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AIR PUBLICATION

2020.001-AFM

PRODUCT MANUAL

JABIRU J160/J70

Original Date of Issue: 1st October 2020
Software Version: v2.0.0

FOREWORD

AUTHORITY

Users are to regard this Flight Manual as an authoritative publication. It is compiled from data available from operating, technical, manufacturing and safety sources, and represents the best level of information available.

These instructions provide you with a general knowledge of the simulated aircraft, its characteristics, and specific normal and emergency operating procedures. Instructions in this manual are for a pilot inexperienced in the operation of the simulation aircraft.

APPLICABILITY

This Flight Manual applies to the *Jabiru J-160/J170 product by IRIS Flight Simulation Software for Microsoft Flight Simulator*.

Under NO circumstances is any component of this product intended to replace, or compliment, any form of real-world training materials.

The intended use is for entertainment purposes ONLY. ALWAYS refer to approved publications from the aircraft manufacturer when flying aircraft.

OPERATING INSTRUCTIONS

This manual provides the best possible operating instructions, however, on occasions these instructions may prove to be a poor substitute for sound judgment. Multiple emergencies, adverse weather, terrain and other considerations may require modification of the procedure.

PERMISSIBLE OPERATIONS

The Flight Manual takes a 'positive approach' and normally states only what you can do. Unusual operations and configurations are prohibited unless specifically covered herein.

AMENDMENT ACTION

To assist in the maintaining of this publication in an up-to-date condition, users are to bring to the notice of IRIS Flight Simulation Software, any errors, omissions or suggestions for improvement by email to help@irissimulations.com.au.

WARNINGS, CAUTIONS AND NOTES

The following definitions apply to 'Warnings', 'Cautions' and 'Notes' found throughout the manual.

WARNING

Operating procedures, techniques, etc., which may result in personal injury or loss of life if not carefully followed. For the purposes of this product, this would mean the end of the simulation session.

CAUTION

Operating procedures, techniques, etc., which may result in damage to equipment if not carefully followed. For the purposes of this product, this would mean the simulated damage to aircraft components possibly resulting in the end to the simulation session.

NOTE

Operating procedures, techniques, etc., which is considered essential to emphasize.

CONTROL AND IDENTIFICATION MARKINGS

The use of block capitals in the text, when identifying switches, controls etc. indicates the actual markings on that item.

AIRSPEEDS

All airspeeds quoted in this manual are 'indicated' unless otherwise stated.

PROCEDURAL STEPS

All procedures and checklists items are numbered sequentially with Arabic numerals.

USE OF THE FLIGHT MANUAL

To use the Flight Manual correctly, it is essential to understand the division of the manual into its sections and the subsequent division of the sections. Each section has a table of contents, and best use will be obtained from the Manual by becoming familiar with the table of contents for each section. The index enables easy reference to a particular topic or item by page number.

CHECKLISTS

The Flight Manual contains amplified checklists. Abbreviated Checklists are issued as a separate publication (IAP 2020.001-ACL1). The items in the checklist have the same number as the amplified checks in the flight manual.

Additionally, checklists are available within the simulation via the checklist tab.

TACTILE OPERATION

Whilst it is important to have a joystick or yoke along with a throttle to get the best out of your simulation experience, it is **ESSENTIAL** that you have a mouse with a scrollable mouse-wheel in order to interact fully with the items inside the simulation's virtual cockpit.

All switches in the cockpit function in the following manner;

1.) Any two positions switches toggle on or move upwards a single click of the LEFT mouse button and toggle OFF or move downwards with a subsequent single click of the LEFT mouse button.

2.) Any multiple position switches (three or more) use a single click and drag function.

All knobs function in the following manner;

1.) If the knob is capable of being 'pushed in' or 'clicked' a single click of the LEFT mouse button will perform this action.

2.) If the knob is capable of being turned clockwise, a moving your mouse-wheel away from you/forward will perform this action.

3.) If the knob is capable of being turned counter-clockwise, a moving your mouse-wheel towards you/backward will perform this action.

LIST OF ASSOCIATED PUBLICATIONS

IAP 2020.001-ACL1	Abbreviated Checklists
IAP 2020.001-PA	Product Acknowledgements

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SECTION 1

DESCRIPTION AND OPERATION

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SECTION 1

CHAPTER 1

DESCRIPTION AND OPERATION - GENERAL

THE AIRCRAFT

Introduction

The J160/J170 aircraft is a strut braced, high wing, fixed tricycle undercarriage, single engine, two seat aircraft that has been designed primarily for training and recreational operations.

The fuselage, wings and empennage are constructed from composite materials. A single integral fuel tank is located in each wing, supplying the engine through a header tank located below the baggage shelf.

The cockpit is designed to accommodate the pilot in command on the left side and all controls, instruments, selectors and switches are located so as to be within easy reach of the occupant of that seat. Conventional 3-axis flight controls, and variable wing flaps are provided. Duplicated flight controls are provided on the right side of the cockpit. The centrally located control pedestal and radio stack are accessible from either of the two cockpit seats.

The cockpit is accessed by forward hinging doors that are located on each side. A baggage compartment is located behind the pilots' seats.

The general arrangement of the aircraft is shown below;

Figure 1-1 Jabiru J160/J170 General Arrangement

Dimensions

The overall dimensions of the aircraft with normal tire and strut inflation are shown in Figure 1-2.

Gross Weight – J160

The aircraft basic empty weight is approximately 661 pounds.
Maximum take-off gross weight is 1190 pounds.

Gross Weight – J170

The aircraft basic empty weight is approximately 705 pounds.
Maximum take-off gross weight is 1323 pounds.

These weights shall not be used for computing aircraft performance or for any type of operation.

Refer to *Section 3, Operating Limitations*, for take-off and landing weights.

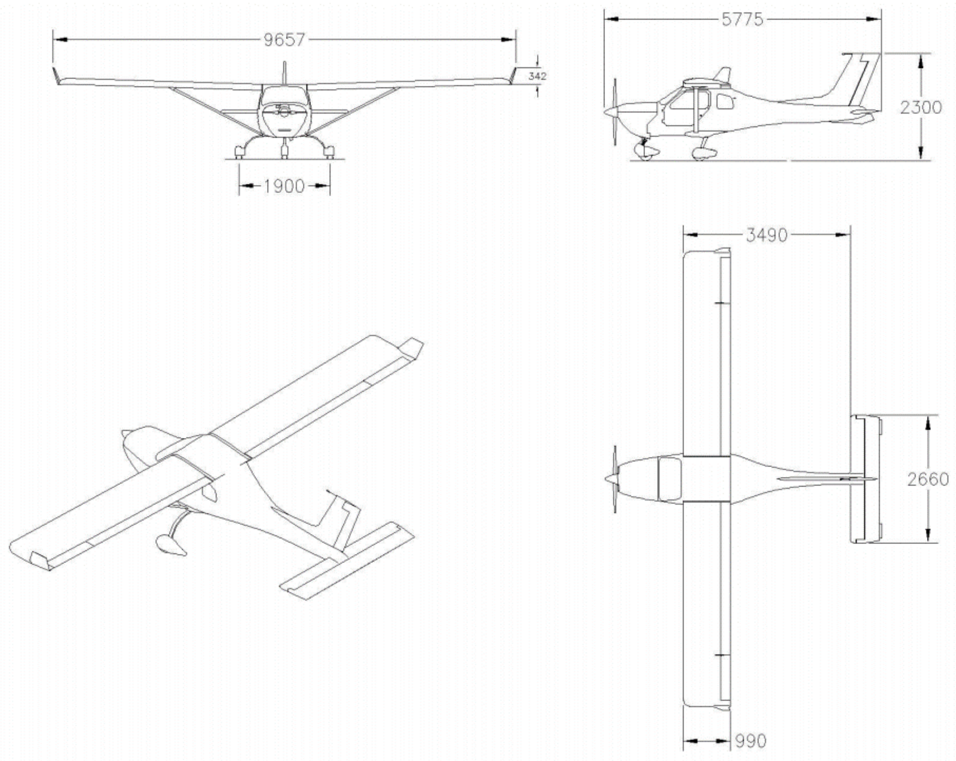

Figure 1-2 Aircraft Dimensions

AIRFRAME

Wings

The wings are of GRP skin construction, and are externally braced with a streamline section strut that bolts to the lower fuselage members and wing spar fittings. The main fuel tanks are incorporated in the inboard section of the wings between the spar and the rear of the wing. The ailerons are controlled via push-pull Teleflex cables. The wing flaps are powered by an electric motor driving through a mechanical linkage.

Fuselage

The fuselage is of GRP construction. The fixed horizontal and vertical tail surfaces are bonded to the structure.

Empennage

The empennage consists of the fin, rudder, horizontal stabiliser, and elevators. All are constructed of GRP.

FLIGHT CONTROLS

The aircraft's flight control system consists of conventional aileron, rudder and elevator control surfaces. These are manually operated by push-pull Teleflex cables. The control column is a centrally mounted stick, with separate handgrip for each pilot. The control column actuates the ailerons and elevators in the conventional manner while the rudder pedals operate the rudder.

The aileron and elevator controls may be locked by securing the control column with the pilot's seat belt when the aircraft is parked on the ground. This will prevent damage to these systems by wind buffeting.

Trim System

The elevator trim control is controlled via levers mounted on either side of the cockpit centre console. The system consists of a cable operated system which uses springs connected to a friction lock to control the elevator control force. Selection of nose up trim pivots the trailing edge of the elevator upwards.

Adjustable Rudder Pedals

J160/J170 aircraft have the option of fitting adjustable rudder pedals. These pedals have two positions, in and out. To adjust the pedals pull the ring on the side of the pedals to the side to release the pedal face. Move the pedal face to the desired location (in or out). When the pedal face is in the desired location, release the ring and move the pedal face around a little bit until the locking pin is felt to engage and the pedal face is locked in place.

CAUTION

- Ensure pedals are locked in position before operating the aircraft. Do not attempt to adjust the pedal position while the aircraft is in motion.

INSTRUMENT PANEL

Although the instrument panel spans the width of the cockpit, flight instruments are on the left hand side in front of the pilot.

Radio and transponders are located in the upper panel close to the centre of the aircraft – offset slightly towards the pilot. The engine tachometer is located centrally on the lower section of the panel, while the other engine instruments are placed in a vertical row slightly to the right of the centre of the panel.

Where electric fuel gauges are fitted they are located centrally – below the radios. The right side of the panel is left empty to allow owner's to fit their choice of GPS system or other instrumentation.

A push-pull throttle knob is located at either side of the panel. Pushing the knob forwards increases engine power.

A diagram and numbered information on the Generation 1 instrument panel is shown in Figure 1-3.

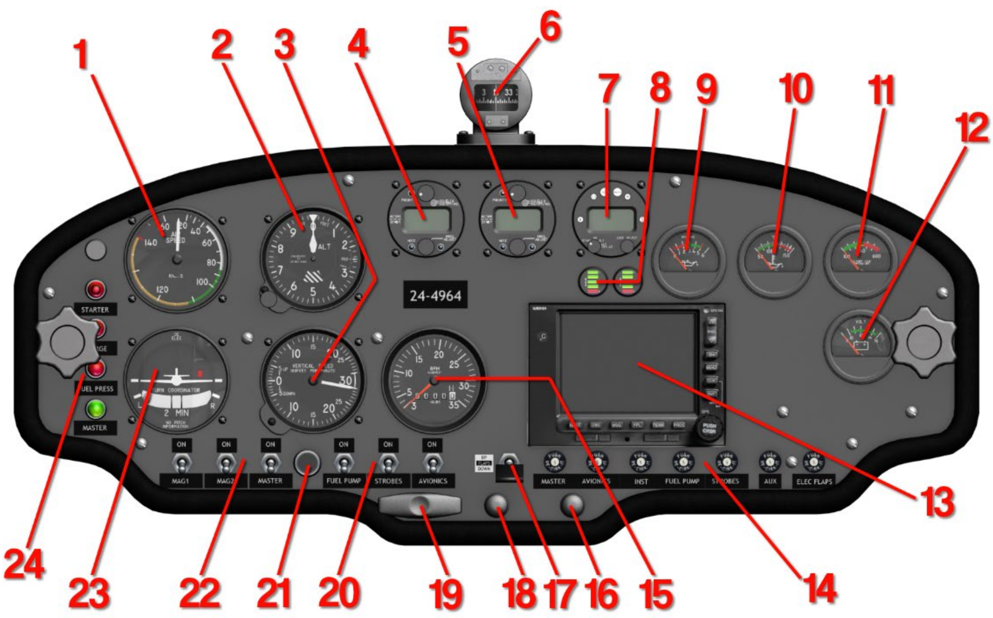

Figure 1-3 Generation IA – Instrument Panel

1. AIRSPEED INDICATOR
2. ALTITUDE INDICATOR
3. VERTICAL SPEED INDICATOR
4. COM RADIO
5. NAV RADIO
6. WHISKEY COMPASS
7. TRANSPONDER
8. FUEL LEVEL INDICATORS
9. OIL PRESSURE INDICATOR
10. OIL TEMPERATURE INDICATOR
11. CYLINDER HEAD TEMPERATURE
12. BATTERY VOLTAGE
13. GPS NAVIGATION UNIT
14. SYSTEM CIRCUIT BREAKERS
15. TACHOMETER
16. CABIN HEAT LEVER
17. FLAPS LEVER
18. CHOKE LEVER
19. CARBURETTOR HEAT LEVER
20. FUEL PUMP, STROBES AND AVIONICS
21. STARTER BUTTON
22. MAGNETOS AND MASTER SWITCH
23. TURN AND SLIP INDICATOR
24. SYSTEM INDICATOR LIGHTS

NOTE

- *Whilst the Generation 1 panel is shown in Option A configuration, aircraft include both Generation I and Generation II panels in Option A or B configurations.*

  In all aircraft, the core elements shown above are included, though layout may vary depending on the aircraft and panel configuration.

  Generally, J160 aircraft will feature the Generation 1 Panel, and the J170, the Generation II panel, either with analogue or digital displays.

ENGINE

Figure 1-4 Jabiru J2200 4 Cylinder Engine

The engine is a four cylinder, horizontally opposed, air cooled, naturally aspirated Jabiru 2200B or 2200C, fitted with an altitude compensating carburettor. Both engines are rated by the manufacturer to 80 BHP at full throttle and 3300 RPM.

Throttle

Engine power is controlled by a throttle located on the left and right sides of the instrument panel. It is readily identified by smooth black cylindrical knobs. The throttle operates in the conventional sense in that when fully forward the throttle is full open, and in the fully aft position, the throttle is closed.

Choke

The choke is a push-pull control located in the centre of the lower section of the instrument panel and is only used for engine starting. It is fitted with a black knob. The choke ON position is full back, and full forward is choke OFF, or normal.

Auto Mixture System

The Jabiru J2200 engine has an auto mixture system and a manual choke.

To simulate this system within the boundaries of Microsoft Flight Simulator a system is incorporated which operates as follows;

1. If the choke lever is pulled out, the fuel/air mixture to the engine is set to full rich.

2. If the choke lever is pushed in, the fuel/air mixture to the engine is controlled by internal logic which sets the fuel/air mixture automatically every second to the best possible mixture for the current flight conditions.

Carburettor Heat

The carburettor heat control is a push-pull control located in the centre of the lower section of the instrument panel. With the control pushed fully forward (in), cold filtered air is selected. Fully aft (heat ON) selects heated filtered air from a muff around the exhaust pipes. The knob is a rectangular shape.

Engine Instruments

Engine operation is monitored by a tachometer, oil pressure and oil temperature, fuel pressure and cylinder head temperature gauges. These instruments are located in the instrument panel in front of the pilot and are marked with green arcs to indicate the normal operating range, yellow arcs to indicate precautionary ranges and red lines at the maximum/minimum allowable limits.

These limits and gauge markings are also given in Section 2 of this manual.

Engine Oil System

Oil for engine lubrication is supplied from a sump at the bottom of the engine. The oil capacity of the engine is 2.3 litres (2.02 US quarts). Oil is drawn from the sump through an oil suction strainer screen into the engine driven oil pump. An adaptor on the engine underneath the oil filter directs oil through the oil cooler. On returning to the engine, the oil passes through the full flow replaceable element oil filter. The filtered oil then enters a pressure relief valve that regulates the engine oil pressure by allowing excessive oil to return to the sump, while the remaining oil under pressure is circulated to the various engine components for lubrication. Residual oil returns to the sump by gravity flow.

An oil filler cap/dipstick is located on the top of the engine and is accessible through an access door in the engine cowling. The dipstick is marked to show upper and lower oil level limits. To minimise possible loss of oil through the breather, filling the sump to the low mark on the dipstick instead of the high is sufficient for routine operations. The upper dipstick mark should be used for flights of 3 hours endurance or longer. For engine oil grade and specifications, refer to Section 2 of this manual. An oil pressure indicator is provided on the instrument panel.

WARNING

- The oil level must be visible on the dip stick. Do not run the engine if the sump oil level is below the bottom of the dipstick.

Ignition System

Engine ignition is provided by two engine driven transistorised magneto coils, each running a single spark plug in each cylinder.

Normal operation is conducted with both magnetos on due to the more complete burning of the fuel-air mixture with dual ignition sources.

The individual magnetos are selected using the two ON – OFF toggle switches located on the left hand side of the instrument panel.

Starting System

The electrically driven starter motor is mounted at the rear of the engine. When energised, the starter motor pinion engages a ring gear that is fitted to the flywheel.

When the master switch is on, pushing the start button energises the starter motor.

If the engine turns at less than 300rpm no spark will be generated and it will not fire. The engine requires choke to start when cold.

When hot it does not require choke and may be started with the throttle just cracked open.

Experience with the individual engine will enable the pilot to make the correct judgment on this. Weak intermittent firing followed by puffs of black smoke from the exhausts usually indicates excess choke or flooding.

If the engine is flooded, leave it to stand for approximately 10 minutes before attempting re-start.

Air Induction System

The engine induction air normally enters through a NACA duct on the left side of the lower engine cowl.

The air is then directed to a filter box where dust and other contaminants are removed by a replaceable paper filter element.

On the outlet side of the filter box there is a flapper valve which allows the pilot to select normal cold induction air or hot induction air which is drawn through the muff fitted to the muffler.

Hot air is not filtered – therefore care must be taken when choosing run up positions to minimise dust ingestion while carb heat is selected ON.

Exhaust System

Each cylinder feeds directly to the muffler via an extractor pipe.

The extractors fit to the head using a metal-metal gasket-less connection which also allows a degree of freedom to the extractor position. A muff is fitted to the muffler to supply hot air for the carburettor heat system.

A separate hot air muff is fitted to the tail pipe to provide air for the cabin heat. The exhaust tailpipe exits out through the lower left side of the engine cowl.

Cooling System

Ram air for engine cooling enters through two intakes at the front of the engine cowl.

The cooling air is directed around the cylinders and other areas of the engine by appropriate baffles and is then exhausted through an opening in the rear of the lower cowl.

Air for oil system cooling enters the lower intake chamber and flows through an oil cooler mounted below the sump. The air then exhausts out the lower cowl opening with the engine cooling air.

GROUND CONTROL

The J160/J170 is fitted with mechanical linkage from the rudder pedals to the nose wheel. This gives ground steering control. The minimum turning radius is approximately 5m (or approximately 1m outboard of the wingtip).

When shut down, the aircraft is easily manoeuvred on level ground by one person without the aid of special ground handling equipment.

WING FLAP SYSTEM

The wing flaps are of the single slotted type with three indicated positions; Up, Take-Off and Land.

The position of the flaps is controlled manually by the pilot – a position indicator is fitted on the pilot's side "A" pillar (between the windscreen and the front of the door opening).

The selected position can be easily confirmed by visual observation of the flaps.

The flap system is electrically actuated. The flaps are extended by mechanical force provided by the flap motor operating on a torque tube and push rod mechanism.

The flap structure is of GRP material and has been designed to withstand all air loads within the approved operating envelope.

UNDERCARRIAGE SYSTEM

The main undercarriage is of GRP. Jabiru wheel and brake assemblies are fitted, using 500 x 6 6-ply tyres. The nose wheel undercarriage is a rubber compression spring – steering is via pushrods direct from the rudder pedals. The nose wheel is a Jabiru assembly with 500 x 6 6-ply tyre.

SEATS

Seats in the J160/J170 are an integral part of the moulded structure. The seat base contains foam which is designed to crush in the event of an accident, absorbing energy from large vertical decelerations.

BAGGAGE SHELF

The baggage storage shelf is located behind the seats. This shelf is fabricated from composite materials and also forms part of the fuel system header tank enclosure.

Tie down points are provided on the sides of this shelf onto which baggage restraint straps can be attached. As the seat backs provide a barrier against forward movement of the baggage, items which are narrower than the full width of the shelf should be located centrally behind a seat back.

ENTRANCE DOORS

A forward opening cockpit door is fitted to each side of the aircraft. The door latch is a simple locking pin operated by a handle on both the inside and out. These doors also act as emergency exits.

Opening of the doors in flight is approved in an emergency such as for smoke or fume evacuation.

PROPELLER

The aircraft is equipped with a two blade Jabiru propeller. The propeller is made of 3 laminations of hoop pine sheathed in GRP.

The propeller has a diameter of 60" and a pitch of 42".

A Urethane leading edge is moulded into the propeller to provide protection from damage caused by small rock strikes, operating in the rain etc.

FUEL SYSTEM

The aircraft has a fuel tank in the inboard section of each wing, and a small header tank which is located in a sealed compartment underneath the baggage shelf. The wing tanks gravity feed into the header tank and there is no provision for the pilot to select and/or isolate a particular wing tank.

A single shut off valve located at the left hand side of the centre console is provided to stop all fuel flow to the engine.

The engine is equipped with a Bing altitude compensating carburettor. There is no mixture control adjustment available to the pilot. A choke is provided for engine starting purposes only.

Two slightly different systems are used depending on the age of the aircraft – details of both are presented below.

System #1

Fuel gravity feeds from the front and rear inboard corner of each tank. The two delivery pipes from each side join together in the fuselage wall below the wing. Then the single delivery line continues to the header tank under the passenger's side of the baggage shelf. Breathers for the wing tanks run from the outboard end of the tank and are connected with lines that run between the tanks. The header tank breather is also connected into this breather line.

System #2

Fuel gravity feeds from the front and rear inboard corner of each tank. The two delivery pipes and the vent line for each wing tank run directly to the header tank located under the passenger's side of the baggage shelf behind the seats.

Both Systems

From the sump tank fuel flows through an electric boost pump then forward through the filter and shutoff valve to the engine driven mechanical fuel pump and carburettor.

All wing and sump tank outlets have finger filters. The three fuel tanks are fitted with fuel drains.

The wing tanks are fitted with vented caps located at the outboard end of the tank. The vent for each cap is directional and provides a small pressure head to the tanks. This system ensures that the air space pressure in each tank is the same, minimising uneven fuel feed rates.

The J160/J170 may use either two fuel sight gauges (one in each wing root) or two electric fuel gauges on the instrument panel to show fluid levels in each wing tank. The sump tank does not have a fuel gauge as its contents are deemed to be unusable and should not to be considered for flight planning. As an option, a low level warning light may be installed in the header tank.

NOTE

- As ground & flight attitudes are essentially the same, fuel gauge indications are valid in both cases

NOTE

- Flying "1 ball" out of balance causes the fuel in the tanks to slosh in to one side by an angle of about 8°. This leads to uneven fuel feeding – 1 tank emptying before the other. In extreme cases, this can cause fuel starvation & engine stoppage while there is significant fuel remaining in one wing tank. Care must be taken to fly the aircraft in balance at all times.

CAUTION

- In the unusual condition where the pilot suspects that one wing tank is feeding and the other wing tank is not, the pilot must consider the fuel in the non-feeding tank as "unusable" and manage the flight accordingly.

BRAKE SYSTEM

The aircraft has a single disc, hydraulically actuated brake on each main undercarriage wheel.

Each brake is connected by a hydraulic line to a master cylinder fitted to the front of the centre console in the cabin. The wheel brakes operate simultaneously.

When the aircraft is parked, the parking brake is set by pulling the brakes on and engaging the park brake cam fitted to the lever. To release the park brake, pull the brake lever back and release the cam.

CAUTION

- Check park brake is OFF prior to landing.

ELECTRICAL SYSTEM

The J160/J170 has a 12 volt electrical system consisting of a 12 volt battery, starter motor, regulator, alternator with a nominal 14 volt output, electric flap, electric fuel boost pump, circuit breakers, oil temperature gauge, optional strobe lights, switches and related wiring.

The electrical system is constructed as a dual bus system.

An instrument bus, powered from the main bus, powers the instruments and radios.

The master bus powers all other electrical systems in addition to the instrument bus.

The master switch (mounted on the lower left hand side of the instrument panel) controls power to the main bus.

Another switch controls the connection between the main bus and the instrument bus.

The Master bus connects with the battery. The feed from the alternator goes to the battery, which acts as a filter, reducing noise in the bus system. All other switches are located along the lower left side of the panel. The circuit breakers are fitted along the lower right side of the instrument panel.

A warning light connected to the regulator illuminates to provide an indication should the alternator cease charging. The regulator delivers a regulated nominal 14 volts to the aircraft battery.

NOTE

- The master switches are not switch breakers and their circuits are protected by circuit breakers found in the lower right side of the instrument panel.

COCKPIT VENTILATION

Ventilation air is provided by vents located beside the rudder pedals. The volume of the air supply can be regulated by sliding the vent shutters as desired using your foot.

PITOT-STATIC SYSTEM AND INSTRUMENTS

The pitot-static system supplies ram air pressure to the airspeed indicator and static pressure to the airspeed indicator and the altimeter. The system is composed of a pitot probe mounted on the right wing strut.

Airspeed Indicator

The airspeed indicator is calibrated in knots. Limitations and range markings (in KIAS) are incorporated on the instrument.

Altimeter

Aircraft altitude is depicted by a barometric type altimeter. A knob near the lower left portion of the altimeter allows the ambient barometric pressure sub-scale to be adjusted to the current value. This sub-scale has a dual calibration of millibars (mb) and inches of Mercury (in Hg).

Vertical Speed Indicator

The vertical speed indicator indicates the aircraft rate of climb or descent in feet per minute. The pointer is actuated by changes in ambient barometric pressure as sensed by the static source.

STALL WARNING SYSTEM

The aircraft is equipped with an air operated artificial stall warning system. A vent is located on the leading edge of the left wing with a small lip protruding below.

As the aircraft approaches the stall the angle of the airflow flowing past the lip produces a suction in the vent which sucks air through a reed "squawker" located in the wing root area of the cabin.

The "squawker" produces an audible note which increases in volume as the stall deepens. The speed at which the warning activates is adjusted by changing the height of the lip below the vent on the wing, and is set to go of 5-10 knots below the stall. The system will operate reliably in any loading condition or flap setting.

AVIONICS

The aircraft may be fitted with a variety of avionics equipment. A selection of common units are described below.

All avionic services are powered from the instrument bus that is energised by turning ON the Master and Instrument Switches on the instrument panel.

Electronic Flight Instrument System (IRIS AV-10 EFIS)

The Jabiru J160/J170 Generation 1 and 2 instrument panels are fitted with either Option A or Option B components. Option B panels come fitted with an EFIS unit as described below.

A larger glass cockpit display unit is fitted to Generation II Option B panels.

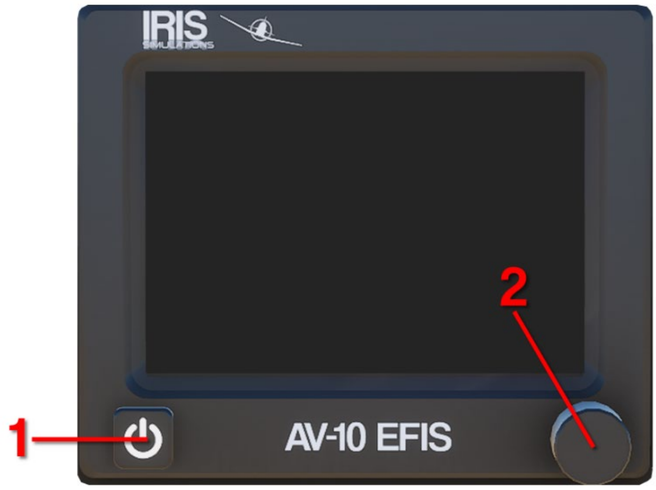

Figure 2-1 EFIS Unit Overview

1. SOFTKEY 1 – POWER
2. BAROMETRIC PRESSURE/TOGGLE KNOB

The Unit is made up primarily of a digital display, one power softkey and a barometric pressure knob under the display, for interaction by the pilot.

EFIS ADI PAGE

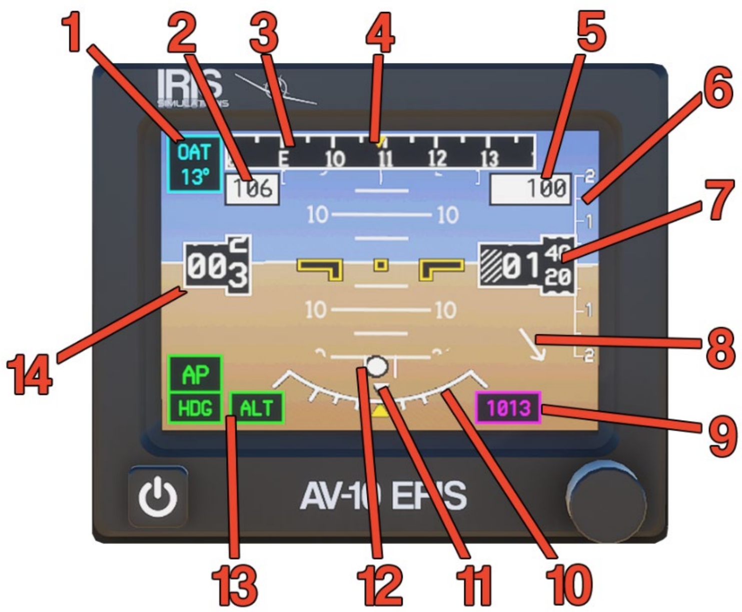

Figure 2-2 EFIS Unit Overview

1. OUTSIDE AIR TEMPERATURE
2. AUTOPILOT HEADING VALUE
3. COMPASS BAR
4. LUBBER LINE
5. AUTOPILOT ALTITUDE VALUE
6. VERTICAL SPEED SCALE
7. ALTITUDE READOUT
8. WIND DIRECTION/VELOCITY READOUT
9. BAROMETRIC PRESSURE (inHG/MB)
10. ROLL SCALE (10/20/30/45DEG)
11. ROLL POINTER
12. SLIP BALL
13. AUTOPILOT ANNUNCIATORS
14. AIRSPEED READOUT

The EFIS ADI page is the default page when initialising the avionics systems on the J160/J170. Pressing *Softkey 1 will* power up the device when the Instrument Bus and Main Bus are powered.

Roll Scale

The roll scale indicates degrees of bank in 10/20/30 and 45 increments.

Heading Readout

The Heading readout displays the current magnetic heading of the aircraft in degrees.

Compass Scale

Similar to the Heading Readout, the compass scale shows magnetic heading in the form of a horizontally moving strip in degrees.

Roll Pointer

The roll pointers show orientation of the aircraft in relation to the roll scale.

Vertical Speed Scale

The vertical speed scale shows the value relating to the deviation of the pink vertical speed bar (not shown).

Altitude Readout

The altitude readout show the current altitude of the aircraft above sea level based on the programmed barometric pressure. The readout will display values in tens of feet.

Barometric Pressure

The barometric pressure readout displays current pilot selected barometric pressure in either inches of mercury (**inHG**) or millibars (**Mb**)

Pressing *the Barometric adjustment knob (Left Mouse)* cycles the barometric pressure readout between inHG and Mb.

Increasing or decreasing the barometric pressure value is done using either the aircraft's altimeter adjustment knob or the barometric adjustment knob on the EFIS.

Wind speed and Direction Indicator

The arrow shown will show the direction of the wind relative to the direction of the aircraft. For example, if the arrow is pointing down to the south, the wind is coming at the nose of the aircraft.

Pitch Ladder

The pitch ladder displays the pitch orientation of the aircraft in degrees with small markers at every 5 degrees and larger horizontal markers in multiples of 10 degrees.

Slip Ball

The slip ball displays a visual representation of coordinated flight. If the aircraft is yawing left or right, either in a turn or in level flight, the ball will move to the left or right of the two black bars.

Aircraft Reference Symbol

The aircraft reference symbol displays a visual indication of the aircraft relative to the artificial horizon, pitch ladder and roll reference scale.

Airspeed Readout

The airspeed readout shows the current indicated airspeed of the aircraft in knots (nautical miles per hour).

Airspeed Scale

The vertical airspeed scale shows different coloured bars for the various conditions of flight and corresponds with the markers on the Airspeed Indicator.

Autopilot Annunciators

The following annunciators display depending on the conditions of flight.

AP – Autopilot engaged.

Vertical Hold Modes

PIT – Pitch hold engaged.
ALT – Altitude hold engaged.

Lateral Hold Modes

ROL – Roll hold engaged.
HDG – Heading hold engaged.
NAV – NAV/GPS hold engaged.

On initial engagement of the autopilot, the aircraft enters pitch and roll hold. The pilot can then select the appropriate lateral and vertical hold modes as required.

Please see the following section for information on the Autopilot Mode Control Panel (AMCP).

AUTOPILOT MODE CONTROL PANEL (AMCP)

Available in the J160/J170 Option B panel, the AMCP provides pilot interaction with the autopilot on the aircraft.

Regardless of the J160 or the J170, the functionality remains the same.

From Left to Right, the functions are as follows;

1. **Autopilot Master pushbutton**
    a. Pressing the AP pushbutton engages roll and pitch hold. A subsequent press of the pushbutton will disengage the autopilot.
2. **Multi-Function Knob**
    a. Scrolling the mousewheel over the knob in HDG adjust mode (flashing green light), will adjust the autopilot selected heading.
    b. Scrolling the mousewheel over the knob in ALT adjust mode (flashing green light), will adjust the autopilot selected altitude.
    c. Scrolling the mouse-wheel over the knob when ALT and HDG adjust modes are not engaged (static green light) will adjust the autopilot vertical speed hold mode.
    d. Clicking the knob with the left mouse, will set the vertical speed hold to zero or level flight.
3. **Heading Hold Mode**
    a. Press to engage heading hold mode. Press again to enter heading adjust mode. In heading adjust mode, use the multi-function knob to adjust selected autopilot heading.
4. **Track Hold Mode – INOP**
5. **NAV Hold Mode**
    a. Press to engage NAV hold mode. Press again to disengage NAV hold mode.
6. **Altitude Hold Mode**
    a. Press to engage altitude hold mode. Press again to enter altitude adjust mode. In altitude adjust mode, use the multi-function knob to adjust selected autopilot altitude (top of climb/bottom of descent).

Note:

If the multi-function knob is not used within 2 seconds of entering heading or altitude adjust mode, the system will revert to heading or altitude hold mode.

AMCP PRACTICAL EXAMPLES

Following a NAV route;

1. Press AP to engage Roll and Pitch Hold.
2. Press NAV to engage NAV lateral hold mode.

Climbing to 5,000 feet;

1. Press AP to engage Roll and Pitch Hold.
2. Press ALT to capture current altitude and engage altitude hold mode.
3. Press ALT again to engage altitude adjust mode.
4. Use the Multi-Function Knob to adjust the altitude value to 5,000ft.
5. When the altitude mode reverts to altitude hold mode (static green light), use the Multi-Function Knob to adjust your vertical speed component.
6. When at the selected altitude, the autopilot will cancel your climb and level off.

Turning to heading 090 degrees;

1. Press AP to engage Roll and Pitch Hold.
2. Press HDG to capture current heading and engage heading hold mode.
3. Press HDG again to engage heading adjust mode.
4. Use the Multi-Function Knob to adjust the heading value to 090 degrees.
5. The aircraft will commence the turn onto heading as soon as you begin to adjust the value.

COM RADIO

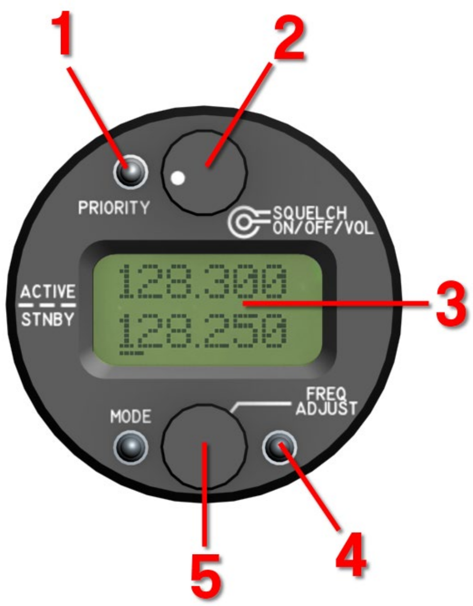

Figure 3-1 COM Radio

1. PRIORITY SWITCH
2. POWER KNOB
3. FREQUENCY DISPLAY
4. FREQUENCY SWAP SWITCH
5. FREQUENCY ADJUST KNOB

Priority Switch

Clicking this switch will set the Active COM frequency to guard of 121.500

Power Knob

LEFT click this knob to power the unit up, and RIGHT click this knob to turn the power off.

Frequency Display

This LCD will display active and standby COM frequencies.

Frequency Swap Switch

Clicking this switch will swap the current active and standby COM frequencies.

Frequency Adjust Knob

This knob tunes the standby frequency using the mouse-wheel, and will tune whichever frequency is currently underlined.

Clicking this knob with the LEFT mouse button will toggle the user-selectable standby frequency area between Mhz and Khz.

NAV RADIO

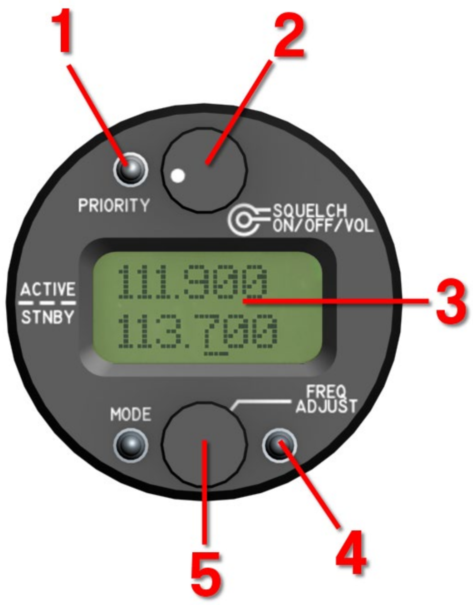

Figure 3-2 NAV Radio

1. PRIORITY SWITCH
2. POWER KNOB
3. FREQUENCY DISPLAY
4. FREQUENCY SWAP SWITCH
5. FREQUENCY ADJUST KNOB

Priority Switch

This switch has no function.

Power Knob

LEFT click this knob to power the unit up, and RIGHT click this knob to turn the power off.

Frequency Display

This LCD will display active and standby NAV frequencies.

Frequency Swap Switch

Clicking this switch will swap the current active and standby NAV frequencies.

Frequency Adjust Knob

This knob tunes the standby frequency using the mouse-wheel, and will tune whichever frequency is currently underlined.

Clicking this knob with the LEFT mouse button will toggle the user-selectable standby frequency area between Mhz and Khz.

TRANSPONDER RADIO – STANDBY MODE

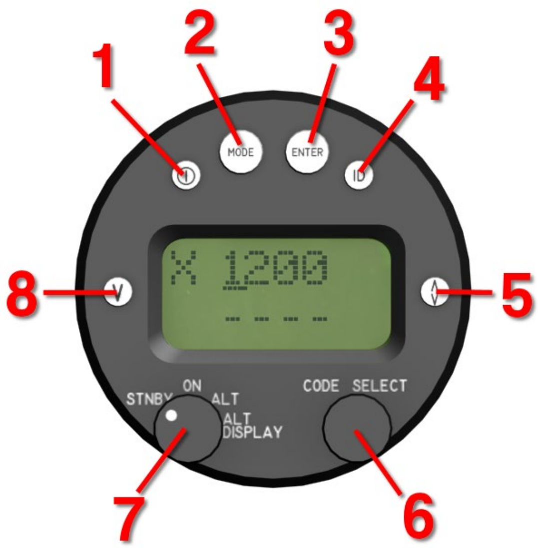

Figure 3-2 Transponder Radio – Standby Mode

1. POWER BUTTON
2. MODE BUTTON
3. ENTER BUTTON
4. IDENT BUTTON
5. CYCLE BUTTON
6. CODE SELECT KNOB
7. MODE KNOB
8. VFR BUTTON

The Standby Mode shows your currently tuned Transponder frequency and does NOT transmit, as indicated by the X on the left of the display.

The following buttons and knobs are common for all following Transponder modes and will only be described in this section.

Power Button

This button turns the power to the unit on or off.

Mode Button

This button is inactive.

Enter Button

This button is inactive.

IDENT Button

This button sets your Transponder to IDENT mode and squawks IDENT for a short period of time. When squawking IDENT, the flashing R character is replaced with a solid I character on the right of the transponder display.

Cycle Button

This button is inactive.

Code Select Knob

This knob allows you to increase or decrease your selected transponder digit from 0-7 using the mouse wheel. Clicking the Knob with your LEFT mouse button will cycle through the first, second, third and fourth digit for adjustment.

Mode Knob

This knob when clicked with the LEFT mouse button will cycle through the following four transponder modes.

- Standby Mode (STNBY)
- Mode A Operation (ON)
- Mode A & C Operation (ALT)
- Mode A & C Operation (ALT DISPLAY)

VFR Button

This button when pressed will set your transponder to 1200.

TRANSPONDER RADIO – MODE A

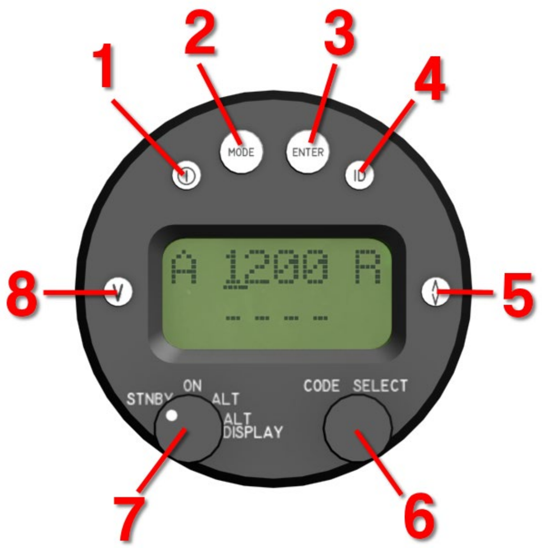

Figure 3-2 Transponder Radio – Mode A Operation

1. POWER BUTTON
2. MODE BUTTON
3. ENTER BUTTON
4. IDENT BUTTON
5. CYCLE BUTTON
6. CODE SELECT KNOB
7. MODE KNOB
8. VFR BUTTON

When the Mode Knob is in the ON position, the Transponder switches to Mode A operation and transmits the tuned transponder code as shown on the display.

A flashing R indicates transmission of the transponder.

TRANSPONDER RADIO – MODE A & C

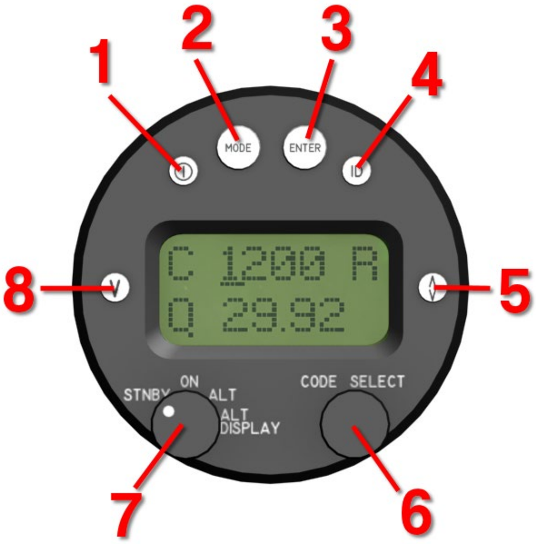

Figure 3-2 Transponder Radio – Mode A & C Operation

1. POWER BUTTON
2. MODE BUTTON
3. ENTER BUTTON
4. IDENT BUTTON
5. CYCLE BUTTON
6. CODE SELECT KNOB
7. MODE KNOB
8. VFR BUTTON

When the Mode knob is in the ALT position, the Transponder switches to Mode A plus C operation and transmits the tuned transponder code as shown on the display.

In this mode, the tuned barometric pressure in inches of mercury is shown below the transponder code.

A flashing R indicates transmission of the transponder.

TRANSPONDER RADIO – MODE A & C (With Altitude)

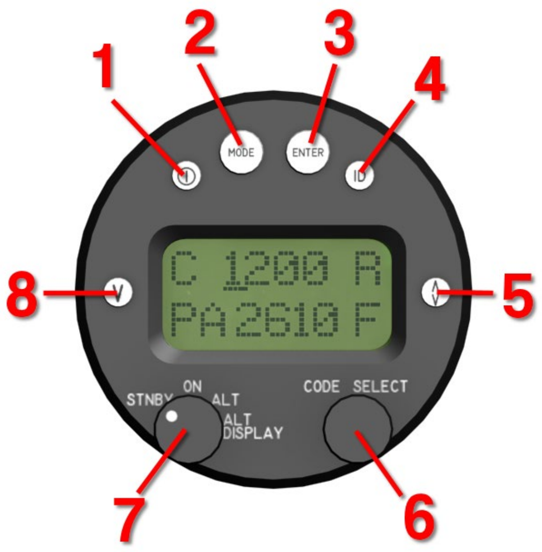

Figure 3-2 Transponder Radio – Mode A & C Operation

1. POWER BUTTON
2. MODE BUTTON
3. ENTER BUTTON
4. IDENT BUTTON
5. CYCLE BUTTON
6. CODE SELECT KNOB
7. MODE KNOB
8. VFR BUTTON

When the Mode knob is in the ALT DISPLAY position, the Transponder switches to Mode A plus C operation and transmits the tuned transponder code as shown on the display.

In this mode, the pressure altitude in feet is shown below the transponder code.

A flashing R indicates transmission of the transponder.

SECTION 2

NORMAL OPERATIONS

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SECTION 2

CHAPTER 1

NORMAL OPERATIONS

GENERAL

The procedures are arranged in the sequence considered to be the most desirable and therefore steps should be performed in the order listed unless good reasons for a deviation exist.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 540 kg (1190lb) and may be used for any lesser weight.

Take-Off:

T.O.S.S. (Speed @ 50 ft.)	66 KIAS
Normal Climb Out	70 KIAS (Take-off Flap)

Climb, Flaps Up:

Initial (scheduled climb)	70 KIAS
Enroute	70-80 KIAS

Landing Approach:

VREF (Speed @ 50 ft.)	63 KIAS
Baulked Landing	65 KIAS Initially

Maximum Recommended in Turbulence:

All Weights	102 KIAS

Maximum Demonstrated Crosswind Velocity: 14 knots

PREFLIGHT INSPECTION

The Pre-flight inspection as covered below is recommended prior to the first flight of the day.

Inspection procedures for subsequent flights can be abbreviated provided essential items such as fuel and oil quantities, security of fuel and oil filler caps are satisfactory. After refuelling fuel samples must be taken from all drain points, three in total, one in each of the two wing fuel tanks and one under the fuselage.

Aircraft operated from rough strips, especially at high altitudes, are subject to abnormal undercarriage abuse.

Frequent checks of all undercarriage components, tyres and brakes is warranted in these situations.

1. Fuel

Quantity in both tanks	Check
Fuel caps	Secure
Water Check	Both tanks and header tank

The fuel gauges used in the J160/J170 use a sender unit which has a built-in analogue needle indicator for fuel level. These senders are located in the wing roots and are visible to the crew.

These units may be used to confirm the fuel level being displayed by the gauges fitted to the instrument panel.

Note that due to the shape of the wing tanks, the gauges will read full from when the tank is full until its level has dropped below around 50 litres. This must be taken into account by manually checking fuel quantity (dipping the tanks) before a long flight.

2. Cockpit

Ignition Switches	OFF
Control lock (if fitted)	REMOVE
Fuel	CHECK CONTENTS
Fuel valve	ON
Master switch	ON

Alternator Warning Light	CONFIRM ON Before Start
Master Switch	OFF
Aileron and elevator cables & fasteners	CHECK
Rudder and nose wheel steerage linkage	CHECK
Rudder centring springs	CHECK
Controls (all)	CHECK full travel, free movement.
Harnesses & Seats	CHECK CONDITION
Windshield	CLEANLINESS
Cockpit area	GENERAL CONDITION
Loose objects	SECURE
Cockpit Doors/Latches	CONDITION & OPERATION
Flight Manual	AVAILABLE

3. Left Undercarriage

Mount bolts	CHECK SECURE
Tyre	CHECK CONDITION / INFLATION

4. Static Source

Static Source	CHECK FOR BLOCKAGE

5. Empennage

Tail tie-down	DISCONNECT
Control surfaces	CHECK Security & Full & Free Movement
Rudder, Elevator & Trim Cables	CHECK Security & Full & Free Movement

6. Right Wing – Trailing Edge

Aileron	CHECK Security & Full & Free Movement

Flap	CHECK Security
Control rods & cables	CHECK Security. Check rod ends for freedom of rotation & excess movement.

7. Right Wing

Wing Tie-Down	DISCONNECT
Wing Strut Mount Bolts	CHECK Security**
Wing Root Mount Bolts	CHECK Security***
Pitot Tube	REMOVE COVER, CHECK for blockage.

8. Nose

Propeller & Spinner	CHECK for nicks & security
Cowl	CHECK Security, rubbing on engine.
Engine Oil	CHECK using oil filler door.
Nose Wheel	CHECK condition & pressure.

9. "Pulling Through" The Engine

Before the first flight of the day the engine must be "pulled through" by hand. This is the process of turning the engine over by turning the propeller by hand.

The compression of each cylinder in turn will be felt a resistance as the propeller is turned. The engine should be rotated for a count of at least 8 compressions.

Master Switch	OFF
Ignitions	OFF
Throttle	Closed

Propeller	TURN by hand & observe engine for odd noises or heavy movements. Check for regular compression.

CAUTION

- Prior to pulling through the propeller by hand, the engine must be cold, both ignition circuits & the Master Switch must be switched OFF, the brakes applied & throttle closed.

WARNING

- A hot engine may fire with the ignition/s switched OFF.
- DO NOT pull through a hot engine.

CAUTION

- Several causes of irregular compression – such as poorly sealing valves – can lead to extensive engine damage if not addressed. The Jabiru 2200 Engine Instruction & Maintenance Manual provides additional details.

10. Left Wing

Wing Tie-Down	DISCONNECT
Wing Strut Mount Bolts	CHECK Security**
Wing Root Mount Bolts	CHECK Security***

11. Left Wing – Trailing Edge

Aileron	CHECK Security & Full & Free Movement
Flap	CHECK Security
Control rods & cables	CHECK Security
	CHECK rod ends for freedom of rotation & excess movement.

AMPLIFIED PROCEDURES

Before Starting Engine

Pre-flight Inspection	COMPLETED
Passenger Briefing	COMPLETED
Harnesses	SECURE
Brakes	ON/PARK
Avionics	OFF
Circuit Breakers	IN
Fuel Level Warning Light (if fitted)	CHECK OPERATION using test switch

The Jabiru 2200 engine is fitted with a dual electronic ignition system. The engine will not start below 300 RPM, which precludes the option of hand swinging or "propping" an engine when there is insufficient charge available in the aircraft battery for a normal start.

Starting using an external power source involves removing the upper engine cowl, attaching jumper leads to the battery terminals and proceeding with the normal start sequence.

WARNING

- When the engine is started, and battery charge restored, shut down before re-fitting the engine cowl.

After starting, oil pressure should start to rise within 10 seconds. If it does not rise within this time stop the engine and investigate the cause.

Starting Engine - Cold

Master Switch	ON
Fuel Shutoff Valve	ON
Carburettor Heat	OFF
Choke	ON
Throttle	CLOSED
Fuel Pump	ON

Ignition switches	ON
Starter	ENGAGE when engine fires RELEASE**
Oil Pressure	CHECK (pressure to be indicated within 10 secs)
Choke	Closed
Throttle	900 – 1000 RPM
Alternator Warning Light	CHECK OFF
Avionics	ON

Before Take-Off

Park Brake	ON

Ground Check & Run Up

Warm Up	1000-1200 RPM avoid prolonged idle at low RPM
Ignition Check	2000 RPM Both-L-Both-R-Both. Max drop 100RPM
Carburettor heat	2000 RPM – ON – slight drop in RPM
Carburettor heat	2000 RPM – OFF – RPM restored
Power Check	2850 RPM +/- 150 RPM
Idle Check	700 – 900 RPM
Trim	SET – Neutral

Engine Management - Ground Running

The 2200 engine fitted to the J160/J170 is cooled by air flowing over the engine and oil cooler. During ground running care must be taken to ensure that there is adequate airflow and that safe engine temperatures are maintained. The guidelines presented below will assist in controlling temperatures.

- Minimise ground running times – especially in hot weather.
- Carry out as many checks as possible before starting the engine.
- Always carry out engine run-up tests with the aircraft pointing into wind.
- In hot weather, after performing run-up checks, leave the aircraft pointing into wind and idling at 1200rpm for 30 seconds to aid cooling.
- If the aircraft is required to wait – such as for runway clearance – temperatures must be monitored, and if they approach ground running limits (listed in Section 2 of this flight manual & displayed as yellow markings on engine gauges) the aircraft must be turned into wind or shut down to prevent any further temperature increase.
- Wind must be coming from within approximately 45° of the aircraft heading to be effective in aiding engine cooling.
- If there is no wind or low wind the engine must be shut down if ground-running temperature limits are reached.

Taxiing

Positive control is available to the pilot when taxiing the J160/J170 due to the direct linkage type nose-wheel steering.

Care should be exercised in strong winds, particularly in quartering tail wind conditions. As with any high wing configuration aircraft, appropriate elevator and aileron control positions are essential during taxiing operations particularly during strong tail wind conditions.

Taxiing over loose gravel or stones should be done at low engine RPM to minimise propeller damage.

Pre Take-Off

Master Switch	ON
Ignition switches	BOTH ON
Fuel Shutoff Valve	ON
Fuel Quantity	CHECK sufficient for task
Fuel Pump	ON
Flaps	TAKE OFF (first stage)
Instruments	SET AND CHECK ALL
Switches	SELECTED as required
Circuit Breakers	CHECK
Controls	FULL & FREE TRAVEL, CORRECT SENSE
Hatches	CLOSED & LOCKED
Harnesses	SECURE all seat belts correctly fastened and adjusted
Oil temperature	ABOVE 50°C

Warm Up

Most of the warm up will have occurred during taxiing and whilst conducting the Before Take-Off checks. The engine is warm enough for take-off when the cylinder head and oil temperatures are in the green arcs.

Power Check

Full throttle run-ups over loose gravel are especially harmful to the propeller and should be avoided. When take-offs must be made from a gravel surface, it is very important that the throttle be advanced slowly and a rolling start take-off technique be used to minimise propeller damage.

It is important to check full throttle engine performance early in the take-off run.

Any sign of rough engine operation or sluggish acceleration is good cause for discontinuing the take-off and conducting a full power run-up to confirm normal engine operation prior to the next take-off attempt.

Wing Flap and Power Settings

Normal take-offs are accomplished at full throttle, and TAKE-OFF flap selected.

The flaps should not be retracted until a safe height is achieved and all obstacles have been cleared.

Take-offs may be made with flaps up but this will increase the take-off distance and will result in a more pronounced nose up attitude at lift off.

Take-Off

Carburettor heat	OFF
Throttle	FULL OPEN
Elevator Control	NEUTRAL
Directional Control	NOSEWHEEL STEERING & RUDDER
Rotate	30 – 40 KIAS raise nose wheel clear of ground
Take-off Safety Speed	66 KIAS
Accelerate to Climb Speed	70 KIAS
Flaps	UP… Accelerate to 70 KIAS
Fuel Pump	OFF at top of climb.
Power	SET as required.

Initial Climb

Throttle	FULL OPEN
Airspeed	70 KIAS

Enroute climb

Enroute climbs are performed with flaps up, full throttle, and at speeds 5 to 10 knots higher than the initial scheduled climb speed.

This provides better engine cooling with little loss of climb performance.

Cruise

The power setting and cruising altitude are the two major factors that will affect the cruising speed and range of the J160/J170.

Other influencing factors include the weight and loading, temperature and equipment installed in a given aircraft. The maximum power setting normally used for cruise is 75% of the engine's rated power.

Power settings below this will result in increased range and endurance corresponding with the reduced fuel consumption.

At a power setting of 45% the J160/J170 is capable of attaining an endurance of close to 13 hours, for a range of over 1000 nautical miles.

For efficient and economical operation as well as to achieve maximum engine service life the engine must always be operated in accordance with the procedures and specifications set out in the engine manufacturer's operator's manual.

75% Power	2800 RPM (14 L/hr)

Stalls

In any attitude or under any loading condition there is no natural stall warning.

An artificial stall warning horn is set to activate 5 to 10 KIAS above the stall speed in any configuration.

All controls are effective up to and completely through the stall and there is no noticeable tendency to enter a spin after the stall.

Descent

Power	As required
Carburettor heat	As required

Before Landing (and flight below 1000ft AGL)

Brakes	OFF
Harnesses	SECURE
Fuel Pump	ON

Approach and Landing

Landings are normally conducted with full flaps. The landing approach is conventional.

Care must be taken to ensure airspeed is accurately maintained during the final landing approach. Timely and appropriate use of power should be exercised to maintain the desired flight path and airspeed.

Excessively high approach speeds will result in prolonged floating and increased landing distance.

Normally the throttle should be fully closed during the 'flare' to reduce the tendency to float and prolong the touchdown.

Touchdown should occur on the main wheels initially, followed by the nose gear which should be held clear of the ground during the initial ground roll.

Positive braking may then be applied depending on requirements and circumstances. For maximum braking effectiveness the wing flaps should be retracted and back pressure applied to the control column.

Landing

Airspeed @ 50ft	63 KIAS
Wing Flaps	FULL
Directional Control	RUDDER & NOSEWHEEL STEERING
Power	AS REQUIRED
Touchdown	MAIN WHEELS FIRST
Braking	AS REQUIRED

NOTE

- If the aircraft is contaminated by build-up of insects or other debris, increase approach speed @ 50ft to 68 KIAS

Cross Wind Landing

The J160/J170 has been approved for operations in crosswinds of up to 14 Knots.

When landing in a strong cross wind use a wing low, crab, or a combination method of drift correction.

Avoid a prolonged hold off by allowing the aircraft to settle onto the runway in a slightly nose high and wing low attitude, touching down on the into wind mainwheel first followed by the other mainwheel and then the nose gear in quick succession.

In strong and/or gusty wind conditions it may be desirable to make the final approach at a slightly higher than normal airspeed with partial or no flap selected.

Baulked Landing

In a baulked landing (go-around), the wing flaps should be retracted to take-off immediately after full power has been applied.

Upon reaching a safe airspeed, the flaps should be smoothly retracted to the full up position and a normal climb established.

Power	FULL THROTTLE
Carburettor heat	COLD
Wing Flaps	RETRACT SLOWLY
Airspeed	ESTABLISH NORMAL CLIMB SPEED

After Landing/Securing

Wing Flaps	UP
Fuel Pump	OFF
Parking Brake	ON/AS REQUIRED
Avionics	OFF
Ignition	OFF
Master Switch	OFF
Controls	SECURE

SECTION 3

PERFORMANCE DATA

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SECTION 3

CHAPTER 1

PERFORMANCE DATA

GENERAL

The performance data on the following pages is presented so that you may know what to expect from the aircraft under various conditions, and also to facilitate the planning of flights in detail and with reasonable accuracy.

The data has been computed from actual flight tests with the aircraft and engine in good condition and using average piloting techniques.

Performance data is presented in tabular or graphical form to illustrate the effect of different variables.

Sufficiently detailed information is provided in the tables so that conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

Cruise performance data assumes that the aircraft is clean the engine is operating correctly, and the propeller is undamaged.

Some indeterminate variables such as carburettor settings, engine and propeller condition, and air turbulence may account for variations in range and endurance.

It is therefore important to utilise all available information to estimate the fuel required for a particular flight.

APPROVED DATA

Airspeed Indicator System Calibration

KIAS	KCAS		
	Flaps UP	Flaps Take-off	Flaps Landing
47	-	-	45
50	-	48	48
56	53	54	54
57	54	55	55
63	60	60	60
73	70	70	70
85	81	82	82
94	90	-	-
106	101	-	-
117	112	-	-
125	120	-	-
135	129	-	-
146	140	-	-

Figure 4-1 Airspeed Indicator Calibration Chart

NOTE

- Indicated airspeed assumes zero instrument error

Stall Speeds

	Angle of Bank							
	0°		30°		45°		60°	
Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
Up	58	53	60	57	66	63	79	75
T/0	51	48	54	52	59	57	71	68
Land	48	45	50	48	56	54	67	64

Figure 4-2 Aircraft Stall Speeds

NOTE

- Stalling speeds will reduce as weight is reduced.
- Staling speeds will reduce as CoG is moved aft, however the reduction is small.

Take-Off Performance

The following table contains data enabling the take-off distance to be determined for a variety of operating conditions.

The take-off distances are given in meters.

The table is based on take-off distances from rest to a height of 15 meter (50 foot) with the engine operating at take-off power which is with throttle in the fully open position, and with the flaps extended to the take-off setting which is a 17 degree extension.

The distances presented are for operating on a level bitumen surface.

When taking off from short dry grass increase the take-off distance by 7%.

When taking off from soft ground or unusually long and/or wet grass the take-off distance will be even longer. The pilot should therefore ensure that adequate strip length is available to cover these conditions.

The technique used in establishing the data in the take-off distance table involves accelerating the aircraft along the ground with the elevators held neutral, then rotating and commencing a climb so that the take-off safety speed (T.O.S.S.) 66-KIAS is achieved and maintained at or before the 15 meter (50 foot) height point.

The data is presented for the maximum permitted take-off weight of 540-kg.

Extrapolation outside the boundaries of the Take-Off Distance Table is not permitted.

When the outside air temperature and/or pressure height is below the lowest range included in the table, the aircraft performance shall be assumed to be no better than that appropriate to this lowest range.

The performance information is not valid when the outside air temperature and/or pressure height exceeds the maximum values for which this information is scheduled.

Take Off Distance								
Weight (kg)	Pressure Altitude (ft)	Outside Air Temperature (degC)						
		-20	-10	0	10	20	30	38
540	0	369	391	415	439	464	490	511
	2000	413	438	465	493	523	553	579
	4000	464	494	525	559	593	630	661
	6000	524	560	598	638	680	726	764
	8000	598	641	687	737	790	847	897

Figure 4-3 Take Off Distance

For every 1 knot of head-wind component, the take-off distance can be reduced by 11 meters.

For every 1 knot of tail-wind component the take-off distance required MUST be increased by 16 meters.

Landing Distances

The landing distance table presented below provides information to achieve the minimum landing distance for a variety of operating conditions. The data is applicable when using a power off glide approach with the flaps extended to the "Landing Flap" or fully extended position, and is based on landing distances from a height of 15 metre (50 feet) to stop.

The landing distance is provided for a hard bitumen surface. Wet and/or slippery surfaces will increase the landing distance over that scheduled and the pilot should therefore ensure that adequate strip length is available to cover these conditions.

The technique used in establishing the Power Off Approach Landing Chart distance is such that the aircraft approaches with idle power down to the 15 metre (50 foot) height point at 63 KIAS. After touch down maximum wheel braking is used to bring the aircraft to a stop.

When the outside air temperature and/or pressure height is below the lowest range scheduled on the charts, the aircraft performance shall be assumed to be no better than that appropriate to this lowest range.

The performance information is not valid when the outside air temperature and/or pressure height exceeds the maximum values for which this information is scheduled.

Landing Distance (metres)								
Weight (kg)	Pressure Altitude (ft)	Outside Air Temperature (degC)						
		-20	-10	0	10	20	30	38
540	0	432	440	448	456	464	472	478
	2000	447	456	464	473	481	490	497
	4000	464	473	482	491	500	510	517
	6000	482	492	502	511	521	531	539
	8000	501	512	523	533	544	555	563

Figure 4-4 Landing Distance

For every 1 knot of head-wind component, the take-off distance can be reduced by 11 meters.

For every 1 knot of tail-wind component the take-off distance required MUST be increased by 17 meters.

CLIMB

Best Rate of Climb Speed

The speed to obtain the best climb gradient when the flaps are fully retracted is 68 KIAS.

This speed does not vary with altitude.

Scheduled Climb

Associated conditions: Power: Full Throttle **Airspeed:** 71 KIAS **Flaps:** UP

Rate of Climb (ft/min)								
Weight (kg)	Pressure Altitude (ft)	Outside Air Temperature (degC)						
		-20	-10	0	10	20	30	38
540	0	453	461	680	623	570	520	482
	2000	685	624	566	513	463	416	381
	4000	570	512	459	409	362	318	285
	6000	460	407	357	310	266	225	194
	8000	357	306	259	216	174	136	106
520	0	856	788	724	665	610	559	520
	2000	730	666	607	552	500	452	416
	4000	610	551	496	444	396	351	317
	6000	498	442	390	342	297	255	223
	8000	391	339	290	245	203	163	133
500	0	908	837	772	711	654	601	561
	2000	778	712	651	594	541	491	453
	4000	654	593	536	483	433	386	351
	6000	538	480	427	377	331	287	254
	8000	427	374	324	277	234	192	161
480	0	965	892	824	761	702	646	605
	2000	830	761	698	639	584	533	494
	4000	702	638	579	524	473	425	388
	6000	581	522	467	415	367	322	288
	8000	467	412	360	312	267	224	192
	10000	359	307	259	214	171	131	101
460	0	1026	950	880	814	753	696	653
	2000	886	815	750	689	632	578	538
	4000	753	688	626	569	516	466	429
	6000	628	567	510	457	407	360	325
	8000	510	453	399	350	303	259	226
440	0	1094	1015	941	873	810	750	705
	2000	948	874	806	742	683	628	586
	4000	810	741	678	619	563	512	473
	6000	680	616	557	502	450	402	365
	8000	557	498	442	391	342	297	263

Figure 4-5 Scheduled Climb Chart

Take-Off Configuration Climb

Associated conditions: Power: Full Throttle **Airspeed:** 68 KIAS **Flaps:** 17°

Rate of Climb (ft/min)								
Weight (kg)	Pressure Altitude (ft)	Outside Air Temperature (degC)						
		-20	-10	0	10	20	30	38
540	0	818	746	679	616	558	503	461
	2000	685	617	554	495	441	389	350
	4000	558	495	436	381	329	281	244
	6000	438	378	323	272	223	178	143
	8000	323	268	216	167	122	79	46
520	0	871	796	727	662	601	545	502
	2000	733	663	598	537	481	428	388
	4000	602	536	476	419	366	316	279
	6000	478	417	360	307	257	210	174
	8000	360	303	249	199	152	108	75
500	0	927	850	778	711	649	590	546
	2000	784	712	645	583	524	469	428
	4000	649	582	519	461	406	354	316
	6000	521	458	399	344	293	245	208
	8000	399	340	285	234	186	140	106
480	0	988	908	834	765	700	640	594
	2000	840	766	696	632	571	515	472
	4000	700	631	566	505	449	396	356
	6000	568	503	442	386	332	283	245
	8000	442	381	325	271	222	175	139
460	0	1055	972	895	823	756	693	646
	2000	901	824	752	685	622	564	519
	4000	756	684	617	554	496	441	399
	6000	619	551	489	430	375	324	285
	8000	489	426	367	312	261	212	175
440	0	1128	1041	961	886	817	752	703
	2000	968	887	813	743	678	617	571
	4000	817	742	672	607	547	490	447
	6000	675	605	540	479	422	369	328
	8000	540	474	413	357	303	253	215

Figure 4-6 Take-Off Configuration Climb Chart

Landing Configuration Climb

Associated conditions: Power: Full Throttle **Airspeed:** 60 KIAS **Flaps:** Land

Sea Level Gradient of Climb: 6.8% (1:14.6)

CRUISE

The JABIRU 2200 engine has an altitude compensating carburettor which ensures that the fuel flow is constant at all operating altitudes.

This feature has been examined by flight testing, and verified for altitudes between sea level and 5000 ft.

RPM	Fuel Flow (litre/hr)	TAS (knots)
2600	10.7	80
2700	12.1	87
2800	13.0	95
2900	14.3	100
3000	16.1	103
3100	21.0	107
Full Power	25.6	120

Figure 4-7 Cruise Power Settings

NOTE

- The JABIRU 2200 engine has an altitude compensating carburettor which provides for a fuel flow that is constant at all operating altitudes.
- This feature has been examined by flight testing, and verified for altitudes between sea level and 5000 ft.
- Fuel flow values have not been verified above 5,000 ft. therefore pilots will need to monitor fuel flows to ensure accuracy when operating above that altitude.

- For flight planning purposes when the flight is above 5,000 ft., pilots should program a fuel burn which is for the next highest rpm range in the table above.

Endurance

Aircraft endurance can be calculated using the information presented in paragraph "Cruise" above.

When calculating endurance, an allowance should be made for engine start, taxi, take-off and climb.

In normal circumstances a total allowance of 5-litres for these would be adequate. This allowance should be subtracted from the actual fuel on board prior to flight. i.e.

Fuel on Board – Allowance = Fuel assumed for endurance calculations.

Baulked Landing Climb

Associated conditions: Power: Full Throttle **Airspeed:** 53 KIAS **Flaps:** Land **Weight:** 540kg

	Rate of Climb (ft/min)							
Weight (kg)	Pressure Altitude (ft)	Outside Air Temperature (degC)						
		-20	-10	0	10	20	30	38
540	0	795	723	656	594	536	481	440
	2000	662	595	532	474	419	368	329
	4000	536	473	414	360	308	260	224
	6000	416	357	302	251	203	157	123
	8000	302	247	195	147	101	59	26

Figure 4-8 Baulked Landing Climb Chart

Demonstrated Crosswind Performance

- 14 Knots