SECTION 4

NORMAL PROCEDURES

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4.1 INTRODUCTION

Section 4 details checklist procedures for normal operations.

4.2 AIRSPEEDS FOR NORMAL OPERATIONS

The following speeds are based on a maximum weight of 7500 lbs for takeoff and may be used for any lesser weight. Section 5 details the speeds required to achieve specific performance capabilities.

TAKEOFF

- Normal Climb Out Speed at 50 ft, Flaps 20^0 74 KIAS

CLIMB

- Best Rate of Climb Flaps 0^0 91 KIAS
- Best Angle of Climb Flaps 0^0 85 KIAS
- Best Angle of Climb Flaps 20^0 74 KIAS

LANDING APPROACH

- Normal Approach, Flaps 40^0 75 KIAS

BALKED LANDING

- Takeoff Power, Flaps 20^0 75 KIAS to flap retraction then 91 KIAS after flap fully up

MAXIMUM RECOMMENDED TURBULENT AIR PENETRATION SPEED

- Maximum Rough Air Speed 140 KIAS

MAXIMUM DEMONSTRATED CROSSWIND VELOCITY

- Takeoff or Landing 14 knots

4.3 PREFLIGHT INSPECTION

Pitot Heat Cover	REMOVE

CABIN

Door	OPEN, CHECK FREEDOM OF MOVEMENT
Pilot's Operating Handbook,	STOWED BETWEEN PILOT AND FRONT PASSENGER SEATS
Axe, First Aid Kit	STOWED BETWEEN PILOT AND FRONT PASSENGER SEATS
Control Lock	REMOVE, STOW

Parking Brake	CHECK OPERATION OF TOE BRAKES AND PARK BRAKES
All Switches	OFF
All Circuit Breakers	IN
Air Conditioner (if installed)	OFF
Fuel Shut Off Valve	ON (lever pushed fully in, safety lock engaged)
Master Switch	ON
Volt/Ammeter	SET TO VOLTS – CHECK 24V MINIMUM. IF LESS THAN 24V USE EXTERNAL POWER FOR START
Fuel Quantity Indicators	CHECK QUANTITY
Flaps	40^0 (fully down)
Lighting	CHECK EXTERNAL AND INTERNAL LIGHTING AS REQUIRED FOR DAY/NIGHT FLYING
Pitot Heat	ON FOR 30 SECONDS, OFF
Master Switch	OFF
Fire Extinguisher	FITTED, SECURE, SEAL UNBROKEN
Oxygen System	CONTENTS SUFFICIENT, SECURITY OF FITTINGS, AND OPERATION OF MASKS

LEFT WING

Upper and Lower	CHECK SURFACE CONDITION
Flap	CHECK ALIGNMENT, BONDING AND CONDITION
Aileron	CHECK FULL AND FREE MOVEMENT, SECURITY OF TABS AND BONDING WIRES
Wing Tip	CHECK CONDITION OF FAIRING
Navigation and Strobe Light	CHECK CONDITION AND CHECK LENS CLEAN
Landing Light	CHECK CONDITION AND CHECK LENS CLEAN
Leading Edge	CHECK CONDITION
Fuel Drains	CHECK FUEL IN FRONT, REAR AND SUMP TANKS FREE OF WATER AND SEDIMENT, CHECK DRAINS CLOSED
Fuel Vent	CHECK FREE OF OBSTRUCTIONS

Left Main Landing Gear	INSPECT, CHECK TIRE INFLATION AND CONDITION, CHECK BRAKE LINES FOR SECURITY AND ABSENCE OF LEAKS AND CHECK OLEO INFLATION
Fuel Filler Caps	OPEN, REMOVE CAPS, CHECK CONTENTS VISUALLY FOR DESIRED LEVEL, REPLACE CAPS AND CHECK CAPS FOR PROPER SEALING AND SECURITY

COCKPIT AND CABIN - LEFTHAND SIDE

Windows	CHECK FOR CRACKS AND CLEANLINESS
Crew Entry Door	CHECK CONDITION

ENGINE

Engine	CHECK NO LEAKS, NO DAMAGE AND CHECK SECURITY OF ENGINE
Cowls	CHECK FOR SECURITY
Exhaust Pipe	REMOVE COVERS, CHECK SECURITY AND CONDITION
Ducts	CHECK FREE OF OBSTRUCTIONS
Air Intake	REMOVE COVER AND CHECK FREE OF OBSTRUCTIONS
Oil Contents	CHECK LEVEL SUFFICIENT FOR FLIGHT AND ENSURE CAP SECURED AND LOCKED

WARNING

Failure to secure the dipstick cap in the correct manner will result in the loss of oil and eventual engine stoppage.

WARNING

Operating the engine with less than the recommended oil will result in engine stoppage.

PROPELLER

Propeller	ROTATE MANUALLY TO ENSURE FREEDOM OF MOVEMENT, CHECK NO OIL LEAKS, CHECK BLADES FREE OF DAMAGE
Spinner	CHECK SECURITY AND CONDITION

NOSE LANDING GEAR

Landing Gear	INSPECT, CHECK TIRE INFLATION AND CONDITION, AND CHECK OLEO INFLATION
Oil Breather Line	CHECK FREE OF OBSTRUCTIONS
Accessory Gear Box Drains	CHECK FREE OF OBSTRUCTIONS AND NO OIL DRAINING FROM VENTS
Fuel Filter Drain	DRAIN AND CHECK FUEL TO ENSURE IT IS FREE OF CONTAMINATION, ENSURE DRAIN CLOSED
Environmental Fuel Can Drain	DRAIN FUEL

COCKPIT AND CABIN - RIGHTHAND SIDE

Windows	CHECK FOR CRACKS AND CLEANLINESS
Crew Entry Door	CHECK CONDITION

RIGHT WING

Upper and Lower	CHECK SURFACE CONDITION
Leading Edge	CHECK CONDITION
Fuel Drains	CHECK FUEL IN FRONT AND SUMP TANKS FREE OF WATER AND SEDIMENT, CHECK DRAINS CLOSED
Fuel Vent	CHECK FREE OF OBSTRUCTIONS
Right Main Landing Gear	INSPECT, CHECK TIRE INFLATION AND CONDITION, CHECK BRAKE LINES FOR SECURITY AND ABSENCE OF LEAKS AND CHECK OLEO INFLATION
Fuel Filler Caps	OPEN, REMOVE CAPS, CHECK CONTENTS VISUALLY FOR DESIRED LEVEL, REPLACE CAPS AND CHECK CAPS FOR PROPER SEALING AND SECURITY

Stall Warning	CHECK DEFLECTION
Landing Light	CHECK CONDITION AND CHECK LENS CLEAN
Wing Tip	CHECK FAIRING CONDITION
Navigation and Strobe Light	CHECK CONDITION AND CHECK LENS CLEAN
Pitot Head	CHECK UNOBSTRUCTED, CHECK FOR WARMTH
Aileron	CHECK FULL AND FREE MOVEMENT, SECURITY OF TABS AND BONDING WIRES
Flap	CHECK ALIGNMENT, BONDING, CONDITION

REAR FUSELAGE

VHF, GPS, ELT Antenna	CHECK CONDITION
Fuselage Skin	CHECK CONDITION
Static Vent	CHECK FREE OF OBSTRUCTION
Dorsal Fin	INSPECT
Ventral Fin	INSPECT
Tailplane	INSPECT, CHECK ELEVATOR FULL AND FREE MOVEMENT, CHECK BONDING WIRES
Tailcone and Bumper	CHECK
Navigation Light	CHECK CONDITION AND CHECK LENS CLEAN
Fin and Rudder	CHECK CONDITION
External Power	CHECK COVER CLOSED IF EXTERNAL POWER NOT IN USE
Static Vent	CHECK FREE OF OBSTRUCTION

4.4 BEFORE ENGINE STARTING

Pre Flight Inspection	COMPLETE
Weight and Balance	COMPLETE
Passenger Briefing	COMPLETE
Cabin Door	CLOSED AND LOCKED
Harness	FITTED, ADJUSTED AND TIGHT

Flight Controls	FULL AND FREE MOVEMENT IN THE CORRECT SENSE
Lighting Dimmers	OFF
Fuel Shut Off Valve	ON (pushed fully in and safety lock engaged)
Parking Brake	ON
Power Lever	CHECK TRAVEL, BETA STOP FREE OPERATION AND ACTION OF FRICTION DAMPER

CAUTION

Do not move the power lever back into the beta range with the engine not running as damage to the control linkages will occur.

Propeller Lever	CHECK TRAVEL, FREE OPERATION AND ACTION OF FRICTION DAMPER
Fuel Condition Lever	CHECK TRAVEL, FREE OPERATION AND ACTION OF FRICTION DAMPER
Flap Lever	UP POSITION
Control Friction	ADJUSTED
Master Switch	ON
Generator Switch	OFF
Fuel Switch	AUTO
Ignition Switch	AUTO
Start Switch	OFF
Pitot Heat	OFF
Avionics Master Switch	OFF
Navigation Lights	AS REQUIRED
Strobe Lights	OFF
Landing Lights	OFF
Instrument Lights	AS REQUIRED
Cabin Lights	AS REQUIRED
Jump Light	OFF

Inertial Separator	NORMAL
Oil Cooler Heater	NORMAL
Circuit Breakers	CHECK IN
Governor Overspeed Test Button	CHECK CONDITION
Warning and Caution Panel	PRESS TO TEST (ensure all lights operating, release) SET TO DAY / NIGHT AS REQUIRED
Annunciator Lights	CHECK (confirm illuminated lights correctly verify airplane status)
Pilot's Flight Instruments	CHECK CONDITION
Engine Instruments	CHECK CONDITION
Fuel Flow/Pressure Indicator	CHECK CONDITION, (programme fuel contents, select AUX)
Fuel Contents Indicator Front	CHECK LEFT & RIGHT, SUFFICIENT FOR PROPOSED FLIGHT
Fuel Contents Indicator Rear	CHECK LEFT & RIGHT, SUFFICIENT FOR PROPOSED FLIGHT
OAT Indicator	CONDITION
ELT	ARMED
Intercom	CHECKED AND SET
Radios and Nav Aids	CHECK CONDITION,
Transponder	CHECK
Trim/ Flap Position Indicators	CHECK CONDITION
Voltmeter/Ammeter	CHECK, SET TO VOLTS (24 V Minimum)
Co-Pilot Flight Instruments	CHECK CONDITION
Data Recorder	ON
Circuit Breakers	CHECK IN
Crew Entry Doors	CLOSED AND LOCKED

4.5 USE OF EXTERNAL POWER

Master Switch	OFF
External Power Supply	CONNECT TO EXTERNAL RECEPTACLE ON RIGHT REAR FUSELAGE, TURN EXTERNAL POWER ON

Master Switch	ON, CHECK VOLTMETER MINIMUM 24 V

Continue with Engine Starting checklist

4.6 ENGINE STARTING

(Normal Procedure – Internal Battery and External Power Supply Start)

Pre Flight and Pre Start Checks	COMPLETED
Power Lever	IDLE
Propeller Lever	FEATHER
Fuel Condition Lever	CUT OFF

CAUTION

Ensure the fuel condition lever is in the CUT OFF position (fully aft) before start otherwise an over temperature condition will result during engine start.

Area	CLEAR
Start Switch	SELECT START (for 1 second then release)
Fuel Condition Lever	AT 13 – 15% Ng MOVE FUEL CONDITION LEVER FORWARD TO GROUND IDLE POSITION.

CAUTION

If ITT increases rapidly towards 1090^{0}C be prepared to return the fuel condition lever to CUT OFF.

CAUTION

Do not exceed the starter time limits detailed in Section 2 Limitations.

CAUTION

If the engine fails to start within 10 seconds after moving the fuel condition lever to the GROUND IDLE position move the fuel condition lever to the CUT OFF position. Allow a 30 second fuel draining period followed by a 15 second dry motoring run before attempting another start.

CAUTION

If for any reason a start is discontinued, allow the engine to come to a complete stop and then complete a dry motoring run.

CAUTION

After completing a dry motoring run ensure the entire starting sequence is completed.

STARTER ENERGISED Light	CHECK OFF
AUX FUEL PUMP Light	CHECK OFF
IGNITION Light	CHECK OFF
Oil Pressure	CHECK 40 PSI MINIMUM
ITT	INDICATING, CHECK WITHIN LIMITS
Oil Temperature	CHECK WITHIN LIMITS
External Power	DISCONNECT (if used)
Propeller Lever	FULLY FORWARD Np CHECK 52-54%
Generator Switch	ON, CHECK CHARGING, AMPS DECREASING

4.7 DRY MOTORING RUN

Before Engine Starting Checks	COMPLETE
Ignition Switch	OFF
Start Switch	SELECT START (for 1 second then release)
Start Switch	SELECT OFF (after 30 seconds)

4.8 BEFORE TAXIING

Avionics Master	ON
Radios and Navaids	ON
Flaps	CHECK NORMAL OPERATION AND RETRACT
Inertial Separator	CHECK OPERATION, ANNUNCIATOR LIGHT “BYPASS” ON. RETURN TO “NORMAL” IF NOT REQUIRED. LEAVE IN “BYPASS” IF THERE IS A POSSIBILITY OF INGESTING FOREIGN MATERIAL INTO THE ENGINE

4.9 TAXIING

Parking Brake	RELEASE BRAKES
Brakes	CHECK OPERATION
Flight Instruments	CHECK

CAUTION

Avoid operating the rudder pedals whilst the airplane is stationary. Heavy loads applied to the nose wheel steering mechanism result in undue wear to the attachment and pivot point.

CAUTION

During taxi operations particular care and attention should be given to propeller tip clearance particularly when operating on unimproved or irregular surfaces.

NOTE

Propeller beta range may be used during taxi but to prevent propeller blade damage care should be exercised in areas where there is loose material on the ground.

4.10 BEFORE TAKEOFF

Trims	SET TAKEOFF POSITION (Elevator: forward CG heavy weight trim position – lower end of green range; aft CG heavy weight trim position – upper end of green range; trim positions for intermediary weights and CG – set relative to maximum weights and CG. Aileron: set neutral. Rudder: set neutral.
Propeller	FEATHER, THEN FULLY FORWARD MAX RPM (allow propeller to go to feather position then check the propeller unfeathers when Propeller Lever selected fully forward)
Flap	SET POSITION REQUIRED FOR TAKEOFF POSITION, 20^0 RECOMMENDED FOR NORMAL OPERATION
Fuel	VALVE ON SAFETY LOCK ENGAGED, FUEL SWITCH AUTO, COMPUTER PROGRAMMED, CONTENTS SUFFICIENT FOR FLIGHT, PRESSURE IN LIMITS, FUEL ANNUNICATOR LIGHTS EXTINGUISHED

Engine Instruments	TEMPERATURES AND PRESSURE WITHIN LIMITS
Flight Instruments	ALTIMETER SET, ARTIFICIAL HORIZON SET, DIRECTIONAL GYRO SET
Avionics	RADIOS AND NAVIGATION EQUIPMENT ON AND SET
Pitot Heat	ON, ANNUNICATOR LIGHT EXTINGUISHED
Lighting	STROBE, NAVIGATION AND LANDING LIGHTS AS REQUIRED
Inertial Separator	NORMAL OR BYPASS AS REQUIRED (refer Section 5 for increased takeoff distance with BYPASS selected)
Annunciator Lights	ALL EXTINGUISHED
Doors	CLOSED, LOCKED AND SECURE, DOOR UNSAFE LIGHT OFF
Harness	SEATS, SEAT BELTS AND SHOULDER HARNESS ADJUSTED AND SECURE
Flight Controls	AILERON AND ELEVATOR FULL, FREE AND CORRECT MOVEMENT
Pre Takeoff Brief	COMPLETE

4.11 NORMAL TAKEOFF

The Normal Takeoff technique is the technique used to derive the takeoff performance data in Section 5.

Lined Up On Runway	CHECK COMPASSES COMPARE WITH RUNWAY HEADING
Fuel Condition Lever	FLIGHT IDLE (fully forward)
Governor Overspeed	TEST AT 91.2% FOR 1-2% DECREASE IN Ng (first flight of the day only)
Brakes	APPLY FOOT BRAKES AND HOLD
Governor Overspeed	Set 73% Np (1606 RPM) with Power Lever, push and hold Governor Overspeed Test Button, move Power Lever forward to set 84% $\pm$ 1% (1848 RPM $\pm$ 22). Np should not exceed 85% (1870 RPM), set 73% with Power Lever, release Governor Overspeed Test Button (first flight of the day only)
Engine Instruments	CHECK ENGINE SETTINGS WITHIN LIMITS

Brakes	RELEASE
Rotation	61 KIAS (refer to Section 5 for speeds at reduced weights) Initial Climb 74 KIAS UNTIL CLEAR OF OBSTACLES (refer to Section 5 for speeds at reduced weights)
Clear of Obstacles	Accelerate to 91 KIAS (refer to Section 5 for speeds at reduced weights)
Flaps	RETRACT to 0^0 AT SAFE HEIGHT

4.12 SHORT FIELD TAKEOFF

Refer to the Normal Takeoff procedures in Section 4.11. The Normal Takeoff technique is also the Short Field Takeoff technique. The takeoff performance data in Section 5 was derived using the takeoff technique detailed in the Normal Takeoff procedures in Section 4.11.

4.13 CLIMB

Flaps	RETRACT WHEN SAFELY AIRBORNE AND CLEAR OF OBSTACLES
Engine Instruments	CHECK TEMPERATURES AND PRESSURE WITHIN LIMITS

NOTES

Refer to Section 2 for engine limitations.

When operating at altitudes at or above 16,000 ft in high temperature conditions (ISA +30^0C) the fuel switch should be selected to MANUAL to minimize the possibility of cavitation of the engine driven fuel pump. The fuel switch should be selected to AUTO once the altitude reduces below 16,000 ft or when the ambient temperature has reduced below ISA + 30^0C.

Landing Lights	AS REQUIRED
Climb Speed	91 KIAS

4.14 MAXIMUM PERFORMANCE CLIMB

Flaps	RETRACTED
Airspeed	Best angle of climb Vx 85 KIAS Best rate of climb Vy 91 KIAS
Propeller Lever	MAX RPM

Power Lever	64 psi torque (5 min. limit) 54 psi torque (MCP)
Engine Instruments	MONITOR TEMPERATURES AND PRESSURE

NOTES

Refer to Section 2 for engine limitations.

When operating at altitudes at or above 16,000 ft in high temperature conditions (ISA +30^{0}C) the fuel switch should be selected to MANUAL to minimize the possibility of cavitation of the engine driven fuel pump. The fuel switch should be selected to AUTO once the altitude reduces below 16,000 ft or when the ambient temperature has reduced below ISA + 30^{0}C.

4.15 CRUISE

Cruise Power	SET AS REQUIRED, (refer cruise power tables in Section 5)
Engine Instruments	MONITOR TEMPERATURES AND PRESSURES

NOTES

Refer to Section 2 for engine limitations.

When operating at altitudes at or above 16,000 ft in high temperature conditions (ISA +30^{0}C) the fuel switch should be selected to MANUAL to minimize the possibility of cavitation of the engine driven fuel pump. The fuel switch should be selected to AUTO once the altitude reduces below 16,000 ft or when the ambient temperature has reduced below ISA + 30^{0}C.

4.16 DESCENT

Altimeter	SET
Power Lever	SET REQUIRED POWER FOR RATE OF DESCENT

4.17 BEFORE LANDING

Power Lever	AS REQUIRED
Propeller Lever	MAX RPM
Fuel Condition Lever	FLIGHT IDLE (fully forward)
Flaps	AS REQUIRED
Harness	TIGHT

Landing Light	AS REQUIRED
Brakes	OFF

4.18 NORMAL LANDING

The Normal Landing technique is the technique used to derive the landing performance data in Section 5.

Flaps	SELECT FULL FLAP, 40^0
Speed	75 KIAS (refer to Section 5 for speeds at reduced weights)
Landing	MAIN WHEELS FIRST
Power Lever	IDLE STOP – (refer Section 5 for landing performance using beta and reverse)
Brakes	APPLY MAXIMUM BRAKING WHILE HOLDING STICK AFT

4.19 SHORT FIELD LANDING

Refer to the Normal Landing procedures in Section 4.18. The Normal Landing technique is also the Short Field Landing technique. The landing performance data in Section 5 was derived using the landing technique detailed in the Normal Landing procedures in Section 4.18.

4.20 BALKED LANDING

Power Lever	SET TAKE OFF POWER
Flaps	RETRACT to 20º
Climb Speed	75 KIAS minimum until clear of obstacles
Clear of Obstacles	ACCELERATE TO 91 KIAS
Flaps	RETRACT TO 0^0 AT A SAFE HEIGHT

4.21 AFTER LANDING

Flaps	RETRACT
Landing Lights	OFF
Pitot Heat	OFF
Fuel Condition Lever	GROUND IDLE

4.22 SHUT-DOWN

Inertial Separator	NORMAL
Power Lever	IDLE
Parking Brake	PARK
Propeller Lever	FEATHER
VHF Radio	SELECT -121.5MHz, listen for ELT audio signal in headset when listening out on 121.5MHz. If ELT is transmitting check airplane ELT is turned OFF.
Fuel Condition Lever	CUT-OFF (after minimum of one minute with power lever at idle) CHECK FOR ITT DECREASE
Light Switches	OFF
Pitot Heat	OFF
Avionics Master	OFF
Start Switch	OFF
Ignition Switch	OFF
Fuel Switch	OFF
Generator Switch	OFF
Master Switch	OFF
Fuel Shut Off Valve	OFF (disengage safety lock and pull lever fully out)
Control Lock	FITTED

CAUTION

On engine shutdown observe ITT and Ng indications to observe immediate fuel cut off. If immediate fuel cut off not evident close the fuel valve.

NOTE

Engine should not be shut down with the power lever in reverse or damage to the propeller link will result

Doors	CLOSED
Wheel Chocks	IN PLACE
Pitot Head Cover	FITTED

Exhaust Covers	FITTED
Air Inlet Cover	FITTTED

4.23 POSTFLIGHT ELT

VHF Radio	SELECT -121.5MHz, listen for ELT audio signal in headset when listening out on 121.5MHz. If ELT is transmitting check airplane ELT is turned OFF.

4.24 ENVIRONMENTAL SYSTEMS

OXYGEN

A Scott Mark II Supplemental Oxygen system is provided for the crew. The 22 litre (5 U.S. gallon) bottle is wall mounted behind the pilot's seat. Two masks may be attached into bayonet fittings at the top of the bottle. Bottle contents are indicated on a pressure gauge also mounted at the top of the bottle. The bottle reads 2000 psi when full and should be refilled before contents falls below 300 psi.

To start the flow of oxygen, first turn the green on off valve fully counter-clockwise. Ensure masks supply lines are securely connected to the bayonet connectors and fit the mask securely over nose and mouth. Adjust the knob on the flow regulator (silver knob uppermost on the bottle) until the associated regulator gauge displays the altitude of flight. A positive flow of oxygen is confirmed when the green flow indicator mounted in the line to the mask is visible. The green indicator retracts and disappears from view when the flow stops. When the system is in use the pilot must regularly check bottle contents and confirm positive flow as well as adjusting the flow regulator whenever operating altitude is changed.

VENTILATION

Cockpit air vents on the lower left and right sides of the instrument panel incorporate swivelling vanes to allow the flow of cooling air to be directed as required. The flow of air is controlled by pull handles mounted immediately left and right of the engine control quadrant. The push/pull controls are pull for on and push for off.

4.25 NOISE CHARACTERISTICS

With ever growing public concern for improving our environment it is the responsibility of all pilots to minimize the effect of airplane noise on the public.

The certificated noise level for the airplane established in accordance with FAR 36 Appendix G is 86.9 dB(A) and 86.8 dB(A) in accordance with ICAO Annex 16 Chapter 10 (through Amendment 7). No determination has been made by the Civil Aviation Authority of New Zealand or Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, or out of, any airport.

As responsible pilots it is possible to demonstrate concern for the environment by following these suggested procedures;

1. Pilots operating VFR over densely populated areas, public gatherings, parks or other noise sensitive areas should make every effort to fly at not less than 2000 ft above the surface when weather and air traffic clearances permit.

2. During departure maintain climb at 74 knots with maximum takeoff power until passing 300 ft above the ground after which the flaps should be retracted and the climb continued at 91 knots (best rate of climb speed). Passing 1500 ft above the ground the power should be adjusted set to maximum continuous power setting for continued climb.

3. During cruise and approach to the airport the use of reduced propeller rpm will significantly reduce noise. The arrival should be planned to minimise prolonged operations at low level. Passing about 1500 ft above the ground the propeller rpm should be returned to maximum, as the before landing checklist is completed.

4. After landing avoid excessive or unnecessary use of beta and reverse thrust and set the fuel condition lever to GROUND IDLE for taxi.

NOTE

The above noise abatement procedures do not apply where they would conflict with air traffic clearances or instructions, or when, in the pilot's judgement, they would compromise the orderly flow of traffic and safe flight conduct.

4.26 FUEL CONSERVATION

The key to fuel conservation is effective planning. Section 5 provides the necessary planning material to plan the flight profile which best suits the intended task.

It is the pilot's responsibility to ensure that adequate fuel is loaded to ensure the safe completion of the mission while maintaining, adequate reserves after intended landing, and such additional fuel as is considered necessary to deal with possible in-flight contingencies or diversions. The carriage of fuel significantly in excess of mission requirements will incur an unnecessary weight and performance penalty and limits the revenue earning payload which could otherwise be carried.

If normal turnaround times permit it is generally more economical to refuel between flights rather than tanking fuel for subsequent flights. Consideration should be given to fuel costs at out ports and other operational factors such as engine cycle limits otherwise savings in fuel consumption may be at the expense of other operating costs.

The performance tables and graphs in Section 5 should be used to determine the climb and cruise fuel requirements for the intended mission. At high weights and/or high ambient temperatures a lower than normal cruising level may be warranted as the gains usually achieved at the high cruise will be eroded with the prolonged climb. This effect is most significant on short sectors.

The benefits of reduced fuel flow at higher altitude are often countered by strong headwinds that increase with altitude. If headwinds are encountered at altitude consideration should be given to cruising at a lower altitude. In headwinds fly at higher than the still-air best range speed. The

increase in specific fuel consumption, at speeds slightly above best range speed, is small and will be offset by the reduced time spent in the headwind.

As the airplane is un-pressurised the descent should be planned to allow sufficient time for passengers to equalise the pressure in their ears. Commence descent at a point which will avoid unnecessary manoeuvring overhead the destination airfield.

The descent should be flown at reduced power and close to the rough air penetration speed, in case turbulence is encountered on descent. A descent at high power and high speed is not recommended as it will compromise both fuel efficiency and passenger comfort.

All ground manoeuvring should be done with the fuel condition lever in the GROUND IDLE position.

4.27 AMPLIFIED PROCEDURES

PREFLIGHT INSPECTION

Thorough and effective preparation is essential for the safety and overall success of every flight. A preflight inspection is an essential part of any preparation for flight. Ultimately the pilot must ensure the airplane is safe for flight. During the preflight inspection careful attention is required to the specific checklist details described in Section 4 of this handbook.

It is beneficial to take a “long range” view of the airplane when first approached to check for any obvious irregularities which may not be so obvious at close range such as the attitude that the airplane is sitting or whether there are any damp patches under the airplane indicating fuel and or oil leaks.

A careful check of the general condition of the airplane should be made at all times, particularly if the airplane is parked exposed to the weather elements or has not been flown for extended periods.

The presence of dents and damage to the airplane skins, landing gear or propeller may indicate previously unreported damage and should be checked by an engineer before flight.

Fuel checks must be carried out before flight and after each refuel. Sufficient fuel should be drained from each of the 6 fuel drains (2 in each wing, 1 sump tank and fuel filter drain). If appreciable amounts of water are present it is possible that the fluid removed may comprise only water and may be mistaken as fuel. Ensure the fuel sample taken from each drain contains fuel and that it is free of water, dust, sand, and other contamination. If the fuel sample contains any water or contamination further samples must be taken until a fuel sample is clear of such contamination. The fuel environmental tank should also be emptied.

A visual fuel check of the fuel tank contents is an integral part of the fuel management process. The pilot should reconcile the visual and dipped contents of the fuel tanks with the gauges and determine whether sufficient fuel exists for the planned flight with appropriate reserves.

The oil level of the engine is best checked within 10 minutes of engine shutdown; however, a check with a completely cold engine is acceptable. Refer to Section 8 for the correct method of determining an appropriate oil level for the airplane.

BEFORE ENGINE STARTING

The pilot is responsible for the correct loading of the airplane and the completion of the weight and balance calculations.

CAUTION

The pilot must complete an accurate weight and balance calculation and ensure the airplane is loaded within the approved weight and balance limits prior to flight. Failure to do so could result in the loss of life and the airplane.

Completion of the before engine starting checklist should be adhered to, to ensure the airplane is configured for a successful engine start.

A description of the annunicator panel lights and appropriate actions should one illuminate is contained in Section 3.18 of the handbook.

The ignition switch is a 3 position switch labelled CONTINUOUS, OFF and AUTO. It should be set to the AUTO position for a normal ground start. The igniters are energised when the starter switch is selected to on. The igniters stop operating when the start cycle is complete.

The avionics master switch should be left off during the start to ensure that no electrical load "spikes" cause damage to the radios and navigation equipment.

It is essential that the power lever is set at the idle stop and the fuel condition lever at the CUT OFF position prior to the start.

CAUTION

Excessive engine temperatures will result if a start is attempted with the power lever forward of the idle stop and or fuel condition lever forward of the cut off position.

ENGINE STARTING

Before starting the engine ensure the before engine starting checklist is completed and that the area around the airplane, particularly in front of the airplane is clear of any obstructions, loose debris and people.

The start sequence is initiated by selecting the start switch ON. The engine will accelerate as noted on the Ng. There will be an audible sound of the engine spooling up and the igniters may be heard and the propeller will begin to rotate. When the Ng reaches 12-15% move the fuel condition lever to the GROUND IDLE position. If the start is normal, within 10 seconds of moving the fuel condition lever to ground idle there should be an audible combustion as the engine accelerates smoothly. When the Ng reaches approximately 30-35% there will be a momentary reduction in engine acceleration until the secondary nozzles take effect at which stage the engine will continue to accelerate to idle of approximately 52% Ng. At this stage the ITT should peak and reduce. During the start closely monitor the ITT so that any unusually high ITT are noticed early. The maximum ITT for start is 1090^0C for no more than 2 seconds.

CAUTION

Abort the start if ITT does not begin to increase within 10 seconds of moving the fuel condition lever to the GROUND IDLE position.

CAUTION

Move the fuel condition lever to CUT OFF if ITT is likely to exceed 1090^0C.

It is important to start the engine in the correct manner otherwise an abnormal start could result causing damage to the engine. The presence of too much fuel (incorrect engine control positions) or a low battery voltage could lead to excessive temperatures during start. The start cycle should be stopped immediately anything unusual is detected. As an example, if the fuel has been scheduled and it is noted that the fuel shut off valve is closed the start cycle should be stopped rather than opening the fuel shut off valve. If the igniters are noted as being off during

the start cycle do not turn them on and attempt to continue the start. A start is aborted by returning the fuel condition lever to the CUT OFF position and then selecting the starter switch to the INTERRUPT position.

A dry motoring run must be completed following any unsuccessful start. This will purge the engine of any unburnt fuel and prevent a hot start on the subsequent start attempt.

Successful engine starts can be accomplished using internal batteries and well maintained external batteries. The minimum indicated voltage for the airplane internal start is 24 V. The use of external batteries is recommended if the airplane battery charge level is low or suspect. A poor battery will manifest itself with slow engine acceleration during the initial start sequence and a hotter start. A slow engine acceleration should be stopped by moving the fuel condition lever to CUT OFF and then selecting the starter switch to the INTERRUPT position.
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CAUTION

Do not attempt a start if battery voltage is less than 24 V.

DRY MOTORING RUN

The dry motoring run procedure is used to clear the engine of any unburnt fuel or vapour which may have resulted from an unsuccessful start. The procedure is also used in the event of an engine fire during start.

Fuel Condition Lever	CUT OFF
Ignition Switch	OFF
Master Switch	ON
Fuel Shut Off Valve	OPEN (pushed fully in and safety lock engaged)
Starter Switch	START - for 30 seconds then select INTERRUPT

CAUTION

The fuel shut off valve should be closed if an engine fire is evident.

CAUTION

Do not exceed the starter limits detailed in Section 2 for a dry motoring run.

CAUTION

If the engine is motored to extinguish a fire continue to motor the engine until the ITT decreases.

Do not attempt a further start if the engine suffered an engine fire until the engine is checked by an appropriately qualified engineer. Do not attempt a further start after a dry motoring run until the appropriate starter cooling period is observed as detailed in Section 2.

IGNITION PROCEDURES

The airplane is equipped with an ignition switch which has 3 positions. The AUTO position is used for normal operations. In this position the igniters are controlled by the start switch.

The CONTINUOUS position is used for conditions where continuous ignition is recommended. In the following conditions it is recommended that the ignition switch is selected to CONTINUOUS:

Operations in visible moisture when the temperature is below $+5^0$C both in the air and on the ground

Operations in heavy precipitation both in the air and on the ground

Operations requiring the use of contaminated (eg, surface water, snow) runway surfaces

Inflight engine starts without starter

If the LOW FUEL LEVEL light illuminates and the fuel contents indicators confirm fuel starvation is likely.

CAUTION

Engine icing can occur without airframe icing. Visible moisture is moisture in any form: clouds, ice crystals, snow, precipitation, or any combination of these.

The third position is OFF.

INERTIAL SEPARATOR

An inertial separator is fitted in the engine inlet duct. The purpose of the inertial separator, when selected to BYPASS is to minimise the possibility of ingesting undesirable material into the engine such as ice, snow, dust and sand. The inertial separator, when selected to BYPASS, creates an airflow path which makes it difficult for solid particles to follow and they are directed overboard. Use of the inertial separator is permitted for all phases of flight including takeoff and landing.

The inertial separator when in use does not allow the most efficient flow of air into the engine so there is some performance degradation. Refer to Section 5 for performance data with inertial separator selected to BYPASS.

When encountering visible moisture below $+5^0$C, engage the particle separator by selecting BYPASS. When airplane operations require the use of contaminated runway surfaces (eg, surface water, snow) consideration should be given to selecting the inertial separator to BYPASS.

CAUTION

Engine icing can occur without airframe icing. Visible moisture is moisture in any form: clouds, ice crystals, snow, precipitation, or any combination of these.

TAXIING

To minimise brake wear the use of beta is recommended as a means of controlling taxi speeds; however, the use of beta should be avoided if there is loose material on the ground such as sand and stones as these could damage the propeller.

CAUTION

The use of beta when taxiing across surfaces with loose material will result in damage to the propeller.

Care should be taken when taxiing with the wind direction off the nose of the airplane.

CAUTION

The incorrect positioning of the flight controls could lead to the airplane sustaining damage.

With the airplane taxiing at low speed or parked out of wind a vibration may be felt. This is due to the wind affect on the flow through the propeller. The vibration can be reduced by parking the airplane directly into wind.

BEFORE TAKEOFF

The thorough completion of the before takeoff checklist is an essential procedure in the pre flight preparation.

When lowering the wing flaps it is recommended that the pilot visually check the flap position to ensure that it relates to the position on the flap indicator.

The airplane fuel system is uncomplicated with only one fuel shutoff valve to control the fuel from all wing tanks to the engine. There are no tank selectors. The fuel shut off valve remains in the on position (pushed fully in and safety lock engaged) at all times during normal operations. The electric fuel pump remains in the AUTO position so that in the event that the engine driven fuel pump fails the electric fuel pump should automatically switch on. Refer Section 3 for a detailed explanation of fuel pump emergencies.

The inertial separator system should be functionally checked periodically if normal operations do not require its regular use. Within 30 seconds of selecting BYPASS on the selector switch the blue ENGINE ANTI ICE annunciator light should illuminate to indicate that the air intake deflector and aft bypass outlet have completed the movement to their bypass positions. Following a selecton back to the NORMAL position the blue annunciator light will extinguish within a few seconds although the complete cycle back to the normal configuration will not be complete for up to 30 seconds.

NORMAL TAKEOFF

A wing flap setting of 20^0 is recommended for all takeoffs. 20^0 flap will provide the best takeoff performance. The Normal Takeoff technique is to be used for Short Field operations and is the technique used to derive the performance data in Section 5.

Ensure that the maximum runway length is available for takeoff and that the nose wheel is straight. After lining up on the runway, and prior to takeoff the fuel condition lever is set at the flight idle position to ensure optimum engine acceleration. The power lever is advanced smoothly to the takeoff torque setting while holding the airplane stationary using the wheel brakes. The control column should be progressively moved rearwards as power is applied to ensure adequate propeller clearance. When takeoff power is confirmed release the brakes. Maintain an elevator position of near neutral with the stick until near rotate speed. On soft unpaved takeoff surfaces aft stick may be used to reduce rolling resistance from the wheels. Rotate the airplane at 61 KIAS and climb at 74 KIAS with flap 20^0 to 50 ft or clear of obstacles. When clear of the obstacles accelerate to 91 KIAS and retract the flaps to 0^0. Refer to Section 5 for takeoff speeds at weights less than 7500 lbs.

SHORT FIELD TAKE OFF

The Normal Takeoff technique is to be used for Short Field operations and is the technique used to derive the performance data in Section 5.

CROSSWIND TAKEOFF

20^0 of flap is recommended for crosswind takeoffs. The crosswind takeoff technique differs from the normal takeoff in that the nose wheel should be held on the ground to the rotate point. In addition, into wind aileron should be applied to prevent the wing lifting. Rotate should be positive ensuring the airplane wheels separate from the ground at the same time. Once the airplane is airborne it should be weather cocked into wind to restore balanced flight, and to track the runway centre line.

CRUISE

Refer to Section 5 for cruise performance data. During cruise the pilot should monitor engine instruments to ensure that temperatures and pressures remain within the specified limits as detailed in Section 2.

When encountering visible moisture below $+5^0$ C (41^0F) turn the pitot heat ON, select the inertial separator to BYPASS, select oil cooler heater to DEICE and select CONTINUOUS on the ignition switch.

WARNING

Flight in icing conditions and or falling and blowing snow conditions is prohibited.

CAUTION

Engine icing can occur without airframe icing. Visible moisture is moisture in any form: clouds, ice crystals, snow, precipitation or any combination of these.

The fuel system is designed to feed evenly from all tanks. During flight fuel feed should be monitored to check for any fuel imbalance. Flight should not continue if a fuel imbalance of more than 100 litres (26.4 U.S. gallons) exists.

STALLS

The airplane stall characteristics are conventional. As speed approaches the stall speed the flying controls, while effective, are less responsive. In normal flight and loading conditions an audible stall warning horn will sound at least 5 knots prior to the stall.

NORMAL LANDING

The normal landing technique is also the technique to be used for short field landings. Landings require accurate speed and approach path control. This requires the airplane to be configured in sufficient time to allow the required parameters to be set and maintained. The aim of a landing is to arrive at the touchdown point at the selected airspeed. The approach should be flown with 40^0 flap and power to maintain the approach path. An approach angle of about 3º should be flown. Airspeed should be maintained at 75 KIAS in a powered approach until a height of 50 ft and then power gradually reduced to allow a speed decay, while maintaining the approach angle, to arrive at the touchdown point just above stall speed of 58 KIAS with power at idle. Flare to land main wheels first and apply maximum wheel braking without skidding the tires. This technique was used for the landing distance performance tabled in Section 5. Further reduction in landing distance of about 10% can be achieved with the use of beta and reverse thrust after touchdown. During the ground roll and after the nose wheel is firmly on the ground ensure the control column is held fully aft to assist maximum wheel braking and to maximize propeller clearance.

The touchdown should be accomplished on the main wheels and then the nose wheel slowly lowered on to the ground.

After landing set the fuel condition lever to the GROUND IDLE position.

SHORT FIELD LANDING

Refer to the normal landing technique which is also the short field landing technique.

CROSSWIND LANDING

There are two recognised techniques for final approach to a crosswind landing, the wing down technique and the crab technique. It is suggested that a combination of both techniques be used comprising the crab technique to short final and then smoothly transitioning to the wing down technique for the touchdown. In strong or gusty wind conditions the introduction of crossed controls should be delayed as the airplane remains more responsive to the controls when flown in balance using the crabbed approach. Up to 10 knots may be added to the normal approach speed for more positive control if the landing distance permits. It is recommended that 40^0 flap is used. Once on the ground maintain directional control with nose wheel steering and ensure that into-wind aileron is applied to prevent the into-wind wing lifting. Forward pressure on the stick will improve nose wheel steering, particularly when loaded at an aft CG. Avoid large or abrupt power changes in the landing flare or aggressive use of beta after touchdown as this will make directional control more difficult.

BALKED LANDING

The balked landing should be initiated with the simultaneous application of takeoff power while applying rudder to maintain balance and setting the climb attitude. The flap should be raised to 20^0 and the initial climb flown at 75 KIAS. Fully retract the flap once established in the climb and when clear of obstacles.

NO FLAP LANDING

If required to land without flap add 8 to 13 knots to the approach speed (8 knots at 4000 lbs and 13 knots at 7,125 lbs. The required landing distance will increase by 25% for a given weight without flaps on asphalt. If landing on dry grass the required landing roll distance will increase by a further 15%. Use of reverse thrust may reduce landing roll distance on a dry asphalt runway by 5%.

AFTER LANDING

After landing turn off any electrical, radio, navigation and lighting equipment which is not required for the taxi to the engine shutdown point. The fuel condition lever should also be set to GROUND IDLE.

AFTER SHUTDOWN

After engine shutdown has been completed ensure that all switches are turned off. If the airplane is going to be left unattended and or there is any wind the control locks should be fitted to prevent the flying controls moving in the wind. The air intake cover and exhaust covers should be fitted and the propeller tie down secured. These measures will prevent foreign objects getting into the engine and the propeller condition deteriorating due to the lack of lubrication. A careful examination of the airplane after flight should be completed to ensure any obvious damage or defects are reported to the relevant engineers so that action is initiated prior to the next flight.

ENGINE HANDLING

The efficiency and life of the engine will be enhanced with careful engine handling during all operations. The rate of movement of the power lever should always be smooth and advanced in unison with engine acceleration. The rate of engine acceleration is not directly proportional to the rate of movement of the power lever. Care taken to avoid prolonged or transient operations at near maximum temperature limits will enhance engine life and reliability while reducing overhaul costs.