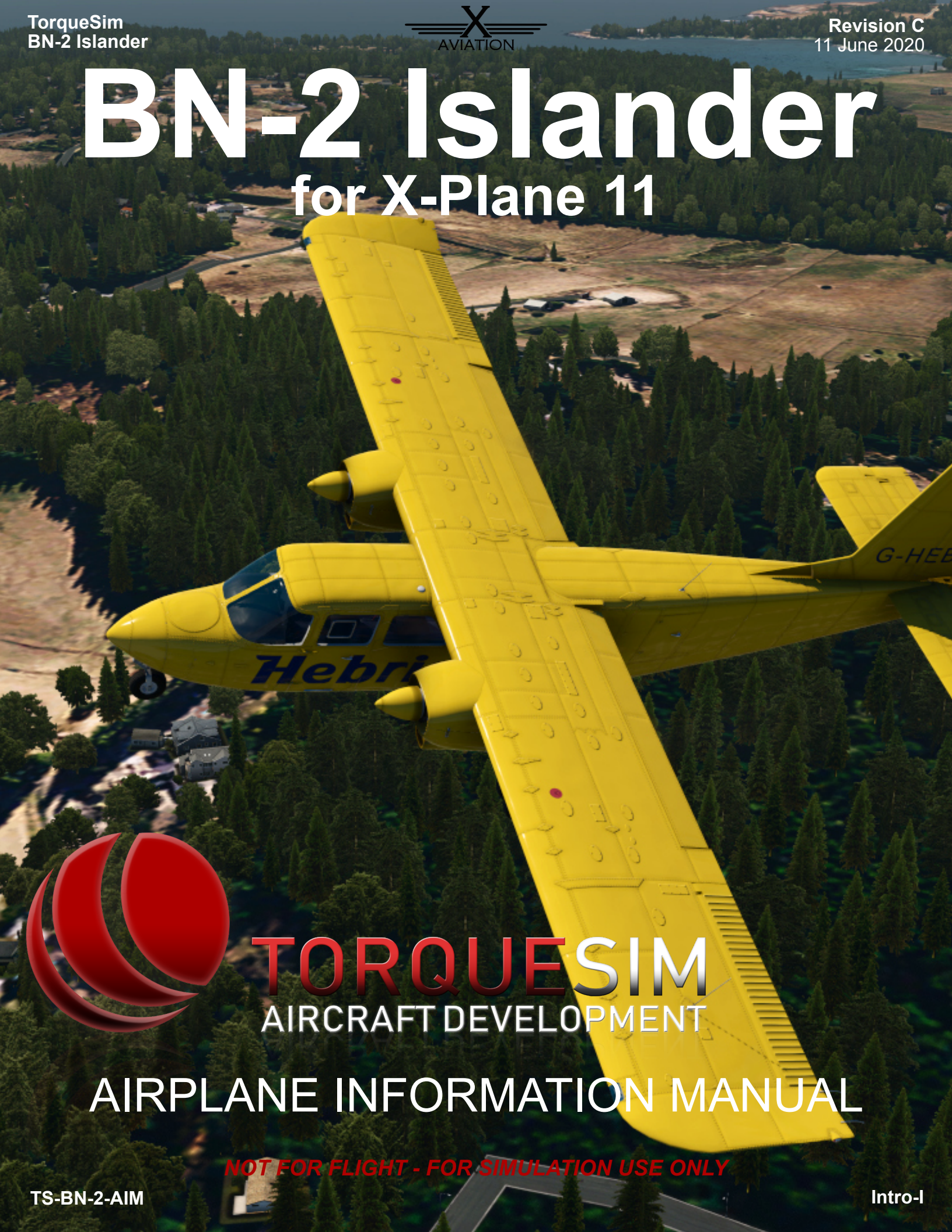
Revision C
11 June 2020

BN-2 Islander

for X-Plane 11



TORQUESIM
AIRCRAFT DEVELOPMENT

AIRPLANE INFORMATION MANUAL

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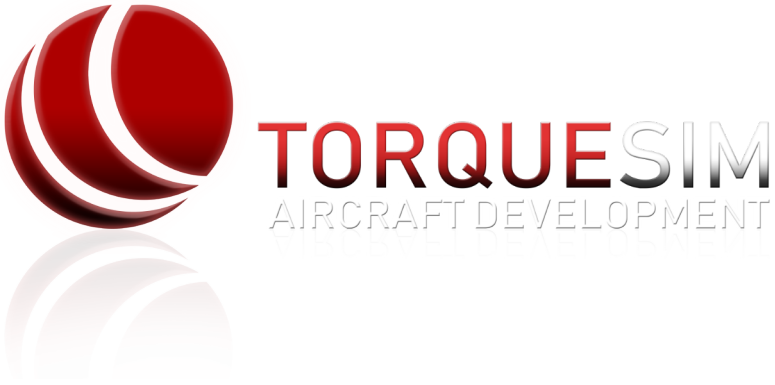

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Acknowledgments

Special Thank You

Valentin for amazing sound recordings

Saso Kiselkov for libacfutils (https://github.com/skiselkov/libacfutils), and for help all along the development process!

Our Customers: Thank you for supporting us – We look forward to integrating your feedback and making this plane even better!

Our Testing Team

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Cooper LeComp *Systems Development, Avionics, Miscellaneous Tuning*

Steaven McKenzie *FMOD Sounds, 3D People, Art Consultation*

The BN-2 Islander is Proudly Sold Exclusively through X-Aviation

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Section 1

General

Table of Contents

Introduction

The BN-2 Islander is a light twin designed in the 1960's as a regional airliner and utility aircraft, and is still widely flown today. Thanks to its rugged construction and excellent short field performance, this aircraft can be found with operators all over the world. The model simulated is the BN-2B-26, equipped with 2 Lycoming O-540 engines. The plane has an 1800 pound useful load with full tanks and can carry 9 passengers on missions with the shortest of runways. Additionally, a 730 nautical mile maximum range and 140 knot cruising speed give the Islander enormous operational flexibility. This airplane is the perfect addition to any simmer's hangar!

The TorqueSim rendition of this fantastic aircraft includes many simulated features designed to enhance your simulation experience. In addition to the beautiful 3D and textures, there are many custom systems including a fully custom electrical system, fuel manager, lighting, and more! Avionics were picked to represent a true workhorse aircraft. The KFC225 Autopilot, GTX345 Transponder, KR87 ADF, and M800 Chronometer were build custom for the aircraft. The default GNS530 and GNS430 is also installed as the GPS of choice.

Customer Support Information

X-Aviation (Sales, Installation, Activation): torques.im/xasupport

X-Pilot Forum (Support, Discussion, Help): torques.im/forum

TorqueSim (Aircraft Problems, Comments): torques.im/support

Bug Reporter (Discovered Issues): torques.im/bugs

The Airplane

Engine

Number of Engines 2
Number of Cylinders 6
Engine Manufacturer ..... Lycoming
Engine Model O-540-E4C5
Fuel Metering ..... Carburetor
Horsepower Rating ..... 260 hp @ 2700 rpm
Bore, Stroke (Inches) 5.125, 4.375
Displacement (Inches) 541.5
Compression Ratio 8.5:1
Fuel Consumption (59% Power, USG/hr) 11.4

Propeller

Propeller Manufacturer ..... Hartzell
Propeller Type ..... Constant Speed, Two Blade
Model Number HC-C2YK-2B/C8477-4
Feathering ..... Fully Feathering

Fuel

Total Capacity ..... 138 U.S. Gallons
Approved Fuel Grades:
100 LL Grade Aviation Fuel (Blue)
100 (Form. 100/130) Grade Aviation Fuel (Green)

Oil

Oil Capacity (Sump) ..... 12 U.S. Quarts
Oil Grades:
All Temperatures ..... SAE 15W-50, 20W-50, or 20W-60
Below 40ºF (4ºC) ..... SAE 30
Above 40ºF (4ºC) ..... SAE 50

Performance

(At 6,300 lb. Take-Off Weight)

Take-off Run (ft)	560
Take-off Distance over 50 ft. obstacle (ft)	1,090
Minimum Control Speed - Single engine (IAS kts)	40
Best Rate of Climb Speed (IAS kts)	65
Rate of Climb (fpm)	1,050
Best Angle of Climb Speed (IAS kts)	65
Best Single Engine Rate of Climb Speed (IAS kts)	65
Single Engine Rate of Climb (left engine feathered) (fpm)	190
Absolute Ceiling (ft)	16,200
Service Ceiling (ft)	14,600
Single Engine Absolute Ceiling (left engine feathered) (ft)	5,600
Single Engine Service Ceiling (left engine feathered) (ft)	2,500
Top Speed (IAS kts)	183
Optimum Cruising Speed (IAS kts)	140
Stalling Speed - Flaps down (IAS kts)	38 to 43
Landing Roll (ft)	450
Landing Distance over 50 ft. Barrier (ft)	960
Cruising Range (maximum at 59% power at 13,000 ft) (miles)	840

Section 2
Design Information
Table of Contents

Electrical System

The electrical system on the BN-2B-26 Islander consists of 1 lead-acid battery, and 2 alternators, one on each engine. The aircraft is equipped with three busses, the Emergency Bus, the Main Bus, and the Avionics Bus.

Battery

The Islander is equipped with one 25-amp-hour lead-acid battery. This battery is capable of powering the plane for short durations before engine start-up and after engine shut-down. During phases of flight when the alternators are running, they should be engaged and the battery will charge. In the case of dual-alternator failure, the battery is capable of powering essential systems for a duration based on electrical load, landing as soon as possible and reducing electrical usage to the absolute minimum is required.

Alternators

The Islander is equipped with two alternators, one on each engine. Both alternators are capable of providing 50 amps of current to the aircraft. The electrical load will naturally balance between both alternators when both are running.

Emergency Bus

The Islander's main electrical bus is the Emergency Bus. The top row of circuit breakers are tied to the electrical bus.

The electrical items on this bus are:

- Auxiliary Fuel Pump 2 (Port and Starboard)
- Fuel Contents Indicators (Port and Starboard)
- Nav Lights
- Map Light
- Turn and Bank Indicator
- Stall Warning
- Stall Heater
- Pitot Heater
- Tachometer
- Audio Panel
- VHF 1 Radio (Part of GNS 530)

Main Bus

The Islander's secondary bus is the Main Bus. The circuit breakers on this bus are on the left and middle of the second and third row, and the whole of the auxiliary panel. The bus is interconnected through the Main to Emergency Busbar Isolation.

The electrical items on this bus are:

- Auxiliary Fuel Pump 1 (Port and Starboard)
- Landing Light (Port and Starboard)
- Cabin Lights
- Panel Lights
- Beacon Lights
- Wing Flaps
- Tank Selector (Left and Right)
- Starter Relays
- Engine Cluster (Port and Starboard)
- Airframe deice
- Cabin heat
- Rudder Servo
- Aileron Servo
- Elevator Servo
- Electric Trim

Avionics Bus

The Islander's tertiary bus is the Avionics Bus which powers the main avionics onboard. The Avionics Bus is connected to the Main Bus through the Avionics switch. The Avionics switch should be turned off during the connection and disconnection of alternators and when starting the engines.

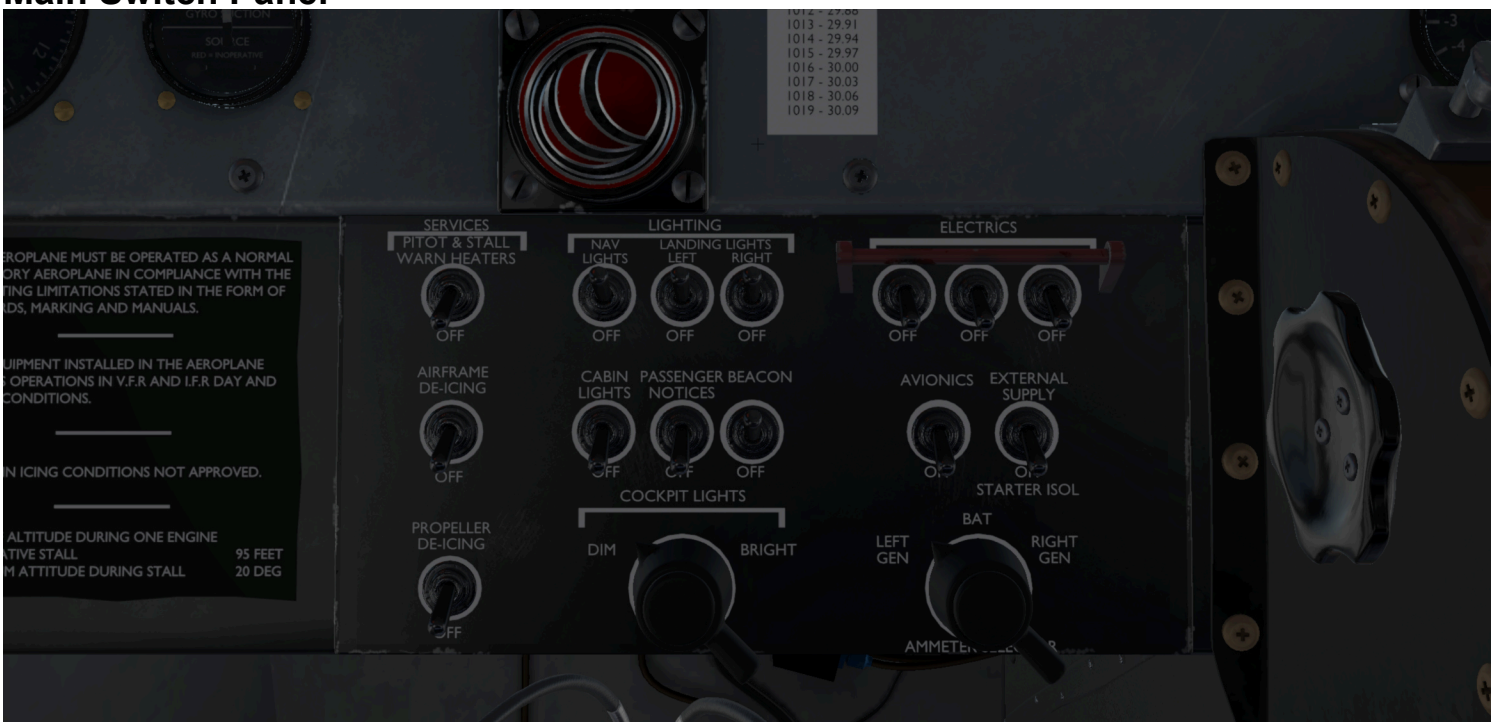
The electrical items on this bus are:

- ADF
- VHF 2 Radio (Part of GNS 430)
- Marker Beacon
- Autopilot (KFC225)
- Transponder (GTX345)
- RMI
- GPS 1 (GNS 530)
- GPS 2 (GNS 430)
- DME

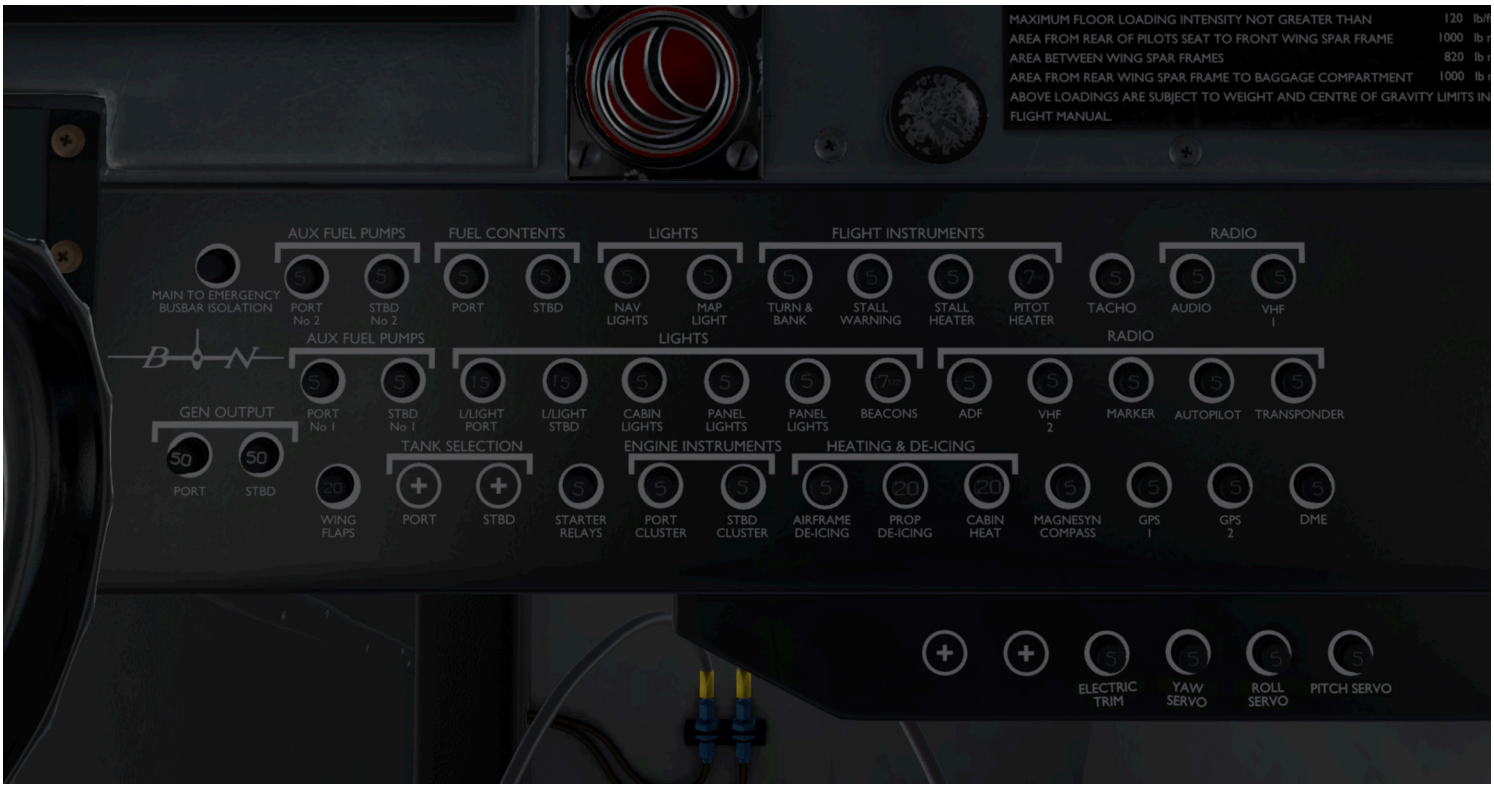
Starter

The starter is connected to the battery through the External Power/Starter Isolation switch. This switch must be turned on for the starters to function. This is a safety feature to prevent inadvertent starter engagement.

Main Switch Panel



Circuit Breaker Panel



Engines

The Islander uses two Lycoming O-540-E4C5 engines putting out 260hp each. Each engine is equipped with dual magnetos, a generator, and engine-driven fuel pumps and vacuum pumps.

The Islander is capable of flight on a single engine, though maximum altitude and climb performance are severely reduced, and this mode should not be used in any case except emergencies.

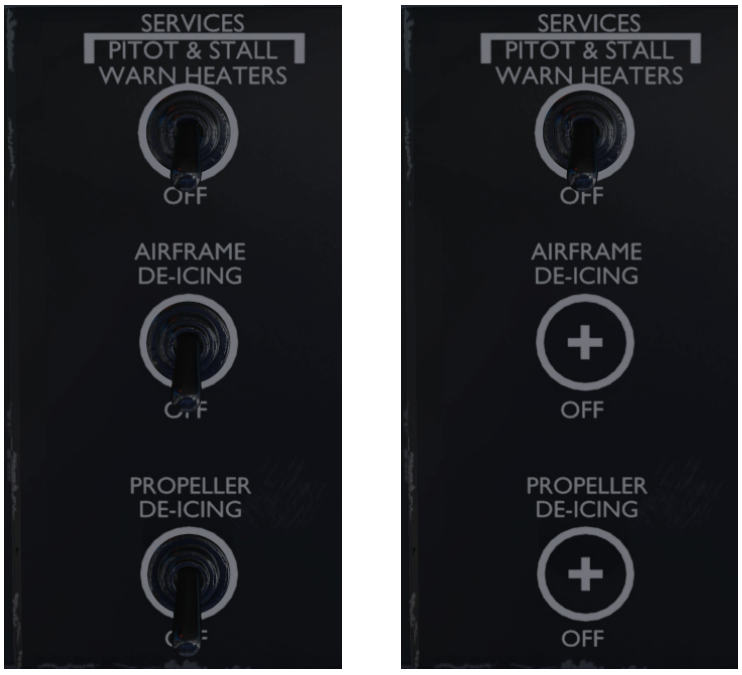
Airframe Systems

Deicing Systems

This aircraft can optionally be equipped with anti-ice boots for the wings, tailplane, rudder, and propeller leading edges for flight in cold climates. The Islander is not certified for flight into known icing, however, and no such maneuver should be attempted.

|The deicing systems can be turned on or off from within the UI Menu system accessible from the left edge of the screen. While they are off, all deice boots, switches, and associated systems are hidden from view and cannot be activated.

Pitot and stall warning heating systems come standard with the aircraft.



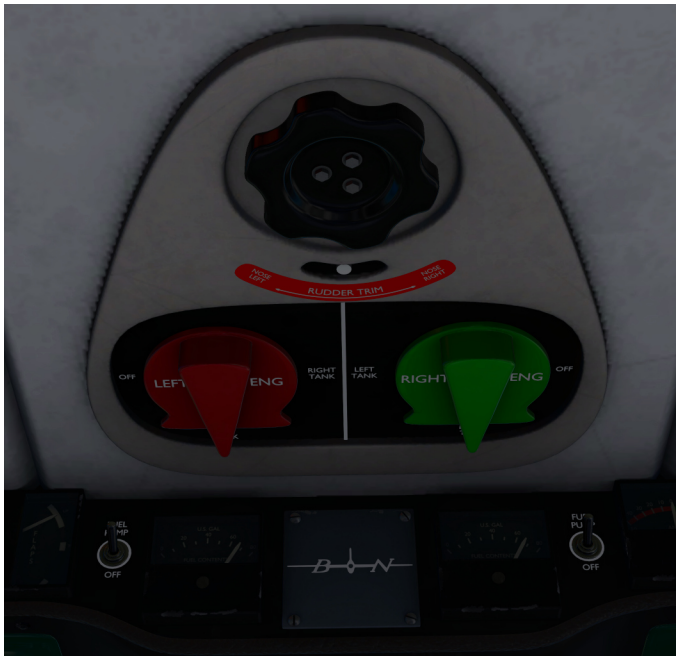
Deicing switches when equipped and hidden

Fuel System

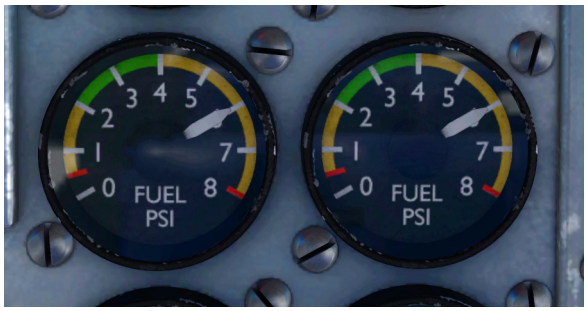
The wings each house a single integral fuel tank able to hold 65 gallons of Avgas usable, for a total of 130 gallons. Dual fuel selectors overhead the cockpit allow for each engine to feed from either tank independently.

Under normal flight conditions, crossfeed is not required, and the tanks should drain equally throughout a flight. It is not recommended to apply single-engine fuel tank selection procedures during flight (ie changing tanks every 20 minutes).

During startup, takeoff, and and landing, the auxiliary fuel pumps should be operated to support and back up the engine-driven fuel pumps. Auxiliary fuel pumps in this model will boost fuel pressure to around 6 psi.



Fuel Selectors and Fuel Pump Switches



Fuel Pressure Indicators

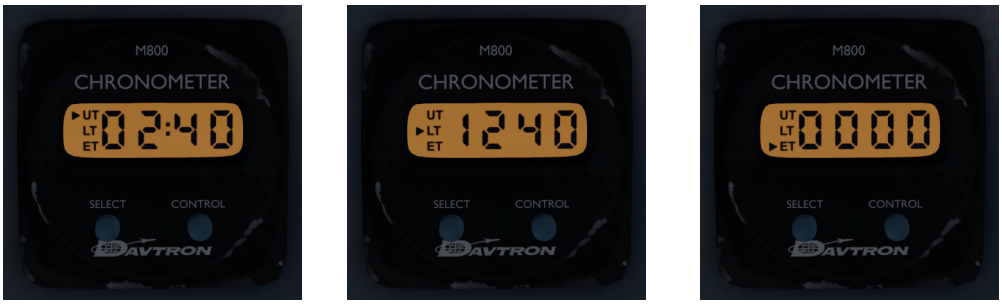
Dual Vacuum System

The vacuum system of the Islander is cross-tied. Should one pump fail, the second one will maintain enough suction in the system to allow normal operation of all dependent instruments.

Avionics

M800 Chronometer

The M800 Chronometer has all three modes (UTC, Local Time, and Elapsed Time) are simulated. The mode “UT” will show the Simulator’s UTC time. The mode “LT” will show the Simulator’s Local time. The mode “ET” will show the Elapsed time, both count down and count up. To switch between modes, click the “Select” button. In the ET mode, clicking the “Control” button will start a count up timer. Clicking again will stop the timer, and clicking once more will reset the timer. Clicking and holding the button for three seconds will enter count down set mode. The “Control” button will adjust the digit, then “Select” will cycle through the four digits before starting the timer.



M800 Chronometer in UT mode, LT mode, and ET mode

KFC225 Autopilot

The KFC225 Autopilot includes a Yaw Damper, Heading Hold, Nav mode, Approach mode, Reverse Course mode, Altitude Hold mode, and Vertical Speed mode. The autopilot is equipped with an altitude preselector. Rotating the “Alt Sel” knob will adjust the altitude, the outer knob in 1000 ft increments, the inner knob in 100 ft increments.

> To arm the altitude selected, you **MUST** click the “ARM” button, otherwise the autopilot will not capture the altitude selected.

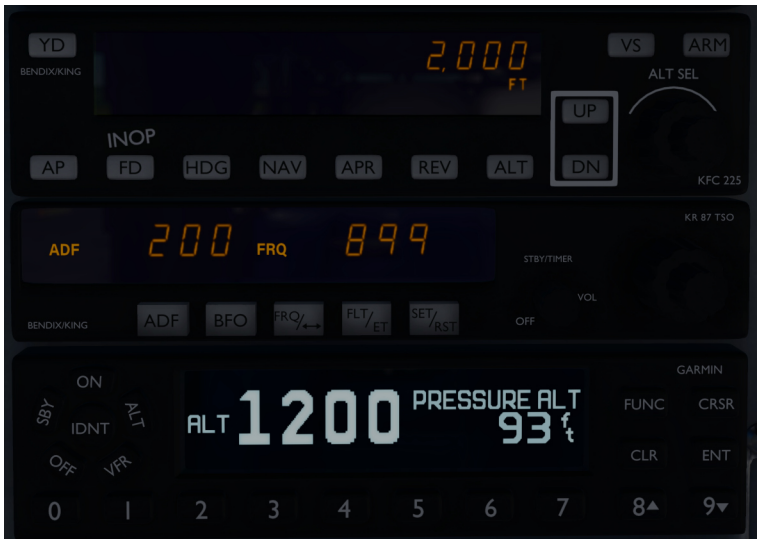
KR87 ADF

The KR87 Mode includes the primary ADF selection and standby ADF selection. Rotating the right knob will adjust the standby selection, the outer knob incrementing the selection in 100 increments, the inner knob in 1 increments. Clicking the FRQ/<-> Button will switch the standby frequency into the primary and the primary frequency into the standby.

GTX345 Transponder

The GTX345 Transponder is equipped with 3 main modes, Standby (SBY), On, and Altitude Reporting (ALT). Clicking these three buttons will set the transponder mode. The IDNT button will Ident the transponder. The VFR button will set the transponder to 1200. Clicking the button a second time will switch to 2000.

Pressure altitude is displayed to the right of the transponder code selection.



KFC225, KR87, and GTX345

Cockpit Features

The 1.1 update of the Islander has a few new cockpit features, which are outlined here.

HDR Lights

The Islander has HDR lights

Overhead Utility Lights

The overhead utility lights for both the pilot and copilot are functional. A small switch on the back of each activates the light itself, and the beam can be directed almost anywhere in the cockpit by clicking on and dragging the body of the light itself.

By nature of their function, these are HDR lights, which means that effects settings in X-Plane must be ‘High’ or ‘Maximum’. On ‘Medium’ or below, these lights will not work! This is a limitation of X-Plane’s rendering system.

Avitab Integration

The excellent Avitab tablet has been integrated with the 3d cockpit. Initially, it starts out hidden from view on every flight, but can be brought up by clicking on the glare-shield edge above the engine gauges.

By clicking and dragging the top and left edges of the tablet, it can be moved to a variety of positions above the glare-shield.

InHg/mmHg Switch

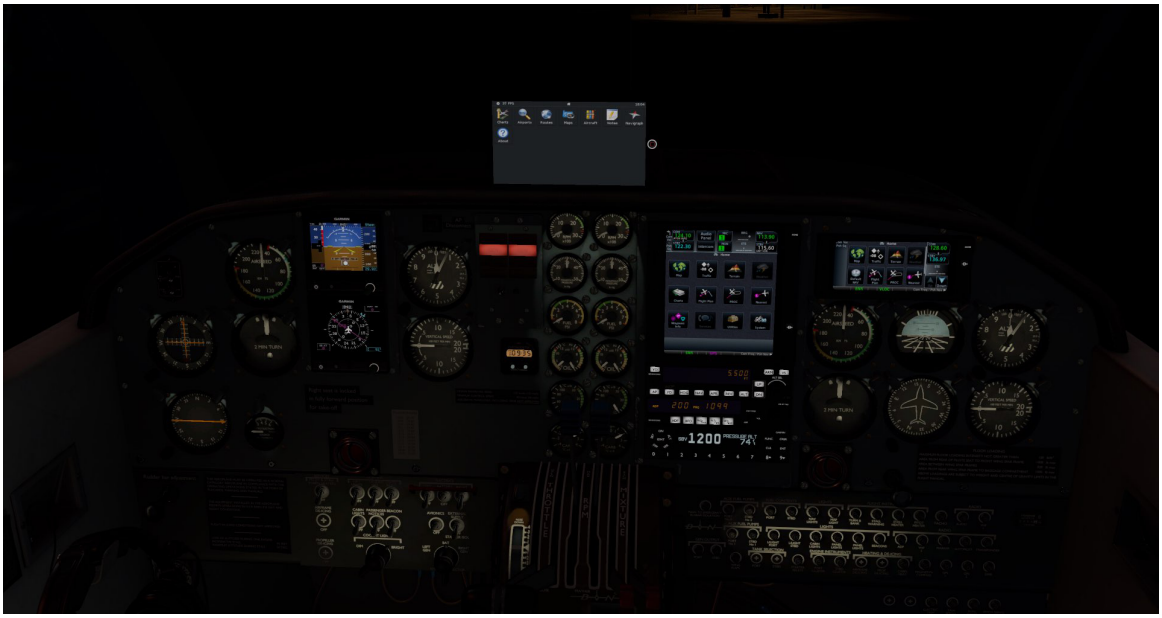
A click on the face of the pilot side altimeter switches the baro display between inches of mercury and millimeters of mercury.

Automatic Laminar 530/430 to RXP GTN 750/650 Change

This function requires a correct installation of the RXP GTN 750 and/or GTN 650 to work. If the automatic switch does not happen, please ensure that your RXP products are installed correctly. We cannot give assistance for any incorrect installation.

If you own (and have correctly installed) the RXP GTN 750 or GTN 650, you can use these in the Islander 3d cockpit. Simply select them from the Plugins menu, and assign any of the 7xx to GTN1 and any of the 6xx to GTN2. The RXP GTNs are integrated with both the normal and G5 versions of the Islander.

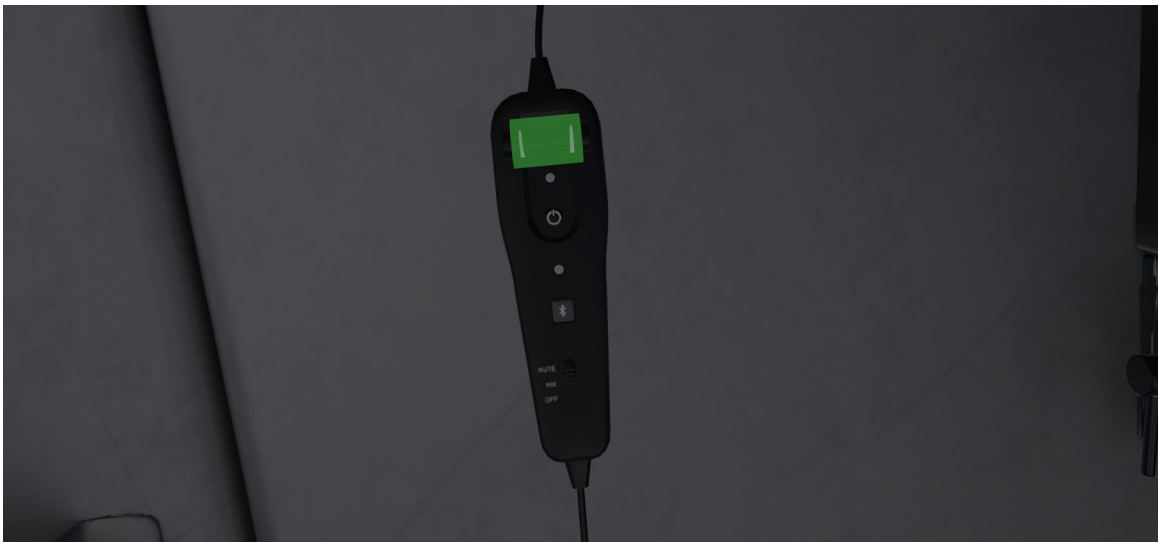
Be aware that limitations in the 3d model mean that you cannot use the GTN 6xx in the GTN1 slot or the GTN 7xx in the GTN2 slot.



Noise Cancelling Headphones

The headphones in the Islander model feature adjustable noise cancellation. With the headphones active, simply click and drag the highlighted manipulator or scroll with the mouse wheel to adjust the level of cancellation.

This setting is saved between sessions.



Section 3

Normal Procedures

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Preflight Checks

Walkaround

Before starting the walk around inspection remove the pitot head cover, control locks, and battery vent plug. During the external inspection, perform a general check of airframe condition and the security of all fasteners and control hinges and attachments.

Cabin

Magneto Switches ..... ALL OFF
Parking Brake ..... ON
All Electrical Switches ..... OFF
Battery Master Switch ..... ON
Pitot Heater Switch ..... ON
Stall Warning Vane ..... Deflect and listen for stall horn.
Pitot Head ..... Check heat.
Rotating Beacon ..... ON, CHECK, OFF
Navigation Lamps ..... ON, CHECK, OFF
Battery Master Switch ..... OFF

> Leaving the Battery Master Switch in the on position for an extended period of time during walkaround can drain the battery. If this happens, use 'Charge Battery' in the UI Menu to restore power.

Left Engine

Propeller ..... CONDITION
Oil ..... CHECK
Gascolator ..... DRAIN AS NECESSARY

Left Undercarriage

Oleo ..... EXTENSION
Brake Discs and Pads ..... CONDITION
Brake Lines ..... CHECK FOR LEAKAGE
Tires ..... INFLATION, CUTS, CREEP

Left Leading Edge

Pitot Head ..... PRESSURE, STATIC VENTS, DRAIN HOLE CLEAR
De-Icer Boots ..... CONDITION

Left Trailing Edge

Aileron .....FREEDOM

Fuel Sump .....DRAIN AS NECESSARY

Fuselage Left Side

Passenger Doors.....SECURED, UNLOCKED

Baggage Bay Door .....SECURED, UNLOCKED

Tail Surfaces

Rudder/Elevator ..... CONDITION and FREEDOM

Trim Tabs..... CONDITION

Fuselage Right Side

Passenger Door .....SECURED, UNLOCKED

Right Trailing Edge

Fuel Sump .....DRAIN AS NECESSARY

Aileron .....FREEDOM

Right Leading Edge

De-Icer Boots ..... CONDITION

Right Undercarriage

Oleo.....EXTENSION

Brake Discs and Pads ..... CONDITION

Brake Lines .....CHECK FOR LEAKAGE

Tires.....INFLATION, CUTS, CREEP

Right Engine

Propeller ..... CONDITION

Oil .....CHECK

Gascolator .....DRAIN AS NECESSARY

Fuselage Nose

Nose Oleo .....EXTENSION

Nose Wheel.....INFLATION, CUTS, CREEP

Nose Cone ..... CONDITION

Windscreen .....CLEANLINESS, CONDITION

Pre Starting Checks

Battery/Master Switch ..... ON

Pilot's Seat..... ADJUST, SECURE

Rudder Pedals..... ADJUST, SECURE

Doors .....CLOSED AND LOCKED

Safety Belts .....FASTENED

Parking Brake ..... ON

Trim Tabs .....FULL MOVEMENT, NEUTRAL

Fuel Selectors ..... FREEDOM, ON

OAT ..... CHECK

Altimeters..... CROSS CHECK

Timepiece .....CHECK AND SET

Cabin Heater .....AS REQUIRED

Fuel Contents Indicators ..... CHECK

Compasses ..... CHECK

Circuit Breakers ..... PUSHED IN

Flight Controls .....FREEDOM

Flaps.....Operate over full range. Check visually and against indicator.

Avionics ..... OFF

External Lights.....AS REQUIRED

Throttles .....CLOSED

Propeller Controls..... FULL FORWARD

Mixture Controls ..... FULL RICH

Carburetor Heat..... FREEDOM, OFF

External Supply Switch..... EXTERNAL SUPPLY (UP)

Aux Fuel Pumps ..... OFF

Generators ..... OFF

When starting from internal battery, the External Supply switch must be turned on to permit the battery to power the starters. Once start has been achieved, return the switch to the OFF/STARTER ISOL position.

WARNING

AVOID HEAVY PROLONGED USE OF THE STARTER. IF THE ENGINE IS RELUCTANT TO START AFTER ABOUT SIX REVOLUTIONS, THEN REST THE SYSTEM TO PREVENT OVERHEATING OF THE COMPONENTS.

To prevent overheating the air cooled Lycoming engine on the ground, the following precautions are strongly advised.

1. Avoid unnecessary ground running.
2. Ensure the airplane faces the wind.
3. Confine propeller pitch to the full fine position.
4. Maintain at least 1200 RPM to avoid fouling the spark plugs.
5. Keep the mixture control in the full rich position.

Starting

The right hand engine is normally the first to be started. Select the starter isolation switch to ON (UP) prior to using the starter.

Set fuel selectors ..... LH to Port Tank, RH to Starboard Tank

Aux Fuel Pumps ..... ON, Check for Pressure

Pump the throttle one to four times over its full travel to prime the engine. A hot engine will require less priming.

Throttle ..... 1/10th OPEN

Left Magneto ..... ON

CHECK ALL CLEAR

Engine should fire almost immediately on application of the starter.

Right Magneto ..... ON

Throttle ..... 1000-1200 RPM

Oil Pressure ..... Indicating within 30 Seconds

Repeat for left engine.

After Starting

Aux Fuel Pumps ..... OFF

Generators ..... ON, Check for low-volt lights extinguished

Vacuum Gauge ..... 3-5 in Hg

Ammeter ..... Indicator within green sector

Ammeter Selector ..... BATT

Oil Pressure ..... ABOVE RED LINE MINIMUM

Fuel Pressure ..... WITHIN GREEN SECTOR

Flight Instruments ..... Indicating normally

Avionics ..... ON

Cabin Heat ..... AS REQUIRED

Ice Protection Systems ..... CYCLE, OFF

After engines are warmed up

1. Test for magneto dead cut at 1200 RPM.
2. Test magneto drop off at 17 in manifold pressure (2100 RPM). Drop should not exceed 175 RPM.
3. Exercise propeller pitch controls at 2100 RPM.
4. Feathering check at 1500 RPM. Return prop control lever to normal range before RPM decreases below 1000.
5. Check ammeter reading 2-5 amps in the green sector. Check generator balance.
6. Check voltmeter for voltage between 27 and 29 volts.

Taxi

Test brakes for effectiveness during taxi. At the runway threshold, set engine power to ~70% and select carburetor head FULL; check for manifold pressure drop and return the heat control to OFF (UP).

Pre-Take-Off Checks

Passenger Notices ..... ON
Doors and Windows ..... CLOSED
Propeller Control ..... FULL FINE
Carburetor Heat ..... OFF
Trims ..... NEUTRAL
Flaps ..... T.O.
Fuel ..... Check contents, selection, and pressure.
Aux Fuel Pumps ..... ON
Engine Instruments ..... CHECKED
Flight Instruments ..... CHECKED AND SET
Pitot Heater ..... ON AS REQUIRED
Ice Protection ..... ON AS REQUIRED
Autopilot ..... OFF
Flight Controls ..... FULL AND FREE MOVEMENT

Take-Off Procedure

Advance throttles slowly to the open position. Rotate the aircraft at a speed 4 knots less than the scheduled 50 ft safety speed. The aircraft is capable of taking off in a 30 knot crosswind without resort to differential throttle.

Climb out should occur at no less than 64 knots. Avoid retracting the flaps at a height of less than 200 ft AGL, as the aircraft may experience a brief sink during flap retraction. Trim for resultant nose heaviness.

Turn Aux fuel pumps off at a safe altitude.

Engine RPM should be reduced to 2500 RPM to reduce noise and vibration. Throttle may be maintained in the full open position during climb. Maximum climb power is at 2700 RPM.

Lean mixture as necessary to maintain good power and fuel economy.

Handling In Flight

The airplane is easy to fly at all speeds and has no unusual features.

Use of Carburetor Heat

Carburetor icing can occur unexpectedly in various combinations of atmospheric conditions. In damp, foggy, or cloudy conditions, keep a sharp observation for power loss indicative of carburetor icing. Should icing arise, apply full carburetor heat for 30 second, then return the controls to OFF (UP) to avoid excessive power loss.

Partial application of carburetor heat should only be done to prevent carburetor ice from forming. Should icing be suspected, FULL heat should be applied first to clear it.

Instrument Flying

The aircraft is equipped for IFR flight.

Flying in Low Temperature Conditions

Propeller governors should be exercised regularly to keep the oil supply circulating and thus avoid sluggish or unresponsive propellers.

Flight at Reduced Speed

A comfortable attitude can be maintained at 78 knots by setting RPM at 2400 and lowering flaps to T.O. position. Airspeed in this configuration must not exceed 114 knots IAS.

Flying in Turbulence

The recommended air speed during turbulence is 88 knots IAS.

Stalling

Stalls are gentle in all configurations and from all attitudes normally encountered. Recovery is affected by pushing the nose down. Provided action is taken promptly, altitude loss will be minimal.

The stall horn and warning annunciator will activate at a safe margin above stall.

Pre Landing Checks

Harness ..... FASTENED
Pilot's Seat..... SECURE
Fuel ..... CONTENTS, SELECTION
Engine Instruments ..... CHECKED
Mixture..... FULL RICH
Carburetor Heat.....OFF or INTERMITTENT
Propellers ..... FULLY FINE
Aux Fuel Pumps .....ON, CHECK PRESSURE
Warning Lamps ..... EXTINGUISHED
Autopilot ..... OFF
Passenger Notices ..... ON
Brakes ..... OFF
Pitot Heat..... ON AS REQUIRED

Final Approach

After selection of flaps down (56 degrees), the speed may be progressively reduced to the appropriate threshold speed.

Approach can be flown comfortably at 65 knots at all permissible weights and CG conditions. This will result in a slight nose high attitude with very little flare required prior to touchdown.

Balked Landing

Apply full power smoothly and establish a positive rate of climb. Set flaps to T.O. and accelerate above 61 knots. Flaps should not be retracted before 200 ft AGL and 65 knots.

WARNING

FULL FLAP DEFLECTION CAUSES VERY HIGH DRAG AND MAY REDUCE CLIMB PERFORMANCE. IMMEDIATE FULL RETRACTION AT LOW SPEED MAY LEAD TO FURTHER ALTITUDE LOSS.

WARNING

APPLICATION OF FULL POWER WITH FULL FLAP DEFLECTION CAUSES A SIGNIFICANT NOSE UP MOMENT.

After Landing Checks

Aux Fuel Pumps ..... OFF

Flaps ..... UP

Pitot Heat ..... OFF

Unrequired Services ..... OFF

Trim ..... NEUTRAL

Cabin Heater ..... OFF

Engine Shutdown

Idle at 1000 RPM until temperatures drop and check the magnetos for a dead cut.
Stop the engines by moving the mixture controls to the cutoff position.

> WARNING
>
> FAILURE TO TURN OFF THE AVIONICS PRIOR TO STOPPING THE ENGINES CAN RESULT IN DAMAGE TO THE ELECTRONICS.

After-Shutdown Checks

Fuel Selectors ..... OFF

Magnetos ..... OFF

Generators ..... OFF

Other Services ..... OFF

Battery Master Switch ..... OFF

Parking Brake ..... ON

Chocks ..... IN POSITION

Section 4
Emergency Procedures

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Electrical Failures

Failure of Right Generator

Right Generator Field Switch .....OFF

Right Generator Circuit Breaker .....TRIP

Failure of Left Generator

Left Generator Field Switch .....OFF

Left Generator Circuit Breaker .....TRIP

No load shedding is necessary except at the pilot's discretion.

Failure of Both Generators

Left Generator Field Switch .....OFF

Right Generator Field Switch .....OFF

Left Generator Circuit Breaker .....TRIP

Right Generator Circuit Breaker .....TRIP

Master Battery Switch ..... ON

Check that the circuit breakers for the following services are engaged and that the services are operating or ready for use as indicated:

a. Auxiliary fuel pumps - Limit to 5 minutes for landing only
b. Wing flaps - Limit to essential operation only
c. Fuel contents indicators
d. Landing lights - Limit to 2 minutes for landing only
e. Navigation lights - Night operations only
f. Engine instruments cluster
g. Map light - Night operations only
h. Turn-and-bank indicator
i. Stall warning
j. Rotating beacons
k. Stall warning heater
l. Pitot head heater
m. Magnesyn compass
n. Tachometer
o. Audio system
p. One essential radio navigational aid
q. One essential radio communications transmitter/receiver - Limit to 5

minutes use during cruise and 2.5 minutes minutes while landing

All other electrical services ..... OFF/CIRCUIT BREAKERS TRIPPED

Under the above conditions the aircraft battery should have sufficient capacity to allow a flight of 25 minutes duration at night or 30 minutes duration by day.

Failure of Main Busbar

Left Generator Field Switch ..... OFF
Right Generator Field Switch ..... OFF
Left Generator Circuit Breaker ..... TRIP
Right Generator Circuit Breaker ..... TRIP

Failure of Battery

Battery Switch ..... OFF
Left Generator ..... ON
Right Generator ..... ON
Pitot and Stall Heaters ..... OFF
Nav Lights ..... OFF
Landing Lights ..... OFF
Cabin Lights ..... OFF
Passenger Notices ..... OFF
Rotating Beacons ..... OFF
All De-Ice systems ..... OFF
Cabin Heater ..... OFF

When electrical loading of the main busbar is reduced sufficiently, both left and right generators will come back online; this can be verified by the ammeter pointer registering in the green sector when selected to the generators, and the voltmeter registering between 27 and 29 Volts. As the generators are not completely stable without the battery, heavy loads may cause them to go offline again, at which point electrical load should be reduced until generator power is restored.

Fires

Fire on the Ground - Engine Fire

Mixtures ..... OFF

Magnetos ..... OFF

Battery Master ..... OFF

Fuel Tanks ..... OFF

Deal with the fire by using the fire extinguisher bottle located beneath the pilot's seat or any similar ground appliance.

Fire in the Air - Fire in the Cabin

Deal with the fire immediately using the fire extinguisher located under the pilot's seat. Although the fumes given off by the extinguisher are non toxic, the cabin should be well ventilated by opening the direct view window and selecting the cabin ventilating blower ON as soon as the fire has been completely extinguished.

Fire in the Air - Engine Fire

On the first indication of a fire, take the following steps after identifying the affected engine:

Mixture ..... CUT OFF

Propeller ..... FEATHER

Throttle ..... CLOSED

Fuel Tank ..... OFF

Magnetos ..... OFF

Fuel Pumps ..... OFF

Generator ..... OFF

When the fire has died away, do not attempt to restart the affected engine. In the case of a persistent fire, a landing must be made at the first available opportunity.

Engine Failure

Failure of One Engine during Take Off

If one engine fails before the take off safety speed is reached, close the throttles and brake to a stop.

Failure of One Engine after Take Off

Immediate Action

In the event of an engine failing after take off safety speed is reached, and whilst the aircraft is climbing, the following procedure must be effected:

Identify the inoperative engine

Mixture.....OFF

Propeller ..... FEATHER

Throttle ..... CLOSED

Fuel Tank.....OFF

Magnetos.....OFF

Fuel Pumps .....OFF

Generator .....OFF

Ensure that the generator of the operative engine is ON. Allow airspeed to build to 65 kt prior to selecting flaps UP.

> Warning
>
> It is essential to raise the flaps to the fully up position to achieve the optimum climb gradient

Handling on One Engine

General

The aircraft is perfectly docile on one engine and should maintain a height of 5600 ft at a gross weight of 6300 lbs in ISA conditions.

Fuel System Management

Should an engine failure be experienced during the early part of the flight the operative engine can be fed, alternately, from either fuel tank to balance the fuel load. This can be done by using the tank selector, applicable to the operating engine, as indicated by the inscribed markings. It is recommended that the tanks be switched at intervals of approximately 30 minutes.

Unfeathering Sequence

Identify the engine to unfeather.

Fuel Tank ..... ON

Magnetos ..... ON

Fuel Pumps ..... ON

Throttle Lever ..... ¼ OPEN

Propeller ..... CRUISE SETTING

Prime engine ..... 2-4 PUMPS OF THE THROTTLE

Isolation Switch ..... ON/UP

Mixture ..... RICH

Starter ..... ACTIVATE

When engine fires, select right magneto switch ON.

Check engine TEMPS and PRESSURES.

Propeller ..... ADJUST TO CRUISE SETTINGS

Auxiliary Fuel Pumps ..... OFF

Isolation Switch ..... OFF/DOWN

Generator ..... ON

Critical Engine

Failure of the left engine has the most adverse effect on the handling and performance characteristics of the engine.

Landing with One Engine Inoperative

Make an initial approach at 65 kt IAS with the flaps selected to T.O.

When committed for landing, select FLAPS DOWN and reduce speed

Emergency Evacuation of Aircraft

Operation of Cabin Doors

All three cabin doors are placarded as emergency exits and should be opened in the normal way as the first resort in making an exit from the cabin. In the case of the pilot's door, however, the left engine magnetos should first be switched OFF, thus allowing the solenoid operated interlocking mechanism to be released. Should this action be overlooked, or if there is an insufficient time available, the interlocking mechanism can be overridden by operating the lock-release lever with one hand whilst operating the internal door handle with the other hand.

Operation of Cabin Window Exits

If the cabin doors cannot be opened, and particularly if the aircraft comes down on to water, each emergency 'pull-in' window must be removed as follows:

1. Grip the red handle at the top corner of the cabin door window trimming
2. Pull inwards and rearwards as hard as possible.

It is necessary to dislodge the window from its groove in the rubberized moulding and considerable physical effort may be required, especially in cold conditions.

Section 5

Performance Data

Table of Contents

Takeoff Performance

Takeoff Safety Speeds

TAKEOFF SAFETY SPEED	
WEIGHT	KNOTS
4000	48
4500	50
5000	51
5500	53
6000	54
6500	56
7000	57

Takeoff Distance

TAKEOFF DISTANCE IN FT AT ISA +30 C				
	TOW			
ALTITUDE	4000	5000	6000	6600
0	850	1150	1450	1600
1000	1000	1300	1600	1750
2000	1150	1450	1700	1900
3000	1250	1550	1850	2000
4000	1400	1700	1950	2150
5000	1500	1800	2050	2250
6000	1600	1950	2200	2400
7000	1750	2100	2350	2500

*SUBTRACT 50FT FOR EVERY 10 C LOWER

WIND AND AIRFIELD SLOPE ARE NOT CONSIDERED IN THIS CHART

Maximum Takeoff and Landing Weight

MAXIMUM TAKEOFF AND LANDING WEIGHT (LBS) BY ALTITUDE AND TEMPERATURE							
	TEMPERATURE						
ALTITUDE FT	ISA -10 C	-5 C	0 C	10 C	20 C	30 C	ISA +30 C
0	6600	6600	6600	6600	6500	6300	6000
1000	6600	6600	6600	6500	6250	6050	5750
2000	6450	6450	6450	6250	6000	5800	5550
3000	6250	6250	6250	6000	5750	5550	5350
4000	6050	6050	5950	5750	5500	5300	5150
5000	5850	5850	5750	5500	5300	5100	4950
6000	5650	5600	5500	5250	5050	4850	4800
7000	5450	5350	5250	5050	4850	4650	4600

TEMPERATURES ARE ACTUAL AIR TEMPERATURE UNLESS OTHERWISE INDICATED

Cruise Performance

POWER	DENSITY ALTITUDE	STANDARD DAY CONDITIONS MANIFOLD PRESSURE - INCHES OF MERCURY 2700 RPM	2600 RPM	2500 RPM	2400 RPM	2300 RPM	2200 RPM	2100 RPM	2000 RPM	IAS MPH	TAS MPH	TAS KTS	FUEL CONSUMPTION GAL/HR US RICH	US LEAN
75 PERCENT	8000	20.50								146	161	140	23.5	29.0
195 BHP	6000	21.25	21.75	22.25	23.00					149	159	138	33.5	29.0
	4000	21.75	22.25	22.75	23.25	24.25				151	157	137	35.0	NOT <5000 FT
	2000	22.25	22.75	23.25	24.00	24.75	25.75			153	154	134	36.0	
	SEA LEVEL	23.25	23.25	23.75	24.50	25.25	26.25			154	151	131	37.0	
67 PERCENT	10000	18.75	19.00	19.50						139	159	138	27.5	25.0
175 BHP	8000	19.25	19.50	20.00	20.50	21.25				141	158	136	29.0	25.0
	6000	19.75	20.00	20.50	21.00	21.75	22.75			144	154	134	29.0	25.0
	4000	20.25	20.50	21.00	21.50	22.25	23.25	24.25		146	152	132	30.0	25.0
	2000	20.75	21.00	21.50	22.00	22.75	23.75	24.75		149	150	130	31.0	25.0
	SEA LEVEL	21.25	21.50	22.00	22.50	23.25	24.25	25.25		151	148	129	32.5	25.0
59 PERCENT	14000	16.00	16.25							126	154	134	23.0	23.0
152.5 BHP	12000	16.50	16.75	17.00	17.50					128	152	133	24.0	23.0
	10000	17.00	17.25	17.50	18.00	18.75	19.50			130	150	131	24.5	23.0
	8000	17.50	17.75	18.00	18.50	19.25	20.00	20.75		134	149	130	25.0	23.0
	6000	18.00	18.25	18.50	19.00	19.75	20.50	21.25	22.25	137	147	128	25.0	23.0
	4000	18.50	18.75	19.00	19.50	20.25	21.00	21.75	22.75	139	145	126	26.0	23.0
	2000	19.00	19.25	19.50	20.00	20.75	21.50	22.25	23.25	141	143	124	26.5	23.0
	SEA LEVEL	19.50	19.75	20.00	20.50	21.25	22.00	22.75	23.75	143	141	122	27.5	23.0

OPTIMUM RPM		
	2400	75 PERCENT
	2200	67 PERCENT
	2000	59 PERCENT

NOT FOR FLIGHT - FOR SIMULATION USE ONLY

Landing Performance

Landing Distance

LANDING DISTANCE IN FT AT ISA +30 C				
	LANDING WEIGHT			
ALTITUDE	4000	5000	6000	6600
0	1300	1400	1480	1590
1000	1340	1450	1550	1640
2000	1410	1500	1590	1700
3000	1470	1560	1660	1760
4000	1540	1620	1720	1830
5000	1580	1680	1770	1880
6000	1650	1740	1840	1940
7000	1700	1800	1900	2000

*SUBTRACT 50FT FOR EVERY 10 C LOWER

**A 5 KNOT TAIL WIND MAY INCREASE LANDING DISTANCE BY UP TO 250 FT

WIND AND AIRFIELD SLOPE ARE NOT CONSIDERED IN THIS CHART

Safe Landing Speed

SAFE LANDING SPEED	
WEIGHT	KNOTS
4000	51
4500	53
5000	54
5500	56
6000	57
6500	59
7000	60