

TeleMaster Electro,

With Flow control



Airplane flight manual

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General

1.1 Introduction

The airplane flight manual is intended to provide the pilot with the necessary information to conduct safe and proficient operation of the airplane. This aircraft was designed as a research platform and is equipped with an active flow control system. When activated this system allows the plane to operate at increased angles of attack without the loss of flight controls. It accomplishes this by releasing pressurized air from microjets (orifices) located along the top of the airfoil, figure 1.

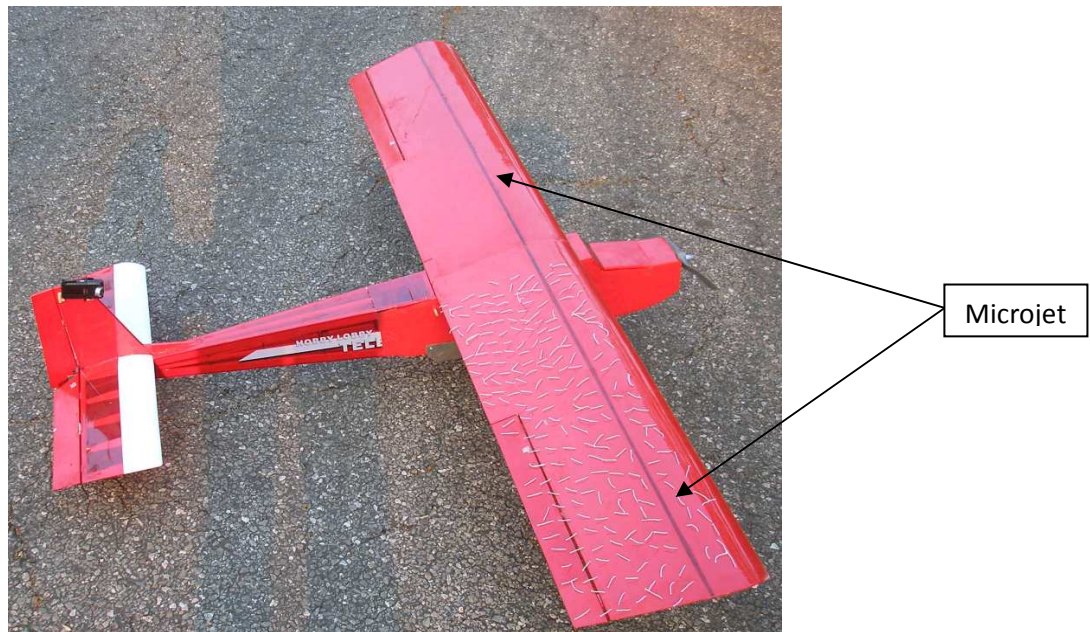


Figure 1, Microjet are located along the top surface of the wing. Compressed air is released through the Microjets at approximately 10psig.

1.2 Warnings, Caution, notes, and other definitions

The following definitions apply to warnings, cautions, and notes used in the light manual:

WARNING

means there exists a risk of serious injury to the operator or bystanders if the procedure/limitation is not observed.

CAUTION

means that damage to the aircraft or equipment may occur if the procedure/limitation is not observed.

NOTE

Draws attention to an item that is unusual of important.

1.3 Engine

Power 60 Brushless Outrunner, Electric motor

Specifications;

Diameter: 50mm (2 in)

Case Length: 62mm (2.4 in)

Weight: 380g (13 oz)

Maximum Operating Temperature: 220 degrees Fahrenheit

Maximum Burst Current duration is 30 seconds

Shaft Diameter: 6mm (.24 in)

Kv: 400 (rpms per volt)

I₀: 2.7A @ 10V (no load current)

R_i: .06 ohms (resistance)

Continuous Current: 40A

Max Burst Current: 60A

Watts: up to 1200

Cells: 16-24 Ni-MH/Ni-Cd or 5-7S Li-Po

Recommended Props: 14x8 to 16x10

Brushless ESC: 80-Amp

1.4 Batteries

Lithium Polymer Batteries,

Number of Batteries: 2

2400 mAh, 3 cell Batteries

Connected in series

Total voltage 25.2V (24.96-25.32)

1.5 Motor Controller

Jeti, Advanced 70 Plus

Weight: 38g

Max Current: 70A

Size: 52mm x 25mm x 12mm

1.6 Radio

Futaba 7CAP, 7 channel radio

Specifications;

T7CAP

I system: 2-stick, 7 channels

Frequency: 50 or FM/PPM or PCM

Switchable 9.6V NT8S600B Ni-Cd battery 250mA

Servo S3151 (Standard, digital)

Control system: Pulse width control, 1.52 ms neutral

Power requirement: 4.8V (from receiver)

Output torque: 43.0 oz-in(3.1 kg-cm) at 4.8V

Operating speed: 0.21 sec/60 at 4.8V

Size: 1.59 x 0.79 x 1.42 (40.5 x 20 x 36.1 mm)

Weight: 1.48oz(42g)

1.7 Battery Charge

Micro Control Balance charge, Model # DBC-14

Specifications;

Power input: 11V-15V

Maximum working current: 6 Amp

Number of Cells: 4

1.8 Supply Tank

Luxfur 6 Composite tank

Maximum pressure: 3000psi

Internal Volume: 68ci

1.9 Pressure regulator

Victor

Maximum pressure: 3000psi

1.10 Valves

Solenoid Valve model 442P

Specifications;

Operating voltage: 24V

Minimum orifice size: ¼ in

1.11 Propeller

15in x 10in composite propeller

1.12 Airplane weight

Maximum takeoff weight 14.9lbs

Normal operating procedures

This section describes how to operate the airplane and its systems. All of the following procedures should be followed in order to conduct a safe and productive flight. This section begins with the preflight groundwork and continues step by step through all aspects of a flight.

2.1 Charging The Batteries

To ensure adequate battery power for the remote and receiver the batteries should be charged for 15 hours. Figure 2 shows the charging setup. This should allow several flights before the radio indicated that the battery is low. The batteries should be discharged at least every 8 weeks to prevent a condition called memory. This can be accomplished by operating the plane's servos on the ground until the system turns off from a low battery condition. The radio and receiver batteries may be charged unattended.

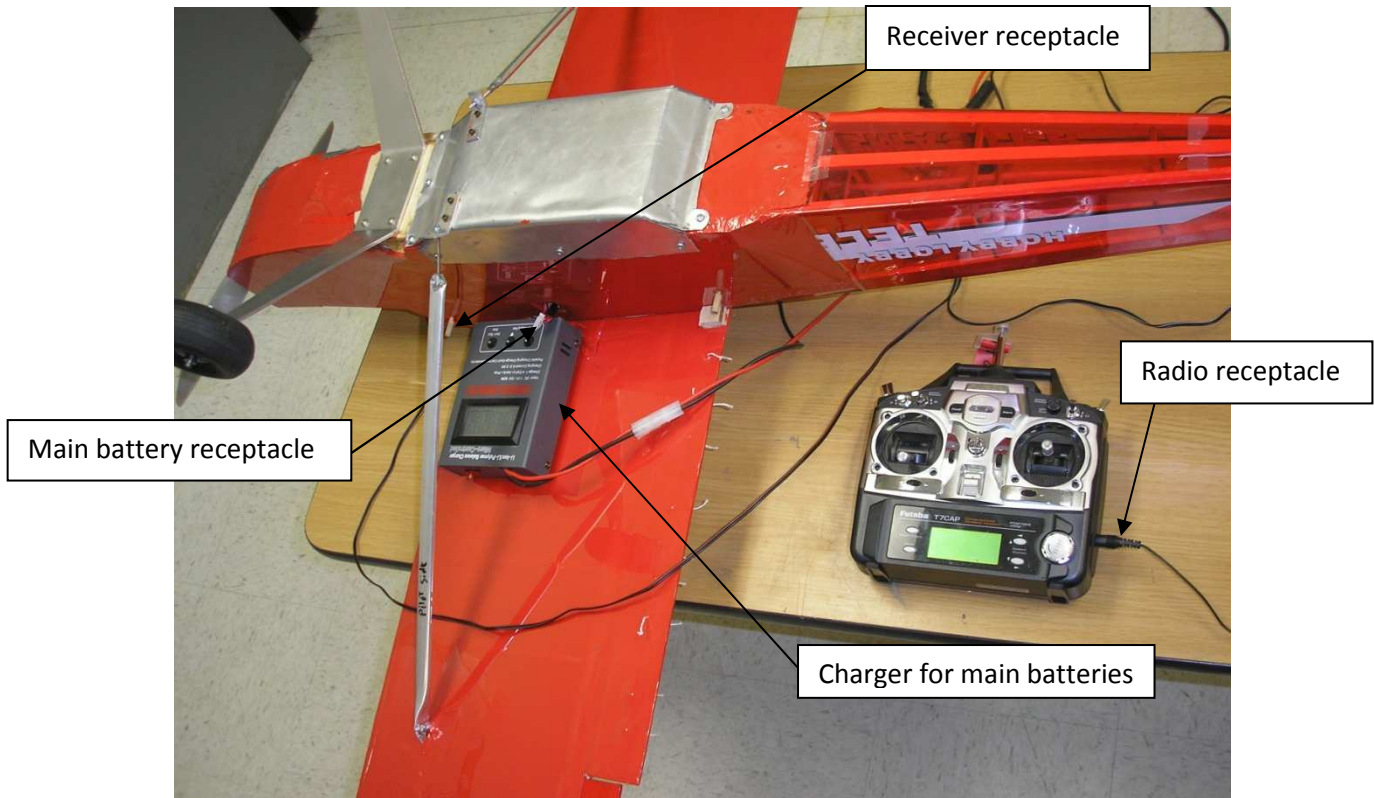


Figure 2, Charging setup. The main batteries must not be charged unattended. However, the radio and receiver batteries may be charged unattended.

The main batteries can be charge at the same time as the radio batteries, Figure 2. The main batteries are Lithium Polymer and are located under the wing just above the compressed air tank.

WARNING

Lithium polymer batteries are prone to catch fire. For this reason these batteries should not be charged unattended. The plane should not be charged in a place where a fire could cause death or injury. For this reason it is recommended that the plane be charge outdoors on a large piece of concrete.

To charge the main batteries place the plane inverted on a soft surface such as carpet or blanket. Connect the battery charger to one of the battery pack receptacles. These receptacles have 5 pins and should be connected to the five pin connector on the charger, figure 2. Once connected ensure that the batteries cells read greater than 2.7 Volts on the L.E.D. display. One charging port will read 0 because there are only three cells per battery and the charger is capable of charging a four cell battery. If a cell reads less than 2.7 Volts the charger will not charge that cell and no attempt should be made to charge the cell using another method. Lithium Polymer batteries become unstable when discharged below 2.7 Volts. Batteries that have been discharged below 2.7 should be removed from service.

NOTE

The main batteries should not be discharged bellow 3.0Volts. The most effective way to avoid this is to monitor the battery level after every flight and correlate this to the duration of the flight. When fully charged the batteries will last for ten minutes or more.

The main batteries should also be visually inspected to ensure flight worthy condition. There should be no evidence of wire shorting or overheating. Additionally, the batteries should not be deformed or look enlarged as if inflated. If any of these conditions exist properly dispose of the batteries immediately.

2.2 Weight And Balance

If the plane has been modified in any way such as adding any weight or moving internal components around the weight and balance should be checked. Check the weight by placing the plane on a scale capable of measuring 16lbs \pm 0.5lbs. The plane should weigh less than 14.9lbs.

CAUTION

The airplane must be balance properly to ensure stable flight characteristics. If the plane is not within the prescribed limits do not fly it.

When properly balanced the plane will sit level when placed on the plane balance. A level condition exists when the horizontal stabilizer is at the same height above the ground as the main wing, figure 3. The balance point of the plane should be between 4.25 inches to 5 inches behind the leading edge of the main wing. This region is known as the balance box.



Figure 3, Ensure proper balance by lifting the plane from its wing. Determine the location of level balance. This should reside in the designated balance box.

2.3 Range Testing

Before each flight the plane radio and receiver should be checked for range. With the radio antenna RETRACTED have one person monitor the plane while another person walks away from the plane while operating the servos. A distance of 100ft must be reached before the receiver loses signal. Repeat this test, this time hold the airplane and test the engine for proper range control.

2.4 Flight Conditions

The plane has demonstrated landing and takeoff with a 8 mph cross wind. However, maximum safe crosswind component will depend on the experience of the pilot. The plane should not be operated in rain. The plane should also be operated when there is sufficient light.

2.5 Filling The Compressed Air Tank

The tank is filled by connecting the compressed air hose to the tank inlet, figure 3.

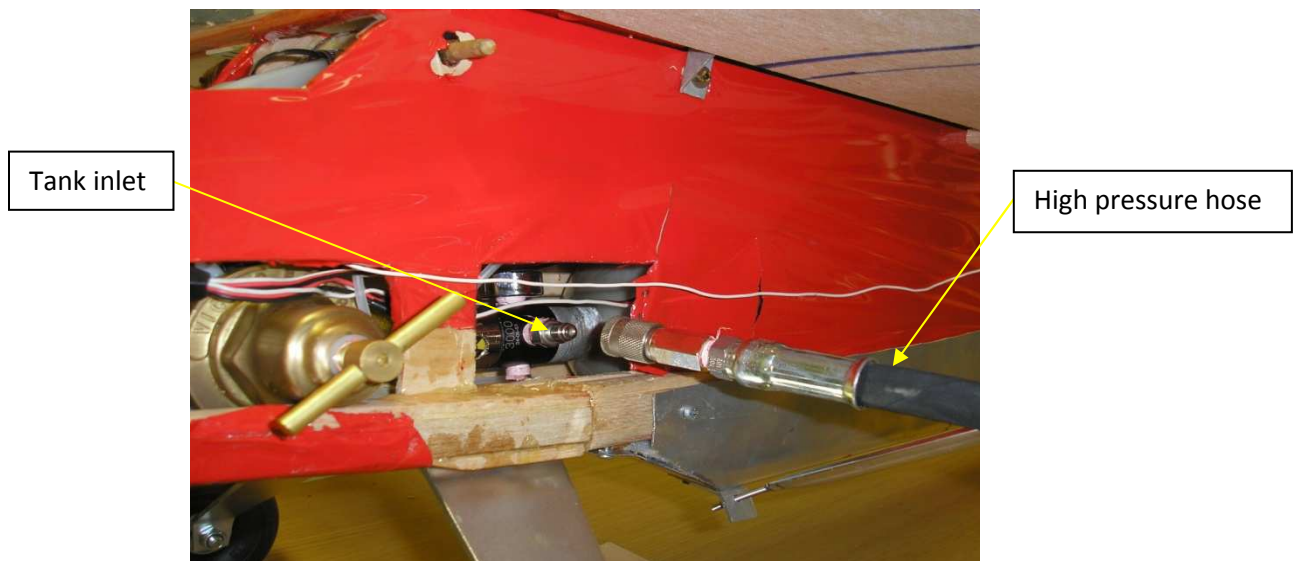


Figure 3, to fill the compressed air tank connect the high pressure hose to the tank inlet.

WARNING

Fill the tank at no more than 100 psi per second. Do not exceed 3000psi.

2.6 Preflight

When the preceding procedures have been completed the plane is ready for preflight. First the plane should be visually checked for damage missing parts. Next check the wheels to ensure free rotation. Once this is done the plane is ready to be turned on.

WARNING

The plane must be activated in the following order. First turn the remote on. Then place the receiver switch located on the plane in the on position. Before connecting the main batteries make certain the throttle is in the cut off position. Connect the main batteries while staying clear of the propeller, figure 4.

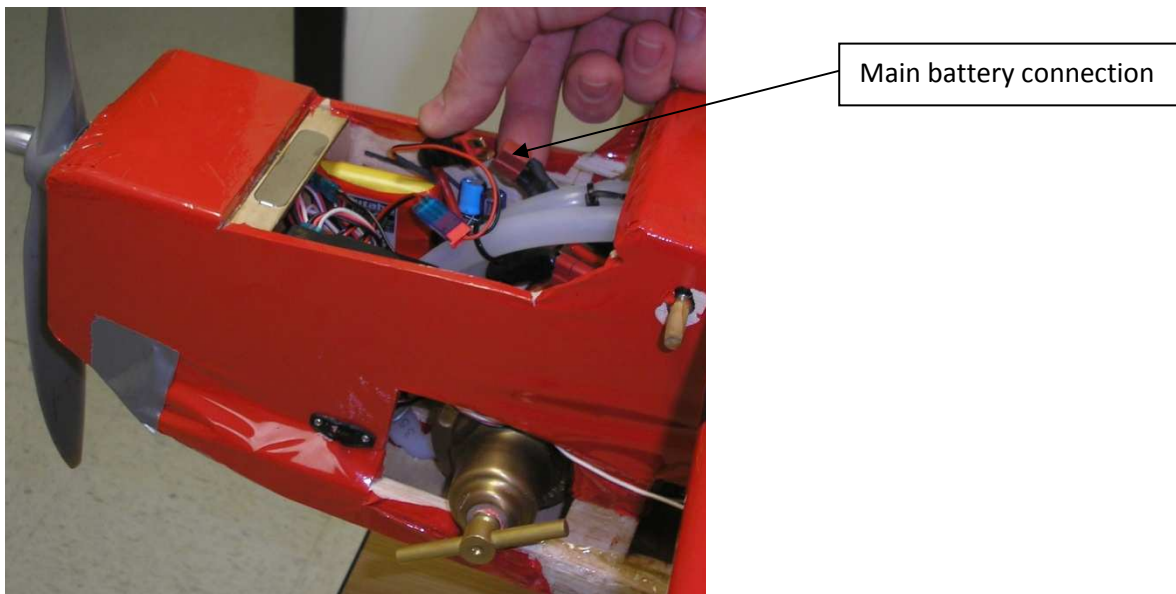


Figure 4, Connect the main battery last. Stay clear of the propeller.

The plane is now activated. Check that the flight controls are free and correct. Then hold the plane and apply full power to check for proper operation, close the throttle. Turn the air supply system on and

quickly turn it off. Any irregularities warrant further investigation. If all systems operate normally the plane is ready to fly.

2.7 Setting the microjet pressure

To set the desired microjet pressure attach a pressure gauge to the pressure port tubes located next to the tank fill port. After attaching the tubes to the ports and turn on the microjets from the radio, switch C or E depending on setup. Next adjust the regulator for the desired pressure.

2.8 Takeoff And Landing

The plane requires significant takeoff distance so all of the runway should be utilized. The plane should takeoff against the wind to reduce takeoff distance. During the takeoff roll full down elevator should be applied to keep the tail wheel firmly on the ground. Full power should be used for takeoff and climb out if clearing an obstacle. For added safety discharge the compressed air tank before landing.

WARNING

Do not fly the airplane above or near any person or property.

2.9 After Landing

Immediately after landing disconnect the main batteries. Then turn the receiver switch off. Last turn the remote off.

Checklist for Telemaster Electro, with flow control

Preflight

Main batteries-Charged
Radio batteries-Charged
Receiver batteries-Charged
Weight and balance-Check
Range test-Check (at least 100ft with antenna down)
Compressed air tank-full (max 3000psi)
Camera (if installed) securely mounted-Check
Engine securely mounted-Check
Wing attachment-Check

Run up

Flight controls free and correct-Check
Microjets activation-Check
Engine (full power)-Check

Before Takeoff

Wind Direction and speed-Check
Traffic-Check

Takeoff

Use full elevator deflection (down) until liftoff
Use full length of the runway
Take off speed approximately 26 mph

Landing

Ensure compressed air tank is empty
Use full length of the runway