2024

KingTech Turbines Engine Manual

KingTech Turbines
Mar 2024

Gen. 5

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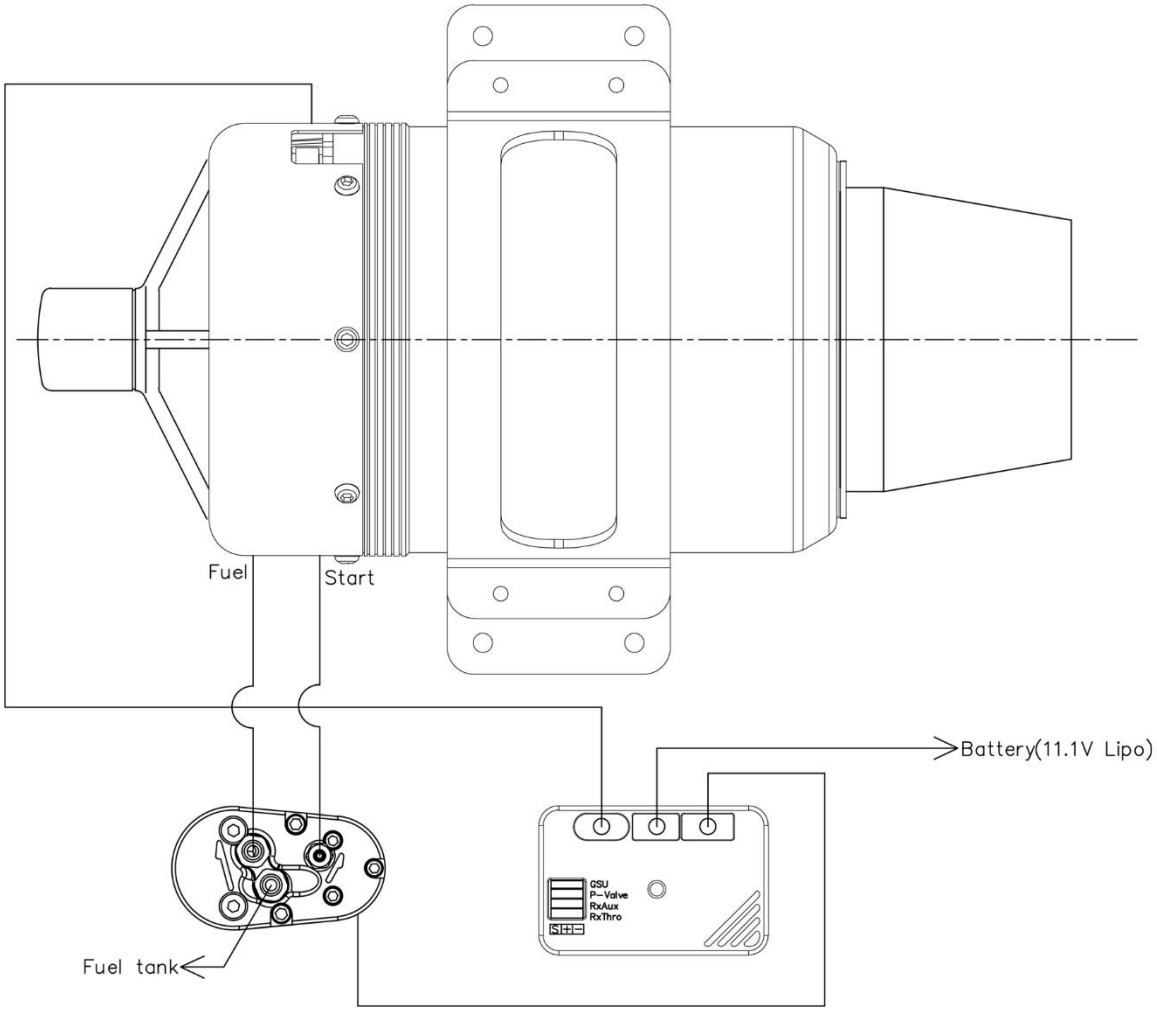
WHAT'S NEW IN G5

- Ultra Quick Starts, under 15 seconds
- Non Specific Engine Orientation Required
- Safer and Predictable Start ups
- Faster Auto Restart, ± 7 seconds
- 11.1V 3S LiPo 2200mAh (minimum) 35C w/ XT60 connector
- Multi Engine Start selectable delays
- User Selectable Diesel or Kero/JetA
- Unlikely to have a failed or wet start

G5 PLUMBING SCHEMATIC



G5 Quick Reference Guide

1. 11.1V 3S LiPo 2200mAh (minimum) 35C w/ XT60 connector for ECU
2. Start Fuel tube, direct connection, no fitting or valve required
3. Learn RC as normal
4. Before first start, must select Fuel Type under Start Menu
5. Go to Test to prime both lines
6. Ready to Start

- for Multi Engine Startup, initialization delay capable.

PURCHASE AGREEMENT, FULL ASSUMPTION OF LIABILITY ANDINDEMNITY AGREEMENT

User acquires from KingTech, or from one of KingTech's authorized dealers, a MINIATURE TURBOJET ENGINE for model aircraft, agrees to all of the following terms and conditions:

1. User's Representations. User represents that he/she is very experienced in model airplane operation, and that all of the information set forth is true and correct. KingTech relies on such representations, and would not enter into this transaction but for these representations.

2. User acknowledges the Risks and Dangers involved. User recognizes that operation of the Model Engine may be dangerous, and that under certain circumstances, its handling will be dangerous. As set forth in Paragraph 3 below, User accepts full responsibility for all of these risks and waives all liability against KingTech.

    a. User's Acknowledgment of Danger. User expressly acknowledges that use of the Model Engine is dangerous if improperly handled and could inflict injury if attempts are made to handle it properly, if the user does not fully acquaint himself/herself with the Model Engine's operation procedures. The Model Engine may cause burns to the user, or the user's assistant, particularly in the start-up procedure, and user agrees to use extreme caution. The Model Engine exhaust is extremely hot, and will burn someone or something placed directly behind the exhaust tube. Highly flammable liquid is used to operate the Model Engine, and it or its fumes will ignite easily and flare up rapidly. The Model Engine itself remains extremely hot, after it is shut off, and requires a cooling down period. Improper use of the Model Engine, or failure to follow Academy of Model Aeronautics ("AMA") guidelines and rules will result in injury to the user, the user's assistant, or bystanders. Operation of the Model Engine in any location other than an approved location, and under safe circumstances could lead to injury to bystanders. A risk

exists from explosion, in the event of tampering, modifications leading to over-speed or extreme metal fatigue.

b. User's Obligation to Become Fully Acquainted With Operation Procedure. User acknowledges receipt of operating instructions for the Model Engine which depicts its handling and operation. User agrees to thoroughly acquaint himself/herself with these materials, and to require his/her assistant to become equally familiar with them. User expressly agrees not to allow any person to assist in the start-up procedure of the Model Engine, who has not become thoroughly familiar with these materials.

c. Agreement to Use Qualified Assistant in Start-Up Procedure. User acknowledges that the start-up procedure for the Model Engine cannot be safely done without an assistant. User expressly agrees to use an assistant, who is thoroughly familiar with the Model Engine and its operation as set forth above, on each occasion when the Model Engine is starting up.

d. Warning to Bystanders. User acknowledges that injury or burns to bystanders could occur, during the start-up procedure or when operating the Model Engine. User expressly agrees to take all steps necessary to assure that no bystander will be in a position to receive injuries during the start-up procedure, or while the Model Engine is running.

3. Full Assumption of Liability; Waiver and Release of KingTech. User assumes all risks of injury, harm and damages, of every nature whatsoever, to himself/herself and his/her property. User fully and completely waives and releases any and all claims which he/she might have at any time arising out of the purchase, handling, or operation of the Model Engine. This assumption, waiver and release is complete, full, and comprehensive.

a. Release Even If KingTech Is Negligent. The waiver and release contained herein releases KingTech from all conduct, no matter how it could be characterized or

alleged. KingTech shall not be liable based on any theory in strict liability in tort. KingTech shall not be liable for any alleged breach of warranty, whether express or implied, of any nature whatsoever, whether a warranty of fitness for a particular use, merchantability, or otherwise.

b. Waiver Effective for All Time. The waiver and release contained herein is effective, without regard to the passage of time. It is effective indefinitely. It will not be changed by any modification to the Model Engine, to any later resold, or other changes in any circumstances.

c. Release Extends to KingTech and All Its Associates. The waiver and release contained herein protects KingTech, and all of its employees, officers, principals, owners, importers, distributors, dealers, designers, and agents ("Associates").

4. No Modifications to Model Engine. User agrees to make no modifications of any kind to the Model Engine. This Agreement pertains to the entire life of the Model Engine.

5. Sale By User to Other Party. User agrees to fully inform any person to whom he/she sells or transfers the Model Engine, concerning the handling, use, and operation of the Model Engine, and agrees to give all operating instructions to such person, at or before the time of sale or transfer. The indemnity and hold harmless agreement contained in Paragraph 3 continues in effect, following such sale or transfer.

6. Severability. In the event any clause, provision, or term of this Agreement is held to be ineffective, void or otherwise unenforceable for any reason, that clause, provision, or term shall be severed from this Agreement, and the Agreement shall otherwise remain binding and effective. If any portion of Paragraph 3 is found to be unenforceable, then the parties agree that the fullest and most complete waiver and release, which is permitted by law, shall be effective.

7. No Interpretation of Agreement Against Either Party. User understands and expressly acknowledges that he/she has the right to have an attorney read and review this

Agreement, before execution. This Agreement shall not be interpreted against either party, but shall be interpreted as if it was drafted mutually by the parties.

8. KingTech reserves the right to void warranty to an individual if one chooses to make a negative public announcement before contacting us and allowing us opportunity to assist or correct.
9. Make certain to comply all local rules, and obtain local licensing, permit, or waiver to operate a turbine engine.
10. KingTech Turbines reserves the right to terminate support to those who are defiant and incompliant to our ways of operations.
11. If the Buyer is not prepared to fully accept the PURCHASE AGREEMENT, FULL ASSUMPTION OF LIABILITY AND INDEMNITY AGREEMENT, the Buyer is advised to return this Model Engine immediately in new and unused condition to the place of purchase.
12. Engine sent in for crash repair or misuse is subject to a $50 inspection fee (inspection fee waived if work is authorized) and return shipping charge.
13. We reserve the right to ensure all repairs are up to factory spec including cosmetics, quality or level of repairs not to be negotiated nor compromised.
14. Any engine sent in not reclaimed within 90 days will be considered abandoned and will be dismantled, disposed or recycled.
15. Terms and conditions may change without notice. Buyers are to accept the latest terms and conditions with no exceptions, which is to be found at: www.kingtechturbines.com.
16. Engine sent in, 30 days after estimate sent with no reply will deem to be forfeited and engine may be disposed or scrapped. 30 days after invoice sent with none payment will also consider forfeited unless arrangements made through writing.

KINGTECH *LIMITED LIFETIME WARRANTY*

KingTech warrants that this MINIATURE TURBOJET ENGINE for model aircraft, cars or boats ("Model Engine") enclosed with this warranty statement is free from defects in materials and workmanship during normal usage, according to the following terms and conditions.

1. The limited warranty extends to the original purchaser ("Buyer") of the Model Engine and is transferable with no fees during the first year of the original purchase, after the first year, a warranty transfer fee of $150 is required to any subsequent purchaser / end-user. Though it may still not have the warranty in place, all engines must be registered with us at www.kingtechturbines.com to receive any type of support.
2. Warranty coverage begins the day you bought the turbine to the day you sold or loss the turbine, all electrical components such as batteries, electric starter motor, glow plug, valves, ECU, GSU, pump and all frictional materials and components will have a one year warranty coverage including but not limited to that of the bearings. All parts, including repaired and replaced parts are covered for the original warranty period. When the warranty on the turbine expires, the warranty on all replaced and repaired parts also expires. The engine core, including but not limited to that of combustion chamber, shaft, shaft tunnel, diffuser, injectors, NGV, turbine wheel, will enjoy lifetime warranty and may or may not be replaced or upgraded during interval services.
3. Buyer must fully accept all conditions of the PURCHASE AGREEMENT, FULL ASSUMPTION OF LIABILITY AND INDEMNITY AGREEMENT.
4. During the warranty period KingTech will repair or replace, at KingTech's option, any defective parts with new or factory rebuilt replacement items if such repair or replacement is needed because of Model Engine malfunction or failure during normal usage. No charge will be made to the Buyer for any such parts. KingTech will also pay for the labor charges incurred by KingTech in repairing or replacing the warranted parts and or components. The limited warranty does not cover defects in appearance. KingTech will not be liable for any other losses or damages.

5. Upon request from KingTech, the Buyer must prove the date of the original purchase of the Model Engine by a dated bill of sale or dated itemized receipt.
6. Buyer must bear the cost of shipping the turbine to KingTech, Taiwan or KingTech Turbines International in Pasadena, California.
7. Buyer shall have no coverage or benefits under this lifetime warranty if any of the following conditions are applicable:
    a. The Model Engine has been subject to abnormal use, abnormal conditions, improper storage, unauthorized modifications, unauthorized repair, misuse, neglect, abuse, accident, alteration, improper installation, fail to engage into proper cool down, or other acts which are not the fault of KingTech, including damage caused by shipping.
    b. The Model Engine has been damaged from external causes such as crash damage, foreign object damage, weather, Act of God, improper electrical connections, or connections to other products not recommend for interconnection by KingTech.
    c. The Model Engine is operated for commercial or institutional use.
    d. The Model Engine serial number has been removed, defaced or altered.

8. If a problem develops during the warranty period, the Buyer shall take the following step-by-step procedure:
    a. The Buyer shall ship the Model Engine prepaid and insured to KingTech, Taiwan or KingTech Turbines International in United States.
    b. The Buyer shall include a return address, daytime phone number, complete description of the problem and proof of purchase.
    c. The Buyer will be charged for any parts and/or labor charges not covered by this warranty.
    d. If the Model Engine is returned to KingTech during the warranty period, but the problem with the Model Engine is not covered under the terms and conditions of this warranty, the Buyer will be notified and given an estimate of the charges the Buyer

must pay to have the Model Engine repaired, with all shipping charges billed to the Buyer. If the estimate is refused, the Model Engine will be returned freight collect plus cost of estimate generally $50. If the Model Engine is returned to KingTech after the expiration of the warranty period, KingTech's normal service policies shall apply and the Buyer will be responsible for all charges.

9. KingTech shall not be liable for delay in rendering service under the limited warranty, or loss of use during the period that the Model Engine is being repaired.
10. KingTech neither assumes nor authorizes any other person or entity to assume for it any other obligation or liability beyond that is expressly provided for in this limited warranty.
11. This is the entire warranty between KingTech and the Buyer, and supersedes all prior and contemporaneous agreements or understandings, oral or written, and all communications relating to the Model Engine, and no representation, promise or condition not contained herein shall modify these terms.
12. This lifetime warranty allocates the risk of failure of the Model Engine between the Buyer and KingTech. The allocation is recognized by the Buyer and is reflected in the purchase price of the Model Engine.
13. If and when the bearings require replacement and ECU timer set back to zero during a warranty repair, customer is to be responsible for the charges of interval service at a prorated amount for the hours used.
14. Terms and conditions of warranty and liability may change without notice; users are to accept the latest terms and conditions with no exceptions.

INTRODUCTION

Congratulations, you have just purchased a turbo-jet engine from KingTech Turbines, with the highest standards and technologies in turbine design and manufacturing. We will provide you with the best after-sales customer support and service to ensure you with many years of enjoyment with this new turbine engine. *Please take a moment to properly register your engine at www.kingtechturbines.com.

Obviously, model turbine aviation - despite all the apparent fun involved - has its potential dangers. All KingTech turbine engines have been through an extensive period of R&D and testing.

To begin, read this manual thoroughly. Develop an overall impression of the engine and its operating procedures, measuring equipment and accessories.

Study the material step-by-step and ascertain how to install, operate and maintain your turbine engine. If you are unsure about anything, re-read it again or contact us directly.

DO NOT OPERATE THE TURBINE BEFORE YOU HAVE READ THE MANUAL AND FULLY UNDERSTAND EVERY PROCEDURAL DETAIL

Once you are accustomed to handling the Kingtech turbine, you will observe that it is a very reliable engine. Some experienced operators have expressed their belief that it handles better than many piston engines. However, always remember, this is a REAL JET ENGINE, requiring knowledge, discipline and maintenance.

In order to learn more about the development of the model turbine engine and understand its function, we highly recommend reading Gas Turbine Engines for Model Aircraft by Kurt Schreckling and Model Jet Engines by Thomas Kamps. These books are available through:

Traplet Publications

Traplet House

Severn Drive

Upton upon Severn, Worcestershire ISBN 0 9510589 1 6

United Kingdom WR8 0JL ISBN 0 9510589 9 1

SAFETY PRECAUTIONS

ALWAYS ENFORCE THE PROPER MINIMUM SAFE DISTANCES FROM THE TURBINE!

In front of ~ 15 feet, On the side (perpendicular to the engine thrust) ~ 25 feet, Behind ~ 15 feet

Fire extinguishers should be on hand at all times. We recommend the CO2 variety.

To avoid hearing damage, always use ear protection when you are near a running turbine engine.

When the turbine is running, never place your hands into the area of the intake. An extreme suction - which can grasp a hand, fingers or other objects in a flash – prevails in this area. Be aware of this source of danger, always!

Prevent foreign materials from entering the intake or exhaust when working with the turbine. Before operation, make sure there are no loose parts or debris near the turbine or within the fuselage. Objects being sucked in will cause severe damage to the engine, which will not be covered by any warranty; furthermore, such damage may also injuries.

Always exercise caution around the hot parts of the turbine, to avoid burns. The outer case at the turbine stage and nozzle reaches 450-500° (Celsius), while the exhaust gas may exceed 750 °C.

Ensure that the fuel is mixed with approximately 5% approved oil. Use only turbine oils by KingTech Special Blend with Synthetics, which is a non-carcinogenic blend and available at **www.kingtechturbines.com** or turbine oil AeroShell 560 or PB3280 available at local airport fuel suppliers.

Never run turbine in a closed room, or an area near any kind of flammable matter.

Do not fly turbine-powered aircraft near flammable materials, nor in forested tracts or areas experiencing drought or dryness. Obey all forest fire regulations and warnings by refraining from operating turbine in restricted fire zones. Never operate model turbine jet aircraft in or around residential or heavily populated areas.

Installation of unauthorized parts from another manufacturing source may also result in engine failure.

Warning:

A flying model with a turbine can reach higher flight speeds than ducted fan-powered models, because the turbine's thrust degrades less with higher flight speeds. With attainable flight speeds of up to 200 MPH or over, you can quickly run out of flying space. There is also a danger of developing control surface flutter or mechanical overload, causing the model to fail in flight. When piloting a turbine powered aircraft, one must properly manage the throttle. Full power should be used for takeoff or vertical maneuvers and a reduced setting for level or descending flight. Please abide AMA flight rules of maintaining less than 200 MPH at all times.

THE CHECKLIST

Before Running the Turbine

- Do not change any parameters in the ECU
- Charge ECU Battery
- Observe all safety precautions on Safety Precautions
- Prepare fire extinguisher
- Check fuel lines and filter. Make sure they are clean with no restrictions
- Check fuel tank vent is unobstructed
- Fill fuel tank(s). Make sure all tanks are full
- Purge Fuel Line, by Test Pump. Take good care not flooding turbine, (Purging fuel line is only necessary after initial set up, and do not get confused with Prime Pump.
- Turn on receiver switch
- Place the model with nose into the wind
- Activate brakes and now you are ready to start.

After Stopping the Turbine

- Turn model into the wind. Activate brakes and shutdown turbine
- The new ECU will allow you to shutdown the engine and receiver as soon as you are back at the pit and it will continue cooling until desired temperature has reached without the RX being powered on.
- In the event that the turbine does not go into the cooling mode, please refer to Turbine Stopping and Cooling 28 for manual activation.

FUEL AND OIL/ FUEL CARE

KingTech engines use Diesel, 1-K kerosene or Jet-A1 for fuel. Fuel must be mixed with 5% KingTech Special Blend or synthetic turbine oil(Aeroshell 500 and all 2-stroke oil are prohibited) equivalent to 1 quart of oil in every 5 gallons of fuel. Among the above 3 types of fuels KingTech highly recommends using regular pump Diesel as they are readily available, inexpensive and having a higher energy density and up to 3% better in fuel efficiency. For best result and full core warranty, use KingTech Oil only, it is proven to be the cleanest and has the best lubrication properties for our engines, please refer to the below comparison chart:

Engine Oil Comparison from KingTech Turbines

	Lubrication	Non-Coking	Non-carcinogenic	Eligibility for 25 hr I.S.	Full Lifetime Warranty	No additional labor required
2 Stroke oils	★☆☆☆☆	★☆☆☆☆	√		*	
Aeroshell 500	★☆☆☆☆	☆☆☆☆☆			*	
Aeroshell 560	★★★☆☆	★★★☆☆		√	√	***
BP 2197	★★★☆☆	★★☆☆☆		√	√	***
BP 2380	★★★☆☆	★★★☆☆		√	√	***
JetCat oil	★★★☆☆	★☆☆☆☆	√	√	√	***
KingTech oil	★★★★★	★★★★★	√	√	√	√
Mobil DTE	★★☆☆☆	★★★★☆	√	**	√ **	√
Mobil Jet II	★★★½☆	★☆☆☆☆		√	√	***
Tellus 32	★★☆☆☆	★★★★☆	√	**	√ **	√

* The use of Aeroshell 500 and 2 Stroke oil will void warranty.

** Running Mobil DTE, Tellus 32 or their equivelent would cause excessive bearing noise and failure, recommended to be sent in for service between 15 to 20, hours. Warranty voids beyond 20 hours.

*** Due to excessive coking, up to 1 hour extra labor charge may apply to the use of Aeroshell 560, BP 2197, BP 2380, JetCat oil and Mobil Jet II

FUEL SYSTEM

When installing the fuel lines on components with barbed connectors, if necessary slightly heat the tubing and lubricate the barbs before connecting. This will soften the tube slightly, making it much easier to install. Double looping safety wire on all barbed connection is also suggested, required if you heated the tubing. To remove tubing from barbed connectors, you must cut the tubing off. Be careful not to damage the barbs when cutting off tubing. This could be done by snipping away the tubing material parallel at the fitting. To insert tubing into a Pisco or Festo quick release fittings, put a drop of oil on the outside of the tubing and use firm pressure until you feel the tube snaps in then lightly pull on the front ring and tubing to ensure a good seal. To release, press in on the front ring, while slightly pushing and turning the tubing then pull the tubing out for a clean release.

ALWAYS use a gasoline-compatible stopper. Silicon stoppers swell and leak.

When running engine at full power, check the fuel line from the pump to the engine. If there is a large quantity of air bubbles flowing with the fuel, there is probably a restriction in the fuel system or an air leak in at least one of the many fittings.

Be careful not to over-pressurize (or over depressurize)the fuel tanks and the shutoff valve during refueling or defueling.

You want to make sure the vent is not plugged. We are now requiring a manual shutoff valve, as an additional prevention of pumping raw fuel into the engine and to avoid a subsequent wet start.

UAT (ULTIMATE AIR TRAP)

An UAT is recommended, between the main fuel tank and the engine. KingTech highly recommends BVM UAT or their equivalent. KingTech has a variant that is stiff and translucent, which has a dual filter within the canister.

PRIME THE PUMP AND SYSTEM

To prime both fuel pumps and fuel lines (or for fuel pump test purposes), it is necessary to open the manual fuel shutoff valve and run fuel pump manually. For this operation, use the GSU and go to TEST icon, and scroll to 6 of 9 or 6/9 to Test Pump. This test opens the fuel valve and acts as a speed control for running the pump.

Tap on the #1 ON button to begin (at this time the pump will run at very low voltage) then you might want to increase pump power by tapping on the same button until desired pump speed reached (more tap more power) pump will continue running at the last tapped power, then tap #2 button to turn it off.

Extremely Important:

Pump Test allows the fuel pump to operate without the turbine running. However, if the fuel feed line is not removed from the turbine during this procedure; it will become flooded with fuel. When this occurs, the next turbine start can become highly flammable; however, G5 will likely to consume the flooded fuel before exits the engine.

Before activating the pump test mode, ALWAYS remove the fuel feed line connected to the turbine and dip the line back to your fuel can or overflow tank.

ECU AND RECEIVER BATTERY (not included)

The ECU battery does not power up the ECU nor GSU. ECU and GSU is powered up by the receiver and required a voltage between 5.7 to 8.4, which will be displayed on the dash board of the GSU. The inferiority of a Futaba system would require power distribution board like Power Box or Smart Fly to deliver a consistent voltage, flickering of GSU may occur should the voltage fall under 5.7V.

The ECU battery required for the **G5** is a **11.1V 3S LiPo 2200mAh (minimum) 35C w/ XT60 connector** . Each flight will require 200 to 600mAh, depending on the size of the engine and duration of the flight. Make sure you do not discharge any Lithium battery pack lower than 80% of its specified capacity.

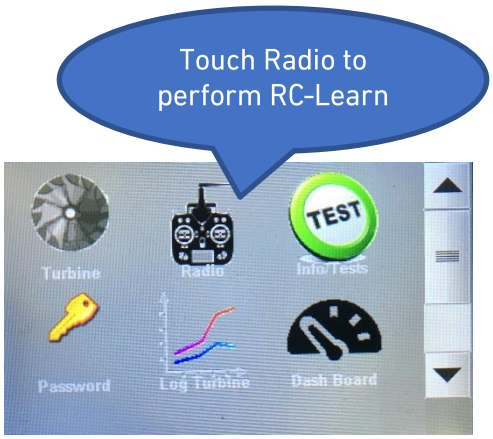
Charging the Battery - Do not charge the battery with a charger using negative discharge pulses when connected to the ECU. This will damage the electronics of the ECU. You must disconnect the battery from the ECU and charge it directly.

LEARN R/C- TEACH THE ECU TO YOUR RADIO SYSTEM

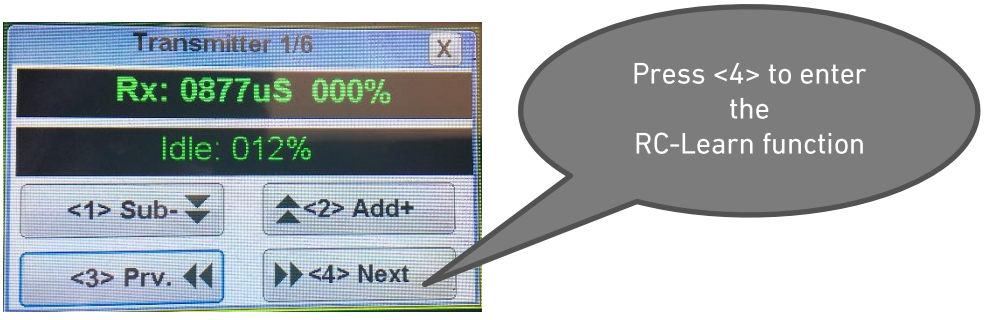
Learn RC, follow below procedures to ensure learning RC for proper failsafe.

1. For JR and and Spektrum Compatible, Power on the transmitter and make sure the throttle reversing is set to at normal, travel 100% and put Stick Down, Trim Down, then turn off transmitter.
   a. For Futaba, Jeti and compatible, do the above except activate the reversing on the throttle channel
2. Bind transmitter Tx to the receiverRx with stick down trim down
3. Press and hold anywhere on the Dashboard for the GSU Desktop.

4. Select "Radio" on this Desktop

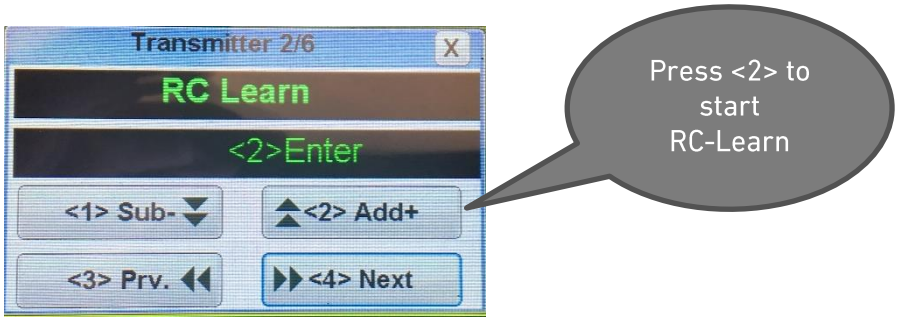


5. To Start the RC-Learn process press <4> Next



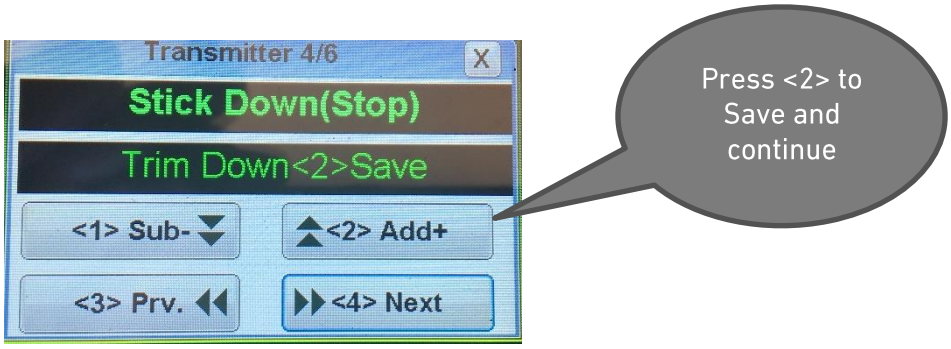
Note: The Correct reading of throttle % by the ECU can be verified on this screen, percentage of the throttle position is shown on, 0% in the position of engine stop (trim and stick down), 100% with stick/trim full up and between 10% and 30% at idle, (stick up trim down).

6. Press <2> to enter the RC-Learn function.



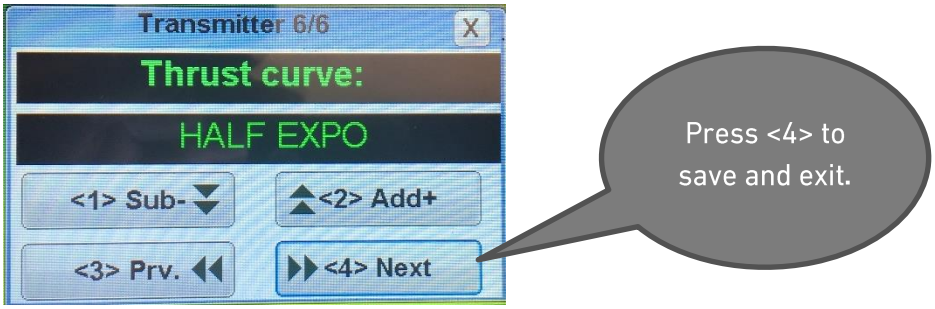
7. Place the Stick Up and the Trim Up on the transmitter Tx and press <2> on the GSU

8. Place the Stick Down and the Trim Down on transmitterTx and Press <2> on the GSU



9. Place the Stick Down and the Trim Up on the transmitter Tx and Press <2> on the GSU

10. Use <4>on the GSU to scroll to "HALF EXPO or LINEAR", default and recommended curve see Throttle Curves for additional information.



This now completes your radio setup.

On your first start after RC learned: Be patient until ECU stabilizes idling RPM, this may take up to 1 minute or so, subsequently hold on tight to your airplane and apply full throttle, and again let the ECU to stabilize its peak RPM, then back down to idle to verify, do this a couple more times and you are ready to fly the model.

Note: Error "Cooling Down" message - Anytime you have a cool down message after you completed the above steps for Learn RC, you have a connection error, most likely your throttle cable is plugged in incorrectly, please check polarity and/or correct slot.

THROTTLE CURVES

Jet engines develop the thrust exponentially, thus half of the RPM is only approximately 1/4 of the thrust. On small engines with a high idle to full power rpm ratio, or in a high drag/low power plane, often only the last 1/3 of the throttle stick produces significant thrust. The low half of the stick travel is not used. Although current digital Transmitters can modify the throttle curve to suit the requirement of the model, the Kingtech ECU can simplify the installation by adjusting to three different throttle curves as follows:

FULL EXPO: Mean linear RPM, it is the default setting and the mode used for all previous software versions. Thrust develops exponentially, and it is the recommended curve for big engines or/and high thrust/weight ratio planes, as it ease the control in low power used during taxi. This mode is not likely used by modelers.

LINEAR: Mean that the thrust develop linearly with the throttle setting, has more resolution at lower half of the throttle stick.

HALF EXPO: An intermediate setting between the previous two modes. This mode maybe beneficial when flying a model with a higher thrust engine than recommended.

	Stick position					
MODE	0% (Idle)	25%	50%	75%	100%	
FULL EXPO	Idle thrust	6%	25%	56%	100%	% of total thrust
HALF EXPO	Idle thrust	16%	38%	66%	100%	
LINEAR	Idle thrust	25%	50%	75%	100%	

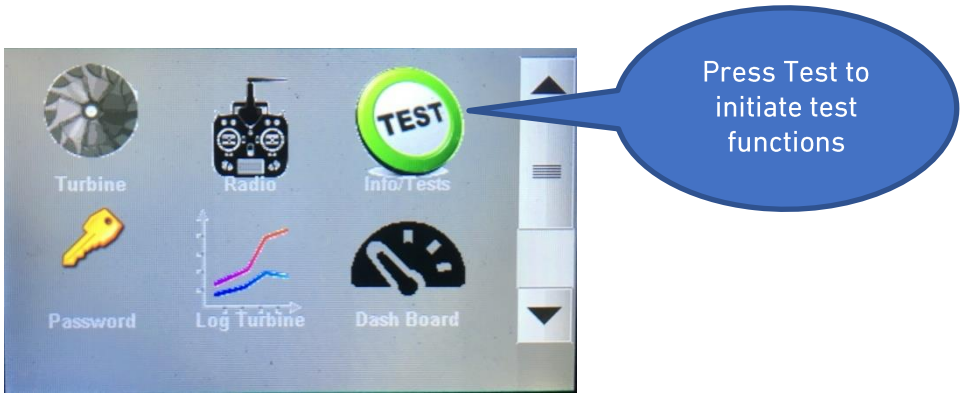
TEST/INFO FUNCTIONS

The ECU provides testing functions to the starter motor, glow or burner plug, pump and both solenoid valves. These test screens are only available when the ECU is on the “Trim Low” status, that is to say, recently powered up and receiving a STOP signal from the TX. Pressing the <1> button will energize the selected device and pressing <2> will shut it down. Special care should be taken when testing the pump, as it is possible that fuel can be pumped into the engine, flooding it, and causing a hot start on next startup. Testing the pump works differently than Xicoy ECUs in that the <1> on function must be pressed repeatedly to increase pump flow. Prior models increased pump flow during test with only a single press of the button.

*With the older F and G series that comes with Xicoy systems, Some LiFe chargers is capable to peak a 3S pack over 10.7V, the ECU might display “Over Voltage” and will not engage engine start mode. Please go back to Description of the ECU to bleed off the peaked voltage.

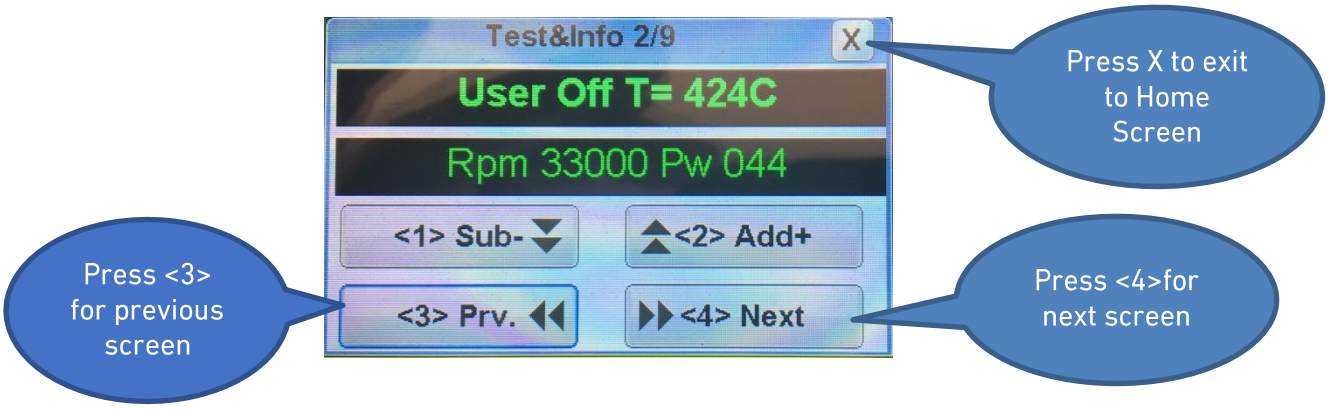
To initiate the test functions press the turbine wheel from the **Dashboard**.

Home Screen: Press “Test” to initiate the test functions.



Test/Info page 1 displays Turbine Total Time in minutes, last Cycle time in seconds and number of cycles. Note: These numbers are reset to 0 upon overhaul. (Interval 25 hours)

Test/Info page 2 displays condition of last shutdown with Temperature, RPM and PW. This is a very important page. Whenever you have a flameout, the four pieces of information from this page is most essential for troubleshooting.



TURBINE STARTING AND RUNNING

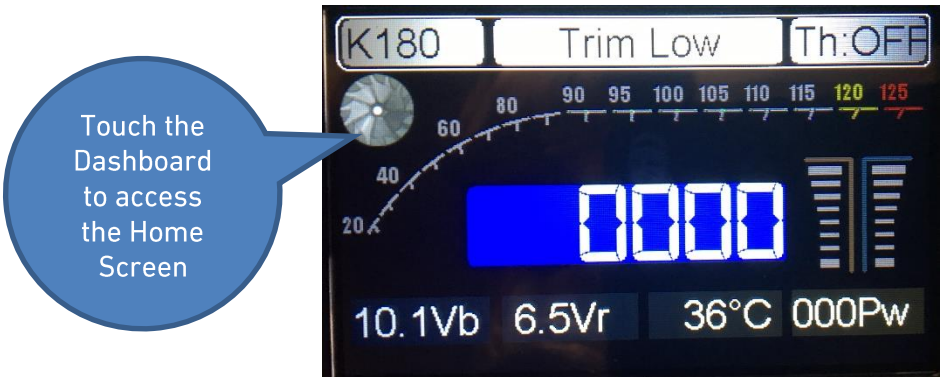
Always set-up and confirm the operation on the test-stand, before installing into your model. This will help you to familiarize all components associated and the characteristics of different stages of turbine engine starting.

Regardless how experienced you are operating a jet engine; it is essential to keep a reading onto the dashboard of the GSU at every start until running. This is especially important when operating multi engine jets. It would be even better if you could sight the dashboard towards the tailcone of the engine.

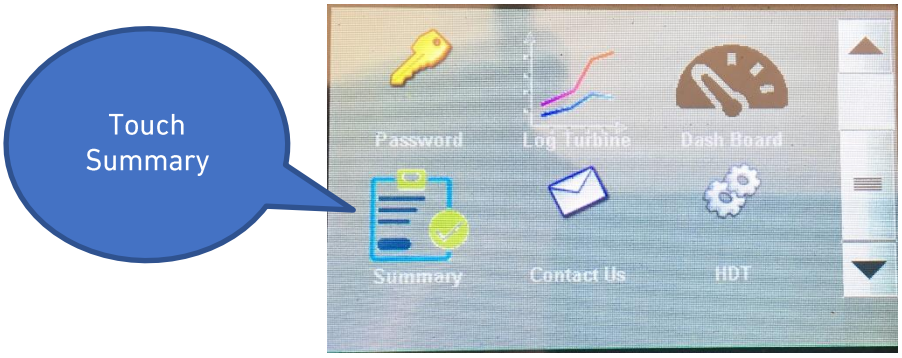
SUMMARY

The Summary is a listing of operating data collected on the last four turbine runs stored in the KingTech ECU and displayed on the GSU screen.

To access the Summary touch anywhere on the **Dashboard**.

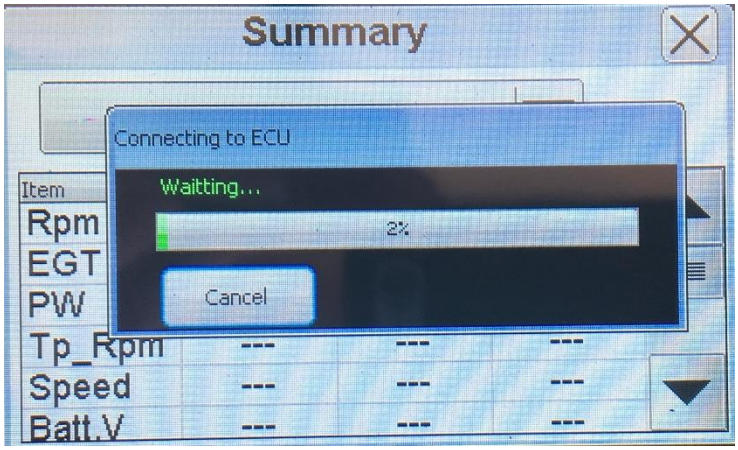


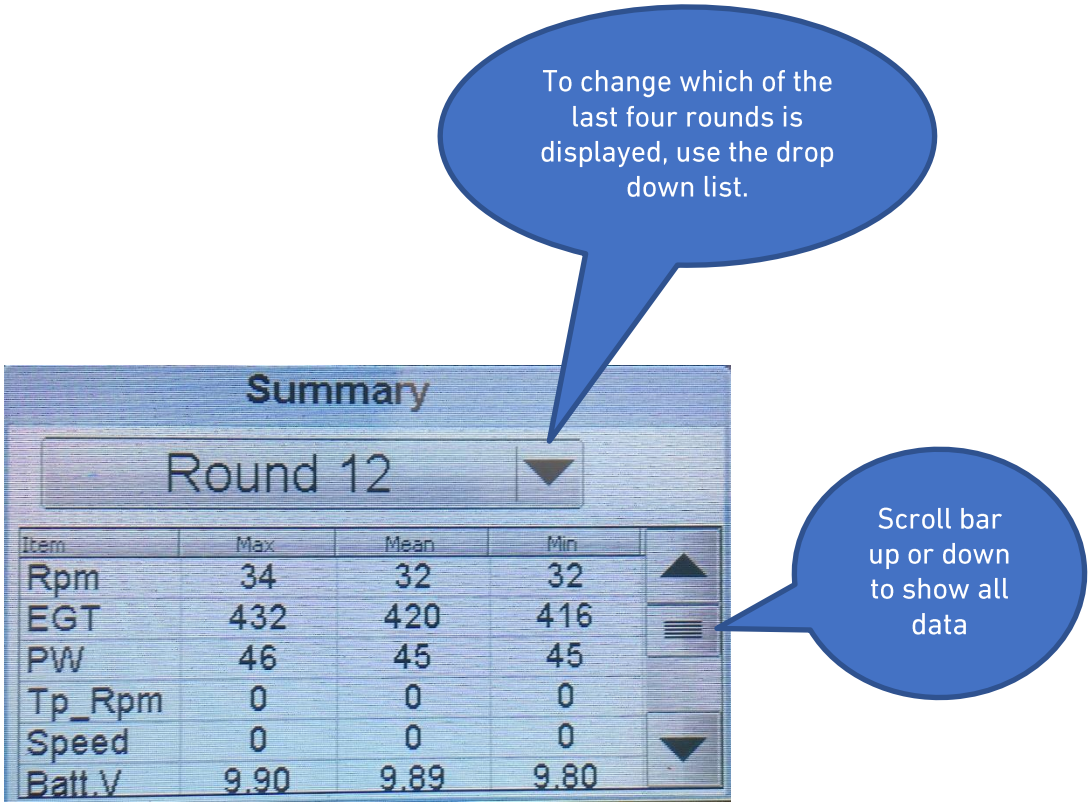
On the Home Screen, touch the Turbine Log to display one of the last four turbine runs or “Rounds”.



If Summary is not displayed, use the scroll bar on the right side of Home Screen to display Summary.

Next the GSU will read the logs from the ECU. Depending on the amount of data this may take a minute or two. To cancel this function and return to the Home Screen touch the “Cancel” button.





To display all of the information you will need to use the scroll bar on the right side of the screen

This information displayed is the Maximum, Mean, and Minimum values for each of the following data items:

Turbine RPM

EGT – Exhaust Gas Temperature

PW Pump Pulse Width

Tp_Rpm (Turbo prop Shaft Rpm)

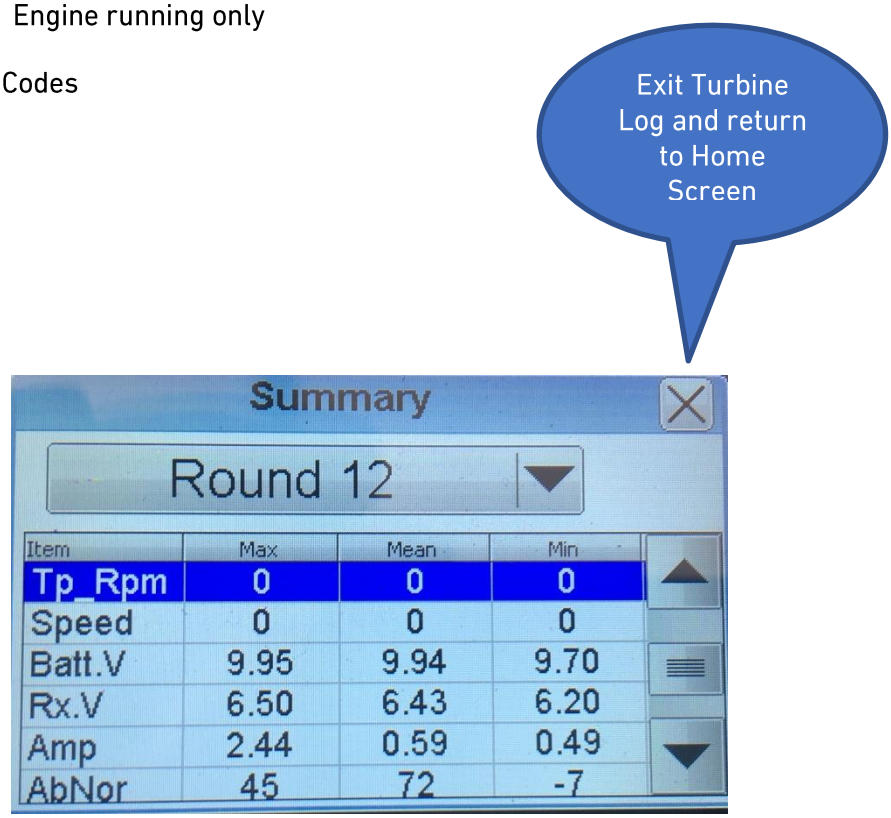
Speed (Air Speed from accessory device)

Battery V. : ECU battery voltage

RX. V : Receiver battery voltage

AMP: ECU current. Engine running only

AbNor: Diagnostic Codes



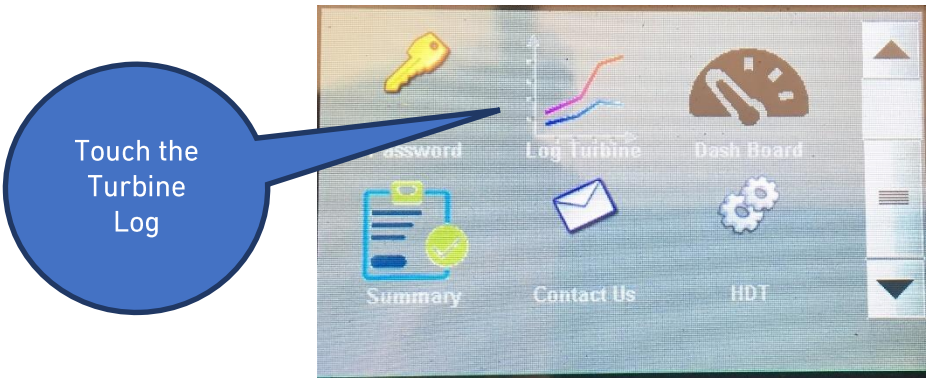
This function is a subset of data stored by the ECU. A more complete data log will be available using the PCT (PC Terminal interface) at a future date.

TURBINE LOG

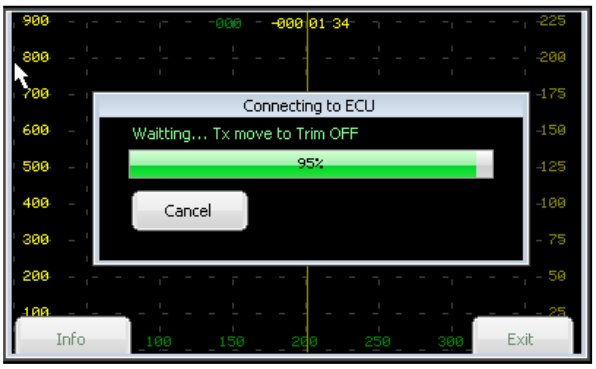
The Turbine Log is a graphical display of Turbine Log data which scrolls across the screen in reference to lapsed time for a turbine run.

To access the Turbine Log screen, touch anywhere on the Dashboard.

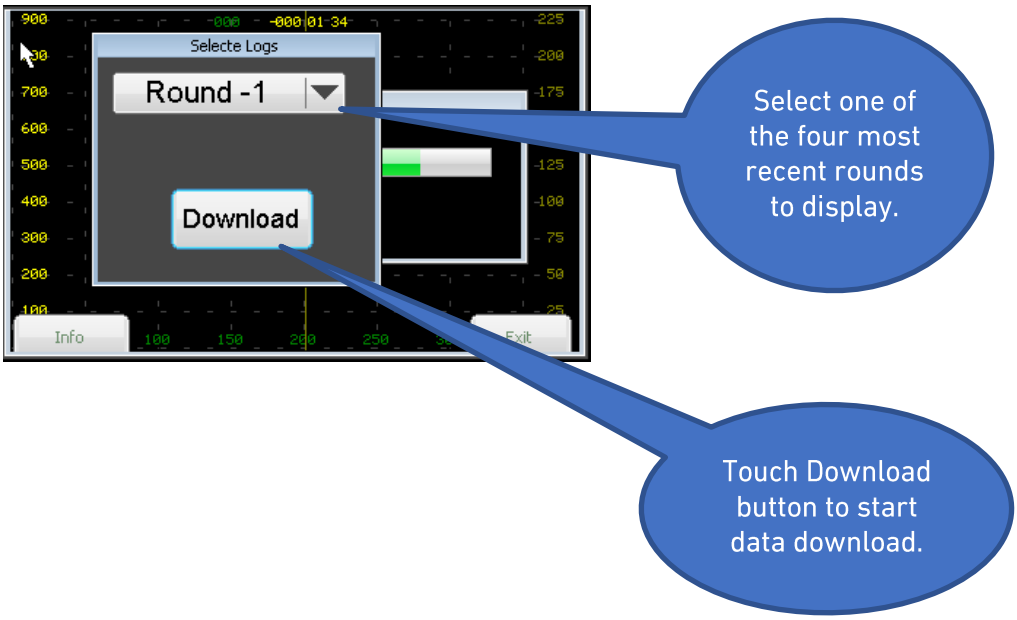
On the Home Screen, use the scroll bar to display the Turbine Log Icon.



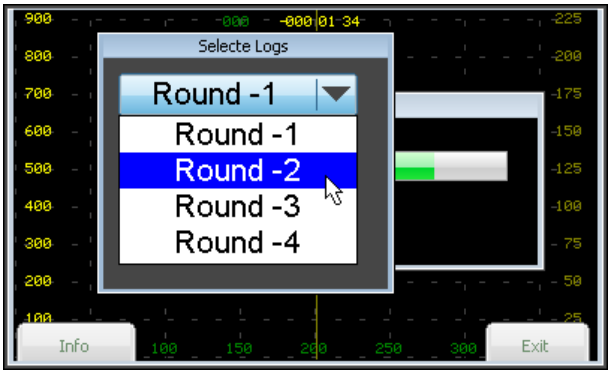
Make sure Throttle Trim is in off position to retrieve log data.



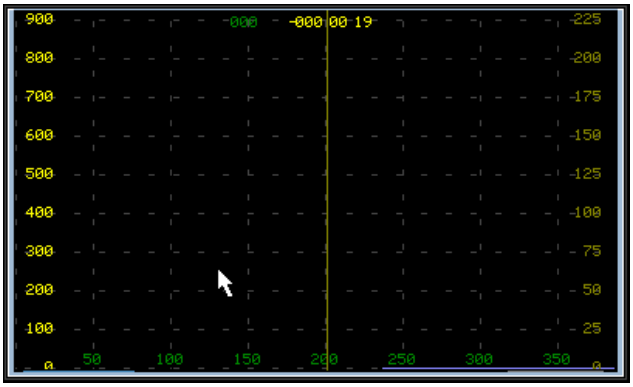
Select one of the four most recent turbine runs *(Rounds)" and touch the Download button.



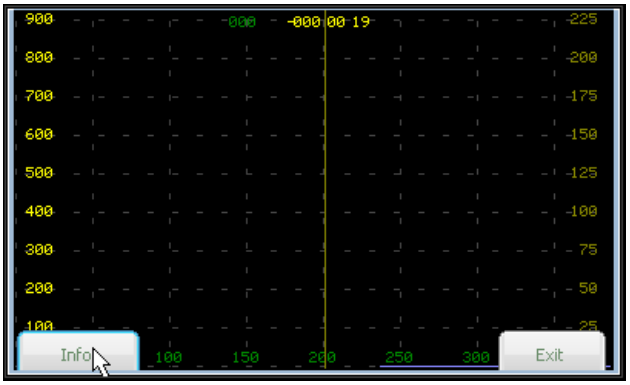
Select data to be displayed from one of four most recent turbine runs.



Wait for data to be displayed.



Touch the Info button for buttons to be displayed for control of displayed log data or press Exit to return to Home Screen.



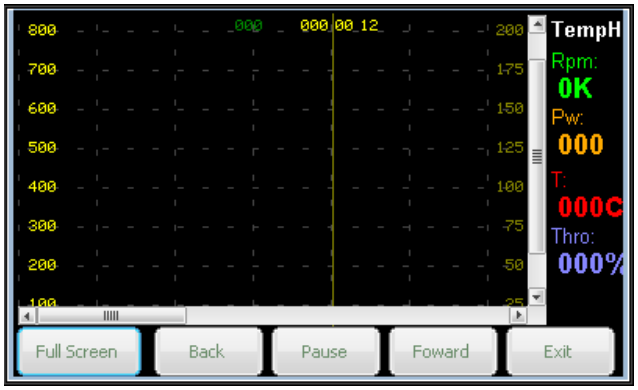
Touch the “Full Screen” button to return to display without control buttons. . The data will scroll on the screen from right to left representing a time line for the data. Press Back, Pause or Forward to control the graphic display of data. This is helpful in comparing the relationships between the various data points. Colored lines on the graph represent.

Green – RPM in thousands

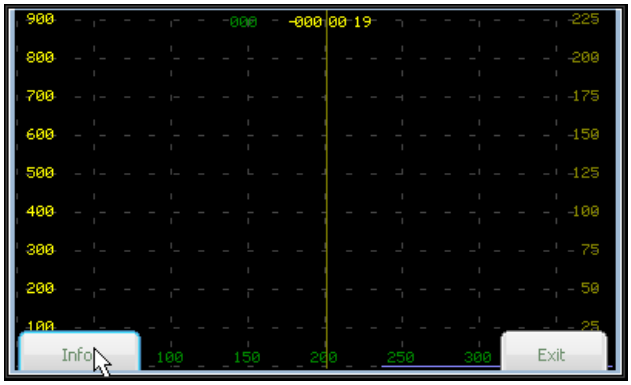
Orange – Pump PW (Pulse Width)

Red – Temperature Celsius

Violet – Throttle %



Press Exit to return to previous screen.Home Screen.



Press Exit to return to Home Screen.

LIST OF ECU STATUS MESSAGE CODES

Here is a list of possible messages shown on the data terminal screen and their meaning.

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)

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

Glow Test: Verifying of glow plug

StartOn: Test of the starter

Ignition: Gas ignition phase.

Preheat: Phase of heating of the combustion chamber after detecting gas ignition.

FuelRamp: Phase of fuel acceleration until IDLE IS reached.

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

Stop: Engine off.

Cooling: Starter operating to cool the engine. (This message would also display if ECU is connected incorrectly, most likely the throttle cable, please check all connections to and from the engine and ECU)

GlowBad: Defective or disconnected glow plug, or a short of glow system wiring.

StartBad: Defective starter, insufficient RPM reached during start.

Low RPM: Engine speed below the minimum.

HighTemp: Excessive temperature

FlameOut: Exhaust GAS Temperature below the minimum.

LIST OF ECU WARNING MESSAGE CODES

RC SIGNAL LOST/INCORRECT: The signal received from the RX is wrong (outside

calibration margin) or absent.

PUMP LIMIT REACHED: The ECU has increased the pump power up to the value set on the “Pump Limit” parameter, but the engine has not arrived to the full power. Causes could be flat battery, fuel restriction or anything that can cause a reduction in the fuel flow.

xxxx OVERLOAD: An excessive current is detected from the specified output.

DIAGNOSTIC MESSAGES

During engine operation the ECU measures and stores all the engine operating parameters recorded during the last the 51 minutes of operation. These measures can be downloaded later to a PC to study the behavior of the engine in flight and to diagnose any possible problems. Also, after each cycle of operation, the ECU stores the last cause of shut down and the values of RPM, temperature and pump power at the moment of shutdown. In order to access these measures, it is necessary to reinitialize the ECU (shut down and powerup).

Set the trim down (TrimLow) and push the left button on the display. The ECU will show the cause of shutdown and the measured values at the moment of shut down.

These are as follows:

Diagnosis messages:

UserOff: The engine has been shut down because it has received the shut down

command from the transmitter.

FailSafe: The engine has been shut down because of loss of signal from the transmitter. Once the ECU detects a loss or invalid RC signal for over 0.5 second, it sets engine power to idle, and if after another 1.5 seconds a valid signal is still not received the engine is shut down.

LowRPM: The engine has been shut down because the RPM has dropped below a minimum. Cause could be lack of fuel, air bubbles, problem with the batteries, or defective RPM sensor.

FlameOut: The engine has been shut down because the temperature has dropped below the minimum of (100°C). (If not shut down manually, usually a thermocouple failure).

RCPwFail: Lack of power from the radio receiver

K-86G5 SPECIFICATIONS

Diameter: 76mm / 2.99”

Length: 178mm / 7.00”

Weight: 725g / 1.9lb (not including brackets)

Maximum RPM: 176,000

Thrust: 8.6 kg @ 15°C. / 18.75 lb @ 59°F

EGT: 700°C max

Pump Type: Digital Sbus brushless pump KP300DP

Battery: 11.1v Lipo (At least 2200mah 35C)

Start Time: 15-20 seconds

Fuel consumption: 300g / min (10.58oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-102G5 SPECIFICATIONS

Diameter: 84mm / 3.30"

Length: 203.3mm / 8"

Weight: 910g / 2lb

Maximum RPM: 160000

Thrust: 10kg @ 15°C. / 22lb @ 59°F

EGT: 750°C max

Pump Type: Digital Sbus brushless pump KP500DP

Battery: 11.1V Lipo (At least 2200mah 35C)

Start Time: 10-15 seconds

Fuel consumption: 330g / min (11.64oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-130G5 SPECIFICATIONS

Diameter: 94.5mm / 3.72”

Length: 220mm / 8.66”

Weight: 1200g / 2.64lb (1270g including brackets)

Maximum RPM: 142000

Thrust: 13kg kg @15°C / 28.6lb @ 59°F

EGT: 700°C

Pump Type: Digital Sbus brushless pump KP500DP

Battery: 11.1V Lipo (At least 2200mah 35C)

Start Time: 10-15 seconds

Fuel consumption: 410g / min (14.46oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-142G5 SPECIFICATIONS

Diameter: 92.25mm / 3.63”

Length: 235mm / 9.25”

Weight: 1300g / 2.86lb

Maximum RPM: 142000

Thrust: 14kg @ 15°C / 30.86lb @ 59°F

EGT: 750°C max

Pump Type: Digital Sbus brushless pump KP600DP

Battery: 11.1V Lipo (At least 2200mah 35C)

Start Time: 10-15 seconds

Fuel consumption: 440g / min (15.52 oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-160G5 SPECIFICATIONS

Diameter: 103mm / 4.05”

Length: 251mm / 9.88”

Weight: 1540g / 3.39lb

Maximum RPM: 125000

Thrust: 16kg @ 15°C / 35 lb @ 59°F

EGT: 740°C max

Pump Type: Digital Sbus brushless pump KP600DP

Battery: 11.1V Lipo (At least 2200mah 35C)

Start Time: 10-15 seconds

Fuel consumption: 490g / min (17.28 oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-180G5 SPECIFICATIONS

Diameter: 103mm / 4.05”

Length: 251mm / 9.88”

Weight: 1540g / 3.39lb

Maximum RPM: up to 130000

Thrust: 18kg @ 15°C / 40 lb @ 59°F

EGT: 700°C max

Pump type: Digital sbus brushless pump KP600DP

Battery:11.1v Lipo (At least 2200mah 35C)

Start time: 10~15 seconds

Fuel consumption: 560g / min (17.28oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-210G5 SPECIFICATIONS

Diameter: 112.6mm / 4.43”

Length: 280mm / 11.02”

Weight: 1740g / 3.83lb

Maximum RPM: 121000

Thrust: 21kg @ max RPM / 46.3 lb @ max RPM

EGT: 750°C max

Pump type: Digital sbus brushless pump KP800DP

Battery:11.1v Lipo (At least 2200mah 35C)

Start time: 10~15 seconds

Fuel consumption: 590g / min (20.81oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$300

K-235G5 SPECIFICATIONS

Diameter: 119mm / 4.68"

Length: 278mm / 10.94"

Weight: 2000g / 4.40lb

Maximum RPM: 109,000

Max Thrust: 23.5kg / 51.80lb

EGT: 750°C max

Pump type: Digital sbus brushless pump KP800DP

Battery:11.1v Lipo (At least 2200mah 35C)

Start time: 10~15 seconds

Fuel consumption: 680g / min (23.98 oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$350

K-260G5 SPECIFICATIONS

Diameter: 120mm / 4.72”

Length: 299mm / 11.77”

Weight: 2200g / 4.85lb

Maximum RPM: 112,000RPM

Max Thrust: 26kg ±0.5 (57lb)

EGT: 750°C max

Pump type: Digital sbus brushless pump KP1000DP

Battery:11.1v Lipo (At least 2200mah 35C)

Start time: 10~15 seconds

Fuel consumption: 760g / min (26.80oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$350

K-320G5 SPECIFICATIONS

Diameter: 132.5mm / 5.21″

Length: 335mm / 13.19″

Weight: 2900g / 6.39lb

Maximum RPM: 100,000RPM

Max Thrust: 32kg / 71lb

EGT: 730°C max

Pump type: Digital sbus brushless pump KP1200DP

Battery:11.1v Lipo (At least 2200mah 35C)

Start time: 10~15 seconds

Fuel consumption: 870g / min (30.68oz)

Fuel: Diesel, Jet A1, Kerosene

Lubrication: 5%

Maintenance cycle: 25 hr US$350

K-450G5 SPECIFICATIONS

Diameter: 152.6mm / 6.00"

Length: 374mm / 14.72"

Weight: 4.0kg / 8.81lb

Maximum RPM: 90,000

Max Thrust: 45kg / 99.20lb

EGT: 730°C max

Pump type: Digital sbus brushless pump KP1250DP

Battery:11.1v Lipo (At least 2200mah 35C)

Start time: 10~15 seconds

Fuel consumption: 1100g / min (38.80oz)

Fuel: Diesel, Jet A1, Kerosene Lubrication: 5%

Maintenance cycle: 25 hr US$450

MAINTENANCE CYCLE INCLUDES

- Turbine dismantle
- Replace of bearings and other components determined by technical staff
- Balance correction
- Cleaning of injectors and chamber
- Turbine assembly
- Test and adjust if necessary

TROUBLESHOOTING

High and Rough Idle –

1. Please relearn RC
2. If relearn RC didn't help, run engine at full RPM, take a look at the value of PW, multiply 1.2, reestablish new pump limit under RUN menu and relearn RC.
3. If above didn't help either, you may have a fuel pump problem, please send it in for evaluation.

ECU Fails to Learn RC

Go to the radio screen, Page 1 of 6 on the GSU and make sure you have a reading on "RX: xxx µs" when the TX is set in the 3 relevant positions (stop, idle, full power).

If Zero, then it is most likely a hardware problem. The throttle lead may be damaged or in the wrong port or the ECU or Receiver is defective.

If same reading is in all 3 positions, the throttle lead is connected in the wrong channel on the Receiver.

If not zero then you should check the value of the readings.

STOP should be between 900µs and 1000µs, Idle should be between 1200µs and 1400µs and full power should be between 1900µs and 2100µs

Idle should be in between STOP and Full, at least 100µs higher than STOP position and 500uS lower than full power position, and be stable, same readings should be obtained after resetting the TX and in all flight modes. For example, an AUTOTRIM function will center the trim each powerup, changing the IDLE position.

Readings outside these limits mean an improper setup on the transmitter, and should be corrected on transmitter. Your ATV settings on the throttle channel need to be set to 100% and -100%.

If all of these items are correct, the Learn RC process may have been done incorrectly.

The usual failures done during procedure are not using the "+" key to confirm the position, or skipping one step, or raising the stick before the trim, some model set ups have a security function for electric flight where the stick is disabled if the trim is not raised first, to prevent sudden startup of electric motors that can injury the operator.

CONTACT INFORMATION

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Email Sales and Administrative Only: mail@kingtechturbines.com

Website: www.kingtechturbines.com

Tech Support: Barry's Cell: 626-399-7588 voice/text

Facebook Messenger: barrymhou

Line: barryhou1

Tech Support: Dirk's Cell: 626-808-6122 voice/text

Engine Model: _____

Serial Number: _____

- Before you call for tech support, make sure your engine is properly registered at www.kingtechturbines.com and with above information ready.
- When sending in an engine for service, please make sure you have included at least the ECU and a Service Request Form (following page or www.kingtechturbines.com) filled out to avoid delay. Completed service request forms ensure that your turbine is serviced and diagnosed correctly. Information passed verbally in person or over the phone does not become part of the permanent record.
- When checking up on status of an engine sent in for service, do not call, please email with history and serial number of engine. Do not call to see if we have received the engine, you will have that information through tracking.
- Service Form available on www.kingtechturbines.com

KingTech Turbines Co., Ltd.

No.198, Ln. 818, Gongxing Rd.

Pingtung City, Pingtung County 90086

TAIWAN

Phone: Phone: 886-8-751-0065 (This is an International call. Check with your provider for additional charges)

Revision Date: Mar. 2024

GLOSSARY

- ECU – Engine Control Unit (Detail description on Description of the Internal ECU)
- EGT – Exhaust Gas Temperature
- FADEC – Full Authority Digital Engine Control. This is another term for ECU.
- GSU – Ground Support Unit. The KingTech Series 2 GSU is an LCD touch screen display that allows for viewing of turbine operation values and allows for access to other maintenance, setup and troubleshooting functions. Note: the Series 2 GSU is only compatible with a KingTech Series 2 ECU.
- RX – Radio receiver. The device in your RC Aircraft that receives radio signals from your transmitter and acts a connection and control point for servos and other devices such as your turbine.
- TX – Radio transmitter that has control inputs such as levers, dials and switches which send control inputs via radio wave transmission to the Radio Receiver in the RC Aircraft.
- UAT – Universal Air Trap. This device eliminates air bubbles from entering the fuel line leaving the fuel supply tanks before they enter the fuel pump and turbine causing a likely flameout.
- µs – This is the symbol for microseconds. A microsecond is equal to one millionth of a second.