O & N AIRCRAFT MODIFICATIONS, INC.
210 WINDSOCK LANE, SEAMANS AIRPORT
FACTORYVILLE, PA 18419

REPORT 1O2O

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR CESSNA P21ON

WITH

ALLISON ENGINE MODEL 25O-B17F/2

STC No. SA1003NE

This Supplement must be attached to the FAA approved Flight Manual and be on board the aircraft when the aircraft is being operated with the Allison Model 250-B17F/2 engine installed in accordance with STC SA1003NE.

Information contained herein supplements or supersedes the basic Pilot's Operating Handbook only in those areas defined in this supplement. For limitations, procedures, and performance information not contained in this document, consult the basic Pilot's Operating Handbook.

N _____

S/N _____

FAA APPROVED:

FOR AS.

Anthony Socias, Manager
New York Aircraft Certification Office
Federal Aviation Administration

DATE: JAN 27 2011

This AFM/POH supplement will be kept current with revisions distributed to the last owner of register of each Cessna P21ON equipped with an Allison 25O-B17F/2 engine and modified per this Supplemental Type Certificate.

It is the responsibility of the owner to maintain this AFM/POH supplement in a current status when it is being used for operational purposes.

Owners should contact O & N Aircraft Modifications, Inc., 210 Windsock Lane, Seaman's Airport, Factoryville, PA 18419, U.S.A., whenever the revision status of their AFM/POH supplement is in question.

Revisions should be examined immediately upon receipt and incorporated in this AFM/POH supplement.

A revision bar will extend the full length of new or revised text and/or illustrations added on new or presently existing pages. This bar will be located adjacent to the applicable revised area on the outer margin of the page.

LOG OF EFFECTIVE PAGES

Dates of Issue for Original and Revised Pages Are:			
Original:	Sept 9, 1992	Revision No.	
Revision No. 1	Aug 7, 1995	Revision No.	
Revision No. 2	August 2, 1997	Revision No.	
Revision No. 3	May 1, 2003	Revision No.	
Revision No. 4	June 8, 2005	Revision No.	
Revision No. 5			

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LOG OF REVISIONS

Revision No.	Pages Affected/Description	Rev Date	FAA Approved
1	Page 4-ii. Contents.	8/7/95	
1	Page 4-29	8/7/95	
1	Page 5-8A (New) Maximum Rate of Climb	8/7/95	
1	Page 5-i. Contents.	8/7/95	
2	Pages ii-iii. Log of Effective Pages	8/12/97	
2	Page iv. Log of Revisions.	8/12/97	
2	Page 2-6. Engine Operation Limitations.	8/12/97	
2	3-10 Inadvertent Icing.	8/12/97	
3	Pages ii-iii. Log of Effective Pages	5/1/2003	
3	Page iv, Log of Revisions.	5/1/2003	
3	Pages 7-i, 7-ii, 7-2, 7-4, 7-5, 7-6. Annunciator Panel	5/1/2003	
4	Page 2-6. Engine operation Limitations	3/21/2005	
5	All pages converted to Microsoft Word Formatting.Changes made to the following Pages i,ii,iii,iv,v; 1-1 POH ref; Page 2-9 (Gauge Inlet Temp); Page 2-13 (Placards); Page 3-10 (inlet) 3-15 (Pressurization); 3-27(ELEC INLET TO NOTE) 3-29(inlet) 6-10 (Equipment List); 7-2 (Temp Gauge);7-7 (ice protection); 7-15 (pressurization System); 5-6, 5-7 & 5-8 (Note 5)		

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FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR CESSNA P21ON WITH ALLISON ENGINE MODEL 25O-B17F/2

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SECTION I

GENERAL

TABLE OF CONTENTS

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SECTION I

GENERAL

INTRODUCTION

This AFM Supplement contains nine sections. It includes the material which is required by FAR 23 to be supplied to the pilot and is FAA approved.

Other supplemental information, useful to the pilot, but not required by the FAA is also included in this document. This information will not be identified as FAA approved.

Section I provides basic data and information relative to the airplane. It also contains definitions or explanations of symbols, abbreviations, and terminology commonly used. If a passage in the basic POH still applies, it will be listed as "No Change."

REVISING THE HANDBOOK

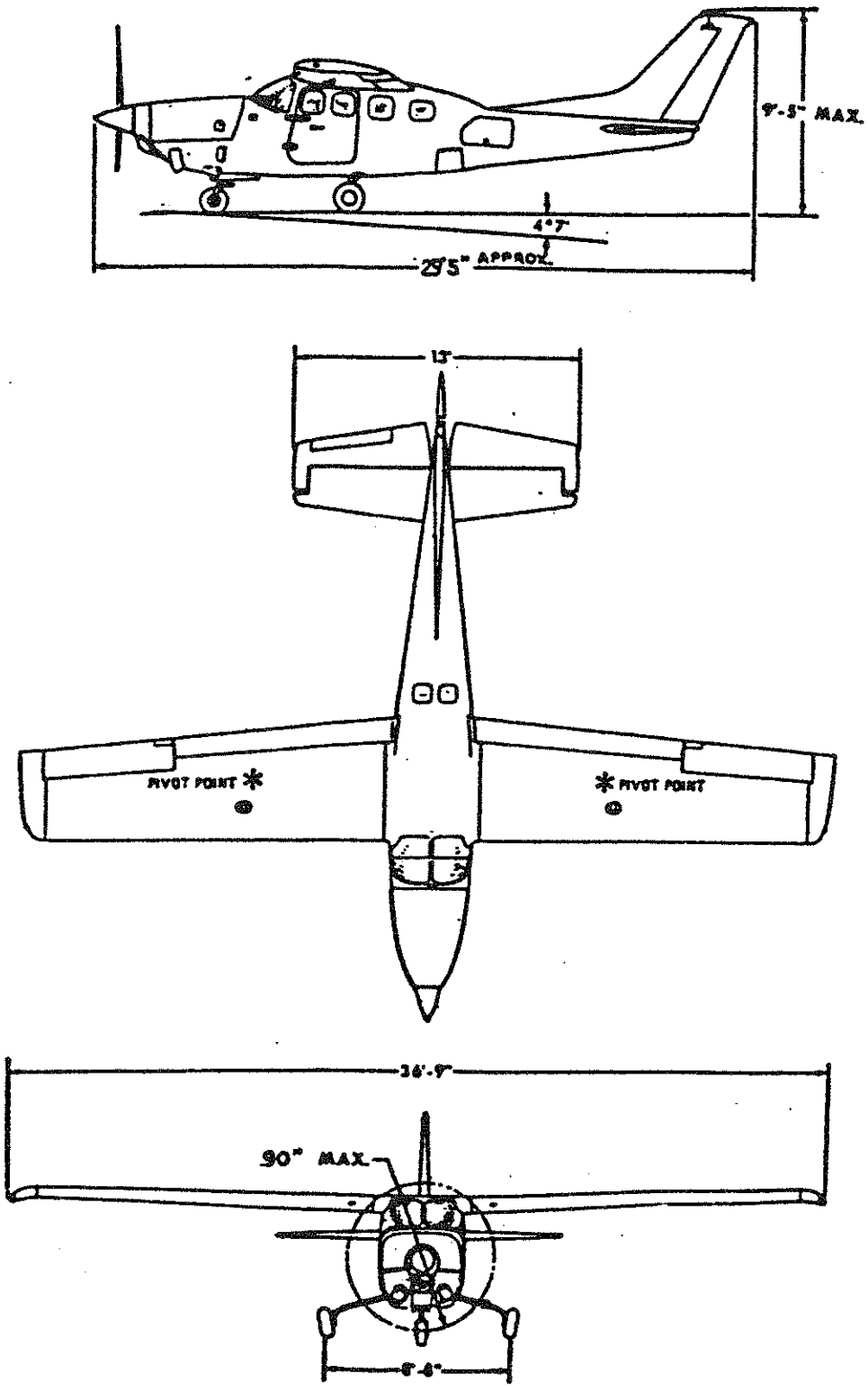
No change from the basic POH revision system. When revising the O & N Aircraft Modifications AFM Supplement, refer to the list of effective pages at the beginning of this supplement.

SUPPLEMENTS REVISION RECORD

No change from the basic POH revision system. When revising the O & N Aircraft Modifications AFM Supplement, refer to the list of effective pages at the beginning of the supplement.

VENDOR ISSUED STC SUPPLEMENTS

No change.



Three-View

GROUND TURNING CLEARANCE

No change.

DESCRIPTIVE DATA

ENGINE

Allison 250-B17F/2 gas turbine engine with a take-off rating of 450 SHP for five (5) minutes and a maximum continuous rating of 380 SHP.

PROPELLER

Hartzell 3-blade, Model HC-B3TF-7A/T9212K-2, constant speed, full feathering, reversible propeller.

FUEL

See "LIMITATIONS", Section II, for approved fuel grades.

FUEL CAPACITY

	Standard Tanks	Transfer Tank
Total capacity:	90 gallons	26.8 gallons
Total usable:	89 gallons	26.8 gallons

OIL

See LIMITATIONS, Section II, for approved oils.

OIL CAPACITY

Total capacity: 12.61 quarts
Tank capacity: 9.0 quarts to full line

MAXIMUM CERTIFICATED WEIGHTS

No change.

CABIN AND ENTRY DIMENSIONS

No change.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Dimensions of the baggage area and baggage door opening are illustrated in detail in Section 6 of the Basic POH; changes in Weight and Balance and Loading Arrangements due to the addition of the transfer tank are noted in Section VI of this Supplement.

SPECIFIC LOADINGS

Power loading (Maximum take-off weight)	8.89 lbs/hp
Wing loading (Maximum take-off weight)	22.9 lbs/sq. ft.

SYMBOLS/ ABBREVIATIONS/ TERMINOLOGY

AIRSPEED - GENERAL	
	No change except Vmo replaces Vno and Vne
Vmo (Maximum Operating Speed)	A speed which may not be deliberately exceeded in any regime of flight (climb, cruise, or descent)
METEOROLOGICAL	
	No change
ENGINE TERMINOLOGY	
Beta	Range of propeller blade angle decreasing from ground idle to full reverse thrust range, where blade angle is controlled by power lever. The beta range may not be used in flight
Engine Ice Protection System	Propeller de-ice, air inlet anti-ice, engine anti-ice, and continuous engine ignition
Engine Start (Normal)	The sequence of events that occur between starter engagement and N1 stabilization at Ground Idle
Flameout	Unintentional loss of combustion chamber flame during operation

Flight Idle	Maximum allowable position of the power lever while in flight
Gas Producer RPM (N1)	Indicates the percent of gas producer (compressor) RPM based on a figure of 100% at 50,970 RPM
Ground Idle	Minimum position of the power lever in the ground (start) position
Hot Start	An engine start or an attempted start in which the TOT exceeds 927° C, or remains at 927° C for more than one second, or remains between 810° to 927° C for more than ten seconds
Maximum Continuous Power	The power developed at the maximum continuous torque limit, TOT limit or N1 limit (No Time Limit)
Power Turbine Speed (N2)	Determined by using the propeller RPM (Np) indicator at a ratio of 20.3 Np RPM to 1% N2 speed
Prop RPM (Np)	Indicates propeller speed in RPM
RPM	Revolutions per minute
SHP	Shaft Horsepower is the power delivered at the propeller shaft
Stagnated Start	Slow acceleration during an engine start, possibly deteriorating to a total stoppage of acceleration even though combustion is still occurring in the combustion section
Take-Off Power	The maximum power allowable with a time limit of five minutes at the takeoff torque limit, takeoff TOT limit, or the N1 limit
Torque Pressure	A modulated oil pressure measurement that is directly proportional to the power output of the engine where one psi is equal to 4.06 SHP at an Np of 2030

ENGINE CONTROLS AND INSTRUMENTS	
Condition Lever	A cockpit control connected to the fuel control and propeller to regulate propeller RPM and supply fuel to the engine
Gas Producer Fuel Control	An engine mounted component that regulates fuel flow to the engine. It responds to compressor discharge pressure, gas producer turbine speed (N1) and the cockpit power control
Power Lever	A cockpit control to regulate power output of the engine through Gas Producer Fuel Control
Power Turbine Governor	Provides engine (N2) overspeed protection in the forward thrust range and regulates propeller (Np) RPM through the gas producer fuel control in the Beta range
Propeller Governor	Adjusts the propeller blade pitch angle to maintain the RPM selected by the condition lever in the forward thrust "Power Lever" range
Propeller Overspeed Governor	An engine mounted component which provides overspeed protection in the event of a propeller power turbine governor failure
Tachometer	An instrument that indicates the speed of the gas producer (N1) or the propeller (Np)
Torque Meter	An instrument that indicates the power output of the engine in psi of torque where one psi is equal to 4.06 SHP at 2030 Propeller RPM
TOT	Turbine Outlet Temperature

AIRPLANE PERFORMANCE AND FLIGHT PLANNING.

See Section V.

WEIGHT AND BALANCE

See Section VI.

SECTION II

LIMITATIONS

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SECTION II

LIMITATIONS

INTRODUCTION

The entire "Limitations" section of the POH/AFM for the Cessna P210 airplane is either revised or repeated as appropriate to the installation of the Rolls-Royce Model 250-B17F/2 engine.

"Limitations" presented in this document have been FAA approved.

AIRSPEED LIMITATIONS

	Speed	**KCAS**	**KIAS**	**REMARKS**
V_{MO}	Max. Operating Speed	165	167	Do not exceed this speed in any operation
V_A	Maneuvering Speed: 4000 pounds 3350 pounds 2700 pounds	 129 118 105	 130 119 106	Do not make full or abrupt control movements above this speed
V_F	Max. Flap Extended Speed: To 10º 10 - 20º 20 - 30º	 159 131 116	 160 130 115	Do not exceed these speeds with the given flap settings.
V_{L0}	Maximum Landing Gear Operating Speed	163	165	Do not extend or retract landing gear above this speed
V_{LE}	Maximum Landing Gear Extended Speed	165	167	Do not exceed this speed with the landing gear extended.
	Maximum Window Open Speed	165	167	Do not exceed this speed with window open

AIRSPEED INDICATOR MARKINGS

Marking	KIAS Value or Marking	Explanation
White Arc	61 – 115	Full flap operating range. Lower limit is maximum weight Vso in landing configuration. Upper limit is maximum speed permissible with flaps extended
Green Arc	76 – 167	Normal Operating Range. Lower limit is maximum weight Vs at most forward C.G. with flaps retracted. Upper limit is maximum operating speed.
Red Line	167	Maximum speed for all operations.

POWERPLANT LIMITATIONS

Engine Manufacturer: Allison
Engine Model Number: 250-B17F/2
Operating Limitations: Take-off Power (5 Minutes)
450 SHP at 2030 Np.
Maximum continuous,
380 SHP at 2030 Np.

ENGINE OPERATING LIMITATIONS

CONDITION	ENGINE OPERATING LIMITS					
Power Setting	Torque PSI	T.O.T. Deg. C (Max.)	Gas Producer (N1) % RPM	Prop (Np) RPM	Engine Oil (PSI)	Oil Temp Deg C
Takeoff Maximum (5 Min)	111	810	94% and above	2030	120 to 130	107
Maximum Cont.	92	752	85% - 94%	2030	90 to 130	107 (8)
Acceleration	---	843 (2)	105 (3)	2233 (7)	---	---
Starting	---	927 (4)	12-15 (5)	---	150 (1)	-40 or -54 (6)

Notes

(1) Cold weather start oil pressure is allowable to 2150 psi. Operate engine at Minimum power until oil pressure is 130 psi or less.

(2) During power transients, an over-temperature in excess of 810º C, but not exceeding 843º C, shall be permitted for a period not to exceed six (6) seconds.

(3) Gas Producer (N1), should not exceed 105% for more than fifteen (15) seconds.

(4) During starts, an over-temperature in excess of 810º C with a momentary peak of one (1) second maximum at 927º C shall be permitted for a period not to exceed ten (10) seconds.

(5) Minimum starting N1 speeds are:
Above 45º F (7º C) ---------- 15%
0 to 40º F (-18 to +7º C) ---- 13%
Below -1º F (-18º C) --------- 12%

(6) Minimum starting oil temperatures are:
MIL-L-7808J or later, -65º F (-54º C)
MIL-L-23699C or later, -40º F (-40º C)

(7) Propeller RPM (Np), maximum continuous 2030 RPM.
Maximum overspeed is 2233 RPM for fifteen (15) seconds maximum.

(8) Normal operating oil temperatures are:
Above 40.6-psi torque: 32-180ºF (0-82º C) continuous
180-225º F (82-107º C) 5 minutes
Below 40.6-psi torque: 32-225º F (0-107º C) continuous

NOTE

THE ENGINE MAY BE OPERATED WITHIN THE OIL TEMPERATURE RANGE OF -65 TO 180º F (-54 TO 82º C) USING MIL-L-7808 OIL OR -40 TO 180º F (-40 TO 82º C) USING MIL-L-23699 OIL WHEN OIL PRESSURE IS WITHIN SPECIFIED LIMITS.

NOTE

IT IS RECOMMENDED THAT WHEN OPERATING AT AMBIENT TEMPERATURES ABOVE 100º F (S.L.) THE ENGINE OIL TEMPERATURE BE CAREFULLY MONITORED AND CONTROLLED, IF NECESSARY, BY OPENING THE COWL FLAPS. AT ALTITUDES ABOVE 15,000 FT, THE GENERATOR MAX LOAD MUST BE REDUCED TO BELOW 100 AMPS.

APPROVED FUEL GRADES

Primary Fuels

A. Arctic Diesel Fuel DF-A (VV-F-800B) conforming to ASTM D-1655, Jet A or A1.
B. MIL-T-8133A, grade JP-8.
C. MIL-T-5624L, grade PU-4 and JP-5.
D. ASTM D-1655, Jet B.
E. ASTM D-1655, Jet A or A1.
F. JP-1 fuel conforming to ASTM D-1655, Jet A.
G. Diesel #1 fuel conforming to ASTM D-1655, Jet A.

Cold Weather Fuels

A. MIL-T-5624L and later, grade JP-4.
B. ASTM D-1655, Jet G.
C. MIL-T-5624L and later, grade JP-5 with anti-ice additive.
D. AVGAS-jet fuel mixture.

APPROVED FUEL GRADES (Cont.)

Emergency Fuel

MIL-G-5572F (Avgas) all grades (1 boost pump on all Ops.);
Maximum of six (6) hours operation per overhaul period.

****CAUTION****

MIL-G-5572 FUEL CONTAINING TRICRESYLPHOSPHATE ADDITIVE SHALL NOT BE USED.

NOTE

THE AVGAS-JET FUEL MIXTURE IS AN ALTERNATE FUEL WHICH MAY BE USED IF STARTING PROBLEMS ARE ENCOUNTERED IN AREAS WHERE JP-4 OR COMMERCIAL JET B CANNOT BE OBTAINED. THE MIXTURE SHALL BE ONE PART BY VOLUME AVGAS TO TWO PARTS BY VOLUME COMMERCIAL JET FUEL. THE AVGAS SHALL CONFORM TO MIL-G-5572F OR LATER, GRADE 80/87, OR GRADE 100/130 WITH A MAXIMUM OF 2.0 ML/GAL LEAD CONTENT. DO NOT USE GRADE 100/130 WITH 4.6 ML/GAL LEAD CONTENT. (THE 2.0 ML/GAL MAXIMUM LEAD CONTENT, GRADE 100/130 AVGAS, IS ALSO KNOWN AS 100L). THE COMMERCIAL JET FUEL MAY BE KEROSENE, JP-5 OR COMMERCIAL JET A CONFORMING TO MIL-T-5624, GRADE JP-5 OR ASTM D-1655, JET A OR A1.

Fuel Additive

For flight at ambient temperatures of 40º (4º C) and below, the fuel used in this aircraft MUST have an anti-icing additive in compliance with MIL-I-27686D or E or Phillips PF A55MB, incorporated or added into the fuel during refueling in accordance with the additive manufacturer's instructions.

****CAUTION****

PROPER MIXING OF THE ANTI-ICING ADDITIVE WITH FUEL IS EXTREMELY IMPORTANT BECAUSE CONCENTRATION IN EXCESS OF THAT RECOMMENDED 0.15% BY VOLUME) WILL RESULT IN DETRIMENTAL EFFECTS TO THE FUEL TANKS. ASSURE THAT THE FUEL ADDITIVE IS DIRECTED INTO AND BLENDING WITH FLOWING FUEL FROM THE FUELING NOZZLE. DO NOT ALLOW CONCENTRATED ADDITIVE TO CONTACT THE AIRPLANE FINISH. SOME FUELS HAVE ANTI-ICING ADDITIVES PREBLENDED IN THE FUEL AT THE REFINERY, SO NOADDITIONAL ADDITIVES SHOULD BE ADDED.

Refer to Section VIII, Handling, Service and Maintenance for further information.

OIL SPECIFICATIONS

The Rolls-Royce Model 250-B17F/2 engine is qualified and certified for use with MIL-L-7808J and MIL-L-23699C lubricating oils. Refer to Section VIII or Rolls-Royce 250-B17F/2 Operation and Maintenance Manual for the most current listing of approved oils and limitations.

PROPELLER SPECIFICATIONS

Hartzell 3 blade, constant speed, full feathering, reversible propeller (HC-B3TF-7A/T9212NK-2); maximum diameter 90 inches; minimum diameter 88 inches.

Pitch settings at 30-inch station:
Low: 6.9º
Feather..... 89º
Beta Light:..... 2.9º

[Using O&N Aircraft Modifications, Inc. Rigging Instructions, Report No. ON-1021]

PROPELLER SYSTEM OPERATING LIMITS

An overspeed governor check shall be performed before the first flight of the day, after engine control system maintenance, or if adjustment has been made.

ENGINE CONTROL SYSTEM OPERATING LIMITS

Flight operation with the power lever retarded below the Flight Idle position is prohibited. Retarding the power lever below the flight idle position in flight may render the prop governor ineffective, resulting in prop overspeed and possible blade separation.

POWERPLANT INSTRUMENT MARKINGS

INSTRUMENT	RED LINE MIN.	GREEN ARC NORMAL	YELLOW ARC CAUTION	RED LINE MAX.	RED TRIANGLE TRANSIENT	RED DIAMOND START
Tach (Np)	---	1827 to 2030	1218 to 1827	2030	2233	---
Tach (N1)	---	60 to 105%	---	105%	106%	---
Torque	---	0 to 92 psi	92 to 111 psi	111 psi	---	---

INSTR.	RED LINE MIN	GREEN ARC NORM.	YELLOW ARC CAUTION	RED LINE MAX	RED TRIANGLE TRANSIENT	RED DIAMOND START
TOT	---	0 to 752º C	752 to 810º C	810º C	843º C	927º C
Engine Oil Pressure	35 psi	90 to 130 psi	35 to 90 psi	130 psi	---	---
Engine Oil Temp	---	0 to 82º C	82 to 107º C	107º C	---	---
Fuel Press	---	0 to 25 psi	---	25 psi	---	---

MISCELLANEOUS INSTRUMENT MARKINGS

INSTRUMENT	RED LINE MIN	GREEN ARC NORM	YELLOW ARC NORM	RED LINE MAX
Fuel Quantity Indicators	0 [1]	---	---	---
Suction Gauge	---	4.6-5.4 Hg	---	---
Voltmeter	---	24-28	20-24	28.5
Ammeter	---	---	---	100/120 Amps [2]
Prop De-Ice Ammeter	---	12-18 Amps	---	---
Cabin Delta-P Gauge	---	0-3.35 psi	---	3.35 psi

[1] .5 Gal Unusable in each main tank
0 Gal. Unusable in transfer tank

[2] At Altitudes of 15,000 ft. and above, the generator max load must be reduced to 100 Amps or below

WEIGHT LIMITS

Maximum Ramp Weight ..... 4016 lbs.
Maximum Takeoff Weight ..... 4000 lbs.
Maximum Landing Weight ..... 3800 lbs.
Maximum Weight in Baggage Compartment:
Baggage Area "A" (Sta. 124 to 152) .....181.5 lbs.
(No fuel in transfer tank)
Baggage Area "A" (Sta. 124 to 152) ..... 0 lbs.
(With 26.5 gal. of fuel in transfer tank)
Baggage Area "B" (Sta. 152 to 166) ..... 80 lbs.
(No fuel in transfer tank)
Baggage Area "B" (Sta. 152 to 166) ..... 0 lbs.
(With 26.5 gal. of fuel in transfer tank)

NOTE

THE MAXIMUM ALLOWABLE COMBINED WEIGHT CAPACITY FOR BAGGAGE AREAS "A" AND "B" IS 181.5 POUNDS.

CENTER OF GRAVITY LIMITS

Center of Gravity Range with Landing Gear Extended:

Forward: 38.4 inches aft of datum at 3200 lbs. or less, with straight-line variation to 42.5 inches aft of datum at 3800 lbs. and with straight-line variation to 43.9 inches aft of datum at 4000 lbs.

Aft: 49 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall.

MANEUVER LIMITS

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60 degrees. Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Limit Flight Load Factors:
Flaps Up: +3.8g, -1.52g
Flaps Down: +2.0g, - 0g

MINIMUM FLIGHT CREW

The minimum flight crew is one (1) pilot.

MAXIMUM PASSENGER SEATING

A maximum of six seats, including the pilot seat, are provided.

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR and may be equipped for night VFR and/or IFR operations. FAR Part 91 establishes the minimum required instrumentation and equipment for these operations. The reference to types of flight operations on the operating limitations placard reflects equipment installed at the time of Airworthiness Certificate issuance.
Flight into known icing conditions is prohibited.

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

The required equipment in Section 6 of the basic Pilot's Operating Handbook and Airplane Flight Manual remains unchanged except for the engine controls and instruments. Following are items, which are required for all conditions of flight:

Annunciator- Beta Light
Annunciator - Chip Detector
Annunciator - Fuel Valve Position
Gauge - Fuel Flow
Gauge - Fuel Pressure
Gauge - Fuel Quantity (Main Tanks)
Gauge - Fuel Quantity (Transfer)
Gauge - Turbine Outlet Temperature (TOT)
Gauge - Oil Pressure
Gauge - Oil Temperature
Gauge-Inlet Temp (for Bleed Air)
Indicator - Air Speed Overspeed Warning
Indicator - Ammeter and Voltmeter
Indicator - Free Air Temperature (OAT)
Indicator - Fuel Transfer
Indicator - Fuel Filter Bypass
Indicator - Oil Filter Bypass
Pumps - Boost (2)
Starter/Generator
Switch - Overspeed Governor Check
System - Continuous Ignition
System - Inlet Heat and Engine Anti-Ice
Tachometer - Gas Generator (N1)
Tachometer - Propeller (Np)
Torquemeter
Vacuum Pumps - Engine Driven and Electric

FUEL LIMITATIONS

Wing tanks: ..... 45 U.S. gallons each.
Total Fuel: ..... 90 U.S. gallons.
Usable Fuel: ..... 89 U.S. gallons.
Unusable Fuel: ..... 1 U.S. gallons.

Transfer tank: ..... 26.8 U.S. gallons.
Usable Fuel: ..... 26.8 U.S. gallons.
Unusable Fuel: ..... 0 U.S. gallons.

Takeoff, climb, cruise and land with the fuel selector valve in the BOTH position. Left or Right fuel valve position, as appropriate, may be used to balance the fuel load in level flight only.

With 1/4 tank or less, prolonged uncoordinated flight is prohibited.

No operation with more than 10 gallons difference between left and right tanks is permitted.

No operation with single tank selected (left or right) with less than 10 gal. in tank is permitted.

Transfer fuel from the transfer tank to either or both main tanks in **level** flight only.

Do not begin fuel transfer until wing fuel tank quantity is 35 gallons or less.

See pages 2-5 and 2-6 for "Approved Fuels".

MAXIMUM OPERATING ALTITUDE LIMIT

Certificated Maximum Operating Altitude: ..... 23,000 feet.

OUTSIDE AIR TEMPERATURE LIMITS

No Operation Above 120º F @ S.L. decreasing
3.5º F per thousand feet of altitude.

HIGH ELECTRICAL LOAD AT ALTITUDE

With a high electrical load, the time to regain power from idle is increased. At 20,000 feet with 100 amp electrical load, the time to regain power is increased by 7 seconds.

CABIN PRESSURIZATION LIMITS

Normal Cabin Operating Differential Pressure: 0 to 3.35 psi.
Maximum Cabin Operating Differential Pressure: 3.35 psi.
Landing with cabin pressurized is prohibited.

FLAP LIMITATIONS

Approved Takeoff Range ..... 0 to 20º
Approved Landing Range ..... 0 to 30º

PLACARDS

The following placards are deleted from the original POH:

a) Reference to fuel selection.
b) Reference to fuel quantity.
c) Reference to fuel type.
d) Reference to major fuel flow fluctuations.
e) Reference to baggage weight.
f) Reference to oil.

The following placards are required to be installed with the installation of the Rolls-Royce 25O-B17F/2 engine:

1. Near landing gear lever:

MAX SPEED IAS
GEAR OPER 165 KTS
GEAR DOWN 167 KTS

1978 Model ONLY (with gear doors):

MAX SPEED IAS
GEAR OPER 140 KTS
GEAR DOWN 167 KTS

2. On fuel selector valve (at appropriate locations):

TAKEOFF & LANDING (BOTH ONLY)

LEFT			RIGHT
ON			ON
44.5			44.5
GAL			GAL
89 GAL	BOTH	BOTH	89 GAL

3. Near fuel selector valve:

NO SINGLE TANK OPERATION BELOW 10 GALLONS

4. On transfer tank fuel selector valve:

AFT FUEL TRANSFER SYSTEM		
L- START		R- START
ON		ON
OFF		OFF

5. On pedestal above fuel selector valve:

AFT FUEL TRANSFER SYSTEM - CAPACITY 26.8 GAL NORMAL OPERATION (SEE POH SUPPLEMENT) 1. TRANSFER FUEL ONLY AFTER MAIN TANK REACHES 35 GAL. 2. TRANSFER FUEL IN LEVEL FLIGHT ONLY. 3. FUEL SELECTOR IN BOTH DURING TRANSFER. 4. BOTH TRANSFER PUMPS ON FOR TRANSFER. 5. TRANSFER IN PROGRESS WHEN TRANSFER LIGHT ILLUMINATES.

6. Near Compass:

CAUTION COMPASS MAY BE ERRATIC WITH INLET HEAT ON OR AIR CONDITIONING ON

7. Under instrument panel:

FUEL TRANS FUSES

8. Aft of wing fuel tank caps:

JET-A FUEL TOTAL CAPACITY 45 U.S. GALLONS SEE AFM FOR OTHER APPROVED FUELS CAPACITY 33.5 GALLONS TO BOTTOM OF FILLER NECK EXTENSION

PLACARDS (Cont.)

9. Near aft tank filler cap:

JET-A FUEL
TOTAL CAPACITY 26.8 U.S. GALLONS
SEE AFM FOR OTHER APPROVED FUELS

10. On baggage compartment door:

MAX. COMPARTMENT WEIGHT WITH FUEL TANK INSTALLED IS 181.5 LBS. FUEL AND/OR BAGGAGE WEIGHT MUST NOT EXCEED THIS LIMIT.
AREA AFT OF BAGGAGE DOOR 80 LBS. MAX.

11. At baggage compartment near drain tubes:

TANK SUMP DRAIN

12. At baggage compartment area near belly:

TRANS LINE DRAIN
DRAIN DAILY

13. On Oil Access Door:

ENGINE OIL
TOTAL CAPACITY 9 U.S. QUARTS
(6 QUARTS MINIMUM)
TYPE: SEE AFM FOR APPROVED OILS.
DO NOT MIX BRANDS.
SERVICED WITH _____

14. On Oil Access Door:

EXTERNAL POWER
28 VOLTS D.C. NOMINAL
400 AMP
STARTING CAPACITY MIN.
DO NOT EXCEED 700 AMPS

15. With Bleed-Air Inlet Installed

Near Inlet Heat Handle:

BLEED AIR MUST BE ON (HANDLE IN) AT AN OAT OF 40°AND BELOW

On Inlet Heat Gauge:

INLET AIR
MIN . TEMP 125 DEG F
AT OAT BELOW 40°

Any placards listed in the basic POH, and not referenced in this Section will remain unchanged.

SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

SECTION III

EMERGENCY PROCEDURES

INTRODUCTION

The emergency procedures presented herein are either revised as required for this engine installation or repeated in this POH/AFM Supplement.

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:
- Wing Flaps Up ..... 85 KIAS
- Wing Flaps Down ..... 80 KIAS

Maneuvering Speed:
- 4000 Lbs. ..... 130 KIAS
- 3350 Lbs. ..... 119 KIAS
- 2700 Lbs. ..... 106 KIAS

Maximum Glide:
- 4000 Lbs. ..... 94 KIAS
- 3350 Lbs. ..... 86 KIAS
- 2700 Lbs. ..... 77 KIAS

Precautionary Landing With Engine Power ..... 75 KIAS

Landing Without Engine Power
- Wing Flaps Up ..... 90 KIAS
- Wing Flaps Down ..... 80 KIAS

Emergency Descent:
- Smooth Air ..... 167 KIAS
- Rough Air:
  - 4000 Lbs. ..... 130 KIAS
  - 3350 Lbs. ..... 119 KIAS
  - 2700 Lbs. ..... 106 KIAS

OPERATIONAL CHECKLISTS

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF ROLL

1. Power Lever -- GROUND IDLE.
2. Brakes -- APPLY.
3. Condition Lever -- CUTOFF.
4. Fuel Shut-off -- OFF (Pull Out).
5. Fuel Pump -- OFF.
6. Wing Flaps -- RETRACT.
7. Turbine Outlet Temperature -- MONITOR.

NOTE

AN INTERNAL ENGINE FIRE (RECOGNIZED BY A RAPID INCREASE IN TOT) CAN OCCUR DURING SHUTDOWN IF FUEL CUTOFF IS NOT COMPLETE. IF A SHUTDOWN FIRE OCCURS, IMMEDIATELY ENGAGE THE STARTER TO THE MOTOR POSITION (SWITCH DOWN) AND MOTOR THE ENGINE TO MINIMIZE THE TEMPERATURE ENCOUNTERED. THE TEMPERATURE LIMITATIONS AND ASSOCIATED MAINTENANCE ACTIONS MUST BE OBSERVED.

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed -- 85 KIAS.
2. Condition Lever -- CUTOFF.
3. Fuel Shut-off -- OFF (pull out).
4. Power Lever -- FLIGHT IDLE.
5. Fuel Pump -- OFF.
6. Wing Flaps -- AS REQUIRED (30o recommended).
7. Battery -- OFF.
8. Generator Switch -- OFF.
9. Cabin Door Safety Lock -- UNLOCK (pull out).

ENGINE FAILURE DURING FLIGHT

1. Airspeed -- 94 KIAS.
2. Fuel Selector Valve -- BOTH.
3. Fuel Pumps -- OFF.
4. TOT -- MONITOR.
5. Power Lever -- FLIGHT IDLE.
6. Condition Lever - CUTOFF (prop will feather).
7. Generator -- OFF.
8. Electrical Load -- OFF.
9. Restart -- ATTEMPT.

ENGINE RESTART PROCEDURES

** **WARNING****

DUE TO THERMAL CHANGES WITHIN THE TURBINE, THE GAS PRODUCER SECTION OF THE ENGINE MAY LOCK UP AFTER AN INFLIGHT SHUTDOWN. THIS IS A TEMPORARY CONDITION WHICH MAY EXIST AFTER THE ENGINE HAS BEEN SHUT DOWN FOR APPROXIMATELY ONE MINUTE AND WHICH MAY CONTINUE FOR UP TO TEN MINUTES FOLLOWING SHUTDOWN. THEREFORE, IF AT ALL POSSIBLE, AIR STARTS SHOULD NOT BE ATTEMPTED DURING THE TIME PERIOD BETWEEN ONE MINUTE AFTER SHUTDOWN AND TEN MINUTES AFTER SHUTDOWN.

1. Generator -- OFF.
2. Electrical Load -- REDUCE.
3. Power Lever -- FLIGHT IDLE.
4. Condition Lever -- CUTOFF.
5. Airspeed -- 94 KIAS.
6. Fuel Selector Valve -- BOTH.
7. Fuel Pump -- ON.
8. Fuel Pressure -- CHECK.
9. Starter Switch -- START.
10. Start & Ignition Annunciators -- ON.
11. TOT -- 150o C or lower below 15,000 feet.
12. N1 --
    a. 15% below 15,000 feet.
    b. Maximum obtainable above 15,000 feet.
13. Condition Lever -- START.
14. TOT -- MONITOR (810o - 927o C - 10 Sec. Max.).

NOTE

UNDER HIGH ALTITUDE CONDITIONS, AFTER ENGINE HAS STARTED, IF PROPER IDLE SPEED (55%) IS NOT ATTAINED, IT MAY BE NECESSARY TO ADVANCE THE POWER LEVER SLIGHTLY.

15. If no start occurs after 5 seconds, Condition Lever -- CUTOFF; Starter -- OFF; then repeat Restart Procedures.
16. Starter -- DE-ENERGIZE as N1 Stabilizes.
17. Generator -- ON as propeller RPM stabilizes.

ENGINE SYSTEMS DISCREPANCY CHECKS

FUEL SELECTOR (Amber) Annunciator Illuminated

If fuel selector not intentionally set to other than BOTH ON:

1. Fuel Selector -- BOTH ON.

START (Amber) Annunciator Illuminated

If start cycle not in progress:

1. Starter switch -- OFF.

If annunciator stays on after start:

2. Engine -- SHUTDOWN.

****WARNING****
DETERMINE CAUSE FOR ANNUNCIATION PRIOR TO FLIGHT.

FUEL BYPASS (Amber) Annunciator Illuminated

If in-flight:

1. Aircraft -- LAND as soon as practical.
2. Fuel Filter -- CHECK cause of bypass indication.

If on ground:

1. Engine -- SHUTDOWN; determine cause for annunciation prior to flight.

BETA (Amber) Annunciator Illuminated

If not intentionally operating (on ground only) in Beta range:

1. Power Lever -- FORWARD OF GROUND IDLE GATE (FLIGHT IDLE GATE in-flight).
2. Power -- CHECK NORMAL RESPONSE.
3. AIRCRAFT -- MAKE NORMAL LANDING; determine cause for annunciation prior to further flight.

OIL CHIP (Red) Annunciator Illuminated

If in-flight:

1. Aircraft -- LAND as soon as practical at suitable airport; determine cause for annunciation prior to further flight.

If on ground:

2. Engine -- SHUT DOWN (if running); determine cause for annunciation prior to flight.

FUEL PRESS (Red) Annunciator Illuminated

1. Fuel pressure gage - CHECK.

If engine continues to operate and fuel pressure indicates ZERO:

2. Fuel Pump Switch -- SELECT other pump.

If pressure indication stays at ZERO:

3. Aircraft -- LAND as soon as practical for repairs to electric fuel pump system.

OIL PRESS (Red) Annunciator Illuminated

1. Oil Pressure Gage -- CHECK.

If pressure low

2. Airplane -- PREPARE to execute forced landing.

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

1. Seats, Seat Belts, Shoulder Harnesses -- SECURE.
2. Airspeed --
   a. 90 KIAS (flaps UP).
   b. 80 KIAS (flaps DOWN).
3. Condition Lever -- CUTOFF.
4. Fuel Shutoff Valve -- PULL OFF.
5. Fuel Pump -- OFF.
6. Landing Gear -- DOWN OR UP (depending on terrain).
7. Wing Flaps -- AS REQUIRED (30o recommended).
8. Battery and Generator Switches -- OFF.
9. Door -- UNLATCH PRIOR TO TOUCHDOWN.
10. Touchdown -- SLIGHTLY TAIL LOW.
11. Brakes -- APPLY HEAVILY IF GEAR IS DOWN.

PRECAUTIONARY LANDING WITH ENGINE POWER

1. Seat, Seat Belts, Shoulder Harnesses -- SECURE.
2. Airspeed -- 85 KIAS.
3. Wing Flaps -- 10O
4. Select Field -- FLY OVER, noting terrain and obstructions.
5. All Switches (except avionics power, battery master, generator, and fuel pump) -- OFF.
6. Dump Valve Control Handle -- PULL OUT.

PRECAUTIONARY LANDING WITH ENGINE POWER (Cont.)

7. Landing Gear -- DOWN or UP at Pilot's Discretion.
8. Wing Flaps -- 30º (on final approach).
9. Airspeed -- 75 KIAS.
10. Door -- UNLATCH PRIOR TO TOUCHDOWN.
11. Avionics Power, Battery Master, Generator and Fuel Pump Switches -- OFF when landing is assured.
12. Touchdown -- SLIGHTLY TAIL LOW.
13. Brakes -- APPLY HEAVILY.

DITCHING

1. Radio -- TRANSMIT MAYDAY on 121.5 MHz, giving location and intentions and SQUAWK 7700 if transponder is installed.
2. Heavy Objects -- SECURE.
3. Seats, Seat Belts, Shoulder Harnesses -- SECURE.
4. Landing Gear -- UP.
5. Wing Flaps -- 30º.
6. Power -- ESTABLISH 300 FT/MIN DESCENT AT 75 KIAS.
7. Approach --
   a. High Winds, Heavy Seas -- INTO WIND.
   b. Light Winds, Heavy Swells -- PARALLEL TO SWELLS.

NOTE

IF NO POWER IS AVAILABLE, APPROACH AT 85 KIAS WITH FLAPS UP OR AT 80 KIAS WITH 10º FLAPS.

8. Cabin Pressurization Switch -- OFF.
9. Cabin Door -- UNLATCH.
10. Touchdown -- LEVEL ATTITUDE AT 300 FT/MIN DESCENT.
11. Face -- CUSHION at touchdown with folded coat.
12. Airplane -- EVACUATE through cabin door and emergency exit. If necessary, open the openable window and flood cabin to equalize pressure so cabin door and emergency exit can be opened.
13. Life Vests and Raft -- INFLATE.

FIRES

DURING START ON GROUND

****CAUTION****

AN ENGINE FIRE (WITH RESULTANT FLAME EMANATING FROM THE TAILPIPE) CAN OCCUR DURING START IF THE COMBUSTION CHAMBER BECOMES OVERLOADED WITH FUEL BEFORE IGNITION TAKES PLACE.

1. Condition Lever -- CUTOFF.
2. Start Switch -- MOTOR to extinguish the fire.
3. Fuel Pump -- OFF.
4. Fuel Shutoff -- PULL OFF.
5. TOT -- MONITOR.
6. Fire Extinguisher - OBTAIN (have ground attendants obtain if not installed in aircraft).
7. Engine Secure --
   a. Start Switch -- OFF.
   b. Battery Switch -- OFF.
8. Exit Aircraft -- INSPECT FOR FIRE DAMAGE (perform all necessary maintenance).

ENGINE FIRE IN FLIGHT

1. Condition Lever -- CUTOFF.
2. Fuel Pump -- OFF
3. Fuel Shutoff Valve -- PULL OFF.
4. Dump Valve Control Handle -- PULL OUT.
5. Bleed Air -- OFF.
6. Electrical Load -- REDUCE.
7. Airspeed -- 120 KIAS
   (If fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture).
8. Cowl Flaps -- CLOSE.
9. Forced Landing -- EXECUTE (as described in Emergency Landing Without Engine Power).

ELECTRICAL FIRE IN FLIGHT

1. Battery Master and Generator Switches -- OFF.

NOTE

IF OPERATING IN UNPRESSURIZED FLIGHT, THE DUMP VALVE CONTROL AND BLEED AIR HANDLES SHOULD BE PULLED TO THE DUMP POSITION PRIOR TO SHUTTING OFF ALL ELECTRICAL POWER, TO AVOID THE POSSIBILITY OF SUDDEN PRESSURIZATION OF THE CABIN.

2. Overhead Vents -- CLOSED, and Fan -- OFF.

NOTE

IF PRESSURIZED, REDUCE POWER TO THE MINIMUM REQUIRED FOR PRESSURIZATION (i.e., TO MAINTAIN A ZERO CABIN RATE OF CLIMB) TO REDUCE AIRFLOW INTO THE CABIN.

3. Fire Extinguisher -- ACTIVATE (if available).

WARNING

IF AN OXYGEN SYSTEM IS AVAILABLE, OCCUPANTS SHOULD USE OXYGEN MASKS UNTIL SMOKE AND DISCHARGED DRY POWDER CLEARS. AFTER DISCHARGING AN EXTINGUISHER WITHIN A CLOSED CABIN, VENTILATE THE CABIN. IF PRESSURIZED, INCREASE POWER TO INCREASE BLEED AIRFLOW INTO CABIN. IF UNPRESSURIZED, ALSO OPEN OVERHEAD AIR CONTROLS AND, IF NECESSARY, OPEN WINDOW.

4. Avionics Power Switch - OFF.
5. All Other Switches (except cabin pressurization switch, if pressurized) -- OFF.

   If fire appears to be out and electrical power is necessary for continuance of flight:
6. Pressurization Switch -- ON (if in pressurized flight).
7. Battery Master Switch -- ON.
8. Generator -- ON.
9. Circuit Breakers -- CHECK for faulty circuit; do not reset.
10. Radio Switches -- OFF.

ELECTRICAL FIRE IN FLIGHT (Cont.)

11. Avionics Power Switch -- ON.
12. Radio and electrical Switches -- ON one at a time, with delay after each until short circuit is localized.
13. Vents/Cabin Air/Heat -- AS DESIRED when it is ascertained that fire is completely extinguished.

CABIN FIRE

1. Battery Master and Generator Switches -- OFF.

NOTE

IF OPERATING IN UNPRESSURIZED FLIGHT, THE DUMP VALVE CONTROL AND BLEED AIR HANDLES SHOULD BE PULLED TO THE DUMP POSITION PRIOR TO SHUTTING OFF ALL ELECTRICAL POWER, TO AVOID THE POSSIBILITY OF SUDDEN PRESSURIZATION OF THE CABIN.

2. Overhead Vents -- CLOSED and Fan -- OFF.

NOTE

IF PRESSURIZED, REDUCE POWER TO THE MINIMUM REQUIRED FOR PRESSURIZATION (i.e., TO MAINTAIN A ZERO CABIN RATE OF CLIMB) TO REDUCE AIRFLOW INTO THE CABIN.

3. Fire Extinguisher -- ACTIVATE (if available).

WARNING

IF AN OXYGEN SYSTEM IS AVAILABLE, OCCUPANTS SHOULD USE OXYGEN MASKS UNTIL SMOKE AND DISCHARGED DRY POWDER CLEARS. AFTER DISCHARGING AN EXTINGUISHER WITHIN A CLOSED CABIN, VENTILATE THE CABIN. IF PRESSURIZED, INCREASE POWER TO INCREASE BLEED AIRFLOW INTO CABIN. IF UNPRESSURIZED, ALSO OPEN OVERHEAD AIR CONTROLS AND, IF NECESSARY, OPEN WINDOW.

4. Land the airplane as soon as possible to inspect for damage. Use electrical power as required until landing is assured.

WING FIRE

1. Radar Altimeter (if installed) – OFF.
2. Navigation Light Switch – OFF.
3. Strobe Light switch (if installed) – OFF.
4. Pitot Heat Switch (if installed) – OFF.
5. Stall Warning Heat Switch – OFF.
6. Radar (if installed) – OFF.
7. Perform sideslip to keep flames away from fuel tank.

ICING

INADVERTENT ICING ENCOUNTER

NOTE

THE ENGINE INLET ANTI-ICE LIP AND ENGINE ANTI-ICE, PROPELLER DE-ICE, AND CONTINUOUS IGNITION MUST BE ACTIVATED FOR FLIGHT OR GROUND OPERATION IN VISIBLE MOISTURE AT AN OAT OF 40°(5°C) AND BELOW OR WHILE OPERATING IN FALLING OR BLOWING SNOW REGARDLESS OF AMBIENT TEMPERATURE. THESE SYSTEMS MUST BE OPERATED IN THE ABOVE MENTIONED CONDITIONS EVEN IF THERE IS NO VISIBLE SIGN OF AIRFRAME ICE AND/OR SNOW ACCUMULATION.

DEACTIVATION OF THE SYSTEM SHALL NOT BE MADE UNTIL THE ABOVE MENTIONED CONDITIONS HAVE BEEN LEFT AND ALL ACCUMULATED AIRFRAME ICE AND/OR SNOW HAS DISSIPATED.

1. **With electric inlet installed**:
   - Check Engine Continuous Ignition Switch -- ON.
   - Check Engine Inlet Anti-Ice Switch -- ON.

NOTE FOR AIRCRAFT WITH THE ELECTRIC INLET

A MINIMUM OF 70% OF N1 SPEED IS REQUIRED FOR THE GENERATOR TO SATISFACTORILY SUPPLY ELECTRICAL POWER IN A HIGH LOAD CONDITION SUCH AS NEEDED WITH THE ENGINE ICE PROTECTION SYSTEM IN OPERATION.

2. **With bleed-air inlet installed**:
   - Check Engine Continuous Ignition Switch – ON.
   - Check Engine Inlet anti-ice switch – ON.
   - Check Bleed air on (handle in) and temperature on inlet temperature Gauge minimum 125° F.

INADVERTENT ICING ENCOUNTER (Cont.)

3. Pitot heat, stall warning heat, propeller anti- ice, and windshield anti-ice switches (if installed) -- ON.

4. Turn back or change altitude to obtain an outside temperature that is less conducive to icing.

5. Pull cabin heat and defrost controls full out to obtain maximum windshield defroster effectiveness.

6. Increase engine speed to minimize ice build-up on propeller blades. If excessive vibration is noted, momentarily reduce propeller speed to the minimum RPM with the Condition Lever and then rapidly move the control full forward.

NOTE

CYCLING THE RPM FLEXES THE PROPELLER BLADES AND HIGH RPM INCREASES CENTRIFUGAL FORCE, CAUSING ICE TO SHED MORE READILY.

7. If icing conditions are unavoidable, plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable "Off Airport" landing site.

8. With an ice accumulation of 1/4 inch or more on the wing leading edges, be prepared for a significantly higher power requirement, approach speed, stall speed and a longer landing roll.

9. Open the window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach.

10. Use a 10º to 20º landing flap setting for ice accumulations of 1 inch or less. With heavier ice accumulations, approach with flaps retracted to ensure adequate elevator effectiveness in the approach and landing.

11. Approach at 85 to 95 KIAS with 20º flaps and 95 to 105 KIAS with 0º to 10º flaps, depending upon the amount of ice accumulation. If ice accumulation is unusually large, decelerate to the planned approach speed while in the approach configuration (landing gear and flaps down) at a high enough altitude which would permit recovery in the event that a stall buffet is encountered.

12. Land on the main wheels first, avoiding the slow and high type of flare-out.

13. Missed approaches should be avoided whenever possible because of severely reduced climb capability. However, if a go-around is mandatory, make the decision much earlier in the approach than normal. Apply maximum power and maintain 95 KIAS while retracting the flaps slowly in 10º increments. Retract the landing gear after immediate obstacles are cleared.

STATIC SOURCE BLOCKAGE

(ERRONEOUS INSTRUMENT READING SUSPECTED)

1. Static Pressure Alternate Source Valve -- PULL ON.

NOTE

IF AN AUTOPILOT IS OPERATING, DISENGAGE ALTITUDE HOLD MODE WHEN ALTERNATE STATIC SOURCE IS TURNED ON.

1. Airspeed and Altitude -- Consult appropriate Alternate Static Source Airspeed Calibration table in Section V; and/or Altimeter Correction table in Section 5 of the original POH/AFM.

LANDING GEAR MALFUNCTION PROCEDURES

LANDING GEAR FAILS TO RETRACT

1. Master Switch -- ON.
2. Landing Gear Lever -- CHECK (lever full up).
3. Landing Gear and Gear Pump Circuit Breakers -- IN.
4. Gear Up Light -- CHECK.
5. Landing Gear Lever -- RECYCLE.
6. Gear Motor -- CHECK operation (ammeter and noise).

LANDING GEAR FAILS TO EXTEND

1. Landing Gear Lever -- DOWN.
2. Emergency Hand Pump -- EXTEND HANDLE and PUMP (perpendicular to handle until resistance becomes heavy -- about 35 cycles).
3. Gear Down Light -- ON.
4. Pump Handle -- STOW.

GEAR UP LANDING

1. Seats, Seat Belts and Shoulder Harnesses -- SECURE.
2. Landing Gear Lever -- GEAR UP.
3. Landing Gear and Gear Pump Circuit Breakers -- IN.
4. Runway -- SELECT longest hard surface or smooth sod runway available.
5. Wing Flaps -- 30o (on final approach).
6. Cabin Door -- UNLATCH PRIOR TO TOUCHDOWN.
7. Avionics Power and Master Switches -- OFF when landing is assured.
8. Touchdown -- SLIGHTLY TAIL LOW.
9. Condition Lever -- CUTOFF/FEATHER.
10. Master Switch -- OFF.
11. Fuel On-Off Valve -- OFF.
12. Airplane -- EVACUATE.

LANDING WITHOUT POSITIVE INDICATION OF GEAR LOCKING

1. Before Landing Check -- COMPLETE.
2. Approach -- NORMAL (full flap).
3. Landing Gear and Gear Pump Circuit Breakers -- IN.
4. Landing -- TAIL LOW as smoothly as possible.
5. Braking -- MINIMUM necessary.
6. Taxi -- SLOWLY.
7. Engine -- SHUTDOWN before inspecting gear.

LANDING WITH A DEFECTIVE NOSE GEAR (Or Flat Nose Tire)

1. Movable Load -- TRANSFER to rear seat.

****CAUTION****
OBSERVE CENTER OF GRAVITY LIMITATIONS.

2. Passenger -- MOVE to rear seat.
3. Before Landing Check -- COMPLETE.
4. Runway -- HARD SURFACE or SMOOTH SOD.

NOTE

IF SOD RUNWAY IS ROUGH OR SOFT, PLAN A WHEELS-UP LANDING.

5. Wing Flaps - 30º
6. Cabin Door -- UNLATCH PRIOR TO TOUCHDOWN.
7. Avionics Power and Master Switches -- OFF when landing assured.
8. Land -- SLIGHTLY TAIL LOW.

LANDING WITH A DEFECTIVE NOSE GEAR (Cont.)

9. Condition Lever -- CUTOFF/FEATHER.
10. Master Switch -- OFF.
11. Fuel On-Off Valve -- OFF.
12. Elevator Control -- HOLD NOSE OFF GROUND as long as possible.
13. Airplane -- EVACUATE as soon as it stops.

LANDING WITH A FLAT MAIN TIRE

1. Before Landing Check -- COMPLETE.
2. Approach -- NORMAL (full flap).
3. Touchdown -- GOOD TIRE FIRST, hold airplane off flat tire as long as possible with aileron control.
4. Directional Control -- MAINTAIN using brake on good wheel as required.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

GEN OUT (RED) ANNUNCIATOR ILLUMINATES

1. Generator Switch -- CHECK ON;
   If On
2. Generator Switch -- RESET/THEN ON.
3. Voltmeter/Ammeter -- CHECK restoration of electrical power.
   If Generator still inoperative,
4. Non-essential electrical equipment -- OFF.
5. Flight -- TERMINATE as soon as practical.

AMMETER SHOWS EXCESSIVE ELECTRICAL LOAD

(More than 120 Amps Below 15,000 feet)
(More than 100 Amps Above 15,000 feet)

1. Nonessential Electrical Equipment -- OFF.
2. Generator -- OFF.

VOLTMETER INDICATES LOW VOLTS (Less than 24 V)

1. Avionics Master Switch -- OFF.
2. Generator Switch -- OFF.
3. Generator Main Breaker -- CHECK.
4. Generator Control Breaker -- CHECK.
5. Generator Switch -- RESET, then ON.

6. Check GEN OUT Light Off and Voltage reading 28 volts and Ammeter indicating. If Normal indications,

VOLTMETER INDICATES LOW VOLTS (Cont.)

7. Avionics Master Switch -- ON.
8. If voltage is still below 24 volts, reduce load by turning off nonessential radio and electrical equipment.
9. Flight -- TERMINATE as soon as practical.

PRESSURIZATION SYSTEM EMERGENCIES

Use the following procedure only in the event that pressurized air contamination is severe enough to require immediate dumping of the pressurized air while above 12,500 feet rather than minor enough to allow a pressurized descent to 12,000 feet or less.

PRESSURIZED AIR CONTAMINATION - CABIN HEAT ON or OFF

1. Cabin Heat Control -- PUSH OFF.
2. Pressurization system -- OFF.
3. Oxygen (if installed) -- USE ABOVE 12,500 ft and only if no cabin fire is suspected.
4. Dump Valve Control Handle -- PULL OUT.
5. Overhead Vent Controls/Openable Window -- ON/OPEN as required to ventilate the cabin.
6. Emergency Descent -- PERFORM as outlined in this section.
7. Flight -- TERMINATE as soon as practical.

IMPENDING FAILURE OF WINDOW OR DOOR,

OR CABIN OVERPRESSURE (Above 3.5 PSI)

1. Cabin Pressurization Switch -- OFF.
2. Dump Valve Control Handle -- PULL OUT.
3. If above 12,500 feet without supplemental oxygen, perform an emergency descent as outlined in this section.
4. If supplemental oxygen is available, check that each occupant is using oxygen in accordance with the appropriate procedures in Section 9 of the Standard Airplane Flight Manual/Pilot's Operating Handbook.
5. Descend to 12,500 feet or below, prior to exhaustion of oxygen supply.
6. Dump Valve Control Handle -- PUSH IN (if cabin heating is required after cabin is depressurized).
7. Flight -- TERMINATE as soon as possible.

EMERGENCY DESCENT PROCEDURES

SMOOTH AIR

1. Seats, Seat Belts, Shoulder Harnesses -- SECURE.
2. Power Lever -- FLIGHT IDLE.
3. Propeller -- HIGH RPM.
4. Fuel Transfer Pumps -- OFF.
5. Airspeed:
   a. During landing gear extension -- 165 KIAS.
   b. After landing gear is fully extended -- 167 KIAS.

****CAUTION****
AT SPEEDS ABOVE THE MANEUVERING SPEED, USE LIGHT CONTROL FORCES AND AVOID ABRUPT PULLOUTS.

6. Landing Gear -- EXTEND.
7. Wing Flaps -- UP.

ROUGH AIR

1. Seats, Seat Belts, Shoulder Harnesses -- SECURE.
2. Power Lever -- FLIGHT IDLE.
3. Propeller -- HIGH RPM.
4. Fuel Transfer Pumps -- OFF.
5. Landing Gear -- EXTEND.
6. Wing Flaps -- UP.
7. Airspeeds:
   a. 4000 Lbs. -- 130 KIAS.
   b. 3350 Lbs. -- 119 KIAS.
   c. 2700 Lbs. -- 106 KIAS.

INADVERTENT OPENING OF CABIN DOOR IN FLIGHT

1. Altitude -- CLIMB (after takeoff) or DESCEND (if above 12,500 feet) to a safe altitude.
2. Airspeed -- MAINTAIN 100 KIAS while closing door.
3. Pilot's Seat -- SLIDE AFT slightly at a safe altitude.
4. Openable Window -- OPEN inward (but not aft).
5. Door Handle -- POSITION (in detent at approximately the one o'clock position).
6. Door -- CLOSE and LATCH.
7. Door Handle Safety Lock -- LOCK.
8. Landing -- Make normal approach and landing if door fails to close and latch.

INADVERTENT OPENING OF EMERGENCY EXIT IN FLIGHT

1. Seats, Seat Belts, Shoulder Harnesses -- SECURE.
2. Altitude -- CLIMB (after takeoff) or DESCEND (if above 12,500 feet) to a safe altitude.
3. Openable Window -- OPEN (to reduce buffeting).
4. Airspeed -- MAINTAIN 100 KIAS while closing exit.
5. Co-pilot's Seat -- SLIDE AFT.
6. Emergency Exit -- CLOSE and LOCK.
7. Landing -- Make normal approach and landing if emergency exit cannot be closed and locked.

AMPLIFIED PROCEDURES

The following Amplified Procedures elaborate upon information contained in the Operations Checklists portion of this section. These procedures also include information not readily adaptable to a checklist format, and material to which a pilot could not be expected to refer in resolution of a specific emergency.

ENGINE FAILURE

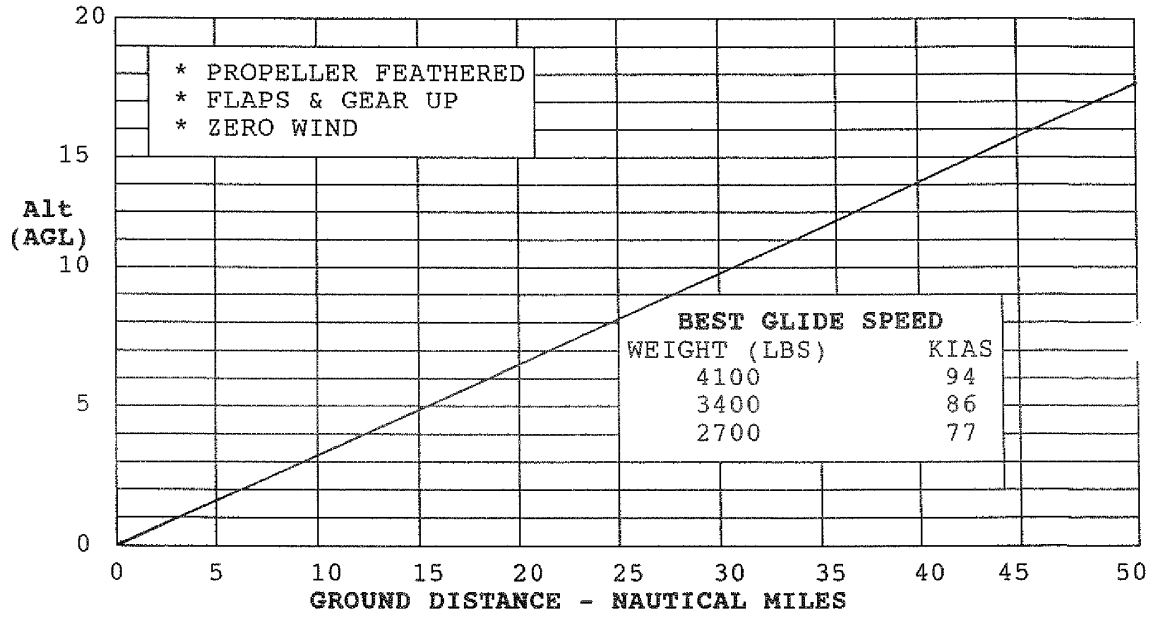
If an engine failure occurs during the takeoff roll, the most important thing to do is stop the airplane on the remaining runway. Those extra items on the checklist will provide added safety after a failure of this type.

Prompt lowering of the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after takeoff. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions.

Altitude and airspeed are seldom sufficient to execute a 180º gliding turn necessary to return to the runway. The checklist procedures assume that adequate time exists to secure the fuel system prior to touchdown.

ENGINE FAILURE (Cont.)

After an engine failure in flight, the best glide speed as shown in the following chart should be established as quickly as possible. While gliding toward a suitable landing area, an effort should be made to identify the cause of the failure. If time permits, an engine restart should be attempted as defined on page 3-3. If the engine cannot be restarted, a forced landing without power must be accomplished.



FORCED LANDINGS

If all attempts to restart the engine fail and a forced landing is imminent, select a suitable field and prepare for the landing as discussed under the Emergency Landing Without Engine Power checklist.

Before attempting an "off airport" landing with engine power available, one should fly over the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as discussed under the Precautionary Landing With Engine Power checklist.

FORCED LANDINGS (Cont.)

Prepare for ditching by securing heavy objects and collect folded coats for protection of occupants' faces at touchdown. Transmit Mayday messages on 121.5 MHz, giving location and intentions, and squawk 7700 if a transponder is installed. Avoid a landing flare because of difficulty in judging height over a water surface.

In a forced landing situation, do not turn off the avionics power and master switches until a landing is assured. Premature deactivation of the switches will disable the encoding altimeter and airplane electrical systems.

This section contains no change from standard Airplane Flight Manual/Pilot's Operating Handbook, except expect a flatter glide with the prop feathered as shown above.

COMPRESSOR STALL

In the event of an engine compressor stall (noted by a bang or popping noise and/or engine surging), slowly reduce power and, if it continues, land as soon as practicable. If a flameout occurs, attempt one restart to check for normal operation.

FUEL FILTER WARNING LIGHT

The illumination of the fuel filter warning light indicates that the pressure differential within the fuel filter is at a point where the filter is about to go on by-pass. The result of this action is to eliminate the large in-line fuel filter and for unfiltered fuel to enter the engine. The flight may be continued as planned unless severely contaminated fuel is suspected, at which point, a landing should be made as soon as possible and the fuel filter serviced.

CHIP DETECTOR LIGHT

The illumination of the oil chip light indicates the presence of metal particles in the engine oil. This may be an indication of an impending engine failure. It is recommended that the flight be terminated as soon as possible and that the engine be inspected for the source of the metal chips.

LANDING WITHOUT ELEVATOR CONTROL

Trim for horizontal flight (with an airspeed of approximately 80 KIAS and flaps set to 20º) by using power lever and trim tab controls. Then do not change the trim tab setting and control the glide angle by adjusting power exclusively.

At flareout, the nose-down moment resulting from power reduction is an adverse factor and the airplane may hit on the nose wheel. Consequently, at flareout, the trim tab should be set at full nose-up position and the power adjusted so that the airplane will rotate to the horizontal attitude for touchdown. Power lever to flight idle at touchdown.

FIRES

Improper starting procedures which involve the accumulation of excess amounts of fuel in the combustion chamber of the engine and overboard dumping of fuel during the starting attempt can result in an internal engine fire with fire emitting from the tail pipes and subsequent ignition of any fuel that has accumulated on the ground.

If this should happen, the airplane should be pushed away from the flames while the engine is being "motored". Ground personnel should be summoned to assist in fire suppression.

Engine fires in flight are extremely rare. However, should one occur, the appropriate checklist must be followed. After completion of the procedures, execute a forced landing. Do not attempt a restart of the engine. Make all necessary and appropriate repairs prior to any attempted engine run-up or flight.

The initial indication of an electrical fire is usually the odor of burning insulation. The checklist for this problem should result in elimination of the fire.

EMERGENCY OPERATION IN CLOUDS

VACUUM SYSTEM FAILURE

The aircraft is equipped with an electrically operated standby vacuum pump, which provides standby suction necessary to operate the airplane vacuum system should the normal engine-driven pump fail in flight. The standby pump and vacuum relief valve are mounted on the engine firewall and are connected in parallel with the engine-driven vacuum pump at the manifold check valve.

VACUUM SYSTEM FAILURE (Cont.)

Control for the pump is provided by a two-position, push-button switch/annunciator located on the left side of the pilot's instrument panel.

PRIMARY VACUUM SYSTEM FAILURE

(Low Vacuum Warning Light (Amber) Illuminates and/or Low Suction Gage Indication)

1. Standby Vacuum Switch -- ON.
2. Suction Gage -- CHECK VACUUM RESTORED.

****CAUTION****

IF VACUUM IS NOT RESTORED, WITH THE STANDBY VACUUM PUMP OPERATING, A FAILURE HAS OCCURRED ELSEWHERE IN THE VACUUM SYSTEM AND PARTIAL PANEL PROCEDURES WILL BE NECESSARY AS OUTLINED IN THE FOLLOWING PROCEDURES. IF AN AUTOPILOT IS INSTALLED WHICH DEPENDS UPON VACUUM-DRIVEN GYROS FOR ATTITUDE OR DIRECTION INFORMATION, IT SHOULD BE TURNED OFF.

EXECUTING A 180º TURN IN CLOUDS

Upon inadvertently entering the clouds, an immediate plan should be made to turn back as follows:

1. Note the compass heading.
2. Note the time of the minute hand and observe the position of the sweep second hand on the clock.
3. When the sweep second hand indicates the nearest half-minute, initiate a standard rate left turn, holding the turn coordinator symbolic airplane wing opposite the lower left index mark for 60 seconds. Then roll back to level flight by leveling the miniature airplane.
4. Check accuracy of the turn by observing the compass heading which should be the reciprocal of the original heading.
5. If necessary, adjust heading primarily with skidding motions rather than rolling motions so that the compass will read more accurately.
6. Maintain altitude and airspeed by cautious application of elevator control. Avoid over controlling by keeping hands off the control wheel as much as possible and steering only with rudder.

EMERGENCY DESCENT THROUGH CLOUDS

If conditions preclude reestablishment of VFR flight by a 180º turn, a descent through a cloud deck to VFR conditions may be appropriate. If possible, obtain radio clearance for an emergency descent through clouds. To guard against a spiral dive, choose an easterly or westerly heading to minimize compass card swings due to changing bank angles. In addition, control by monitoring the turn coordinator. Occasionally check the compass heading and make minor corrections to hold an approximate course. Before descending into the clouds, set up a stabilized let-down condition as follows:

1. Landing Gear -- EXTEND.
2. Power -- REDUCE to establish a 500 to 800 ft./min. rate of descent.
3. Trim -- ADJUST elevator and rudder for stabilized descent at 105 KIAS.
4. Control Wheel -- HANDS OFF.
5. Turn Coordinator -- MONITOR (make corrections with rudder only).
6. Rudder Trim -- ADJUST to relieve unbalanced rudder force.
7. Compass -- CHECK TREND (make cautious corrections with rudder to stop turn).
8. Out of Clouds -- RESUME NORMAL CRUISE FLIGHT.

RECOVERY FROM A SPIRAL DIVE

If a spiral is encountered, proceed as follows:

1. Power Lever to FLIGHT IDLE.
2. Stop the turn by using coordinated aileron and rudder control to align the symbolic airplane in the turn coordinator with the horizon reference line.
3. Cautiously apply control wheel back pressure to slowly reduce the airspeed to 105 KIAS.
4. Adjust the elevator trim control to maintain a 105 KIAS glide.
5. Keep hands off the control wheel, using rudder control to hold a straight heading. Adjust the rudder trim to relieve unbalanced rudder force.
6. Clear engine occasionally, but avoid using enough power to disturb the trimmed glide.
7. Upon breaking out of clouds, resume normal cruising flight.

INADVERTENT FLIGHT INTO ICING CONDITIONS

See pages 3-10 to 3-12 of this Supplement.

STATIC SOURCE BLOCKED

If erroneous readings of the static source instruments (airspeed, altimeter, and vertical speed) are suspected, the static pressure alternate source valve should be pulled on, thereby supplying static pressure to these instruments from the baggage compartment.

Baggage compartment pressures will be affected by pressurization, open window, and varying airspeeds, and this will affect the readings.

With the cabin pressurized, maximum airspeed and altimeter variation from normal reaches 3 knots and 70 feet respectively at maximum cruise (instruments read high). At climb speeds, typical variations are 2 knots and 20 feet respectively (reads high).

With the cabin unpressurized, dump valve open, vents closed, and window closed, variations up to 10 knots and 60 feet occur near stall (reads high) and 5 knots and 80 feet at maximum cruise (reads high).

With the cabin unpressurized and the window open, variations up to 7 knots and 40 feet occur near stall (reads high) and 6 knots and 100 feet at maximum cruise (reads high). During approach, typical variations are 7 knots and 55 feet (reads high).

With the alternate static source on, fly the airplane at airspeeds and altitudes, which compensate for the variations from normal indications. For more exact airspeed correction, refer to the alternate static source airspeed calibration table in Section V, appropriate to the pressurization and window configuration.

SPINS

Intentional spins are prohibited in this airplane. Should an inadvertent spin occur, the following recovery technique may be used:

1. Power Lever -- RETARD (flight idle position).
2. Ailerons -- NEUTRAL.

SPINS (Cont.)

3. Rudder -- APPLY full opposite to direction of rotation.
4. Control Wheel -- FULL FORWARD, until stall is broken.
5. Controls -- MAINTAIN above settings until rotation stops.
6. Rudder -- NEUTRALIZE as rotation stops and make a smooth recovery from the resulting dive.

NOTE

IF DISORIENTATION PRECLUDES A VISUAL DETERMINATION OF THE DIRECTION OF ROTATION, THE SYMBOLIC AIRPLANE IN THE TURN COORDINATOR OR THE NEEDLE OF THE TURN AND BANK INDICATOR MAY BE REFERRED TO FOR THIS INFORMATION.

ENGINE-DRIVEN FUEL PUMP FAILURE

Failure of the engine-driven fuel pump will be evidenced by a sudden loss of engine power.

Follow the "Emergency Landing Without Engine Power" procedures as described on page 3-5 of this Section.

LOW OIL PRESSURE

The oil pressure warning light illuminates when the engine oil pressure is below 35 psi. Should the light illuminate in flight, confirm the loss of oil pressure with the oil pressure gage and land as soon as practicable at the nearest suitable airport.

If a total loss of engine oil pressure is accompanied by a loss of torque indication, an engine failure is imminent. Shut down the engine and proceed with the Emergency Landing Without Engine Power procedures as described on page 3-5 of this Section.

LANDING GEAR MALFUNCTION PROCEDURES

In the event of a possible landing gear retraction or extension malfunction, there are several general checks that should be made prior to initiating the steps outlined in the following paragraphs.

LANDING GEAR MALFUNCTION PROCEDURES (Cont.)

In analyzing a landing gear malfunction, first check that the master switch is ON and the LDG GEAR and GEAR PUMP circuit breakers are IN; reset if necessary. Also, check both landing gear position indicator lights for operation by "pressing-to- test" the light units and rotating them at the same time to check for open dimming shutters. A burned out bulb can be replaced in flight by using the bulb from the remaining gear position indicator light.

RETRACTION MALFUNCTIONS

Normal landing gear retraction time is approximately 8 seconds. If the landing gear fails to retract normally or an intermittent GEAR UP indicator light is present, check the indicator light for proper operation and attempt to recycle the landing gear. Place the landing gear lever in the GEAR DOWN position. When the GEAR DOWN light illuminates, reposition the gear lever in the GEAR UP position for another retraction attempt. If the GEAR UP light still fails to illuminate, the flight may be continued to an airport having maintenance facilities, if practical.

If gear motor operation is audible after a period of one minute following gear lever retraction actuation, pull the GEAR PUMP circuit breaker switch to prevent the electric motor from overheating. In this event, remember to re-engage the circuit breaker switch just prior to landing. Intermittent gear motor operation may also be detected by momentary fluctuations of the ammeter needle.

EXTENSION MALFUNCTIONS

Normal landing gear extension time is approximately 6 seconds. If the landing gear will not extend normally, perform the general checks of circuit breakers and master switch, and repeat the normal extension procedures at a reduced airspeed of 100 KIAS. The landing gear lever must be in the DOWN position with the detent engaged. If efforts to extend and lock the gear through the normal landing gear system fail, the gear can be manually extended (as long as hydraulic system fluid has not been completely lost) by use of the emergency hand pump. The hand pump is located between the front seats. A checklist is provided for step-by-step instructions for manual gear extension.

EXTENSION MALFUNCTIONS (Cont.)

If gear motor operation is audible after a period of one minute following gear lever extension actuation, pull the GEAR PUMP circuit breaker to prevent the electric motor from overheating. In this event remember to re-engage the circuit breaker just prior to landing.

GEAR UP LANDING

If the landing gear remains retracted or is only partially extended, and all efforts to fully extend it (including manual extension) have failed, plan a wheels-up landing. In preparation for landing, reposition the landing gear lever to GEAR UP and push the LDG GEAR and GEAR PUMP circuit breakers IN, allowing the landing gear to swing into the gear wells at touchdown. Then proceed in accordance with the checklist.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

GENERATOR INOPERATIVE PROCEDURE

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter and the generator warning light. However, the cause of these malfunctions is usually difficult to determine. A broken generator wire is the most likely cause of failures. A damaged or improperly adjusted voltage regulator can also cause malfunctions. Problems of this nature constitute an electrical emergency and should be dealt with immediately. Electrical power malfunctions usually fall into two categories: Excessive generator output and insufficient generator output. The paragraphs below describe the recommended remedy for each situation.

EXCESSIVE GENERATOR OUTPUT

After engine starting and heavy electrical usage, the battery condition will be low enough to accept above normal charging during initial part of a flight. However, after two minutes of operation, the ammeter should be indicating less than 40 amps.
If the generator output were to remain above this value, it would put an excessive load on the electrical system. Electronic components in the electrical system could be adversely affected by higher than normal voltage if a faulty regulator setting is causing the high output.

EXCESSIVE GENERATOR OUTPUT (Cont.)

To preclude these possibilities, an over-voltage sensor will automatically trip the generator system off at 32 volts, plus or minus one volt, and the generator "OUT" warning light will illuminate. Assuming that the malfunction was only momentary, an attempt should be made to activate the system.

To do this, turn the generator switch off, then to the down generator reset position, and bring the generator switch back on again. If the problem no longer exists, normal generator charging will resume and the warning light will go off. The system should be checked at the completion of the flight. If the light comes on again, a malfunction is confirmed. In this event, the flight should be terminated and/or the current drain on the battery minimized, because the battery can supply the electrical system for only a limited period of time.

If the emergency occurs at night, power should be conserved for later use of the landing lights, flaps and landing gear during landing.

INSUFFICIENT GENERATOR OUTPUT

If the ammeter and generator "OUT" light indicate the generator is not supplying power to the system, it should be shut down. The generator circuit breaker should be checked and reset as required, the generator reset switch should be pushed and the generator restored. If normal generator operation does not occur, turn the system off. All non-essential equipment should be turned off and the flight terminated as soon as practicable.

NOTE IF EQUIPPED WITH ELECTRIC HEATED INLET

A MINIMUM OF 70% N1 SPEED IS REQUIRED FOR THE GENERATOR TO SATISFACTORILY SUPPLY ELECTRICAL POWER IN A HIGH LOAD CONDITION SUCH AS NEEDED WITH THE ENGINE ICE PROTECTION SYSTEM OPERATING.

PRESSURIZATION AIR CONTAMINATION

Strong fumes (smoke or odors) coming from the pressurization air outlets under any condition, indicates oil contamination from recent pressurization system maintenance or from a malfunction in the engine compressor section.

PRESSURIZATION AIR CONTAMINATION (Cont.)

Determine if the contamination is severe enough to require an immediate depressurization and an emergency descent rather than minor enough to allow a pressurized descent to 12,500 feet or less and ventilating the cabin. In any case the flight should be terminated as soon as practical and the source of contamination found and repaired.

INADVERTENT OPENING OF CABIN DOOR IN FLIGHT

If the cabin door should inadvertently open in flight while unpressurized or while just beginning to pressurize, probably due to improper latching or locking procedures, turn the cabin pressurization switch off, and if desired, attempt to close the door in flight at a safe altitude following the checklist in this section. To facilitate closing the door, open the openable window inward (but not aft) to relieve cabin pressure, and slide the seat aft slightly (so as to retain control of the airplane) to obtain a better grasp of the door grip. it is important that the door handle be in the detent at approximately the one o'clock position prior to pulling the door closed, followed immediately by rotating he handle forward to latch.

If the cabin door inadvertently opens when locked closed, the flight should be terminated as soon as practical and repairs made. Flight characteristics are normal in any flap position with the cabin door open.

INADVERTENT OPENING OF EMERGENCY EXIT IN FLIGHT

If the emergency exit should inadvertently open in flight while unpressurized or when just beginning to pressurize, probably due to improper latching or locking procedure, the flight may be continued after closing the emergency exit following the checklist in this section.

If the emergency exit inadvertently opens when locked closed, the flight should be terminated as soon as practical and repairs made.

Flight characteristics are normal in any flap position with the emergency exit open, although a moderately strong buffet exists in the cabin due to air pressure fluctuations. This buffet can be minimized by opening the openable window.

OTHER EMERGENCY CONDITIONS

PROPELLER OVERSPEED

The propeller is protected from over speeding by an overspeed governor that must be tested prior to the first flight each day. However, should an overspeed occur as reflected in the propeller rpm increasing to 2150 rpm, the primary governor has failed and maintenance is required.

BETA LIGHT ILLUMINATION IN FLIGHT

If at flight idle, advance the power control. If thrust output appears to be normal, the most likely failure is in the indicator circuit. CHECK at the next intended stop.

ELECTRIC INLET HEAT FAILURE

1. Check light bulb, if not lit push “TEST” button on annunciator. If light does not come on replace bulb at next stop. If light comes on proceed to next step.
2. Check circuit breaker, Reset if required.
3. Cycle Inlet Heat switch. If the light stays off, leave the conditions requiring the use of the engine ice protection system as soon as possible.

BLEED AIR ENGINE INLET FAILURE

1. Abrupt drop in inlet air temperature may indicate failure of inlet heat.
2. Check for increase in TOT.
3. Cycle Bleed Air Controls. If inlet air temperature remains low, leave the conditions requiring the use of the engine ice protection system as soon as possible.

ENGINE CONTINUOUS IGNITION FAILURE

1. Check light bulb, if not lit push “TEST” button on annunciator. If light does not come on replace bulb at next stop. If light comes on proceed to next step.
2. Check ignition breaker, Reset if required
3. If light stays off or breaker will not reset, leave the conditions requiring the use of the engine ice protection system as soon as possible.

PROPELLER DE-ICE FAILURE

1. Be certain that this is not just a normal cycle.
2. Check circuit breaker.
3. Cycle de-ice switch and leave condition requiring the use of the engine ice protection system as soon as possible.

TRANSFER PUMP FAILURE PRIOR TO OR DURING AUXILIARY FUEL TRANSFER

In the event one of the two fuel transfer pumps fail prior to or during auxiliary fuel transfer:

1. Move the fuel selector valve to select the wing tank that has the operational transfer system until all fuel has been transferred.
2. Return selector valve to BOTH position after fuel level is approximately equal in both wing tanks.

SECTION IV

TABLE OF CONTENTS

SECTION IV

NORMAL PROCEDURES

INTRODUCTION

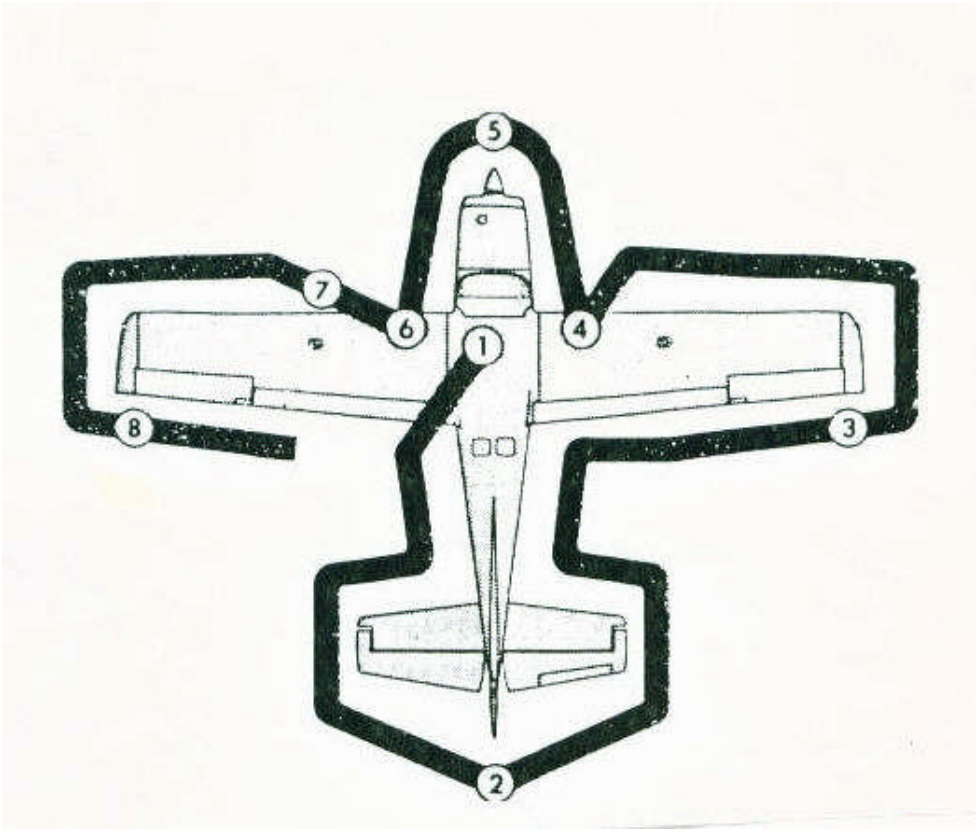
The Normal Procedures Section is revised or repeated in its entirety. The Checklists may be amplified as necessary in the "Amplified Procedures" subsection.

SPEEDS FOR NORMAL OPERATION

All airspeeds quoted in this section are indicated airspeeds (KIAS).

Unless otherwise noted, the following speeds are based on a maximum weight of 4000 pounds and may be used for any lesser weight. However, to achieve the performance specified in Section V for takeoff distance, the speed appropriate to the particular weight must be used.

Takeoff		
	Normal Climb Out	80-90 KIAS
	Short Field Takeoff, Flaps 20º, Speed @ 50 ft	78 KIAS
Enroute Climb, Flaps and Gear Up:		
	Normal	110-140 KIAS
	Best Rate of Climb, Sea Level-23,000 ft	100 KIAS
	Best Angle of Climb, All Altitudes	80 KIAS
Landing Approach (3,800 Pounds)		
	Normal Approach, Flaps Up	85-95 KIAS
	Normal Approach, Flaps 30º	75-85 KIAS
	Short Field Approach, Flaps 30º	75 KIAS
Balked Landing (3,800 Pounds):		
	Maximum Power, Flaps 20º	80 KIAS
Maximum Recommended Turbulent Air Penetration Speed:		
	4000 Pounds	130 KIAS
	3350 Pounds	119 KIAS
	2700 Pounds	106 KIAS
Maximum Demonstrated Crosswind Velocity:		
	Takeoff or Landing	21 KIAS



CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

(1) CABIN

1. POH/AFM Supplement -- ONBOARD AIRCRAFT.
2. Pilot's Operating Handbook -- ONBOARD AIRCRAFT.
3. Airplane Weight and Balance -- CHECKED.
4. Control Wheel Lock -- REMOVE.
5. Parking Brake -- SET.
6. Landing Gear Lever -- GEAR DOWN.
7. Avionics Power Switch -- OFF.
8. Radar (if installed) -- OFF.
9. Air Conditioner (if installed) -- OFF.
10. Master Switch -- ON.

PREFLIGHT INSPECTION (Cont.)

11. Cabin Altitude Warning Light -- PRESS TO TEST.
12. Annunciator Test Switch -- PRESS TO TEST.
13. Low-Vacuum Warning Light --ON.
14. Landing Gear Locked Light and Warning Horn -- GREEN and PRESS TO TEST (with throttle closed).
15. Landing Gear Up Light -- OFF and PRESS TO TEST (yellow).
16. Power Lever -- GROUND IDLE.
17. Condition Lever -- CUTOFF/FEATHER.
18. Cowl Flaps -- OPEN.
19. Fuel Shut-Off Valve -- ON (push full in).
20. Fuel Quantity Indicators -- CHECK QUANTITY.
21. Fuel Selector Valve -- BOTH ON.
22. Transfer Tank Fuel Quantity -- CHECK.
23. Gen. Out, Fuel Press, and Oil Press. Annunciators -- ON.
24. Suction Gage Warning Buttons (if installed) -- CHECK both extended.
25. Oxygen Expended Lights (if installed) -- CHECK.
26. Master Switch -- OFF.
27. Static Pressure Alternate Source Valve -- OFF.
28. Trim Controls -- NEUTRAL (rudder) and TAKEOFF (elevator).
29. Oxygen System (if installed) -- CHECK MASKS, HOSES and QUANTITY.
30. Windshield and Windows -- CHECK for CRACKS.

(2) EMPENNAGE

1. Left Static Source Opening -- CHECK for blockage.
2. Left Main Gear Wheel Well -- CHECK for condition and cleanliness.
3. Transfer Tank Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed.
4. Baggage Door -- CHECK for security.
5. Rudder Gust Lock -- REMOVED.
6. Tail Tie-Down -- REMOVED.

PREFLIGHT INSPECTION (Cont.)

7. Control Surfaces -- CHECK freedom of movement and security.
8. Elevator Trim Tab -- CHECK no play and security.
9. Transfer Tank Fuel Filler Cap -- SECURE.
10. Transfer Tank Fuel Line Drain Valves (2) -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment, and proper fuel before first flight of day and after each refueling. If water is observed, take further samples until clear. Take repeated samples from all fuel drain points until all contamination has been removed.
11. Right Main Gear Wheel Well -- CHECK for condition and cleanliness.
12. Right Static Source Opening -- CHECK for blockage.

(3) RIGHT WING Trailing Edge

1. Aileron --CHECK for freedom of movement and security.
2. Aileron Gap Seal -- CHECK security and fit.
3. Fuel Tank Vent at Wing Tip Trailing Edge -- CHECK for stoppage.

(4) RIGHT WING

1. Wing Tie-Down -- REMOVE.
2. Fuel quantity -- CHECK VISUALLY for desired level.
3. Fuel Filler Cap -- SECURE.
4. Radome (if weather radar is installed) -- CHECK for condition and security.
5. Fuel Tank Sump Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water sediment and proper fuel before first flight each day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed.
6. Right Main Wheel -- CHECK tire for proper inflation and condition.

PREFLIGHT INSPECTION (Cont.)

(5) NOSE

1. Right Fuel Reservoir Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points until all contamination has been removed.
2. Right Cowl Flap -- SECURE.
3. Fuel Strainer Quick-Drain Valve -- DRAIN at least a cupful of fuel to check for water and sediment fuel before first flight of day. Check strainer drain CLOSED. Take repeated samples until all contamination has been removed.
4. Oil Filter Bypass Indicator -- CHECK through right tail pipe opening or through cowl flap. Red button showing indicates blocked filter.
5. Nose Tie-Down -- REMOVE.
6. Nose Gear Doors -- CHECK for security.
7. Nose Wheel Tire, Strut and Wheel Well -- CHECK tire and strut for proper inflation and wheel well for condition and cleanliness.
8. Propeller and Spinner -- CHECK for nicks, security, and oil leaks.
9. Air Inlets -- CHECK oil cooler/starter, right cowl ventilation, vacuum pump, engine induction, bleed-air heat exchanger, left cowl ventilation, and cabin air heat exchanger/ejector air inlets for restrictions. Remove inlet & exhaust dust covers.
10. Landing and Taxi Lights -- CHECK for conditions and cleanliness.
11. Engine Oil Dipstick -- CHECK oil level, then check dipstick SECURE. Do not operate with less than six quarts.
12. Engine Compartment -- Visually check engine compartment for fluid leaks, loose connections, and general integrity.
13. Left Cowl Flap -- SECURE.
14. Left Fuel Reservoir Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points until all contamination has been removed.

PREFLIGHT INSPECTION (Cont.)

(6) LEFT WING

1. Left Main Wheel -- CHECK tire for proper inflation and condition.
2. Fuel Tank Sump Quick Drain Valve(s) -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment and proper fuel before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed.
3. Fuel quantity -- CHECK VISUALLY for desired level.
4. Fuel Filler Cap -- SECURE.

(7) LEFT WING Leading Edge

1. Pitot Tube Cover -- REMOVE and check openings for stoppage.
2. Stall Warning Vane -- CHECK for freedom of movement. While master switch is turned on, horn should sound when vane is pushed upward.
3. Wing Tie-Down -- REMOVE.

(8) LEFT WING Trailing Edge

1. Fuel Tank Vent at Wing Tip Trailing Edge -- CHECK for stoppage.
2. Aileron -- CHECK for freedom of movement and security.
3. Aileron Gap Seal -- CHECK security and ATTACHMENT.

BEFORE STARTING ENGINE

1. Preflight Inspection -- COMPLETE.
2. Passenger Briefing -- COMPLETE.
3. Seats, Seat Belts, Shoulder Harnesses -- ADJUST and LOCK.
4. Control Wheel Lock -- CHECK REMOVED.
5. Emergency Exit -- LOWER and LOCK.
6. Cabin Door -- CLOSE and LOCK (with cabin window open).
7. Openable Window -- AS DESIRED for ventilation.
8. Brakes -- TEST and SET.
9. Avionics Power Switch -- OFF.

BEFORE STARTING ENGINE (Cont.)

****CAUTION****

THE AVIONICS POWER SWITCH MUST BE OFF DURING ENGINE START TO PREVENT POSSIBLE DAMAGE TO AVIONICS.

10. Circuit Breakers -- CHECK IN.
11. Engine Inlet Heat -- OFF.
12. Continuous Ignition Switch -- OFF.
13. Cabin Pressurization:
    a. Dump Valve Control -- IN.
    b. Bleed Air Control -- OUT.
    c. Cabin Pressurization Switch -- ON (OFF on warm days).
    d. Cabin Altitude Selector -- SET (HIGH on warm days).

NOTE

FOR IMPROVED CABIN COMFORT ON WARM DAYS, THE CABIN ALTITUDE SELECTOR SHOULD BE SET TO 8000 TO 10,000 FEET; THE BLEED VALVE CONTROL SHOULD NOT BE PUSHED IN; AND THE PRESSURIZATION SWITCH SHOULD NOT BE TURNED ON UNTIL APPROACHING THE SET ALTITUDE. WITH THE OVERHEAD AIR CONTROLS ON, THE INDIVIDUAL OVERHEAD OUTLETS OPEN AND THE CABIN VENTILATION FAN ON HIGH, THIS PROCEDURE WILL ALLOW MAXIMUM ENTRY AND CIRCULATION OF THE COOLER RAM AIR FROM THE WING AIR SCOOPS WHILE CLIMBING OR CRUISING THROUGH THE WARM LOWER ALTITUDES. A SIMILAR PROCEDURE SHOULD BE USED FOR HOT WEATHER DESCENTS.

14. Electrical Equipment -- OFF.
15. Landing Gear Lever -- DOWN.
16. Autopilot (if installed) -- OFF.
17. Air Conditioner (if installed) -- OFF.
18. Radar (if installed) -- OFF.
19. Starter Switch -- OFF.
20. Generator Switch -- OFF.
21. Fuel Pump Switch -- OFF.
22. Power Lever - GROUND IDLE.
23. Condition Lever -- CUTOFF.
24. Cowl Flaps -- OPEN (move lever out of locking hole to reposition).
25. Fuel Shut-Off Valve --ON (push full in).
26. Fuel Selector Valve -- BOTH ON.

BEFORE STARTING ENGINE (Cont.)

27. Master Switch -- ON.
28. Landing Gear Down Light -- ON.
29. Fuel Quantity Indicators -- CHECK QUANTITY.
30. Fuel Totalizer -- CHECK and SET.
31. Annunciator Panel, and Cabin Altitude and Landing Gear Warning Lights -- PRESS TO TEST.
32. Fuel Boost Pumps -- CHECK.
    a) No. 1 pump ON -- CHECK FUEL PRESS ANNUNCIATOR goes out and fuel pressure goes to approximately 25 psi; then No. 1 pump OFF -- CHECK FUEL PRESS ANNUNCIATOR illuminates and fuel pressure drops to -0-; then
    b) No. 2 pump ON -- CHECK FUEL PRESS ANNUNCIATOR goes out and fuel pressure goes to approximately 25 psi; then No. 2 pump OFF -- CHECK FUEL PRESS ANNUNCIATOR illuminates and fuel pressure drops to -0-.

****CAUTION****

FLIGHT SHALL NOT BE CONDUCTED IF THE FUEL BYPASS ANNUNCIATOR IS INOPERATIVE (OR ILLUMINATED), OR THE OIL SCREEN FLAG IS VISIBLE, OR IF EITHER FUEL BOOST PUMP IS INOPERATIVE.

33. Auxiliary Instrument Air -- ON. Check gyro pressure 4.6 to 5.4, then OFF.

STARTING ENGINE

1. Avionics Master Switch -- OFF.
2. Boost pump -- ON (1 OR 2).
3. Fuel Pressure -- 10 psi MINIMUM.
4. Voltmeter -- 24 V MINIMUM.
5. Propeller -- CLEAR.
6. TOT -- 150º C or less.

NOTE

IT IS RECOMMENDED THAT RESIDUAL TOT BE NO MORE THAN 150º C WHEN THE CONDITION LEVER IS OPENED AND LIGHT OFF IS ATTEMPTED. RESIDUAL TOT CAN BE REDUCED BY MOTORING THE ENGINE WITH THE STARTER. IF HIGH AMBIENT CONDITIONS ARE ENCOUNTERED AND TOT CANNOT BE REDUCED TO 150º C, MOTOR THE ENGINE UNTIL TOT IS STABILIZED BEFORE OPENING THE CONDITION LEVER. CLOSELY MONITOR TOT DURING START.

STARTING ENGINE (Cont.)

7. Starter Switch -- STARTER.
8. Start and Ignition Annunciators -- CHECK ON.
9. Condition Lever -- START AT:

N1 RPM	TEMPERATURE DEG. F	DEG. C
15%	45	+7
13%	0 - 44	- 18 - +7
12%	Below 0	-18

****CAUTION****

DURING A START, THE CONDITION LEVER MUST NEVER BE ADVANCED OUT OF THE FUEL CUTOFF POSITION UNTIL AFTER THE STARTER AND IGNITION EXCITER HAVE BEEN ENERGIZED AND THE DESIRED CRANKING SPEED HAS BEEN ATTAINED. TO DO SO MAY RESULT IN AN EXPLOSIVE LIGHT-OFF OR AN OVERTEMPERATURE START.

10. TOT -- MONITOR (810 to 927º), 10 seconds maximum with no more than 1 second at 927º C.
11. Propeller (Np) -- CHECK rotating by 25% N1.
12. Engine Oil Pressure -- POSITIVE indication by completion of start.

NOTE

COLD WEATHER START OIL PRESSURE IS ALLOWABLE TO 150 PSI. WHILE OVER 130 PSI, OPERATE THE ENGINE AT MINIMUM POWER UNTIL NORMAL OIL PRESSURE IS ATTAINED.

13. Starter Switch -- OFF as N1 stabilizes (within 25 to 60 seconds).
14. N1 -- CHECK 59 to 63%.
15. Propeller -- UNFEATHERED by completion of start.

STARTING ENGINE (Cont.)

NOTE

THE START SHOULD BE COMPLETED IN ONE MINUTE; HOWEVER, IF N1 AND N2 ARE ACCELERATING AND TOT IS WITHIN LIMITS, THE START MAY BE CONTINUED LONGER THAN ONE MINUTE.

16. Generator Switch -- ON.
17. Voltmeter/Ammeter -- CHECK.
18. Avionics Master Switch -- As required.
19. Lights -- AS REQUIRED.

ABORTED START - ENGINE CLEARING PROCEDURE

1. Condition Lever -- CUTOFF.
2. Starter -- MOTOR.
3. TOT -- MONITOR.

****CAUTION****

THE PILOT AND MAINTENANCE PERSONNEL ARE RESPONSIBLE TO RECORD AND TAKE RECOMMENDED CORRECTIVE ACTION WHEN OVERTEMPERATURES OCCUR.

NOTE

IF THE ENGINE HAS BEEN SHUT DOWN FOR MORE THAN 15 MINUTES, AFTER RESTART, STABILIZE AT IDLE FOR ONE MINUTE BEFORE INCREASING POWER.

BEFORE TAKEOFF

1. Parking Brake -- SET.
2. Seats, Seat Belts, Shoulder Harnesses --CHECK SECURE.
3. Cowl Flaps -- OPEN.
4. Flight Controls -- FREE and CORRECT.
5. Instruments -- CHECK and SET.
6. Boost Pump -- CHECK ON (1 or 2).
7. Fuel Quantity -- RECHECK.

BEFORE TAKEOFF (Cont.)

8. Fuel Selector Valve -- BOTH ON.
9. Fuel Transfer Pumps -- ON one at a time and observe monitor lights, then OFF (transfer pumps level flight only).
10. Trim -- SET FOR TAKEOFF.
11. Friction Lock -- SET.
12. Condition Lever -- HIGH (START).
13. Power Lever -- 1725 (Np) RPM.
14. Propeller Overspeed Governor -- TEST prior to first flight of the day. [Press and hold overspeed governor test button, observe a decrease in Np RPM to approx. 1600 RPM, release test button, Np returns to 1725 RPM. Do not hold button more than 20 seconds.]

NOTE

DO NOT CONDUCT THIS TEST IN FLIGHT TO AVOID UNCOMFORTABLE AIRSPEED SURGE.

15. Beta Light -- CHECK (move Power Lever to reverse range, observe Beta Light illumination on annunciator panel.)
16. Power Lever -- GROUND IDLE.
17. Door Seals -- INFLATE.
18. Engine Inlet Heat Switch -- ON (observe INLET HEAT annunciator monitor light then OFF unless weather conditions require engine anti-ice).
19. Continuous Ignition Switch -- ON (observe IGN annunciator monitor light then OFF unless weather conditions require continuous ignition).
20. Propeller Anti-Ice -- ON (observe fluctuation of Propeller Ammeter approximately each 20 seconds) then OFF unless weather conditions require.

WARNING

FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED.

21. Gyro Pressure -- CHECK 4.6 to 5.4 in Hg.
22. Flaps -- SET (20º max) -- See Takeoff Checklist.
23. Annunciators -- OFF or CONSIDERED.
24. Cabin Door, Openable Window and Emergency Exit -- CLOSED and LOCKED.
25. Cabin Door Handle Safety Lock -- UNLOCKED (pulled out).

BEFORE TAKEOFF (Cont.)

26. Air Conditioner (if installed) -- OFF.
27. Brakes -- RELEASE.

TAKEOFF

NORMAL TAKEOFF

1. Wing Flaps -- 10º (recommended).
2. Power Lever -- TAKEOFF POWER (111 psi torque pressure or 810º C TOT).
3. Elevator Control -- LIFT NOSE WHEEL at 65-70 KIAS.

NOTE

WHEN NOSE WHEEL IS LIFTED, THE GEAR MOTOR MAY RUN 2-3 SECONDS TO RESTORE HYDRAULIC PRESSURE.

4. Initial Climb Speed -- 80-90 KIAS.
5. Landing Gear -- RETRACT.
6. Flaps -- RETRACT after reaching 85 KIAS.

NOTE

DO NOT REDUCE POWER UNTIL WING FLAPS AND LANDING GEAR HAVE BEEN RETRACTED.

SHORT FIELD TAKEOFF

1. Wing Flaps -- 10o (see Section V Takeoff Chart).
2. Brakes -- APPLY.
3. Condition Lever -- FULL INCREASE.
4. Power Lever -- TAKEOFF (111 psi torque or 810º C TOT). Observe torque and temperature limits.
5. Brakes -- RELEASE.
6. Elevator Control -- LIFT NOSE WHEEL at 65 KIAS.

NOTE

WHEN NOSE WHEEL IS LIFTED, THE GEAR MOTOR MAY RUN 2-3 SECONDS TO RESTORE HYDRAULIC PRESSURE.

7. Climb Speed -- 78 KIAS (until obstacles are cleared).
8. Landing Gear -- RETRACT (after obstacles are cleared).

SHORT FIELD TAKEOFF (Cont.)

9. Wing Flaps -- RETRACT after reaching 85 KIAS.

NOTE

DO NOT REDUCE POWER UNTIL WING FLAPS AND LANDING GEAR HAVE BEEN RETRACTED.

CLIMB

NORMAL CLIMB

1. Airspeed -- 110 to 140 KIAS.
2. Power -- 92 psi torque or 752o C TOT and 2030 Np.
3. Cowl Flaps -- OPEN.
4. Cabin Door Handle Safety Lock -- LOCK (before pressurizing).
5. Cabin Pressurization -- CHECK dump valve control IN, push bleed valve control IN, and CHECK/TURN pressurization switch ON at or before set altitude. CHECK maximum differential pressure at and above inner scale altitude.

MAXIMUM PERFORMANCE CLIMB (Vy)

1. Airspeed -- 100 KIAS.
2. Power -- 92 psi torque or 752º C TOT and 2030 Np.
3. Cowl Flaps -- OPEN.
4. Cabin Door Handle Safety Lock -- LOCK (before pressurizing).
5. Cabin Pressurization -- CHECK dump valve control IN, push bleed air valve control IN, and CHECK/TURN pressurization switch ON at set altitude. CHECK maximum differential pressure at and above inner scale altitude.

NOTE

MAXIMUM PERFORMANCE WILL RESULT IF PRESSURIZATION BLEED AIR IS NOT TURNED ON.

CRUISE

1. Power -- SET (Observe TOT, torque and airspeed limits).
2. Elevator and Rudder Trim -- ADJUST.
3. Cowl Flap -- AS REQUIRED.
4. Boost Pump -- ON (at all times).

CRUISE (Cont.)

5. Fuel Selector -- May be positioned to either LEFT or RIGHT during cruise for balancing fuel load only.

****CAUTION****

NO OPERATION IS PERMITTED WITH MORE THAN 10 GALLONS DIFFERENCE BETWEEN LEFT AND RIGHT TANKS.

WARNING

DO NOT SELECT SINGLE TANK WHEN FUEL IN THAT TANK IS LESS THAN 10 GALLONS.

6. Fuel Transfer -- AS REQUIRED (in level flight only).

DESCENT

1. Power -- AS DESIRED.

NOTE

A MINIMUM OF APPROXIMATELY 30 PSI TORQUE IS REQUIRED FOR PRESSURIZATION, DEPENDING ON AIRCRAFT ALTITUDE, CABIN ALTITUDE, AND OAT.

NOTE

ENGINE ACCELERATION (RATE OF POWER RECOVERY) WILL BE REDUCED WITH HIGH ELECTRICAL LOADS AND AT ALTITUDES ABOVE 5000 FT. AVOID THE REQUIREMENT FOR SUDDEN APPLICATION OF POWER DURING APPROACH TO HIGH ALTITUDE AIR FIELDS UNDER CONDITIONS REQUIRING HIGH ELECTRICAL LOADS (NIGHT/IFR/DEICING EQUIPMENT ON).

2. Cabin Altitude Selector -- SET.

NOTE

FOR IMPROVED CABIN COMFORT ON WARM DAYS, SLOWLY SET CABIN ALTITUDE SELECTOR TO 5,000-10,000 FEET PRIOR TO OR DURING INITIAL DESCENT. AFTER DESCENDING BELOW SET ALTITUDE TURN PRESSURIZATION SWITCH OFF, PULL BLEED AIR OFF.

DESCENT (Cont.)

3. Airspeed -- AS DESIRED (Observe Vmo).

****CAUTION****

AT SPEEDS ABOVE THE MANEUVERING SPEED, USE LIGHT CONTROL FORCES AND AVOID ABRUPT PULLOUTS.

NOTE

IF NECESSARY, EXTEND THE LANDING GEAR (BELOW 165 KIAS) TO INCREASE RATE OF DESCENT.

4. Cowl Flaps -- CLOSED.

BEFORE LANDING

1. Seat, Seat Belts, Shoulder Harnesses -- SECURE.
2. Fuel Selector Valve -- BOTH.
3. Boost Pump -- ON.
4. Landing Gear -- EXTEND (below 165 KIAS).
5. Landing Gear -- CHECK (observe gear down green light).
6. Condition Lever -- FULL INCREASE.
7. Door Seals -- DEFLATE.
8. Cabin Pressurization -- CHECK ZERO differential.
9. Cabin Door Handle Safety Lock -- UNLOCK (pulled out).
10. Autopilot -- OFF (if installed).
11. Landing and Taxi Lights -- AS REQUIRED.
12. Radar if Installed -- OFF
13. Wing Flaps -- AS DESIRED (0-10º below 160 KIAS; 10-20º below 130 KIAS; and 20-30º below 115 KIAS).
14. Power -- AS REQUIRED.

WARNING

POWER LEVER MUST NOT BE POSITIONED AFT OF THE FLIGHT IDLE GATE UNTIL AIRPLANE IS ON GROUND.

15. Elevator Trim -- ADJUST for landing.
16. Air Conditioner (if installed) -- OFF.

LANDING

NORMAL LANDING

1. Airspeed -- 85 to 95 KIAS (flaps up).
2. Wing Flaps -- AS DESIRED (flaps down preferred).
3. Airspeed -- 75 to 85 KIAS (flaps DOWN).
4. Touchdown -- MAIN WHEELS FIRST.
5. Landing Roll -- LOWER NOSE WHEEL GENTLY.
6. Power Lever -- GROUND IDLE or REVERSE as needed (after all three wheels are on the ground and speed is below 80 KIAS).
7. After the aircraft is on the ground, the power lever may be retarded below FLIGHT IDLE when ground speed is 90 KIAS or less. Reverse thrust selection is permitted.
8. Brakes -- APPLY (minimum necessary).

SHORT FIELD LANDING

1. Wing Flaps -- FULL DOWN.
2. Airspeed -- 75 KIAS (at 3800 lbs).
3. Elevator Trim -- ADJUST.
4. Power -- REDUCE to FLIGHT IDLE (after clearing obstacle).
5. Touchdown -- MAIN WHEELS FIRST.
6. Power -- GROUND IDLE to achieve Section V performance. Shorter distances may be obtained using FULL REVERSE.
7. Brakes -- APPLY HEAVILY.
8. Flaps -- RETRACT.

BALKED LANDING

1. Power -- 111 psi torque or 810º C TOT (5 minutes).
2. Initial Climb Speed -- 80 KIAS (with full flaps).
3. Wing Flaps -- RETRACT to 20º.
4. Climb Speed -- 90 KIAS (until obstacles are cleared).
5. Wing Flaps -- RETRACT SLOWLY (after reaching safe altitude.
6. Cowl Flaps -- OPEN.

AFTER LANDING

1. Wing Flaps -- RETRACT.
2. Cowl Flaps -- OPEN.
3. Radar (if installed) -- OFF.

SHUTDOWN/SECURING AIRPLANE

1. Parking Brake -- SET.
2. Avionics Power Switch, Electrical Equipment -- OFF.
3. Power Lever -- GROUND IDLE (for 2 minutes, including taxi).
4. Generator -- OFF.
5. Fuel Boost Pump -- OFF.
6. Condition Lever -- FUEL CUTOFF/FEATHER.

****CAUTION****

HOLD BRAKES DURING SHUTDOWN TO PREVENT AIRCRAFT MOVEMENT AS PROPELLER FEATHERS.

7. TOT -- Monitor.

NOTE

AN INTERNAL ENGINE FIRE (RECOGNIZED BY A RAPID INCREASE IN TOT) CAN OCCUR DURING SHUTDOWN IF FUEL CUTOFF IS NOT COMPLETE. IF A SHUTDOWN FIRE OCCURS, IMMEDIATELY ENGAGE THE STARTER AND MOTOR THE ENGINE TO MINIMIZE THE TEMPERATURE ENCOUNTERED. THE TEMPERATURE LIMITATIONS AND ASSOCIATED MAINTENANCE ACTIONS MUST BE OBSERVED.

8. Battery -- OFF.
9. Control Lock -- INSTALL.
10. Fuel Selector Valve -- LEFT ON or RIGHT ON (select low wing tank if parked on sloping surface to minimize cross-feeding and spillage).
11. Engine Plug, Exhaust Covers -- INSTALL (when cool).
12. Propeller -- SECURE.

AMPLIFIED PROCEDURES

STARTING ENGINE

WARNING

TO ENSURE ADEQUATE WARNING OF POSSIBLE EMERGENCY ENGINE OPERATING CONDITIONS, VERIFY THAT THE ENGINE WARNING SYSTEMS ARE OPERABLE PRIOR TO EACH FLIGHT.

OVERTEMPERATURE STARTS OR AFTER SHUTDOWN FIRES MAY CAUSE CRACKS IN THE FIRST-STAGE TURBINE WHEEL RIM. THESE CRACKS CAN EVENTUALLY CAUSE A SECTION OF THE WHEEL TO BREAK OUT AND EXIT THE ENGINE WITH POTENTIALLY DISASTROUS RESULTS.

****CAUTION****

BEFORE THE ENGINE IS OPERATED, MAKE CERTAIN THE COMPRESSOR INLET IS FREE OF DEBRIS. ALSO, MAKE CERTAIN THE COMPRESSOR ROTOR IS NOT FROZEN IF THE AIRCRAFT IS IN A FREEZING ATMOSPHERE.

****CAUTION****

TO ENSURE THE SAFETY OF PERSONS WHO COME IN CLOSE PROXIMITY TO THE ENGINE, THE PILOT AND MAINTENANCE PERSONNEL ARE RESPONSIBLE TO RECORD AND TAKE RECOMMENDED CORRECTIVE ACTION WHEN OVERTEMPERATURE OCCURS.

NORMAL STARTING

Normal engine starts are almost automatic, allowing the pilot to monitor the engine gages to assure the start is proceeding normally. Several items should be observed during the start, as follows:

It is recommended that residual TOT be no more than 150º C when the condition lever is advanced for start. If high, residual TOT can be reduced by motoring the engine with the starter. If the TOT cannot be reduced to 150º C, motor the engine until TOT is stabilized before advancing the condition lever. Closely monitor TOT during the start.

NORMAL STARTING (Cont.)

During a start, the condition lever must never be advanced out of the FUEL OFF/FEATHER position until after the starter and ignition exciter have been energized and the desired cranking speed has been attained. To do so might result in an explosive or an over temperature start.

An engine fire (with resultant flame emanating from the tailpipe) can occur during start if the combustion chamber becomes overloaded with fuel before ignition takes place. To extinguish the fire, continue to motor the engine using the starter, with the condition lever fully closed and the main fuel valve OFF.

Monitor oil pressure during start. Damage to rotor bearings can result if a positive indication of oil pressure is not obtained by the time idle speed has been reached.

The start is complete when a stabilized N1 speed of 60 to 63% is reached. Completion of the start normally takes 15 to 45 seconds after moving the condition lever to the full forward position. A positive indication of oil pressure must be obtained by this point in the start. If it is not, shut down the engine and check to be sure that oil is available at the power and accessory gearbox inlet. Monitor the measured gas temperature; do not exceed the limits. Propeller unfeathering will automatically occur during the engine start cycle.

****CAUTION****

IF THE PROPELLER IS NOT ROTATING BY 25% N1 SPEED, ABORT THE START. ATTEMPT A SECOND OR THIRD START. IF THE CONDITION STILL EXISTS, REFER TO THE ALLISON OPERATION AND MAINTENANCE MANUAL.

NOTE

IF THE ENGINE HAS BEEN SHUT DOWN FOR MORE THAN 15 MINUTES, STABILIZE AT IDLE SPEED FOR ONE MINUTE BEFORE INCREASING POWER.

NORMAL STARTING (Cont.)

NOTE

IF A FALSE OR STAGNATED START IS EXPERIENCED, SHUT DOWN, THEN REPEAT START PROCEDURE.

IF OVERTEMPERATURE IS EXPERIENCED DURING THE START, PLACE THE CONDITION LEVER TO OFF/FEATHER AND MOTOR THE ENGINE WITHOUT IGNITION FOR 10 SECONDS.

COLD WEATHER STARTING

1. Use appropriate covers on the inlet duct, exhaust stacks, etc. when the aircraft is parked.
2. At temperatures below 40o F (4o C), use JP-4 commercial Jet B fuel if available. As an alternate, use the AVGAS-jet fuel mixture defined in the "Limitations" Section.

NOTE

USE FUEL CONTAINING AN ANTI-ICE ADDITIVE WHENEVER ENGINE OPERATIONS ARE CONDUCTED BELOW 40º F (4º C). SOME FLIGHTS MAY REQUIRE OPERATING THE AIRCRAFT TEMPORARILY IN BOTH LOW AND HIGH AMBIENT TEMPERATURES. TEMPERATURE RESTRICTIONS REFER TO CONTINUOUS OPERATION.

3. If equipment is available and conditions allow, when the aircraft has been cold soaked at temperatures below 40o F (4o C), use an auxiliary power source for faster, more satisfactory starts.

****CAUTION****

DO NOT USE AN OPEN FLAME HEATER TO PREHEAT THE ENGINE OR BATTERY.

4. If the aircraft has been cold soaked at temperatures below 0º F (-18º C) and a battery start must be made, preheat the engine fuel control area and battery if equipment is available and conditions allow.
5. If the aircraft has been cold soaked and a battery start must be made without preheating the battery, remove and store the battery until it is required if conditions allow. Store the battery in an area where it can be maintained or warmed to a temperature above ambient outside conditions or to approximately 70º (21ºC).

COLD WEATHER STARTING (Cont.)

6. If stagnated starts are encountered, refer to the Allison Operation and Maintenance Manual.
7. Variations in jet fuels can affect engine lightoff in cold ambient conditions. The engine may experience a short delay before lightoff after the condition lever is moved to the maximum position. This delay should be less than 3 seconds regardless of the type of fuel used. If the lightoff delay exceeds 3 seconds, return the condition lever to FUEL OFF/FEATHER and continue to motor the engine with the starter for 30 seconds to purge unburned fuel from the engine.

****CAUTION****

POSITIVE OIL PRESSURE MUST BE OBTAINED BY THE TIME IDLE SPEED IS REACHED. IF NOT OBTAINED, SHUT DOWN THE ENGINE AND CHECK TO BE SURE THAT OIL IS AVAILABLE AT THE POWER AND ACCESSORY GEARBOX INLET.

Monitor measured gas temperature. Do not exceed the temperature limits. If overtemperature occurs, move the fuel lever to FUEL OFF and continue to motor the engine without ignition for 10 seconds.

If propeller is not rotating by 25% N1 speed, abort the start. Attempt a second or third start. If the condition still exists, refer to "Troubleshooting" Section of the Allison Operation and Maintenance Manual.

8. In some instances N1 may accelerate slowly through the 25 to 30% speed range on a battery start after an engine has been cold soaked and not preheated. If the start is not completed within the starter engagement time limits, shut down the engine. Before attempting next start, wait for the starter duty cycle limits to pass or for one minute, whichever is longer. This wait will allow residual heat from the previous start attempt to soak back into the engine and battery and improve conditions for the next start attempt.

9. After a cold weather battery start, allow the engine to run at idle speed for two minutes before actuating the generator switch. This will prevent N1 speed run-down resulting from high generator loading.

BEFORE TAKEOFF

No particular warm up procedures are required for the engine. Before the first flight of the day conduct an overspeed governor test. The remainder of the BEFORE TAKEOFF checklist will configure the aircraft preparatory to departure.

TAKEOFF

Takeoffs should always be conducted using maximum takeoff power. This power corresponds to the "top of the yellow" (or redline) torque or TOT, whichever is reached first, and 2030 propeller rpm. Use of this power is limited to 5 minutes.

During takeoff operation, the gas producer governor regulates the fuel flow and the propeller governor regulates the blade angle position. The speed settings of the gas producer governor and the propeller governor are established by the position of the power lever and the condition lever, respectively.

WING FLAP SETTINGS

For normal takeoffs, use of 0-20o flaps is approved. Each notch of flaps will reduce takeoff distances approximately 10% as compared to the next lesser notch.

SHORT FIELD TAKEOFF

Takeoff performance shown in the Basic P210N Pilot's Operating Handbook, repeated in Section V of this Airplane Flight Manual Supplement, can be equaled or exceeded for all ambient conditions except at altitudes above 7000 feet and temperatures above 30º C. In this circumstance, the use of 20º flap will produce equivalent takeoff performance.

CROSSWIND TAKEOFF

No change from the Basic Airplane Flight Manual/Pilot's Operating Handbook.

LANDING GEAR RETRACTION

No change from the Basic Airplane Flight Manual/Pilot's Operating Handbook.

ENROUTE CLIMB

Normal enroute climbs are conducted at a speed which provides a reasonable compromise between climb performance and over the nose visibility. The normal climb power setting (maximum continuous) corresponds to the top of the green torque gage or TOT gage markings (whichever is lower) and 2030 propeller rpm (also top of the green).

If it is necessary to climb rapidly to clear mountains or reach favorable winds or weather at high altitudes more quickly, the best rate of climb airspeed of 100 KIAS should be used with the "top of the green" power settings.

If an obstruction dictates the use of a steep climb angle, climb with flaps retracted, "top of the green" power, at approximately 80 KIAS. This type of climb should only be conducted as needed for short duration.

CRUISE

Normal cruising is accomplished most efficiently at the highest altitude at which the desired cruise horsepower can be obtained. Cruise power settings are limited to maximum continuous power (top of the green torque or TOT, whichever is less, and 2030 propeller rpm), although at lower altitudes this power setting will produce speeds in excess of the limiting airspeed (Vmo) and excess fuel consumption.

NOTE

DURING FLIGHT OPERATION, THE GAS PRODUCER GOVERNOR REGULATES THE FUEL FLOW AND THE PROPELLER GOVERNOR REGULATES THE BLADE ANGLE POSITION. THE SPEED SETTINGS F THE GAS PRODUCER GOVERNOR AND THE PROPELLER GOVERNOR ARE ESTABLISHED BY THE POSITION OF THE POWER LEVER AND CONDITION LEVER, RESPECTIVELY.

1. Condition Lever -- ADJUST to desired Np, between 1624 and 2030 rpm.

****CAUTION****

THE CONDITION LEVER MUST NOT BE MOVED BELOW THE 80% SETTING POSITION IN FLIGHT EXCEPT FOR ENGINE SHUTDOWN (FUEL CUTOFF AND FEATHER). LOWER CONDITION LEVER POSITIONS MAY RESULT IN FUEL SHUTOFF.

CRUISE (Cont.)

2. Power Lever -- SET (to desired power; observe torque and temperature limits).

WARNING

THE POWER LEVER MUST NOT BE MOVED BELOW FLIGHT IDLE POSITION DURING FLIGHT OPERATION. LOWER LEVER POSITIONS MAY RESULT IN PROPELLER OVER-SPEED AND EXCESSIVE DRAG DUE TO LOW BLADE ANGLE OR SELECTION OF REVERSE THRUST, AND MAY SEVERELY DEGRADE AIRCRAFT CONTROLLABILITY.

FUEL MANAGEMENT

The fuel system shall normally be operated with the selector valve in the BOTH ON position. However, in level flight, operation from a single tank is permissible for the purpose of correcting wing heaviness due to any uneven fuel usage from the wing tanks. To prevent any possibility of an unexpected flame out, single tank operation is prohibited when the tank in use reaches ten gallons.

To insure use of all transfer tank fuel, transfer should be initiated, in level flight, when the wing tanks reach 35 gallons. Normally, both transfer pumps are operated together to transfer fuel from the aft tank to both wing tanks evenly. However, a single transfer pump may be used if necessary to remedy uneven fuel transfer or fuel usage from the wing tanks.

Fuel should be managed so that the difference in quantity between the left and right main tanks never exceeds 10 gallons.

STALLS

The stall characteristics are conventional with aural warning provided by a stall warning horn which sounds between 5 and 10 KIAS prior to stall. Altitude loss in a flight idle wings level stall may be as much as 600 feet depending on power application.

Flight idle stall speeds at maximum weight for both forward and aft C.G. are listed in Section V of this Airplane Flight Manual Supplement.

DESCENT

Unlike a piston engine, the turbine engine can be operated at full flight idle without shock cooling concerns. However, when pressurized, a minimum torque value of about 30 psi will be required to maintain full cabin pressure. Increased rates of descent can be achieved by extending the landing gear.

WARNING

THE POWER LEVER MUST NOT BE MOVED BELOW FLIGHT IDLE POSITION DURING FLIGHT OPERATION. LOWER LEVER POSITIONS MAY RESULT IN PROPELLER OVER-SPEED AND EXCESSIVE DRAG DUE TO LOW BLADE ANGLE OR SELECTION OF REVERSE THRUST, AND MAY SEVERELY DEGRADE AIRCRAFT CONTROLLABILITY.

NOTE

AT LOW AIRSPEEDS WITH A FLIGHT IDLE POWER LEVER SETTING, THE PROPELLER BLADE MAY REACH THE FLIGHT LOW PITCH STOP, CAUSING POWER TURBINE SPEED TO DROP BELOW 100%.

BEFORE LANDING

No change from the Basic P210N Pilot's Operating Handbook.

LANDING

****CAUTION****

THE POWER LEVER MUST NOT BE RETARDED BELOW FLIGHT IDLE AT SPEEDS GREATER THAN 80 KIAS DURING GROUND OPERATION.

After the aircraft is on the ground the Power Lever may be retarded below FLIGHT IDLE when ground speed is 80 KIAS or less. Reverse thrust selection is permitted.

LANDING (Cont.)

****CAUTION****

USE OF REVERSE THRUST WITH THE CONDITION LEVER AT LESS THAN 100% POSITION IS PROHIBITED. AT LESS THAN 100% CONDITION LEVER, N1 RPM DECAY, ENGINE OVERTEMPERATURE, AND LOSS OF POWER CAN BE ENCOUNTERED.

NOTE

DURING REVERSE THRUST OPERATION, THE POWER TURBINE GOVERNOR REGULATES THE FUEL FLOW AND THE BETA CONTROL VALVE REGULATES THE PROPELLER BLADE ANGLE. THE BETA CONTROL SETTING IS ESTABLISHED BY THE POSITION OF THE POWER LEVER.

NORMAL LANDING

Normal landing approaches can be made with power on or at flight idle with any flap setting desired. Use of full flaps is normally preferred to minimize touchdown speed, and thereby reduce brake and tire wear. Reverse thrust may be selected after all three wheels are on the ground, if necessary. The power lever should be returned to the ground idle position at approximately 20 KIAS to minimize propeller tip erosion.

SHORT FIELD LANDING

For a short field landing make a power approach with full flaps. Plan the approach so that any obstacle can be crossed in a steady glide at 72 KIAS with the power reduced to Flight Idle. Touchdown should be made on the main wheels first. Immediately after touchdown, lower the nose gear, apply heavy braking, and move the power lever to the Ground Idle position. For maximum braking, raise the flaps. This procedure is applicable to the use of the landing performance charts in Section V of this Supplement. An additional incremental reduction in stopping distance may be obtained by the use of reverse thrust after all three wheels are down and the airspeed is below 80 KIAS.

CROSSWIND LANDING

See Basic P210N Pilot's Operating Handbook.

BALKED LANDING

Generous climb performance is available for a range of airspeeds appropriate for a balked landing go-around with flaps fully extended. The balked landing performance shown in Section V will be achieved with full flaps at airspeed of 66 KIAS. However, it is recommended that in a balked landing go-around climb, the wing flap setting should be reduced to 20o after full power is applied and an airspeed of 80 KIAS is achieved. For balked landings initiated from other than the usual full flap approach, use airspeeds corresponding to the recommended initial takeoff climb speed until immediate obstacles are cleared. After immediate obstacles are cleared, the wing flaps should be retracted.

SHUTDOWN

WARNING

OVERTEMPERATURE STARTS OR AFTERFIRES AFTER SHUTDOWN MAY CAUSE CRACKS IN THE FIRST-STAGE WHEEL RIM. THESE CRACKS CAN EVENTUALLY CAUSE A SECTION OF THE WHEEL TO BREAK OUT AND EXIT THE ENGINE WITH POTENTIALLY DISASTROUS RESULTS.

NOTE

FOR THE ULTIMATE SAFETY OF ALL PERSONNEL WHO COME IN CLOSE PROXIMITY WITH THE ENGINE IN THE FUTURE, IT IS THE RESPONSIBILITY OF THE PILOT AND MAINTENANCE PERSONNEL TO RECORD AND TAKE RECOMMENDED CORRECTIVE ACTION WHEN OVERTEMPERATURE OCCURS.

****CAUTION****

IDLE DWELL TIME PRIOR TO SHUTDOWN IS IMPORTANT TO PREVENT HARMFUL ACCUMULATION OF CARBON IN THE ENGINE, WHICH CAN RESULT IN COMPLETE ENGINE STOPPAGE.

NOTE

IF THE ENGINE HAS BEEN GROUND RUN AT HIGH POWER, MAINTAIN THE ENGINE AT FLIGHT IDLE FOR TWO MINUTES BEFORE SHUTDOWN.

COLD WEATHER OPERATION

WARNING

THIS AIRCRAFT IS NOT APPROVED FOR FLIGHT INTO KNOWN ICING CONDITIONS. FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED.

An inadvertent encounter with these conditions can best be handled using the checklist procedures in Section III. The best procedure is to turn back or change altitude to escape the icing conditions.

NOTE

THE ENGINE ICE PROTECTION SYSTEM MUST BE ACTIVATED WHEN OPERATING ON THE GROUND OR IN FLIGHT IN VISIBLE MOISTURE WITH AN OAT OF 41o F (5o C) AND BELOW OR WHILE OPERATING IN EITHER FALLING OR BLOWING SNOW. THE SYSTEM SHALL NOT BE DEACTIVATED UNTIL THE ABOVE CONDITIONS HAVE BEEN LEFT AND ALL ACCUMULATED AIRFRAME ICE HAS DISSIPATED.

PREFLIGHT INSPECTION

See Basic P210N Pilot's Operating Handbook.

All accumulations of ice, snow, and frost must be removed from the wings, tail, control surfaces and hinges, propeller engine inlet, windshield, fuel cell filler caps and fuel vents. If such accumulations are not removed completely, the airplane shall not be flown. The deposits will not blow off in flight. While an adverse weight factor is clearly involved in the case of heavy deposits, it is less obvious that even slight accumulations will disturb or completely destroy the designed aerodynamic properties of the airfoils.

Also see "Cold Weather Starting" in this Section and Section II for cold weather fuels.

COLD WEATHER STARTING

See "Cold Weather Starting", pages 4-20 to 4-21, this Section.

HOT WEATHER OPERATION

On a hot day, takeoff power will be limited by TOT. There is a lag in the TOT gage; it should be monitored during the takeoff run. Additionally, the oil temperature should be monitored closely. Operation at powers above 40 psi with engine oil temperature between 82º and 107º C is limited to 5 minutes.

It is recommended that when operating at ambient temperatures about 100º F (S.L.) the engine oil temperature be carefully monitored and controlled, if necessary, by opening the cowl flaps. Also, the generator max load must be reduced below 100 amps at altitudes above 15,000 ft.

NOISE CHARACTERISTICS

The takeoff noise level, determined in accordance with FAR Part 36, Appendix G, through Amendment 36-20, is 73.6 db. (AAAI Report 1152, Rev. 1, dated June 1995.)

No determination has been made by the Federal Aviation Administration that the noise level of this airplane is, or should be acceptable or unacceptable, for operation at, into, or out of any airport.

SECTION V

PERFORMANCE

TABLE OF CONTENTS

Description

PERFORMANCE

INTRODUCTION

Performance of the Cessna P210N, equipped with the Allison Engine, Model 250-B17F/2, meets the performance requirements of the Certification Basis established by the Federal Aviation Administration for this alteration.

Performance data changes on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy. The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques.

Changes to the original AFM/POH have been made in the following sections:

- Revised airspeed calibration data is provided (pages 5-2 to 5-4) with engine bleed air "On" or "Off."

- Stall speeds and revised altitude loss during stall recovery (page 5-5) is presented at various bank angles and at both most rearward and most forward centers of gravity at a gross weight of 4000 lbs.

- Takeoff Distance: The takeoff power available from the Allison Turboprop engine in most cases exceeds the power available from the original Cessna P210N Continental turbocharged engine throughout the takeoff range of altitudes and temperatures. Therefore, takeoff performance of the P210N can be equaled (and improved upon) by the T-P210 and the Cessna charts remain applicable. Refer to Takeoff Distance notes (pages 5-6 to 5-8) to cover the rare high altitude, hot day condition where the Allison power is lower.

- Takeoff and Balked Landing Rates of Climb charts (page 5-9) are provided to satisfy FAR 23 requirements for this data for the T-P210.

- Landing Distances (page 5-10) are presented here to provide Conditions of landing.

AIRSPEED CALIBRATION

NORMAL STATIC SOURCE

CONDITIONS:

4000 Pounds
Power required for level flight or maximum power during descent.
Pressurized or unpressurized (openable window open or closed).

FLAPS UP								
KIAS	60	80	100	120	140	160	180	200
KCAS	59	79	99	119	139	158	177	195
FLAPS 10º								
KIAS	60	70	80	90	100	120	140	150
KCAS	63	71	80	90	100	120	140	150
FLAPS 20º								
KIAS	60	70	80	90	100	110	115	
KCAS	64	73	82	92	101	111	116	
FLAPS 30º								
KIAS	50	60	70	80	90	100	110	115
KCAS	57	65	74	83	92	102	111	116

AIRSPEED CALIBRATION

ALTERNATE STATIC SOURCE

PRESSURIZED

FLAPS UP							
NORMAL KIAS	60	80	100	120	140	160	180
ALTERNATE KIAS	63	82	102	125	146	167	189

UNPRESSURIZED WITH WINDOW CLOSED

{Bleed Air On (Pushed In) and Vents Open}

FLAPS UP							
NORMAL KIAS	60	80	100	120	140	160	180
ALTERNATE KIAS	58	77	98	119	140	162	186
FLAPS 10º							
NORMAL KIAS	60	80	100	120	140	150	
ALTERNATE KIAS	61	81	102	123	143	154	
FLAPS 30º							
NORMAL KIAS	50	60	70	80	90	100	110
ALTERNATE KIAS	56	64	74	84	94	105	115

UNPRESSURIZED WITH WINDOW CLOSED

{Bleed Air On or Off/Vents Open or Closed}

FLAPS UP							
NORMAL KIAS	60	80	100	120	120	160	180
ALTERNATE KIAS	59	80	101	123	145	166	190
FLAPS 10º							
NORMAL KIAS	60	80	100	120	140	150	
ALTERNATE KIAS	62	81	103	123	146	156	
FLAPS 30º							
NORMAL KIAS	50	60	70	80	90	100	110
ALTERNATE KIAS	56	65	76	86	97	107	118

FAA APPROVED
DATE: JAN 27, 2011

UNPRESSURIZED WITH WINDOW CLOSED

{Bleed Air Off (Pulled Out) and Vents Closed}

FLAPS UP							
NORMAL KIAS	60	80	100	120	140	160	180
ALTERNATE KIAS	63	83	103	124	145	165	186
FLAPS 10º							
NORMAL KIAS	60	80	100	120	140	150	
ALTERNATE KIAS	65	85	106	127	147	158	
FLAPS 30º							
NORMAL KIAS	50	60	70	80	90	100	110
ALTERNATE KIAS	60	69	79	90	100	110	120

STALL SPEEDS

NOTES:

1. Altitude loss during a stall recovery may be as much as 600 feet from a wings level stall and even greater from a turning stall.
2. KIAS values are approximate.

MOST REARWARD CENTER OF GRAVITY

Conditions: FLT IDLE
Gear Up or Down

Weight Lbs.	Flap Deflection	Angle of Bank							
		0º		30º		45º		60º	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
4000	UP	74	69	80	74	88	82	105	82
	10º	69	65	74	70	82	77	98	92
	20º	63	61	68	66	75	73	89	86
	30º	59	58	63	62	70	69	83	82

MOST FORWARD CENTER OF GRAVITY

Conditions: FLT IDLE
Gear Up or Down

Weight Lbs.	Flap Deflection	Angle of Bank							
		0º		30º		45º		60º	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
4000	UP	76	71	84	76	80	84	107	100
	10º	70	66	75	71	83	78	99	93
	20º	65	63	70	68	77	75	92	89
	30º	61	60	66	64	73	71	86	85

TAKEOFF DISTANCE

MAXIMUM WEIGHT 4000 LBS

SHORT FIELD

CONDITIONS:

Flaps 10º (See Note 4)
2030 RPM, Torque 1185 ft.lb./ 111 psi - Max Temp 1490ºF/810ºC
Paved, Level, Dry Runway - Zero Wind

NOTES:

1. Short field technique as specified in Section IV.
2. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.
4. At altitudes above 7000 feet with ambient temperature above 30ºC, use 20º flaps to achieve these takeoff distances.
5. **WARNING:** Takeoff performance listed is with bleed air off (pulled out). In the event of a stuck bleed air valve, takeoff performance may be affected. Bleed air can account for a reduction in 8-10 horsepower and higher TOT readings. If engine inlet temperature indicator shows higher than normal temperatures, check bleed air valve prior to takeoff.

TAKEOFF SPEED: LIFT OFF 72 KIAS
AT 50 FT. 78 KIAS

	0º C		10º C		20º C		30º C		40º C	
PRESS ALT FT	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST
S.L.	1140	1885	1245	2065	1360	2265	1485	2490	1620	2755
1000	1215	2005	1330	2195	1450	2415	1585	2660	1735	2950
2000	1300	2130	1420	2340	1550	2575	1695	2845	1855	3160
3000	1390	2270	1520	2495	1660	2755	1815	3045	1990	3390
4000	1485	2425	1625	2665	1775	2945	1945	3265	2130	3645
5000	1590	2585	1740	2850	1905	3155	2085	3510	2285	3930
6000	1700	2765	1860	3050	2040	3385	2235	3770	2455	4240
7000	1820	2955	1995	3270	2185	3630	2400	4060	2635	4585
8000	1955	3165	2140	3505	2345	3905	2575	4385	2835	4970

TAKEOFF DISTANCE

MAXIMUM WEIGHT 3700 LBS

SHORT FIELD

CONDITIONS:
Flaps 10º (See Note 4)
2030 RPM, Torque 1185 ft.lb./111 psi - Max Temp 1490ºF/810ºC
Paved, Level, Dry Runway - Zero Wind
NOTES:

1. Short field technique as specified in Section IV.
2. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.
4. At altitudes above 7000 feet with ambient temperature above 30ºC, use 20º flaps to achieve these takeoff distances.
5. **WARNING:** Takeoff performance listed is with bleed air off (pulled out). In the event of a stuck bleed air valve, takeoff performance may be affected. Bleed air can account for a reduction in 8-10 horsepower and higher TOT readings. If engine inlet temperature indicator shows higher than normal temperatures, check bleed air valve prior to takeoff.

TAKEOFF SPEED: LIFT OFF 69 KIAS
AT 50 FT. 75 KIAS

	0º C		10º C		20º C		30º C		40º C	
PRESS ALT FT	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST
S.L.	950	1565	1035	1705	1125	1865	1230	2045	1340	2245
1000	1010	1660	1105	1815	1205	1985	1315	2180	1435	2395
2000	1080	1765	1180	1930	1285	2115	1405	2325	1535	2560
3000	1155	1875	1260	2055	1375	2255	1500	2480	1640	2740
4000	1230	2000	1345	2190	1470	2405	1605	2650	1760	2935
5000	1320	2130	1440	2335	1575	2570	1720	2835	1885	3145
6000	1410	2270	1540	2495	1685	2745	1845	3040	2020	3380
7000	1510	2420	1650	2665	1805	2940	1980	3260	2170	3630
8000	1615	2585	1770	2850	1940	3150	2125	3500	2330	3910

TAKEOFF DISTANCE

MAXIMUM WEIGHT 3400 LBS

SHORT FIELD

CONDITIONS:
Flaps 10º (See Note 4)
2030 RPM, Torque 1185 ft.lb./111 psi - Max Temp 1490ºF/810ºC
Paved, Level, Dry Runway - Zero Wind
NOTES:

1. Short field technique as specified in Section IV.
2. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.
4. At altitudes above 7000 feet with ambient temperature above 30ºC, use 20º flaps to achieve these takeoff distances.
5. **WARNING:** Takeoff performance listed is with bleed air off (pulled out). In the event of a stuck bleed air valve, takeoff performance may be affected. Bleed air can account for a reduction in 8-10 horsepower and higher TOT readings. If engine inlet temperature indicator shows higher than normal temperatures, check bleed air valve prior to takeoff.

TAKEOFF SPEED: LIFT OFF 66 KIAS
AT 50 FT. 72 KIAS

	0º C		10º C		20º C		30º C		40º C	
PRESS ALT FT	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST
S.L.	780	1290	850	1405	925	1530	1010	1670	1100	1830
1000	835	1370	910	1490	990	1625	1080	1780	1175	1950
2000	890	1455	970	1585	1055	1730	1150	1895	1255	2075
3000	950	1545	1035	1685	1130	1840	1230	2015	1345	2215
4000	1015	1640	1105	1790	1205	1960	1315	2150	1440	2365
5000	1085	1745	1185	1910	1290	2090	1410	2295	1540	2530
6000	1160	1860	1265	2035	1380	2230	1510	2450	1650	2705
7000	1240	1980	1355	2170	1480	2380	1620	2625	1770	2900
8000	1325	2110	1450	2315	1585	2545	1735	2810	1900	3110

MAXIMUM RATE OF CLIMB

CONDITIONS:

Maximum Continuous Power	Allison 250-B17F/2
Gear Retracted	2030 RPM
Flaps 0º	90 Inch Prop
Bleed On	Flat Rated at 380 SHP

WEIGHT LBS	PRESSURE ALTITUDE FT	CLIMB SPEED KIAS	RATE OF CLIMB - FPM OUTSIDE AIR TEMPERATURE				
			STANDARD DAY @ SL 15º C				
4000	0	100	1520				
			40º C	**20º C**	**0ºC**	**-20º C**	**-40º C**
4000	0	100	1996	1834	1681	1341	642
	4000	100	1873	1698	1476	894	281
	8000	100	1750	1515	1028	505	
	12000	100	1490	1070	625	139	
	16000	100	1038	662	257		
	20000	100	630	279			
	23000	100	332	21			
3700	0	100	2215	2042	1879	1514	760
	4000	100	2086	1899	1662	1036	375
	8000	100	1958	1707	1183	620	38
	12000	100	1683	1231	753	231	
	16000	100	1200	797	361		
	20000	100	765	389	8		
	23000	100	449	116			
3400	0	100	2467	2282	2107	1711	893
	4000	100	2332	2131	1876	1196	480
	8000	100	21298	1927	1359	749	119
	12000	100	1903	1415	898	332	
	16000	100	1384	948	477		
	20000	100	917	511	83		
	23000	100	578	220			

TAKEOFF RATE OF CLIMB

CONDITIONS:

T.O. POWER	Allison 250-B17F/2
Gear Retracted	2030 RPM
Flaps 20º	90 Inch Prop
Bleed On	Flat Rated at 450 BHP
WEIGHT 4000 LBS.	**CLIMB SPEED 78 KIAS**

		Rate of Climb - FPM				
Press Alt	Temp - Relative to ISA - ºF					
Feet	-60	-40	-20	0	20	40
S.L.	1559	1500	1429	1340	1105	834
2000	1545	1488	1435	1255	1043	802
4000	1505	1455	1365	1165	949	731
6000	1502	1420	1249	1080	876	672
8000	1479	1319	1137	980	796	603

BALKED LANDING RATE OF CLIMB

CONDITIONS:

T.O. POWER	Allison 250-B17F/2
Gear Down	2030 RPM
Flaps 30º	90 Inch Prop
Bleed On	Flat Rated at 450 BHP
WEIGHT 4000 LBS.	**CLIMB SPEED 66 KIAS**

		Rate of Climb - FPM				
Press Alt	Temp - Relative to ISA - ºF					
Feet	-60	-40	-20	0	20	40
S.L.	1452	1382	1342	1240	1023	784
2000	1438	1370	2330	1160	953	739
4000	1425	1360	1260	1080	900	683
6000	1400	1301	1153	998	808	620
8000	1375	1214	1046	900	735	548

LANDING DISTANCE

MAXIMUM WEIGHT 3400 LBS

SHORT FIELD

CONDITIONS:
Flaps 30º Power FLT IDLE; Ground Idle After Touchdown
Heavy Braking Weight 3800 (Maximum Landing Weight)
Speed at 50 Feet - 75 KIAS
Paved, Level, Dry Runway - Zero Wind
NOTES:

1. Short field technique as specified in Section IV.
2. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on a dry, grass runway, increase distances by 40% of the "ground roll" figure.

TAKEOFF SPEED: LIFT OFF 66 KIAS
AT 50 FT. 72 KIAS

	0º C		10º C		20º C		30º C		40º C	
PRESS ALT FT	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST	GRND ROLL FT	TOT TO CLEAR 50 FT OBST
S.L.	725	1440	750	1480	780	1520	805	1560	830	1600
1000	750	1480	780	1520	805	1560	835	1605	860	1645
2000	780	1525	810	1565	835	1605	865	1650	895	1695
3000	810	1563	840	1610	870	1660	900	1705	930	1750
4000	840	1615	870	1660	900	1705	930	1750	965	1800
5000	870	1660	905	1710	935	1755	965	1805	1000	1855
6000	905	1710	940	1765	970	1810	1005	1860	1035	1910
7000	940	1765	975	1815	1010	1870	1045	1920	1075	1970
8000	975	1815	1010	1870	1050	1930	1085	1980	1120	2035

CLEAN CLIMB PERFORMANCE

This Section intentionally left blank.

CRUISE PERFORMANCE

This Section intentionally left blank.

RANGE PERFORMANCE

This Section intentionally left blank.

ENDURANCE PERFORMANCE

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SECTION VI

WEIGHT AND BALANCE/EQUIPMENT LIST

Table of Contents

INTRODUCTION

This Section describes the procedures for establishing the basic empty weight and moment of the airplane. Sample forms are provided for references. Procedures for calculating the weight and moment for various operations are also provided. It should be noted that specific information regarding the weight, arm, moment, and installed equipment list for this airplane can only be found in the appropriate weight and balance records carried in the airplane. It is the responsibility of the pilot to ensure that the airplane is loaded properly.

AIRPLANE WEIGHING PROCEDURES

1. Preparation:
   a) Inflate tires to recommended operating pressures.
   b) Remove the fuel tank sump quick-drain fillings and fuel reservoir quick-drain fittings to drain all fuel.
   c) Remove oil sump drain plug to drain all oil.
   d) Move sliding seats to the most forward position.
   e) Raise flaps to the fully retracted position.
   f) Place all control surfaces in neutral position.

2. Leveling:
   a) Place scales under each wheel (minimum scale capacity, 1OOO pounds).
   b) Deflate the nose tire and/or lower or raise the nose strut to properly center the bubble in the level (see figure 6-1).

3. Weighing:
   With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

4. Measuring:
   a) Obtain measurement A by measuring horizontally (along the airplane center line) from a line stretched between the main wheel centers to a plumb bob dropped from the firewall.
   b) Obtain measurement B by measuring horizontally and parallel to the airplane center line, from center of nose wheel axle, left side, to a plumb bob dropped from the line between the main wheel centers. Repeat on right side and average the measurements.

5. Using the weights from item 3 and measurements from item 4, the airplane weight and C.G. can be determined.

6. Basic Empty Weight may be determined by completing figure 6-1.

Sample Airplane Weighing

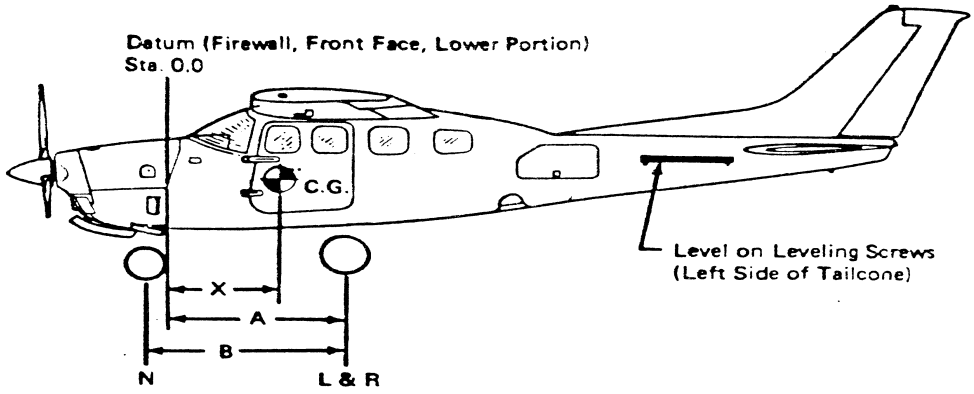


Figure 6-1. Sample Airplane Weighing

Scale Position	Scale Reading	Tare	Symbol	Net Wt
Left Wheel			L	
Right Wheel			R	
Nose Wheel			N	
Sum of Net Weights (As Weighed)			W	

$$X = \text{Arm} = (A) - \frac{(N) \times (B)}{W}$$

C.G. = (X) inches aft of datum

Item	Weight (Lbs)	x	C.G. Arm (In)	Moment/1000 (Lbs. - In.)
Airplane Weight (From Item 5 above)				-0.25
Add Oil (9 qts. @ 7.5 lbs./gal.)	-16.9		-15.0	-0.25
Add Unusable Fuel (1 gal. @ 6.7 lbs./gal.)	6.7		23.0	0.15
Equipment Changes				
Airplane Basic Empty Weight				

Sample Weight and Balance Record

[Continuous History of Changes in Structure or Equipment Affecting Weight and Balance]

AIRPLANE MODEL				SERIAL NUMBER						PAGE #	
Date	Item No.		Description of Article or Modification	WEIGHT CHANGE						Running Basic Empty Weight	
				Added (+)			Removed (-)				
	In	Out		Wt. (lbs)	Arm (in.)	Moment /1000	Wt. (lbs)	Arm (in.)	Moment /1000	Wt (lb.)	Moment /1000

Figure 6-2. Sample Weight & Balance Record

Loading Arrangements

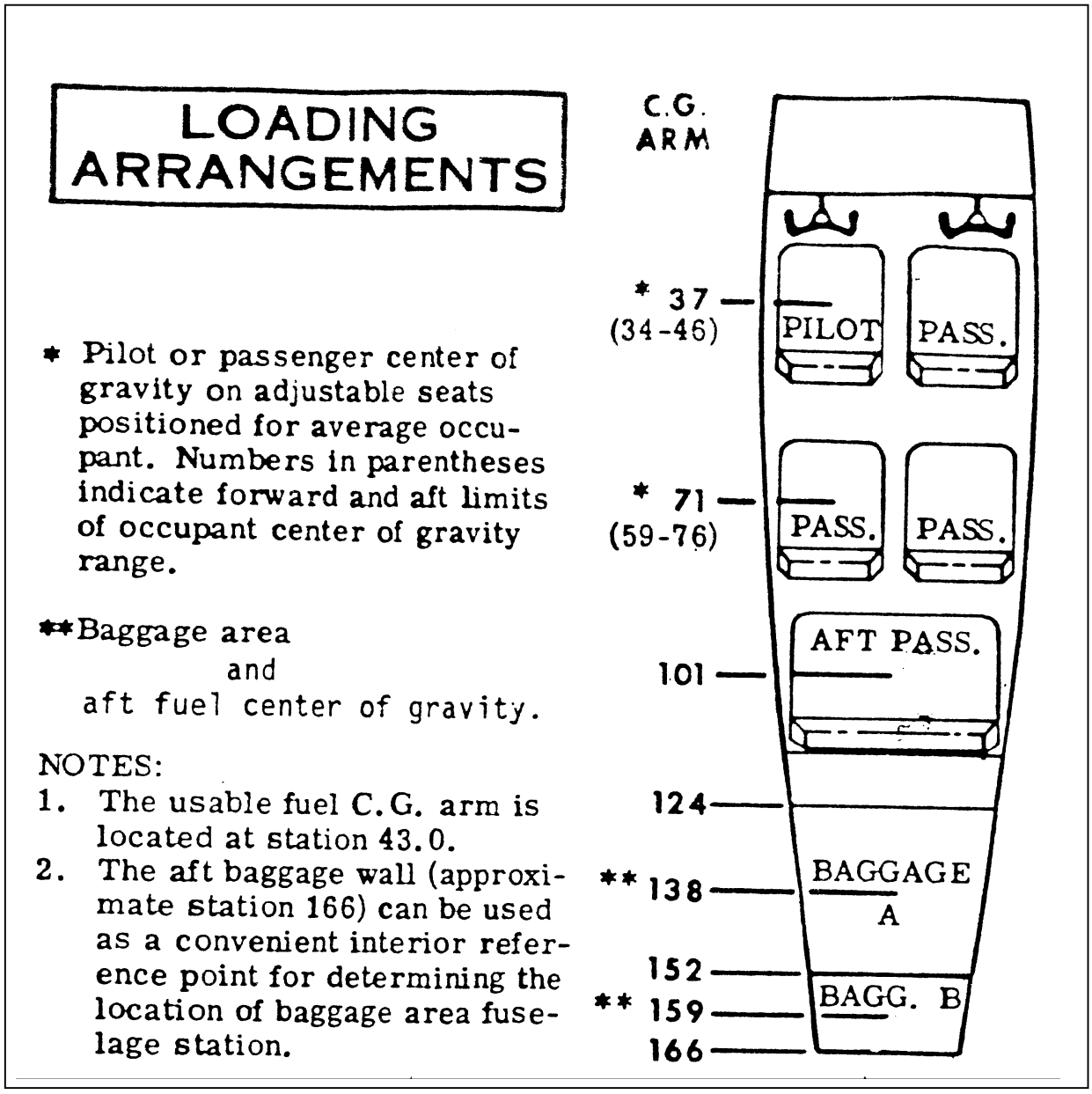
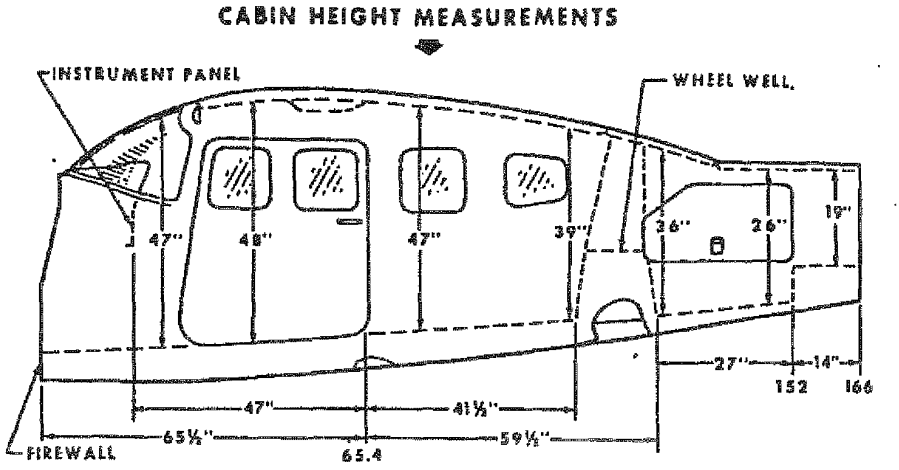


Figure 6-3. Loading Arrangements

Cabin Dimensions



DOOR OPENING DIMENSIONS

	WIDTH (TOP)	WIDTH (BOTTOM)	HEIGHT (FRONT)	HEIGHT (REAR)
CABIN DOOR	31"	36"	40"	38½"
BAGGAGE DOOR	19"	28½"	8½"	14¾"

WIDTH
o LWR WINDOW LINE
* CABIN FLOOR

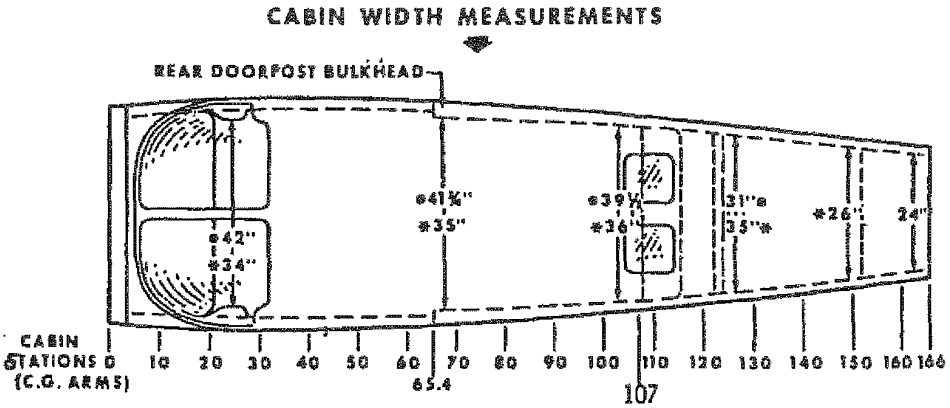
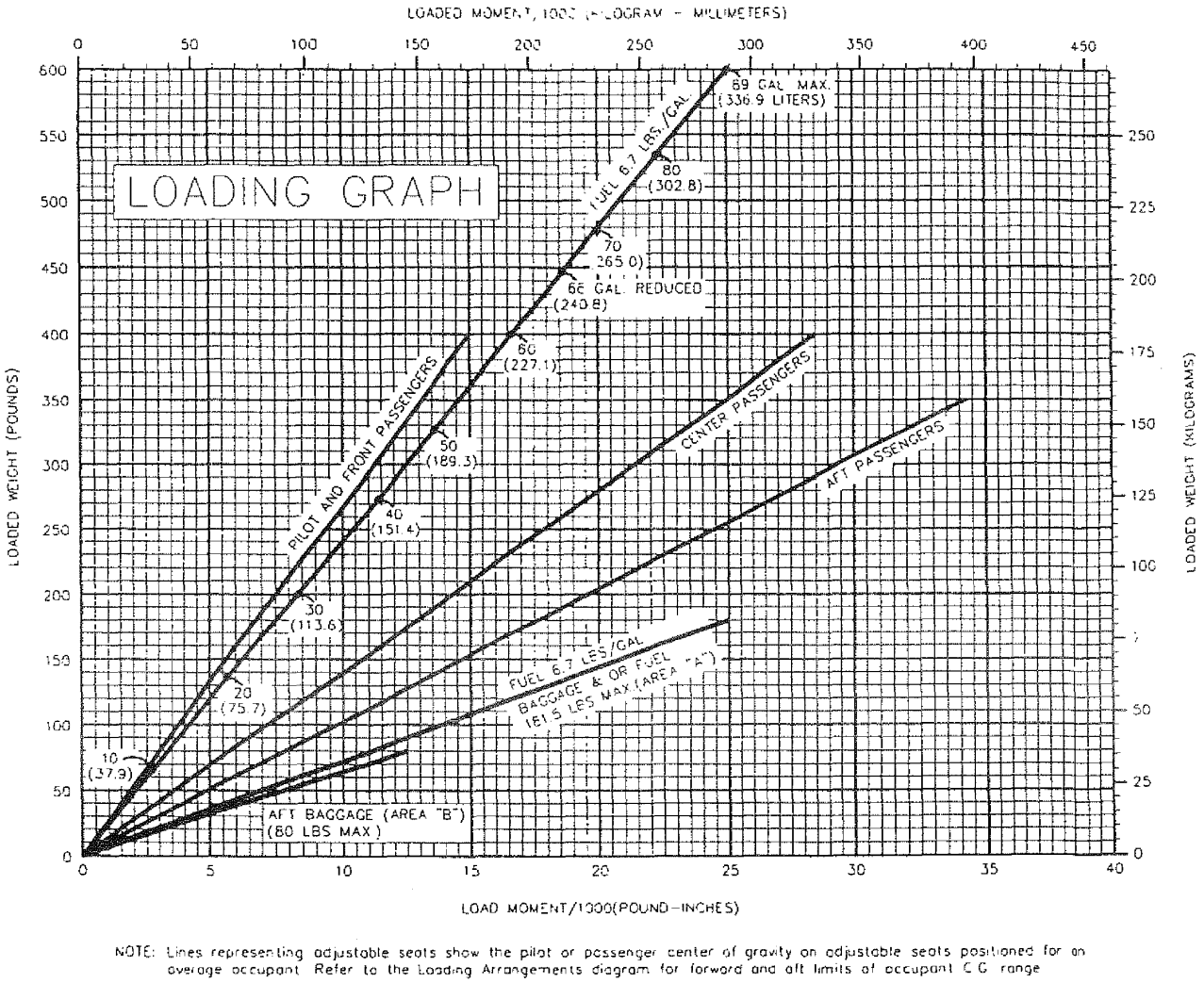


Figure 6-4. Internal Cabin Dimensions

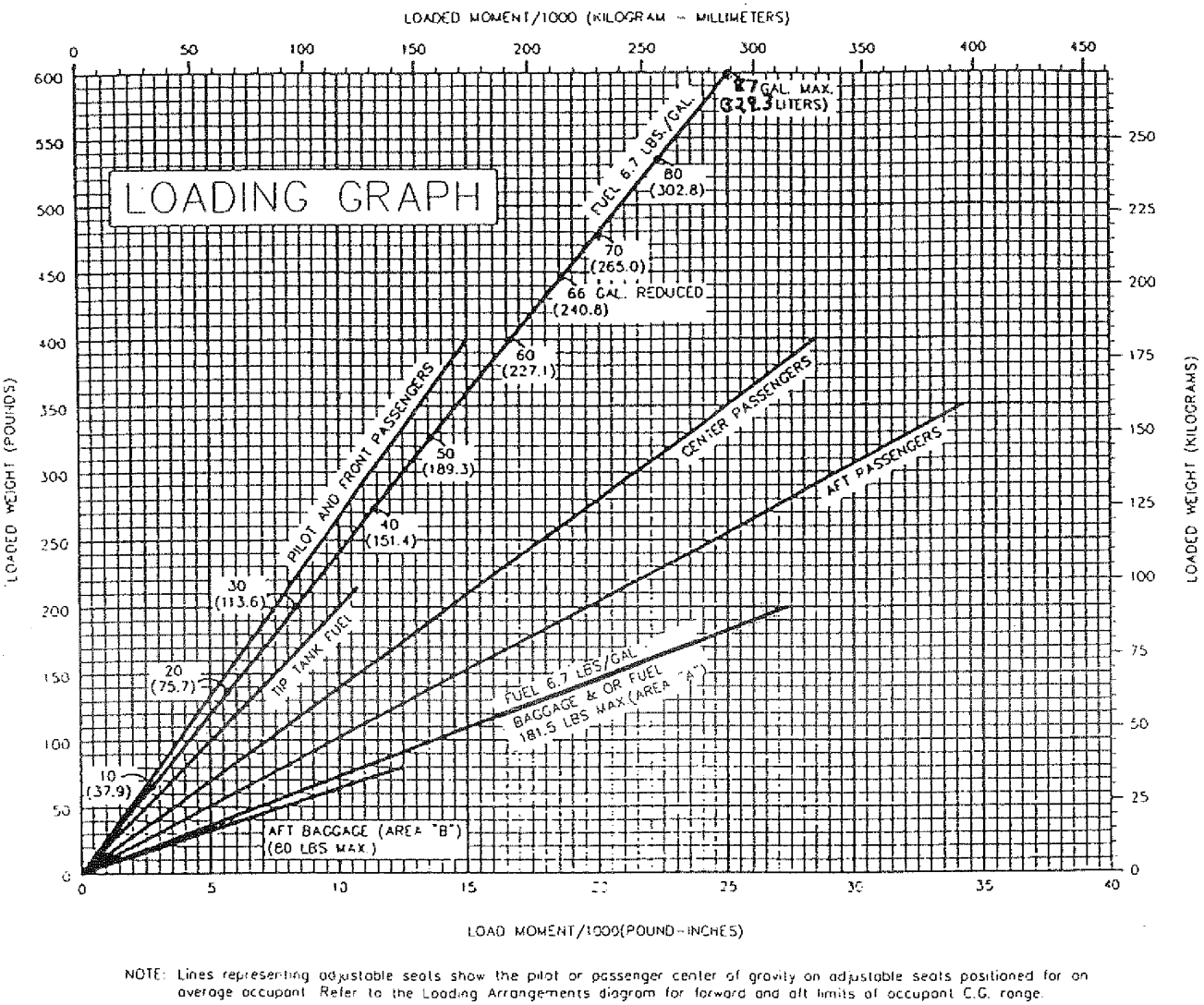
Loading Graph



NOTE: Lines representing adjustable seats show the pilot or passenger center of gravity on adjustable seats positioned for an average occupant. Refer to the Loading Arrangements diagram for forward and aft limits of occupant C.G. range

Figure 6-5. Loading Graph

Loading Graph



NOTE: Lines representing adjustable seats show the pilot or passenger center of gravity on adjustable seats positioned for an average occupant. Refer to the Loading Arrangements diagram for forward and aft limits of occupant C.G. range.

Figure 6-5. Loading Graph

Center of Gravity Moment Envelope

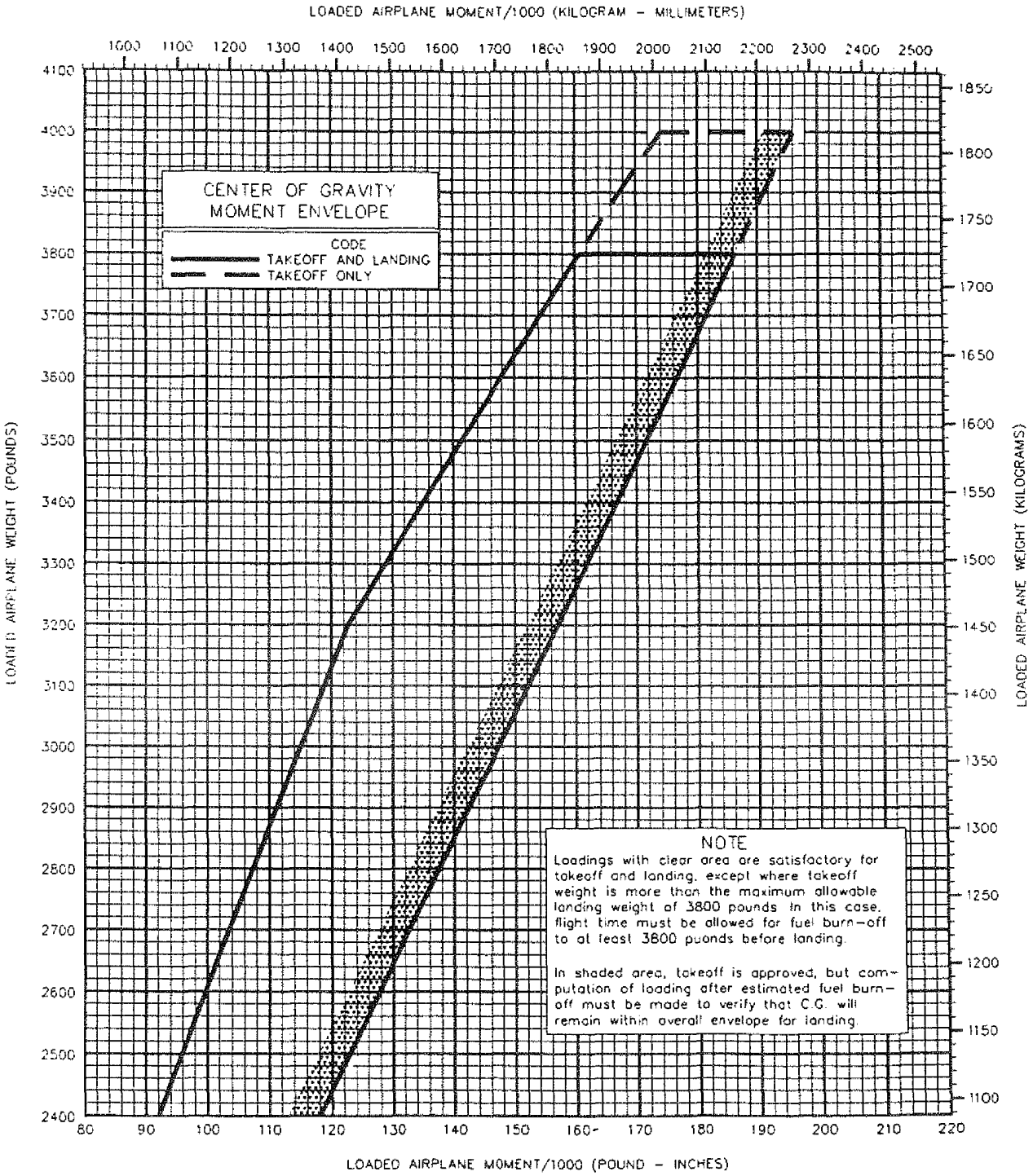


Figure 6-6. Center of Gravity Moment Envelope

Center of Gravity Limits

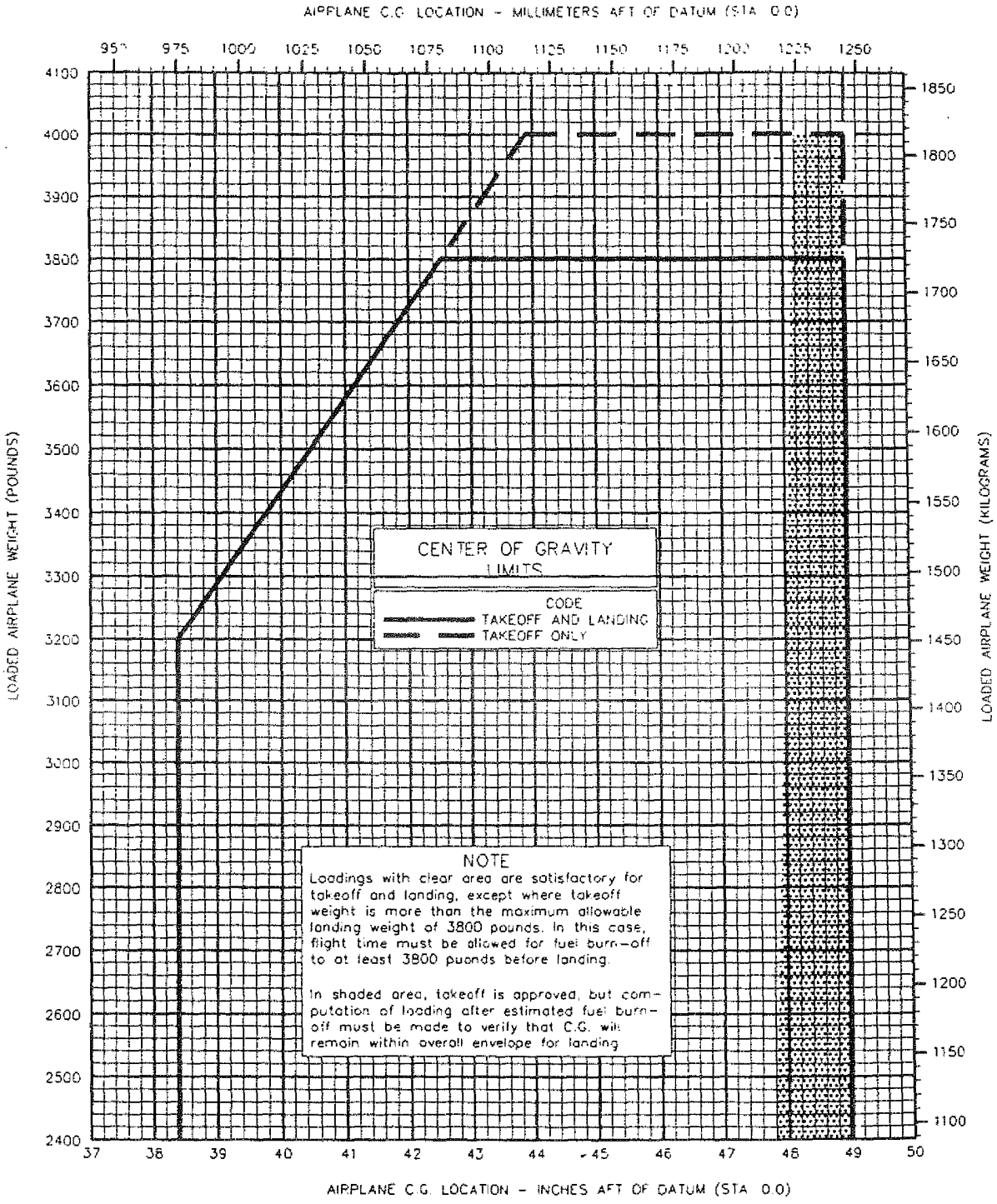


Figure 6-7. Center of Gravity Limits

Sample Loading Problem

	SAMPLE LOADING PROBLEM	SAMPLE AIRPLANE		YOUR AIRPLANE	
		Weight (lbs)	Moment lb-ins/1000	Weight (lbs)	Moment lb-ins/1000
1	Basic Empty Weight (Use the data pertining to your airplane as it is presently equipped. Includes unusable fuel and full oil……..	2464	97.8		
2	Usable fuel (at 6.7 lbs./gal.) Standard Tanks (89 Gal. Maximum)……..	532	23		
	Reduced Fuel (66 Gal.)……..……				
3	Pilot & Front Passenger (Station 34 to 46)……..	340	12.6		
4	Center Passengers (Station 59 to 76) ……..	340	24.1		
5	Aft Passengers……..	340	34.3		
6	***Tip-Tank Fuel** (at 6.7 lbs/gal) 32.5 Gal. Usable (Station 49.5)……..	217.75	10.8		
7	***Baggage (Area "A")** (Station 124 to 152) 200 Lbs. Max……... ***Baggage - Aft (Area "B")** (Station 152 to 166) 80 Lbs. Max……..				
8	RAMP WEIGHT AND MOMENT	4016	191.8		
9	Fuel allowance for engine start, taxi & runup……	-16	-0.7		
10	TAKEOFF WEIGHT AND MOMENT (Subtract Step 9 from Step 8)	4000	191.1		
11	Locate this point (4000 at 191.1) on the Center of Gravity Moment Envelope. Since this loading falls within the shaded area of the moment envelope, proceed with steps 12, 13, and 14. If the computed loading point falls within the clear area of the momen				
12	Estimated Fuel Burn-Off (Climb and Cruise) 65 Gals @ 6.7 Lbs./Gal……	-435	-18.7		
13	Subtract step 12 from step 10 for estimated airplane landing weight……..	3565	172.4		
14	Locate this point (3742 at 193.7) on theCenter of Gravity Moment Envelope. Since this point falls within the overall envelope, the landing may be assumed acceptable for landing.				
*The maximum allowable combined weight capacity for baggage areas A and B is 200 lbs.					

Equipment List

Note:
Installed = X Not Installed = O Required = R Accessory = A

Item		POWER PLANT & ACCESSORIES	Wt. Lbs.	Arm Ins
X	R	Engine – Allison 250-B17F/2	212.0	-31
X	R	Starter/Generator	17.0	-26
X	R	Tach Generators (Gas Gen. & Propeller)	2.4	-37
X	R	Vacuum Pump (Engine Driven)	3.5	-26.5
X	A	Vacuum Pump (Standby Electrical)	6.1	1
X	R	Fuel Filter	2.3	-17
X	R	Oil Filter	3.0	-11.5
X	R	Oil Tank	8.0	-15.5
X	R	Oil Cooler	10.0	-5.5
X	R	Electric Fuel Pumps (2 ea.)	9.0	-2
X	R	Oil and Fuel Hoses	12.0	-21
X	R	Propeller (3 blade Hartzell)	116.3	-55
X	R	Spinner – Propeller	4.5	-58
X	R	Propeller De-Ice Slip Ring/Brush Block		
X	R	Exhaust Pipes (2 ea.)	8.0	-28.25
	R	Engine Inlet & Plumbing – Electric	3.5	-52
	R	Contactor, Inlet Controller, Circuit Breaker	1.75	-.7
	R	Aluminum Inlet & Plumbing	5.5	-52
X	R	Engine Mount (Tubular)	23.6	-18
X	R	Battery	80.0	-2.5
X	R	Pressurization Venturi	3.2	-16
X	R	Pressurization Heat Exchanger	3.0	-36
X	A	Air Conditioner, Pump, Motor & Mount	30.0	-2.25
X	A	Air Conditioner, Evaporator, Fan	10.0	50.0
X	A	Air Conditioner, Condenser & Fan	11.0	-4.0
X	A	Air Conditioner, Ducting	1.25	36.5
X	A	Main and Emergency Door Seals	4.0	54.0
X	A	Aux. Baggage Compartment Fuel Tank	25.5	131.3
	A	Aux. Wing Tip Fuel Tank	39.5	49.5
		ENGINE GAUGES		
X	R	TOT Indicator	1.2	17.5
X	R	Torque Indicator	.6	17.5
X	R	Propeller Indicator	1.3	17.0
X	R	Gas Gen. RPM	1.3	17.0
X	R	Fuel Pressure Indicator	.6	17.5
X	R	Volt/Amp Indicator	.8	17.5
X	R	Oil Pressure/Oil Temp Indicator	1.0	17.5
X	R	Fuel Flow/Totalizer Indicator	1.3	16.7
X	R	Annunciator Lights (10)	1.1	17.5
X	R	Overspeed Warning (Airspeed)	1.3	15.0

SECTION VII

AIRPLANE & SYSTEMS DESCRIPTIONS

Description Page

Description Page

SECTION VII

AIRPLANE & SYSTEMS DESCRIPTIONS

INTRODUCTION

This section provides descriptive and operational information concerning the airplane and its systems. It contains information that applies only to the turbine-powered airplane. The general arrangement of the material of this section is unchanged from Section 7 of the original AFM/POH; if a passage in Section 7 of the original AFM/POH still applies, it will be marked "No Change". However, there will be material added and minor changes in format due to the installation of the turbine engine, the baggage compartment mounted fuel transfer tank system and the dual elevator trim tab system.

AIRFRAME

The basic airframe of the Cessna P210N has been altered as follows:

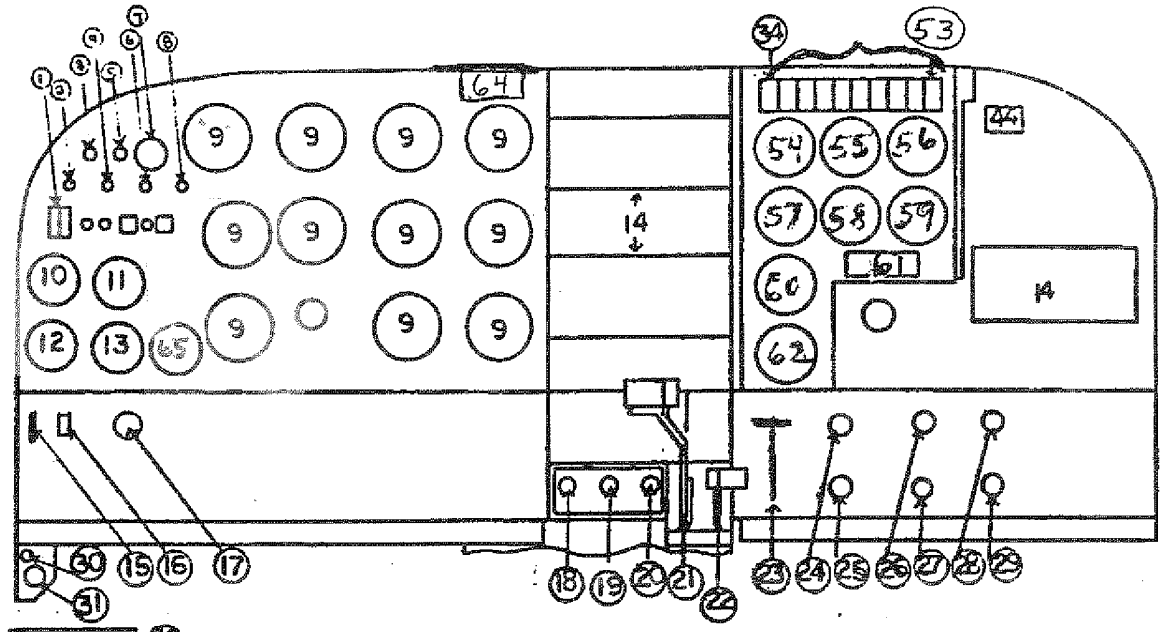
The elevator trim tab system has been altered by adding Dual actuation.
Trim bungee spring increase.
Stall strips have been added.

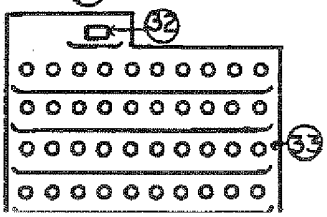
FLIGHT CONTROLS

TRIM TABS

The trim systems remain unchanged except for the addition of dual actuation for the elevator trim. A second trim actuator is added beside the original one. It is driven by the original actuator through a chain and sprocket arrangement.

INSTRUMENT PANEL





1) Emergency Vacuum Pump
2) Annunciator Test
3) Cabin Altitude
4) Overspeed Governor Test
5) Door Seal
6) Engine Inlet Heat
7) Prop De-Ice Amp Meter
8) Continuous Ignition
9) Flight Instruments
10) Clock
11) Intercom
12) Cabin Altitude
13) Cabin Rate of Climb
14) Radio Stack
15) Emergency Cabin Dump
16) Master Switch
17) Bleed Air On/Off Switch
18) Starter/Motor Switch
19) Generator/Reset Switch
20) Fuel Pumps #1 & #2
21) Power Lever
22) Condition Lever
23) Flap Switch
24) Defrost
25) Cabin Heat
26) Cabin Heat
27) Overhead Vent Fan
28) Lighter
29) Air Distribution
30) Gen Control Breaker
31) Generator Main Breaker
32) Radio Master
33) Circuit Breakers
34) Fuel Selector
35) Starter
36) Ignition
37) Inlet Heat
38) Fuel Bypass
39) Beta
40) Gen Out
41) Oil Chip #1
42) Oil Chip #2
43) Oil Chip #3
44) Fuel Pressure
45) Oil Pressure
46) Cabin Pressure
47) L/H Low Fuel Qty.
48) R/H Low Fuel Qty
49) Landing Gear Pump
50) Door Seal Pump
51) Baggage Door
52) Torque Pressure
53) Vacuum Pressure
54) TOT (Turbine Outlet Temp)
55) N1 Gas Gen RPM
56) Fuel Pressure Gage
57) Torque Pressure
58) Propeller Tach
59) Vacuum Suction Gage
60) Oil Press/Oil Temp
61) Fuel Flow/Totalizer
62) Voltmeter/Ammeter
63) Hour Meter
64) Master Caution
65) Inlet Temperature Gauge

ENGINE INSTRUMENTS

The engine instruments, located on the right panel, include a propeller tachometer, N1 tachometer, a turbine outlet temperature indicator, torque pressure gage, fuel pressure gage, oil pressure/oil temperature indicator, a fuel flow/fuel totalizer indicator, and a voltmeter/ ammeter.

PROPELLER TACHOMETER

This instrument indicates propeller RPM and receives its signal from a tachometer generator mounted on the engine power and accessories gearbox. The generator is driven by the N2 (power section) gear train.

TURBINE OUTLET TEMPERATURE

Four chromel-alumel single junction thermocouples and their associated harness are located in the turbine section of the engine. The voltages of the four thermocouples are electrically averaged in the assembly and delivered by the assembly lead for connection to the TOT indicator, indicating temperatures in degrees C at the turbine outlet.

N1 TACHOMETER

This unit indicates N1 (gas producer section) RPM in percent, where 100% equals 50,970 RPM.

FUEL PRESSURE GAGE

This unit indicates fuel pressure at the engine pump inlet.

TORQUE PRESSURE

The power train portion of the engine gearbox consists of two stages of helical gearing. These gears are such that a forward axial thrust is produced on the torque meter shaft during normal operation. This axial thrust is transmitted to the sliding cylinder counterbalanced by oil from the lubrication system. The cylinder oil pressure is quoted to an external connection for use with a torque indicator that is calibrated in PSI of torque. The torque indicator displays the engine power output in the form of engine oil pressure, modulated in the internal engine torque meter.

OIL PRESSURE/OIL TEMPERATURE

Engine oil pressure is directly measured and displayed in pounds per square inch. Oil temperature is measured at the engine oil inlet and is electrically transmitted and displayed by the indicator in degrees C. This is a combination gage.

FUEL FLOW/TOTALIZER

This instrument displays the fuel flow rate used by the engine. It also displays fuel used and fuel remaining.

VOLTMETER/AMMETER

This dual indicating gage shows bus voltage at all times the master switch is turned on. The ammeter portion shows current draw of the electrical system, including battery-charging current.

ANNUNCIATOR PANEL

An annunciator panel is located high in the right hand instrument panel and provides visual condition indications for the following:

Fuel Selector (Amber)

The fuel selector light will be illuminated when fuel selector is in LEFT or RIGHT position; light will be off when fuel selector is in BOTH position.

Start (Amber)

This light provides indication that the starter is engaged.

IGN (Green)

The ignition light will be illuminated when the igniter system is activated by either the switch, the de-ice switch, or the starter.

Inlet Heat (Green)

The inlet heat light will illuminate when the de-ice switch provides power to the heated inlet contactor. For confirmation of proper function, monitoring of the ammeter will show a 50 Amp increase in load.

Fuel Bypass (Red)

The fuel bypass warning light provides warning when the fuel filter has become clogged or contaminated to the point that the fuel filter is being by-passed. This provides warning that the fuel screen is blocked.

Torque (Amber)

The torque light comes on when torque pressure reaches 105 psi.

Vacuum Pressure (Amber)

The vacuum light comes on when vacuum falls below 3.5 inches of mercury.

Beta (Amber)

The Beta light is illuminated when the propeller is in the range approaching reverse pitch (before the blade moves more than 8^{o} below the flight low pitch stop).

Gen Out (Red)

The generator warning light will illuminate any time the generator is off the line.

Oil Chip Lights (3) (Red)

Three magnetic chip plugs are located in the engine. A magnetic particle attaching to any plug will cause one of the oil chip warning lights to illuminate.

Fuel Press (Red)

This warning light illuminates whenever fuel pressure drops below 5 psi.

Oil Press (Red)

The oil pressure warning light will illuminate at engine oil pressure below 35 psi.

Cabin Pressurization (Red)

When cabin altitude reaches 12,000 feet, light illuminates

Gear Pump (Amber)

Light illuminates when pump is running

Door Seal (Amber)

Light illuminates when door seal motor is running.

Baggage Door (Amber)

Light illuminates when door is ajar.

Low Fuel Quantity Lights (2) (Red)

Light illuminates when either tank reaches 7 gallons or less. These lights do not illuminate the Master Caution Light.

MASTER CAUTION LIGHT

Located above the flight instruments, the Master Caution Light illuminates to alert the pilot to conditions requiring immediate attention.

GROUND CONTROL

No change.

WING FLAP SYSTEM

No change.

LANDING GEAR SYSTEM

No change, except for installation of landing gear warning system.

BAGGAGE COMPARTMENT

No change except for weight limits (See Section II, p. 2-8.)

SEATS

No change.

SEAT BELTS AND SHOULDER HARNESSES

No change.

ENTRY DOOR

Inflatable seal added.

EMERGENCY EXIT DOOR

Inflatable seal added.

CABIN WINDOWS

No change.

CONTROL LOCKS

No change.

ENGINE

The engine is an Allison 250-B17F/2 powerplant rated at 450 SHP for takeoff, and 380 SHP max. continuous.

ENGINE CONTROLS

A control coordinator is used to provide automatic sequencing of the multiple powerplant controls in response to input from the pilot operated power and condition levers.

POWER LEVER

The coordinator input power control allows thrust modulation from takeoff to maximum reverse.

CONDITION LEVER

The condition lever allows engine starting and shutdown, propeller feathering and fuel shutoff and the capability to vary the propeller governor setting between 80% and 100% of propeller speed. A gate in the control prevents accidental fuel shutoff while reducing propeller RPM.

NOTE

THE PROPELLER CANNOT BE FEATHERED WITH THE ENGINE RUNNING.

ENGINE ICE PROTECTION SYSTEM

The Allison 250-B17F/2 engine, as installed on the Cessna P210N is equipped with the following ice protection provisions:

1. The compressor inlet guide vanes and front bearing support hub are engine components with anti-icing provisions. Anti-icing is provided by using compressor discharge air, which is taken through a valve at the 3 o'clock position on the compressor scroll. The air shutoff valve is electrically controlled.

2. Continuous engine ignition. The electrically heated inlet lip is a fiberglass part, molded to fair into the upper and lower cowlings. The electrical elements are applied by a wire mesh and porcelain type spray matte finish. No painting of this inlet lip is allowed.

3. The aluminum inlet is heated using bleed air ducted from the engine. A gauge is used to display the inlet temperature based on a probe located in the bleed air exit from the inlet. No painting of this inlet lip is allowed.

4. There are two (2) switches to control the engine ice protection system in this installation. A single switch controls the inlet guide vane ice protection system as well as the heated inlet lip. The continuous engine ignition is controlled by an individual switch.

ENGINE ICE PROTECTION SYSTEM (Cont.)

NOTE

THE EFFECT OF OPERATING WITH THE ANTI-ICING SYSTEM IN OPERATION WILL VARY WITH CHANGES IN AMBIENT TEMPERATURE, ALTITUDE, LIQUID WATER CONTENT OF AIR INGESTED AND WATER DROPLET SIZE. THE EFFECT AT LOWER POWERS AND SPEEDS ARE MINIMAL. HOWEVER, POWER LOSSES AND TOT INCREASES IN EXCESS OF 40 HP AND 60^{o} C, RESPECTIVELY, CAN BE EXPECTED AT HIGH ALTITUDES WITH MAXIMUM POWER. FUEL FLOW WILL INCREASE BY 5% WHEN THE POWER LEVER IS ADJUSTED TO MAINTAIN THE PREVIOUS POWER SETTING.

POWER CHANGES WILL BE IMMEDIATE AND EVIDENT WITH THE APPLICATION OF THE ANTI-ICING SYSTEM.

LUBRICATION SYSTEM

The lubrication system is a dry sump-type. The system consists of an external reservoir, a heat exchanger, a gear-type pressure and scavenge pump assembly mounted within the power and accessory gearbox. An assembly containing an oil filter element and a filter bypass valve is located in the lower right hand side of the engine compartment and is accessible by removing the right upper cowl assembly. The oil filter bypass indicator can be seen through the gap between the exhaust pipe and the cowling on the right side of the aircraft.

A filter that has activated the by-pass mode shows a red button protruding from the bottom center. The filter assembly should be inspected before each flight. Three indicating magnetic chip detector plugs are installed in the engine and the chip detectors are annunciated on the instrument panel. Oil temperatures are controlled by an automatic thermostat bypass control in the cooler. The bypass control will limit oil flow through the oil cooler when operating temperatures are below normal, and will permit the oil to bypass the cooler if it should become blocked.

STARTER/GENERATOR

The DC starter/generator is a self-excited unit. The unit incorporates an integral fan, which provides cooling at all rated operations. As an engine starter, the unit can be energized either by the battery or by ground power unit. As a generator, the unit provides rated DC output when driven at speeds within the rated speed range.

NOTE

MAINTAIN A MINIMUM OF 64+2% N1 WHEN ACTIVATING THE GENERATOR.

PROPELLER

The Hartzell propeller (Model HCB3TF7A/T9212K-2) has three aluminum alloy blades, is constant speed, is reversible and feathering. The diameter of the propeller is 90 inches.

Propeller RPM is controlled by a governor which regulates hydraulic engine oil pressure to the hub. The condition lever on the control console allows the pilot to select the governor RPM range.

A propeller overspeed governor is also provided on the engine. In the event of a propeller governor failure the overspeed governor limits the RPM to 2030.

If oil pressure is lost, the propeller will go to the low RPM (high pitch) position. This is because the propeller high RPM (low pitch) is obtained by governor boosted engine oil pressure working against the centrifugal twisting moment of the blade counterweights and piston spring pressure.

ENGINE BREAK-IN INFORMATION

There are no specific break-in procedures required for the Allison 250-B17F engine. The engine may be safely operated within all normal operating ranges authorized by the engine manufacturer at the time of delivery of the airplane.

COOLING SYSTEM

Ram air for engine compartment cooling enters through two small flush scoops located in the two upper cowls. This cooling air circulates through the compartment and exits through the cowl flaps. The cowl flaps are operated mechanically from the cabin by means of the cowl flap lever on the right side of the control pedestal.

FUEL SYSTEM

The standard Cessna P210N fuel system has remained virtually unchanged except for the vapor return line, which is not required for this installation. The fuel selector valve has been modified to allow BOTH, LEFT, and RIGHT operation. A separate fuel shutoff valve has been added. A fuel transfer tank with left and right transfer pumps has been added. The transfer tank is located on the floor in the baggage compartment area with fueling provisions on the right side of the fuselage.

A large fuel filter is installed in the engine compartment and is equipped with a fuel filter by-pass warning indicator. The fuel filter should be cleaned during regular maintenance.
However, if the filter should become blocked to a point where fuel flow is restricted, the by-pass will open and a warning light will illuminate.

Fuel Quantity Indication System

The standard fuel quantity gages remain in the same location. They have been re-marked to reflect the calibration (in gallons). A fuel gage has been added with the transfer tank.

Fuel Boost Pumps

The turbine engine requires (in addition to the engine driven pump), a continuous duty electric boost pump. A second electric boost pump is installed as a back up.

Only one fuel boost pump can be turned on at a time. One boost pump must be ON for all engine operations. Fuel boost pump operating time should be shared between pumps. Run No. 1 pump on one flight and No. 2 pump on the following flight.

Fuel Transfer Pumps

There are two transfer pumps (left and right). The left pump transfers fuel from the transfer tank to the left main tank, and the right pump transfers fuel from the transfer tank to the right main tank. The pumps may be run simultaneously to transfer equal amounts of fuel to the left and right main fuel tanks or they may be operated individually in order to balance the fuel load as desired. Fuel load may be balanced by using the appropriate transfer pump.

FUEL SYSTEM (Cont.)

Should the right wing become heavy due to an imbalance of fuel, the left transfer pump may be activated which will transfer fuel from the transfer tank to the left wing tank. Fuel may not be transferred if the fuel level in the selected tank is more than 30 gallons.

Monitor lights are located adjacent to the transfer pump selector switches to indicate when the transfer pump(s) are in operation.

A pressure sensor in the transfer system will automatically shut down the transfer pump(s) when the fuel supply in the transfer tank has been depleted.

NOTE

FUEL TRANSFER SHOULD BE ACCOMPLISHED IN LEVEL FLIGHT ONLY.

NOTE

TRANSFER TANK FUEL IS NOT AVAILABLE DIRECTLY FROM THE TRANSFER TANK TO THE ENGINE.

NOTE

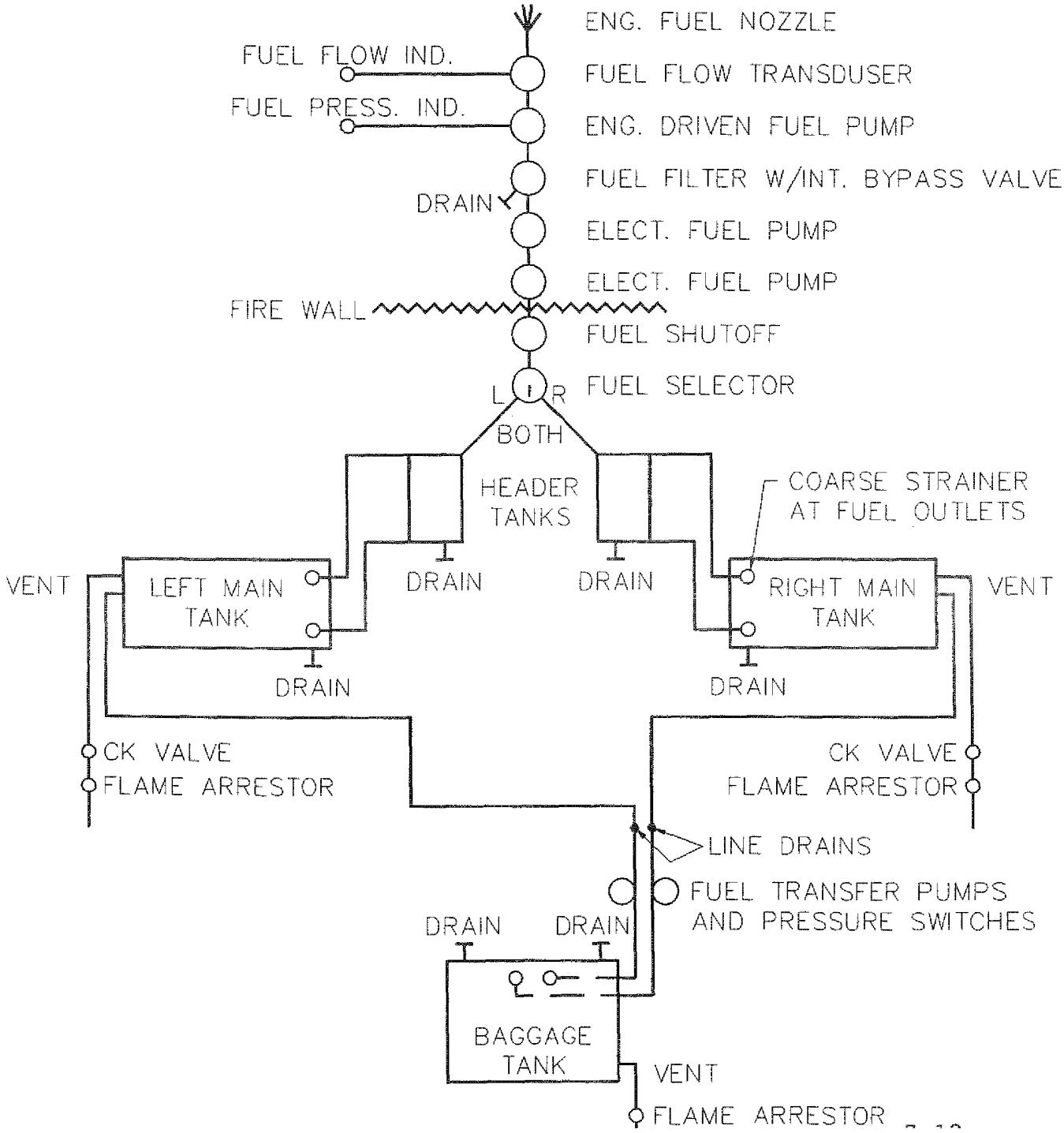
MAXIMUM ALLOWABLE FUEL TANK ASYMMETRY IS **TEN** GALLONS BETWEEN LEFT AND RIGHT MAIN TANKS.

Main Tank Selection

The fuel selector location is unchanged (Left, Right and Both) with the exception of the addition of amber colored annunciator light. However, Left, Right or Both selections are identified with continuously variable valve positions usable from full left to full right. In addition to the visual position of the fuel selector, an amber annunciator light is provided to indicate when the selector is in any position other than "Both".

The "Both" position must be used for all normal operations. The left or right position may be used for the purpose of balancing the fuel load in level flight only. Operation from a single tank should not be conducted with less than 10 gallons of fuel in that tank.

Figure 7-2. Fuel System



HYDRAULIC SYSTEM

No change.

BRAKE SYSTEM

No change.

ELECTRICAL SYSTEM

There are no significant changes to the electrical system. Certain switches, circuit breakers etc. peculiar to the turbine engine installation and its related systems have been added.

MASTER SWITCH

A single battery Master Switch replaces the split battery/alternator master of the P210N.

AVIONICS POWER SWITCH

No change.

VOLT/AMMETER

See page 7-4 of this Section.

CIRCUIT BREAKERS AND FUSES

Circuit Breakers and fuses have been added for items of equipment associated with the turbine engine installation, such as fuel boost pumps and transfer pumps.

GROUND SERVICE PLUG RECEPTACLE

No change, except see placard limits on GPU output.

BATTERY

A 24 Volt, 43 Ampere-hour, Gill Model G-6381E, Lead-Acid battery is located approximately on center-line on the forward side of the engine firewall.

LIGHTING SYSTEMS

Exterior Lighting

Landing lights in nose (new cowl) under Plexiglas streamliner.

Interior Lighting

No changes except those appropriate to the installation of instruments and new instrument panel, and peculiar to the turbine engine and fuel transfer tank.

PRESSURIZATION SYSTEM

No change except for the source of pressurized air, and the addition of a bleed air control. See Figure 7-3.

CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM

No change except for the source.

OXYGEN SYSTEM

No change.

PITOT-STATIC SYSTEM AND INSTRUMENTS

The Pitot-Static system has not changed. The airspeed indicator has been re-marked to reflect Vmo and an Airspeed Overspeed Warning Device has been added.

AIRSPEED INDICATOR

The airspeed indicator has been re-marked by removing the original Vne red line and yellow arc, repositioning the red line to Vmo (167 Kt).

AIRSPEED WARNING SYSTEM

The overspeed warning device is an aural warning. The sound from the aural warning device is separate and distinct from any other aural warning in the aircraft. The device is activated by a pressure switch in the pitot and static lines and is adjusted to sound at a speed of Vmo+6 Kt.

ALTIMETER

No change.

VACUUM SYSTEM AND INSTRUMENTS

No change, except location of suction gage. (See back-up vacuum pump.)

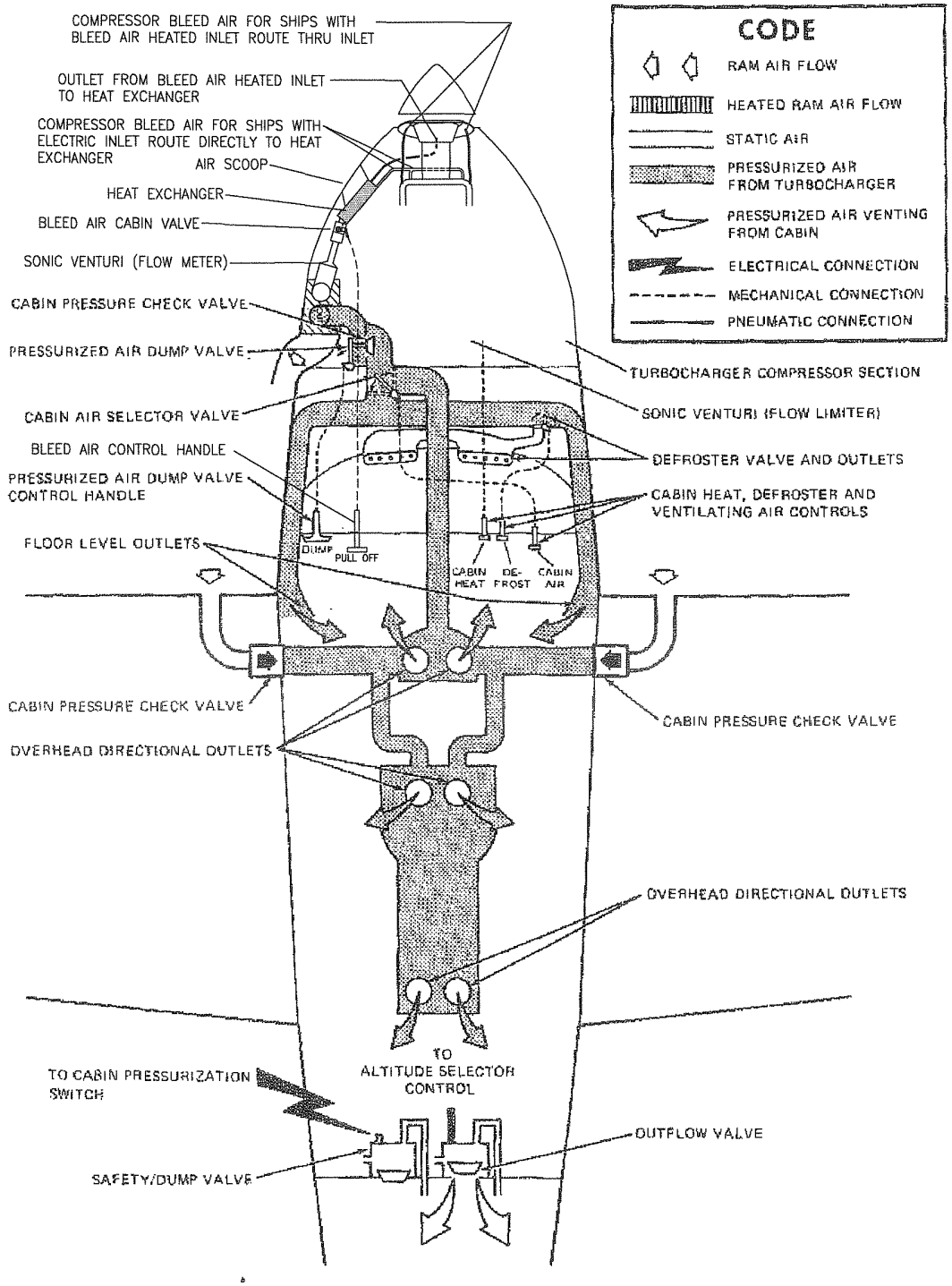


Figure 7-3. Pressurization System

BACK-UP VACUUM PUMP

A back-up electric motor driven vacuum pump has been added and is activated by a switch/annunciator on the instrument panel.

STALL WARNING SYSTEM

No change.

OUTSIDE AIR TEMPERATURE GAGE

An outside temperature gage is required, and installed, on this aircraft.

CABIN FEATURES

No change.

Section VIII

HANDLING, SERVICE & MAINTENANCE

TABLE OF CONTENTS

SECTION VIII

HANDLING, SERVICE & MAINTENANCE

INTRODUCTION

The purpose of this section is to outline the maintenance requirements for the turbine powered P-210N that differ from those for the piston powered aircraft.

It contains information that applies only to the turbine powered aircraft. If a passage in the basic POH still applies, it will be listed as "No Change."

Federal Aviation Regulations place the responsibility for the maintenance of this airplane on the owner and operator, who must ensure that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this supplement are considered mandatory.

If a question should arise concerning the care of the turbine powerplant in your P210N, please contact O & N Aircraft Modifications, Inc.

IDENTIFICATION PLATE

No Change.

OWNER FOLLOW-UP SYSTEM

No Change.

PUBLICATIONS

No Change.

ADDITIONAL PUBLICATIONS

The following publications are provided with each turbine powered P210N when delivered immediately after conversion:

1. Flight Manual Supplement.
2. Maintenance/Shop Manual Supplement.
3. Service Instructions.
4. Wiring Diagram Supplement.
5. Allison 250-B17F Series Overhaul and Maintenance Manual.
6. Allison VHS Videotape - "250-B17 Coordinator [Engine] Rigging."
7. Allison VHS Videotape - "250-B17 Series Turboprop Rigging."
8. Allison 250-B17F Series Parts Manual.

Revisions to these publications will be provided for twelve months after delivery to the registered owner free of charge. Upon expiration of the free service, O & N Aircraft Modifications, Inc. will provide manual holders with detailed information on how to obtain continuing revision service.

AIRPLANE FILE

No Change.

AIRPLANE INSPECTION PERIODS

FAA REQUIRED INSPECTIONS

As required by Federal Aviation Regulations, all civil aircraft of U.S. registry must undergo a complete inspection (annual) each twelve calendar months. In addition to the required Annual inspection, aircraft operated commercially (for hire) must have a complete inspection every 100 hours of operation.

The FAA may require other inspections by the issuance of airworthiness directives applicable to the airplane, engine, propeller, and components. It is the responsibility of the owner/operator to ensure compliance with all applicable airworthiness directives and, when the inspections are repetitive, to take appropriate steps to prevent inadvertent noncompliance.

FAA REQUIRED INSPECTIONS (Cont.)

In lieu of the 100-Hour and Annual inspection requirements, an airplane may be inspected in accordance with a progressive inspection schedule, which allows the work load to be divided into smaller operations that can be accomplished in shorter time periods.

RECOMMENDED INSPECTION SCHEDULES

In addition to the FAA required inspections, refer to the following manufacturers' recommended inspection guides:

1. Cessna Recommended Inspection Guide.
2. Allison Recommended Inspection guide.
3. O & N Aircraft Modifications Recommended Inspection Guide.
4. See Overhaul or Replacement Schedule (page 8-13) for further inspection schedules.

PILOT CONDUCTED PREVENTIVE MAINTENANCE

No Change.

ALTERATIONS OR REPAIRS

No Change.

GROUND HANDLING

No Change.

TOWING

No Change.

PARKING

No Change.

TIE-DOWN

Proper tie-down procedure is the best precaution against damage to the parked airplane by gusty or strong winds. To tie-down the airplane securely, proceed as follows:

1. Set the parking brake and install the control wheel lock.
2. Install a surface control lock over the fin and rudder.

TIE-DOWN (Cont.)

3. Tie sufficiently strong ropes or chains (700 pounds tensile strength) to the wing and tail tie-down fittings and secure each rope or chain to a ramp tie-down.
4. Tie a rope (no chains or cables) to the nose gear torque link and secure a ramp tie-down.
5. Install a pitot tube cover.
6. Install a compressor inlet plug or cover.
7. Using nylon rope to prevent damage, secure propeller to exhaust covers.

JACKING

No Change.

LEVELING

No Change.

PROLONGED OUT OF SERVICE CARE

For engine preservation and de-preservation instructions, refer to the Allison 250-B17F Series Operation and Maintenance Manual.

NOTE

IN NO CASE SHALL THE SHUTDOWN PERIOD EXCEED
FIVE DAYS WITHOUT PRESERVING THE COMPRESSOR.

FLYABLE STORAGE

No Change.
During flyable storage, refer to the Allison 250-B17F Series Operation and Maintenance Manual.

ENGINE PREPARATION FOR STORAGE

Refer to Allison 250-B17F Series Operation and Maintenance Manual.

SERVICING

No Change.

ENGINE OIL

The oils listed in Tables I and II comply with the engine manufacturer's specifications. These oils are approved for use in the Allison 250-B17F/2 engine. Refer to the Allison 250-B17F Operations and Maintenance Manual for the most current listing of oils and limitations.

Table I
RECOMMENDED OILS AT SPECIFIC AMBIENT TEMPERATURES

Ambient Temperature	Oil Type
0OC (32OF) and above	MIL-L-23699B preferred
0OC (32OF) to -4OC (-40OF)	MIL-L-23699B or MIL-L-7808G
-4OC (-40OF) and below	MIL-L-7808G only

NOTE

BECAUSE OF REDUCED COKING AND BETTER LUBRICATING QUALITIES AT HIGHER TEMPERATURES, MIL-L-23699B OILS ARE PREFERRED FOR USE IN MODEL 250 ENGINES. PRIOR TO ADDING OIL, SHAKE THE OIL CANS VIGOROUSLY TO ASSURE THAT THE ANTI-FOAMING AGENT HAS NOT SETTLED IN THE OIL CAN.

When adding oil, service the engine with the same group that is currently being used. For example, an oil in Group 23 may be mixed with another brand of oil in Group 23.

WARNING

ALTHOUGH EITHER MIL-L-23699B OR MIL-L-7808G OIL IS ACCEPTABLE, DO NOT MIX THESE OILS. MIXING OF THE SAME MIL GRADE OIL NOT IN THE SAME GROUP IS PERMITTED ONLY IN AN EMERGENCY. USE OF MIXED OILS (OILS NOT IN THE SAME GROUP) IN AN ENGINE IS LIMITED TO FIVE HOURS TOTAL RUNNING TIME. ADEQUATE MAINTENANCE RECORDS MUST BE MAINTAINED TO ENSURE THAT THE FIVE-HOUR LIMIT IS NOT EXCEEDED. FAILURE TO COMPLY WITH MIXING RESTRICTIONS CAN RESULT IN ENGINE FAILURE.

Table II
APPROVED OILS

GROUP NO.	MIL-L-23699B
21	Mobil Jet II
21	Mobil Jet 254
22	Aeroshell Turbine Oil 500
22	Royco Turbine Oil 500
23	American PQ Lubricant 6700
23	Brayco 899G
23	Hatcol 3211
24	Exxon Turbo Oil 2380
25	Stauffer Jet II (Castrol 205
25	Caltex RPM Jet Engine Oil 5
27	Aeroshell Turbine Oil 555
27	Royco Turbine Oil 555

GROUP NO.	MIL-L-7808G
1	American PQ Lubricant 6899
2	Brayco 880H
3	Exxon Turbo Oil 2389
4	Mobil Aurey S Turbo 256
5	Mobil RM-201A
6	Mobil RM-184A
7	Stauffer Jet I

OIL DRAIN PERIOD

It is recommended that the oil be changed every 200 hours or six months, whichever comes first.

****CAUTION****

USE OF OILS WHICH ARE NOT INCLUDED IN THE APPROVED OILS LISTING, OR FAILURE TO DRAIN OIL WITHIN THE PRESCRIBED INTERVAL WILL BE CONSIDERED AS MISUSE UNDER THE WARRANTY POLICY. REFER TO THE MAINTENANCE MANUALS FOR THE COMPLETE OIL SYSTEM MAINTENANCE SCHEDULE.

OIL LEVEL CHECK

Normal operating range on the oil dipstick is six (6) to nine (9) U.S. quarts in the tank.

OIL SYSTEM

The engine oil filter cap and dipstick are accessible by opening the door on the left side of cowl. System capacity is 12.61 U.S. quarts.

To assure complete drainage, the operation should be carried out immediately after shutdown. Change the oil as follows:

1. Open cowl doors.
2. Drain oil tank through left cowl flap.
3. Drain oil cooler through right cowl flap.
4. Drain gear box collector tank (front of engine).
5. Remove scavenge filter bowl;inspect filter element.
6. Remove engine pressure filter and inspect filter element.
7. Lubricate O-ring and replace scavenge filter and filter bowl.
8. Replace engine pressure filter and cap.
9. Install drain plugs and safety wire.
10. Fill the system with approved engine oil.

FUEL

APPROVED FUEL GRADES

Primary Fuels

MIL-T-5624 JP-5
MIL-T-83133 JP-8
ASTMD-1655 JET A OR A1
JP-1 FUEL CONFORMING TO ASTM D1655, JET A
DIESEL #1 FUEL CONFORMING TO ASTM D1655, JET A

****CAUTION****

TO PREVENT ENGINE FUEL SYSTEM CONTAMINATION WHICH COULD CAUSE ENGINE FLAME-OUT, AN EXTERNAL LOW PRESSURE FUEL FILTER SHOULD BE USED ON ANY AIRCRAFT REFUELING FROM REMOTE REFUELING SITES (DRUMS, ETC.) NOT ALL NO. 1 DIESEL, JP1, OR ARCTIC DIESEL FUELS WILL MEET THE PRIMARY FUEL SPECIFICATIONS. THE BURDEN OF PROOF RESTS WITH THE OPERATOR AND HIS SUPPLIER.

COLD WEATHER FUELS

To assure consistent starts below 4ºC (40ºF), the following fuels may be necessary:

*MIL-T-5624, Grade JP-4
*ASTM D-1655, Jet B
*AVGAS/JET A, Jet A1, or JP-5 Mixture

NOTE

JET A, JET A1, JP-5, OR JP-8 MAY START THE ENGINE AT TEMPERATURES BELOW 40oF; HOWEVER, WHEN COLD SOAKED, MARGINAL STARTS MAY RESULT DUE TO VISCOSITY CHANGES.

In order to obtain a light off when cold weather fuel is used, it may be necessary to:

1. Preheat the engine; or
2. Bleed the fuel system.

Preheat the engine in the area of the fuel control.

****CAUTION****

DO NOT USE AN OPEN FLAME HEATER TO PREHEAT THE ENGINE. REFER TO ENGINE OPERATION AND MAINTENANCE MANUAL FOR FUEL SYSTEM BLEEDING PROCEDURES.

The alternate cold weather fuel mixture shall consist of one part by volume AVGAS and two parts by volume JET FUEL. The AVGAS shall conform to MIL-G-5572C, Grade 80/87, or Grade 100LL with 2.0 ml/U.S. Gal. max. lead content. DO NOT use Grade 100/130 with 4.6 ml/U.S. Gal. lead content. Make the fuel mix in the aircraft tank. The AVGAS can be added before or after the JET FUEL. The only restriction is that the final mix (including fuel in the tank before starting the mix) be not less than two parts JET FUEL to not more than one part AVGAS.

****CAUTION****

THERE IS NO LIMIT FOR ENGINE OPERATION USING THE AVGAS-JET FUEL MIXTURE AS LONG AS 80/87 GRADE AVGAS IS USED AND THE 1:2 VOLUME RATIO IS OBSERVED. USE OF 100LL GRADE AVGAS-JET FUEL MIXTURE SHALL BE RESTRICTED TO 300 HOURS IN ONE OVERHAUL PERIOD DUE TO THE HIGH LEAD CONTENT OF THE FUEL.

FUEL (Cont.)

****CAUTION****

WHEN MIXING THE FUELS, AVOID HIGH FLOW RATES. DO NOT EXCEED A FLOW RATE OF 50 GALLONS PER MINUTE. ALSO, MAKE SURE THE FUEL NOZZLE AND FUEL TANK ARE GROUNDED TO THE AIRCRAFT.

NOTE

ANTI-ICE ADDITIVE IS NEEDED FOR THE AVGAS-JET FUEL MIXTURE.

NOTE

PROLONGED AND UNINTERRUPTED OPERATION WITH ONLY AVGAS-JET FUEL MIXTURE WILL INDUCE LEAD BUILDUP ON TURBINE PARTS. THIS LEAD BUILDUP CAN CAUSE A GRADUAL POWER REDUCTION; CONSEQUENTLY, THIS AVGAS- JET FUEL MIXTURE SHOULD BE USED ONLY FOR COLD WEATHER OPERATION. DURING OPERATION WITH NORMAL JET A TYPE TURBINE FUEL, THE LEAD BUILDUP WILL SLOWLY DISSIPATE. WHEN THE AVGAS-JET FUEL MIXTURE IS USED IN THE ENGINE THE LEAD FROM THE GASOLINE ACCUMULATES ON THE TURBINE AND EXHAUST COLLECTOR OUTLET DUCTS. THE NORMAL APPEARANCE AFTER OPERATION ON LEADED FUEL IS A PALE YELLOW POWDER DEPOSIT ON THE EXHAUST SYSTEM.

WARNING

HANDLING LEAD RESIDUE COATED PARTS CAN BE EXTREMELY DANGEROUS, DUE TO POSSIBLE LEAD POISONING.

FUEL CAPACITY

Capacity Each Tank -- 45 gallons.
Reduced Capacity Each Tank
(when filled to bottom of filler neck extension) -- 33.5 Gallons
Auxiliary Fuel Tank -- 26.8 Gallons

FUEL STRAINERS

A low pressure fuel filter is located on the engine compartment and filters the fuel before it enters the engine driven pump. The filter is equipped with a replacement element, an impending bypass warning switch, a bypass valve, and a press-to-test switch. At a predetermined pressure differential, the warning switch will close and actuate a cockpit warning light. The element should be changed every 300 hours or any time the filter goes into bypass.

FUEL DRAINS

Drain fuel drains daily and after taking on fuel to purge any water from the system. Each main tank drain is located inboard near the fuselage under the wing. There are two fuel header tank drains located under the fuselage behind the cowl flaps. A fifth drain is used to check the fuel filter and is located on the right side under the cowl, just forward of the cowl flap. Two aft baggage fuel tank drains are located under the fuselage just behind the main gear opening, inside the vent tubes.

FUEL ADDITIVE

For flight at ambient temperatures of 40oF and below, the fuel used in this aircraft MUST have an anti-icing additive in compliance with MIL-L-27686D or E, or Phillips PF A55MB, incorporated or added into the fuel during refueling in accordance with the additive manufacturer's instructions.

****CAUTION****

PROPER MIXING OF ANTI-ICING ADDITIVE WITH FUEL IS EXTREMELY IMPORTANT BECAUSE CONCENTRATION IN EXCESS OF THAT RECOMMENDED (0.15% BY VOLUME) WILL RESULT IN DETRIMENTAL EFFECTS TO THE FUEL TANKS. ASSURE THAT THE FUEL ADDITIVE IS DIRECTED INTO AND BLENDING WITH FLOWING FUEL FROM THE FUELING NOZZLE. DO NOT ALLOW CONCENTRATED ADDITIVE TO CONTACT THE FUEL CELL OR AIRPLANE FINISH. SOME FUELS HAVE ANTI- ICING ADDITIVES PRE-BLENDED IN THE FUEL AT THE REFINERY, SO NO ADDITIONAL ADDITIVES SHOULD BE ADDED.

NOTE

FUELS CONTAINING TRI-CRESYL-PHOSPHATE (TCP) ADDITIVES SHALL NOT BE USED.

LANDING GEAR

No Change.

OXYGEN

No Change.

CLEANING AND CARE

No Change.

WINDSHIELD-WINDOWS

No Change.

PAINTED SURFACES

No Change, except as follows:

****CAUTION****

WHEN WASHING AIRCRAFT, MAKE SURE COMPRESSOR INLET IS FIRMLY PLUGGED.

PROPELLER CARE

No Change.

LANDING GEAR CARE

No Change.

ENGINE CARE

Refer to the Allison 250-B17F Series Operation and Maintenance Manual for approved solvents and engine cleaning procedures.

****CAUTION****

DO NOT SPRAY CLEANING SOLVENT ON ENGINE WITHOUT BLOCKING BLEED VALVE CLOSED AND COVERING BLEED ORIFICE, FUEL CONTROL, AND GOVERNOR.

COMPRESSOR CARE

1. Water rinse. Accomplish on a daily basis in salt water areas using the best water available. It is not necessary to disconnect any tubing during the water rinse. However, the bleed valve must be blocked in the closed position. Refer to compressor salt water contamination removal in the Allison 250- B17F Series Operation and Maintenance Manual.

2. Cleaning. Accomplish when the compressor becomes dirty using aircraft skin cleaner. Cleaning is normally required after 200-300 hours of operation in smoggy areas. Tubing must be removed and the bleed valve must be blocked closed during the cleaning. Refer to Allison 250-B17F Series Operation and Maintenance Manual.

INTERIOR CARE

No Change.

OVERHAUL OR REPLACEMENT SCHEDULE

Powerplant

Component	Overhaul (hrs)	or	Replace (hrs/cycles)
Compressor	3500		
Gearbox	On Condition		
Turbine	3500		
Propeller Reduction Gearbox	On Condition		
Fuel Pump (TRW)	2500		
Fuel Control (Bendix)	2000		
Woodward Combined Governor	1500		
Woodward Overspeed Governor	3000		
Bleed Valve	1500		
Compressor Impeller			3550/9150
First Stage Turbine Wheel			1775/3000
Second Stage Turbine Wheel			1775/3000
Third Stage Turbine Wheel			4550/6000
Fourth Stage Turbine Wheel			4550/6000
Starter/Generator	On Condition		
Oil Cooler	On Condition (Replace when contaminated)		
Propeller	1500		

Fuel System Additions

Fuel Boost Pumps (2 ea.)	On Condition

Section IX

(Optional Systems Description

And

Operating Procedures)

TABLE OF CONTENTS

SECTION IX

SUPPLEMENTS
(Optional Systems Descriptions And Operating Procedures)

INTRODUCTION

This Section consists of a series of supplements, each covering a single optional system which has been installed in the airplane. Each supplement contains a brief description, and when applicable, operating limitations, emergency and normal procedures, and performance.

Other routinely installed items of optional equipment, whose function and Operational procedures do not require detailed instructions, are discussed In Section VII, Airplane and Systems Description.