engine inhales foreign body will cause the serious damage. A lot of high temperature steam will be produced when turbines engine is working. The exit gas temperatures will be up to 650 degrees Celsius. Please attention the surrounding temperature’s insulation and anti-temperature facilities. Do not start it indoors! Because of consuming large amounts of oxygen, turbines engine’s working indoors will cause people suffocation. Exit heat and powerful airflow will ignite dry inflammable and blown debris. Because turbines aircraft flies at a high speed, you must pay attention to the safety of the airspace and the ground.
Warning:

To compare the speed of turbines aircraft with the same thrust ducted aircraft, turbines aircraft flies much faster. Because turbines’ jet speed considerably exceeded ducts, turbines aircraft’s speed can easily reach 300km/hr. Care must be taken when you installing the reliability of the aircraft’s rudder. Do not accelerate when the aircraft is diving! This will cause the disintegration of the aircraft. It must be in broad airspace and the situation of good view that can let the aircraft fly. Aircraft should install the deceleration braking equipment. American Association for HM AMA top speed is limited to 320km/hr.

Chapter Two Installation And Startup

1. Before you starting, you have to check:
   Charge receiver battery.
   Check surroundings.
   Prepare the fire fighting equipment.
   Check the pipeline and the oil filter. Keep the internal tubing clean. No folding press.
   Check the fuel tank.
   When refuelling the fuel tank, due to the high viscosity of kerosene and diesel, you should refuel slowly to prevent the fuel tank tumbled for excessive pressure refueling.
   Fix the turbines’ oil pump. When oil pump is working, it will produce torque jitter and cause tubing folding.
   Observed the turbines’ solenoid valve is closed or not when you fuelling the turbines engine. Sometimes due to the impurities stuck the solenoid valve, it will cause the solenoid valve not tight, making the fuel entering the engine.
   Turn on the receiver power, connect the power supply.
   When you operating the turbines engine, keep the air inlets aligned the windward direction.
Check the brake.
Finally, we can start the turbines engine.

2. The Operation About Shutting The Turbines Engine
   Keep turbines engine’s air inlets aligned the windward direction.
   When turbines engine cooled completely, shut down the receiver power.
   If the engine didn’t enter the program of automatic cooling when it stalled, you should make it cool by yourself immediately.
   When you collect your aircraft, please pump the fuel out of the tank to prevent the accident.

3. The System Of Fuel
   Turbines engine’s fuel tubes are divided into two parts. Before the pump is the low-pressure area. After the pump is the high-pressure area. You should use the soft tubes which inside diameter are larger than 2.5mm in low-pressure. And you must use the rigid tubes which inside diameter are 2.5mm, outside diameter are 4mm in high-pressure area. We recommend you using the rigid PU tube made by Japanese Morita. Try to shorten the length of the tubing area of the low pressure pump as the location of the oil pump. All of the tubing must be closely connected. You should use thin wires or ring buckles to fix the tubes. Tubes interface must be prevented from entering the air bubbles or oil leakage. We don’t recommend that you use the cable ties to fix the tube interface. Tubes which are in the tank should be soft, and you should use the large heavy hammer. The internal diameter of the oil system can’t be less than 2.5mm. When you use the part of rigid pipe and connect to the fast 4mm connector, surface of the oil pipe should be cast lubricant. And then you can plug the quick connector. Prevent scratching the seal which is in the quick connector. When you dismantle the tubes, you should first depress the releasing tablet of the quick connector, and then you can pull out the tubes. When the engine or oil pump been dismantled, transported or collected, small pieces of tubes joints should be kept at the external connector, and you can use a lighter to soften the pipe after heating, flattening and sealing the pipe to prevent dust entering. In the oil pump there is a very sophisticated gear. Even a small cotton can cause the gear work instable. This is the biggest hidden danger causing the engine stalling. So you must take seriously to the dust problem.
The oil blocking should be made by metal material. Do not use screws as oil blocking and do not use the oil blocking, connector and tubes made by silicone material. Using the anti-petrol transparent tubes is best. There must be a reliable filter before the pump to prevent contaminants entering the pump which may cause sticking in the gear, for example you can use anti-bubble tank which has filtering effect. You must use high flow oil filter, checking and cleaning it regularly. We don’t recommend you use the filter made by copper sintered and flat mesh filter. You must use high flow oil filter whose structure is three-dimensional network.
To determine the method of pipe connection reliability, you should let it operate at large throttle after starting turbines engine and observe whether there is bubbles flowing in the tubes. You must pay attention to the bubbles because bubbles are the main reason leading to the engine flameout. When you fuel the tank, you should use a low voltage 3.3V-4.8V power to the pump, and because kerosene and diesel oil have the large viscosity, you should fuel slowly. Fueling too quickly will give great pressure to the tank to cause the tank brust. And it will squeeze the pressure into the solenoid valve causing lots of oil in the engine. If this situation happens, it will bring up a fire at the engine starting. You must install a ball valve after the oil pump and between the engine to prevent the fuel flowing into the engine. You should install a oil filter at the exit of the pump to prevent impurities flying into the fuel tank of aircraft. Pay attention to keep the fueling nozzle clean!

4. Anti-bubble Tank (UAT)
When you use turbines engine, you must use an anti-bubble oil tank to prevent bubbles enter the engine causing it flameout. The anti-bubble tank should be placed between the main tank and the oil pump. When you fuel the anti-bubble oil tank, you should exhaust the air which is in it. Our company supporting the anti-bubble oil tank sales.
5. About The Pump And System Debugging
   After you connected the fuel pipe system, you have to test the oil pump. You should unplug the rigid tube which connects to the engine, and then test the pump through the ECU Info menu. Do not let the pump work during it empty! Observe the oil bubbles and fuel leakage after the fuel entering the pump. Do not inject the fuel into the engine when the tubes of turbines engine are not unpined. Due to the excess oil in the engine, it will cause the serious flaming when the engine starting, and it is very dangerous. New installations must be strict with cleaning the oil system to prevent the dust from tubes or inner tank entering the pump. After the completion of the new machine, you must let it try to work on the ground to ensure the reliability of the hydraulic system.

6. The Connection Diagram Of Tank System
7. Engine Installation
   The engine is fixed by two pieces of retaining ring which are made by stainless steel, so you must locked it tightly. You have to accordance with the requirements of the position of attempting heating and temperature sensors in the turbines engine. The connector of the tube must be installed facing up, you can refer to the installation diagram on third page of the manual. Deviation angle should be within plus or minus 45 degrees. If it starts difficulty regularly, you can change the installation angle. Some models’ inlets are in the bottom of the aircraft, such us F16, passenger plane, ect. These kinds of inlets are easy to inhale foreign things. You should install a safety net at the air inlet of the turbines engine.

8. Install Cables To The ECU
There are two wirings on the turbines engine. The thick line of green plug is connected to heated roto and driving motor. To avoid it falling off when the aircraft flying, you can fix it by smearing a small amount of hot melt glue at the surface of plug after connection. The thin line is the control line of the speed, temperature, and the solenoid valve. These two lines should be connected to the ECU body. Power supply of the ECU comes from the throttle cable, and the power comes from the receiver. The throttle cable should be connected to the \textit{Throttle input} on the ECU. The electricity which turbines engine uses is from motive power. Factory standard uses plug of T-type, however, users can modify the plug by yourself as the case. ECU uses a non-polar protection design. Incorrect polarity will cause the ECU burned. Pumps, solenoid valves, heated roto, motor, etc., all use the motive power.
9. Power Supply

The receiver uses 6.6V Life batteries or 6V Nimh batteries. Electric power is 8.4V. Turbines engine kit does not include batteries. ECU’s power supply (the receiver) is limited to 6.6V, which works as 5 Nimh batteries or 2 Life batteries. Power supply uses 8.4V, which works as 2 Lipo batteries or 7 Nimh batteries. We suggest that the capacity of power supply is between 2000~5000mAH. In every once about five minutes flight, including start to flamed out and abstract the heat, may consume the power about 350mAH. So, just to be on the safe side, the battery should always keep more than 70% of the electricity when the aircraft prepares to fly. There is a power consumption counter in ECU menu. You can check the power consumption of each flight. Press the GSU (+) button in the display to clearing.

Battery can not be connected with the ECU while it charging. If you do not obey it, pulse of the charger will damage the ECU’s electronic components. It will consume a lot of power while turbines engine starting, the total current will even reach 10A, because the power is used to heat the rotor and drive the motor. When the engine starts at cold regions, you must ensure the battery capacity and discharge ability. If the battery’s voltage drops severely, ECU will alarm and stop starting.

Chapter Three Setting And Adjustment Of The Turbines Engine

1. Function Of ECU

Turbines engine can operate successfully in severe conditions, it must rely on precise calculation of the ECU. Every process is stylized operation, from starting to operating to automatic cooling. ECU will control the solenoid valve, heat the rotor, mobilize motor and pump automatically to operate synchronously according to return conditions of the sensor, temperature and speed. In this way, turbines engine is able to start, operate and flame out. If this operating condition is not established, the engine will close the program and stop operating to avoid danger.

Apart from chip operation in ECU, there are lots of detective functions to adjust or observe the parameters through the GSU. Other practical detective functions are:

- The temperature of tailpipe
- The voltage of power
- Output current
- The position of throttle pos (PW Pulse Width), Displayed as a percentage.
- Engine’s speed
- Engine’s operating time
- Analog signal input (pitot)
- Count the lost received signal (detect which is out of control)
- Total electricity consumption
- The test functions of solenoid valves, heating rotor, pump and driving motor.
- Operation recorder (the black box function)
2. Recognize The Operation On The Display.

There are four buttons on the display ﹀,︿,−,+．﹀,︿ is for flipping the menu,and −,+ is for changing and confirming the number. The display is connected to DATA T/PC plug on ECU. There are four basic data you can see after turning on the engine. The current work status is at the upper left corner, and the tail pipe temperature T is at the upper right corner. Rpm is at the lower left corner, Pw is at the lower right corner.

![Data Terminal](image)

If you meet the situation like next picture and flashes every two seconds after you turning on the engine

![Data Terminal](image)

This situation indicates that there is a problem about signal connection between the ECU and the receiver, or maybe it is out of control. So you must re-check the receiver or reset the throttle pos.

If you press the second button on the left side (︿), another picture will appear on the display. The upper text indicates the bandwidth of pulse which is connected to the receiver. The current amount of throttle is shown at right expressed as a percentage. 00% says the cutoff location, 26% says the idle position, 100% means the full throttle. Vb in the second row on the left shows the current power voltage and V on the right shows the software version of the ECU.
Press ‘︿’ again will enter the main menu. There are four options:

Start: This is about setting various parameters when starting.
Info: This is a functional test menu.
Radio: This is about setting the throttle pos.
Run: This is about setting the parameters during it operating.

3. Checking The Throttle Pos
   You must set the throttle pos first at the first time using it. The process is as follows:
   If you use the remote which is JR system, throttle servo does not need to reverse. If you use the remote which is Futaba system, you must reverse the throttle servo. On the last picture, you can enter the setting throttle pos menu by pressing the button(-) which is below the ‘Radio’. When the display shows the picture like next picture, you can enter the setting throttle pos menu by pressing the button(+) to confirm.

You can set full throttle pos at first, which is at the maximum of throttle stick, maximum of fine tuning (Push it to the top position. Push it to the end when push over the neutral point.) Press the button(+) to confirm.
Then you can set the cutoff travel, which is at the minimum of throttle stick, minimum of fine tuning (Push it to the lowest position. Push it to the end when push over the neutral point.) Press the button (+) to confirm.

In the end, you can set the idling travel, which is at the minimum of throttle stick, maximum of fine tuning (Push it to the toppest position. Push it to the end when push over the neutral point.) Press the button (+) to confirm.

Next is to set the throttle curve. You can choose Linear or others.

Finally, press the button (〜) to save and exit to be back to the home screen.
When you replace the remote or receiver, you have to reset the throttle pos. During the new engine operating within the first one or two hours, the pump should go through a period of run-in period. If you find high idling on the wing, you can reset the throttle pos. Because the ECU has a learning function, changing of the pump status will affect the judgment of ECU. So reset the throttle pos will let the ECU re-calibrate the working conditions at idling.

At first starting after setting the throttle pos, ECU will self-adjust and learn. So you have to let the engine idle at least 10 seconds to let ECU find the most stable remote control signals to maintain idling and memory the pump power, etc. After that, these parameters will be the idling standard at every time you starting the engine. After the first time you starting and maintaining idling, you can increase the throttle to the maximum slowly and observe whether the maximum speed reaches to the predetermined value. ECU will learn the maximum throttle parameters too to help it accelerate in the future and accelerate directly to the maximum speed at once.

4. Throttle Curve
The engine’s thrust is out of step with speed. For example, there is only a quarter of the maximum thrust when the engine is operating at half speed. The thrust changes exponentially. For general flight, most low-speed and high-speed part of the throttle stick is not linear on the operation. ECU offers three stalls of throttle curve to let users choose.

Full Expo is suitable for great thrust plane, because it can control the thrust at low speed well and control the plane gliding on the ground easily.
Half Expo is the complex curve which combines full expo and linear. For little turbines engine plane, this curve can be taken.
Linear, the thrust increases according to the proportion of the stick.

<table>
<thead>
<tr>
<th></th>
<th>The Position Of The Throttle Stick</th>
<th>Percentage Of Maximum Thrust</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% Idling 25% 50% 75% 100%</td>
<td></td>
</tr>
<tr>
<td>Full Expo</td>
<td>Idling Thrust 6% 25% 56% 100%</td>
<td></td>
</tr>
<tr>
<td>Half Expo</td>
<td>Idling Thrust 16% 38% 66% 100%</td>
<td></td>
</tr>
<tr>
<td>Linear</td>
<td>Idling Thrust 25% 50% 75% 100%</td>
<td></td>
</tr>
</tbody>
</table>

5. The Test Function Info
ECU provides the test function to troubleshoot and check problems. This function is allowed to enter the menu at the situation which you turn off the remote or shut the engine.
Press the button (︿) which is under the Info, then the display will show the picture like next picture.

![Data Terminal](image)

At this time, display shows the using time. At last picture, we can see that you totally used 48min, last time you used 256s, and totally cycled 12 times.

Press the button (︿) again, the display will show like next picture:

![Data Terminal](image)

At this time, the display shows the total power electric quantity. You can press (+) to clear.

Press the button (︿) again, the display will show like next picture:

![Data Terminal](image)

This is the number of the ECU receiving the wrong signal and the outta time. When the engine flameout accidently, you can look through this picture to check whether there has something wrong. Press the button (︿) again to enter the picture which has kinds of test function. Button(—) means on, button(+) means off. As following picture:

Test starter
Test glow-plug

Test pump

Test gas valve

Test fuel valve
6. Starting At The First Time
When you get Swiwin turbines engine, we suggest that you install it on a stable testbed to let it test starting several times and check the equipment such as the engine, circuit, oil line, oil filter, anti-bubble tank and main tank. After checking there is no problem in these equipments, then you can install the engine on the model aircraft. This allows you to perform various operations in a safe environment and be familiar with the performance.

In the first start, you have to pump the fuel into the rigid tubes through the test pump function in the Info menu. However, don’t let the fuel enter the engine. You should set the remote at idling position, at this time, the display will appear the word Ready. This says that the ECU is into the standby mode and ready to start anytime. After security checking procedures, you should push the throttle to the maximum, at this time, the driving motor will rotate. Then close the throttle to the minimum, at this time, the engine will automatically enter the ignition start-up procedure.

If the trimming is at the minimum position and the throttle stick is at maximum position, the motor will rotate too. However, if you close the throttle to the minimum, the engine will not enter the starting program.

After entering the automatical program, the next step will be displayed on the display:

Burner on: Ignition and warming up.

Ignition: Start to ignite. You will hear the sound of dripping from the solenoid valve. At this time, the motor will drive the spindle. If the fuel enters to the inside of the engine, it will sound like burning when the ignition is successful, and then, the temperature will rise slowly. It will enter the next program when the temperature is stable.

Pre Heat: Combustion chamber is preheating. You have to continue to increase the fuel delivery and pick up speed at this stage. Provide more air to let it burn. If the temperature is up
to 80° C, it means that preheating of the combustion chamber has finished already. At this time, the color of the flame is low in red and yellow.

Switch Over: The motor begins to accelerate when you turn on the solenoid valve of the main oil line. Now, the main oil line starts fueling. In the initial, the temperature is not high enough in combustion chamber and the fuel has not burned completely yet, so it will erupt a small amount of flame. After a few seconds, the temperature will be up to 200–300 degrees Celsius.

Fuel Ramp: At this stage, the oil pump will let continuous oil supply replace the intermittent oil supply. The flame will sound like explosion and appear the color of cyan. When the speed increases more than thirty thousand rpm, the clutch will get out of the spindle to let turbines engine keep rotation and continue to accelerate until idling.

Running: At this time, it has finished starting and reach the speed of idling.

If you fail to start, it may be because of the bubbles appearing in the tubes or low power or others. When you fail to start, you have to turn off the trimming to the minimum. The ECU will cool automatically until the temperature drops below 100 degrees. If there is no automatic cooling, you can use the throttle stick to change the mode to the manual cooling to avoid the accident. When the body is cooled to 50 degrees, you can restart it again.

7. Cutoff And Cooling
When you prepare to turn off the engine during it operating, you should close the throttle stick and the throttle trimming to the lowest, and then, it will enter to the cutoff program automatically. At this time, the driving motor will drive the spindle to cool intermittently until the temperature drops below 100 degrees. After finishing the first start cycle, the program will be terminated. If you want to start again, you have to restart the power.

8. Operating Menu RUN
In the RUN, you can set and adjust the parameters of operating, such as idling, the maximum speed, acceleration and deceleration, the maximum temperature, the maximum pump power, etc.

9. The Meaning Of The Status Which ECU Says

<p>| Trim Low | The throttle trimming is at the lowest, means that the throttle position is at cutoff. |
| Ready   | Ready to start. At this time, the blue light on the ECU will light up. |
| StickLo! | Now, the throttle stick is not at idling position and it can’t start. |
| Glow Test | Test the heated rotor. |
| StartOn | Test the driving motor. |
| Ignition | Fire. |
| Preheat | Preheat the combustion chamber. This status will appear only when the ignition success. |</p>
<table>
<thead>
<tr>
<th>FuelRamp</th>
<th>Continue to increase the oil supply until it reaches the idling speed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running</td>
<td>The user can use the throttle stick to control the speed during it operating.</td>
</tr>
<tr>
<td>Stop</td>
<td>Stop operating.</td>
</tr>
<tr>
<td>Cooling</td>
<td>Let the engine cool.</td>
</tr>
<tr>
<td>GlowBad</td>
<td>There are some troubles in the heated rotor. Maybe open or short circuit, or cable fault.</td>
</tr>
<tr>
<td>StartBad</td>
<td>There are some troubles in the motor. There are maybe some troubles in the motor or in the speed sensor, when the ECU can’t detect the proper corresponding speed.</td>
</tr>
<tr>
<td>Low RPM</td>
<td>It causes flameout when the speed is lower than the minimum speed that the ECU sets.</td>
</tr>
<tr>
<td>High Temp</td>
<td>It says that the temperature of the tail pipe exceeds the maximum temperature that the ECU sets.</td>
</tr>
<tr>
<td>FlameOut</td>
<td>It causes flameout when the temperature is lower than the setting temperature.</td>
</tr>
<tr>
<td>RC SIGNAL LOST/INCORRECT</td>
<td>The system alarms when the signal was lost or out of control.</td>
</tr>
<tr>
<td>PUMP LIMIT REACHED</td>
<td>The alerting signal which appears when the accelerator pushed to the maximum, the pump reaches the maximum power setted by ECU alarms caused by tubes blocked, oil filter blocked or the excessive stickiness of fuel caused by the cold.</td>
</tr>
<tr>
<td>XXXX OVERLOAD</td>
<td>The system alarms when some value exceeds the rated value.</td>
</tr>
</tbody>
</table>

10. The Recording Function Of The Black Box
ECU can record the last 51 minutes of the using cases, status temperature, speed, power pump, ect of the turbines engine. If there are some troubles appearing when you use the turbines engine or carry out periodic maintenance, please send the ECU to our company. Our company will analysis the problem through the record from the computer and clear the accumulated using time.

The users can also observe the reason of the last flameout through the screen.

<table>
<thead>
<tr>
<th>UserOff</th>
<th>Cutoff through the remote.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FailSafe</td>
<td>When the ECU lost the throttle signal from the receiver, it will reduce to idling automatically in 0-0.5s. After 1.5s, it will turn off the engine automatically to prevent the accidents.</td>
</tr>
<tr>
<td>LowRPM</td>
<td>If the flameout happens when the speed is lower than the minimum speed setted by ECU, it may be because of the bubbles in tubes, oil lines be blocked, low power, deficiency of air, low lubrication level of the bearing.</td>
</tr>
<tr>
<td>FlameOut</td>
<td>When the temperature suddenly drops below 100 degrees, it means that the flame stops burning or the temperature sensor has trouble, or the faulty wiring, ect.</td>
</tr>
</tbody>
</table>
Chapter Four The Maintenance Of The Engine

1. Maintenance
The engine should be sent to our company to maintain after it having been used 50 hours. The main content of the maintenance is replacement the bearings, checking the parts, cleaning the oil lines, replacement the internal filter, removing the accumulated carbon, re-balancing, re-testing and adjustment, clearing the data of the ECU and letting it recover to the new status. When you prepare to send the engine to our company to maintain, you should send the entire electronic system and the engine to our company.

Cap repairment: Our company provides the maintenance services if your engine is serious injury.

2. Tips:
When you remove the engine or pump, you must use the small pieces of tubes to connect to the nipple and close the tubes to avoid the impurities into the engine or pump. Even the very small impurities entering to the engine will cause the oil lines plug or make the pump gear failed. If these problem happens, it will cause the flameout causeless.

When you install a new machine, you must clear the tank carefully and install a oil filter at the oil port of the pump. The refueling nozzle should not contact with the groud when it is being used to prevent sticking dust.

The ECU is the product imported from Spain and it is high cost. The line of the power supply is prohibited to reversed. If you find the plug occurs bad phenomenon, you should replace the plug immediately. Intermittent power will also lead to the ECU having problems easily.

The cooling which is caused after the engine cutoff will affect the using life of the bearing directly. So you have to let the engine fully cool after the engine cutoff.

Overheating, falling heavily, ultimate using are affect the using life of the turbines engine. If the engine shut down accidently, you have to put the remote at cutoff position and cool it manually. If the engine is fallen heavily, you can send it to our company re-balancing. If the engine inhales some foreign bodies causing the blades damaged, we suggest that you should send the engine to our company re-balancing. Otherwise, the using life of the bearing will be shorten seriously.

You have to check the oil filter regularly. After the engine start, you should push to the full throttle to check whether it has air leakage phenomenon and whether there has the bubbles. You should not let one bubble go.

You should observe the flame when the engine starts. If you meet big abnormal fire, it maybe because the solenoid valve closing not entire makes that there are some fuel in the engine. The solenoid valve not closed entirely maybe because there are some fine sands in the fuel and the sands leaved the impression at the time of the solenoid valve action. You can install a ball valve in the hard tubes. You should turn off the ball valve after the engine cutoff each time. If you find at the bottom of the engine with a fuel leak, you must remove the engine. You can restart your engine on the external test stand after oil discharge. If you still force to start the
engine when you find submerged cylinder phenomenon, it will cause a big fire. If you find the idling drift, we suggest that you have to reset the throttle travel and let ECU do the self-learning which it learns after the first start. The pump operating instability and the flow being instability which causes by the impurities in the gear are another reason making the idling drift. You have to completely clear away the residual foreign things in the engine after you have installed the engine already. If the engine intakes screws, it will cause the serious damage. If the screen occurs the interference phenomenon, it can only use on the ground. The aircraft can not fly in the sky when it carries the display.

The users who live in the cold area and use the diesel fuel should attention the phenomenon of paraffin deposit of the diesel fuel. And if this phenomenon happens, it will be easy to block the oil filter and oil pump, and make the wrong operation. The oil plug of the anti-bubble tank can’t let the screw instead. You must use the standard oil plug.

3. The Main Reason Of The Large Flame Happens During The Engine Starting Or The Engine Can Not Start
   Because the different hydraulic system of each plane will cause the different pressure to the pump, this will cause the difficult start or occur the large flame during the engine starting. You can adjust the startup power of fuel supply moderately and it will be improve significantly. You can do as follows:

   ![Data Terminal](image1)

   In this main menu, you should enter the choice Start. Then, you should find the picture of the following parameters.

   ![Data Terminal](image2)
The fuel will become thick when the weather is cold. So, if you find that the engine can’t ignite effectively, you can increase this number moderately to increase the power of the oil pump when the engine is igniting. Decrease the number can reduce the flame when the engine starts. Except this parameter, you can’t change other startup parameters.

4. Acceleration And Deceleration Parameters
Because of the different hydraulic system, when the oil pump supplies the oil to the engine slowly and unstably, the engine will be easy to flameout during it acceleration or deceleration. At this time, you can enter to the choice Run of the main menu to find the following picture to adjust the delay time of the acceleration and deceleration.

![Acceleration Delay](image)

The top picture shows the delay of the acceleration.

![Deceleration Delay](image)

The top picture shows the delay of the deceleration.

Chapter Five Specification
The specification and the size of SW 6Kg

Size: 84mm  
Total length: 232mm  
Total weight: 820g  
Speed: 50,000-165,000  
Standard thrust: 6 kg  
Rated exhaust temperature: 650 degrees  
The maximum throttle fuel consumption: 200 g / min  
Fuel: kerosene or diesel oil  
Lubricants: 5% Mobil Pegasus II  
The cycle of regular maintenance: each 50 hours  
Power supply: 2S Lipo or 8.4V Nimh

The version of the manual: 2015/1/27