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Britten-Norman

Islander

(260 h.p. O-540 and 300 h.p. IO-540 Lycoming engines)

Owner's Handbook

Britten-Norman (Bembridge) Limited
A member of the Fairey Group

INTRODUCTION

The purpose of this handbook is to present you with a simple guide to the safe and economic operation of your Britten-Norman Islander. More detailed information is contained in the Flight and Maintenance Manuals.

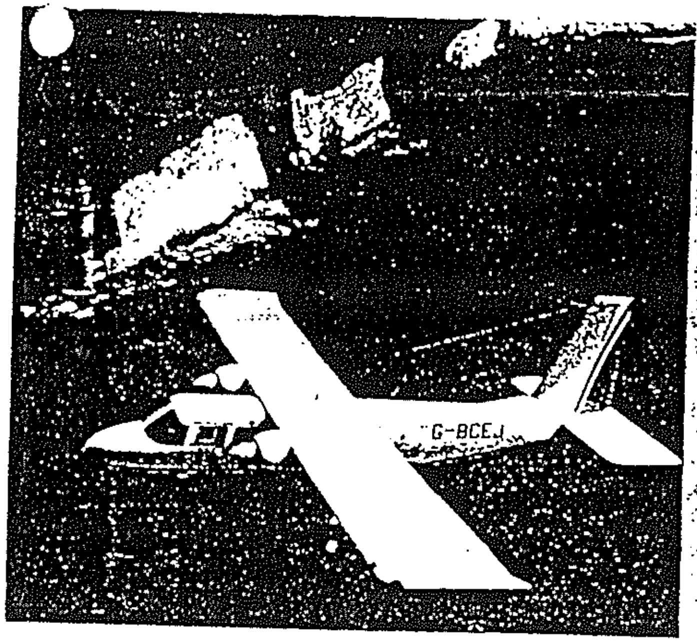
The Islander was produced to meet the specific needs of the air taxi companies and the third level and commuter airlines or, indeed, any operator requiring an economical and efficient aircraft with excellent payload capacity over relatively short distances. Detailed analysis of air taxi and third-level airline operations shows that the majority of flights are of 50 to 300 miles. The fundamental design philosophy of the Islander is to bring a new low level of operating cost and the high level of profitability to short-haul air transport.

Low wing loading and high power-weight ratio give the Islander the performance required for the STOL traffic patterns at major airports. STOL strip operation is achieved without resort to expensive and complicated flaps and slots or to unconventional piloting techniques.

The well-proven, highly efficient and inexpensive 260 h.p. Lycoming O-540 E and 300 h.p. Lycoming IO-540 engines are at the heart of the Islander's exceptional economy. The airframe structure is simple, robust and fully corrosion proofed for a fatigue free life of at least 20 years. All items of standard equipment were chosen for efficient performance, proven reliability and the availability of world-wide service support.

Low operating costs per aircraft-mile on short sectors together with the large payload capacity are the factors which define the unique profitability of the Islander. The large cabin is readily adapted for passengers, freight, ambulance, photographic and geophysical survey, agriculture, parachuting and numerous other roles.

We are sure that your Britten-Norman Islander will give you every satisfaction, but should you require any assistance from either your distributor, from the factory or from the undersigned, we are all at your service.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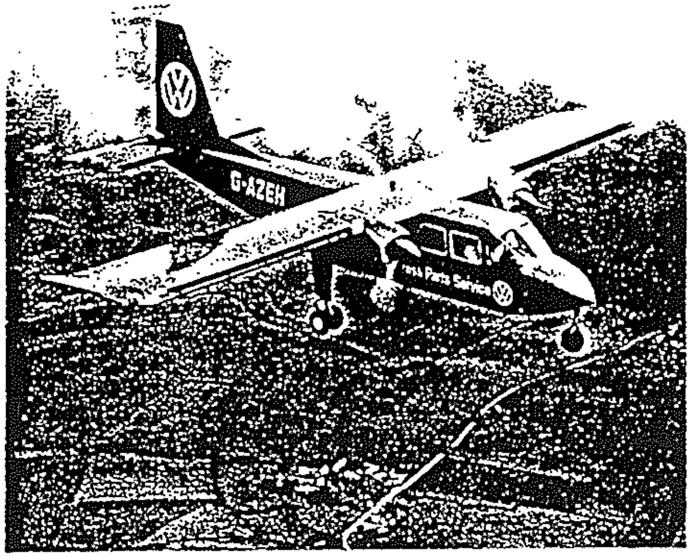


SECTION 1

SPECIFICATIONS

26. H.P. ISLANDER

Power Plant

Engine	Lycoming 0-540-E4C5
Rated Horsepower	260
Rated RPM	2,700
Bore (Inches)	5.125
Stroke (Inches)	4.375
Displacement (Cubic Inches)	541.5
Compression Ratio	8.5:1
Dry Weight (Pounds)	399
Fuel Consumption (59% maximum power, U.S. Gallons per hour, leaned)	11.4
Oil Sump Capacity (quarts)	12
Fuel Aviation Grade (Octane)	minimum 91/96

Performance (At 6,600 lb. Take-Off Weight)

Take-off Run (feet)	590
Take-off Distance over 50 ft. barrier (feet)	1,160
Minimum Control Speed—Single engine (MPH I.A.S.)	45
Best Rate of Climb Speed (MPH I.A.S.)	75
Rate of Climb (feet per minute)	950
Best Angle of Climb Speed (MPH I.A.S.)	75
Best Single Engine Rate of Climb Speed (MPH I.A.S.)	75
Single Engine Rate of Climb (left engine feathered) (ft. per min.)	145
Absolute Ceiling (feet)	14,600
Service Ceiling (feet)	13,000
Single Engine Absolute Ceiling (left engine feathered) (feet)	4,450
Top Speed (MPH E.A.S.)	170
Optimum Cruising Speed (75% power at 7,000 feet) (MPH E.A.S.)	160
Cruising Speed (67% power at 9,000 feet) (MPH E.A.S.)	158
Stalling Speed (MPH I.A.S.)—Flaps down	46
Landing Roll (feet) *(Applicable to an AUW–6300 lb)*	450
Landing Distance over 50 ft. barrier (feet)	960
Cruising Range (maximum at 59% power at 13,000 feet) (Statute miles)	800

Published figures are for Standard Aircraft flown at gross weight under standard conditions at sea level unless otherwise stated.

260 H.P. ISLANDER

Weight

Gross Weight (lb.) as CAA certificated	6,600
Max. Landing Weight (lb.)	6,300
Empty Weight basic aircraft (lb.)	3,612
Useful Load (lb.)	2,988

See Section 5 for items included in empty weight.

Leading Particulars

Wing Span (ft.) (excluding optional wing tip tanks)	49
Wing Span (ft.) (including optional wing tip tanks)	53
Wing Area (excluding optional wing tip tanks) (sq. ft.)	325
Wing Area (including optional wing tip tanks) (sq. ft.)	337
Length	35′ 8″
Height	13′ 9″
Wing Loading (excluding optional tip tanks) (lb per sq. ft.)	20.3
Power Loading (lb. per HP)	12.7
Propeller Diameter (in.)	80

Fuel

Fuel Capacity—standard (U.S. Gallons)	137
Fuel Capacity with optional Wing Tip Tanks (U.S. Gallons)	196
Fuel Aviation Grade (Octane)	91/96

Baggage

Maximum Baggage Rear Compartment (lb.)	400
Baggage Space—Rear Baggage Compartment (cu. ft.)	27.7*
Baggage Door Size (in.)	25 x 18

**increases to 42.7 cu.ft. if extended Luggage Bay modification is incorporated.*

Landing Gear

Wheel Tread (ft.)		13′ 1″
Wheel Track (ft.)		11′ 10″
Tyre Pressure	Nose	29 p.s.i.
	Main	35 p.s.i.
Tyre Size	Nose	600 x 6
	Main (Twin wheel)	600 x 6
	Option	700 x 6

300 H.P. ISLANDER

Power Plant

Engine	Lycoming IO-540-K1B5	
Rated Horsepower	300	
Rated RPM	2,700	
Bore (Inches)	5.125	
Stroke (Inches)	4.375	
Displacement (Cubic Inches)	541.5	
Compression Ratio	8.7:1	
Dry Weight (Pounds)	472	
Fuel Consumption (59% maximum power, U.S. Gallons per hour, leaned)	13.25	100LTS
Oil Sump Capacity (quarts U.S.)	12	
Fuel Aviation Grade (Octane)	minimum 100/130	

Performance (At 6,600 lb. Take-Off Weight) 2994kg.

Take-off Run (feet)	665	203m
Take-off Distance over 50 ft. barrier (feet)	1,100	335m
Minimum Control Speed—Single engine (MPH I.A.S.)	45	39kt
Best Rate of Climb Speed (MPH I.A.S.)	75	65kt
Rate of Climb (feet per minute)	1,130	
Best Angle of Climb Speed (MPH I.A.S.)	75	65kts.
Best Single Engine Rate of Climb Speed (MPH I.A.S.)	75	✓
Single Engine Rate of Climb (left engine feathered at sea level) (ft. per min.)	200	
Absolute Ceiling (feet)	19,600	
Service Ceiling (feet) (100 ft. per min.)	18,000	
Single Engine Absolute Ceiling (left engine feathered) (feet)	6,200	
Single Engine Service Ceiling (100 ft./min.) (left engine feathered) (feet)	3,100	
Top Speed (MPH E.A.S.)	180	158kt
Optimum Cruising Speed (75% power at 7,500 feet) (MPH E.A.S.)	170	148kts
Cruising Speed (67% power at 9,000 feet) (MPH E.A.S.)	168	146kts
Stalling Speed (MPH I.A.S.)—Flaps down	46	40
Landing Roll (feet) *(Applicable to an AUW–6300 lb)*	450	
Landing Distance over 50 ft. barrier (feet)	960	294m.
Cruising Range (maximum at 59% power at 13,000 feet) (Statute miles)	800	700nm

Published figures are for Standard Aircraft flown at gross weight under standard conditions at sea level unless otherwise stated.

Weight

	LBS	KG
Gross Weight (lb.) as CAA certified	6,600	2994
Max. Landing Weight (lb.)	6,300	2858
Empty Weight basic aircraft (lb.)	3,762	1706
Useful Load (lb.)	2,838	1288

Leading Particulars

Wing Span (ft.) (excluding optional wing tip tanks)	49	15m.
Wing Span (ft.) (including optional wing tip tanks)	53	16m.
Wing Area (excluding optional wing tip tanks) (sq. ft.)	325	
Wing Area (including optional wing tip tanks) (sq. ft.)	337	
Length	35' 8"	11m.
Height	13' 9"	4m.
Wing Loading (excluding optional tip tanks) (lb. per sq ft.)	20.3	
Power Loading (lb per HP)	11.0	
Propeller Diameter (in.)	80	

Fuel

Fuel Capacity—standard (U.S. Gallons)	137	519 LTS
Fuel Capacity with optional Wing Tip Tanks (U.S. Gallons)	196	742 LTS
Fuel Aviation Grade (Octane)	100/130	

Baggage

Maximum Baggage Rear Compartment (lb.)	400	182
Baggage Space—Rear Baggage Compartment (cu. ft.)	27.7*	
Baggage Door Size (in.)	25 x 18	

**increases to 42 7 cu.ft if extended Luggage Bay modification is incorporated.*

Landing Gear.

Wheel Tread		13' 1"
Wheel Track		11' 10"
Tyre Pressure	—Nose	29 p.s.i.
	Main	35 p.s.i.
Tyre Size	—Nose	600 x 6
	Main (Twin wheel)	600 x 6
	Option	700 x 6

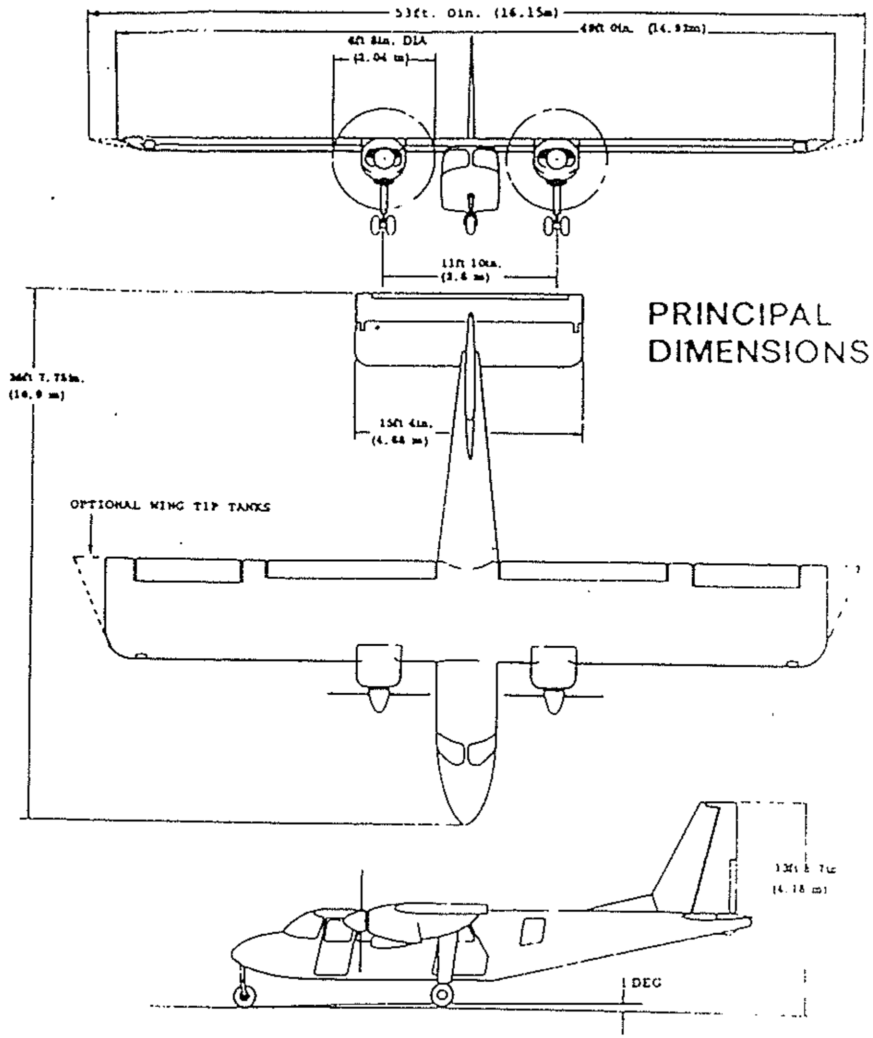
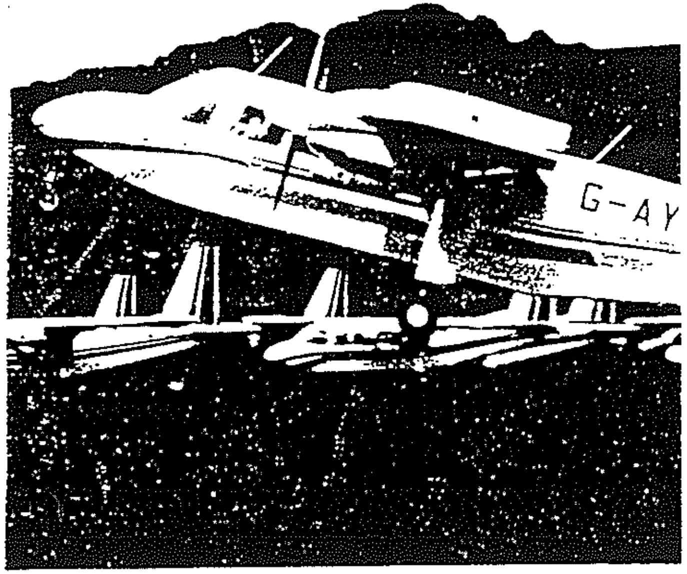


Fig. 1.1. General Arrangement Drawing



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SECTION 2

DESIGN INFORMATION

Engines and Propellers (260 h.p. Islander)

The Lycoming 0-540-E engines in the Islander are rated at 260 HP at 2700 RPM. These engines have a compression ratio of 8.5:1 and use 91/96 minimum octane Aviation fuel.

Unless otherwise stated in the Flight Manual, both engines are equipped with starter, alternator, vacuum pump, float type carburettor, two magnetos, shielded harness, shielded spark plugs, diaphragm fuel pump, propeller governor and an oil thermostat.

When the engine is fitted only with a single alternator, this is installed on the right engine.

Engine mountings are of steel tube construction and incorporate vibration absorbing Lord mountings. Engine cowlings are fully interchangeable and are made of Fibreglass. The lower cowl is readily removable by means of quick release fasteners. The top cowl is attached by screws and anchor nuts. No cowl flaps are needed as the engines cool satisfactorily under ISA + 35°C conditions (50°C, 122°F at sea level). (*see Flight Manual*).

The Oil Cooler is fitted on the rear pressure baffle.

Carburettor air is led to the carburettor air box via a quickly removable air filter located in the lower cowling. Heated air for the carburettor is taken from shrouds on the exhaust manifolds through flexible tubes to the air box.

The propellers on the Islander are Hartzell constant-speed fully feathering type HC-C2YK-2B/C8477-4 or /8477-4. Propeller feathering at about 120 knots takes seven seconds. The propeller is unfeathered by moving the propeller control forward and engaging the starter. Unfeathering accumulators, which can be supplied as an option, reduce the time taken to unfeather.

Engines and Propellers (300 h.p. Islander)

The Lycoming IO-540-K1B5 engines in the Islander are rated at 300 HP at 2700 RPM. These engines have a compression ratio of 8.7:1 and use 100/130 minimum octane Aviation fuel.

Unless otherwise stated in the Flight Manual, both engines are equipped with starter, alternator, vacuum pump, injector, two magnetos, shielded harness, shielded spark plugs, fuel pump, propeller governor and an oil thermostat.

When the aircraft is fitted only with a single alternator, this is installed on the right engine.

Engine mountings are of steel tube construction and incorporate vibration absorbing Lord mountings. Engine cowlings are fully interchangeable and are made of Fibreglass. The lower cowl is readily removable by means of quick release fasteners. The top cowl is attached by screws and anchor nuts No cowl flaps are required.

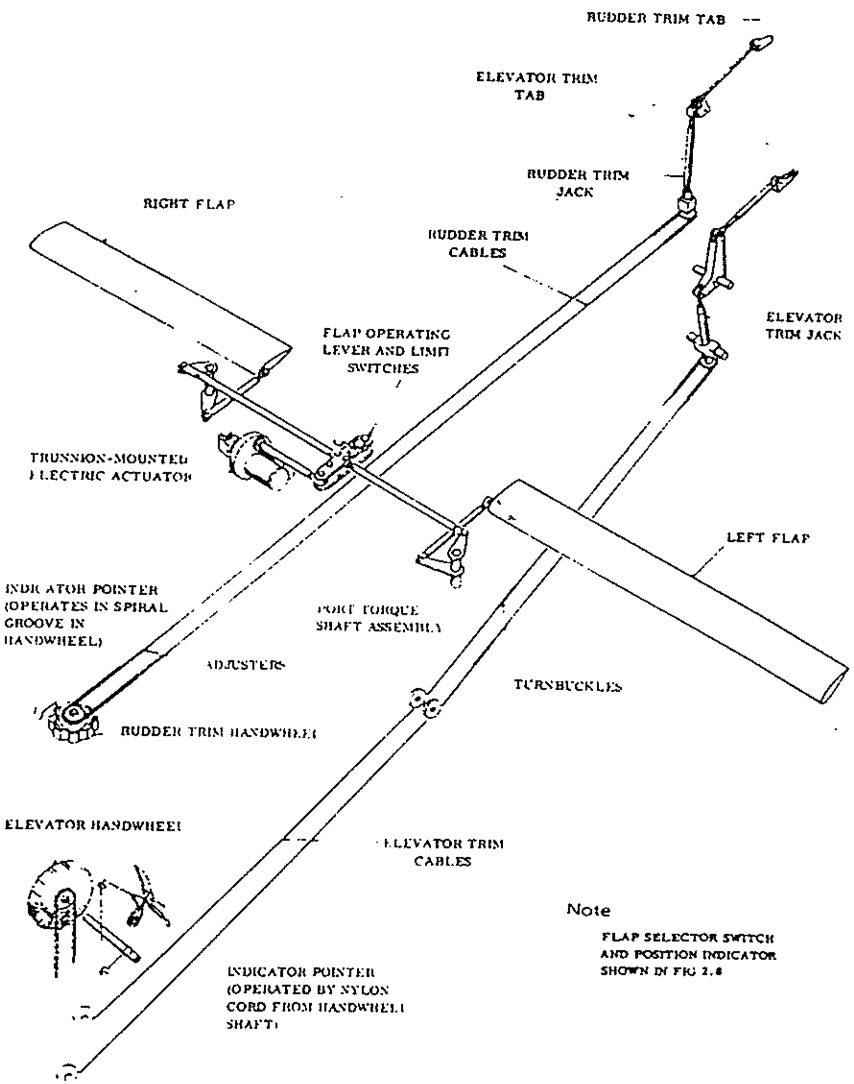


Fig. 2.1 Flap and trim control systems

Two oil coolers are fitted to each engine, one on the rear pressure baffle of the engine and the other in the wing just outboard of each engine nacelle.

Induction air is led into the air box via a quickly removable air filter located in the lower cowling. Heated air for the intake is taken from shrouds on the exhaust manifolds to the air box.

The propellers on the Islander are Hartzell constant-speed fully feathering type HC-C2YK-2B/C8477-4 or HC-C2YK-2B/8477-4 or HC-C2YK-2C/C8477-4. Propeller feathering at about 120 knots takes seven seconds. The propeller is unfeathered by moving the propeller control forward and engaging the starter. Unfeathering accumulators, which can be supplied as an option, reduce the time taken to unfeather.

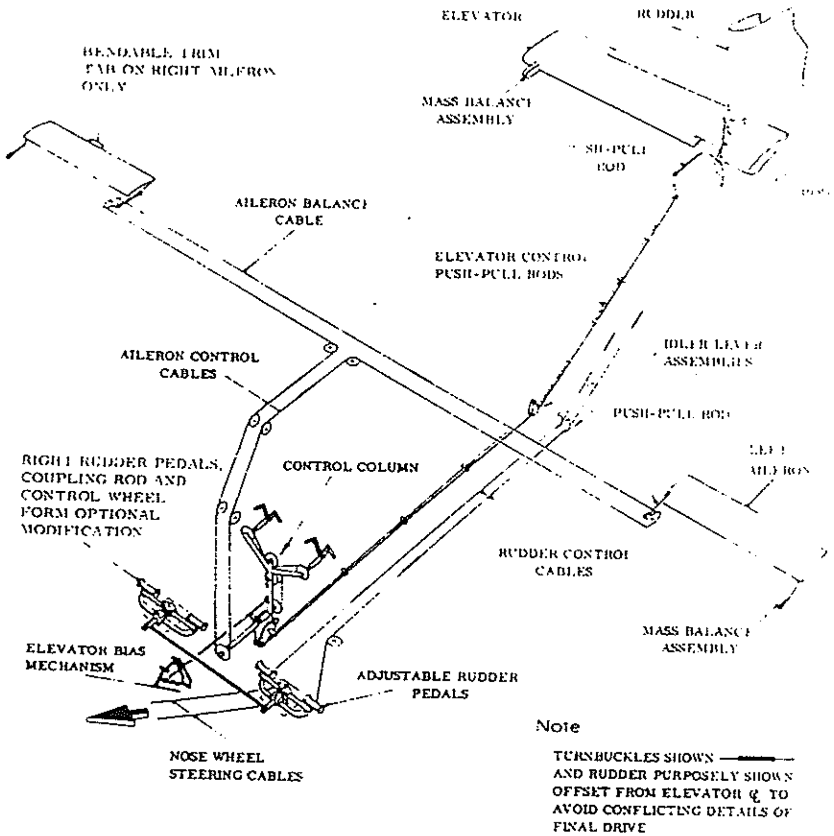


Fig. 2.2 Flight Control Systems

Fuselage and Wing Structures

The fuselage is of semi-monocoque construction built up from fabricated frames, longitudinal stringers and stressed skin sheets. The one-piece two spar wing embodies fabricated spars, pressed ribs, spanwise stringers and stressed skin plating. Integrally constructed nacelles carry steadying ties for fixed extension tubes of the main undercarriage units. Two fuel tanks are situated one outboard of each engine nacelle and are formed as an integral part of the wing structure between the front and rear spars. The one-piece tail plane is of similar construction to the wing; the fin structure differs only in that no stringers are used. Control surfaces are all metal and embody mass balance weights; the ailerons, and the one-piece elevator, are also aerodynamically balanced. All parts of the aircraft are protected to the highest standards against corrosion.

The airframe structure is designed to have a fatigue free life in excess of 15,000 hours

Landing Gear

The fixed tricycle-type undercarriage comprises twin-wheel main units and a single steerable nose wheel unit. Each of the main wheels is equipped with a brake installation operated through controllable parking valves from master cylinders on the rudder bar assembly. Toe pedals are attached to the rudder bar and are directly connected to the operating rod of each master cylinder. A duplicate set of brake pedals on the right hand rudder bar may be obtained as an option.

Flight Controls

Conventional manually operated flight controls are installed at the left side of the flight compartment; dual controls may, however, be installed as an option. Fig. 2.2 shows the layout of the flight controls.

Ailerons and rudder control systems are cable operated, but the elevator is operated by push-pull rods. The elevator control system incorporates a bias mechanism for increased aircraft stability. The rudder and elevator control systems are equipped with controllable trim tabs; the rudder trim system is operated by a handwheel in the cabin roof, and the elevator trim system by a handwheel in the right hand side of the pilot's console. Each trim system operates an indicator showing the degree of trim applied. A "bendable" trim tab is fitted to the trailing edge of the starboard aileron. Electrically operated single-slotted flaps are fitted. An actuator on the wing rear spar operates the flaps through a system of push-pull rods. The actuator is controlled by a selector switch on the pilot's console and a flap position indicator is situated on the cabin roof instrument panel. The flap control selector switch is a spring-loaded centre OFF unit and is wired to the actuator through a system of relays. Moving the switch to the DOWN position will only move the flaps 25 degrees to a TAKE-OFF setting and when this setting has been reached a second downwards switch movement will be required to set the flaps to DOWN. Similarly, when raising the flaps, the first switch movement will only raise them to the TAKE-OFF setting and a second switch movement is necessary to completely raise the flaps.

Fuel System

Each fuel tank has a quick-release filler cap on the upper surface of the wing. The air vents are interconnected between the tanks. An underwing sump, below each tank, maintains a reserve of fuel to feed each engine, regardless of changing flight attitudes. The arrangement of the fuel system, including a diagram, appears in Fig. 2.3. Fuel contents transmitters are installed in each tank and transmit, electrically, to indicators on the cabin roof instrument panel. For normal operation, fuel is fed from the fuel sumps to the respective engine via electrically operated auxiliary fuel pumps, three-way cocks, line filters (gascolators) and engine driven pumps. The auxiliary fuel pumps are controlled by double-pole switches on the cabin roof instrument panel, and provide boosted fuel pressure for take-off, landing and adverse flight conditions. During normal flight conditions the engine driven pumps are capable of supplying adequate quantities of fuel to the carburettors and the auxiliary pumps should be switched off. The fuel cocks are operated by cable and sprocket driven chain assemblies from two selectors in the cabin roof. Both fuel feed pipelines are interconnected with the fuel cocks thus enabling crossfeed selections to be made from either tank to either engine.

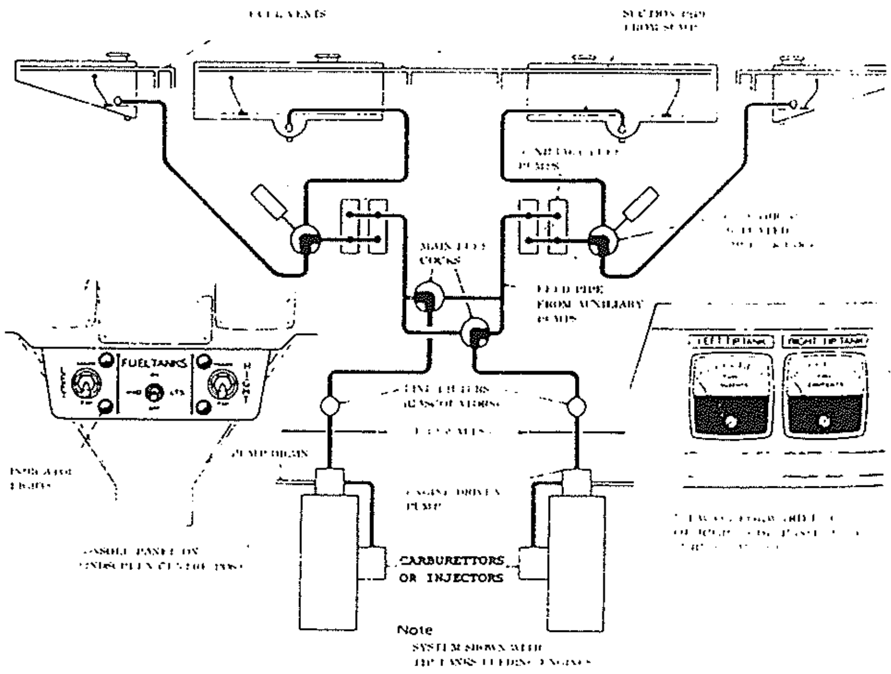


Fig. 2.3. Fuel system with wing tip tanks fitted

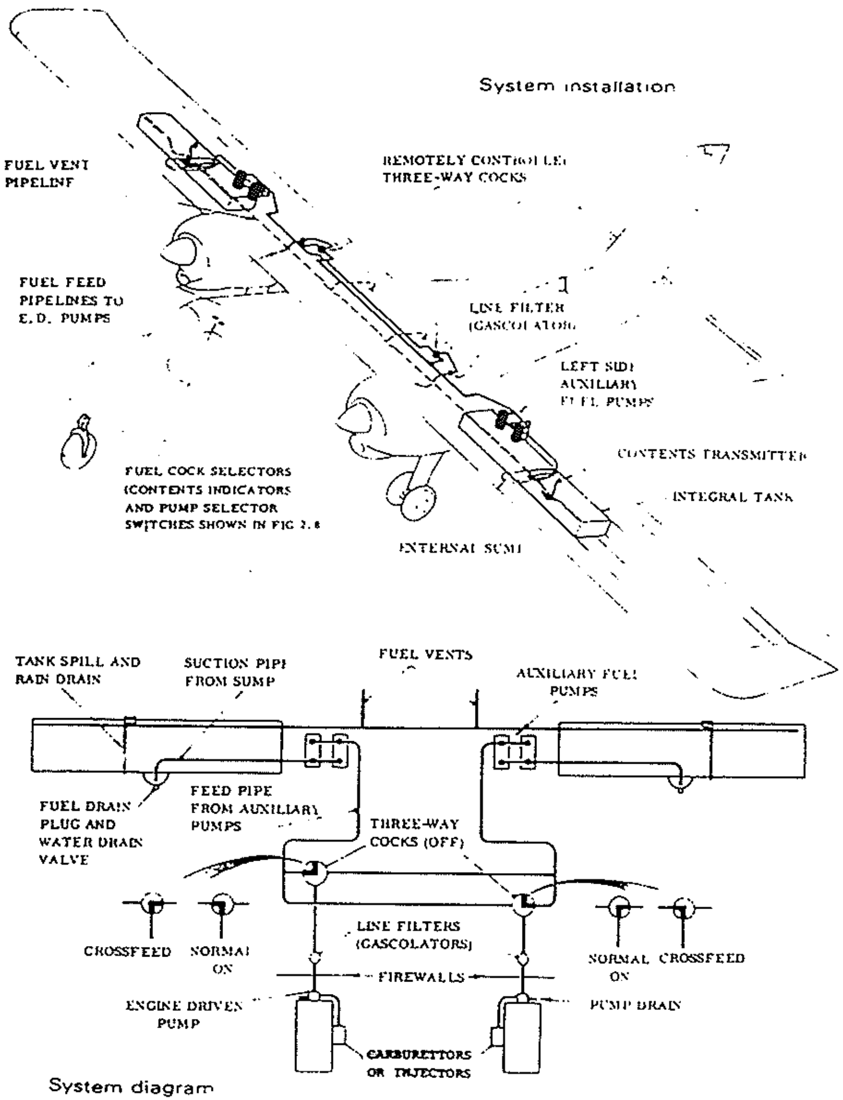
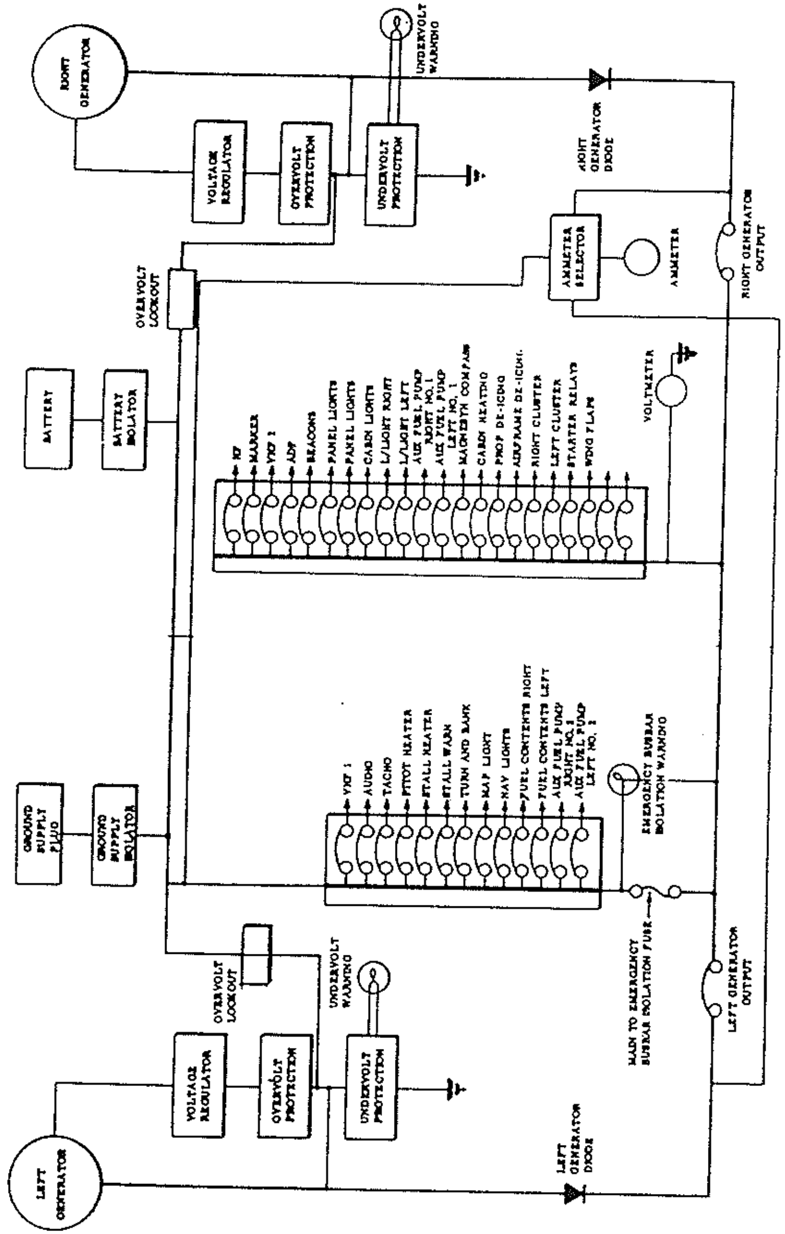


Fig. 2.4. Arrangement of fuel system



Note—Only aircraft fitted with A.C. Delco-Remy equipment have overvolt warning lamps

Fig. 2.5. Simplified generating system

104LTS

Optional Wing Tip Tanks

Addition of wing tip fuel tanks (optional) increases fuel capacity by 27.5 usable U.S. gallons per side and wing span to 53 ft

The fuel from the tip tanks is led to an electrically actuated two-way fuel cock interposed between the inner wing tank and the fuel booster pump. These cocks are actuated by switches mounted on an auxiliary panel fitted to the windscreen dividing panel. Indicator lights connected to micro switches show the position of these electrically actuated cocks These indicator lights may be selected "off" for night operation by means of a switch mounted on the auxiliary panel A line diagram of the fuel system is shown in figure 2.4.

With the tip tanks fitted, the total aircraft unusable fuel is 44 lb. The take-off weight (depending upon different airworthiness authorities) remains at 6,600 lb and the landing weight remains at 6,300 lb The zero fuel weight is increased up to 6,200 lb. depending on local regulations Due to structural reasons 80 lb. of fuel should be retained in each wing tip at all times except that this fuel may be used as reserve for flights to alternate airfields and holding

The wing tip tanks should always be refuelled first and used last.

With the tip tanks fitted, the single engine rate of climb is increased by 25 feet/minute.

Electrical System

A self-rectifying generator, mounted at the front of the right engine, is belt driven from a pulley on the engine starter ring. The generator provides a 24-volt d.c. supply, via control equipment, to a main busbar and circuit breaker panel assembly. A 24-volt lead-acid battery is connected in the battery charging circuit and the normal indication, for correct operation should be 2 to 5 amps (marginally within the green sector). After heavy battery discharges, e.g. engine starting, short-lived large charge currents may be observed which should then reduce to the nominal 2 to 3 amps. A dual generating system, having an emergency busbar provision, can be installed as an optional extra All main services are protected by circuit breakers and minor services are protected by fuses. Fig. 2.5 shows a simplified diagram of the dual generating system. In this system a voltmeter indicates the state of the aircraft's main busbar whilst the ammeter, which monitors the battery charge/discharge rates, can also be switched to indicate the output of each generator. In normal operation the output of each generator will be approximately equal at equal engine speeds; when the electrical loading is light, however, differences up to 35 amps in output may occur without detriment Should one generator consistently show a low output, compared with the other, the system should be checked on the ground for voltage regulation. External lighting includes high intensity navigation lamps and twin landing lamps. Flashing anticollision beacons can be fitted as optional extras. Internal lighting includes individually operated cabin lamps and separately controlled, variable intensity, instrument lighting A variable intensity map light is fitted above the pilot's head

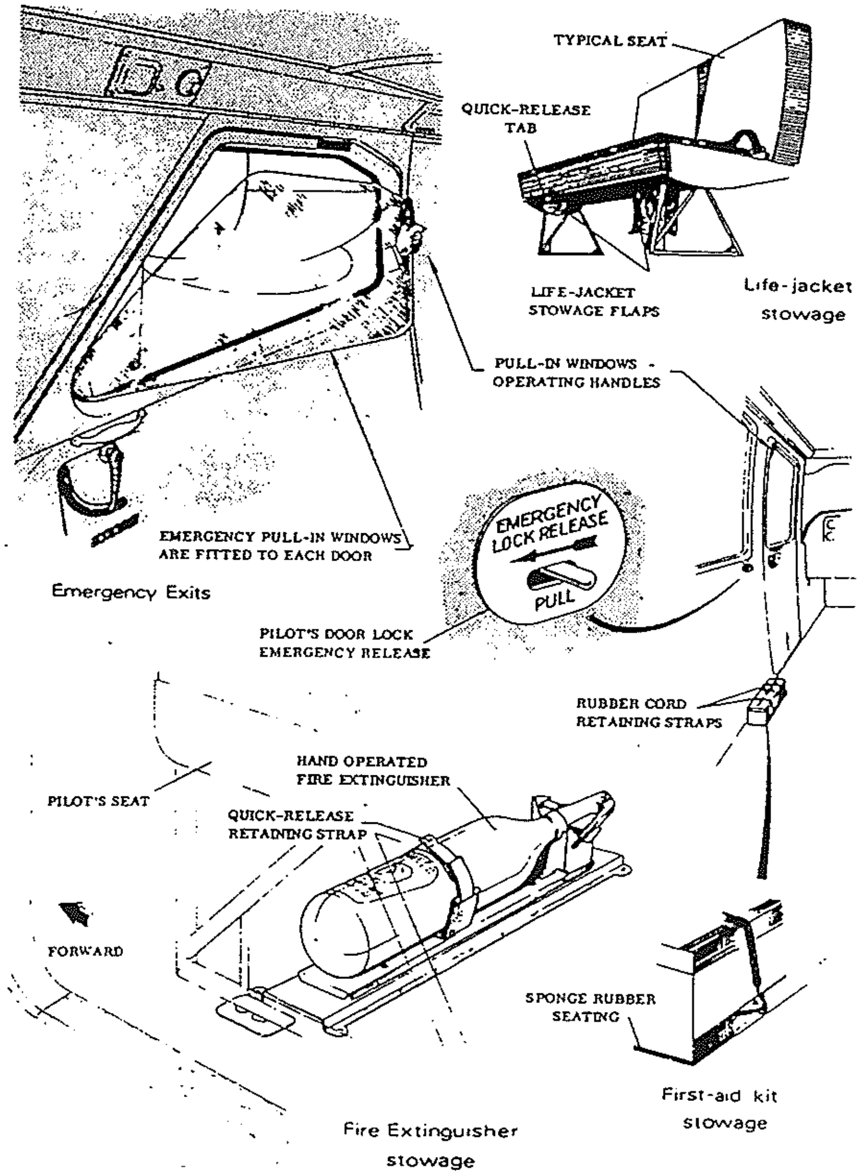


Fig. 2.6 Emergency equipment

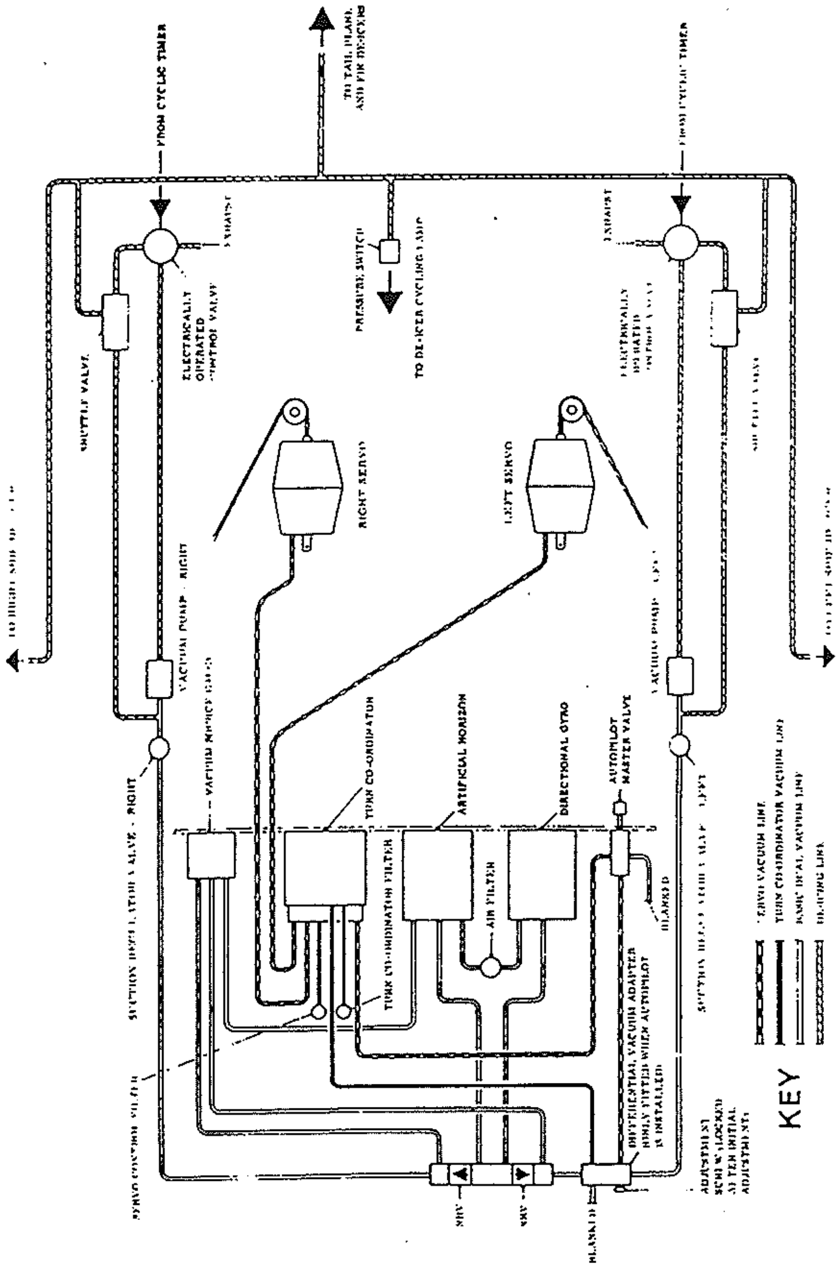


Fig. 2.7 Diagrammatic Arrangement of the Dual Vacuum System

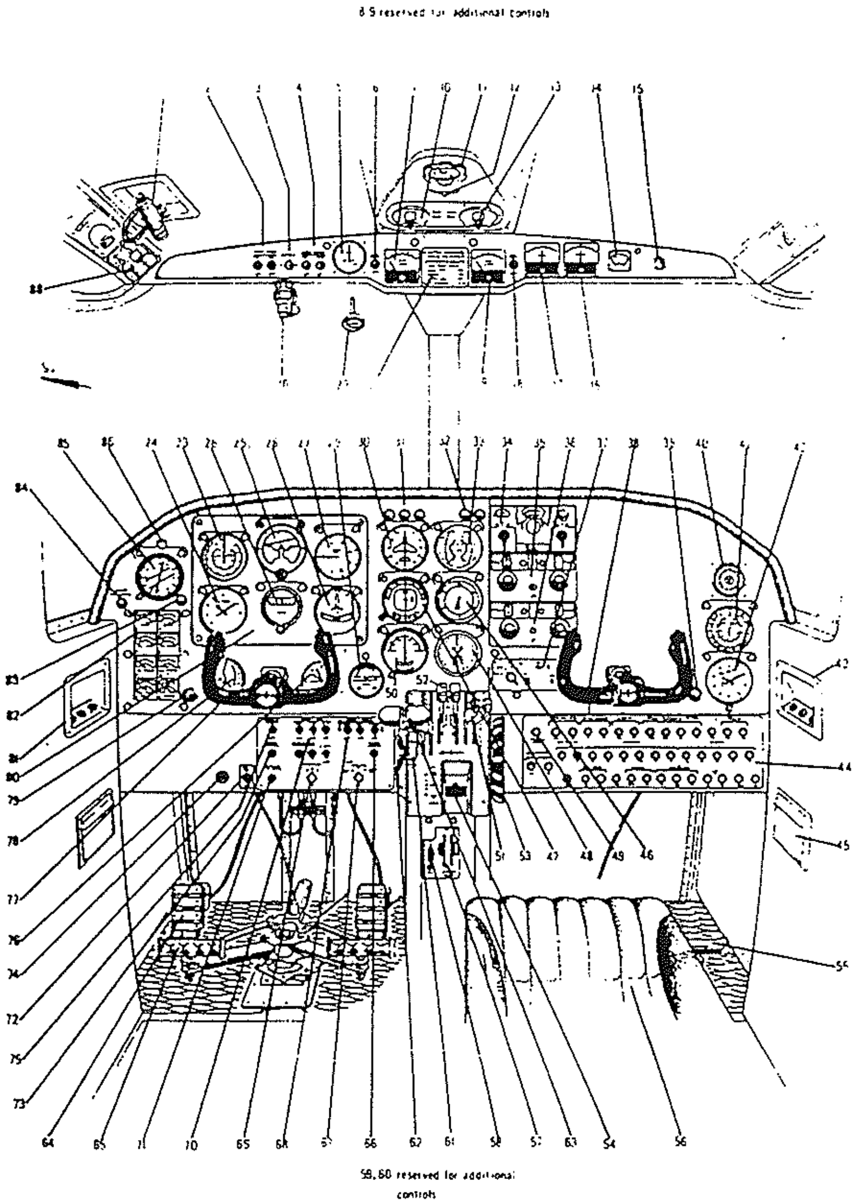


Fig. 2.8. Typical Flight Compartment Layout

1 [illegible]
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2 ENGINE MAGNETO SWITCHES - LEFT
LEFT MAGS - No. 1 - OFF - No. 2 - OFF

3 ENGINE STARTING SWITCH
STARTER - L - R Spring-loaded to centre 'OFF' position (unmarked)

4 ENGINE MAGNETO SWITCHES - RIGHT
RIGHT MAGS - No. 1 - OFF - No. 2 - OFF

5 WING FLAPS POSITION INDICATOR

6 AUXILIARY FUEL PUMPS SWITCH - LEFT

7 FUEL CONTENTS INDICATOR - LEFT

8
9 RESERVED FOR ADDITIONAL CONTROLS

10 FUEL COCK SELECTOR - LEFT
LEFT ENG - OFF - ON - RIGHT TANK
Three-way cock enables engine to crossfeed from right tank

11 RUDDER TRIM CONTROL WHEEL

12 RUDDER TRIM POSITION INDICATOR POINTER

13 FUEL COCK SELECTOR - RIGHT
RIGHT ENG - OFF - ON LEFT TANK Similar to item 10

14 PROPELLER DE-ICING AMMETER

15 AIRFRAME DE-ICING SYSTEM CYCLING LAMP
Lamp glows green during inflation periods

16 VOLTMETER

17 AMMETER

18 AUXILIARY FUEL PUMPS SWITCH - RIGHT

19 FUEL CONTENTS INDICATOR - RIGHT

20 DIRECT READING COMPASS (TYPE E2B) AND CORRECTION CARD

21 AIRCRAFT AND ENGINES LIMITATIONS DATA PLATE

22 OUTSIDE AIR TEMPERATURE THERMOMETER

23 AIRSPEED INDICATOR

24 SENSITIVE ALTIMETER

25 ARTIFICIAL HORIZON

26 DIRECTION INDICATOR

27 RATE-OF-CLIMB INDICATOR

28 TURN-AND-BANK INDICATOR (or TURN CO-ORDINATOR)

29 VACUUM SYSTEM INDICATOR (DUEL VACUUM SYSTEM)
Indicator for dual system incorporates two 'pop-out' warning buttons

30 ADF INDICATOR

31 RADIO BEACON MARKER LAMPS (3) AIRWAYS - OUTER - MIDDLE

32 GENERATOR SYSTEM WARNING LIGHTS

33 ENGINE SPEED INDICATOR - LEFT AND RIGHT

34 ADF RECEIVER

35 VHF 1 COMM/NAV TRANSMITTER/RECEIVER

36 VHF 2 COMM/NAV TRANSMITTER/RECEIVER

37 AUDIO SELECTOR PANEL

38 CONTROL HANDWHEEL - RIGHT

39 RUDDER PEDAL ADJUSTMENT KNOB - RIGHT
RUDDER PEDAL ADJUSTMENT
Spring-loaded pedals move towards pilot when knob is pulled

40 PRE-STALL WARNING INDICATOR
Functions also as a visual and aural warning device if pilot's door is insecurely latched when left engine magnetos are switched ON

41 AIRSPEED INDICATOR

42 SENSITIVE ALTIMETER

43 COMMUNICATIONS SOCKET PANEL - RIGHT
PHONES - MIC - HEADSET

44 CIRCUIT BREAKER PANEL

45 ASH TRAY Similar for left side

46 MANIFOLD PRESSURE INDICATOR - LEFT AND RIGHT

47 VHF OMNI - RANGE INDICATOR

48A CARBURETTOR CHARGE TEMPERATURE INDICATOR – LEFT AND RIGHT (260 h.p.)

48B FUEL FLOW METER (300 h.p.)

49 MAIN TO EMERGENCY BUSBAR WARNING LAMP
Lamp glows red if protective fuse ruptures

50 VOR/ILS INDICATOR

51 MIXTURE CONTROL LEVERS - LEFT AND RIGHT
MIXTURE - RICH - CUT OFF
Each lever operates the respective slow-running cut off

52 PROPELLER CONTROL LEVERS - LEFT AND RIGHT
RPM - MAX - FEATHER
Levers operate in gated slots to prevent inadvertent feathering

53 ELEVATOR TRIM CONTROL WHEEL
TAIL TRIM

54 WING FLAPS SELECTOR SWITCH
FLAPS - UP - OFF - DOWN

55 RUDDER BAR - RIGHT

56 ADJUSTABLE SEAT

57A CARBURETTOR HEAT CONTROL LEVERS – LEFT AND RIGHT
Pre-Mod 304
CARB HEAT – OFF – FULL (260 h.p.)

57B ENGINE WARM AIR CONTROL LEVERS (300 h.p.)

58 PARKING BRAKE CONTROL LEVER
PARKING BRAKES - ON - OFF Lever engages in gate in ON position

59
60 RESERVED FOR ADDITIONAL CONTROLS

61 ELEVATOR TRIM INDICATOR POINTER
NOSE UP - NOSE DOWN Operates in conjunction with item 53

62 ENGINE CONTROLS FRICTION ADJUSTER

63 THROTTLE CONTROL LEVERS - LEFT AND RIGHT
THROTTLE - OPEN - CLOSE

64 TOE BRAKE PEDALS Master cylinder mounted behind each pedal

65 ARTICULATED RUDDER PEDALS

66 EXTERNAL SUPPLIES SELECTOR AND STARTER ISOLATING SWITCH
EXTERNAL SUPPLY OFF STARTER ISOL

67 AMMETER SELECTOR SWITCH
LEFT GEN - BAT - RIGHT GEN
Works in conjunction with ammeter on roof instrument panel

68 GENERATOR AND BATTERY MASTER SWITCHES
LEFT GEN - OFF - BATTERY - OFF - RIGHT GEN - OFF

69 INSTRUMENT LIGHTING CONTROL SWITCH
PANEL LIGHTS - OFF - BRIGHT

70 LIGHTING SELECTOR SWITCHES
from left to right. NAV LIGHTS - OFF.
LANDING LIGHTS - LEFT - OFF - RIGHT - OFF. CABIN LIGHTS - OFF

71 PROPELLER DE-ICING CONTROL SWITCH
PROPELLER DE-ICING - OFF

72 ICE INSPECTION LAMP SELECTOR SWITCH
ICE INSPECTION LAMP - OFF Controls lamp in left engine nacelle

73 AIRFRAME DE-ICING CONTROL SWITCH
AIRFRAME DE-ICING - OFF

74 AUTOPILOT SELECTOR KNOB STABILIZER - PULL ON

75 PITOT AND STALL WARNING HEATER CONTROL SWITCH
PITOT & STALL WARN HEAT · OFF

76 CLOCK

77 CONTROL HANDWHEEL · LEFT

78 COMBUSTION MONITOR INDICATOR LEFT AND RIGHT

79 RUDDER PEDAL ADJUSTMENT KNOB · LEFT
RUDDER PEDAL ADJUSTMENT
Spring-loaded pedals move towards pilot when knob is pulled

80 FLIGHT INSTRUMENT PANEL

81 COMMUNICATIONS SOCKET PANEL · LEFT
PHONES · MIC · HEADSET

82 ENGINE INSTRUMENT CLUSTER UNIT
Incorporates four pairs of instruments serving left and right engines respectively, reading from the top as follows:—
CYL HD TEMP. OIL TEMP. OIL PRESS. FUEL PRESS

83 MAGNESYN COMPASS SYSTEM WARNING LAMP
Lamp glows amber if the system fails

84 PASSENGER DOORS WARNING LAMP
PASSENGER DOOR WARNING Lamp glows red if either of the two passenger doors is insecurely latched

85 MAGNESYN COMPASS SYSTEM INDICATOR

86 CABIN HEATER OVERHEAT WARNING LAMP

87 PILOT'S DIRECT VISION PANEL (IN DOOR)

88 CABIN HEATING AND VENTILATING CONTROLS
CABIN TEMP · COLD · HOT. CABIN AIR · OFF ON
HEATER OFF VENT MOTOR OFF

Emergency Equipment

Emergency equipment installed in the aircraft is shown by fig. 2.6 and consists of:—a hand-operated fire extinguisher, mounted in a quick-release bracket on the floor below the pilot's seat, and a first-aid kit contained within a mounting tray on the cabin floor, at the left side. Life jackets can be fitted in the stowage pockets beneath each seat. A "pull-in" window is fitted in each cabin door.

Vacuum System

Provision is made for the installation of either a single or dual vacuum system according to the operator's option. The single vacuum system is powered by a dry air pump mounted on, and driven by, the left engine. When the dual vacuum system is installed a dry air pump is mounted on, and driven by, each engine. Instruments are fed from a distribution manifold which incorporates automatic check valves to safeguard the supply in each case of a single pump failure. A vacuum gauge is included in the system; in the case of the dual system the gauge also incorporates source indication media. Fig. 2.7 shows a diagrammatic arrangement of the dual vacuum system.

Pilot's Controls, Instruments and Equipment

Access to the flight compartment is gained from the ground, through a door on the left side of the cabin. A sliding control column with a handwheel, and an articulated rudder bar assembly, with adjustment for leg reach, are installed. The aircraft is equipped with a pre-stall warning system, embodying an indicator which gives a visible and audible signal to the pilot at speeds between 5 and 10 miles an hour above the stall. The pilot's door latching mechanism operates a microswitch connected to the battery, directly, and to the stall warning indicator, through the magneto switches in the left engine. This arrangement produces visible and audible warning to the pilot if the door is not securely latched when the left engine magnetos are switched ON. Aircraft also embody a solenoid operated locking device which prevents the pilot's door from being opened when the left magnetos are ON. A typical flight compartment layout is shown in fig. 2.8 and all these items of equipment and the various control media are annotated in the accompanying key.

The two pilots' seats are adjustable. The passenger seats are easily removed and all four of them can be stowed in the Baggage Compartment, leaving a completely free cabin floor.

Communications and Navigation Equipment

The aircraft is designed to accommodate a wide range of communication and navigation equipment.

Heating and Ventilation

Fresh cabin air is ducted to each individual passenger seat position by means of a fully adjustable louvre. The air for this system is taken in from an air intake under each wing.

A combustion heating system, which is offered as optional equipment, incorporates in the system a separately controlled blower which can be used for ventilating purposes and an inertia switch to isolate the installation in the event of an accident.

Some aircraft are not fitted with cabin heaters and incorporate the ventilating blowers only. This ventilating system is selected on the heater control panel and the volume of air regulated by the air control lever. In flight it is unnecessary to use this ventilator.

The cabin heater can be used when the aircraft is on the ground provided that the ventilating blower is switched on. To start up, select the heater switch to the ON position and the system will then operate automatically to a temperature datum determined by thermostats and the heater will continue to cycle in order to maintain the predetermined temperature. In flight the ventilating blower may be switched OFF and sufficient air will be delivered by ram effect. The temperature can

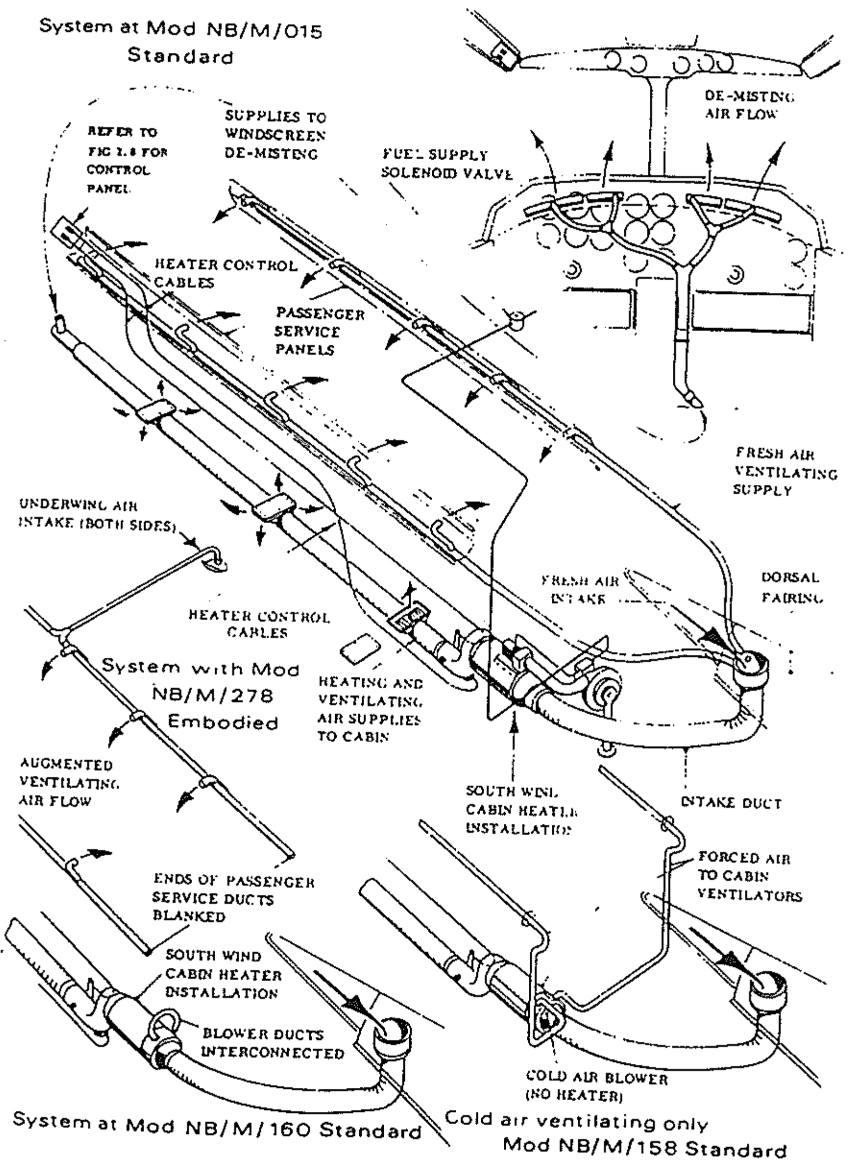


Fig. 2.9. Cabin Ventilating and Heating

be varied by the heat control lever. If the thermostat should fail or there is insufficient air flow for correct operation, the heater fuel system is automatically cut off. A micro-switch embodied in the heater is connected to a red warning light at the side of the main instrument panel. This switch operates when the air delivered from the heater rises above a predetermined temperature. It cuts off the fuel supply to the heater and lights the warning lamp. Should this occur, it can only be rectified by pressing a red button on top of the heater unit. This button is inaccessible in flight. Unless the overheated condition occurs as mishandling, it denotes a fault which should be investigated without delay. If, on the ground, the heat is switched off simultaneously with the ventilation, a resultant heat rise may be sufficient to re-activate the switch. In this event, it will not be possible to start up the heater again until the button on top of the heater has been reset. Ensure that the vent motor be allowed to run for at least one minute after turning the heater off to dissipate residual heat.

For prolonged flight at low speed, the ventilating blower should be left "ON".

A diagram of the ventilating and heating system is shown in fig. 2.9.

Handling on the Ground

Towing

A ground steering bar is available for manoeuvring the aircraft while on the ground. This bar can be attached to the nose wheel retaining fork as shown by fig. 3.1 and fig. 3.2 which also show the minimum turning circle required by the aircraft. Although there is nothing to prevent the aircraft from being towed under power, it is strongly recommended that special precautions are taken to ensure that oversteering does not occur. Severe damage to the nose wheel steering stops could be occasioned in the event of oversteering whilst under tow. To release the brakes, before manoeuvring the aircraft, move the parking brake selector lever to the OFF position whilst depressing the brake pedals until an audible "click" occurs.

Caution . . .

Aircraft with steerable nosewheel must not be manoeuvred with a rudder locking clamp fitted or damage to the rudder control system will result. Limiting angle for nose wheel unit arc of rotation is 25 degrees to either side of the neutral position. With fully castoring nosewheel, aircraft can be manoeuvred with rudder lock installed, limiting angle for nosewheel unit arc of rotation is 65 degrees to either side of the neutral position. Note: With fully castoring nosewheel, rudder lock is provided.

Parking

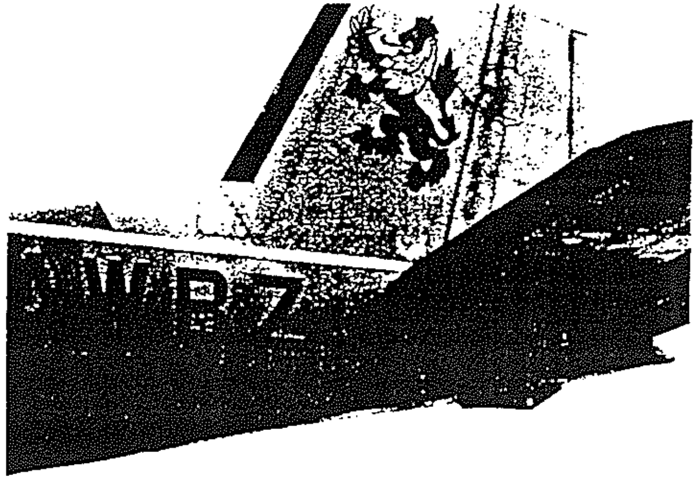
The aircraft should always be parked facing into the wind, with the main undercarriage wheels chocked and the brakes applied, fig. 3.3. To apply the brakes for parking, depress the brake pedals and hold down whilst the parking brake selector is moved to the ON position after which the brake pedals can be released.

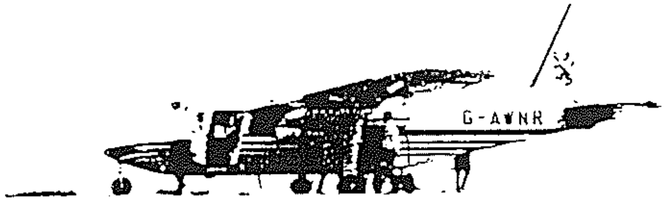
Picketing

In gusty conditions the aircraft should be parked as previously described and picketed to ground anchorages as shown by fig. 3.3. Picketing rings with screwed shanks are provided and these are stowed in a canvas bag attached to the front of the baggage platform. The rings are designed to screw into the wing jacking positions. A picketing eye is formed in the moulded glass reinforced polyester (g r p) tail bumper to secure the rear end of the aircraft.

Caution . . .

When attaching the picketing ropes ensure that they are not taut. This will allow for rope shrinkage in wet weather.





SECTION 3

OPERATING INSTRUCTIONS

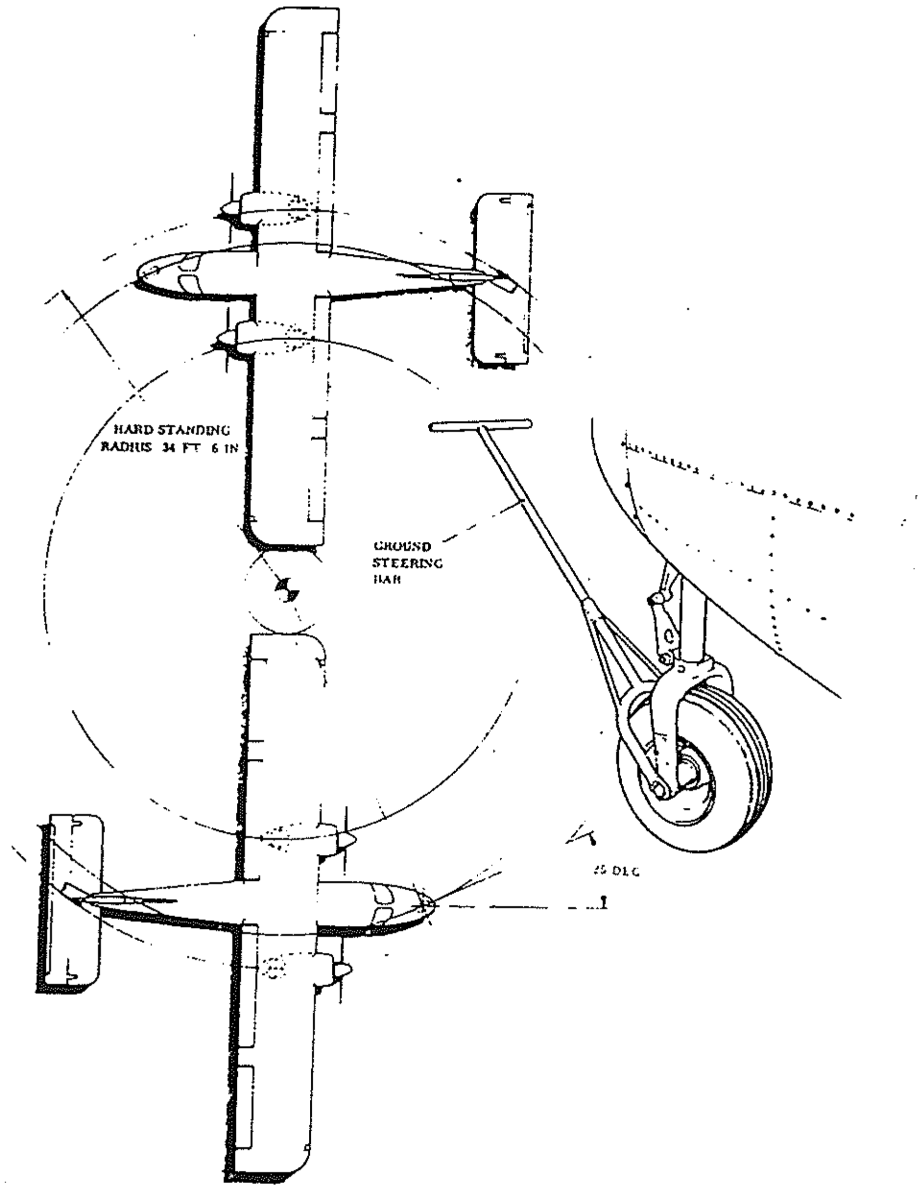


Fig. 3.1. Ground Manoeuvring — Steerable Nosewheel

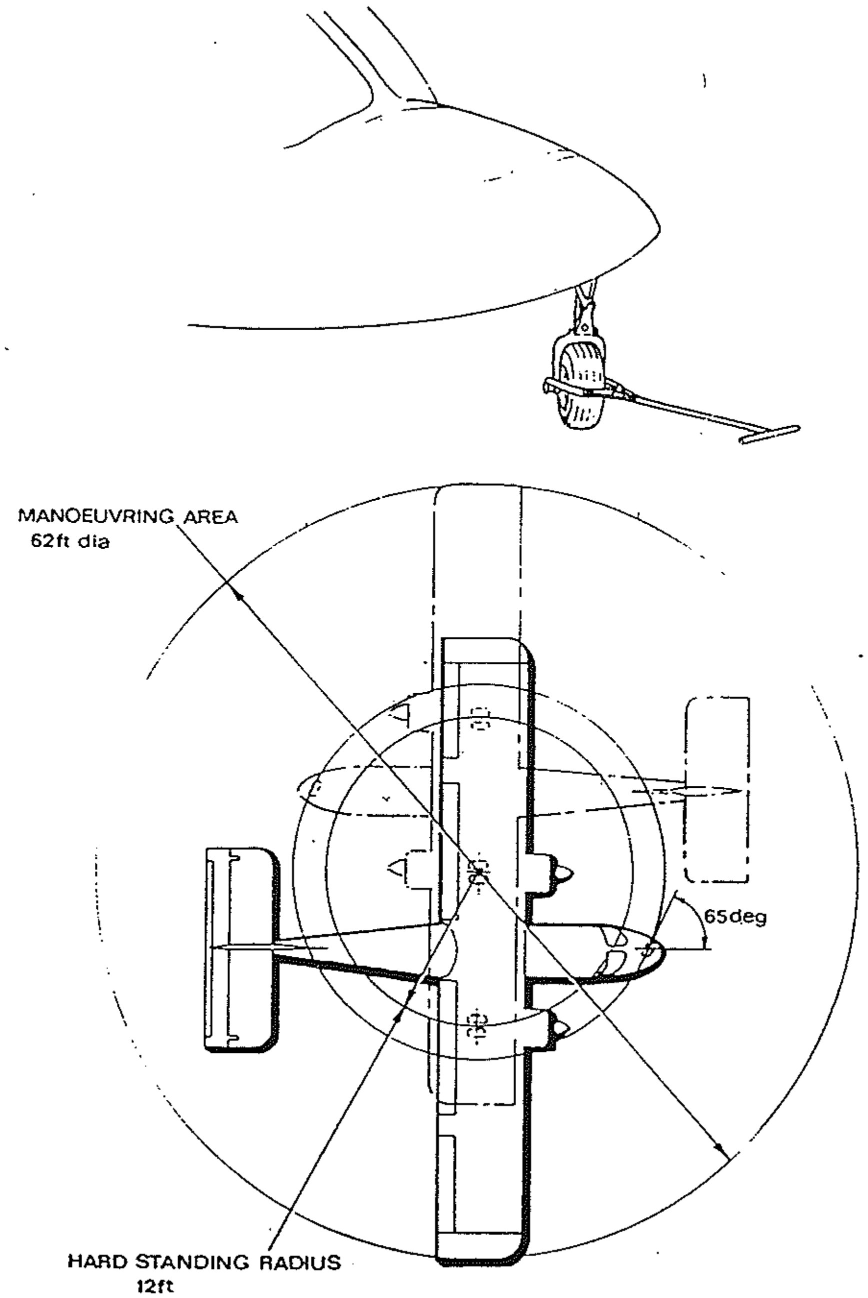


Fig. 3.2 Ground Manoeuvring — Castoring Nosewheel

Locking the Controls

A gust locking clamp for the elevator and two similar clamps for the ailerons are provided with the aircraft. These clamps are stowed in a canvas bag attached to the front of the baggage platform. No provision is made for locking the rudder, however, because of the rudder control system being interconnected with the nose wheel steering facility. In adverse wind conditions the control locking clamps should be fitted (fig. 3.3) at the discretion of the operator.

Note: With fully castoring nosewheel, rudder lock is provided.

Protective Covers

A detachable cover, with attached warning pennant, is provided for the pitot head. The pitot head cover is stowed in the canvas bag referred to in the preceding paragraph. This cover should be fitted at all times when the aircraft is parked (fig. 3.3).

Pre-flight

The following safety procedure and instructions must become an integral part of the pilot's operational routine and pre-flight inspection.

Given in fig. 3.4 is an outline for pre-flighting the Islander.

Pre-flight Checks

Check general serviceability and cleanliness of all external surfaces, intakes and aerials; accumulations of frost or snow must be adequately removed. Check security of access panels and fuel tank caps. Inspect de-icer boots (if fitted) for damage. Examine oleos for obvious pressure faults and inspect tyres for creeping and condition, check the brake hoses for general serviceability and look for signs of fluid leakage in this area. See that the wheels are correctly chocked and all external locks and covers are removed and stowed.

Caution . . .

If fluid de-frosting preparations are used to clear ice and snow from wing and tail surfaces, ensure that the solutions do not contaminate control surface ballraces as this can lead to seizure.

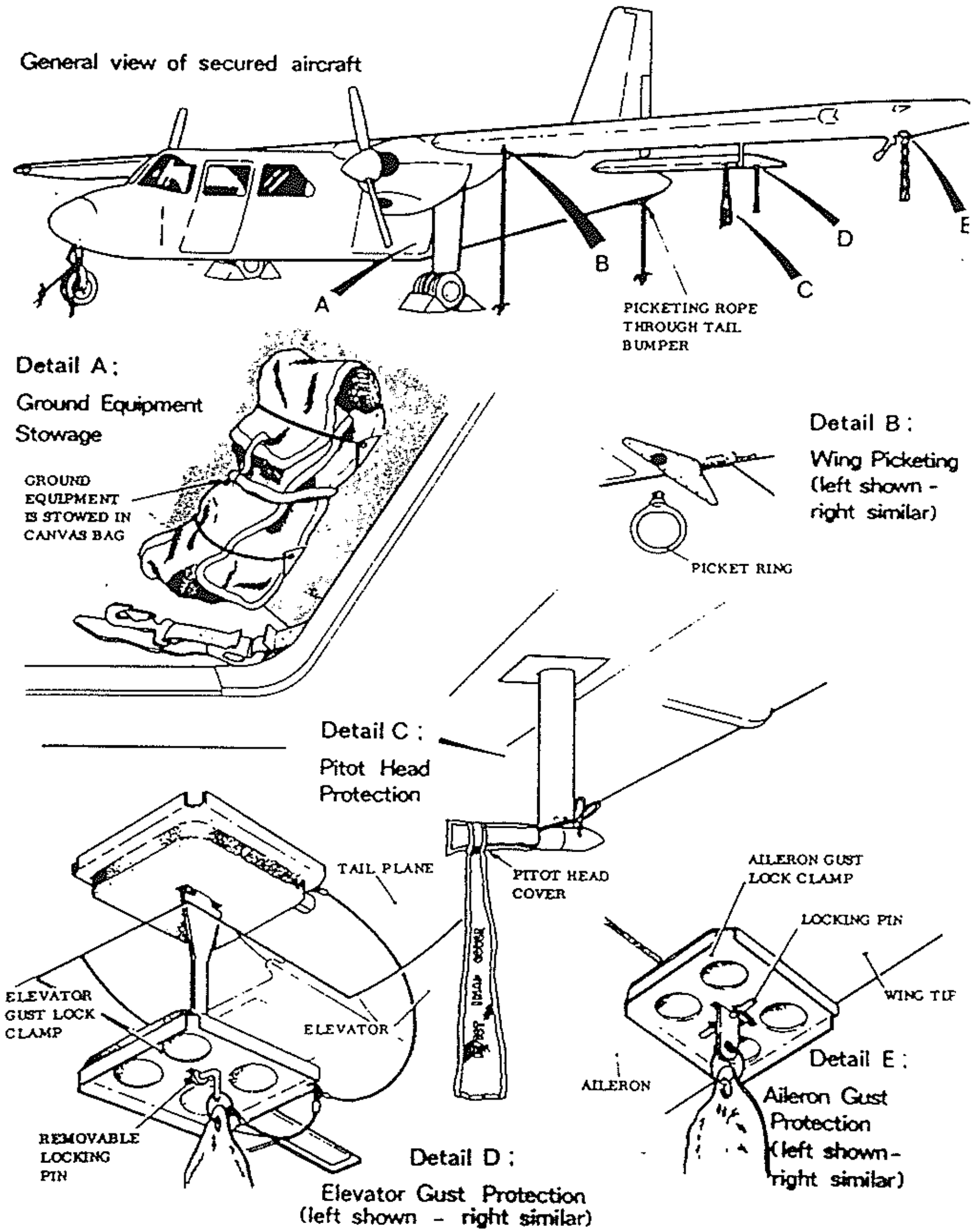
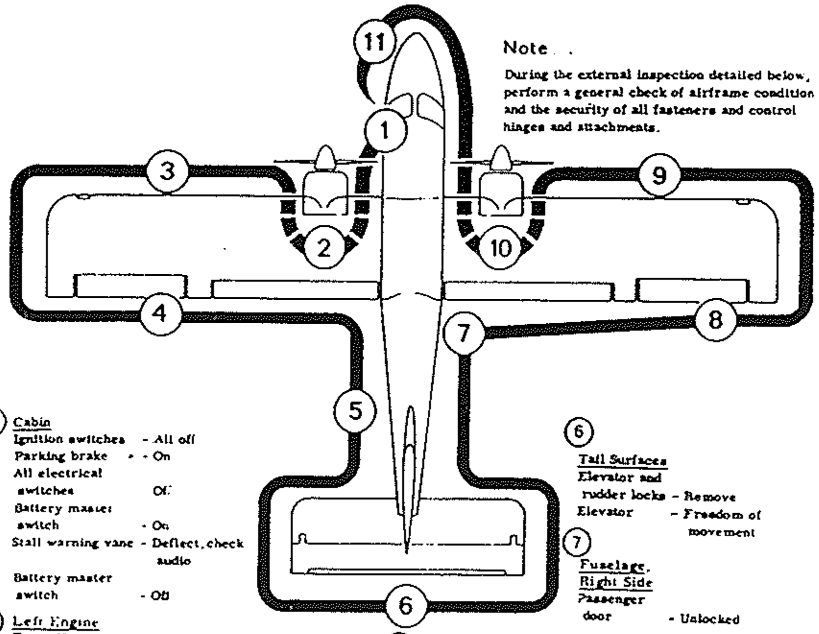


Fig. 3.3 Parking and Picketing

PRE-FLIGHT CHECK LIST



(1) **Cabin**

Ignition switches	- All off
Parking brake	- On
All electrical switches	Off
Battery master switch	- On
Stall warning vane	- Deflect, check audio
Battery master switch	- Off

(2) **Left Engine**

Propeller	- TURN SIX TIMES BY HAND (FIRST START OF THE DAY)
Oil	- Check; dipstick and cover secure
Gascolator	- Drain as necessary, cover secure

Left Undercarriage

Oleo	- Extension
Brake rings and pads	- Condition
Brake leads	- Examine for leakage
Tyres	- Inflation, cuts, creep, condition

(3) **Mainplane - Left Leading Edge**

Pitot head	- Cover removed; pressure, static vents and drain hole clear

(4) **Mainplane - Left Trailing Edge**

Aileron	- Remove lock
Fuel sump	- Drain as necessary

(5) **Fuselage, Left Side**

Passenger and baggage doors	- Unlocked
Baggage bay	- Contents secure

(6) **Tail Surfaces**

Elevator and rudder locks	- Remove
Elevator	- Freedom of movement

(7) **Fuselage, Right Side**

Passenger door	- Unlocked

(8) **Mainplane - Right Trailing Edge**

Fuel sump	- Drain as necessary
Aileron	- Remove lock, freedom of movement

(9) **Mainplane - Right Leading Edge**

Right Undercarriage

Oleo	- Extension
Brake rings and pads	- Condition
Brake leads	- Examine for leakage
Tyres	- Inflation, cuts, creep, condition

(10) **Right Engine**

Propeller	- TURN SIX TIMES BY HAND (FIRST START OF THE DAY)
Oil	- Check, dipstick and cover secure
Gascolator	- Drain as necessary, cover secure

(11) **Fuselage Nose**

Nose Oleo	- Correct extension
Nose wheel	- Inflation, cuts, creep, condition

Fig. 3.4 Pre-flighting the Islander

Pre-starting Checks

Aircraft	Headed into wind
Magneto switches	OFF
Engines	Turn twice by hand
Parking brake	ON
Rudder pedals	Set as required
Battery master switch	ON
Stall warning device	Check serviceability by applying gentle finger pressure to the detector vane in the wing leading edge (left side) until the klaxon in the flight compartment operates
Electrical switches	All off and reset as required
Generators	OFF. Undervolt warning lamps illuminated
Pilot's door	Closed. (Warning klaxon checked by momentary selection of either magneto on the left engine whilst the door is still open)
Passenger doors	Closed. Warning lamp extinguished (Ensure that both doors have key-operated tumbler locks disengaged)
Circuit breakers	All engaged
All warning lamps	Press to test
Radio	Select frequencies as required
Marker lamps	Press to test
Engine controls	Check for full and free movement
Friction lock	Check and set appropriately
Carburettor heat or	OFF
Intake heat	CLOSED
Throttles	Full forward (MAX. RPM)
Pitch levers	Full RICH
Mixture controls	Check full movement and set neutral
Elevator and rudder trim	Select as required. Check contents
Fuel	Operate over the full range. Check visually and against indicator. (Ensure
Flaps	flaps move only to next "datum" position when selection is made and that a second selection is necessary to complete full travel range)

Starting the Engines

Using external batteries

If the engines are to be started from an external source, then the External Supply Switch must be selected ON after the external supply is connected. (Insertion of the ground supply socket automatically isolates the aircraft battery from the busbar.) After the engines are started, the socket must be withdrawn and the External Supply Switch returned to the OFF/STARTER ISOL position.

Note . . .

It is recommended that the generators are not selected ON until the external supply has been disconnected, otherwise a heavy charge will be delivered to the external ground supply source.

Using internal battery

If the engines are to be started from the internal battery, the External Supply Switch must still be selected to ON to allow the starters to be activated. After start up, the switch must be returned to OFF/STARTER ISOL position for the remainder of the trip. (Should it be necessary to use the starters in order to assist a sluggish restart in the air, then this cannot be effected until the External Supply Switch is selected ON for the purpose.)

Warning . . .

Avoid heavy prolonged use of the starter. If the engine is reluctant to start after about six revolutions, then rest the system to prevent overheating of the components.

General

The Lycoming engine is air-cooled and depends on forward movement of the aircraft to maintain proper cooling. To prevent overheating on the ground the following precautions are strongly advised.

1. Avoid unnecessary ground running
2. Ensure the aircraft faces the wind.
3. Confine the propeller pitch to the fine position (MAX. RPM).
4. Maintain at least 1200 rev/min as this will also help to avoid fouled plugs.
5. Keep the mixture control in the full RICH position.

Starting Procedure — 260 h.p. Islander

The right engine is normally the first to be started.

1. Set fuel cock selectors; left selector LEFT TANK; right selector RIGHT TANK.
2. Select auxiliary fuel pumps ON and check fuel pressure (indicator pointers within green sectors).
3. Pump right throttle one to four times over its full travel to prime the engine, bearing in mind that a hot engine requires little or no priming.
4. Set throttle to about one tenth OPEN.
5. Select left magneto ON.
6. Check "All Clear". Move starter switch toward the engine to be started. Engine should fire almost immediately, whereupon the right magneto should be selected ON and the rev/min controlled to 1000 to 1200.
7. Look for an indication of oil pressure and if this does not register within 30 seconds shut down the engine and investigate the fault.
8. Repeat the process with the left engine.

Starting Procedure — 300 h.p. Islander

The undermentioned sequence relates to starting from cold and the right engine is normally the first to be started.

1. Set propeller controls to max. r.p.m.
2. Set fuel cock selectors; left selector, left tank; right selector, right tank.
3. Set throttle approximately one quarter open.
4. Switch right auxiliary fuel pump on and move the mixture control to full rich until a slight but steady flow is indicated by the fuel flow meter.
5. Return the mixture control to idle cut off.
6. Select left magneto ON.
7. Check "All Clear" to start the right engine and engage starter switch. As soon as engine starts, select right magneto ON.
8. Move mixture control slowly but smoothly to full rich.
9. Check oil pressure for indicated pressure. If pressure is not indicated within 30 seconds, stop engine and determine trouble.
   Note: If engine fails to achieve a normal start, assume it to be flooded and use standard clearing procedure before repeating this sequence.
10. Check fuel pressure indication is between 12 and 18 lb. per square inch.
    Caution: If a difficulty is experienced in starting a hot engine, the instructions in the note to operation 9 should be observed.
11. Repeat the process with the left engine.

Checks after starting

Auxiliary fuel pumps	OFF
Generators	After noting the generator undervolt warning lamps are illuminated, select the generators ON, using each selector switch, in turn, and note that the respective warning lights are extinguished accordingly
Vacuum gauge	3-5 in. Hg. (In the case of aircraft with dual vacuum systems the warning buttons on the vacuum gauge must be retracted)
Ammeter	Normal indication (indicator pointer within green sector)
Ammeter selector switch	BAT
Oil pressure (minimum)	30 lb./in.^{2}
Fuel pressure	Normal indication (indicator pointers within green sectors)
Flight instruments	Indicating normally
Radio	Select frequencies as required
Heater controls	Select as required
Ice protection systems	Cycle and OFF

Ground Checks

Warm up

The engines are warm enough for take-off when they respond normally to throttle openings. When satisfied that this is the case the following tests should be made:—

1. Test each magneto in turn for a dead cut at 1200 rev/min.
2. Increase power on engine to 17in. Hg manifold pressure (approximately 2100 rev/min). Switch from both magnetos to one and note drop off. Reselect both and wait until engine rev/min recover, then switch to the other magneto. Note drop off and return to both. Normal drop off is 100 rev/min, it should not exceed 175 rev/min and should not exceed 50 rev/min difference between magnetos.
3. Set the throttle of each engine, in turn, to give 2100 rev/min and exercise the respective propeller pitch control lever to check correct operation of the governors; note that engine speeds (rev/min) decrease and increase accordingly.
4. Set throttles to give 1500 rev/min and effect a feathering check as follows:—move each propeller pitch control lever, in turn, down through the gate to the FEATHER position; note drop in rev/min and return pitch control lever before rev/min decrease below 1000.

Ammeter check

Note that the ammeter reading is approximately 2 to 5 amps (in the green sector) or is gradually falling to settle at that value.

Ammeter selector switch

Note that both left and right generator outputs are similar and indicating in the green sector. The sum of these two generator outputs should be consistent with the expected electrical demand. Normally the ammeter selector switch should be returned to the BAT position after use.

Voltmeter check

Note that the voltmeter registers between 27 and 29 volts. An abnormal indication is registered if the instrument shows 24 volts or less.

Taxying

Before attempting to taxy, ensure the parking brake is released. The aircraft can be steered effectively during ground manoeuvring by means of the rudder pedals. Brakes should be tested for efficient operation as soon as possible after the aircraft has started rolling.

Runway threshold check

Open up each engine, in turn, to approximately 70% power and select carburettor heat FULL; check that the manifold pressure drops and return the carburettor heat control to OFF.

Pre-take-off checks

Safety belts	Fastened
Passenger notices	ON
Doors and DV panel	Closed
Pitch	Full fine (MAX. RPM)
Mixture	Full RICH
Carburettor heat	OFF
Trim tabs	Set neutral
Flaps	Set to TAKE-OFF position (check indicator)
Fuel	Check contents, selection and pressure (fuel pressure indicator pointers within green sectors)
Auxiliary fuel pumps	ON
Engine instruments	Checked
Flight instruments	Check and set as required

Pitot heater	As required
Ice protection systems	As required
Autopilot system	OFF
Flight controls	Full and free movement
Electrics	Selected as required (Ammeter showing charge: Voltmeter reading 27-29 volts · Circuit breakers engaged)
Heater (if fitted)	OFF

Take-off

Align the aircraft with the runway and open the throttles slowly to the TAKE-OFF position. **Depending upon the weight at which it is operating, the aircraft must be rotated at a speed of 4 kt (5 m.p.h.) less than the speeds scheduled for the 50 feet safety heights in Section 6.** The aircraft is capable of taking off in a 30 kt (35 m.p.h.) crosswind without resort to differential throttle application.

After take-off

At a height above 200 feet, select flaps UP and trim out resultant nose heaviness.

Auxiliary fuel pumps OFF at a safe height.

Engine rev/min and manifold pressure set to climb-out power

Heater, if fitted, selected as necessary.

Set altimeter(s) as required.

Passenger notices selected as required.

Intake heat selected as required. Lean-off the mixture as appropriate (Lycoming Operators Manual (Part Number 60297-10)).

Handling in Flight

The best Climb Gradient speed is 65 kt (75 m.p.h.) IAS with maximum power, but a more comfortable attitude is maintained at 95 kt (110 m.p.h.) IAS with 75% power.

General flying

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

260 H.P. ISLANDER

Use of carburettor heat

Carburettor icing can occur, unexpectedly, in various combinations of atmospheric conditions. On damp, cloudy or foggy days, regardless of the outside temperature, keep a sharp watch for power loss, indicated by a decrease in manifold pressure. When this is seen, apply full carburettor heat for 30 seconds; this action will cause a further slight drop in manifold pressure. Return the heat control levers to OFF and note that selected engine power is restored. Do not keep heat selected FULL for long periods or excessive power loss will result, with very little indication from the manifold pressure indicator. During normal flight operations the carburettor heat control levers should be left in the OFF position.

300 H.P. ISLANDER

Use of intake heat

Intake icing can occur, unexpectedly, in various combinations of atmospheric conditions. On damp, cloudy or foggy days, regardless of the outside temperature, keep a sharp observation for power loss, indicated by a decrease in manifold pressure. When this situation arises, apply full intake heat for 30 seconds; this action will cause a further slight drop in manifold pressure. Return the heat control levers to OFF and note that selected engine power is restored. Do not keep heat selected FULL for long periods or excessive power loss will result, with very little indication from the manifold pressure indicator. During normal flight operations the intake heat control levers should be left in the OFF position.

Instrument flying

The degree to which flight in IFR conditions can be undertaken depends upon how comprehensively the aircraft is equipped.

The aircraft is fitted with a full blind flying panel with a full range of radio options available. De-icing to FAA Part 135 is also offered as an option.

Flying in low temperature conditions

When flying in low ambient temperatures the propeller governors should be regularly exercised - every ten to fifteen minutes - to keep the oil supply circulating and thus avoid sluggish or unresponsive propellers.

Changes of trim

Flaps up	Nose down tendency
Flaps down	Nose up tendency
Application of power	Large increases in power produce a marked nose up tendency

Usable fuel - safe flight attitudes

It has been established that fuel can be used down to zero reading on the indicators, in all combinations of flight attitudes within the following :— Nose up 14 deg ; Nose down 2 deg ; Wing down 3 deg. The quantity of fuel remaining in the tanks when the contents indicators register zero, cannot safely be used in flight.

Stalling

Stalls are gentle in all configurations and from all attitudes normally encountered. Because of this characteristic the electrically operated stall warning system provides visible and audible warning at a safe margin above the stall. Recovery action is normal. Provided the recovery action is taken promptly, the height loss will be small.

Diving

The limiting speed or VNE for the 260 H.P ISLANDER is 177 kts (204 m.p.h.) IAS.

The limiting speed or VNE for the 300 H.P. ISLANDER is 184 kts (212 m.p.h.) I.A.S.

Spinning

Intentional spinning is prohibited.

Descent

Mixture should be richened appropriately before commencing descent and this should then be executed at 500 ft/min to give an acceptable rate for passenger comfort.

Airfield Approach

Procedure and checks

On entering the circuit the speed should be reduced to 113 kts (130 m.p.h.) IAS before lowering the flaps to the TAKE-OFF position.

Altimeter(s)	Set as appropriate
Brakes	OFF
Mixture	Full RICH
Carburettor heat	OFF (Intermittent use may be advisable to ensure responsive engines if a balked landing is likely and ambient conditions are such that ice formation could occur)
Propellers	Fully fine (MAX. RPM)
Fuel	Selected as appropriate
Auxiliary fuel pumps	ON. Check pressures (indicator pointers within green sectors)
Harness	Secured
Passenger notice	ON
Heater	OFF (ventilating blower ON for windscreen demisting)

Touch down

Initial approach should be made at 65 kts (75 m.p.h.) IAS with flaps at TAKE-OFF (25 deg.). After selection of FLAPS DOWN (56 deg.) the speed may be progressively reduced to the appropriate threshold speed quoted in Section 6. After touch down allow the nose wheel to sink gently and apply the brakes as required.

Balked landing

Apply full power smoothly to the engines and be prepared to deal with a nose-up change in trim which can require a strong stick force, especially if the airspeed is low. Establish a positive climb away, select flaps to T.O., trim the aeroplane and accelerate to 61 kts (70 m.p.h.) IAS. Select flaps UP at a height above 200 feet and climb out at 65 kts (75 m.p.h.) IAS.

Cross Wind Approaches

The aircraft is capable of landing with a 30 kts (35 m.p.h.) cross wind.

Post Landing Checks

Auxiliary fuel pumps	OFF
Brakes	For satisfactory operation
Flaps	UP
Pitot heater	OFF
Unrequired services	OFF
Trim settings	For take-off
Cabin heater (if fitted)	OFF

Stopping the Engines

Idle the engines at 1000 rev/min for a period until temperatures drop and check the magnetos for a dead cut. Stop the engines by moving the mixture controls fully downward into the idle cut off position.

Checks after Stopping

Ignition switches	OFF
Generator(s)	OFF
Gyros	Caged
Radios	OFF
Battery master switch	OFF
Parking brake	ON
Controls	Locked (Gust locks stowed in canvas bag at rear of cabin)
Chocks	In position

Stalling Speeds

The stalling speeds with throttles closed for all C.G's. and with droop leading edge are as follows:

Flap Angle (deg.)	Stalling Speed kt. (m.p.h.) (Indicated Air Speed)				
	1814 kg	2268	2722	2858	2994
	4000 lb.	5000 lb.	6000 lb.	6300 lb.	6600 lb.
UP	42.0(48.4)	45.0(51.9)	48.0(55.3)	48.9(56.3)	49.8(57.4)
25 (T.O.)	36.6(42.1)	39.1(45.0)	41.5(47.8)	42.3(48.8)	43.0(49.5)
56 (DOWN)	33.7(38.8)	36.0(41.5)	38.3(44.1)	39.0(44.9)	39 7(45.8)

In certain circumstances, at forward C.G., lack of sufficient elevator angle may just prevent a true stall from developing.

The take-off safety speeds and the landing approach speeds scheduled in Sect. 6 are based on zero thrust stalling speeds, which are as follows:—

Flap Angle (deg.)	Stalling Speed kt. (m.p.h.) (Indicated Air Speed)				
	kg's 1814	2268	2722	2858	2994
	4000 lb.	5000 lb.	6000 lb.	6300 lb.	6600 lb.
25 (T.O.)	34.4(39.9)	36.0(41.5)	37.5(43.2)	38.0(43.8)	38.5(44.4)
56 (DOWN)	30.4(35.0)	32.0(36.9)	33.6(38.7)	34.0(39.2)	34.5(39.8)

OPERATIONAL TIPS

In the operation of the Islander, as in that of any other type of aircraft, there are a few points of technique and information that apply particularly to this aircraft. The following operational tips may be helpful in the operation of the Islander:

a. For best take-off and landing distances, it is important to fly exactly to the figures listed under the Performance Charts of Section 6.

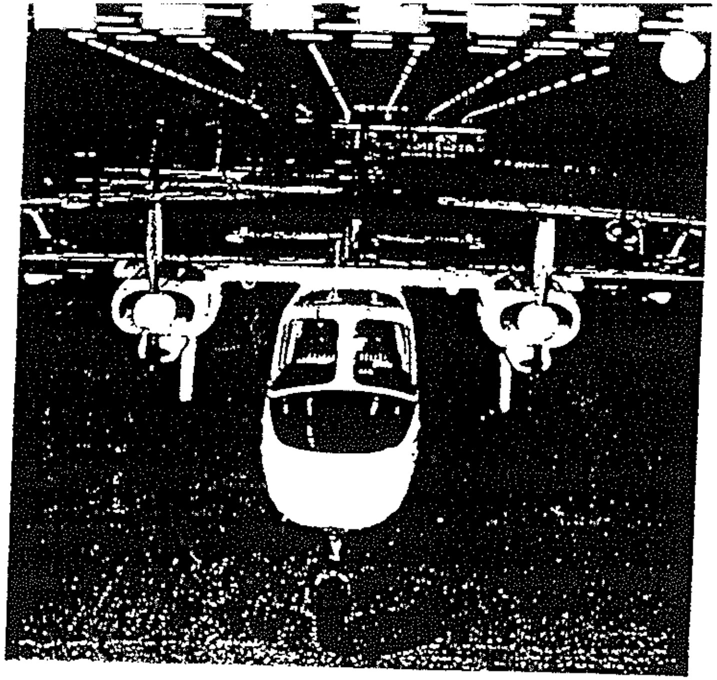
b. For convenience and to obtain best service life from the heater components, it is recommended that the heater switch be turned OFF about two minutes before stopping the engines and shutting off the master switch. This should normally be done during taxy after landing.

c. Before starting the engines ascertain that all radio switches, light switches and the pitot heat switch are in the OFF position, so as not to create an overloaded condition when the starter is engaged.

d. The trim tab on the Islander is very responsive and a small adjustment in trim control gives a rapid trim change attitude.

e. The Lycoming engines on the Islander run very rich at the full rich position of the mixture control, and must be leaned under all cruise conditions under 75% power to obtain satisfactory economy.

f. Zero thrust at 70 knots IAS may be set up with the propeller pitch in full fine and 10 inches of manifold pressure.



4

SECTION 4

EMERGENCY OPERATING
PROCEDURES

Electrical Failure

FAILURE OF RIGHT GENERATOR

Indications

1. Right generator undervolt warning lamp - Lit
2. Ammeter (if selected to RIGHT GEN) - Pointer at zerò, or in red sector
3. Right generator circuit breaker - Tripped

Action

When any one, or more, of the failure indications are present, the following action must be taken.

1. Right generator field switch - OFF
2. Right generator circuit breaker - Trip

Load shedding

No load shedding is necessary except at the pilot's discretion. If, however, a heavy load is imposed on the busbar, the left generator undervolt warning lamp may light; this condition is correct provided that the ammeter shows the left generator to be still carrying load - indicated by the ammeter pointer within the green sector when selected to LEFT GEN.

FAILURE OF LEFT GENERATOR

Indications

1 Left generator undervolt warning lamp - Lit
2 Ammeter (if selected to LEFT GEN) - Pointer at zero or in red sector
3 Left generator circuit breaker - Tripped

Action

When any one, or more of the failure indications are present, the following action must be taken

1. Left generator field switch - OFF
2 Left generator circuit breaker - Trip

Load shedding

No load shedding is necessary except at the pilot's discretion. If, however, a heavy load is imposed on the busbar, the right generator undervolt warning lamp may light: this condition is correct provided that the ammeter shows the right generator to be still carrying load - indicated by the ammeter pointer within the green sector when selected to RIGHT GEN.

FAILURE OF BOTH GENERATORS

Indications

1. Left generator undervolt warning lamp - Lit
2 Right generator undervolt warning lamp - Lit
3 Ammeter (if selected to BAT) - Discharge (in red sector)
4. Ammeter (if selected to LEFT GEN) - Pointer at zero or in red sector
5. Ammeter (if selected to RIGHT GEN) - Pointer at zero or in red sector
6. Voltmeter - 24 volts or less
7. Left generator circuit breaker - Tripped
8. Right generator circuit breaker - Tripped

Action

Ensure that the undermentioned procedure is followed immediately indications to (8) inclusive are present; indications (1) and (2), and (9) and (10), being additional in some fault conditions.

1. Left generator field switch - OFF
2. Right generator field switch - OFF
3. Left generator circuit breaker - Trip
4. Right generator circuit breaker - Trip
5. Ensure that the battery master switch is ON
6. Check that the circuit breakers for the following services are engaged and that the services are operating or ready for use as indicated :—
   a. Auxiliary fuel pumps - Limit to 5 minutes for landing only
   b. Wing flaps - Limit to essential operation only
   c. Fuel contents indicatc s
   d. Landing lights - Limit to 2 minutes use for landing only
   e. Navigation lights - Night operations only
   f. Engine instruments cluster
   g. Map light - Night operations only
   h. Turn-and-bank indicator
   i. Stall warning
   j. Rotating beacons
   k. Stall warning heater
   l. Pitot head heater
   m. Magnesyn compass
   n. Tachometer
   o. Audio system
   p. One essential radio navigational aid
   q. One essential radio communications transmitter/receiver - Limit to 5 minutes use during cruise (after 7 below) and 2.5 minutes use whilst landing
7. All other electrical services - OFF and circuit breakers tripped

Under the above conditions the aircraft battery should have sufficient capacity to allow a flight of 25 minutes duration (at night) or 30 minutes duration, by da ter the time at which both generators failed.

FAILURE OF MAIN BUSBAR

Indications

1. Emergency to Main busbar warning lamp - Lit
2. Ammeter (if selected to BAT) - Discharge (in red sector)
3. Ammeter (if selected to LEFT GEN) - Zero (or full scale in green sector)
4. Ammeter (if selected to RIGHT GEN) - Zero (or full scale in green sector)
5. Left generator undervolt warning lamp - Lit
6. Right generator undervolt warning lamp - Lit
7. Instruments and systems supplied from main busbar - De-energized

Action

All the indications listed above will occur when this fault is present. All circuits associated with the main busbar will, of course, be lost with the busbar itself. There is no action that can be taken, in the air, to restore the main busbar in the unlikely event of such a failure, but the following action must be taken immediately and a landing must be made as soon as possible

1. Left generator field switch - OFF
2. Right generator field switch - OFF
3. Left generator circuit breaker - Trip
4. Right generator circuit breaker - Trip

FAILURE OF BATTERY

Indications

1. Left generator undervolt warning lamp - Lit momentarily and then extinguished
2. Right generator undervolt warning lamp - Lit momentarily and then extinguished
3. Ammeter (if selected to BAT) - Pointer at zero
4. Ammeter (if selected to LEFT GEN) - Pointer at zero
5. Ammeter (if selected to RIGHT GEN) - Pointer at zero
6. Instruments and systems - De-energized

Action

The above indications will all apply in the case of a battery failure, whether due to an earth fault or disconnection. The following remedial action must be taken as promptly as possible.

1. Battery master switch - OFF
2. Ensure that both generator field switches (LEFT GEN - RIGHT GEN) are still selected ON
3. Pitot and stall warning heaters - OFF
4. Nav lights - OFF
5. Landing lights - OFF
6. Cabin lights - OFF
7. Passenger notices - OFF
8. Rotating beacons - OFF
9. Airframe de-icing - OFF
10. Propeller de-icing - OFF
11. Cabin heater (if fitted) - OFF

Note . . .

When the electrical loading on the main busbar is reduced sufficiently the generators, both left and right, will come back on line; this will be indicated by the ammeter pointer registering in the green sector when selected to the appropriate generator, and the voltmeter registering between 27 and 29 volts. Care should be taken when switching on heavy loads because the generators are not completely stable without the battery. Should the generators go off line during a reapplication of load, reduce the load until the generators are restored.

Action in the Event of Fire

FIRE ON THE GROUND

Fire in the cabin

Deal with the fire immediately by using the fire extinguishant bottle. Although the fumes given off after use are non-toxic the cabin should be well ventilated, by opening all doors, when the fire has been extinguished.

Engine fire

Shut down the affected engine immediately and :–

1. Switch magnetos - OFF
2. Select battery master switch - OFF
3. Select fuel tanks - OFF
4. Deal with the fire by using the fire extinguishant bottle or any similar ground appliance

FIRE IN THE AIR

Fire in the cabin

Deal with the fire immediately by using the fire extinguishant bottle. Although the fumes given off after use are non-toxic the cabin should be well ventilated after use by opening the DV window panel and selecting the cabin ventilating blower ON, as soon as the fire has been completely extinguished.

Engine fire

On the first indication of fire, the propeller of the affected engine must be feathered, in sequence with the following actions, immediately :–

1. Select mixture control lever - IDLE CUT-OFF
2. Select propeller control lever - FEATHER
3. Select throttle control lever - CLOSED
4. Select appropriate fuel tank - OFF
5. Select appropriate magnetos - OFF
6. Select appropriate auxiliary fuel pumps switch - OFF
7. Select appropriate generator field switch - OFF

Warning . . .

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

ENGINE FAILURE

Failure of one engine during take-off

If an engine fails before take-off safety speed is reached (this will vary according to the weight at which the aircraft is operating - Sect. 6 refers), close the throttles and brake to a stop.

Failure of one engine after take-off

Immediate action

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

1. Ensure full take-off power is applied to both engines and that the mixture controls are selected fully RICH
2. Determine the inoperative engine
3. Select mixture control lever - IDLE CUT-OFF
4. Select propeller control lever - FEATHER
5. Ensure that the generator on the operative engine is selected ON
6. Allow the airspeed to build up to 65 kt (75 m.p.h.) IAS
7. Select flaps UP and trim out the resultant stick force
8. Adjust the rudder trim as necessary for the climb
9. Select throttle control lever - CLOSED
10. Select appropriate fuel tank - OFF
11. Select appropriate magnetos - OFF
12. Select appropriate auxiliary fuel pumps switch - OFF
13. Select appropriate generator field switch - OFF

Warning . . .

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

Note . . .

Should an engine fail during normal level flight at a safe altitude, procedure elements (6) to (8) inclusive will not be applicable although some re-trimming may be necessary.

HANDLING ON ONE ENGINE

General

Both versions of the Islander are perfectly docile on one engine. The 260 h.p. Islander will maintain a height of 5,700 ft. and the 300 h.p. a height of 7,800 ft., both at 6,300 lb. gross weight. With a 300 lb. increase in gross weight, the 260 h.p. Islander will maintain a height of 4,450 ft. and the 300 h.p. a height of 6,200 ft.

Fuel system management

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

Feathering and unfeathering

The correct feathering procedures have been detailed in previous paragraphs. The unfeathering sequence is as follows:—

1.	Select appropriate fuel tank	ON
2.	Select appropriate left magneto switch	ON
3.	Select appropriate auxiliary fuel pumps switch	ON
4.	Set appropriate propeller control lever	Cruise rev/min
5.	Prime appropriate engine (bear in mind a hot engine requires little or no priming)	2-4 pumps with throttle
6.	Select External Supplies Switch	ON
7.	Select mixture control lever	RICH
8.	Set appropriate throttle lever	Approx. ¼ open
9.	Select engine starter switch	Appropriate engine
10.	When engine fires, select right magneto switch	ON
11.	Check engine temperatures and pressures	Satisfactory
12.	Check setting of propeller control lever	Cruise rev/min
13.	As temperatures and pressures stabilize, increase throttle lever	As necessary
14.	Select auxiliary fuel pumps switches	OFF
15.	Select External Supplies Switch	OFF/STARTER ISOL
16.	Select generator master switch	ON (observe output)
17.	Check vacuum gauge (if applicable)	Satisfactory

Note . . .

The feathered propeller will unfeather dynamically but the engine cannot be restored without the use of the electric starter. As an option, an unfeathering accumulator can be fitted, which assists the dynamic unfeathering action.

Critical Engine

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

Landing with one engine inoperative

Make an initial approach at approximately 65 kt (75 m.p.h.) IAS with the flaps selected to TAKE-OFF (25 deg). When committed for landing, select FLAPS DOWN (56 deg) and reduce speed over the threshold to a value compatible with the information scheduled in Sect. 6 and touch down normally.

Landing with flaps up

Make an approach at 65 kt (75 m.p.h.) IAS and a normal landing.

Note . . .

The aircraft will tend to float for some distance.

EMERGENCY EVACUATION OF AIRCRAFT

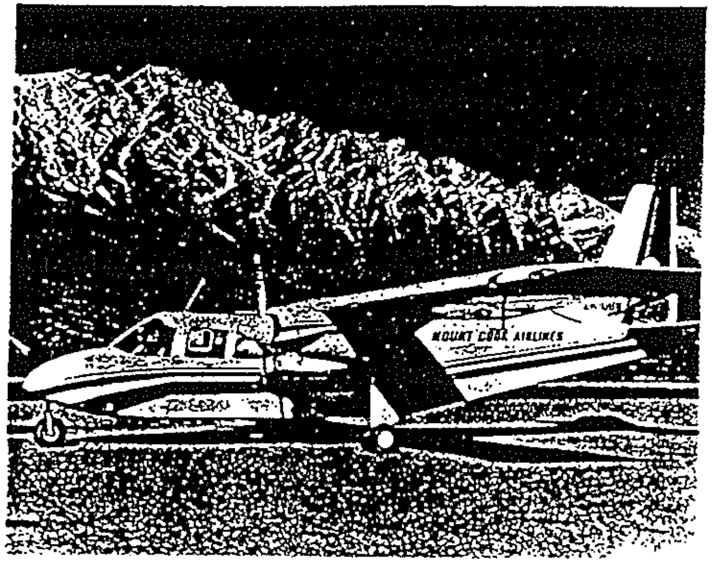
Operation of cabin doors

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

Operation of cabin window exits

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

1. Grip the red handle at the top corner of the cabin door window trimming and pull inwards and rearwards as hard as possible.
2. It is necessary to dislodge the window from its groove in the rubberized moulding and considerable physical effort may be required, especially in cold conditions.



SECTION 5

5

WEIGHT AND MOMENT DATA

Weight summary

Max. take-off weight as CAA certificated	6,600 lb.
Max. landing weight	6,300 lb.
Max. zero fuel weight as CAA certificated	6,300 lb.

Note . . .

The maximum zero fuel weight is defined as the maximum weight with a DRY wing.

Fuel moment arm (main tanks) 27 inches aft of datum.

For all details of weights and moments arms for all equipment fitted, consult the weighing schedule provided with each aircraft.

To enable you to operate your Britten-Norman Islander within the prescribed weight and centre of gravity limitations, either use the Load and Trim Sheets supplied with each aircraft or the following method as has been used in the following sample problem:

> Take the licensed empty weight and the moment divided by 100 from the weight and balance supplied in the Flight Manual and write them down in the appropriate columns, using the loading graph to determine the moment divided by 100 of each item to be carried. Total the weights and moments divided by 100 and use the c.g. moment envelope to determine whether the point falls within the envelope and if the loading is acceptable.

Alternatively, Load and Trim Sheets are available in pad form from Britten-Norman (Bembridge) Ltd.

LOADING EXAMPLE	Example Aircraft		Your Aircraft	
	Weight —lb	Moment lb. ins / 100	Weight —lb.	Moment lb. ins / 100
1 **Empty Certificated Weight** (From Empty Weight and Balance Statement or from the latest repair and alteration Form 337)	4,050	+932		
2. **Pilot**	170	-77		
3 **Passengers, Row 1 (One Male)**	180	-81		
4. **Passengers, Row 2 (Two Males)**	340	52		
5. **Passengers, Row 3 (Two Males)**	310	+47		
6. **Passengers, Row 4 (Two Males)**	340	+151		
7. **Passengers, Row 5 (One Female)**	130	+94		
8. **Baggage**	400	+484		
Wing Zero Fuel Weight (See appropriate Flight Manual)	5,920	+1498		
9. **Unusable Fuel**	42	+11	42	+11
10. **Oil (Full)***	45	−1	45	−1
11. **Fuel**	593	+160		
12. **Total Aircraft Weight** (Loaded)	6,600	+1,668		
13. **Fuel used**	325	−88		
14. **Landing Weight**	5,275	+1,580		
15. Locate this point (6,000 at 1,488) on the Centre of Gravity Moment Envelope, and since this point falls within the envelope the loading is acceptable.				

* *Note: Normally, full oil assumed for all flights.*

Fig. 5.1 Sample Loading Problem

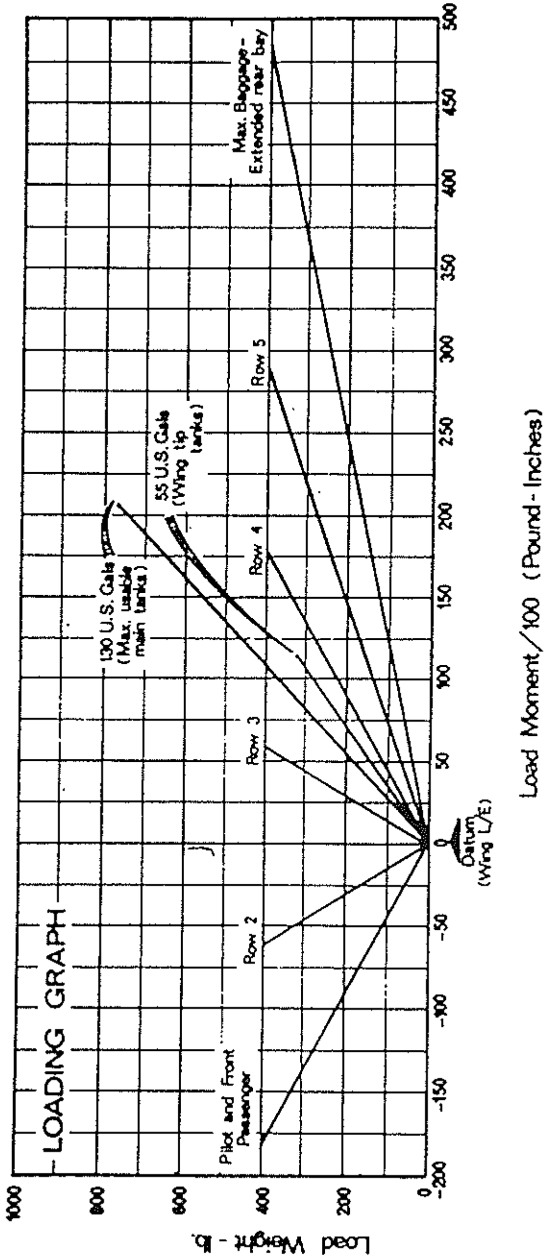


Fig. 5.2. Loading Graph

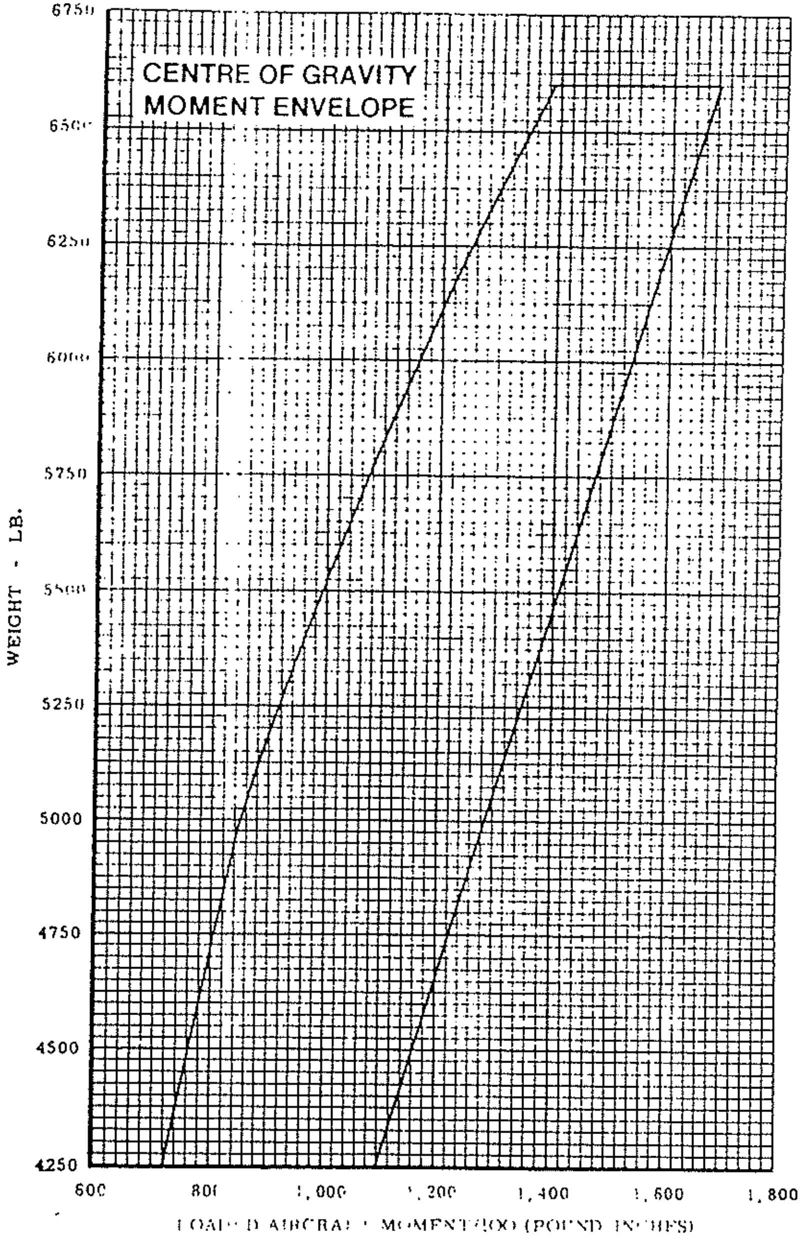
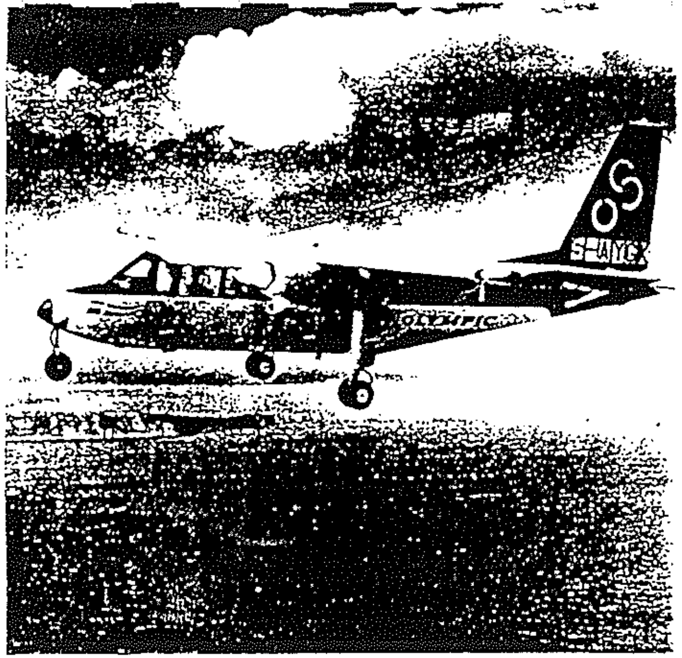


Fig. 5.3. Centre of Gravity Moment Envelope



SECTION 6

6

PERFORMANCE DATA

a) Both versions of Islander
b) 260 h.p. Islander
c) 300 h.p. Islander

DETERMINATION OF TEMPERATURE IN RELATION TO ISA AND CONVERSION OF °F TO °C .

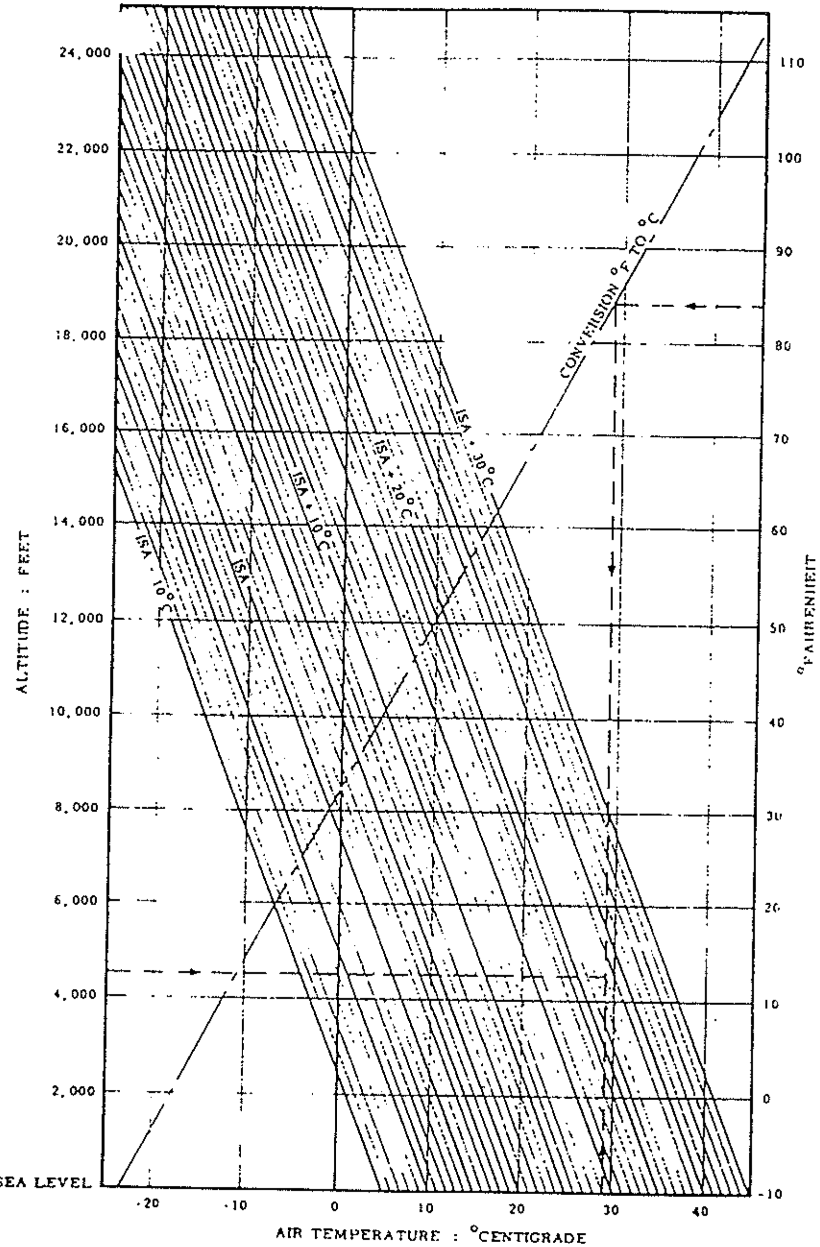
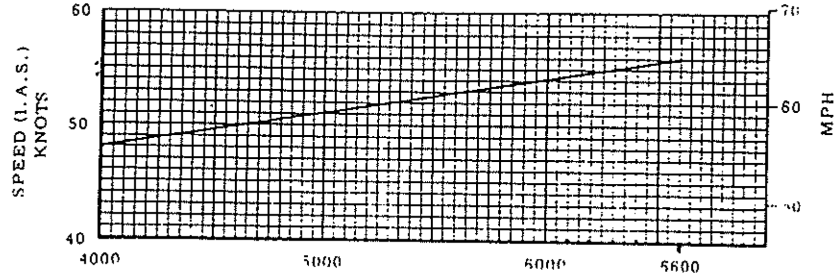


Fig. 6.1 ISA conversion chart

VARIATION OF TAKE-OFF SAFETY SPEED WITH AEROPLANE GROSS WEIGHT



VARIATION OF LANDING APPROACH SPEED WITH AEROPLANE GROSS WEIGHT

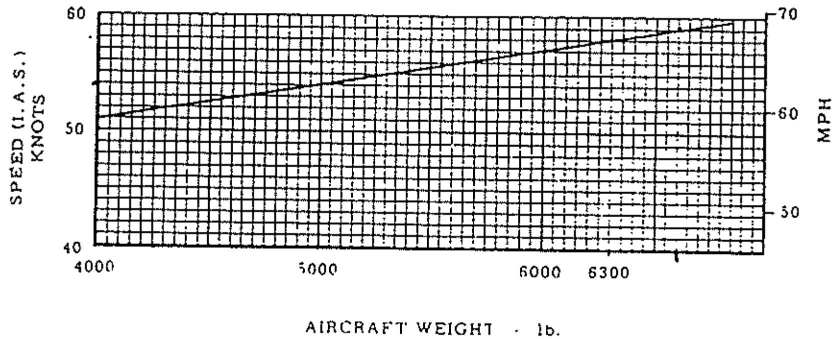


Fig. 6.2 Take-off and landing speeds

POSITION ERROR CORRECTION TO INDICATED AIRSPEED

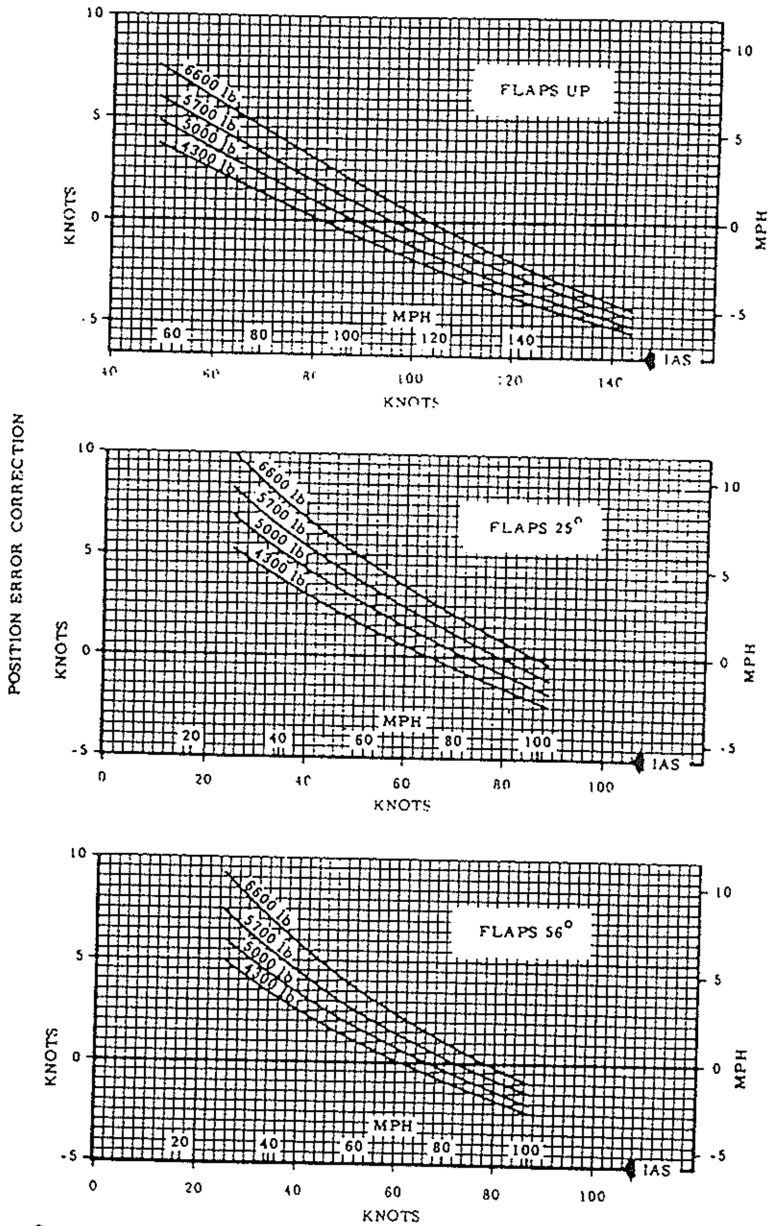
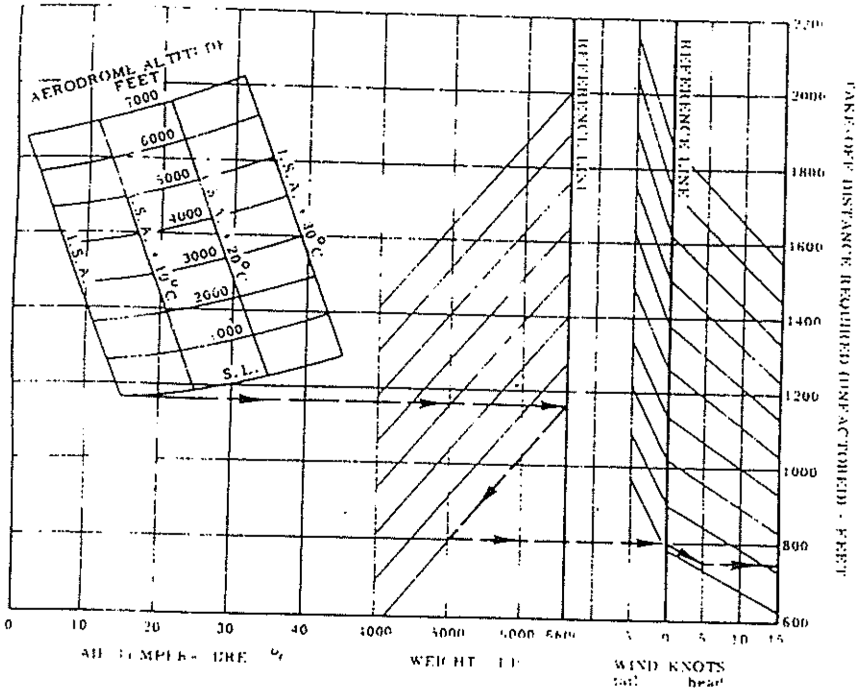


Fig. 6.3 Position error correction to indicated airspeed

TAKE-OFF DISTANCE TO 50 FEET



NOTE: Take-off roll approximately 51% of take-off distance to 50 ft.

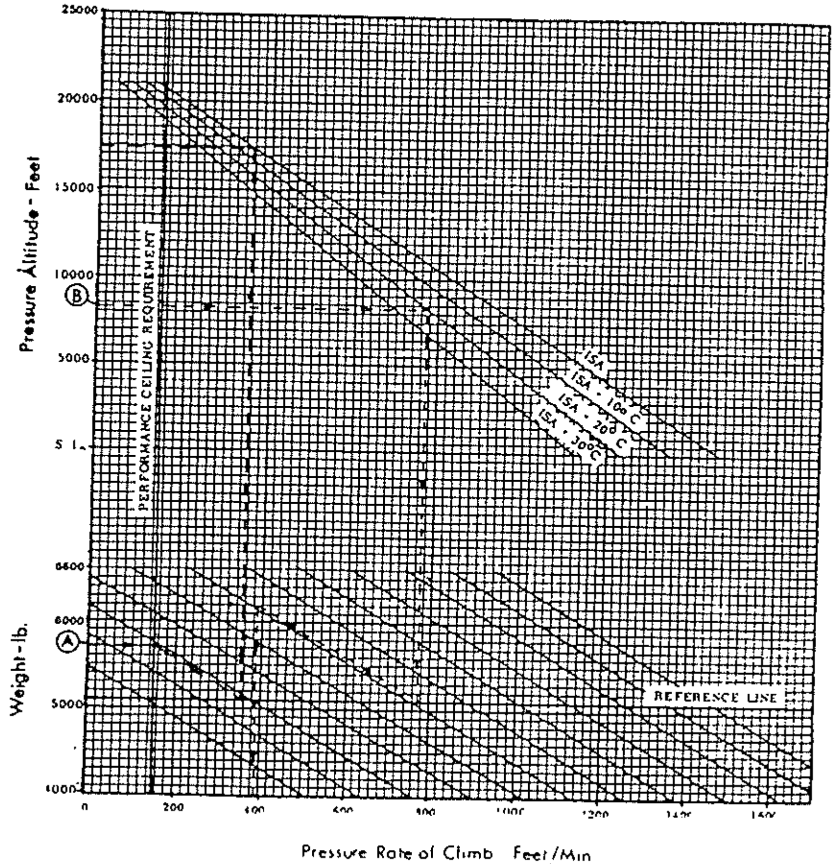
Conditions:—
Dry tarmac runway
(For operations from dry grass runways with freshly cut grass and firm subsoil, the distance for a dry tarmac runway should be increased by 10%)

Technique:—
Aircraft rotated at V_r minus 4 knots and climbed through 50 ft. at V_r (see fig 6.2)

Example: Temperature: ISA
Weight: 6,000 lb.
Altitude: Sea Level
Headwind: 5 knots
Take-off distance to 50 ft. : 965 ft.

Fig. 6.4 Take-off distance over 50 foot obstacle at various weights, altitudes, temperatures and winds

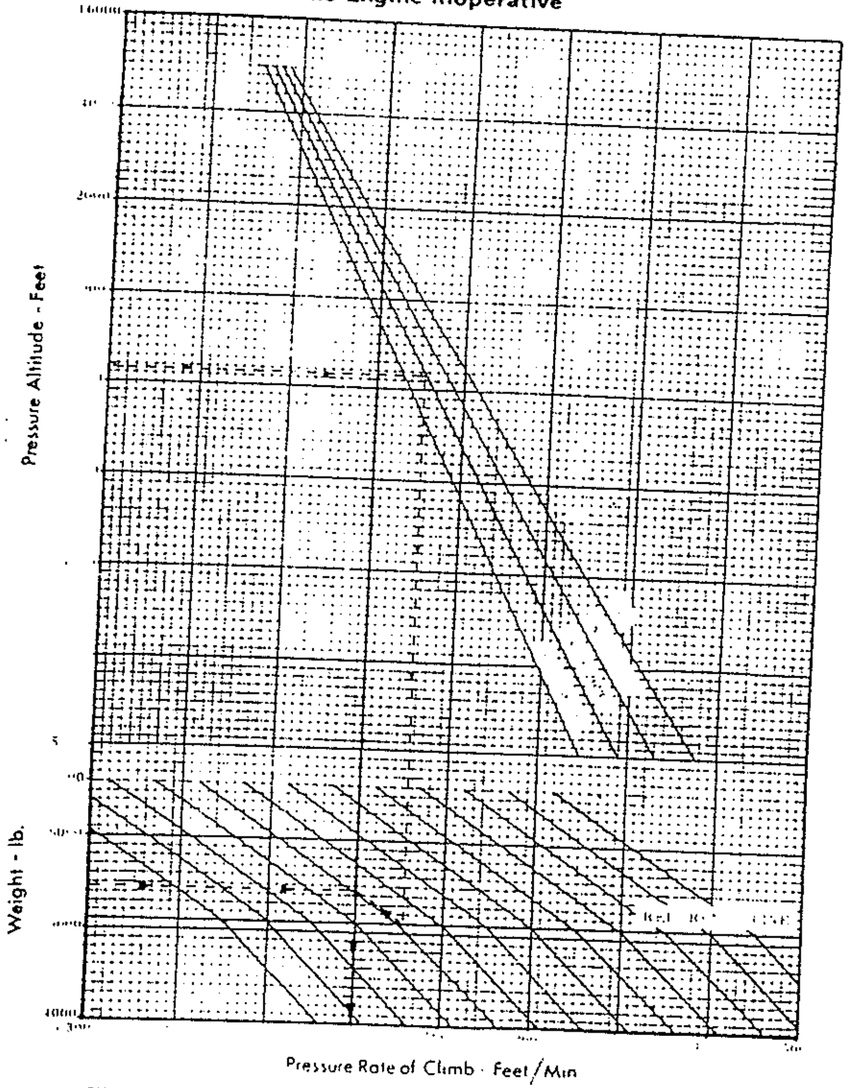
...iling and Rate of Climb - Both Engines Operating



CLIMB SPEED 75 MPH IAS (65 KNOTS)
EXAMPLE (A)
WEIGHT: 5700 LB
TEMPERATURE: ISA
PERFORMANCE CEILING 17400 FT
EXAMPLE (B):
ALTITUDE 8300 FT
TEMPERATURE ISA + 20 DEG C
WEIGHT 6200 LB
RATE OF CLIMB 390 FT/MIN

Fig. 6.5 Multi-engine rate of climb.

Rate of Climb - One Engine Inoperative



EXAMPLE

CLIMB SPEED 75 MPH IAS (65 KNOTS)

ALTITUDE: 8300 FT
TEMPERATURE: ISA +20 DEG C
WEIGHT: 5450 LB
SINGLE ENGINE PRESSURE RATE OF CLIMB: ZERO

Fig. 6.6 Single engine rate of climb

Cruise

The cruising speed of the Islander is determined by many factors including trim setting altitude, temperature, load and equipment installed on the aircraft

The normal recommended economy cruising power setting of the Islander is 59% power at 10,000 feet which gives 150 MPH TAS. Best power setting is obtained under standard conditions at 2200 RPM and 19.5 inches manifold pressure. This gives a total fuel consumption of about 23 U.S Gallons per hour

2,400 RPM is recommended for maximum cruise performance and lower RPM's down to 1,800 for more economical cruising conditions Ordinarily an RPM setting should be selected which will give maximum smoothness To avoid undesirable stresses on the propellers and a possibility of detonation in the engine, no manifold pressure settings of over 25 inches should be used for an RPM of less than 2,000.

Use of the mixture control in cruising flight reduces fuel consumption by at least 10% according to altitude. The engine runs very rich at the full rich mixture setting and leaning is essential to achieve satisfactory economy of operation.

To lean, pull back the mixture controls to the farthest aft point at which a rapid forward movement of the control does not produce a momentary surge in RPM, indicating that the mixture has been too lean for maximum power. To get optimum leaning, the control must be within ⅛ inch forward of this point, which may be established by using a thumbnail as a temporary marker, or adding a pencil reference line on the quadrant placard. If an exhaust gas analyser is fitted, the mixture should be leaned to between 50 and 100°F. of the rich side of the peak temperature. Leaning is only permitted at engine powers of less than 75%.

The carburettor air heater on the Islander is of extremely high capacity, and is designed to provide enough heat to remove carburettor icing and related induction system phenomena under the most severe conditions. A heat rise of approximately 100°F can be obtained with the application of full heat. This creates a power loss of about 10% with very little indication on the Manifold Pressure gauge, which has a maximum drop of about 1.3 inches Manifold Pressure. The power loss will show up in the performance of the aircraft, and should be held to a minimum by applying only that amount of heat required to keep the carburettor or induction system free of ice.

POWER	DENSITY ALTITUDE	2,700 RPM	2,600 RPM	2,500 RPM	2,400 RPM	2,300 RPM	2,200 RPM	2,100 RPM	2,000 RPM	IAS MPH	TAS MPH	TAS KTS	Fuel Consumption Gal/hr Imp (US) Rich	Fuel Consumption Gal/hr Imp (US) Lean
		STANDARD DAY CONDITIONS — MANIFOLD PRESSURE—INCHES OF MERCURY												
75 per cent. (195 BHP per engine)	8,000	20½		—						146	161	140	27 (32½)	24 (29)
	6,000	21¼	21¾	22¼	23				—	149	159	138	28 (33½)	24 (29)
	4,000	21¾	22¼	22¾	23½	24½	—		—	151	157	137	29 (35)	Not
	2,000	22¼	22¾	23¼	24	24¾	25¾		-	153	154	134	30 (36)	below
	SEA LEVEL	22¾	23¼	23¾	24½	25¼	26½	-	—	154	151	131	31 (37)	5,000 ft
67 per cent. (175 BHP per engine)	10,000	18¾	19	19½	-	—			—	139	159	138	23 (27½)	21 (25)
	8,000	19¼	19½	20	20½	21¼	—		—	141	157	136	24 (29)	21 (25)
	6,000	19¾	20	20½	21	21¾	22¾	-	-	144	154	134	24 (29)	21 (25)
	4,000	20¼	20½	21	21½	22¼	23¼	24¼	-	146	152	132	25 (30)	21 (25)
	2,000	20¾	21	21½	22	22¾	23¾	24¾	-	149	150	130	26 (31)	21 (25)
	SEA LEVEL	21¼	21½	22	22½	23¼	24¼	25¼	—	151	148	129	27 (32½)	21 (25)
59 per cent. (152.5 BHP per engine)	14,000	16	16½	—	—	—	—	—	—	126	154	134	19 (23)	19 (23)
	12,000	16½	16¾	17	17½	—	—		-	128	152	133	20 (24)	19 (23)
	10,000	17	17¼	17½	18	18¾	19½			130	150	131	20½ (24½)	19 (23)
	8,000	17½	17¾	18	18½	19¼	20	20¾		134	149	130	21 (25)	19 (23)
	6,000	18	18¼	18½	19	19¾	20½	21½	22¼	137	147	128	21 (25)	19 (23)
	4,000	18½	18¾	19	19½	20¼	21	21¾	22¾	139	145	126	21½ (26)	19 (23)
	2,000	19	19¼	19½	20	20¾	21½	22¼	23¼	141	143	124	22 (26½)	19 (23)
	SEA LEVEL	19½	19¾	20	20½	21¼	22	22¾	23¾	143	141	122	23 (27½)	19 (23)

OPTIMUM RPM—2,400 at 75 per cent.
2,200 at 67 per cent.
2,000 at 59 per cent

Lean mixture consumptions calculated for S.F.C.'s 0.43—0.45
S.F.C.'s of 0.40—0.42 have been achieved in normal operation

Fig. 6.7 Cruise power fuel consumption data

SEA LEVEL PERFORMANCE

To find Actual Horse Power from Altitude, RPM, Manifold Pressure and Air Inlet Temperature.

1. Locate **A** on full throttle altitude curve for given RPM manifold pressure.
2. Locate **B** on sea level curve for RPM and manifold pressure and transfer to **C**.
3. Connect **A** and **C** by straight line and read horsepower at given altitude **D**.
4. Modify horsepower at **D** for variation of air inlet temperature **T** from standard altitude temperature T_S by formula:

$$\text{H.P at } D \times \sqrt{\frac{460 - T_S}{460 - T}} = \text{Actual H.P}$$

Approximately 1 per cent. correction for 10 deg F variation from T_S.

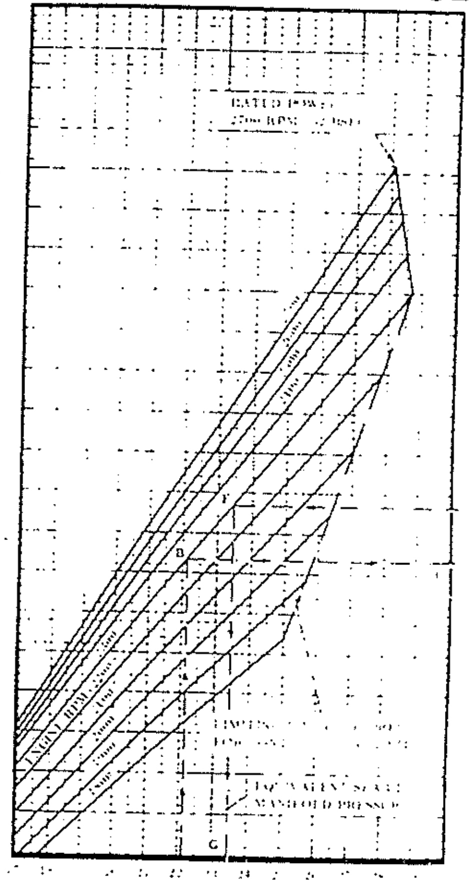
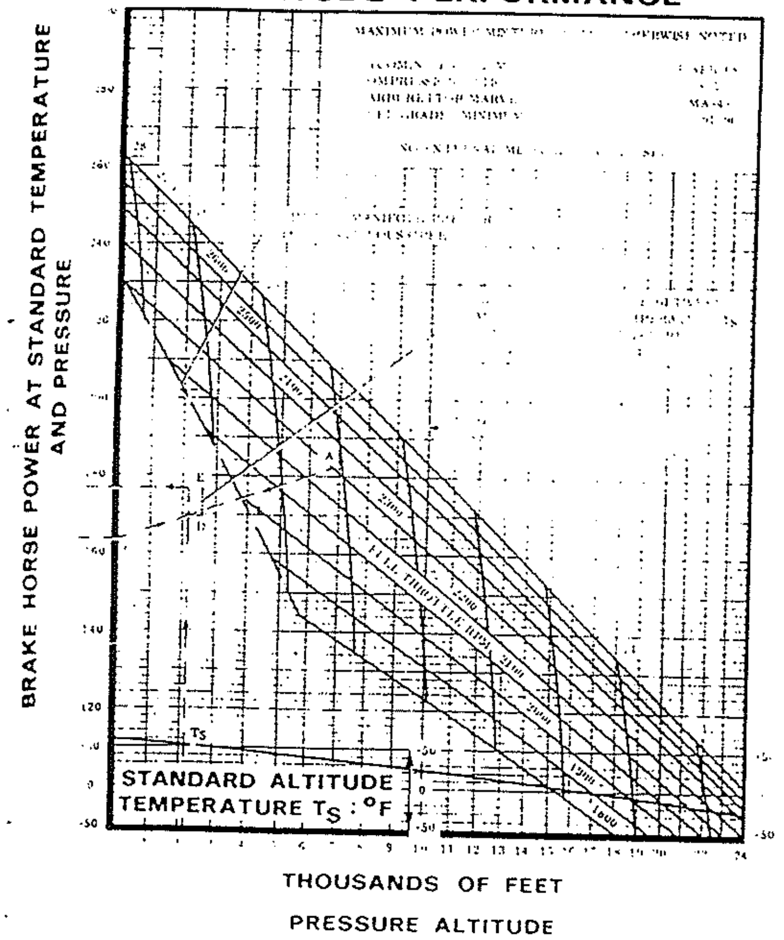
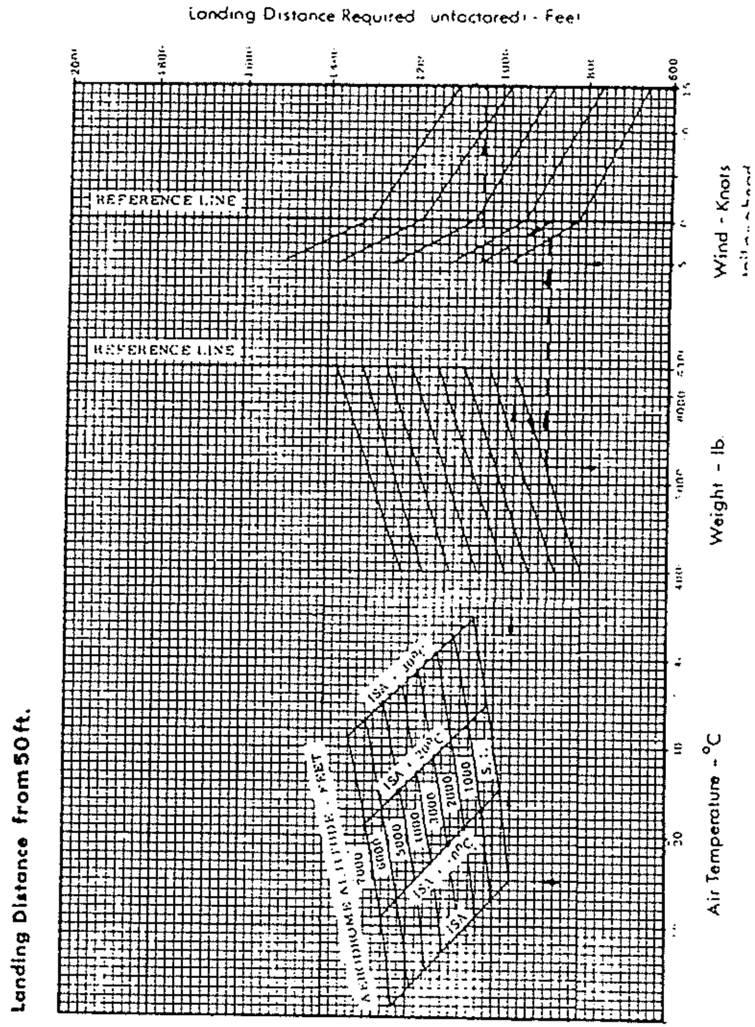


Fig. 6.8 Power chart Lycoming O-540 engine

ALTITUDE PERFORMANCE



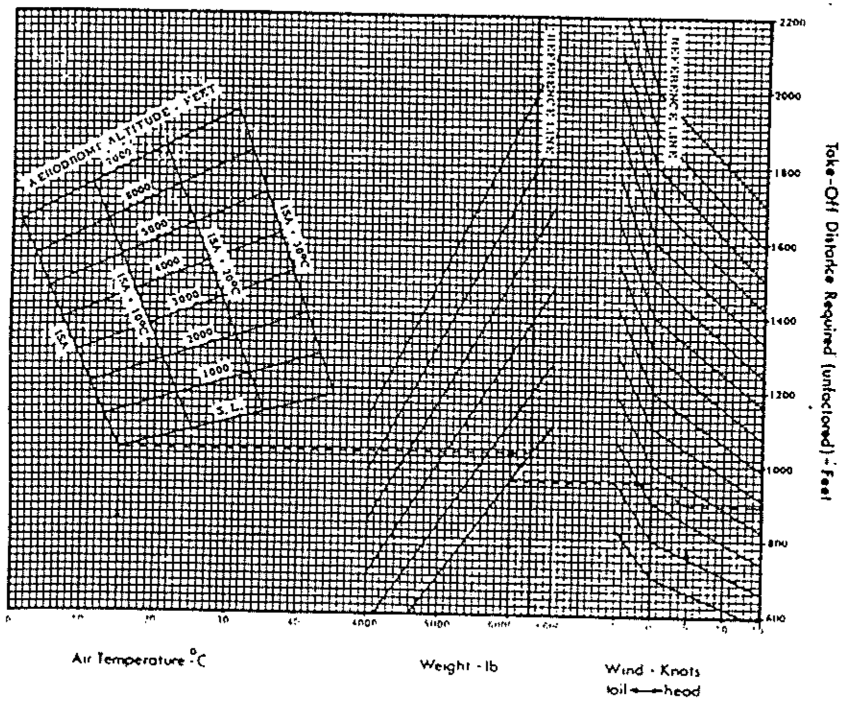


NOTE: Landing roll approximately 47% of landing distance from 50 ft

Conditions :— Dry tarmac runway (For operations from dry grass runways with freshly cut grass and firm subsoil, the distance for dry tarmac should be increased by 10%)	Technique	Approach at appropriate threshold speed. (See Fig Maximum wheel braking applied immediately after touchdown	
	Example	Temperature ISA Weight 5,200 lb Altitude Sea level Tailwind 5 knots	Landing distance from 50 ft : 1,045 ft

Fig. 6.9 Landing distance required (over 50 ft. obsta

Take-Off Distance to 50ft.



NOTE. Take-off roll approximately 51% of take-off distance to 50 ft.

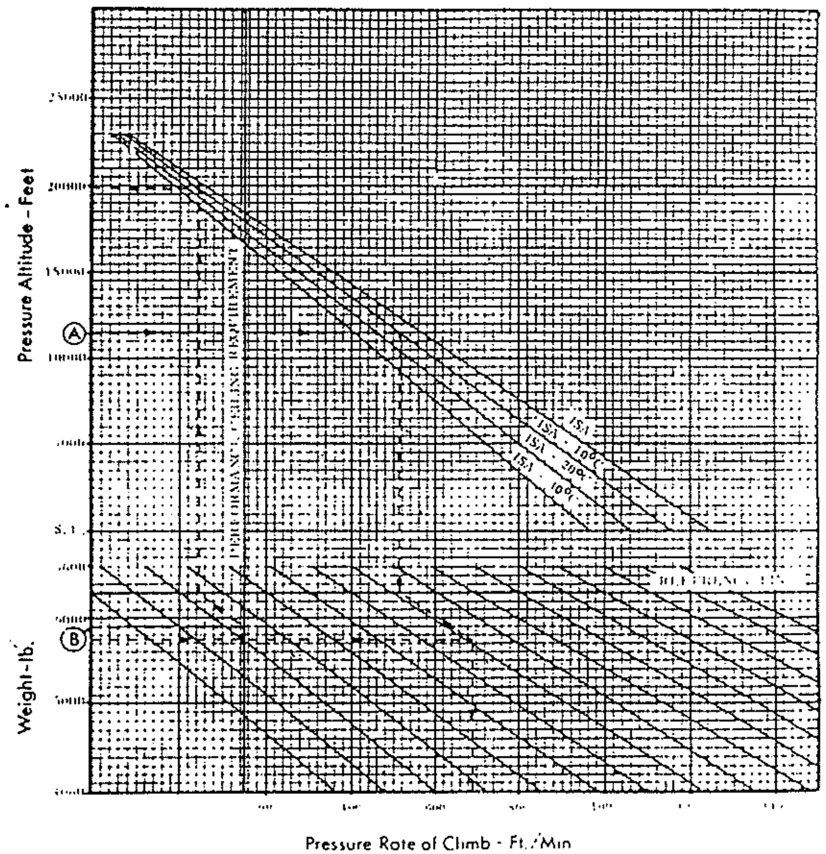
Conditions:—
Dry tarmac runway
(For operations from dry grass runways with freshly cut grass and firm subsoil, the distance for a dry tarmac runway should be increased by 10%)

Technique:—
Aircraft rotated at V_r minus 4 knots and climbed through 50 ft. at V_r (See fig. 6.8)

Example: Temperature: ISA
Weight: 5,000 lb.
Altitude: Sea Level
Headwind 5 knots
} Take-off distance to 50 ft.: 745 ft

Fig. 6.10 Take-off distance over 50 foot obstacle at various weights, altitudes, temperatures and winds

Ceiling and Rate of Climb - Both Engines Operating



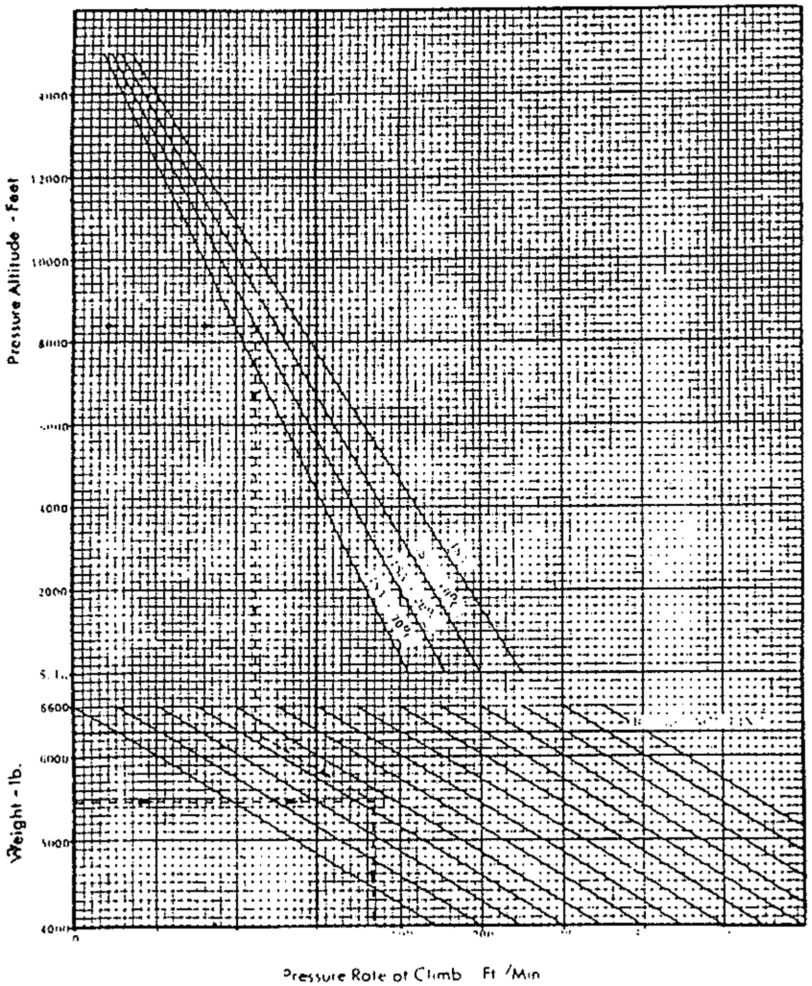
CLIMB SPEED: 75 MPH IAS (65 KNOTS)

EXAMPLE A:
ALTITUDE: 11400 FT
TEMPERATURE: ISA + 10 DEG C
WEIGHT: 5740 LB
RATE OF CLIMB: 690 FT/MIN

EXAMPLE B:
WEIGHT: 5900 LB
PERFORMANCE CEILING: 19800 FT
TEMPERATURE: ISA + 10 DEG C

Fig. 6.11 Multi-engine rate of climb

Rate of Climb One Engine Inoperative



CLIMB SPEED 75 MPH IAS (65 KNOTS)

EXAMPLE.
ALTITUDE 8400 FT
TEMPERATURE: ISA 20 DEG C
WEIGHT: 5450 LB
SINGLE ENGINE RATE OF CLIMB: 66 FT/MIN

Fig. 6.12 Single engine rate of climb

Cruise

The cruising speed of the Islander is determined by many factors including trim setting, altitude, temperature, load and equipment installed on the aircraft.

140kt.

The normal recommended economy cruising power setting of the Islander is 59% power at 10,000 feet which gives 160 MPH TAS. This power setting under standard conditions is 2,200 RPM and 20.75 inches of manifold pressure at 10,000 feet. This gives a total fuel consumption of about 26½ U.S. Gallons per hour.

100Lts.

2,400 RPM is recommended for maximum cruise performance and lower RPM's down to 1,800 for more economical cruising conditions. It should be noted that due to propeller stresses below 2,200 RPM the manifold pressure should not exceed 23 inches Hg. Ordinarily an RPM setting should be selected which would give maximum smoothness.

Use of the mixture control in cruising flight reduces fuel consumption by at least 10% according to altitude. The engine runs very rich at the full rich mixture setting and leaning is essential to achieve satisfactory economy of operation.

The following recommendations for manual mixture leaning control procedure are taken from the Avco Lycoming Manual Part No. 60297/10:

Improper fuel/air mixture during flight is responsible for many engine problems particularly during take-off and climb power settings. The procedure prescribed in this handbook provides proper fuel/air mixture when leaning the IO-540 engine; they have proven to be both economical and practical by eliminating excessive fuel consumption and reducing damaged parts replacement. It is therefore recommended that all operators utilise the instructions in this handbook any time the fuel/air mixture is adjusted during flight.

Manual leaning may be monitored by exhaust gas temperature indication, fuel flow indication and by observation of engine speed and m 'old pressure.

Leaning Precautions

Never exceed the maximum red line cylinder head temperature limit.

For continuous operation cylinder head temperatures should be maintained below 435°F. (224°C.).

Maintain the mixture control in "Full Rich" position for rated take-off, rated maximum continuous, climb and cruise powers above 75%. However, during take-off from high elevation airports or during climb, roughness or loss of power may result from over-richness. In such a case, adjust mixture control only enough to obtain smooth operation—not for economy. Observe instruments for temperature rise. Rough operation due to over-rich fuel/air mixture is most likely to be encountered at altitudes above 5,000 feet.

Always enrich mixture before increasing power.

1 Equipped with Exhaust Gas Temperature Gauge.

(*a*) *Above 75% power*—Never lean beyond 150°F on rich side of peak EGT and monitor cylinder head temperatures.

(*b*) *75% power and below*—Operate at peak EGT or, if not achievable, 50°F on rich side of peak EGT.

2 Equipped with Fuel Flowmeter

Lean in accordance with power/fuel flow curve on Fig. 6.7.

3 Leaning with Manual Mixture Control (at 75% power or less without flowmeter or EGT gauge).

(*a*) Slowly move mixture control from "Full Rich" position toward lean position.

(*b*) Continue leaning until slight loss of power is noted. Loss of power may or may not be accompanied by roughness.

(*c*) Enrich until engine runs smoothly and power is regained.

POWER	DENSITY ALTITUDE	STANDARD DAY CONDITIONS — MANIFOLD PRESSURE—INCHES OF MERCURY 2700 RPM	2600 RPM	2500 RPM	2400 RPM	2300 RPM	2200 RPM	2100 RPM	IAS MPH	TAS MPH	TAS KNOTS	Fuel Consumption (Gal/hr) per engine — Rich IMP	Rich US	Engine Speed	Lean IMP	Lean US
75 per cent (225 BHP per engine)	8,000	21¼	—	—	—	—	—	—	155	168	146	15·80	18·90	2,700	13·60	16·30
	6,000	22	22¾	23¼	24¼	—	—	—	159	169	147	15·40	18·50	2,600	13·40	16·10
	4,000	22½	23¼	23¾	24¾	25½	—	—	161	166	144	15·20	18·25	2,500	13·20	15·80
	2,000	23	23¾	24¼	25¼	26	—	—	163	163	142	15·00	18·00	2,400	13·00	15·60
	SEA LEVEL	23½	24¼	26	25¾	26½	—	—	165	161	140	14·80	17·75	2,300	12·80	15·30
67 per cent. (201 BHP per engine)	10,000	19¼	20	20½	—	—	—	—	149	168	146	14·80	17·70	2,700	12·70	15·20
	8,000	19¾	20½	21	21¾	22¼	—	—	153	167	145	14·40	17·30	2,600	12·50	15·00
	6,000	20¼	21	21½	22¼	22¾	—	—	154	164	142	14·20	17·00	2,500	12·30	14·70
	4,000	20¾	21½	22	22¾	23¼	—	—	156	162	141	13·90	16·70	2,400	12·00	14·40
	2,000	21¼	22	22½	23¼	23¾	—	—	158	159	138	13·70	16·40	2,300	11·80	14·20
	SEA LEVEL	21¾	22½	23	23¾	24¼	—	—	161	157	136					
59 per cent. (177 BHP per engine)	14,000	16¾	17	—	—	—	—	—	137	163	141	13·35	16·00	2,700	11·40	13·70
	12,000	17¼	17½	18	18¾	—	—	—	140	162	140	13·00	15·60	2,600	11·20	13·40
	10,000	17¾	18	18½	19¼	19¾	20½	—	142	160	139	12·80	15·30	2,500	10·90	13·10
	8,000	18¼	18½	19	19¾	20¼	21	21¾	145	158	137	12·50	15·00	2,400	10·70	12·80
	6,000	18½	19	19½	20¼	20¾	21½	22¼	147	156	135	12·25	14·70	2,300	10·40	12·50
	4,000	19	19½	20	20¾	21¼	22	22¾	148	153	133	12·00	14·40	2,200	10·20	12·20
	2,000	19½	20	20½	21¼	21¾	22¼	--	150	151	131	11·70	14·00	2,100	10·00	12·00
	SEA LEVEL	20	20½	21	21¾	22¼	23	--	153	149	129					

Below 2,200 rpm the Manifold Pressure must not exceed 23 in Hg.

Fig. 6.13 Cruise power fuel consumption data

EFFECT OF FUEL/AIR RATIO AT CONSTANT RPM CRUISE RANGE OPERATION

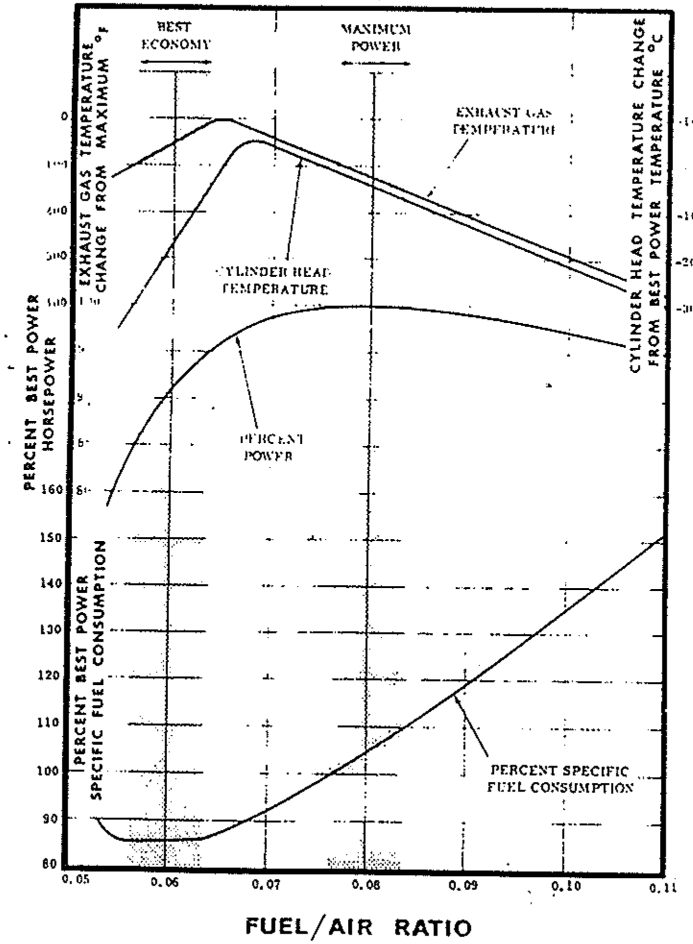


Fig. 6.14 Effect of Fuel/Air Ratio

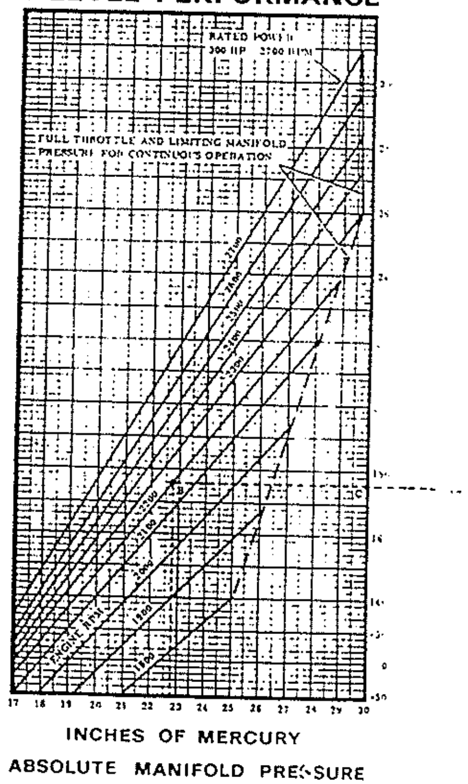
SEA LEVEL PERFORMANCE

To find Actual Horse Power from Altitude, RPM, Manifold Pressure and Air Inlet Temperature.

1. Locate A on full throttle altitude curve for given RPM manifold pressure.
2. Locate B on sea level curve for RPM and manifold pressure and transfer to C.
3. Connect A and C by straight line and read horsepower at given altitude D.
4. Modify horsepower at D for variation of air inlet temperature T from standard altitude temperature T_S by formula:

$$\text{H.P. at D} \times \sqrt{\frac{460+T_S}{460+T}} = \text{Actual H.P.}$$

Approximately 1 per cent. correction for 10 deg F variation from T_S.



ALTITUDE PERFORMANCE - ZERO RAM

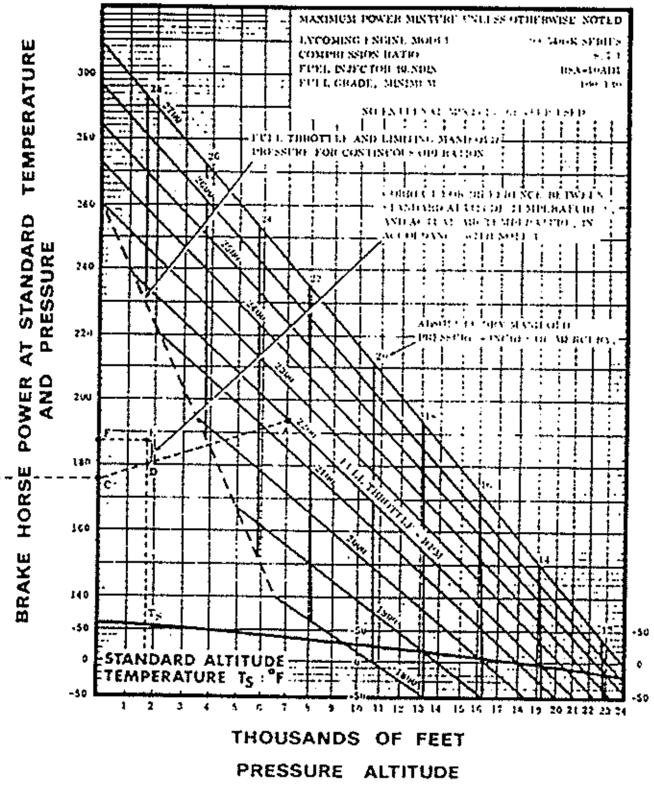


Fig. 6.15 Power chart Lycoming IO-540 engine

PART THROTTLE FUEL CONSUMPTION

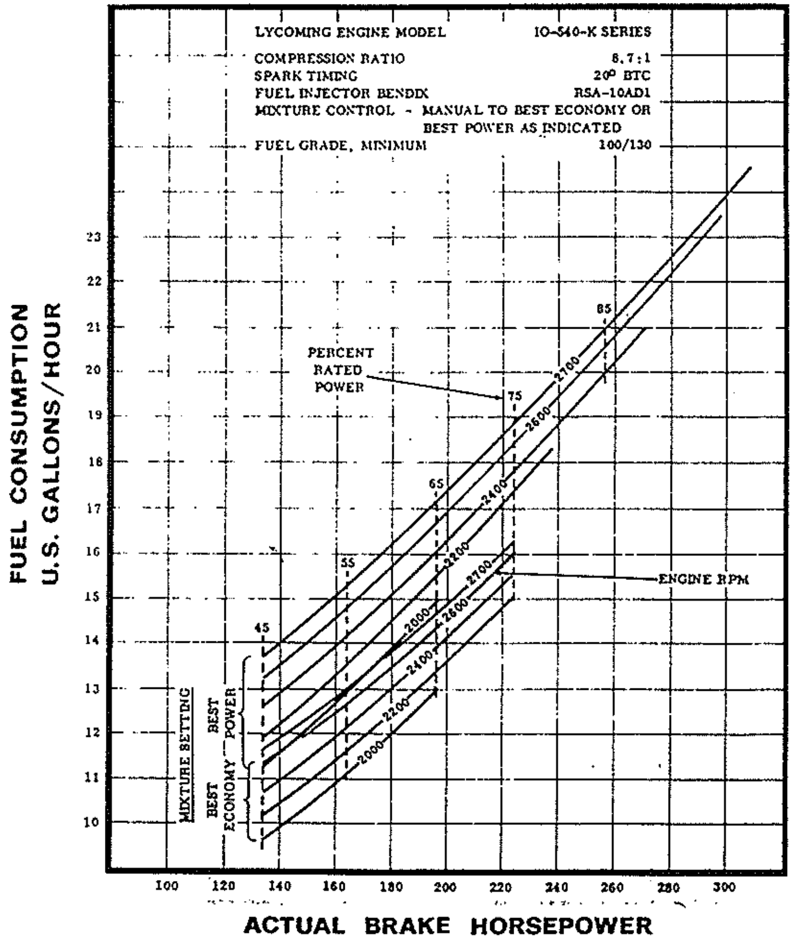
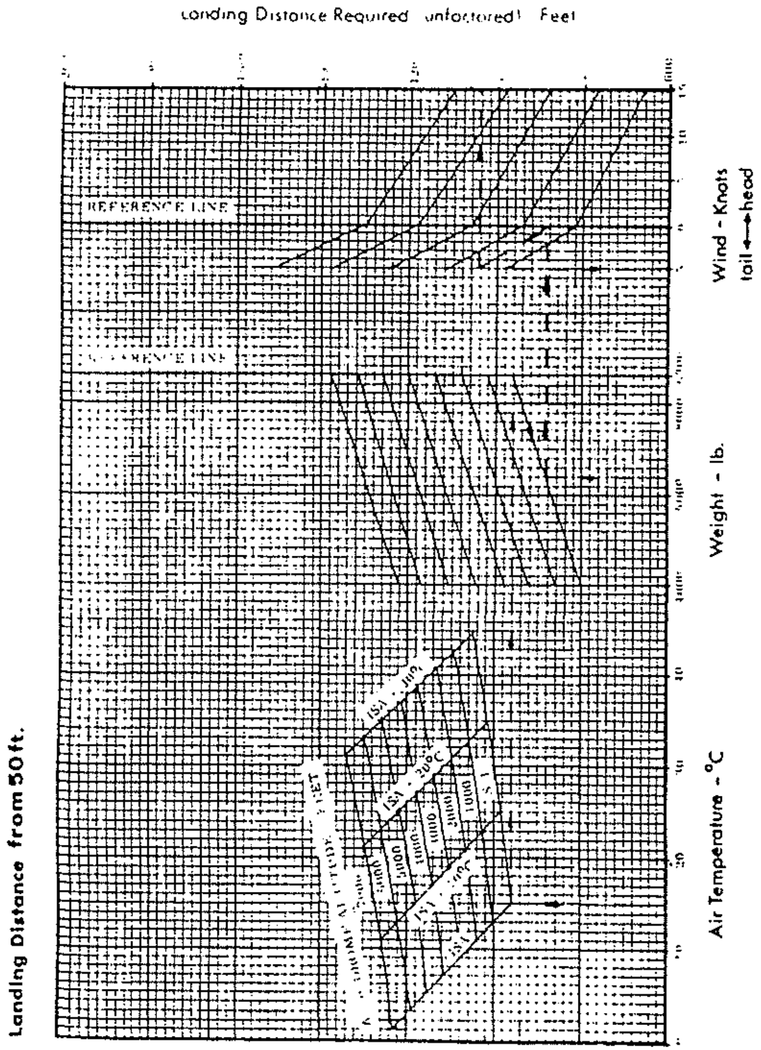


Fig. 6.16 Part Throttle Fuel Consumption



NOTE: Landing roll approximately 47% of landing distance from 50 ft.

Conditions :—
Dry tarmac runway
(For operations from dry grass runways with freshly cut grass and firm subsoil the distance for dry tarmac should be increased by 10%

Technique: Approach at appropriate threshold speed.(See Fig. 6 10 Maximum wheel braking applied immediately after touchdown.

Example: Temperature ISA
Weight 5,200 lb
Altitude Sea level
Tailwind 5 kts

Landing distance from 50 ft 1 045 ft.

• Fig. 6. 17 Landing distance required (over 50 ft. obstacle)

SECTION 7

GENERAL MAINTENANCE

7

Full information on the maintenance of the Islander is given in the Islander's Maintenance Manual. Details of progressive maintenance checks are given in the Islander Maintenance Schedule.

The following details are given for general information and guidance.

Tyre inflation

For maximum service from the tyres, keep the Islander main wheels inflated to 35 p.s.i. and the nose tyre to 29 p.s.i. All Islander wheels and tyres are balanced before original installation. Out-of-balance wheels can cause vibration in the landing gear during take-off and landing periods. After fitting new tyres, it may be necessary to rebalance the wheels with the tyres mounted.

Battery

Access to the 24-volt, 17 ampere or 25 ampere battery is obtained by removing the nose electronics bay access panel. The battery should be checked regularly for proper fluid level.

If the battery is not up to proper charge, recharge starting with a charging rate of 4 amps and finishing with 2 amps. Quick charges are not recommended.

Brake Service

The brake system is filled with DTD-585 or alternative mineral-based oil hydraulic brake fluid. This should be checked at every 100 hours inspection and replenished when necessary. Do not use vegetable based (blue) fluid when refilling the system. When it is necessary to add fluid, the procedure laid down in the Maintenance Manual should be followed. No adjustment to brake clearances is necessary on the Islander brakes. If after extended service, braking action requires too much movement of the toe pedal, new brake pads can easily be installed - see Maintenance Manual.

Landing Gear Service

In jacking up the Islander for landing gear and other service, you need two hydraulic jacks (min. height, 60"; max. height, 82") and a tail support trestle manufactured locally to drawings provided by Britten-Norman. The jacks are placed under the jack pads on the front wing spar and the tail support attached to the tail bumper. The right and left landing gear units of the Islander are completely interchangeable. The oleo unit on the nose wheel contains many parts which are interchangeable with the oleo parts on the main gears.

The operation of the landing gear oleos is standard for the air-oil type; hydraulic fluid passing through an orifice serves as the major shock absorber while air compressed statically acts as a taxying spring. The piston tube has a total travel of about 9 inches and about 1 to 1½ inches of tube should be exposed under normal static loads.

All of the oleos are inflated through readily accessible valves on the bottom of the units to 100 p.s.i. The nosewheel is steerable through the rudder pedals. The turning arc of the nosewheel is 25 degrees in either direction.

When adjusting the steering arm stops, check that the nosewheel reaches its full travel just after the rudder hits stops, which guarantees that the rudder will be allowed to move through its full travel.

Ground Servicing

Aviation grade 91/96 minimum octane fuel can be used for the 260 h.p. Islander, although 100L is considered normal grade for both aircraft. The use of lower grades of fuel can cause serious engine damage in a very short period of time, and is considered of such importance that the engine warranty is invalidated by such use

The oil capacity of both engines is 12 quarts. It is recommended that the engine oil be changed every 50 flying hours, sooner under unfavourable conditions. The minimum safe quantity of oil required is 3 quarts. The following grades are required for the specified temperatures:

Temperatures above 60°F	S.A.E. 40 or 50
30°F to 90°F	S.A.E. 40
0°F to 70° F	S.A.E. 30, 40 or 20W-30
Below 10°F	S.A.E. 20 or 20W-30

Figure 7.1. shows details of all ground servicing points.

Care of Air Filter

The carburettor or intake air filters must be cleaned at least once every fifty hours and, depending on the type of condition existing, it may be necessary to clean the filters daily or every five hours. Extra filters are inexpensive and should be kept on hand and used for rapid replacement.

The following cleaning procedure is recommended by the manufacturers of the filter.

1. Remove filter, inspect, and clean by tapping it against a hard surface to remove grit, sand and dirt. (Do not blow out with an air hose, soak in oil, or cleaning fluid)
2. If the filter is found to be in good condition and is not obstructed after being properly cleaned, reinstall filter.

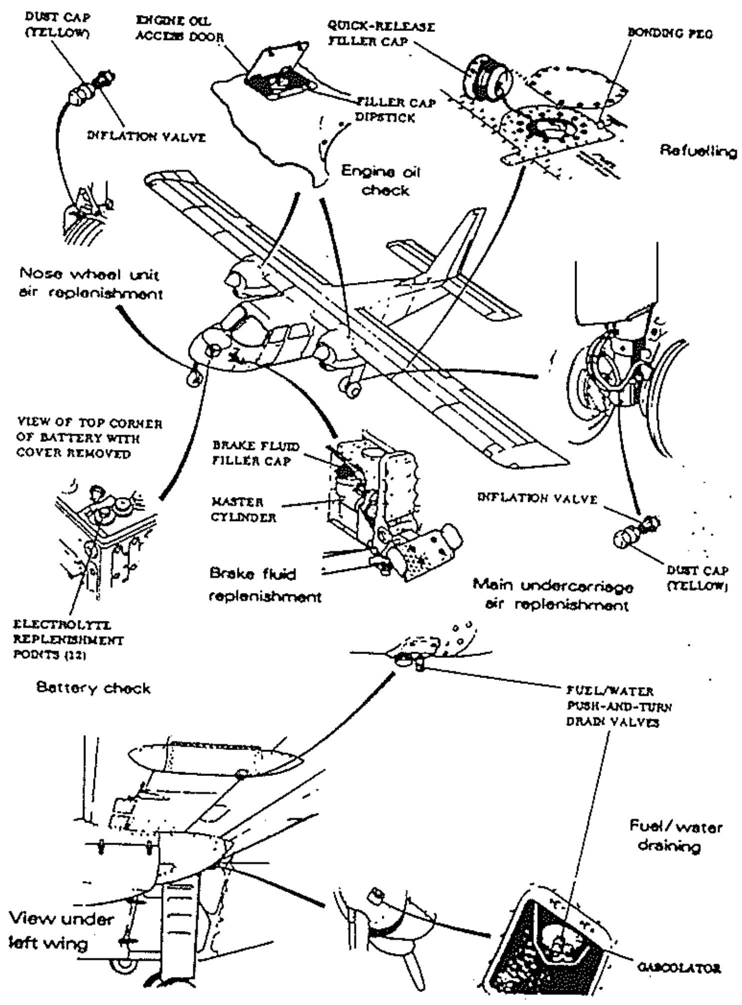


Fig. 7.1. Ground Servicing

Care of Windshields and Windows

The plastic windshield and windows should be cleaned with an aircraft windshield cleaner. Apply the cleaner sparingly with a soft cloth and rub with moderate pressure until all dirt, oil scum and stains are removed. Allow the cleaner to dry, then wipe it off with a soft cloth.

If a windshield cleaner is not available, the plastic can be cleaned with a soft cloth and Stoddard solvent to remove oil and grease.

Note: *Never use Gasoline, benzine, alcohol, acetone, Carbon Tetrachloride, Fire Extinguisher or De-Ice Fluid*

These cleaners may damage the plastic.

Follow by careful washing with a mild detergent and plenty of water. Rinse thoroughly, then dry with a clean moist shammy. Do not rub the plastic with a dry cloth as this builds up an electrostatic charge which attracts dust. Waxing with a good commercial wax will finish the cleaning job. A thin even coat of wax, polished up by hand with clean, soft flannel cloth, will fill in minor scratches and help to prevent further scratching.

Painted Surfaces

The painted exterior surfaces of your Islander have a durable long lasting finish which when cured completely, requires no special care other than periodic washing to remove dirt, and occasional waxing to preserve the bright lustre. Approximately 90 days is required for the paint to cure completely. In the event that polishing or buffing is required during the curing period, it is recommended that the work be done by someone experienced in handling uncured paint.

Wash the aeroplane with water and mild soap and follow by rinsing with water, drying with cloths or shammy. Harsh or abrasive soaps or detergents which cause corrosion or make scratches should never be used. Remove stubborn oil and grease with a cloth moistened with Stoddard solvent.

Once the finish has cured completely, it may be waxed with a good automotive wax. A heavier coating of wax on the leading edges on the wings and tail and on the engine nose cap and spinner will help reduce abrasion in these areas.

Propeller Care

Inspect propeller blades for nicks and wipe occasionally with an oily cloth to clean off grass and mud stains. It is vital that small nicks in the propeller, particularly near the tips and along the leading edges are dressed out as soon as possible, as these nicks produce stress

concentrations and, if ignored, may result in cracks. Never use an alkaline cleaner on the blades, remove grease and dirt with carbon tetrachloride or Stoddard solvent.

Interior Care

To remove dust and loose dirt from the upholstery and fabric carpet, clean the interior regularly with a vacuum cleaner.

Mop up any spilt liquid promptly with tissue or rags. Continue blotting until no more liquid is taken up. Clean off sticky material with a blunt knife and spot clean the area.

Stains may be cleaned with household spot removers used sparingly. Before using any solvent, read instructions on the container and test it on an obscure place on the fabric to be cleaned. Never saturate the fabric, as it may damage the padding and backing material

Soiled upholstery, carpet and fabric may be cleaned with foam type detergent according to the manufacturer's instructions. To minimise wetting the fabric, keep the foam as dry as possible and remove it with a vacuum cleaner.

The plastic trim headliner, instrument panel and control knobs need only be wiped over with a damp cloth. Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with Stoddard solvent. Volatile solvents which are mentioned in paragraphs on care of the windshield must never be used since they soften and graze the fabric.

De-Icer Boot care

If your aircraft is fitted with De-Icer Boots, the following notes should be borne in mind.

De-icer boots have a special dirt free conductive coating to lead off static charges which cause radio interference and may perforate the boots. Fuelling and other servicing operations should be done carefully to avoid damaging the conductive coat or tearing the boots.

Keep the boots clean and free from oil and grease which swell the rubber. Wash the boots with mild soap and water, using Benzol or unleaded gasoline if necessary to remove stubborn grease. Do not scrub the boots and be sure to wipe off all solvent before it dries.

Small tears and abrasions can be repaired temporarily without removing the boots and the conductive coating can be renewed.

Serial Number Plate

The serial number plate on the Islander is located at the top of the pilot's door frame aperture. The serial number of the aeroplane should always be used in referring to the aeroplane in service and warranty matters.

WARRANTY

Britten-Norman (Bembridge) Limited (hereinafter referred to as "the Vendor") warrants that, subject to the terms below set out, each part of the Aircraft manufactured by it will be free from defects due to defective material or defective workmanship, having regard to the state of the art at date of construction. This warranty shall remain in force for the first 500 hours of operation or for 12 months after delivery to the Purchaser (whichever shall occur first) and relates to (but only to) all such defects discovered within that period and notified to the Vendor within thirty days of discovery, provided that the Aircraft and every part thereof has been used, handled, stored, maintained and operated in accordance with sound aviation practice and the instructions issued by the Vendor. The Vendor's liability under the said warranty shall be limited to the repair or replacement (as the case may be) free of charge by the Vendor at its works of any such part found to be defective in the said respects within the warranty period, the Purchaser bearing and paying in advance all packaging, insurance an transportation charges. Any part so replaced will become the property of the Vendor.

TRANSFER OF WARRANTIES

In addition to the above warranty the Vendor will, without obligation, use its best endeavours to transfer to the Purchaser the benefits of any warranties given by the manufacturers of engines, parts, radios or accessories fitted to the Aircraft.

EXEMPTION CLAUSE

The obligations of the Vendor set out herein are given and accepted in substitution for and there is hereby excluded all other conditions or warranties, whether express or implied by statute or otherwise, on the part of the Vendor or its agents or their respective servants or agents, and save for their said obligations neither the Vendor nor its agents shall in any circumstances be liable to the Purchaser (whether in contract or in tort) for any loss or damage howsoever caused suffered by them in connection with or arising from the Aircraft as supplied by the Vendor.

INDEX

APPROVED

FLIGHT MANUAL

BN-2B-20 and -21

ISLANDER

APPROVED

For the Civil Aviation Authority
of Australia

DATE: 3 March 1989

PRINTED IN ENGLAND BY THE TECHNICAL PUBLICATIONS UNIT PILATUS BRITTEN-NORMAN LTD

Civil Aviation Authority
AUSTRALIA

APPROVED FLIGHT MANUAL

Nationality and Registration Marks	:	VH - BNX
Manufacturer	:	Pilatus Britten-Norman Ltd
Designation of Aircraft	:	BN2B-21
Aircraft Serial Number	:	2177
Certification Category or Categories	:	NORMAL

This Manual has been approved by the
Civil Aviation Authority and is
the Flight Manual referred to in
Certificate of Airworthiness number ..BNE/10682

13.7.95
Date

for the Authority

ANY PERSON FINDING THIS MANUAL SHOULD RETURN IT TO
THE NEAREST FIELD OFFICE OF THE CIVIL AVIATION AUTHORITY

Civil Aviation Authority
AUSTRALIA

AMENDMENT RECORD SHEET

Amendment Number	Description of Amendment	Pages Affected	Signature and Date of Incorporation
INITIAL ISSUE	CAA APPROVED FLIGHT MANUAL F/M47 INCLUDING GEN. AMDT. 4 (DRAFT A) MARCH 1995.		

.OTE: Amendment numbers may not always be consecutive

Amendment Record Sheets

Amendment Number	Description of Amendment	Signature and date of incorporation
Gen Amdt 1	Sections 1 through 9 amended by editorial corrections to refer to metric standards and speeds now quoted in knots only. Noise Statement included; oil grades updated; engine failure preamble and performance data amended; introduction of optional larger diameter propellers included.	
Gen Amdt 2	Manual Amended as, and where, necessary to show new title of airworthiness authority as Civil Aviation Authority of Australia. Miscellaneous editorial changes in sections 1, 2, 4, 5, 7 and 9 as shown by LOEP and marginal lines.	
Gen Amdt 3	Minor alterations to section 1, as indicated. Section 2 amended to show cross reference for optional wing tip fuel tank data. Section 3 and 4 amended to show cross reference for optional wing tip fuel tanks as necessary. Information updated in sections 4 and 6 to include revised instrumentation standard to Mod NB/M/1287 in later production aeroplanes. Section 9, List of Supplements amended to show current status of Supplements; NIGHT VFR OPERATIONS and IFR AND/OR LIMITED IFR OPERATIONS are deleted (the two supplements should be removed and destroyed). A new supplement for OPTIONAL WING TIP FUEL TANKS TO MODIFICATION NB/M/1153 is added.	
Gen Amdt 4	Page effectivity system introduced to deal with changes to the basic build standard of the BN2B-20 series Islander. The basic build standard modifications that affect page effectivity are: NB/M/1148 - 70amp generator system NB/M/1287 - Revised instrument panels NB/M/1518 - Janaero cabin heater installation Section 1 now includes a description of the effectivity system. Section 2 includes generator load limit information and a Janaero heater altitude limit. Section 3 has been completely amended with revised and new checklist procedures. Section 4 includes a revised electrical system diagram and, if applicable, operating instructions for the NB/M/1518 standard cabin heating system. Section 9, List of Supplements amended to show current status of Supplements. The temporary fuel system supplement has been amended and re-titled. The supplement for Mod NB/M/1153 wing tip fuel tanks now includes a revised placard and additional weight and balance information.	

Note...

Amendment numbers may not always be consecutive

Gen Amt 1
Sept 1985

LIST OF CONTENTS

With the exception of two pages in Section 8 (Aeroplane Weight; and Loading System) all of the material in the above Sections has been approved by the Department of Aviation for Australia.

Section 1 - General

STATEMENT OF APPROVAL

Nationality and Registration Marks : VH-

Aeroplane Serial Number :

Manufacturer : Pilatus Britten-Norman Limited

Designation of Aeroplane : BN-2B-

Certification Category
or Categories : Normal

This Flight Manual has been approved by the Civil Aviation Authority of Australia and is the Flight Manual referred to in

Certificate of Airworthiness Number ....

Date ....
for the Authority

Any Person finding this Manual should return it to the nearest Regional Office of the Civil Aviation Authority.

Section 1- General

Log of Effective Pages

Original Issue -May 1983
Gen Amt 1 - Sept 1985
Gen Amt 2 - Feb 1989
Gen Amt 3 - Apr 1990
Gen Amt 4 - (Draft A) Mar 1995

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May 1983

Section 1 - General

PARTICULAR AMENDMENT RECORD SHEET

Amendment Number	Paragraph(s) Affected	Signature	Date of Incorporation

Incorporation of a Particular Amendment must be certified by inserting the date of incorporation and signature in the appropriate columns. All amendments must be embodied consecutively. This page will be reissued with each Particular Amendment, and the previous copies should be retained in the Flight Manual to serve as a record of amendments issued. Superseded Flight Manual pages should be removed and destroyed.

Date ....

....

for Secretary of the Department of Aviation

Introduction

General

This Flight Manual applies only to the particular aircraft identified by registration marking and serial number on the Statement of Approval Page and contains the airworthiness limitations and essential operating data for this aircraft.

Special operations requiring additional limitations and instructions are listed in the Supplements Section and this section shall be consulted before undertaking any such operations. For operating information not included in this manual reference should be made to the appropriate operations or manufacturer s manuals.

The Flight Manual shall be carried in the aircraft on all flights (unless an exemption under CAR 139 has been issued to this aircraft). It is the responsibility of the pilot in command to be familiar with the contents of this manual and to comply with all directions contained herein relating to the operation of the aircraft.

Amendments will be approved by the Authority as necessary and will take the form of replacement pages with changes to the text indicated by a vertical line in the margin together with the amendment date at the top of the page. Interim/Temporary amendments may be issued in the same manner and are to be inserted as directed. These amendments will be issued on coloured pages and will take precedence over the stated affected page. It is the owners responsibility to incorporate in this manual all such amendments and to enter the date of incorporation and his signature on the appropriate Amendment Record Sheet.

The aircraft has been certificated on the basis of the equipment fitted at the time of certification. Any changes in equipment are subject to approval by the Authority. No entries or endorsement may be made to this Flight Manual except in the manner and by persons authorized for the purpose by the Authority.

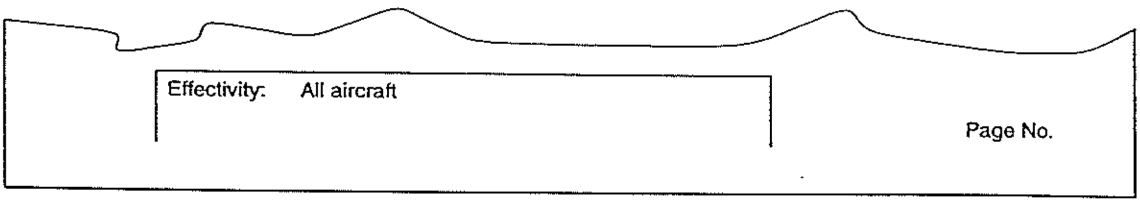
All pages previously approved under; Department of Aviation (D of A) are subsequently approved by the Authority.

A list of all Authority Approved Supplements is included in this manual. The owner/operator is authorized and required to ensure that the Australian CAA Approved Supplements applicable to this aircraft are retained and amended to the specified status.

Page Effectivity

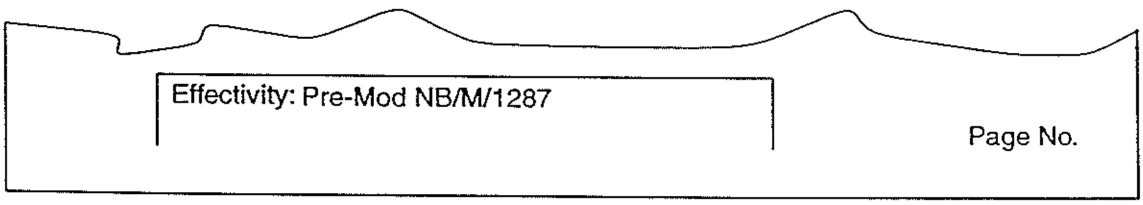
From General Amendment 4 onwards you will find an 'Effectivity' box at the bottom of each revised page. The information in the box is to be used when incorporating a new general amendment to ensure that the Flight Manual matches the build standard of the aeroplane. This system has been introduced to allow for changes in the basic build standard of BN2B Series Islanders.

Example 1



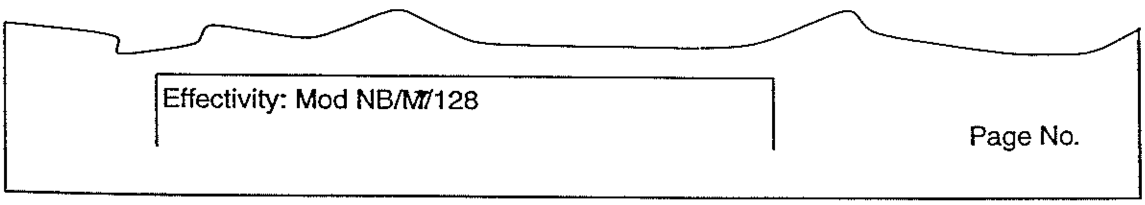
This page is effective for all Islander aircraft using this Flight Manual.

Example 2



This page is effective for aeroplanes that were built before the introduction of modification NB/M/1287.

Example 3



This page is effective for aeroplanes that were built with modification NB/M/1287 incorporated.

Definitions

The following definitions shall apply throughout this manual:

Airfield Pressure Altitude

The Airfield Pressure Altitude is that height registered at the surface of an airfield by an altimeter with the pressure sub-scale set to 1013.2 hectopascals (millibars).

I.A.S

Indicated airspeed, which is the reading obtained from an airspeed indicator having no calibration error.

Take-off Safety Speed

The Take-off Safety Speed is a speed chosen to ensure that adequate control will exist under all conditions, including turbulence and sudden and complete engine failure, during the climb after take-off.

Approach Speed

The Approach Speed is a speed chosen to ensure that adequate control will exist under al conditions, including turbulence, to carry out a normal flare and touchdown

Normal Operating Limit Speed (Maximum Structural Cruising Speed)

This speed shall not normally be exceeded. Operations above the normal Operating Limit Speed shall be conducted with caution and only in smooth air.

Manoeuvreing Speed

Maximum for manoeuvres involving an approach to stall conditions or full applications of the primary flight controls.

Minimum Control Speed

The minimum speed at which the aeroplane is controllable with the critical engine inoperative in the take-off configuration.

Power Plant Data

Engines

Manufacturer: Avco Lycoming

Type: IO-540-K1B5

Propellers

Manufacturer	Type	Diameter	Pitch Settings
Hartzell	Basic HC-C2YK-2B/C8477-6 (or later) Optional (Sect 5 refers) HC-C2YK-2B/8477-4 (or later)	Not Under: 1981 mm Not over: 2032 mm	At 760 mm station - Low: 13.0 deg High: 78.6 deg (Feather)

Note...

(1) Minor variation to the above type numbers may sometimes occur as the result of Hartzell's product improvement.

(2) 2032 mm diameter propellers give an improved take-off performance (Sect 5 refers)

(3) The noise level of this aeroplane is in compliance with the FAR Part 36 Noise Standards, applicable to this type, at the maximum normal operating power at full throttle and in any approved configuration, when modification NB/M/1090 is incorporated (Sect 2 refers).

Fuel

Grade: 100/130 (minimum) grade aviation gasoline; 100L or 100LL Avgas

Capacity: Wing tanks: 65 US gal (246.1 litres) usable per side

(one each side) 3.5 US gal (13.2 litres) unusable per side

Effectivity: All aircraft

Oil

Specification:

First 50 hour engine life (Straight mineral oil)	UK Spec D Eng RD 2472A/0 (or B/O) latest issue US Spec MIL-L-6082
Subsequent hours (Ashless dispersant)	UK Spec D Eng RD 2450 US Spec MIL-L-22851

Ambient Air Temperature	Viscosity Grade
Above 80 F (26.6 C)	SAE 60
Above 60 F (15.5 C)	SAE 40 or 50
30 F to 90 F (-1.1 C to 32.2 C)	SAE 40
0 F to 70 F (-17.8 C to 21.1 C)	SAE 30, 40 or 20W -40
0 F to 90 F (-17.8 C to 32.2 C)	SAE 15W 50* or 20W -50*
below 10 F (-12.2 C)	SAE30 or 20W -30

* *These grades may be used at all temperatures Avco Lycoming SI1014 (latest issue) refers*

Capacity:

Each engine sump has capacity for 12 US quarts (11.35 Litres) Minimum safe oil level for each engine is 2.3 US quarts

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May 1983

Section 2 - Limitations

- Airspeed
- Weights and Loadings
- Power Plant
- Miscellaneous

Gen Amt 1
Sept 1985

Section 2 - Limitations

AIRSPEED

The Never Exceed (VNE) speed is : 184 kt IAS

The Normal Operating Limit (VMO) speed is : 141 kt IAS
This speed shall not normally be exceeded; the limitation is imposed to reduce the possibility of excessive loads on the structure being caused by unexpected gusts. If this speed is exceeded, it must be done with caution on occasions when it is the pilot's opinion that appreciable atmospheric turbulence is unlikely to be encountered.

The Design Manoeuvring (VA) speed is : 107 kt IAS
Manoeuvres likely to involve full application of the primary flight controls shall not be attempted in excess of this.

The maximum speed for flight with flaps extended 56 deg (DOWN), or VFE speed is : 88 knots IAS. With flaps extended only through 25 deg, to the T.O. position, a maximum speed not exceeding 114 knots IAS may be used.

The Minimum Control (VMC) speed is the minimum speed at which the aeroplane is controllable with the critical engine inoperative in the take-off configuration. This speed is : 40 kt IAS.

The one engine inoperative en-route best gradient of climb speed is : 65 kt IAS.

Instrument limit markings :

The following is an explanation of the markings on the airspeed indicator.

Minimum Control, or VMC (red line)	40 knots IAS
Flap Operating Range (white arc)	43-88 knots IAS
Normal Operating Range (green arc)	51-141 knots IAS
One Engine Inoperative Best Gradient of Climb (blue line)	65 knots IAS
Caution Range (yellow arc)	141-184 knots IAS
Never exceed, or VNE (red line)	184 knots IAS

Section 2 - Limitations

WEIGHTS AND LOADINGS

Weight

Maximum take-off and landing weight is :- 2994 kg

Maximum wing zero fuel weight (the maximum weight to which the aeroplane can be loaded for take-off, excluding the combined weight of usable and unusable fuel) is :- 2858 kg

Note... Unusable fuel totals 19.0 kg in aeroplanes without wing tip fuel tanks. For aeroplanes with optional wing tip fuel tanks, refer to Supplements.

Loading

Subject to balance considerations, the cabin loading limits shall be as follows:-

Maximum cabin floor loading intensity ... ... 586.00 kg/m^2

Maximum baggage floor loading intensity ... ... 586.00 kg/m^2

Total load on the baggage floor must not exceed 181 kg

The moment arm for the baggage compartment is + 3073.4 mm aft of datum and co-incident with aircraft stn 255.5.
Full particulars of loading recommendations and C.G. computation will be found in Section 8.

CENTRE OF GRAVITY

Centre of gravity datum

The c.g. datum is 20.32 mm behind the leading edge of the cambered inboard sections of the wing but coincident with leading edge at stn 134.5 (3416.3 mm)

Centre of gravity range

The aeroplane shall be so loaded that the centre of gravity always falls within the limits shown by fig. 1 overleaf.

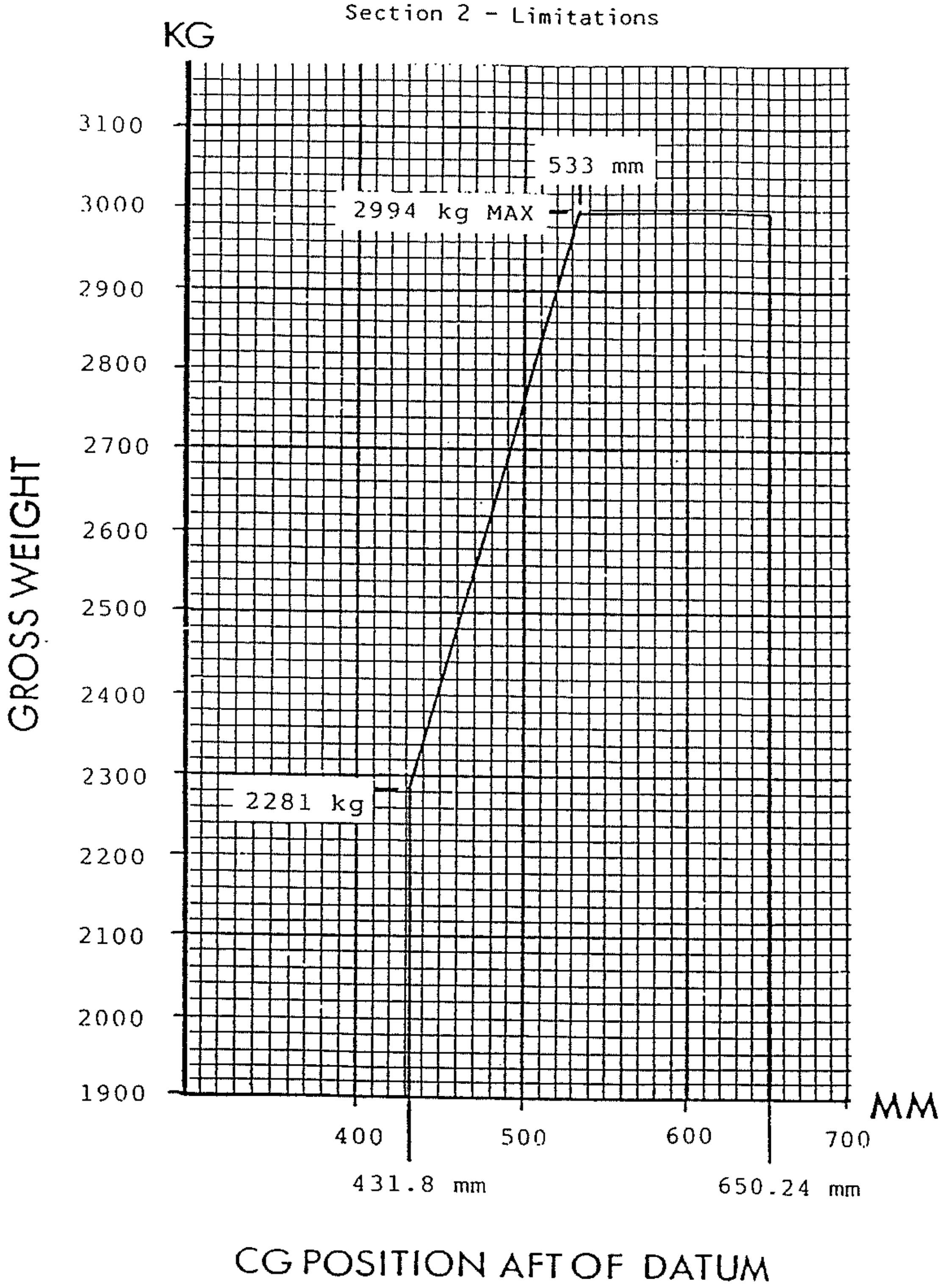

Fig 1 C.G. envelope diagram

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Section 2 - Limitations

POWER PLANT

Engine Model Avco Lycoming IO-540-K1B5

Engine Limits

(a) Maximum take-off power and maximum continuous power are identical at full throttle and 2700 rev/min.

(b) Maximum normal operating power for normal conditions is 2500 rev/min and full throttle when Mod NB/M/1090 (FAR 36 Noise Certification) is embodied.

(c) For maximum take-off, maximum continuous power, or any power greater than 75 per cent, the mixture must be fully rich as directed by the Lycoming Operator's Manual (Part No. 60297-10).

(d) At all engine speeds below 2250 rev/min the manifold pressure must not exceed 23 in Hg.

Power Plant Instruments

Engine speed:

(Pre-Modification NB/M/1090)	
Green Arc (normal operating range)	1850 - 2700 rev/min
Red Line (maximum engine rated speed)	2700 rev/min
(Post Modification NB/M/1090)	
Green Arc (normal operating range)	1850 - 2500 rev/min
Red Line (maximum engine rated speed)	2700 rev/min

Note...

Modification NB/M/1090 introduced revised engine tachometer markings to reduce the extent of the green arc as part of the compliance with FAR 36 Noise standards applicable to this type.

Cylinder head temperature:

Green Arc (normal operating range)	300 deg F - 500 deg F (149 deg C - 260 deg C)
Red Line (do not exceed)	500 deg F (260 deg C)

Section 2- Limitations

Oil Temperature:

Red Line (minimum temperature)	40 deg F (5 deg C)
Yellow Arc (cautionary operation)	40 deg F - 140 deg F (5 deg C - 60 deg C)
Green Arc (normal operating range)	140 deg F - 225 deg F (60 deg C - 107 deg C)
Yellow Arc (cautionary operation)	225 deg F - 245 deg F (107 deg C - 118 deg C)
Red Line (maximum temperature)	245 deg F (118 deg C)

Oil Pressure:

Red Line (minimum pressure)	25 lb/in^2 (172.37 kPa)
Yellow Arc (cautionary operation)	25 lb/in^2 - 60 lb/in^2 (172.37 kPa) - (413.70 kPa)
Green Arc (normal operating range)	60 lb/in^2 - 90 lb/in^2 (413.70 kPa) - (620.55 kPa)
Yellow Arc (cautionary operation)	90 lb/in^2 - 100 lb/in^2 (620.55 kPa) - (689.50 kPa)
Red Line (maximum pressure)	100 lb/in^2 (689.50 kPa)

Fuel Pressure:

Red Line (minimum pressure)	12 lb/in^2 (82.74 kPa)
Yellow Arc (cautionary operation)	12 lb/in^2 - 18 lb/in^2 (82.74 kPa) - (124.11 kPa)
Green Arc (normal operating range)	18 lb/in^2 - 40 lb/in^2 (124.11 kPa) - (275.8 kPa)
Red Line (maximum pressure)	40 lb/in^2 (275.8 kPa)

GENERATOR LOAD

The limit of generator load for an aeroplane in which one generator has failed is 50 amps

Note...

Battery charge current must be considered part of the generator load

Caution...

Should a demand in excess of the load limit be required, the battery will be progressively discharged accordingly.

MISCELLANEOUS

Flight in Icing Conditions

Flight in icing conditions is not approved unless the aeroplane incorporates the Pilatus Britten-Norman prescribed modifications and associated Supplemental inclusion in its Flight Manual.

Manoeuvres Permitted

Operations shall be limited to normal flying manoeuvres, but may include stright and steady stalls, and turns in which the angle of bank does not exceed 60 degrees. All aerobatic manoeuvres, including spins are prohibited.

Flight Crew

The minimum flight crew is one pilot. In certain circumstances when the aeroplane has been modified to accept fully individual sliding seats for pilot and adjaceent crew member, it is essential for the RH seat to be locked in the fully forward position during take-off and landing.

Maximum Number of Occupants

The maximum number of occupants to be carried including crew, shall not exceed 10 or the number of seats which are approved for use during take-off and landing, except as permitted by Civil Aviation Orders Part 20.

Smoking

Smoking is not permitted during take-off, landing, refuelling and defuelling operations.

Air Temperature

Maximum air temperature for operation is ISA +23 deg C. No minimum air temperature has been established.

Effectivity: Pre Mod NB/M/1148

Maximum Crosswind

The maximum crosswind component for take-off and landing is 30 knots.

Placards

The following placards must be displayed at the positions stated:-

Roof instrument panel - L.H side adjacent to flap position indicator

SPEED LIMITATIONS - FLAP SELECTION
TAKE-OFF - 114 KT
LANDING - 88 KT

Upper R.H side of main instrument panel

	THIS AEROPLANE MUST BE OPERATED AS A NORMAL CATEGORY AEROPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS.
★	THE EQUIPMENT INSTALLED IN THIS AEROPLANE PERMITS OPERATIONS IN VFR NIGHT CONDITIONS
★	FLIGHT IN ICING CONDITIONS NOT APPROVED
	LOSS OF ALTITUDE DURING ONE ENGINE INOPERATIVE STALL 95 FEET MAXIMUM ATTITUDE DURING STALL 20 DEG.

★**Note...**
This statement will vary according to the installations built into the aeroplane at the time of its delivery.

Flight instrument panel

DESIGN MANOEUVRE SPEED	107 KNOTS
MINIMUM CONTROL SPEED	40 KNOTS
NO AEROBATIC MANOEUVRES INCLUDING SPINS APPROVED	

On the instrument panel - below the engine instruments

BELOW 2250 RPM
MANIFOLD PRESSURE
MUST NOT EXCEED 23" HG

Roof trim panel - adjacent to fuel cock selector

USABLE FUEL (US GAL)
LEFT TANK 65 RIGHT TANK 65
FUEL REMAINING IN TANKS WHEN CONTENTS INDICATOR READS ZERO CANNOT SAFELY BE USED

Left side of flight compartment - below windscreen corner
(Deviation Card for the remote compass)

FOR COMPASS COURSE STEER BY		
	000	
	030	
	060	
	090	
	120	
	150	
	180	
	210	
	240	
	270	
	300	
	330	

Section 2- Limitations

Windscreen central pillar - L.H side

STAND-BY COMPASS	
To read this compass the following conditions must be observed 1. Switch off Port and Stbd generators 2. Do not trip any circuit breakers 3. Switch off all but the following loads	
DAY	NIGHT
PITOT & STALL WARN. HEATERS VHF NO.1 ADF ROTATING BEACON	PITOT & STALL WARN. HEATERS VHF NO.1 ADF ROTATING BEACON NAV LIGHTS PANEL LIGHTS
SEE ALSO FLIGHT MANUAL	

Windscreen central pillar

Day Steer by	For Compass Course	Night Steer by
	000	
	030	
	060	
	090	
	120	
	150	
	180	
	210	
	240	
	270	
	300	
	330	

Effectivity: All aircraft

Top each cabin door

DITCHING EXIT PULL HANDLE

Adjacent to each cabin door handle

EMERGENCY EXIT

Pilot's door at emergency lock release handle (Pre Mod 296)

EMERGENCY LOCK RELEASE - LIFT

Cabin side wall behind pilot's door aperture (Post Mod 296)

EMERGENCY LOCK RELEASE - PULL

Cabin walls above each door

EXIT

Cabin wall R.H side central

FLOOR LOADING

MAXIMUM FLOOR LOADING INTENSITY NOT GREATER THAN 586 KG/M

AREA FROM REAR OF PILOT'S SEAT TO FRONT WING SPARFRAME	454 kg MAX
AREA BETWEEN WING SPAR FRAMES	372 kg MAX
AREA FROM REAR WING SPAR FRAME TO BAGGAGECOMPARTMENT	454 kg MAX

ABOVE LOADINGS ARE SUBJECT TO WEIGHT AND CENTRE OF GRAVITY LIMITS IN THE FLIGHT MANUAL

Baggage compartment door - inside face

MAX PERMISSIBLE LOAD
181 KG. MAX
PERMISSIBLE LOAD
INTENSITY 586 kg/m²

Effectivity: All aircraft

In the event of individual sliding seats, on floor-mounted rails, being fitted in the flight compartment (under certain PBN modifications) the next placards will apply to aircraft so modified and will be fixed:-

On the instrument panel in front of the 1st pilot

RIGHT HAND SEAT MUST BE IN FORWARD POSITION FOR TAKE-OFF AND LANDING

Instrument Colour Markings

When an instrument dial is marked in colours these have the following meanings:

Red radial lines:	Maximum and/or minimum values
Red segments:	Prohibited range
Yellow segments:	Cautionary operation for short periods
Green segments:	Normal operating range
White segments:	Normal operating range with wing flaps extended
Air speed indicators only	
Blue radial line (@ 65 kt):	One engine inoperative en-route best gradient of climb speed

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May 1983

Section 3 - Emergency Procedures

- Essential Considerations
- Electrical Failure
- Action in the event of Fire
- Engine Failure
- Handling on One Engine
- Critical Engine
- Landing with One Engine Inoperative
- Landing with Flaps Up
- Emergency Evacuation of Aeroplane
- Audio Failure

ESSENTIAL CONSIDERATIONS

GENERAL

This section contains the necessary information to enable a pilot to recognise and deal with all foreseeable conditions of emergency, as they may arise, individually or in combination. Although procedures and performance data are given in this manual for both the aircraft manufacturer's recommended normal climb power (2500 rev/min at full throttle) and maximum continuous power (2700/min at full throttle) the pilot must use the full maximum continuous power rating of the engine(s) when safety considerations so dictate.

ELECTRICAL SYSTEM VARIATIONS

The aeroplane will be fitted with a dual generator system of either 50 amps or 70 amps. All BN2B-20 aeroplanes that incorporate revised instrument panels to Mod NB/M/1287 also incorporate the 70 amp dual generator system to Mod NB/M/1148.

ELECTRICAL FAILURE

GENERAL

These emergency procedures refer to system failures rather than operational errors, even though the indications may be the same.

Electrical System failure indications are:

(1) Both generator low volt lamps. . . . . On if the busbar voltage falls below 26 volts.

(2) Ammeter. . . . . The ammeter selector may be switched to measure the output current of each generator, or the charge-discharge of the battery. Indications in the red sector are abnormal.

(3) Circuit Breakers. . . . . Expose a white collar when open.

(4) Voltmeter. Abnormal indication.

LOSS OF ONE GENERATOR

Indications:

(1) Ammeter indicates zero when switched to the failed generator

(2) Gen low volt warning light will be on

(3) Circuit breaker of failed circuit may be open

Action:

(1) Switch off the failed generator

(2) Open the failed generator's circuit breaker

Note...

The live generator will normally carry the full busbar load. If, however, this load approaches the single generator load limit of 50 amps, the generator output voltage may fall below 26 volts, causing the generator low-volt warning light to illuminate. Busbar loads in excess of 50 amps will be carried by the battery. Under these conditions it is recommended the electrical load is reduced to stop the battery discharge, and to extinguish the generator low volt warning light.

LOSS OF BOTH GENERATORS

Indications

(1) Both generator low volt warning lamps on

(2) Ammeter indicating discharge on battery and zero on each generator

(3) Generator circuit breakers may be open

(4) Voltmeter indicating 24 volts or less

Action

(1) Switch both generators OFF

(2) Load shed by opening all circuit breakers except the following:
- Wing flaps - limit to essential operation
- Fuel contents
- Navigation lamps, use only if required
- Engine instruments
- Map lamp - use one only, if required
- Landing lamp - use one only, if required
- Pilot's Turn Co-ordinator
- Stall warning
- Stall warning heat
- Pitot heat, use only if required
- Gyro compass
- Tachometer
- Audio system
- One essential radio navigational aid
- One essential communications radio - limit transmission time to less than 3 minutes in total

The battery has sufficient capacity for at least 30 minutes flight without benefit of the generators, night or day, provided the measures listed above are carried out within 10 minutes of the start of "battery only" operation.

MAIN BUSBAR GROUND FAULT

The Main Busbar is connected to the Emergency Busbar by a heavy duty fuse. In the unlikely event of a Main Busbar ground fault this fuse will rupture, isolating the Emergency Busbar which is connected to the battery. Such a fault would take both generators off line.

Indications

(1) Illumination of the busbar isolation warning lamp

(2) Voltmeter indicating off scale towards zero

Action

(1) Switch both generators OFF

The following services are available from the Emergency Busbar:

- Auxiliary fuel pumps
- Fuel contents
- Navigation lamps
- Map lamp
- Turn co-ordinator - Pilot's
- Stall warning
- Stall warning heater
- Pitot heater
- Tachometer
- Audio system - headphones only
- VHF No.1

BATTERY

The generators depend, to some extent upon, the battery for stability. In the unlikely event of the battery becoming disconnected, it is possible that both generators will go off line when switching heavy loads. In this event the pilot must reduce the electrical loads and this should, automatically, restore both generators. Loads may then be re-applied. The battery master switch must be selected to OFF.

ACTION IN THE EVENT OF FIRE

GENERAL

No integral fire detection/extinguisher system for the power plant or airframe zones is installed in a basic aeroplane. A hand-operated fire extinguisher bottle is installed in a quick release mounting beneath the pilot's seat.

FIRE ON THE GROUND

Fire in the cabin:

Immediate action

(1) Evacuate the passengers from the aeroplane

(2) Fire extinguisher . . . . Discharge at source of fire

When fire is completely extinguished

(3) Cabin doors . . . . Open all for ventilation

Engine fire:

Shut down both engines immediately by selecting:

(1) Magnetos . . . . OFF

(2) Battery master switch . . . . OFF

(3) Fuel cocks. . . . . OFF

(4) Extinguish the fire with the fire extinguisher bottle or any similar ground appliance

FIRE IN THE AIR

Fire in the cabin:

Immediate action

(1) Fire extinguisher . . . . Discharge at source of fire

When the fire is completely extinguished:

(2) DV Panel . . . . OPEN

(3) Cabin ventilation blower . . . . CABIN AIR-ON

(4) Land at the first available airfield

If the fire is not extinguished LAND AT THE FIRST AVAILABLE OPPORTUNITY

ENGINE FIRE:

Immediate Action

Shut down affected engine immediately by selecting:

(1) Mixture control lever . . . . IDLE CUT-OFF

(2) Propeller control lever . . . . FEATHER

(3) Throttle control lever . . . . CLOSED

(4) Appropriate fuel cock . . . . OFF

(5) Appropriate magnetos . . . . OFF

Secondary action

(6) Generator master switch . . . . OFF

(7) Auxiliary fuel pump. . . . . OFF

When the fire is extinguished

(8) Land at the first available airfield

If the fire is not extinguished LAND AT THE FIRST AVAILABLE OPPORTUNITY

WARNING...

(1) DO NOT ATTEMPT TO RESTART THE AFFECTED ENGINE

(2) THE AFFECTED PROPELLER MUST BE FEATHERED QUICKLY BEFORE ENGINE REV/MIN DECREASES TO A POINT WHERE THE LOW SPEED FEATHERING STOPS ENGAGE. (See Note 2 on page 10)

Effectivity: All aircraft

Note...
Should an engine fail during normal level flight at a safe altitude, procedure elements (4) and (5) will not be applicable.

WARNINGS...

1. ENSURE THAT THE AFFECTED PROPELLER IS FEATHERED SMARTLY BEFORE ENGINE REV/MIN DECREASE TO POINT WHERE LOW SPEED FEATHERING STOPS ENGAGE (Note 2 overleaf refers).

2. IT IS ESSENTIAL TO RAISE THE FLAPS TO THE FULLY UP POSITION TO ACHIEVE THE OPTIMUM CLIMB GRADIENT.

HANDLING ON ONE ENGINE

General

The aeroplane is perfectly docile on one engine and exhibits no unusual characteristics.

Fuel system management

Should an engine failure be experienced during the early part of a flight the operative engine can be fed from the tank(s) on the opposite side to improve the aircraft roll trim. This can be done by using the "crossfeed" selection shown in Section 4; when optional wing tip tanks are fitted, their use in these circumstances will not differ from that detailed in Section 4.

Section 3 - Emergency Procedures

Feathering and unfeathering

The correct feathering procedures have been detailed under the headings of FIRE IN THE AIR and FAILURE OF ONE ENGINE AFTER TAKE-OFF earlier in this section, and need not be repeated here but the unfeathering sequence is given hereunder:-

1.	Select appropriate fuel tank	ON
2.	Select appropriate left magneto switch	ON
3.	Select External Supplies Switch	EXTERNAL SUPPLY
4.	Set appropriate throttle lever	Approx 1/4 open
5.	Set appropriate propeller control lever	Cruise rev/min
6.	Select appropriate auxiliary fuel pump	ON
7.	Move mixture control lever to FULL RICH until flowmeter registers slight but steady flow (pre-Mod NB/M/1287). In aeroplanes without fuel flowmeters (Mod NB/M/1287) make the same selection and monitor the fuel pressure gauge for approximately 3-5 seconds, when a slight drop in fuel pressure will be noted after which, execute 8 below and continue. (Section 4 also refers).	
8.	Return mixture control lever to	IDLE CUT-OFF
9.	Select engine starter switch	Appropriate engine
10.	When engine fires select right magneto switch	ON
11.	Advance mixture control lever	As necessary

Gen Amdt 4
(Draft B) Apr 1995

Section 3- Emergency Procedures

ENGINE FAILURE

FAILURE OF ONE ENGINE DURING TAKE-OFF

If an engine fails before rotation is reached reduce power and decelerate to a stop. If an engine fails after rotation the decision whether or not to land straight ahead should be made with due consideration to runway length and level of performance available, and surrounding terrain (obstacles). If committed to continuing take-off the procedure below should be followed.

Immediate action:

(1) BOTH throttle control levers . . . . MAXIMUM TAKE-OFF POWER

(2) BOTH mixture controls . . . . Fully RICH

(3) BOTH Intake heat controls . . . . OFF

(4) Determine inoperative engine

Secondary action

(5) Propeller control lever (affected engine) . . . FEATHER

(6) If below 200 ft, climb to this height at the take-off safety speed

(7) Airspeed . . . . Increase to 65 kt IAS

(8) Flaps . . . . UP

(9) Trim . . . . AS REQUIRED

(10) Mixture control lever (affected engine) . . . . IDLE CUT-OFF

(11) Throttle control lever (affected engine) . . . . CLOSED

WARNING...

(1) THE AFFECTED PROPELLER MUST BE FEATHERED QUICKLY BEFORE ENGINE REV/MIN DECREASES TO A POINT WHERE THE LOW SPEED FEATHERING STOPS ENGAGE. See Note 2 on page 10)

(2) IT IS ESSENTIAL TO RAISE THE FLAPS TO THE FULLY UP POSITION TO ACHIEVE THE OPTIMUM CLIMB GRADIENT

Follow up action:

(12) Fuel cock selector (affected engine) . . . . . OFF

(13) Auxiliary fuel pumps switch (affected engine) OFF

(14) Magnetos (affected engine) . . . . OFF

(15) Generator (affected engine) . . . . OFF

(16) Generator (operative engine) . . . . ON

FAILURE OF ONE ENGINE EN-ROUTE

Should an engine fail during normal level flight at a safe altitude, follow the FAILURE OF ONE ENGINE DURING TAKE-OFF procedures as appropriate.

FAILURE OF BOTH ENGINES EN-ROUTE

If both engines fail en-route, carry out the following procedures:

Immediate action to attempt quick restart

(1) Both intake heat controls . . . . FULL

(2) Both mixture control levers. . . . . FULL RICH

(3) If successful slowly open throttles and resume normal flight

(4) Both auxiliary fuel pumps . . . . ON

(5) Ensure fuel cocks are selected to tank with indicated contents

Secondary action if quick restart is unsuccessful

(6) Fly and trim the aircraft at the recommended gilding speed of 70 kts IAS

(7) Both generator switches . . . . OFF

(8) Attempt normal air start on either engine

(9) If start is unsuccessful, attempt start on the other engine

Follow up action

(10) If neither engine can be started after repeated attempts carry out a forced landing without power.

(11) When none or both engine have been restarted carry out normal after start checks.

WARNING...
APPROXIMATELY 1000 ft WILL BE LOST DURING THE EXECUTION OF EACH RESTART ATTEMPT

FORCED LANDING WITHOUT POWER

(1) Mixture control levers . . . . IDLE CUT-OFF
(2) Both fuel cocks . . . . OFF
(3) All magnetos . . . . OFF
(4) Carry out initial approach at. . . . . 70 kt IAS
(5) Non essential equipment . . . . OFF
(6) Brakes. . . . . OFF
(7) Approach speed. . . . . 65 kt IAS
(8) Battery master switch . . . . OFF (after final flap selection)
(9) Reduce speed to touchdown in a nose high attitude

HANDLING ON ONE ENGINE

GENERAL

The aeroplane is perfectly docile on one engine and exhibits no unusual characteristics.

FUEL SYSTEM MANAGEMENT

Should an engine failure be experienced during the early part of a flight the operative engine can be fed from the fuel tank(s) on the opposite side to improve aircraft roll trim. This can be done by using the "crossfeed" selection shown in Section 4; when optional wing tip fuel tanks are fitted, their use in these circumstances will not differ from that detailed in Section 4.

FEATHERING AND UNFEATHERING

The correct feathering procedures have been detailed under the headings of FIRE IN THE AIR and FAILURE OF ONE ENGINE AFTER TAKE-OFF earlier in this section, and need not be repeated here but the unfeathering sequence is given hereunder:-

(1) Select appropriate fuel cock . . . . ON

(2) Select appropriate left magneto switch . . . . ON

(3) Select external supplies switch . . . . EXTERNAL SUPPLY

(4) Set appropriate throttle lever. . . . . Approx ¼ open

(5) Set appropriate propeller control lever. . . . . Cruise rev/min

(6) Select appropriate auxiliary fuel pump switch . ON

(7) Move mixture control lever to FULL RICH until flowmeter registers slight but steady flow.

(8) Return mixture control lever to . . . . IDLE CUT-OFF

(9) Select engine starter switch . . . . Appropriate engine

(10) When engine fires select right magneto switch ON

(11) Advance mixture control lever . . . . As necessary

(12) Check engine temperatures and pressures . . . Satisfactory

(13) Check setting of propeller control lever . . . . Cruise rev/min

(14) As temperature and pressures stabilize, increase throttle lever and mixture control. . . As necessary

(15) Select auxiliary fuel pump switch . . . . OFF

(16) Select external supplies switch . . . . OFF/STARTER ISOL

(17) Select generator master switch . . . . ON (observe output)

(18) Check vacuum gauge . . . . Satisfactory

Note...

(1) Oil pressure is required for unfeathering the propeller. This is normally gained by the use of the electric starter. In aircraft with Mod NB/M/55, or Mod NB/M/694 embodied, an unfeathering accumulator installation assists the dynamic unfeathering action.

(2) Inadvertent feathering at low rotational speeds is prevented by protective devices fitted to the propellers. Do not allow the engine speed to decay below 1300 rev/min for aircraft fitted with propellers Part No. containing the element 2B (eg. HC-C2YK-**2B**/C8477A-6) or below 700 rev/min for aircraft fitted with propellers Part No. containing the element 2C (eg. HC-C2YK-**2C**/C8477A-6) before selecting feather, otherwise the propeller may not go into the feathered condition.

Effectivity: Pre Mod NB/M/1287

CRITICAL ENGINE

Failure of the left (port) engine has the more adverse effect on the handling and performance characteristics of the aeroplane.

LANDING WITH ONE ENGINE INOPERATIVE

Make an initial approach at approximately 65 kt IAS with the flaps selected to TAKE-OFF (25 deg). When committed for landing, select FLAPS DOWN (56 deg) and reduce speed over the threshold to a value compatible with the information scheduled in Section 5 and touch down normally.

LANDING WITH FLAPS UP

Make an approach to the runway threshold, progressively reducing the air speed as possible to achieve 65 kt IAS at the threshold and make a normal landing. Provided the speed recommended above is carefully observed the landing distance with wing flaps up, will not exceed the factored landing distance required as scheduled in Section 5 of this manual.

EMERGENCY EVACUATION OF AEROPLANE

OPERATION OF CABIN DOORS

All three cabin doors are placarded as emergency exits and should be opened in the normal way as the first resort in making an exit from the cabin. In the case of the pilot's door, however, the left (port) engine magnetos should be first switched OFF, thus allowing the solenoid operated interlocking mechanism to be released. Should this action be overlooked, or if there is insufficient time available, the interlocking mechanism can be overridden by pushing the red lock-release lever with one hand whilst operating the internal door handle with the other hand. Whenever that is necessary ensure that the propeller has stopped turning before the door is opened, since the object of the mechanism is to prevent injury from that cause. The lock release lever is situated just to the rear of the pilot's door aperture, in the cabin side wall.

OPERATION OF CABIN WINDOW EXITS

If the cabin doors cannot be opened, particularly if the aeroplane comes down onto water, each emergency 'pull-in' window can be removed as follows:

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

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

ACTIVATION OF EMERGENCY LOCATOR TRANSMITTER

One of two types of Emergency Locator Transmitter may be fitted under optional modifications. The Garrett equipment (Mod NB/M/622 - when installed) is permanently fixed in the aeroplane. The Narco equipment (Mod NB/M/676 Part D - when installed) can be disconnected from the aeroplane wiring and used as a self-contained mobile transmitter. Both installations incorporate automatic inertia switches but can also be triggered manually by a switch adjacent to the radio rack on the RH side of the main instrument panel. When a controlled emergency landing has been effected without undue 'g' forces, and depending upon local circumstances, activate the Emergency Locator Transmitter switch by hand.

AUDIO FAILURE

FAILURE OF AUDIO CONTROL SYSTEM

Bendix/King Audio Selector Panel (Mod NB/M/1250):

In the event of audio failure in headphones, set the Microphone Selector Switch to EMG. This will allow the pilot emergency operation on VHF Comm 1 only.

S G Brown Audio Selector Panel (Mod NB/M/491):

In the event of audio failure in headphones, set the Speaker/Phone Switch to 'SPEAKER'. This routes the phones audio through a separate and different amplifier.

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Section 4 - Normal Procedures

- Checks, Taxying, Take-off and Handling

- Systems Management

Section 4 - Normal Procedures

CHECKS, TAXYING, TAKE-OFF AND HANDLING

Re-fuelling

Use only the fuel prescribed in Section 2 of this manual and, when operational considerations permit, ensure that the fuel tanks are kept full to minimize possible condensation effects. Tank capacities are as follows.

Wing main tanks (2) : 68.5 US gal (259.3 litres) per side
Usable fuel amounts to 65 US gal (246.1 litres) per side, while unusable fuel is 3.5 US gal (13.2 litres) per side.
For optional wing tip tanks, refer to Supplements.

Pre-flight checks (external)

Refer to fig. 1 and effect the "walk-round" checks as described according to the conditions.

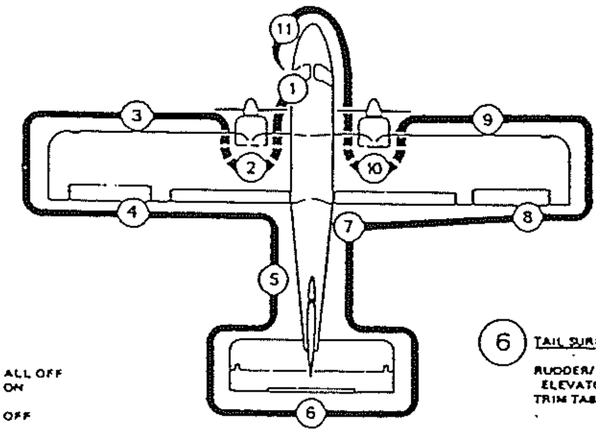
CAUTION...

If fluid de-frosting preparations are used to clear ice and snow from wing and tail surfaces, ensure that the solutions do not contaminate control surface ballraces as this can lead to seizure.

NOTES...

A. BEFORE STARTING THE WALK-ROUND INSPECTION, REMOVE THE PITOT HEAD COVER, CONTROL LOCKS AND BATTERY VENT PLUG; STOW IN BAG AT REAR OF CABIN.

B. DURING THE EXTERNAL INSPECTION DETAILED BELOW, PERFORM A GENERAL CHECK OF AIRFRAME CONDITION AND THE SECURITY OF ALL FASTENERS AND CONTROL HINGES AND ATTACHMENTS.



(1) CABIN

MAGNETO SWITCHES – ALL OFF
PARKING BRAKE – ON
ALL ELECTRICAL SWITCHES – OFF
BATTERY MASTER SWITCH – ON
PITOT HEAD/STALL WARN. HEATER SWITCH – ON
STALL WARNING VANE – DEFLECT, CHECK AUDIO AND HEATER
PITOT HEAD – CHECK HEATER, SWITCH OFF
WINDSCREEEN HEATER (IF FITTED) – ON, CHECK HEAT, OFF
ROTATING BEACON SWITCH – ON, CHECK, OFF
NAVIGATION LAMPS SWITCH – ON, CHECK, OFF
BATTERY MASTER SWITCH – OFF

(2) LEFT ENGINE

PROPELLER – CONDITION
OIL – CHECK; DIPSTICK AND COVER SECURE
GASCOLATOR – DRAIN AS NECESSARY, COVER SECURE

LEFT UNDERCARRIAGE

OLEO – EXTENSION
BRAKE DISCS AND PADS – CONDITION
BRAKE PIPES – EXAMINE FOR LEAKAGE
TYRES – INFLATION, CUTS, CREEP

(3) MAINPLANE – LEFT LEADING EDGE

PITOT HEAD – PRESSURE, STATIC VENTS AND DRAIN HOLE CLEAR
DE-ICER BOOTS – CONDITION

(4) MAINPLANE – LEFT TRAILING EDGE

AILERON – FREEDOM
FUEL SUMP – DRAIN AS NECESSARY
TIP TANK (IF FITTED) – DRAIN AS NECESSARY

(5) FUSELAGE, LEFT SIDE

PASSENGER AND BAGGAGE BAY DOORS – SECURED BUT UNLOCKED

(6) TAIL SURFACES

RUDDER/ ELEVATOR – CONDITION AND FREEDOM
TRIM TABS – CONDITION

(7) FUSELAGE RIGHT SIDE

PASSENGER DOOR – SECURED BUT UNLOCKED

(8) MAINPLANE – RIGHT TRAILING EDGE

FUEL SUMP – DRAIN AS NECESSARY
AILERON – FREEDOM
TIP TANK (IF FITTED) – DRAIN AS NECESSARY

(9) MAINPLANE – RIGHT LEADING EDGE

DE-ICER BOOTS – CONDITION

RIGHT UNDERCARRIAGE

OLEO – EXTENSION
BRAKE DISCS AND PADS – CONDITION
BRAKE PIPES – EXAMINE FOR LEAKAGE
TYRES – INFLATION, CUTS, CREEP

(10) RIGHT ENGINE

PROPELLER – CONDITION
OIL – CHECK, DIPSTICK AND COVER SECURE
GASCOLATOR – DRAIN AS NECESSARY, COVER SECURE

(11) FUSELAGE NOSE

NOSE OLEO – EXTENSION
NOSE WHEEL – INFLATION, CUTS, CREEP
NOSE CONE – CONDITION
WINDSCREEN – CLEANLINESS AND CONDITION

Fig. 1 - Pre-Flight Inspection Diagram

Section 4 - Normal Procedures

Pre-starting checks (internal)

CAUTION...

The checks under this heading are written to relate to early BN-2B Series production aeroplanes with pre-Mod NB/M/1287 instrumentation. Later production aeroplanes incorporate improved instrument panel presentation, to Mod NB/M/1287, which features a Central Annunciator Panel (CAP) for important systems warning lamps and individual indicator lamps for the flaps. There are no significant changes to the detailed checks for later aeroplanes but those "Press-to-Test" functions which occur can be satisfied on the CAP in one operation.

Battery/Master Switch	ON
Pilot's Door Interlock	Before locking and securing the pilot's door, momentarily select either magneto of port engine ON and check for audible warning
Pilot's seat and rudder pedals	Set as required and check for security
Doors	Closed and Locked. (Warning light extinguished)
Flight compartment safety belts	Fastened
Parking brake	ON
Rudder and elevator trim tabs	Full movement: return to neutral
Fuel cocks	Freedom and ON
OAT indicator(s)	Check
Cabin heater and door warning lamps	Press-to-test

Section 4 - Normal Procedures

Pre-stall warning indicator lamp	Press-to-test
Generator low-volt warning lamps	Press-to-test
Altimeters	Cross check
Timepiece	Check and set
Electrical power	Select external or internal power source as appropriate
Cabin heater	As required
Airframe de-icer cycling lamp (if fitted)	Press-to-test
Fuel contents indicators	Check
Compasses	Check
Engine and flight instruments	Check
Circuit breakers	Pushed in
Main to Emerg. Busbar warning lamp	Press-to-test
Flight controls	Freedom
Flaps	Operate over the full range. Check visually and against indicator/ lights (Ensure flaps move only to next 'datum' position when selection is made and that a second selection is necessary to complete full travel range)
Marker beacon lamps	Test
Radios	OFF

Section 4 – Normal Procedures

Switch panel	Select as required
Throttles	Closed
Propeller controls	Full forward (MAX RPM)
Mixture controls	Full RICH
Intake heat	Freedom and OFF
External Supply/Starter Isol Switch	EXTERNAL SUPPLY
Auxiliary fuel pumps	OFF
Generator switches	OFF

Additional items for Night Operations:-

Lighting/switches (Inst panel; cabin; map; airframe ice inspection lamp if fitted)	Check

Note...

In aeroplanes with NB/M/1287 incorporated, an additional selector switch, for instrument panel lighting, automatically facilitates a dimming function for the three flap indicator lamps (introduced under the same modification) when selected on.

Section 4 - Normal Procedures

Starting the engines

Preliminary notes ...

1. Using the internal battery:
When the engines are to be started from the internal battery, the External Supply/Starter Isol Switch must be selected to EXTERNAL SUPPLY to allow the starters to be activated. After start up, the switch must be returned to the OFF/STARTER ISOL position for the remainder of the flight, unless an air start is required when the switch selection will again be necessary.

2. Using an external power source:
If the engines are to be started from an external power source, the External Supply Switch must be selected on (EXTERNAL SUPPLY) after the external supply is connected. (Insertion of the ground supply socket automatically isolates the aeroplane battery from the busbar). After the engines have been started, the socket must be withdrawn and the External Supply Switch returned to the OFF/STARTER ISOL position. The generators should not be selected ON until the external supply has been disconnected, otherwise a heavy charge will be delivered to the external ground supply source. Should it become necessary to use the engine starters in order to assist a sluggish restart in the air, then this cannot be effected until the External Supply Switch is selected EXTERNAL SUPPLY for the purpose.

WARNING...

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

Section 4 - Normal Procedures

General:

The Lycoming engine is air pressure cooled and depends on forward movement of the aeroplane to maintain proper cooling. To prevent overheating on the ground the following precautions are strongly advised.

1. Avoid unnecessary ground running.

2. Ensure the aeroplane faces the wind.

3. Confine the propeller pitch to the fine position (MAX RPM)

4. Maintain at least 1200 rev/min as this will also help to avoid fouled plugs.

5. Keep the mixture control in the full RICH position.

Starting procedure

The starboard engine is normally the first to be started and the sequence relates to starting from cold.

1. Set fuel cock selectors; port selector PORT TANK; stbd selector STBD TANK.

2. Set throttle approximately one quarter OPEN.

3. Switch starboard auxiliary fuel pump ON and move the mixture control to FULL RICH until a slight but steady flow is indicated by the fuel flowmeter in pre-Mod NB/M/1287 aeroplanes. In aeroplanes without fuel flowmeters (Mod NB/M/1287) make the same selection and monitor the fuel pressure gauge for approximately 3-5 seconds, when a slight drop in fuel pressure will be noted after which, execute 4 below and continue.

4. Return the mixture control to IDLE CUT-OFF.

5. Select left magneto ON.

Section 4 - Normal Procedures

6. Check all clear to start starboard engine and engage starter switch. As soon as engine starts select right magneto ON.

7. Move mixture control slowly but smoothly to FULL RICH.

8. Check oil pressure for indicated pressure. If pressure is not indicated within 30 seconds, stop engine and determine trouble.

   Note...

   If engine fails to achieve a normal start assume it to be flooded and use standard clearing procedure before repeating this sequence.

9. Check fuel pressure indication is between 12 and 18 lb/in^2.

   CAUTION...

   If difficulty is experienced in staring a hot engine the instructions in the Note to operation 8, above, should be observed.

10. Repeat the process with the port engine.

Section 4 - Normal Procedures

Checks after starting

Auxiliary fuel pumps	OFF
Generators	After noting the generator low-volt warning lamps are illuminated, select the generators ON, using each selector switch, in turn, and note that the respective warning lights are extinguished accordingly.
Vacuum gauge	3 - 5 in. Hg. (The warning buttons on the vacuum gauge must be retracted).
Ammeter	Normal indication (indicator pointers within green sector).
Ammeter selector switch	BATT
Oil pressure	Above red line minimum.
Fuel pressure	Normal indication (indicator pointers within green sectors).
Combustion monitor	Check. Regulate mixture as necessary
Fuel flowmeter (if fitted)	Indicating normally
Flight instruments	Indicating normally
Radio (if fitted)	Select frequencies as required
Heater controls	Select as required
Ice Protection systems (if fitted)	Cycle and OFF
Pilot's door emerg. lock release	Lever forward in slot

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Section 4 - Normal Procedures

Ground checks

Warm up:

The engines are warm enough for take-off when they respond normally to throttle openings. When satisfied that this is the case the following tests should be made:-

1. Test each magneto in turn for a dead cut at 1200 rev/min.

2. Increase power on engine to 17 in. Hg manifold pressure (approximately 2100 rev/min). Switch from both magnetos to one and note rev/min drop off. Re-select both magnetos and wait until engine rev/min recover, then switch to the other magneto. Note rev/min drop off and return to both magnetos. Normal drop off is 100 rev/min, it should not exceed 175 rev/min and should not exceed 50 rev/min difference between magnetos.

3. Set the throttle of each engine, in turn, to give 2100 rev/min and exercise the respective propeller pitch control lever to check correct operation of the governors; note that the engine speeds (rev/min) decrease and increase accordingly.

4. Set throttles to give 1500 rev/min and effect a feathering check as follows:- move each propeller pitch control lever, in turn, down through the gate to the FEATHER position; note drop in rev/min and return pitch control lever before rev/min decrease below 1000.

Ammeter check:

Note that the ammeter reading is approximately 2 to 5 amps (in the green sector) or is gradually falling to settle at that value.

Ammeter selector switch:

Note that both port and starboard generator outputs are similar and indicating in the green sector. The sum of these two generator outputs should be consistent with the expected electrical demand. Normally the ammeter selector switch should be returned to the BATT position after use.

Voltmeter check:

Note that the voltmeter registers between 27 and 29 volts. An abnormal indication is registered if the instrument shows 24 volts or less.

Section 4 - Normal Procedures

Optional wing tip fuel tanks

When these are fitted, refer to Supplements.

Taxying

Before attempting to taxy, ensure the parking brake is released. The aeroplane can be steered effectively during ground manoeuvring by means of the rudder pedals. Brakes should be tested for efficient operation as soon as possible after the aeroplane has started rolling.

Runway threshold check

Open up each engine, in turn to approximately 70 per cent power and select intake heat FULL; check that the manifold pressure drops accordingly and return the intake heat control to OFF.

Pre-take-off checks

Passenger notices (if fitted)	ON
Doors and DV panels	Closed
Pitch	Full fine (MAX RPM)
Mixture	Full RICH
Intake heat	OFF
Trim tabs	Set neutral
Flaps	Set to TAKE-OFF position (check indicator/lights)

Fuel	Check contents, selection and pressure (fuel pressure indicator pointers within green sectors)
Auxiliary fuel pumps	ON
Engine instruments	Checked
Flight instruments	Check and set as required
Pitot/stall warn heaters	As required
Ice protection systems (if fitted)	As required
Autopilot system (if fitted)	OFF
Flight Controls	Full and free movement; nose-wheel steering engaged
Electrics	Selected as required (Ammeter showing charge; Voltmeter reading 27 - 29 volts; Circuit breakers engaged)
Cabin Heater	OFF

Take-off

General:

It should be noted that to achieve the performance criteria scheduled in Section 5 of this manual, the speeds and technique given below under the heading of Recommended Procedure, must be followed.

Recommended procedure:

Align the aeroplane with the runway and open the throttles slowly to the OPEN position. Depending upon the weight at which it is operating the aeroplane must be rotated at a speed of 4 kt less than the speeds scheduled for the 50 ft safety height in Section 5. The aeroplane is capable of taking off in a 30 kt crosswind without resort to differential throttle application.

Section 4 - Normal Procedures

After take-off

At a height above 200 feet, select flaps UP and trim resultant nose heaviness.

Auxiliary fuel pumps OFF at a safe height.

Engine rev/min and manifold pressure set to recommended normal climb power when safely clear of obstacles or terrain.

If pitot and stall warning heaters have been selected during take-off these may be switched off at the pilots discretion and depending upon ambient conditions

Lean off the mixture as appropriate (Lycoming Operator's Manual Pt No. 60297-10). Correct leaning is essential to ensure proper engine functioning and maximum fuel economy.

Cabin Heater selected as necessary.

Set altimeter(s) as required.

Passenger notices selected as required.

Intake heat selected as required (use intermittently for short periods).

Handling in flight

Procedures and performance data are given in this manual for the maximum normal operating power (2500 rev/min at full throttle). Take-off and maximum continuous power (2700 rev/min at full throttle) are available for take-off, one engine out, or when other safety considerations so dictate. The best Rate-of-Climb and Gradient speed is 65 kt IAS but a more comfortable attitude is maintained at 95 kt IAS with 75 per cent power.

Section 4 – Normal Procedures

General flying:

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

Use of intake heat:

Intake icing is unusual with the fuel injected engines installed in this aircraft. It is recommended that intermittent use of the intake heat system be made when flying in snowstorms, 5 deg C with visible moisture and other types of possible icing conditions. Select the heat control levers ON for approximately 30 seconds, return the heat control levers to OFF and note that selected engine power is restored. Do not keep heat selected FULL for long periods or excessive power loss will result, with very little indication from the manifold pressure indicator. During normal flight operations the intake heat control levers should be left in the OFF position.

Instrument flying:

The degree to which flight in IFR conditions can be undertaken depends upon how comprehensively the aeroplane is equipped with optional instrument installations. A remote indicating compass system is installed and this is the primary compass; the direct reading compass is the stand-by instrument.

Flying in low temperature conditions:

When flying in low ambient temperatures the propeller governors should be regularly exercised – every ten to fifteen minutes – to keep the oil supply circulating and thus avoid sluggish or unresponsive propellers.

Changes of trim:

Flaps up	Nose down tendency
Flaps down	Nose up tendency
Application of power	Large increases in power produce a marked nose up tendency

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Section 4 - Normal Procedures

Usable fuel - safe flight attitudes:

It has been established that fuel can be used down to zero reading on the indicators, in all combinations of flight attitudes within the following:-

Nose up 14 deg. Nose down 2 deg. Wing down 3 deg. The quantity of fuel remaining in the tanks when the contents indicators register zero, cannot safely be used in flight.

Feathering and unfeathering:

The correct procedures are detailed in Sect 3 of this manual.

Flying at reduced speed:

Fly at 2400 rev/min and lower flaps to the T.O. position. This enables a comfortable attitude to be maintained at 78 kt IAS. The maximum speed in this condition must not exceed 114 kt IAS.

Flying in turbulence:

The "Rough Air Speed" in turbulence is 88 kt IAS.

Stalling:

Stalls are gentle in all configurations and from all attitudes normally encountered. Because of this characteristic the electrically operated stall warning system provides visible and audible warning at a safe margin above the stall. Recovery action is normal. Provided the recovery action is taken promptly, the height loss will be small.

Section 4 – Normal Procedures

Diving:

The limiting speed or VNE for this aeroplane is 184 kt IAS (Section 2 refers).

Spinning:

Intentional spinning is prohibited (Section 2 refers)

Descent:

Mixture should be richened appropriately before commencing descent and this should then be executed at not more than 500 ft/min to give an acceptable rate for passenger comfort.

Instrument/controls monitoring:

From time to time, during flight, all indicators, selector switches, and other control media should be monitored to ensure satisfactory functioning of the aeroplane systems.

Pre-landing checks

Harness	Fastened
Pilot's seat	Secure
Fuel	Contents and Selection
Engine instruments	Checked
Mixture	Full RICH
Intake heat	OFF (unless required intermittently)
Propellers	Fully fine (MAX RPM)
Auxiliary fuel pumps	ON. Check pressure (indicator pointers within green sectors)

All warning lamps	Extinguished
Cabin heater	OFF (Ventilating blower ON for windscreen de-misting)
Autopilot (if fitted)	OFF
Passenger notice	ON
Brakes	OFF
Pitot/stall warn heat	As required

Final approach

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

Balked landing

Apply full power smoothly to the engines and establish a positive rate of climb. Select flaps to T.O. position and accelerate to 61 kt. Select flaps UP at 200 feet and climb out at 65 kt or above as required for passenger comfort. Be prepared for nose up change of trim during application of power and selection of flap from T.O. to UP.

Cross wind landing

The aeroplane is capable of landing with a 30 kt cross wind.

Note...

Where conditions permit, this operation is facilitated by setting flaps to T.O. or UP and increasing the airspeed accordingly.

Section 4 – Normal Procedures

After Landing Checks

Auxiliary fuel pumps	OFF
Flaps	UP
Pitot/Stall Warn Heaters	OFF
Unrequired services	OFF
Trim settings	For take-off
Cabin heater	OFF

Stopping the engines

Idle the engines at 1000 rev/min for a period until temperatures drop and check the magnetos for a dead cut. Stop the engines by moving the mixture controls fully downward into the idle cut-off position.

Checks after Stopping

Fuel cocks	OFF
Ignition switches	OFF
Generators	OFF
Other services	OFF
Battery master switch	OFF
Parking brake	ON
Controls	Locked (Gust locks stowed in canvas bag at rear of cabin)
Chocks	In position

Stalling speeds

The stalling speeds for a combination of weights and flap settings are tabulated below:-

With throttles closed and power off at all C.G.'s

Flap Angle (deg)	Stalling Speed kt (Indicated Air Speed)				
	1814 kg	2268 kg	2722 kg	2858 kg	2994 kg
UP	42	45	48	49	50
T.O. (25)	37	39	42	42	43
DOWN (56)	34	36	38	39	40

Note...
The above stalling speeds are equally effective for Models BN-2B-21 although their gross weights are slightly different.

SYSTEMS MANAGEMENT

Fuel system

Preparation for flight:

Before the first flight of the day (and at other times as necessary when climatic conditions combine to produce a risk of moisture ingress) draw off a generous amount of fuel from each of the tank and gascolator drain points (fig.2 refers). Should water content be evident, ensure that all traces are expelled before taking off. Selection of the various simple fuel system controls is detailed in the preceding sequential checks which the pilot is required to perform, before and during flight, but the line diagram opposite is included to enable a clear understanding of system layout. When the cabin heater is in use it should be noted that an approximate additional 4 US gal (15.14 litres) per hour will be consumed from the starboard main tank and due allowances should be made.

Operation of auxiliary fuel pumps:

In accordance with normal civil airworthiness requirements auxiliary fuel pumps are provided to back up the engine driven fuel pumps during the take-off and landing flight phases; they also assist in engine starting. To ensure long life the auxiliary fuel pumps should be used as prescribed in this manual and they should not, of course, be run if the fuel tanks are dry.

After flight:

Ensure that the auxiliary fuel pumps are switched OFF and the fuel cock selectors are returned to OFF. Fuel tanks should always be replenished as soon as possible after landing otherwise there is a high risk of condensation contaminating the fuel.

Optional wing tip fuel tanks:

Two different installations are available from the aircraft manufacturer and, if either of these is fitted, reference must be made to the Supplements in Section 9 of this manual.

Fig.2 Fuel System

ELECTRICAL SYSTEM

General

To promote a clear understanding of the main power supplies and distribution services, a simplified diagram is illustrated in Figure 3. Clear instructions for operation of the various electrical systems in the aeroplane are, however, given in the preceding sequential checks and procedures which the pilot is required to perform before and during flight. Persistent interruptions from ejected circuit breakers should be investigated, without delay, upon landing in case of circuit faults. Minor services are protected by fuses that are inaccessible in flight. Fuse failures will affect the circuits concerned until rectified on the ground. This does not apply to cabin heating and ventilating fuses which are located adjacent to the heater controls.

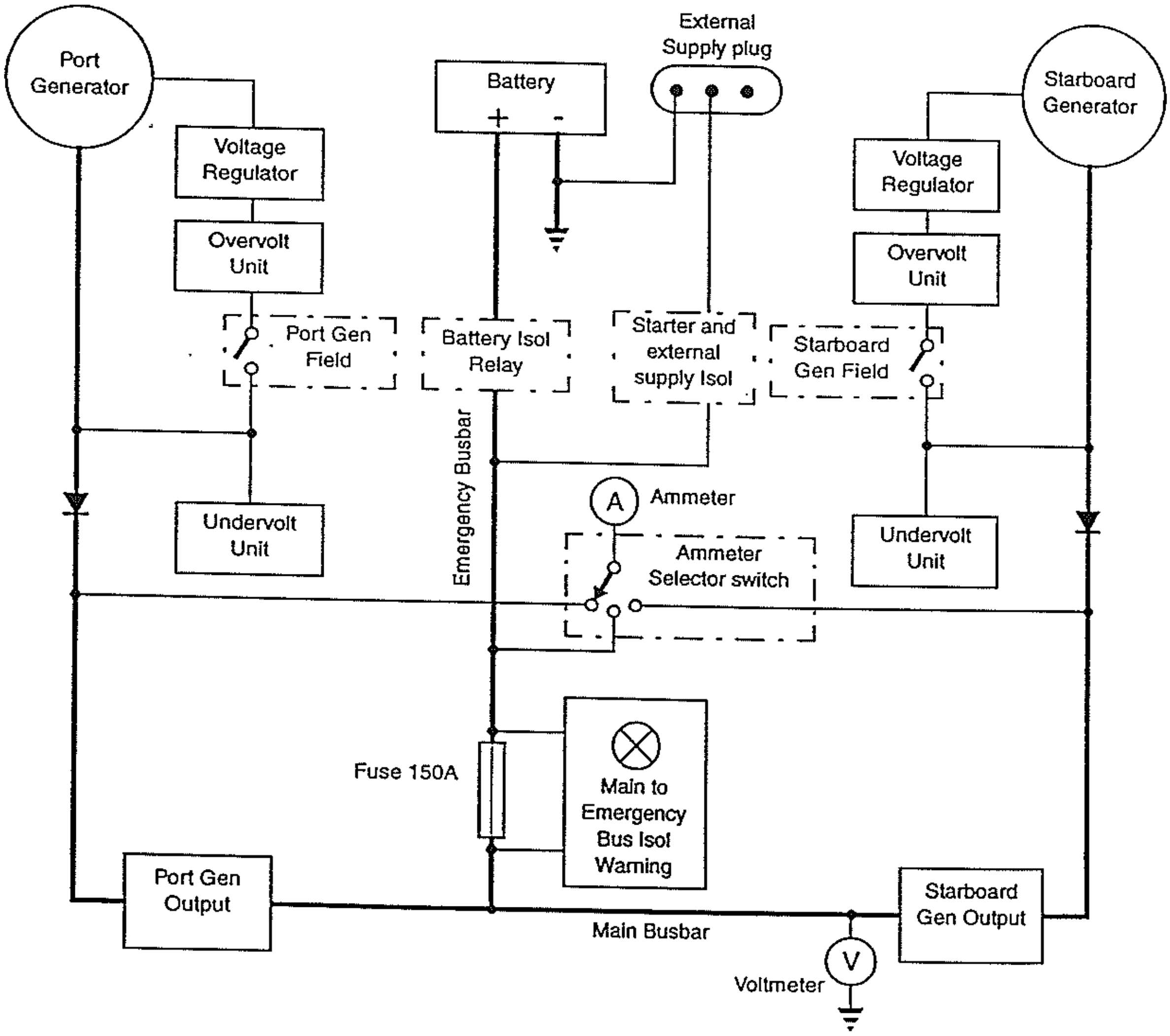

Fig 3 Electrical System - Simplified Diagram

Effectivity: Pre Mod NB/M/1287

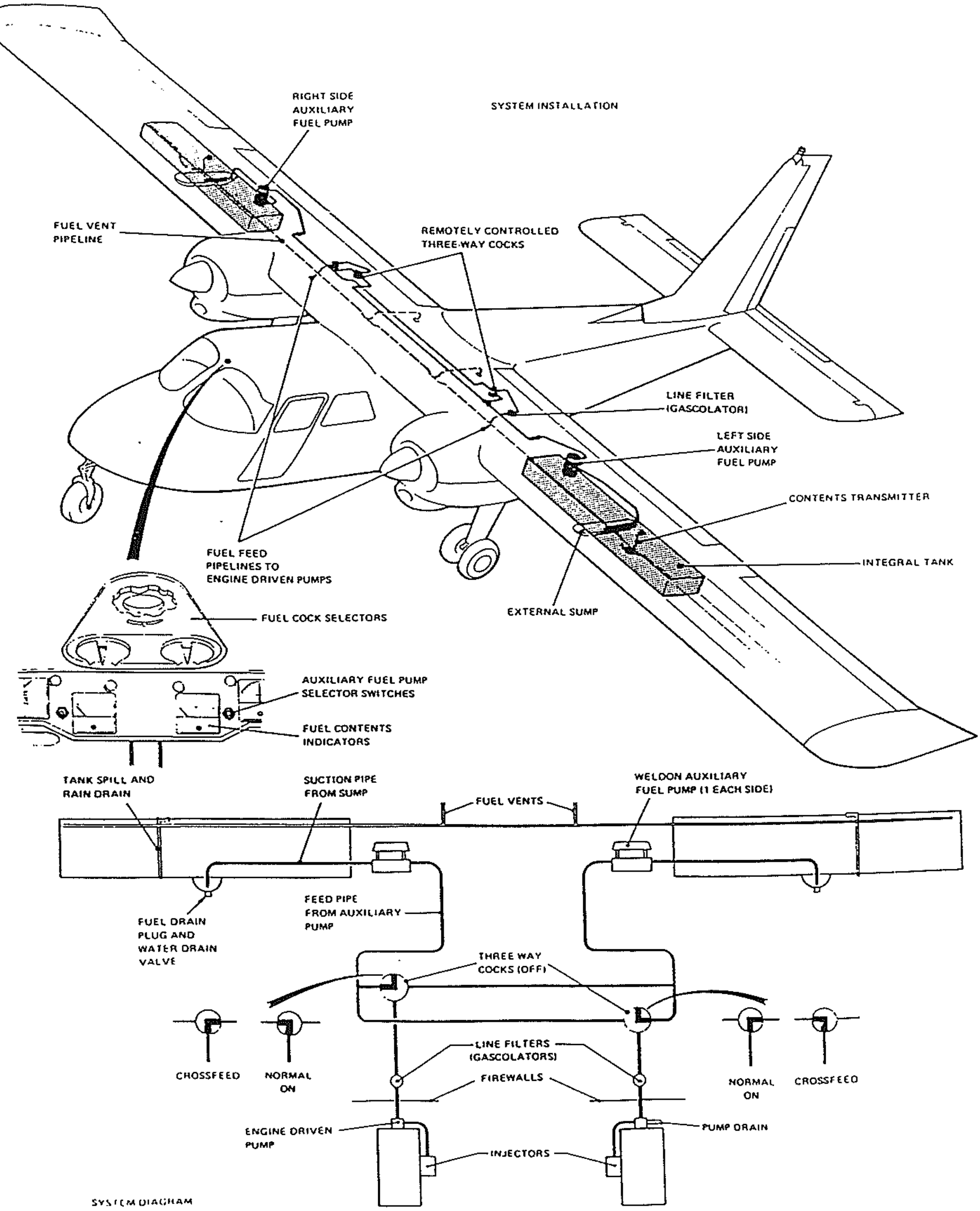

Fig. 2 Fuel System

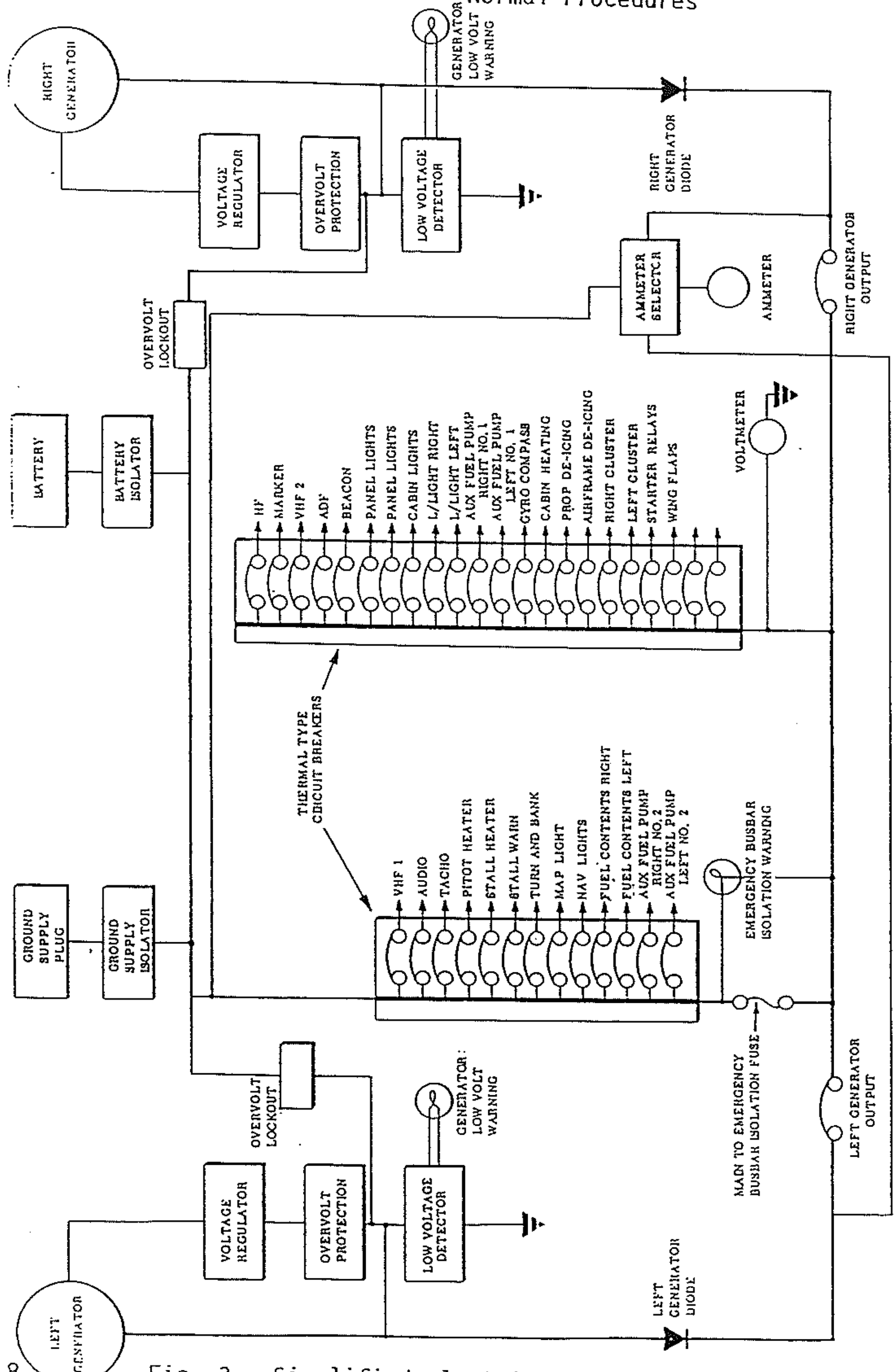

Fig. 3 - Simplified electrical diagram

Air Conditioning System

Cabin Ventilating System:

Operation on the ground

The ventilation fan within the cabin heater may be used for cabin ventilation on the ground. Select the VENT MOTOR switch, on the heater control panel, the volume of air is controlled by adjusting the CABIN AIR lever. Fresh air is ducted to vents in the floor. In hot conditions, the cabin will be more comfortable for the passengers if the adjustable vents above each seat position are opened before entry.

Operation in the air

When airborne, fresh air is collected by underwing air intakes. The air is delivered, by ram effect, to individual adjustable vents above each seat position.

Cool Air System

A cool air system may be fitted as an optional installation in some aeroplanes. This system can be brought into use by the pilot with a switch on the instrument panel.

Cabin Heater System:

To start the heater, select the HEATER switch, on the heater control panel. The system will operate at the selected thermostatically controlled temperature. The cabin temperature may be varied with the CABIN TEMP control lever.

Operation on the ground

The heater system can be used when the aeroplane is on the ground provided that the VENT MOTOR is switched ON. If this is not done the heater will overheat and shutdown as described below.

Operation in the air

During flight the VENT MOTOR can be switched OFF

Note...
For prolonged flight at low speeds the VENT MOTOR should be left ON

Cabin Heater Lock-out and Reset

If the thermostat fails or there is insufficient air flow to enable its correct operation the heater fuel supply is automatically shut off. An overheat switch operates if the air delivery, from the heater, rises above a pre-determined temperature; its action shuts off the fuel supply to the heater, 'locks-out' the heater selection circuit and lights the warning lamp.

This condition can only be rectified on the ground by depressing a "reset" button on the heater unit. Unless the overheated condition occurs as a result of mishandling, it denotes a serious fault which should be investigated without delay.

Caution...

If, on the ground, the heater is switched OFF simultaneously with the VENT MOTOR, the resultant heat rise within the heater unit may be sufficient to activate the overheat switch. In that event it will not be possible to start the heater again until the "reset" button on the heater has been depressed. Ensure, therefore, that VENT MOTOR is selected for at least one minute, after switching the heater OFF, to dissipate the residual heat.

Heater Control System Fuse:

A fuse, situated on the heater control panel, protects the heater control circuit in the event of a fault. A spare fuse is situated adjacent to the inoperative one and this is provided for use in case of a transient fault. Repeated failure of the fuse may be indicative of a wiring failure and this should be reported.

Ice Protection Systems

Full information on the operation of ice protection systems, when these are installed, is given in Supplement form in Section 9.

Autopilot Systems

Full information on the operation of autopilot systems, when these are installed, is given in Supplement form in Section 9.

Pitot-Static System

An alternative static air pressure source in the form of a small manually operated valve, is fitted at the extreme lower left of the pilot's instrument panel. This device allows the pilot to open the static pipeline to the cabin atmosphere if malfunction occurs in the normal static system. Certain instrument errors will be noticeable with the alternative static source selected as follows:

At any altitude, speed, flap position, power setting and with DV windows open or closed, an altimeter error of less than 50 ft low reading will be incurred, within all normal flight conditions.

With a clean pitot, the ASI reading will not be slow, or fast, by more than 10 kt.

Emergency Locator Transmitter Systems

One of these systems may be installed under an optional modification (Section 3 also refers). Of the two types specified, one is a permanent fixture in the aeroplane whilst the other can be detached, if required, for use as a separate mobile transmitter. Both of the systems can be triggered automatically by inertia switches or, manually, by switches on the main instrument panel. A test facility is included but tests must only be conducted with the prior agreement and permission of the local Air Traffic Control Organization.

Effectivity: Pre Mod NB/M/1518

Stand-by Compass

To obtain a correct reading from the stand-by compass the following conditions must be observed:

(1) Switch off the left and right generators

(2) DO NOT trip any circuit breakers

(3) Switch off all but the following electrical systems:

DAY	**NIGHT**
Pitot and Stall Warning Heaters	Pitot and Stall Warning Heaters
VHF No. 1	VHF No.1
ADF	ADF
Beacon	Beacon
	Nav Lights
	Instrument Panel Lights

Caution...
If these actions are not performed, the electrical system will introduce unpredictable deviations to the stand-by compass reading.

Deviation Card

The stand-by compass is affected by local magnetic field variations caused by electrical equipment and airframe structure. These variations are measured under the conditions listed above and recorded on the compass deviation card. The compass deviation card for the stand-by compass is positioned on the windscreen central pillar. The central column of the deviation card shows the required heading while the day or night columns show the compass reading that should be steered to achieve the required heading:.

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May 1983

Section 5 - Performance

- General

- Take-Off Weight Chart

- Landing Weight Chart

Section 5 - Performance

GENERAL

Performance Charts

The charts in this Section contain data establishing weight limitations for take-off and landing in accordance with Civil Aviation Order 101.22.

Extrapolation outside the boundaries of the performance charts is not permitted. When the outside air temperature and/or pressure height is below the lowest range scheduled on the charts, the aeroplane performance shall be assumed to be not better than that appropriate to this lowest range. The performance information is not valid when the outside air temperature and/or pressure height exceed the maximum values for which this information is scheduled.

Take-off

The gross weight of the aeroplane for take-off shall not exceed the lesser of:-

(i) the maximum take-off weight specified in Section 2 of this Manual; and

(ii) the gross weight for take-off determined from the take-off weight chart of this section.

The take-off weight chart is based on factored take-off distances from rest to a height of 50 feet with all engines operating at take-off power. The surface corrections on the chart are based on standard factors related to strips with a firm surface. Soft ground and unusually long and/or wet grass will increase the take-off 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 take-off distance is such that the aeroplane is held on or close to the ground until the appropriate take-off safety speed is approached, and the climb away then commenced so that this speed is achieved and maintained at or before the 50 foot height point.

Section 5 - Performance

The weight limitation curve on graph A of the take-off weight chart, is to ensure that the aeroplane achieves the required 6 per cent climb gradient at take-off. This graph is based on the all engines climb at the take-off safety speed using take-off power. For aeroplanes fitted with propellers of not less than 2032 mm diameter (Sect 2 refers) the take-off performance will be improved by 5 per cent, for similar conditions of weight, altitude, temperature, and runway environment, over that scheduled in the Take-off Weight Chart.

Landing

The gross weight of the aeroplane for landing shall not exceed the lesser of:-

(i) the maximum landing weight specified in Section 2 of this Manual; and

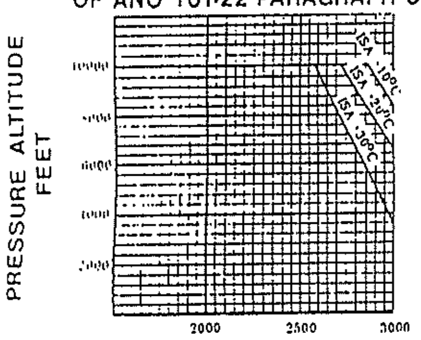
(ii) the gross weight for landing determined from the landing weight chart of this Section.

The landing weight chart is based on factored landing distances on a short dry grass surface from a height of 50 feet to stop. The chart is also applicable to sealed and gravel strips. 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 landing distance is such that the aeroplane approaches at the given approach speed in a glide through the 50 foot height point at the strip threshold. After touchdown, maximum wheel braking is used to bring the aeroplane to a stop.

The weight limitation curve, on graph A of the landing weight chart, is to ensure that the aeroplane achieves the required 2 per cent climb gradient during a baulked landing in ISA+22.7 deg C conditions. This graph is based on an all engines operating climb at the approach speed using take-off power.

LIMITING WEIGHT FOR ALL ENGINES TAKE-OFF CLIMB GRADIENT REQUIREMENT OF ANO 101·22 PARAGRAPH 3·21



TAKE-OFF WEIGHT CHART

BN-2B-20 & BN-2B-21 ISLANDERS

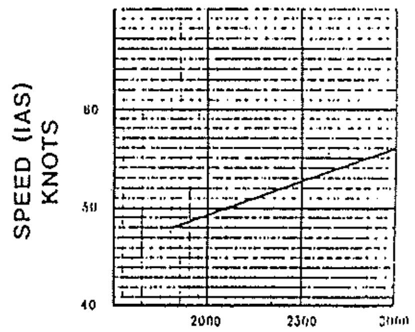
CONFIGURATION	TAKE-OFF POWER: FLAPS T.O. (25 DEG) REV MIN: FULL FINE (2700) MAN PRESS: FULL THROTTLE

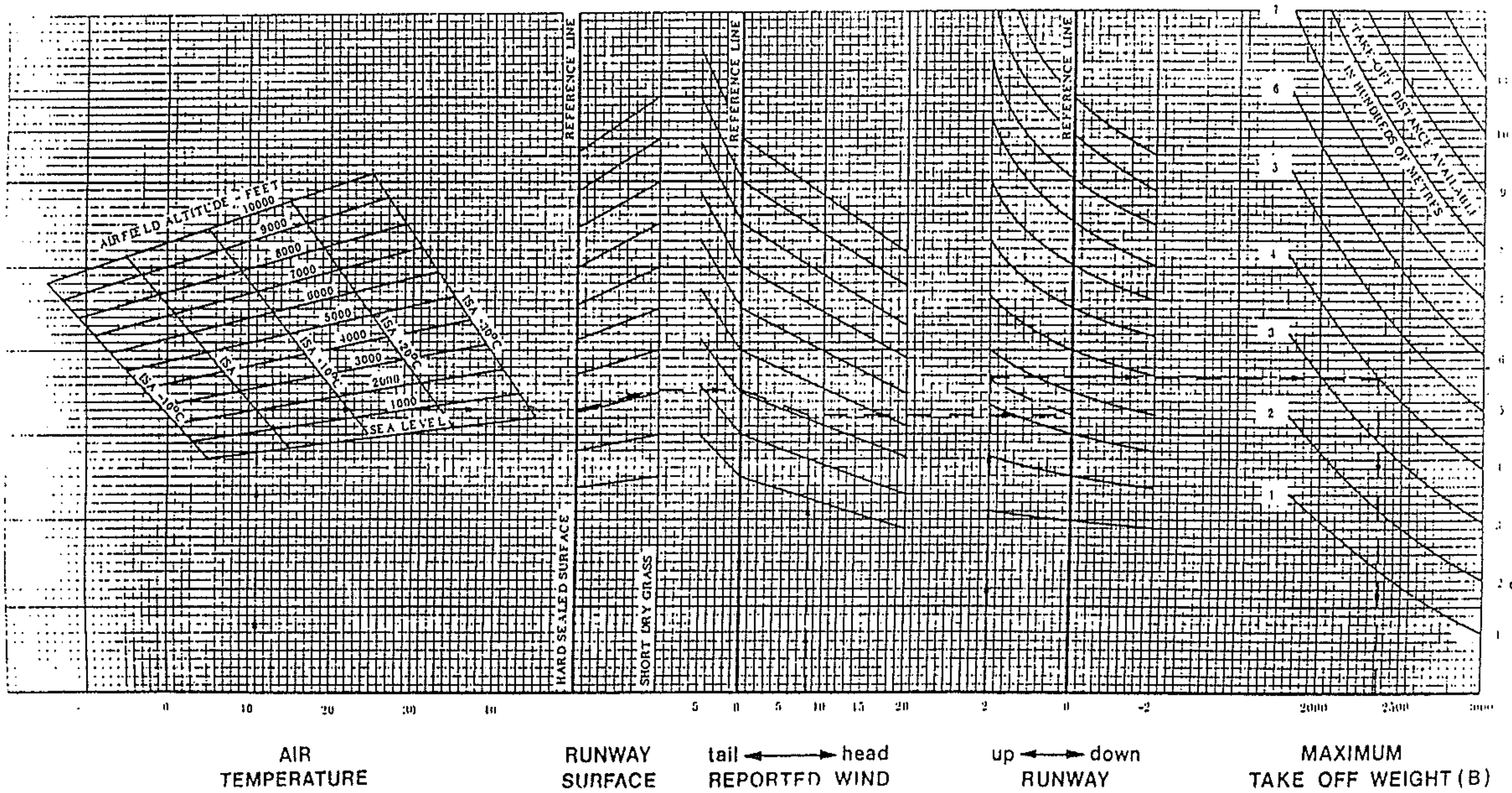
1. WEIGHT BASED ON LESSER OF 1.22 ALL ENGINE DISTANCE TO 50 FT (B) AND THE MINIMUM ALL ENGINES TAKE-OFF POWER CLIMB GRADIENT OF 6 PER CENT AT AIRFIELD ALTITUDE AND TEMPERATURE (A)
2. SET ALTIMETER AT 1013 MILLIBARS TO READ AIRFIELD PRESSURE ALTITUDE

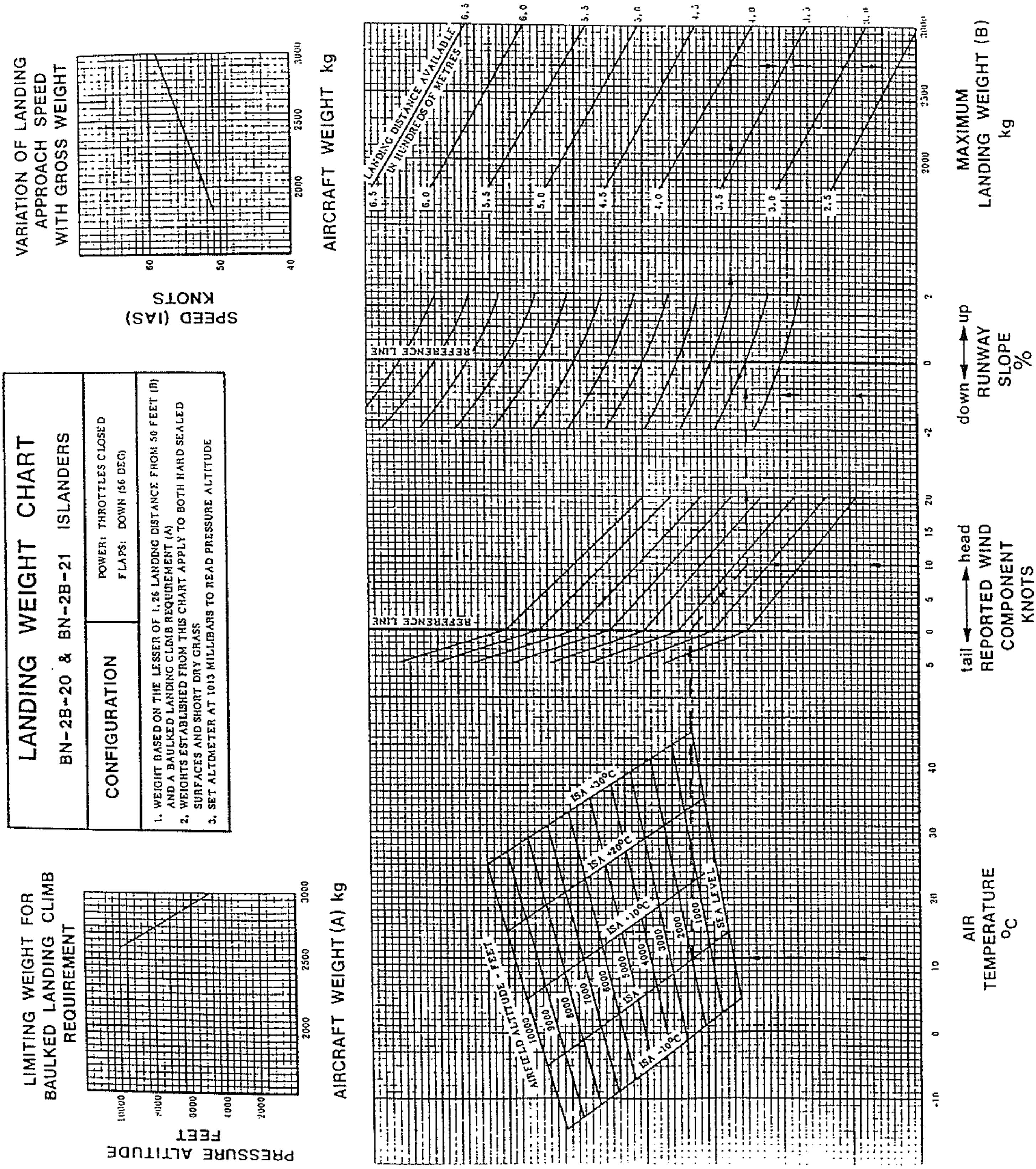
NOTE:
FOR IFR CHARTER OR AERIAL WORK GROSS WEIGHT FOR TAKE-OFF SHALL NOT EXCEED THE FOLLOWING:

BN-2B-20 2880 kg
BN-2B-21 2962 kg

VARIATION OF TAKE-OFF SAFETY SPEED (V_2) WITH GROSS WEIGHT






LANDING WEIGHT CHART
BN-2B-20 & BN-2B-21 ISLANDERS
CONFIGURATION
POWER: THROTTLES CLOSED
FLAPS: DOWN (56 DEG)
1. WEIGHT BASED ON THE LESSER OF 1.26 LANDING DISTANCE FROM 50 FEET (B) AND A BAULKED LANDING CLIMB REQUIREMENT (A)
2. WEIGHTS ESTABLISHED FROM THIS CHART APPLY TO BOTH HARD SEALED SURFACES AND SHORT DRY GRASS
3. SET ALTIMETER AT 1013 MILLIBARS TO READ PRESSURE ALTITUDE
VARIATION OF LANDING APPROACH SPEED WITH GROSS WEIGHT
SPEED (IAS) KNOTS
AIRCRAFT WEIGHT kg
LIMITING WEIGHT FOR BAULKED LANDING CLIMB REQUIREMENT
PRESSURE ALTITUDE FEET
AIRCRAFT WEIGHT (A) kg
LANDING DISTANCE AVAILABLE IN HUNDREDS OF METRES
REFERENCE LINE
AIRFIELD ALTITUDE - FEET
SEA LEVEL
ISA -10°C
ISA
ISA +10°C
ISA +20°C
ISA +30°C
MAXIMUM LANDING WEIGHT (B) kg
RUNWAY SLOPE %
down up
REPORTED WIND COMPONENT KNOTS
tail head
AIR TEMPERATURE °C

Britten Norman 2A-21
ISLANDER

Speeds (kias)

Vso	40	Vfe $_{25^o}$	114	X wind	30
Vs	50	Vfe	88	Vtoss	
Vmc	39	Va	107	2994 kg	56
Vx	65	Vno	141	Vat	
Vy	65	Vne	184	2858 kg	58
Vxse	65	Baulked Flap	61	2300 kg	55
Vyse	65				

Aircraft Weights	VH-OBJ
BEW(2 seats)	1852
BEW(10 seats)	1897
MTOW	2994
MLW	2858
MZFW	2812

Tyre Pressures
Nose : 29 PSI Main: 35 PSI

Door Off Limitations:
130 kias max, 30 AOB, No smoking, MTOW 2994 kg, Right door locked.

Fuel Capacity	litres	US Gal	kgs
Main Tanks useable	492	130	354
Auxiliary Tip Tanks	204	55	147

Fuel Policy @ 67%	litres	US gal	kg
Climb/Cruise/Taxi	140/hour	37/hour	101/hour
Variable reserve	140/hour	37/hour	101/hour
Holding @ 15"/2000 rpm	84/hour	22/hour	61/hour
Fixed Reserve	63	17	45
Planned TAS @ 22"/2300 rpm	140 kts		

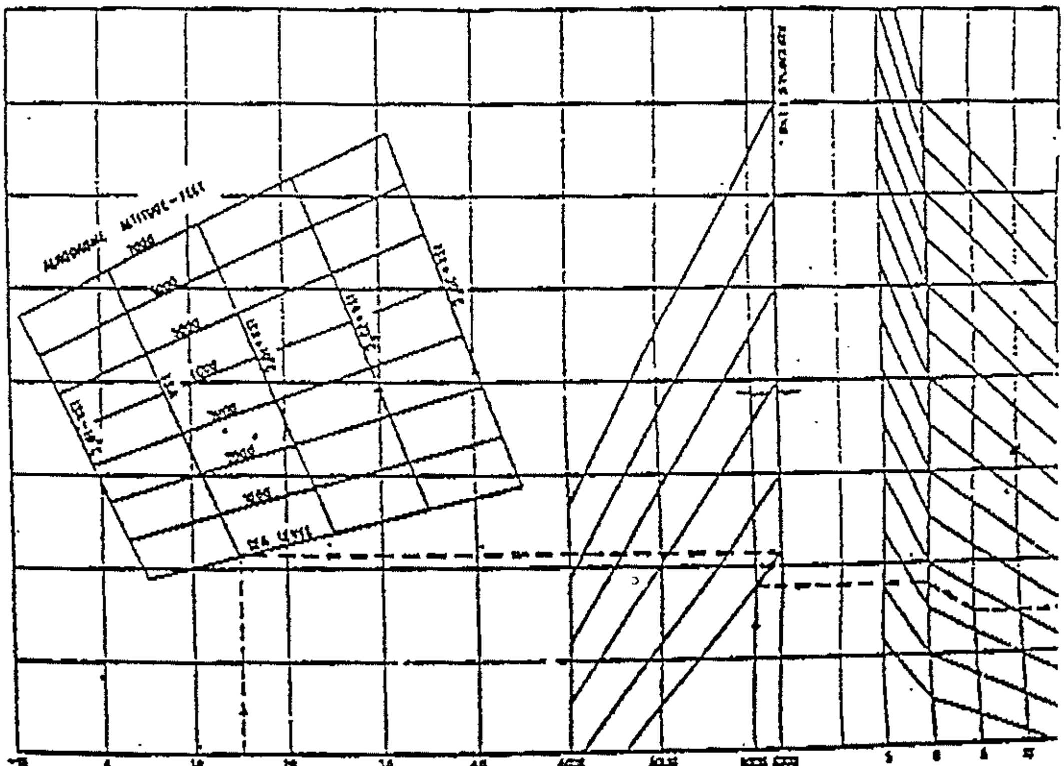
Engines
Lycoming IO-540

MTOP/MCP	29" MP 2700 rpm
Climb	25" MP 2500 rpm
Cruise	23" MP 2300 rpm
Descent	15" MP 2200 rpm

Additional Information

- Oil levels not lower than 10 qts/side

TAKE-OFF DISTANCE TO 50 FEET



NOTE: Take-off roll approximately 60% of take-off distance to 50 ft.

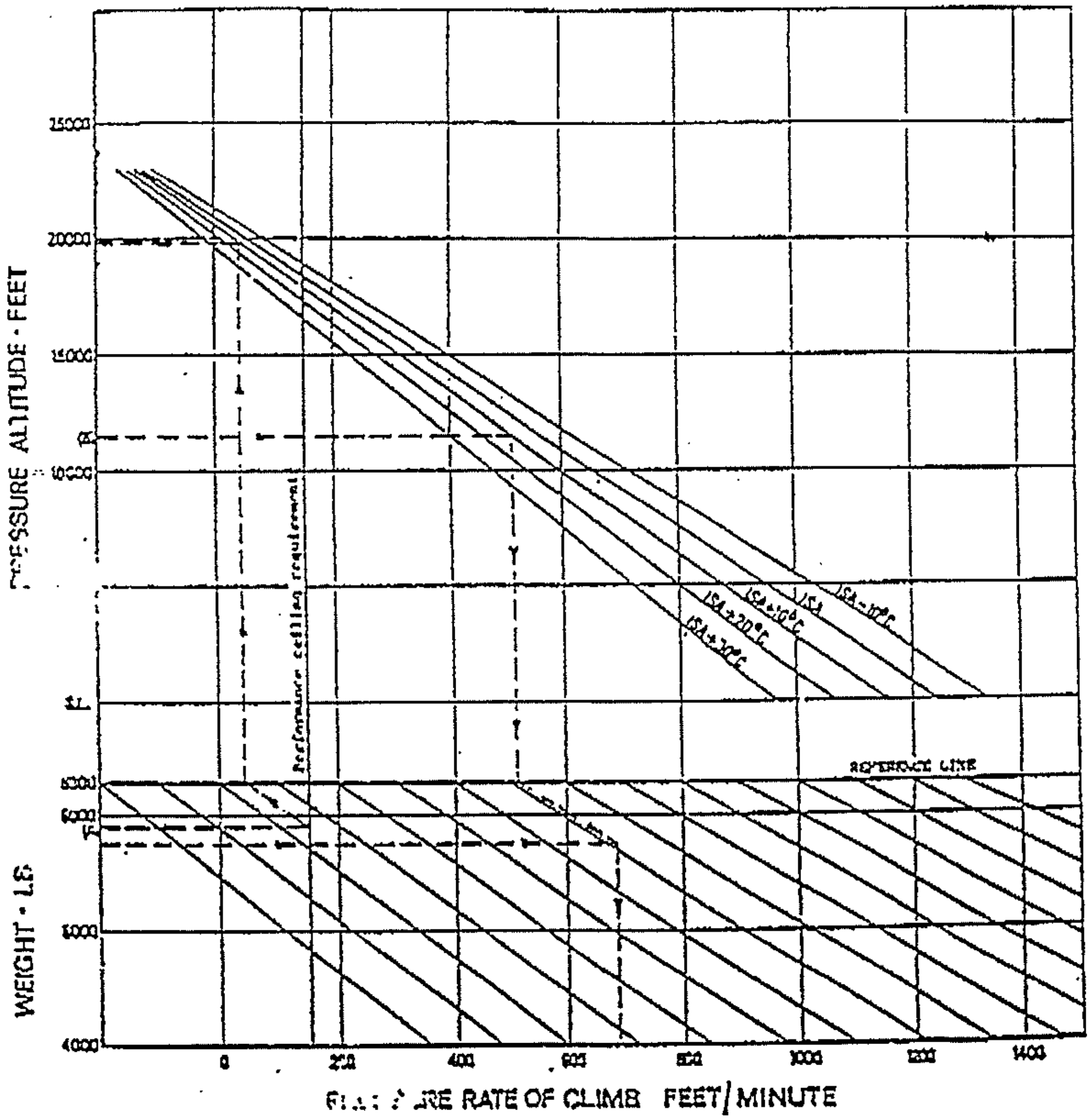
Conditions:—
Dry tarmac runway
(For operations from dry grass runways with freshly cut grass and firm subsoil, the distance for a dry tarmac runway should be increased by 10%)

Technique:—
Aircraft rotated at V_1 minus 4 knots and climbed through 50 ft. at V_2 (See fig. 6.10)

Example: Temperature: ISA
Weight: 8,000 lb.
Altitude: Sea Level
Headwind: 6 knots
} Take-off dist to 50 ft. : 8…

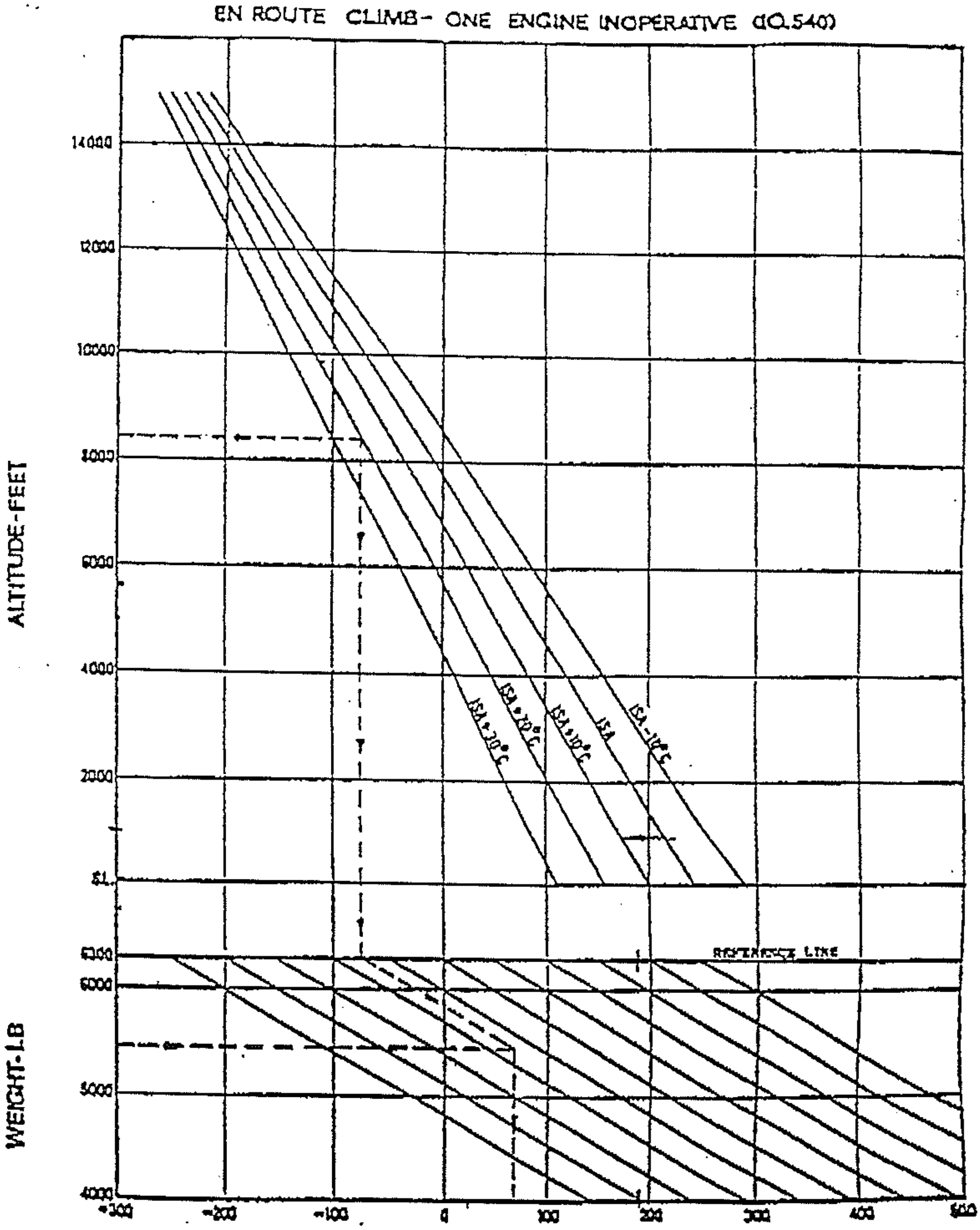
Fig. 6.2 Take-off distance over 50 foot obstacle at vari weights, altitudes, temperatures and winds

EN ROUTE PERFORMANCE CEILING AND GROSS RATE OF CLIMB – TWO ENGINES OPERATING



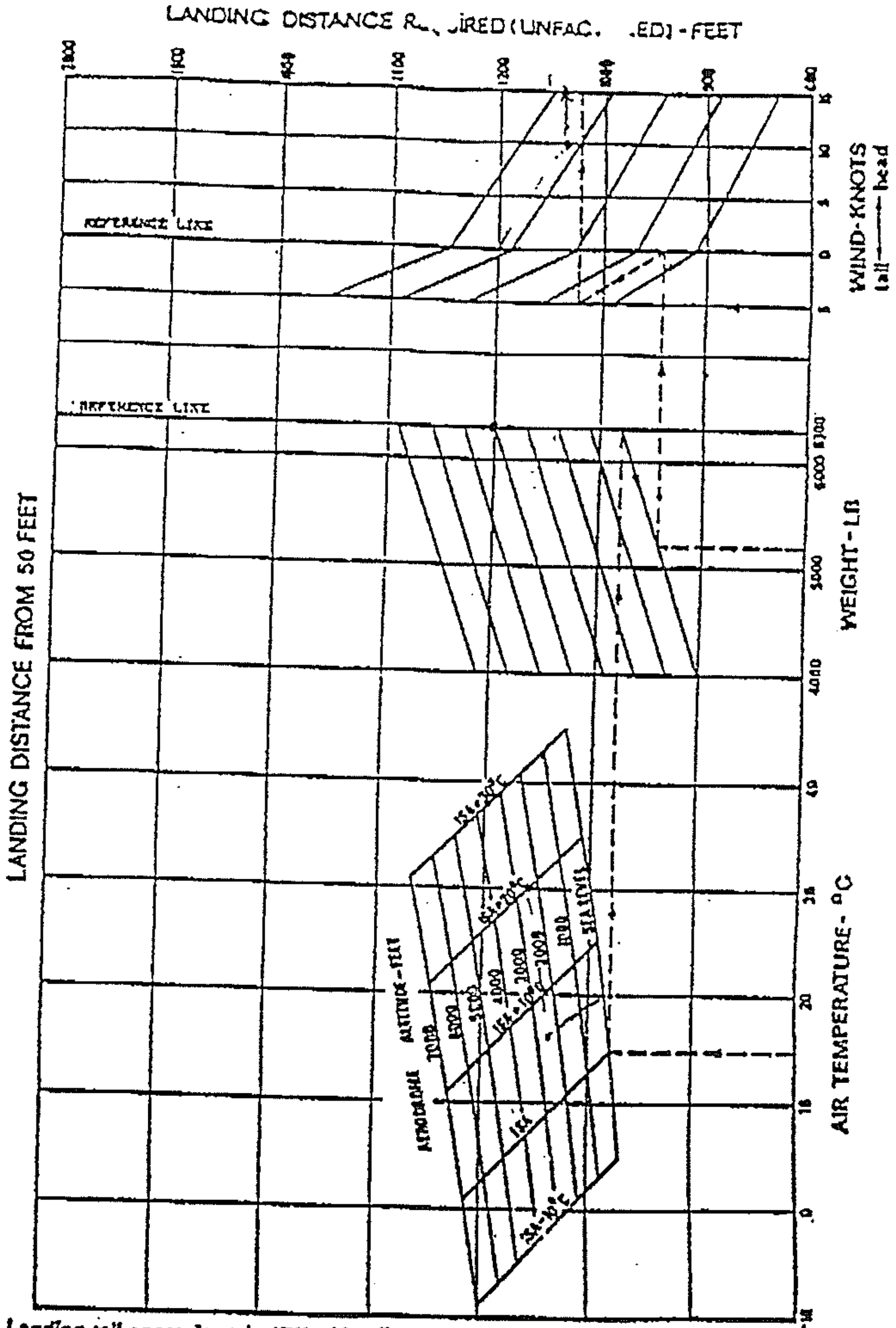
[illegible]:	65 Knots (75 mph) IAS
[illegible]:	Weight: 5,900 lb Temperature: ISA+10°C Performance ceiling: 15,300 ft.
Example (B):	Altitude: 11,500 ft. Temperature: ISA+10°C Weight: 5,750 lb. Rate of climb: 650 ft./min.

Fig. 6.3 Multi-engine rate of climb



Climb Speed:	65 knots (75 mph) IAS
Example:	Altitude: 8,400 ft. Temperature: ISA+21°C Weight: 5,450 lb. Single engine pressure rate of climb: 67 ft./min.

Fig. 6.4. Single engine rate of climb



NOTE: Landing roll approximately 47% of landing distance from 50 ft.

Conditions:—
Dry tarmac runway
(For operations from dry grass runways with freshly cut grass and firm subsoil, the distance for dry tarmac should be increased by 10%)

Technique: Approach at appropriate threshold speed. (See Fig. 6.10
Maximum wheel braking applied immediately after touchdown.

Example:
Temperature: ISA
Weight: 5,200 lb.
Altitude: Sea level
Tailwind: 5 knots
} Landing distance from 50 ft. : 1,045 ft.

Fig. 6.9 Landing distance required (over 50 ft. obstacle)

May 1983

Section 6 - Mandatory Equipment List

- Mandatory Instruments and Indicators

Section 6 - Mandatory Equipment List

MANDATORY INSTRUMENTS AND INDICATORS

The aeroplane shall not be operated unless, in addition to the minimum flight and navigational instruments required by Air Navigation Orders Section 20.18. the following indicators and instruments are also installed:-

(a) Position Indicators -

- (i) Trim position indicators
- (ii) Flap position indicator (pre-Mod NB/M/1287), or position lamps (Mod NB/M/1287)

(b) Power Plant Instruments and Indicators -

- (i) Fuel quantity indicator for each tank
- (ii) Fuel pressure indicator for each engine
- (iii) Oil pressure indicator for each engine
- (iv) Oil temperature indicator for each engine
- (v) Tachometer for each engine
- (vi) Manifold pressure indicator for each engine
- (vii) Cylinder head temperature indicator for each engine
- (viii) Fuel flowmeter for each engine (pre-Mod NB/M/1287 aeroplanes only)

(c) Other Airworthiness Instruments or Indicators -

Stall Warning indicator

Door warning and safety interlocking systems

Note...

The cabin door latching mechanisms operate microswitches which activate warning lamps if any door is not securely fastened. In addition, a solenoid-operated interlocking system, wired through the magneto switches of the port engine, prevents the pilot's door from being opened if the port magnetos are ON.

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May 1983

Section 7 - Radio Systems

- Operational Limitations

Section 7 - Radio Systems

OPERATIONAL LIMITATIONS

The radio communication and radio navigation systems in this aeroplane are approved for the types of operation and maximum operating altitudes shown in the table below.

Approval for a particular type of operation is signified by inclusion of the maximum operating altitude of the equipment (expressed in thousands of feet) under the appropriate headings in the table.

System	Equipment Type	Type of Operation		
		I.F.R	Limited I.F.R	Day and Night V.F.R
COM 1 & 2	KING KX165	I15	I15	I15
NAV 1	KING KX165, KI525A	I15	I15	I15
NAV 2	KING KX165, KI202	I15	I15	I15
ADF 1 & 2	KING KR87, KI227	I15	I15	I15
HF	CODAN 2000	I30	I30	I30
DME I	KING KN63	I50	I50	I50
ATC	KING KT76A	I15	I15	I15
MODE C	KING KEA 126	I15	I15	I15
MARKER	KING KR 21	I15	I15	I15
AUDIO	SG BROWN B691	I25	I25	I25

FM/47

May 1983

Section 8 - Weight and Balance

- Loading Data

Section 8 - Weight and Balance

LOADING DATA

General

This Section contains basic weight and centre of gravity information necessary to ensure correct loading of the aeroplane and comprises Aeroplane Weight and Loading System pages. Both of these documents, separately approved by the Dept of Aviation are to be carried in the Flight Manual at all times.

It is the responsibility of the owner to ensure that current copies of these documents are included in this Section of the Flight Manual.

Aeroplane Weight

Aeroplane Type BN-2B Islander

Registration Marking VH

Issue	Date	Date of Expiry

Aeroplane Weight and Centre of Gravity Data:

Weight (see note below) kg	Arm (aft of datum) mm	Index Units	Cabin Configuration
			Passenger
			Freighter
			Ambulance
			Aerial Survey
			Crop Spraying

Note... The above weight(s) include those items comprising the basic aeroplane plus optional equipment installed to customers requirements.

Approved Stamp

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Loading System

Aeroplane Type BN-2B Islander

Registration Marking VH

Issue	Date

Refer to C.G. particulars (Sect 2) also to the Cargo Loading Chart (overleaf) and to the Load and Trim Sheets supplied with each aeroplane.

ITEM	LEVER ARM MM
FUEL	+ 685.8
ENGINE OIL	- 66.0
BAGGAGE	+2679.7
Passenger role	
Passenger in Row 1	-1148.1
2	- 381.0
3	+ 383.5
4	+1127.7
5	+1839.0

Freighter role

Floor loading limits shown in Section 2

Approval
Stamp

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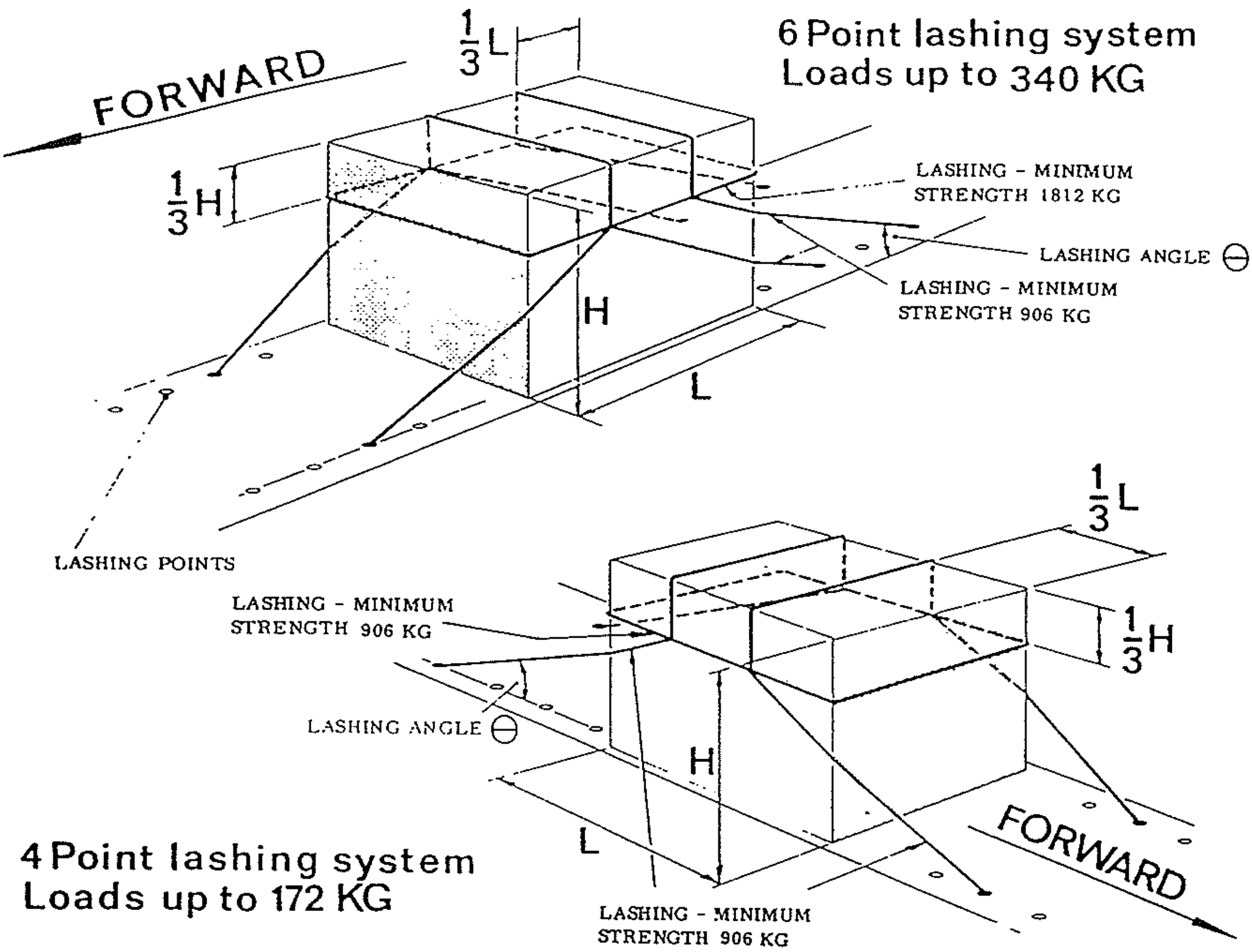
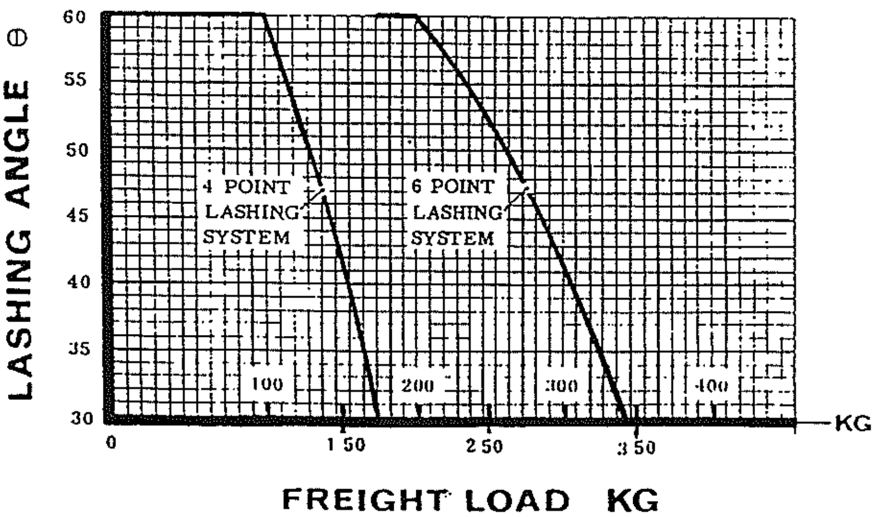


CURVES OF LOAD AGAINST LASHING ANGLES



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6.2 AIRCRAFT WEIGHT

AIRCRAFT TYPE: BN2B-21 S/n. 2177

REGISTRATION: VH-BNX

ISSUE	DATE	EXPIRY DATE
ONE	11/7/95	10/7/98

ITEM	WEIGHT KG	ARM mm AFT OF DATUM	INDEX UNIT kg/mm / 1000	CONFIGURATION
EMPTY WEIGHT	1953.2	645	1259.345	10 SEATS TOTAL
BASIC WEIGHT	1973.6	637	1257.999	10 SEATS TOTAL

NOTE; THE ABOVE WEIGHTS INCLUDE;

EMPTY WEIGHT: UNUSABLE FUEL & UNDRAINABLE ENGINE OIL

BASIC WEIGHT: UNUSABLE FUEL & FULL ENGINE OIL

REFER TO FLIGHT MANUAL 6.3 ISSUE 1 FOR LOAD SYSTEM.

J.W. LIDDLE
6 PERINGA ST.
COOPERS PLAINS
QLD. 4108
PHONE: (07) 277 1311
A/H (07) 277 3621
FAX (07) 277 9347
MOBILE: 015 652 376

APPROVED

DATE 11/7/95

WEIGHT CONTROL OFFICER ...

6.3 LOADING SYSTEM

AIRCRAFT TYPE BN2B-21 S/n. 2177

REGISTRATION VH-BNX

ISSUE	DATE
FOUR	18/4/95

1) REFER TO FLIGHT MANUAL FOR LOAD LIMITATIONS.
2) LOAD AIRCRAFT USING LOAD SYSTEM JL-29 ISSUE 5.
3) CHECK LOADING AT ZERO FUEL AND TAKE-OFF WEIGHTS.

ooooOoooo

J.W. LIDDLE
6 PERINGA ST.
COOPERS PLAINS
QLD. 4108

PHONE: (07) 277 1311
A/H (07) 277 3621
FAX (07) 277 9347
MOBILE: 015 652 376

APPROVED

DATE 11/7/95

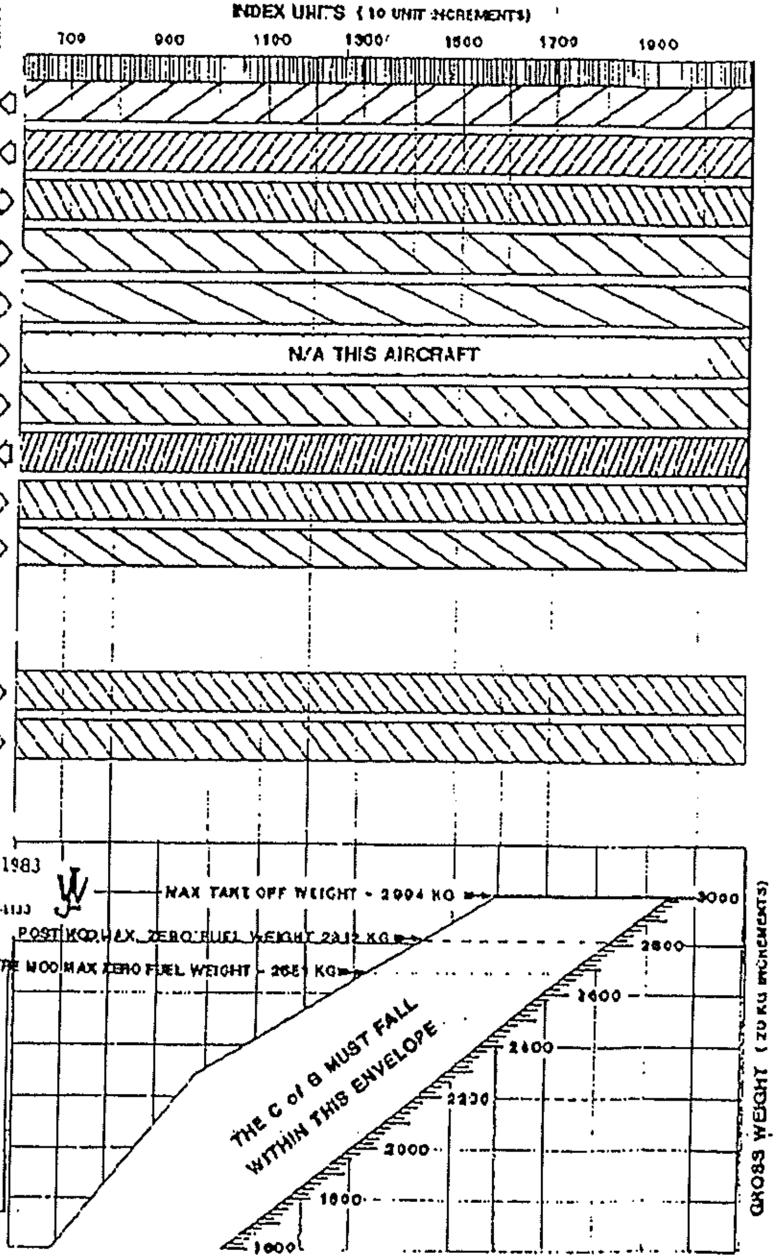
WEIGHT CONTROL OFFIC 1Q6

LOAD SYSTEM JL-29 ISSUE 5 — VH-BNX — BN2B-21 LOAD SHEET

FLIGHT No:	DATE:
FROM:	TO:
CAPTAIN:	
FIRST OFFICER:	

PASSENGER LIST	Wt.	Bgge.	Comp.
TOTALS			

	WEIGHT - KG	INDEX
AIRCRAFT BASIC WEIGHT		
SEATS - ROW 1		77 KG
SEATS - ROW 2		77 KG
SEATS - ROW 3		77 KG
SEATS - ROW 4		77 KG
SEATS - ROW 5		77 KG
BAGGAGE - PRE MOD NB/M/483		20 KG
BAGGAGE - POST MOD NB/M/183		20 KG
FREIGHT - STN 122		50 KG
FREIGHT - STN 162		50 KG
FREIGHT - STN 194		50 KG
ZERO FUEL WEIGHT (REFER FLIGHT MANUAL FOR MAX WT)		
FUEL - MAIN		50 KG
FUEL - TIP		50 KG
TAKE OFF WEIGHT		
FUEL BURN OFF		
LANDING WEIGHT		



PILOTS CERTIFICATE.
I AM SATISFIED THAT THE AIRCRAFT IS CORRECTLY LOADED FOR SAFETY IN ACCORDANCE WITH REGULATIONS SPECIFIED BY THE CIVIL AVIATION AUTHORITY

CAPTAIN.....................

DATE............. TIME.........

LOAD SHEET
PREPARED BY AND CERTIFIED CORRECT.

....

STATUS.....................

METHOD OF USE

1. OBTAIN THE BASIC INDEX & STARTING FROM THIS POINT ON THE INDEX SCALE, DROP A VERTICAL LINE TO THE SLOPING LINE IN THE FIRST COMPARTMENT IN USE, MOVE HORIZONTALLY, DO NOT SLIDE DOWN THE SLOPING LINE, ALONG THIS SCALE IN THE INDICATED DIRECTION FOR THE APPROPRIATE LOAD INCREMENT, BEFORE MOVING VERTICALLY DOWN OR UP TO THE OTHER SCALES IN USE, MOVING ALONG EACH SCALE IN THE SAME MANNER.
2. DRAW A VERTICAL LINE FROM THE LAST COMPARTMENT SCALE IN USE DOWN TO THE C of G ENVELOPE (NEGLECTING THE FUEL) STOPPING AT THE APPROPRIATE WEIGHT. THIS POINT SHOWS THE C of G AT ZERO FUEL WEIGHT.
3. THE C of G AT TAKE-OFF MAY BE FOUND BY RETURNING TO THE FUEL SCALE AND MAKING THE APPROPRIATE ALLOWANCE FOR FUEL (AS SHOWN ON CHART) BEFORE DROPPING ANOTHER VERTICAL LINE TO THE C of G ENVELOPE, STOPPING AT THE TAKEOFF WEIGHT.

THE OWNER/OPERATOR OF VH-BNX IS HEREBY AUTHORISED TO REPRODUCE LOAD SYSTEM JL-29 ISSUE 5 PROVIDED THAT IT IS REPRODUCED WITHOUT ANY ALTERATIONS WHATSOEVER AND IS NOT USED FOR ANY OTHER AIRCRAFT.

APPROVED 11/7/95
[signature] A06

CIVIL AVIATION AUTHORITY AUSTRALIA

WEIGHT AND BALANCE RECORD

Part A - Weight and Balance Maintenance Data *(to be completed by a Weight and Balance Control Officer (WBCO))*

Revision and Re - Issue Required 10/7/98

J. W. Liddle
6 Peringa Street,
COOPERS PLAINS, 4108
Phone (07) 277 1311
A/H. (07) 277 3821
Fax (07) 277 9347

APPROVED
DATE 11-7-95
WEIGHT CONTROL OFFICER A06 AP27
Approval Stamp

Weight and Balance Report Ref: WB-2270

Centre of Gravity Position (CG) is LONGITUDINAL / ~~LATERAL~~ *(delete as appropriate)* measured AFT of datum

Configuration: 10 SEATS TOTAL

Aircraft Longitudinal / ~~Lateral~~ Datum

20mm AFT OF W.L.E. BETWEEN ENGINE & FUSELAGE

Empty Weight and Empty Weight CG (Weighing ~~or Validation~~ dated 11 / 7 / 95)

Weight (kg)	Arm (mm)	Index
1953.2	645	1259345

Maximum and Minimum Empty Weight & Empty Weight CG. Revision and Re-Issue by WBCO is required when calculated running totals are

	Weight (kg)	Arm (mm)
MORE THAN	1968.2	650
or LESS THAN	1938.2	640

Part B - Record of Empty Weight and Balance Changes *(the person co-ordinating maintenance shall ensure that Part B is calculated and recorded in accordance with CAO 100.7)*

Date	Description of Alteration	Moment Arm from Datum (mm)	Weight and Balance Change: Added (+) Weight (kg)	Added (+) Index	Removed (-) Weight (kg)	Removed (-) Index	Running Total of Empty Weight & Empty Weight CG: Weight (kg)	Arm (mm)	Index
11/7/95							1953.2	645	1259345

Organisation: J. W. & D. J. LIDDLE, 6 PERINGA ST. COOPERS PLAINS 4108. (07) 277 3821

A. Type BN2B-21 S/N 2177 VH - BNX

May 1983

Section 9 - Supplements

- As Listed Overleaf

LIST OF SUPPLEMENTS

General

The following is a list of approved Flight Manual Supplements issued in respect of the BN2B-20 and -21 Islander Aeroplane.

Any operation which is subject to the limitations and instructions contained in a Supplement shall not be undertaken unless the particular Supplement has been included in this section.

Supplement Title

Radio Systems and Types of Operation. Refer to Section 7

Overweight and Delivery Flights with a temporary fuel system installed.
(Modifications NB/M/233 and NB/M/435)

Information and procedures for the operation of Islander aircraft with Mod NB/M/866 Part 4 incorporated (propeller synchronisers).

Procedures, limitations and information for operation of increased wingspan Islanders with wing top fuel tanks (Model BN-2B-21) and differing operational weight.

Optional wing tip fuel tanks and automatic fuel transfer facilities to modification NB/M/1153

S-TEC System 50 Auto Pilot Model ST-225-50 installed IAW STC SA 5307SW-D

Operation with left hand rear cabin door removed.

OVERWEIGHT AND DELIVERY FLIGHTS WITH A TEMPORARY FUEL SYSTEM INSTALLED (MODIFICATIONS NB/M/233 AND NB/M/435)

INTRODUCTION

This installation consists of a crate that provides a mounting for the fuel tanks and a control panel embodying two electrically operated fuel pumps and three fuel cocks. One two way tank selector cock is employed, with two ON/OFF cocks in the fuel feed lines. Fuel pump selector switches are also mounted on the control panel and the electrical system is connected to a temporary circuit breaker on the circuit breaker panel. Fuel drums have been adapted for use as fuel tanks but there is no low fuel level warning device. The fuel system may consist of either 2 or 4 drums. If it consists of 2 drums the rearmost drum is No. 1 TANK and the foremost drum is No. 2 TANK. If it consists of 4 drums the two rearmost drums together constitute No. 1 TANK and the two foremost drums together constitute No. 2 TANK. The installation is mounted in the cabin and locates in the keyhole slots in the cabin floor. Fuel is fed from the installation through flexible fuel piping connected to the main fuel feed system, downstream of the main fuel cocks.

LIMITATIONS

Unless superseded by any of the following special limitations imposed by this Supplement, the normal limitations stated in Section 2 of the Flight Manual remain applicable.

Use of Aeroplane

The aeroplane shall not be used for the purpose of public transport or aerial work. Flight may be made solely to reach a place at which it is intended to use the aeroplane in its normal role.

Carriage of persons

No person shall be carried who is not necessary for the safety of the aeroplane during the delivery flight or who is not a member of the flight crew.

Maximum duration of flight

No flight shall be attempted if it is calculated that, at arrival at the intended destination and at each alternative destination, and after an engine failure at any point along the route, the quantity of oil remaining in the oil system of the operative engine is insufficient for the engine to continue operating safely. The oil consumption assumed is to be taken as equal to the mean rate obtained during the previous five hours flying but, in any case, no flight shall be attempted if this mean rate of oil consumption was more than 1 US pint (0.47 litres) per hour on either engine.

Runway surface

At weights in excess of 2994 kg the aeroplane must be operated from hard runways.

Weight and balance

Maximum take off weight is 3293 kg. The maximum landing weight, except in an emergency, remains at 2994 kg. Centre of gravity range: the aeroplane shall be so loaded that the centre of gravity falls within the limits shown by Fig. 1.

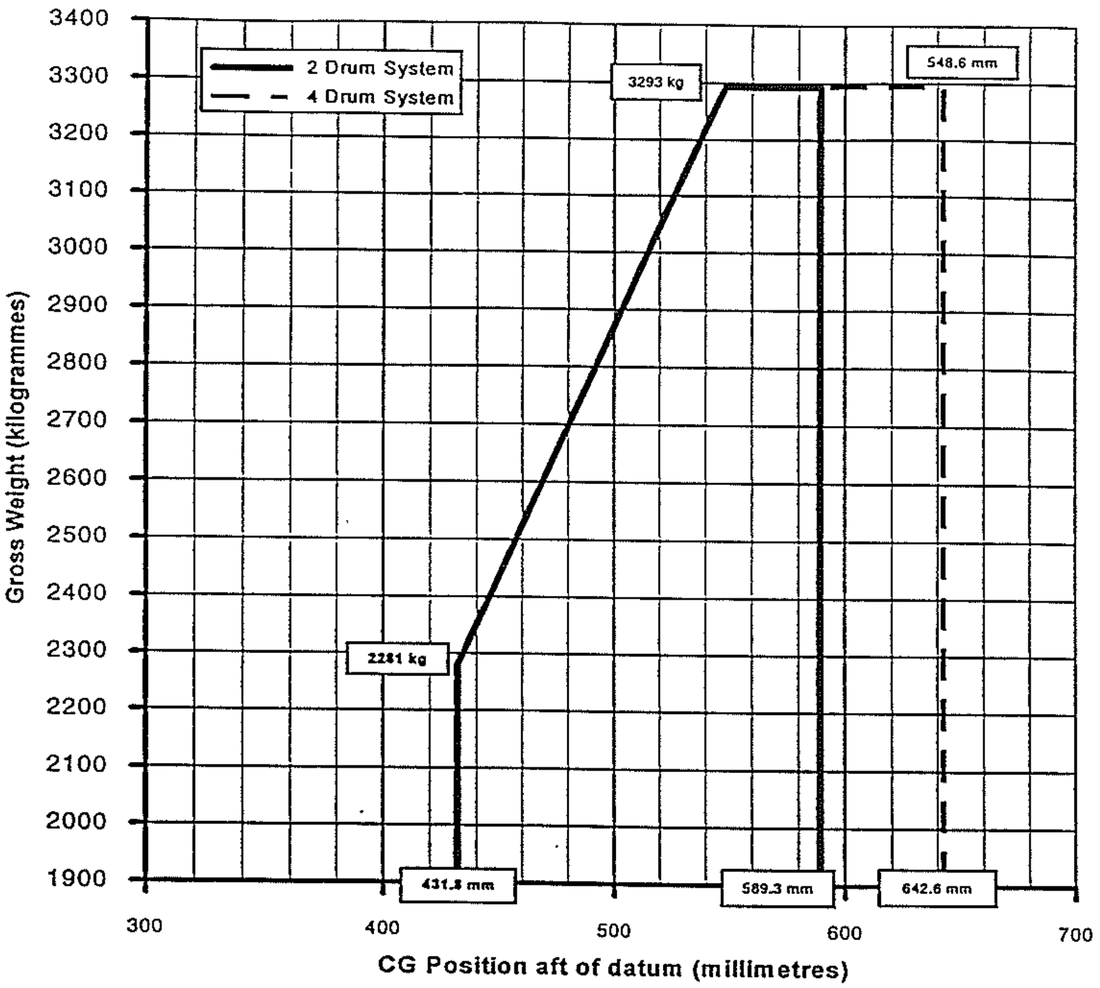


Fig 1 C.G. Envelope diagram

Smoking

Smoking is not permitted.

Flight compartment placards

A placard (to Mod NB/M/435 standard) detailing Emergency and Normal Operating Procedures to be observed during operation with the ferry fuel system, shall be available to the pilot in the cockpit.

EMERGENCY PROCEDURES

Single Engine Failure

(1) If operating on main fuel tanks appropriate main fuel cock OFF.

(2) If operating on ferry fuel tanks appropriate ferry fuel feed cock OFF.

NORMAL OPERATING PROCEDURES

Handling on the ground

(1) Ensure that the tyre pressures of the four main undercarriage wheels are adjusted to 38 lb/in² (262 kPa).

(2) During refuelling operations both the main fuel cocks, the two ferry fuel feed cocks and the switches for the ferry fuel pumps, on the tank crate, must be in the OFF position. The wing tanks must be replenished first.

(3) Before starting the engines, check the operation of each of the two ferry fuel pumps, in turn, by switching ON and listening for pump operation. After checking, switch the pumps OFF.

(4) Select cabin ventilation services ON to ensure a flow of air through the cabin.

(5) Avoid fast or very small radius turns, and heavy braking, when manoeuvring on the ground before and after each flight.

Tank capacities

Each drum has a total fuel capacity of 54.6 US gal 206.8 litres); there is an air space of 2 to 3 per cent in each drum. Usable fuel, in level flight for each of the two possible systems is:

2 Drum System 53.4 US gal (202.3 litres) per tank

4 Drum System 106.8 US gal (404.6 litres) per tank

A dipstick is provided for the purpose of checking the fuel level.

Handling in flight

Pre Take-Off Checks

(1) Ferry fuel tank selector cock No. 1 TANK ON.

Caution...
To operate aeroplane within its centre of gravity limits, No.1 ferry fuel tank must be used first.

(2) Ferry fuel feed cock - left engine OFF.

(3) Ferry fuel feed cock - right engine OFF

(4) Ferry fuel pumps OFF.

(5) Main fuel cock - left engine LEFT TANK.

(6) Main fuel cock - right engine RIGHT TANK.

(7) Auxiliary fuel pumps ON

(8) Ensure cabin ventilation services ON

Caution...
The ferry fuel system is ungauged and unusable fuel in various flight attitudes has not been determined. Use of the ferry fuel system at low fuel states must be confined to level flight.

After Take-Off

After take-off, at the pilots discretion auxiliary fuel pumps OFF.

Ten Minutes After Take-Off

(1) Ferry fuel feed cock - left engine ON.

(2) Ferry fuel feed cock - right engine ON.

(3) Ferry fuel pumps ON.

(4) Main fuel cock - left engine OFF.

(5) Main fuel cock - right engine OFF.

(6) Ensure auxiliary fuel pumps OFF.

First Sign of Engine Malfunction Due to Fuel Starvation

Ferry fuel tank selector cock No. 2 TANK ON.

Second Sign of Engine Malfunction Due to Fuel Starvation

(1) Main fuel cock - left engine LEFT TANK.

(2) Main fuel cock - right engine RIGHT TANK.

(3) Auxiliary fuel pumps ON.

(4) Ferry fuel feed cock - left engine OFF.

(5) Ferry fuel feed cock - right engine OFF.

(6) Ferry fuel pumps OFF.

When Satisfactory Engine Operation has been Established

(7) Auxiliary fuel pumps OFF.

Pre Landing Checks

(8) Main fuel cock - left engine LEFT TANK.

(9) Main fuel cock - right engine RIGHT TANK.

(10) Auxiliary fuel pumps ON.

(11) Ferry fuel feed cock - left engine OFF.

(12) Ferry fuel feed cock - right engine OFF.

(13) Ferry fuel pumps OFF.

WEIGHT AND BALANCE

Weight and Moment Data

2 Drum System

System weight and moment (including unusable fuel)		95.5 kg	+ 22843 kg mm
Usable fuel weight and moment:	Tank 1	145.4 kg	+ 44303 kg mm
	Tank 2	145.5 kg	- 44303 kg mm

4 Drum System

System weight and moment (including unusable fuel)		137.4 kg	+ 73988 kg mm
Usable fuel weight and moment:	Tank 1	290.7 kg	+ 354425 kg mm
	Tank 2	290.7 kg	0 kg mm

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INFORMATION AND PROCEDURES FOR THE OPERATION OF ISLANDER AIRCRAFT WITH MODIFICATION NB/M/866 PART 4 INCORPORATED (PROPELLER SYNCHRONIZER)

INTRODUCTION

Modification NB/M/866 introduces a Woodward Propeller Synchronizer system for the Islander. Part 4 of the modification caters for wide-deck engines (post-mod NB/M/746) as installed in Model BN-2B series Islanders.

TECHNICAL DETAILS

The Woodward Propeller Synchronizer, when energized, automatically adjusts the speed of each engine to identical rev/min provided that the rev/min of each engine are within 50 rev/min of each other. The speed adjustment is accomplished by varying the governor speeder-spring tension with an electric solenoid. The solenoid is controlled by a small computer which, when the system is ON, receives a signal from magnetic speed sensing devices in each governor. The computer signals for a reduction in rev/min on the fast engine and an increase in rev/min on the slow engine. Control of the system is effected by a single ON/OFF toggle switch at the lower L.H. side of the main instrument panel. The synchronizer system will not have sufficient power to automatically synchronize the engines unless the pilot has manually selected the engine speeds within 50 rev/min of each other. In the event of any failure of the synchronizer system, the propeller speed control system is only affected in that propeller synchronization must be accomplished manually (as for aircraft without this modification). There is no loss of constant speed facility or normal R.P.M. control.

EMERGENCY PROCEDURES

Propeller Synchronizer Failure

If the synchronizer system fails, as indicated by the failure of the system to auto-synchronize when both engine rev/min are within 50 rev/min of each other, select the system OFF.

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Engine Failure

Select the sychronizer OFF in the event of an engine failure.

NORMAL OPERATING PROCEDURES

The propeller synchronizer system must be OFF for take-off but may be selected ON at any time during normal flight after the en-route climb speed of 65 kt IAS has been attained and the flaps are in the UP position. The system will only function when the engine rev/min are within 50 rev/min of each other, as stated earlier in this Supplement.

Airfield Approach - Procedure and Checks

During the pre-landing checks, select the propeller synchronizer system OFF.

May 1983

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PROCEDURES, LIMITATIONS AND INFORMATION FOR OPERATION OF INCREASED WING SPAN ISLANDERS WITH WING TIP FUEL TANKS (MODEL BN-2B-21) AND DIFFERING OPERATIONAL WEIGHTS

INTRODUCTION

This supplement was first issued to make available the information relating to the model mentioned in the above title. The aeroplane has evolved by a series of Pilatus Britten-Norman modifications, which have resulted in the different type number, but the significant modification is the wing tip fuel tank extensions covered by Mod NB/M/364. Whenever this modification is installed it is, therefore, incumbent upon the responsible persons to ensure that the Model Designation on the Title Page and on the List of Effective Pages of this Manual is properly amended to include this supplement. The supplement has been revised to cover changes to the controls made by an updating of the modification retrospectively introduced by PBN Service Bulletin BN-2/SB157.

TECHNICAL DETAILS

The wing span of the aeroplane is increased from 49 feet (14.93m) to 53 feet (16.15 m) when Mod NB/M/364 is embodied and the fuel system changes are summarized briefly as follows. Extra fuel capacity totals 29.5 US gal (111.66 litres) per side and electrically operated selector cocks and indicator lamps are installed. Two additional fuel contents indicators are fitted at the starboard side of the cabin and an auxiliary control panel is situated at the top of the windscreen central pillar. Since the operational weights of this model differ from the basic model (Sec.2) these details are set out under the LIMITATIONS heading. The modified fuel system is illustrated in fig.1 and a revised Weight and C.G. envelope is shown by fig.2.

LIMITATIONS

Unless superseded by any of the following special limitations imposed by this Supplement the normal limitations stated in Section 2 of this manual remain applicable.

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LIMITATIONS

Unless superseded by any of the following special limitations imposed by this Supplement the normal limitations stated in Section 2 of this manual remain applicable.

Weight and Balance

Maximum Take-off and Landing Weight	2994 kg
Maximum Zero Fuel Weight	2812 kg

The moment arm of the fuel in the tip tanks is 881.38 mm aft of datum. The certificated empty weight and corresponding centre of gravity location must include the following:-

Unusable Fuel (Main and tip tank total)	19.96 kg arm + 792.48 mm
Unusable System Oil	4.54 kg arm - 66.04 mm

Fuel Management

Structural reasons dictate the 36.29 kg of fuel, 13.5 US gal (51.10 litres), are retained in each wing tip tank at all times, except that this fuel may be used as a reserve for flights to alternative airfields and holding. This amount of fuel includes 2.0 US gal (7.57 litres) that are ungaugeable and therefore unusable in each wing tip tank due to attitude limitations. The wing tip tanks must always be refuelled before the main tanks and used in flight after the main tanks are exhausted. The fuel in the main tanks may be used below the zero marking in cruise flight until the tanks are empty. Between 40 and 50 seconds of warning are given before engine malfunction occurs due to fuel exhaustion of the main tanks. The warning is characterised first by drop-off of fuel pressure followed by a gentle hunting of the propeller. At no time may take-off or landing operations be conducted on main tanks when the fuel contents gauge of either main tank indicates a remainder of three gallons or below.

Placards and Markings

The following Placard is displayed on the Roof Instrument Panel between the main fuel tank contents indicators.

> THIS IS A TIP-TANKED AIRCRAFT
> TIP TANKS ARE TO BE FILLED FIRST -
> USED LAST. BEFORE TAKE-OFF CHECK
> BOTH MAIN AND TIP TANK CONTENTS.
> TAKE-OFFS & LANDINGS ARE PROHIBITED
> ON MAIN TANKS WHEN GAUGE READS LESS
> THAN THREE GALLONS ABOVE ZERO

NORMAL OPERATING PROCEDURES

Ground Handling

When refuelling the aircraft, the wing tip tanks should always be filled first.

Tank Capacities

The total usable fuel capacity of each tank is 28.5 US gal (104.10 litres).

Main Wing Tanks

As the main fuel tanks may be used until fuel exhaustion occurs, the residual fuel in these two tanks amounts to a total weight of 9.07 kg.

Ground Checks

1. Before take-off, check the functioning of the electrically actuated fuel cocks by selecting from main tanks to tip tanks and returning to main tanks, checking that the appropriate indicator lights illuminate (fig 1). Select the appropriate tank for take-off and agin check that the position lights are correctly illuminated. If main tanks are selected the lights may be selected ON or OFF by a switch mounted in the centre of the auxiliary panel; for safety reasons the

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If main tanks are selected the lights may be selected ON or OFF by a switch mounted in the centre of the auxiliary panel; for safety reasons the indicator lights for the tip tanks remain on at all times when the tip tanks are selected for use. The same switch enables the tip tank lights to be selected DIM or BRIGHT.

2. For take-off the manually controlled main fuel cock selectors, in the cabin roof, determine whether the fuel is fed from the left-hand or right-hand side to an appropriate engine. The auxiliary panel switches then select whether the fuel comes from the tip tank or the main tank on the selected side.

Flight Handling

The auxiliary fuel pumps should be used in the normal manner for take-off or landing with either the tip tanks or main tanks selected. In addition, the auxiliary fuel pumps should be used whenever below zero fuel quantities are indicated for the main fuel tanks and the process of transfer to the wing tip tanks is completed with satisfactory engine operation established. The pumps should also be selected when the fuel quantity falls below 5 US gallons (18.92 litres) in the tip tanks.

EMERGENCY PROCEDURES

Single Engine Failure

In the event of a single engine failure, the manually controlled main fuel cock should be selected OFF for the appropriate engine. The fuel from the main or tip tanks on the side of the failed engine, may be selected to the opposite engine by operating the main fuel cock in a similar way to that described in Section 3, of the flight manual. The auxiliary panel switches can then be used to select main or tip tanks supply.

Electrically Actuated Fuel Cock Failure

In the event of an electrically actuated fuel cock failing and trapping fuel in one tip tank, the aircraft remains fully controllable. With an empty tip tank on one side and a full one on the other, the aircraft is fully controllable and may be trimmed out normally in cruise and descent.

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Note...

In the unlikely event of a failure of both generators, as dealt with in Section 3 of this manual, it should be remembered that battery power will decrease progressively thus leaving smaller resources available for successful actuator selections. If tip tank fuel is required to complete the flight, the pilot must make the appropriate selections at the earliest possible time after the failures have occured.

PERFORMANCE

The only changes in performance, from that scheduled in Section 5 of this manual, are as follows:-

Single Engine Rate of Climb

Increased by 25 feet per minute

Single Engine Climb Gradient

Increased by 0.3 per cent gradient

Maximum Take-off and Landing Weight for Altitude and Temperature

Add 63.50 kg to the weight obtained from the graph in Section 5.

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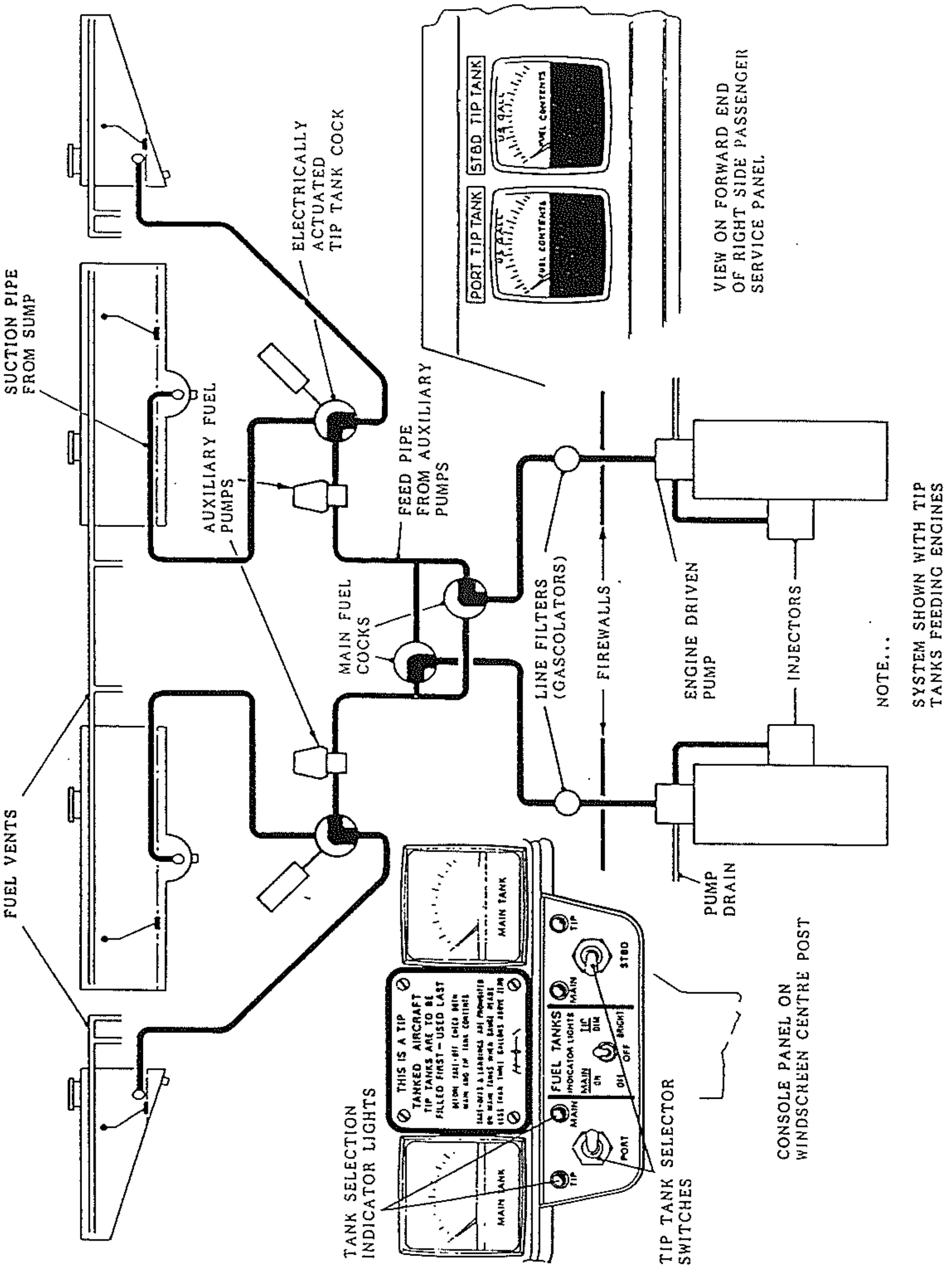

Fig 1 Main and wing tip tank fuel system diagram

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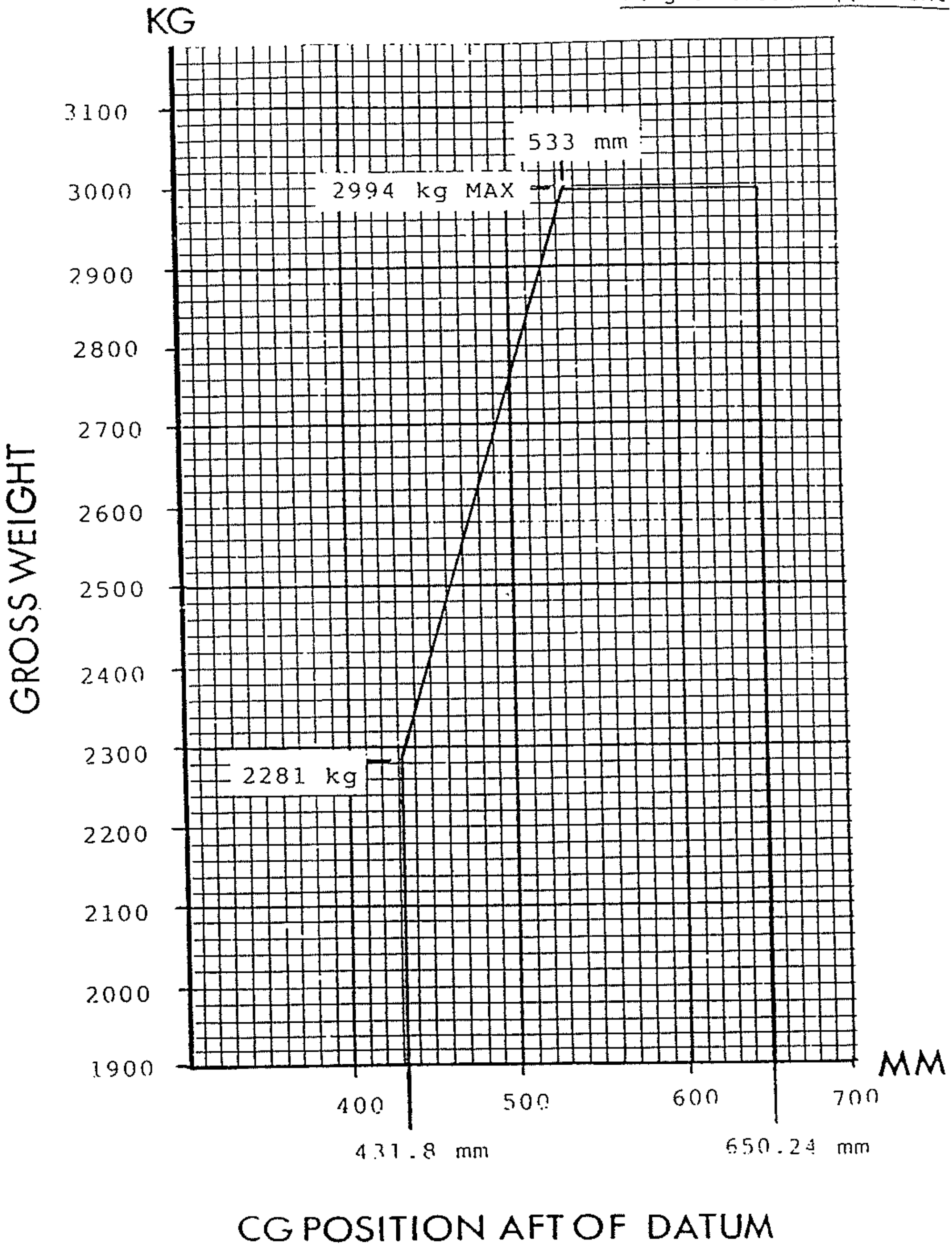

Fig 2 C.G. envelope diagram

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OPTIONAL WING TIP FUEL TANKS AND AUTOMATIC FUEL TRANSFER FACILITIES TO MODIFICATION NB/M/1153

INTRODUCTION

These optional wing tip fuel tanks are incorporated within the normal 49 ft wing span and tip profile of the Model BN-2B-20 aeroplane. The outer, between spar, bays of the wing are modified to accommodate an extension cell bolted to the attachment rib of each detachable wing tip. A partially integral and partially separate tank unit, at each side, is formed by this arrangement which has no effect on the model designation of the aeroplane. In combination with the tip tanks, each main fuel tank is modified to embody a float switch and is interconnected with its respective tip tank by a piping system, incorporating a solenoid valve and an electric fuel transfer pump. A system of electrical relays, actuated by the main fuel tank float switches, operates the transfer pumps as the fuel levels descend in the main tanks, thus ensuring that tip tank fuel is automatically transferred to the main tanks, as long as the facility remains selected by the pilot.

TANK CAPACITIES/SYSTEM DATA

Each wing tip fuel tank has capacity for 44.5 US gal (168.4 litres) of which the usable fuel amounts to 42.5 US gal (160.9 litres) while the unusable fuel is 2 US gal (7.5 litres). The weight of this unusable fuel is, therefore, 5.5 kg on each side which must be taken into account during loading calculations.

Note...

Whether the automatic fuel transfer facilities are in use or whether the pilot is selecting fuel transfer manually, a complete transfer of all the usable fuel from the wing tip tanks can only be achieved with the aeroplane in the cruise attitude.

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LIMITATIONS

No additional limitations.

EMERGENCY PROCEDURES

No additional emergency procedures.

NORMAL PROCEDURES

Checks, Taxying, Take-off and Handling

Under Pre-starting checks (in Sect 4 of this manual) the following additional check, at the end of the sequence, is required:

Tip tank fuel transfer system OFF

Under the Ground Checks and, specifically, the heading of Optional wing tip fuel tanks (in Sect 4 of this manual) the following check should be done before taxying out.

When fuel is present in these tanks, the automatic fuel transfer system should be checked as follows. Select each tip tank fuel transfer switch, in turn, to MANUAL and note that the appropriate transfer indication lights appear; select the switches OFF and observe that the lights extinguish, then select the switches to AUTO. Fuel transfer, from the wing tip fuel tanks to the main fuel tanks, will then take place automatically in flight.

There are no other effects on procedures, or flight handling, as a result of this wing tip fuel tank installation but further details, necessary for a thorough understanding, are given below.

System Management

Automatic fuel transfer:

In aeroplanes fitted with Mod NB/M/1153 (Fig 1 overleaf) an automatic fuel transfer system enables the tip tank fuel contents to be transferred to the main fuel tanks to give increased endurance. The following details describe the operation of the system (Sect 2, 3 and 4 also cross refer) and the preceding amendments to the pilots' check lists, make allowances for aeroplanes with this system. The fuel transfer operation is accomplished automatically, provided that the two roof panel switches have been selected to AUTO. Fuel from the LH or RH wing tip tank is pumped into the associated main tank, when the fuel contents level of the main fuel tank descends to approximately 35 US gallons. It is recommended that the fuel transfer switches are selected to AUTO as part of the pre-take off checks and care should be taken, by the pilot, to avoid switching the facility off before the fuel transfer cycle is complete. A green light, above each switch, shows when the associated fuel transfer pump and solenoid valve have been selected. Fuel transfer is indicated by the changing state of main and tip fuel tank contents indicators. Tip tank contents should decrease, while main tank contents should increase or remain static dependent upon engine demand. The switches have three positions and will permit manual switching of the fuel transfer pumps, by the pilot, if desired. If any of the above indications do not appear at the appropriate time, a system failure may be likely and close attention should be given to the main and tip tanks contents indicators to determine whether fuel transfer is taking place.

CAUTION...

A green light indication, on its own, is not positive indication that fuel transfer is taking place. Similarly, the absence of a green light indication (when main fuel tank contents are less than 35 US gallons) is not necessarily an indication of failure to transfer fuel. Correct indication of fuel transfer is given by the contents indicators for the tip and main tanks as described above. If a fuel transfer failure is suspected in the auto mode, select MAN and monitor the fuel contents indicators closely. If a failure is confirmed the tip tank fuel on that side will not be available. Should malfunction produce a premature fuel transfer function, select OFF on the appropriate switch and use manual control when desired.

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Apr 1990

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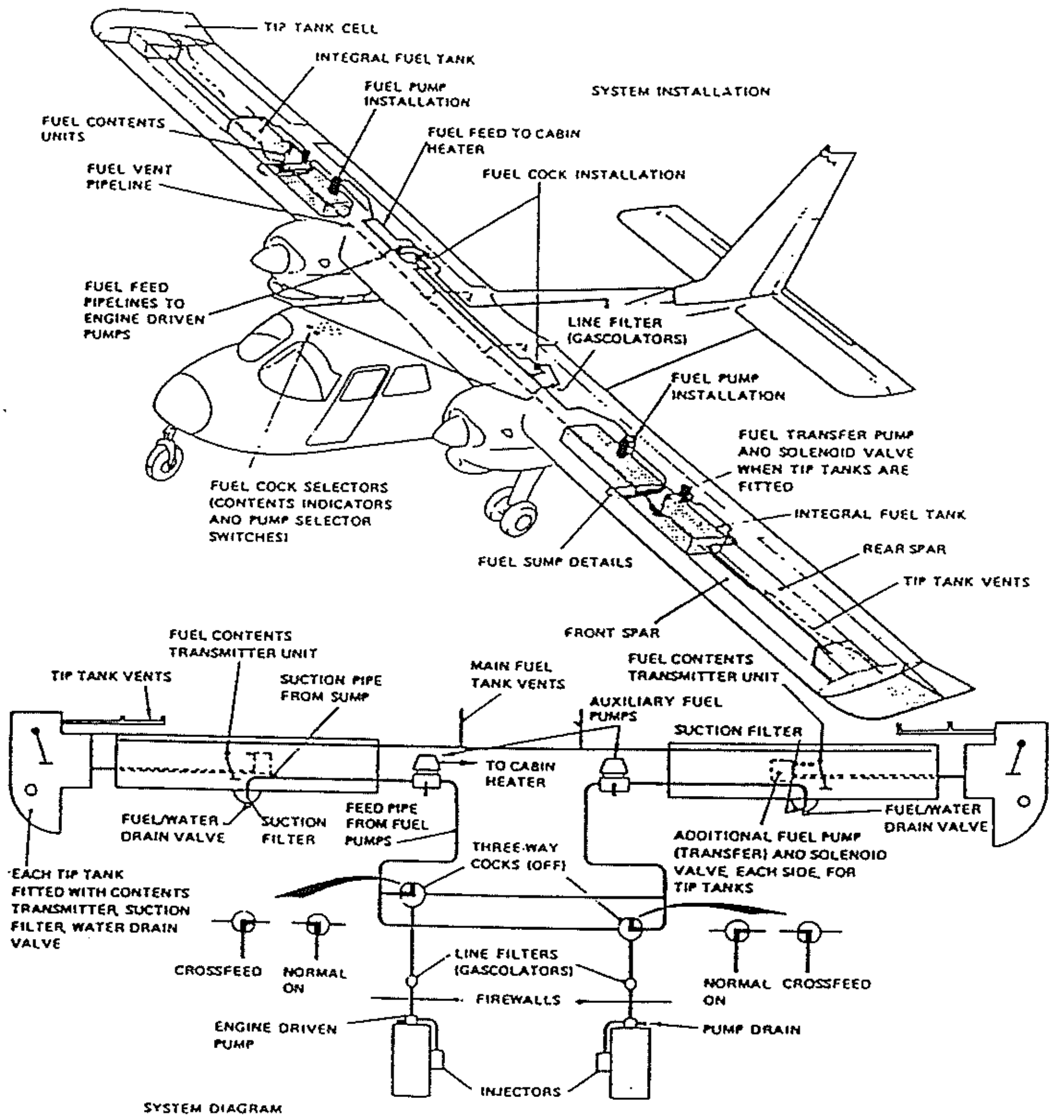


Fig 1 - Fuel System with Wing Tip Tanks
(NB/M/1153) in situ

Manual operation of fuel transfer:

When using the manual transfer process, the following procedure is recommended for transferring fuel from the wing tip tanks to the main tanks.

1. When the contents of each main fuel tank have decreased to approximately 40 US gal, select the fuel transfer pump switches to MAN and top up the main fuel tanks.

2. Under normal conditions the fuel transfer rates and engine demands are similar but, nevertheless, monitor the main fuel tank contents indicators, during fuel transfer, to avoid the possibility of overfilling the main tanks and pumping fuel overboard, through the tank vents.

3. Cease the fuel transfer if 60 US gal is indicated at any time in either main fuel tank.

4. When main tank contents again decrease to 40 US gal, repeat the fuel transfer switching process.

   Note...

   In case of failure to transfer fuel from one tip tank, it has been demonstrated that the effects on asymmetric flight characteristics are negligible.

S-TEC CORPORATION
RT. 4, BLDG. 946
WOLTERS INDUSTRIAL COMPLEX
MINERAL WELLS, TEXAS 76067

FAA APPROVED SUPPLEMENT TO PILOT'S OPERATING HANDBOOK AND/OR FAA APPROVED AIRPLANE FLIGHT MANUAL FOR BRITTEN NORMAN MODELS BN-2A-2, BN-2A-8, BN-2A-20, BN-2A-26, BN-2B-20, AND BN-2B-26 AND BN-2B-21. S-TEC SYSTEM 50 TWO AXIS AUTOMATIC FLIGHT GUIDANCE SYSTEM (28 VOLT SYSTEM)

REG. NO. VH-BNX
SER. NO. 2177

This supplement must be attached to the applicable FAA Approved Airplane Flight Manual, Pilot's Operating Handbook, or Pilot's Operating Handbook and FAA Approved Airplane Flight Manual modified by the installation of S-TEC System 50 Autopilot Model ST-225-50 installed in accordance with STC SA 5307SW-D. The information contained herein supplements the information of the basic POH and/or AFM; for Limitations, Procedures and Performance information not contained in this Supplement, consult the basic POH and/or AFM.

SECTION I

GENERAL

This manual is to acquaint the pilot with the features and functions of the System 50 Two Axis Autopilot and to provide operating instructions for the system when installed in the above aircraft model(s). The aircraft must be operated within the limitations herein provided when the autopilot is in use.

SECTION II

OPERATING LIMITATIONS

1. Autopilot operation prohibited above 160 KIAS, (Vmo).
2. Use of flaps prohibited during operation in altitude hold mode.
3. Autopilot must be "OFF" during take-off and landing.

SECTION III

EMERGENCY OPERATING PROCEDURES

In the event of an autopilot malfunction, or any time the autopilot is not performing as expected or commanded, do not attempt to identify the system problem. Immediately regain control of the aircraft by overpowering the autopilot as necessary and then disconnect the autopilot. Do not re-engage the autopilot until the problem has been identified and corrected.

1. Autopilot may be disconnected by:
   a. Depressing the "AP Disconnect" Switch on the left horn of the pilot's control wheel (if installed).
   b. Depressing the "ON-OFF" Switch on the autopilot programmer unit.
   c. Moving autopilot master switch to "OFF" position.
   d. Pulling the autopilot circuit breaker.
2. Altitude loss during a malfunction and recovery.
   a. The following altitude losses and bank angles were recorded after a malfunction with a 3 second recovery delay:

Configuration	Bank Angle/Altitude Loss
Climb	50^{o} / NONE
Cruise	50^{o} / -300'
Descent	30^{o} / -320'
Cruise (Single Engine)	45^{o} / -200'

   b. The following altitude losses and bank angles were recorded after a malfunction with a 1 second recovery delay:

Configuration	Bank Angle/Altitude Loss
Maneuvering	15^{o} / -100'
Approach (coupled or uncoupled)	20^{o} / -20'
Approach (Single Engine)	20^{o} / -20'

The above values are the worst case for all the models covered by this document.

3. Single Engine Operations
   a. Engine failure during an autopilot approach operation: Disengage autopilot, conduct remainder of approach manually.
   b. Engine failure during normal climb, cruise, descent: Retrim aircraft, perform normal aircraft engine out procedures.
   c. Maintain aircraft yaw trim throughout all single engine operations.

SECTION IV
NORMAL OPERATING PROCEDURES

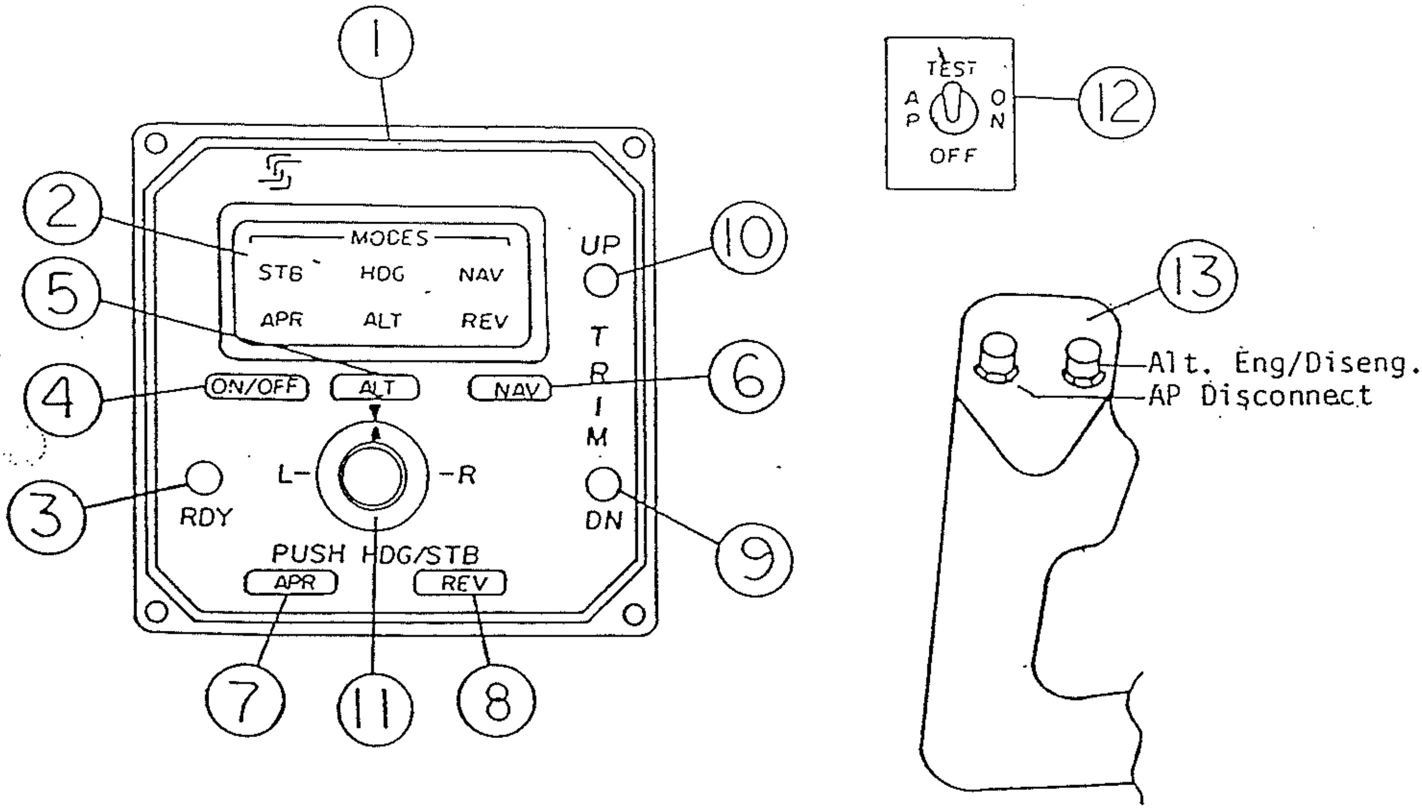
4-1 SYSTEM DESCRIPTION

The System 50 is a pure rate autopilot which uses an inclined rate gyro in the Turn Coordinator instrument as the primary roll and turn rate sensor and an accelerometer and an absolute pressure transducer as pitch rate sensors. The turn coordinator includes an autopilot pick-off, a gyro RPM detector and an instrument power monitor. Low electrical power will cause the instrument "flag" to appear while low RPM will cause the autopilot to disconnect. The autopilot includes an automatic pre-flight test feature that allows a visual check of all the annunciator lamps and checks critical elements of the accelerometer system. The test feature will not enable autopilot function unless the automatic test sequence is satisfactorly completed.

When the pre-flight test is satisfactorily completed and when the rate gyro RPM is correct, the green "RDY" light will illuminate indicating the autopilot is ready for the functional check and operation. The autopilot cannot be engaged unless the "RDY" light is illuminated. When the system is equipped with the optional 3" Air Driven Directional Gyro (D.G.) or a compass system, directional information is provided to the autopilot by a heading bug in the instrument.

Pitch axis control is provided for the altitude hold function by use of the accelerometer and the pressure transducer. When the altitude hold mode is engaged an elevator trim sensor in the pitch servo will detect the elevator trim condition. When elevator trim is necessary to re-establish a trimmed condition, trim indicator lights on the programmer unit will illuminate to indicate the direction to trim to restore a trimmed condition.

The indicator and annunciator lamp brilliance is controlled through the aircraft instrument light rheostat, except for the "trim" indicators which always illuminate at full intensity.



1. Mode Programmer and Annunciator Unit - Provides mode switches and annunciation for the system.

Mode Annunciation Window - Displays mode in use.

3. Ready Light (RDY) - Green RDY lamp illuminates when autopilot is ready for engagement.

4. ON-OFF Stabilizer Mode Switch - Momentary actuation engages roll system in stabilizer (STB) Mode and allows use of the turn knob (Item 11) to command turn rate desired. When the system is operating a momentary actuation will disengage the system and cancel all annunciations.

5. Altitude Mode Switch (ALT) - Momentary actuation will engage altitude hold mode or disengage altitude mode if previously engaged. This function is also available by use of an optional control wheel mounted altitude engage/disengage switch, for added convenience.

6. Navigation Mode Switch (NAV) - Momentary activation will engage the VOR Tracking Mode. This mode provides low system gain for comfortable cross country tracking.

7. Approach Mode Switch (APR) - Momentary actuation will engage the VOR or Localizer Tracking Mode. This mode provides a higher level of system gain for more active tracking of VOR or Localizer front course signals.

8. Reverse Approach Mode Switch (REV) - Momentary activation will engage the reverse tracking mode for use when tracking a localizer backcourse. This mode provides the same system gain as the APR Mode with reverse needle sensing.

9. Down TRIM Light (DN) - This light illuminates to indicate the need for nose down trim. When both the UP and DN lights are not lighted, the aircraft is in trim longitudinally.

10. UP Trim Light (UP) - This light illuminates to indicate the need for nose UP trim.

11. Turn Knob and Heading Switch - The turn knob allows the selection of turn rates up to standard rate(3^o/sec.) either right or left. Turning the knob to the right or left will cause a turn that is proportional to the displacement of the knob from center. For level flight the electronics provide a small dead zone of approximately 10^o at the center indice. To actuate heading mode, momentarily depress the turn knob. To return to STB Mode from HDG, depress the turn knob. When the system is operating in any radio mode and the system is equipped with a D.G., depressing the turn knob will return the system to HDG Mode directly.

12. Autopilot Master ON-OFF Test Switch - Refer to Pre-Flight Procedures for operating details.

. Optional remote AP disconnect switch and/or remote altitude hold engage-disengage switch.

-2 PRE-FLIGHT PROCEDURES

NOTE: During system functional checks the system must be provided adequate DC voltage (12 or 24 VDC minimum as appropriate)

ANDATORY PRE-FLIGHT TEST

. AP Master Switch - Move to TEST position.

a. Observe all lights and annunciators illuminate.
b. Observe the following light sequence of the trim indicators: (Sequence requires 9 seconds)

1. Initially both trim UP & DN lights are illuminated.
2. Up light extinguishes momentarily and relights.
3. DN light then extinguishes and will remain off.

AP Master Switch - Move to ON position, observe ready (RDY) light illuminates. Autopilot can be engaged and disengaged repeatedly without repeating the test sequence until electrical power is removed. Once power is interrupted the test must be reconducted to get a ready indication. If the ready light does not illuminate after the test a failure to pass the test is indicated and the system will require service. NOTE: ALTITUDE MODE CANNOT BE ENGAGED UNLESS POWER IS ON FOR MORE THAN 15 SECONDS.

YSTEM FUNCTIONAL TEST

Depress ON-OFF Switch - STB Annunciator illuminates. Rotate turn knob left and right, observe control wheel moves in corresponding direction. Center turn knob.

. Set D.G. and place bug under lubber line (if installed) push turn knob to engage HDG mode. Observe HDG annunciator. Move HDG bug left and right observe proper control wheel motion.

. Overpower Test - Grasp control wheel and overpower roll servo left and right. Overpower action should be smooth with no noise or jerky feel. If unusual sounds or excessive play is detected, have the servo installation inspected prior to flight.

6. Radio Check - A. Turn on NAV Radio, with valid NAV signal, engage NAV Mode and move VOR OBS so that VOR needle moves left and right - control wheel should follow the direction of needle movement.

B. Select REV Mode - the control wheel should rotate in opposite direction of the NAV needle.

C. Select APR Mode - the control wheel should again follow radio needle movement and with more authority than produced by NAV Mode.

7. Move control wheel to level flight position - Engage ALT Mode. Move control wheel fore and aft to overpower pitch servo clutch. Overpower action should be smooth with no noise or jerky feel. If unusual sounds or excessive play is detected, have the servo installation inspected prior to flight.

8. Trim Check - Manually apply back pressure to control wheel for 2-3 seconds - observe the DN trim light illuminates. Apply forward pressure to the contrc wheel for 2-3 seconds, observe the UP trim light illuminates. Move the control wheel to center - observe both UP/DN lights extinguish.

9. Hold control wheel and depress ON-OFF Switch - note that roll and pitch servo release. Move control wheel to confirm roll and pitch motions are free, with no control restriction or binding. If the optional disconnect switch is installed it may be used to effect the disconnect for this check.

4-3 IN-FLIGHT PROCEDURES

NOTE: The required pre-flight test can be conducted in the air if necessary. It should be noted, however, that when the UP/DN lights are flashing the pitch servo will momentarily engage and disengage. This alternate engage-disengage sequence is part of the test function. Because of the engage-disengage sequence the test should not be conducted while maneuvering.

1. Check - RDY light on.

2. Trim aircraft for existing flight condition.

3. Center turn-knob - depress ON-OFF Switch.

4. Set turn knob to level or turning flight, as desired.

5. Set HDG bug to desired heading (if installed) and depress turn knob to engage heading mode, select headings as desired.

6. At desired altitude, depress ALT Mode Switch. Trim aircraft as necessary to establish cruise condition - disengage ALT Mode to climb or descend.

S-TEC CORPORATION
MINERAL WELLS, TEXAS 76067

VOR TRACKING AND VOR-LOC APPROACH

1. Tune NAV receiver and select radial.

2. Maneuver aircraft to selected radial (or localizer) within ± 1 needle width and within 10^{0} of the course heading.

3. Engage NAV Mode for VOR tracking.

4. Engage APR Mode for VOR or LOC approach.

To track the localizer front course outbound to the procedure turn area, maneuver to the localizer center and, when on the outbound heading, select REV Mode. To track the localizer back course inbound, maneuver to the localizer back course center and, when on the inbound heading, select REV Mode.

Approach Mode may be used to track VOR radials cross country, if desired. Use of APR Mode for cross country tracking may result in some course scalloping if the VOR signal is weak or otherwise "noisey". In areas of poor signal quality NAV Mode may provide more accurate tracking even with reduced gain.

SECTION V

OPERATIONAL DATA

Text of this Section not affected by installation of this equipment.

SECTION VI

REQUIRED OPERATING EQUIPMENT

Text of this Section not affected by installation of this equipment.

SECTION VII

WEIGHT AND BALANCE

Text of this Section not affected by installation of this equipment.

APPROVED BY ______________________
James L. Irwin

S-TEC CORPORATION
DAS 5 SW
P/N 89354
DATE: 4-26-84

Flight Manual Supplement

INFORMATION AND PROCEDURES FOR THE OPERATION OF ISLANDER AIRCRAFT WITH LEFT HAND REAR CABIN DOOR REMOVED

This Supplement shall apply when the aeroplane is operated with the left-hand rear cabin door removed. Only that information which differs from the basic Flight Manual is contained herein.

LIMITATIONS

1. Maximum Speed with door removed - 130 kt IAS.
2. Maximum take-off weight with door removed - Pre-Mod NB/M/358 aeroplanes: 5900lb; Post-Mod NB/M/358 aeroplanes : 6000lb.
3. Operations are limited to VFR only and shall be confined to normal flying manoeuvres. Turns in which the angle of bank exceeds 30 degrees, stalls, sideslips and acrobatic manoeuvres shall not be performed.
4. Smoking is not permitted.
5. When determining the gross weight for take-off as limited by local conditions, the distance applied to the take-off weight chart shall be the actual distance available reduced by 5 per cent. When a climb weight limitation is included on the take-off an/or landing weight charts, then the gross weights determined in accordance with this limitation shall be reduced by 5 per cent.
6. No baggage or other loose articles may be carried unless adequately restrained or stowed.
7. With the left-hand rear cabin door removed the passenger door warning light will remain ON whether the right-hand door is properly locked or not. The pilot should therefore satisfy himself at all times that the right hand cabin door is properly locked.
8. The following placard shall be displayed on the instrument panel in full view of the pilot during actual operation with the door removed.

> **OPERATION WITH DOOR REMOVED**
> Operations are limited to normal flying manoeuvres.
> Turns exceeding 30° bank, stalls, sideslips and acrobatic manoeuvres are not permitted.
> Speeds not in excess of 130 kt IAS.
> Maximum take-off weight 6000lb with Mod (5900lb without Mod NB/M/358)
> No smoking permitted.
> No loose articles permitted.
> Physically check right hand door is locked before take-off.
> For additional requirements see Approved Flight Manual supplement.

9. For requirements relating to the carriage and restraint of persons and the dropping of articles, refer to the relevant sections of Civil Aviation Orders Parts 20 and 29.

FLYING INSTRUCTOR'S MANUAL

FOR THE

~~BN-2T TURBINE ISLANDER~~

AND

BN2 PISTON ISLANDER SERIES ✓

ASSOCIATED PUBLICATIONS

Information for this Instructor's Manual has been drawn from the following publications:-

Flight Manuals FM/40, FM/41, FM/100 and AFM/2T - 4S.

Islander Maintenance Manuals.

Lycoming Operator's Manual (Pt. No. 60297-10) for 0-540 and IO-540 series Aircraft Engines.

Detroit Diesel Allison 250-B17 Engine Operation and Maintenance Manual (Pub. Ref. 11W2 with B17C & F Supplements).

Hartzell Propeller Owner's Manual (FAA Approved Manual 115).

The Oxford Air Training School Instructional Notes for Twin Engined Aircraft.

John R. Ayers, M.R.Ae.S.,
Chief Test Pilot, Retired,
Britten-Norman Group Ltd.

September, 2000

INDEX

INSTRUCTIONAL NOTES FOR THE ISLANDER AIRCRAFT SERIES

INTRODUCTION

Where possible, techniques dealt with in training publications in a general way have been expanded to cover specific characteristics of the BN2 Piston Islander and BN-2T Turbine Islander Series.

It is left to instructors to vary the instruction given to suit the individual pilot and, to amplify and elaborate as necessary upon the outlines given in the Asymmetric Flight General Considerations chapter. Considerably more detailed instruction will be required for a pilot with no previous multi-engine experience than for an experienced multi-engine pilot requiring refresher training during conversion to type. All speeds and power settings are quoted from the British Flight Manual.

Before any conversion exercises are carried out, the pilot should be briefed on the aircraft systems with particular reference to the aircraft power plants. Ideally, the pilot should have completed a company approved pilot's engineering course on the airframe and engines. In the interests of standardisation, monitor the pre-flight checks, starting and taxiing procedures, and power checks. Be prepared to demonstrate any aspect particularly with inexperienced pilots with no previous multi-engined experience.

Before the asymmetric sequences are flown, the basic principles of asymmetric flight must be explained to the inexperienced pilot with particular reference to aircraft critical speed, minimum control speed and take-off safety speed. An experienced pilot may require some refresher briefing on these aspects. The pilot should be able to carry out the majority of the flying on the conversion exercises with only a commentary by the instructor where appropriate.

<u>Note 1:</u> These notes may be applied to the conversion training for any twin/multi engined aircraft, however, speeds and power settings quoted are specific to the BN2 Piston Islander series. Where there are variations between the -26 and -20 models, the -20 figures will be quoted in brackets. The BN2T Turbine Islander will be covered in a later chapter. Typical questions, similar to those used in the CAA Type Technical examinations, are in Appendices 'I' and 'J'.

<u>Note 2:</u> Speeds and power settings quoted are for the maximum Take-off and landing weights of the two types of Islander - i.e. 6,600lbs for the BN-2 Piston aircraft and 7000 lbs for the BN-2T Turbine aircraft. The graphs at Appendices 'F' and 'G' show variation of Take-off Safety Speed and Landing Threshold Speed with Aircraft Gross Weight for the two types.

<u>Note 3:</u> The Trislander aircraft is not covered in this manual, however, a typical conversion syllabus is at Appendix 'N' and CAA typical questions at Appendix 'K'.

NEVER EVER SHUT DOWN AN ENGINE, FOR PRACTISE PURPOSES, BELOW 3,000 FEET ABOVE GROUND LEVEL.

BN-2 PISTON ISLANDER

CONVERSION NOTES

GENERAL HANDLING

PRE-FLIGHT BRIEFING

(a) Study the Check List, Flight Operating Procedures and Technical Notes.

(b) Cabin layout, cockpit instrumentation, switches and circuit breakers.

(d) Power checks.

(e) Take-off techniques.

(f) Engine handling including synchronisation.

(g) Straight and Level - cruising at various airspeeds.

(h) Low speed handling including stalling.

(i) Steep turns.

(j) Descending.

(k) Approach and landing.

(l) Overshooting and balked approach.

AIR EXERCISES

The external and internal inspection of the aircraft and all inflight checks, including emergency drills, must be carried out from the Aircraft Check List as derived from the Flight Manual. As it is quite common to carry other crew members on board during conversion training, reference must be made to the aircraft loading and C of G. It is also very important to cover evacuation drills and passenger briefing before the first air exercise. The pace of the initial air exercise will be dictated by the pilot's experience and background, but, it should not be rushed.

ENGINE STARTING

Either engine may be started first using the Aircraft Check List instructions. It is often convenient to adopt a convention such as Left Engine first on odd dates and the Right Engine on even dates. This convention has the merit of balancing engine component wear caused by cold starting; this is not a critical item, but, asymmetric component wear may become noticeable over a period of time, particularly on Turboprop engines, when, say, the Right Engine is always started first.

Note (I) Instruction should be given on the procedure to be used in the event of an engine becoming over primed (There are differing procedures for O - 540 and IO - 540 engines).

Note (ii) As soon as an engine starts the throttle should be adjusted to avoid an excessive burst of power which can damage an engine whilst oil pressure is still very low in the initial post start phase. It is ABSOLUTELY VITAL to maintain a cold engine at not more than 1000 - 1200 RPM until the oil pressure and oil temperature have reached normal operating minimums.

1. TAXIING

The general principles used on single engined aircraft apply equally to the twin. The aircraft should normally be manoeuvred using nose wheel steering and symmetric power, however, in a confined area, the nose wheel steering limits may be exceeded so that the nose wheel becomes fully castoring (known as 'kicking out'). In this case, brakes and asymmetric power handling need to be used until the nose wheel is back within the steering limits.

The wind speed limit for ground manoeuvring is 55 Kts. Particular care must be taken at these wind speeds to hold the aileron control firmly, when taxiing downwind to prevent 'aileron snatching'. For prolonged downwind taxiing it may be prudent to stop engines whilst facing into wind and fitting an external aileron lock before continuing.

CAUTION - IF PIVOT TURNS ARE BEING PRACTISED, THE BRAKE MUST BE RELEASED ON THE INSIDE WHEELS TO PREVENT TWISTING OF THE UNDER CARRIAGE LEG ASSEMBLY.

Carry out taxi checks as per the Aircraft Check List.

POWER CHECKS

Except on very wet grass or other slippery surfaces, it is normal practise to do the power checks on both engines at the same time - in other words, all engine indications should be "balanced". This technique more readily highlights any engine malfunctions.

2. TAKE-OFF AND CLIMB

Line up on the runway and open up the throttles to 2000 RPM against the brakes **(CAUTION - DO NOT APPLY THE PARKING BRAKE)**. Check manifold pressures, fuel pressures, fuel flows (if gauges fitted) and engine temperatures and oil pressures. Release the brakes and smoothly apply full power; recheck the manifold pressures and engine RPMs - **ABORT TAKE-OFF AT THIS POINT** if any indications show that an asymmetric power situation has developed. Initially, directional control is achieved with nose wheel steering, but, by the time the nose wheel is lifted off the runway, the rudder is fully effective. In strong cross winds, directional control is more precise with up to full aileron applied in the direction of the cross wind until the point of lift off.

For a normal take-off, when performance is not a consideration, commence rotation at 50 Kts, aiming to unstick at 60 Kts. Once well clear of the ground, brake the wheels and climb at 65 Kts to 200'. Note the climbing attitude.

When performance is a consideration, commence rotation at V_1 - 5 Kts aiming to unstick at V_1 and climb at V_1 to 200'. Note the climbing attitude.

At 200' retract the flaps and continue the climb at 90 Kts reducing the power to 75% (climbing power). Whilst not the best rate of climb speed, 90 Kts does give better forward visibility. (Note:- Manifold pressure will reduce as height is gained, thus, the throttles have to be advanced to maintain 75% up to full throttle height). Carry out climb checks as per the Aircraft Check List.

If planning a prolonged climb, then, to maintain optimum climb power the mixture must be adjusted as per the Lycoming Operator's Manual. In essence, this means that at 75% power or below the pilot leans the mixture until the peak exhaust gas temperature (EGT) is found and then enrich the mixture for an EGT drop of 87°C/150°F (Also see Appendix 'H'). Above full throttle height the IAS should be progressively reduced at, say, 5 Kts per 1000' to maintain the rate of climb but not below 65 Kts. If cylinder head temperatures (CHTs) approach the limits then progressively ease the mixture controls towards rich until the CHTs reduce.

3. FLIGHT AT VARIOUS SPEEDS

(a) Flight at Cruising Speed

Level off at a height below full throttle height, allow the speed to increase to 130 Kts and set cruising power - note the trim changes as the aircraft accelerates. Carry out the cruise checks using the Aircraft Check List and note the attitude and effectiveness of the controls and trimmers. As in the climb, setting the mixture controls to the optimum point may take two or three minutes due to the response time lag of the EGT indicators.

Level Rate 1 turns should be practised noting the degree of co-ordination required to maintain balanced flight. As bank angles are increased up to 50°-55° bank note the attitude and the reduction in IAS with no additional power applied. (NOTE:- A steep turn done to take avoiding action with the aircraft in the landing or holding configuration would, of course, require extra power up to the maximum available).

From the cruise condition set up a descent maintaining the cruise IAS. Mixtures should be set to RICH before retarding the throttles. Note the power required for a given rate of descent and the attitude (say 500 feet/min - a typical cruise descent). During the descent, practise Rate 1 turns. After levelling off ensure that the power is re-applied correctly which includes resetting the mixtures.

(b) Flight at Holding Speed

Carry out the initial approach checks from the aircraft check list, and allow the speed to reduce to 110 Kts. The engine RPM should remain at the cruise setting. Note change in level attitude and the effectiveness of controls. Point out that 110 Kts is the speed for holding and also commencing the downwind leg for a visual circuit. Rate 1 level and descending turns should be practised noting the power required for a descent at 110 Kts at 500-1000 fpm and also the attitude.

(c) Flight with Flaps Extended

Complete the pre-landing checks and set the engine RPM to 2,400 (2,500). Emphasise the flap limiting speeds, then, as flaps are extended, note the trim changes and the increase in drag which necessitates a power adjustment to maintain 95 - 100 Kts as a target speed with flaps at 25° down. Note the new attitude for level flight and changes in control effectiveness. Maintaining 95-100 Kts, reduce power for a descent at 500 fpm - note the manifold pressure required to maintain a steady descent. Practise level and descending Rate 1 turns. Finally lower full flap and reduce speed to 65 Kts maintaining 500 fpm rate of descent to simulate a final approach.

At a pre-determined height carry out an overshoot by applying full power (Maximum RPM and full throttle). Maintain 65 Kts, check the rate of descent and raise the flaps to the take-off setting. Once the climb has become established, raise the remaining flap, set climbing power and allow the speed to increase to 90 Kts. With an inexperienced pilot it pays to repeat this set of sequences several times to enable him to become familiar with engine handling and used to the trim changes that occur with change of flap settings and speed and power changes. Finally level off at a suitable altitude for stalling and set power for holding at 110 Kts and trim.

4. STALLING

(a) Pre-stall checks

As per the check list.

(b) Stalling - Flaps Up

Close both throttles and maintain level flight keeping straight with rudder until the stall is reached with the control column fully back. Note the changes in stick force as the speed reduces, the speed at which the stall warning horn/light comes on and the speed at which the stall occurs. DO NOT re-trim the aircraft as the speed reduces to avoid introducing bad habits on the final approach.

RECOVERY Both throttles to Full Power smoothly. At the same time move the control column forward until the wings are unstalled. Use sufficient rudder to check yaw. Ease out of the recovery dive and level the wings as necessary with ailerons when sufficient speed has been attained.

(c) Stalling in the Approach Configuration

From 110 Kts in the clean configuration, close both throttles and maintain level flight. As the speed reduces below the flap limiting speeds select take-off and then full flap. The speed will reduce very rapidly and either wing may drop at the stall. Any pitch break is more marked at high weights and an aft Centre of Gravity. During recovery, as full power is applied there is a very marked nose up change of trim. Raise the flaps in two stages maintaining 65 Kts in the climb.

Simulating an approach, set 13" - 14" manifold pressure. When full flap has been extended stabilise the speed at 65 Kts with the aircraft in trim. Then, reduce speed until the onset of stall warning and initiate recovery at that point. Only apply sufficient forward pressure on the control column to prevent the nose rising steeply - note the height loss during the recovery manoeuvre which should be very little.

(d) Turning Stalls

Whilst stall recovery in all configuration should be practised in turns caution should be exercised to avoid exceeding the aircraft 'g' limits particularly when flaps are extended. This is particularly so in the Approach Configuration with power set to 13 ins. - 14 ins.

STEADY RATE SPEED REDUCTION STALL

It is not uncommon for pilots to have difficulty recognising the symptoms of an imminent stall because the speed is reducing too quickly. Another technique for stall/low speed training is to use a steady rate speed reduction instead of maintaining level flight. The technique ignores any change in height, so, adequate height must be available. The technique is best flown with the aircraft initially in trim at 1.5 Vs and then reduce the speed at 1-2 Kts per second. As a significant symptom occurs, the speed at which it occurs can be maintained by slightly relaxing the back pressure on the control column. Increasing the back pressure again allows the speed to reduce at the desired rate. With the BN2 series aircraft with full flap extended there is only 2 Kts light buffet warning of the stall in moderate general buffet generated by the flaps. Additionally, changes in control effectiveness are more easily demonstrated using this technique.

NOTE: Students should not be taught to do stalls using this technique; it is purely a teaching technique to assist the student in recognising symptoms and changes in aircraft handling and is normally flown by the instructor with the student 'following through'.

5. CIRCUIT PROCEDURES

(a) The Circuit Pattern (See Appendix 'A')

(I) The normal circuit pattern for the Islander is the Oval Race-track pattern.

(ii) The 'Square' circuit is shown to enable the circuit to be adjusted to accommodate other traffic.

(b) Circuit Speeds

(I) With 17 ins. manifold pressure and 2,400 RPM (2,500 RPM), the circuit speed will initially be approximately 110 Kts (Following the Approach Checks). Complete the Pre-landing Checks as per the check list (Emphasise the flap limiting speed). Thereafter, stabilise the speed at 95 - 100 Kts by adjusting the manifold pressure to 19 ins. - 20 ins.

(ii) Either:-

Abeam the threshold set the power to 14 ins - 15 ins and commence turning whilst descending onto base leg at 90 Kts aiming to complete the turn onto finals with wings level at 400 ft and < 88 Kts.

Or:-

Abeam the threshold, note the time, set the power to 14 ins - 15 ins and commence descent at 90 Kts. After 20 - 30 seconds commence turning onto base leg as above. The timing is dependant on wind/circuit conditions and the descent on the downwind leg should not be continued below 750 ft QFE. This method is particularly useful in poor visibility conditions.

(iii) After completing the turn onto Finals, the speed should be < 88 Kts (Emphasise flap limiting speed) reducing to not less than 65 Kts (Blue line) with Land Flap lowered and the aircraft in trim.

(c) Normal Landing

(I) The Threshold Speed at maximum all-up weight with Land Flap selected is 60 Kts. Threshold Speeds at other weights are detailed in the Flight Manual. There are moderate trim changes with change of power/speed and retrimming should be resisted during the last stages of the approach to land otherwise 'trim chasing' will occur and the approach becomes destabilised

(ii) The technique for landing the aircraft is similar to that for the Cessna 172 or Cherokee In normal wind conditions. Both throttles should be closed together during the flare and the back pressure on the control column maintained during the short period of float before the touch down. Relaxing the back pressure too early may lead to a bounce, and, in extreme cases, to the characteristic of 'porpoising'.

(iii) Once the nosewheel is lowered, firm progressive braking may be applied. Maximum braking effect occurs when the control column is brought fully back with brakes applied.

CAUTION: The brakes are very powerful and it is relatively easy to lock the wheels leading to a burst tyre; this is particularly so on a wet runway. On wet grass, directional control may be lost if the wheels become locked and the landing run may be significantly lengthened.

(d) Crosswind Landing

(i) The maximum permissible crosswind component for the BN2 Piston Islander is given in the Flight Manual as 30 Kts. Operators may specify a lower crosswind limit for wet surfaces and pilot experience.

(ii) Use 90 Kts as an initial approach speed aiming for 60 Kts at the threshold.

(iii) Under limiting crosswind conditions using not more than Take-off flap and an increase of 5 Kts in airspeed is beneficial.

Note 1: The wing down technique for eliminating drift is recommended.

Note 2: No difficulty should be experienced with the displaced nosewheel when correcting for drift on landing.

Note 3: When the aircraft is on the ground after landing, applying aileron in the direction of the crosswind assists direction control. Up to full aileron may be applied in very strong crosswinds.

(e) Flapless Landing

For a flapless landing the base leg and initial approach speed should be 90 Kts aiming for a touch down at not less than 60 Kts. At less than 60 Kts there is a risk of striking the tail bumper on the ground. There is little risk of 'porpoising' if touch down speeds are slightly high but more runway will be used. Note:-

(i) The higher nose attitude than when flap is used for the approach and the tendency to fly a flatter approach path.

(ii) The change of attitude during the flare is much reduced. Ideally, power should be maintained to touch down for improved elevator effectiveness.

(iii) The period of float before touch down may be appreciably lengthened. Try not to 'hold-off'.

(iv) Control of airspeed on the final approach is more difficult due to the relatively low drag. Speed should be stabilised at the correct IAS at an early stage to avoid a 'glide landing' type of approach.

(f) Touch and Go Landings (Rollers)

The take-off following a roller landing with full flap selected may lead to the 'porpoising' mentioned earlier.

SAFETY NOTE - IN THE EVENT OF ENGINE FAILURE AFTER TAKE-OFF WITH FULL FLAP SELECTED THE AIRCRAFT WILL DESCEND

The technique to be adopted for a roller landing is:-

(i) After touch down the student will call 'Flaps to Take-off'.

(ii) The Instructor will then select Take-off flap and call 'Flaps Set'.

(iii) The student will then re-apply power to continue for take-off.

(g) The Go Around (Overshoot)

An overshoot may occur for any number of reasons and may be commenced at a very late stage of an approach including a bounce from a bad landing. With both engines operating, the Islander has adequate performance even with full flap selected, but, **NOTE THE SAFETY NOTE ABOVE.** Flaps should be set to Take-off as soon as convenient after full power has been established. The best technique is:-

(i) Level wings and smoothly apply full power.

(ii) Select flaps to Take-off.

(iii) Keeping straight, climb at 65 Kts.

(iv) Above 200' select flaps to Up and continue climb into the circuit pattern.

Note:- It is normal to leave the electric fuel pumps 'ON' when practising circuits and landings.

BN2T TURBINE ISLANDER

CONVERSION NOTES

INTRODUCTION

The majority of the conversion flying is very similar to that for the BN2 Piston Islander. Hence, only specific differences are detailed. Ideally, pilots should have completed an Allison Engine handling course before commencing conversion

1. Engine Starting

Either engine may be started first following Check List instructions. Emphasis needs to be placed on careful monitoring of the engine instruments to achieve a successful start without exceeding the engine limitations. In particular, the Turbine Gas Temperature (TGT) gauge is probably the most important instrument

Note (i) Instruction must be given on the procedure for starting a hot engine.

Note (ii) Emphasis must be placed on the careful monitoring of TGT and that limitations **MUST NOT BE EXCEEDED.**

Note (iii) When using a generator assisted start for the second engine, the first engine must be at NOT LESS than 64% N1 to avoid a gas generator run down due to power loading.

2. Taxiing

Due to the residual thrust, it will be found that taxiing speeds are that much higher. Try and avoid "riding the brakes" excessively as this is detrimental to brake and disc life. Typically, one would expect to see 25% brake wear in 300 landings and 100 hours of operation off concrete/asphalt surfaces.

3. Take-off and Climb

Completion of engine checks may be done either before entering the runway or when lined up on the runway; this will depend on the traffic situation. Set 830 lb ft torque (maximum certificated power) against the brakes, check the engine instruments for 'correct and **balanced** indications' and release the brakes. Re-check the temperatures and pressures, particularly the TGT if operating in high ambient temperatures/high altitude airfields. The BN2T accelerates rapidly with good directional control from the steerable nose wheel and the rudder becoming fully effective well before the nose wheel is lifted off the runway. Aim to rotate at 58 Kts and unstick at 65 Kts. After take-off, brake the wheels and maintain 65 Kts until through 200 ft when the flaps are retracted and the climb continued at 75 Kts. Note the very steep climbing attitude and lack of forward view (approximately 12° - 15° nose up). As the climb continues torque will decrease as height increases - thus the power levers have to be advanced (suggest every 1,000 ft) to maintain climb power until the TGT limits are reached Carry out climb checks as per the Aircraft Check List.

A more comfortable take-off and climb technique, when performance is not a consideration, is to initially set the power against the brakes to 600 lb ft torque, check the engine instruments, release the brakes and smoothly open the power levers to 830 lb ft torque. Re-check the temperatures and pressures and aiming to unstick as before at 65 Kts. Once through 200 ft accelerate through 75 Kts, retract the flaps and continue to increase speed to 100 Kts. This IAS, even at maximum take-off weight, will still give over 1,000 ft/min rate of climb under ISA conditions up to about 7,000 ft. Power should be left at maximum but the propeller RPM may be reduced to 1850 RPM from 2030 RPM to give quieter conditions in the cabin. Reference to Fig. 1 will give the correct torque setting for any given propeller RPM.

Another option, post take-off, is to climb at 1,000 ft/min (maximum rate of climb for passengers) and allow the IAS to 'look after itself'. This condition is valid up to about 7,000 ft when the IAS will have reduced to 100 Kts which should then be maintained up to 10,000 ft.

Fig. 1 below shows the combinations of propeller RPM (N_2) and torque which produce the maximum permitted shaft horsepower of 320. The only torque/propeller RPM combination permitted for take-off is 830 lb ft of torque at the maximum governed propeller RPM of 2030.

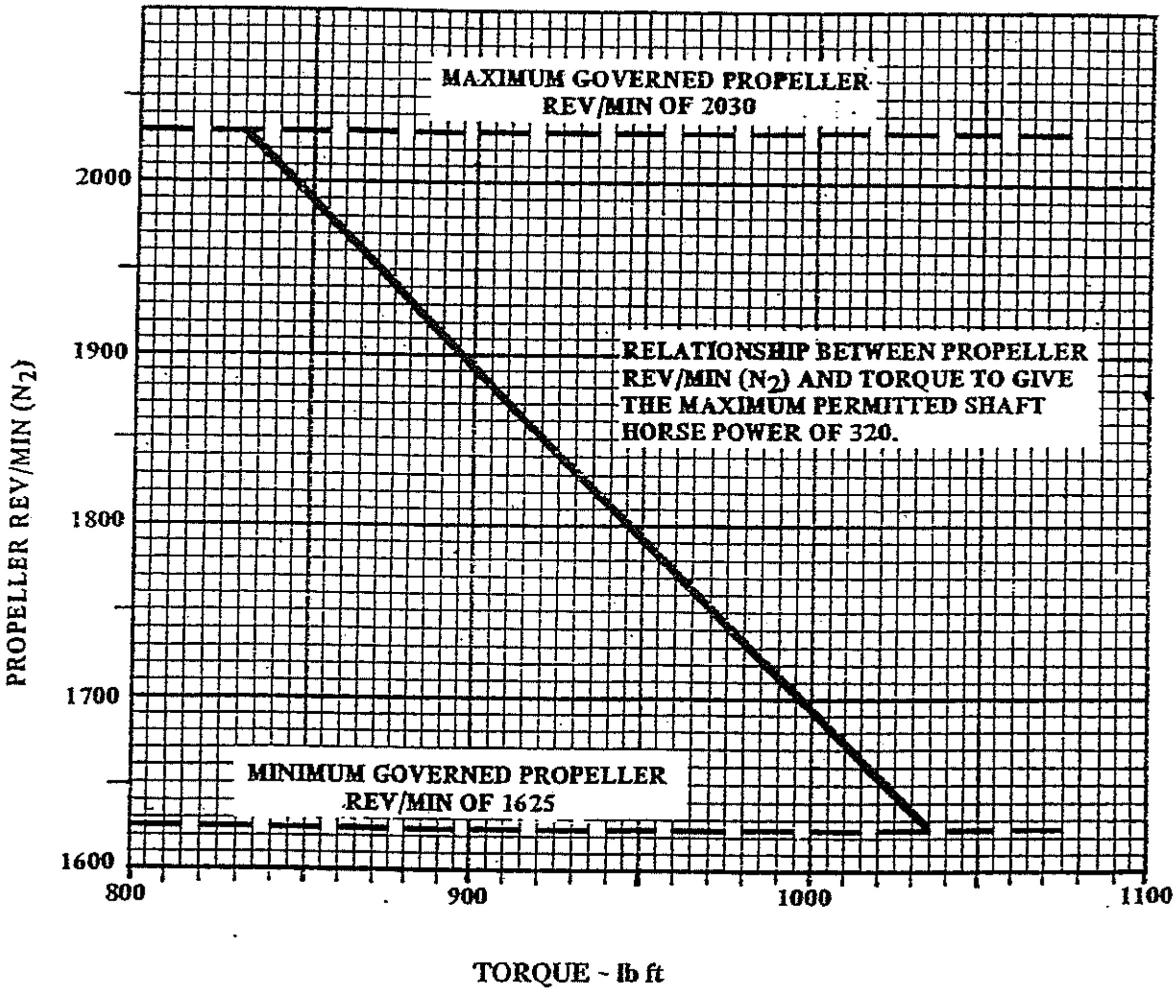


Fig. 1 Propeller RPM against engine torque

4. Flight at Various Speeds

Brief the student to level off at a convenient height below peak TGT altitude and select maximum propeller RPM and power (TGT limit = 738° C). Point out the trim and attitude changes as the aircraft accelerates and ensure that the student re-trims correctly. Also note the slight increase in torque due to ram effect during the acceleration. By carrying out turns at varying angles of bank in each direction at various rates of roll the student will quickly become familiar with the control forces and manoeuvrability available (the student should be able to compare these rates and forces at different airspeeds and configurations).

From level flight fully close both power levers rapidly and point out the rapid deceleration and trim changes. Target the student to reduce the speed to not below 75 Kts - this will require anticipating the engine spool-up time from idle power to achieve the target speed. These accelerations and decelerations should be repeated several times at various propeller RPM settings to show the change in braking effect of the propellers and also the differing trim changes.

5. Flight with Flaps Extended

The significant features are the trim changes that occur as flaps are lowered, and, at approach speeds, how differing propeller RPMs affect the trim changes for small changes of power at low power. This is an important point for the student to assimilate to avoid over controlling on the approach. The following points should be emphasised:

a. The large trim change that occurs during an overshoot (go around) manoeuvre at 75 Kts with land flap selected at maximum power.

b. Maximum power is achieved at less than full travel of the power levers in the quadrant.

c. Smooth handling of the power levers particularly if applying power from idle.

d. Care in not exceeding maximum power limitations (Torque/TGT). TGT is not usually critical until operating under hot and high altitude airfield conditions.

6. Stalling

This section of the aircraft conversion is essentially an exercise in engine handling to allow the student to become used to smooth operation of the power levers and monitoring the Torque and TGT instruments when opening up the power during stall recovery. Unlike a piston engine there is little or no change in engine noise with power changes, **SO BEWARE**, in the early stages of a BN2T conversion it is not uncommon for a student to **FULLY OPEN** the power levers. Providing that the Instructor immediately retards the levers and **THE RED DIAMONDS AT 843° C (6 Second Limit)** have not been exceeded no harm will be done.

7. Circuit Procedures

The circuit patterns are given at Appendices 'B' and 'C' where typical power settings and speeds are indicated. The aircraft has quite a large variation in speed with landing weight, the graph of which is given at Appendix 'G'. Note that the maximum landing weight, except for an emergency, is 6,800 lbs. Maximum take-off weight for a delivery flight with ferry fuel tanks fitted is 7,700 lbs but the maximum landing weight, except for an emergency, remains at 6,800 lbs.

FLAPLESS OPERATION

1. Introduction

Flapless take-offs are a normal operation from prepared runways for both models of Islander when performance is not a consideration. The same philosophy may be applied for landings when operating into a high density terminal area when speeds higher than flap limiting speed are required for as long as possible to maintain separation between aircraft on the final approach path. See Appendix 'E' for power settings and speeds.

2. Take-off

Note that the trim setting is one division NOSE UP and that lift off is at 'blue line' speed (best single engine rate of climb). In the interests of reducing cabin noise, The Piston Islander propeller RPM may be reduced to 2400 during the take-off run. The Flight Manuals schedule the minimum conditions for flapless take-offs under the heading "Alternative Procedures".

3. Circuit

The circuit is as for a normal twin engined operation. In a busy Terminal Manoeuvring area (TMA) the BN-2T may easily fly at V_{no} as against 130 Kts for the BN-2 model.

3. Landing

a. Initial Approach

Apart from TMA considerations, the aircraft should be at the idealised speed during the initial approach and should be wings level on final approach at not less than 400 ft. Note that the approach is flatter than normal with a higher nose attitude. Under light or calm wind conditions only a low power setting will be required to maintain a steady rate of descent.

b. Final Approach

Taper the speed back to the correct value and aim for a stabilised speed almost to the point of touch down. A properly trimmed condition helps to stabilise the approach. Under marked wind shear conditions a high rate of descent may develop with little warning, particularly with the BN-2T - the propeller disc drag of the turbine engine at 2030 RPM at low power must be emphasised. Engine response must be anticipated.

c. Flare and Touch Down

It is preferable to maintain a small amount of power until the point of touch down to give better engine response particularly under gusty conditions. Very little flare is required to arrest the rate of descent as the aircraft is more or less in the landing attitude and the ground cushion effect is quite noticeable. A shade too much power will create a long float before touch down. The landing run will only be slightly longer than normal without using excessive braking.

CAUTION - DO NOT 'HOLD OFF' DURING THE LANDING AS THERE IS A RISK OF STRIKING THE TAIL BUMPER WHEN TOUCHING DOWN BELOW V_{AT}

STOL OPERATION

1. Introduction

STOL training should not commence until the instructor is satisfied that the student has fully assimilated the asymmetric phase. Both models are being flown closer to V_{mca} than previously during take-off and landing and there is, therefore, less margin for error in the event of engine failure. The circuit pattern after take-off is the same as for normal twin engined operations until on the final approach. Appendix 'D' details the speeds and power settings for both models of Islander.

2. Take-off

a. **On the Runway** Hold the aircraft on the toe brakes whilst establishing full power. DO NOT ENGAGE THE PARKING BRAKE. It will take a few seconds for the engines to stabilise. After brake release, check the acceleration rate (this is vital under short, soft ground operations) and rotate at the correct speed

b. **Initial Climb** Beware of over rotating just after take-off particularly when obstructions are quite close to the end of the take-off path (e.g. a jungle strip). Note that this climb is at Take-off Safety Speed.

c. **Engine Failure on Take-off** Be prepared to abandon take-off in the event of an engine failure.

3. Landing

a. **Initial Approach** Treat the initial approach as for the conventional twin engined case. Aim to be lined up with the runway/strip by 400 ft with the wings level, Take-off Flap set and 88 Kts.

b. **Final Approach** Once Land Flap has been extended reduce speed not below 'Blue Line'. Then, when about 500 metres from the selected point of touch down, taper the speed back to 55 Kts (65 Kts BN-2T) and **TRIM**. Make sure the approach is well stabilised and emphasise that the rate of descent is directly controlled by power. Avoid using the elevator trim, if possible, once committed to the landing and accept the small out of trim forces that may occur with power changes. Under turbulent conditions the rudder should be used to assist the ailerons for roll control.

c. **Flare and Touch Down** The last few feet of the approach are the critical phase of the landing. A slight increase in power plus a check back on the elevator is required to stop the descent. Too much power and the aircraft will float just off the ground; too little power coupled to too low an airspeed will result in a heavy landing (elevator effectiveness is also reduced). Immediately the main wheels make contact ensure that the power is right off, lower the nose wheel and commence continuos maximum braking. Maintain the back pressure on the control column, ideally with the control full back achieve maximum weight transfer to the wheels. **DO NOT** raise flap during the landing - raising flap only tends to increase the landing roll as conditions change from maximum drag to maximum lift.

CAUTION - DO NOT OVER ROTATE IN THE FLARE AS THERE IS A RISK OF BANGING THE TAIL BUMPER ON THE GROUND

4. Go Around

If at any time the approach becomes de-stabilised, overshoot action should be taken. The two commonest reasons for de-stabilisation are:

a. Poor trimming and,

b. Over correcting with power.

The BN2 piston aircraft presents no problem during the go around as the throttles may be advanced fully forward; this is not the case with the BN-2T. The engines take approximately 5 seconds to reach full power from idle and the power levers **DO NOT** travel the full range of movement available. Care must be taken not to exceed engine limitations, particularly TGT at high ambient temperatures and altitudes.

Note 1: Section 5 of the Flight Manual should be consulted to obtain optimum performance.

Note 2: Take-off Flap (25^{O}) produces the optimum conditions for a short field take-off. Any other flap setting either reduces C_L or increases C_D. In any case, it is not possible to accurately estimate the flap angle - the only accurate settings are the manufacturers pre-set stops.

Note 3: For soft ground conditions, load the aircraft so that the C of G is on the aft datum; this will assist in raising the nose wheel against the rolling friction nose down pitching moment.

ASYMMETRIC PROCEDURES

1. General

The condition of asymmetric flight occurs when the aircraft is flown with unbalanced thrust about the normal axis. This causes a yawing moment which is counteracted by correct operation of the flying controls.

2. Basic Considerations

The explanation of the forces involved is more conveniently done using an aircraft model.

When an engine fails, asymmetric thrust will cause yaw towards the failed engine. If uncorrected, the aircraft will roll towards the failed engine and the nose will drop. As the yawing moment is the immediate problem, the first action by the pilot is to keep straight using opposite rudder to the yaw.

The yaw when an engine fails or is stopped is very marked. The severity will depend on:

a. The amount of thrust being delivered by the live engine.

b. The thrust moment arm (where applicable).

c. Amount of offset drag (windmilling or feathered propeller).

d. The indicated airspeed.

The effectiveness of the rudder is of prime importance in preventing yaw. The major considerations are:

a. The indicated airspeed.

b. The angle of deflection of the rudder.

c. The rudder moment arm (the distance of the rudder from the C of G).

d. Aircraft stability (Directional).

e. The strength and skill of the pilot in applying the rudder.

3. Critical Speed

Critical speed is the lowest possible speed on a multi-engined aircraft at which, at a constant power setting and aircraft configuration, the pilot is able to maintain directional control after failure of one or more engines on one side.

4. Factors Affecting Critical Speed

The critical speed is affected by:

a. The power output of the live engine(s).

b. Which engine has failed (where applicable).

c. Drag (position of the undercarriage and flaps).

d. Asymmetric drag (failed engine propeller windmilling or feathered).

e. C of G position.

f. Amount of bank towards the live engine.

g. Atmospheric turbulence

h. Strength and skill of the pilot.

If at any time the airspeed falls below the critical speed, the primary consideration is to keep straight at all costs. If the pilot cannot do this using the flying controls, **he must reduce power sufficiently on the live engine to stop the** yaw. Height may be lost, but this must be of secondary importance to keeping straight.

5. Minimum Single Engine Control Speed (V_{MCA})

V_{MCA} is the speed at which, in the event of sudden engine failure, the pilot can stop the turn which results within 20^0 of the original heading, and, after recovery, hold a steady heading with not more than 5^0 of bank and full rudder towards the live engine.

Note:

a. V_{MCA} for the BN2 Piston Islander = 39 Kts.

b. V_{MCA} for the BN-2T Turbine Islander = 47 Kts.

6. Refusal Speed

Refusal speed is the maximum speed for a given length of take-off direction from which the aircraft could be brought to rest in the remaining length of dry surface using maximum (non skid) braking applied not more than five seconds after one engine has failed.

Note: No Refusal Speed is quoted for the Islander series of aircraft, but, the following is a guide:

'The action taken after failure of one engine during the take-off depends on available stopping distance or the ability to clear or avoid all obstacles under single engine operation. In all cases where the airspeed is below V_{MCA} the throttle should be closed and the aircraft brought to rest'.

7. Take-off Safety Speed (TOSS)

Take-off Safety Speed is the minimum speed at which, following sudden and complete failure of an engine in the take-off configuration, the ability exists to maintain directional control at a safe margin above the stall. This is regardless of whether or not the aircraft has sufficient performance to maintain a positive gradient of climb on the remaining engine(s)

Note 1: The Islander series of aircraft are included in Performance Group 'C'. This group includes aircraft with a performance such that a forced landing should not be necessary if a power unit fails after take-off and initial climb has commenced.

Note 2: At Maximum Take-off Weight:

a. TOSS for the BN2 Piston Islander = 50 Kts.

b. TOSS for the BN-2T Turbine Islander = 58 Kts

8. Engine Failure <u>On</u> Take-off Drill

i. Aircraft Speed Less Than V_{MCA}

In the event of an engine failure below V_{MCA} both throttles **must be closed** and the take-off abandoned.

ii. Aircraft Airborne, Airspeed Between V_{MCA} and Safety Speed

The decision to abandon or carry on with the take-off will depend on a number of factors, the more important being:

a. The degree of engine failure (partial or complete loss of power).

b. Speed attained at the time of the engine failure.

c. The aircraft weight.

d. The aircraft configuration - flap position.

e. The length of runway remaining.

f. The position of any obstacles ahead

If the decision is made to continue the take-off, the following drill must be followed:

Note: This situation should not arise in either the BN2 or the BN-2T as the aircraft are rotated at Safety Speed for normal operations.

Engine Failure On Take-off Drill

a. Keep straight by instant use of rudder, and, if necessary, up to 5^0 of bank towards the operating engine(s).

b. Identify the failed engine. Set power on the operating engine(s).

c. Feather the failed engine.

d. Consider the direction of flight.

e. Raise flap if appropriate.

f. On the 'dead' engine, switch off:

Magnetos.

Fuel pump.

Fuel Cock.

g. Check for FIRE.

h. On the live engine, check:

Engine instruments - temperature and pressures.

Generator output - keep load within limits. Be prepared to off load any electrical equipment.

Suction.

i. R/T call declaring state of emergency.

j. TRIM.

iii. Aircraft Airborne, Airspeed Above Take-off Safety Speed

Provided immediate corrective action is applied it should not be necessary to carry out a forced landing in a normally loaded aircraft. Once the yaw has been corrected, the failed engine feathered and the flap raised the aircraft should climb. The 'Engine Failure On Take-off' drill should be followed.

Note: Normally when practising this exercise in the circuit, the instructor should simulate engine failure, at a height not less than 200 feet above the ground, by smoothly closing the throttle. Airspeed should not be less than 65 Kts in the BN2 Piston Islander and 75 Kts in the BN-2T Turbine Islander.

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AIR EXERCISE

AIRMANSHIP

NEVER EVER SHUT DOWN AN ENGINE, FOR PRACTICE PURPOSES, BELOW 3,000 FEET ABOVE GROUND LEVEL.

CAUTION - Protect the engines when practicing in engine icing conditions. For example, impact tube icing on the Lycoming IO-540 engine will inhibit restarting in flight and if intake anti-ice is selected on an Allison engine maximum power may not be available because of TGT limiting.

SIMULATING ENGINE FAILURE

(a) **BN2B Piston Islander.**

(i) **Below 1,000 ft a.g.l.** Close the throttle fully with care to avoid any damage to the counter balanced crankshaft. (Read LYCOMING FLYER - Key Reprints - '**Protecting The Engine During Simulated Emergency Procedure Operation**' on page 51)

(ii) **Above 1,500 fat a.g.l.** Close the mixture lever at any power setting.

(iii) **Zero Thrust Setting** 2,400 RPM/12" Manifold pressure.

(b) **BN2-T Turbine Islander.**

(i) **At Any Altitude** Close the power lever fully as rapidly as required.

(ii) **Zero Thrust Setting** Power lever closed/minimum propeller RPM

ASYMMETRIC FLIGHT (PART 1)

1. The AIM of this exercise is to teach the student:-

(a) To recognize the symptoms of engine failure.

(b) To maintain control and identify the failed engine.

(c) To study the effects of power and speed on control available.

2. The AIR EXERCISE should be carried out in the following sequence:-

3. Single Engined Flight

(a) At a suitable height above 3000 ft a.g.l. and within easy reach of a suitable airfield, carry out check list feathering drills. Then hand over control to the student to carry out normal maneuvers. Point out:-

(i) Handling characteristics of the aircraft. Include moderate turns (up to 45° bank angle in each direction).

(ii) Power required for straight and level flight - say 105 Kts.

(iii) Rudder Trim.

(iv) Ball of Slip Indicator.

(v) Demonstrate cross-feeding the fuel.

(b) Carry out unfeathering drill (check list).

(i) Set 12" Hg for warm up (piston Islander)/idle power + minimum propeller RPM (BN2-T) and note that the rudder trim requirement is the same as for the feathered condition.

(ii) Resume normal twin engine cruise when temperatures and pressures permit.

4. **Effect of Engine Failure**

(a) At normal cruising speed trim to straight and level flight. Then, close each throttle/power lever in turn and note:-

(i) By external references the yaw, roll and developing spiral towards the 'failed' engine.

(ii) After practice on alternate engines point out instrument indications in relation to the failed engine (fluctuations of the turn Co-Ordinator)

(b) Resume normal straight and level cruise.

5. **Action to Maintain Control, and, Identification of Failed Engine**

(a) Close the throttle/power lever on one engine and point out action to maintain control.

(i) Prevent yaw by use of rudder.

(ii) Use of aileron to keep the wings level.

(iii) Maintain height with the elevator (any loss of speed being acceptable in this configuration).

(iv) Note the ball in the center for balanced flight with the wings level.

(v) Repeat for the other engine.

(vi) The student now practices control technique.

(b) Demonstrate 'DEAD LEG = DEAD ENGINE' diagnosis of failed engine.

(c) The student practices control and identification. The instructor masking the engine control quadrant whilst simulating failures.

(i) The student calls which engine has failed each time a failure is simulated.

(d) Show alternative method of maintaining directional control after failure, i.e. reducing power on the live engine noting:-

(i) Yaw is stopped and control regained but loss of height and/or speed is considerable and therefore this method may not be acceptable.

6. <u>Effect of Engine Failure In Turns</u>

(a) At normal cruise power carry out a 30^0 angle of bank level turn in either direction. Throttle back/close power lever on the inside engine and note:-

(i) Rapid rate of roll towards the 'failed' engine.

(ii) A steep spiral condition is quickly reached towards the 'failed' engine if no corrective action is taken.

(b) Continue the turn and throttle back/close power lever on the outside engine and note:-

(i) Slow rate of roll towards the 'failed' engine.

(ii) If no corrective action is taken the aircraft will enter a spiral towards the 'failed' engine.

(c) Continue the turn and throttle back/close power lever on the inside and outside engines in turn and note:-

(i) Instrument indications.

(ii) Controlling aircraft - preventing yaw with rudder - then leveling the wings and identifying the failed engine.

(d) The student now practices control and identification. The instructor masks the engine control quadrant whilst simulating failures.

(i) The student calls which engine has failed each time a failure is simulated.

7. <u>Effect of Varying Speed at a Constant Power Setting</u>

(a) Set power for 120 Kts (22" Hg - 2400 RPM for BN-2/2030 RPM - 650 lbs torque for BN-2T) and trim to straight and level flight. Throttle back/close power lever on one engine and allow the propeller to windmill. Maintain directional control (do not re-trim) and hold the airspeed at 120 Kts disregarding height loss.

(i) Check heading and slip indicator for straight balanced flight - check the wings are level.

(ii) Note the rudder foot load required.

(b) Allow the speed to reduce to 65 Kts BN-2, 75 Kts BN-2T (Blue Line Speed).

(i) Note the increased amount of rudder deflection and additional foot load required to maintain direction and balance as speed decreases.

(ii) Stabilize the speed at 65/75 Kts (accepting any height loss) ready for the next part of the exercise.

8. Effect of Varying Power at Constant Speed

(a) Maintaining Blue Line Speed, increase power on the live engine to maximum. Maintain directional control and speed.

(i) Check heading and slip indicator for straight balanced flight - check the wings are level.

(ii) Note the further increase in rudder deflection required and the increased foot loading.

(b) The student repeats the full combined sequences 7 and 8 on the other engine. These sequences should be repeated as required.

(c). Ensure that the student fully understands that changes of power and airspeed result in changes of rudder requirement to keep straight. The critical combination being high power and low speed. He should also have mastered the control and identification technique of engine failure management.

9. Effect of Flap and Windmilling Drag on Aircraft Single Engine Performance (The Student Does All the Flying)

(a) At Blue Line Speed, with the 'dead' engine windmilling and the live engine at Maximum power, select Take-Off Flap. Maintain Blue Line Speed.

(i) Note the change in aircraft performance; at maximum weight and ISA conditions either aircraft should just maintain height at 4,000 Ft. A.S.L.

(ii) Note any changes in rudder deflection and foot loads.

(b) Maintain Blue Line Speed and select Land Flap.

(i) Note the change in aircraft performance; a marked rate of descent will occur.

(ii) Note any changes in rudder deflection and foot loads.

(c) Maintaining Blue Line Speed the **instructor** feathers the 'dead' engine.

(i) Note the change in aircraft performance; the rate of descent will decrease - quite significantly on the BN-2T.

(ii) Note any changes in rudder deflection and foot loads.

(d) Maintaining Blue Line Speed select Take-Off Flap.

(i) Note the dramatic improvement in aircraft performance: in most cases at ISA either aircraft should have a small rate of climb even at maximum weight.

(ii) Note any changes in rudder deflection and foot loads.

(e) Maintaining Blue Line Speed select Flaps Up.

(i) Note the significant improvement in aircraft performance and that the climb is quite positive except at limiting ambient temperature (Weight/Altitude/Temperature Performance Chart).

(ii) Note any changes in rudder deflection and foot loads.

(f) Maintaining Blue Line Speed, flight at optimum bank angle and side slip.

(i) In smooth air note the Rate of Climb with the wings level, the Slip Ball centered and the aircraft in trim. Then, apply 5^0 of bank towards the live engine, reduce rudder pressure to maintain direction and note the Slip Ball will be at about a half ball displacement also towards the live engine - retrim. Note the new Rate of Climb.

(g) Ensure that the student understands the effects of flap position and engine feathering have on aircraft performance. Control of the aircraft is paramount at the point of engine failure followed by identifying the failed engine and completing the appropriate feathering drill. Point out to the student that he has been through the various phases of a circuit from take-off to land plus 'go-around' and that the aircraft **has no climb performance until the flaps are fully UP** even with the engine feathered - this will be particularly so when the ambient temperature is at or near the W.A.T. limits. From a performance point of view the worst case will be an engine failure on a 'go-around' with Land Flap selected. In this case there could be up to 100 Ft height loss from the engine failure point to the aircraft climbing away. From a handling point of view the **Engine Failure After Take-Off** is the worst case.

ASYMMETRIC FLIGHT (PART 2)

1. The AIM of this exercise is:-

(a) To study the factors affecting critical speeds.

(b) To learn the significance of take-off safety speed.

(c) To practice the feathering and unfeathering drills.

2. Critical Speeds, Significance and Recovery

(a) Set maximum RPM on both engines with the speed at 120 Kts. Close the left throttle/power lever - i.e., left engine windmilling. Apply maximum power to the right engine. Maintain directional control with the wings level.

(i) Reduce speed keeping the wings level until either directional control is lost with full rudder applied OR the stall warning comes on. Use the Gyro Compass as reference.

(ii) Note the speed at which this occurs.

(iii) Recovery - lower the nose to increase speed until directional control is regained or stall warning ceases.

(b) In the same configuration as (a) above, stabilize the speed at 10 Kts above stall warning speed.

(i) Apply 5^0 of bank towards the live engine and reduce the rudder pressure to maintain a constant heading. Note that the Slip Ball is off centre towards the live engine.

(ii) Note that less rudder is required to keep straight and therefore a lower critical speed could be achieved.

(c) Maintain configuration and speed as in (b) above.

(i) Set simulated feather on the 'failed' engine.

(ii) Note that less rudder is required to maintain a constant heading and therefore again a lower critical speed could be achieved.

3. Engine Failure in Take-Off Configuration

(a) At a suitable height (preferably 1500 - 2000 Ft) select maximum RPM on both engines and flap to Take-Off. Reduce to climbing speed (Blue Line Speed), increase power to maximum and raise the nose to maintain speed - trim as required. Then:-

(i) Close throttle/power lever on one engine.

(ii) Point out that it is possible to control the aircraft, but, height may have to be lost in order to maintain speed above Take-Off Safety Speed.

(iii) Carry out the emergency drill for engine failure on take-off (E.F.A.T.O.).

(iv) Allow the aircraft to stabilize and trim to the single engine climb speed (65 Kts BN2/75 Kts BN-2T).

(v) The student now practices E.F.A.T.O. drills.

4. Feathering and Unfeathering Drills (Above 3000 Ft a.g.l.)

Supervise the student whilst he practices these drills until proficient. The Check List should be used to verify that the checks are correct.

Note 1: Ensure that the student appreciates that critical speed is varied by a number of factors and that he has been shown only three variations chosen for their importance and practicality. Point out that power is reduced during recovery only when essential for safety.

Note 2: These exercises are not convincing if carried out at too great an altitude because of the decrease in power available. 3000 Ft a.g.l. is a practical height for the BN2 and not above 7000 Ft for the BN-2T.

Note 3: Ensure that the student appreciates that in the event of an engine failure after take-off, even if the correct climbing speed is attained, a forced landing may still be necessary if obstacle clearance cannot be achieved.

Note: When practicing feathering drills, an engine fire may be simulated to initiate the drill. In this case, the drill should then be done from memory and **followed up with the Check List** to confirm that the drill has been done correctly.

ASYMMETRIC CIRCUIT - (SEE APPENDICES 'A' AND 'C')

1. Points to be made during the pre-flight briefing are:-

(a) The size and shape of the circuit pattern should be as nearly as possible the same as for a normal circuit.

(b) The flap should not be lowered before the base leg.

(c) Rudder trim should be used to ease foot loads. It may not be possible to remove all foot loads all the time as power may be varying on the live engine.

(d) When practicing asymmetric circuits, whether for a 'go-around' or a landing, the student should be briefed that too large a circuit could cause difficulty due to large amounts of power being required to reach the threshold. Conversely, too close a circuit is also undesirable as a high position on finals could lead to a glide approach and a possible runway overshoot. Bear in mind that once committed to land it is virtually impossible to make a single engined 'go-around' from near the runway surface.

(e) The significance of Take-Off Safety Speed must be emphasized in connection with all asymmetric approaches. At no time must the speed fall below Blue Line speed until committed to land.

(f) Emphasize care in keeping the aircraft in balance at all times.

2. Asymmetric decision Height

This is the height relevant to an asymmetric approach at which a 'go-around' must be initiated unless all of the following criteria are satisfied.

(a) The aircraft has been cleared to land by Air Traffic Control.

(b) The runway is clear and appears to be remaining clear.

(c) The approach to land is stabilized and is in all respects satisfactory.

The **Asymmetric Decision Height is 200 Ft.** QFE (Category 1 ILS). If the decision is made to continue the approach and land, it is at or after this point that Land Flap is lowered. Land Flap **must not be lowered** at decision height if a planned 'go-around' is to be made.

3. The 'Go-Around'

The student must be briefed on the following points:-

(a) The wings must be level.

(b) Apply full power smoothly, the RPM remain at 2400 BN2 and 2030 BN-2T.

(c) As soon as full power has been applied select flaps UP.

(d) Be prepared for the large changes in foot load as the power is increased.

(e) If not already at Blue Line speed, the aircraft must be accelerated to that speed for the single engine climb. If necessary a little height may be lost to achieve the correct speed. Also, if necessary, maximum RPM may be used on the live engine (BN2).

(f) The aircraft should be climbed straight ahead to 1000 Ft a.g.l. if practicable.

(g) When circuit height and speed have been attained, power may be reduced to maintain the single engine circuit speed of 105 Kts.

4. **The Landing**

The pre-flight briefing for the asymmetric landing must include the following points:-

(a) At asymmetric decision height the wings must be level and the aircraft aligned with the runway or intended landing path.

(b) Power from the live engine is used to produce a normal descent path. Speeds are the same as for a twin engined approach.

(c) If Land Flap is to be used for landing, the final selection of flap is made at or after the decision to land has been made. Allow the flap to take effect before adjusting power.

(d) Keep the rudder trimmed as this will assist when using power to regulate descent; changes of foot load will occur as power changes are made.

(e) The reverse foot load experienced when the throttle/power lever of the live engine is closed to land must be fully understood by the student.

Note 1: The 12" manifold pressure used to simulate a feathered propeller on the BN2 cannot be left on for landing as the lift derived from the slipstream may cause the wing on that side to rise after touchdown. Therefore, for landing, both engines must be throttled back. It may be more convenient for the instructor to close the 'dead' engine throttle before decision height so that the student has a more realistic simulated final approach even though the windmilling engine actually has more drag than the real feathered case.

Note2: Consider the use of Carburetor Heat on the O-540 engine to protect the 'dead' engine on base leg and final approach - THIS IS the instructor's responsibility.

Note 3: Speed should be adjusted to take into account turbulence on the approach.

5. **After Landing**

When clear of the active runway, stop and carry out the After Landing checks from the Check List.

BN - 2/BN - 2T FAMILIARIZATION

(THIS MAY ALSO BE USED FOR PILOTS WHO HAVE NO PREVIOUS MULTI - ENGINE AIRCRAFT EXPERIENCE)

AIM: To learn the general handling characteristics of the BN - 2 or BN - 2T aircraft (as appropriate).

AIRMANSHIP: Orientation, Flight Envelope, Lookout (Cockpit Visibility), Limiting Speeds for Flap.

AIR EXERCISE:

1. TAXIING

As for a PA 28 Cherokee for example.
Throttles/Power Levers together.
Using toe brakes - parking brake application and release.
Nose wheel steering and castering.
Small radius turns.

2. TAKE-OFF & CLIMB

Runway checks.
Rotate speed - (Appropriate to a/c type).
Climb attitudes/speeds.
Climb checks - propeller synchronization.
Climbing turns - cockpit visibility.

3. FLIGHT AT VARIOUS SPEEDS

(a) CRUISING SPEED (appropriate to aircraft type)

Cruise checks.
Straight and level attitude.
Power setting.
Effectiveness of controls.
Trim.
Medium level turns - attitude.
Steep level turns - attitude and speed control.
Cruise descent - attitude, power setting and Rate of Descent.
Descending turns - Rate 1.

(b) HOLDING SPEED - 110 Kts

Initial approach checks.
Straight and level attitude - power setting required.
Effects of controls - trim.
Rate 1 level turns - attitude and power.
Descending - attitude, power setting and Rate of Descent.
Descending turns - Rate 1.

(c) FLAPS DOWN

Pre-landing checks.
At 110 Kts select flaps to Take-Off - trim change.
Without changing power setting, allow speed to reduce to 90 Kts then adjust power to maintain 90 Kts.
Straight and level attitude - power required.
Effects of controls - trim.
Rate 1 level turns - attitude and power.
Descending - attitude, power setting and Rate of Descent.
Descending turns - Rate 1.
In steady descent at 90 Kts, select flaps to Land - trim change.
Without changing power setting and attitude, allow speed to reduce to and maintain 'Blue Line' speed. Then adjust power to control Rate of Descent required - trim. Vary the power setting to experience changes in Rate of Descent and control forces.
Apply maximum power for a 'go-around', bringing the flaps Up in two stages to establish a climb.

4. STALLING

(a) PRE-STALL CHECKS

As check list.

(b) STALL - FLAPS UP

Close throttles/power levers.
Maintain height - speed reduces, effects of controls and note airspeed at which stall warning occurs.
At stall - effects of controls and note airspeed.

(c) STALL - FLAPS SET TO LAND PLUS POWER

Power - set for predetermined Rate of Descent at 'Blue line' speed.
Final approach configuration - increase back pressure and reduce speed at a steady rate.
As speed reduces - effects of controls and note airspeed at which stall warning occurs.
Standard Stall Recovery at stall warning - together apply full power, rudder as required and relax back pressure on the elevator.
Select flaps to Take-Off and accelerate to 'Blue Line' speed. Raise remainder of flap after a height gain of 200 ft.
Accelerate to climbing speed and set climb power.

ASYMMETRIC FLIGHT (PART 1)

AIM: TO LEARN
(a) To recognise the symptoms of engine failure.
(b) To control the aircraft and identify the failed engine.
(c) To study the effects of Power and Speed on control available.

AIRMANSHIP: NO PRACTISE FEATHERING BELOW 3000 FT AGL - ensure a readily available airfield; temperatures and pressures (LIVE ENGINE); warn onboard crew - LOOKOUT.

AIR EXERCISE: **CHECK LIST FEATHERING DRILL** Note: Handling; power required for Straight and Level flight; rudder trim; ball central; engine instrument indications; cross feeding.

UNFEATHER FROM CHECKLIST Set 12" manifold pressure (idle power/minimum RPM on BN - 2T). Note that rudder trim required is the same as for the feather engine.

EFFECTS OF ENGINE FAILURE Straight and Level Flight - cruise airspeed. **ENGINE FAILS** - Yaw - Roll - Spiral towards the failed engine. **INSTRUMENT INDICATIONS** - Yaw - slip ball and turn co-ordinator. Roll } } Artificial Horizon and ASI. Spiral } **CONTROL** - Prevent yaw with rudder (ball in the centre). Aileron to level the wings. Elevator - height. Airspeed falls - consider power to the live engine. **ALTERNATE METHOD** - Reduce power on the live engine: Note height loss. **IDENTIFICATION - DEAD LEG = DEAD ENGINE**	**ENGINE FAILURE IN TURNS** Outside engine failure: Roll and yaw slow. Spiral entry slow. Inside engine failure: Roll, yaw and spiral entry rapid. Note: Instrument indications. Control as before - correct yaw before levelling the wings. **EFFECT OF POWER AND SPEED ON CONTROL** Power - Constant. Varying Speed Increase speed - Less rudder required. Reduce speed - More rudder required. At Constant Speed - Vary Power Less power - Less rudder required. More power - More rudder required. ∴ Critical combination is LOW SPEED and HIGH POWER e.g. ON TAKE-OFF

ASYMMETRIC FLIGHT (PART 2)

AIM:

(a) To learn the significance of critical speeds.
(b) To practise Engine Failure After Take-Off (EFATO) drill.
(c) To practise feathering and unfeathering drills.

AIRMANSHIP: As Part 1.

AIR EXERCISE Revision of Part 1 - Control and Identification

CRITICAL SPEEDS

a. Maximum power on one engine, the other engine windmilling wings level. Reduce speed. Note airspeed at which directional control is lost or stall warning occurs.

b. Same configuration - maintain 10 Kts above stall warning. Apply 5^0 bank towards live engine.
Note: Less rudder required to keep straight - ball not in the centre.
Value of bank in reducing critical speed.

c. Same configuration - Note rudder required.
Simulate feathering - Note again less rudder required to keep straight.
Value of feathering. Lower critical speed could be achieved.

ENGINE FAILURE AFTER TAKE-OFF (EFATO)

a. Speed below V_{MCA} - **Abandon Take-Off.**

b. Speed at V_{MCA} - Considerations.

(i) If runway remaining allows - **Abandon Take-Off.**
(ii) Carry out EFATO drill and manoeuvre for a forced landing.
(iii) Continue take-off and use EFATO drill.

c. Above V_{MCA} - Carry out EFATO drill.

EFATO DRILL

(i) Keep straight by use of rudder and up to 5^0 of bank. Lower nose to maintain minimum of 'Blue Line' speed (65 Kts BN - 2/ 75 Kts BN - 2T/ 78 Kts BN2T - 4S).

(ii) Identify failed engine - set power on the live engine.

(iii) Feather (Touch drill for simulated) failed engine.

(iv) Raise flaps.

(v) On dead engine, switch off (Touch drill for simulated): Magnetos, fuel pump(s), Fuel cock.

(vi) Check for fire.

(vii) On live engine, check: Engine temperatures and pressures, Alternator output, Suction.

(viii) Make appropriate R/T call.

(ix) Trim.

(x) Check services remaining - off-load non essential electrical systems.

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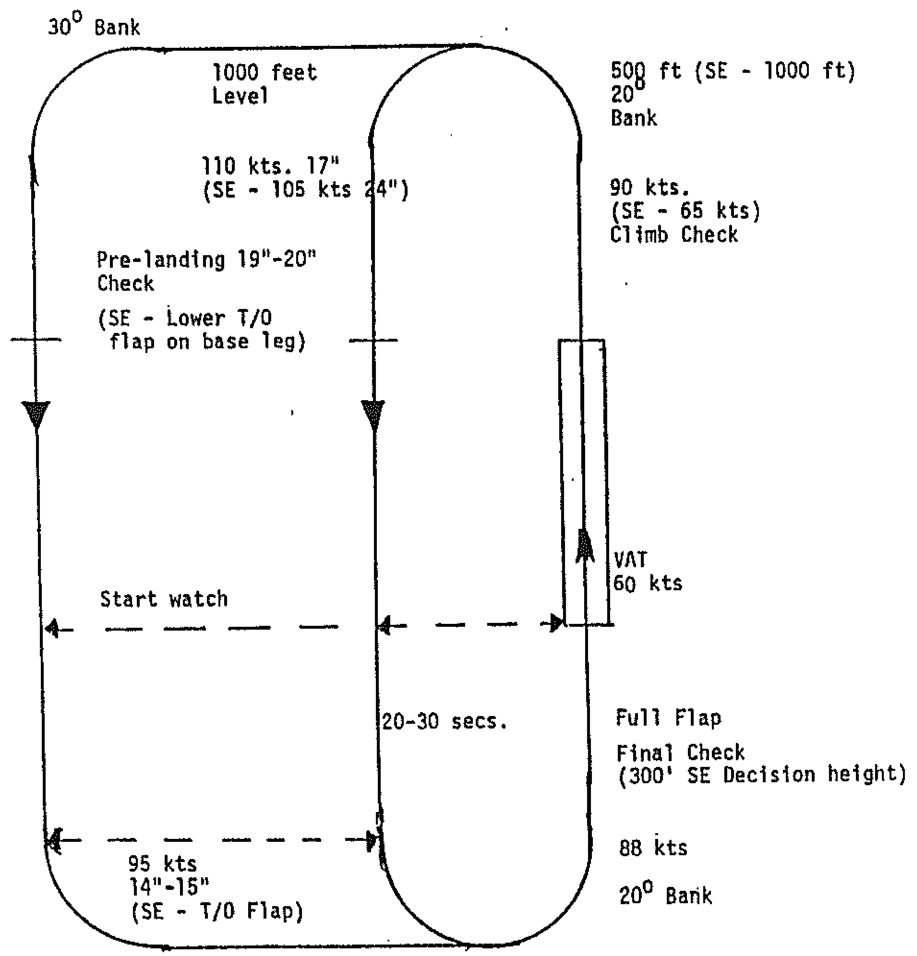
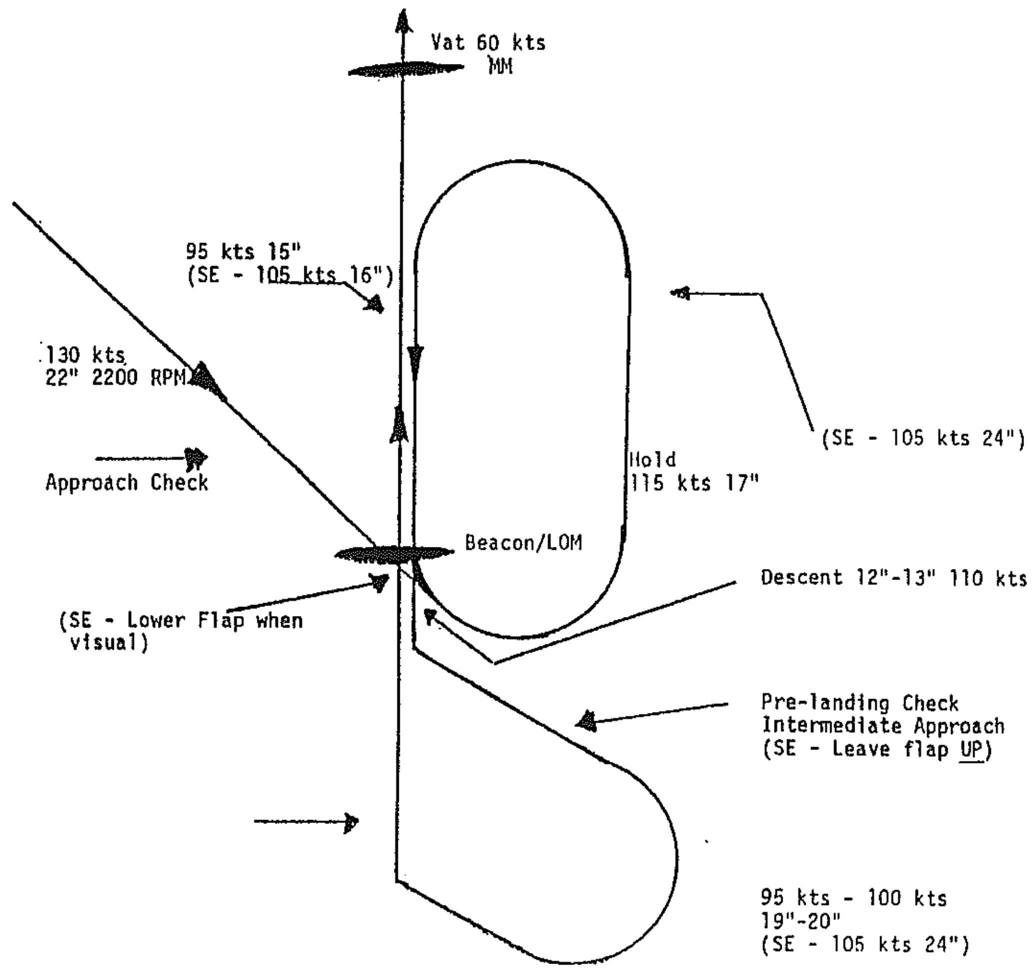
APPENDIX A

BN-2 ISLANDER

VISUAL CIRCUIT



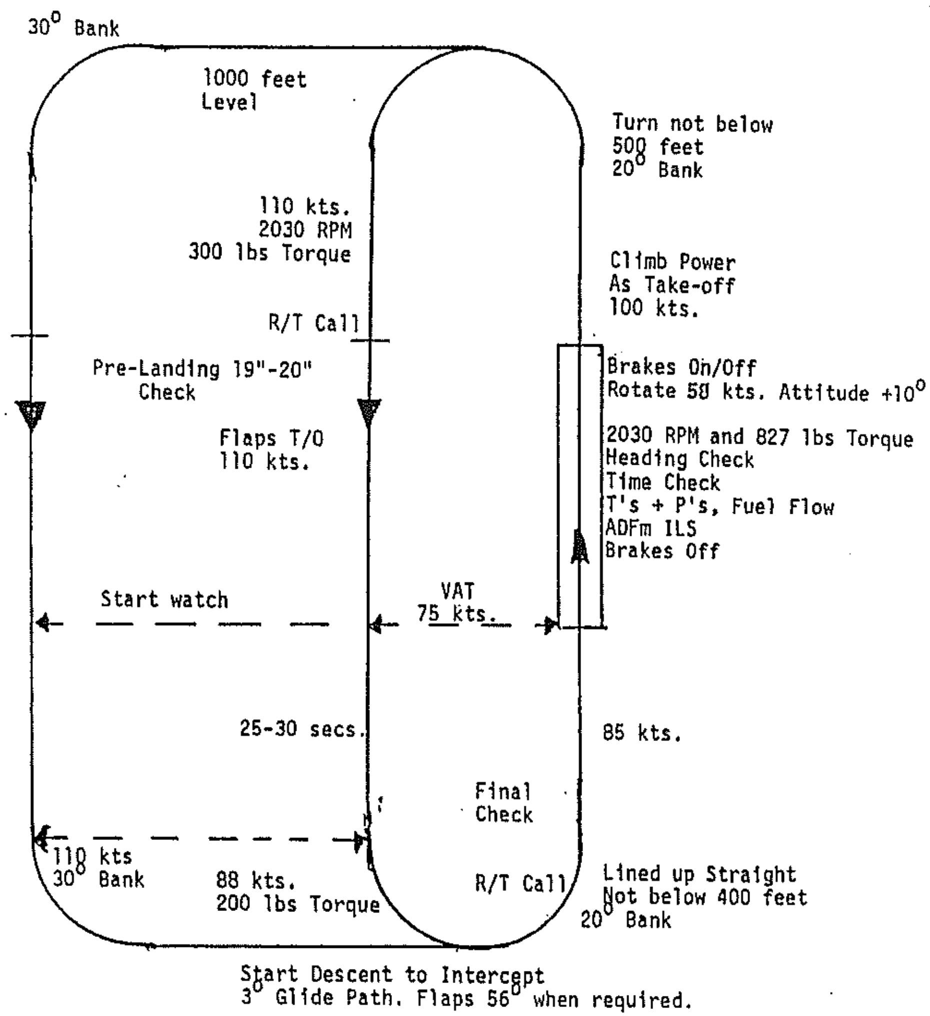
ILS/ADF PATTERN



APPENDIX B

BN-2T TURBINE ISLANDER - BOTH ENGINES OPERATING

VISUAL CIRCUITS



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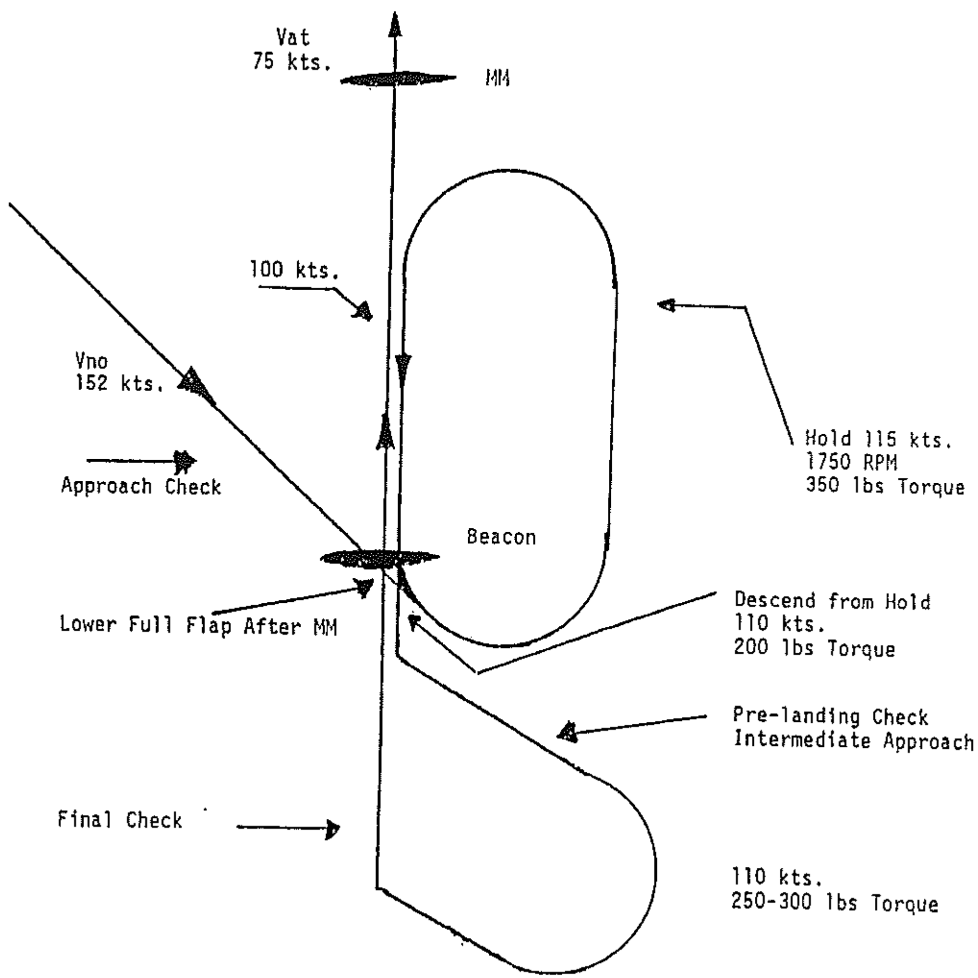
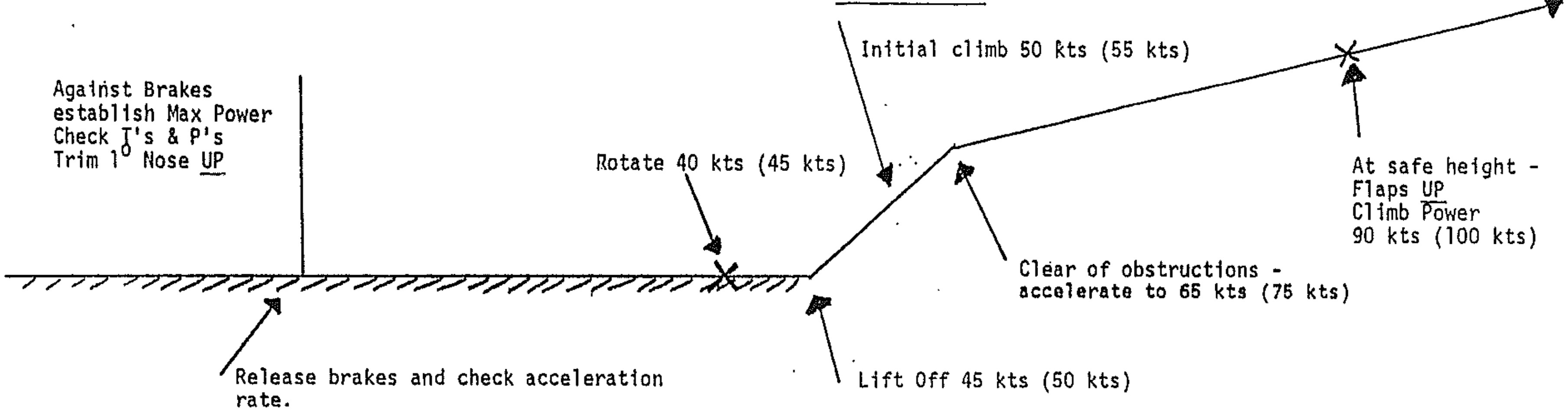
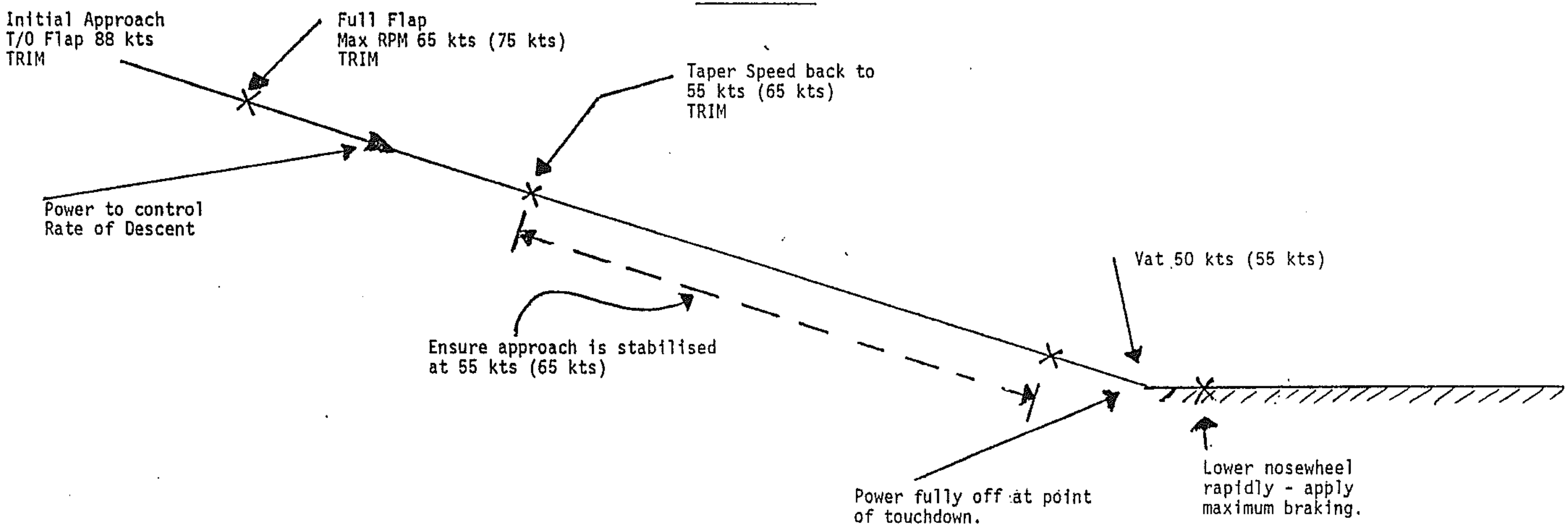


(BN-2T SPEEDS IN BRACKETS)

STOL TAKE OFF

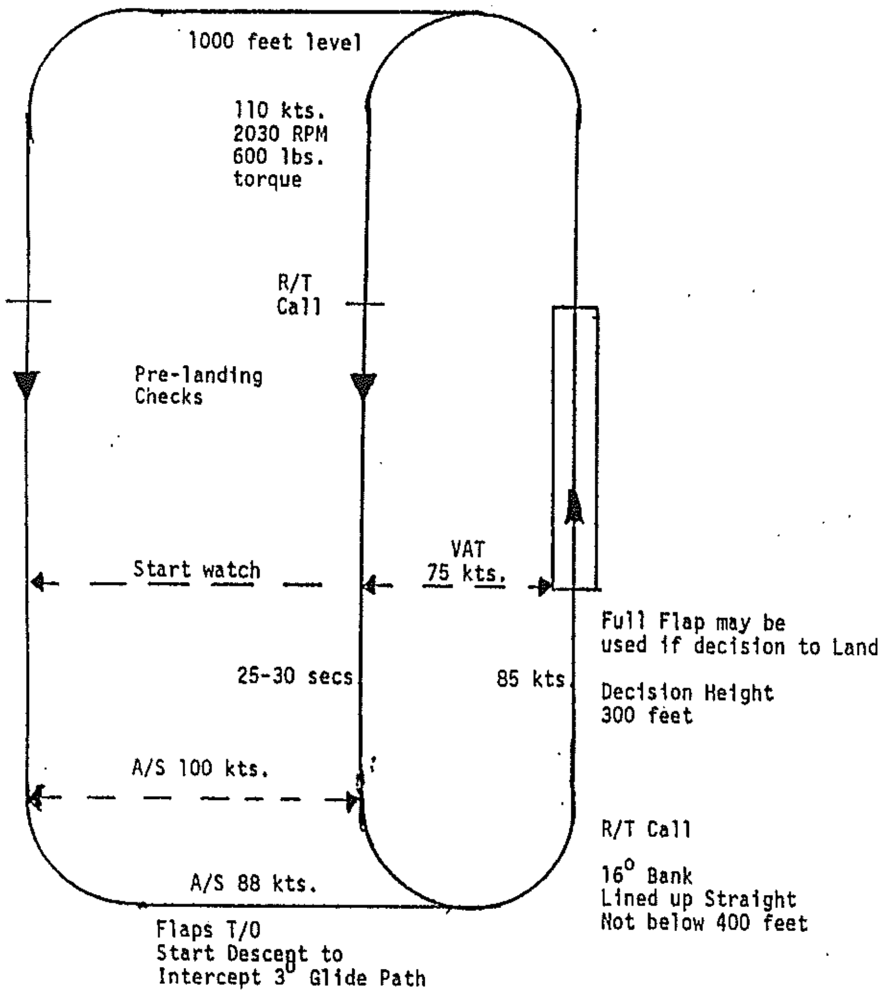


STOL LANDING

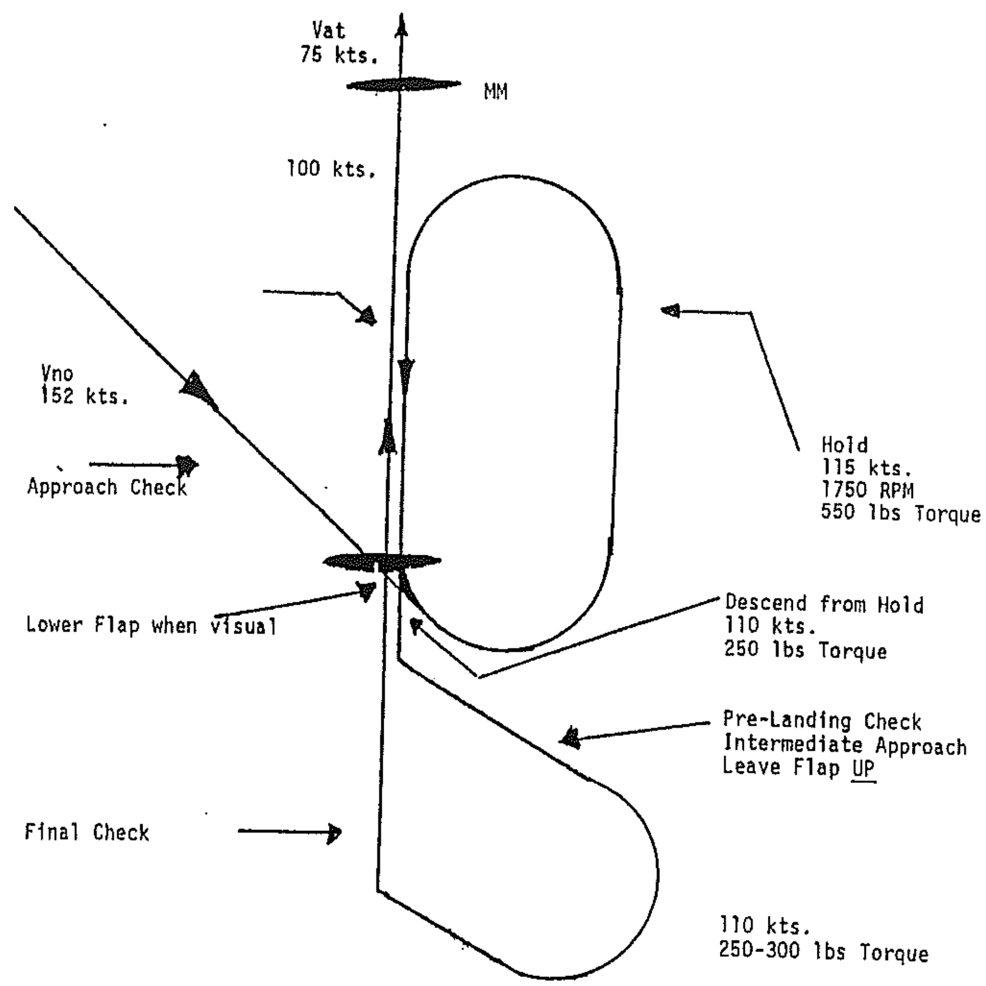


BN-2T TURBINE ISLANDER

SINGLE ENGINED CIRCUIT

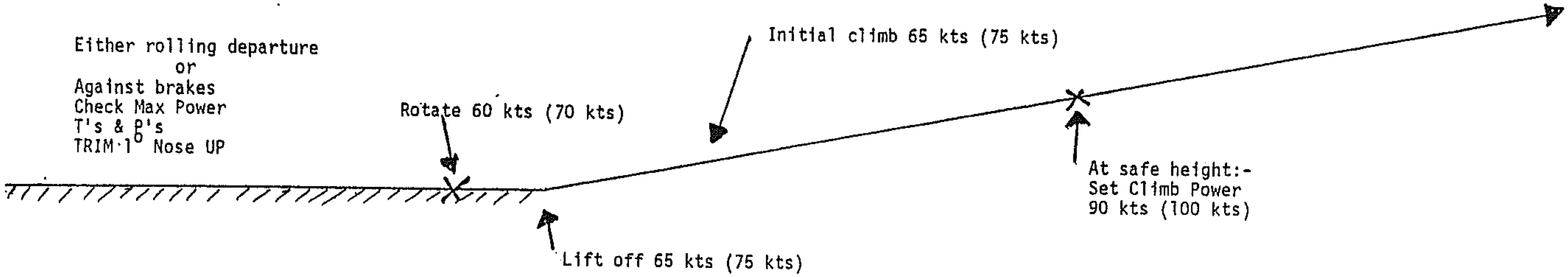


SINGLE ENGINED ILS/ADF PATTERN

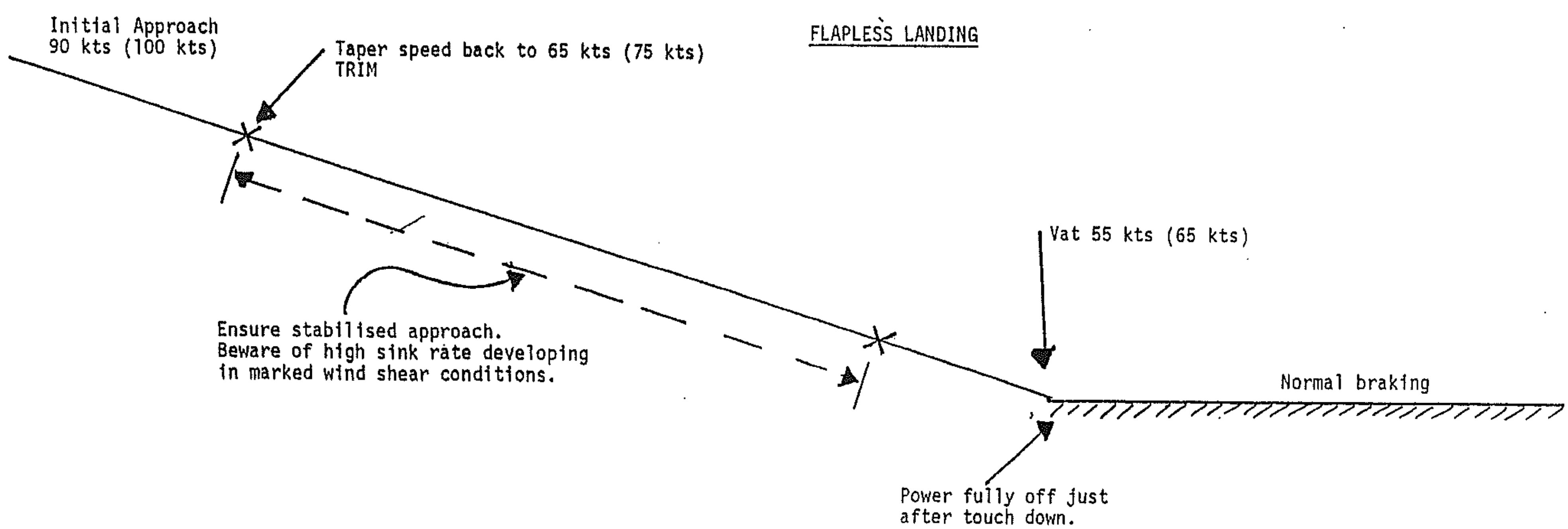


(BN-2T SPEEDS IN BRACKETS)

FLAPLESS TAKE-OFF

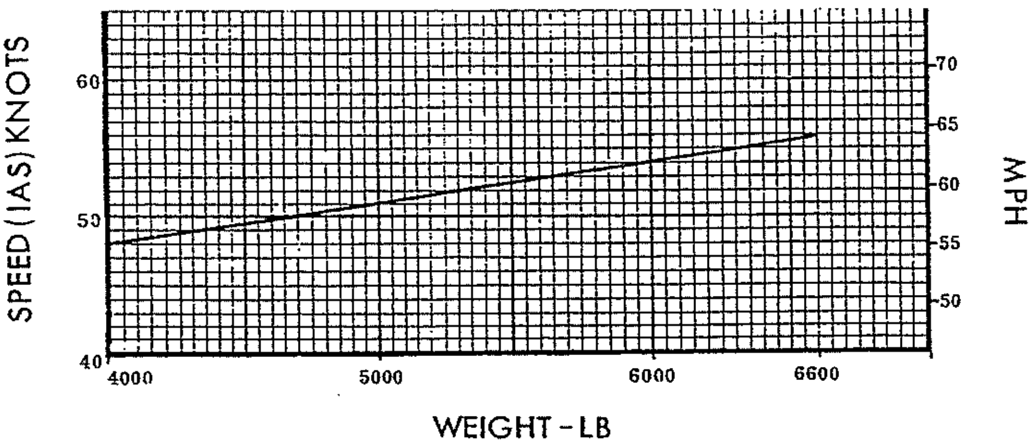


FLAPLESS LANDING

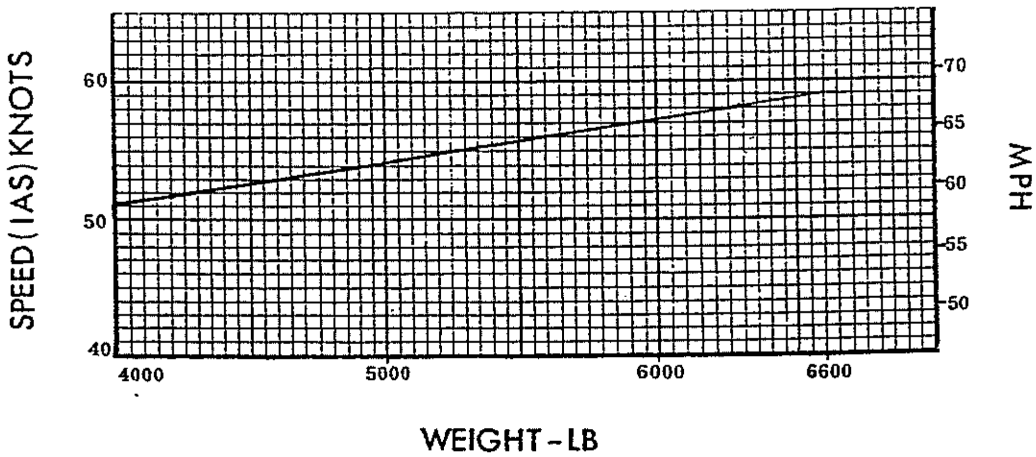


BN-2 ISLANDER

VARIATION OF TAKE-OFF SAFETY SPEED WITH AEROPLANE GROSS WEIGHT



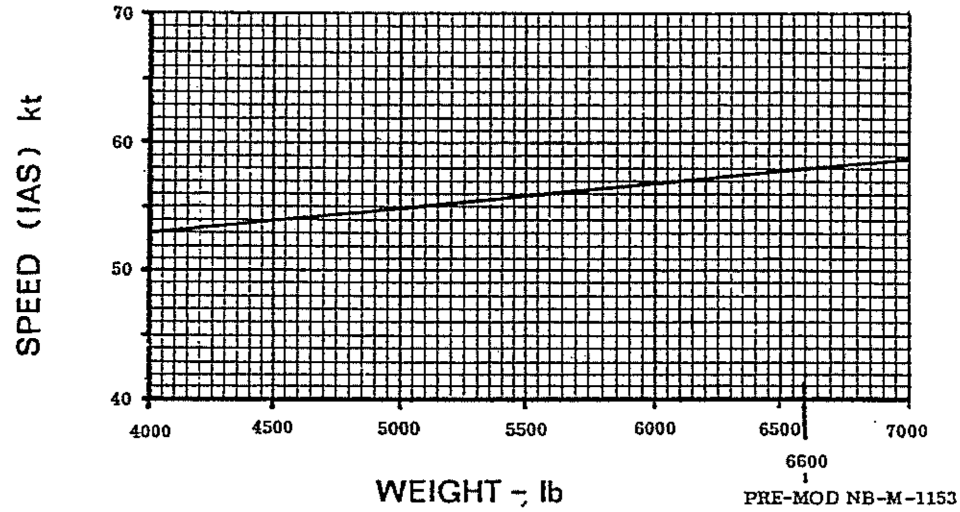
VARIATION OF LANDING APPROACH SPEED WITH AEROPLANE GROSS WEIGHT



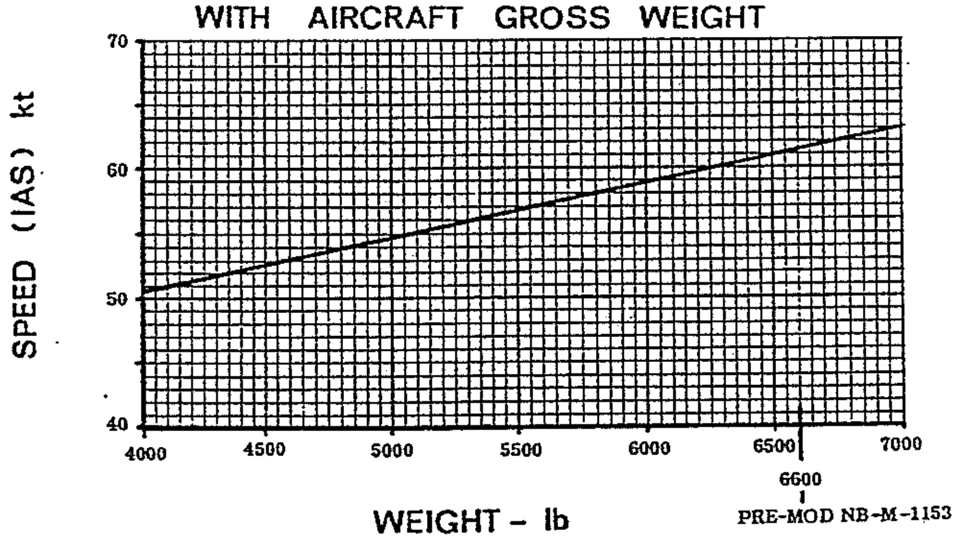
Variation of take-off and landing speeds with aeroplane gross weight

BN-2T TURBINE ISLANDER

VARIATION OF TAKE-OFF SAFETY SPEED
WITH AIRCRAFT GROSS WEIGHT



VARIATION OF LANDING THRESHOLD SPEED
WITH AIRCRAFT GROSS WEIGHT



Variation of take-off and landing speeds
with aeroplane gross weight

CRUISE PERFORMANCE DATA

FOR

THE ISLANDER SERIES AIRCRAFT

The cruise performance of the Islander Series aircraft is determined by many factors including trim setting, altitude, temperature, load and external equipment installed. The following Data Tables are for standard aircraft operating under ISA conditions. Drag decrements from installed external equipment (e.g.: Under-wing fuel tanks, weapons, surveillance systems and radomes) must be determined from the appropriate Flight Manuals.

BN2T - TURBINE ISLANDER

Turbine engined aircraft, irrespective of the engine type, operate at their best at high altitude. Therefore, selecting the correct power setting is invariably a compromise between operational role, range or endurance (loiter) flying and weather conditions. Where range or endurance is not a consideration it is best to operate at maximum IAS as it is cheaper to burn fuel than consume engine life. A good compromise here is to fly at 150 Kts IAS at heights up to 10,000' which speed is within the Flight Limitations of most auto-pilots. Under operational role must be considered covert operations such as minimum noise which will define the propeller RPM to be used; i.e., the lower the RPM the lower the noise signature. However, the propeller is at its most efficient at 2030 RPM at 100% power, but, the reduction in efficiency as RPM are reduced at lower power is only a few percentage points

Having chosen the power setting to be used for the flight a 'Rule of Thumb' technique for quickly achieving the setting in flight is:-

From the tables note the fuel consumption at the chosen power.

Using the Power levers, set the flow meters for that fuel consumption.

Using the Condition levers set the required propeller RPM **(Note: 2030 RPM in actual icing conditions).**

Monitor the actual fuel consumption using the fuel totaliser and adjust the power as required to obtain the chosen fuel consumption/IAS. A method is to note the fuel consumed over a three minute period at regular intervals (e.g. 15 lbs in three minutes = 15 x 20 = 300 lbs/hr). As fuel is consumed the IAS will increase by 1 Kt per 300 lbs of fuel. Under most situations this increase may be ignored.

Consideration must be given to flight in forecast **engine icing conditions.** Engine intake ice will form in visible moisture when the ambient temperature is below + 5°C. The effect of selecting engine anti-ice is to increase fuel consumption by 5%.

BN2T - 4 SERIES TURBINE ISLANDERS

See Appendix 'H1' for the cruise data for the BN2T - 4R and 4S Turbine Islanders. Note that propeller RPM settings are more critical to achieve optimum performance.

BN2B PISTON ISLANDER SERIES

Both the O - 540 and IO - 540 engines run very rich at the full rich mixture setting and leaning is essential to achieve satisfactory economy of operation. Correct leaning reduces fuel consumption by at least 10% according to altitude. For both engines the leaning technique is the same:-

> From the tables set the manifold pressures and engine RPMs for the desired power.
>
> To lean, pull back the mixture controls until the peak exhaust gas temperature (EGT) is achieved and note the temperature. Do not expect to see the same peak temperature on both engines.
>
> Enrich the mixtures by 27°C/50°F.

Correct leaning may take several minutes due to the lag between mixture lever movement and the EGT stabilising. An error of 10°C can lead to as much as 2 US Galls/hr increase in fuel consumption per engine. Over a period of six hours, for example, this could be critical to achieving the range required

In the event of failure of an EGT gauge or gauges are not fitted, a close approximation to the correct settings may made by the following technique:-

> Set the engine power as above.
>
> Pull the mixture levers back to the farthest aft point on the quadrant at which a small rapid forward movement of the control does not produce a momentary surge in RPM, indicating that the mixture has been too lean for maximum power. Mark that position on the quadrant and then move the levers 1/4" forward for the O - 540 and 1/8" forward for the IO -540.

Operation of the IO - 540 engine is slightly more complex than the O - 540 because of the fuel injection system and more care is required to obtain the best performance. A more detailed description of the leaning procedure for the IO - 540 is on Page 7 of this Appendix.

BN2B - 26 (O - 540 Engine)

The normal recommended economy cruising power setting is 59% power at 10,000' which gives 130 Kts TAS. The best power setting is obtained under standard conditions at 2200 RPM and 19.5" manifold pressure. This gives a total fuel consumption of about 23 US Galls/hr.

2400 RPM is recommended for maximum cruise performance and lower RPM's down to 1800 RPM for more economical cruising conditions. Ordinarily, an RPM setting should be selected which will give maximum smoothness. To avoid undesirable stresses on the propellers and a possibility of detonation in the engine, **no manifold pressure settings of over 25" should be used for an RPM of less than 2200.**

BN2B - 20 (IO - 540 Engine)

59% power at 10,000' gives 139 Kts TAS. This power setting under standard conditions is 2200 RPM and 20.75" and gives a total fuel consumption of about 26.5 US Galls/hr.

2400 RPM is recommended for maximum cruise performance and lower RPM's down to 1800 for more economical cruising conditions. It should be noted that due to propeller stresses below 2200 RPM **the manifold pressure should not exceed 23"**. Ordinarily, an RPM setting should be selected to give maximum smoothness.

CRUISE POWER FUEL CONSUMPTION FOR THE BN2T UNDER ISA CONDITIONS

POWER	TORQUE - lb ft					PRESSURE ALTITUDE ft.	IAS kts	TAS kts	FUEL CONSUMPTION lb/hr
	2030 rpm	1900 rpm	1800 rpm	1700 rpm	1600 rpm				
100% 320 shp	830	890	940	990	1050	10,000	151	170	396
						5,000	156	163	406
						SEA LEVEL	159	154	418
90% 288 shp	749	799	842	890	945	10,000	145	165	363
						5,000	149	156	375
						SEA LEVEL	153	148	390
80% 256 shp	661	709	749	790	845	15,000	134	165	318
						10,000	137	156	332
						5,000	141	148	345
						SEA LEVEL	144	140	367
70% 224 shp	579	620	654	690	740	20,000	120	163	276
						15,000	127	157	287
						10,000	131	149	300
						5,000	133	141	315
						SEA LEVEL	137	134	336
60% 192 shp	498	530	560	590	630	20,000	114	155	242
						15,000	119	148	254
						10,000	122	140	268
						5,000	125	133	285
						SEA LEVEL	128	126	307

BN2T RANGE & ENDURANCE @ 10,000' BASED ON A.U.W. OF 7,000 lbs UNDER ISA CONDITIONS

Allowances:
1. 100 lbs for Start-up, Taxi, Take-off and climb to 10,000'.
2. 10 minutes for climb to 10,000'.
3. 15 nms covered in the climb to 10,000'.

Power Setting %	TAS/IAS Kts	Fuel Consumption lbs/hr	Ferry Tanks = 2953 lbs Range nms	Ferry Tanks Time hrs	U/W Tanks = 2236 lbs Range nms	U/W Tanks Time hrs	Main & Tip Tanks = 1441 lbs Range nms	Main & Tip Tanks Time hrs
100	170/151	396	1239	7:21	932	5:33	590	3:32
90	165/145	363	1312	8:01	986	6:02	624	3:51
80	156/137	332	1355	8:45	1018	6:35	644	4:12
70	149/131	300	1432	9:40	1076	7:16	680	4:37
60	140/122	268	1505	10:48	1131	8:07	715	5:09
Range and Time difference between 80% and 60% power settings			150	2:03	113	1:32	71	0.57
% Range/Time			9.9%	19.1%	10.0%	18.9%	9.9%	18.6%

Note: 1. These figures are to tanks dry. Jet A1 = 6.7 lbs/US gal.

Note: 2. Ferry fits give up to 7,700 lbs AUW. Allow 130 lbs for Start-up, Taxi, Take-off and climb to 10,000'. Initial cruise speed is achieved at 10% higher power than at 7,000 lbs AUW. Max. landing weight = 6,800 lbs.

Note: 3. Increase IAS by 1 Kt per 300 lbs of fuel burn.

Note: 4. Typical descent profile: 150 Kts IAS at 500 ft/min Rate of Descent. Commence descent from 10,000' to 2,000' at 40 nms range. Fuel burn = 130 lbs including approach and landing from a straight in approach with no delays.

Fuel Tank Capacities:-

Mains	65.0 US Gals	= 435.50 lbs
Tips	42.5 US Gals	= 284.75 lbs
U/W Tanks	59.4 US Gals	= 398.00 lbs
2 Drum ferry	107.0 US Gals	= 717.00 lbs

Holding:-

110 Kts = 240 lbs/hr (under icing conditions)
90 Kts = 210 lbs/hr

PERFORMANCE DATA - BN2B - 26 (O - 540 Engine)

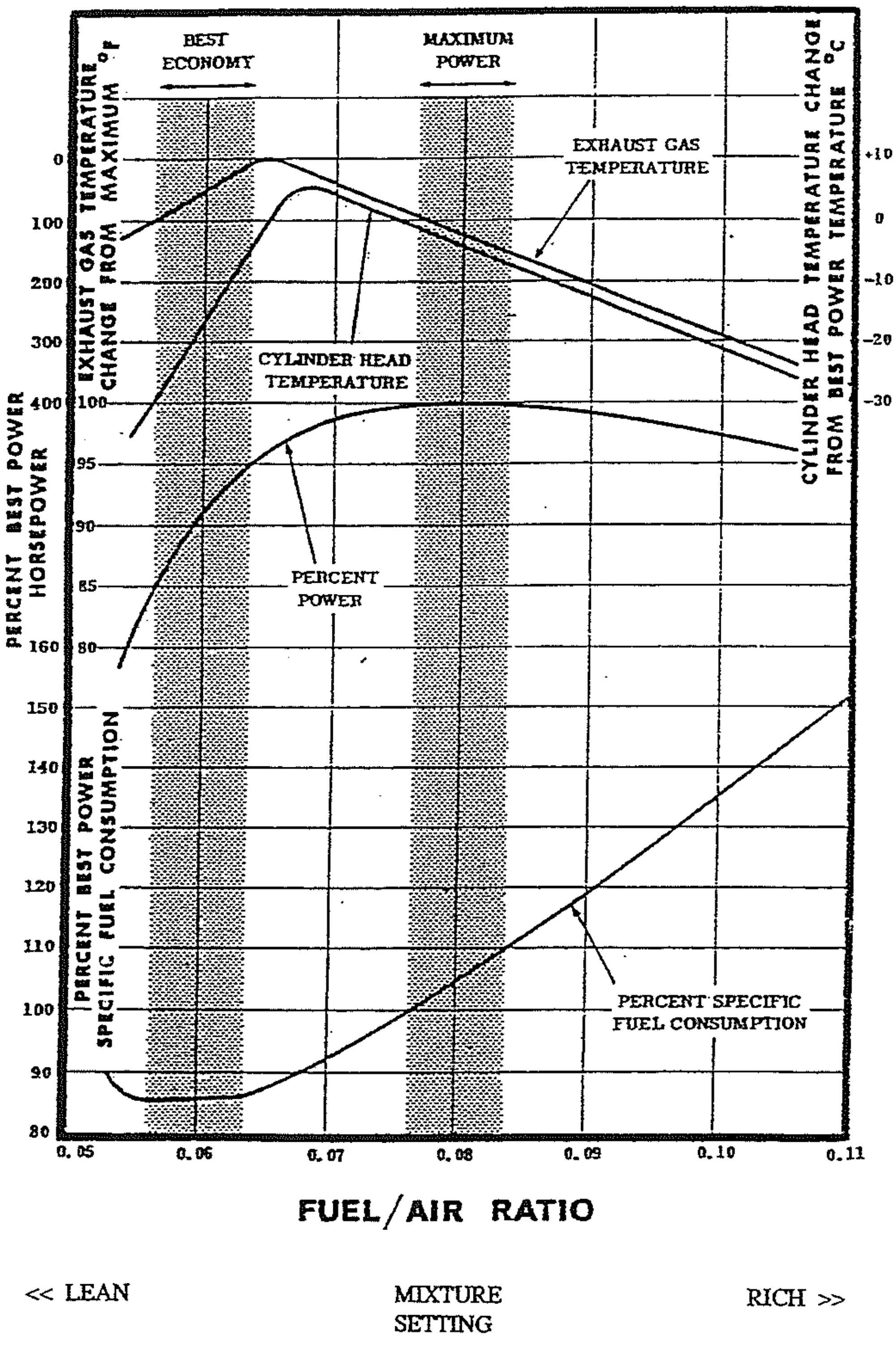
POWER	DENSITY ALTITUDE Ft.	STANDARD DAY CONDITIONS MANIFOLD PRESSURE - INCHES OF MERCURY 2700 RPM	2600 RPM	2500 RPM	2400 RPM	2300 RPM	2200 RPM	2100 RPM	2000 RPM	RAS Kts	TAS Kts	Fuel Consumption US Gallons/hour Rich Mixture	Lean Mixture
	8,000	20.50	-	-	-	-	-	-	-	124	140	32.5	29
75%	6,000	21.25	21.75	22.25	23	-	-	-	-	126	138	33.5	29
195 BHP	4,000	21.75	22.25	22.75	23.25	24.25	-	-	-	129	137	35	Not
per	2,000	22.25	22.75	23.25	24	24.75	25.75	-	-	130	134	36	below
engine	SEA LEVEL	22.75	23.25	23.75	24.50	25.25	26.25	-	-	135	131	37	5,000'
	10,000	18.75	19	19.50	-	-	-	-	-	118	138	27.5	25
67%	8,000	19.25	19.50	20	20.50	21.25	-	-	-	121	136	29	25
175 BHP	6,000	19.75	20	20.50	21	21.75	22.75	-	-	123	134	29	25
per	4,000	20.25	20.50	21	21.50	22.25	23.25	24.25	-	124	132	30	25
engine	2,000	20.75	21	21.50	22	22.75	23.75	24.75	-	126	130	31	25
	SEA LEVEL	21.25	21.50	22	22.50	23.25	25.25	25.25	-	132	129	32.5	25
	14,000	16	16.25	-	-	-	-	-	-	108	134	23	23
59%	12,000	16.50	16.75	17	17.50	-	-	-	-	111	133	24	23
152.5	10,000	17	17.25	17.50	18	18.75	19.50	-	-	113	131	24.5	23
BHP	8,000	17.50	17.75	18	18.50	19.25	20	20.75	-	115	130	25	23
per	6,000	18	18.25	18.50	19	19.75	20.50	21.25	22.25	117	128	25	23
engine	4,000	18.50	18.75	19	19.50	20.25	21	21.75	22.75	119	126	26	23
	2,000	19	19.25	19.50	20	20.75	21.50	22.25	23.25	120	124	26.5	23
	SEA LEVEL	19.50	19.75	20	20.50	21.25	22	22.75	23.75	125	122	27.5	23

NOTES

OPTIMUM RPM - 2400 at 75% power
2200 at 67% power
2000 at 59% power

Lean mixture consumptions calculated for S.F.C.'s of 0.43 - 0.45.
S.F.C.'s of 0.40 - 0.42 have been achieved in normal operation.

EFFECT OF FUEL/AIR RATIO AT CONSTANT RPM
CRUISE RANGE OPERATION



Representative Effect of Leaning on Cylinder Head Temperature, EGT (Exhaust Gas Temperature), Engine Power and Specific Fuel Consumption at Constant Engine RPM and Manifold Pressure.

CAA TYPICAL TYPE TECHNICAL QUESTIONS

BN2B PISTON ISLANDER SERIES

There are, as will be seen from these Typical Type Technical Examination Questions, many common features between the various models of the Islander Series of aircraft. Differences, where they apply are annotated:-

BN2B-26 (260 hp) for the O-540 engine installation.

BN2B-20 (300 hp) for the IO-540 engine installation.

Note 1: These questions are based on the BN2B Piston Islander (Max T.O.W. 6600 lbs). Earlier aircraft of the BN2A series have T.O.W.'s of 5700 lbs and 6300 lbs and thus there will be detail differences which the appropriate Flight and Maintenance Manuals will cover.

Note 2: FM/40 and FM/41 are the Flight Manuals to which these questions relate. Amendments to these manuals are issued as required and hence there may be some changes to the typical answers given. Where a difference exists, the Flight Manual figures or operational sequence MUST be taken as correct. These answers are for guidance only.

J.R.Ayers, M.R.Ae.S.
14th August, 1996.

LIMITATIONS

Q1. What is the maximum permissible load in the fuselage forward of the front spar?

(a) 800 lbs.
(b) 1000 lbs.
(c) 1200 lbs.

Q2. The current standard maximum all up weight is:-

(a) 6300 lbs.
(b) 5700 lbs.
(c) 6600 lbs.

Q3. The C of G datum point is defined as:-

(a) Coincident with the wing trailing edge.
(b) Coincident with the wing leading edge outboard of the engine nacelle (Stn. 134.5).
(c) Coincident with the nose of the propeller spinners.

Q4. The Never Exceed speed (Vne) is:-

BN2B-26 (260 hp)		BN2B-20 (300 hp)	
(a)	184 kts.	(a)	184 kts.
(b)	134 kts.	(b)	141 kts.
(c)	201 kts.	(c)	208 kts.

Q5. The Normal Operating Limit (Vno) speed is:-

BN2B-26 (260 hp)		BN2B (300 hp)	
(a)	176 kts.	(a)	184 kts.
(b)	114 kts.	(b)	134 kts.
(c)	141 kts.	(c)	141 kts.

Q6. Flap limiting speeds (Vfe) are:-

(a) 114 kts T.O. and 88 kts Land.
(b) 122 kts T.O. and 107 kts Land.
(c) 133 kts T.O. and 110 kts Land.

Q7. The manoeuvring speed Va is:-

(a) 122 kts.
(b) 141 kts.
(c) 107 kts.

Q8. The maximum engine R.P.M. are:-

(a) 2500 rpm
(b) 3000 rpm
(c) 2700 rpm

Q9. The maximum cylinder temperature is:-

(a) 500°F/260°C
(b) 525°F/274°C
(c) 530°F/277°C

Q10. Total load on the baggage floor must not exceed:-

(a) 100 lbs/45.5 kgs.
(b) 120 lbs/54.4 kgs.
(c) 400 lbs/182.0 kgs.

Q11. The maximum floor loading intensity on the cabin floor is:-

(a)	120 lbs/sq.ft.	(586 kgs/m2)
(b)	100 lbs/sq.ft.	(488 kgs/m2)
(c)	250 lbs/sq.ft.	(1220 kgs/m2)

Q12. The maximum floor loading intensity on the baggage bay floor is:-

(a)	100 lbs/sq.ft	(488 kgs/m2)
(b)	90 lbs/sq.ft	(439 kgs/m2)
(c)	120 lbs/sq.ft	(586 kgs/m2)

Q13. The maximum air temperature for operation of the aircraft is:-

FM/40		FM/41	
(a)	ISA + 25°C	(a)	ISA + 15°C
(b)	ISA + 28°C	(b)	ISA + 23°C
(c)	ISA + 35°C	(c)	ISA + 32°C

Q14. At ambient temperatures above 15°C (60°F) using oil SAE 40 or SAE 50, the maximum oil temperature is:-

(a) 107°C/225°F
(b) 118°C/245°F
(c) 99°C/210°F

ENGINE HANDLING

Q18. During an internal battery start the external supply switch is selected to:-

- (a) "STARTER"
- (b) "EXTERNAL SUPPLY"
- (c) "ON"

Q19. When starting using external power:-

- (a) The external supply switch must be selected to "EXTERNAL SUPPLY" after external power is connected.
- (b) The external supply switch must be selected "OFF".
- (c) The battery master switch must be "ON".

Q20. For engine starting:-

- (a) The left magneto is selected "ON".
- (b) The right magneto is selected "ON".
- (c) Both magnetos are selected "ON".

Q21. When priming a cold engine (BN2B-26) this is done by:-

- (a) Pumping the throttle manually approximately 4 times.
- (b) Moving the mixture control to "PRIME".
- (c) Selecting the priming pump switch to "PRIME".

Q22. There is sufficient fuel pressure when:-

- (a) The fuel low pressure warning light is out.
- (b) The fuel pressure indicators show in the green sector.
- (c) The auxiliary fuel pumps are selected "ON".

Q23. The engines are warmed up after start-up at:-

- (a) 1000 rpm.
- (b) 1000 to 1200 rpm.
- (c) 1100 rpm

Q24. What power setting is used for the magneto checks:-

- (a) 1500 rpm.
- (b) 1700 rpm.
- (c) Approximately 2100 rpm at 17" Hg manifold pressure.

Q25. The maximum acceptable RPM drop during the magneto checks is:-

(a) 100 rpm.
(b) 125 rpm.
(c) 175 rpm.

Q26. For starting, using external power, the generators are selected ON:-

(a) Before disconnecting the external power supply.
(b) After disconnecting the external power supply.
(c) Before connecting the external power supply.

Q27. When operating at maximum take-off power/climb power, the mixture controls should be set:-

(a) Fully rich.
(b) Fully rich below 5000 feet provided rough running is not experienced.
(c) Fully weak.

Q28. A "dead-cut" ignition check should be done at:-

(a) Minimumm idling RPM.
(b) 1200 rpm.
(c) 1000 rpm..

Q29. To achieve the maximum fuel economy lean the mixtures with engine powers:-

(a) Greater than 75%
(b) Less than 75%
(c) Less than 59%

Q30 The maximum oil temperature is:-

(a) 107°C/225°F
(b) 260°C/500°F
(c) 118°C/245°F

Q31. The first action in the event of an engine fire is:-

(a) To set the mixture lever to "IDLE CUT-OFF".
(b) To turn the fuel cock to "OFF".
(c) To select the magneto switches "OFF".

Q32. The RPM for the engine feathering check is:-

(a) 2100 rpm.
(b) 1500 rpm.
(c) 1200 rpm.

Q33. When feathering an engine:-

(a) Pull the propeller control lever down and up into the gate.
(b) Pull the propeller control lever up and down into the gate.
(c) Pull the propeller control lever down into the gate.

Q34. The engine starters are operated by:-

(a) One switch only, spring loaded, moving Left/Right. .
(b) One switch only, spring loaded, moving Up/Down.
(c) Two spring loaded switches, one for each engine, "UP" to start.

Q35. During engine operation, repeated rapid changes of RPM will:-

(a) Cause damage to the crankshaft floating counter weights.
(b) Not effect engine reliability.
(c) Prevent the sparking plugs from oiling up.

FUEL AND OIL

Q36. The minimum fuel octane rating is:-

BN2B-26 (260 hp)		BN2B-20 (300 hp)	
(a)	81/86	(a)	91/96
(b)	91/96	(b)	100/130
(c)	100/130	(c)	100/145

Q37. The total quantity of usable/gaugeable main tank fuel is:-

(a) 108 imp.galls. (130 US).
(b) 97 imp.galls. (116 US).
(c) 112 imp.galls. (134 US).

Q38. The unusable fuel, per tank, in the main tanks post Mod.240 is:-

(a) 12.5 imp.galls. (15.0 US).
(b) 2.9 imp.galls. (3.5 US).
(c) 9.5 imp.galls. (11.4 US).

Q39. The engine oil capacity is measured by:-

(a) A sight glass in the sump.
(b) A dipstick in the filler cap.
(c) A guage on the instrument panel.

Q40. The minimum quantity of oil for take-off in the engine sump is:-

(a) 12 0 US Quarts.
(b) 3.5 US Quarts.
(c) 2.3 US Quarts.

Q41. The engines are normally stopped by:-

(a) Moving the propeller control to "FEATHER".
(b) Selecting both magneto switches to "OFF".
(c) Moving the mixture control to "IDLE CUT-OFF".

Q42. The fuel crossfeed cocks are located:-

(a) On the rear face of the central pedestal.
(b) In the cockpit roof.
(c) On the cockpit floor aft of the central pedestal.

Q43. The starboard engine can receive fuel via the:-

(a) Port electric fuel pump "ON" from the port tank, starboard crossfeed "OFF".
(b) Port electric fuel pump "ON" from the starboard tank, starboard crossfeed "OFF".
(c) Starboard crossfeed "ON".

Q44. Fuel pumps must be "ON" for:-

(a) Take-off only.
(b) All flight conditions.
(c) Take-off and landing.

Q45. The fuel cocks are located:-

(a) On the left cockpit wall under the mic/tel sockets.
(b) On the right cockpit wall under the mic/tel sockets.
(c) In the cockpit roof, forward of the rudder trim wheel.

FLYING CONTROLS

Q46. When manoeuvring on the ground:-

(a) The rudder locks must be in place.
(b) The rudder locks must not be in place.
(c) A tow bar must be used.

Q47. With "LAND FLAP" selected, the flap angle is:-

(a) 25°
(b) 6°
(c) 56°

Q48. The flaps are operated by:-

(a) A manually operated lever through a gate below the throttle quadrant box.
(b) A selector switch on the eye-brow panel by the flap position indicator.
(c) A selector switch on the rear face of the central pedestal.

Q49. To operate the flaps through their full travel, the maximum number of selections required is:-

(a) 3
(b) 2
(c) 1

Q50. Longitudinal trim is adjusted by means of:-

(a) A trim/balance tab.
(b) A spring bias mechanism.
(c) A trim tab.

Q51. The rudder trim wheel is located:-_

(a) On the central pedestal.
(b) On the floor between the pilot's seats.
(c) In the cockpit roof.

Q52. If, during flap operation, a reverse selection is made:-

(a) The flaps will continue running to the next position and stop.
(b) They will reverse immediately.
(c) The flap actuator will be damaged.

LANDING GEAR

Q53. What fluid is used in the brake system:-

(a) Akyseol.
(b) DTD 585 Red Mineral Oil.
(c) Aeroshell D80.

Q54. The parking brake is operated by:-

(a) A lever on the left rear face of the central pedestal.
(b) A rachet lever on the floor to the pilot's left.
(c) A "T" shaped lever on the lower left instrument panel.

Q55. The parking brake is applied by:-

(a) Putting the brake lever to ON upwards.
(b) Putting the brake lever to ON downwards.
(c) Depressing the toe pedals, moving the brake lever downwards to ON and then releasing the pedals.

Q56. The maximum tyre pressure for the main wheel tyres is:-

(a) 38psi.
(b) 35 psi.
(c) 28 psi.

Q57. The main undercarriage oleo extensions should be (Fairy undercarriage):-

(a) 1-1.5"
(b) 8-9"
(c) Sufficient for normal operations.

Q58. The brake fluid reservoirs are located:-

(a) In the nose bay.
(b) One in each main wheel undercarriage leg.
(c) Over the brake pedals and master cylinders.

ELECTRICS

Q59. The aircraft battery is located:-

(a) Under the pilot's seat.
(b) Behind the luggage bay bulkhead.
(c) In the nose bay compartment.

Q60. What does continuous illumination of both undervolt lights indicate:-

(a) Generator failure (dual).
(b) The battery has failed.
(c) Generator output has exceeded 50 amps.

Q61. What is the indication when a generator fails:-

(a) The overvolt light is ON.
(b) No charge is indicated.
(c) The undervolt light is ON.

Q62. If the klaxon horn operates on the ground it means that:-

(a) The parking brake is "ON".
(b) The pilot's door is unlocked.
(c) The cabin heating system has failed.

Q63. If one generator has failed:-

(a) The battery charge current must not be counted as part of the generator load.
(b) The battery charge must be counted as part of the load.
(c) The battery will not be charged.

Q64. The first action, if on a single generator, the warning light illuminates is:-

(a) To check that the ammeter is reading within the green sector.
(b) Switch "OFF" the generator field switch.
(c) Pull out the generator circuit breaker.

Q65. With one generator failed, the maximum loading should be (Post Mod. 1148):-

(a) 30 amps.
(b) 40 amps.
(c) 70 amps.

Q66. Illumination of the main to emergency busbar warning light indicates that:-

(a) The emergency busbar has failed.
(b) The main busbar has failed, isolating the emergency busbar.
(c) The battery has failed.

Q67. The generator circuit breakers are located:-

(a) On the left panel lower side.
(b) On theleft panel right hand side.
(c) On the left side of the circuit breaker panel.

Q68. What is the indication that the cabin heating system has overheated:-

(a) The heating system is automatically shut down and a warning light comes on.
(b) A horn sounds.
(c) A light comes on and a horn sounds.

Q69. The stall warning system is tested by:-

(a) Lightly pressing the stall warning vane in the wing.
(b) By operating its "PRESS-TO-TEST" button.
(c) By turning the left engine magneto switches "ON" and opening the pilot's door.

Q70. The generator outputs are checked by:-

(a) The undervolt and overvolt warning lights.
(b) An ammeter.
(c) Two ammeters.

Q71. In the event of a battery malfunction:-

(a) The battery master switch remains "ON".
(b) Both generator switches remain "ON".
(c) The emergency to main busbar warning light comes on.

Q72. Insertion of the external power supply plug:-

(a) Connects external power to the aircraft busbar.
(b) Disconnects the aircraft battery.
(c) Requires generator field switches to be "ON".

Q73. Electrical power is provided by (Post Mod. 1148):-

(a) 12 Volt 50 amp DC generators.
(b) 28 Volt 50 amp AC alternators.
(c) 28 Volt 70 amp self rectifying alternators.

Q74. The cabin heating system, if fitted is switched, off:-

(a) During take-off.
(b) During landing.
(c) During Take-off and landing.

Q75. The voltmeter reading before take-off, engines running, should be:-

(a) 27-29 volts.
(b) 24-26 volts.
(c) 15-17 volts.

AIRFRAME AND LOADING

Q76. The elevator bias mechanism:-

(a) Loads the elevator controls nose down.
(b) Loads the elevator controls nose up.
(c) Loads the elevator controls to neutral.

Q77. The forward C of G limit at maximum AUW with reference to the datum is:-

(a) 21" fwd
(b) 17" aft
(c) 21" aft

Q78. At 5030 lbs AUW the forward and rearward C of G limits with reference to the datum are:-

	Forward Datum	Aft Datum
(a)	21" aft	25.6" aft
(b)	17" aft	25.6" aft
(c)	17" aft	24.5" aft

Q79. At maximum AUW the rearward C of G limit with reference to the datum is:-

(a) 25.6" aft
(b) 24.5" aft
(c) 26.4" aft

Q80. The maximum safe design load factor flaps UP is:-

(a) + 2.80g to - 2.0g
(b) + 2.63g to - 1.0g
(c) + 3.55g to - 1.0g

Q81. The maximum positive safe flight load factor flaps down is:-

(a) + 1.7g
(b) + 2.0g
(c) + 2.7g

Q82. The power off stalling speed flaps UP at maximum AUW is:-

(a) 57 kts. IAS
(b) 50 kts. IAS
(c) 43 kts. IAS

Q83. The power off stalling speed flaps LAND at maximum AUW is:-

(a) 43 kts. IAS
(b) 42 kts. IAS
(c) 40 kts. IAS

Q84. The single engine minimum control speed (Vmca) at maximum AUW is:-

(a) 43 kts. IAS
(b) 40 kts. IAS
(c) 46 kts. IAS

Q85. The take-off safety speed at maximum AUW is:-

(a) 49 kts. IAS
(b) 55 kts. IAS
(c) 56 kts. IAS

Q86. On a dry runway, the maximum crosswind component limit is:-

(a) 23 kts.
(b) 25 kts.
(c) 30 kts.

Q87. The best single engine climb speed (Blue Line) is:-

(a) 63 kts. IAS
(b) 65 kts. IAS
(c) 56 kts. IAS

Q88. The best gradient climb speed is:-

(a) 65 kts. IAS
(b) 70 kts. IAS
(c) 88 kts. IAS

Q89. The landing approach speed at maximum landing weight is:-

(a) 65 kts. IAS
(b) 59 kts. IAS
(c) 54 kts. IAS

Q90. Vfe for flaps selected to LAND is:-

(a) 88 kts. IAS
(b) 95 kts. IAS
(c) 107 kts. IAS

Q91. Vr at maximum AUW is:-

(a) 52 kts. IAS
(b) 50 kts. IAS
(c) 45 kts. IAS

Q92. Vfe for flaps selected to "TAKE OFF" is:-

(a) 114 kts. IAS
(b) 133 kts. IAS
(c) 88 kts. IAS

ENGINES, FUEL, OIL AND OTHER SYSTEMS

Q93. The engines fitted to the Piston Islander Series Aircraft are:-

BN2B-26 (260 hp)		BN2B-20 (300 hp)	
(a)	Lycoming O-540-E4C5	(a)	Lycoming IO-540-K1B5
(b)	Lycoming OI-540-E4C3	(b)	Lycoming OI-540-E5C4
(c)	Lycoming O-340-E4C5	(c)	Lycoming O-340-E4C5

Q94. The approved propellers are:-

(a) Hartzell HC-C2RK-HC and TC-C2YK-2B
(b) Hartzell HC-C2YK-2C and HC-C2YK-2B
(c) Hartzell HC-C3YK-2C and HC-C3YK-2B

Q95. Propellers should be feathered before the RPM drop to:-

(a) 1300 rpm on 2B props or 700 rpm on 2C props.
(b) 1000 rpm on 2B props or 950 rpm on 2C props.
(c) 500 rpm on 2B props or 850 rpm on 2C props.

Q96. The oil specification after the first 50 hours of operation is:-

UK Specification		US Specification	
(a)	D.Eng RD 2450	(a)	MIL-L-22851
(b)	D.Eng RD 2472A/0	(b)	MIL-L-6082
(c)	D.Eng RD 2485	(c)	MIL-G-5572

Q97. The normal operating oil pressures are between:-

(a) 50-100 lbs/sq.in
(b) 25-100 lbs/sq.in
(c) 60-90 lbs/sq.in

Q98. The oil capacity is:-

(a) 9.0 US quarts
(b) 12.0 US quarts
(c) 2.3 US quarts

Q99. The vacuum system suction pumps are mounted on:-

(a) Both engines (rear of engines)
(b) Starboard engine (one front and one rear of engine)
(c) In the inboard wing leading edges.

Q100. The following instruments are normally operated by the vacuum system:-

(a) The turn co-ordinator.
(b) The artificial horizon and directional gyro.
(c) The rate of climb and descent indicator.

Q101. The flap settings are restricted to:-

(a) "UP" (6° droop), 25° and 56°.
(b) "UP", 15°, 25° and 36°.
(c) Variable between "UP" and 56°.

Q102. Controllable trim tab(s) are fitted to:-

(a) The rudder, aileron and elevator.
(b) The rudder and elevator.
(c) The left aileron.

Q103. The ammeter indicates when "BAT" is selected:-

(a) The charging or discharging current at the battery.
(b) The electrical system load.
(c) The difference between the two generator outputs.

Q104. In the fuel system of an aircraft fitted with tip tanks (pre or post Mod.1153), the following number of water drain cocks have to checked:-

(a) 5
(b) 8
(c) 6

Q105. The starboard fuel contents guage indicates:-

(a) The total fuel contained in the starboard tank.
(b) The total usable fuel in the starboard tank.
(c) The total quantity of fuel availiable to the starboard engine at any given time.

Q106. The vacuum system is set to a value of:-

(a) 3 1/2 Ins.Hg.
(b) 2 1/2 Ins.Hg.
(c) 4 1/2 Ins.Hg.

Q107. Failure of the left vacuum pump is indicated by:-

(a) The vacuum guage reading zero.
(b) The left source fail button coming out.
(c) The left source button going in.

Q108. Propeller de-icing heating is sequenced to heat:-

(a) One blade of each propeller in turn for 34 seconds.
(b) The following sequence for 34 seconds at each part of the sequence:- Left propeller inner - right propeller outer - left propeller outer - right propeller inner.
(c) One third of the mats on one blade of both propellers for 34 seconds and then two thirds of the mats on the other blade of both propellers for 34 seconds.

Q109. The airframe de-icing timing switch will inflate the boots for:-

(a) 6 seconds followed by 174 seconds dormant making a 3 minute cycle.
(b) 30 seconds every other 30 seconds.
(c) 12 seconds followed by 108 seconds dormaud making a 2 minute cycle.

Q110. If carburettor icing is indicated by, rough running, black exhaust smoke, a decrease in EGT or a drop in manifold pressure, carburettor heat should be applied:-

(a) By permanent application of full carburettor heat.
(b) By permanent application of partial carburettor heat.
(c) By application of full carburettor heat to clear the ice followed by a return to cold air.

Q111. The alternate static source valve is located:-

(a) At the top right hand side of the instrument panel.
(b) At the lower left hand side of the instrument panel.
(c) At the pitot head.

Q112. The fire extinguisher is located:-

(a) On the floor behind the pilot's seat.
(b) On the floor under the pilot's seat.
(c) On the shelf at the front of the luggage bay.

Q113. With Mod. 1153 wing tip fuel tanks fitted, the refuelling sequence should be:-

(a) As convenient.
(b) Refuel the tip tanks first then the main tanks.
(c) Refuel the main tanks first then the tip tanks.

Q114. With Mod. 1153 wing tip fuel tanks fitted, the auto transfer sequence should start when:-

(a) The main fuel tank contents indicate 0.
(b) The main fuel tank contents are reading aproximately 35 US gallons.
(c) The main fuel tank contents read 60 US gallons.

ANSWER SHEET

Q1.	Q21.	Q41.	Q61.	Q81.	Q101.	Q121.	Q141.
Q2.	Q22.	Q42.	Q62.	Q82.	Q102.	Q122.	Q142.
Q3.	Q23.	Q43.	Q63.	Q83.	Q103.	Q123.	Q143.
Q4.	Q24.	Q44.	Q64.	Q84.	Q104.	Q124.	Q144.
Q5.	Q25.	Q45.	Q65.	Q85.	Q105.	Q125.	Q145.
Q6.	Q26.	Q46.	Q66.	Q86.	Q106.	Q126.	Q146
Q7.	Q27.	Q47.	Q67.	Q87.	Q107.	Q127.	Q146
Q8.	Q28.	Q48.	Q68.	Q88.	Q108.	Q128.	Q148
Q9.	Q29.	Q49.	Q69.	Q89.	Q109.	Q129.	Q149
Q10.	Q30.	Q50.	Q70.	Q90.	Q110.	Q130.	Q150
Q11.	Q31.	Q51.	Q71.	Q91.	Q111.	Q131.	Q151
Q12.	Q32.	Q52.	Q72.	Q92.	Q112.	Q132.	Q152
Q13.	Q33.	Q53.	Q73.	Q93.	Q113.	Q133.	Q153
Q14.	Q34.	Q54.	Q74.	Q94.	Q114.	Q134.	Q154
Q15.	Q35.	Q55.	Q75.	Q95.	Q115.	Q135.	Q155
Q16.	Q36.	Q56.	Q76.	Q96.	Q116.	Q136.	Q156
Q17.	Q37.	Q57.	Q77.	Q97.	Q117.	Q137	Q157
Q18.	Q38.	Q58.	Q78.	Q98.	Q118.	Q138	Q158
Q19.	Q39.	Q59.	Q79.	Q99	Q119	Q139.	Q159
Q20.	Q40.	Q60.	Q80.	Q100.	Q120.	Q140.	Q160