PA-46-600TP
M600
(G3000 NG)

INFORMATION MANUAL

Piper

WARNING

This Information Manual may be used for general information purposes only.

This Information Manual is not kept current. It must not be used as a substitute for the official FAA approved Pilot's Operating Handbook required for operation of the airplane.

Piper®

M600

PA-46-600TP

SN 4698061, 4698081 and Up

INFORMATION MANUAL

MANUAL PART NUMBER 767-106

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APPLICABILITY

Application of this handbook is limited to the specific Piper PA-46-600TP model airplane designated by serial number and registration number on the face of the title page of this handbook.

This handbook cannot be used for operational purposes unless kept in a current status.

WARNING

EXTREME CARE MUST BE EXERCISED TO LIMIT THE USE OF THIS HANDBOOK TO APPLICABLE AIRCRAFT. THIS HANDBOOK IS VALID FOR USE WITH THE AIRPLANE IDENTIFIED ON THE FACE OF THE TITLE PAGE. SUBSEQUENT REVISIONS SUPPLIED BY PIPER MUST BE PROPERLY INSERTED.

WARNING

INSPECTION, MAINTENANCE AND PARTS REQUIREMENTS FOR ALL NON-PIPER APPROVED STC INSTALLATIONS ARE NOT INCLUDED IN THIS HANDBOOK. WHEN A NON-PIPER APPROVED STC INSTALLATION IS INCORPORATED ON THE AIRPLANE, THOSE PORTIONS OF THE AIRPLANE AFFECTED BY THE INSTALLATION MUST BE INSPECTED IN ACCORDANCE WITH THE INSPECTION PROGRAM PUBLISHED BY THE OWNER OF THE STC. SINCE NON-PIPER APPROVED STC INSTALLATIONS MAY CHANGE SYSTEMS INTERFACE, OPERATING CHARACTERISTICS AND COMPONENT LOADS OR STRESSES ON ADJACENT STRUCTURES, PIPER PROVIDED INSPECTION CRITERIA MAY NOT BE VALID FOR AIRPLANES WITH NON-PIPER APPROVED STC INSTALLATIONS.

REVISIONS

The information compiled in the Pilot's Operating Handbook, with the exception of the equipment list, will be kept current by revisions distributed to the airplane owners. The equipment list was current at the time the airplane was licensed by the manufacturer and thereafter must be maintained by the owner.

Revision material will consist of information necessary to update the text of the present handbook and/or to add information to cover added airplane equipment.

I. Revisions

Revisions will be distributed whenever necessary as complete page replacements or additions and shall be inserted into the handbook in accordance with the instructions given below:

1. Revision pages will replace only pages with the same page number.
2. Insert all additional pages in proper numerical order within each section.
3. Insert page numbers followed by a small letter in direct sequence with the same common numbered page.

II. Identification of Revised Material

Each handbook page is dated at the bottom of the page showing the date of original issue and the date of the latest revision. Revised text and illustrations are indicated by a black vertical line located along the outside margin of each revised page opposite the revised, added, or deleted information. A vertical line next to the page number indicates that an entire page has been changed or added.

Vertical black lines indicate current revisions only. Correction of typographical or grammatical errors or the physical relocation of information on a page will not be indicated by a symbol.

ORIGINAL PAGES ISSUED

The original pages issued for this handbook prior to revision are given below:

Title, ii through viii, 1-1 through 1-32, 2-1 through 2-42, 3-1 through 3-120, 4-1 through 4-40, 5-1 through 5-58, 6-1 through 6-26, 7-1 through 7-96, 8-1 through 8-30, 9-1 through 9-8, and 10-1 through 10-2.

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS

Current Revisions to the PA–46–600TP M600 Pilot's Operating Handbook, Report VB–2793 issued July 3, 2018.

Revision Number and Code	Revised Pages	Description of Revisions	FAA Approved Signature and Date
Rev. 1 (PR180727)	v	Added Rev. 1 to L of R.	
	1-9	Revised Para. 1.21.	
	1-12	Revised Para. 1.21.	
	1-13	Revised Para. 1.21.	
	2-ii	Revised T.O.C.	
	2-12	Revised Para. 2.47.	
	2-15	Revised Para. 2.47.	
	2-17, 18	Relocated text within 2.47.	
	2-19	Relocated, revised Para's 2.47 and 2.49.	
	2-20	Revised Para. 2.55.	
	2-21	Relocated Para. 2.59 to 2-22.	
	2-22 thru 2-26	Added New Para. 2.58. Relocated Para. 2.61.	
	2-27	Revised Para. 2.63.	
	3-iii	Revised T.O.C.	
	3-1	Revised Para. 3.1 Note.	
	3-37	Revised Para. 3.19.	
	3-64	Revised Para. 3.41.	
	3-71	Revised Para. 3.41g.	
	3-74	Revised Para. 3.41i.	
	3-75	Revised Para. 3.41j.	
	3-78	Revised Para. 3.41m.	
	3-93	Revised Para. 3.43b.	
	4-20	Revised Para. 4.5e.	
	4-27	Revised Para. 4.5h.	
	4-38	Revised Para. 4.9.	
	6-4	Revised Fig. 6-2.	
	7-10	Revised Para. 7.9 Note.	
	7-32	Added WireAware text.	
	7-33	Relocated TAWS-B text.	
	7-34	Relocated text from 7-33.	
	7-51	Revised GTX 345 Transponder.	
	7-72	Revised Fig. 7-7.	
	7-73	Revised Fig. 7-8.	Eric A. Wright
	9-7	Revised Para. 4.9.	July 27, 2018

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (continued)

Revision Number and Code	Revised Pages	Description of Revisions	FAA Approved Signature and Date
Rev. 2	i	Added EASA approval.	
(PR181130)	vi	Added Rev. 2 to L of R.	
	4-38	Revised Para. 4.9.	
	7-7	Revised Para. 7.7.	
	7-8	Revised Figure 7-1.	
	9-3	Revised Supplement 1.	Eric A. Wright
	9-7	Revised Para. 4.9.	November 30, 2018
Rev. 3	ii	Updated copyright.	
(PR191206)	vi	Added Rev. 3 to L of R.	
	9-i	Revised T.O.C.	
	9-9	Added Supplement 3.	
	thru	Added new pages.	Eric A. Wright
	9-12		December 6, 2019
Rev. 4	i	Removed EASA approval.	
(PR200515)	ii	Updated copyright.	
	vi	Added Rev. 4 to L of R.	
	vi-a, -b	Add pages.	
	1-7 thru	Revised Para. 1.21. Column	
	1-20	head typo PNB to PBN.	
	1-29, -30	Revised Para. 1.25.	
	2-ii	Revised T.O.C.	
	2-9	Revised Table 2-2.	
	2-12, -13	Revised Para. 2.47.	
	2-19 thru	Added Para. 2.48 and	
	2-21	relocated Para. 2.49.	
	3-iv	Revised T.O.C.	
	3-3, -4	Revised Para. 3.1.	
	3-7 thru	Revised Para. 3.1.	
	3-10		
	3-12 thru	Relocated Tables.	
	3-15	Revised Para. 3.1.	
	3-23, -24	Revised Para. 3.9d.	
	3-70	Revised Para. 3.41f.	

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (continued)

Revision Number and Code	Revised Pages	Description of Revisions	FAA Approved Signature and Date
	3-72	Revised Para. 3.41g.	
	3-73	Revised Para. 3.41h.	
	3-76	Revised Para. 3.41k.	
	3-78	Revised Para. 3.41m.	
	3-81	Revised Para. 3.41p.	
	3-90, 91	Revised Para. 3.41y.	
	3-92	Revised Para. 3.43a.	
	3-100	Revised Para. 3.45d.	
	3-120	Added Para. 3.59.	
	3-121 thru 3-124	Added new pages.	
	4-i	Revised T.O.C.	
	4-7, -8	Relocated text from 4-8.	
	4-9	Relocated Para. 4.5b to 4-9.	
	4-10, -11	Revised Para. 4.5b.	
	4-13, -15	Revised Para. 4.5c.	
	4-16a and 4-16b	Add pages. Revised Para. 4.5c.	
	4-17	Relocated Para. 4.5d.	
	4-21a and 4-21b	Add pages. Revised Para. 4.5g.	
	4-22	Relocated Para. 4.5h.	
	4-29	Revised Para. 4.5j.	
	7-ii	Revised T.O.C.	
	7-15	Revised Autopilot Controls.	
	7-19, -20	Add Caution and Note.	
	7-51, -52	Revised GTX 345 Notes.	
	7-55	Revised Para. 7.15.	
	7-62	Revised Figure 7-3.	
	7-71 thru 7-75	Revised Figures 7-6, 7-7, 7-8 and 7-9	
	7-96	Added Para. 7.41.	
	7-97 thru 7-98	Added new pages.	Eric A. Wright May 15, 2020

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (continued)

Revision Number and Code	Revised Pages	Description of Revisions	FAA Approved Signature and Date

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TABLE OF CONTENTS

SECTION 1

GENERAL

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SECTION 1

GENERAL

1.1 INTRODUCTION

This Pilot's Operating Handbook is designed for maximum utilization as an operating guide for the pilot. It includes the material required to be furnished to the pilot by the Federal Aviation Regulations and additional information provided by the manufacturer and constitutes the FAA Approved Airplane Flight Manual.

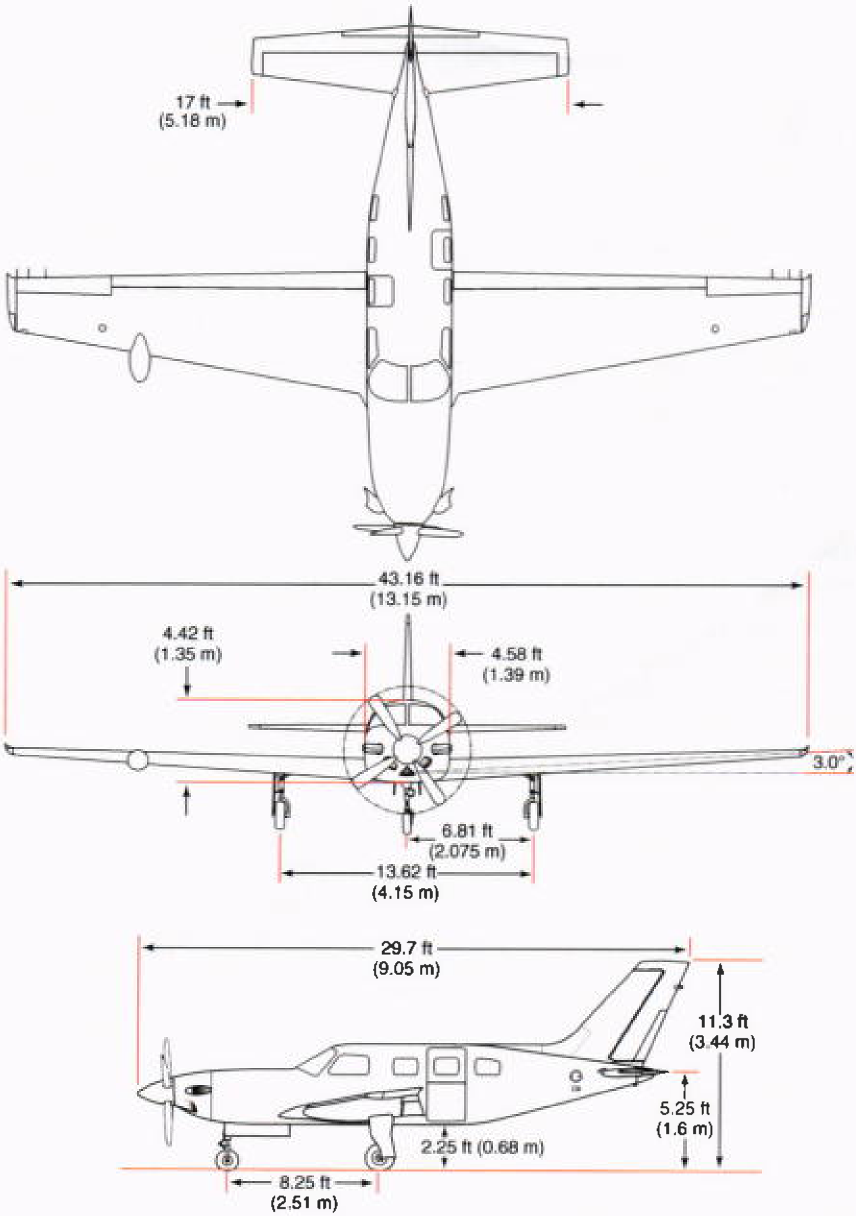
This handbook is not designed as a substitute for adequate and competent flight instruction, knowledge of current Airworthiness Directives, applicable Federal Aviation Regulations or Advisory Circulars. It is not intended to be a guide for basic flight instruction or a training manual and should not be used for operational purposes unless kept in a current status. The pilot should study the entire handbook to familiarize himself with the limitations, performance, procedures, and operational handling characteristics of the airplane before flight.

Assurance that the airplane is in an airworthy condition is the responsibility of the owner. The pilot in command is responsible for determining that the airplane is safe for flight. The pilot is also responsible for remaining within the operating limitations as outlined by instrument markings, placards, and this handbook.

The handbook has been divided into numbered sections each provided with a finger-tip tab divider for quick reference. Provisions for expansion of the handbook have been made by the deliberate omission of certain paragraph numbers, figure numbers, item numbers and pages noted as being intentionally left blank.

NOTE

In countries other than the United States of America, FAA operating rules may not apply. Operators must ensure that the aircraft is operated in accordance with national operating rules.



Three View
Figure 1-1

1.3 NOTATIONS

WARNING

Operating procedures or techniques which may result in personal injury or loss of life if not carefully followed or a hazard which may require immediate crew recognition and corrective action.

CAUTION

Operating procedures or techniques which may result in damage to equipment if not carefully followed or the need for immediate crew awareness and possible need for future corrective action.

NOTE

Supplemental information or highlights considered of sufficient significance to require emphasizing.

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1.5 ENGINE

Number of Engines	1
Engine Manufacturer	Pratt & Whitney Canada
Engine Model Number	PT6A-42A

Engine Type

This airplane incorporates a free shaft turboprop engine with 3 axial and 1 centrifugal compressor stages, an annular combustion chamber, and a 3 stage turbine where one stage drives the compressor and a dual stage powers the propeller.

Horsepower Rating and Engine Speed

Takeoff Power	600 SHP
Maximum Continuous Power (MCP)	600 SHP
Compressor Turbine Speed (Ng)	38,100 rpm (101.7%)
Propeller Speed (PROP RPM)	2,000 RPM

1.7 PROPELLER

Number of Propellers	1
Propeller Manufacturer	Hartzell
Blade Model	E8501K-3.5
Number of Blades	4
Hub Model	HC-E4N-3Q
Propeller Diameter	Maximum 82.5 in. (209.5 cm)
	Minimum 81.5 in. (207 cm)

Propeller Type

The propeller assembly consists of a hub unit and four metal blades, and is a hydraulically actuated, constant speed, full feathering and reversible type.

1.9 FUEL

JET FUEL ONLY

Fuel Capacity	1764 lb/263.2 U.S. gal.	(800.1 kg/996.3 liter)
Unusable Fuel	21.4 lb / 3.2 U.S. gal.	(9.7 kg / 12.1 liter)

Fuel

Fuel, Aviation	Jet A, Jet A-1
Anti-Icing Additive	Refer to latest revision of Pratt & Whitney Service Bulletin 3044 for anti-icing additive conforming to MIL-DTL-85470

1.11 OIL

Oil Capacity	12 qt (11.35 liter)
Oil Specification	Refer to Section 8 for Oil Specifications

1.13 MAXIMUM WEIGHTS

Maximum Ramp Weight	6050 lb	(2744.23 kg)
Maximum Takeoff Weight	6000 lb	(2721.55 kg)
Maximum Landing Weight	5800 lb	(2631 kg)
Maximum Weight in Baggage Compartment	100 lb	(45.3 kg)
Maximum Zero Fuel Weight	4850 lb	(2199.9 kg)

1.15 CABIN AND ENTRY DIMENSIONS

Cabin Width (max.)	49.5 in.	(125.7 cm)
Cabin Length (Instrument panel to rear bulkhead)	148 in.	(375.9 cm)
Cabin Height (max.)	47 in.	(119.4 cm)
Entry Width	24 in.	(60.9 cm)
Entry Height	46 in.	(116.8 cm)

1.17 BAGGAGE SPACE AFT CABIN

Compartment Volume	20 cu. ft.	(0.56 m^3)
Entry Dimensions	24 x 46 in.	(60.9 x 116.8 cm)

1.19 SPECIFIC LOADING

Wing Loading at 6000 lb (2721.55 kg)	28.71 lb/ft^2	(140.14 kg/m^2)
Power Loading @ MCP	10 lb/SHP	(4.54 kg/SHP)

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES

The Garmin G3000 Integrated Avionics GNSS long range navigation system installed in this airplane is a GPS system with a Satellite Based Augmentation System (SBAS) comprised of two TSO-C145d Class 3 approved Garmin GIA 64Ws (which include GNSS, SBAS, and VOR/LOC/GS receivers), three TSO-C146d Class 3 approved Garmin GDU Display Units (1250W), two Garmin-approved GPS/SBAS antennas (GA35), two GTC 570 Touchscreen Controllers, and GPS software version 7.00 or later approved version. The Garmin GNSS navigation system in this aircraft is installed in accordance with AC 20-138D. When all the equipment is operative, the Garmin G3000 system has two independent GNSS long-range navigation systems. Failure of any of the above equipment or the posting of 'BOTH ON GPS1' or 'BOTH ON GPS2' annunciators indicate only one operational GNSS system.

The Garmin G3000 Integrated Avionics GNSS navigation system as installed in this airplane complies with the requirements of AC 20-138D and has airworthiness approval for navigation using GPS and GPS/SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en-route, terminal area, non-precision approach, and approach procedures with vertical guidance operations.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

As described in AC90-108, the G3000 GNSS navigation system qualifies as a suitable RNAV system that can be used as follows:

Type of Operation	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Substitute Means of Navigation	GNSS navigation may be used as a *Substitute Means of Navigation* in lieu of that from out-of-service conventional navaids (VOR, DME, TACAN, VORTAC, VOR/DME, NDB and LOM/LMM), and/ or inoperative or not-installed navigation equipment compatible with the conventional navaid (i.e., may use GNSS navigation to hold over an out-of-service NDB). Part 91 (subpart K) and 135 operators require operational approval from the FAA.	FAA AC 20-138D. FAA AC 90-105A. FAA AC 91-108.	N/A	N/A	

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Type of Operation	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Alternate Means of Navigation	GNSS navigation may be used as an *Alternate Means of Navigation* in lieu of that from operating conventional navaids (VOR, DME, VORTAC, VOR/ DME/TACAN, NDB and LOM/LMM), and navigation equipment that is installed, operational, and compatible with the conventional navaid (i.e., may use GNSS navigation to fly a procedure or route based on an operational VOR using GNSS navigation without monitoring the VOR. Part 91 (subpart K) and 135 operators require operational approval from the FAA.	FAA AC 20-138D. FAA AC 90-105A. FAA AC 91-108.	N/A	N/A	

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

The Garmin G3000 Integrated Avionics GNSS navigation system as installed in this airplane complies with the equipment, performance, and functional requirements established for the following navigation specifications:

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 10 RNP 10 Oceanic and Remote Areas of Operation (Class II Navigation).	GNSS FDE/RAIM availability must be verified prior to flight. Maximum predicted FDE/RAIM unavailability is 34 minutes. Two GNSS systems required to be operational. (one GNSS system for those routes requiring only one long range navigation system) No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-105A. FAA AC 91-70B. EASA AMC 20-12.	R	A1	The GPS equipment as installed complies with the requirements for GPS primary means of Class II navigation in oceanic and remote airspace without reliance on other long-range navigation systems, when used in conjunction with the Garmin RAIM/Fault Detection and Exclusion Prediction Tool.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
B-RNAV / RNAV 5 (Europe)	Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. Maximum predicted RAIM/ FDE unavailability is 5 minutes. 1 This does not constitute an operational approval.	FAA AC 20-138D. FAA AC 90-96A CHG 1. EASA AMC 20-4A.	R	B2	

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 4 Oceanic and Remote Areas of Operation (Class II Navigation).	GNSS FDE/RAIM availability must be verified prior to flight. Maximum predicted FDE/RAIM unavailability is 25 minutes. [1] Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor). No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-105A. FAA AC 91-70B.	R	L1	The GPS equipment as installed complies with the requirements for GPS primary means of Class II navigation in oceanic and remote airspace without reliance on other long-range navigation systems, when used in conjunction with the Garmin RAIM/Fault Detection and Exclusion Prediction Tool. [1]

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 2	Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. Maximum predicted RAIM/ FDE unavailability is 5 minutes. 1 The GNSS RNAV system as installed meets the performance and functional requirements of AC 90-100A CHG 2. In accordance with AC 90-100A CHG 2, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A CHG 2 are authorized to fly RNAV 2 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-100A CHG 2.	R	C2	Includes RNAV Q and T routes.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 1	Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. Maximum predicted RAIM/ FDE unavailability is 5 minutes. 1 The GNSS RNAV system as installed meets the performance and functional requirements of AC 90-100A CHG 2. In accordance with AC 90-100A CHG 2. Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A CHG 2 are authorized to fly RNAV 1 procedures. Part 91 subpart K. 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-100A CHG 2.	R	D2	Includes RNAV terminal departure and arrival procedures.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
P-RNAV (Europe)	GNSS receiver is required for takeoff in P-RNAV airspace. Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. This does not constitute an operational approval.	FAA AC 20-138D. FAA AC 90-96A CHG 1. JAA TGL10 Rev 1.	R	D2	ICAO flight plan code for P-RNAV no longer exists. P-RNAV utilizes RNAV 1 flight plan codes

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 1	Procedures containing Radius-to-Fix (RF) legs are not authorized. Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. Maximum predicted RAIM/ FDE unavailability is 5 minutes. [1] In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-105A.	R	O2	Includes RNP terminal departure and arrival procedures.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV minima	Procedures containing Radius-to-Fix (RF) legs are not authorized. Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. Maximum predicted RAIM/ FDE unavailability is 5 minutes. 1 All instrument approach procedures that are retrieved from the current navigation database are authorized. In accordance with AC 90-105A. Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-105A. EASA AMC 20-27A.	R	S1	Includes non-precision approaches based on conventional navigation aids with "or GPS" in the title and area navigation approaches titled "GPS", "RNAV (GPS)", and "RNAV (GNSS)".

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV/ VNAV minima	Procedures containing Radius-to-Fix (RF) legs are not authorized. Must have GNSS/ SBAS capability and availability or GNSS RAIM/FDE availability must be verified prior to flight. Maximum predicted RAIM/ FDE unavailability is 5 minutes. All instrument approach procedures that are retrieved from the current navigation database are authorized. In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV/VNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-105A. EASA AMC 20-27A with CM-AS-002.	R	S2	Includes area navigation approaches titled "RNAV (GPS)" and "RNAV (GNSS)." Vertical guidance is based on GPS/SBAS when within SBAS coverage and by baro VNAV when outside SBAS coverage, or when SBAS has been pilot disabled for approaches with 'WAAS VNAV NA'. The aircraft complies with the criteria of AMC 20-27 for RNP approaches to LNAV/ VNAV minima, with the exception that VNAV is based on SBAS/GNSS geometric altitude when SBAS/GNSS is available and authorized

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LP minima	Procedures containing Radius-to-Fix (RF) Legs are not authorized. All instrument approach procedures that are retrieved from the current navigation database are authorized. In accordance with AC 90-107, Part 91 operators (except subpart K), following the operational considerations and training guidance in AC 90-107 are authorized to fly RNP APCH LP minima Procedures Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D. FAA AC 90-107.	N/A	N/A	Includes area navigation approaches titled "RNAV (GPS)" and "RNAV (GNSS)". GNSS/SBAS capability and availability is required for LP procedures.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LPV minima	Procedures containing Radius-to-Fix (RF) Legs are not authorized. All instrument approach procedures that are retrieved from the current navigation database are authorized. In accordance with AC 90-107, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LPV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval	FAA AC 20-138D. FAA AC 90-107. EASA AMC 20-28.	B	N/A	Includes area navigation approaches titled "RNAV (GPS)" and "RNAV (GNSS)." GNSS/SBAS capability and availability is required for LPV procedures.
RNP AR APCH					Not Authorized

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

Navigation Specification	Operational Requirements/ Authorizations	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Advanced RNP See Notes for specific Advanced RNP functions	This does not constitute an operational approval.	FAA AC 20-138D.	N/A	N/A	RNAV Holding: Supported. RF Legs: Not supported. Parallel Offsets: Supported. Higher Continuity: Supported when both GIA 64 GPS/SBAS receivers are operating and providing GPS navigation guidance to their respective PFD. Scalable RNP: Not supported. Fixed Radius Transitions (FRT): Not supported. Time of Arrival Control (TOAC): Not supported.

1.21 G3000 GNSS/SBAS NAVIGATION OPERATIONAL CAPABILITIES (continued)

1. FDE/RAIM availability worldwide can be determined via the following:
   - Using the Garmin RAIM/Fault Detection and Exclusion Prediction Tool available on the Garmin website fly.garmin.com.

   Also within the United States:
   - Via the FAA's RAIM Service Availability Prediction Tool (SAPT) website: http://sapt.faa.gov.
   - Contacting a Flight Service Station (not DUATS) to obtain non-precision approach RAIM.

   Also within Europe:
   - Europe's AUGER GPS RAIM Prediction Tool at http://augur.ecacnav.com/augur/app/home.

   Verification of FDE/RAIM availability is not necessary if SBAS coverage is confirmed to be available along the entire route of flight.

   Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153A for database integrity, quality, and database management practices for the Navigation database. Flight crews and operators can view the LOA status at FlyGarmin.com then select" Type 2 LOA Status".

   Navigation information is referenced to the WGS-84 reference system.

1.23 FLIGHT INTO KNOWN ICING CONDITIONS

This provides information necessary for the operation of the Piper M600 aircraft for flight into known icing conditions.

Icing conditions can exist when:

- The outside air temperature (OAT) is 5°C or colder, and visible moisture in any form such as clouds, fog or mist, rain, snow, sleet and ice crystals are present.
- During ground operations when operating on contaminated ramps, taxiways or runways where surface snow, ice, standing water or slush are present.
- There are visible signs of ice accretion on the aircraft.

The M600 ice protection system was designed and tested for operation in light to moderate meteorological conditions defined in FAR 25, Appendix C, for continuous maximum and intermittent maximum icing conditions. The ice protection system was not designed or tested for flight in freezing rain, freezing drizzle or supercooled liquid water and ice crystals, or conditions defined as severe. Flight in these conditions is prohibited and must be avoided.

The ice protection system was not designed to remove ice, snow or frost accumulations from a parked airplane. Ice, snow or frost must be completely removed during preflight to ensure a safe takeoff and subsequent flight. Procedures for ice, snow or frost removal, such as storing the aircraft in a heated hangar, must be used to ensure that ALL ice, snow, or frost is completely removed from the wings, tail, control surfaces, windshield, propeller, engine intakes, fuel vents and pitot-static ports, prior to flight.

Some icing conditions not defined in FAR Part 25, Appendix C have the potential of producing hazardous ice accumulations, which may exceed the capabilities of the airplane's ice protection equipment. See section titled Visual Cues for Supercooled Large Droplet (SLD) Conditions in this supplement.

Flight into icing conditions which are outside FAR Part 25, Appendix C conditions is prohibited, and pilots are advised to be prepared to divert the flight promptly, by changing course or altitude, if hazardous ice accumulations occur.

1.23 FLIGHT INTO KNOWN ICING CONDITIONS (continued)

ICING DEFINITIONS

Residual Ice - Ice that remains attached to the de-ice boot at the conclusion of that boot inflation cycle.

Intercycle Ice - The quantity of ice that accumulates on the wing, horizontal stabilizer and vertical stabilizer de-ice boots between de-ice boot cycles.

Failure Ice - The quantity of ice accumulated on the wing, horizontal stabilizer and vertical stabilizer de-ice boots if the pneumatic surface de-ice system fails.

Light Icing - The rate of accumulation may create a problem if flight is prolonged in this environment. Occasional use of de-icing/anti-icing equipment removes/prevents accumulation.

Moderate Icing - The rate of accumulation is such that even short encounters become potentially hazardous and use of de-icing/anti-icing equipment or flight diversion is necessary.

Severe Icing - The rate of accumulation is such that de-icing/anti-icing equipment fails to reduce or control the hazard. Immediate flight diversion is necessary.

Rime Ice - A rough, milky, opaque ice formed by the instantaneous freezing of small, supercooled water droplets.

Mixed Ice - Simultaneous appearance of rime and clear ice or an ice formation that has the characteristics of both rime and clear ice.

Clear Ice - A glossy, clear, or translucent ice formed by the relatively slow freezing of large supercooled water droplets. The terms “clear” and “glaze” have been used for essentially the same type of ice accretion, although some reserve “clear” for thinner accretions which lack horns and conform to the airfoil.

Supercooled Large Drops (SLD) - Supercooled liquid water that includes freezing rain or freezing drizzle.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

The following definitions are of symbols, abbreviations and terminology used throughout the handbook and those which may be of added operational significance to the pilot.

(a) General Airspeed Terminology and Symbols

CAS	Calibrated Airspeed means the indicated speed of an aircraft, corrected for position and instrument error. IAS values published in this handbook assume zero instrument error.
KCAS	Calibrated Airspeed expressed in "Knots".
GS	Ground Speed is the speed of an airplane relative to the ground.
IAS	Indicated Airspeed is the speed of an aircraft as shown on the airspeed indicator.
KIAS	Indicated Airspeed expressed in "Knots".
M	Mach Number is the ratio of true airspeed to the speed of sound.
$\mathbf{M_{MO}}$	Maximum Operating Limit Speed is the speed limit that may not be deliberately exceeded in normal flight operations, expressed in Mach number.
TAS	True Airspeed is CAS corrected for altitude, temperature and compressibility.
$\mathbf{V_{FE}}$	Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(a) General Airspeed Terminology and Symbols (continued)

V_{LE}	Maximum Landing Gear Extended Speed is the maximum speed at which an aircraft can be safely flown with the landing gear extended.
V_{LO}	Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.
V_{MO}	Maximum Operating Limit Speed is the speed limit that may not be exceeded at any time, expressed in knots.
V_O	Maximum Operating Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.
V_R	Rotation Speed used for takeoff.
V_S	Stalling Speed or the minimum steady flight speed at which the airplane is controllable.
V_{SO}	Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration at maximum gross weight.
V_{S1}	Stalling Speed or the minimum steady flight speed obtained in a specific configuration at maximum gross weight.
V_X	Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.
V_Y	Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(b) Meteorological Terminology

IMC	Instrument Meterological Conditions
ISA	International Standard Atmosphere in which: (1) The air is a dry perfect gas; (2) The temperature at sea level is 15° Celsius (59° Fahrenheit); (3) The pressure at sea level is 29.92 in. Hg (1013.2 mb).
OAT	Outside Air Temperature is the free air static temperature obtained either from inflight temperature indications or ground meteorological sources, adjusted for instrument error and compressibility effects.
Indicated Pressure Altitude	The number actually read from an altimeter when the barometric subscale has been set to 29.92 in. Hg (1013.2 mb).
Pressure Altitude (P.A.)	Altitude measured from standard sea-level pressure of 29.92 in. Hg (1013.2 mb) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this handbook, altimeter instrument errors are assumed to be zero.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(c) Power Terminology

Flight Idle Power	The power required to run an engine, in flight, at the lowest speed that will ensure satisfactory engine and systems operation and airplane handling characteristics.
MCP	Maximum Continuous Power is the highest power setting approved for continuous operation.
Reverse Thrust	The thrust of the propeller directed opposite the usual direction, thereby producing a braking action.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(d) Engine Controls and Instruments

Beta Range	On turbine powered aircraft using fully reversing propellers, this is the range of propeller blade angle movement not controlled by a governor and the propeller control lever. In this range, the blade pitch angle is scheduled by power lever movement and the constant propeller speed mechanism is blocked out.
Constant Speed Range	The engine operating range where the propeller is out of Beta range and operating at a constant rpm.
Gas Generator RPM (Ng)	Indicates the percent of gas generator rpm based on a figure of 101.7% at 38,100 rpm.
ITT	Interstage Turbine Temperature in the turbine section of the engine.
Manual Override (MOR)	The device that controls engine power in case of a pneumatic failure in the engine control systems. It can also control engine power in case of a power control linkage failure.
Propeller Feather	This is a propeller pitch condition which produces minimum drag in a flight condition.
Propeller Governor	The device that keeps propeller rpm constant by increasing or decreasing propeller pitch through a pitch change mechanism in the propeller hub.
Propeller RPM (PROP RPM)	Propeller speed in revolutions per minute.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(e) Avionics System Abbreviations/Terminology

1	Refers to pilot's side (AHRS1, ADC1, GPS1)
2	Refers to co-pilot's side (AHRS2, ADC2, GPS2)
ADC	Air Data Computer
ADS-B	Automatic Dependent Surveillance - Broadcast
AFCS	Automatic Flight Control System
AHRS	Attitude and Heading Reference System
AT	Autothrottle
CPCS	Cabin Pressure Control System
EAL	Emergency Autoland
EBD	Evolution Backup Display (Aspen standby instrument)
EIS	Engine Indication System
FDE	Fault Detection and Exclusion
GCU	Generator Control Unit
GDL	Garmin Datalink
GDU	Garmin Display Unit
GEA	Garmin Engine/Airframe Processing Unit
GFC	Garmin Flight Control System
GIA	Garmin Integrated Avionics Unit
GMA	Garmin Audio Panel
GMC	Garmin AFCS Mode Controller
GMU	Garmin Magnetometer Unit
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GTC	Garmin Touchscreen Controller
GTX	Garmin Transponder
GWX	Garmin Weather Radar
LOM	Locator Outer Marker
LMM	Locator Middle Marker

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(e) Avionics System Abbreviations/Terminology (continued)

MFD	Multi-Function Display
MM	Mismatch
PBN	Performance Based Navigation
PFD	Primary Flight Display
RAIM	Receiver Autonomous Integrity Monitoring
RF	Radius-to-Fix
RNP	Required Navigation Performance
SBAS	Satellite-Based Augmentation System
STAR	Standard Terminal Arrival
SVS	Synthetic Vision System
TAS	Traffic Avoidance System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Collision and Avoidance System
TIS	Traffic Information Services
WAAS	Wide Area Augmentation System

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(f) Airplane Performance and Flight Planning Terminology

Climb Gradient	The demonstrated ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time interval.
Demonstrated Crosswind Velocity	The demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests. The value shown is not limiting.

(g) Weight and Balance Terminology

A.O.D.	Aft of Datum.
Arm	The horizontal distance from the reference datum to the center of gravity (C.G.) of an item.
Center of Gravity (C.G.)	The point at which an airplane would balance if suspended. The C.G.'s distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. Arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight.
Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.

1.25 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY (continued)

(g) Weight and Balance Terminology (continued)

Basic Empty Weight	Standard empty weight plus optional equipment.
Maximum Landing Weight	Maximum weight approved for touchdown when landing.
Maximum Ramp Weight	Maximum weight approved for ground maneuver. (It includes the weight of fuel for start, taxi and run up.)
Maximum Takeoff Weight	Maximum Weight approved for the start of the takeoff run.
Maximum Zero Fuel Weight	Maximum weight exclusive of usable fuel.
Moment	The product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits.)
Payload	Weight of occupants, cargo and baggage.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Station	A location along the airplane fuselage usually given in terms of distance from the reference datum.
Unusable Fuel	The quantity of fuel at which the first evidence of malfunctioning occurs under the most adverse fuel feed condition occurring under each intended operation and flight maneuver involving that tank.
Usable Fuel	Fuel available for flight planning.
Useful Load	Difference between takeoff weight, or ramp weight if applicable, and basic empty weight.

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LIMITATIONS

SECTION 2

LIMITATIONS

2.1 GENERAL

This section provides the FAA Approved operating limitations, instrument markings, color coding and basic placards necessary for operation of the PA-46-600TP and its systems.

Limitations associated with those optional systems and equipment which require handbook supplements can be found in Section 9 (Supplements).

2.3 AIRSPEED LIMITATIONS

	SPEED		KCAS	KIAS	MACH	
V_{MO}	Maximum Operating Limit Speed	Below 20,300 ft.	250	251	----	Do not exceed this speed in any operation
M_{MO}		Above 20,300 ft.	----	----	0.55	
V_O	Maximum Operating Maneuvering Speed	6000 LB	151	153	----	Do not make full or abrupt control movements above this speed
		3750 LB	119	121	----	
V_{FE}	Maximum Flaps Extended Speed	T/O	145	147	----	Do not exceed this speed at the given flap setting
		LND	108	112	----	
V_{LE}	Maximum Landing Gear Extended Speed	----	168	170	----	Do not exceed this speed with the landing gear extended
V_{LOE}	Maximum Landing Gear Operating Speed	Extension	168	170	----	Do not operate the landing gear above this speed
V_{LOR}		Retraction	128	130	----	

2.5 AIRSPEED INDICATOR MARKINGS

PFD and Standby Airspeed Indicator

MARKING	KIAS	SIGNIFICANCE
Red Line	251 / 0.55M	Maximum Operating Limit (V_{MO} / M_{MO}).
White Range	62 to 112	Operating Speed Range with full flaps extended (V_{FE}).
Green Range	73 to 251	Normal operating speed.
Red Line* (* PFD only)	62	Stalling speed with landing gear and landing flaps extended (V_{SO}) at maximum weight.

NOTE

Airspeed indicator markings on the Garmin G3000 system when the stall warning icing schedule is active are shown in Paragraph 2.61.

2.7 POWER PLANT LIMITATIONS

Engine

Number of Engines	1
Engine Manufacturer	Pratt & Whitney Canada
Engine Model No.	PT6A-42A

The limits presented in the Table 2-1 shall be observed. The limitations presented do not necessarily occur simultaneously. Refer to the Pratt & Whitney Engine Maintenance Manual for specific action should any of the limits be exceeded.

Table 2-1

OPERATING CONDITION (1)	SHP	TORQUE ft-lb (2)	MAX ITT °C	Ng %	PROP RPM (7)	OIL PRESS PSI (9)	OIL TEMP °C
Take Off	600	1575	800	101.7	2000	100 - 135	0 - 99
Max Continuous	600	1575	800	101.7	2000	100 - 135	0 - 99
Min. Idle			750 (3)	63 - 65		60 min.	-40 - 99
Starting			1000 (4)			0-200 (10)	-40 min (11)
Transient			850 (5) 880 (4)	104.1 (6)	2205 (8)	40 - 200	99 - 104 (12)
Max Reverse		310 - 360	770		1900	100 - 135	0 - 99

See Notes next page.

2.7 POWER PLANT LIMITATIONS (continued)

NOTES:

(1) Engine inlet condition limit for engine operation:
(a) temperature 46°C (115°F);
(b) altitude: sea level to 30,000 ft. (temperature lapse rate of 2.0°C (3.7°F) per 1,000 ft. assumed).

(2) Torque limit applies within range of 1600 to 2000 rpm prop shaft, below 1600 rpm torque is limited to 1100 ft. lb.

(3) Applies over range 63 - 65% Ng.

(4) This value is time-limited to 5 seconds.

(5) This value is time limited to 20 seconds.

(6) This value is time-limited to 10 seconds.

(7) In flight in the absence of a minimum 40 psig oil pressure, continuous steady state propeller rotation must be prevented by propeller feathering. On the ground, with the engine shutdown, continuous propeller rotation must be prevented.

(8) May be employed in an emergency condition, at all ratings, to complete a flight.

(9) Normal oil pressure with gas generator speed above 72% speed. With engine torque below 1575 ft. lb., minimum oil pressure is 85 psig at normal oil temperature (60 to 70°C). Under emergency conditions to complete a flight, a lower oil pressure limit of 60 psig is permissible at reduced power level, not exceeding 1100 ft. lb.

(10) During extremely cold starts (less than 0°F / -17.7°C), oil pressure may reach 200 psig.

(11) Limited by oil temperature.

(12) Time limited to 10 minutes at any condition.

2.7 POWER PLANT LIMITATIONS (continued)

Fuel Limitations

Approved Aviation Fuels .... JET A, JET A-1

Anti-Icing Additive

Anti-icing additive per MIL-DTL-85470 is required for use in the above fuels in the amount by volume of .15% maximum. See Section 8 for blending and handling procedures.

Total Capacity .... 1764 lb / 263.2 U.S. gal
(800.1 kg / 996.3 liter)

Unusable Fuel... 21.4 lb / 3.2 U.S. gal
(9.7 kg / 12.1 liter)

The unusable fuel for this airplane is 10.7 lb/1.6 U.S. gal. (4.9 kg/6.1 liter) in each wing in critical flight attitudes.

Usable Fuel.. 1742 lb / 260 U.S. gal
(790.1 kg / 984.2 liter)

The usable fuel is 871 lb / 130 U.S. gal (395.1 kg / 492 liter) in each wing.

Fuel quantity indication is not accurate in uncoordinated flight.

Fuel Imbalance

The maximum allowable fuel imbalance in this airplane is 40 lb (18.1 kg).

NOTE

To ensure balanced fuel condition and avoid adverse effects on fuel quantity indication, minimize or avoid uncoordinated flight.

2.7 POWER PLANT LIMITATIONS (continued)

Oil Limitations

Oil Grade or Specification

Refer to the latest revision of Pratt & Whitney Canada, Service Bulletin 3001 for approved oils. (Refer to Section 8 for Oil Specifications.)

CAUTION

Do not mix brands or types of oils.

Total Oil System Capacity .... 12 U.S. qt (11.35 liter)
Oil Tank Capacity .... 9.2 U.S. qt (8.7 liter)

Propeller Limitations

Propeller Manufacturer	Hartzell
Propeller Model Number	HC-E4N-3Q/E8501K-3.5
Number of Propellers	1
Number of Propeller Blades	4
Propeller Diameter	
Maximum	82.5 in. (209.5 cm)
Minimum	81.5 in. (207 cm)
Propeller Operating Limits	
Maximum Normal Operation	2000 RPM
Maximum Reverse	1900 RPM
Minimum Operation During Ground Operation	1180 RPM

CAUTION

Propeller operation below 1180 RPM is prohibited.

Blade Angles at Propeller Station 30 at Hydraulic Low Pitch Stop.	
Low Pitch Stop Min./Max.	18.9°/19.1°
Feather Min./Max.	84°/85°
Reverse Min./Max.	-9.5°/-10.5°

2.9 STARTER LIMITATIONS

Use of the starter is limited to 30 seconds ON, one minute OFF, 30 seconds ON, one minute OFF, 30 seconds ON, 30 minutes OFF before a fourth start may be attempted.

2.11 GENERATOR/ALTERNATOR LIMITATIONS

Generator/Alternator	Max. Continuous Load (amps)
Starter/Generator	145
Starter/Generator (when OAT is 5°C or less)	160
Alternator Ground Operation	120
Alternator In Flight	130

2.13 BATTERY LIMITATIONS

Battery VOLTS must not be less than 24.5 Volts (GEN and ALT OFF) prior to flight.

2.15 CONTROL LEVER OPERATION

(a) POWER LEVER CONTROL

Power lever operation aft of the flight idle detent is not permitted:

1. When the engine is shut down.
2. During flight.

WARNING

Positioning the power lever aft of the flight idle stop in flight is prohibited. Such positioning may cause loss of airplane control or may result in an engine overspeed condition and consequent loss of engine power.

(b) CONDITION LEVER CONTROL

CAUTION

Do not use the COLD START position for engine starting when the oil temperature is greater than 0°C as this could result in an over-temperature condition.

1. The COLD START position should only be used during engine starting on the ground when the oil temperature is 0°C {32°F} and below.
2. The COLD START position should not be used during in-flight engine starting.

2.17 CHIP DETECTOR

Takeoff is not approved with CHIP DETECT annunciator illuminated.

2.19 POWERPLANT INSTRUMENT MARKINGS

The powerplant instrument markings are presented in Table 2-2.

Table 2-2

Instrument	Red Line	Yellow Range	Normal Operating Range	Yellow Range	Red Line
Propeller Speed (PROP RPM)	2040		1180 - 2000		1180 (4)
Engine Speed (%N_g)	101.8	0 - 62.9 (4)	63 - 101.7		
Fuel Flow - PPH Flow - KPH			0 - 600 0 - 272		
Oil Pressure - PSI	201	136 - 200	100 - 135	60 - 99 (1) 85 - 99 (2)	59 (1) 84 (2)
Oil Temp. °C	100		0 - 99	-40 - -1	-41
ITT - °C	805 (5) 1005 (3)	805-1000 (3)	0 - 800		
Torque Ft - Lb	1580		0 - 1575		

NOTES:

(1) When torque is below 1100 ft. lb.
(2) When torque is greater than or equal to 1100 ft. lb.
(3) When engine is OFF and during engine START.
(4) When 12 seconds has elapsed after engine start is complete.
(5) When N_g is greater than or equal to 60%.

2.21 WEIGHT LIMITS

Maximum Ramp Weight	6050 lb	(2744.2 kg)
Maximum Takeoff Weight	6000 lb	(2721.6 kg)
Maximum Landing Weight	5800 lb	(2631.0 kg)
Maximum Zero Fuel Weight	4850 lb	(2199.9 kg)
Maximum Weight in Baggage Compartment	100 lb	(45.3 kg)

2.23 CENTER OF GRAVITY LIMITS

Weight	Forward Limit Distance Aft of Datum	Rearward Limit Distance Aft of Datum
6050 lb (2744.2 kg)	144.00 in (365.76 cm)	146.0 in (370.84 cm)
6000 lb (2721.6 kg)	144.00 in (365.76 cm)	146.0 in (370.84 cm)
5800 lb (2630.8 kg)	141.15 in (358.52 cm)	146.0 in (370.84 cm)
4500 lb (2041.2 kg)	--	146.0 in (370.84 cm)
3925 lb (1780.4 kg)	137.0 in (347.98 cm)	--
3500 lb (1587.6 kg)	137.0 in (347.98 cm)	140.0 in (355.60 cm)

Reference Center of Gravity Limits Graph (Figure 6-16).

2.25 MANEUVER LIMITS

This is a Normal Category airplane. No acrobatic maneuvers including spins approved.

2.27 FLIGHT LOAD FACTOR LIMITS

Flaps UP	+3.6g,	-1.4g
Flaps T/O	+2.0g,	0.0g
Flaps LND	+2.0g,	0.0g

2.29 RUNWAY SURFACE

Takeoff and landing operations are limited to paved runways.

2.31 FLIGHT CREW LIMITS

The minimum required flight crew is one pilot in the left seat.

2.33 OUTSIDE AIR TEMPERATURE (OAT - Free Air Static Temperature) LIMITS

	Starting	**In-flight**
Minimum	-34°C	-54°C
Maximum	+46°C	+46°C

Ground operations with avionics on will be limited to 15 minutes for ambient temperatures at or above 46°C unless cabin air conditioning is provided.

2.35 FUEL TEMPERATURE LIMITS

Minimum Limit

Fuel Type	Starting	In-flight
Jet A	-34°C	-34°C
Jet A-1	-34°C	-41°C

Maximum Limit

Fuel Type	Starting	In-flight
Jet A	+50°C	+50°C
Jet A-1	+50°C	+50°C

NOTE

When a mixture of Jet A and Jet A-1 is present in the fuel tanks, the Jet A minimum fuel temperature limit of -34°C must be observed.

2.37 OPERATING ALTITUDE LIMITATIONS

Flight above 30,000 feet pressure altitude is not approved. Flight up to and including 30,000 feet is approved if equipped with avionics in accordance with FAR Part 91. The M600 is not Reduced Vertical Separation Minimum (RVSM) compliant.

2.39 EMERGENCY OXYGEN

A minimum of 800 psi in the emergency oxygen bottle is required for pressurized flight above 25,000 feet.

2.41 CABIN PRESSURIZATION LIMITS

(a) Maximum cabin differential pressure: 5.6 psi.
(b) Pressurized landing not approved.

2.43 MAXIMUM SEATING CONFIGURATION

The maximum seating capacity is 6 (six) persons.

2.45 SMOKING

Smoking is not permitted in the aircraft.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS

1. The Garmin G3000 Cockpit Reference Guide for the Piper PA-46-600TP, (Garmin P/N 190-02447-XX, latest revision), must be immediately available to the flight crew.

NOTE

The Cockpit Reference Guide contains additional Warnings, Cautions and Advisories with which the pilot should become familiar.

2. The Garmin G3000 System must utilize the following or later FAA approved software versions:

Sub-System	Software Version
PFD	20.8.2
MFD	20.8.2
GMA	5.10D
AHRS	2.04
ADC	2.04
GIA	2.02.1
GEA	2.11
GPS	7.00

Database versions are displayed on the MFD power-up page immediately after system power-up and must be acknowledged. The remaining system software versions can be verified by touching GTC HOME>UTILITIES>SETUP>AVIONICS SETUP.

NOTE

Some G3000 and autopilot features contained in this manual may not be available unless the latest approved software version is installed.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

3. Operation in the following regions is not authorized due to unsuitability of the magnetic fields near the Earth's poles:
   - North of 72° North latitude at all longitudes
   - South of 70° South latitude at all longitudes
   - North of 65° North latitude between longitude 75° W. and 120° W (Northern Canada)
   - North of 70° North latitude between longitude 70° W. and 128° W (Northern Canada)
   - North of 70° North latitude between longitude 85° E. and 114° E (Northern Russia)
   - South of 55° South latitude between longitude 120° E. and 165° E. (Region south of Australia and New Zealand)

4. The TAWS and terrain databases have an area of coverage as follows:
   - Terrain database covers all longitude and latitudes.
   - Obstacle database coverage includes the United States, Canada, and Europe.

NOTE

Database coverage areas may change over time. Reference the database status page to determine which regions are currently loaded to the system.

5. If the optional GDL 69 datalink is installed, weather information is limited to supplemental use only and may not be used in lieu of an official weather data source.

6. The AFCS preflight test must be successfully completed prior to use of the autopilot, flight director, or manual electric trim.

NOTE

The AFCS test mode is indicated by a red boxed "AFCS" annunciation during test. Successful completion of the test is indicated by a 2-note tone and the red "AFCS" annunciation being removed from the PFD.

7. The autopilot and yaw damper must be off during takeoff and landing.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

8. Autopilot operational limits are as follows:

Condition	Minimum Engagement Heights
Approach	200 feet AGL
Engagement after takeoff	400 feet AGL
Cruise	1000 feet AGL

Altitude	Minimum Operating Speed	Maximum Operating Speed
Below FL200	90 KIAS	251 KIAS
Above FL200	100 KIAS	251 KIAS/.55 Mach
Approach	100 KIAS	

	Pitch Up	Pitch Down	Roll
Maximum Autopilot Engagement Attitudes	50°	50°	+/-75°

9. Instrument approaches with the autopilot/flight director are limited to Category 1 precision instrument approaches and non-precision instrument approaches only.

NOTE

If coupled to the GNSS navigation while navigating to a fix on a LOC or ILS approach, the system must be set to APR mode in order to properly transition to LOC and GS. If the CDI source is changed when the autopilot is engaged in NAV mode, the autopilot lateral mode will revert to roll mode (ROL) and NAV mode must be manually reselected by the pilot.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

10. Autopilot operation with the G3000 in the reversionary (Display Backup) mode is limited to training and display failure conditions only.
11. When operating in areas where SBAS coverage is not available along the entire route of flight, the pilot must verify RAIM/FDE availability. See Section 1.21 for available FDE/RAIM prediction programs.
12. For operations within the U.S. National Airspace System on RNP and RNAV procedures when SBAS signals are not available, the availability of RAIM/FDE shall be confirmed for the intended route of flight. In the event of a predicted continuous loss of RAIM/FDE of more than five minutes for any part of the intended route of flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM/FDE requirements can be met. The flight may also be re-planned using non-GNSS based navigational capabilities.
13. For operations within European B-RNAV/RNAV 5 and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of RAIM/FDE shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM/FDE of more than five minutes for any part of the intended flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM/FDE requirements can be met.
14. For operations where the route requires oceanic/remote area (Class II) navigation, the aircraft's operator or flight crew must determine that RAIM/FDE will be available along the intended route of flight. If RAIM/FDE will be unavailable for more than 34 minutes for RNP-10 airspace or 25 minutes for RNP-4 airspace, then the operation must be rescheduled when RAIM/FDE is available.
15. Both GNSS navigation receivers, associated GTC 570 touchscreen controllers and GDU 1200 display units must be operating and providing GNSS navigation guidance for operations in the following airspace:
    a. RNP-4
    b. RNP-10
    c. Oceanic/Remote Areas (Class II navigation) (except routes requiring only one long range navigation system)

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

16. RNP and RNAV routes including Standard Instrument Departures (SIDs) and Obstacle Departure Procedures (ODPs), Standard Terminal Arrival (STAR), and enroute (including RNAV "Q" and RNAV "T" routes) must be loaded into the flight plan from the database in their entirety, rather than loading route waypoints from the database into the flight plan individually, except in cases where the procedure is not contained in the database. In such cases, route waypoints can be loaded into the flight plan by selecting and inserting individual named fixes from the database provided all fixes along the published route to be flown are inserted. Manual entry of procedure waypoints using latitude/longitude, place/bearing/distance or place/bearing is prohibited.
17. **When GPS WAAS is available**, alternate airport flight planning must be based on the straight-in or circling minimums associated with the following approaches:
    a. The RNAV (GPS) LNAV,
    b. GPS approach procedure or conventional approach procedure with "or GPS" in the title.
    c. Instrument approach procedure that is not GPS–based and is anticipated to be operational and available at the estimated time of arrival.

    Upon arrival at the alternate, if the WAAS navigation equipment indicates LNAV/VNAV, or LPV service is available, then the associated vertical guidance and minimums may be used.

    When GPS WAAS is not available, alternate airport flight planning must be based on the straight-in or circling minimums associated with the following approaches:
    a. The RNAV (GPS) LNAV,
    b. LNAV/VNAV (based on barometric vertical navigation, Baro-VNAV),
    c. Instrument approach procedure that is not GPS–based and is anticipated to be operational and available at the estimated time of arrival.

    Filing a GPS-based instrument approach at either the destination or alternate airport is acceptable, but not at both locations. The GPS receiver must have fault detection and exclusion (FDE) capability and the pilot must perform a preflight RAIM prediction at the airport where the RNAV (GPS) approach will be flown.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

18. Navigation information is referenced to the WGS-84 reference system, and can only be used where the Aeronautical Information Publication (including electronic data and aeronautical charts) conform to WGS-84 or equivalent.
19. GNSS/SBAS based IFR oceanic, enroute and terminal navigation is prohibited unless the flight crew verifies and uses a current navigation database or verifies each waypoint for accuracy by reference to current approved data.
20. The flight crew must confirm that current navigation data is available for the intended route of flight.
21. Navigation procedures with known database discrepancies must not be conducted using data from the navigation database until a new navigation database is installed in the aircraft and the discrepancy is verified to have been corrected.

NOTE

Navigation database discrepancies can be reported at FlyGarmin.com by selecting "Aviation Data Error Report." Flight crew and operators can view navigation database alerts at FlyGarmin.com then select "NavData Alerts."

22. If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.
23. The following limitations are applicable to instrument approach procedures conducted using G3000 GNSS navigation guidance:
    a. Instrument approaches using GNSS guidance may only be conducted when the system is operating in the approach mode.
    b. GNSS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is retrieved from the navigation database. The navigation database must be the current cycle.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

c. When conducting instrument approaches referenced to true North, the NAV Angle on the Setup > Avionics Settings>Units menu must be set to True.

d. Navigating the final approach segment (that segment from the final approach fix to the missed approach point) of an ILS, LOC, LOC-BC, LDA, SDF, or any other type of approach not approved for GNSS navigation guidance, is not authorized with GNSS navigation guidance. The LOC/GS receiver must be selected to fly the final approach segment of these approach procedures and localizer/glideslope deviation data must be displayed on the primary navigation display of the pilot flying.

NOTE

The navigation equipment required to join and fly an instrument approach procedure is indicated by the title of the procedure and notes on the IAP chart.

e. Advisory vertical guidance for approach procedures is provided when LNAV+V, LP+V or L/VNAV is shown as the active approach mode. When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

f. When GNSS/SBAS corrections are unavailable or if operating outside of GNSS/SBAS coverage, instrument approaches utilizing the GNSS receiver will be conducted in the approach mode and Fault Detection and Exclusion mode. Loss of Integrity annunciations must not be displayed at the Final Approach Fix. Vertical guidance from GNSS/SBAS will not be available if GNSS/SBAS corrections are unavailable or if operating outside of SBAS coverage. Barometric vertical guidance (Baro-VNAV) may be used for LNAV/VNAV approaches in the absence of SBAS coverage.

2.47 GARMIN G3000 AVIONICS SYSTEM LIMITATIONS (continued)

24. Not all published Instrument Approach Procedures (IAP) are in the navigation database. Flight crews planning to fly an RNAV instrument approach must ensure that the navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the navigation database into the GNSS system flight plan by its name. Users are prohibited from flying any approach path that contains manually entered waypoints.
25. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain and obstacle information appears on the map and terrain display pages as red and yellow tiles or towers, and is depicted for advisory use only.
26. IFR non-precision approach approval using the GNSS/SBAS sensor is limited to published approaches within the U.S. National and EASA Airspace Systems. Approaches to airports in other airspace are not approved unless authorized by the appropriate governing authority.
27. Use of the Synthetic Vision System (SVS) display elements alone for aircraft control without reference to the G3000 primary flight instruments or the aircraft standby instrument is prohibited.

    Use of the Synthetic Vision System alone for navigation, or obstacle/ terrain avoidance is prohibited.

2.48 EMERGENCY AUTOLAND (Optional)

WARNING

The Emergency Autoland system is for emergency use only. An emergency will be declared via automatic radio communications and transponder code (7700). Use of this system is prohibited during all ground and normal flight operations.

WARNING

When EAL is operating in a degraded mode, it will attempt a landing using those systems available. Under these circumstances, EAL is designed to provide only a survivable landing.

2.48 EMERGENCY AUTOLAND (Optional) (continued)

WARNING

EAL may not consider all weather factors or runway condition when selecting a destination. It is therefore possible the aircraft will depart the runway surface during landing. Additionally, EAL does not know if a runway is closed or occupied.

Loss of the Navigation Databases, Terrain Databases, or Obstacle Databases will present an EAL FAIL system message and not allow the EAL system to engage.

2.49 RADAR LIMITATIONS

Do not operate the radar during refueling operations or within 15 feet of trucks or containers accommodating flammables or explosives. Do not allow personnel within 15 feet of area being scanned by antenna when system is transmitting. Radar images beyond approximately 220 nm should not be relied upon.

2.51 TERRAIN AWARENESS AND WARNING SYSTEM (TAWS)

Navigation must not be predicated upon the terrain awareness display. The TAWS B is intended as a situational awareness tool, and should not be used as the sole means for avoiding obstacles or terrain. To avoid giving unwanted audible alerts, TAWS B should be inhibited when landing at an airport that is not included in the airport database. All TAWS B caution and warning aural alerts must be followed immediately upon receipt unless the pilot has visual contact with the terrain and can visually maintain adequate terrain/obstacle clearance. Pilots are authorized to deviate from their current ATC clearance to the extent necessary to comply with terrain/ obstacle warnings from the TAWS B per FAR 91.223.

2.53 TRAFFIC INFORMATION

The pilot should not maneuver the aircraft based on the traffic display only. The traffic display is intended to assist in visually locating traffic. The traffic display lacks the resolution necessary for use in evasive maneuvering. Maneuvers should be consistent with ATC instructions.

2.55 ELECTRONIC FLIGHT BAG (EFB)

The G3000 system as installed in this aircraft meets the criteria specified in AC120-76B for Hardware Class 3, Software Type B Electronic Flight Bag (EFB) electronic aeronautical chart applications when using current

2.55 ELECTRONIC FLIGHT BAG (EFB) (continued)

FliteChart or Chart View data. 14 CFR Part 91 operators are encouraged to have a secondary or back up source of aeronautical information necessary for the flight available to the pilot. The secondary or backup information may be either traditional paper-based material or displayed electronically. If the source of aeronautical information is in electronic format, operators must determine there is no interference between the electronic source and other aircraft equipment.

For EASA aircraft (aircraft in compliance with EASA type design TCDS IM.A.077) no EFB airworthiness approval has been obtained. Geo-referenced data (airplane symbol) presented on moving maps and electronic approach charts must be used for situational awareness only. Paper charts or other EASA approved electronically displayed information must be used as the primary source of aeronautical information. If the source of aeronautical information is electronically displayed, operators must determine noninterference with the G3000 system and existing aircraft systems for all flight phases. For EASA aircraft this limitation supersedes the first paragraph of chapter 2.55.

2.57 JEPPESEN CHARTVIEW or SafeTaxi® or GARMIN FLIGHT CHARTS LIMITATIONS

The geographic referenced aircraft symbol must not be used for navigation.

NOTE

The aircraft symbol displayed provides supplemental aircraft situation awareness information. It is not intended as a means for navigation or flight guidance. The airplane symbol is not to be used for conducting instrument approaches or departures. Position accuracy, orientation, and related guidance must be assumed by other means of required navigation.

Do not use SafeTaxi® or Chartview functions as the basis for ground maneuvering. SafeTaxi® and Chartview functions have not been qualified to be used as an Airport Moving Map Display (AMMD). SafeTaxi® and Chartview are intended to improve pilot situation awareness during ground operations and should only be used by the flight crew to orient themselves on the airport surface.

2.58 FLIGHT STREAM 510 (For EASA aircraft only - aircraft in compliance with EASA type design TCDS IM.A.077)

1. Data Received by Personal Electronic Devices (PED)

   The PED is not approved as the sole source of information to base tactical or strategic decision making and is not approved to replace the information provided by the G3000 system. The Flight Stream 510 interface and data provided to a portable electronic device is not approved to replace any required or installed aircraft display equipment, including navigation or traffic/weather display equipment. The data presented on the PED may not have the required integrity to be used as the sole source of information to base tactical or strategic decision making.

2. Flight Plan Transfer

   Use of the Flight Stream 510 for flight plan importing during critical phases of flight by the pilot flying is prohibited.

3. Electronic Flight Bag (EFB)

   Use of the Flight Stream 510 interface and data for the purpose of Electronic Flight Bag (EFB) applications is not approved. Use of any device as an EFB may require separate approvals.

2.59 ASPEN STANDBY INSTRUMENT LIMITATIONS

1. The Aspen Evolution Backup Display (EBD) Pilot's Guide P/N 091-00027-001, latest revision, must be immediately available to the flight crew.
2. The unit's internal battery must checked for proper charge prior to operations in IFR conditions. If the charge level is less than 80%, flight in IFR conditions is prohibited.
3. Use of the EBD for IFR operations within 750 nautical miles of the magnetic North or South Pole is NOT AUTHORIZED.

NOTE

See Paragraph 2.63 Kinds of Operation Equipment List for approved Types of Operations when the EBD has an invalid or failed function.

2.61 FLIGHT INTO KNOWN ICING (FIKI) LIMITATIONS

REQUIRED EQUIPMENT

The Piper M600 airplane is approved for flight into light to moderate icing conditions as defined by FAR Part 25, Appendix C, only when the following required ice protection systems and equipment are installed and functioning properly.

1. Surface De-ice System
2. Propeller De-ice System
3. Windshield Heat Anti-ice System
4. Pitot Heat Anti-ice System
5. Stall Heat Anti-ice System
6. Wing Inspection Light (Ice Light)
7. Generator and Alternator

ENVIRONMENTAL CONDITIONS

Inadvertent operation in freezing rain, freezing drizzle, or conditions defined as severe may be detected by heavy ice accumulation on the airframe and windshield, ice accumulation in areas not normally observed to collect ice, or when ice forms on the upper surface of the wing, aft of the surface de-ice boot. If these conditions are encountered, the pilot should take immediate action to exit these conditions by changing altitude or course.

Takeoff is prohibited with the following forms of contamination:

With frost adhering to the following areas:

1. Wing leading edge
2. Wing upper surface
3. Windshield

With ice, snow or slush adhering to the following areas:

1. Wing leading edge and upper wing surface
2. Flight control surfaces
3. Top of fuselage
4. Windshield
5. All static ports
6. Upper surface of engine cowling forward of windshield
7. Propeller blades
8. Engine inlet

2.61 FLIGHT INTO KNOWN ICING (FIKI) LIMITATIONS (continued)

ENVIRONMENTAL CONDITIONS (continued)

A visual and tactile (hand on surface) check of the wing leading edge and wing upper surface must be performed to ensure the wing is free from frost, ice, snow, or slush when the outside air temperature is less than 10°C (50°F) or if it cannot be determined, when wing fuel temperature is below 0°C (32°F) and:

1. there is visible moisture present (rain, drizzle, sleet, snow, fog, etc.); or
2. water is present on the wing upper surface; or
3. the difference between the dew point and the outside temperature is 3°C (5°F) or less; or
4. the atmospheric conditions have been conducive to frost formation.

OPERATING PROCEDURES

In icing conditions the airplane must be operated, and its ice protection systems used as described in the NORMAL PROCEDURES (Section 4) of this manual. Where specific operational speeds and performance information have been established for such conditions, this information must be used.

MINIMUM SPEED IN ICING CONDITIONS

Minimum speed during flight in icing conditions with flaps UP is 130 KIAS.

FLAP SETTINGS FOR OPERATION IN ICING CONDITIONS

Flaps must be UP when holding in icing conditions. Maximum flap extension is the **T/O position** with **ANY** ice accumulation on the airframe or whenever the outside air temperature (OAT) is 5°C or less and there is visible moisture present in the form of clouds, fog or mist, rain, snow, sleet or ice crystals.

MINIMUM TORQUE REQUIRED FOR PROPER SURFACE DE-ICE SYSTEM OPERATION

During flight, engine torque must be maintained at or above the following settings to assure proper surface de-ice system operation.

- 350 ft. lb. above 25,000 feet
- 250 ft. lb. at or below 25,000 feet

2.61 FLIGHT INTO KNOWN ICING (FIKI) LIMITATIONS (continued)

AUTOPILOT

Autopilot operation during icing conditions may mask cues that indicate adverse changes in aircraft handling characteristics. Autopilot operation is prohibited if any of the following conditions in icing flight are experienced:

- Severe icing conditions (reference SECTION 1 - GENERAL).
- Elevator bridging is encountered.
- Frequent autopilot trim wheel movement during straight and level flight.
- Conditions developed which cause pitch, roll or yaw servo to provide a sustained force as indicated by ELE, AIL or RUD alert annunciations in the AFCS system status field on the PFD and/or pilot qualitative evaluations.

NOTE

The autopilot must be disconnected periodically to evaluate the above mentioned conditions.

CAUTION

During flight in icing conditions, ice will form on the unprotected leading edge of the elevator, and possibly form a bridge of ice, or ice cap, between the stabilizer and the elevator. This condition may be detected and verified by visual observation, an "ELE" annunciation during autopilot operation, or an increase in elevator control forces, during straight and level flight. If ice bridging is detected or suspected, disconnect the autopilot and pulse the aircraft elevator pitch control to dislodge the ice bridge. Elapsed time between conducting elevator checks will vary, depending upon the amount and type of ice accretion. Usually 8 to 10 minutes between elevator pulsing cycles is considered sufficient.

2.61 FLIGHT INTO KNOWN ICING (FIKI) LIMITATIONS (continued)

AUTOPILOT (continued)

Minimum Autopilot Operating Speeds:

	Flaps Up	Flaps T/O	Flaps LND
With ice accretions on the airframe	130	95	N/A

SURFACE DE-ICE SYSTEM

Operation of the surface de-ice system is prohibited in temperatures below -40°C. Such operation may result in damage to the surface de-ice boots.

OAT PROBES

At M_{MO} with an OAT probe fully covered in ice, the indicated OAT could be as much as 11°C less than actual.

AIRSPEED INDICATOR MARKINGS

PFD Airspeed Indicator
(when stall warning icing schedule is active)

MARKING	KIAS	SIGNIFICANCE
Red Line	251 / 0.55M	Maximum Operating Limit (V_{MO} / M_{MO}).
White Range	75 to 147	Operating Speed Range with maximum approved flaps extended (V_{FE}).
Green Range	84 to 251	Normal operating speed.
Red Line	75	Stalling speed with landing gear and landing flaps (T/O position) extended at maximum weight.

2.63 KINDS OF OPERATION EQUIPMENT LIST

This airplane may be operated in day or night VFR and day or night IFR when the appropriate equipment is installed and operable.

The following equipment list identifies the systems and equipment which must be installed and operable for the particular kind of operation and meteorological conditions indicated.

NOTE

The following system and equipment list does not include specific flight instruments and communication/navigation equipment required by the FAR Part 91 operating requirements.

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
1. **Garmin G3000 System Equipment**		
GDU 1250W Primary Flight Display	1 (PFD1) 2	DAY, NIGHT, VFR IFR, ICING
GDU 1250W Multi-function Display	1	IFR, ICING
GTC 575 MFD/PFD Touchscreen Controller	1 (GTC1)	DAY, NIGHT, VFR, IFR, ICING
GIA 64W Integrated Avionics Unit	2	DAY, NIGHT, VFR, IFR, ICING
GEA 71B Engine Airframe Interface	1	DAY, NIGHT, VFR, IFR, ICING
GRS 79 Attitude and Heading Reference System (AHRS)	1 2	DAY, NIGHT, VFR IFR, ICING
GDC 72 Air Data Computer (ADC)	1 2	DAY, NIGHT, VFR IFR, ICING
GMU 44 Magnetometer	2	DAY, NIGHT, VFR, IFR, ICING

2.63 KINDS OF OPERATION EQUIPMENT LIST (continued)

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
2. **Flight Instrumentation**		
Standby Attitude Indicator	1	IFR, ICING
Standby Airspeed Indicator	1	IFR, ICING
Standby Altimeter	1	IFR, ICING
Standby Heading Indicator	1	IFR, ICING
Outside Air Temperature (OAT)	1	DAY, NIGHT, VFR, IFR, ICING
Clock	1	IFR, ICING
3. **Engine Instrumentation**		
Torquemeter	1	DAY, NIGHT, VFR, IFR, ICING
Propeller Speed (PROP RPM)	1	DAY, NIGHT, VFR, IFR, ICING
Interstage Turbine Temperature	1	DAY, NIGHT, VFR, IFR, ICING
Gas Generator Tachometer (Ng)	1	DAY, NIGHT, VFR, IFR, ICING
Oil Pressure	1	DAY, NIGHT, VFR, IFR, ICING
Oil Temperature	1	DAY, NIGHT, VFR, IFR, ICING

2.63 KINDS OF OPERATION EQUIPMENT LIST (continued)

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
4. **Miscellaneous Instrumentation**		
Fuel Quantity Left and Right Tanks	2	DAY, NIGHT, VFR, IFR, ICING
Fuel Temperature	1	DAY, NIGHT, VFR, IFR, ICING
Voltmeter	1	DAY, NIGHT, VFR, IFR, ICING
DC Ammeter (Generator)	1	DAY, NIGHT, VFR, IFR, ICING
DC Ammeter (Alternator)	1	ICING
5. **Equipment/ Furnishings**		
Safety Restraint Each Occupant	AR	DAY, NIGHT, VFR, IFR, ICING
6. **Engine**		
Starter Generator	1	DAY, NIGHT, VFR, IFR, ICING
Alternator	1	ICING
Lt Fuel Pump	1	DAY, NIGHT, VFR, IFR, ICING
Rt Fuel Pump	1	DAY, NIGHT, VFR, IFR, ICING
Firewall Fuel Shutoff Valve	1	DAY, NIGHT, VFR, IFR, ICING

2.63 KINDS OF OPERATION EQUIPMENT LIST (continued)

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
7. **Flight Controls**		
Flap Position	1	DAY, NIGHT, VFR, IFR, ICING
Pitch Trim Position	1	DAY, NIGHT, VFR, IFR, ICING
Yaw Trim Position	1	DAY, NIGHT, VFR, IFR, ICING
8. **Ice Protection**		
Heated Windshield	1	DAY, NIGHT, VFR, IFR, ICING
Heated Pitot Head	1 (pilot) 2	DAY, NIGHT, VFR IFR, ICING
Pneumatic Deice System (Wing and Empennage Protection)	1	ICING
Horizontal Tail Heaters	2	ICING
Electrothermal Propeller Deice System	1	ICING
Heated Stall Warning Vane	1	ICING
Wing Ice Detection Light	1	ICING
Alternate Static Source	1	ICING

2.63 KINDS OF OPERATION EQUIPMENT LIST (continued)

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
9. **Landing Gear**		
Hydraulic Pump	1	DAY, NIGHT, VFR, IFR, ICING
Landing Gear Position Indications	3	DAY, NIGHT, VFR, IFR, ICING
10. **Lights - External**		
Landing Light	1	NIGHT
Position Lights a. Left Wing - Red and White	1 ea.	NIGHT
b. Right Wing - Green and White	1 ea.	NIGHT
Anti-Collision (Strobe) Lights	3	DAY, NIGHT, VFR, IFR, ICING
Taxi/Rec Lights	2	NIGHT

2.63 KINDS OF OPERATION EQUIPMENT LIST (continued)

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
11. **Lights - Cockpit**		
Switch	1	NIGHT
Panel	1	NIGHT
Avionics	1 (pilot)	NIGHT
Panel Flood	AR	NIGHT
Dome (map)	1 (pilot)	NIGHT
12. **Pressurization**		
Cabin Altitude	1	DAY, NIGHT, VFR, IFR, ICING
Cabin Differential Pressure	1	DAY, NIGHT, VFR, IFR, ICING
Cabin Vertical Speed	1	DAY, NIGHT, VFR, IFR, ICING
Outflow Valves	2	DAY, NIGHT, VFR, IFR, ICING
Cabin Pressure Control System	1	DAY, NIGHT, VFR, IFR, ICING

2.63 KINDS OF OPERATION EQUIPMENT LIST (continued)

System	Number Required	Types of Operation and Remarks (DAY, NIGHT, VFR, IFR and ICING Conditions)
13. **Miscellaneous System**		
Stall Warning	1	DAY, NIGHT, VFR, IFR, ICING
Crew Alerting System (CAS)*	1	DAY, NIGHT, VFR, IFR, ICING

* Includes all associated sensors which the CAS system monitors.

2.65 PLACARDS

THIS AIRCRAFT MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS.
NO ACROBATIC MANEUVERS, INCLUDING SPINS, APPROVED.
THIS AIRCRAFT APPROVED FOR V.F.R., I.F.R., DAY AND NIGHT ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH THE AIRPLANE FLIGHT MANUAL.

WARNING

TURN OFF STROBE LIGHTS WHEN IN CLOSE PROXIMITY TO GROUND OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE.
PRESSURIZED LANDING NOT APPROVED.

ALTERNATE STATIC SOURCE

(LOCATED PILOTS SIDE BELOW PANEL)
UP - ALTERNATE
DOWN - PRIMARY

2.65 PLACARDS (continued)

If equipped with Stormscope:

STORMSCOPE NOT TO BE USED FOR
THUNDERSTORM AREA PENETRATION

On the fuel shutoff cover below power console:

FUEL SHUTOFF
LIFT COVER - PULL OFF

2.65 PLACARDS (continued)

On the copilot's side panel:

EMERGENCY OXYGEN
IN DRAWER UNDER SEAT
(AISLE ACCESS)

PULL MASK OUT OF DRAWER FULLY
AT FULL EXTENSION, PULL CORD
MAXIMUM DURATION ········ 15 MINS
SEE POH
NO SMOKING WHILE IN USE

On the pyramid cabinet behind the copilot's seat:

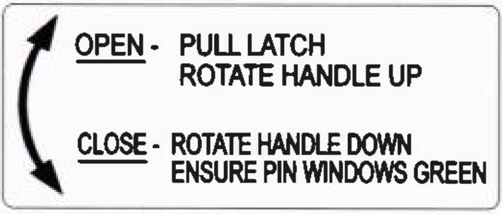
OXYGEN ONLY
NO STOWAGE

PILOT OXYGEN
OFF ON

FIRE EXTINGUISHER
IN DRAWER

2.65 PLACARDS (continued)

To the right of the handle on the upper cabin door (inside aircraft):



On the upper edge of the cabin lower door:

On the handle of the upper cabin door (outside aircraft):

On the edge of table:

TABLE MUST BE STOWED FOR
TAKEOFF AND LANDING

TOTAL MAXIMUM WEIGHT CAPACITY
OF THIS TABLE IS 5 LB (2.3 KG)

2.65 PLACARDS (continued)

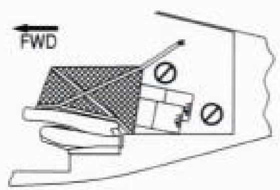
Over the emergency exit handle:

EMERGENCY EXIT
REMOVE GLASS
PULL DOOR IN - LIFT UP

STANDARD CARGO NET INSTALLED

MAX BAGGAGE THIS COMPARTMENT
100 LBS (45.3 KG)

GOLF CARGO NET INSTALLED



NO BAGGAGE PERMISSIBLE IN THESE AREAS WHEN THE GOLF NET IS IN USE

MAX GOLF CLUB LOAD
105 LBS (47.6 KG)

MAX ADDITIONAL BAGGAGE
BEHIND LEFT SEAT
50 LBS (22.6 KG)

On inside of aft fuselage stowage door:

MAXIMUM WEIGHT THIS
COMPARTMENT 4 LBS (1.8 KG)

2.65 PLACARDS (continued)

Around wing fuel caps:

Under each wing:

FUEL SUMP
DRAIN-PUSH

Near right and left aft nose gear door:

FUEL RETURN
DRAIN-PUSH

Near left forward nose gear door:

FUEL FILTER
DRAIN-PUSH

2.65 PLACARDS (continued)

On the brake fluid reservoir:

BRAKE FLUID
RESERVOIR
SERVICE USING
MIL-PRF-5606 OR EQUIVALENT

On the inboard section of the left flap:

NO
STEP

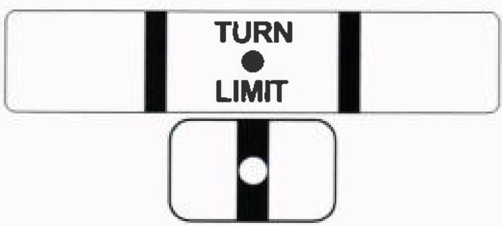
Inside the external power receptacle door:

STARTING PROCEDURE
FOR EXTERNAL POWER
MASTER SWITCH AND
RADIOS MUST BE OFF
SEE AIRPLANE FLIGHT
MANUAL FOR
DETAILED INSTRUCTIONS

Outside the external power receptacle door:

EXTERNAL POWER
28 VOLTS D.C.
TURN MASTER SWITCH
AND ALL EQUIP. OFF
BEFORE INSERTING
PLUG

On the nose gear strut:



2.65 PLACARDS (continued)

TIRE AND STRUT
SERVICE INSTRUCTIONS

INFLATE MAIN GEAR TIRE TO 95 PSI AIR PRESSURE. SEE MAINTENANCE MANUAL FOR STRUT SERVICING INSTRUCTIONS. WITHOUT THE WEIGHT OF AIRCRAFT, THE AIR OR NITROGEN PRESSURE SHALL BE ADJUSTED TO 275 ±4 PSI.

TIRE AND STRUT
SERVICE INSTRUCTIONS

INFLATE NOSE GEAR TIRE TO 88 PSI AIR PRESSURE. SEE MAINTENANCE MANUAL FOR STRUT SERVICING INSTRUCTIONS. WITHOUT THE WEIGHT OF AIRCRAFT, THE AIR OR NITROGEN PRESSURE SHALL BE ADJUSTED TO 160 ±4 PSI.

2.65 PLACARDS (continued)

On the backside of the oil filler door:

ENGINE OIL SPECIFICATION
DO NOT MIX DIFFERENT BRANDS OF OIL.
OIL TANK CAPACITY: 9.2 QTS / 8.7 L. DO NOT OVERFILL
FILL WITH APPROVED OIL TO MAXIMUM MARK ON DIP STICK.
SEE LATEST REVISION OF PRATT & WHITNEY CANADA ENGINE SERVICE BULLETIN SB 3001 FOR LIST OF APPROVED LUBRICATING OILS.

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SECTION 3

EMERGENCY PROCEDURES

SECTION 3

EMERGENCY PROCEDURES

3.1 GENERAL

This section provides the recommended procedures for handling various emergency or critical situations. All emergency procedures required by the FAA are presented, along with those necessary for operation of the airplane. Emergency procedures associated with optional systems and equipment which require handbook supplements are presented in Section 9, Supplements. Checklists within this section are divided into two distinct parts.

1. The Emergency Procedures Checklists, depicted within boxes, describe action sequences that should be followed during critical situations.
2. When applicable, amplified procedures are provided immediately below the relevant Emergency Procedures Checklist, to enhance the pilot's understanding of the procedure.

Pilots must familiarize themselves with the procedures in this section and must be prepared to take the appropriate action should an emergency situation arise. The procedures are offered as a course of action for handling the particular situation or condition described. They are not a substitute for sound judgement and common sense.

Most basic emergency procedures are a normal part of pilot training. The information presented in this section is not intended to replace this training. In order to remain proficient, pilots should periodically review standard emergency procedures.

NOTE

The latest appropriate revision of the Garmin G3000 Cockpit Reference Guide for the Piper PA-46-600TP (Garmin P/N 190-02447-XX), and the Garmin G3000 Pilot's Guide for the Piper PA-46-600TP (Garmin P/N 190-02446-XX), contain detailed descriptions of the annunciator system, including all CAS messages, PFD and MFD annunciations, and aural alerts.

3.1 GENERAL (continued)

Crew Alerting System (CAS)

NOTE

Depending on system software version and optional systems installed, not all annunciator system (CAS and Non-CAS) messages listed in this handbook are applicable.

The following tables show the color and significance of the CAS Warning, Caution and Advisory text messages which may appear on the Garmin G3000 displays.

3.1 GENERAL (continued)

Warning Messages – Red – Triple Chime

CAS Event	CAS Message	Checklist Page	Cause*
CAS Warnings with Text Messages			
Alternator Failure	ALTERNATOR FAIL	3-54 3-55	Alternator has failed.
Automatic Descent	AUTO DESCENT	3-100 3-121	Posted if HYPOXIA ALERT caution message not acknowledged in 60-seconds. If AUTO DESCENT message is not acknowledged in 60-seconds, the aircraft will begin descent to 14,000 ft. If no pilot interaction detected for 4-minutes after reaching 14,000 ft., the aircraft will begin descent to 12,500 ft.
Engine Bleed is Over Temperature	BLEED OVERTEMP	3-104	Temperature in the bleed air duct is higher than 350°F.
Cabin Altitude is 12,000 ft or Higher	CABIN ALT 12K	3-99	Cabin altitude is above 12,000 feet.
Landing Gear are Not Down and Locked. Aural Alert "Check Gear" OR Landing Gear is Selected UP When on Ground	CHECK GEAR	3-47	Landing gear is not down and locked when aircraft is below 400 feet AGL and torque is less than 420 ft-lb (mutable aural) or flaps are set to LND (non-mutable aural) or when below 400 feet AGL when flaps are set to T/O and torque is less than 1000 ft-lb (non-mutable). OR The landing gear selector is in the UP position when the airplane is on the ground.
Cabin Door is Not Closed	DOOR AJAR	3-117	Cabin door is not properly closed and latched while the engine is operating.
Emergency Autoland switch is stuck ON	EAL SWITCH STUCK	3-123	The Emergency Autoland switch on the instrument panel is stuck ON.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Warning Messages – Red (continued)

CAS Event	CAS Message	Checklist Page	Cause*
CAS Warnings with Text Messages (continued)			
Engine Fire (Optional)	ENGINE FIRE	3-35 3-36	Over temperature condition detected in the engine compartment, possibly due to fire.
Flap Configuration/ Position Not Authorized	FLAP CONFIG	3-51	The flaps are in the LND position when the icing schedule is active.
Flap System Failure	FLAP FAIL	3-51	Wing flap system failure due to an overcurrent condition in the flap motor/actuator circuit
Fuel Pressure is Low	FUEL PRESS LOW	3-92	Fuel pressure is less than 10 PSIG.
Fuel Quantity in Warning Range	FUEL QTY	3-93	Total fuel quantity is less than 100 lbs.
Landing Gear System Failure	GEAR SYS	3-48 3-50	Landing gear system malfunction while on the ground.
Generator Failure	GENERATOR FAIL	3-53 3-55	Generator has failed.
Hydraulic Pump is operating when it should not be operating	HYDR PUMP ON	3-46	Landing gear hydraulic pump is operating while the aircraft is on the ground.
L and R Pitot Heat Failure	PITOT HT FAIL	3-110	Both left and right pitot heaters have failed.
Propeller Heat Failure	PROP HEAT FAIL	3-113	A fault has developed in the propeller heat system.
Stall Heat Failure	STALL HEAT FAIL	3-111	Stall heater not providing proper amount of heat.
Aircraft not configured properly for takeoff	T/O CONFIG	3-18	Engine torque greater then 800 ft-lb. Flaps greater than T/O. Rudder or elevator not within green band.
Underspeed Protection	USP ACTIVE	3-83	Autopilot is engaged and the airspeed has fallen below the USP threshold or stall warning has activated.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Warning Indications – Red (continued)

CAS Event	CAS Message	Checklist Page	Cause*
CAS Warnings with EIS Indications			
Alternator Amperage	-	3-54	Alternator is producing greater than 130 amps.
Cabin Differential Pressure	-	3-89	Cabin differential pressure is greater than 5.6 psi.
Generator Amperage	-	3-53	Generator is producing greater than 145 amps when OAT is greater than 5°C or producing greater than 160 amps when OAT is 5°C or less.
Inter-Turbine Temperature	-	-	ITT exceeds 1005° C during engine start or 805° C after engine start.
Landing Gear Failure	-	3-50	Malfunction in any of the landing gear as indicated by a red circle on the landing gear display.
Ng Overspeed	-	-	Ng is greater than 101.7%.
Oil Pressure	-	3-26	**For torque greater than 1100 ft-lb:** Oil pressure less than 85 psi or greater than 200 psi. **For torque less than 1100 ft-lb:** Oil pressure less than 60 psi or greater than 200 psi.
Oil Temperature	-	3-25	Oil Temperature is in the warning range (less than -40° C or greater than 99° C).
Propeller Speed	-	3-34	Propeller speed is in the warning range (less than 1180 or greater than 2040 RPM)
Torque	-	-	Torque is greater than 1575 ft-lb.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Warning Indications – Red (continued)

CAS Event	CAS Message	Checklist Page	Cause*
CAS Warnings with EIS Indications			
Voltage	-	3-53 thru 3-55	Main electrical bus voltage is outside the following normal operating ranges: On Ground - between 24V and 32V. In Flight - between 25V and 32V. Or when operating on EMER bus and voltage is less than 24V.
Fuel Quantity		N/A	Left or right fuel quantity less than 50 pounds.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Caution Messages - Amber

CAS Event	CAS Message	Checklist Page	Cause*
CAS Cautions with Text Messages			
Propeller is in Beta in flight	BETA	3-30	Power lever is selected below flight idle position in flight.
Cabin altitude is 10,000 ft or higher	CABIN ALT 10K	3-98	Cabin altitude is above 10,000 feet.
Landing gear are not down and locked. Aural Alert "Check Gear"	CHECK GEAR	3-47	Landing gear is not down and locked when aircraft is higher than 400 feet AGL and torque is less than 420 ft-lb (mutable aural) or flaps are set to LND (non-mutable aural) or when between 400 - 800 feet AGL when flaps are set to T/O and torque is less than 1000 ft-lb (non-mutable).
Engine oil is contaminated	CHIP DETECT	3-27	Ferrous metal particles have been detected in the engine oil system.
Pressurization System Failure	CPCS FAIL	3-102	The CPCS internal test has failed at any time or CPCS communications have failed while on the ground.
Pressurization System Fault	CPCS FAULT	3-103	CPCS communications have failed while in flight.
Flaps Mismatch after EAL deactivation	EAL FLAPS MM	3-124	Flaps were activated by EAL; Flap lever position does not match.
Gear Mismatch after EAL deactivation	EAL GEAR MM	3-124	Gear was activated by EAL; Gear lever position does not match.
EAL will activate in 30 seconds	EAL IN 30 SEC	3-121	EAL will automatically activate in 30 seconds.
Pitot Heat Mismatch after EAL deactivation	EAL PITOT HT MM	3-124	Pitot heat was activated by EAL; Switch position does not match.
Propeller Heat Mismatch after EAL deactivation	EAL PROP HT MM	3-124	Propeller heat was activated by EAL; Switch position does not match.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Caution Messages - Amber (continued)

CAS Event	CAS Message	Checklist Page	Cause*
CAS Cautions with Text Messages (continued)			
Stall Heat Mismatch after EAL deactivation	EAL STALL HT MM	3-124	Stall heat was activated by EAL; Switch position does not match.
Surface De-ice Mismatch after EAL deactivation	EAL SURF DEICE MM	3-124	Surface De-ice was activated by EAL; Switch position does not match.
Windshield Heat Mismatch after EAL deactivation	EAL WSHD HT MM	3-124	Windshield heat was activated by EAL; Switch position does not match.
Propeller is feathered	FEATHER	3-29	Indicates that the condition lever has moved to cut-off/ feather when RPM is greater than 1350.
Fuel filter is contaminated	FUEL FILTER	3-94	Fuel filter contamination level is approaching the bypass mode and requires maintenance.
Fuel imbalance	FUEL IMBALANCE	3-95	Fuel quantity imbalance greater than 40 pounds.
Total fuel quantity in caution range	FUEL QTY	3-93	Total fuel quantity is less than 180 pounds, but greater than 100 pounds.
Landing gear system failure	GEAR SYS	3-48	Landing gear system malfunction while in flight.
Hydraulic pump is running when it should not be running.	HYDR PUMP ON	3-46	Landing gear hydraulic pump has been operating for more than 20 seconds in flight.
Hypoxia Alert	HYPOXIA ALERT	3-100	The ARE YOU ALERT? advisory message not acknowledged within 60-seconds.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Caution Indications - Amber (continued)

CAS Event	CAS Message	Checklist Page	Cause*
CAS Cautions with EIS Indications			
Cabin Emergency Oxygen has been activated	OXYGEN	3-118	One or more of the passenger emergency oxygen generators are activated while the aircraft is in flight.
Pitot heat selected OFF	PITOT HEAT OFF	3-112	PITOT HEAT is NOT selected ON (no chime accompanies this CAS message).
L Pitot heat failure	L PITOT HT FAIL	3-108	Left pitot heat has failed, and right pitot heat is operational.
R Pitot heat failure	R PITOT HT FAIL	3-109	Right pitot heat has failed, and left pitot heat is operational.
Stall heat selected OFF	STALL HEAT OFF	3-112	STALL HEAT is NOT selected ON (no chime accompanies this CAS message).
Stall Warning system failure	STALL WARN FAIL	3-116	The lift computer and/or lift transducer has failed.
Starter motor energized when engine is running	START ENGAGED	3-28	Starter is engaged after Ng has reached 56%.
Surface de-ice system failure	SURF DEICE FAIL	3-115	A failure is detected in the de-ice boot system which compromises inflation or deflation.
Horizontal tail heater failure	TAIL HEAT FAIL	3-115	One or both of the horizontal tail heaters has failed.
Windshield Overtemperature	WNDSHLD OVRTEMP	3-114	Windshield temperature exceeds 160°F or the windshield temperature sensor has failed.
Fuel Quantity	---	N/A	Left or right fuel quantity between 50 and 90 pounds.
Inter-turbine Temperature	---	N/A	ITT in the caution ranges.
Low NG	---	N/A	Gas generator speed is less than 63%.
Oil Temperature	-	3-25	Oil temperature is in the caution range (from -40° C to 0° C).

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Advisory Messages - White

CAS Event	CAS Message	Checklist Page	Cause*
CAS Advisories with Text Messages			
Determine Pilot Alertness	ARE YOU ALERT?	3-100	Posted automatically after some period of pilot inactivity.
Alternator switch OFF	ALTERNATOR OFF	-	The alternator switch is selected OFF.
Propeller is in Beta range	BETA	-	Power lever is selected below flight idle position and propeller blade angle is below low pitch stop on ground.
Cabin door is not closed	DOOR AJAR	3-117	Cabin door is not properly closed and latched while on the ground with the engine not operating.
EAL will activate in 1 minute	EAL IN 1 MIN	3-121	EAL will automatically activate in 1 minute.
Emergency bleed is on	EMER BLEED ON	3-101	Emergency bleed system has been activated automatically at a cabin altitude above 12,000 ft., or manually by the pilot.
Propeller is feathered	FEATHER	-	Indicates that the propeller is feathered during shutdown and the feathering electrical system is operating properly.
Fire detection system failure	FIRE DETECT FAIL	-	The optional fire detection system has failed.
Left fuel pump is on	L FUEL PUMP ON	-	Left fuel pump is operating and delivering 4.5 psig minimum.
Right fuel pump is on	R FUEL PUMP ON	-	Right fuel pump is operating and delivering 4.5 psig minimum.
Fuel Temperature Low	FUEL TEMP	3-96	Fuel Temperature is less than -34 deg C

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

Advisory Messages - White (continued)

CAS Event	CAS Message	Checklist Page	Cause*
CAS Advisories with Text Messages			
Generator switch OFF	GENERATOR OFF	-	The generator switch is selected OFF.
Engine ignition is on	IGNITION ON	-	Ignition switch is selected to MANUAL or engine torque is below 450 ft-lbs when ignition switch is selected to AUTO.
Cabin Emergency Oxygen has been activated	OXYGEN	3-118	One or more of the passenger emergency oxygen generators are activated while the aircraft is on the ground.
The stall warning system is not being heated	STALL HEAT INHIB	-	The stall warning heating system is inhibited when the STALL HEAT switch is selected ON and OAT is greater than 5° C.
The stall warning system is biased for icing conditions	S WARN ICE SCHD	-	The icing stall warning schedule is active until deactivated by the pilot or subsequent power cycle.
Starter motor energized	START ENGAGED	-	The starter is engaged and operating properly.
Aircraft not configured properly for takeoff	T/O CONFIG	3-18	Fuel pumps or Ignition not in manual. Autopilot or Yaw Damper not disengaged. Flaps greater than T/O. Rudder or elevator not within green band.

* CAS Messages/Alerts may have small time delays to avoid nuisance alarms.

3.1 GENERAL (continued)

PFD Annunciations and Alerts

The Garmin G3000 System produces a number of PFD and MFD annunciations outside of the Crew Alerting System (CAS). These annunciations are not accompanied by master WARNING or master CAUTION alerts and are displayed in dedicated areas of the PFD or MFD. Various aural alerts (voice or chime) may accompany PFD and MFD annunciations and no pilot action is required to acknowledge them.

Comparator Annunciations

Comparator Text	Condition
ALT	White annunciation when altitude data is not available from one or both ADCs, or amber annunciation when the difference between ADC1 and ADC2 altitude exceeds 200 feet.
IAS	White annunciation when airspeed data is not available from one or both ADCs, or amber annunciation when the difference between ADC1 and ADC2 airspeed exceeds 7 knots.
HDG	White annunciation when heading data is not available from one or both AHRS, or amber annunciation when the difference between AHRS1 and AHRS2 heading exceeds 6 degrees.
PIT	White annunciation when pitch data is not available from one or both AHRS, or amber annunciation when the difference between AHRS1 and AHRS2 pitch exceeds 5 degrees.
ROL	White annunciation when roll data is not available from one or both AHRS, or amber annunciation when the difference between AHRS1 and AHRS2 roll exceeds 6 degrees.

ISSUED: July 3, 2018
REVISED: May 15, 2020

3.1 GENERAL (continued)

PFD Annunciations and Alerts (continued)

Reversionary Sensor Annunciations

Reversionary Sensor Window Text	Condition
BOTH ON ADC1	Both PFD's are displaying data from ADC1.
BOTH ON ADC2	Both PFD's are displaying data from ADC2.
BOTH ON AHRS1	Both PFD's are displaying data from AHRS1.
BOTH ON AHRS2	Both PFD's are displaying data from AHRS2.
BOTH ON GPS1	Both PFD's are displaying data from GPS1.
BOTH ON GPS2	Both PFD's are displaying data from GPS2.
USING ADCx	The PFD displaying this annunciation is displaying data from the cross-side ADC.
USING AHRSx	The PFD displaying this annunciation is displaying data from the cross-side AHRS.

3.1 GENERAL (continued)

PFD Annunciations and Alerts (continued)

Miscellaneous Annunciations

Text	Condition
MAXSPD	Aircraft actual or projected airspeed exceeds V_{MO}/M_{MO}.
MINSPD	Airspeed is below the minimum approved autopilot operating airspeeds with autopilot or flight director engaged. See Section 2 - Limitations.
EXT1	Left EAL brake control failure; Produces an EAL DEGRADED system message.
EXT2	Right EAL brake control failure; Produces an EAL DEGRADED system message.
AT	Emergency autothrottle control failure; Produces an EAL FAIL system message.
RA FAIL	Radar altimeter data becomes invalid; Produces an EAL DEGRADED system message.
LOW ALT	When the Final Approach Fix (FAF) is the active waypoint in a GPS SBAS approach using vertical guidance and the current altitude is at least 164 feet below the prescribed altitude at the FAF. Note: This annunciation is available only when SBAS is available and terrain alerting is inhibited, is unavailable, or has failed.

3.1 GENERAL (continued)

Aural Alerts

- Master Warning - Repeating triple chime.
- Master Caution - Non-repeating double chime.
- Advisory - Non-repeating single chime.
- Airspeed greater than VMO/MMO - "Airspeed...Airspeed" voice alert.
- Airspeed Trend Vector less than 85 knots (non-icing) or 90 knots (icing with flaps T/O) or 105 knots (icing with flaps UP) with the autopilot engaged and USP installed - "Airspeed" voice alert.
- Autopilot disconnect and successful completion of autopilot preflight test - Autopilot disconnect tone.
- Terrain cautions/warnings - various voice alerts.
- Automatic autopilot engagement from ESP - "Engaging Autopilot" voice alert.
- Traffic System - various voice alerts.
- Stall Warning - "Stall...Stall" voice alert.
- Landing gear position - "Check Gear" voice alert.
- 500 feet above the terrain or runway threshold - "Five Hundred" voice alert.
- MDA/DA if set by the pilot - "Minimums...Minimums" voice alert.
- SurfaceWatch voice alerts.
- "Incoming Call" voice alert when optional Iridium phone senses incoming call.
- "Time Expired" voice alert when countdown timer reaches zero.
- "Vertical Track" voice alert when aircraft is one minute from VNAV Top of Desent.
- When the aircraft is passing through 1000 ft from the selected altitude and when +/-200 feet of the selected altitude after altitude capture - Altitude alert tone.
- Emergency Autoland (if installed) - various voice alerts and instructions.

3.1 GENERAL (continued)

System Messages

The G3000 system generates several system messages. A new system message causes the MSG softkey to flash on either touchscreen controller. To access the system messages, press the MSG softkey, then press the System Messages tab in the Notifications window. Pressing the MSG softkey again will hide the Notifications window.

Circuit Breakers

Opening and closing a circuit breaker to "reset" a system may be identified in various procedures, and is acceptable. A circuit breaker that trips in flight should only be reset if necessary for the continuation of the flight. If a circuit breaker is reset and trips again, it should not be reset. Fuel system circuit breakers should not be reset if they trip in flight.

Overriding Considerations

In all emergencies, the overriding consideration must be to:

- Maintain airplane control.
- Analyze the situation.
- Take proper action.

Terminology

Many emergencies require some urgency in landing the aircraft. The degree of urgency varies with the emergency; therefore the terms "land as soon as possible" and "land as soon as practical" are employed. These terms are defined as follows:

Land as soon as possible

A landing should be accomplished at the nearest suitable airfield considering the severity of the emergency, weather conditions, field facilities, and ambient lighting.

Land as soon as practical

Emergency conditions are less urgent, and although the flight should be terminated, the emergency is such that an immediate landing at the nearest suitable airfield may not be necessary.

3.3 AIRSPEEDS FOR EMERGENCY OPERATIONS

STALL SPEEDS

6000 LBS (Gear UP, Flaps UP)...73 KIAS
6000 LBS (Gear DOWN, Flaps LND) ....62 KIAS

MAXIMUM OPERATING MANEUVERING SPEED (Vo)

6000 LBS...153 KIAS
3750 LBS...121 KIAS

BEST GLIDE (Propeller Feathered, Gear UP, Flaps UP)

6000 LBS...115 KIAS
5000 LBS...105 KIAS
4000 LBS...94 KIAS

WITH ICE ACCRETIONS (~45 minutes of ice accumulation)

STALL SPEEDS

6000 LBS (Gear DOWN, Flaps UP) ....85 KIAS
6000 LBS (Gear DOWN, Flaps T/O) ....75 KIAS

BEST GLIDE (Propeller Feathered, Gear UP, Flaps UP)

6000 LBS...115 KIAS
5000 LBS...105 KIAS
4000 LBS...94 KIAS

3.5 TAKEOFF CONFIGURATION ERROR

Takeoff Configuration Error

Indication: Advisory Message, T/O CONFIG

Flaps .... SET to T/O
Elevator Trim .... SET in Green Band
Rudder Trim .... SET in Green Band
FUEL PUMPS Switch .... MAN
IGNITION Switch .... MAN
Autopilot .... DISENGAGED
Yaw Damper .... DISENGAGED

Indication: Master Warning, Triple Chime, T/O CONFIG

CAUTION

Takeoff distances may be longer than published.

FLAPS .... SET to T/O
Elevator Trim .... SET in Green Band
Rudder Trim .... SET in Green Band

The T/O CONFIG advisory will remain on during taxi until the BEFORE TAKEOFF checklist has been completed.

3.7 REJECTED TAKEOFF

Rejected Takeoff

POWER Lever .... IDLE
Braking .... AS REQUIRED
Reverse .... AS REQUIRED

If insufficient runway remains for a safe stop:

CONDITION Lever .... CUT-OFF / FEATHER
BATTERY Switch .... OFF
Firewall FUEL SHUTOFF Valve .... LIFT COVER - PULL OFF

Maneuver as necessary to avoid obstacles.

After the aircraft has stopped - EVACUATE.

3.9 ENGINE FAILURE

3.9a Engine Failure Before Rotation

POWER Lever .... IDLE
Braking .... AS REQUIRED
STOP STRAIGHT AHEAD

If insufficient runway remains for a safe stop:

CONDITION Lever ....CUT-OFF / FEATHER
BATTERY Switch .... OFF
Firewall FUEL SHUTOFF Valve .... LIFT COVER - PULL OFF

Maneuver as necessary to avoid obstacles.

After the aircraft has stopped - EVACUATE.

3.9 ENGINE FAILURE (continued)

3.9b Engine Failure Immediately After Takeoff

If sufficient runway remains for a normal landing, land straight ahead. If insufficient runway remains for a normal landing, use shallow turns to avoid obstacles while maintaining a safe airspeed.

If flaps in T/O position:

Airspeed .... 95 KIAS
LANDING GEAR .... DOWN (if desired)
POWER Lever .... IDLE
CONDITION Lever .... CUT-OFF / FEATHER

If flaps in UP position:

Airspeed .... 110 KIAS
LANDING GEAR .... DOWN (if desired)
POWER Lever .... IDLE
CONDITION Lever .... CUT-OFF / FEATHER

Prior to landing:

FLAPS .... LND
Airspeed .... 85 KIAS

If time permits:

BATTERY Switch .... OFF
Firewall FUEL SHUTOFF Valve .... LIFT COVER - PULL OFF

Maneuver as necessary to avoid obstacles.

After the aircraft has stopped – EVACUATE.

3.9 ENGINE FAILURE (continued)

3.9c Engine Failure in Flight

Pilot Emergency Oxygen ....DON MASK (if required)
Passenger Emergency Oxygen .... ACTIVATE and DON MASK (if required)
MIC SEL Switch .... MSK (if required)
Airspeed.. 115 KIAS
(Refer to Range and Endurance Figure 5-35)
POWER Lever.. IDLE
CONDITION Lever ....CUT-OFF / FEATHER
Propeller ....VERIFY FEATHERED

CAUTION

The battery switch must be ON to feather the propeller.

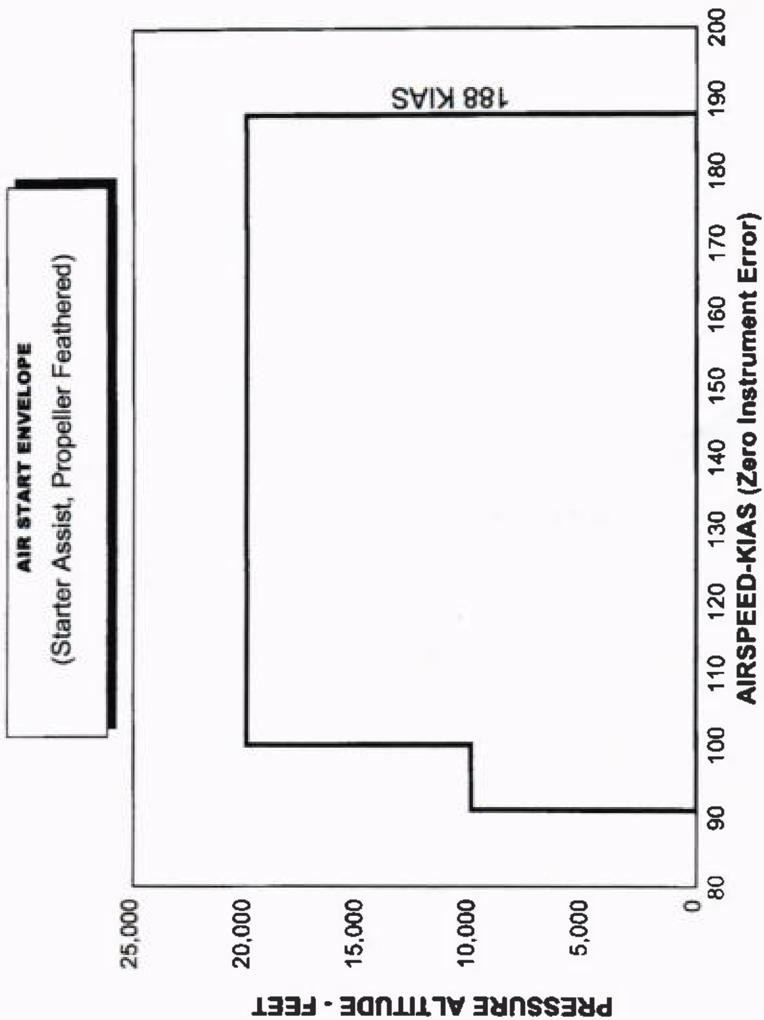
Remaining Fuel ....CHECK
Air Start ....Refer to Air Start procedure Paragraph 3.9d.

If above the airstart envelope (Figure 3-1), descend into the envelope and make an airstart per this section. Use emergency oxygen as required. Perform a normal descent or emergency descent as appropriate.

If engine air start is not successful, proceed with the Power Off Landing procedure per Paragraph 3.27.

3.9 ENGINE FAILURE (continued)

Air Start Envelope



Air Start Envelope
Figure 3-1

3.9 ENGINE FAILURE (continued)

3.9d Air Start - Starter Assist

Autopilot .... DISCONNECT
CONDITION Lever .... CUT-OFF / FEATHER
Altitude & Airspeed .... WITHIN THE AIR START ENVELOPE
POWER Lever .... IDLE
GEN Switch .... OFF
ALT Switch .... OFF

NOTE

If conditions permit, turning off the high current items such as air conditoning, blower fan, windshield heat, stall heat, and pitot heat will allow the battery to retain additional capacity to use for engine starting.

Electrical Load .... REDUCE
BLEED AIR SELECT Switch .... OFF
BLEED AIR Lever .... PULL OUT (OFF)
EMER PRESSURE Circuit Breaker .... PULL / OPEN
(Located on pilot's aft circuit breaker panel, row B, position 6)
AUTO BRAKE Circuit Breaker .... PULL / OPEN
(Located on pilot's forward circuit breaker panel, row D, position 5)
FUEL PUMPS Switch .... MAN
IGNITION Switch .... MAN

CAUTION

*To obtain an AUTO air start, the START MODE MAN/STOP switch must **not** be selected. If the switch is selected to MAN (switch light illuminated), the PUSH START switch must be held ON to keep the starter engaged during the start.*

START MODE Switch .... AUTO MODE

↓

3.9 ENGINE FAILURE (continued)

↓

PUSH START Switch.......................................LIFT COVER / PUSH
CONDITION Lever (Ng min. 13%)..RUN
ITT and Ng ....MONITOR

After Engine Relight - Ng ≥ 63%:

WARNING

Do not reset AUTO BRAKE circuit breaker after engine relight.

GEN Switch..ON
ALT Switch..ON
FUEL PUMPS Switch.. AUTO
IGNITION Switch.. AUTO
EMER PRESSURE Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row B, position 6)
BLEED AIR Lever.. PUSH IN (ON)
BLEED AIR SELECT Switch ....NORM
Electrical Equipment .... AS REQUIRED

CAUTION

When the AUTO BRAKE circuit breaker is pulled, the optional Emergency Autoland system will operate in a degraded mode. Automatic braking on the runway will not occur and the engine will not shut down automatically after the aircraft comes to a full stop.

If engine air start is not successful, proceed with the Power Off Landing procedure per Paragraph 3.27.

ISSUED: July 3, 2018
REVISED: May 15, 2020

3.11 ENGINE SYSTEM

3.11a High Oil Temperature

Indication: Master WARNING; Repeating triple chime; Flashing red OIL °C indication.

On Ground:

HEADING..INTO WIND
POWER Lever..IDLE

In Flight:

POWER Lever..REDUCE POWER

If temperature remains high, continue flight at reduced power and *land as soon as possible.*

3.11 ENGINE SYSTEM (continued)

3.11b Oil Pressure

Indication: Master WARNING; Repeating triple chime; Flashing red OIL PSI indication.

POWER Lever.......... REDUCE TO MINIMUM TORQUE REQUIRED TO COMPLETE FLIGHT

Land as soon as possible.

NOTE

If possible, maintain altitude as necessary in order to retain glide capability to the selected airport in case of total engine failure.

3.11 ENGINE SYSTEM (continued)

3.11c Chip Detector

Indication: Master CAUTION; CHIP DETECT **; Double chime.**

On Ground:

Return to parking area and shutdown engine.

In Flight:

Oil Temperature .... MONITOR
Oil Pressure .... MONITOR

If engine indications in normal operating ranges:

Land as soon as practical.

If engine indications outside normal operating ranges:

Land as soon as possible.

NOTE

If possible, maintain altitude as necessary in order to retain glide capability to the selected airport in case of total engine failure.

Inspect Engine Before Next Flight

3.11 ENGINE SYSTEM (continued)

3.11d Starter Engaged

Indication: Master CAUTION; START ENGAGED ; Double chime.

On Ground:

START MODE Switch .... MAN MODE
CONDITION Lever .... CUT-OFF / FEATHER
BATTERY Switch .... OFF

In Flight:

START MODE Switch .... MAN MODE
GEN Switch .... VERIFY ON

If generator is not on, *land as soon as possible.*

3.11 ENGINE SYSTEM (continued)

3.11e Feather

Indication: **Master CAUTION;** FEATHER **; Double chime.**

On Ground After Engine Start:

Shut down and investigate cause.

In Flight:

If the propeller is not fully feathered:

Land as soon as possible and investigate cause.

If the propeller is fully feathered:

Conduct a Power Off Landing, Paragraph 3.27.

3.11 ENGINE SYSTEM (continued)

3.11f Beta

Indication: Master CAUTION; BETA **; Double chime.**

In Flight:

POWER Lever..........................VERIFY FLIGHT IDLE OR FORWARD OF FLIGHT IDLE POSITION

If the propeller is not in beta:

Land as soon as practical and investigate cause.

If the propeller is in beta:

Conduct a Power Off Landing, Paragraph 3.27.

3.13 FUEL CONTROL UNIT MALFUNCTION OR POWER LEVER CONTROL LOSS (MANUAL OVERRIDE OPERATION)

Fuel Control Unit Malfunction or Power Lever Control Loss (Manual Override Operation)

WARNING

The manual override system is an emergency system and must only be used in the event of FUEL CONTROL UNIT MALFUNCTION OR POWER LEVER CONTROL LOSS.

CAUTION

The manual override lever is not to be used on the ground for taxiing. During ground operations, it may not be possible to recover low Ng with the manual override lever.

The pilot must ensure that the MANUAL OVERRIDE LEVER is in the OFF (full aft) position prior to start otherwise an over-temperature condition may result.

Utilize slow and smooth movement of the MANUAL OVERRIDE LEVER to avoid engine surges and/ or exceeding ITT, Ng, or torque limits. Rapid movement of the MOR lever can cause compressor surges and excessive ITT (over temperature) conditions.

Indication: Power lever movement does not change Ng. or uncommanded engine power reduction.

POWER Lever...FLIGHT IDLE
MANUAL OVRD Lever...................... PULL UPWARDS AND MOVE FORWARD SLOWLY TO ACHIEVE REQUIRED ENGINE POWER

CAUTION

Reverse will not be available for landing.

Land as soon as possible.

3.13 FUEL CONTROL UNIT MALFUNCTION OR POWER LEVER CONTROL LOSS (MANUAL OVERRIDE OPERATION) (cont.)

↓

After landing:

CONDITION Lever ....CUT-OFF / FEATHER

If power is excessive when using manual override:

Reduce airspeed to below 170 KIAS by increasing pitch attitude.
LANDING GEAR...DOWN (below 170 KIAS)
FLAPS...T/O (below 147 KIAS)

Land as soon as possible.

When landing is assured:

CONDITION Lever ....CUT-OFF / FEATHER

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3.15 PROPELLER SPEED

Propeller Speed

Indication: Master WARNING; Repeating triple chime; Flashing red PROP RPM indication.

For Prop RPM less than 1180:

POWER Lever...INCREASE POWER

For Prop RPM greater than 2040:

POWER Lever..REDUCE AS NECESSARY
Airspeed..REDUCE AS NECESSARY

Land as soon as possible.

NOTE

If possible, maintain altitude as necessary in order to retain glide capability to the selected airport in case of total engine failure.

Should heavy vibration or uncontrolled propeller speed occur, be prepared to shut down the engine.

CONDITION Lever ....CUT-OFF / FEATHER

Conduct a Normal Descent, Paragraph 4.5n, or Emergency Descent, Paragraph 3.23, as appropriate and Power Off Landing, Paragraph 3.27.

3.17 ENGINE FIRE

3.17a Fire On Ground

Indication (if optional fire detection system is installed):
Master WARNING; ENGINE FIRE ;
Repeating triple chime.

Visual Indication (if optional fire detection system is not installed):

POWER Lever .... IDLE
CONDITION Lever .... CUT-OFF / FEATHER
Firewall FUEL SHUTOFF Valve .... LIFT COVER - PULL OFF
BATTERY Switch .... OFF
PARK BRAKE .... SET
Aircraft .... EVACUATE

3.17 ENGINE FIRE (continued)

3.17b Fire In Flight

Indication (if optional fire detection system is installed):
Master WARNING; ENGINE FIRE ;
Repeating triple chime.

Visual Indication (if optional fire detection system is not installed):

Engine Power .... REDUCE TO MINIMUM ACCEPTABLE ACCORDING TO FLIGHT SITUATION
Pilot Emergency Oxygen .... DON MASK (if required)
Passenger Emergency Oxygen .... ACTIVATE and DON MASK (if required)
MIC SEL Switch .... MSK (if required)

Confirm that fire exists then:

CAUTION

If pressurized, this procedure will result in an immediate loss of pressurization and cabin altitude will rise at an uncontrolled rate.

CONDITION Lever .... CUT-OFF / FEATHER
Firewall FUEL SHUTOFF Valve .... LIFT COVER - PULL OFF
BLEED AIR SELECT Switch .... OFF
BLEED AIR Lever .... PULL OUT (OFF)

Conduct a Normal Descent, Paragraph 4.5n, or Emergency Descent, Paragraph 3.23, as appropriate and Power Off Landing, Paragraph 3.27.

If fire can not be confirmed:

Land as soon as possible.

NOTE

If possible, maintain altitude as necessary in order to retain glide capability to the selected airport in case of total engine failure.

3.19 ELECTRICAL FIRE, SMOKE OR FUMES

Electrical Fire, Smoke or Fumes

If source is known:

Pilot Emergency Oxygen .... DON MASK (set to 100%)
Passenger Emergency Oxygen .... ACTIVATE and DON MASKS
MIC SEL Switch .... MSK
Fire (if necessary).. EXTINGUISH
Faulty Circuits .... ISOLATE
Smoke Evacuation (if necessary)..................... EXECUTE CHECKLIST
(per Paragraph 3.21)

Land as soon as possible.

If source is unknown:

Pilot Emergency Oxygen .... DON MASK (set to 100%)
Passenger Emergency Oxygen .... ACTIVATE and DON MASKS
MIC SEL Switch .... MSK
Smoke Evacuation (if necessary)..................... EXECUTE CHECKLIST
(per Paragraph 3.21)
GEN Switch... OFF
ALT Switch .... OFF
Autopilot... DISCONNECT
Standby Instrument .... VERIFY ON
(Maintain attitude control using standby instrument)
EMER Switch.. ON
BATTERY Switch .... OFF
Emergency Descent to a safe altitude .... EXECUTE CHECKLIST
(per Paragraph 3.23)

Land as soon as possible.

(If required, Perform Emergency Landing Gear Extension procedure and Landing Without Flaps procedure (per Paragraphs 3.35c and 3.37c))

3.19 ELECTRICAL FIRE, SMOKE OR FUMES (continued)

If smoke or fire still persists:

All 7 Tie Bus Breakers ....PULL / OPEN
(located on lower left side of instrument panel)

Land as soon as possible.

(If required. Perform Emergency Landing Gear Extension procedure and Landing Without Flaps procedure (per Paragraphs 3.35c and 3.37c))

CAUTION

The airplane may still be pressurized on the ground. Exercise extreme caution when operating cabin door.

3.21 SMOKE EVACUATION

Smoke Evacuation

CAUTION

If pressurized, the following procedure will result in an immediate loss of pressurization and the cabin altitude will rise at an uncontrollable rate.

Pilot Emergency Oxygen .... DON MASK (set to 100%)
Passenger Emergency Oxygen .... ACTIVATE and DON MASKS
MIC SEL Switch .... MSK
CABIN PRESSURE DUMP Switch .... DUMP
BLEED AIR SELECT Switch .... OFF
BLEED AIR Lever .... PULL OUT (OFF)
EMER PRESSURE Circuit Breaker .... PULL / OPEN
(Located on pilot's aft circuit breaker panel, row B, position 6)
AIR COND and HI / LO Switches .... OFF
VENT FAN Switch .... ON
Emergency Descent to a safe altitude .... EXECUTE CHECKLIST
(per Paragraph 3.23)

Land as soon as possible.

NOTE

If fumes/smoke dissipate, land as soon as possible to investigate problem. If fumes/smoke persist, refer to Fire in Flight procedure, Paragraph 3.17b.

3.23 EMERGENCY DESCENT - MAXIMUM RATE

Emergency Descent - Maximum Rate	
Autopilot	DISENGAGE
POWER Lever	IDLE
CAUTION *In rough air, it may be necessary to descend at Vo (153 KIAS @ 6000 lb., 121 KIAS @ 3750 lb.) with the landing gear extended. Do not exceed 170 KIAS with the landing gear extended.*	
Airspeed	V_{MO}/M_{MO} (251 KIAS/0.55M)
Windshield DEFROST	PULL OUT
WINDSHLD HT Switch	DEFOG or ANTI-ICE (as required)

3.25 DESCENT - MAXIMUM RANGE AFTER ENGINE FAILURE

Descent - Maximum Range After Engine Failure

Pilot Emergency Oxygen .... DON MASK (if required)
Passenger Emergency Oxygen .... ACTIVATE and DON MASKS (if required)
MIC SEL Switch .... MSK (if required)
POWER Lever .... IDLE
CONDITION Lever .... CUT-OFF / FEATHER
Propeller .... VERIFY FEATHERED
LANDING GEAR .... UP
FLAPS .... UP
Airspeed .... 115 KIAS at 6000 lb. (105 KIAS @ 5000 lb., 94 KIAS @ 4000 lb.)
Electrical Load .... REDUCE (monitor battery voltage)

CAUTION

If landing gear and/or flaps are not retracted or the propeller does not feather, glide distance will be severely reduced. Retracting the landing gear and flaps will reduce battery endurance significantly.

NOTE

Refer to Section 5, Performance, Figure 5-35 for glide range.

NOTE

It may be necessary to increase the rate of descent of the aircraft in order to achieve a cabin altitude of 12,500 feet before the emergency oxygen supply is exhausted.

3.27 POWER OFF LANDING (ENGINE CUTOFF/FEATHER)

Power Off Landing (Engine Cutoff/Feather)

Best Glide Speed is 115 KIAS at 6000 lb.
(105 KIAS @ 5000 lb., 94 KIAS @ 4000 lb.)

POWER Lever	IDLE
CONDITION Lever	CUT-OFF / FEATHER
Propeller	VERIFY FEATHERED
FUEL PUMPS Switch	OFF
IGNITION Switch	OFF
Firewall FUEL SHUTOFF Valve	LIFT COVER - PULL OFF
Electrical Load	REDUCE
BLEED AIR SELECT Switch	OFF
CABIN PRESSURE DUMP Switch	DUMP
Seats and Seat Backs	UPRIGHT & locked in position
Seat Belts and Harness	FASTEN / TIGHT CHECK INERTIA REEL
Passengers	BRIEF

Locate suitable field

Establish spiral pattern. If sufficient altitude is available, maintain 115 KIAS @ 6000 lb. (105 KIAS @ 5000 lb., 94 KIAS @ 4000 lb.) with flaps UP in the pattern.

Assure 1000 feet (1500 feet if ice accretions are on the airframe) above field at downwind position for landing approach.

NOTE

For ditching or other off-airport landings, the Terrain Awareness and Warning System may be inhibited by selecting TAWS Inhibit on the TAWS Settings page of the touchscreen controller.

3.27 POWER OFF LANDING (ENGINE CUTOFF/FEATHER (continued)

When committed to landing:

NOTE

Landing gear extension requires 8 seconds minimum.

NOTE

For ditching or off-airport landings, it may be desirable to leave the landing gear and/or flaps retracted. In this case, a final approach speed of 100 KIAS should be used.

LANDING GEAR .... DOWN (if suitable for terrain, otherwise maintain UP)
FLAPS ....LND (T/O with ice accretions)
Final Approach Speed ....85 KIAS (102 KIAS with ice accretions)

After Touchdown:

BATTERY Switch .... OFF
After the aircraft has stopped ....Evacuate

3.29 LANDING WITH PRIMARY CONTROL FAILED

3.29a Landing With Primary Longitudinal Control Failed

Passengers .... BRIEF
FLAPS .... UP
LANDING GEAR .... DOWN
Final Approach Speed .... TRIM TO MAINTAIN 110 KIAS

- Select the longest runway available and make a flat, no flap approach.
- Minimizing the use of pitch trim to avoid pilot induced oscillations.
- Set power (approximately 300 FT-LB torque) and pitch trim to maintain airspeed, pitch attitude, and 300 to 500 ft/min rate of descent.
- Maintain condition until touchdown, then slowly reduce power to idle, use reverse and brakes as required.

3.29 LANDING WITH PRIMARY CONTROL FAILED (continued)

3.29b Landing With Primary Lateral Control Failed

CAUTION

The pilot should attempt to land as soon as practical to minimize fuel imbalances created during sideslip maneuvers.

Passengers .... BRIEF

During cruise flight:

FUEL PUMPS .... VERIFY AUTO

POWER Lever .... 1000 ft-lb

- Control heading with rudder input. Maintain bank angles less than 15 degrees.

During enroute descent:

LANDING GEAR and FLAPS .... VERIFY UP

POWER Lever .... 350 ft-lb

Airspeed .... 175 KIAS

- Control heading with rudder input. Maintain bank angles less than 15 degrees.

During level-off and maneuvering for approach:

- Maintain airspeed above 160 KIAS with LANDING GEAR and FLAPS UP.

During final approach and landing:

- Select the longest runway available with minimum crosswind component. Use rudder to make shallow turns to establish the airplane on the final approach course.
- When in position for descent: Reduce power to establish descent rate of 300 to 500 ft/min. Maintain 145 KIAS or greater.
- Lower LANDING GEAR, maintain FLAPS UP.
- When landing is assured, use rudder to keep the airplane aligned with the runway centerline, slowly reduce power to idle and flare the airplane to touch down at 100 KIAS or greater.
- On the runway use rudder to maintain directional control, while using reverse and brakes as required.

3.31 HYDRAULIC SYSTEM MALFUNCTION

Hydraulic System Malfunction

On Ground:

Indication: Master WARNING; HYDR PUMP ON **;**
Repeating triple chime.

LANDING GEAR Selector..VERIFY DOWN

Flight operations are not authorized with a HYDR PUMP ON WARNING annunciation.

In Flight:

Indication: Master CAUTION; HYDR PUMP ON **; Double chime.**

HYDRAULIC PUMP POWER Circuit Breaker ....PULL / OPEN

(Located on pilot's forward circuit breaker panel, row C, position 5)

Land as soon as practical and investigate the cause.

Prior to landing, the HYDRAULIC PUMP POWER circuit breaker must be reset to extend the landing gear. If the pump continues to run after the gear is locked down, pull the HYDRAULIC PUMP POWER circuit breaker. If the gear fails to extend, refer to the **Emergency Landing Gear Extension procedure (Paragraph 3.35c).**

3.33 LANDING GEAR POSITION UNSAFE

Landing Gear Position Unsafe

**Indication: Master WARNING; CHECK GEAR ;
CHECK GEAR Aural Alert.**

LANDING GEAR Selector .... DOWN
LANDING GEAR Indications .... 3 GREEN

**Indication: Master CAUTION; CHECK GEAR ;
CHECK GEAR Aural Alert.**

NOTE

The CHECK GEAR aural alert will activate during a normal descent at low power.

LANDING GEAR Selector .... DOWN (if desired)
LANDING GEAR Indications .... 3 GREEN

3.35 LANDING GEAR MALFUNCTIONS

3.35a Landing Gear Failure

Indication: Master WARNING; GEAR SYS **;**
Repeating triple chime.

LANDING GEAR Selector .... VERIFY DN

Resolve issue prior to flight.

Indication: Master CAUTION; GEAR SYS **; Double chime.**

HYDRAULIC PUMP CTRL Circuit Breaker ...... VERIFY IN/CLOSED
(Located on pilot's forward circuit breaker panel, row C, position 4)
HYDRAULIC PUMP POWER Circuit Breaker .. VERIFY IN/CLOSED
(Located on pilot's forward circuit breaker panel, row C, position 5)
BATTERY Switch .... VERIFY ON
GEN Switch .... VERIFY ON
ALT Switch .... VERIFY ON
LANDING GEAR Selector .... CYCLE
If issue not resolved .... Perform Emergency Landing
Gear Extension (Paragraph 3.35c)
and maintain airspeed below 170 KIAS.

3.35 LANDING GEAR MALFUNCTIONS (continued)

3.35b Gear Up Landing

BLEED AIR SELECT Switch .... OFF
CABIN PRESSURE DUMP Switch .... DUMP
Passengers .... BRIEF
Seats and Seat Backs .... UPRIGHT & LOCKED IN POSITION
Seat Belts and Harness .... FASTEN / TIGHT
CHECK INERTIA REEL
FLAPS .... LND
Final Approach Speed .... 85 KIAS

When Runway is Assured:

POWER Lever .... IDLE
CONDITION Lever .... CUT-OFF / FEATHER
Firewall FUEL SHUTOFF Valve .... LIFT COVER - PULL OFF

After Touchdown:

BATTERY Switch .... OFF

After the aircraft has stopped - EVACUATE

3.35 LANDING GEAR MALFUNCTIONS (continued)

3.35c Emergency Landing Gear Extension

Indication: One or more landing gear indicators not showing down and locked (green circle) and/or GEAR SYS .

Airspeed.. 100 KIAS
HYDRAULIC PUMP POWER Circuit Breaker ....PULL / OPEN
(Located on pilot's forward circuit breaker panel, row C, position 5)
LANDING GEAR Selector.. DOWN
EMERGENCY GEAR EXTENSION Control ....PULL

If 3 green are still not indicated:

Yaw the aircraft left and right to lock the main landing gear.
Reduce airspeed to minimum safe speed to improve nose gear locking.

If 3 green are indicated:

Land.
If not successful, refer to Gear Up Landing (Paragraph 3.35b) and maintain airspeed below 170 KIAS.

3.37 FLAP SYSTEM MALFUNCTIONS

3.37a Flap System Malfunction

Indication: Master WARNING; FLAP FAIL ;
Repeating triple chime.

FLAP WARN Circuit Breaker .... RESET, VERIFY NORMAL FLAP OPERATION

(Located on pilot's forward circuit breaker panel, row B, position 4)

If Red FLAP FAIL message remains present:

FLAP MOTOR Circuit Breaker .... PULL / OPEN

(Located on pilot's forward circuit breaker panel, row B, position 3)

Refer to Landing Without Flaps (Paragraph 3.37c).

3.37b Flap Configuration Not Authorized

Indication: Master WARNING; FLAP CONFIG ;
Repeating triple chime.

WARNING

When ice accretions are on the aircraft, longitudinal control of the aircraft may be compromised when flaps LND is selected. Flaps set to the LND position when ice accretions are on ANY aircraft surface or whenever OAT is less than or equal to 5°C and moisture is present, is prohibited.

If ice accretions are on ANY aircraft surface or whenever OAT is less than or equal to 5°C and moisture is present:

FLAPS .... RETRACT to T/O or UP Position

If there are NO ice accretions on ANY aircraft surface and OAT is greater than 5°C with no moisture present:

STALL WARN ICE
SCHEDULE Switch .... SELECT OFF

3.37 FLAP SYSTEM MALFUNCTIONS (continued)

3.37c Landing Without Flaps

Proceed as for normal approach.

LANDING GEAR.. DOWN
Final Approach Speed .... 100 KIAS
Final Approach Speed (with ice accretions)............................ 110 KIAS
Landing.. NORMAL
Braking .... AS REQUIRED
Reverse... AS REQUIRED

NOTE

If no ice accretions are on the airframe, increase landing distances 20% when landing at flap positions other than LND. If ice accretions are on the airframe, increase landing distances by 25% when landing with flaps UP. If the nose gear contacts the runway at a groundspeed greater than 104 knots, inspect the tire and nose landing gear trunnion structure per Maintenance Manual procedures prior to future flights. Use of reverse is recommended unless the runway is icy, in which case, use of reverse should be minimized as much as required to maintain directional control.

3.39 ELECTRICAL SYSTEM MALFUNCTIONS

3.39a Generator Failure

Indication: Master WARNING; GENERATOR FAIL **;**
Repeating triple chime.

Electrical Load .... REDUCE UNTIL TOTAL LOAD IS BELOW 130 AMPS & VOLTS INDICATION IS NORMAL
AIR COND Switch .... OFF
GEN Switch.. OFF then ON

If generator fails to reset:

GEN Switch.. OFF
GENERATOR CONTROL Circuit Breaker................................ RESET
(Located on the lower left instrument panel)
GEN Switch...ON

If circuit breaker opens again or VOLTS indication is flashing red with zero amps indicated:

GEN Switch.. OFF
GENERATOR CONTROL Circuit Breaker......................PULL / OPEN
DO NOT RESET

If alternator has assumed the load, limit load to under 130 amps. Exit and avoid IFR and icing conditions. Repair generator before next flight.

Land as soon as practical.

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

3.39b Alternator Failure

Indication: Master WARNING; ALTERNATOR FAIL ;
Repeating triple chime.

ALT Switch .... OFF then ON

If alternator fails to reset:

ALT Switch .... OFF
ALTERNATOR FIELD Circuit Breaker .... RESET
(Located on pilot's forward circuit breaker panel, row C, position 1)
ALT Switch .... ON

If circuit breaker opens again or CAS message remains illuminated with zero amps indicated:

ALT Switch .... OFF
ALTERNATOR FIELD Circuit Breaker .... PULL / OPEN
DO NOT RESET

Limit load to under 145 amps (160 amps when OAT is 5°C or less) and continue flight while avoiding icing conditions. Repair alternator prior to flight in icing conditions.

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

3.39c Dual Failure - Both Generator and Alternator Fail

Indication: Master WARNING; GENERATOR FAIL and ALTERNATOR FAIL ; Repeating triple chime.

GEN Switch .... OFF
ALT Switch .... OFF
GENERATOR CONTROL Circuit Breaker .... RESET
(Located on the lower left instrument panel.)
ALTERNATOR FIELD Circuit Breaker .... RESET
(Located on pilot's forward circuit breaker panel, row C, position 1)
GEN Switch (after OFF at least one second) .... ON
ALT Switch (after OFF at least one second) .... ON

If only the generator resets:

ALT Switch .... OFF
Electrical Load .... MAINTAIN LESS THAN 145 AMPS
(160 amps if OAT is 5ºC or less)
Ammeter .... MONITOR

Continue flight while avoiding icing conditions.

If only the alternator resets:

GEN Switch .... OFF
Electrical Load .... MAINTAIN LESS THAN 130 AMPS
Ammeter .... MONITOR

Exit and avoid IFR and icing conditions.

Land as soon as practical.

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

↓

If neither the generator nor alternator resets:

GEN Switch .... OFF
ALT Switch .... OFF
EMER Switch .... VERIFY OFF
BATTERY Switch .... VERIFY ON
Electrical Load .... REDUCE TO MINIMUM
(per load-shed procedures shown on next page)

Land as soon as possible.

NOTE

To have 30-minutes of battery power remaining after failure of the alternator and generator, the load shedding procedure shown below must be completed within 5-minutes. It is advised to start the load shedding procedure as soon as conditions permit. Items that are not shown, such as the EBD standby instrument, are allowed to run continuously and still meet the 30-minute requirement.

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

3.39d Load-shed procedure
(Recommended usage for 30-minutes of battery life)
VFR/DAY/NIGHT/ICING Conditions

CAUTION

Caution should be exercised when deactivating certain items. Any items that remain ON or are not activated as shown may reduce the battery life to less than 30-minutes.

NOTE

Exit and avoid IFR and icing conditions as soon as possible. Electrical equipment needed for flight in icing conditions, other than that shown below, may reduce battery life to less than 30-minutes.

NOTE

Turning off the AVIONICS switch removes power from all equipment on the Non-Essential Avionics Bus (Ref. Figure 7-5), some of which may be desired. Power must be removed as soon as conditions allow, and within 5-minutes of the alternator and generator failure, to ensure 30-minutes of battery life from the time of failure.

AIR COND Switch .... OFF
VENT FAN Switch .... OFF
Autopilot .... DISCONNECT
AVIONICS Switch .... OFF
FUEL PUMPS Switch .... AUTO
IGNITION Switch .... AUTO
WINDSHLD HT Switch .... VERIFY OFF
PITOT HEAT Switch .... OFF (unless in visible moisture and ≤5°C)
PROP HEAT Switch .... VERIFY OFF
STALL HEAT Switch .... VERIFY OFF

↓

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

↓

SURF DE-ICE Switch...VERIFY OFF
(if icing conditions - 1 cycle in CRUISE,
1 cycle at LANDING)
TAXI/REC LT Switch .... OFF
LANDING LIGHT Switch .... OFF
NAV LIGHT Switch .... OFF
STROBE LIGHT Switch .... OFF
ICE LIGHT Switch .... OFF
(if icing conditions - ON 1 minute in CRUISE,
1 minute at LANDING)
COM1 Transmit .... 2-minutes in CRUISE
1-minute at LANDING)

If desired equipment has been deactivated:

Circuit breakers of non-desired equipment .... PULL / OPEN
AVIONICS Switch.. ON

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3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

3.39e Landing after load-shed
(Recommended usage for 30-minutes of battery life)

NOTE

If the landing is performed at a time that is approximately 30-minutes or more after the alternator and generator failure, activation of the following equipment may cause a complete electrical system failure. Be prepared to execute the appropriate emergency procedure.

COM1 Transmit .... 1 Minute Usage
FUEL PUMPS Switch .... 5-Minutes Usage
IGNITION Switch .... AS REQUIRED
LANDING LIGHT Switch .... 5-Minutes Usage

Prepare for landing with an inoperative landing light.

FLAPS .... AS REQUIRED

Prepare to use Flap System Malfunction checklist, Paragraph 3.37a or Landing Without Flaps checklist, Paragraph 3.37c.

LANDING GEAR .... AS REQUIRED

Prepare to use Emergency Landing Gear Extension checklist, Paragraph 3.35c.

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

3.39f Complete Electrical Failure

Indication: PFDs, MFD and all equipment, except the EBD Standby Instrument, will be unpowered.

NOTE

AHRS1 can take up to 45-seconds to realign after power is established on the emergency bus.

Standby Instrument .... VERIFY ON
Attitude/Airspeed/Altitude .... USE Standby Instrument
EMER Switch .... ON
BATTERY Switch .... OFF
GEN Switch .... OFF
ALT Switch .... OFF
AVIONICS Switch .... OFF
CABIN PRESSURE DUMP Switch (prior to landing) .... DUMP

3.39 ELECTRICAL SYSTEM MALFUNCTIONS (continued)

↓

CAUTION

During operations on the emergency bus, BETA and reverse are not available.

NOTE

The emergency bus powers PFD1 in DISPLAY BACKUP. AHRS1 and ADC1 data are presented, along with a subset of engine parameters and landing gear indications. The MIC SEL and CABIN PRESSURE DUMP switch are also illuminated. The pilot's touchscreen will control NAV1 and COM1.

NOTE

When the aircraft battery can no longer supply sufficient power to the emergency bus, the EBD will immediately revert to its internal battery allowing 30 additional minutes of operation. During this period, the EBD will illuminate an "ON BAT" annunciation and an estimated battery charge state.

Land as soon as possible.

Use Emergency Landing Gear Extension checklist, Paragraph 3.35c.

Use Landing Without Flaps checklist, Paragraph 3.37c.

3.41 AVIONICS SYSTEMS

NOTE

The latest appropriate revision of the Garmin G3000 Cockpit Reference Guide for the Piper PA-46-600TP (Garmin P/N 190-02447-XX), and the Garmin G3000 Pilot's Guide for the Piper PA-46-600TP(Garmin P/N 190-02446-XX, contain operational information and detailed descriptions of the Garmin G3000 avionics system.

3.41a PFD1 Failure

Indication: PFD1 Display goes blank.

DISPLAY BACKUP button on instrument panel .... PUSH
XFR (located on autopilot control panel) .... SELECT PFD2

Exit and avoid IFR and icing conditions as soon as practical.

NOTE

With PFD1 failed, the MFD and PFD2 will remain in normal display mode until the DISPLAY BACKUP button is pressed. The following items will become inoperative with a complete loss of PFD1:

3.41 AVIONICS SYSTEMS (continued)

3.41b MFD Failure

Indication: MFD Display goes blank.

Exit and avoid IFR and icing conditions as soon as practical.

NOTE

PFD1 and PFD2 will automatically revert to a reversionary mode display. The following features will become inoperative if there is a complete loss of MFD functionality:

- GDL 69SXM (Garmin Datalink - SiriusXM)

3.41 AVIONICS SYSTEMS (continued)

3.41c PFD2 Failure

Indication: PFD2 Display goes blank.

Exit and avoid IFR and icing conditions as soon as practical.

NOTE

If PFD2 fails, the MFD and PFD1 will remain in normal display format. The following features will become inoperative:

- Traffic System
- Weather Radar

3.41 AVIONICS SYSTEMS (continued)

3.41d GTC1 Failure

Indication: GTC1 Display goes blank.

PFD1, PFD2, MFD Control .... USE GTC2
COM1 .... USE PILOT HEADSET

Exit and avoid IFR and icing conditions as soon as practical.

CAUTION

Stall warning is inoperative. Maintain airspeed well above that which would activate the stall warning system.

CAUTION

Audio through the pilot's headset is still available on Com1 but all other audio functionality, including aural alerts, CAS chimes, navigational facility ID's, and the overhead speaker will be lost.

NOTE

The marker beacon will be inoperative.

Repair GTC1 prior to next flight.

3.41 AVIONICS SYSTEMS (continued)

3.41e GTC2 Failure
Indication: GTC2 Display goes blank.
PFD1, PFD2, MFD Control .... USE GTC1

3.41 AVIONICS SYSTEMS (continued)

ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS) FAILURES

3.41f AHRS1 Failure

On Ground:

Indication: HDG, PIT, and ROL white annunciations on PFD.

System Messages (MSG Softkey)..CONSIDER
AHRS1 Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row C, position 6)

If AHRS1 data still invalid:

Sensors > AHRS Settings > AHRS 2 Softkeys ....SELECT

Avoid flight in IFR and icing conditions.

In Flight:

Indication: HDG, PIT, and ROL white annunciations and BOTH ON AHRS2 amber annunciation on PFD.

System Messages (MSG Softkey)..CONSIDER
AHRS1 Circuit Breaker ....RESET
(Located on pilot's aft circuit breaker panel, row C, position 6)

If AHRS1 data still invalid:

AHRS2 data............................ CROSSCHECK with standby instrument

Exit and avoid IFR and icing conditions as soon as practical.

CAUTION

An amber HDG, PIT, or ROL annunciation indicates a miscomparison of that AHRS parameter. The pilot must crosscheck the affected indications with other sources to determine which are correct.

3.41 AVIONICS SYSTEMS (continued)

ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS) FAILURES (continued)

↓

NOTE

Due to the AHRS monitors detecting a roll angle difference between AHRS1 and AHRS2, a red ROL annunciation will appear on the PFD at bank angles greater than approximately 3°. This does not indicate a problem with the roll servo.

NOTE

If AHRS1 remains invalid, the autopilot and Emergency Autoland will be inoperative. If the autopilot transfer button is selected to the pilot side PFD, Electronic Stability and Protection (ESP) will be inoperative.

NOTE

Automatic reversion to the good AHRS will only occur if the entire AHRS has failed.

3.41 AVIONICS SYSTEMS (continued)

ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS) FAILURES (continued)

3.41g AHRS2 Failure

On Ground:

Indication: HDG, PIT, and ROL white annunciations on PFD.

System Messages (MSG Softkey)...CONSIDER
AHRS2 Circuit Breaker .... RESET
(Located on copilot's circuit breaker panel, row A, position 4)

If AHRS2 data still invalid:

Sensors > AHRS Settings > AHRS 1 Softkeys ....SELECT

Avoid flight in IFR and icing conditions.

In Flight:

Indication: HDG, PIT, and ROL white annunciations and BOTH ON AHRS1 amber annunciation on PFD.

System Messages (MSG Softkey)...CONSIDER
AHRS2 Circuit Breaker .... RESET
(Located on copilot's circuit breaker panel, row A, position 4)

If AHRS2 data still invalid:

AHRS1 data............................. CROSSCHECK with standby instrument

Exit and avoid IFR and icing conditions as soon as practical.

CAUTION

An amber HDG, PIT, or ROL annunciation indicates a miscomparison of that AHRS parameter. The pilot must crosscheck the affected indications with other sources to determine which are correct.

↓

3.41 AVIONICS SYSTEMS (continued)

ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS) FAILURES (continued)

↓

NOTE

Due to the AHRS monitors detecting a roll angle difference between AHRS1 and AHRS2, a red ROL annunciation will appear on the PFD at bank angles greater than approximately 3°. This does not indicate a problem with the roll servo.

NOTE

If AHRS2 remains invalid, the autopilot and Emergency Autoland will be inoperative. If the autopilot transfer button is selected to the copilot side PFD, Electronic Stability and Protection (ESP) will be inoperative.

NOTE

Automatic reversion to the good AHRS will only occur if the entire AHRS has failed.

3.41 AVIONICS SYSTEMS (continued)

ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS) FAILURES (continued)

3.41h AHRS1 and AHRS2 Failure

Indication: (Ground and Flight): HDG, PIT, ROL white annunciations and red-X's on all AHRS1 and AHRS2 parameters.

Standby Instrument ....VERIFY no failure indications
Attitude and Heading .... USE standby instrument
Course.. SET in digital CRS window
System Messages (MSG Softkey)...CONSIDER

If all AHRS data are invalid
and time allows .... RESET AHRS1 and AHRS2 Circuit Breakers
(Located on pilot's aft circuit breaker panel, row C, position 6)
(Located on copilot's circuit breaker panel, row A, position 4)

Land as soon as practical.

NOTE

The AHRS can take up to 45-seconds to re-align after resetting the circuit breakers.

NOTE

If both AHRS remain invalid, the autopilot, Electronic Stability and Protection (ESP), Emergency Autoland, and SurfaceWatch will be inoperative.

3.41 AVIONICS SYSTEMS (continued)

AIR DATA COMPUTER (ADC) FAILURES

3.41i ADC1 Failure

On Ground:

Indication: ALT and IAS white annunciations on PFD1.

System Messages (MSG Softkey).......................................CONSIDER
ADC1 Circuit Breaker.. RESET
(Located on pilot's aft circuit breaker panel, row C, position 5)

If ADC1 data still invalid:

Sensors > ADC Settings > ADC 2 Softkeys.............................SELECT

Avoid flight in IFR and icing conditions.

In Flight:

Indication: ALT and IAS white annunciations and BOTH ON ADC2 amber annunciation on PFD.

System Messages (MSG Softkey).......................................CONSIDER
ADC1 Circuit Breaker.. RESET
(Located on pilot's aft circuit breaker panel, row C, position 5)

If ADC1 data still invalid:

ADC2 data.............................. CROSSCHECK with standby instrument

Exit and avoid IFR and icing conditions as soon as practical.

CAUTION

An amber ALT or IAS annunciation indicates a miscomparison of that ADC parameter. The pilot must crosscheck the affected indications with other sources to determine which are correct.

NOTE

Automatic reversion to the good ADC will only occur if the entire ADC has failed.

ISSUED: July 3, 2018
REVISED: July 27, 2018

3.41 AVIONICS SYSTEMS (continued)

AIR DATA COMPUTER (ADC) FAILURES (continued)

3.41j ADC2 Failure

On Ground:

Indication: ALT and IAS white annunciations on PFD.

System Messages (MSG Softkey)...CONSIDER
ADC2 Circuit Breaker...RESET
(Located on pilot's aft circuit breaker panel, row A, position 5)

If ADC2 data still invalid:

Sensors > ADC Settings > ADC1 Softkeys.................................SELECT

Avoid flight in IFR and icing conditions.

In Flight:

Indication: ALT and IAS white annunciations and BOTH ON ADC1 amber annunciation on PFD.

System Messages (MSG Softkey)...CONSIDER
ADC2 Circuit Breaker...RESET
(Located on pilot's aft circuit breaker panel, row A, position 5)

If ADC2 data still invalid:

ADC1 data..............................CROSSCHECK with standby instrument

Exit and avoid IFR and icing conditions as soon as practical.

CAUTION

An amber ALT or IAS annunciation indicates a miscomparison of that ADC parameter. The pilot must crosscheck the affected indications with other sources to determine which are correct.

NOTE

Automatic reversion to the good ADC will only occur if the entire ADC has failed.

3.41 AVIONICS SYSTEMS (continued)

AIR DATA COMPUTER (ADC) FAILURES (continued)

3.41k ADC1 and ADC2 Failure

Indication (Ground and Flight): ALT, IAS white annunciations and red-X or yellow-X on all ADC parameters.

Airspeed and Altitude .... USE standby instrument
System Messages (MSG Softkey)..CONSIDER

If all ADC data are invalid
and time allows .... RESET ADC1 and ADC2 circuit breakers

(Located on pilot's aft circuit breaker panel, row C, position 5 and on copilot's circuit breaker panel, row A, position 5)

Land as soon as practical.

NOTE

If both ADCs remain invalid, Emergency Autoland will be inoperative.

ISSUED: July 3, 2018
REVISED: May 15, 2020

3.41 AVIONICS SYSTEMS (continued)

3.41l Erroneous or Loss of Engine and Fuel Displays

Indication: Yellow-X over affected engine parameter or fuel display as erroneous indications.

NOTE

Erroneous information may be identified by indications which do not agree with other system information. Erroneous indications may be determined by comparing a display with other displays and other system information.

1. Set power based on throttle lever position, engine sound and speed.
2. Monitor other indications to determine the health of the engine.
3. Use known power settings and power setting tables for approximate fuel flow values.
4. Use other system information, such as annunciator messages, fuel totalizer quantity and flow, to safely complete the flight.

If ALL engine parameters are invalid and time allows:

GEA circuit breaker .... RESET
(Located on pilot's aft circuit breaker panel, row C, position 2)

3.41 AVIONICS SYSTEMS (continued)

3.41m Autopilot or ESP Malfunction

Indication: **An unexpected or uncommanded change in the airplane's flight path and/or flight director command; abnormal flight control movement; red PTCH, ROLL, YAW, PTRM, or AFCS annunciator; or the autopilot abnormally disconnects with flashing red AP and continuous aural alert.**

WARNING

Do not press the LVL switch if an autopilot or pitch trim malfunction is suspected.

NOTE

Autopilot malfunctions also include AFCS enhanced features such as Underspeed Protection, Level Mode, and Coupled Go-Around.

NOTE

Electronic Stability and Protection (ESP) and Emergency Autoland will be inoperative following an autopilot failure.

Control Wheel .... GRASP FIRMLY
Attitude Indicators .... CROSSCHECK
AP Disconnect/Trim Interrupt Switch .... DEPRESS and HOLD
Pitch Trim.. RETRIM manually if necessary
Autopilot Circuit Breaker.. PULL / OPEN
(Located on pilot's forward circuit breaker panel, row D, position 2)

Autopilot.. DO NOT RE-ENGAGE

3.41 AVIONICS SYSTEMS (continued)

3.41n Automatic Autopilot Disconnect

Indication: Flashing red and white AP on PFD and aural alert.

Control Wheel .... GRASP FIRMLY
A/P DISC Switch .... DEPRESS and RELEASE
(cancels disconnect tone)
Pitch Trim .... RETRIM manually if necessary

NOTE

The autopilot disconnect may be accompanied by a red boxed AFCS, PTRM, PTCH (pitch) or ROL (roll) annunciation on the PFD, indicating the axis which has failed. The autopilot cannot be re-engaged with any of these annunciations present.

NOTE

Yaw damper disengagement is indicated by a 5 second flashing amber YD.

3.41 AVIONICS SYSTEMS (continued)

3.41o Electric Trim Failure

Indication: Red boxed PTRM on PFD

NOTE

Loss of the electric pitch trim servo will not cause the autopilot to disconnect. Monitor pitch attitude for unusual behavior. Be alert to possible autopilot out-of-trim conditions (see AUTOPILOT OUT OF TRIM procedure this section) and expect residual control forces upon disconnect. The autopilot will not re-engage after disconnect with failed pitch trim.

A/P DISC Switch .... DEPRESS and RELEASE

If autopilot not engaged when PTRM annunciation appears:

Pitch Trim Switches .... MOVE independently to UNSTICK

3.41 AVIONICS SYSTEMS (continued)

3.41p Electric Pitch Trim Runaway

Indication: An unexpected pitch deviation from the desired flight path and possible autopilot disconnect with red AFCS annunciation and amber or red AP annunciation.

WARNING

Do not press the LVL switch if an autopilot or pitch trim malfunction is suspected.

NOTE

Electronic Stability and Protection (ESP) and Emergency Autoland will be inoperative following an autopilot failure.

NOTE

After the autopilot is disengaged, it can not be re-engaged until the electric pitch trim system regains functionality.

Control Wheel .... GRASP FIRMLY
Attitude Indicators .... CROSSCHECK
A/P DISC Switch .... DEPRESS and HOLD
PITCH TRIM Circuit Breaker .... PULL / OPEN
(Located on pilot's forward circuit breaker panel, row D, position 1)
Pitch Trim .... RETRIM MANUALLY

3.41 AVIONICS SYSTEMS (continued)

3.41q Autopilot Overspeed Recovery

Indication: MAXSPD annunciation above airspeed tape and possible "AIRSPEED...AIRSPEED" aural alert.

This submode becomes active when the autopilot is attempting to prevent the aircraft from exceeding V_{MO}/M_{MO}. This may occur even at indicated airspeeds well below V_{MO}/M_{MO} if airspeed is increasing at a high rate. It remains active until the airspeed is reduced and V_{MO}/M_{MO} exceedance is no longer a factor.

POWER Lever...REDUCE POWER as required
Autopilot..DISCONNECT if required

The pilot may elect to fly the aircraft and reduce airspeed.

NOTE

Overspeed recovery mode provides a pitch up command to decelerate the airplane below V_{MO}/M_{MO}. Overspeed recovery is not active in altitude hold (ALT) mode unless Electronic Stability and Protection is installed. The speed reference cannot be adjusted while in overspeed recovery mode.

3.41 AVIONICS SYSTEMS (continued)

3.41r Autopilot Underspeed Recovery

Indication: MINSPD **annunciation above airspeed tape, "AIRSPEED" aural alert,** USP ACTIVE

WARNING

When Underspeed Protection is active, the autopilot is actively lowering the nose of the aircraft to avoid a stall. If Underspeed Protection activates on approach, consider performing a go-around.

NOTE

Underspeed Protection is active whenever the autopilot is engaged and the airspeed has fallen below a minimum threshold or stall warning has activated.

POWER Lever....................................INCREASE POWER as required
FLAPS..CONSIDER
LANDING GEAR..CONSIDER

3.41 AVIONICS SYSTEMS (continued)

3.41s Loss of Navigation Information

Indication: Amber VOR, VAPP, GPS, BC, LOC or GS flashing on PFD

NOTE

If a navigation signal is lost while the autopilot is tracking it, the autopilot will roll the aircraft wings level and default to roll mode (ROL). NAV mode can be reselected after a valid navigation source is present.

Nav Source ....SELECT A VALID NAV SOURCE
Autopilot................................ SELECT ANOTHER LATERAL MODE

If on an instrument approach at the time the navigation signal is lost:

Missed Approach..EXECUTE
(A second approach may be attempted using other navaids.)

3.41 AVIONICS SYSTEMS (continued)

3.41t Autopilot Out-Of-Trim

Indication: **Amber** **←RUD** , **RUD→** , **←AIL** , **AIL→** , **↓ELE** , **or** **↑ELE** **on PFD**

CAUTION

Do not attempt to overpower the autopilot in the event of an elevator mistrim. The autopilot servos will oppose pilot input and will trim opposite the direction of pilot input in the pitch axis. This could lead to a significant out-of-trim condition. Disconnect the autopilot using the A/P DISC switch if manual control is desired.

If **←RUD** or **RUD→** annunciation.... adjust rudder trim.

NOTE

For aileron mistrims, ensure the slip/skid indicator is centered and observe the 40 pound maximum fuel imbalance limitation.

NOTE

Sustained elevator mistrims indicate a possible problem with the electric pitch trim system.

Control Wheel .... GRASP FIRMLY

CAUTION

Be prepared to apply a sustained control force in the direction of the annunciation arrow. For example, an arrow pointing to the right with AIL annunciation indicates that sustained right wing down control wheel force will be required upon autopilot disconnect.

A/P DISC Switch .... DEPRESS
Affected trim system .... RETRIM
Autopilot..RE-ENGAGE if available

If the mistrim indication re-occurs, disconnect the autopilot for the remainder of the flight or until the offending condition is resolved.

3.41 AVIONICS SYSTEMS (continued)

3.41u Abnormal Flight Director Mode Transitions

Indication: Flashing lateral or vertical mode annunciations on PFD

NOTE

After 10 seconds of flashing, the new mode will be annunciated in green. Upon loss of a selected mode, the system will revert to the default mode for the affected axis, either ROL or PIT.

Loss of selected vertical mode (FLC, VS, ALT, GS, GP)

Autopilot Mode Controls ......SELECT ANOTHER VERTICAL MODE

If on an instrument approach:

Autopilot.. DISCONNECT (if coupled) and continue manually or execute missed approach

Loss of selected lateral mode (HDG, NAV, LOC, APP, BC)

Autopilot Mode Controls .... SELECT ANOTHER LATERAL MODE

If on an instrument approach:

Autopilot.. DISCONNECT (if coupled) and continue manually or execute missed approach

3.41 AVIONICS SYSTEMS (continued)

3.41v Failure of the Preflight Test

Indication: Red Boxed AFCS or PFT on PFD

AUTOPILOT Circuit Breaker..PULL / OPEN
(Located on pilot's forward circuit breaker panel, row D, position 2)

PITCH TRIM Circuit Breaker ....PULL / OPEN
(Located on pilot's forward circuit breaker panel, row D, position 1)

NOTE

When the autopilot circuit breaker is pulled, the red AFCS annunciation will be removed and the autopilot will be inoperative. Do not reset the circuit breakers unless the airplane is on the ground.

3.41 AVIONICS SYSTEMS (continued)

3.41w Loss of Cabin Altitude Display

Indication: Cabin Altitude Display on the MFD is Yellow-X'd

Monitor cabin differential pressure for indications of pressurization system malfunction or loss of cabin pressure.

If an emergency descent is necessary, refer to paragraph 3.23, Emergency Descent - Maximum Rate.

3.41 AVIONICS SYSTEMS (continued)

3.41x Loss of Cabin Altitude Display and Cabin Differential Pressure Display

Indication: Cabin Altitude Display and Cabin Differential Pressure Display on the MFD are Yellow-X'd

Descend to an altitude below which supplemental oxygen use would not be required in the event of a loss of cabin pressure.

If an emergency descent is necessary, refer to paragraph 3.23, Emergency Descent - Maximum Rate.

3.41 AVIONICS SYSTEMS (continued)

3.41y Dual GPS Failure

Navigation .... Use alternate source of navigation (ILS, LOC, VOR, DME, ADF)

If no alternate navigation sources are available:

Dead Reckoning (DR) Mode - Active when the airplane is greater than 30 NM from the destination airport.

Navigation .... Use the airplane symbol and magenta course line on the MAP display.

WARNING

Information normally derived from GPS turns amber. Information will become more inaccurate over time. After 20 minutes, all information is removed from the display.

NOTE

TAWS and Emergency Autoland are inoperative.

NOTE

DR mode uses heading, airspeed and last known GPS position to estimate the airplane's current position.

All maps with an airplane symbol show a ghosted airplane and a DR label.

Traffic Information System (TIS) is not dependent on GPS information. The position of displayed traffic relative to the airplane symbol on the map is still accurate.

Loss of Integrity (LOI) mode - Active when the airplane is within 30 NM of the destination airport (as calculated from the previous GPS or DR position).

3.41 AVIONICS SYSTEMS (continued)

Navigation .... Fly towards known VMC. Use ATC or other information sources as possible.

NOTE

All information derived from GPS or DR is removed from the displays.

The airplane symbol is removed from all maps. The map will remain centered at the last known position.

"No GPS Position" is shown in the center of the map.

TAWS, TIS, and Emergency Autoland are inoperative.

3.43 FUEL SYSTEM

3.43a Fuel Pressure

Indication: Master WARNING; FUEL PRESS LOW ;
Repeating triple chime.

Power .... REDUCE
FUEL PUMPS Switch .... MAN
AUTO BRAKE Circuit Breaker .... PULL / OPEN
(Located on pilot's forward circuit breaker panel, row D, position 5)
Fuel Quantity and Balance .... MONITOR

If FUEL PRESS LOW warning CAS message remains illuminated, ***land as soon as possible.***

If FUEL PRESS LOW warning CAS message extinguishes, ***land as soon as practical.***

CAUTION

When the AUTO BRAKE circuit breaker is pulled, the optional Emergency Autoland system will operate in a degraded mode. Automatic braking on the runway will not occur and the engine will not shut down automatically after the aircraft comes to a full stop.

3.43 FUEL SYSTEM (continued)

3.43b Fuel Quantity

Indication: Master WARNING; FUEL QTY ;
Repeating triple chime; Red fuel quantity low indication.

Land as soon as possible. Monitor fuel quantity. Reduce power/fuel flow if possible. Total fuel quantity (left and right tanks) is less than or equal to 100 pounds.

Indication: Master CAUTION; FUEL QTY ;
Double chime; Amber fuel quantity low indication.

Land as soon as practical. Monitor fuel quantity. Reduce power/fuel flow if possible. Total fuel quantity (left and right tanks) is less than or equal to 180 pounds.

3.43 FUEL SYSTEM (continued)

3.43c Fuel Filter

Indication: Master CAUTION; FUEL FILTER ; Double chime.

Land as soon as practical. Contaminated fuel or clogged filter is possible. Inspect filter after landing and repair prior to next flight.

3.43 FUEL SYSTEM (continued)

3.43d Fuel Imbalance

Indication: Master CAUTION; FUEL IMBALANCE ;
Double chime; Amber fuel imbalance indication.

CAUTION

Maximum fuel imbalance is 40 pounds. Do not takeoff with a FUEL IMBALANCE caution CAS message illuminated.

FUEL PUMPS Switch .... Verify AUTO
Fuel Pump .... VERIFY L or R FUEL PUMP ON advisory CAS message on high fuel side
Fuel Quantity .... MONITOR

NOTE

When left and right fuel quantity differ by more than 25 pounds, the fuel pump from the high fuel side will turn on. When left and right fuel quantity differ by more than 40 pounds, the amber FUEL IMBALANCE message will illuminate and fuel pump activation is indicated by illumination of the white L or R FUEL PUMP ON advisory CAS message.

NOTE

When the FUEL PUMPS switch is in the MAN position, both white L and R FUEL PUMP ON advisory CAS messages are illuminated, indicating operation of the left and right fuel pumps.

If fuel imbalance continues to increase above 40 pounds:

FUEL PUMPS switch .... Select MANUAL ON
FUEL PUMP c/b corresponding to low quantity fuel tank ....PULL
FUEL PUMP .... VERIFY FUEL PUMP ON advisory CAS message on high fuel side.
Fuel Quantity .... MONITOR

Land as soon as practical.

3.43 FUEL SYSTEM (continued)

3.43e Fuel Temperature

Indication: FUEL TEMP **; Single chime; (Fuel temperature less than minimum fuel temperature limit of -34°C.)**

Ground:

Do not start engine when fuel temperature is below -34°C.

Flight (Jet A -34°C, Jet A-1 -41°C):

Maintain fuel within fuel temperature limitations by changing altitude into warmer ambient OAT conditions.

Indication: Fuel temperature greater than maximum fuel temperature limit (+50°C).

Ground:

Do not start engine above +50°C Fuel Temperature.

Flight:

FUEL PUMPS Switch.. MAN

Land as soon as practical.

Indication: Fuel temperature indicator blank/malfunctions.

Continue flight assuming OAT is equal to fuel temperature and maintain fuel temperatures within limits using OAT.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS

3.45a Fire / Smoke or Fumes in Cabin

If source is known:

Pilot Emergency Oxygen .... DON MASK (set to 100%)
Passenger Emergency Oxygen .... ACTIVATE and DON MASKS
MIC SEL Switch .... MSK
Extinguish fire using the hand held fire extinguisher located in the bottom drawer of the cabinet located behind the copilot's seat.

If source is not known:

Emergency Oxygen Mask .... ON (100%)
MIC SEL Switch .... MSK
BLEED AIR SELECT Switch .... OFF
BLEED AIR Lever .... PULL OUT (OFF)
Cabin Pressure DUMP Switch .... DUMP
VENT FAN Switch .... ON
Emergency Descent to a safe altitude .... EXECUTE CHECKLIST
(per Paragraph 3.23)

Land as soon as possible.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45b Cabin Altitude Above 10,000 feet
Indication: Master CAUTION; CABIN ALT 10K ; Double chime.
Cabin Altitude .... MONITOR
If cabin continues to increase, be prepared to execute **Cabin Altitude Above 12,000 feet procedure (Paragraph 3.45c).**

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45c Cabin Altitude Above 12,000 feet

Indication: Master WARNING; CABIN ALT 12K ;
Repeating triple chime; Red cabin altitude indication.

Pilot Emergency Oxygen .... DON MASK
Passenger Emergency Oxygen .... ACTIVATE and DON MASK
MIC SEL Switch .... MSK
BLEED AIR SELECT Switch .... Verify NORM or HIGH selected
BLEED AIR Lever .... Verify IN (ON)
Master WARNING .... Press to Mute Tone

Descend as soon as practical.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45d Hypoxia Alert - Emergency Descent Mode

Indication: ARE YOU ALERT?; Single chime.

Any button on PFD1, MFD, PFD2, GTC1, GTC2, Autopilot ......PRESS

If applicable buttons not pressed in 60-seconds:

Indication: Master CAUTION; HYPOXIA ALERT; Double chime.

Any button on PFD1, MFD, PFD2, GTC1, GTC2, Autopilot ......PRESS

If applicable buttons not pressed in 60-seconds:

Indication: Master WARNING; AUTO DESCENT; Repeating triple chime, EDM Annunciation on PFD,

NOTE

Emergency Autoland (if installed) will automatically activate at 14,100 feet.

Autopilot will descend aircraft in current lateral mode to 14,000 feet unless it is disconnected by the pilot.

If the autopilot is not disconnected within 4-minutes after level-off at 14,000 feet:

Indication: Master WARNING; AUTO DESCENT; Repeating triple chime, EDM Annunciation on PFD,

Autopilot will descend aircraft in current lateral mode to 12,500 feet unless it is disconnected by the pilot.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45e Emergency Pressurization

Indication: EMER BLEED ON ; **Single chime.**

Automatic Operation:

Pilot Emergency Oxygen .... DON MASK
Passenger Emergency Oxygen .... ACTIVATE and DON MASK
MIC SEL Switch .... MSK
BLEED AIR SELECT Switch .... NORM or HIGH

NOTE

Emergency pressurization will activate as the cabin altitude approaches 12,000 feet and will deactivate as the cabin altitude approaches 11,000 feet. If cycling of emergency pressurization is experienced, it can be eliminated by rotating the BLEED AIR SELECT switch to the EMER position.

Manual Operation:

BLEED AIR SELECT Switch .... EMER
Cabin Altitude .... MONITOR

Descend as soon as practical.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45f Cabin Pressurization Control System Failure

Indication: Master CAUTION; CPCS FAIL ; Double chime.

On Ground:

BLEED AIR Lever .... AS DESIRED
BLEED AIR SELECT Switch .... AS DESIRED
CABIN PRESSURE DUMP Switch .... DUMP

NOTE

When a CPCS FAIL caution CAS message occurs on the ground, both outflow valves remain open and the flight must be conducted unpressurized. The BLEED AIR lever and BLEED AIR SELECT switch may be used to attain a desirable temperature in the cabin.

In Flight:

Cabin Altitude .... MONITOR
Cabin Differential Pressure .... MONITOR
Pilot Emergency Oxygen .... DON MASK
Passenger Emergency Oxygen .... ACTIVATE and DON MASK
MIC SEL Switch .... MSK (if required)

Descend as soon as practical.

Prior to landing:

CABIN PRESSURE DUMP Switch .... DUMP

CAUTION

When a CPCS FAIL caution CAS message appears in flight, the CPCS controller stops regulating cabin pressure. Cabin pressure changes are now related to aircraft altitude and the aircraft is still protected from exceeding maximum differential pressure.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45g Cabin Pressurization Control System Fault

Indication: Master CAUTION; CPCS FAULT ; Double chime.

Cabin Altitude .... MONITOR
Cabin Differential Pressure .... MONITOR

Prior to landing:

CABIN PRESSURE DUMP Switch .... DUMP

NOTE

When a CPCS FAULT caution CAS message occurs the CPCS uses its internal sensors in lieu of the Garmin G3000 system. The landing field elevation and squat switch information may not be available, so the cabin must be depressurized manually prior to landing.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45h Bleed Overtemperature

Indication: Master WARNING; BLEED OVERTEMP **;**
Repeating triple chime.

POWER Lever..REDUCE
Climate Control ....SELECT LOWER TEMP

If message remains illuminated:
Pilot Emergency Oxygen .... DON MASK
Passenger Emergency Oxygen................. ACTIVATE and DON MASK
MIC SEL Switch...MSK
BLEED AIR SELECT Switch .... OFF
BLEED AIR Lever.......................................PULL OUT (OFF)
Descend and land as soon as practical.

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45i Overpressurization

Indication: Master WARNING; Repeating triple chime; Flashing red DIFF PRESS indication.

If cabin differential pressure remains above 5.6 psi:

Pilot Emergency Oxygen .... DON MASK
Passenger Emergency Oxygen .... ACTIVATE and DON MASK
MIC SEL Switch .... MSK
BLEED AIR SELECT Switch .... OFF
BLEED AIR Lever .... PULL OUT (OFF)

If overpressurization continues:

Cabin Pressure DUMP Switch .... DUMP
Emergency Descent .... ACCOMPLISH PER Paragraph 3.23

3.45 PRESSURIZATION / ENVIRONMENTAL SYSTEM MALFUNCTIONS (continued)

3.45j Rapid or Explosive Decompression

Pilot Emergency Oxygen .... DON MASK
Passenger Emergency Oxygen .... ACTIVATE and DON MASK
MIC SEL Switch .... MSK

If increase in cabin altitude is explosive:

Emergency Descent .... ACCOMPLISH PER Paragraph 3.23

If increase in cabin altitude is rapid and cabin altitude has not exceeded 14,000 feet (time permitting):

BLEED AIR SELECT Switch ....HIGH

If cabin altitude exceeds 14,000 feet:

Emergency Descent .... ACCOMPLISH PER Paragraph 3.23

3.47 USE OF OVER WING EMERGENCY EXIT

Use of Over Wing Emergency Exit
Exit .... LOCATE (second window from front on right side)
NOTE **The cabin must be depressurized before attempting to open the emergency exit.**
Plexiglas Cover .... REMOVE
Handle .... PULL
Emergency Exit Window .... PULL IN
Emergency Exit Window .... THROW OUTSIDE or STOW IN FUSELAGE (as desired)
Aircraft .... EVACUATE

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS

3.49a Left Pitot Heat Failure

Indication: Master CAUTION; L PITOT HT FAIL **; Double chime.**

L PITOT HEAT Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row A, position 2)

If amber or white IAS annunciation on PFD:

ADC2..SELECT

NOTE

Failure of the L pitot heat could cause erroneous airspeed indications on the standby instrument.

Exit and avoid IFR and icing conditions.

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49b Right Pitot Heat Failure

Indication: Master CAUTION; R PITOT HT FAIL ; Double chime.

R PITOT HEAT Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row A, position 3)

If amber or white IAS annunciation on PFD:

ADC1 .... SELECT

Exit and avoid IFR and icing conditions.

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49c Both Left and Right Pitot Heat Failure

**Indication: Master WARNING; PITOT HT FAIL ;
Repeating triple chime.**

WARNING

Failure of both left and right pitot heaters could cause erroneous airspeed indications on PFD1, PFD2 and/or standby instrument. Monitor PFD1 and PFD2 airspeeds. In the event of complete loss of airspeed, maintain safe airspeed by use of proper pitch attitude and power setting.

L PITOT HEAT Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row A, position 2)
R PITOT HEAT Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row A, position 3)

If either or both circuit breakers open again, do not reset:

Exit and avoid IFR and icing conditions.

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49d Stall Heat Fail

Indication: **Master WARNING; STALL HEAT FAIL ;**
Repeating triple chime.

STALL HEAT Switch.. RESET

If message remains illuminated:

STALL HEAT Circuit Breaker.. RESET
(Located on pilot's aft circuit breaker panel, row A, position 5)

If message remains illuminated:

Avoid low airspeeds and monitor approach speeds closely.
Monitor wing and empennage deice boots.
Exit and avoid icing conditions.

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49e Pitot Heat Off
Indication: Master CAUTION; PITOT HEAT OFF **.**
PITOT HEAT Switch..ON

3.49f Stall Heat Off
Indication: Master CAUTION; STALL HEAT OFF **.**
STALL HEAT Switch..ON

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49g Prop Heat Failure

Indication: Master WARNING; PROP HEAT FAIL ;
Repeating triple chime.

PROP HEAT Circuit Breaker .... VERIFY IN / CLOSED
(Located on pilot's aft circuit breaker panel, row A, position 4)

If PROP HEAT Circuit Breaker was in/closed:

PROP HEAT Switch .... Cycle OFF then ON

If message remains illuminated:

Exit and avoid icing conditions.

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49h Windshield Over Temp

Indication: Master CAUTION; WNDSHLD OVRTEMP ; Double chime.

WINDSHLD HT Switch .... OFF

If Windshield Over Temp CAS message extinguishes:

WINDSHLD HT Switch .... DEFOG

If Windshield Over Temp CAS message remains illuminated:

WINDSHLD HT Switch .... OFF

WINDSHIELD HEAT Circuit Breakers (2) .... PULL / OPEN

(Located on pilot's aft circuit breaker panel, row A, positions 7, 8)

Exit and avoid IFR and icing conditions and conditions where windshield heat may be necessary.

3.49 ANTI-ICE/DE-ICE SYSTEM MALFUNCTIONS (continued)

3.49i Surface De-ice Failure

Indication: Master CAUTION; SURF DEICE FAIL **; Double chime.**

SURFACE DE-ICE Circuit Breaker .... RESET
(Located on pilot's aft circuit breaker panel, row A, position 6)

If message remains illuminated:

Exit and avoid icing conditions.

3.49j Horizontal Tail Heat Failure

Indication: Master CAUTION; TAIL HEAT FAIL **; Double chime.**

Exit and avoid icing conditions.

3.51 STALL WARNING FAIL

Stall Warning Fail
Indication: Master CAUTION; STALL WARN FAIL ; Double chime.
STALL WARN Circuit Breaker .... RESET (Located on pilot's forward circuit breaker panel, row C, position 6)
FLAP Lever .... VERIFY FULLY IN A DETENT
CAUTION *Underspeed Protection (USP) is inoperative when Stall Warning is inoperative.*
Avoid low airspeeds and monitor approach speeds closely. If there is ice on the airplane, maintain a minimum of 130 KIAS with flaps UP and 102 KIAS with flaps T/O.
Wing and empennage deice boots............ MONITOR
If message remains illuminated:
Exit and avoid IFR and icing conditions.

3.53 DOOR AJAR

Door Ajar

On the Ground:

Indication: DOOR AJAR .

Door Latching ....CHECK AND VERIFY
4 GREEN INDICATORS

In Flight:

Indication: Master WARNING; DOOR AJAR **;**
Repeating triple chime.

Ensure all occupants are seated with seat belts and harnesses on.

Remain clear of the door.

Reduce cabin pressurization.

Reduce airspeed.

Land as soon as practical.

3.55 EMERGENCY OXYGEN

Emergency Oxygen
On Ground: **Indication:** OXYGEN **on MFD.** Indicates one or more of the passenger emergency oxygen canisters is in use or is expended. If the emergency oxygen system is not working properly, have the condition corrected before flight where oxygen may be required to cover the case of a cabin depressurization. **In Flight:** **Indication: Master CAUTION;** OXYGEN **; Double chime.** Indicates one or more of the passenger emergency oxygen canisters is in use or is expended. Descend to altitude where supplemental oxygen is not required.

3.57 SPIN RECOVERY

Spin Recovery	
POWER Lever	IDLE
Ailerons	NEUTRAL
Rudder	FULL OPPOSITE TO DIRECTION OF ROTATION
Elevator	FULL FORWARD
WHEN ROTATION STOPS	
Controls	NEUTRALIZE
Flaps	RETRACT
Attitude	LOOK TO THE HORIZON, ROLL UPRIGHT, SMOOTHLY PULL TO LEVEL FLIGHT

3.59 EMERGENCY AUTOLAND

3.59a Emergency Autoland - Manual Activation

Indication: Pilot incapacitation.

WARNING

The Emergency Autoland system is for emergency use only. An emergency will be declared via automatic radio communications and transponder code (7700). Use of this system is prohibited during all ground and normal flight operations.

WARNING

When EAL is operating in a degraded mode, it will attempt a landing using those systems available. Under these circumstances, EAL is designed to provide only a survivable landing.

WARNING

EAL may not consider all weather factors or runway condition when selecting a destination. It is therefore possible the aircraft will depart the runway surface during landing. Additionally, EAL does not know if a runway is closed or occupied.

NOTE

The Emergency Autoland switch should be pressed and held until the EAL system activates, as indicated by the PFDs and MFD changing to the EAL display mode.

EMERGENCY AUTOLAND Switch.............................. LIFT COVER/ PRESS & HOLD

CAUTION

The flight controls, throttle, landing gear, and flap levers should not be manipulated during the Emergency Autoland sequence. Doing so could interrupt the autonomous nature of the system.

If Emergency Autoland has activated but is not desired, refer to paragraph 3.59c Emergency Autoland - Deactivation.

3.59 EMERGENCY AUTOLAND (continued)

3.59b Emergency Autoland - Automatic Activation

Indication: **Advisory Message; EAL IN 1 MIN ; Single chime. Master Caution; EAL IN 30 SEC ; Double chime, Autopilot LVL modes on PFD.**

OR

Indication: **Master WARNING; AUTO DESCENT ; Repeating triple chime, EDM Annunciation on PFD.**

WARNING

The Emergency Autoland system is for emergency use only. An emergency will be declared via automatic radio communications and transponder code (7700). Use of this system is prohibited during all ground and normal flight operations.

WARNING

When EAL is operating in a degraded mode, it will attempt a landing using those systems available. Under these circumstances, EAL is designed to provide only a survivable landing.

WARNING

EAL may not consider all weather factors or runway condition when selecting a destination. It is therefore possible the aircraft will depart the runway surface during landing. Additionally, EAL does not know if a runway is closed or occupied.

CAUTION

Emergency Autoland (if installed) will automatically activate after 2 continuous minutes in Level Mode.

NOTE

Emergency Autoland (if installed) will automatically activate at 14,100 feet during a descent in Emergency Descent Mode.

If Emergency Autoland has activated but is not desired, refer to paragraph 3.59c Emergency Autoland - Deactivation.

3.59 EMERGENCY AUTOLAND (continued)

3.59c Emergency Autoland - Deactivation

A/P DISC Switch ....DEPRESS and RELEASE

CAUTION

Emergency Autoland may have automatically activated multiple systems as indicated by CAS messages present after Emergency Autoland deactivation. To regain manual operation of these systems, refer to the Emergency Autoland - Switch/ Lever Mismatches emergency checklist.

NOTE

Upon deactivation of Emergency Autoland, PFD1 and PFD2 return to the reversionary mode display, the GTC1 and GTC2 return to the normal display mode, and the MFD remains in the Emergency Autoland user interface. After 1-minute, the MFD and PFDs will return to the normal display mode.

NOTE

Upon deactivation of Emergency Autoland, the flight plan, if present prior to EAL activation, will be deleted and must be re-entered. The barometric pressure, altitude preselect, Com volumes, and intercom volumes may also have to be reset.

3.59 EMERGENCY AUTOLAND (continued)

3.59d Emergency Autoland - Switch Stuck

On Ground:

Indication: Master WARNING; EAL SWITCH STUCK ; Repeating triple chime; Red light in Emergency Autoland switch illuminated.

INTEG AV 1 Circuit Breaker ....PULL
(Located on pilot's aft circuit breaker panel, row C, position 8)

Resolve issue prior to flight.

In Flight:

Indication: Emergency Autoland continues to activate after deactivation.

Control Wheel .... GRASP FIRMLY
Attitude Indicators .... CROSSCHECK
A/P DISC Switch .... DEPRESS and HOLD
Pitch Trim.. RETRIM manually if necessary
INTEG AV 1 Circuit Breaker ....PULL
(Located on pilot's aft circuit breaker panel, row C, position 8)
AUTO THROTTLE Circuit Breaker ....PULL
(Located on pilot's forward circuit breaker panel, row D, position 6)

NOTE

The following features will become inoperative when the INTEG AV 1 circuit breaker is pulled:

- Emergency Autoland
- Autopilot
- Electric Pitch Trim
- Electronic Stability and Protection (ESP)
- Radar altimeter
- Stall warning system
- Cabin pressurization. Refer to paragraph 3.45f (CPCS FAULT) or 3.45g (CPCS FAIL) as appropriate.
- Left Pitot Heat
- XPNDR 1, GPS 1, COM 1, NAV 1, DME

Exit and avoid IFR and icing conditions.

3.59 EMERGENCY AUTOLAND (continued)

3.59e Emergency Autoland - Switch/Lever Mismatches

Indication: Master CAUTION; EAL FLAPS MM ; Double chime.

To resume manual control of the flaps:

FLAPS ....T/O then AS DESIRED

Indication: Master CAUTION; EAL GEAR MM ; Double chime.

To resume manual control of the landing gear:

LANDING GEAR Selector..........................DOWN then AS DESIRED

Indication: Master CAUTION; EAL PITOT HT MM ; Double chime.

To resume manual control of the pitot heat system:

PITOT HEAT Switch ....ON

Indication: Master CAUTION; EAL PROP HT MM ; Double chime.

To resume manual control of the propeller heat system:

PROP HEAT Switch ....ON then AS DESIRED

Indication: Master CAUTION; EAL STALL HT MM ; Double chime.

To resume manual control of the stall heat system:

STALL HEAT Switch ....ON

Indication: Master CAUTION; EAL SURF DEICE MM ; Double chime.

To resume manual control of the surface de-ice system:

SURFACE DE-ICE Switch ....ON then AS DESIRED
STALL WARN ICE SCHEDULE Switch ....OFF
(if NO ice accretions on any aircraft surface)

Indication: Master CAUTION; EAL WSHD HT MM ; Double chime.

To resume manual control of the windshield de-ice system:

WINDSHLD HEAT Switch .... ANTI ICE then AS DESIRED

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NORMAL PROCEDURES

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NORMAL PROCEDURES

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NORMAL PROCEDURES

4.1 GENERAL

This section provides the normal operating procedures for the PA-46-600TP, M600 airplane. All normal operating procedures required by FAA regulation, as well as those deemed necessary for normal operation of the airplane are presented.

This section provides checklists for all normal operating procedures, using a simple action - reaction format, with little emphasis on system operation. These checklists should be used during normal ground and flight operations.

When appropriate, additional information is provided immediately below the checklist, providing more detailed information related to that procedure. In order to operate the airplane in a safe and efficient manner, pilots should familiarize themselves with the both the checklist and amplified procedures.

Normal operating procedures associated with optional systems and equipment which require handbook supplements are presented in Section 9, Supplements.

CAUTION

Pilots who fly at high altitude must be aware of the physiological problems associated with prolonged flight at such altitudes.

Flight Into Known Icing Conditions

The Piper PA-46-600TP is approved for flight into known icing conditions as defined in Section 1, GENERAL. Operating in icing conditions of Continuous Maximum and Intermittent Maximum as defined in FAR 25, Appendix C has been substantiated; however, there is no correlation between these conditions and forecasts of reported "Light, Moderate and Severe" conditions. **Flight into severe icing is not approved**.

Icing conditions can exist in any clouds when the temperature is less than 5° C; therefore it is necessary to closely monitor outside air temperature when flying in clouds or precipitation. Clouds which are dark and have sharply defined edges usually have high water content and should be avoided whenever possible. **Freezing rain and freezing drizzle must always be avoided.**

4.1 GENERAL (continued)

Flight Into Known Icing Conditions (continued)

Pneumatic boots must be cleaned regularly for proper operation in icing. The exterior surfaces of the aircraft should be checked prior to flight. **Do not attempt flight with frost, ice or snow adhering to the exterior surfaces of the aircraft or landing gear.**

Prior to dispatch into forecast icing conditions all ice protection equipment must be functionally checked for proper operation.

4.3 AIRSPEEDS FOR SAFE OPERATION

The following airspeeds are significant to the safe operation of the airplane. They are for standard airplanes flown at maximum weight under standard sea level conditions.

Performance for a specific airplane may vary from published figures depending upon the equipment installed, the condition of the engine, airplane and equipment, atmospheric conditions and piloting technique.

Rotation and Liftoff (V_R) .... 85 KIAS
Best Angle of Climb Speed (V_X) .... 95 KIAS
Best Rate of Climb Speed (V_Y) .... 122 KIAS
Maximum Operating Maneuvering Speed (V_O)
At 6000 LBS GW .... 153 KIAS
At 3750 LBS GW .... 121 KIAS

Demonstrated Crosswind Velocity .... 17 KTS

4.3 AIRSPEEDS FOR SAFE OPERATION (continued)

Normal Approach Speeds
Flaps T/O .... 100–120 KIAS
Flaps LND .... 95–105 KIAS

Landing Final Approach Speed (threshold)
Flaps T/O .... 91 KIAS
Flaps LND .... 85 KIAS

Maximum Flaps Extended Speed
Takeoff (T/O) .... 147 KIAS
Landing (LND) .... 112 KIAS

Airspeeds for Autopilot Operation
Less than or equal to FL200: 90–251 KIAS/.55M
Greater than FL200: 100–251 KIAS/.55M

Minimum Airspeed for Autopilot Coupled Approach .... 100 KIAS

When Ice Accretions on the Airframe

Normal Approach Speeds
Flaps UP .... 130–145 KIAS
Flaps T/O .... 110–130 KIAS

Landing Final Approach Speed (threshold)
Flaps T/O .... 102 KIAS

Airspeeds for Autopilot Operation
Flaps UP 130–251 KIAS/.55M
Flaps T/O .... 95–147 KIAS

Minimum Airspeed for Autopilot Coupled Approach
Flaps UP .... 130 KIAS
Flaps T/O .... 110 KIAS

4.5 NORMAL PROCEDURES CHECKLIST

4.5a Preflight Checklist

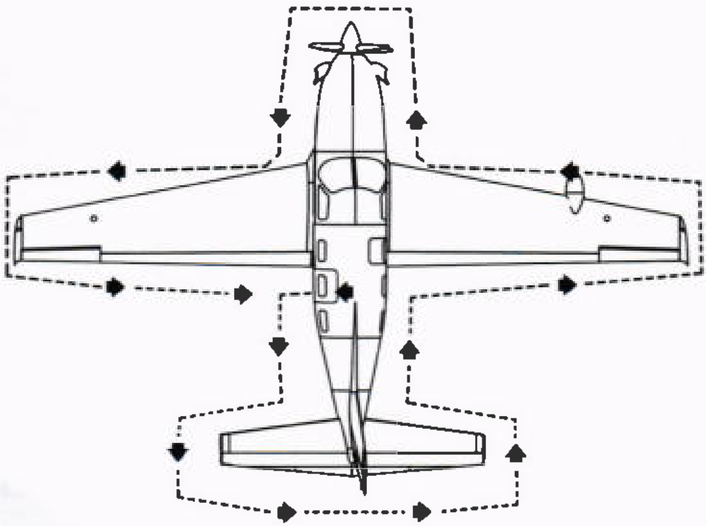
COCKPIT

Empty Seats....................................SEAT BELTS SNUGLY FASTENED
Windows..CHECK CLEAN
Emergency Exit..SECURED
Required Documents...CHECK ON BOARD
All Switches .... OFF
Control Wheel ....RELEASE RESTRAINTS
Primary Flight Controls ....PROPER OPERATION
PARK BRAKE...SET
LANDING GEAR Selector.. DOWN
BATTERY Switch ....ON
FLAPS...LND
Pilot's Emergency Oxygen System....................................ON / CHECK
Exterior Lighting Switches ....ON / CHECK, THEN OFF
Interior Cabin Lighting ....ON / CHECK, THEN OFF
BATTERY Switch .... OFF
Baggage ....STOW / SECURE

Set the parking brake by first depressing and holding the toe brake pedals and then pulling the PARK BRAKE knob.

Verify proper mask and microphone operation as follows: Select the mask microphone (MIC SEL to MSK). Turn PILOT OXYGEN supply ON and depress the PRESS TO TEST AND RESET button. Verify the flow indicator blinks (yellow cross) and O2 flow can be heard over the intercom or overhead speaker. The mask does not have to be removed from the stowage box for preflight testing. After the check is complete, select BOM on the MIC SEL switch. Verify minimum 800 psi in emergency oxygen supply before commencing high altitude operations.

4.5a Preflight Checklist (continued)



WALK-AROUND
Figure 4-1

EMPENNAGE

Fuselage Underside Static Ports (4) .... CLEAR
Left Fuselage Side Static Port .... CLEAR
Storage Compartment Door .... CLOSE / SECURE
External Power Receptacle Door .... CLOSED
Antennas (Upper and Lower) .... CHECK
Surface Condition .... CLEAR OF ICE, FROST, SNOW
Deice Boots (Horizontal and Vertical Stabilizers) .... CHECK
Elevator and Elevator Trim Tab .... CHECK
Rudder and Rudder Trim Tab .... CHECK
Elevator and Rudder Static Wicks (11) .... CHECK
Tie Down .... REMOVE
Right Fuselage Side Static Port .... CLEAR

4.5a Preflight Checklist (continued)

RIGHT WING

Surface Condition	CLEAR OF ICE, FROST, SNOW
Flap and Hinges	CHECK
Aileron and Hinges	CHECK
Static Wicks (3)	CHECK
Wing Tip and Lights	CHECK
Fuel Tank Vent	CLEAR
Fuel Tank and Filler Cap	CHECK SUPPLY / SECURE CAP
Deice Boot	CHECK
Stall Strip	CHECK
Radar Pod	CHECK / SECURE
Pitot Head	CHECK
Tie Down and Chock	REMOVE
Main Gear Strut	PROPER INFLATION
Gear Door	CHECK
Tire	CHECK
Brake Block and Disc	CHECK
Wing Fuel Sump	DRAIN / CHECK

If installed, remove pitot cover and verify that it is clear of obstructions.

Check the landing gear for hydraulic leaks and for proper inflation. There should be approximately 2.5 in. (6.4 cm) +/- 0.1 in (0.25 cm) of strut exposed under normal load.

4.5a Preflight Checklist (continued)

NOSE SECTION

Right Cowl Door....................OPEN / CHECK / SECURE
Right Forward Cowling....................CHECK LATCHES
Air Outlet and Exhaust Covers....................REMOVE
Generator / Alternator Cooling Air Inlet....................CLEAR
Oil Filler Door....................SECURE
Exhaust Stacks....................CHECK
Right Fuel Sump (1)....................DRAIN / CHECK
Air Inlets....................CLEAR
Propeller Spinner....................CHECK
Propeller and Deice Boots....................CHECK
Landing Light....................CHECK
Chock....................REMOVE
Nose Gear Strut....................PROPER INFLATION
Nose Tire....................CHECK
Gear Doors....................CHECK
Left Fuel Sumps (2)....................DRAIN / CHECK
Left Forward Cowling....................CHECK LATCHES
Left Cowl Door....................OPEN / CHECK OIL LEVEL
Oil Filler Cap....................VERIFY FULLY CLOSED
Alternator and Air Conditioner
Compressor Belts....................CHECK
Brake Fluid Reservoir Cap....................VERIFY CLOSED
Left Cowl Door....................CLOSED / SECURE

Open right cowling door and check general condition of engine linkages, hoses and wiring. Close and secure the door. Verify that each forward cowling latch is properly fastened. When a latch is properly fastened, the slot will be in the horizontal position and aligned with indicator marks on the cowling, and the indicator pin in the center of the slot will be extended into the slot.

Remove engine and oil cooler inlet covers (3), exhaust covers (2), propeller tip covers (2) and top cowling inlet cover (1) and verify all inlets are clear of obstructions. Check the exhaust stacks for cracks and ensure they are securely attached. Check the propeller and spinner for cracks, nicks or other defects. Rotate the propeller and listen for noises and check for binding.

4.5a Preflight Checklist (continued)

Check the nose gear strut for hydraulic leaks and proper inflation. There should be approximately 2.6 in (6.6 cm) +/- 0.1 in. (0.25 cm) of strut exposure under normal loading conditions. Check tires for cuts, wear and proper inflation.

Drain the fuel sumps before first flight of the day and after each refueling. Ensure all water and sediment is removed and verify proper fuel type.

Open the left cowling door and check oil level. Oil quantity may be checked either by the sight gage or the dipstick (refer to Section 8 for procedures). Verify the oil filler cap is closed and the locking tab is down.

LEFT WING

Surface Condition .... CLEAR OF ICE, FROST, SNOW
Ice Light .... CHECK
Main Gear Strut .... PROPER INFLATION
Gear Door .... CHECK
Tire .... CHECK
Brake Block and Disc .... CHECK
Wing Fuel Sump .... DRAIN / CHECK
Tie Down and Chock .... REMOVE
Pitot Head .... CHECK
OAT Probes (2) .... CHECK
Deice Boot .... CHECK
Stall Strip .... CHECK
Stall Warning Vane .... CHECK
Fuel Tank and Filler Cap .... CHECK SUPPLY / SECURE CAP
Fuel Tank Vent .... CLEAR
Wing Tip and Lights .... CHECK
Static Wicks (3) .... CHECK
Aileron and Hinges .... CHECK
Flap and Hinges .... CHECK

4.5a Preflight Checklist (continued)

LEFT WING (continued)

Drain the fuel sumps before first flight of the day and after each refueling. Ensure all water and sediment is removed and verify proper fuel type. See Figure 8-3 for location of fuel system sump drains.

If installed, remove pitot cover and verify it is clear of obstructions. Verify the OAT probes are clear of obstructions.

Check the landing gear for hydraulic leaks and for proper inflation. There should be approximately 2.5 in. (6.4 cm) +/- 0.1 in (0.25 cm) of strut exposed under normal load.

4.5b Before Starting Engine Checklist

BEFORE STARTING ENGINE

Passengers .... BOARD
Emergency Autoland .... BRIEF PASSENGERS
Door .... CLOSE / LATCH

WARNING

Do not initiate any flight if all four door pin indicators are not green and/or the DOOR AJAR message is illuminated.

Door Pins.................................. ALL (4) INDICATORS GREEN
Pitot and Static Drains (3 left/2 right).................. PUSH TO DRAIN
Seats.. ADJUSTED / LOCKED
Seat Belts and Harness .... FASTEN / TIGHT
CHECK INERTIA REEL
All Electrical Switches .... OFF
DAY/NIGHT Switch.................................. VERIFY SETTING
Environmental Control Panel Switches .... OFF
Circuit Breakers.................................. VERIFY IN / CLOSED
BLEED AIR SELECT Switch .... OFF
PARK BRAKE.. SET
BLEED AIR Lever.................................. PULL OUT (OFF)
MANUAL OVRD Lever (MOR).................................. OFF (full aft and
locked in place)
POWER Lever.. IDLE
CONDITION Lever .... CUT-OFF / FEATHER

4.5b Before Starting Engine Checklist (continued)

BEFORE STARTING ENGINE (continued)

Firewall FUEL SHUTOFF Valve .... IN (open) / COVER CLOSED
EMER Switch .... ON (verify emergency equipment operation)

NOTE

Whenever system voltage permits, the aircraft should be started using battery power only, especially when the ambient temperature is below 0°C (32°F). This procedure warms the battery and improves its re-charging acceptance.

BATTERY Switch .... ON (OFF, if external power applied)
EMER Switch .... OFF
ANN TEST Switch .... PRESS / HOLD
MIC SEL Switch .... BOM (boom)
Alternate Static Source .... CHECK DOWN / PRIMARY
Fuel Gauges .... CHECK QUANTITY / BALANCE
OAT .... VERIFY WITHIN LIMITS
Fuel Temperature .... VERIFY WITHIN LIMITS
Oil Temperature .... CHECK
CAS Messages .... CONSIDER ANY DISPLAYED
PFD Annunciations .... CONSIDER ANY DISPLAYED
Proceed with appropriate Engine Start Checklist.

A passenger preflight briefing of the Emergency Autoland system should include, at a minimum, the following information:

- What the system is intended to do (see paragraph 7.41 for additional details)
  - Performs a fully-automatic, survivable landing at the nearest suitable airport in case of pilot incapacitation.
  - Shuts down the engine after coming to a stop.
- It is an **emergency system** and activation **is prohibited during all ground and normal flight operations**.
- How to activate the system via the Emergency Autoland guarded switch on the instrument panel.

4.5b Before Starting Engine Checklist (continued)

BEFORE STARTING ENGINE (continued)

- Follow the information and instructions presented on the Garmin displays, such as keeping hands and feet away from the aircraft controls. If needed, the passengers should adjust the volume on the GTC and their headsets to achieve a desirable level.
- How to deactivate the Emergency Autoland system (if considered necessary) should a passenger at the flight controls be a proficient pilot in this model aircraft.
- After an emergency autolanding, leave the Emergency Autoland system ON for first responders to deactivate when ready to move the airplane to a safe location.

Operation of the emergency power distribution system should be checked before each flight. With the EMER switch ON and BATTERY switch OFF, verify the following equipment is operating properly:

- PFD1 is powered in reversionary mode with valid attitude and airspeed data.
- GTC1 (left touchscreen) is powered with valid COM1, NAV1.
- EIS displays valid engine parameters (subset) and landing gear indication.
- MIC SEL and CABIN PRESSURE DUMP switch are illuminated.

When depressing ANN TEST switch, all fields in the MIC SEL and CABIN PRESSURE DUMP switch should illuminate.

The OAT and fuel temperature limits can be found in Paragraphs 2.33 and 2.35, respectively.

The oil temperature should be checked prior to engine start. The cold start procedure is required when oil temperature is 0°C and below.

Before starting the engine, verify the parking brake is set and the area around the airplane is clear of personnel and equipment. To set the parking brake, first depress and hold the toe brake pedals and then pull the parking brake knob.

CAUTION

To prevent damage to the control linkage, do not move the power lever aft of the idle stop when the engine is not operating.

4.5c Engine Start Checklist

ENGINE START - USING AIRPLANE BATTERY

Battery VOLTS ....CHECK 24 – 26 VOLTS
STROBE LIGHT.. AS REQUIRED

CAUTION

Allow G3000 avionics to initialize and display CAS messages prior to initiating an engine auto start sequence. Starting the engine prior to display of G3000 CAS messages will result in disruption of the auto start sequence possibly resulting in an engine overtemp condition.

CAUTION

For warm weather operation engine starts may be attempted with a battery voltage of 23.5 volts minimum. Observe the engine start ITT limitation, Ng minimum speed of 13% and ensure combustion occurs within 10 seconds after moving the condition lever to run. Failure to observe these limitations can result in damage to the engine.

FUEL PUMPS Switch .... MAN
L and R FUEL PUMP ON Messages .... ILLUMINATED
IGNITION Switch... MAN
IGNITION ON Message .... ILLUMINATED
Prop Area...CLEAR
START MODE Switch ....AUTO MODE
PUSH START Switch.......................................LIFT COVER / PUSH
Oil Pressure ....CHECK RISING
Ng (min. 13%)...STABILIZED

For oil temperature less than or equal to 0°C:

CONDITION Lever ....COLD START (HOLD)
CONDITION Lever (at 50% Ng minimum).................................. RUN

For oil temperature greater than 0°C:

CONDITION Lever .... RUN

ITT ....MAX. 1000°C LIMITED TO 5 SEC.

4.5c Engine Start Checklist (continued)

ENGINE START - USING AIRPLANE BATTERY (continued)

If combustion is not initiated within 10 sec. of moving Condition Lever to Run then:

a. CONDITION Lever ....CUT-OFF / FEATHER
b. START MODE Switch ....PUSH MAN / STOP
c. Allow minimum of 30 seconds fuel draining period, then refer to DRY MOTORING RUN (Paragraph 4.5d)

At 56% Ng...VERIFY START ENGAGED MESSAGE IS EXTINGUISHED
Ng ....STABLE AT OR ABOVE 63%
PROP RPM .... VERIFY 1180 RPM MINIMUM
Battery VOLTS ....CHECK 24.5 VOLTS (minimum)
GEN Switch... ON / CHECK POSITIVE AMPS
ALT Switch ....ON
FUEL PUMPS Switch..AUTO
IGNITION Switch.. OFF
Oil Pressure ....CHECK
Proceed to BEFORE TAXIING Checklist.

For Auto (normal) Start, lift the PUSH START switch guard cover and press and release the PUSH START switch to engage the starter.

During the start, verify the START ENGAGE CAS advisory message extinguishes above 56% Ng. If it does not, push the START MODE MAN / STOP switch to disengage the starter.

If Ng is in the caution range and/or propeller RPM is in the warning range once the engine has reached idle, the power level should be advanced until the caution and/or warning extinguishes. Ng and propeller RPM can be checked again at the end of the ENGINE RUNUP checklist (after the engine warms up). If this check is unsuccessful, the issue must be resolved prior to flight.

If the battery VOLTS indication is less than 24.5 volts, it can be checked again at the end of the ENGINE RUN UP checklist (after being charged by the generator). If this check is unsuccessful, the issue must be resolved prior to flight.

4.5c Engine Start Checklist (continued)

ENGINE START (MANUAL MODE) - USING AIRPLANE BATTERY

Battery VOLTS .... CHECK 24 – 26 VOLTS
STROBE LIGHT .... AS REQUIRED

CAUTION

For warm weather operation engine starts may be attempted with a battery voltage of 23.5 volts minimum. Observe the engine start ITT limitation, Ng minimum speed of 13% and ensure combustion occurs within 10 seconds after moving the condition lever to run. Failure to observe these limitations can result in damage to the engine.

FUEL PUMPS Switch .... MAN
L and R FUEL PUMP ON Messages .... ILLUMINATED
IGNITION Switch .... MAN
IGNITION ON Message .... ILLUMINATED
Prop Area .... CLEAR
START MODE Switch .... MAN (light in switch illuminated)
PUSH START Switch .... LIFT COVER / PRESS & HOLD
Oil Pressure .... CHECK RISING
Ng (min. 13%) .... STABILIZED

For oil temperature less than or equal to 0°C:

CONDITION Lever .... COLD START (HOLD)
CONDITION Lever (at 50% Ng minimum) .... RUN

For oil temperature greater than 0°C:

CONDITION Lever .... RUN

ITT .... MAX. 1000°C LIMITED TO 5 SEC.

4.5c Engine Start Checklist (continued)

ENGINE START (MANUAL MODE) - USING AIRPLANE BATTERY (continued)

If combustion is not initiated within 10 sec. of moving Condition Lever to Run then:

a. CONDITION Lever ....CUT-OFF / FEATHER
b. PUSH START Switch.. RELEASE
c. Allow minimum of 30 seconds fuel draining period, then refer to ENGINE DRY MOTORING RUN (Paragraph 4.5d)

At 56% Ng PUSH START Switch .... RELEASE
Ng .... STABLE AT OR ABOVE 63%
PROP RPM .... VERIFY 1180 RPM MINIMUM
Battery VOLTS ....CHECK 24.5 VOLTS (minimum)
GEN Switch... ON / CHECK POSITIVE AMPS
ALT Switch..ON
FUEL PUMPS Switch..AUTO
IGNITION Switch.. OFF
Oil Pressure ....CHECK
Proceed to BEFORE TAXIING Checklist.

Verify area around propeller is clear. For manual start, verify the START MODE switch is in the MAN position (light in the switch is illuminated). Lift the PUSH START switch guard cover and press and hold the PUSH START switch to engage the starter.

At 56% Ng, release the PUSH START switch and verify the START ENGAGE CAS advisory message extinguishes. If it does not, push the START MODE MAN / STOP switch to disengage the starter.

If Ng is in the caution range and/or propeller RPM is in the warning range once the engine has reached idle, the power level should be advanced until the caution and/or warning extinguishes. Ng and propeller RPM can be checked again at the end of the ENGINE RUNUP checklist (after the engine warms up). If this check is unsuccessful, the issue must be resolved prior to flight.

If the battery VOLTS indication is less than 24.5 volts, it can be checked again at the end of the ENGINE RUN UP checklist (after being charged by the generator). If this check is unsuccessful, the issue must be resolved prior to flight.

4.5c Engine Start Checklist (continued)

ENGINE START - USING EXTERNAL POWER

BATTERY Switch .... OFF
External Power Unit .... CONNECT
VOLTS .... CHECK STABLE 24 – 29 VOLTS
STROBE LIGHT .... AS REQUIRED
FUEL PUMPS Switch .... MAN
L and R FUEL PUMP ON Messages .... ILLUMINATED
IGNITION Switch .... MAN
IGNITION ON Message .... ILLUMINATED
Prop Area .... CLEAR
START MODE Switch .... AUTO MODE
PUSH START Switch .... LIFT COVER / PUSH
Oil Pressure .... CHECK RISING
Ng (min. 13%) .... STABILIZED

For oil temperature less than or equal to 0°C:

CONDITION Lever .... COLD START (HOLD)
CONDITION Lever (at 50% Ng minimum) .... RUN

For oil temperature greater than 0°C:

CONDITION Lever .... RUN

ITT .... MAX. 1000°C LIMITED TO 5 SEC.

If combustion is not initiated within 10 sec. of moving Condition Lever to Run then:

a. CONDITION Lever .... CUT-OFF / FEATHER
b. START MODE Switch .... PUSH MAN / STOP
c. Allow minimum of 30 seconds fuel draining period, then refer to ENGINE DRY MOTORING RUN (Paragraph 4.5d)

At 56% Ng .... VERIFY START ENGAGED MESSAGE IS EXTINGUISHED
Ng .... STABLE AT OR ABOVE 63%
PROP RPM .... VERIFY 1180 RPM MINIMUM
FUEL PUMPS Switch .... AUTO
IGNITION Switch .... OFF
Oil Pressure .... CHECK
BATTERY Switch .... ON
External Power Unit .... DISCONNECT
Battery VOLTS .... CHECK 24.5 VOLTS (minimum)

4.5c Engine Start Checklist (continued)

ENGINE START - USING EXTERNAL POWER (continued)

GEN Switch.. ON / CHECK POSITIVE AMPS
ALT Switch .... ON
Proceed to BEFORE TAXIING Checklist.

CAUTION

Allow G3000 avionics to initialize and display CAS messages prior to initiating an engine auto start sequence. Starting the engine prior to display of G3000 CAS messages will result in disruption of the auto start sequence possibly resulting in an engine overtemp condition.

NOTE

For engine starting, the external power source must be capable of providing 24 to 29 volts and 1200 amps.

For Auto (normal) Start, lift the PUSH START switch guard cover and press and release the PUSH START switch to engage the starter.

During the start, verify the START ENGAGE CAS advisory message extinguishes above 56% Ng. If it does not, push the START MODE MAN / STOP switch to disengage the starter.

If Ng is in the caution range and/or propeller RPM is in the warning range once the engine has reached idle, the power level should be advanced until the caution and/or warning extinguishes. Ng and propeller RPM can be checked again at the end of the ENGINE RUNUP checklist (after the engine warms up). If this check is unsuccessful, the issue must be resolved prior to flight.

If the battery VOLTS indication is less than 24.5 volts, it can be checked again at the end of the ENGINE RUN UP checklist (after being charged by the generator). If this check is unsuccessful, the issue must be resolved prior to flight.

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4.5d ENGINE DRY MOTORING RUN

Allow minimum of 30 seconds fuel draining period, then:

POWER Lever .... IDLE
CONDITION Lever .... CUT-OFF / FEATHER
FUEL PUMPS Switch .... MAN
IGNITION Switch .... OFF
BATTERY Switch .... ON (OFF, if external power applied)
START MODE Switch .... MAN (switch light illuminated)
PUSH START Switch .... PUSH / HOLD (15 SEC.)
PUSH START Switch .... RELEASE

4.5e BEFORE TAXIING

CAUTION

Isolated reports of no engine response to power lever movement have occurred during low engine power (Ng idle speed below 63%) and high engine accessory load operations in hot environments. If Ng is below 63% at the completion of the BEFORE TAXIING checklist, shutdown the engine and resolve the issue. The manual override lever is not to be used on the ground for taxiing or takeoff.

Environmental Control Panel Switches .... AS REQUIRED
AVIONICS Switch...ON
Multi-Function Display (MFD)............................ VERIFY DATABASE
Weight Planning..ENTER
Fuel on Board or FOB SYNC..ENTER
CAS Messages................................ CONSIDER ANY ILLUMINATED
Autopilot.. VERIFY SELF TEST
DEST ELV .... VERIFY

WARNING

If the internal battery of the EBD standby instrument is less than 80%, IFR flight is prohibited. Failure to press the EXT PWR softkey after the internal battery check could deplete the internal battery.

Standby Flight Instrument.......................... VERIFY no red-X, no failure annunciations, and internal battery checked.

NOTE

Heading indications on the ground may differ between EBD and PFD1/PFD2 due to separate magnetometer locations in the airframe. If a significant heading split is indicated, reposition the aircraft away from large metal structures or underground cables. Heading splits of no more than 4 degrees are acceptable on the ground.

4.5e BEFORE TAXIING (continued)

PITOT HEAT Switch.................................. ON / CHECK OPERATION
PITOT HEAT Switch.. OFF
STALL HEAT Switch................................. ON / CHECK OPERATION
STALL HEAT Switch... OFF
Radios / Avionics / Transponder Code .... CHECK
FLAPS .... AS REQUIRED
PITCH Trim .... SET FOR TAKEOFF
YAW Trim .... SET FOR TAKEOFF
BLEED AIR Lever.. PUSH IN (ON)
CABIN PRESSURE DUMP Switch......................... VERIFY POSITION
BLEED AIR SELECT Switch .... NORM

NOTE

Maximum cooling on the ground may be achieved by operating with the BLEED AIR lever in the OUT (OFF) position and the BLEED AIR SELECT control selected OFF.

STALL WARN TEST Switch .... PRESS TO TEST

CAUTION

Adjust headset volume to hear the STALL WARN TEST at an acceptable level. This will ensure all aural alerts and tones will be audible through the headset.

TAWS and TCAS/TAS (if installed)... TEST
Annunciator .... TEST
PILOT OXYGEN .... VERIFY ON
TAXI / REC LT Switch .... AS REQUIRED
NAV and STROBE LIGHT Switches .... AS REQUIRED
PARK BRAKE .... RELEASE

The MFD power-up screen lists all databases and expiration dates. The pilot should verify database currency and weight, fuel and destination elevation. See Garmin Cockpit Reference Guide for detailed procedures. (Refer to initial Note of Paragraph 3.41)

Verify successful Autopilot self-test by confirming the red AFCS box is removed from the PFD and the autopilot disconnect tone is heard.

4.5e BEFORE TAXIING (continued)

The EBD and emergency bus must be checked for proper operation prior to flight.

WARNING

IFR flight is prohibited when any component of the emergency or standby systems are inoperative. Failure to press the EXT PWR softkey after the internal battery check could deplete the internal battery.

To check the standby instrument's internal battery charge level, press the MENU key, rotate the MODE/SYNC knob to the POWER SETTINGS page, then press BATTERY line select key. BAT LEVEL IN --.-- will be displayed for a short period of time as internal battery capacity is being measured. This could take up to 10 minutes if the ambient temperature is below 0°C. Once the capacity is measured the ON BAT XX% REM annunciation will be displayed. After checking the battery charge level, the EXT PWR softkey must be pressed to reestablish power from the aircraft electrical system. Press the MENU key to return to the normal display.

If a Standby Flight Instrument malfunction is experienced during initialization, press MENU key, turn to menu page 12 and select RESTART. If this action does not reinitialize the unit, reset the STBY INSTR circuit breaker located on pilot's forward circuit breaker panel, row D, position 4.

Verify pitot heat and stall heat operation by observing increased electrical current (AMPS) when selecting PITOT HEAT and STALL HEAT switches ON. Also verify PITOT HEAT OFF and STALL HEAT OFF caution CAS messages function properly when turning the switches off.

Use the System Tests screen on either touchscreen controller to test the TAWS, TCAS/TAS, and Annunciator systems. Acceptable functionality is provided by voice alerts for TAWS and TCAS/TAS and by all switch lights illuminating on the autopilot for the Annunciation test.

To release the parking brake, first depress and hold the toe brake pedals and then push in the parking brake knob.

4.5f TAXIING

Taxi Area..CLEAR
POWER Lever.. ADVANCE SLOWLY
Brakes..CHECK
Steering...CHECK
Flight Instruments ....CHECK

WARNING

Propeller operation below 1180 rpm is prohibited.

NOTE

BETA range (aft of IDLE detent) may be used during taxi to control taxi speed and reduce wear on brakes.

4.5g ENGINE RUN UP

PARK BRAKE..SET
POWER Lever.. 1900 RPM
OVERSPEED GOV TEST Switch ....LIFT COVER / PUSH / HOLD
PROP RPM.....................OBSERVE APPROX. 20 – 50 RPM DROP
OVERSPEED GOV TEST Switch .... RELEASE
PROP RPM..RETURN TO 1900 RPM
POWER Lever..IDLE
REVERSE LOCK OUT Switch....................PUSH / HOLD (min. 5 sec.)
POWER Lever........................ LIFT / RETARD TOWARDS REVERSE
Beta and Prop Reverse ....NOT ATTAINABLE
REVERSE LOCK OUT Switch.........RELEASE, POWER LEVER CAN BE MOVED TOWARDS REVERSE
POWER Lever..IDLE
GEN Switch...................................OFF (verify alternator assumes load, GENERATOR OFF CAS Advisory)
GEN Switch...ON
ALT Switch ....OFF (ALTERNATOR OFF CAS Advisory)
ALT Switch ....ON
Quadrant FRICTION Lock ....SET

4.5g ENGINE RUN UP (continued)

POWER Lever..IDLE
Ng .... STABLE AT OR ABOVE 63%
PROP RPM .... VERIFY 1180 RPM MINIMUM

CAUTION

Flight prohibited if Ng is in the caution range and/or propeller RPM is in the warning range.

If battery check must be accomplished prior to flight:

GEN Switch...OFF
ALT Switch ....OFF
Battery VOLTS .... 24.5 VOLTS (minimum)
GEN Switch...ON
ALT Switch ....ON

CAUTION

Flight prohibited if battery volts indication is less than 24.5 volts.

If Flight Into Known Icing Conditions Anticipated:

WINDSHLD HT Switch.............................. ON / CHECK OPERATION
WINDSHLD HT Switch...OFF
PROP HEAT Switch................................... ON / CHECK OPERATION
PROP HEAT Switch...OFF
SURFACE DE-ICE Switch......................... ON / CHECK OPERATION
(set minimum torque of 250 ft-lb)

Operational checks of the icing equipment include verification that the light in the overhead switch illuminates when the system is activated, an amperage rise is present (if applicable) and there are no associated caution or warning CAS messages. During the windshield heat check, both DEFOG and ANTI ICE switch positions should be checked. During the surface deice check, the pilot should visually verify that the wings and horizontal tail boots inflate and deflate completely and there is an amperage rise produced by the horizontal tail heaters.

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4.5h FLIGHT INTO KNOWN ICING CONDITIONS

The PA-46-600TP is approved for flight into known icing conditions as defined in Section 1, GENERAL.

WARNING

Flight in icing conditions is prohibited if there is a known failure of any ice protection system listed in the REQUIRED EQUIPMENT for Flight Into Known Icing Conditions in Section 2.

WARNING

The autopilot will not maintain airspeed if ice accretes on the airplane. Monitor airspeed closely.

4.5h FLIGHT INTO KNOWN ICING CONDITIONS (continued)

WARNING

If ice is observed forming aft of the protected surfaces on the wing or if unusual lateral trim requirements or autopilot mistrim annunciations appear, the pilot should:

- **If the flaps are in the T/O position, do not retract them until the airframe is clear of ice.**
- **Reduce the angle of attack by increasing speed as much as the airplane configuration and weather allow, without exceeding Vo.**
- **If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot. Do not re-engage the autopilot until the airframe is clear of ice.**
- **Exit the icing condition immediately by changing altitude or course.**
- **Report these weather conditions to air traffic control.**

CAUTION

During flight in icing conditions, ice will form on the unprotected leading edge of the elevator, and possibly form a bridge of ice, or ice cap, between the stabilizer and the elevator. This condition may be detected and verified by visual observation, an "ELE" annunciation during autopilot operation, or an increase in elevator control forces, during straight and level flight. If ice bridging is detected or suspected, disconnect the autopilot and pulse the aircraft elevator pitch control to dislodge the ice bridge. Elapsed time between conducting elevator checks will vary, depending upon the amount and type of ice accretion. Usually 8 to 10 minutes between elevator pulsing cycles is considered sufficient.

CAUTION

Uneven ice buildup and shedding on the propeller can cause vibration (low frequency rumble) and possible reduction in thrust. Vibrations should subside after a few cycles (3 minutes per cycle) of propeller heat, however the pilot may assist ice shedding by modulating power between low power and MCP. If power requirements become excessive, exit icing conditions immediately.

4.5h FLIGHT INTO KNOWN ICING CONDITIONS (continued)

CAUTION

Flight in freezing rain or freezing drizzle, may result in hazardous ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and it may seriously degrade the performance and controllability of the airplane.

NOTE

The pilot has the primary responsibility of detecting icing conditions or ice accretions. Ice will typically form first on the leading edge of the wing or on the pilot and/or copilot windshields. The windshield heat and stall heat should be activated whenever OAT is less than 5°C and visible moisture is present. During night operations, the pilot should activate all ice protection systems per Section 4 whenever visible moisture is present and the outside air temperature is below 5°C.

SUPERCOOLED LARGE DROPS (SLD) CONDITIONS

Identification of SLD Conditions

The cues listed may be used to identify possible SLD conditions:

- Visible rain when outside air temperatures is below 5°C; even as cold as -18°C.
- Droplets that splash or splatter on impact at outside air temperatures below 5°C.
- Performance losses larger than normally encountered in icing conditions. It is possible to experience severe ice accretions on the underside of the wings or on the propeller blades which are not visible to the flight crew. Aircraft performance should be monitored closely.

4.5h FLIGHT INTO KNOWN ICING CONDITIONS (continued)

SUPERCOOLED LARGE DROPS (SLD) CONDITIONS (continued)

The cues listed should be used to identify SLD conditions:

- Ice may become visible on the upper surface of the wing, aft of the active part of the deicing boots. Pilots should look for irregular or jagged lines of ice or for pieces of ice shedding off the airplane. During night operations, adequate illumination should be used to observe all areas.
- The aft limit of ice accumulation on a propeller spinner that is not heated will reveal ice extending beyond normal limits.
- Unheated portions of side windows may begin to accumulate granular dispersed ice crystals or a translucent or opaque coating over the entire window. This icing may be accompanied by other ice patterns on the windows, such as ridges. These patterns may occur from within a few seconds to half a minute after exposure to SLD conditions.
- Ice coverage may become unusually extensive, with visible ice fingers or feathers on parts of the airframe that normally would not be covered by ice.

Procedures for Exiting SLD Conditions

1. Verify visual cues of SLD conditions exist (any phase of flight).
2. Exit the freezing rain / freezing drizzle immediately to avoid extended exposure to flight conditions outside those for which the airplane has been certificated for operation.
3. Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
4. Do not engage the autopilot as it may mask unusual control system forces.
5. If an unusual roll response or uncommanded control movement is observed, reduce the angle-of-attack by increasing airspeed or rolling wings level (if in a turn), and apply additional power, if needed.
6. Avoid extending flaps during extended operation in icing conditions. This may reduce the possibility of ice forming on the upper surface of the wing further aft than normal, possibly aft of the protected area.
7. If the flaps are extended, do not retract them until the airframe is clear of ice.
8. Report these weather conditions to ATC.

4.5h FLIGHT INTO KNOWN ICING CONDITIONS (continued)

PRIOR to entering icing conditions, the following ice protection systems **MUST** be activated.

NOTE

Windshield heat and stall heat should be activated whenever OAT is less than 5°C and visible moisture is present. During night operations, all ice protection equipment should be activated when OAT is less than 5°C and visible moisture is present.

IGNITION Switch .... MAN
WINDSHLD HT Switch .... ANTI ICE
PITOT HEAT Switch .... VERIFY ON
PROP HEAT Switch .... ON
STALL HEAT Switch .... ON
SURF DE-ICE Switch .... ON
Wing Inspection Light (ICE LIGHT) .... AS REQUIRED
Windshield DEFROST .... PULL OUT
BLEED AIR SELECT Switch .... HIGH

During Icing Conditions:

Wing Leading Edge .... MONITOR
(for continual ice shedding)
EIS Indications and CAS Window .... MONITOR
(for abnormal system operation)

WARNING

If any of the aircraft ice protection systems fail during flight in icing conditions, exit and avoid icing conditions.

4.5h FLIGHT INTO KNOWN ICING CONDITIONS (continued)

After departure from icing conditions with any ice remaining on the airframe:

SURF DE-ICE Switch..MAINTAIN ON
STALL HEAT Switch..MAINTAIN ON
PROP HEAT Switch..MAINTAIN ON
PITOT HEAT Switch...MAINTAIN ON
WINDSHLD HT Switch..AS REQUIRED
IGNITION Switch...AUTO
FLAPS............................DO NOT EXTEND BEYOND T/O POSITION

After removal of all ice from the airframe:

SURF DE-ICE Switch..OFF
STALL HEAT Switch..MAINTAIN ON
PROP HEAT Switch..OFF
PITOT HEAT Switch...MAINTAIN ON
WINDSHLD HT Switch..AS REQUIRED
STALL WARNING ICE SCHEDULE Switch ....PRESS (OFF)

When activating the surface de-ice system, the advisory CAS message S WARN ICE SCHD will appear, indicating that the stall warning system and minimum autopilot operating speeds are biased for icing conditions. When deactivating the surface de-ice system and pressing the STALL WARNING ICE SCHEDULE switch, the advisory CAS message extinguishes and the stall warning system and minimum autopilot operating speeds revert to the normal/non-icing condition.

4.5i BEFORE TAKEOFF

Seat Backs .... ERECT
Seats .... ADJUSTED / LOCKED
Armrests .... STOWED
Seat Belts and Harness .... FASTEN / TIGHT
GEN Switch .... VERIFY ON
ALT Switch .... VERIFY ON
Flight Instruments .... CHECK (primary / standby)
CAS messages .... CONSIDER ANY MESSAGES
Engine Instruments .... CHECK
Radios / Avionics .... AS REQUIRED
FLAPS .... T/O
PITCH Trim .... SET FOR TAKEOFF
YAW Trim .... SET FOR TAKEOFF
Flight Controls .... FREE & PROPER TRAVEL
TO/GA .... PRESS (if desired)

After Takeoff Clearance:

FUEL PUMPS Switch .... MAN
IGNITION Switch .... MAN
PITOT HEAT Switch .... ON
STALL HEAT Switch .... ON
TAXI/REC LT Switch .... AS REQUIRED
LANDING LIGHT Switch .... AS REQUIRED
NAV LIGHT Switch .... AS REQUIRED
STROBE LIGHT Switch .... AS REQUIRED

4.5j TAKEOFF

CAUTION

If the Emergency Autoland system activates inadvertently, execute the Emergency Autoland - Deactivation checklist in paragraph 3.59c.

NOTE

Increasing airspeed will cause torque to increase.

NOTE

Depressing the TO/GA button on the throttle will set the flight director at the recommended (9 degree) takeoff pitch attitude.

NORMAL TAKEOFF - T/O FLAPS

Brakes .... APPLY
POWER Lever .... SET TO MCP
Brakes .... RELEASE
Engine Instruments .... MONITOR
Rotation (V_R) .... 85 KIAS
Obstacle Clearance Speed .... 95 KIAS

After liftoff and positive rate of climb:

LANDING GEAR .... UP
FLAPS (after obstacles cleared) .... UP

After setting power, scan the engine instruments to verify all indications are within the normal operating range. To obtain published takeoff performance, set MCP before releasing brakes. Accelerate to 85 KIAS (V_R). Monitor engine power, torque will increase slightly as airspeed increases. After liftoff, adjust the airplane attitude as required to attain the obstacle clearance speed of 95 KIAS and retract the landing gear once positive rate of climb is established.

4.5k MAXIMUM CONTINUOUS POWER CLIMB

POWER Lever...MCP
FUEL PUMPS Switch..AUTO
IGNITION Switch...AUTO
LANDING LIGHT Switch ....OFF
TAXI/REC LT Switch ....AS REQUIRED

Engine Instruments
a. Torque ....MONITOR (1575 FT-LB MAX.)
b. ITT...MONITOR (800°C MAX.)
c. Ng ....MONITOR (101.7% MAX.)

Climb Speed (best rate).. 122 KIAS
Pressurization System ....MONITOR
Transponder..VERIFY ALT MODE

NOTE

Ignition may be operated continuously and should be used for takeoff, landing, or flight into precipitation. There is no time limitation, although continuous operation will reduce component life.

4.5l CRUISE CLIMB

Climb Power...SET MCP
Engine Instruments
a. Torque ....MONITOR (1575 FT-LB MAX.)
b. ITT...MONITOR (800°C MAX.)
c. Ng ....MONITOR (101.7% MAX.)

Cruise Climb Speed.....................................145 KIAS (to 20,000 FT)
122 KIAS (20,000 FT to 30,000 FT)
Pressurization System ....MONITOR
Altimeters ....CHECK

4.5m CRUISE

Cruise Power .... SET PER POWER TABLES IN SECTION 5
Engine / Fuel Instruments .... MONITOR
Pressurization System .... MONITOR
Fuel Temperature / OAT .... MONITOR
Environmental Control Panel Switches .... AS DESIRED

The cruising speed is determined by many factors including power setting, altitude, temperature, loading, and equipment installed on the airplane. Also, weather conditions should be continuously monitored, with special attention to conditions which could lead to icing.

4.5n DESCENT

CAUTION

Isolated reports of no engine response to power lever movement have occurred during low engine power (Ng idle speed below 63%) and high engine accessory load operations in hot environments. The possibility of encountering this condition (referred to as "engine roll back") may be minimized by turning air conditioning and bleed air off before final landing approach. During flight operations, if an engine roll back is detected, immediately perform the FUEL CONTROL UNIT MALFUNCTION OR POWER LEVER CONTROL LOSS (Manual Override Operation) procedure in Section 3. Pilots should review this procedure in advance and be prepared to execute if required.

DEST ELV .... CHECK
Windshield DEFROST .... PULL ON (IF REQUIRED)
WINDSHLD HT Switch ....DEFOG (IF REQUIRED)
POWER Lever ....SET TO DESIRED TORQUE
Altimeter & Standby Instrument .... CHECK
Cabin Pressure System .... MONITOR
Environmental Control Panel Switches .... AS REQUIRED

Prior to landing, verify that the correct landing field elevation is displayed in DEST ELV. Failure to do so may result in landing with aircraft still pressurized. The pilot must verify the aircraft is not pressurized prior to landing.

WARNING

Do not land with aircraft pressurized.

4.5o BEFORE LANDING

APPROACH CHECK

NOTE

The minimum approved operating speed with the autopilot coupled is 90 KIAS. The minimum speed for autopilot coupled approaches is 100 KIAS.

Altimeter & Standby Altimeter .... SET
FUEL PUMPS Switch .... MAN
IGNITION Switch .... MAN
Fuel Quantity .... CHECK
Seats .... ADJUSTED / LOCKED
Armrests .... STOWED
Seat Belts .... FASTEN / TIGHT
CHECK INERTIA REEL
LANDING GEAR .... DOWN (below 170 KIAS)
LANDING LIGHT Switch .... ON
FLAPS .... T/O (below 147 KIAS)

Approach Speeds
Flaps T/O .... 100–120 KIAS
Flaps LND .... 95–105 KIAS

Approach Speeds - Icing
Flaps UP .... 130–145 KIAS
Flaps T/O .... 110–130 KIAS

NOTE

ADF indication may fluctuate by as much as 10 degrees during landing gear extension or retraction.

LANDING CHECK

LANDING GEAR .... 3 GREEN
Brakes .... CHECK

WARNING

After pumping several times, if one or both toe brakes are inoperative, DO NOT attempt landing on a short field.

4.5o BEFORE LANDING (continued)

FLAPS .... LND (below 112 KIAS)
Autopilot .... DISCONNECT
Airspeed (threshold)
Flaps T/O .... 91 KIAS
Flaps LND .... 85 KIAS

Airspeed (threshold) - Icing
Flaps T/O .... 102 KIAS

CAUTION

Do not trim to airspeeds lower than 85 KIAS.

Yaw Damper (prior to landing) .... DISENGAGE

4.5p LANDING

CAUTION

In crosswind conditions, the nosewheel may not be aligned with the runway as the wheel touches down because of opposite rudder input. To prevent swerving in the direction the nosewheel is offset, the rudder must be promptly centered just as the nosewheel touches down.

CAUTION

Abrupt or aggressive application of reverse thrust during landing rollout, especially during crosswind landings, may reduce directional control.

NORMAL TECHNIQUE

POWER Lever .... IDLE
Brakes .... MODERATE (or as required)
POWER Lever .... BETA (or REVERSE as required)

In order to duplicate published landing performance, power should be reduced to idle prior to touchdown. After touchdown apply braking as required to stop as quickly as possible without skidding the tires. Use of BETA or REVERSE during ground roll out, is recommended.

4.5q BALKED LANDING

Go-Around

CAUTION

Rapid application of power from low power settings will require a strong push on the control wheel to prevent an excessive nose-up pitch attitude. To reduce the required push force, simultaneously apply nose down electric trim during power application until control forces neutralize.

POWER Lever..................SMOOTHLY SET to MCP and select TO/GA
Pitch Trim..............................APPLY NOSE DOWN ELECTRIC TRIM
(until control forces neutralized)
FLAPS...RETRACT to T/O
Climb Airspeed ....95 KIAS
LANDING GEAR.. UP (after climb established)
FLAPS..RETRACT to UP
Climb airspeed..................................... 122 KIAS (after obstacle cleared)

If ice accretions remain on the airplane

POWER Lever..................SMOOTHLY SET to MCP and select TO/GA
Pitch Trim..............................APPLY NOSE DOWN ELECTRIC TRIM
(until control forces neutralized)
FLAPS..RETRACT to UP
LANDING GEAR.. UP (after climb established)
Climb airspeed..................................... 130 KIAS (after obstacle cleared)

Autopilot Coupled Go-Around

CAUTION

The autopilot coupled go-around will produce a balked landing climb gradient less than that shown in Figure 5-34.

POWER Lever..................SMOOTHLY SET to MCP and select TO/GA
FLAPS...RETRACT to T/O
LANDING GEAR.. UP (after climb established)
FLAPS..RETRACT to UP
Climb airspeed...122 KIAS (as required)

4.5q BALKED LANDING (continued)

Autopilot Coupled Go-Around (continued)

If ice accretions remain on the airplane

POWER Lever.................. SMOOTHLY SET to MCP and select TO/GA
FLAPS .... RETRACT to UP
LANDING GEAR.. UP (after climb established)
Climb airspeed... 130 KIAS (as required)

During the non Autopilot Coupled Go-Around, manual pitch trim may be used in place of electric pitch trim if desired. In either go-around procedure, selecting TO/GA will set flight director bars to 7 degrees.

4.5r AFTER LANDING

FUEL PUMPS Switch.. AUTO
IGNITION Switch.. OFF
PITOT HEAT Switch.. OFF
All Ice Protection Equipment.. OFF
Landing / Taxi Lights.. AS REQUIRED
Strobe Light.. AS REQUIRED
WX Radar..STBY
FLAPS .... UP (unless ice accumulations are present)

If ice accumulations are present in the flap system, consider leaving the flaps in the current position until free from ice and snow.

4.5s TAXI BACK FOR TAKEOFF

WARNING

Takeoff with ice accretions remaining on the airframe is prohibited. See ENVIRONMENTAL CONDITIONS in Paragraph 2.61.

FLAPS .... T/O
PITCH Trim .... SET FOR TAKEOFF
YAW Trim .... SET FOR TAKEOFF
TO/GA .... PRESS (if desired)

When Cleared for Takeoff:

FUEL PUMPS Switch .... MAN
IGNITION Switch .... MAN
PITOT HEAT Switch .... ON
STALL HEAT Switch .... ON
TAXI/REC LT Switch .... AS REQUIRED
LANDING LIGHT Switch .... AS REQUIRED
NAV LIGHT Switch .... AS REQUIRED
STROBE LIGHT Switch .... AS REQUIRED

4.5t SHUTDOWN

PARK BRAKE .... SET
BLEED AIR SELECT Switch .... OFF
POWER Lever .... IDLE
Environmental Control Panel Switches .... OFF
FUEL PUMPS Switch .... OFF
AVIONICS Switch .... OFF
GEN Switch .... OFF
ALT Switch .... OFF

4.5t SHUTDOWN (continued)

NOTE

Allow ITT to stabilize at least two minutes at idle.

WARNING

If there is evidence of fire within the engine after shutdown, proceed immediately with the ENGINE DRY MOTORING RUN Procedure, Paragraph 4.5d.

CAUTION

When the CONDITION lever is selected to CUT-OFF/FEATHER, the propeller should quickly stop (20 to 30 seconds) in the feather position and a white FEATHER message on the PFD should be displayed. If the propeller continues to windmill for an extended period, or an amber FEATHER message appears on the PFD; a feathering system failure has occurred. Investigate and correct the problem prior to the next flight.

CONDITION Lever ....CUT-OFF/FEATHER
"FEATHER" CAS Message ....CHECK ON
BLEED AIR Lever..PULL OUT (OFF)
Exterior Lighting Switches ....OFF
BATTERY Switch ....OFF
Flight Controls ....SECURED
PILOT OXYGEN..OFF
Wheel Chocks ....AS REQUIRED
Tie Downs ....AS REQUIRED
Air Inlets, Exhaust and Pitot Covers..INSTALL

The aileron and elevator controls can be secured by looping the seat belt through the control wheel and pulling it snug. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured. Wheel chocks should be positioned in place and tiedowns should be secured to the main landing gear and to the tail skid. The parking brake can be released after the wheel chocks are in place.

4.7 STALLS

When conducting intentional stalls, Electronic Stability & Protection (ESP) may be manually disabled by accessing the Avionics Settings Systems tab on the touchscreen controller.

Power on stalls should not be conducted with more than 550 ft/lbs torque. Depending on configuration and power setting, altitude loss of up to 900 feet may be experienced during properly executed stalls. During stall recovery control yoke back pressure may be necessary to prevent excessive nose down pitch attitudes and power increases should be smoothly applied while maintaining directional control.

NOTE

Stall speed increases approximately 2 knots when the de-ice boots are inflated.

4.9 NOISE LEVEL

The corrected noise level of this aircraft is 75.8 dB(A) as measured per ICAO Annex 16, Volume I, 7th edition, Amendment 11-B, Part II, Chapter 10, and 14 CFR Part 36, Appendix G, Amendment 36-28.

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

The noise level stated above has been verified by and approved by the Federal Aviation Administration in accordance with 14 CFR Part 36, Noise Standards - Aircraft Type and Airworthiness Certification. This aircraft model is in compliance with all 14 CFR Part 36 noise standards applicable to this type.

4.11 HIGH ALTITUDE OPERATION

During operations above approximately 28,500 ft. MSL, the cabin altitude will exceed 10,000 ft. and an amber CABIN ALT 10K caution message will be displayed. This is an indication for the pilot to:

- Be vigilant about monitoring the cabin altitude.
- Check the BLEED AIR lever is pushed IN and the BLEED AIR SELECT rotary switch is set to NORM.
- Check the CABIN PRESSURE DUMP switch is CABIN PRESS.
- Check the DEST ELV is properly set.
- Check the pilot's emergency oxygen system charge (minimum 800 psig).

If the cabin altitude rises above 12,000 ft. MSL, a red CABIN ALT 12K message will illuminate, a mutable warning chime will sound and the emergency pressurization system will activate, indicating the pilot should:

- Don the pilot's emergency oxygen mask and ensure that oxygen is flowing.
- Descend to an altitude where the red CABIN ALT 12K message extinguishes.

  AND
- Make an emergency descent if required per Emergency Descent - Maximum Rate (Paragraph 3.23).

CAUTION

A fully charged (1850 psig) pilot supplemental demand flow oxygen system contains a supply (approximately 30 minutes) of oxygen for the pilot to breathe in the "normal" setting for a duration in excess of that required for an emergency descent. The minimum duration of oxygen required for an emergency descent to an appropriate altitude for unpressurized flight is indicated on the oxygen gauge by a yellow arc.

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TABLE OF CONTENTS

SECTION 5

PERFORMANCE

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SECTION 5

PERFORMANCE

5.1 GENERAL

The data provided in this section allows the operator to determine expected takeoff, climb, cruise and landing performance for various ambient conditions.

Performance information associated with those optional systems and equipment which require handbook supplements, is provided in Section 9 (Supplements).

5.3 PERFORMANCE AND FLIGHT PLANNING

Performance charts are based on flight test data, flown with a properly maintained airplane, using average piloting techniques.

The performance charts do not make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft. This performance can be duplicated by following the stated procedures in a properly maintained airplane.

True airspeed may vary ±1% due to tolerances in power, airspeed and temperature indications.

While some performance charts show information below -54°C, performance information presented in this chapter is valid for the range from +50°C (122°F) to -54°C (-65°F) only.

Effects of conditions not considered on the charts must be evaluated by the pilot, such as the effect of winds aloft on cruise and range performance.

WARNING

Performance information derived by extrapolation beyond the limits shown on the charts should not be used for flight planning purposes.

Flight Into Known Icing Conditions

The performance charts in this section related to flight in icing conditions are based on a PA-46-600TP with ice on the unprotected surfaces along with intercycle ice on the protected surfaces that would accumulate during a 45 minute hold in icing conditions. It is assumed that the flaps and landing gear are retracted while executing the 45 minute hold.

5.5 FLIGHT PLANNING EXAMPLE

(a) Aircraft Loading

The first step in planning the flight is to calculate the airplane weight and center of gravity by utilizing the information provided by Section 6 (Weight and Balance) of this handbook.

The flight planning example uses the following weights.

(1)	Basic Empty Weight	3800 lb (1723.7 kg)
(2)	Occupants	510 lb (231.3 kg)
(3)	Baggage and Cargo	80 lb (36.3 kg)
	Total Zero Fuel Weight {(1) + (2) + (3)}	4390 lb (1991.3 kg)
(4)	Fuel (6.7 lb/gal. x 247.8) (3.04 kg/gal x 247.8)	1660 lb (753.0 kg)
(5)	Ramp Weight	6050 lb (2744.2 kg)
(6)	Start, Taxi and Runup Weight	-50.0 lb (-22.7 kg)
(7)	Takeoff Weight	6000 lb (2721.6 kg)
(8)	Landing Weight (a)(5) minus (g)(1), (6050 lb minus 934 lb) (2744.2 kg minus 423.8 kg)	5116 lb (2320.4 kg)

The total zero fuel weight is less than the maximum of 4850 lbs (2199.9 kg).

The takeoff weight is less than or equal to the maximum of 6000 lbs (2721.6 kg) and the weight and balance calculations show the C.G. position is within the approved limits. Refer to Figure 6-16.

(b) Takeoff and Landing

To determine takeoff and landing performance, existing conditions at the departure airport and forecast conditions at the destination airport must be evaluated.

5.5 FLIGHT PLANNING EXAMPLE (continued)

(b) Takeoff and Landing (continued)

Use Takeoff Distance table (Figure 5-8) to determine the runway length required for takeoff and/or obstacle clearance at the departure airport.

The landing distance and landing weight calculations are based on the forecast conditions at the destination airport.

A takeoff and landing distance example is shown below:

	Departure Airport	Destination Airport
(1) Pressure Altitude	1000 ft	4000 ft
(2) Temperature	23°C (ISA +10)	-3°C (ISA -10)
(3) Wind Component (Headwind)	10 KTS	5 KTS
(4) Runway Length Available	3600 ft (1097.3 meters)	5000 ft (1524 meters)
(5) Runway Gradient	1% up	2% up
(6) Takeoff* and Landing** Distance Required:		
Ground Roll	2282 ft (696 meters)	1538 ft (469 meters)
Total Distance over 50 ft Obstacle	3128 ft (953 meters)	2567 ft (782 meters)

* reference Figure 5-8
** reference Figure 5-39

5.5 FLIGHT PLANNING EXAMPLE (continued)

(c) Climb

Using tables found in Figure 5-14 and Figure 5-15, determine the Fuel, Time, and Distance to Climb components from sea level to the selected cruise altitude (28000 ft in this example), and from sea level to the departure field elevation using departure conditions. The difference between the values is the Fuel, Time and Distance to Climb corrected for pressure altitude and temperature.

A Fuel, Time and Distance to Climb example is shown below:

(1)	Cruise Pressure Altitude	28000 ft
(2)	Cruise OAT	-40° C (ISA)
(3)	Fuel to Climb (includes Start, Taxi and Takeoff)	
	(155 lb plus 50 lb minus 5 lb)	200.0 lb.*
	(93.0 kg minus 2.3 kg)	(90.7 kg)*
(4)	Time to Climb	
	(26:30 min:sec minus 0:40 min:sec)	25:50 min:sec *
(5)	Distance to Climb	
	(69 nm minus 1.5 nm)	67.5 nautical miles*

* reference Figure 5-14 and Figure 5-15

5.5 FLIGHT PLANNING EXAMPLE (continued)

(d) Descent

Using the cruise pressure altitude and OAT, (28000 ft and -40° C), determine the fuel, time, and distance for descent to sea level (Figure 5-34).

These figures must be adjusted for the field pressure altitude and temperature at the destination airport.

Using tables found in Figure 5-34, determine the Fuel, Time, and Distance to Descend components from the 4000 ft field elevation to sea level.

Subtract the values obtained using the destination field conditions from the values obtained using the cruise conditions to find the true fuel, time and distance values needed for the descent segment of the flight plan.

The values obtained from the tables for the descent segment of the example are shown below.

(1) Fuel to Descend (27.0 lb minus 5.6 lb) (12.2 kg minus 2.5 kg)	21.4 lb* (9.7 kg)*
(2) Time to Descend (9:50 min:sec minus 1:12 min:sec)	8:38 min:sec*
(3) Distance to Descend (38 nm minus 4.8 nm)	33.2 nm*

* reference Figure 5-34

5.5 FLIGHT PLANNING EXAMPLE (continued)

(e) Cruise

From the Power Setting Guide (Figure 5-16 and Figure 5-17) use cruise pressure altitude and OAT to determine the torque setting for Normal Cruise. Calculate the cruise fuel consumption for the cruise power setting from the information provided in the Power Setting Tables (refer to Figure 5-18 thru Figure 5-31).

5.5 FLIGHT PLANNING EXAMPLE (continued)

(e) Cruise (continued)

The cruise time is found by dividing the cruise distance by the cruise speed and the cruise fuel is found by multiplying the cruise fuel consumption by the cruise time.

The cruise calculations established for the cruise segment of the flight planning example are as follows:

(1)	Total Distance	800 nm
(2)	Cruise Distance (e)(1) minus (c)(5) minus (d)(3), (800 nm minus 67.5 nm minus 33.2 nm)	699.3 nm
(3)	Maximum Power Cruise	1216 ft.-lb. (ISA)
(4)	Cruise Speed	257 KT TAS*
(5)	Cruise Fuel Consumption	262.0 pph* (118.8 kg/hr)*
(6)	Cruise Time (e)(2) divided by (e)(4), (699.3 nm divided by 257 KTAS)	2.72 hrs (2:44 hr:min)
(7)	Cruise Fuel (e)(5) multiplied by (e)(6) (262 pph multiplied by 2.72 hrs) (118.8 kg/hr multiplied by 2.72 hrs)	713 lb. (323 kg)

If desired, the Specific Air Range tables (Figure 5-32) may be used to determine the influence of cruise altitude and power setting on air range. To determine air range, multiply the value obtained from the table by the fuel remaining in hundreds of pounds. Note, this air range does not include the effects of winds aloft or 45 minute reserve fuel (210 LB / 32 gal.) which is based on a fuel flow at 600 FT-LB and 5,000 FT.

* reference Figure 5-20

5.5 FLIGHT PLANNING EXAMPLE (continued)

(f) Total Flight Time

The total flight time is determined by adding the time to climb, the time to descend and the cruise time.

The flight time required for the flight planning example is shown below:

(1) Total Flight Time
(c)(4) plus (d)(2) plus (e)(6),
(25:50 min:sec plus 8:38 min:sec plus 2:44 hr:min) 3:18:28 (hr:min:sec)

5.5 FLIGHT PLANNING EXAMPLE (continued)

(g) Total Fuel Required

Determine the total fuel required by adding the fuel to climb (includes fuel to start, taxi and runup), the fuel to descend, and the cruise fuel. When the total fuel in pounds (kilograms) is determined, divide this value by 6.7 lb/gal. (.80 kg/L) to determine the total fuel in gallons (liters) used for the flight.

The total fuel calculations for the example flight plan are shown below.

(1) Total Fuel Required
(c)(3) plus (d)(1) plus (e)(7),

(200 lb plus 21.4 lb plus 713 lb)	934 lb
(90.7 kg plus 9.7 kg plus 323 kg)	423 kg

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5.7 PERFORMANCE CHARTS

LIST OF FIGURES

5.7 PERFORMANCE CHARTS (continued)

LIST OF FIGURES (continued)

5.7 PERFORMANCE CHARTS (continued)

LIST OF FIGURES (continued)

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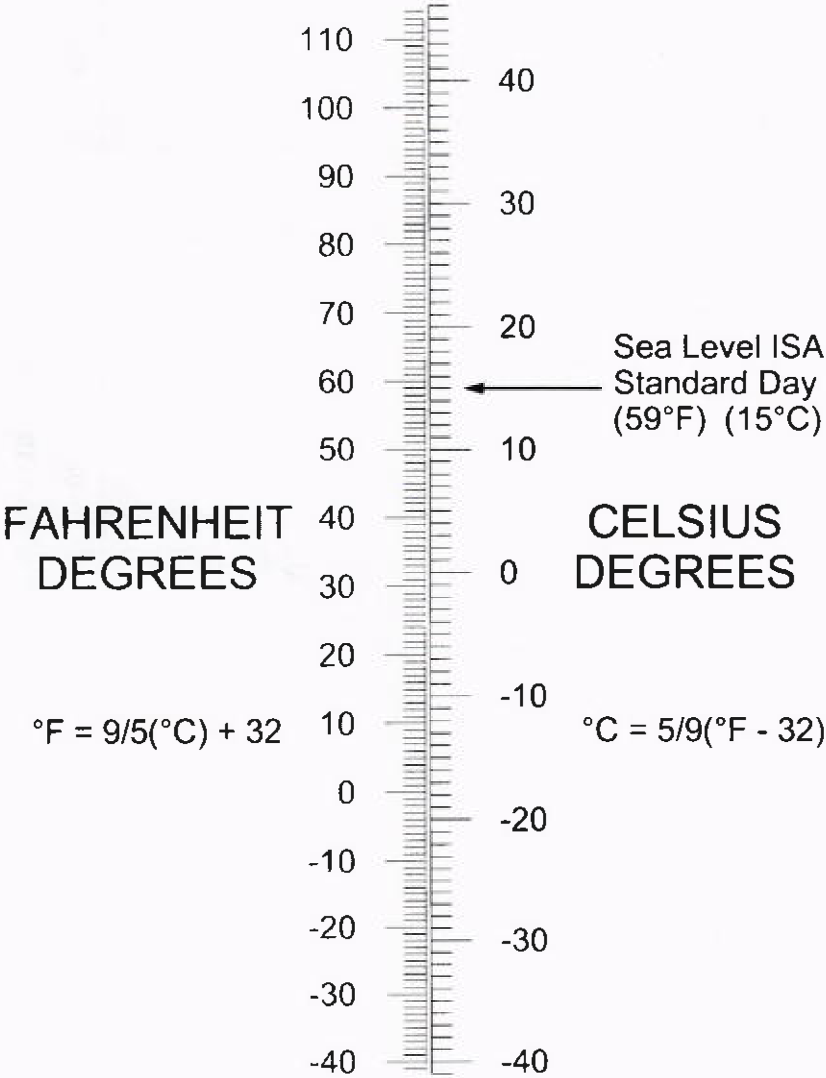
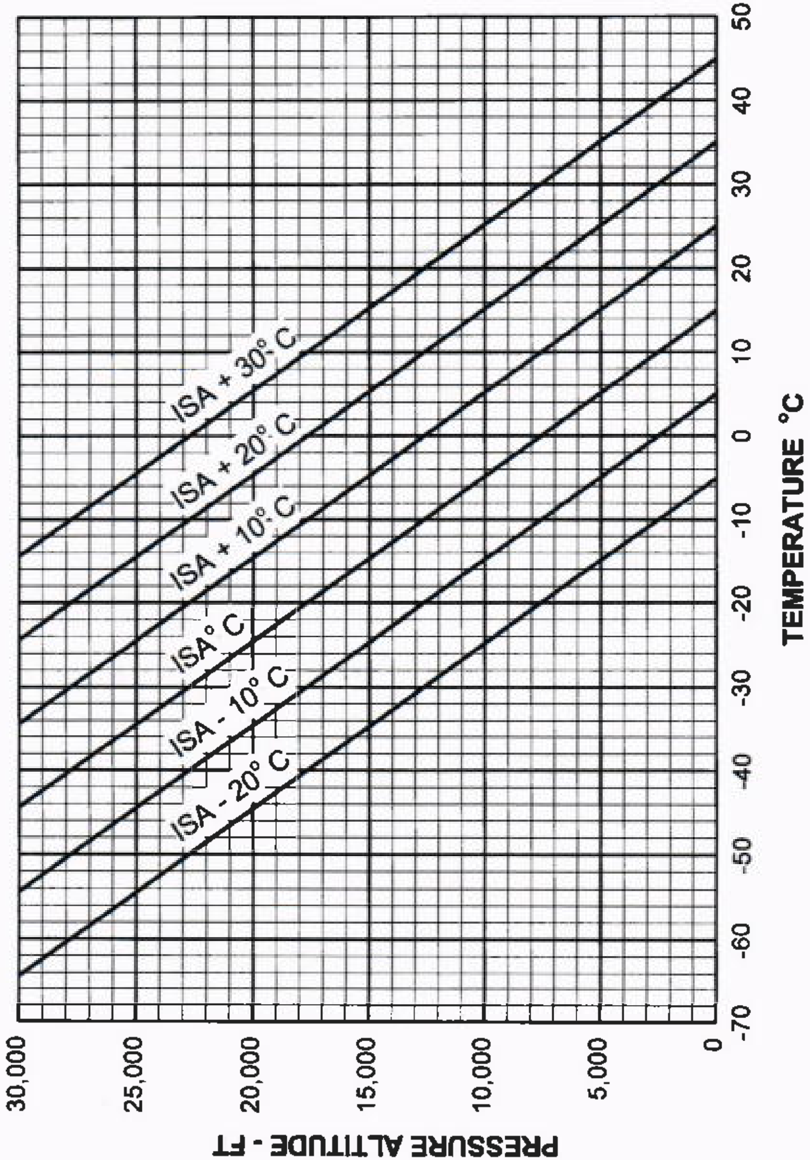


Temperature Conversion
Figure 5-1

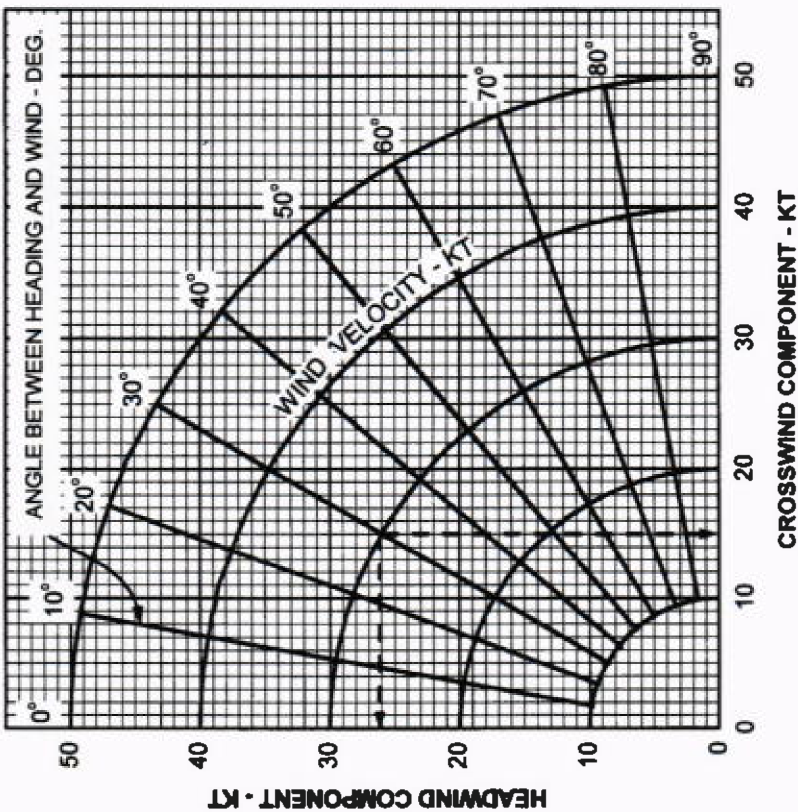


ISA Temperature Conversion
Figure 5-2

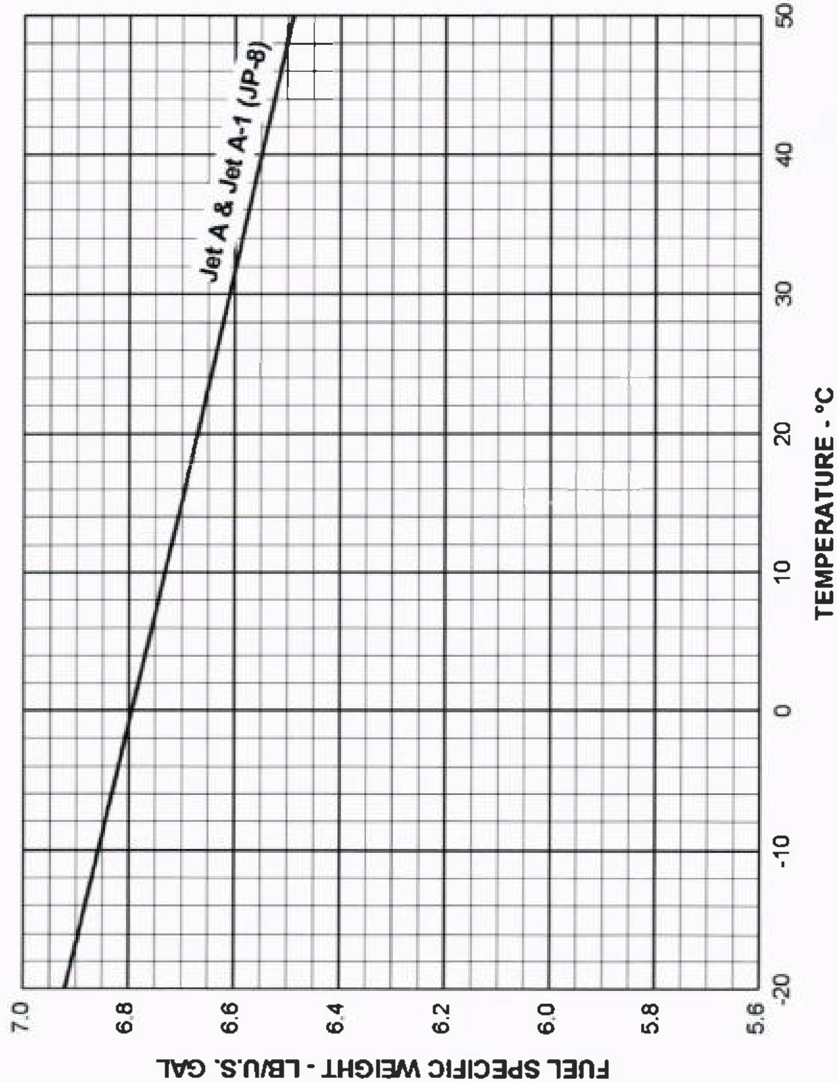
EXAMPLE:

Wind Velocity:	30 Kt
Angle between flight path and wind:	30°
Headwind:	26 Kt
Crosswind:	15 Kt

Demonstrated Crosswind:
17 KTAS



Wind Components
Figure 5-3



Aviation Fuel Specific Weight
Figure 5-4

Airspeed and Altitude Calibration

Primary Static Source – Flaps Up and Takeoff

Associated Conditions:

- Flaps .... Up and Takeoff
- Gear .... All Gear Settings

Airspeed Example:

Indicated Airspeed .... 125 KIAS

Calibrated Airspeed .... 123 KCAS

Altitude Example:

Indicated Airspeed .... 170 KIAS

Pressure Altitude .... 20,000 FT

Add Correction to Pressure Altitude ..... 19,950 FT

Notes:

Indicated Airspeed and Altitude assumes zero instrument error

FLAPS UP & TAKEOFF		Δ Altitude Correction (Feet)				
		Indicated Altitude (Feet)				
KIAS	KCAS	Sea Level	5000	10000	20000	30000
60	58	-12	-14	-16	-22	-32
70	68	-14	-16	-19	-26	-37
80	78	-15	-18	-21	-29	-41
90	88	-17	-20	-23	-32	-45
100	98	-18	-21	-25	-35	-49
110	108	-20	-23	-27	-37	-53
120	118	-21	-25	-29	-40	-57
130	128	-23	-26	-31	-42	-60
140	138	-24	-28	-32	-45	-63
150	148	-25	-29	-34	-47	-66
160	158	-26	-30	-35	-49	-69
170	168	-27	-31	-36	-50	-72
180	178	-28	-32	-38	-52	-74
190	188	-29	-33	-39	-54	-76
200	198	-29	-34	-40	-55	-78
210	208	-30	-35	-41	-56	-80
220	218	-30	-35	-41	-57	-81
230	228	-31	-36	-42	-58	-83
240	239	-31	-36	-42	-59	-84
250	249	-32	-37	-43	-59	-85

Airspeed and Altitude Calibration
Figure 5-5 (Sheet 1 of 2)

Airspeed and Altitude Calibration

Primary Static Source – Flaps Landing

Associated Conditions:

- Flaps .... Landing
- Gear .... Down

Airspeed Example:

Indicated Airspeed .... 85 KIAS

Calibrated Airspeed .... 82 KCAS

Altitude Example:

Indicated Airspeed .... 100 KIAS

Pressure Altitude .... 5,000 FT

Add Correction to Pressure Altitude .... 4,965 FT

Notes:

Indicated Airspeed and Altitude assumes zero instrument error

FLAPS LANDING		Δ Altitude Correction (Feet)				
		Indicated Altitude (Feet)				
KIAS	KCAS	Sea Level	5000	10000	20000	30000
60	58	-8	-9	-11	-15	-22
70	68	-12	-14	-17	-23	-33
80	77	-18	-20	-24	-33	-47
90	87	-24	-27	-32	-44	-63
100	97	-30	-35	-41	-57	-81
110	106	-38	-44	-52	-71	-102
112	108	-40	-46	-54	-74	-106

Airspeed and Altitude Calibration
Figure 5-5 (Sheet 2 of 2)

Angle of Bank vs. Stall Speed

Associated Conditions:

- Power .... Flight Idle
- Aircraft Weight ...... 6,000 LB
- Static System .... Primary

Example:

Flaps .... Landing
Gear .... Extended
Bank Angle .... 45 Degrees

Indicated Stall Speed .... 74 KIAS

Bank Angle Degrees	STALL SPEED (KIAS)	
	Flaps Landing Gear Extended	Flaps Retracted Gear Retracted
0	62	73
10	62	74
20	63	75
30	66	78
40	70	83
50	77	91
60	87	103

Angle of Bank vs. Stall Speed
Figure 5-6

Angle of Bank vs. Stall Speed - Icing

Associated Conditions:

- Power .... Flight Idle
- Aircraft Weight ...... 6,000 LB
- Static System .... Primary

Example:

Flaps .... Takeoff
Gear .... Extended
Bank Angle .... 45 Degrees

Indicated Stall Speed .... 90 KIAS

CAUTION: Avoid low airspeeds and monitor approach speeds closely.
If there is ice on the airplane, maintain a minimum of 130 KIAS with flaps UP and 102 KIAS with flaps T/O. Avoid excessive bank angles.

Bank Angle Degrees	STALL SPEED (KIAS) Flaps Takeoff Gear Extended	Flaps Retracted Gear Extended
0	75	84
10	76	84
20	77	86
30	81	90
40	86	96
50	93	104
60	106	118

Angle of Bank vs. Stall Speed - Icing
Figure 5-6a

Takeoff Distance

Associated Conditions:

- Runway .... Paved, Dry Surface
- Power .... Full Prior to Brake Release
- ECS .... Normal
- Flaps .... Takeoff
- Gear .... Extended
- Rotation Speed .... 85 KIAS
- Obstacle Speed .... 95 KIAS

Example:

Pressure Altitude .... 6,000 FT
OAT .... ISA + 10 °C (13 °C)
Takeoff Weight .... 6,000 LB
Headwind Component .... 0 KT

Ground Roll Distance .... 2,891 FT
Distance to 50' Obstacle .... 3,963 FT

Notes:

For high density altitude conditions a power setting of 1575 FT-LB may not be obtained. This is factored into the takeoff distance tables. Power should be set to maximum continuous as described in the power plant limitations section

Wind and Runway Gradient Factors

Headwind – Subtract 7% from the table distance for each 10 knots headwind, up to 20 knots

Tailwind – Add 10% to the table distance for each 2 knots tailwind, up to 10 knots

Runway Gradient

Add 12% to the table distance for each 1% of uphill (positive) runway gradient, up to 2%

Subtract 2% from the table distance for each 1% of downhill (negative) runway gradient, up to 2%

Slope and Wind Example:

Pressure Altitude .... 6,000 FT
OAT .... ISA + 10 °C (13 °C)
Takeoff Weight .... 6,000 LB
Headwind Component .... 20 KT
Runway Gradient .... +1%
Ground Roll (no wind or slope) .... 2,891 FT
Distance to 50' (no wind or slope) .... 3,963 FT

Ground Roll gradient contribution .... 347 FT
Ground Roll wind contribution .... - 405 FT
Final Ground Roll .... 2,833 FT

Distance to 50' gradient contribution .... 476 FT
Distance to 50' wind contribution .... -555 FT
Final Distance to 50' .... 3,884 FT

Takeoff Distance
Example
Figure 5-7

Takeoff Distance

Associated Conditions:

- Runway .... Paved, Dry Surface
- Power .... Full Prior to Brake Release
- ECS .... Normal
- Flaps .... Takeoff
- Gear .... Extended
- Rotation Speed .... 85 KIAS
- Obstacle Speed .... 95 KIAS

CAUTION:
Distances in table do not include effects of wind or runway gradient. See factors and example on previous page

PRESSURE ALTITUDE	OAT	Δ ISA	TAKEOFF DISTANCE (FEET)					
			6000 LB		5000 LB		4000 LB	
Feet	°C	°C	GR	D50	GR	D50	GR	D50
SL	-5	-20	1676	2298	1408	1901	1138	1508
	5	-10	1797	2464	1510	2038	1220	1616
	15	0	1922	2635	1615	2179	1304	1729
	25	+10	2051	2811	1723	2325	1392	1844
	35	+20	2183	2993	1834	2475	1482	1964
	50	+35	2390	3276	2008	2709	1622	2149
2000	-9	-20	1871	2566	1572	2122	1270	1683
	1	-10	2008	2753	1687	2277	1363	1806
	11	0	2150	2947	1806	2437	1459	1933
	21	+10	2296	3147	1929	2603	1558	2065
	31	+20	2446	3354	2055	2773	1660	2200
	46	+35	2681	3675	2252	3039	1819	2411
4000	-13	-20	2092	2868	1758	2372	1420	1882
	-3	-10	2248	3081	1888	2548	1525	2021
	7	0	2408	3302	2023	2730	1634	2166
	17	+10	2574	3529	2162	2918	1747	2315
	27	+20	2745	3764	2306	3112	1863	2469
	42	+35	3012	4129	2530	3414	2044	2709
6000	-17	-20	2343	3212	1968	2656	1590	2107
	-7	-10	2519	3454	2116	2856	1710	2266
	3	0	2702	3704	2270	3064	1834	2430
	13	+10	2891	3963	2429	3278	1962	2600
	23	+20	3086	4231	2592	3499	2094	2775
	38	+35	3268	4486	2745	3710	2218	2943
8000	-21	-20	2732	3746	2295	3098	1854	2457
	-11	-10	2942	4033	2471	3335	1996	2646
	-1	0	3158	4330	2653	3581	2144	2841
	9	+10	3382	4637	2841	3835	2296	3042
	19	+20	3614	4954	3036	4097	2453	3250
	34	+35	4202	5780	3530	4779	2852	3791
10000	-25	-20	3187	4370	2678	3614	2163	2867
	-15	-10	3436	4710	2886	3895	2332	3090
	-5	0	3693	5062	3102	4187	2506	3321
	5	+10	3958	5427	3325	4488	2687	3560
	15	+20	4233	5803	3556	4799	2873	3807
	30	+35	-	-	4284	5812	3461	4609

NOTE: Empty value indicates that the condition is outside aircraft operating limitations

Takeoff Distance
6000 LBS, 5000 LBS and 4000 LBS
Figure 5-8

Takeoff Climb Gradient

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Takeoff
- Gear .... Extended
- Climb Speed .... 122 KIAS

Example:

Pressure Altitude .... Sea Level
OAT .... ISA - 10 °C (5 °C)
Aircraft Weight .... 5,500 LB
Climb Gradient ... 621 Feet per NM

PRESSURE ALTITUDE	OAT	Δ ISA	CLIMB GRADIENT ~ Feet per Nautical Mile				
			WEIGHT (LB)				
Feet	°C	°C	6000	5500	5000	4500	4000
SL	-5	-20	560	646	747	868	1015
	5	-10	537	621	719	836	979
	15	0	516	598	693	807	947
	25	+10	495	576	669	780	915
	35	+20	474	552	643	751	883
	50	+35	445	521	608	712	838
2000	-9	-20	525	608	704	819	960
	1	-10	503	584	678	790	927
	11	0	480	559	650	759	892
	21	+10	458	535	624	730	858
	31	+20	438	513	600	703	828
	46	+35	409	481	565	664	784
4000	-13	-20	490	570	663	773	907
	-3	-10	466	543	633	740	870
	7	0	444	519	606	710	836
	17	+10	423	496	581	682	804
	27	+20	402	474	557	654	773
	42	+35	374	443	522	616	730
6000	-17	-20	453	529	618	722	850
	-7	-10	430	504	590	692	815
	3	0	408	480	563	662	781
	13	+10	388	458	539	635	751
	23	+20	369	437	516	609	722
	38	+35	328	392	467	554	660
8000	-21	-20	417	490	575	675	796
	-11	-10	395	466	548	644	762
	-1	0	374	443	523	616	730
	9	+10	353	420	497	588	698
	19	+20	333	398	472	561	667
	34	+35	266	325	393	472	566
10000	-25	-20	383	453	533	629	744
	-15	-10	360	428	506	598	709
	-5	0	338	404	479	568	675
	5	+10	317	381	454	540	644
	15	+20	298	360	431	514	615
	30	+35	-	262	323	394	479

NOTE: Empty value indicates that the condition is outside aircraft operating limitations

Takeoff Climb Gradient
Figure 5-9

Enroute Climb Performance

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted
- Climb Speed .... 122 KIAS

Example:

Pressure Altitude .... 15,000 FT
OAT .... ISA + 20 °C (5 °C)
Aircraft Weight .... 5,500 LB

Climb Performance ..... 1,303 FPM

PRESSURE ALTITUDE Feet	OAT °C	Δ ISA °C	RATE OF CLIMB ~ Feet per Minute				
			WEIGHT (LB)				
			6000	5500	5000	4500	4000
SL	-5	-20	1586	1814	2080	2396	2782
	5	-10	1571	1799	2065	2381	2766
	15	0	1556	1785	2051	2367	2752
	25	+10	1542	1771	2037	2353	2738
	35	+20	1525	1753	2019	2335	2718
	50	+35	1500	1729	1994	2309	2692
5000	-15	-20	1521	1750	2016	2331	2714
	-5	-10	1501	1730	1996	2311	2693
	5	0	1482	1711	1977	2291	2673
	15	+10	1462	1691	1956	2270	2651
	25	+20	1446	1675	1940	2254	2634
	40	+35	1406	1633	1897	2208	2586
10000	-25	-20	1442	1671	1936	2250	2631
	-15	-10	1419	1648	1913	2226	2606
	-5	0	1395	1623	1888	2200	2579
	5	+10	1372	1601	1865	2176	2554
	15	+20	1350	1578	1842	2153	2529
	30	+35	1163	1377	1624	1913	2262
15000	-35	-20	1346	1574	1838	2149	2525
	-25	-10	1319	1547	1811	2121	2496
	-15	0	1292	1520	1783	2093	2466
	-5	+10	1236	1461	1720	2024	2392
	5	+20	1089	1303	1548	1836	2182
	20	+35	882	1080	1306	1570	1885
20000	-45	-20	1231	1459	1720	2027	2398
	-35	-10	1163	1386	1643	1944	2306
	-25	0	1060	1276	1524	1815	2164
	-15	+10	957	1167	1406	1686	2022
	-5	+20	856	1058	1290	1559	1881
	10	+35	683	873	1089	1339	1637
25000	-55	-20	875	1080	1314	1587	1912
	-45	-10	786	986	1213	1478	1793
	-35	0	689	882	1102	1357	1660
	-25	+10	585	772	984	1229	1518
	-15	+20	486	667	871	1106	1383
	0	+35	342	514	706	927	1185
30000	-64	-20	362	533	724	944	1201
	-54	-10	368	542	737	961	1225
	-44	0	281	451	640	857	1110
	-34	+10	188	352	535	743	986
	-24	+20	-	250	426	625	856
	-9	+35	-	101	267	452	666

NOTE: Empty value indicates that the condition is outside aircraft operating limitations

Enroute Climb Performance
Figure 5-10

Enroute Climb Gradient

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted
- Climb Speed .... 122 KIAS

Example:

Pressure Altitude .... 15,000 FT
OAT .... ISA + 20 °C (5 °C)
Aircraft Weight .... 5,500 LB

Climb Gradient .... 501 FT per NM

PRESSURE ALTITUDE Feet	OAT °C	Δ ISA °C	CLIMB GRADIENT ~ Feet per Nautical Mile WEIGHT (LB) 6000	5500	5000	4500	4000
SL	-5	-20	830	952	1096	1269	1484
	5	-10	806	926	1067	1237	1447
	15	0	785	902	1040	1207	1412
	25	+10	764	880	1015	1178	1380
	35	+20	743	856	989	1149	1346
	50	+35	713	824	953	1108	1300
5000	-15	-20	739	852	984	1144	1340
	-5	-10	715	826	956	1111	1303
	5	0	693	802	929	1081	1268
	15	+10	671	778	903	1052	1235
	25	+20	652	757	879	1025	1205
	40	+35	619	720	838	979	1152
10000	-25	-20	649	753	875	1021	1200
	-15	-10	626	728	847	990	1164
	-5	0	603	703	820	959	1129
	5	+10	583	681	795	931	1097
	15	+20	563	659	771	904	1066
	30	+35	472	560	661	781	926
15000	-35	-20	560	656	767	900	1062
	-25	-10	537	631	740	869	1027
	-15	0	516	608	714	840	994
	-5	+10	484	573	675	797	945
	5	+20	419	501	596	708	844
	20	+35	330	404	489	589	709
20000	-45	-20	472	560	662	782	928
	-35	-10	436	521	618	733	872
	-25	0	389	469	561	670	800
	-15	+10	345	420	507	609	732
	-5	+20	302	374	456	552	667
	10	+35	234	300	375	461	564
25000	-55	-20	308	381	464	561	677
	-45	-10	271	340	419	511	620
	-35	0	232	298	372	459	562
	-25	+10	193	255	325	406	503
	-15	+20	157	216	282	359	449
	0	+35	108	162	222	292	374
30000	-64	-20	117	172	234	305	389
	-54	-10	116	171	233	304	387
	-44	0	87	139	198	265	343
	-34	+10	57	106	162	225	298
	-24	+20		74	126	185	253
	-9	+35		29	77	130	192

NOTE: Empty value indicates that the condition is outside aircraft operating limitations

Enroute Climb Gradient
Figure 5-11

Enroute Climb Performance - Icing

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted
- Climb Speed .... 130 KIAS

Example:

Pressure Altitude .... 15,000 FT
OAT .... ISA + 10 °C (-5 °C)
Aircraft Weight .... 5,500 LB

Climb Performance .... 689 FPM

PRESSURE ALTITUDE Feet	OAT °C	Δ ISA °C	RATE OF CLIMB ~ Feet per Minute WEIGHT (LB) 6000	5500	5000	4500	4000
SL	-5	-20	1018	1195	1398	1638	1929
	5	-10	1149	1339	1559	1818	2132
5000	-15	-20	996	1177	1385	1630	1926
	-5	-10	894	1067	1266	1500	1781
	5	0	1016	1202	1417	1669	1973
10000	-25	-20	885	1063	1267	1506	1794
	-15	-10	845	1021	1223	1459	1743
	-5	0	744	913	1106	1332	1601
	5	+10	857	1039	1246	1489	1780
15000	-35	-20	750	924	1123	1354	1631
	-25	-10	710	882	1079	1307	1580
	-15	0	662	833	1026	1251	1520
	-5	+10	529	689	871	1081	1330
	5	+20	500	660	841	1049	1297
20000	-45	-20	595	764	956	1178	1442
	-35	-10	502	665	849	1062	1314
	-25	0	381	535	709	909	1144
	-15	+10	252	397	560	745	962
	-5	+20	89	221	368	535	728
	10	+35	7	135	277	437	622
25000	-55	-20	185	327	485	666	876
	-45	-10	78	213	363	533	729
	-35	0	-36	91	232	390	572
	-25	+10	-158	-39	92	237	402
	-15	+20	-286	-176	-57	75	223
	0	+35	-391	-287	-175	-52	84
30000	-64	-20	-380	-277	-167	-47	87
	-54	-10	-398	-293	-181	-60	76
	-44	0	-504	-406	-302	-190	-68
	-34	+10	-614	-523	-428	-327	-219
	-24	+20	-728	-645	-559	-469	-376
	-9	+35	-988	-923	-860	-800	-743

Enroute Climb Performance
(with ice accretions on airframe)
Figure 5-12

Enroute Climb Gradient - Icing

Associated Conditions:
- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted
- Climb Speed .... 130 KIAS

Example:
Pressure Altitude .... 15,000 FT
OAT .... ISA + 10 °C (-5 °C)
Aircraft Weight .... 5,500 LB

Climb Gradient ...... 253 Ft per NM

PRESSURE ALTITUDE	OAT	Δ ISA	CLIMB GRADIENT ~ Feet per Nautical Mile				
			WEIGHT (LB)				
Feet	°C	°C	6000	5500	5000	4500	4000
SL	-5	-20	496	583	684	803	948
	5	-10	550	642	749	876	1032
5000	-15	-20	451	534	630	743	880
	-5	-10	397	475	564	669	797
	5	0	444	526	620	732	868
10000	-25	-20	372	447	534	635	758
	-15	-10	348	421	505	603	722
	-5	0	301	369	448	540	650
	5	+10	340	413	496	593	710
15000	-35	-20	292	360	437	528	637
	-25	-10	270	336	411	499	604
	-15	0	247	311	384	468	570
	-5	+10	194	253	319	397	489
	5	+20	180	237	303	378	468
20000	-45	-20	214	274	343	424	519
	-35	-10	176	234	298	374	463
	-25	0	131	184	244	313	394
	-15	+10	85	134	189	252	325
	-5	+20	29	73	122	177	241
	10	+35	2	44	89	141	200
25000	-55	-20	61	108	160	220	290
	-45	-10	25	69	117	172	236
	-35	0	-12	29	73	123	181
	-25	+10	-49	-12	28	73	125
	-15	+20	-87	-53	-17	23	68
	0	+35	-116	-85	-52	-15	25
30000	-64	-20	-115	-84	-51	-14	26
	-54	-10	-118	-87	-54	-18	22
	-44	0	-146	-118	-87	-55	-20
	-34	+10	-174	-148	-121	-93	-62
	-24	+20	-203	-179	-155	-130	-104
	-9	+35	-267	-249	-232	-216	-201

Enroute Climb Gradient
(with ice accretions on airframe)
Figure 5-13

Time, Fuel, and Distance to Enroute Climb
(ISA - 20 °C, ISA - 10 °C, ISA)

Associated Conditions:

- Aircraft Weight ... Max Takeoff
- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted
- Climb Speed .... 122 KIAS

Example:

Cruise Press. Alt .... 26,000 FT
Cruise OAT .... ISA + 20 °C (-16 °C)
Departure Press. Alt. .... 2,000 FT
Departure OAT .... ISA + 20 °C (31 °C)

Time to Climb .... 25:20 (min:sec)
Fuel used during Climb .... 145 LB
Distance during Climb .... 68 NM

Notes:
Add 50 LB of Fuel for Start, Taxi, and Takeoff

Pressure Altitude	ISA - 20°C			ISA - 10°C			ISA		
	Time	Fuel	Dist.	Time	Fuel	Dist.	Time	Fuel	Dist.
Feet	min : sec	LB	NM	min : sec	LB	NM	min : sec	LB	NM
SL	0 : 00	0	0	0 : 00	0	0	0 : 00	0	0
2000	1 : 20	10	3	1 : 20	10	3	1 : 20	10	3
4000	2 : 40	20	5	2 : 40	20	5	2 : 40	20	5
6000	4 : 00	29	8	4 : 00	30	8	4 : 10	30	8
8000	5 : 20	39	11	5 : 30	39	11	5 : 30	40	12
10000	6 : 50	48	14	6 : 50	49	14	7 : 00	50	15
12000	8 : 10	57	17	8 : 20	58	18	8 : 20	59	18
14000	9 : 40	67	21	9 : 50	68	21	10 : 00	69	22
16000	11 : 10	76	24	11 : 20	77	25	11 : 30	79	26
18000	12 : 40	85	28	13 : 00	87	29	13 : 10	89	30
20000	14 : 20	95	32	14 : 40	97	34	15 : 00	99	35
22000	16 : 00	105	37	16 : 30	107	39	17 : 00	110	41
24000	18 : 00	116	42	18 : 40	119	45	19 : 30	123	48
26000	20 : 20	128	49	21 : 20	132	52	22 : 30	138	57
28000	23 : 30	142	58	24 : 40	147	63	26 : 30	155	69
30000	28 : 10	162	72	29 : 20	168	77	32 : 40	180	89

**Time, Fuel, and Distance to Enroute Climb -
Max. Takeoff Weight (ISA -20°C, ISA -10°C, ISA)**
Figure 5-14

Time, Fuel, and Distance to Enroute Climb

(ISA + 10 °C, ISA + 20 °C, ISA + 35 °C)

Associated Conditions:

- Aircraft Weight ... Max Takeoff
- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted
- Climb Speed .... 122 KIAS

Notes:
Add 50 LB of Fuel for Start, Taxi, and Takeoff

Pressure Altitude	ISA + 10°C			ISA + 20°C			ISA + 35°C		
	Time	Fuel	Dist.	Time	Fuel	Dist.	Time	Fuel	Dist.
Feet	min : sec	LB	NM	min : sec	LB	NM	min : sec	LB	NM
SL	0 : 00	0	0	0 : 00	0	0	0 : 00	0	0
2000	1 : 20	10	3	1 : 30	10	3	1 : 30	11	3
4000	2 : 50	21	6	2 : 50	21	6	2 : 50	21	6
6000	4 : 10	31	9	4 : 10	31	9	4 : 20	32	9
8000	5 : 30	41	12	5 : 40	41	12	5 : 50	43	13
10000	7 : 00	51	15	7 : 10	51	16	7 : 30	54	17
12000	8 : 30	60	19	8 : 40	61	19	9 : 20	65	22
14000	10 : 00	70	23	10 : 20	72	24	11 : 30	77	27
16000	11 : 40	80	27	12 : 10	83	29	13 : 50	90	33
18000	13 : 30	91	32	14 : 20	94	34	16 : 20	104	40
20000	15 : 30	102	37	16 : 30	107	40	19 : 10	118	49
22000	17 : 50	114	44	19 : 10	120	48	22 : 30	134	58
24000	20 : 40	128	52	22 : 20	136	58	26 : 50	154	72
26000	24 : 20	145	63	26 : 50	155	71	33 : 20	181	92
28000	29 : 20	166	79	33 : 30	182	93	46 : 30	232	136
30000	37 : 50	201	107	49 : 10	243	145	-	-	-

NOTE: Empty value indicates that the condition is outside aircraft operating limitations

Time, Fuel, and Distance to Enroute Climb - Max. Takeoff Weight (ISA+10°C, ISA +20°C, ISA +35°C)
Figure 5-15

Normal (Recommended) Cruise

Power Setting Guide

Associated Conditions:

- Power .... As Listed in Table
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

Example:

Cruise Press. Alt .... 20,000 FT
Cruise OAT .... 8°C

Torque Setting .... 1307 FT-LBS

OAT	ALTITUDE (Feet)							
°C	15000	16000	17000	18000	19000	20000	21000	22000
-54	1575	1575	1575	1575	1575	1575	1575	1575
-52	1575	1575	1575	1575	1575	1575	1575	1575
-50	1575	1575	1575	1575	1575	1575	1575	1575
-48	1575	1575	1575	1575	1575	1575	1575	1574
-46	1575	1575	1575	1575	1575	1575	1575	1566
-44	1575	1575	1575	1575	1575	1575	1575	1558
-42	1575	1575	1575	1575	1575	1575	1575	1550
-40	1575	1575	1575	1575	1575	1575	1575	1542
-38	1575	1575	1575	1575	1575	1575	1575	1534
-36	1575	1575	1575	1575	1575	1575	1572	1522
-34	1575	1575	1575	1575	1575	1574	1560	1510
-32	1575	1575	1575	1575	1575	1568	1547	1498
-30	1575	1575	1575	1575	1575	1562	1534	1486
-28	1575	1575	1575	1575	1575	1556	1522	1474
-26	1575	1575	1575	1575	1575	1550	1509	1462
-24	1575	1575	1575	1575	1575	1542	1496	1450
-22	1575	1575	1575	1575	1570	1527	1482	1437
-20	1575	1575	1575	1573	1556	1513	1469	1425
-18	1575	1575	1575	1563	1541	1499	1455	1412
-16	1575	1575	1573	1553	1527	1485	1442	1399
-14	1575	1575	1570	1543	1512	1471	1429	1387
-12	1575	1575	1568	1534	1497	1457	1416	1374
-10	1575	1575	1566	1522	1483	1444	1402	1361
-8	1575	1575	1557	1505	1469	1430	1389	1348
-6	1575	1570	1537	1489	1454	1416	1376	1336
-4	1573	1554	1517	1472	1440	1402	1362	1323
-2	1565	1538	1497	1456	1424	1386	1348	1311
0	1558	1522	1477	1439	1407	1370	1334	1298
2	1550	1506	1458	1421	1390	1354	1320	1286
4	1542	1489	1439	1403	1372	1339	1306	1273
6	1529	1468	1420	1385	1355	1323	1292	1261
8	1507	1448	1401	1367	1338	1307	1278	1246
10	1485	1427	1382	1349	1320	1291	1263	1231
12	1463	1407	1363	1331	1303	1275	1247	1217
14	1440	1386	1344	1313	1287	1260	1232	1202
16	1418	1366	1325	1296	1271	1244	1216	1187
18	1396	1345	1307	1279	1254	1229	1201	-
20	1374	1326	1289	1261	1238	1213	-	-

Normal (Recommended) Cruise
(Altitude - 15000 to 22000 feet)
Figure 5-16

Normal (Recommended) Cruise

Power Setting Guide

Associated Conditions:

- Power .... As Listed in Table
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

OAT	ALTITUDE (Feet)							
°C	23000	24000	25000	26000	27000	28000	29000	30000
-54	1560	1505	1447	1387	1331	1275	1215	1160
-52	1555	1497	1437	1378	1323	1270	1211	1152
-50	1549	1485	1426	1369	1316	1264	1202	1143
-48	1538	1474	1415	1360	1308	1254	1192	1135
-46	1527	1463	1405	1350	1297	1244	1183	1127
-44	1516	1451	1394	1340	1287	1234	1174	1118
-42	1505	1440	1383	1330	1277	1224	1165	1109
-40	1494	1429	1372	1319	1267	1214	1155	1099
-38	1483	1418	1360	1309	1257	1204	1145	1090
-36	1471	1408	1349	1298	1247	1194	1135	1080
-34	1460	1397	1338	1287	1237	1184	1126	1071
-32	1449	1386	1327	1276	1227	1174	1116	1061
-30	1438	1374	1315	1265	1217	1164	1106	1052
-28	1426	1363	1304	1254	1206	1154	1096	1042
-26	1414	1351	1292	1243	1195	1143	1086	1032
-24	1402	1339	1281	1232	1184	1132	1077	1023
-22	1390	1328	1269	1220	1173	1121	1067	1013
-20	1377	1315	1257	1209	1162	1110	1056	1003
-18	1365	1303	1245	1197	1151	1100	1045	992
-16	1352	1291	1234	1186	1140	1089	1035	982
-14	1340	1279	1222	1175	1129	1078	1024	972
-12	1327	1267	1211	1163	1119	1068	1013	962
-10	1315	1255	1199	1152	1108	1057	1003	952
-8	1302	1244	1188	1141	1097	1046	992	942
-6	1290	1232	1177	1129	1086	1036	982	932
-4	1278	1221	1165	1118	1075	1025	972	922
-2	1266	1210	1154	1107	1064	1015	963	913
0	1254	1198	1143	1095	1054	1005	953	903
2	1242	1187	1130	1083	1043	994	944	-
4	1230	1173	1117	1071	1033	984	-	-
6	1215	1159	1104	1059	1023	-	-	-
8	1200	1145	1091	1047	-	-	-	-
10	1185	1130	1078	-	-	-	-	-
12	1170	1116	-	-	-	-	-	-
14	1155	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-

Normal (Recommended) Cruise
(Altitude - 23000 to 30000 feet)
Figure 5-17

Maximum Cruise

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

NOTE: Not recommended by Pratt and Whitney Canada, use Normal Cruise
Use may result in increased engine wear and maintenance requirements

ISA - 15 °C				
Altitude FT	**OAT** °C	**Torque** FT-LB	**Fuel Flow** PPH	**Airspeed** KTAS
14000	-28	1575	366	241
16000	-32	1575	358	246
18000	-36	1575	352	250
20000	-40	1575	347	255
22000	-44	1575	344	260
24000	-48	1575	342	265
26000	-52	1575	341	269
28000	-55	1575	340	273
30000	-59	1553	334	276

NOTE: Shaded areas are beyond aircraft OAT limit

ISA				
Altitude FT	**OAT** °C	**Torque** FT-LB	**Fuel Flow** PPH	**Airspeed** KTAS
14000	-13	1575	366	245
16000	-17	1575	358	250
18000	-21	1575	352	255
20000	-25	1575	347	260
22000	-29	1575	344	264
24000	-33	1575	342	269
26000	-37	1569	340	273
28000	-40	1499	324	274
30000	-44	1434	308	274

ISA + 15 °C				
Altitude FT	**OAT** °C	**Torque** FT-LB	**Fuel Flow** PPH	**Airspeed** KTAS
14000	2	1575	366	249
16000	-2	1575	358	254
18000	-6	1575	352	259
20000	-10	1575	347	263
22000	-14	1541	337	266
24000	-18	1473	320	267
26000	-22	1411	306	268
28000	-25	1353	292	269
30000	-29	1295	279	269

Maximum Cruise
(ISA -15°C, ISA, ISA +15°C)
Figure 5-18

Normal (Recommended) Cruise

(ISA - 20 °C, ISA - 10 °C)

Associated Conditions:

- Power .... As Listed in Table
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

ISA - 20 °C				
Altitude FT	**OAT** °C	**Torque** FT-LB	**Fuel Flow** PPH	**Airspeed** KTAS
SL	-5	1575	457	209
2000	-9	1575	442	213
4000	-13	1575	426	218
6000	-17	1575	411	222
8000	-21	1575	399	226
10000	-25	1575	386	230
12000	-29	1575	374	235
14000	-33	1575	365	239
16000	-37	1575	357	244
18000	-41	1575	352	249
20000	-45	1575	346	254
22000	-49	1575	343	259
24000	-53	1500	325	260
26000	-57	1399	302	258
28000	-60	1291	277	256
30000	-64	1157	249	250

NOTE: Shaded areas are beyond aircraft OAT limit

ISA - 10 °C				
Altitude FT	**OAT** °C	**Torque** FT-LB	**Fuel Flow** PPH	**Airspeed** KTAS
SL	5	1575	459	212
2000	1	1575	443	216
4000	-3	1575	427	220
6000	-7	1575	413	224
8000	-11	1575	400	229
10000	-15	1575	387	233
12000	-19	1575	375	238
14000	-23	1575	365	243
16000	-27	1575	357	247
18000	-31	1575	352	252
20000	-35	1575	346	257
22000	-39	1537	335	260
24000	-43	1443	313	260
26000	-47	1353	292	259
28000	-50	1266	272	257
30000	-54	1161	250	254

Normal (Recommended) Cruise
(ISA -20°C, ISA -10°C)
Figure 5-19

Normal (Recommended) Cruise

(ISA, ISA + 10 °C)

ISA				
Altitude FT	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	15	1575	461	214
2000	11	1575	445	219
4000	7	1575	429	223
6000	3	1575	414	227
8000	-1	1575	401	232
10000	-5	1575	388	236
12000	-9	1575	375	241
14000	-13	1575	366	245
16000	-17	1575	358	250
18000	-21	1575	352	255
20000	-25	1546	341	259
22000	-29	1478	324	260
24000	-33	1389	302	259
26000	-37	1301	281	258
28000	-40	1216	262	257
30000	-44	1120	242	253

ISA + 10 °C				
Altitude FT	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	25	1575	462	217
2000	21	1575	447	221
4000	17	1575	431	225
6000	13	1575	416	230
8000	9	1575	402	234
10000	5	1575	389	239
12000	1	1575	376	243
14000	-3	1575	367	248
16000	-7	1575	358	253
18000	-11	1527	342	256
20000	-15	1475	328	257
22000	-19	1416	312	259
24000	-23	1331	292	258
26000	-27	1246	271	257
28000	-30	1167	252	255
30000	-34	1073	232	252

Normal (Recommended) Cruise
(ISA, ISA +10°C)
Figure 5-20

Normal (Recommended) Cruise
(ISA + 20 °C, ISA + 35 °C)

ISA + 20 °C				
Altitude FT	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	35	1575	464	219
2000	31	1575	449	223
4000	27	1575	433	228
6000	23	1575	418	232
8000	19	1575	403	237
10000	15	1575	390	241
12000	11	1575	377	246
14000	7	1573	367	251
16000	3	1496	345	251
18000	-1	1445	328	253
20000	-5	1407	315	256
22000	-9	1352	301	257
24000	-13	1270	281	257
26000	-17	1189	261	255
28000	-20	1113	243	253
30000	-24	1025	224	250

ISA + 35 °C				
Altitude FT	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	50	1575	468	222
2000	46	1575	452	227
4000	42	1575	436	231
6000	38	1575	421	236
8000	34	1575	406	240
10000	30	1536	384	243
12000	26	1472	360	244
14000	22	1406	339	245
16000	18	1342	320	246
18000	14	1310	306	248
20000	10	1288	295	252
22000	6	1258	284	254
24000	2	1184	264	254
26000	-2	1104	245	252
28000	-5	1033	228	249
30000	-9	949	210	245

NOTE: Shaded areas are beyond aircraft OAT limit

Normal (Recommended) Cruise
(ISA +20°C, ISA +35°C)
Figure 5-21

Intermediate Cruise - 1400 FT-LB

(ISA - 20 °C, ISA - 10 °C, ISA)

ISA - 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	-5	1400	430	201
5000	-15	1400	391	211
10000	-25	1400	354	221
15000	-35	1400	330	232
20000	-45	1400	314	244
25000	-55	1400	303	256
30000	-64	1157	249	251

ISA - 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	5	1400	431	203
5000	-5	1400	393	214
10000	-15	1400	355	224
15000	-25	1400	331	235
20000	-35	1400	314	247
25000	-45	1397	303	260
30000	-54	1161	250	254

ISA				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	15	1400	433	205
5000	5	1400	394	216
10000	-5	1400	357	227
15000	-15	1400	331	238
20000	-25	1400	314	250
25000	-35	1341	291	259
30000	-44	1120	242	254

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 1400 Ft-Lb
(ISA -20°C, ISA -10°C, ISA)
Figure 5-22

Intermediate Cruise - 1400 FT-LB

(ISA + 10 °C, ISA + 20 °C, ISA + 35 °C)

ISA + 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	25	1400	435	208
5000	15	1400	395	219
10000	5	1400	358	229
15000	-5	1400	332	241
20000	-15	1400	314	253
25000	-25	1284	280	258
30000	-34	1073	232	252

ISA + 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	35	1400	437	210
5000	25	1400	397	221
10000	15	1400	360	232
15000	5	1400	333	244
20000	-5	1400	314	256
25000	-15	1224	269	256
30000	-24	1025	224	250

ISA + 35 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	50	1400	440	213
5000	40	1400	400	224
10000	30	1400	361	236
15000	20	1371	329	246
20000	10	1287	295	252
25000	0	1140	254	253
30000	-9	949	210	245

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 1400 Ft-Lb
(ISA+10°C, ISA +20°C, ISA +35°C)
Figure 5-23

Intermediate Cruise - 1200 FT-LB

(ISA - 20 °C, ISA - 10 °C, ISA)

ISA - 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	-5	1200	400	189
5000	-15	1200	360	199
10000	-25	1200	323	209
15000	-35	1200	295	220
20000	-45	1200	277	231
25000	-55	1200	265	242
30000	-64	1157	249	251

ISA - 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	5	1200	401	192
5000	-5	1200	361	202
10000	-15	1200	324	212
15000	-25	1200	296	222
20000	-35	1200	278	234
25000	-45	1200	265	245
30000	-54	1161	250	254

ISA				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	15	1200	403	194
5000	5	1200	363	204
10000	-5	1200	325	214
15000	-15	1200	297	225
20000	-25	1200	278	236
25000	-35	1200	265	248
30000	-44	1120	242	254

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 1200 Ft-Lb
(ISA -20°C, ISA -10°C, ISA)
Figure 5-24

Intermediate Cruise - 1200 FT-LB

(ISA + 10 °C, ISA + 20 °C, ISA + 35 °C)

ISA + 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	25	1200	404	196
5000	15	1200	364	206
10000	5	1200	326	217
15000	-5	1200	297	228
20000	-15	1200	279	239
25000	-25	1200	265	251
30000	-34	1073	232	252

ISA + 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	35	1200	406	198
5000	25	1200	365	209
10000	15	1200	327	219
15000	5	1200	298	230
20000	-5	1200	279	242
25000	-15	1200	265	254
30000	-24	1025	224	250

ISA + 35 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	50	1200	409	201
5000	40	1200	367	212
10000	30	1200	329	223
15000	20	1200	300	234
20000	10	1200	280	246
25000	0	1140	254	253
30000	-9	949	210	245

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 1200 Ft-Lb
(ISA+10°C, ISA +20°C, ISA +35°C)
Figure 5-25

Intermediate Cruise - 1000 FT-LB

(ISA - 20 °C, ISA - 10 °C, ISA)

ISA - 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	-5	1000	371	176
5000	-15	1000	330	185
10000	-25	1000	292	195
15000	-35	1000	263	205
20000	-45	1000	243	215
25000	-55	1000	227	226
30000	-64	1000	219	237

ISA - 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	5	1000	373	178
5000	-5	1000	331	188
10000	-15	1000	293	197
15000	-25	1000	264	207
20000	-35	1000	243	218
25000	-45	1000	228	228
30000	-54	1000	219	240

ISA				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	15	1000	374	180
5000	5	1000	332	190
10000	-5	1000	294	200
15000	-15	1000	265	210
20000	-25	1000	244	220
25000	-35	1000	228	231
30000	-44	1000	218	242

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 1000 Ft-Lb
(ISA -20°C, ISA -10°C, ISA)
Figure 5-26

Intermediate Cruise - 1000 FT-LB

(ISA + 10 °C, ISA + 20 °C, ISA + 35 °C)

ISA + 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	25	1000	375	182
5000	15	1000	333	192
10000	5	1000	295	202
15000	-5	1000	265	212
20000	-15	1000	245	223
25000	-25	1000	229	234
30000	-34	1000	219	245

ISA + 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	35	1000	376	184
5000	25	1000	335	194
10000	15	1000	296	204
15000	5	1000	266	215
20000	-5	1000	245	225
25000	-15	1000	229	236
30000	-24	1000	219	248

ISA + 35 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	50	1000	378	187
5000	40	1000	337	197
10000	30	1000	297	207
15000	20	1000	268	218
20000	10	1000	246	229
25000	0	1000	230	240
30000	-9	949	210	245

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 1000 Ft-Lb
(ISA+10°C, ISA +20°C, ISA +35°C)
Figure 5-27

Intermediate Cruise - 800 FT-LB

(ISA - 20 °C, ISA - 10 °C, ISA)

ISA - 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	-5	800	343	159
5000	-15	800	302	169
10000	-25	800	263	178
15000	-35	800	234	187
20000	-45	800	211	196
25000	-55	800	194	205
30000	-64	800	182	215

ISA - 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	5	800	344	162
5000	-5	800	302	171
10000	-15	800	263	180
15000	-25	800	234	189
20000	-35	800	211	198
25000	-45	800	194	208
30000	-54	800	182	217

ISA				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	15	800	345	164
5000	5	800	303	173
10000	-5	800	264	182
15000	-15	800	235	191
20000	-25	800	212	200
25000	-35	800	194	210
30000	-44	800	182	219

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 800 Ft-Lb
(ISA -20°C, ISA -10°C, ISA)
Figure 5-28

Intermediate Cruise - 800 FT-LB

(ISA + 10 °C, ISA + 20 °C, ISA + 35 °C)

ISA + 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	25	800	346	166
5000	15	800	304	175
10000	5	800	265	184
15000	-5	800	235	193
20000	-15	800	213	203
25000	-25	800	195	212
30000	-34	800	183	221

ISA + 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	35	800	347	168
5000	25	800	305	177
10000	15	800	266	186
15000	5	800	236	195
20000	-5	800	213	205
25000	-15	800	195	214
30000	-24	800	183	223

ISA + 35 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	50	800	349	170
5000	40	800	307	180
10000	30	800	268	189
15000	20	800	237	198
20000	10	800	215	208
25000	0	800	196	217
30000	-9	800	184	226

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 800 Ft-Lb
(ISA+10°C, ISA +20°C, ISA +35°C)
Figure 5-29

Intermediate Cruise - 600 FT-LB

(ISA - 20 °C, ISA - 10 °C, ISA)

ISA - 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	-5	600	317	137
5000	-15	600	275	146
10000	-25	600	236	154
15000	-35	600	205	162
20000	-45	600	182	170
25000	-55	600	162	177
30000	-64	600	149	183

ISA - 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	5	600	318	139
5000	-5	600	275	148
10000	-15	600	236	156
15000	-25	600	205	164
20000	-35	600	182	172
25000	-45	600	163	179
30000	-54	600	149	185

ISA				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	15	600	319	141
5000	5	600	276	150
10000	-5	600	236	158
15000	-15	600	206	166
20000	-25	600	182	174
25000	-35	600	163	181
30000	-44	600	149	186

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 600 Ft-Lb
(ISA -20°C, ISA -10°C, ISA)
Figure 5-30

Intermediate Cruise - 600 FT-LB

(ISA + 10 °C, ISA + 20 °C, ISA + 35 °C)

ISA + 10 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	25	600	320	143
5000	15	600	277	152
10000	5	600	236	160
15000	-5	600	206	168
20000	-15	600	183	175
25000	-25	600	164	182
30000	-34	600	149	187

ISA + 20 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	35	600	321	145
5000	25	600	278	154
10000	15	600	237	162
15000	5	600	207	169
20000	-5	600	183	177
25000	-15	600	164	183
30000	-24	600	150	188

ISA + 35 °C				
Altitude Feet	OAT °C	Torque FT-LB	Fuel Flow PPH	Airspeed KTAS
SL	50	600	321	147
5000	40	600	279	156
10000	30	600	238	164
15000	20	600	208	172
20000	10	600	184	179
25000	0	600	165	185
30000	-9	600	151	188

NOTE: Shaded areas are beyond aircraft OAT limit

Intermediate Cruise - 600 Ft-Lb
(ISA+10°C, ISA +20°C, ISA +35°C)
Figure 5-31

Specific Air Range

Associated Conditions:

- Power .... As Listed in Table
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

Example:

Cruise Altitude .... 25,000 FT
OAT .... ISA + 20 °C (-15 °C)
Cruise Distance .... 500 NM
Cruise Power .... 1,000 FT-LB

Fuel Required .... 485 LBS

Notes:

Does not include 45 minute reserve, 210 LB (32 gal.)
45 minute reserve fuel is based on fuel flow for 600 FT-LB torque setting at 5,000'
Shaded areas are beyond aircraft OAT limit

NORMAL (RECOMMENDED) CRUISE

Altitude	Cruise Nautical Miles / 100 Lbs. Fuel					
Feet	ISA - 20 °C	ISA - 10 °C	ISA	ISA + 10 °C	ISA + 20 °C	ISA + 35 °C
0	45.7	46.2	46.5	47.0	47.2	47.5
5000	52.7	53.1	53.5	53.8	54.1	54.6
10000	59.8	60.4	61.0	61.6	62.1	63.4
15000	67.2	68.0	68.7	69.3	70.6	74.7
20000	73.5	74.4	76.0	78.7	81.4	85.4
25000	82.8	85.8	88.9	91.9	95.0	99.7
30000	100.6	101.8	105.1	108.6	111.9	117.0

INTERMEDIATE CRUISE – 1000 FT-LB

Altitude	Cruise Nautical Miles / 100 Lbs. Fuel					
Feet	ISA - 20 °C	ISA - 10 °C	ISA	ISA + 10 °C	ISA + 20 °C	ISA + 35 °C
0	47.5	47.8	48.2	48.5	48.9	49.4
5000	56.2	56.7	57.2	57.7	58.0	58.6
10000	66.7	67.3	67.9	68.5	69.0	69.7
15000	77.8	78.6	79.3	80.0	80.6	81.2
20000	88.5	89.5	90.3	91.1	91.9	92.9
25000	99.3	100.3	101.4	102.3	103.2	104.4
30000	108.2	109.7	111.0	112.1	113.2	117.0

INTERMEDIATE CRUISE – 600 FT-LB

Altitude	Cruise Nautical Miles / 100 Lbs. Fuel					
Feet	ISA - 20 °C	ISA - 10 °C	ISA	ISA + 10 °C	ISA + 20 °C	ISA + 35 °C
0	43.2	43.7	44.2	44.7	45.2	45.8
5000	53.2	53.8	54.4	54.9	55.3	56.0
10000	65.5	66.3	67.1	67.8	68.4	69.0
15000	79.3	80.1	80.7	81.3	81.9	82.6
20000	93.4	94.5	95.2	95.9	96.6	97.1
25000	109.4	110.1	110.7	111.3	111.7	112.2
30000	123.1	124.0	124.8	125.1	125.2	124.9

Specific Air Range
Normal Cruise, Intermediate Cruise, Low Cruise
Figure 5-32

Holding Time and Fuel Required

Associated Conditions:

- Airspeed .... 130 KIAS
- Power .... As Listed in Table
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

Example #1:

Holding Time .... 40 Min
Altitude .... 5,000 FT

Fuel Required .... 181 LB

Example #2:

Fuel Available .... 200 LB
Altitude .... 20,000 FT

Holding Time .... 60 Min

Notes:
Power required based on ISA + 35 °C Fuel Flow

Altitude	Torque for 130 KIAS	Fuel (LB) Required to Hold for Specified Time					
Feet	FT-LB	10 Minutes	20 Minutes	30 Minutes	40 Minutes	50 Minutes	60 Minutes
SL	515	52	104	155	207	258	310
5000	540	46	91	136	181	227	272
10000	580	40	79	119	158	197	237
15000	630	36	72	107	143	178	214
20000	685	33	66	99	132	165	198
25000	750	32	63	95	126	157	189
30000	815	31	62	93	124	155	186

Holding Time and Fuel Required
Figure 5-33

Time, Fuel, and Distance to Descend

Associated Conditions:

- Power .... 350 FT-LB
- Airspeed .... As Listed in Table
- ECS .... Normal
- Flaps .... Retracted
- Gear .... Retracted

Example:

Cruise Press. Alt. .... 28,000 FT
Destination Press. Alt .... Sea Level
Rate of Descent .... 3,000 FPM

Time to Descend .... 9:50 (min:sec)
Fuel used during Descent .... 27 LB
Distance during Descent .... 41 NM

Notes:
Performance table given for 4,500 LB aircraft weight
Aircraft weights greater than 4,500 LB will require faster airspeeds to maintain descent rate

Pressure Altitude	3000 FPM Descent				1500 FPM Descent			
	Airspeed	Time	Fuel	Dist.	Airspeed	Time	Fuel	Dist.
Feet	KIAS	min : sec	LB	NM	KIAS	min : sec	LB	NM
30000	186	10:00	28	41	154	20:00	58	69
28000	188	9:50	27	38	156	18:30	55	63
25000	190	8:50	25	33	158	16:30	51	55
20000	195	6:30	22	26	162	13:50	44	43
15000	198	5:10	17	19	165	10:10	36	31
10000	203	3:50	13	12	168	6:30	26	20
5000	205	1:30	7	6	170	3:50	14	10
SL	208	0:00	0	0	172	0:00	0	0

Time, Fuel and Distance to Descend
Figure 5-34

Glide Range and Endurance

Associated Conditions:

- Flaps & Gear .... Retracted
- Propeller .... Feathered
- Power .... Off
- Wind .... 0 KTS
- Best Glide Speed ...... Weight Dependent, See Tables

GLIDE RANGE WITH ICE ACCRETIONS:
Subtract 1 NM from range per 1,000 FT altitude
Reduce endurance by approximately 30%

Example:

Aircraft Weight .... 5,500 LB
Pressure Altitude 25,000
OAT .... ISA - 20 °C (-54 °C)

Glide Airspeed .... 110 KIAS
Glide Range .... 67 NM
Glide Endurance .... 31 Minutes

WEIGHT:		6000 LB		
AIRSPEED - BEST GLIDE:		115 KIAS		
Altitude	Range	Endurance (minutes)		
Feet	NM	ISA - 20 °C	ISA	ISA + 35 °C
30000	81	35	34	32
28000	75	34	32	30
25000	67	30	29	27
20000	54	25	24	23
15000	40	20	19	18
10000	27	14	13	12
5000	13	7	6	6
SL	0	0	0	0

WEIGHT:		5000 LB		
AIRSPEED - BEST GLIDE:		105 KIAS		
Altitude	Range	Endurance (minutes)		
Feet	NM	ISA - 20 °C	ISA	ISA + 35 °C
30000	81	39	37	35
28000	75	37	36	34
25000	67	33	32	30
20000	54	28	27	26
15000	40	21	21	19
10000	27	15	14	13
5000	13	7	7	7
SL	0	0	0	0

WEIGHT:		4000 LB		
AIRSPEED - BEST GLIDE:		94 KIAS		
Altitude	Range	Endurance (minutes)		
Feet	NM	ISA - 20 °C	ISA	ISA + 35 °C
30000	81	43	42	39
28000	75	41	39	37
25000	67	38	36	34
20000	54	31	30	28
15000	40	24	23	22
10000	27	17	16	15
5000	13	8	8	7
SL	0	0	0	0

Glide Range and Endurance
6000 LB, 5000 LB and 4000 LB
Figure 5-35

Balked Landing Climb Gradient

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Landing
- Gear .... Extended
- Climb Speed .... 85 KIAS

Example:

Pressure Altitude .... Sea Level
OAT .... ISA - 10 °C (5 °C)
Aircraft Weight .... 5,500 LB

Climb Gradient ... 806 Feet per NM

PRESSURE ALTITUDE	OAT	Δ ISA	CLIMB GRADIENT ~ Feet per Nautical Mile				
			WEIGHT (LB)				
Feet	°C	°C	6000	5500	5000	4500	4000
SL	-5	-20	692	837	1004	1203	1446
	5	-10	665	806	970	1164	1402
	15	0	635	773	933	1122	1354
	25	+10	606	741	898	1083	1308
	35	+20	579	712	865	1046	1266
	50	+35	542	671	820	995	1207
2000	-9	-20	647	787	949	1140	1374
	1	-10	616	752	910	1096	1324
	11	0	586	720	874	1056	1277
	21	+10	559	690	840	1018	1234
	31	+20	533	661	809	982	1193
	46	+35	496	621	764	932	1135
4000	-13	-20	598	733	889	1073	1296
	-3	-10	568	700	852	1031	1249
	7	0	539	669	817	992	1204
	17	+10	512	639	784	955	1161
	27	+20	487	611	753	920	1122
	42	+35	450	570	708	869	1064
6000	-17	-20	551	681	831	1008	1222
	-7	-10	522	649	795	968	1176
	3	0	494	619	762	929	1132
	13	+10	467	589	729	893	1090
	23	+20	441	560	697	857	1050
	38	+35	393	508	640	793	976
8000	-21	-20	506	632	776	946	1151
	-11	-10	476	599	740	906	1105
	-1	0	448	568	705	866	1061
	9	+10	422	539	674	831	1020
	19	+20	395	510	642	795	979
	34	+35	322	430	553	695	866
10000	-25	-20	460	581	721	883	1080
	-15	-10	431	549	685	843	1034
	-5	0	402	518	650	804	990
	5	+10	374	488	617	767	947
	15	+20	348	458	584	731	906
	30	+35	254	356	471	604	761

Balked Landing Climb Gradient
Figure 5-36

Balked Landing Climb Gradient - Icing

Associated Conditions:

- Power .... Max Continuous
- ECS .... Normal
- Flaps .... Takeoff
- Gear .... Extended
- Climb Speed .... 102 KIAS

Example:

Pressure Altitude .... Sea Level
OAT .... ISA - 10 °C (5 °C)
Aircraft Weight .... 5,500 LB

Climb Gradient ... 652 Feet per NM

PRESSURE ALTITUDE Feet	OAT °C	Δ ISA °C	CLIMB GRADIENT ~ Feet per Nautical Mile				
			WEIGHT (LB)				
			6000	5500	5000	4500	4000
SL	-5	-20	476	584	708	854	1031
	5	-10	538	652	783	938	1126
2000	-9	-20	398	499	614	748	910
	1	-10	496	606	732	881	1061
	11	0	472	579	703	848	1023
4000	-13	-20	406	507	623	758	922
	-3	-10	409	510	627	763	927
	7	0	433	537	656	795	964
6000	-17	-20	405	506	622	758	921
	-7	-10	323	416	522	646	794
	3	0	393	493	608	741	902
	13	+10	368	466	578	708	864
8000	-21	-20	368	466	578	708	865
	-11	-10	273	361	462	579	718
	-1	0	338	433	542	668	819
	9	+10	328	422	529	653	802
10000	-25	-20	328	422	529	654	803
	-15	-10	298	389	493	613	757
	-5	0	242	328	426	538	672
	5	+10	288	378	481	600	742

Balked Landing Climb Gradient
(with ice accretions on airframe)
Figure 5-37

Landing Distance without Reverse

Associated Conditions:

- Aircraft Weight .... 5,800 LB
- Runway .... Paved, Dry Surface
- Flaps .... Landing
- Gear .... Extended
- Threshold Speed .... 85 KIAS
- Touchdown Speed .... 74 KIAS

Example:

OAT .... ISA + 10 °C (13 °C)
Pressure Altitude .... 6,000 FT
Headwind Component .... 0 KT

Distance Over 50' Obstacle .... 3,148 FT
Ground Roll Distance .... 1,903 FT

NOTE: Apply maximum braking after touchdown, as required to avoid skidding tires

Wind, Runway Gradient, and Configuration Factors

Headwind – Subtract 8% from the given distance for each 10 knots headwind, up to 20 knots

Tailwind – Add 9% to the given distance for each 2 knots tailwind, up to 10 knots

Runway Gradient

Subtract 3% from the table distance for each 1% of uphill (positive) runway gradient, up to 2%

Add 9% to the table distance for each 1% of downhill (negative) runway gradient, up to 2%

For landings performed with the flaps up or in the takeoff setting:

	Approach Speed	Increase Ground Roll and Total Distance by:
Flaps Up	**100 KIAS**	**20 %**
Flaps T/O	**91 KIAS**	**20 %**

Slope and Wind Example:

Pressure Altitude .... 6,000 FT
OAT .... ISA + 10 °C (13 °C)
Headwind Component .... 20 KT
Runway Gradient .... +2%
Ground Roll (no wind or slope) .... 1,951 FT
Distance to 50' (no wind or slope) .... 3,201 FT

Ground Roll gradient contribution .... -117 FT
Ground Roll wind contribution .... - 312 FT
Final Ground Roll .... 1,522 FT

Distance from 50' gradient contribution .... -192 FT
Distance from 50' wind contribution .... -512 FT
Final Distance from 50' .... 2,497 FT

Landing Distance without Reverse - Example
Figure 5-38

Landing Distance without Reverse

Associated Conditions:

- Aircraft Weight .... 5,800 LB
- Runway .... Paved, Dry Surface
- Flaps .... Landing
- Gear .... Extended
- Threshold Speed .... 85 KIAS
- Touchdown Speed .... 74 KIAS

CAUTION:
Distances in table do not include effects of wind or runway gradient. See factors and example on previous page

PRESSURE ALTITUDE	OAT	Δ ISA	LANDING DISTANCE (FEET)	
			5800 LB	
Feet	°C	°C	GR	D50
SL	-5	-20	1465	2505
	5	-10	1519	2582
	15	0	1574	2659
	25	+10	1629	2737
	35	+20	1683	2815
	50	+35	1765	2932
2000	-9	-20	1552	2628
	1	-10	1611	2711
	11	0	1670	2795
	21	+10	1728	2879
	31	+20	1787	2963
	46	+35	1875	3090
4000	-13	-20	1646	2761
	-3	-10	1709	2852
	7	0	1772	2942
	17	+10	1836	3033
	27	+20	1899	3125
	42	+35	1994	3262
6000	-17	-20	1747	2906
	-7	-10	1815	3004
	3	0	1883	3102
	13	+10	1951	3201
	23	+20	2019	3300
	38	+35	2122	3449
8000	-21	-20	1930	3184
	-11	-10	2006	3295
	-1	0	2083	3406
	9	+10	2159	3518
	19	+20	2236	3630
	34	+35	2350	3798
10000	-25	-20	2130	3490
	-15	-10	2216	3615
	-5	0	2302	3741
	5	+10	2388	3866
	15	+20	2474	3993
	30	+35	2602	4183

Landing Distance without Reverse
- 5800 LB
Figure 5-39

Landing Distance without Reverse - Icing

Associated Conditions:

- Aircraft Weight .... 5,800 LB
- Runway .... Paved, Dry Surface
- Flaps .... Takeoff
- Gear .... Extended
- Threshold Speed .... 102 KIAS
- Touchdown Speed .... 90 KIAS

Example:

OAT .... ISA + 10 °C (13 °C)
Pressure Altitude .... 6,000 FT
Headwind Component .... 0 KT

Distance Over 50' Obstacle .... 4,261 FT
Ground Roll Distance .... 2,301 FT

NOTE: Apply maximum braking after touchdown, as required to avoid skidding tires

Wind, Runway Gradient, and Configuration Factors

Headwind – Subtract 6% from the given distance for each 10 knots headwind, up to 20 knots

Tailwind – Add 8% to the given distance for each 2 knots tailwind, up to 10 knots

Runway Gradient

Subtract 2% from the table distance for each 1% of uphill (positive) runway gradient, up to 2%

Add 7% to the table distance for each 1% of downhill (negative) runway gradient, up to 2%

Slope and Wind Example:

Pressure Altitude .... 6,000 FT
OAT .... ISA + 10 °C (13 °C)
Headwind Component .... 20 KT
Runway Gradient .... +2%
Ground Roll (no wind or slope) .... 2,301 FT
Distance to 50' (no wind or slope) .... 4,261 FT

Ground Roll gradient contribution .... -92 FT
Ground Roll wind contribution .... - 276 FT
Final Ground Roll .... 1,933 FT

Distance from 50' gradient contribution .... -170 FT
Distance from 50' wind contribution .... -511 FT
Final Distance from 50' .... 3,580 FT

Landing Distance without Reverse
(with ice accretions on airframe) - Example
Figure 5-40

Landing Distance without Reverse - Icing

Associated Conditions:

- Aircraft Weight .... 5,800 LB
- Runway .... Paved, Dry Surface
- Flaps .... Takeoff
- Gear .... Extended
- Threshold Speed .... 102 KIAS
- Touchdown Speed .... 90 KIAS

CAUTION:
Distances in table do not include effects of wind or runway gradient. See factors and example on previous page

PRESSURE ALTITUDE	OAT	Δ ISA	LANDING DISTANCE (FEET)	
			5800 LB	
Feet	°C	°C	GR	D50
SL	-5	-20	1727	3332
	5	-10	1792	3435
2000	-9	-20	1830	3497
	1	-10	1899	3608
	11	0	1969	3719
4000	-13	-20	1941	3674
	-3	-10	2015	3795
	7	0	2090	3916
6000	-17	-20	2060	3867
	-7	-10	2140	3998
	3	0	2220	4129
	13	+10	2301	4261
8000	-21	-20	2275	4239
	-11	-10	2366	4387
	-1	0	2456	4535
	9	+10	2546	4684
10000	-25	-20	2512	4647
	-15	-10	2613	4813
	-5	0	2714	4981
	5	+10	2816	5149
	15	+20	2917	5318

Landing Distance without Reverse
(with ice accretions on airframe)
Figure 5-41

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SECTION 6

WEIGHT AND BALANCE

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SECTION 6

WEIGHT AND BALANCE

6.1 GENERAL

In order to achieve design performance and flying characteristics, the airplane must be operated and flown within the approved weight and center of gravity (C.G.) envelope. (Refer to Figure 6-16.) The airplane offers flexibility of loading, however, it cannot be flown with the maximum number of passengers, full fuel tanks and maximum baggage.

Before the airplane is licensed, a basic empty weight and C.G. location is computed (basic empty weight consists of the standard empty weight of the airplane plus the optional equipment). Using the basic empty weight and C.G. location, the pilot can determine the weight and C.G. position for the loaded airplane. It is the responsibility of the pilot in command to ensure that the airplane is loaded within approved weight and C.G. envelope limits prior to each flight.

The basic empty weight and C.G. location is recorded in the Weight and Balance Data Form (Figure 6-3) and the Weight and Balance Record (Figure 6-4). If modification work is performed or new equipment is added to the airplane, a revised basic empty weight and C.G. must be computed and recorded in the Weight and Balance Data Form and the Weight and Balance Record. The current values for weight and C.G. should be used to calculate the quantity of fuel, baggage, and passengers that can be boarded so as to remain within the approved weight and C.G. limitations.

The following pages contain procedures and forms used when weighing an airplane and computing basic empty weight, C.G. position, and useful load. Note that the useful load includes usable fuel, baggage and passengers.

6.3 AIRPLANE WEIGHING PROCEDURE

The removal or addition of equipment or airplane modifications can affect the basic empty weight and center of gravity. The following is a weighing procedure to determine this basic empty weight and center of gravity location:

(a) Preparation

(1) Verify that all items checked in the airplane equipment list are installed in the proper location in the airplane.

(2) Remove excessive dirt, grease, moisture, and foreign items such as rags and tools, from the airplane before weighing.

(3) Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Then add the unusable fuel, 21.4 pounds (3.2 gallons total, 1.6 gallons each wing).

(4) Fill oil to full capacity.

(5) Place pilot seat in fifth (5th) notch and copilot seat in sixth (6th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. All entrance and baggage doors should be closed.

(6) Weigh the airplane inside a closed building to prevent errors in scale readings due to wind.

6.3 AIRPLANE WEIGHING PROCEDURE (continued)

(b) Leveling

(1) With the airplane on scales, insert a 3.4 inch spacer on each of the main gear struts and a 3.0 inch spacer on the nose gear strut.

(2) Level airplane (refer to Figure 6-2) deflating (or inflating as required) nose wheel tire, to center bubble on level.

(c) Weighing - Airplane Basic Empty Weight

(1) With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading. (Refer to Figure 6-1.)

Scale Position and Symbol		Scale Reading	Tare	Net Weight
Nose Wheel	(N)			
Right Main Wheel	(R)			
Left Main Wheel	(L)			
Basic Empty Weight, as Weighed	(T)			

WEIGHING FORM
Figure 6-1

6.3 AIRPLANE WEIGHING PROCEDURE (continued)

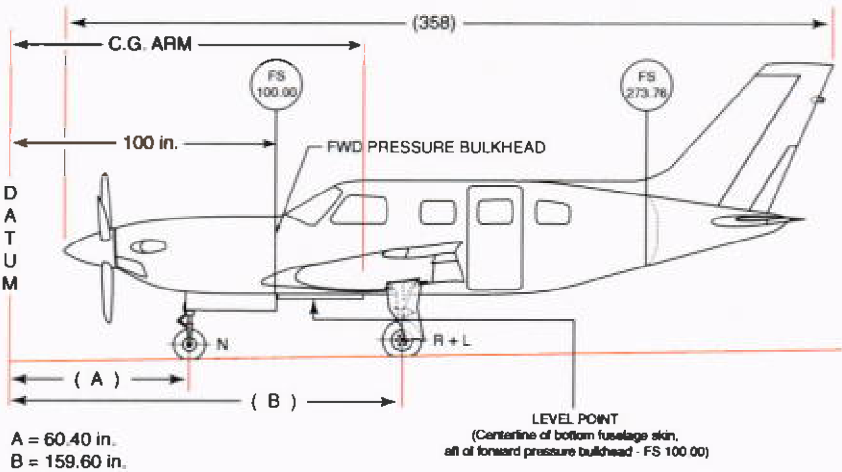
(d) Basic Empty Weight Center of Gravity

(1) The following geometry applies to the airplane when it is level. Refer to Leveling paragraph 6.3 (b).

(2) The basic empty weight center of gravity (as weighed including optional equipment, full oil and unusable fuel) can be determined by the following formula:

$$\text{C.G. Arm} = \frac{(N)(A) + (R + L)(B)}{T} \text{ inches}$$

Where: T = N + R + L



LEVELING DIAGRAM
Figure 6-2

6.5 WEIGHT AND BALANCE DATA AND RECORD

The Basic Empty Weight, Center of Gravity location and Useful Load listed in Figure 6-3 are for the airplane as licensed at the factory. These figures apply only to the specific airplane serial number and registration number shown.

The basic empty weight of the airplane as licensed at the factory has been entered in the Weight and Balance Record (Figure 6-4). This form is provided to present the current status of the airplane basic empty weight and a complete history of previous modifications. Any change to the permanently installed equipment or modification which affects weight or moment must be entered in the Weight and Balance Record.

6.5 WEIGHT AND BALANCE DATA AND RECORD (continued)

MODEL PA-46-600TP

Airplane Serial Number ____________________

Registration Number ____________________

Date ____________________

AIRPLANE BASIC EMPTY WEIGHT

Item	Weight x (Lb)	C.G. Arm (Inches Aft = of Datum)	Moment (In-Lbs)
Actual Standard Empty Weight* Computed			
Optional Equipment			
Basic Empty Weight			

* The standard empty weight includes full oil capacity and 3.2 gallons of unusable fuel.

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

(Ramp Weight) - (Basic Empty Weight) = Useful Load

(6050 lbs) - (lbs) = lbs.

THIS BASIC EMPTY WEIGHT, C.G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS LICENSED AT THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD WHEN ALTERATIONS HAVE BEEN MADE.

WEIGHT AND BALANCE DATA FORM
Figure 6-3

6.5 WEIGHT AND BALANCE DATA AND RECORD (continued)

PA-46-600TP		Serial Number		Registration Number			Page Number	
Date	Item No.	Description of Article or Modification	Added (+) Removed (-)	Weight Change			Running Basic Empty Weight	
				Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100
		As licensed						

WEIGHT AND BALANCE RECORD
Figure 6-4 (1 of 2)

PA-46-600TP		Serial Number		Registration Number			Page Number	
Date	Item No.	Description of Article or Modification	Added (+) Removed (-)	Weight Change			Running Basic Empty Weight	
				Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100

WEIGHT AND BALANCE RECORD (continued)
Figure 6-4 (2 of 2)

6.7 GENERAL LOADING RECOMMENDATIONS

For all airplane configurations, it is the responsibility of the pilot in command to make sure that the airplane always remains within the allowable weight and center of gravity limits while in flight.

WARNING

Do not attempt to fly this airplane under any conditions when it is loaded outside the limits of the approved weight and center of gravity envelope.

NOTE

With configuration loadings falling near the envelope limits, it is important to check anticipated landing loadings since fuel burn could result in a final loading outside of the approved weight and center of gravity envelope.

NOTE

Always load the fuel equally between the right and left tanks.

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

A sample loading calculation is explained below, along with examples for use of the Weight and Balance Computation (Figure 6-5) and Weight and Moment Calculation (Figure 6-6) forms.

(a) Enter the airplane basic empty weight and moment from the most current Weight and Balance Data form onto the Weight and Balance computation form (Figure 6-7).

(b) Enter the weight and corresponding moment of each loaded item using the loading tables (Figure 6-11 through Figure 6-15).

(c) Add the weight and moment of all items to the basic empty weight and moment to determine the zero fuel weight and moment.

(d) Divide the zero fuel weight moment by the zero fuel weight to determine the zero fuel weight arm (C.G.).

(e) Verify the zero fuel weight is below the Maximum Zero Fuel Weight (4850 pounds).

(f) Determine the fuel moment using the loading table for fuel (Figure 6-15) and enter the fuel, the weight and moment in the Weight and Balance Computation Form.

(g) Total the zero fuel weight and moment with the fuel loading weight and moment to obtain ramp weight and moment.

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

(h) Divide the ramp weight moment by the ramp weight to determine the ramp weight arm (C.G.). Verify that the ramp weight and C.G. are within the approved Weight and Balance Envelope (Figure 6-16).

(i) Subtract the weight and moment of the fuel allowance for engine start, taxi, and runup to determine takeoff weight and moment. A standard 50.0 pound fuel allowance for taxi and runup is assumed. The moment for the fuel allowance is determined by the difference in moments of the total fuel loaded and the fuel remaining on board after taxi and runup. Enter the fuel allowance weight and moment in the Weight and Balance Computation form.

(j) Divide the takeoff weight moment by the takeoff weight to determine the takeoff weight arm (C.G.). Verify that the takeoff weight and C.G. are within the approved Weight and Balance Envelope (Figure 6-16).

(k) Enter the weight and moment of the fuel used during the flight in the Weight and Balance Computation form.

(l) Subtract the weight and moment of the fuel used during the flight to determine landing weight and moment. Divide the landing weight moment by the landing weight to determine the landing weight arm (C.G.). Verify that the landing weight and C.G. are within the approved Weight and Balance Envelope (Figure 6-16).

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

EXAMPLE ONLY	Weight (Lb)	Arm Aft of Datum (Inches)	Moment (In.-Lb)
Basic Empty Weight	3730.0	137.90	514367.0
Pilot (Seat 1)	170.0	135.50	23035.0
Copilot (Seat 2 - Folding Seat)		136.70	
Center Passenger L/H (Seat 3)	180.0	177.00	31860.0
Center Passenger R/H (Seat 4)		177.00	
Rear Passenger L/H (Seat 5)		218.75	
Rear Passenger R/H (Seat 6)		218.75	
Aft Golf Baggage net (105 Lbs. Max. -3 bags)-optional		222.31	
Aft Baggage (100 Lbs. max.) (50 Lbs. maximum with golf bag)	80.0	248.23	19858.4
Aft oil stowage compartment (Max. 5 Lbs.)		286.50	
Zero Fuel Weight (Max. 4850 Lbs)	4160.0	141.62	589120.4
Fuel (260 gals. Max.) @ 6.7 Lbs. per gallon	904.5	146.50	132509.3
Maximum Ramp Weight (6050 Lbs.)	5064.5	142.50	721629.7
Fuel allowance for Engine Start, Taxi and Run up	-50.0	146.70	-7335.0
Maximum Takeoff Weight (6000 Lbs.)	5014.5	142.50	714294.7

EXAMPLE OF WEIGHT AND BALANCE COMPUTATION FORM STANDARD CONFIGURATION (Sample Loading)

Figure 6-5

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

Example Weight Calculation	Weight (Lbs.)
Total Fuel	904.5
Fuel allowance for Engine Start, Taxi and Run up	-50.0
Fuel Remaining on board	854.5
Example Moment Calculation	**Moment (In.-Lbs.)**
Total Fuel	132509.3
Fuel remaining on board	-125174.3
Fuel allowance for Engine Start, Taxi and Run up	7335.0

Example Weight Calculation	Weight (Lbs.)
Takeoff Fuel	854.5
Mission Fuel used (Fuel burned during Climb, Cruise and Descent)	-633.3
Post Mission Fuel (Fuel remaining at landing)	221.2
Example Moment Calculation	**Moment (In.-Lbs.)**
Takeoff Fuel	125174.3
Mission Fuel used (Fuel burned during Climb, Cruise and Descent)	-91828.5
Post Mission Fuel (Fuel remaining at landing)	33345.8

Example Calculation	Arm Aft Weight (Lb)	of Datum (Inches)	Moment (In.-Lb)
Maximum Takeoff Weight (6000 Lbs.)	5014.5	142.5	714294.7
Minus Estimated Fuel Burn-off (Climb & Cruise) @ 6.7 Lbs. per gallon	-633.3	145.0	-91828.5
Maximum Landing Weight (5800 Lbs.)	4381.2	142.1	622466.2

EXAMPLE OF WEIGHT AND MOMENT CALCULATIONS
(Sample Loading)
Figure 6-6

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

	Weight (Lb)	Arm Aft of Datum (Inches)	Moment (In.-Lb)
Basic Empty Weight			
Pilot (Seat 1)		135.50	
Copilot (Seat 2 - Folding Seat)		136.70	
Center Passenger L/H (Seat 3)		177.00	
Center Passenger R/H (Seat 4)		177.00	
Rear Passenger L/H (Seat 5)		218.75	
Rear Passenger R/H (Seat 6)		218.75	
Aft Golf Baggage net (105 Lbs. Max. -3 bags)-optional		222.31	
Aft Baggage (100 Lbs. Max.) (50 Lbs. Max with golf bag net option)		248.23	
Aft oil stowage compartment (Max. 5 Lbs.)		286.50	
Zero Fuel Weight (Max. 4850 Lbs)			
Fuel (260 gals. Max.)[1] @ 6.7 Lbs. per gallon			
Maximum Ramp Weight (6050 Lbs.)			
Fuel allowance for Engine Start, Taxi and Run up[2]	-50.0		
Maximum Takeoff Weight (6000 Lbs.)			

NOTES:

1. Use the fuel loading table (Figure 6-15) to determine the moment for the amount of fuel being loaded for the flight. If fuel is to be added to existing fuel, determine the total fuel weight and use the fuel loading table to determine the fuel moment. (Arm = Moment/Weight).
2. A standard 50.0 pound fuel allowance for taxi and runup is assumed. The moment for the fuel allowance is determined by the difference in moments of the total fuel loaded and the fuel remaining on board after taxi and runup.

Locate the arm (C.G.) of the takeoff weight on the Center of Gravity Limits graph (Figure 6-16). If this point falls within the Weight/C.G. envelope, the loading is acceptable for takeoff.

WEIGHT AND BALANCE COMPUTATION FORM

Figure 6-7

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6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

Weight Calculation	Weight (Lbs.)
Total Fuel	
Fuel allowance for Engine Start, Taxi and Run up	
Fuel Remaining on board	
Moment Calculation	**Moment (In.-Lbs.)**
Total Fuel	
Fuel remaining on board	
Fuel allowance for Engine Start, Taxi and Run up	

MOMENT CALCULATION FOR FUEL ALLOWANCE
Figure 6-8

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

Weight Calculation	Weight (Lbs.)
Takeoff Fuel	
Mission Fuel used (Fuel burned during Climb, Cruise and Descent)	
Post Mission Fuel (Fuel remaining at landing)	
Moment Calculation	**Moment (In.-Lbs.)**
Takeoff Fuel	
Mission Fuel used (Fuel burned during Climb, Cruise and Descent)	
Post Mission Fuel (Fuel remaining at landing)	

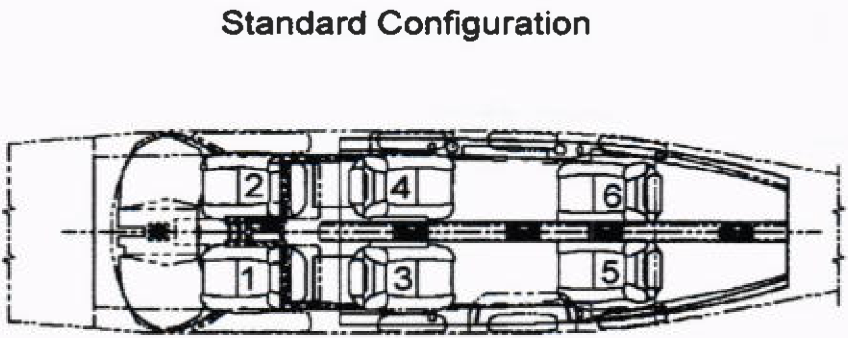
	Weight (Lb)	Arm Aft of Datum (Inches)	Moment (In.-Lb)
Maximum Takeoff Weight (6000 Lbs.)			
Minus Estimated Fuel Burn-off (Climb & Cruise) @ 6.7 Lbs. per gallon			
Maximum Landing Weight (5800 Lbs.)			

Locate the arm (C.G.) of the landing weight on the Center of Gravity Limits graph (Figure 6-16). If this point falls within the Weight/C.G. envelope, the loading is acceptable for landing.

IT IS THE SOLE RESPONSIBILITY OF THE PILOT IN COMMAND TO ENSURE THAT THE AIRPLANE IS LOADED PROPERLY AT ALL TIMES.

MOMENT CALCULATION FOR FUEL BURNED DURING THE MISSION
Figure 6-9

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)



SEATING CONFIGURATIONS
Figure 6-10

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

Weight	Pilot	Copilot (Seat 2) (Folding)	Seat 3	Seat 4	Seat 5	Seat 6
(pounds)	Arm FS 135.5	Arm FS 136.7	Arm FS 177.0	Arm FS 177.0	Arm FS 218.75	Arm FS 218.75
Moment (inch - pounds)						
20	2710.0	2734.0	3540.0	3540.0	4375.0	4375.0
30	4065.0	4101.0	5310.0	5310.0	6562.0	6562.0
40	5420.0	5468.0	7080.0	7080.0	8750.0	8750.0
50	6775.0	6835.0	8850.0	8850.0	10937.5	10937.5
60	8130.0	8202.0	10620.0	10620.0	13125.0	13125.0
70	9485.0	9569.0	12390.0	12390.0	15312.5	15312.5
80	10840.0	10936.0	14160.0	14160.0	17500.0	17500.0
90	12195.0	12303.0	15930.0	15930.0	19687.5	19687.5
100	13550.0	13670.0	17700.0	17700.0	21875.0	21875.0
110	14905.0	15037.0	19470.0	19470.0	24062.5	24062.5
120	16260.0	16404.0	21240.0	21240.0	26250.0	26250.0
130	17615.0	17771.0	23010.0	23010.0	28437.5	28437.5
140	18970.0	19138.0	24780.0	24780.0	30625.0	30625.0
150	20325.0	20505.0	26550.0	26550.0	32812.5	32812.5
160	21680.0	21872.0	28320.0	28320.0	35000.0	35000.0
170	23035.0	23239.0	30090.0	30090.0	37187.5	37187.5

LOADING TABLE
OCCUPANTS
Figure 6-11

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

Standard Baggage net configuration	
Weight (pounds)	**Standard baggage Arm FS 248.23 Moment (inch-pounds)**
10	2482.3
20	4964.6
30	7446.9
40	9929.2
50	12411.5
60	14893.8
70	17376.1
80	19858.4
90	22340.7
100	24823.0

LOADING TABLE
STANDARD BAGGAGE
Figure 6-12

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

Golf Baggage		
Weight (pounds)	**Golf baggage location Arm FS 222.31 Moment (inch-pounds)**	**Aft location Arm FS 248.23 Moment (inch-pounds)**
10.0	2223.1	2482.3
20.0	4446.2	4964.6
30.0	6669.3	7446.9
40.0	8892.4	9929.2
50.0	11115.5	12411.5
60.0	13338.6	N/A
70.0	15561.7	N/A
80.0	17784.8	N/A
90.0	20007.9	N/A
100.0	22231.0	N/A
105.0	23342.6	N/A

LOADING TABLE
GOLF BAGGAGE - Optional
Figure 6-13

GOLF BAGGAGE LOADING CONFIGURATION
Figure 6-14

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

WINGS
(JET A & A1, 6.7 LB/GAL)

GALLONS	WEIGHT	MOM/100	FS	GALLONS	WEIGHT	MOM/100	FS
5	33.5	48	144.0	50	335.0	482	144.0
6	40.2	58	144.0	51	341.7	492	144.0
7	46.9	68	144.0	52	348.4	502	144.1
8	53.6	77	144.0	53	355.1	512	144.1
9	60.3	87	144.0	54	361.8	522	144.2
10	67.0	96	144.0	55	368.5	531	144.2
11	73.7	106	144.0	56	375.2	541	144.2
12	80.4	116	143.9	57	381.9	551	144.3
13	87.1	125	143.9	58	388.6	561	144.3
14	93.8	135	143.8	59	395.3	571	144.4
15	100.5	145	143.8	60	402.0	580	144.4
16	107.2	154	143.8	61	408.7	590	144.4
17	113.9	164	143.7	62	415.4	600	144.4
18	120.6	173	143.7	63	422.1	610	144.5
19	127.3	183	143.6	64	428.8	620	144.5
20	134.0	192	143.6	65	435.5	629	144.5
21	140.7	202	143.6	66	442.2	639	144.5
22	147.4	212	143.6	67	448.9	649	144.6
23	154.1	221	143.6	68	455.6	659	144.6
24	160.8	231	143.6	69	462.3	669	144.7
25	167.5	240	143.6	70	469.0	679	144.7
26	174.2	250	143.6	71	475.7	688	144.7
27	180.9	260	143.6	72	482.4	699	144.8
28	187.6	269	143.5	73	489.1	708	144.8
29	194.3	279	143.5	74	495.8	718	144.9
30	201.0	288	143.5	75	502.5	728	144.9
31	207.7	298	143.5	76	509.2	738	144.9
32	214.4	308	143.5	77	515.9	748	144.9
33	221.1	317	143.6	78	522.6	758	145.0
34	227.8	327	143.6	79	529.3	767	145.0
35	234.5	337	143.6	80	536.0	777	145.0
36	241.2	346	143.6	81	542.7	787	145.0
37	247.9	356	143.6	82	549.4	797	145.1
38	254.6	366	143.7	83	556.1	807	145.1
39	261.3	375	143.7	84	562.8	817	145.2
40	268.0	385	143.7	85	569.5	827	145.2
41	274.7	395	143.7	86	576.2	837	145.2
42	281.4	405	143.8	87	582.9	846	145.2
43	288.1	414	143.8	88	589.6	857	145.3
44	294.8	424	143.9	89	596.3	866	145.3
45	301.5	434	143.9	90	603.0	876	145.3
46	308.2	443	143.9	91	609.7	886	145.3
47	314.9	453	143.9	92	616.4	896	145.3
48	321.6	463	144.0	93	623.1	906	145.4
49	328.3	473	144.0	94	629.8	916	145.4
				95	636.5	925	145.4
				96	643.2	935	145.4
				97	649.9	946	145.5
				98	656.6	955	145.5
				99	663.3	966	145.6
				100	670.0	975	145.6

LOADING TABLE FUEL
Figure 6-15 (Sheet 1 of 3)

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

GALLONS	WEIGHT	MOM/100	FS	GALLONS	WEIGHT	MOM/100	FS
101	676.7	985	145.6	151	1011.7	1485	146.8
102	683.4	996	145.7	152	1018.4	1495	146.8
103	690.1	1005	145.7	153	1025.1	1506	146.9
104	696.8	1016	145.8	154	1031.8	1516	146.9
105	703.5	1025	145.8	155	1038.5	1526	146.9
106	710.2	1035	145.8	156	1045.2	1535	146.9
107	716.9	1045	145.8	157	1051.9	1545	146.9
108	723.6	1056	145.9	158	1058.6	1556	147.0
109	730.3	1066	145.9	159	1065.3	1566	147.0
110	737.0	1075	145.9	160	1072.0	1576	147.0
111	743.7	1085	145.9	161	1078.7	1586	147.0
112	750.4	1095	145.9	162	1085.4	1596	147.0
113	757.1	1105	146.0	163	1092.1	1606	147.1
114	763.8	1115	146.0	164	1098.8	1616	147.1
115	770.5	1125	146.0	165	1105.5	1626	147.1
116	777.2	1135	146.0	166	1112.2	1636	147.1
117	783.9	1144	146.0	167	1118.9	1646	147.1
118	790.6	1155	146.1	168	1125.6	1657	147.2
119	797.3	1165	146.1	169	1132.3	1667	147.2
120	804.0	1175	146.1	170	1139.0	1677	147.2
121	810.7	1184	146.1	171	1145.7	1686	147.2
122	817.4	1195	146.2	172	1152.4	1696	147.2
123	824.1	1205	146.2	173	1159.1	1707	147.3
124	830.8	1215	146.3	174	1165.8	1717	147.3
125	837.5	1225	146.3	175	1172.5	1727	147.3
126	844.2	1235	146.3	176	1179.2	1737	147.3
127	850.9	1245	146.3	177	1185.9	1747	147.3
128	857.6	1256	146.4	178	1192.6	1758	147.4
129	864.3	1265	146.4	179	1199.3	1768	147.4
130	871.0	1275	146.4	180	1206.0	1777	147.4
131	877.7	1285	146.4	181	1212.7	1788	147.4
132	884.4	1295	146.4	182	1219.4	1797	147.4
133	891.1	1305	146.5	183	1226.1	1808	147.5
134	897.8	1315	146.5	184	1232.8	1818	147.5
135	904.5	1325	146.5	185	1239.5	1828	147.5
136	911.2	1335	146.5	186	1246.2	1838	147.5
137	917.9	1345	146.5	187	1252.9	1848	147.5
138	924.6	1355	146.6	188	1259.6	1858	147.5
139	931.3	1365	146.6	189	1266.3	1868	147.5
140	938.0	1375	146.6	190	1273.0	1878	147.5
141	944.7	1385	146.6	191	1279.7	1888	147.5
142	951.4	1395	146.6	192	1286.4	1897	147.5
143	958.1	1406	146.7	193	1293.1	1909	147.6
144	964.8	1415	146.7	194	1299.8	1919	147.6
145	971.5	1425	146.7	195	1306.5	1928	147.6
146	978.2	1435	146.7	196	1313.2	1938	147.6
147	984.9	1445	146.7	197	1319.9	1948	147.6
148	991.6	1456	146.8	198	1326.6	1959	147.7
149	998.3	1466	146.8	199	1333.3	1969	147.7
150	1005.0	1476	146.8	200	1340.0	1979	147.7

LOADING TABLE FUEL

Figure 6-15 (Sheet 2 of 3)

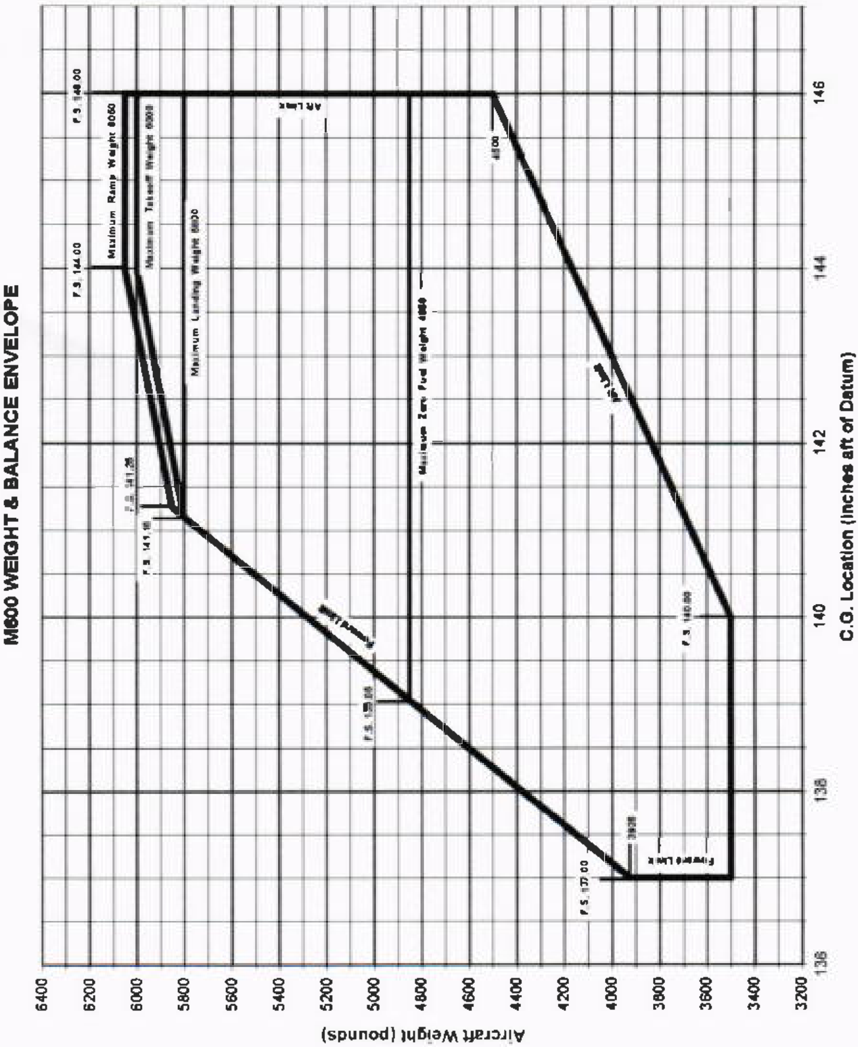
6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)

GALLONS	WEIGHT	MOM/100	FS
201	1346.7	1989	147.7
202	1353.4	1999	147.7
203	1360.1	2010	147.8
204	1366.8	2020	147.8
205	1373.5	2030	147.8
206	1380.2	2040	147.8
207	1386.9	2050	147.8
208	1393.6	2061	147.9
209	1400.3	2071	147.9
210	1407.0	2081	147.9
211	1413.7	2091	147.9
212	1420.4	2101	147.9
213	1427.1	2112	148.0
214	1433.8	2122	148.0
215	1440.5	2132	148.0
216	1447.2	2142	148.0
217	1453.9	2152	148.0
218	1460.6	2163	148.1
219	1467.3	2173	148.1
220	1474.0	2182	148.1
221	1480.7	2193	148.1
222	1487.4	2203	148.1
223	1494.1	2214	148.2
224	1500.8	2224	148.2
225	1507.5	2233	148.2
226	1514.2	2244	148.2
227	1520.9	2254	148.2
228	1527.6	2264	148.2
229	1534.3	2274	148.2
230	1541.0	2284	148.2
231	1547.7	2294	148.2
232	1554.4	2304	148.2
233	1561.1	2315	148.3
234	1567.8	2325	148.3
235	1574.5	2335	148.3
236	1581.2	2345	148.3
237	1587.9	2355	148.3
238	1594.6	2366	148.4
239	1601.3	2376	148.4
240	1608.0	2387	148.4
241	1614.7	2396	148.4
242	1621.4	2408	148.5
243	1628.1	2418	148.5
244	1634.8	2429	148.6
245	1641.5	2438	148.6
246	1648.2	2449	148.6
247	1654.9	2459	148.6
248	1661.6	2471	148.7
249	1668.3	2481	148.7
250	1675.0	2490	148.7
251	1681.7	2501	148.7
252	1688.4	2511	148.7
253	1695.1	2522	148.8
254	1701.8	2532	148.8
255	1708.5	2542	148.8
256	1715.2	2552	148.8
257	1721.9	2562	148.8
258	1728.6	2574	148.9
259	1735.3	2584	148.9
260	1742.0	2593	148.9

3.2 gallons of unusable fuel (21.4 pounds, 3079.5 inch pounds) included in basic empty weight. The above weights are based on a fuel specific gravity of 0.02899 pounds per cubic inch at 59 degrees F for Jet A and Jet A-1, which yields a fuel density of 6.7 pounds per gallon.

LOADING TABLE FUEL
Figure 6-15 (Sheet 3 of 3)

6.9 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT (continued)



CENTER OF GRAVITY LIMITS GRAPH
Figure 6-16

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SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

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SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

7.1 THE AIRPLANE

The PA-46-600TP M600 is a single engine, all metal, retractable landing gear, low wing, turbo-propeller airplane. It has a pressurized cabin with seating for six occupants and a luggage compartment located behind the aft cabin seats.

7.3 THE AIRFRAME

The primary airframe is of aluminum alloy construction, with a steel combination engine mount - nose gear support structure. The nose cowl is made of aluminum and fiberglass.

The fuselage is an all metal, semi-monocoque structure with flush riveted skin. The skin has internally bonded doublers and is butt jointed at all seams not in the airflow direction. There are two basic fuselage sections: the pressurized cabin section and the tail cone section. The cabin section is sealed to maintain pressurization.

The seating arrangement includes two crew seats and four passenger seats. The forward passenger seats face aft, and all passenger seats have adjustable backs with built-in headrests. An inside baggage area is provided aft of the rear passenger seats.

Cabin access is through the main cabin door, located on the left side, aft of the wing. The main door is a horizontally split door with retractable steps in the lower half. The upper half is held open by a gas spring. A plug type, inward releasing, emergency egress door is located on the right side adjacent to the aft facing seat.

Windows include a two-piece windshield, pilot and copilot windows and three passenger windows on each side.

The wing is a linearly tapered wing design with stylized wing tips.

Each wing contains sealed integral fuel cells.

The wing skins are sheet aluminum with access panels in various locations; removable for service or inspection purposes.

7.3 THE AIRFRAME (continued)

Metal stylized wing tips closeout the tip of each wing and provide mounting for position, and anti-collision lights. The recognition/taxi lights are mounted in the leading edge of each wing tip.

A radome, capable of accommodating 10" diameter weather radar, is located on the right wing midspan (outboard edge of the flap/inboard edge of aileron).

The all-metal flaps are electrically actuated through a mechanical linkage. The flaps extend aft and down on three tracks and have three preselect positions (UP, T/O and LND).

The ailerons are constructed of aluminum structure, and are installed with three hinges. Trailing edge thicknesses is with respect to span. The right aileron incorporates a fixed aileron trim tab.

The empennage is of conventional fin and rudder, stabilizer and elevator design with aerodynamic and mass balanced control surfaces. Surfaces are all-metal construction. The single-piece elevator assembly incorporates a center-mounted anti-servo trim tab. The rudder trim tab is operated by an electrically driven actuator.

Various access panels on the fuselage, wings and empennage are removable for service or inspection purposes.

Electrical bonding is provided to ensure good electrical continuity between components. Lightning strike protection is provided in accordance with presently accepted practices. Anti-static wicks are provided on trailing edges of ailerons, elevator and rudder to discharge static electricity that might cause avionics interference.

7.5 ENGINE AND PROPELLER

Engine

The M600 is powered by a Pratt & Whitney PT6A-42A turbo-propeller engine, with a flat rated power of 600 shp and maximum propeller speed of 2000 RPM. This engine is a reverse flow, free turbine arrangement. Accessories include a starter/generator and a belt driven alternator and air conditioning compressor.

Engine intake air is provided through dual, symmetric air inlets located on the forward portion of the cowling at the four and eight o'clock positions. The inlets are of fixed geometry such that no moving ice vanes or doors are utilized. The inlets are designed such that the dynamics of icing conditions do not allow the inlet to ice closed. Both inlets supply air to an inertial separator, which in turn supplies a common engine inlet plenum and intake screen.

The inertial separator functions by preventing foreign objects from making an abrupt turn into the plenum and instead exit through the bypass outlet. As air enters through the intake screen, it is ducted into a three-stage axial and single-stage centrifugal compressor driven by a single-stage reaction turbine. A dual turbine, counter-rotating with the first, drives the propeller through a two-stage reduction gear box. Exhaust is provided through dual exhaust stacks located on either side of the engine just behind the propeller.

A single annular combustion chamber, containing 14 removable fuel nozzles and two igniter plugs, comprises the combustion system. Seven of the fuel nozzles are used for starting; the remaining nozzles activate as the engine accelerates. A hydropneumatic fuel control schedules fuel flow to maintain engine power.

The ignition system consists of one exciter box, two ignition leads and two spark igniters. Both igniters are engaged simultaneously. DC power is delivered to the exciter box from the essential bus through an ignition mode selector switch in the overhead switch panel and a torque pressure switch. When in the automatic ignition mode, the ignition system will activate when the torque is less than or equal to approximately 240 ft. lbs., and deactivate when the torque is greater than or equal to approximately 450 ft. lbs. Continuous ignition, at any torque setting, is provided in the manual ignition mode.

7.5 ENGINE AND PROPELLER (continued)

Engine (continued)

The engine incorporates an integral oil lubrication system with an oil tank of approximately 12 quarts (11.35 liters) total capacity including propeller, integral engine oil system, and oil cooler. The oil tank is an integral part of the compressor inlet case in front of the accessory gearbox and contains a filler neck with calibrated dipstick. The filler neck incorporates a ball check valve to ensure oil does not migrate out of the filler neck in the event the dipstick is not properly secured. In addition, an oil level sight glass is provided to indicate the oil level in the gearbox without having to remove the dipstick. Adequate oil level for engine operation is indicated by an oil level within the green area of the sight glass.

Engine instruments are displayed on the MFD in normal and reversionary modes and on each PFD in reversionary mode only.

Fire detection, if installed, is provided by a heat sensitive fire cable, which passes a current at approximately 540°F (282.2°C). This current alerts the fire detection computer, which then activates the red ENGINE FIRE message on the CAS display and associated master warning triple chime.

7.5 ENGINE AND PROPELLER (continued)

Propeller

The propeller is a Hartzell model number HC-E4N-3Q/E8501K-3.5, 82.5 inch diameter, four blade, metal, constant speed unit with reversing and full feathering capabilities. Each propeller blade incorporates an electric deice boot.

The propeller governor pressurizes and regulates the flow of the propeller gearbox oil to a piston in the propeller dome. The piston is linked by a sliding rod and fork arrangement to the propeller blades. Governor oil pressure against the piston works to decrease propeller blade pitch. Centrifugal twisting moments on the propeller blades work to decrease propeller blade pitch and increase rpm. Governing of the interaction of these and other forces to maintain a constant rpm is provided by the propeller governor.

The propeller governor maintains a constant propeller speed and is not pilot controlled, but rather fixed at a maximum propeller speed of 2000 RPM. Propeller feather is selected by moving the condition lever to the cutoff position. Beta and reverse blade angles are controlled by power lever movement. Movement of the power lever into the beta and reverse range of operation is only possible on the ground via a squat switch controlled solenoid. An additional overspeed governor is also provided to protect against propeller and power turbine overspeed.

Propeller feathering is controlled electrically by switches in the throttle quadrant and a torque sensing switch. The battery switch must be ON to feather the propeller.

7.7 ENGINE CONTROLS

The engine is controlled by power, condition, and manual override (MOR) levers, located on the control quadrant of the lower central instrument panel. The power lever is used to actuate the engine fuel control unit as well as propeller beta and reverse settings. The power lever is connected through linkage to the fuel control unit at the rear of the engine, and controls engine power through the full range from maximum takeoff power back to idle and further aft to the beta detent and the reverse detent. When the power lever is at the idle stop, the gas generator (Ng) is at idle and the propeller (PROP RPM) is at minimum pitch. A lifting action is required to raise the power lever over the idle detent to the beta and reverse detents. When the power lever is selected to the beta position, the gas generator is at idle and the propeller blade pitch is controlled by the power lever from idle thrust back through a zero or a no thrust condition. The beta position may be used after landing during ground roll and to control taxi speed. Further lifting and aft movement of the power lever to the reverse detent increases engine power and provides negative thrust (reverse).

WARNING

Positioning the power lever aft of the flight idle stop in flight is prohibited. Such positioning may cause loss of airplane control or may result in an engine overspeed condition and consequent loss of engine power.

CAUTION

To prevent damage to the control linkage, do not move the power lever aft of the idle stop when the engine is not operating.

Low power settings can activate a CHECK GEAR voice alert if the landing gear are not down and locked. See the LANDING GEAR description in Section 7 for details.

7.7 ENGINE CONTROLS (continued)

CAUTION

Do not use the COLD START position for engine starting when the oil temperature is greater than 0°C as this could result in an over-temperature condition.

The fuel control unit requires fuel enrichment during cold weather starting when the engine oil temperature is at or below 0°C. Fuel enrichment is controlled by placing the condition lever full forward into the COLD START position and holding it there until Ng increases to a minimum of 50%, after which it is moved to the RUN position. Placement of the condition lever in the COLD START position requires movement of the control knob with forward pressure while lifting slightly from the RUN position (Figure 7-1). It is recommended the operator familiarize themselves with this feature prior to engine start by placing the condition lever into the COLD START position before application of battery power. Return the condition lever to the CUT-OFF/FEATHER position prior to start.

CAUTION

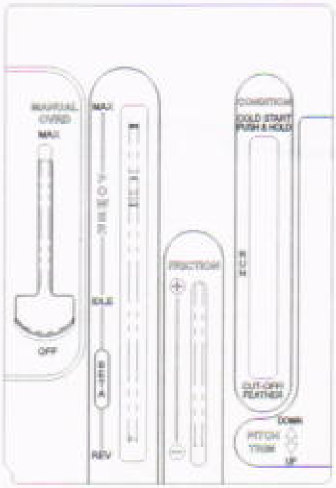
Do not force the condition lever into the COLD START position. Use of excessive force may cause damage to the condition lever.

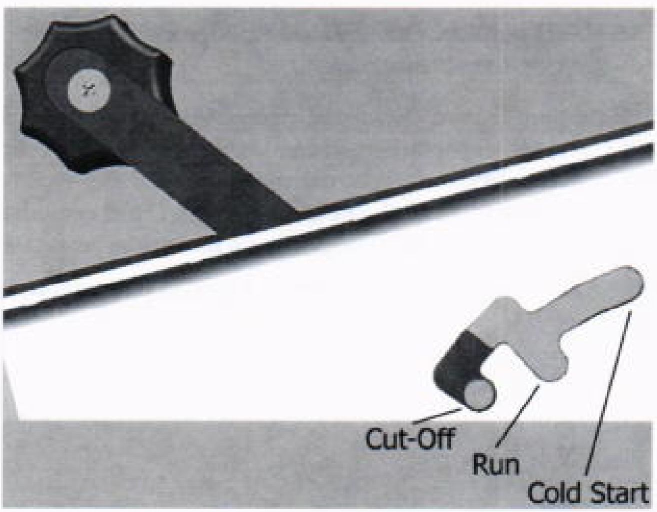
The RUN position is used for engine starting when the oil temperature is greater than 0°C and for all normal ground and flight operations. A detent at the RUN position prevents inadvertent movement to the COLD START or CUT-OFF/ FEATHER positions. The full aft CUT-OFF/FEATHER position is used to cut off fuel flow to the engine and simultaneously feather the propeller.

An image of the engine control quadrant and condition lever detent positions are shown in Figure 7-1.

7.7 ENGINE CONTROLS (continued)

Condition Lever
Woodward Fuel Control Units
(Cold Start Functionality)





Engine Control Quadrant Condition Lever
Figure 7-1

7.7 ENGINE CONTROLS (continued)

The MOR is an emergency device that may allow the crew to regain power and continue safe flight and landing following fuel control unit (FCU) malfunction or power lever control loss. The MOR is used to control fuel flow to the engine in the event a pneumatic malfunction occurs in the engine fuel control unit. A malfunction of the pneumatic signal (Py) input to the FCU will result in the fuel flow decreasing to minimum idle (approximately 48% Ng at sea level and increasing with altitude). Additional effects of a Py malfunction are loss of the torque/Ng limiting functions and, Nf governor operation (reverse is not available).

The manual override (MOR) lever is located in the center console to the left of the power lever. To operate the MOR, lift up on the lever and slowly move it forward to take up the dead-band until the engine responds. If possible, allow engine to stabilize before advancing further. Monitor gas generator speed (Ng), ITT, and torque. Rapid movement of the MOR lever can cause compressor surges and excessive ITT (over temperature) conditions.

The friction adjustment lever, located in the middle of the control quadrant, may be adjusted to increase or decrease the friction holding the power lever.

7.9 GARMIN G3000 AVIONICS SYSTEM

NOTE

The latest appropriate revision of the Garmin G3000 Cockpit Reference Guide for the Piper PA-46-600TP (Garmin P/N 190-02447-XX), and the Garmin G3000 Pilot's Guide for the Piper PA-46-600TP (Garmin P/N 190-02446-XX, contain operational information and detailed descriptions of the Garmin G3000 avionics system.

NOTE

Use of polarized eyewear may cause the flight displays to appear dim or blank.

The Garmin 3000 Integrated Avionics System consists of dual Primary Flight Displays (PFD), a Multi Function Display (MFD), dual Touchscreen Controllers, dual Attitude and Heading Reference Systems (AHRS), dual Air Data Computers (ADC), a GFC 700 Autopilot, and the sensors and computers to process flight and engine information for display to the pilot. The system contains dual GNSS/SBAS receivers, dual VOR/ILS receivers, dual VHF communication transceivers, dual Mode S transponders and an integrated crew alerting system (CAS). The G3000 also has an integrated Class B TAWS, traffic system, and weather radar. The G3000 can also integrate Becker ADF, Sirius / XM datalink weather and music, Iridium Telephone, King/Honeywell KN 63 DME, and L-3 Stormscope. In normal operations, PFD1 and PFD2 present graphical flight instrumentation (such as heading, airspeed, altitude, vertical speed) in either Full Mode or Split Mode. In Full Mode, the PFD (including its softkeys) occupies the entire display portion of the GDU. In Split Mode, the PFD is condensed to accommodate a Display Pane on the outboard portion of the GDU. The MFD shows an Engine Indication on the left portion of the GDU. It also shows either a single Display Pane in Full Mode, or two Display Panes side-by-side in Half Mode. Either Touchscreen Controller selects the Full and Half Modes for the MFD.

PRIMARY FLIGHT DISPLAY

In normal operations, GTC1 (pilot's side Touchscreen Controller) controls the PFD1 Display Pane (in Split Mode), and the MFD left Display Pane (in Half Mode) and GTC2 (copilot's side Touchscreen Controller) controls the PFD2 Display Pane (in Split Mode) and the right Display Pane on the MFD. Either Touchscreen Controller may also control a single MFD Display Pane in Full

PRIMARY FLIGHT DISPLAY (continued)

Mode. A button on the Touchscreen Controller indicates when Full Mode or Half Mode is available for the currently selected MFD Display Pane.

The Touchscreen Controller joysticks select Display Panes for control. Moving the joystick left or right highlights the active Display Pane as indicated by a cyan border on the pilot's side, or a dark purple border on the copilot side.

Each PFD features 12 softkeys across the bottom of the GDU 1250W display. Their function is controlled via the GTC 575 touchscreen controllers. PFD and MFD displays are sensitive to the selected display screen setting. The PFD typically displays airspeed, attitude, altitude, heading, and vertical speed information in a traditional format. Slip information is shown as a trapezoid under the bank pointer. One width of the trapezoid is equal to a one ball-width slip. Rate of turn information is shown on the scale above the rotating compass card; a standard rate turn is accomplished when the turn rate trend vector stops at the second tick mark (standard rate tick mark). OAT information is presented in the lower left corner of the PFD. The measured value of OAT is adjusted for probe recovery factor and ram air effects to indicate static air temperature. The primary function of the PFDs is to provide attitude and heading data from the Attitude and Heading Reference System, air data from the Air Data Computer, and navigation and alerting information. Concentrated training on the controllers and displays is recommended as a precursor to efficient flight management. Performance, nav, com, terrain, weather, cabin pressurization, and engine instrument data is available to the trained user.

Attitude and Heading Reference System (AHRS)

The GRS 79 AHRS uses GNSS/SBAS, rate sensors, air data, and magnetic variation to provide pitch and roll attitude, sideslip and heading to the display system. The AHRS incorporates internal monitors to determine validity of its parameters. If a parameter is suspect but still within tolerance of the internal monitors, the appropriate amber miscompare annunciation will be posted and the pilot, considering similar parameters for comparison, must validate the suspect parameter. If the parameter is determined invalid by the internal monitors, a red-X is displayed over the invalid parameter and the appropriate white annunciation is posted. If the entire AHRS becomes invalid while in flight, the G3000 system will automatically select the other AHRS, as indicated by a BOTH ON AHRS1 or BOTH ON AHRS2 annunciation, depending on which AHRS is functioning, and post the appropriate white annunciations. In this situation, the autopilot will become inoperative. If the AHRS becomes valid again, the pilot must manually re-select that AHRS if desired. Selection of

PRIMARY FLIGHT DISPLAY (continued)

Attitude and Heading Reference System (AHRS) (continued)

which AHRS should be used or is being used is made via the SENSOR softkey on the PFD. If both AHRS become invalid, a red-X will be displayed on the attitude indicator and a red-X will be displayed over the heading window and a white HDG annunciation will be displayed adjacent to the heading display. The course pointer on the HSI will indicate straight up and the course may be set using the digital window. The AHRS will align while the aircraft is in motion, but will align quicker if the wings are kept level during the alignment process.

Air Data Computer (ADC)

The ADC provides airspeed, altitude, vertical speed, and air temperature to the display system. In addition to the primary displays, this information is used by the FMS and Traffic systems.

The ADC incorporates internal monitors to determine validity of its parameters. If a parameter is suspect but still within tolerance of the internal monitors, the appropriate amber miscompare annunciation will be posted and the pilot, considering similar parameters for comparison, must determine the suspect parameter. If the parameter is determined invalid by the internal monitors, a red-X is displayed over the invalid parameter and the appropriate white annunciation is posted. If the entire ADC becomes invalid while in flight, the G3000 system will automatically select the other ADC, as indicated by a BOTH ON ADC1 or BOTH ON ADC2 annunciation, depending on which ADC is functioning, and post the appropriate white annunciations. If the ADC becomes valid again, the pilot must manually re-select that ADC if desired via the SENSOR softkey on the PFD. If both ADC's become invalid, a red-X will be displayed on the altitude and airspeed displays and a yellow-X on the vertical speed display.

The primary function of the VHF Communication portion of the G3000 is to enable external radio communication. The primary function of the VOR/ILS Receiver portion of the equipment is to receive VOR, Localizer, and Glide Slope signals. The primary function of the GNSS/SBAS portion of the system is to acquire signals from the GNSS and SBAS satellites and process this information in real-time to obtain the user's position, velocity, and time. This GNSS/SBAS is certified under TSO C146a and therefore is qualified as a primary navigation system. The PFD also displays all autopilot annunciations, including mode annunciations in the AFCS status box at the top center of the display and system and preflight test status annunciations to the left of the AFCS status box.

PRIMARY FLIGHT DISPLAY (continued)

Crew Alerting System (CAS)

The Crew Alerting System (CAS) consists of master WARNING, CAUTION and ADVISORY alerts operating in conjunction with CAS text messages and aural alerts. Master alerts are colocated in the furthest right softkey label on each PFD. Pushing the softkey below a WARNING or CAUTION clears the master alert and acknowledges associated CAS text messages. If a warning and a caution occur simultaneously, only the master WARNING alert is displayed. Pressing the softkey below the WARNING will simultaneously acknowledge the new warnings and cautions. Some CAS messages are inhibited during particular phases of flight to reduce nuisance alerts. CAS text messages are categorized as warning, caution or advisory as follows:

Warnings

Warnings consist of a red master WARNING alert, a flashing red CAS Warning text message and a repeating triple chime. When acknowledged, the master WARNING will extinguish, the CAS Warning text messages, if applicable, will stop flashing and revert to a steady red on black message, and the aural chime will silence. CAS Warning text messages will persist until the initiating condition is removed. If the warning was initiated by a condition indicated on the Engine Indicating System (EIS), a text message will not be present and the EIS indication will flash until the condition is removed.

Cautions

Cautions consist of an amber master CAUTION alert, a flashing amber CAS Caution text message and a double chime. When acknowledged, the master CAUTION will extinguish, and the CAS Caution text messages, if applicable, will revert to a steady amber on black message. CAS Caution text messages will persist until the initiating condition is removed. If the Caution was initiated by a condition indicated on the Engine Indicating System (EIS), a CAS Caution text message will not be present and the EIS indication will remain steady amber until the condition is removed.

Advisories

CAS Advisory text messages appear in the CAS window in white text. Advisory messages do not require acknowledgment and those which are initiated by pilot action are not accompanied by a single aural chime. CAS Advisory text messages persist until the initiating condition is removed.

PRIMARY FLIGHT DISPLAY (continued)

Reversionary Mode

If a GDU fails or is off-line, the system provides the capability to show a PFD, an EIS display, and a Display Pane on another GDU in Reversionary Mode.

In the event of display failure, the display modes are as follows:

- PFD1 failure – Setting the pilot's side Display Backup Button to REV will cause the MFD to enter Reversionary Mode, displaying PFD1's AHRS and ADC information, an EIS and a Display Pane. PFD2 will operate normally.
- MFD failure – When the MFD fails, both PFD1 and PFD2 go to reversion mode. Neither Display Backup button functions when the MFD fails.
- PFD2 failure – Setting the copilot's side Display Backup Button to REV will cause the MFD to enter Reversionary Mode, displaying PFD2's AHRS and ADC information, an EIS and a Display Pane. PFD1 will operate normally.

If the MFD is operating in Reversionary Mode (e.g. PFD1 or PFD2 failure), the Touchscreen Controller on the failed GDU side controls the Reversionary Mode Display Pane. If PFD1 or PFD2 is in Reversionary Mode, the on-side Touchscreen Controller controls the Reversionary Mode Display Pane.

If both PFD1 and PFD2 fail or are off-line, GTC1 controls the Reversionary Mode Display Pane on the MFD. The GTC2 functions (with the exception of Display Pane control) continue to be available in the event of PFD1 and PFD2 failure.

AUTOPILOT CONTROLS

Controls for selecting lateral and vertical flight director modes and for engaging/ disengaging autopilot, yaw damper and flight director, are located on the GMC 711 autopilot controller located above the MFD. The FMS and MAN functions on the SPD knob are functional in software version 2975.14 or later approved versions. In earlier versions of software, the FMS function on the SPD knob is deactivated, and if selected, will display a system message indicating that it is disabled. Additional autopilot related functions are controlled by the following:

A/P DISC / TRIM INTER Switch – Autopilot Disconnect and Trim Interrupt switch located on the control wheel. Depressing this red switch interrupts the electric pitch trim and disconnects the autopilot and yaw damper.

Electric Pitch Trim Switch – Split switch located on the control wheel. Commands nose up or nose down pitch trim when both halves of the switch are operated simultaneously.

CWS Switch – Control Wheel Steering switch located on the control wheel. While this switch is depressed, the autopilot servos are disconnected, allowing the pilot to fly the airplane manually.

TO/GA Switch – Takeoff/Go-Around switch located on the throttle lever. Depressing this switch commands the flight director to an initial takeoff or go-around pitch attitude and wings level.

LVL Switch - Optional Level mode switch located on the instrument panel above the MFD. Depressing this blue switch activates the autopilot Level Mode, which engages the autopilot and commands the airplane to wings level and zero vertical speed.

AUTOPILOT OPERATION

When the AVIONICS switch is selected ON, the GFC700 automatically conducts a self-test, as indicated by a white boxed PFT on the PFD. Successful completion of this self-test is indicated by extinguishing the PFT with no AP failure indications and an autopilot "warble" tone (the same tone as autopilot disconnect). If the GFC700 preflight test is not completed successfully, a red PFT and/or AFCS annunciation will be displayed on the PFD and the autopilot and electric pitch trim will not function.

Selected autopilot modes are displayed on the AFCS Status Box at the top of the PFD. Lateral modes are displayed on the left, autopilot status is in the middle, and vertical modes are on the right. All active modes are shown in green and armed modes are white.

Pressing the AP key activates the autopilot and flight director in the default ROL and PIT modes. Pressing the FD key activates only the flight director in default ROL and PIT modes. Pressing any key associated with a valid lateral or vertical mode activates that mode and the default mode in the opposing axis. For example, pressing the ALT key activates the flight director in ALT hold mode with the default lateral (ROL) mode. Re-selection of any valid lateral or vertical mode toggles between the selected mode and the default mode for that axis.

If the information required to compute a flight director mode becomes invalid or unavailable, the flight director automatically reverts to the default mode for that axis. A flashing yellow mode annunciation and annunciator light indicate loss of sensor (ADC) or navigation data (VOR, LOC, GNSS/SBAS, VNV) required to compute commands. If the loss occurs in the lateral axis, the system defaults to ROL mode and rolls wings level. If the loss occurs in the pitch axis, the system defaults to PIT mode and maintains the current pitch attitude. The flashing annunciation stops when the affected mode key is pressed, another mode for the axis is selected, or after 10 seconds, if no action is taken.

AUTOPILOT OPERATION (continued)

Autopilot Disengagement Methods:

The autopilot can be disengaged manually by the following "normal" methods which are indicated by a yellow flashing AP annunciation:

- Pressing the A/P DISC / TRIM INTER switch on the control wheel
- Activation of either half or both halves of the manual electric pitch trim switch on the control wheel
- Pressing the AP key on the GMC 711

The autopilot can be disengaged manually by the following "abnormal" methods which are indicated by a red flashing AP annunciation:

- Pulling the AUTOPILOT or AP MODE SELECT circuit breaker

The autopilot will disengage automatically under the following conditions which are indicated by a red flashing AP annunciation:

- Internal autopilot system failure
- Total AHRS failure
- Inability to compute default flight director modes

The autopilot can be momentarily disengaged by pressing and holding the CWS switch on the control wheel.

After any autopilot disengagement, the aural disconnect alert can be canceled by pressing the A/P DISC switch or manual electric pitch trim switches.

AUTOPILOT FEATURES

Overspeed Recovery Mode

Overspeed Recovery attempts to prevent the aircraft from exceeding Vmo/Mmo by providing a flight director pitch up command whenever the airspeed trend vector exceeds VMO/MMO. If flying manually, the pilot may follow the pitch up commands, or if engaged, the autopilot will follow the command. The pitch up command will not exceed that for level flight; to decelerate more rapidly the pilot should reduce engine power. When Overspeed Recovery is active, an amber MAXSPD is displayed above the airspeed tape.

Takeoff Mode

Takeoff Mode allows the pilot to manually follow the flight director command bars after takeoff rotation. Takeoff Mode is activated by pressing the TO/GA switch on the throttle lever while on the ground. Whenever Takeoff Mode is active, "TO" will be displayed as the lateral and vertical modes in the AFCS status box, commanding wings level and 9 degrees pitch attitude respectively.

Go-Around Mode

Go-Around Mode allows the pilot or autopilot to follow the flight director command bars during a go-around maneuver. Go-Around Mode is activated by pressing the TO/GA switch on the throttle lever while in flight. Whenever Go-Around Mode is active, "GA" will be displayed as the lateral and vertical modes in the AFCS status box, commanding wings level and 7 degrees pitch attitude respectively. During a coupled go-around the autopilot remains engaged and the pilot must add power and reduce drag according to the BALKED LANDING (Autopilot Coupled Go-Around) checklist in Section 4.

Underspeed Protection (Optional)

Underspeed Protection (USP) is a flight director function that provides low speed awareness and prevents the airplane from stalling. The autopilot must be engaged for USP to function. An AIRSPEED aural alert and an amber MINSPD annunciation activates to indicate a low airspeed condition. If airspeed continues to decrease, a USP ACTIVE CAS warning is triggered and the airplane pitches down. If the flight director is in a non-altitude critical mode (VS, VNAV, PIT, LVL or FLC) the airplane pitches down to maintain airspeed above the stall warning speed. If the flight director is in an altitude critical mode (ALT, GP, GS, TO or GA) the airplane may decelerate to stall warning. After stall warning the airplane rolls wings level and pitches down to achieve and maintain a speed approximately two knots above stall warning deactivation.

AUTOPILOT FEATURES (continued)

Underspeed Protection (Optional) (continued)

When USP is active, the flight director modes remain unchanged, but the pitch mode annunciation turns white in altitude critical and non-altitude critial modes and the roll mode annunciation turns white in altitude critical mode. In all cases, the pilot should take action to exit the underspeed condition by increasing engine power and decreasing drag as appropriate.

Level Mode

WARNING

Do not press the LVL switch (if installed) if an autopilot or pitch trim malfunction is suspected.

CAUTION

Emergency Autoland (if installed) will automatically activate after 2 continuous minutes in Level Mode.

Level Mode commands the airplane to wings level and zero vertical speed. It is activated by pressing the blue switch (labeled LVL) located to the left of the autopilot. Level Mode should only be activated when the autopilot is disengaged but should not be used if the autopilot is operating in any failure condition. Level Mode will activate automatically if Electronic Stability and Protection is engaged for more than 10 seconds in any 20 second interval. Activation is indicated by green LVL and LVL for lateral and vertical modes respectively.

Electronic Stability and Protection (Optional)

Electronic Stability and Protection (ESP) provides a control force feedback to deter the pilot from operating outside a defined envelope. ESP functions only when the autopilot is operable, but is disengaged. As the aircraft reaches the ESP activation thresholds, the autopilot servos automatically engage to provide a resistive force toward the nominal operating envelope. The pilot can easily overpower the restoring tendency, and may interrupt ESP with the AP disconnect or CWS switches. If the pilot operates in the ESP envelope for an extended period of time, the autopilot will automatically engage in LVL mode. At any time (usually for training reasons), the ESP function may be disabled by accessing Utilities>Setup>Avionics Setting>Systems on either GTC. When disabled in this manner, ESP OFF system message is displayed. ESP will automatically re-enable after each electrical power cycle.

AUTOPILOT FEATURES (continued)

Expanded Engagement Envelope

Expanded engagement envelope allows autopilot engagement up to the pitch and roll attitudes shown in the autopilot limitations of Section 2. If the autopilot is engaged at a pitch or roll attitude within the expanded engagement envelope but beyond the maximum autopilot command limits, the airplane will be pitched or rolled to the maximum autopilot command limits.

Hypoxia Recognition and Emergency Descent Mode (Optional)

NOTE

Emergency Autoland (if installed) will automatically activate at 14,100 feet during a descent in Emergency Descent Mode.

Hypoxia Recognition and Emergency Descent Mode (EDM) detects pilot incapacitation due to the affects of hypoxia or other physical condition. This is accomplished by monitoring pilot response to various message prompts. If the system determines that pilot is not responding, Emergency Descent Mode is activated, placing the aircraft in a descent to a lower altitude to provide an opportunity for the pilot and passengers to recover from the effects of hypoxia.

The system is operative when the autopilot is engaged and the aircraft cabin altitude exceeds 14,900 feet pressure altitude. After a period of inactivity (time is dependent on cabin altitude) the pilot is prompted for a response. If no response is detected the aircraft will initially descend to 14,000 feet and then to 12,500 feet MSL.

TOUCHSCREEN CONTROLLER

The two Touchscreen Controllers, designated as GTC1 and GTC2, are a pedestal-mounted user interface allowing for ease of data entry, Display Pane operation, and Nav/Com tuning. Operations performed via the Touchscreen Controller include but are not limited to the following:

- The Comm/Nav/Surveillance (CNS) Bar across the top of the GTC provides user interface for audio and tuning control of com and nav radios, ICS control, and transponder control.
- The Screen portion of the GTC provides user interface for Map, Traffic, Weather, TAWS, Nav, Aircraft Systems, Subscription Services, Weight and Balance information, and Fuel information.
- The row of knobs across the bottom of the GTC controls ranges, scales, volume levels, frequency, joystick, and map selection.

The touchscreen uses a grid of infrared beams to determine the location of the touch, even when the operator is wearing gloves. Objects or debris on the touchscreen can interfere with these infrared beams and cause unintended activation of buttons.

For radio tuning on the touchscreen controller, touch the COM/NAV button in the upper/left corner of the touchscreen. This opens access to tune and volume controls of the two communication radios, the two navigation radios, and the ADF and DME. Volume of the selected com or nav radio can be adjusted by sliding the triangular scale left or right. Percent of full volume is displayed on the volume controller. Volume can also be changed by turning the middle knob on the bottom of the touchscreen. Touching the radio identifier button to turn the monitor bar green enables nav radio audio to be monitored.

To the right of each radio volume display is a frequency button containing the active frequency and standby frequency. Tapping that frequency button swaps between active and standby. Additionally, the ADF mode (ADF, ANT, BFO) can be selected by tapping the ADF Mode button.

To use the ADF pointer, touch the PFD SETTINGS softkey on the bottom of the PFD. Using Bearing 1 or Bearing 2 softkeys, select ADF1 on Bearing 1 or Bearing 2. There is no ADF2.

If either GTC 575 Touchscreen Controller fails, the operating Touchscreen Controller controls the Display Panes for all GDUs as well as Communication/Navigation/Surveillance control for both the pilot and copilot.

Screen Cleaning mode temporarily deactivates touch input on the Touchscreen Controller screen to facilitate cleaning. The screen can be cleaned using a microfiber or soft cotton cloth lightly dampened with clean water. Do not use chemical cleaning agents, as these may damage the coating on the glass surface.

MULTI-FUNCTION DISPLAY

The Multi-Function Display (MFD) is the primary display for engine parameters, map information (including dedicated map pages for navigation, traffic, weather radar, stormscope, weather datalink and TAWS), waypoint information, nearest functions, charts, flight plan information, and approach procedures.

Reversionary Mode

If a GDU fails or is off-line, the system provides the capability to show a PFD, an EIS display, and a Display Pane on another GDU in Reversionary Mode.

In the event of display failure, the display modes are as follows:

- PFD1 failure – Setting the pilot's side Display Backup Button to REV will cause the MFD to enter Reversionary Mode, displaying PFD1's AHRS and ADC information, an EIS and a Display Pane. PFD2 will operate normally.
- MFD failure – When the MFD fails, both PFD1 and PFD2 go to reversion mode. Neither Display Backup button functions when the MFD fails.
- PFD2 failure – Setting the copilot's side Display Backup Button to REV will cause the MFD to enter Reversionary Mode, displaying PFD2's AHRS and ADC information, an EIS and a Display Pane. PFD1 will operate normally.

If the MFD is operating in Reversionary Mode (e.g. PFD1 or PFD2 failure), the Touchscreen Controller on the failed GDU side controls the Reversionary Mode Display Pane. If PFD1 or PFD2 is in Reversionary Mode, the on-side Touchscreen Controller controls the Reversionary Mode Display Pane.

If both PFD1 and PFD2 fail or are off-line, GTC1 controls the Reversionary Mode Display Pane on the MFD. The GTC2 functions (with the exception of Display Pane control) continue to be available in the event of PFD1 and PFD2 failure.

MULTI-FUNCTION DISPLAY (continued)

Traffic Information Service (TIS)

NOTE

If the G3000 system is configured to use the optional Traffic Collision Avoidance System (TCAS I) or the Traffic Advisory System (TAS), TIS will not be available for use.

Traffic Information Service (TIS) provides a graphic display of traffic advisory information to the pilot. The G3000 system performs an automatic test of the TIS system upon power-up. If the TIS power-up test is passed, it will enter STANDBY mode while on the ground. If the TIS power-up test is failed, a failure annunciation will be indicated in the center of the Traffic Map page.

The traffic mode of operation is indicated in the upper-left corner of the Traffic Map page. The TIS will automatically switch to OPERATING mode once the aircraft is airborne and provide a voice or tone audio output and a graphic display of traffic. TIS uses the Mode S transponder for the traffic data link and is available only when the aircraft is within the service volume of a TIS-capable, ground based, terminal radar site. Updates are available to the pilot in 5-second intervals. Aircraft without a transponder are invisible to TIS and aircraft without altitude reporting capability are shown without altitude separation data or climb/ descent indication.

Traffic Map Page

The Traffic Map page is selectable from 2 nm to 12 nm. The G3000 system can display up to eight traffic targets within a 7.5 nm radius, from 3000 feet below to 3500 feet above the requesting aircraft. The altitude difference between the requesting aircraft and other aircraft is displayed above/below the traffic symbol in hundreds of feet. If the traffic target is above the requesting aircraft, the altitude separation text appears above the traffic symbol; if below, the altitude separation text appears below the traffic symbol. An altitude trend up/down arrow is displayed to the right of the traffic target symbol when the relative climb or descent speeds are greater than 500 ft/min in either direction. TIS also provides a vector line showing the direction in which the traffic is moving, to the nearest 45°.

MULTI-FUNCTION DISPLAY (continued)

Traffic Information Service (TIS) (continued)

Traffic Map Page (continued)

Traffic is overlaid on the following pages:

- Navigation Map Page
- Traffic Map Page
- Trip Planning Page
- Nearest Pages
- PFD Inset Map

TIS Alerts

Traffic is displayed according to TCAS symbology using four different symbols:

1. Non-Threat Traffic – An open white diamond with black center that indicates traffic is beyond a 5 nm range and greater than ±1200 feet from the requesting aircraft.
2. Traffic Advisory (TA) – A solid yellow circle that indicates that traffic has met the criteria for a traffic advisory and is considered to be potentially hazardous. A yellow TRAFFIC annunciation is displayed at the top left of the attitude indicator on the PFD and an alert is heard in the cockpit, advising "Traffic".
3. Traffic Advisory Off Scale - On the Traffic Map page a half TA symbol indicating a traffic advisory (TA), which is detected but is outside the range of the map will be displayed at the edge of the scale on the azimuth of the detected traffic. On the map page the off-scale traffic advisory is provided in a text box located on the lower left corner of the map.

Traffic information for which TIS is unable to determine the bearing (non-bearing traffic) is displayed in the center of the Traffic Map Page or in a banner at the lower left corner of map pages other than the Traffic Map Page on which traffic can be displayed.

Traffic Advisory System (TAS) – Optional

NOTE

If the G3000 system is configured to use the optional Traffic Collision Avoidance System (TCAS I) or Traffic Information Service (TIS), TAS will not be available for use.

MULTI-FUNCTION DISPLAY (continued)

Traffic Advisory System (TAS) – Optional (continued)

The optional Garmin GTS 825 is a Traffic Advisory System (TAS). It enhances flight crew situational awareness by displaying traffic information from transponder-equipped aircraft. The system also provides visual and aural traffic alerts including voice announcements to assist in visually acquiring traffic.

The GTS 825 provides a system test mode to verify the TAS system is operating normally. The test takes ten seconds to complete. When the system test is initiated, a test pattern of traffic symbols appears on the Traffic Map Page. If the system test passes, the system announces, "TAS System Test Passed" otherwise the system announces, "TAS System Test Failed." When the system test is complete, the traffic system enters Standby Mode.

After power-up, the GTS 825 automatically enters STANDBY Mode and no traffic depictions or alerts will be given. The GTS 825 must be in OPERATE Mode for traffic to be displayed and for TA's to be issued. The pilot can manually change the system between STANDBY mode and OPERATE mode at any time by selecting Traffic>Traffic Settings on the GTC Home screen. If the pilot does not manually select a mode of operation, the system will automatically transition from STANDBY to OPERATE 8-seconds after becoming airborne and transition from OPERATE to STANDBY 24-seconds after landing. TAS aural alerts will be muted during all gear down operations.

Traffic Map Page

The Traffic Map page, located in the Map Group on the MFD, is selectable from 2 nm to 40 nm. The GTS 825 is capable of tracking up to 45 intruding aircraft equipped with Mode A or C transponders, and up to 30 intruding aircraft equipped with Mode S transponders. A maximum or 30 aircraft with the highest threat potential can be displayed simultaneously over a range of 2 nm to 40 nm at altitudes of 10,000 feet below to 10,000 feet above the requesting aircraft. No TAS surveillance is provided for aircraft without operating transponders. The altitude difference between the requesting aircraft and other aircraft is displayed above/below the traffic symbol in hundreds of feet. If the traffic target is above the requesting aircraft, the altitude separation text is preceded by a "+" symbol and appears above the traffic symbol; if below, the altitude separation text is preceded by a "–" symbol and appears below the traffic symbol. An altitude trend up/down arrow is displayed to the right of the traffic target symbol when the relative climb or descent speeds are greater than 500 ft/min in either direction.

MULTI-FUNCTION DISPLAY (continued)

Traffic Advisory System (TAS) – Optional (continued)

Traffic Map Page (continued)

Traffic is overlaid on the following pages:

- Navigation Map Page
- Traffic Map Page
- Trip Planning Page
- Nearest Pages
- PFD Inset Map
- PFD Forward Looking Depiction Area (when Synthetic Terrain is selected ON)

TAS Alerts:

Traffic is displayed according to TCAS symbology using four different symbols.

1. Non-Threat Traffic – An open white diamond with black center that indicates traffic is beyond a 6 nm range from the requesting aircraft.
2. Proximity Advisory (PA) – A solid white diamond indicating that the intruding aircraft is within ± 1,200 feet and 6 nm range, but is still not considered a TA threat.
3. Traffic Advisory (TA) – A solid yellow circle that indicates that traffic has met the criteria for a traffic advisory and is considered to be potentially hazardous. A yellow TRAFFIC annunciation is displayed at the top left of the attitude indicator on the PFD and an alert is heard in the cockpit, advising "Traffic", along with additional voice information about the bearing, relative altitude, and approximate distance from the intruder that triggered the TA. For example, the voice alert "Traffic, 11 o'clock, high, three miles" would indicate that the traffic is in front of and slightly to the left of the own aircraft, above own altitude, and approximately three nautical miles away. A TA will be displayed for a minimum of 8 seconds, even if the condition(s) that triggered the TA are no longer present.
4. Traffic Advisory Off Scale – On the Traffic Map page a half TA symbol indicating a traffic advisory (TA), which is detected but is outside the range of the map will be displayed at the edge of the scale on the azimuth of the detected traffic. On the map page the off-scale traffic advisory is provided in a text box located on the lower left corner of the map.

MULTI-FUNCTION DISPLAY (continued)

Traffic Advisory System (TAS) – Optional (continued)

TAS Alerts (continued)

Traffic information for which TAS is unable to determine the bearing (non-bearing traffic) is displayed in the center of the Traffic Map Page or in a banner at the lower left corner of maps other than the Traffic Map Page on which traffic can be displayed.

TAS customization options are available to the pilot by depressing the MENU key while on the Navigation Map Page, and then selecting "Map Setup" then "Traffic" Group. TAS traffic may also be displayed on the Navigation Map by selecting the MAP softkey and then selecting TRAFFIC softkey.

MULTI-FUNCTION DISPLAY (continued)

Traffic Collision Avoidance System (TCAS I) – Optional

NOTE

If the G3000 system is configured to use the optional Traffic Collision Avoidance System (TCAS I) or the Traffic Information Service (TIS), TAS will not be available for use.

The Garmin GTS 855 is a Traffic Alert and Collision Avoidance System I (TCAS I). It enhances flight crew situational awareness by monitoring the airspace for transponder-equipped aircraft. The system also provides visual annunciations and voice alerts to assist the flight crew with the visual acquisition of traffic.

The GTS 855 is capable of tracking up to 45 intruding aircraft equipped with Mode A or C transponders, and up to 30 intruding aircraft equipped with Mode S transponders. The system can display a maximum of 30 aircraft with the highest threat potential simultaneously. The system provides no surveillance information for aircraft without operating transponders.

Theory Of Operation

When the traffic system is in Operating Mode, the system interrogates the transponders of other aircraft while monitoring for transponder replies. The system uses this information to derive the distance, relative bearing, and if reported, the altitude and vertical trend for each aircraft within its surveillance range. The system then calculates a closure rate to each intruder based on the projected Closest Point of Approach (CPA). If the closure rate meets the threat criteria for a Traffic Advisory (TA), the system provides visual and voice alerting.

TCAS I Surveillance Volume and Symbology

The GTS 855 monitors the airspace within ±10,000 feet of own altitude, and up to 80 nm in the forward direction. Traffic system range is somewhat reduced to the sides and aft of own aircraft due to the directional interrogation signal patterns. The system displays TCAS I-detected traffic.

MULTI-FUNCTION DISPLAY (continued)

Traffic Collision Avoidance System (TCAS I) – Optional (continued)

Traffic Map Page

The Traffic Map page, accessed via the Touchscreen, range is selectable from 500 feet to 50 nm. The TAS can track up to 45 aircraft and display up to 30 of them. TAS can track aircraft with relative altitudes from 10,000 feet below to 10,000 feet above the requesting aircraft. The altitude difference between the requesting aircraft and other (intruder) aircraft is displayed above/below the traffic symbol in hundreds of feet. If the traffic target is above the requesting aircraft, the altitude separation text appears above the traffic symbol; if below, the altitude separation text appears below the traffic symbol. An altitude trend up/down arrow is displayed to the right of the traffic target symbol when the relative climb or descent speeds are greater than 500 ft/min in either direction.

Traffic is overlaid on the following pages:

- Navigation Map Page
- Traffic Map Page
- Trip Planning Page
- Nearest Pages
- Active Flight Plan Page
- PFD Inset Map

TCAS I Alerts:

Traffic is displayed according to TCAS symbology using four different symbols.

1. Non-Threat Traffic – An open white diamond with black center that indicates traffic is beyond a 6 nm range and greater than ±1200 feet from the requesting aircraft.
2. Proximity Advisory – A solid white diamond that indicates traffic is within a 6 nm range and within ±1200 feet of the requesting aircraft. They are not considered traffic advisories (TA), which alert the crew to intruding aircraft.
3. Traffic Advisory (TA) – A solid yellow circle that indicates that traffic has met the criteria for a traffic advisory and is considered to be potentially hazardous. A single voice alert "Traffic" is heard followed by voice information about the bearing, relative altitude, and approximate distance, such as "Traffic! 12 o'clock, high, four miles".

MULTI-FUNCTION DISPLAY (continued)

Traffic Collision Avoidance System (TCAS I) – Optional (continued)

TCAS I Alerts (continued)

4. Traffic Advisory Off Scale – On the Traffic Map page a half TA symbol indicating a traffic advisory (TA), which is detected but is outside the range of the map will be displayed at the edge of the scale on the azimuth of the detected traffic. On the map page the off-scale traffic advisory is provided in a text box located on the lower left corner of the map.

Traffic information for which TAS is unable to determine the bearing (non-bearing traffic) is displayed in the center of the Traffic Map Page or in a banner at the lower left corner of maps other than the Traffic Map Page on which traffic can be displayed.

Terrain Proximity

NOTE

If the G3000 system is configured to use the optional Terrain Awareness and Warning System (TAWS-B), Terrain Proximity will not be available for use.

G3000 Terrain Proximity is a terrain awareness system that increases situational awareness and aids in reducing controlled flight into terrain (CFIT). It is similar to the Terrain Awareness and Warning System (TAWS-B) but does not comply with TSO-C151b certification standards. Terrain Proximity does not provide warning annunciations or voice alerts but it does provide color indications on map displays when terrain and obstacles are within a certain altitude threshold from the aircraft. Although the terrain and obstacle color map displays are the same, TAWS-B uses a more extensive database and more sophisticated algorithms to assess aircraft distance from terrain and obstacles. The terrain and obstacles database may not contain all obstructions, so the information provided should be used as an aid to situational awareness and should never be used to navigate or maneuver around terrain.

MULTI-FUNCTION DISPLAY (continued)

Terrain Proximity (continued)

GPS altitude, which is derived from satellite position and therefore may differ from baro-corrected altitude read from the altimeter, is converted to mean sea level (MSL)-based altitude (GPS-MSL altitude) and is used in conjunction with GPS position to calculate and predict the aircraft's flight path in relation to the surrounding terrain and obstacles, whose altitudes are also referenced to MSL.

System Status:

Terrain Proximity requires the following components to operate properly:

- valid 3-D GPS position
- valid terrain/obstacle database

If Terrain Proximity does not have a valid 3-D GPS position a yellow "No GPS Position" text will be displayed at the center of the Terrain Proximity Page and on the PFD inset map if terrain is selected. If there is not a valid terrain/obstacle database, the system will not display the yellow and red colors associated with the offending obstacles and terrain.

Operation of Terrain Proximity:

To display terrain data use the Touchscreen's Home page and press Terrain Proximity or Map>Map Settings>Sensor>Terrain. When Terrain Proximity is selected on maps other than the Terrain Proximity Page, an icon to indicate the feature is enabled for display and a legend for Terrain Proximity colors are shown.

Additional information about obstacles can be displayed by panning over the display on the map. The panning feature is enabled by depressing the RANGE knob on the keypad then pushing the knob in the desired direction until it is over the obstacle of interest. There is no inhibit function associated with Terrain Proximity, as there are no aural or visual alerts to inhibit.

MULTI-FUNCTION DISPLAY (continued)

Terrain Proximity (continued)

Terrain Proximity Page:

The Terrain Proximity Page is specialized to show terrain and obstacle data in relation to the aircraft's current altitude, without clutter from the basemap. Aviation data (airports, VORs, and other NAVAIDs) can be displayed for reference.

Aircraft orientation on this map is always heading up unless there is no valid heading. Map range is adjustable with the RANGE Knob from 250 FT to 1,000 NM, as indicated by the map range rings (or arcs).

Terrain is also displayed on the following pages:

- Navigation Map Page
- Terrain Proximity Page
- Trip Planning Page
- PFD Inset Map

On all pages that display terrain data, obstacles and terrain are depicted with the following colors:

- Red - above or within 100 feet below the aircraft altitude.
- Yellow - between 100 feet and 1000 feet below the aircraft altitude.
- Black - more than 1000 feet below the aircraft altitude.

Terrain Proximity Alerts:

Terrain Proximity does not provide warning annunciations or voice alerts associated with obstacles or terrain.

WireAware

For additional safety, the terrain system incorporates Garmin's WireAware™ wire obstacle information. The system shows wire obstacles such as power lines on maps as well as the Synthetic Vision display. For the Terrain-SVT and TAWS-B only, this system can also issue cautions or warnings for potential impact with wire obstacles.

WireAware database information includes Hazardous Obstacle Transmission (HOT) power lines which are typically high voltage transmission lines depicted on VFR Sectional charts, and are considered of special interest to fixed-wing pilots. These include power lines which may span rivers, valleys, canyons, or be in close proximity to airports.

MULTI-FUNCTION DISPLAY (continued)

WireAware (continued)

WireAware database coverage is mostly limited to tall transmission lines and their associated support structures. It does not typically have information for the smaller utility poles or lines. WireAware obstacle database coverage exists mainly in the United States; with limited coverage in portions of Canada and Mexico. The height of the wire obstacles is commonly estimated and should not be relied upon for maneuvering decisions.

Terrain Awareness and Warning System (TAWS-B) – Optional

NOTE

If the G3000 system is configured to use the optional Terrain Awareness and Warning System (TAWS-B), Terrain Proximity will not be available for use.

The Terrain Awareness and Warning System (TAWS-B) is an optional feature used to increase situational awareness and aid in reducing controlled flight into terrain (CFIT). TAWS-B provides visual and aural cautions and warning alerts when terrain and obstacles are within a given altitude threshold from the aircraft. The displayed alerts and warnings are advisory in nature only. TAWS-B satisfies TSO-C151b Class B certification requirements whereas the more limited Terrain Proximity does not.

TAWS-B uses terrain and obstacle information supplied by government sources. Terrain information is based on terrain elevation information in a database that may contain inaccuracies. Individual obstructions may be shown if available in the database. The data undergoes verification by Garmin to confirm accuracy of the content, per TSO-C151b standards, however, the displayed information should never be understood as being all-inclusive and data may be inaccurate.

GPS altitude, which is derived from satellite position and therefore may differ from baro-corrected altitude read from the altimeter, is converted to mean sea level (MSL)-based altitude (GPS-MSL altitude) and is used in conjunction with GPS position to calculate and predict the aircraft's flight path in relation to the surrounding terrain and obstacles, whose altitudes are also referenced to MSL.

MULTI-FUNCTION DISPLAY (continued)

Terrain Awareness and Warning System (TAWS) – Optional (continued)

System Status:

During G3000 power-up, TAWS-B conducts a self-test of its aural and visual annunciations. The system test can also be manually initiated by selecting Aircraft Systems > System Tests>TAWS from the Touchscreen. An aural alert "TAWS System Test OK" or "TAWS System Failure" is issued at test completion, regardless of whether the test was initiated automatically or manually. TAWS-B System Testing is disabled when ground speed exceeds 30 knots.

TAWS-B requires the following to operate properly:

- A valid terrain/obstacle/airport terrain database
- A valid 3-D GPS position solution

If a valid 3-D GPS position solution and vertical accuracy requirements are not attained or the aircraft is out of the database coverage area, a TAWS N/A annunciation will appear on the TAWS Page and the aural annunciation "TAWS Not Available" is heard. When the GPS signal is re-established and the aircraft is within the database coverage area, the aural message "TAWS Available" is heard.

Operation of TAWS-B:

To inhibit the aural and visual Premature Descent Alert (PDA) and Forward Looking Terrain Awareness (FLTA) alerts (RTC, ITI, ROC, IOI, RLC, and ILI), touch TAWS>TAWS Settings>TAWS Inhibit from the Touchscreen Home page. These alerts may also be inhibited by pressing Map>Map Settings>Sensor>Terrain (Settings)>TAWS Inhibit from the Touchscreen Home page. Use caution when inhibiting TAWS as the system should be enabled when appropriate. Once TAWS is inhibited a TAWS INH alert annunciation is displayed on the TAWS Page and PFD.

NOTE

If TAWS-B alerts are inhibited when the Final Approach Fix is the active waypoint during a GNSS/SBAS approach, a LOW ALT annunciation may appear on the PFD next to the altimeter if the current aircraft altitude is at least 164 feet below the prescribed altitude at the Final Approach Fix.

MULTI-FUNCTION DISPLAY (continued)

Terrain Awareness and Warning System (TAWS) – Optional (continued)

TAWS Page:

The TAWS Page is accessed via the Touchscreen.

The TAWS Page is specialized to show terrain, obstacle, and potential impact point data in relation to the aircraft's current altitude, without clutter from the basemap. Aviation data (airports, VORs and other NAVAIDs, and intersections) can be displayed for reference. If an obstacle and the projected flight path of the aircraft intersect, the display automatically zooms in to the closest potential point of impact on the TAWS Page.

Aircraft orientation on this map is always heading up unless there is no valid heading. Map range is adjustable with the RANGE Knob from 250 FT to 1,000 NM, as indicated by the map range rings or arcs.

Terrain is also displayed on the following pages:

- Navigation Map Page
- TAWS Page
- Trip Planning Page
- PFD Inset Map

On all pages that display terrain data, the obstacles and terrain are depicted with the following colors:

- Red - above or within 100 feet below the aircraft altitude.
- Yellow - between 100 feet and 1000 feet below the aircraft altitude.
- Black - more than 1000 feet below the aircraft altitude.

Alert Type	PFD/TAWS Pane Annunciation	Touchscreen Controller Pop-Up Alert	Voice Alert
Reduced Required Terrain Clearance Warning (RTC)	PULL-UP	TERRAIN - PULL-UP	"Terrain, Terrain; Pull Up, Pull Up"
Imminent Terrain Impact Warning (ITI)	PULL-UP	TERRAIN AHEAD - PULL-UP	"Terrain Ahead, Pull Up; Terrain Ahead, Pull Up"
Reduced Required Line Clearance Warning (RLC)	PULL-UP	WARNING - WIRE	"Wire, Wire; Pull Up, Pull Up"
Imminent Line Impact Warning (ILI)	PULL-UP	WIRE AHEAD - PULL-UP	"Wire Ahead; Pull Up, Pull Up"
Reduced Required Obstacle Clearance Warning (ROC)	PULL-UP	OBSTACLE - PULL-UP	"Obstacle, Obstacle; Pull Up, Pull Up"
Imminent Obstacle Impact Warning (IOI)	PULL-UP	OBSTACLE AHEAD - PULL-UP	"Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up"
Excessive Descent Rate Warning (EDR)	PULL-UP	PULL-UP	"Pull Up"
Excessive Closure Rate Warning (ECR)	PULL-UP	PULL-UP	"Pull Up"
Reduced Required Terrain Clearance Caution (RTC)	TERRAIN	CAUTION - TERRAIN	"Caution, Terrain; Caution, Terrain"
Imminent Terrain Impact Caution (ITI)	TERRAIN	TERRAIN AHEAD	"Terrain Ahead; Terrain Ahead"
Reduced Required Line Clearance Caution (RLC)	TERRAIN	CAUTION - WIRE	"Caution, Wire; Caution, Wire"
Imminent Line Impact Caution (ILI)	TERRAIN	WIRE AHEAD	"Wire Ahead; Wire Ahead"
Reduced Required Obstacle Clearance Caution (ROC)	TERRAIN	CAUTION - OBSTACLE	"Caution, Obstacle; Caution, Obstacle"
Imminent Obstacle Impact Caution (IOI)	TERRAIN	OBSTACLE AHEAD	"Obstacle Ahead; Obstacle Ahead"
Premature Descent Alert Caution (PDA)	TERRAIN	TOO LOW - FLAPS	"Too Low Flaps"
Excessive Descent Rate Caution (EDR)	TERRAIN	SINK RATE	"Sink Rate"
Excessive Closure Rate Caution (ECR)	TERRAIN	TERRAIN	"Terrain, Terrain"

* See associated Response Techniques checklists on pages 7-38 and 7-39.

TAWS Alert Types
Table 7-1
Sheet 1 of 2

MULTI-FUNCTION DISPLAY (continued)

Terrain Awareness and Warning System (TAWS) – Optional (continued)

Operation of TAWS (continued)

Alert Type	PFD/TAWS Pane Annunciation	Touchscreen Controller Pop-Up Alert	Voice Alert
Negative Climb Rate Caution (NCR)	TERRAIN	DON'T SINK	"Don't Sink"
Flight Into Terrain High Speed Caution (FIT)	TERRAIN	TOO LOW - TERRAIN	"Too Low, Terrain"
Flight Into Terrain Gear Caution (FIT)	TERRAIN	TOO LOW - GEAR	"Too Low, Gear"
Flight Into Terrain Flaps Caution (FIT)	TERRAIN	TOO LOW - FLAPS	"Too Low, Flaps"
Flight Into Terrain Takeoff Caution (FIT)	TERRAIN	TOO LOW - TERRAIN	"Too Low, Terrain"
Glide Slope Deviation Caution (GSD) (depends on approach type)	GLIDESLOPE Or GLIDEPATH	GLIDESLOPE Or GLIDEPATH	"Glideslope" or "Glidepath"
Altitude Voice Callout (VCO)	None	None	"Five Hundred"

* See associated Response Techniques checklists on pages 7-38 and 7-39.

TAWS Alert Types
Table 7-1
Sheet 2 of 2

MULTI-FUNCTION DISPLAY (continued)

Terrain Awareness and Warning System (TAWS) – Optional (continued)

TAWS-B Alerts:

Alerts are issued when flight conditions meet parameters that are set within TAWS-B software algorithms. TAWS alerts typically employ a CAUTION or a WARNING alert severity level, or both. When the system issues an alert, annunciations appear on the PFDs, the TAWS Pane, and on the Touchscreen Controllers. The PFD shows the annunciation to the left of the altitude tape. The TAWS Pane shows the annunciation in the lower-left corner of the pane. In addition, a pop-up alert appears on each Touchscreen Controller. To respond to the pop-up alert, do one of the following on either Touchscreen Controller:

- Touch the TAWS Button to display the TAWS Pane and the TAWS Settings Screen.
- Touch the OK Button to remove the pop-up alert.
- Touch the Inhibit TAWS Button to inhibit the TAWS system from issuing alerts.

TAWS alerts types are shown in Table 7-1.

Response Technique - WARNING:

1. Level the wings while simultaneously adding maximum power.
2. Smoothly pitch up at a rate of 2° to 3° per second towards an initial target pitch attitude of 15°.
3. Adjust pitch attitude to ensure terrain clearance, while respecting stall warning. If the flaps are extended, retract flaps to the UP position.
4. Continue climb at best angle of climb speed (Vx) until terrain or obstacle clearance is assured.
    - Only vertical maneuvers are recommended unless operating in VMC or the pilot determines, after using all available information and instruments, that a turn, in addition to the vertical escape maneuver, is the safest course of action.
    - Pilots are authorized to deviate from their current air traffic control (ATC) clearance to the extent necessary to comply with a TAWS warning.

MULTI-FUNCTION DISPLAY (continued)

Terrain Awareness and Warning System (TAWS) – Optional (continued)

TAWS Alerts (continued)

Response Technique - CAUTION:

1. Take positive corrective action until the alert ceases.
2. Based on analysis of all available instruments and information:
    - Stop descending or,
    - Initiate a climb and/or,
    - Turn as necessary.

Weather Radar

The Weather Radar installation consists of a Receiver/Transmitter unit in a bullet shaped pod mounted on the right wing just outboard of the wing jack point.

The Garmin GWX 75/80 Airborne Color Weather Radar is a four-color digital pulsed radar with 6.5 kilowatts of output power. It combines excellent range and adjustable scanning profiles with a high-definition target display. The pulse width is four microseconds (µs) on all ranges except the 2.5 nm range. At close range, the GWX 75/80 uses a one µs pulse width to reduce the targets smearing together on the displays for better target definition at close range.

The Piper PA-46-600TP uses a 10-inch phased array antenna that is fully stabilized to accommodate 30° of pitch and roll.

To focus radar scanning on specific areas, Sector Scanning offers pilot-adjustable horizontal scan angles of 20°, 40°, 60°, or 90°. A vertical scanning function helps to analyze storm tops, gradients, and cell buildup activity at various altitudes.

Radar features include:

- Independent weather radar settings for each Display Pane.
- Turbulence Detection presents areas of turbulence associated with precipitation using Doppler measurements.
- Ground Clutter Suppression (GCS), to remove ground clutter from the displays.
- Extended Sensitivity Time Constant (STC) logic that automatically correlates distance of the return echo with intensity, so cells do not suddenly appear to get larger as they get closer.

MULTI-FUNCTION DISPLAY (continued)

Weather Radar (continued)

- WATCH® (Weather Attenuated Color Highlight) helps identify possible shadowing effects of short-range cell activity, identifying areas where radar return signals are weakened or attenuated by intense precipitation (or large areas of lesser precipitation) and may not fully reflect the weather behind a storm.
- Weather Alert that looks ahead for intense cell activity in the 80-320 nm range, even if these ranges are not being monitored.
- Below Altitude Weather: Weather returns deemed irrelevant based on the aircraft's altitude are displayed clearly to the pilot to aid in decision making. (GWX 80 only)
- Zero Blind Range: Utilizes the volumetric storage of data to display returns as close as 0 nautical miles. (GWX 80 only)
- Lightning and Hail Prediction: The system determines areas which are conducive to formation of hail/lightning and advises the crew of the threat. (GWX 80 only)

Operation of Radar:

NOTE

Radar images beyond approximately 230 nm should not be relied upon.

Weather Mode:

If the aircraft is on the ground, the Touchscreen Controller displays a prompt to confirm radar activation. Touch the OK Button to begin transmitting, or touch the Cancel Button to return to the Weather Radar Settings screen, and the radar remains in Standby Mode. If OK is pressed, a pop-up menu will appear alerting the pilot that the radar is being activated on the ground and safety precautions should be exercised.

1) From Home, touch Weather>Weather Selection>WX RADAR Settings .
2) Touch the Radar On Button. Radar options are enabled when button annunciator is green, off when gray.
3) Touch the Display Mode Button.
4) Touch the Weather Button. If the aircraft is airborne, the radar begins transmitting, and the Radar Mode indicates 'WEATHER'.

When the weather radar system is in either the Weather or Ground Map mode, the system automatically switches to Standby mode upon landing.

MULTI-FUNCTION DISPLAY (continued)

Weather Radar (continued)

Ground Map Mode:

Operation in Ground Map Mode

1) From Home, touch Weather>Weather Selection>WX RADAR Settings.
2) Touch the Radar On button.
3) Touch the Display Mode Button.
4) Touch the Ground Button to place the radar in Ground Map mode.
5) Press the Joystick to activate the antenna tilt selection function.
6) Use the Joystick to select the desired antenna tilt angle.
7) When ground returns are shown at the desired distance, press the Joystick to disable the tilt adjustment function of the Joystick.

When the weather radar system is in either the Weather or Ground Map mode, the system automatically switches to Standby mode upon landing.

Weather Radar Page:

Weather Display:

When evaluating various target returns on the weather radar display, the colors denote precipitation intensity and rates shown in Table 7-2.

Weather Mode Color	Intensity	Approximate Precipitation Rate (inches/hour)
Black	< 23 dBZ	< .01
Green	23 dBZ to < 32 dBZ	.01 to 0.1
Yellow	32 dBZ to < 41 dBZ	0.1 to 0.5
Red	41 dBZ to < 50 dBZ	0.5 to 2
Magenta	50 dBZ and greater	> 2

Precipitation Intensity and Rates
Table 7-2

MULTI-FUNCTION DISPLAY (continued)

Weather Radar (continued)

Weather Radar Page (continued)

Updrafts and downdrafts in thunderstorms carry water through the cloud, therefore the more severe the drafts, the greater the number and size of the precipitation droplets. With this in mind, the following interpretations can be made from what is displayed on the weather radar.

Avoid these areas by an extra wide margin.

- In areas where the displayed target intensity is red or magenta (indicating large amounts of precipitation), the turbulence is considered severe.
- Areas that show steep color gradients (intense color changes) over thin bands or short distances suggest irregular rainfall rate and strong turbulence.
- Areas that show red or magenta are associated with hail or turbulence, as well as heavy precipitation. Vertical scanning and antenna tilt management may be necessary to identify areas of maximum intensity.

Proper use of the weather radar is critical for detecting various types of weather phenomena (thunderstorms, squall lines, tornadoes, hail, etc.).

MULTI-FUNCTION DISPLAY (continued)

Weather Radar (continued)

Weather Radar Page (continued)

Ground Map Display:

When evaluating various intensities of ground target returns, the colors shown in Table 7-3 below should be used.

Ground Map Mode Color	Intensity
Black	0 dB
Light Blue	> 0 dB to < 9 dB
Yellow	9 dB to < 18 dB
Magenta	18 dB to < 27 dB
Blue	27 dB and greater

Ground Target Return Intensities
Table 7-3

A secondary use of the weather radar system is for the presentation of terrain. This can be a useful tool for verifying aircraft position. A picture of the ground is represented much like a topographical map that can be used as a supplement to the Navigation Map on the MFD.

Ground Map mode uses a different gain range than Weather mode. Different colors are also used to represent the intensity levels. The displayed intensity of ground target returns is defined in the table shown above. The type and orientation of the target in relation to the aircraft affects the intensity displayed. Use of the GAIN and TILT controls helps improve contrast so that specific ground targets can be recognized more easily.

Proper use of the weather radar is critical for detecting various types or features of terrain.

MULTI-FUNCTION DISPLAY (continued)

Garmin Datalink (GDL) – Optional

SiriusXM Satellite Weather and SiriusXM Satellite Radio® entertainment services are provided through the optional GDL 69SXM, a remote-mounted data-link satellite receiver. SiriusXM Satellite Radio and SiriusXM Satellite Weather services, available by subscription, each have coded IDs unique to the installed GDL 69SXM. These coded ID's must be provided to SiriusXM Satellite Radio to activate service. These IDs are located on the label on the back of the Data Link Receiver and on the SiriusXM Information Page and in the SiriusXM Satellite Radio Activation Instructions included with the unit (available at www.garmin.com, P/N 190-00355-04). Once activated, SiriusXM Satellite Radio uses the coded IDs to send an activation signal that allows the G3000 to display weather data and/or entertainment programming provided through the GDL 69SXM.

NOTE

Pulling the XM circuit breaker will disable the GDL 69SXM functions (SiriusXM weather and SiriusXM radio).

SiriusXM Satellite Weather:

Received graphical weather information and associated text is displayed on the Multi Function Display (MFD) and the Primary Flight Display (PFD) Inset Map. SiriusXM satellite weather operates in the S-band frequency range and provides continuous reception capabilities at any altitude throughout North America.

The primary map for viewing SiriusXM Weather data via the Weather Data key on the Touchscreen. This is the only G3000 map display capable of showing information for all available SiriusXM weather products.

Selecting the products for display on the Weather Page is made by the Touchscreen Weather>Weather Selection>Sirius XM Weather [or] > Connect Weather [or] > Stormscope [or] > WX RADAR Settings. After a particular weather source is selected, it will appear in the leader at the top of the weather page. When a weather product is selected for display, the corresponding key changes to green to indicate the product is enabled. Unavailable weather products have subdued softkey labels (softkeys are disabled from selection).

MULTI-FUNCTION DISPLAY (continued)

Garmin Datalink (GDL) – Optional (continued)

SiriusXM Satellite Weather (continued)

NOTE

Echo Tops and Cloud Tops are not selectable at the same time due to their color similarities.

The following pages can display various portions of SiriusXM Weather data:

- Navigation Map
- Weather Datalink Page (able to display all SiriusXM Weather data)
- Weather Information Page
- Trip Planning Page
- Nearest Pages
- PFD Inset Map

When a weather product is active the age of the data is displayed on the screen. The age of the product is based on the time difference between when the data was assembled on the ground and the current GPS time. Weather products are refreshed at specific intervals.

If for any reason, a weather product is not refreshed within the 30, 60, or 90-minute Expiration Time intervals, the data is considered expired and is removed from the display. This ensures that the displayed data is consistent with what is currently being broadcast by SiriusXM Satellite Radio services. If more than half of the expiration time has elapsed, the color of the product age displayed changes to yellow.

The Table 7-4 shows the weather product symbols, the expiration time and the refresh rate. The refresh rate represents the interval at which SiriusXM Satellite Radio broadcasts new signals that may or may not contain new weather data. It does not represent the rate at which weather data is updated or new content is received by the Data Link Receiver. Weather data are refreshed at intervals defined and controlled by SiriusXM Satellite Radio and their data vendors. Customizing the Weather Data Link Page is possible via the Touchscreen Controller.

MULTI-FUNCTION DISPLAY (continued)

Garmin Datalink (GDL) – Optional (continued)

SiriusXM Satellite Weather (continued)

SiriusXM Weather Product	Symbol	Expiration Time (minutes)	Refresh Rate (minutes)
Next-generation Radar (NEXRAD)		30	5 (U.S.) 10 (Canada)
Cloud Tops		60	15
Echo Top		30	7.5
SiriusXM Lightning		30	5
Storm Cell Movement		30	12
SIGMETs/	SIGMET	60	12
AIRMETs	AIRMET	60	12
Meteorological Aerodrome Report (METARs)		90	12
City Forecast		90	12
Surface Analysis		60	12
Freezing Levels		120	12
Winds Aloft		90	12
County Warnings		60	5
Cyclone (Hurricane) Warnings		60	12
Icing Potential (CIP and SLD)		90	22
Pilot Weather Report (PIREPs)		90	12
Air Reports (AIREPs)		90	12
Turbulence		180	12
No Radar Coverage	No Product Image	30	5
Temporary Flight Restrictions (TFRs)	No Product Image	60	12
Terminal Aerodrome Reports (TAFs)	No Product Image	60	12

Weather Product Symbols, Expiration Times and Refresh Rates
Table 7-4

MULTI-FUNCTION DISPLAY (continued)

Garmin Datalink (GDL) – Optional (continued)

SiriusXM Radio Entertainment:

The optional SiriusXM Radio entertainment feature of the GDL 69A Data Link Receiver is available for the pilot's and passengers' enjoyment. SiriusXM Satellite Radio offers a variety of radio programming over long distances without having to constantly search for new stations. The GDL 69A can receive the S-band, SiriusXM Satellite Radio® entertainment services at any altitude throughout the Continental U.S. Based on signals from satellites, coverage far exceeds land-based transmissions.

SiriusXM Radio is never muted for the cabin passengers unless a stereo input to the stereo input jack is installed. SiriusXM Radio is automatically muted for the front seat crewmembers during the following conditions:

- Aircraft radio reception
- Push-to-talk switch activation
- Stall warning activation
- Gear warning activation
- Marker beacon audio activity
- Master caution and master warning chimes
- Audible system messages

The SiriusXM Radio Page provides information and control of the audio entertainment features of the SiriusXM Satellite Radio.

MULTI-FUNCTION DISPLAY (continued)

Stormscope - Optional

WARNING

Never use your Stormscope system to attempt to penetrate a thunderstorm. The FAA Advisory Circular, Subject: Thunderstorms, and the Aeronautical Information Manual (AIM) recommend that a pilot "avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo.

NOTE

There are several atmospheric phenomena other than nearby thunderstorms that can cause isolated discharge points in the strike display mode. However, clusters of two or more discharge points in the strike display mode do indicate thunderstorm activity if these points reappear after the screen has been cleared. Avoid the clusters and you will avoid he thunderstorms. In the cell display mode, even a single discharge point may represent thunderstorm activity and should be avoided.

NOTE

When active, the engine igniters can create false indications of lightning by the L-3 StormScope. If false strike indications are suspected, the location and range of the false strikes can be determined by deactivating the ignition system (if safe to do so), clearing the strike display, and then observing strikes after activating and deactivating the ignition system.

NOTE

L-3 STORMSCOPE® WX-500 Lightning and GDL 69/69A XM® Satellite Weather Lightning are mutually exclusive products.

MULTI-FUNCTION DISPLAY (continued)

Stormscope - Optional (continued)

The L-3 WX-500 Stormscope Weather Mapping Sensor Users Guide, p/n 002-11503-002, Rev. K, dated 10-Jan-2008 or later appropriate revision, must be immediately available to the flight crew whenever weather avoidance is predicated on the use of this system.

To display Stormscope data, use the Touchscreen Home page and touch Weather>Weather Selection>Stormscope.

These pages can display cell or strike data using yellow lightning strike symbology. Information concerning the map orientation is shown in the upper left corner of the Navigation Map page and information concerning Stormscope mode selected, and strike rate per minute is displayed in the upper right corner of the Navigation Map page. If heading input is lost, strikes and/or cells must be cleared manually after the execution of each turn. This is to ensure that the strike and/or cell positions are depicted accurately in relation to the nose of the aircraft.

Stormscope lightning data can be displayed up to 800 nm zoom range (in North Up orientation) on the Navigation Map Page. However, in Track Up orientation at the 500 nm range, a portion of Stormscope lightning data can be behind the aircraft and therefore not visible on the Navigation Map. Since the range for Stormscope data is 400 nm diameter total (200 nm in front and 200 nm behind), the 500 nm range in North Up orientation shows all the data. At a map range of less than 25 nm, Stormscope lightning data is not displayed, but can still be present. The presence of Stormscope lightning data is indicated by the annunciation 'LTNG < 25 nm' in the upper right corner of the Navigation Map Page. On the dedicated Stormscope page, the selectable range is 25 nm to 200 nm.

Navigation Map Page.

Lightning Age	Symbol
Strike is less than 6 seconds old	
Strike is between 6 and 60 seconds old	
Strike is between 1 and 2 minutes old	
Strike is between 2 and 3 minutes old	

GTX 335 Transponder

The GTX 335 transponder provides Extended Squitter Version 2 Automatic Dependent Surveillance-Broadcast (ADS-B) which meets the TSO C166b mandate for 2020. ADS-B Out information consisting of altitude, position, velocity, and heading are automatically transmitted to other aircraft and ground stations.

A GTX 335 without an accompanying GTS 825 or GTX 345 also provides the following functions:

- Reception of TIS-A traffic data from a ground station
- Provide TIS-A traffic alerting to the pilot via interfaced display and audio output.

The combined installation of GTX 335 and GTS 825 adds the following capabilities:

- ADS-B In: receives altitude, position, velocity, and heading information from aircraft and ground stations.

Traffic information will be displayed as a combination of two systems:

- ADS-B traffic information from other ADS-B equipped aircraft
- GTS 825 Traffic Advisory System (TAS)

NOTE

ADS-B traffic information will be available on the normal traffic display maps/pages. In the absence of ADS-B traffic information, the GTS 825 system will display all other transponder equipped aircraft.

ADS-B transmission defaults to enabled at each power cycle. To enable/disable the transmission of the ADS-B information, press the Transponder Mode Button on the touch screen display. Press the ADS-B TX button to activate or deactivate ADS-B. Do not disable ADS-B transmission unless requested by ATC. If the GTX 335 fails, the transponder mode key on the touchscreen will turn yellow and display the word FAIL.

GTX 345 Transponder - Optional

In addition to the functionality of the GTX 335, the GTX345 transponder performs the following additional functions:

- Reception of ADS-B In data on 1090 MHz
- Reception of ADS-B In data on UAT (978 MHz)
- ADS-B (Data directly from another transmitting aircraft)
- ADS-R (Rebroadcast of ADS-B data from a ground station)
- TIS-B (Broadcast of secondary surveillance radar) (SSR) derived traffic information from a ground station.
- FIS-B (Broadcast of aviation data from a ground station)
- Provide ADS-B traffic information and alerting to the pilot via an interfaced display
- Correlation and consolidation of traffic data from multiple traffic sources
- Aural and visual traffic alerting
- Provide FIS-B data to the pilot via an interfaced display

NOTE

The FIS-B Data Status on the FIS-B Weather Settings page shows "Last Ground Uplink: - - -" and "Reported Outages: Data not available", indicating that no FIS-B weather information has been uplinked. The actual FIS-B weather is uplinked to the aircraft according to the times specified in the upper right corner of the FIS-B Weather page on the MFD. To eliminate confusion, the Data Status has been revised in software version 2975.05 or later approved versions.

NOTE

The GTX 345 transponder provides weather information to the Emergency Autoland (EAL) system. If the EAL system is installed, the GTX 345 transponder becomes required (not optional) equipment.

NOTE

If the GTX 345 transponder fails, traffic from all sources (ADS-B, TAS or TIS-B) will be removed from the displays.

GTX 33DES (Diversity Extended Squitter) Transponder - Optional

The GTX 33DES transponder is equipped with two antennas, one on the top of the fuselage and the other on the bottom, which provides additional signal coverage. The GTX 33DES is offered as an option for the number 1 transponder in a dual transponder installation.

7.11 STANDBY INSTRUMENT

The Aspen Evolution Backup Display (EBD) is a fully digital, independent flight instrument display which provides attitude, barometric altitude, airspeed, heading, vertical speed, slip/skid and turn rate indications. The purpose of this flight instrument is to provide a reference to crosscheck the G3000 system information for system reliability and to display basic flight information in the event of a G3000 system failure. While the EBD is installed in the M600 in Portrait Orientation, references to the standby instrument in the EBD Pilot's Guide (091-00027-001 Rev A, EBD Pilots Guide V&H) are relative to Landscape Orientation.

The EBD is located to the left of PFD1 in direct view of the pilot. During normal operation, power is provided by the essential bus. If both the generator and alternator fail, the EBD will continue to operate on the essential bus until the primary battery is depleted. The EBD will then operate on the emergency battery/bus for 30 minutes permitting the pilot to find a suitable landing location. During this period, the EBD will illuminate an "ON BAT" annunciation and display an estimated battery charge state.

WARNING

Failure to press the EXT PWR softkey after the internal battery check could deplete the internal battery.

The EBD and emergency bus must be checked for proper operation prior to flight. Verification of proper operation and battery health, is contained in the BEFORE TAXIING checklist. IFR flight is prohibited when any component of the emergency or standby systems is inoperative or when the internal battery is less than 80%.

7.13 HYDRAULIC SYSTEM

The hydraulic system provides the power to retract and extend the landing gear. (See Figure 7-2.)

The electric motor driven hydraulic pump assembly is located aft of the rear baggage compartment and is accessible through the baggage compartment aft close-out panel. The pump assembly has an integral reservoir with overflow reservoir as well as filler plug, sight gauge and vent. The pump assembly incorporates pressure switches, bypass relief valves, and thermal relief valves in both the UP and DOWN sides. A shuttle valve is also incorporated to allow for unequal volumes of hydraulic fluid displaced during UP and DOWN gear actuation. Normal system operating pressure is controlled by the pressure switches. Maximum system operating pressure is limited by the bypass relief valves, and maximum system holding or trapped pressure is limited by the thermal relief valves.

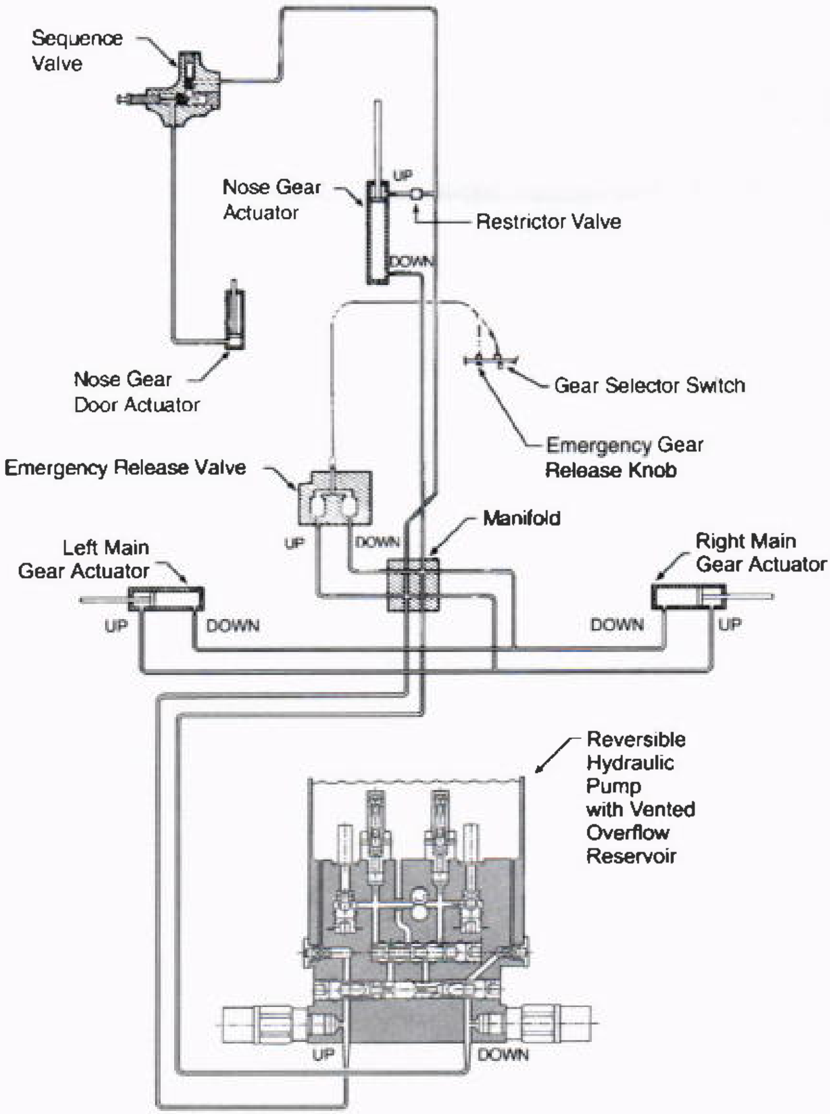
NOTE

Occasional cycling of the hydraulic pump during climb and initial cruise can occur due to variations in the system pressure caused by ambient temperature changes.

The motor which drives the hydraulic pump is reversible and runs in one direction to supply gear UP pressure and in the opposite direction to supply gear DOWN pressure. The direction in which the pump runs is controlled electrically by the position of the gear selector switch on the instrument panel.

Other major components of the hydraulic system are the three gear actuators and the emergency gear extension valve. Operation of these components is covered in the landing gear section.

7.13 HYDRAULIC SYSTEM (continued)



Hydraulic System
Figure 7-2

7.15 LANDING GEAR

The aircraft is equipped with hydraulically operated, fully retractable, tricycle landing gear.

Locking-type actuators are used for main and nose gears. The actuator assembly provides mechanical gear-down locking at the fully extended position and is hydraulically unlocked. The actuator also acts as the gear brace in the extended position.

The main gear retracts inboard into the wing root area. A mechanically linked door covers the strut assembly.

Hydraulic pressure for gear operation is furnished by an electrically driven hydraulic pump. Landing gear operation is controlled by a two position landing gear selector switch with a wheel shaped knob located to the left of the engine power control quadrant. Three green lights, which are individually activated as each gear mechanically locks into the DOWN position, are located on the MFD.

The landing gear selector switch must be pulled outward from a detent before it is moved to the UP or DOWN position. The UP detent, used when moving the gear selector out of the UP position, may not be available on all S/N aircraft. In addition, there is a squat switch on the left main gear which prevents operation of the gear UP electrical circuit when the aircraft weight is on the gear. If the landing gear selector is placed in the UP position with the aircraft weight on the gear, the gear warning triple chime will sound, and the GEAR SYS warning CAS message will annunciate.

The landing gear is held in the UP position by hydraulic pressure which is trapped in the system UP lines by a check valve in the pump assembly. When normal pump operation is stopped by the pressure switch, a check valve in the pump assembly closes to trap fluid pressure in the UP side of the system. Emergency gear extension is accomplished by a manually actuated valve which relieves the pressure in the UP side and bypasses fluid to the DOWN side of the system. The additional fluid required for DOWN operation comes directly from the reservoir.

The landing gear is held in the DOWN position by spring loaded mechanical locking mechanisms built into each of the three actuating cylinders. The individual gear safe light switches are also mechanically operated when each mechanism is in the LOCKED position. With the hydraulic pump and system operating normally, hydraulic pressure is also trapped in the DOWN side of the system. This DOWN pressure is not required to mechanically lock the cylinders and is not available if the hydraulic pump is inoperative.

7.15 LANDING GEAR (continued)

The EMERGENCY GEAR EXTENSION system allows the landing gear to free fall, with spring assist on the nose gear, into the extended position where the mechanical locks engage. Prior to performing an emergency gear extension, the aircraft should be slowed to 100 KIAS or less. Emergency gear extension is accomplished by moving the guard across the emergency gear extension knob to the side and pulling the EMERGENCY GEAR EXTENSION knob fully aft. If a gear system malfunction has been indicated and the EMERGENCY GEAR EXTENSION system used, it is recommended that the EMERGENCY GEAR EXTENSION control and the HYDRAULIC PUMP circuit breaker be left in the pulled position until the aircraft is safely on jacks. See the Maintenance Manual for proper landing gear system check-out procedures. If the aircraft is being used for training purposes or a pilot check-out flight the EMERGENCY GEAR EXTENSION control and HYDRAULIC PUMP POWER circuit breaker must be reset in order for hydraulic pressure to be generated in the UP side of the system and the gear retracted.

CAUTION

When flying in extreme cold where the aircraft has been cold-soaked for an extended period of time, the gear may not indicate down and locked for 15 to 20 seconds during normal gear extension.

CAUTION

When flying in extreme cold where the aircraft has been cold soaked, it may take several minutes for all three gear to indicate down and locked following an EMERGENCY EXTENSION "FREE FALL".

Whenever all three gear are not fully down and locked, or not fully up with the gear doors closed, the landing gear indicator turns to a red circle and is accompanied by a master warning and flashing of the LANDING GEAR title on the MFD. The gear will turn to a red circle if gear is in transit for at least 20 seconds. An amber GEAR SYS message will display during flight or red GEAR SYS message while on the ground whenever the gear selector position or gear up/down positions can not be determined by the G3000 system. An amber HYDR PUMP ON message will display on each PFD with a double chime any time the hydraulic pump has been operating for 20 seconds or more while airborne. A red HYDR PUMP ON message will display on each PFD with a repeating triple chime during any activation of the hydraulic pump while on the ground.

7.15 LANDING GEAR (continued)

The G3000 system incorporates alerts to remind the pilot that the gear is not down and locked during landing scenarios. The CHECK GEAR voice alert and associated CAS message will activate under the following conditions when the landing gear are not in the DOWN position.

1. In flight when the throttle is reduced below 420 ft-lbs torque and altitude is greater than 400 ft AGL (CAUTION) or altitude is less than 400 ft AGL (WARNING). This voice alert can be muted by pressing the master WARNING or CAUTION softkey.
2. In flight when the flaps are extended beyond the T/O position and the altitude is greater than 400 ft AGL (CAUTION) or altitude is less than 400 ft AGL (WARNING). This voice alert can not be muted.
3. In flight when the flaps are extended to the T/O position, engine torque is less than 1000 ft-lb and altitude is less than 800 ft AGL (CAUTION) or less than 400 ft AGL (WARNING).

7.17 BRAKE SYSTEM

The brake system is designed to meet all normal braking needs. Two single-disc, double puck brake assemblies, one on each main gear, are actuated by toe brake pedals mounted on both the pilot's and copilot's rudder pedals. A brake system reservoir, independent of the hydraulic system reservoir, is located on the firewall. Brake fluid should be maintained at the level marked on the reservoir. For further information see BRAKE SERVICE in Section 8 of this handbook.

The parking brake knob is located below the pilot's control column. To set the parking brake, first depress and hold the toe brake pedals and then pull the parking brake knob. To release the parking brake, first depress and hold the toe brake pedals and then push in on the parking brake knob.

7.19 FLIGHT CONTROL SYSTEM

The primary flight controls are conventional and are operated by dual control wheels and rudder pedals. The control wheel operates the ailerons and elevator. The rudder pedals actuate the rudder and nose wheel steering. The toe brakes, which are an integral part of the pedals, operate the wheel brakes. The ailerons and rudder are interconnected through a rudder/aileron spring system, which is activated only when controls are out of harmony. In normal coordinated flight, the system is inactive. All flight control systems are operated by closed circuit cable systems.

The elevator control system incorporates a mechanical down-spring, located below the throttle quadrant. If the down-spring fails during takeoff rotation, a push force may be required to prevent over rotation.

The pitch trim control and the yaw trim control are both located on the pedestal. There is no pilot adjustable aileron trim function. The pitch trim control wheel is located on the right side of the pedestal. The trim wheel is rotated forward for nose-down trim and aft for nose-up trim. Trim indications are located on the MFD. The green arc indicates the normal takeoff range. Yaw trim is achieved by a trim tab driven by an electro-mechanical linear actuator. The yaw trim is activated by depressing a rocker switch, located on the the pedestal. The switch is marked with L and R, corresponding to nose left or nose right. Trim indications are located on the MFD. The green arc indicates the normal takeoff range.

The wing flaps are electrically controlled by a flap selector switch mounted on the instrument panel immediately to the right of the control pedestal. The flap position indicator is located on the MFD. The flaps may be set to one of three detent positions; UP, T/O and LND. The flaps will automatically move to the selected position, which can be confirmed by referring to the position indicator on the EIS display. The flaps may be extended to T/O at speeds below 147 KIAS and to LND at speeds below 112 KIAS. If a red FLAP FAIL message displays on the PFD, it is indicative of a flap system malfunction in which case the flap protection circuit automatically removes power from the electric flap motor. Resetting the FLAP WARN circuit breaker will restore normal operating power to the flap motor. If the message displays again after resetting the breaker and operating the flaps, then a system malfunction is indicated. The flap motor circuit breaker should be pulled.

7.21 FUEL SYSTEM

The fuel system consists of two independent main and header wing tanks, two wing boost pumps, supply and heated fuel return fuel lines, and five fuel sump drains (2 fuel header tank drains, 2 return line drains, and 1 filter drain). Fuel is drawn from both wings simultaneously, with float valves employed to prevent air ingestion. There are fuel level switches to prevent the boost pumps from running dry.

The two header tank sump drains are located beneath the wing at the most inboard wing station. The two heated fuel return line drains are located on the lower aft left and right sides of the cowling (See Figure 7-3). The filter sump drain is located adjacent to the left heated fuel return system drain (See Figure 7-3).

Upon engine shutdown, the fuel remaining in the fuel manifold drains via an EPA fuel purge system. This system utilizes accumulated engine bleed air to force the residual fuel into the burner upon shutdown. A slight and momentary increase in ITT and the possible presence of smoke in the exhaust is normal as the residual fuel is consumed.

The fuel shut-off valve T-handle is located on the center pedestal under a red protective cover and is pulled aft for the closed position. The cover acts as a block to prevent re-opening of the fuel valve until the cover is lifted and the T-handle is pushed forward. The protective cover prevents inadvertent use of the shut off T-handle.

A fuel temperature indicator, shown on the MFD, displays the fuel temperature sensed by a fuel temperature probe, located in the right inboard fuel header tank. During operations where the fuel temperature indicator is below 0°C (32°F), OAT is below -30°C (-22°F), and fuel quantity is greater than 100 pounds, the fuel return solenoid valve downstream of the engine fuel-oil heat exchanger energizes open and returns unused fuel to the outboard left and right fuel tanks. This returning of warmed fuel to the fuel tanks slows the cooling process of the fuel, which allows the aircraft to operate at temperatures as cold as -54°C (-65°F) for a longer period of time. If fuel temperature drops below -34°F, a FUEL TEMP advisory CAS message is posted.

Individual left or right wing boost pump activation is more likely to occur while warm fuel is being returned to the tanks due to the increased likelihood of fuel tank imbalance.

If both wing boost pumps are commanded ON, regardless of fuel temperature, the fuel return solenoid will be de-energized (closed).

7.21 FUEL SYSTEM (continued)

An inline electric wing boost pump is located in each wing root fairing just inboard of the header tanks. Control of these pumps is through a three-position switch located on the left overhead panel with selections: MAN, OFF, and AUTO. The pumps operate in unison to provide emergency back up for the engine driven pump, boost pressure for starting, and vapor suppression at high altitudes. In the AUTO position, a pressure switch activates both pumps automatically when the fuel pressure from the engine driven pump drops below 9 psig, and remains activated until the pressure increases to 12 psig. During this period, the red FUEL PRESS LOW message with triple chime warning, white L FUEL PUMP ON and white R FUEL PUMP ON messages will illuminate. As pressure increases to 12 psig the pumps are automatically turned off and all three messages extinguish. This boost pump cycling prompts the pilot to select the MAN mode to provide continuous fuel pressure.

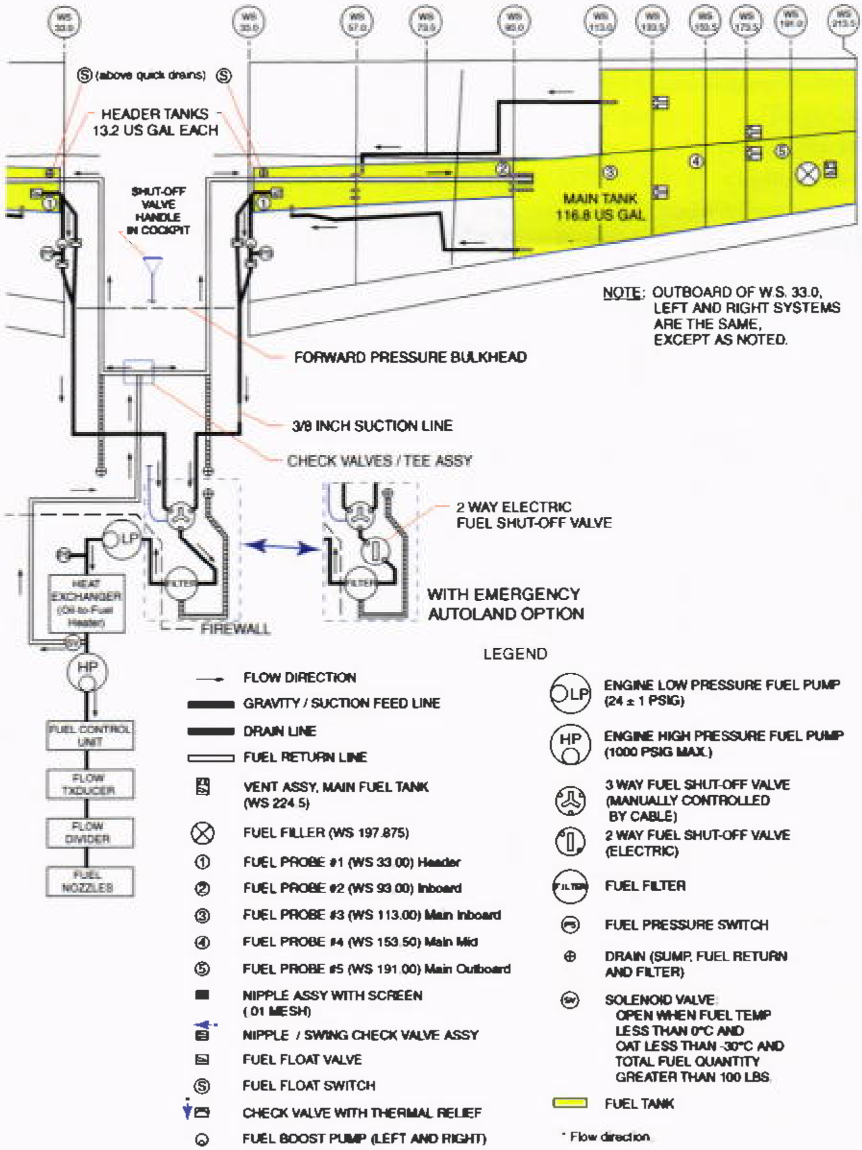
In the AUTO mode the pumps are also controlled automatically, but separately, by the Garmin system. The Garmin system also provides a secondary means to control fuel balance. To provide proper fuel balance, a discrete signal from the Garmin system activates the boost pump on the "heavy" side once a 25-pound imbalance is reached. The system should automatically correct itself.

If the system does not correct itself and the imbalance increases to 40 pounds, a FUEL PUMP ON advisory message will illuminate corresponding to the heavy wing along with an amber FUEL IMBALANCE caution annunciation and a double aural chime indicating a possible fuel balancing system malfunction that may require pilot action.

NOTE

Uncoordinated flight or ground maneuvering may cause momentary fuel imbalance indications.

7.21 FUEL SYSTEM (continued)



Fuel System Schematic
Figure 7-3

7.23 ELECTRICAL SYSTEM

Power for the 28 Vdc negative ground dual fed split bus electrical system is supplied by a direct driven 200 ampere generator and a belt driven 135 ampere alternator. Due to cooling requirements, the generator and alternator currents are limited to 145 amperes and 130 amperes, respectively. When OAT is 5°C or less or both OAT indications have failed, the generator limit is increased to 160 amperes. The generator and the alternator are located on the aft end of the engine. Although the units do not operate in true parallel fashion, both units are kept running at the same time. The generator is considered the primary current source and the alternator is the back-up. The units that control the generator and the alternator are adjusted such that the generator furnishes all of the load and the alternator is the backup. In the event that the generator should fail or be turned off for any reason, the alternator picks up the entire load. A single 24 Vdc lead acid battery of 38 ampere hour capacity is located in the battery compartment in the right side of the nose of the aircraft just forward of the wing leading edge. The battery provides power for engine starting and also acts as an emergency source of electrical power in the event the generator and the alternator should both fail.

Electrical switches are located as follows.

- An overhead switch panel located above the upper edge of the windshield (Figure 7-5).
- Avionics and systems switches located on the instrument panel (Figure 7-9).
- Environmental control panel installed in the instrument panel.

A battery bus, located in the engine compartment, provides power for the courtesy lights for a 15-minute time duration whenever the lower cabin door is open. Because the battery bus is connected directly to the battery, power is available for these functions even when the BATTERY switch is OFF. The battery bus contains fuses to protect these circuits. A switch labeled COURTESY LIGHT RESET is located adjacent to the left-aft seat which, when pressed, activates the courtesy lights for an additional 15-minutes.

The Emergency (EMER) bus can be activated by depressing the EMER switch on the overhead switch panel.

NOTE

In the event of a total electrical failure and to operate exclusively on the emergency bus, the battery switch must be OFF and the EMER switch ON.

7.23 ELECTRICAL SYSTEM (continued)

NOTE

The displayed voltage VOLTS will be that of the emergency bus when the EMER switch is turned ON and the battery, alternator and generator switches are turned OFF, otherwise the displayed voltage will be that of the tie bus.

The EMER bus is tied directly to the battery via a relay. Turning ON the EMER switch will activate the PFD1 in reversionary mode (with AHRS1 data, ADC1 data, a subset of engine parameters, and landing gear indication), the left touchscreen, the standby instrument, the MIC SEL switch, and the CABIN PRESSURE DUMP switch. The emergency bus is intended to provide emergency power to systems required to land the aircraft in the event of a total electrical failure.

When the BATTERY switch, located on the overhead switch panel, is turned ON, the battery contactor closes, enabling current to flow from the battery to both the start contactor and the tie bus located on the lower left section of the pilot's instrument panel. Should the airplane's battery be depleted, a receptacle (located behind a small access door on the left side of the aft fuselage) permits using an external 24 Vdc power source for engine start. With the BATTERY switch OFF, connecting an appropriate external source completes a circuit that closes the external power contactor, permitting current to flow to the starter generator and the tie bus. Whether using the airplane's battery or external power, tie bus overcurrent protection is provided by the 150 ampere BATTERY circuit breaker.

NOTE

A flashing red VOLTS indication and red master WARNING with repeating chime will occur when the main bus voltage falls below 24 volts (if the generator is OFF, alternator is OFF and aircraft is on the ground) or 25 volts (if the generator is ON, alternator is ON, or aircraft is in the air) or any time the EMER bus voltage drops below 24 volts. Check the voltmeter for correct voltage.

The generator and the alternator each have their own independent ON-OFF switch located on the overhead switch panel. Each system also has its own solid state voltage regulator which regulates field voltage to their respective

7.23 ELECTRICAL SYSTEM (continued)

device. When selected ON, the output of the generator and the alternator is fed through individual shunts to the tie bus. The alternator is tied to the bus by a 150 ampere ALTERNATOR circuit breaker. The generator is tied to the bus by a line contactor which is controlled by the generator control unit (GCU). Should an overvoltage or field ground fault condition occur in the alternator system, its voltage regulator will turn off the output to the alternator field. Once the fault has been cleared the alternator system may be turned back on by turning the alternator switch on the overhead switch panel OFF and then back ON. Should an overvoltage or ground fault condition occur in the generator system the GCU will open the line contactor and place itself in the tripped mode. Once the fault has been cleared the generator can be put back on line by resetting the GENERATOR CONTROL circuit breaker (on the lower left section of the pilot's instrument panel) and turning the generator switch on the overhead switch panel OFF and then back ON. Any time the alternator or generator fails when the engine is operating, a red ALTERNATOR FAIL message or a red GENERATOR FAIL message will be displayed on the PFD with repeating aural chimes. When the alternator and/or generator are turned OFF when the aircraft is in the air, no CAS message is posted. The green light in the ON/OFF switch will extinguish to confirm that the generator or alternator is turned off. However, if you continue operating on battery power only, and system voltage drops below 24 V, the system will post the GENERATOR FAIL and ALTERNATOR FAIL CAS messages and aural alerts.

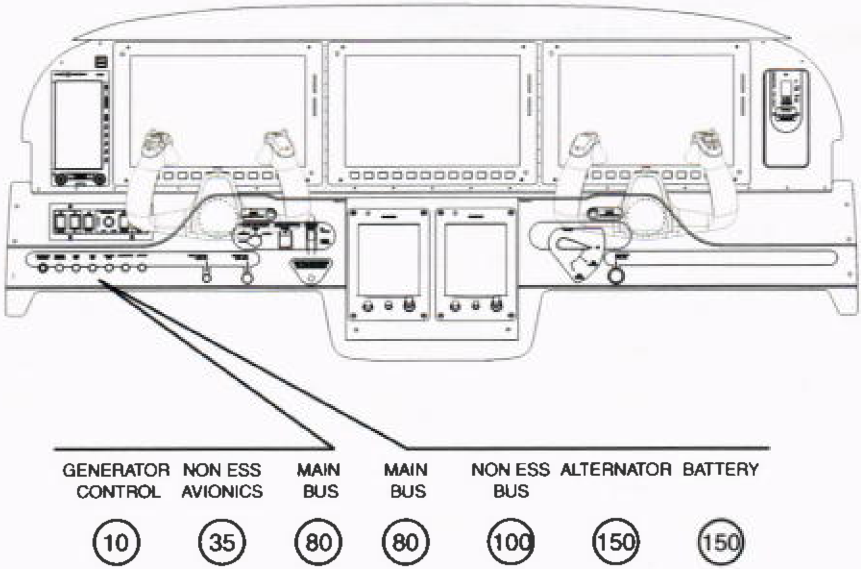
The engine start system has an Auto and a Manual mode. The START MODE switch, when activated (green light on), allows for manual engine starting (MAN) or stopping the starter (STOP) during an aborted start. During manual engine starts, the PUSH START switch must be pressed and held until Ng increases to 56%. When the START MODE switch is not active (green light extinguished), the engine will start in automatic mode after momentarily pushing the PUSH START switch. The engine is normally started in automatic mode.

A main electrical bus with associated circuit breakers is located on the pilot's forward and aft side panels (Figure 7-7). The non-essential bus and non-essential avionics bus are located on the co-pilot's forward side panel (Figure 7-8).

Current is fed to the main bus by two conductors. Two in line diodes provide isolation in the event of a ground fault in one of the feeder lines. The two feeders are protected by two 80 amp circuit breakers. The non-essential bus is also fed by the 100 amp circuit breaker (Figure 7-4).

7.23 ELECTRICAL SYSTEM (continued)

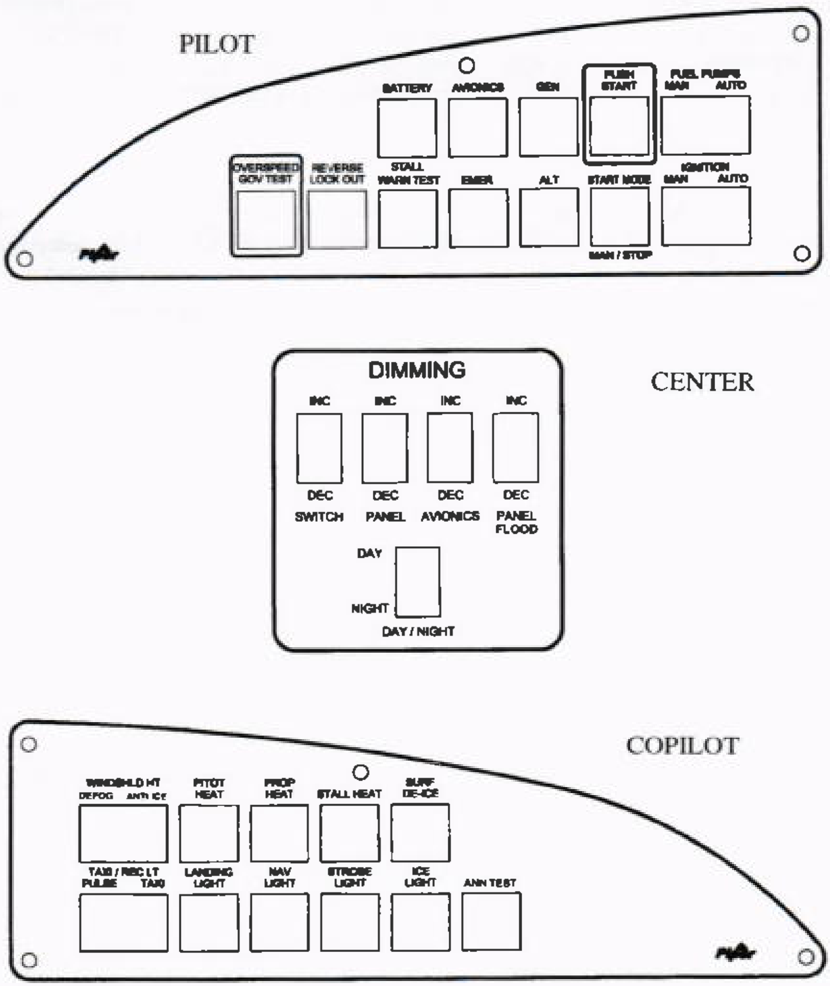
The non-essential avionics bus is fed through an independent contactor. The feeder to the contactor is protected by a 35 ampere circuit breaker. When the AVIONICS switch on the overhead switch panel is selected ON, the avionics contactor closes allowing current to flow to the non-essential avionics bus. Should the need arise, the non-essential avionics bus can be isolated by pulling the NON ESS AVIONICS circuit breaker.



Tie Bus Circuit Breakers
Figure 7-4

Optimum cockpit and external lighting for night operations is achieved by using a combination of the light switches and dimming switches on the overhead switch panel. External light switches are located on the co-pilot overhead switch panel shown in Fig. 7-4. The LANDING LIGHT switch activates the lights on the main landing gear while the TAXI/REC LT switch (in TAXI position) activates the lights on the main landing gear and wingtips. When the TAXI/REC LT switch is selected to PULSE, the wingtip lights activate in a pulsing/alternating fashion.

7.23 ELECTRICAL SYSTEM (continued)



Overhead Switch Panel
Figure 7-5

7.23 ELECTRICAL SYSTEM (continued)

Dimming switches are located at the center of the overhead switch panel. The SWITCH dimmer controls lighting intensity of the overhead switches. The PANEL dimmer controls lighting intensity of the circuit breaker panels, instrument panel EL placards, yaw trim switch, and environmental control panel. The AVIONICS dimmer combined with a photo cell contribution controls lighting intensity of the Garmin displays and the autopilot. The PANEL FLOOD dimmer controls lighting intensity of the LED light strips imbedded in the glareshield and the fuel shutoff handle. The DAY/NIGHT switch dims and brightens the MIC SEL and CABIN PRESSURE DUMP switches on the instrument panel.

Standby Flight Instrument display lighting is controlled automatically via photocell or manually. Manual lighting intensity can be adjusted by selecting the MENU button, pressing the lower left knob to select manual mode, and then adjusting the lower left knob to achieve the desired display brightness.

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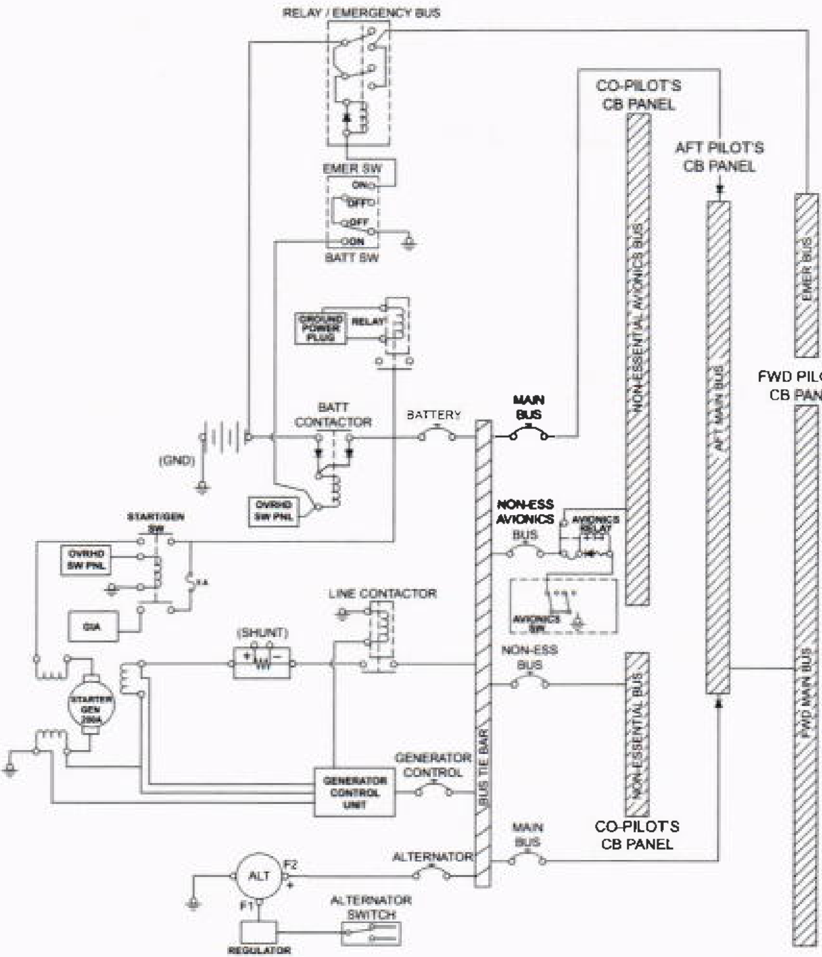
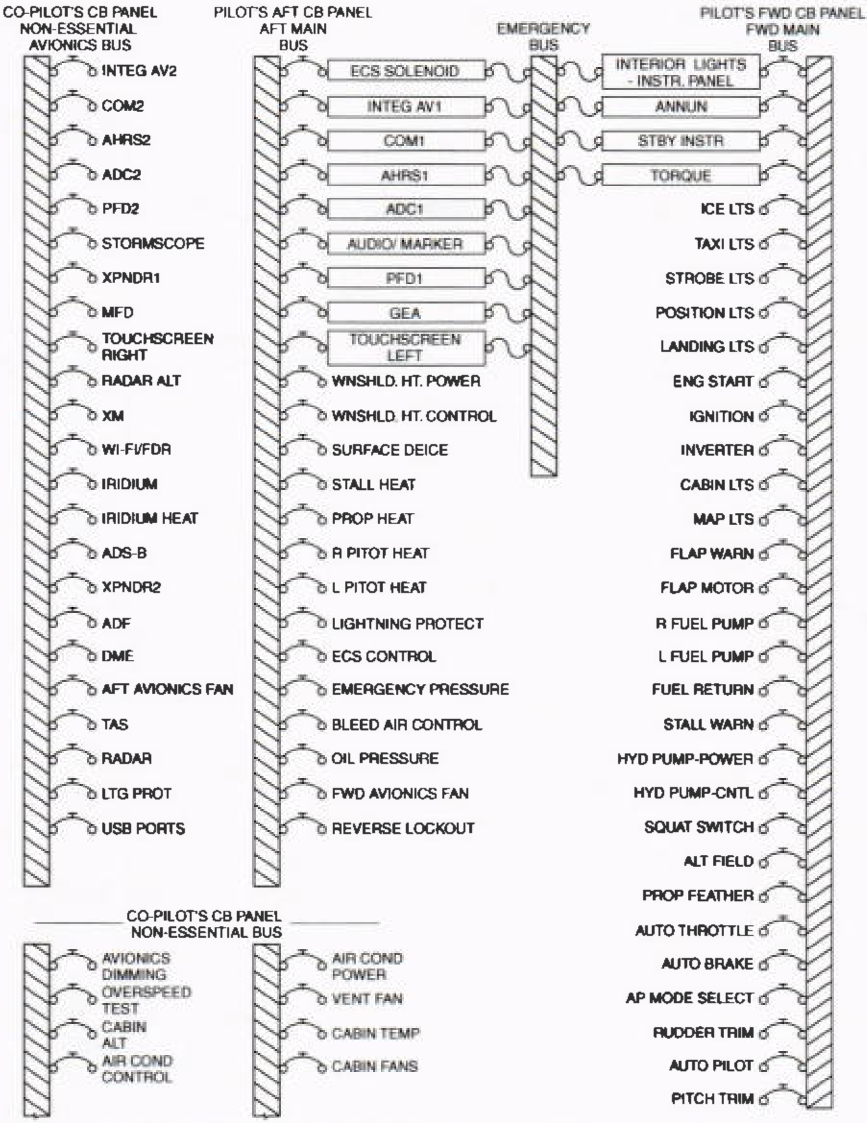
7.23 ELECTRICAL SYSTEM (continued)



Electrical Power Distribution System
Figure 7-6 (Sheet 1 of 2)

7.23 ELECTRICAL SYSTEM (continued)

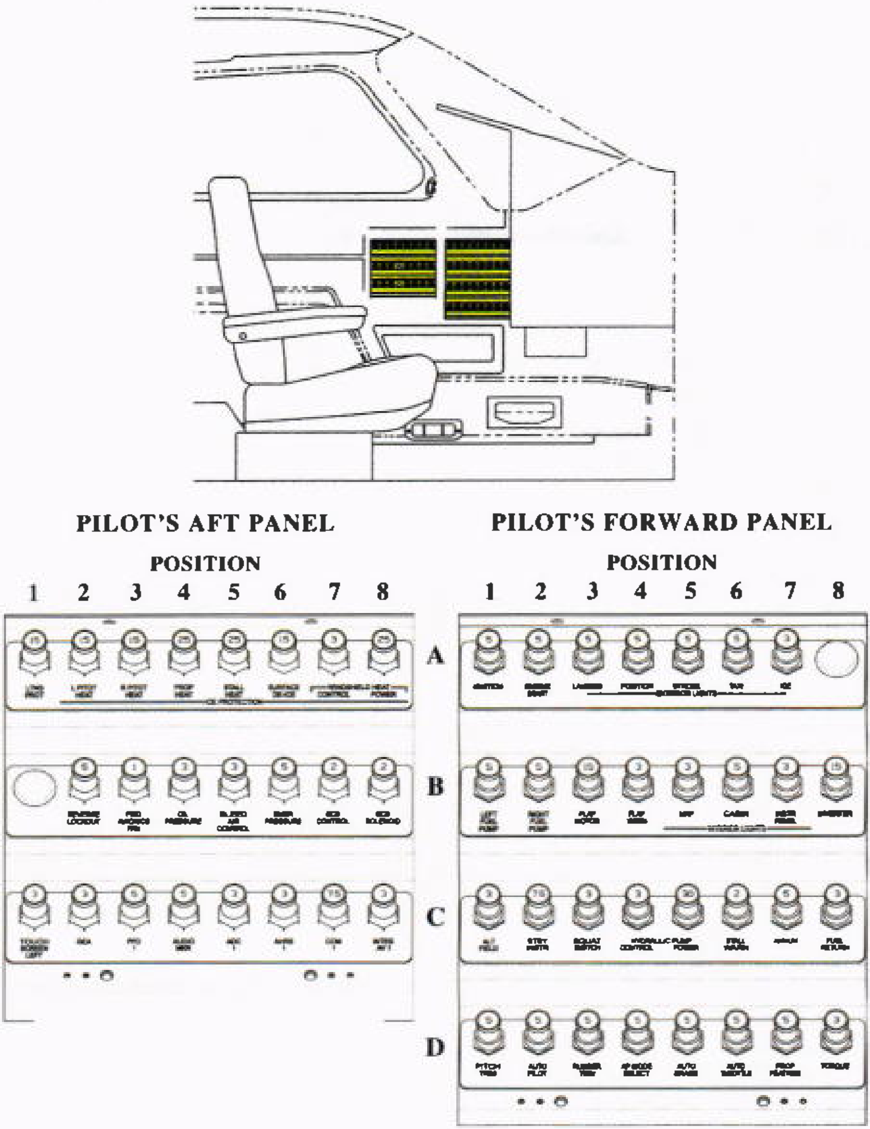


NOTE: CIRCUIT BREAKERS AND LABELS MAY VARY DEPENDING ON EQUIPMENT INSTALLED.

Electrical Power Distribution System

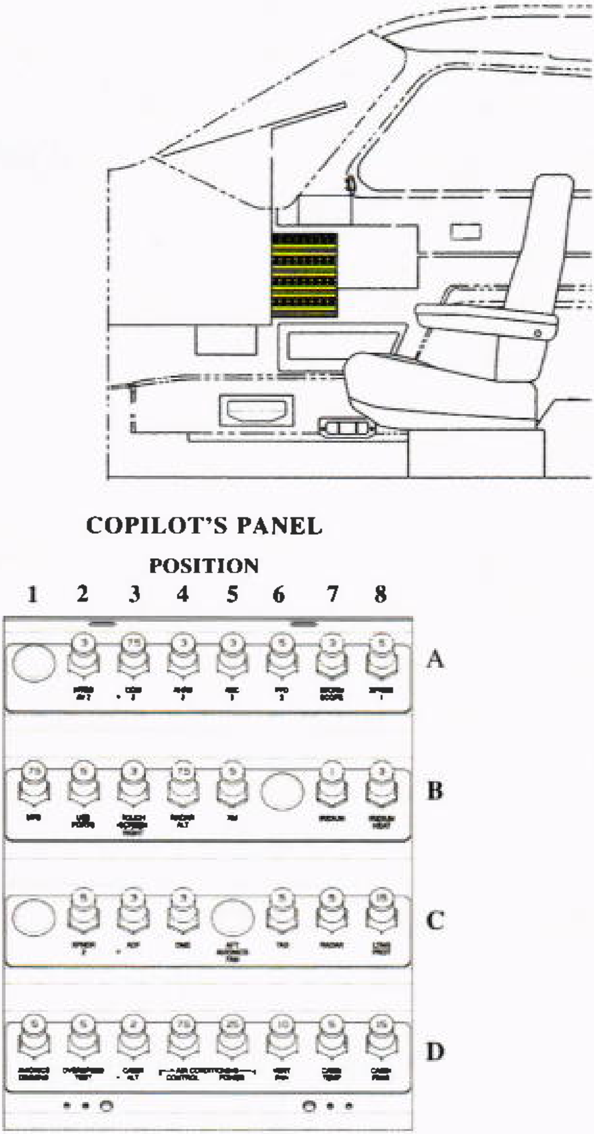
Figure 7-6 (Sheet 2 of 2)

7.23 ELECTRICAL SYSTEM (continued)



Circuit Breaker Panel - Pilot's Side, Typical
Figure 7-7

7.23 ELECTRICAL SYSTEM (continued)



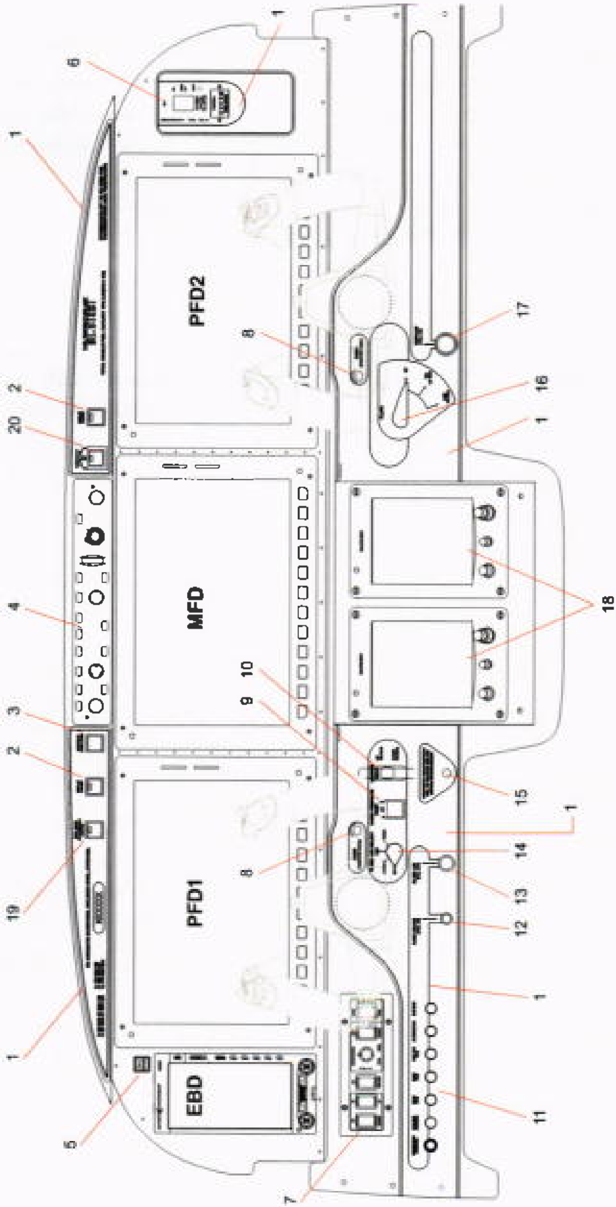
Circuit Breaker Panel - Copilot's Side, Typical
Figure 7-8

7.25 INSTRUMENT PANEL

The instrument panel has been designed to incorporate the Garmin G3000 Integrated Cockpit. All communication and navigation systems, flight instruments, engine instruments, and system annunciations have been integrated into a custom design package specifically for the PA-46-600TP.

All the high current tie bus input and feeder circuit breakers are located on the lower left section of the instrument panel.

7.25 INSTRUMENT PANEL (continued)



1. EL PLACARDS
2. DISPLAY BACKUP SWITCH
3. AUTOPILOT LEVEL MODE
4. AUTOPILOT CONTROLLER
5. MIC SELECT (BOM/MSK)
6. ELT SWITCH
7. ENVIRONMENTAL CONTROL SYSTEM PANEL
8. PUSH STD BARO
9. CABIN PRESSURE DUMP SWITCH
10. LANDING GEAR SELECTOR
11. TIE BUS CIRCUIT BREAKERS
12. PARKING BRAKE
13. BLEED AIR SHUT OFF LEVER
14. BLEED AIR SELECT
15. EMERGENCY GEAR EXTENSION
16. FLAP LEVER
17. DEFROST SWITCH
18. DUAL GTC 575
19. STALL WARN ICE SCHEDULE SWITCH
20. EMERGENCY AUTOLAND SWITCH

Instrument Panel, Typical
Figure 7-9

7.27 PITOT STATIC SYSTEM

Pitot pressure for the airspeed indicators is sensed by heated pitot heads installed on the bottom of the left and right wings and is carried through lines within the wing and fuselage to the two air data computers mounted behind the instrument panel. Static pressure for the two air data computers and standby instrument is sensed by static source ports on the underside of the fuselage. Static pressure for both pressurization system outflow valves is sensed by two separate static ports located on the aft bottom of the aircraft near the static ports.

An alternate static source control valve is located below the instrument panel to the left of the pilot. For normal operation, the lever remains down. To select alternate static source, place the lever in the up position. When the alternate static source is selected, ADC1 and the standby instrument will be vented to alternate static ports on the aft sides of the fuselage. During alternate static source operation, these instruments may give slightly different readings.

If one or more of the pitot static instruments malfunction, the system should be checked for dirt, leaks or moisture.

The holes in the sensors for pitot and static pressure must be fully open and free from blockage. Blocked sensor holes will give erratic or zero readings on the instruments.

Both the pitot and static systems can be drained through separate drain valves located on both the right and left lower side panel next to the crew seats. Three drains exist on the pilot's side. The forward valve is the pilot's static drain, the center valve is the alternate static drain and the aft valve is the pilot's pitot drain. Two drains exist on the copilot's side. The forward valve is the copilot's static drain and the aft valve is the copilot's pitot drain.

The pitot heads are heated, which alleviate problems with icing and heavy rain. The switch for pitot heat is located on the right overhead switch panel. Static source ports have been demonstrated to be non-icing; however, in the event that icing does occur, selecting the alternate static source will alleviate the problem.

7.29 ENVIRONMENTAL SYSTEM

The environmental system consists of:

(a) An engine bleed air and conditioning system.

(b) The ventilating air system.

(c) An air conditioning system.

(d) The cabin air distribution system.

(e) The pressurization control system.

Compressor bleed air from the P3 engine port supplies air for heating the cabin during flight and ground operations and for pressurization. The bleed air is first routed through a mass flow controller that mixes ambient and bleed air, then the air flow is split between a heat exchanger and muffler. The amount of air flowing through each component is dependent on the cabin air temperature setting. The air then flows into the cabin through the lower left and right cabin side panel ducts, and through the windshield defroster, when selected by pulling the defoster knob located below the right control column. Conditioned bleed air entering the cabin will always be warmer than the outside air and typically warmer than the cabin air.

Cabin ventilation air is provided by a blower which is activated by the VENT FAN switch on the Environmental Control panel. Ambient air through this system is only available during ground operations or unpressurized flight.

Cabin air conditioning is provided by a vapor cycle system. The compressor is belt driven by the engine dual drive. The condenser and its cooling air fan are located in the tailcone immediately aft of the rear pressure bulkhead. Cooling air from outside the tailcone is drawn into the cooling air duct through a flush opening in the skin, routed across the condenser coil, and discharged overboard through the tailcone exit opening. Two recirculation blowers and evaporator assemblies are located aft of each rear seat below the rear baggage compartment floor. The recirculation blowers draw air into each evaporator coil through grills in the floor structure behind the rear seats and discharge it into the upper left and right cabin side panel ducts. Adjustable eyeball outlets are located at each seat location in the airplane.

7.29 ENVIRONMENTAL SYSTEM (continued)

The AIR COND and blower LO & HI switches, located as part of the environmental control panel at the lower-left of the instrument panel, are used to control the air conditioning system. When the AIR COND switch is selected ON, the compressor belt drive is electrically clutched, the condenser blower motor relay is closed, and cooling air flows over the condenser coil. When the HI/LO switch is selected, the recirculation blower motor activates to the selected speed, causing cabin air to flow across the evaporators then to the air conditioning vents at each seat location. Overcurrent protection is provided by the 15 amp CABIN FANS, 7.5 amp AIR CONDITIONING CONTROL, and 25 amp AIR CONDITIONING POWER circuit breakers in the copilot's circuit breaker panel.

The coolant (HFC-134A) portion of the system incorporates a receiver dryer, a sight gauge, suction and discharge service valves, and 265 psi high pressure and 40 psi low pressure switches. Should the compressor discharge pressure increase above 265 psi, or decrease below 40 psi, the applicable pressure switch will open, disengaging the compressor clutch.

Refer to paragraph 7.31, BLEED AIR, CONDITIONING AND PRESSURIZATION SYSTEM, for a more complete description of the pressurization system and use of related controls and switches.

Environmental Control Panel Operation

1. **Environmental Control Panel Switches and Controls**

   Environmental Control Panel switches and controls are located just to the left of the pilot's control column. (Refer to item 7, Figure 7-9.)

   The environmental control panel switches and controls from left to right on the panel are:

   - AIR COND / ON switch
   - HI / LO blower switch
   - VENT FAN / ON switch
   - CLIMATE CONTROL - AUTO / COOL / WARM rotary switch
   - AUTO / MANUAL mode switch
   - MANUAL WARM / COOL switch

7.29 ENVIRONMENTAL SYSTEM (continued)

2. Auto Temp Operation

Under normal conditions, temperature will be maintained automatically. For automatic operation, set the mode switch to AUTO. Rotate the CLIMATE CONTROL to the desired COOL or WARM range. Set the recirculation blower fan switch to either HI or LO as desired.

3. Manual Temp Operation - Maximum Cabin Heating

NOTE

Maximum heat can be obtained in the MANUAL mode by positioning the BLEED AIR SELECT switch to HIGH. When on the ground, this position should only be used when ambient temperature is less than 20°F (-7°C). Should the bleed overtemperature annunciator light illuminate, manually decrease the temperature by pulsing the WARM/COOL switch to the cool position.

For maximum heating, hold the manual WARM/COOL switch to the WARM position for 45 seconds. The switch may be pulsed to the COOL position to adjust the cabin temperature as desired.

4. Manual Temp Operation - Maximum Cabin Cooling

On Ground:

On the ground, maximum cabin cooling may be obtained by pulling the BLEED AIR lever OUT (OFF), and setting the BLEED AIR SELECT to OFF, and AIR COND to ON. Select MANUAL and hold the manual WARM/COOL switch to the cool position for 45 seconds. Set the recirculation blower fan to HI.

In Flight:

In flight, cabin cooling should be obtained with the AIR COND switch selected to ON and the aircraft pressurized normally.

7.31 BLEED AIR, CONDITIONING AND PRESSURIZATION SYSTEM

Air for cabin pressure is obtained from the P3 engine bleed port. Bleed air is routed through the mass flow and temperature controllers. The mass flow controller meters the amount of mass flow to the cabin through an actuator controlled, ambient and bleed air mixing ejector. The amount of mass flow is controlled by a four position rotary switch located to the right of the pilot's control column. The available settings are OFF, NORM, HIGH, and EMER.

The temperature controller sets the percentage of bleed air that will flow through the cooling heat exchanger versus the percentage that will flow through the acoustic muffler. The amount of air through each device determines the mixed cabin supply air temperature. The temperature controls are located on the environmental control panel located on the instrument panel to the left of the pilot's control column. There are two modes of operation, automatic and manual. Cabin temperature is controlled by a relative temperature knob when in automatic mode and an increase/decrease rocker switch when in manual mode. The automatic temperature mode relies on the cabin temperature sensor, located behind the pilot in a side close out panel, for temperature regulation. The manual temperature mode directly controls the amount of air flowing through the cooling heat exchanger and acoustic muffler.

Cabin pressure is controlled by two electromechanical outflow valves located on the aft pressure bulkhead. These valves provide identical functions of maintaining a desired pressurization schedule during all phases of flight without exceeding the maximum differential pressure of 5.5 +/-0.1 psi. If the cabin pressure control system develops a communications fault during flight, a CPCS FAULT caution CAS message is posted. In this case, the landing field elevation and weight on wheels sensors may be lost, thereby allowing the cabin to remain pressurized after landing. The pilot must verify that the cabin is fully depressurized prior to landing. If the cabin pressure control system develops a communications failure on the ground, a CPCS FAIL caution CAS message is posted. The outflow valves will remain open and the cabin will not pressurize. If a CPCS FAIL caution CAS message is experienced during flight, the outflow valves will close, allowing the system to continue to operate in a degraded mode.

Cabin pressurization system controls and switches are located on the left instrument panel while the pressurization system displays are incorporated into

7.31 BLEED AIR, CONDITIONING AND PRESSURIZATION SYSTEM (continued)

the MFD, or PFD in Reversionary mode.

The cabin pressurization system controls, switches, and displays are as follows:

(a) BLEED AIR lever (PULL OFF)
(b) BLEED AIR SELECT switch (OFF /NORM /HIGH /EMER)
(c) CAB PRES / DUMP switch
(d) Cabin Altitude, Differential Pressure, and Rate of Climb EIS indications
(e) Destination Field Elevation (DEST ELV) window on the MFD.

The only action required by the pilot during normal operation is to input the destination airport elevation by entering a flight plan with a destination or by accessing the Systems Page on the Touchscreen, and entering field elevation in the DEST ELV field. If a new destination elevation is not entered, the last value entered will be used, which could result in the airplane landing while still pressurized.

Should cabin pressure altitude exceed 10,000 feet, an amber CABIN ALT 10K message and double chime will alert the pilot. If the cabin altitude exceeds 12,000 feet, the emergency bleed air solenoid is automatically opened and a white EMER BLEED ON message and a red CABIN ALT 12K (as sensed by the Garmin GAE43 or independent cabin altitude switch) message and triple chime will replace the amber CABIN ALT 10K message. Each outflow valve has a cabin altitude limiter. They will attempt to limit the cabin altitude to 14,300 +/- 300 feet by modulating the outflow valves as required.

7.31 BLEED AIR, CONDITIONING AND PRESSURIZATION SYSTEM (continued)

For pressurized flight, set the BLEED AIR SELECT to NORM and the CABIN PRESSURE - DUMP switch set to CABIN PRESS (DUMP extinguished). The G3000 uses flight plan cruise altitude and landing elevation to automatically set and adjust the cabin pressurization system to maintain the cabin at a safe and comfortable altitude.

For instructions on the operation of the cabin pressurization system during high altitude operations, refer to Section 4, Normal Procedures.

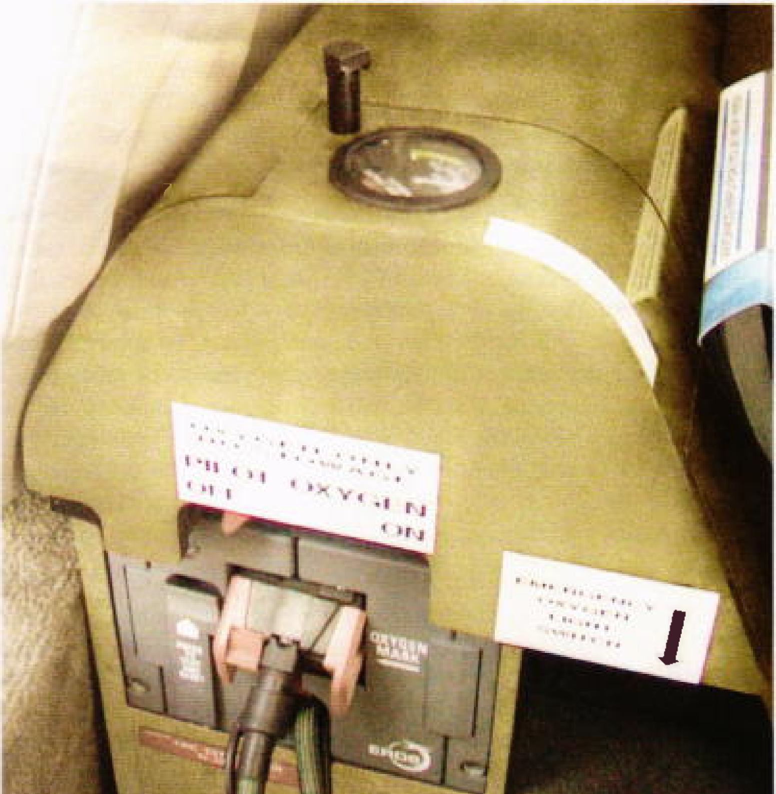
The CABIN PRESSURE - DUMP switch, when set to DUMP, electrically opens a solenoid valve allowing return pressure to open the safety valve and rapidly dump cabin pressure to the cabin altitude limiter value of 14,300 +/-300 ft. Above 12.5K, even if the BLEED AIR SELECT switch is selected to OFF, the emergency bleed will provide bleed air to the cabin.

For unpressurized flight the BLEED AIR SELECT control should be set to OFF and the pressurization bleed air shut off valve pulled closed. Setting the CABIN PRESSURE - DUMP switch to DUMP will provide maximum airflow through the cabin.

For procedures to follow during pressurization malfunctions, refer to Section 3 - Emergency Procedures.

7.33 EMERGENCY OXYGEN SYSTEM

The pilot diluter demand emergency oxygen system consists of a quick donning mask, stowage box, pressure gauge, and oxygen bottle with pressure regulator and shutoff valve assembly. The complete system is contained within a cabinet located behind the copilot seat. Figure 7-10 shows the pilot emergency oxygen system as installed within the cabin.



Emergency Oxygen System Installation
Figure 7-10

7.33 EMERGENCY OXYGEN SYSTEM (continued)

The oxygen system is activated by a lever located above the stowage box and slightly recessed within the cabinet. A placard on the cabinet clearly marks the ON and OFF positions. The system pressure gauge is located on top of the cabinet and is illuminated by a post light. The pressure gauge incorporates a yellow arc from 0 to 800 psi. The minimum safe charge for pressurized operation above 25,000 feet is 800 psi or above. The quick donning mask stowage box incorporates a test indicator and is located in the upper left corner of the stowage box face. A press-to-test button is also located in the lower left corner of the stowage box face. The controls on the mask itself consist of a switch to select between diluted/normal (N) flow and non-diluted flow (100%), as well as an additional emergency pressure breather switch. Integral to the mask supply line and adjacent to the mask is a secondary flow indicator.

To remove the mask from the stowage box, pull on the inflation control valve (red handles) protruding from the face of the stowage box. Once removed, depressing the inflation control valve inflates the harness and allows it to be placed over the head. After the harness is completely over the head, releasing the inflation control valve will firmly hold the mask in place. To achieve optimum fit, simply reinflate the harness by depressing the inflation control valve and adjusting the mask as needed. The MIC SEL switch, located above the Aspen Standby Instrument, when in the MSK position activates the mask microphone. Continued oxygen system operation can be verified by the pressure gauge, located on top of the cabinet, and two flow indicators, one located on the face of the stowage box and the other integral to the oxygen mask supply line.

With the system charged to 800 psi or higher and the mask set to normal (N), the pilot oxygen system will provide adequate oxygen for an emergency descent from 30,000 feet to 10,000 feet. The 15 minute descent profile used to define the minimum safe oxygen charge includes a one-minute dwell time at 30,000 feet, a 5,000 fpm descent to 10,000 feet, followed by a 10 minute hold at 10,000 feet. With the system fully charged to 1800 psi and the mask set to normal (N), the oxygen system will provide oxygen to the pilot for approximately 25 minutes at 30,000 feet.

NOTE

Pilot emergency oxygen system pressure must be above the yellow arc, or greater than 800 psi, during pressurized flight above 25,000 feet.

7.33 EMERGENCY OXYGEN SYSTEM (continued)

The emergency oxygen system for all occupants other than the pilot consists of two oxygen generators and six masks. The system consists of two major assemblies, the copilot and cabin passenger assemblies. The oxygen generators provide sufficient oxygen flow for six people for a 15 minute period. Once an oxygen generator is activated, it will continue to produce oxygen until depleted, as no shutoff provisions are provided. The generator under the co-pilot seat has two masks. The generator below the aft facing seat has 4 masks.

The copilot assembly is located under the copilot seat and contains two masks and one two-man oxygen generator mounted on a sliding tray. The tray slides out into the aisle between the pilot and copilot seat, exposing the two masks. Each mask is connected to the oxygen generator via a clear plastic oxygen delivery tube and lanyard. Pulling either of the masks, and thus the lanyard, activates the oxygen generator and delivers oxygen to both masks simultaneously. The additional mask can be used by the pilot in the event of a failed pilot demand oxygen system. The oxygen generator has two over-pressure relief valves to prevent excessive pressure should a malfunction in the system occur.

The cabin passenger assembly is located in a drawer beneath the right rear-facing passenger seat. Four masks and a single 4-man oxygen generator are accessed by sliding the drawer out in the aft direction. Any of the four masks will reach any of the four passengers. Activation and operation of the passenger oxygen generator is identical to the copilot assembly.

Placards are provided on the side panels outboard of the copilot's seat and the right aft-facing seat; the placards state the location and operation of the copilot and passenger emergency oxygen system, and that smoking is prohibited.

An OXYGEN message is provided to inform the crew whenever either of the two oxygen generators has been activated. The message is displayed as a white advisory while on the ground but as an amber caution while in flight and is activated by a microswitch on each generator. The message will continue to illuminate until the used generator is replaced with a full one.

7.35 STALL WARNING SYSTEM

The stall warning system consists of a lift transducer located in the leading edge of the left wing and a lift computer to power regulators, a signal processor, control circuitry and a push-to-test switch. The lift transducer protrudes into the air stream and during flight is positioned by local airflow velocity and direction. A continuous stall warning aural alert (STALL STALL) will sound prior to the actual stall.

Activation of the stall warning push-to-test switch (STALL WARN TEST) during ground operation will produce an aural stall warning alert, verifying proper stall warning operation. The amber STALL WARN FAIL caution message indicates that the lift computer and/or lift transducer has failed.

7.37 EMERGENCY LOCATOR TRANSMITTER

The Emergency Locator Transmitter (ELT) operates on self-contained batteries and is located in the aft fuselage section. It is accessible through a cover on the bottom right side of the fuselage.

A battery replacement date is marked on the transmitter. To comply with FAA regulations, the battery must be replaced on or before this date. The battery must also be replaced if the transmitter has been used in an emergency situation, if the accumulated test time exceeds one hour, or if the unit has been inadvertently activated for an undetermined time period.

NOTE

If for any reason a test transmission is necessary, the test transmission should be conducted only in the first five minutes of any hour and limited to three audio sweeps. If a test must be made at any other time, the test should be coordinated with the nearest FAA tower or flight service station.

ARTEX ELT 1000 OPERATION

There is a three position switch (placarded ON ARM/OFF, and TEST) on the ELT unit. The switch is set to ARM/OFF when the ELT is installed at the factory, and it should remain in that position whenever the unit is installed in the airplane.

A remote switch (placarded ON ARM/OFF, and TEST) is located on the copilot's instrument panel to allow the transmitter to be armed or turned on from inside the cabin. The switch is normally in ARM /OFF position. Moving the switch to ON will activate the transmitter. A warning light located above the remote switch will alert you when ever the ELT is activated.

The Artex ELT 1000 (406 MHz) is equipped with a warning buzzer. This warning buzzer, which receives power from the ELT itself, is mounted in the tailcone. Whenever the ELT is activated the buzzer "beeps" periodically. The time between pulses lengthens after 12 hours. The objective is to hear the buzzer from outside the aircraft while the engine is not running.

Should the ELT be activated inadvertently it can be reset by either positioning the cockpit remote switch or the local ELT box switch to ON then immediately switching it to the ARM position. The ELT cannot be reset if either the cockpit remote switch or the ELT local switch is in the ON position.

7.37 EMERGENCY LOCATOR TRANSMITTER (continued)

ARTEX ELT 1000 OPERATION (continued)

The transmitter can be activated manually at any time by placing either the remote switch or the ELT switch to the ON position.

NOTE

A monthly functional check is recommended to verify operational status of the ELT. Prior to testing, the aircraft must be located to receive GPS signals with avionics on. Within the first 5 minutes after the hour, select the cockpit remote switch to the test position for ~ 1 second and then return to the ARM/OFF position. The remote switch LED light and buzzer should then activate for ~ 2 seconds. If the 2 second LED light and buzzer indication is not received, refer to the ARTEX ELT 1000 maintenance manual.

The ARTEX ELT 1000 should be checked during postflight to make certain the unit has not been activated. Check by selecting 121.50 MHz on an operating receiver. If a downward sweeping audio tone is heard the ELT may have been activated. Set the remote switch to ON. If there is no change in the volume of the signal, your airplane's ELT is probably transmitting. Setting the remote switch back to ARM/OFF will automatically reset the ELT and should stop the signal being received on 121.50 MHz.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS

PNEUMATIC DE-ICE SYSTEM

The M600 utilizes BF Goodrich pneumatic de-ice boots to displace ice from the leading edges of the wing, vertical and horizontal stabilizer. The de-ice boots are fabricated from neoprene containing built in span wise inflation tubes. The system consists of the wing, vertical and horizontal stabilizer de-ice boots, pressure regulator, water separator, heat exchanger and three de-icer flow valves each with an integral ejector and pressure switch.

When the SURF DE-ICE switch on the overhead switch panel is selected ON, the G3000 system energizes the empennage de-icer flow valve to supply engine bleed air to the empennage boots for six seconds. At the end of six seconds the empennage de-icer flow valve returns to the vacuum (normal) position and the bottom wing de-icer flow valve is energized to the pressure side. After a second 6 seconds the bottom wing deicer flow valve is de-energized and returns to the vacuum position and the process is repeated for the upper wing boots. This complete cycle is repeated every 60 seconds for the time the SURF DE-ICE switch remains on. The G3000 system monitors boot pressure for proper system operation and will generate a SURF DEICE FAIL caution CAS message when a system failure is detected.

Circuit protection for the surface de-ice system is provided by a SURFACE DE-ICE circuit breaker located on the pilot's aft circuit breaker panel, row A, position 6.

Additionally, when the SURF DE-ICE switch is selected ON, the G3000 system energizes two small heaters, one on each horizontal stabilizer leading edge immediately outboard of the inflatable portion of the de-ice boot.

During ground operations, when the SURF DE-ICE switch is selected ON, the G3000 system turns on the heaters for 3 seconds then turns them OFF for 2 minutes. This cycle is repeated until the SURF DE-ICE switch is turned OFF or the airplane becomes airborne.

In flight, when the SURF DE-ICE switch is selected ON, the G3000 system turns on the heaters whenever the outside air temperature (OAT) is 5°C or less or both OAT indications have failed, and turns them OFF whenever both OAT indications are greater 5°C. The heaters remain on until the SURF DE-ICE switch is selected off or the airplane lands.

Should either heater not draw enough current or too much current when switched on by the G3000 system, a TAIL HEAT FAIL caution CAS message will be generated. Circuit protection for the horizontal stabilizer heaters is provided by a SURFACE DE-ICE circuit breaker located on the pilot's aft circuit breaker panel, row A, position 6.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS (continued)

HEATED PROPELLER

Ice protection for the propeller blades is accomplished through the use of electrically heated boots. The propeller de-ice system consists of one deice boot per blade, a relay, dual brush blocks and a slip ring assembly.

During ground operations when the PROP HEAT switch on the overhead switch panel is selected ON, the Garmin G3000 system directs power to the outer heating element in each blade for 10 seconds followed by power being directed to inner heating elements for an additional 10 seconds. After 1-minute, the G3000 system removes power from the propeller heat system. System operation is re-established by turning the PROP HEAT switch OFF, then back ON.

In flight, when the PROP HEAT switch is selected ON, the G3000 system directs power to the outer heating element in each blade for 90-seconds followed by power being directed to inner heating elements for an additional 90 seconds. This cycle is repeated continuously until the PROP HEAT switch is turned OFF or the airplane lands.

The G3000 system monitors amperage supplied to the propeller heating system. If the current is greater than 30 amps or less than 17.75 amps when the system is on or greater than 4 amps when the system is off, the G3000 system will generate a PROP HEAT FAIL warning CAS message.

In the over current scenario, the G3000 system will de-energize the propeller heat, and generate a PROP HEAT FAIL warning CAS message. In the under current scenario, the G3000 system will maintain the propeller heat on and generate a PROP HEAT FAIL warning CAS message. Circuit protection for the propeller heat system is provided by a PROP HEAT circuit breaker located on the pilot's aft circuit breaker panel, row A, position 4.

CAUTION

Uneven ice buildup and shedding on the propeller can cause vibration (low frequency rumble) and possible reduction in thrust. Vibrations should subside after a few cycles (3 minutes per cycle) of propeller heat, however the pilot may assist ice shedding by modulating power between low power and MCP. If power requirements become excessive, exit icing conditions immediately.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS (continued)

HEATED WINDSHIELD

The left-side windshield in the cockpit is heated by electrical heating elements embedded in the windshield. The system consists of two heating elements, a high heat element (ANTI ICE) and a low heat element (DEFOG), a thermocouple and two relays. The low heat element covers a larger section of the windshield than the high heat element. Windshield heat is controlled by a 3 position rocker switch located on the overhead switch panel. When the WINDSHLD HT switch is selected to DEFOG, the low heat element is energized and when selected to ANTI ICE, the high heat element is energized. In both cases, the Garmin G3000 system cycles the power on and off to maintain the windshield temperature between 95°F and 105°F. Circuit protection for the heated windshield is provided by the WINDSHIELD HEAT CONTROL and POWER circuit breakers on the pilot's aft circuit breaker panel, row A, positions 7 and 8, respectively. The G3000 system monitors windshield temperature and will generate a WNDSHLD OVRTEMP caution CAS message when the temperature exceeds 160°F.

CAUTION

If ice is noticed on the heated portion of the windshield, reduce airspeed as required to clear the ice or exit icing conditions. At airspeeds higher than 150 KIAS, the windshield heater may not have enough capacity to keep the windshield heated portion clear of ice in all icing conditions.

NOTE

The right cockpit windshield is not heated, therefore during icing conditions visibility through the right windshield may be impaired or completely eliminated.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS (continued)

HEATED WINDSHIELD (continued)

WINDSHLD HT should be selected to the ANTI ICE position prior to entering suspected icing conditions. Sudden penetration into icing conditions, with the windshield heat OFF, will greatly reduce its effectiveness in preventing or eliminating ice accretions on the windshield.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS (continued)

HEATED PITOT

Pitot heat is provided through an electrically heated pitot probe. The system consists of one pitot probe under each wing and an associated current monitor. Pitot heat is controlled by a single PITOT HEAT switch located on the overhead switch panel. Whenever the PITOT HEAT switch is turned OFF a PITOT HEAT OFF caution CAS message is posted.

During ground operations, when the PITOT HEAT switch is selected ON, the Garmin G3000 system turns on the heating elements for 30-seconds then turns them off for 3-minutes. This cycle is repeated until the PITOT HEAT switch is turned OFF or the aircraft is airborne.

In flight, when the PITOT HEAT switch is selected ON, the G3000 system turns on the heating elements continuously. The heating elements remain on until the PITOT HEAT switch is turned OFF or the airplane lands.

If either pitot probe draws no current when switched on by the G3000 system, the associated caution CAS message (L PITOT HEAT FAIL or R PITOT HEAT FAIL) will be generated. If both pitot tubes draw no current when switched on by the G3000 system, a PITOT HEAT FAIL warning CAS message is generated. Circuit protection for the pitot heat system is provided by L PITOT HEAT and R PITOT HEAT circuit breakers located on the pilot's aft circuit breaker panel, row A, positions 2 and 3, respectively.

CAUTION

Care should be taken when an operational check of the heated pitot head is being performed on the ground. The unit becomes very hot.

NOTE

The AVIONICS switch must be turned ON and INTEG AV2 (GIA2) functioning for the right pitot heat to operate.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS (continued)

HEATED STALL WARNING

Stall vane heat is provided through an electrically heated cover plate, stall vane and case. The system consists of a stall sensor and current monitor. Stall heat is controlled by a STALL HEAT switch located on the overhead switch panel. Whenever the STALL HEAT switch is turned OFF a STALL HEAT OFF caution CAS message is posted.

During ground operations, when the STALL HEAT switch is selected ON, the Garmin G3000 system turns on the heating elements for 3-seconds then turns them off for 30-seconds. This cycle is repeated, regardless of OAT, until the STALL HEAT switch is turned OFF or the aircraft is airborne.

In flight, when the STALL HEAT switch is selected ON and either OAT indication is 5°C or less, the G3000 system turns on the heating elements continuously. The heating elements remain on until the STALL HEAT switch is turned OFF, both OAT indications are greater than 5°C, or the airplane lands. Whenever STALL HEAT is ON during flight and both OAT indications are greater than 5°C, the heating elements will automatically deactivate and a STALL HEAT INHIB advisory CAS message will be posted.

When the SURF DE-ICE switch is selected ON the stall warning becomes biased to provide adequate stall warning with ice accretions on the airframe. During ground operations, the stall warning becomes biased ~20 seconds after liftoff as indicted by the S WARN ICE SCHED advisory CAS message. In flight, the stall warning becomes biased immediately. This biasing continues until the SURF DE-ICE switch is turned OFF and the pilot presses the STALL WARN ICE SCHEDULE switch on the instrument panel or after an electrical power cycle.

Should either the plate or stall vane and case heaters not draw enough current or too much current when switched on by the G3000 system, a STALL HEAT FAIL warning CAS message will be generated. Circuit protection for the stall heat system is provided by a STALL HEAT circuit breaker located on the pilot's aft circuit breaker panel, row A, position 5.

7.39 FLIGHT INTO KNOWN ICING SYSTEMS (continued)

ICE LIGHT (Wing Inspection Light)

An ice detection light is installed on the left side of the forward fuselage, and when selected ON, will illuminate the left wing leading edge. The ice detection light is controlled by the ICE LIGHT switch located in the overhead switch panel. Circuit protection is provided by an ICE circuit breaker located in the EXTERIOR LIGHTS section of the pilot's forward circuit breaker panel row A, position 7.

ALTERNATE STATIC SOURCE

An alternate static source control valve is located below the instrument panel to the left of the pilot. For normal operation, the lever remains down. To select alternate static source, place the lever in the up position. When the alternate static source is selected, ADC1 and the standby instrument will be vented to alternate static ports on the aft sides of the fuselage. In this situation, indications on PFD1 and the standby instrument may be slightly different from those on PFD2.

7.41 EMERGENCY AUTOLAND (Optional)

WARNING

The Emergency Autoland system is for emergency use only. An emergency will be declared via automatic radio communications and transponder code (7700). Use of this system is prohibited during all ground and normal flight operations.

WARNING

When EAL is operating in a degraded mode, it will attempt a landing using those systems available. Under these circumstances, EAL is designed to provide only a survivable landing.

WARNING

EAL may not consider all weather factors or runway condition when selecting a destination. It is therefore possible the aircraft will depart the runway surface during landing. Additionally, EAL does not know if a runway is closed or occupied.

The Emergency Autoland (EAL) system, when fully functional, is designed to automatically guide the airplane to an appropriate approach, configure the airplane for landing, perform a safe landing, decelerate and steer the airplane to a full stop, and shutdown the engine. This system is for emergency use only. Do not allow the presence of this system to influence your operational decision making, such as attempting a flight into weather that you would not otherwise attempt if the EAL system were not installed.

Emergency Autoland can be activated by the following manual or automatic methods:

1. Manually pressing the EMERGENCY AUTOLAND guarded switch on the instrument panel.
2. Automatic engagement after being in Autopilot Level Mode for 2 minutes.
3. Automatic engagement after reaching 14,100 feet in Hypoxia Alert - Emergency Descent Mode.

7.41 EMERGENCY AUTOLAND (Optional) (continued)

CAUTION

The flight controls, throttle, landing gear, and flap levers should not be manipulated during the Emergency Autoland sequence. Doing so could interrupt the autonomous nature of the system.

CAUTION

Attention should be given whenever Level Mode is activated. Emergency Autoland will activate after two continuous minutes in Level Mode.

Upon activation of Emergency Autoland, the autopilot will roll the airplane to wings level and zero vertical speed and the Garmin displays will change immediately to the Emergency Autoland User Interface. The EAL system will automatically broadcast emergency information to the appropriate air traffic control facilities in the form of radio transmission and transponder code (7700). The displays and associated aural messages are designed to be comforting to the passengers while providing guidance as to what actions are necessary, such as keeping hands and feet away from the aircraft controls, seat belt usage and aircraft exiting instructions, and provide awareness/updates to present and future system actions. The EAL system will determine the most favorable route and approach to conduct considering weather, terrain features, fuel quantity, wind conditions, runway length and width and various other factors.

The Emergency Autoland system uses FIS-B weather information from the GTX 345 transponder as well as weather from the optional Iridium transceiver, if installed. If both sources are available, they are combined to form a composite image that EAL can use. FIS-B weather is available whenever flying within the ADS-B coverage area. Iridium weather is not available for use by EAL until ten to fifteen minutes after Emergency Autoland activation. Therefore, if Iridium is the sole source of weather information when Emergency Autoland is activated, the initial routing will be made without consideration to weather. Winds will not be considered, and a landing with excessive crosswinds or tailwinds may be possible. In such cases, the aircraft may depart the runway surface during landing.

If specific aircraft configuration, airspeed, or altitude criteria are not met when approaching the final approach fix, the aircraft will enter a holding pattern as depicted on the MFD. After the criteria are met, the gear and flaps will automatically extend and the aircraft will proceed from the final approach fix to the runway.

7.41 EMERGENCY AUTOLAND (Optional) (continued)

After landing on the runway, the brakes and rudder steering are used to steer the airplane along the runway and bring it to a full stop. After coming to a stop, a fuel solenoid valve (which receives power through the AUTO BRAKE circuit breaker) will close, cutting off fuel to the engine, causing the engine to shut down. Audio-visual instructions will instruct the occupants how to exit the aircraft through the main cabin door.

Upon completion of the Emergency Autolanding, brakes will remain set, and the communications system will continuously transmit until the system is deactivated using the AP DISC Switch (see section 3.59c) or the battery switch is turned off. The system **should not** be deactivated until first responders arrive and are ready to move the airplane to a safe location.

Although not required, if there is a desire for a passenger to communicate with air traffic control, each GTC will display a large microphone which allows radio transmissions on the emergency frequency 121.50 MHz.

CAUTION

Deactivating the Emergency Autoland system will release the brakes.

Emergency Autoland can be deactivated by any of the following methods:

1. Pressing the red A/P DISC switch on pilot or co-pilot control yokes.
2. Pressing the AP button on the autopilot mode controller.
3. Pulling/opening the AUTOPILOT circuit breaker.
4. Turning the Battery Switch OFF (for First Responders to do after an Emergency Autolanding)

The Emergency Autoland system incorporates an automatic self-test feature which determines the status of equipment used by the Emergency Autoland system. If a required system fails the self-test, a system message "EAL FAIL - Emergency Autoland is unavailable" is presented to the pilot. In this case, the Emergency Autoland system will not function or will discontinue functioning if previously activated. If a desired (but not required) system fails the self-test, a system message "EAL DEGRADED - EAL is available, but missing some functionality" is presented. In this case, the Emergency Autoland system will continue to function in a degraded mode, whereby the system will do the best it can with the information provided, and provide a survivable landing.

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AIRPLANE HANDLING, SERVICING, AND MAINTENANCE

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SECTION 8

AIRPLANE HANDLING, SERVICING, AND MAINTENANCE

8.1 GENERAL

This section provides guidelines relating to the handling, servicing, and maintenance of the M600. For complete maintenance instructions, refer to the PA-46-600TP Maintenance Manual.

WARNING

Inspection, maintenance and parts requirements for non-PIPER approved STC installations are not included in this handbook. When a non-PIPER approved STC installation is incorporated on the airplane, those portions of the airplane affected by the installation must be inspected in accordance with the inspection program published by the owner of the STC. Since non-PIPER approved STC installations may change systems interface, operating characteristics and component loads or stresses on adjacent structures, PIPER provided inspection criteria may not be valid for airplanes with non-PIPER approved STC installations.

WARNING

Modifications must be approved in writing by PIPER prior to installation. Any and all other installations, whatsoever, of any kind will void this warranty in its entirety.

8.1 GENERAL (continued)

WARNING

Use only genuine PIPER parts or PIPER approved parts obtained from PIPER approved sources, in connection with the maintenance and repair of PIPER airplanes.

Genuine PIPER parts are produced and inspected under rigorous procedures to ensure airworthiness and suitability for use in PIPER airplane applications. Parts purchased from sources other than PIPER, even though identical in appearance, may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in an airplane.

Additionally, reworked or salvaged parts or those parts obtained from non-PIPER approved sources, may have service histories which are unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures or may have other hidden damage not discernible through routine visual or nondestructive testing. This may render the part, component or structural assembly, even though originally manufactured by PIPER, unsuitable and unsafe for airplane use.

PIPER expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-PIPER approved parts.

8.1 GENERAL (continued)

Every owner should stay in close contact with an approved Piper Service Center or Piper's Customer Services Department to obtain the latest information pertaining to their airplane, and to avail themselves of Piper's support systems.

Piper takes a continuing interest in having owners get the most efficient use from their airplane and keeping it in the best mechanical condition. Consequently, Piper, from time to time, issues service releases including Service Bulletins, Service Letters, Service Spares Letters, and others relating to the airplane.

Piper Service Bulletins are of special importance and Piper considers compliance mandatory. These are available on the Piper.com website. Depending on the nature of the release, material and labor allowances may apply. This information is provided to all approved Piper Service Centers.

Service Letters deal with product improvements and servicing techniques pertaining to the airplane. They are available on the Piper.com website.. Owners should give careful attention to Service Letter information.

Service Spares Letters offer improved parts, kits, and optional equipment which were not available originally, and which may be of interest to the owner.

Maintenance manuals, parts catalogs, and revisions to both, are available from Piper Service Centers.

Any correspondence regarding the airplane should include the airplane model and serial number to ensure proper response.

8.3 AIRPLANE INSPECTION PERIODS

WARNING

All inspection intervals, replacement time limits, overhaul time limits, the method of inspection, life limits, cycle limits, etc., recommended by Piper are solely based on the use of new, remanufactured or overhauled Piper approved parts. If parts are designed, manufactured, remanufactured, overhauled and/or approved by entities other than Piper, then the data in Piper's maintenance/service manuals and parts catalogs are no longer applicable and the purchaser is warned not to rely on such data for non-Piper parts. All inspection intervals, replacement time limits, overhaul time limits, the method of inspection, life limits, cycle limits, etc., for such non-Piper parts must be obtained from the manufacturer and/or seller of such non-Piper parts.

Piper has developed inspection items and required inspection intervals for the PA-46-600TP. The PA-46-600TP Progressive Inspection Manual contains inspection procedures, which should be complied with by a properly trained, knowledgeable, and qualified mechanic at an authorized Piper Service Center or a reputable repair shop. Piper cannot accept responsibility for the continued airworthiness of any aircraft not maintained to these standards, and/or not brought into compliance with applicable Service Bulletins issued by Piper, instructions issued by the engine, propeller, or accessory manufacturers, or Airworthiness Directives issued by the FAA.

In addition, but in conjunction with the above, the FAA requires periodic inspections on all aircraft to keep the Airworthiness Certificate in effect. The owner is responsible for assuring compliance with these inspection requirements and for maintaining proper documentation in logbooks and/or maintenance records.

8.5 PREVENTIVE MAINTENANCE

The holder of a pilot certificate issued under Federal Aviation Regulations (FAR) Part 61 may perform certain preventive maintenance as defined in the FARs. This maintenance may be performed only on an aircraft which the pilot owns and operates, and which is not used in air carrier or air taxi/commercial operations service.

All other aircraft maintenance must be accomplished by a person or facility appropriately certificated by the Federal Aviation Administration (FAA) to perform that work.

Any time maintenance is accomplished, an entry must be made in the appropriate aircraft maintenance records. The entry shall include:

(a) The date the work was accomplished.
(b) Description of the work.
(c) Number of hours on the aircraft.
(d) The certificate number of pilot performing the work.
(e) Signature of the individual doing the work.

8.7 AIRPLANE ALTERATIONS

If the owner desires to have his aircraft modified, he must obtain FAA approval for the alteration. Major alterations accomplished in accordance with Advisory Circular 43.13-2, when performed by an A & P mechanic, may be approved by the local FAA office. Major alterations to the basic airframe or systems not covered by AC 43.13-2 may require a Supplemental Type Certificate.

8.9 AIRPLANE FILE

The owner or pilot is required to ascertain that the following aircraft papers are in order and in the aircraft.

(a) To be displayed in the aircraft at all times:
   (1) Aircraft Airworthiness Certificate Form FAA-8100-2.
   (2) Aircraft Registration Certificate Form FAA-8050-3.

(b) To be carried in the aircraft at all times:
   (1) Pilot's Operating Handbook and FAA approved Airplane Flight Manual.
   (2) Weight and Balance data plus a copy of the latest Repair and Alteration FAA Form -337, if applicable.
   (3) Aircraft equipment list.
   (4) Other equipment manuals as required.

Although the aircraft and engine logbooks are not required to be in the aircraft, they should be made available upon request. Logbooks should be complete and up to date. Good records will reduce maintenance cost by giving the mechanic information about what has or has not been accomplished.

8.11 GROUND HANDLING

(a) Towing

The airplane may be moved on the ground by power equipment that will not damage or excessively strain the nose gear steering assembly.

CAUTION

When towing with power equipment, do not turn the nose gear beyond its steering limit in either direction, as this will result in damage to the nose gear and steering mechanism.

CAUTION

Do not tow the airplane when the controls are secured.

In the event towing lines are necessary, ropes should be attached to both main gear struts as high up on the tubes as possible. Lines should be long enough to clear the nose and/or tail by not less than fifteen feet, and a qualified person should ride in the pilot's seat to maintain control by use of the brakes.

8.11 GROUND HANDLING (continued)

(b) Taxiing

CAUTION

Do not operate engine above ground idle with cabin doors open.

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Engine starting and shut-down procedures as well as taxi techniques should be covered. When it is ascertained that the propeller blast and taxi areas are clear, power should be applied to start the taxi roll, and the following checks should be performed:

(1) Taxi a few feet forward and apply the brakes to determine their effectiveness.
(2) Propeller thrust may be modulated from full forward to full reverse by selection of the reversing range. A lock-out feature allows reverse pitch to function only during ground operations.
(3) While taxiing, make slight turns to ascertain the effectiveness of the steering.
(4) Observe wing clearance when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.
(5) When taxiing over uneven ground, avoid holes and ruts.
(6) Do not operate the engine at high rpm when running up or taxiing over ground containing loose stones, gravel, or any loose material that may cause damage to the propeller blades.
(7) When the airplane is stopped on the taxiway or runway and brake freeze-up occurs, actuate the brakes several times using maximum pressure. To reduce the possibility of brake freeze-up during taxi operation in severe weather conditions, one or two taxi slow downs (from 25 to 5 knots) may be made using light brake pressure, which will assist moisture evaporation within the brake.
(8) Minimize ground operation in Beta/Reverse and monitor engine oil temperature.

8.11 GROUND HANDLING (continued)

(c) Parking

When parking the airplane, be sure that it is sufficiently protected from adverse weather conditions and that it presents no danger to other aircraft. When parking the airplane for any length of time or overnight, it is suggested that it be moored securely.

(1) To park the airplane, head it into the wind if possible.
(2) The parking brake knob is located just below the left control column. To set the parking brake, first depress and hold the toe brakes and then pull out on the parking brake knob. To release the parking brake, first depress the brake pedals and then push in on the parking brake knob.

CAUTION

Care should be taken when setting brakes that are overheated or during cold weather when accumulated moisture may freeze a brake.

(3) Aileron and elevator controls should be secured with the front seat belt and chocks should be used to properly block the wheels.

(d) Mooring

The airplane should be moored for immovability, security and protection. The following procedures should be used for the proper mooring of the airplane:

(1) Head the airplane into the wind if possible.
(2) Retract the flaps.
(3) Immobilize the ailerons and elevator by looping the seat belt through the control wheel and pulling it snug.
(4) Place chocks both fore and aft of the main wheels.

8.11 GROUND HANDLING (continued)

(d) Mooring (continued)

(5) Secure tiedown ropes to main landing gear and tail tiedown at approximately 45 degree angles to the ground. When using rope of non-synthetic material, leave sufficient slack to avoid damage to the airplane should the ropes contract.

CAUTION

Use bowline knots, square knots or locked slip knots. Do not use plain slip knots.

NOTE

Additional preparations for high winds include using tiedown ropes from the nose landing gear and securing the rudder.

(6) Install pitot head covers if available. Be sure to remove the pitot head covers before flight.

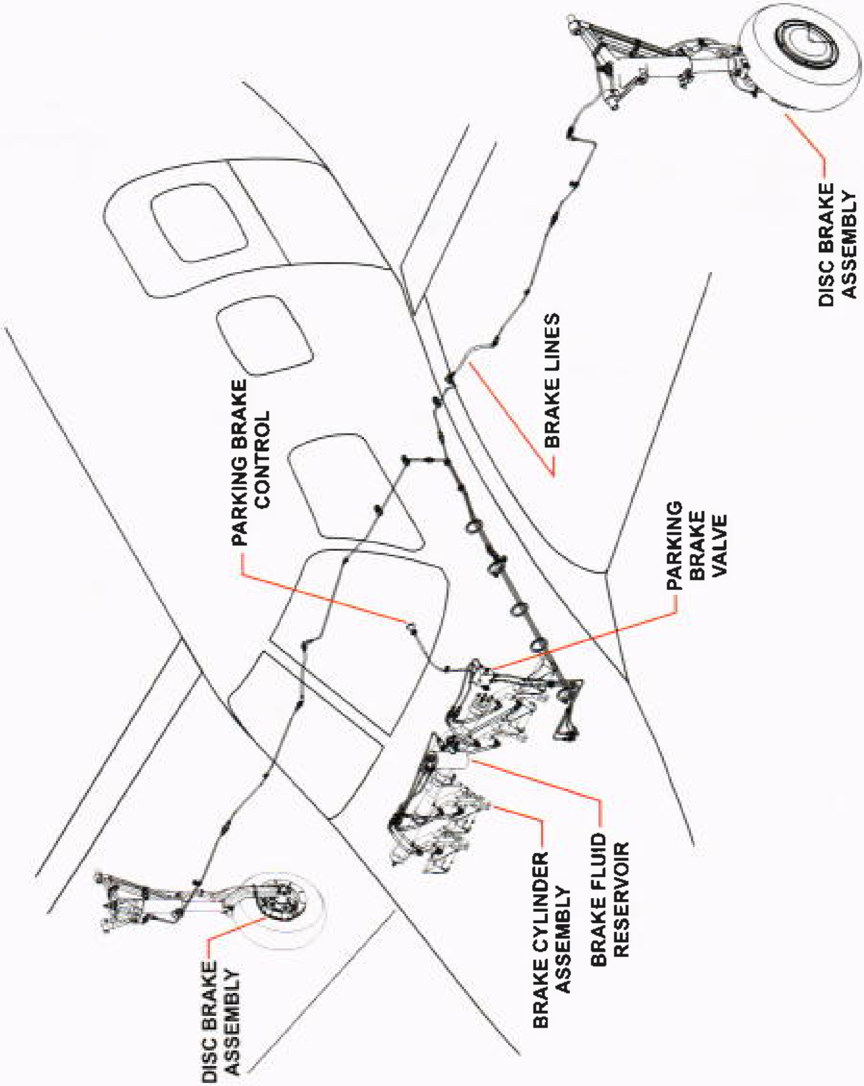
(7) The cabin door should be locked when the airplane is unattended.

(8) For overnight or in blowing snow or dust, install engine inlet covers and dust covers on the air inlet cooling duct on top of the cowling and on the exhaust stacks. Attach propeller restrainers to prevent windmilling.

8.13 BRAKE SERVICE

The brake system is filled with MIL-PRF-5606 (petroleum base) hydraulic fluid. The fluid level should be checked periodically (at least every 90 days) or at every 100 hour inspection, and replenished when necessary. The brake fluid reservoir is located on the left side of the firewall. If the entire system must be refilled, fill with fluid under pressure from the brake end of the system. This will eliminate air from the system.

No adjustment of the brake clearances is necessary. If, after extended service, brake blocks become excessively worn they should be replaced with new segments.



BRAKE SYSTEM
Figure 8-1

8.15 HYDRAULIC SYSTEM SERVICE

The hydraulic system reservoir is an integral part of the electric hydraulic pump assembly. It is located aft of the aft cabin baggage compartment and is accessible through the baggage compartment aft closeout panel. The fluid level should be checked periodically (at least every 90 days) or at every 100 hour inspection, and replenished when necessary. Consult maintenance manual for instructions on hydraulic system reservoir servicing.

8.17 LANDING GEAR SERVICE

The main landing gear uses 18 x 5.5 wheels with 18 x 5.5, eight-ply rating tubeless tires. (Refer to paragraph 8.25.)

The nose wheel uses a 5.00 x 5 wheel with a 5.00 x 5 10-ply rating, type III tire and tube. (Refer to paragraph 8.25.)

Wheels are removed by taking off the hub cap, cotter pin, axle nut, and bolts holding the brake segment in place. Mark tire and wheel for reinstallation; then dismount by deflating the tire, removing the through-bolts from the wheel and separating the wheel halves.

Landing gear oleos should be serviced according to the instructions in the maintenance manual. The main oleos should be extended under normal static load (no one on board with full fuel/oil) until 2.5 in. (6.4 cm) ±0.1 in. (0.25 cm) of oleo piston tube is exposed, and the nose gear should show 2.6 in. (6.6 cm) ±0.1 in. (0.25 cm).

8.17 LANDING GEAR SERVICE (continued)

In jacking the aircraft for landing gear or other service, two hydraulic jacks and a tail stand should be used. At least 400 pounds of ballast should be placed on the base of the tail stand before the airplane is jacked up. The hydraulic jacks should be placed under the jack points on the bottom of the wing and the airplane jacked up until the tail skid is at the right height to attach the tail stand. After the tail stand is attached and the ballast added, jacking may be continued until the airplane is at the height desired.

The steering rods from the rudder pedals to the transverse bellcrank in the nose wheel tunnel are factory adjusted and should be readjusted only in accordance with the applicable rigging specification. Nose wheel alignment is accomplished by adjusting the rod end(s) on the steering bungee assembly in such a way that the nose wheel is in line with the fore and aft axis of the plane when the rudder pedals are centered. Alignment of the nose wheel can be checked by pushing the airplane back and forth with the rudder two degrees to the right to determine that the plane follows a straight line. The turning arc of the nose wheel is 30° right, 20° left and is limited by stops at the trunnion forging or the forward steering contact arm mounted on the engine mount.

NOTE

The rudder is set to neutral with the rudder pedals neutralized and the nose wheel centered.

8.19 PROPELLER SERVICE

The spinner and backing plate should be cleaned and inspected for cracks frequently. Before each flight the propeller should be inspected for nicks, scratches, and corrosion. Significant damage must be repaired by a qualified mechanic prior to flight. Nicks or scratches cause an area of increased stress which can lead to serious cracks or the loss of a propeller tip. The back face of the blades should be painted when necessary with flat black paint to retard glare. To prevent corrosion, the surface should be cleaned and waxed periodically.

8.21 OIL REQUIREMENTS

Oil conforming to Pratt & Whitney Canada Service Bulletin 3001 and all revisions or supplements thereto, must be used. The oils listed below comply with the engine manufacturers specification PWA521 and have a viscosity Type II rating. These oils are fully approved for use in Pratt & Whitney Canada, Inc. commercially operated engines. When adding oil, service the engine with the type and brand which is currently being used in the engine. Refer to the airplane and engine maintenance records for this information. Should oils of different viscosities or brands be inadvertently mixed, the oil system servicing instructions in the Pratt & Whitney Maintenance Manual, p/n 3013242, shall be carried out.

Exxon Turbo Oil 2380
Aero Shell Turbine Oil 500
Aero Shell Turbine Oil 560 (Third generation lubricant)
Royco Turbine Oil 500
Royco Turbine Oil 560 (Third generation lubricant)
Mobil Jet Oil II
Mobil Jet Oil 254 (Third generation lubricant)
Castrol 5000
Turbonycoil 525-2A

CAUTION

Do not mix brands or types of oils.

When changing from an existing lubricant formulation to a "third generation" lubricant formulation (see list above), the engine manufacturer strongly recommends that such a change should only be made when an engine is new or freshly overhauled. For additional information on the use of third generation oils, refer to the engine manufacturer's pertinent oil service bulletins.

8.21 OIL REQUIREMENTS (continued)

TOTAL OIL CAPACITY

12 U.S quarts (11.4 L) (including oil in filter, cooler and hoses)

DRAIN AND REFILL QUANTITY

Approximately 9.2 U.S. quarts (8.7L).

OIL QUANTITY OPERATING RANGE

NOTE

Oil quantity operating range may be verified either by the dipstick method or by the visual sight glass method. Either method is acceptable for oil quantity preflight operations.

Dipstick Method

Fill to within 1½ quarts of MAX HOT or MAX COLD (as appropriate) on dipstick. Quart markings indicate U.S. quarts low if oil is hot. For example, a dipstick reading of 3 indicates the system is within 2 quarts of MAX, if the oil is cold, and within 3 quarts of MAX if the oil hot. It is recommended the oil level be checked either within 10 minutes after engine shutdown while the oil is hot (MAX HOT marking) or prior to the first flight of the day while the oil is cold (MAX COLD marking). If more than 10 minutes has elapsed since engine shutdown, and engine oil is still warm, perform an engine dry motoring run (Section 4.5d) before checking oil level.

WARNING

Ensure oil dipstick cap is securely latched down. Operating the engine with less than the recommended oil level and with the dipstick cap unlatched will result in excessive oil loss and eventual engine stoppage.

8.21 OIL REQUIREMENTS (continued)

OIL QUANTITY OPERATING RANGE (continued)

Sight Glass Method

Engine oil quantity may be determined by using the visual sight glass located on the aft, left corner of the engine. Oil quantity (whether hot or cold) indicated in the green area of the sight glass is adequate for flight operations.

OIL DRAIN PERIOD

Pratt & Whitney Canada experience, over an extended period of time, has indicated that regular oil changes are no longer necessary for the PT6A-42 engine. However, operators should be aware of the danger of oil contamination from extraneous matter such as hydraulic fluid, sand, etc. which would require the oil system to be drained, flushed and replenished with new oil of an approved brand.

8.23 FUEL SYSTEM

(a) Servicing Fuel System

At every 100 hour inspection or after an extended downtime, the fuel filter strainer must be cleaned. The fuel filter strainer is located under the aft nose section on the left side.

(b) Fuel Requirements (Jet A, Jet A-1)

NOTE

For approved additives, refer to Pratt & Whitney Service Bulletin 3044.

The operation of the aircraft is approved only with an anti-icing additive in the fuel. If pre-blended fuel is not used, then an anti-icing additive must be added to the fuel when refueling. The anti-icing additive must meet the specification MIL-DTL-85470, must be uniformly blended with the fuel while refueling, and must not exceed 0.15% by volume. One and one half liquid ounces per ten gallons of fuel would fall within this range. A blender supplied by the additive manufacturer should be used. Except for the information contained in this section, the manufacturer's mixing or blending instructions should be carefully followed.

CAUTION

Assure that the additive is directed into the flowing fuel stream. The additive flow should start after and stop before the fuel flow. Do not permit the concentrated additive to come in contact with the aircraft painted surfaces or the interior surfaces of the fuel tanks.

Some fuels have anti-icing additives pre-blended in the fuel at the refinery, so no further blending should be performed.

Fuel additive can not be used as a substitute for preflight draining of the fuel system drains.

8.23 FUEL SYSTEM (continued)

(c) Filling Fuel Tanks

WARNING

Do not operate any avionics or aircraft electrical equipment during refueling. Do not allow open flame or smoking in the vicinity of the airplane while refueling.

During all refueling operations, fire fighting equipment must be available. Two ground wires from different points on the airplane to separate approved grounding stakes shall be used.

Observe all safety precautions required when handling fuel. Fill the fuel tanks through the filler located on the forward slope of the wing. Each wing holds 871 pounds (130 U.S gallons) of usable fuel. When using less than the standard 260 gallons capacity, fuel should be distributed equally between each side.

CAUTION

Fuel imbalance must not exceed 40 pounds prior to takeoff.

NOTE

Aircraft should be refueled in a wings level condition. At times this will require alternate filling of left and right tanks until the full condition is reached.

NOTE

Fill only to the bottom of the filler necks.

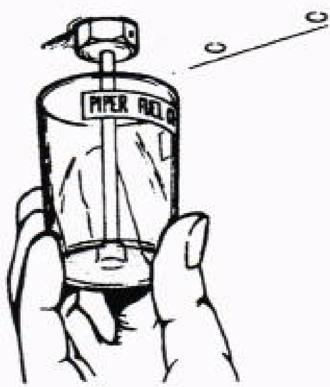
8.23 FUEL SYSTEM (continued)

(d) Draining Fuel Strainer, Sumps and Lines

The fuel tank sumps (2), fuel return sumps (2), and fuel filter (1) should be drained before the first flight of the day and after refueling. The 2 fuel tank sumps are located in the left/right wing roots at the lowest points in the fuel tanks. The 2 fuel return system drains are located on the left and right aft bottom of the engine cowling. (Refer to Figure 8-3.) The fuel filter drain is located on the lower left side of the cowling a few inches forward of the left return system drain. Sumps and filter should be drained until sufficient fuel has flowed to ensure the removal of any contaminants. When draining filter and sumps, use the end of the rod to push in the valve, catching fuel in the cup. (Refer to Figure 8-2.) Always inspect fuel for contaminants, water and fuel grade (color). Assure that valves have sealed after draining.

NOTE

Sump drains will lock open if valve is pushed in and turned Counter Clockwise. Continue turning Clockwise to release lock.



FUEL TANK DRAIN CUP
Figure 8-2

8.23 FUEL SYSTEM (continued)

(e) Emptying Fuel System

CAUTION

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting the engine.

CAUTION

Whenever the fuel system is completely drained and fuel is replenished, it will be necessary to purge the fuel system and the fuel control, per the Pratt & Whitney Engine Maintenance Manual, to ensure that no air exists in the fuel supply lines.

Draining fuel using gravity is accomplished as follows:

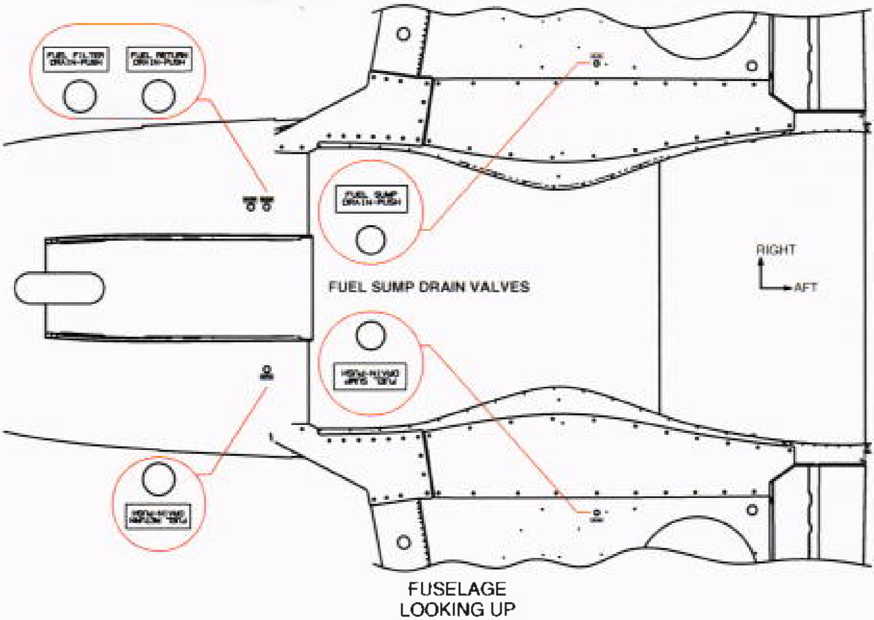
(1) Locate a properly-sized container under each header tank sump drain.
(2) To start and maintain fuel flow into the container: Use a standard flat blade screw driver to push in on the poppet valve and rotate counter clockwise, approximately 90 degrees to lock open.
(3) To stop flow, rotate the poppet valve approximately 90 degrees either direction to close the valve.

Draining fuel using the airplane's boost pumps is accomplished as follows:

(1) Attach a 5/8" line to the engine-driven low pressure pump outlet.
(2) Place the open end of the 5/8" line into a properly-sized container.
(3) Energize the wing pump on the side you wish to drain.
(4) Alternately, attach a suction pump to the open end of the 5/8" line and direct the discharge into a properly-sized container.

NOTE

The boost pumps are disabled at approximately 5 gallons per side. The final small amount must be drained from the sump drains.



FUEL SYSTEM SUMP DRAINS
Figure 8-3

8.25 TIRE INFLATION

For maximum service, keep tires inflated to the proper pressure: nose tire should be 88 psi (see placard on nose wheel strut to verify correct psi) and main tires should be 95 psi. All wheels and tires are balanced before original installation, and the relationship of tire, tube, and wheel should be maintained upon reinstallation. Unbalanced wheels can cause extreme vibration in the landing gear; therefore, in the installation of new components, it may be necessary to rebalance the wheels with the tires mounted. When checking tire pressure, examine the tires for wear, cuts, bruises, and slippage.

8.27 BATTERY SERVICE

Access to the 24-volt battery is through the battery access panel located on the aft right side of the engine compartment. Remove the access panel by removing the screws securing the panel to the fuselage. Release the retainers (one on each side near the bottom of the battery) by loosening the top screw on each retainer enough to pivot the retainer out of the way and allow the battery to be pulled out.

The battery is maintenance free and requires no maintenance of the liquid level. The battery may be used in any attitude without danger of leakage or spilling of electrolyte.

Inspect the battery for general condition (at least every 30 days). If evidence of leakage is present, the battery must be replaced.

8.29 EMERGENCY OXYGEN SYSTEM

The emergency oxygen system must be serviced if used. The canister generators must be replaced with new units to restore the emergency system to a useable condition. The pilot's quick-donning oxygen system also must be serviced if used or if it shows indications of low pressure. Refer to the PA-46-600TP Maintenance Manual for oxygen system maintenance and inspection requirements.

8.31 PRESSURIZATION SYSTEM

The system performs a self test upon power-up. Should the self test show any malfunction of the pressurization system, refer to the PA-46-600TP Maintenance Manual.

8.33 LUBRICATION

For lubricating instructions, a chart showing lubrication points and types of lubricants to be used, and lubrication methods, refer to the PA-46-600TP Maintenance Manual.

8.35 CLEANING

(a) Cleaning Engine Compartment

(1) Place a large pan under the engine to catch waste.
(2) See engine maintenance manual for engine external cleaning requirements.
(3) Lubricate the controls, bearing surfaces, etc., in accordance with the Lubrication Chart in the PA-46-600TP Maintenance Manual.
(4) Assure that all engine exhaust deposits and stains are removed frequently from bottom of aircraft around exhaust outlets. *Accumulation of exhaust deposits left even over short periods of time will cause corrosion.*

(b) Cleaning Landing Gear

Before cleaning the landing gear, place a plastic cover or similar material over the wheel and brake assembly.

CAUTION

Do not brush the micro switches.

(1) Place a pan under the gear to catch waste.
(2) Spray or brush the gear area with solvent or a mixture of solvent and degreaser, as desired. Where heavy grease and dirt deposits have collected, it may be necessary to brush areas that were sprayed, in order to clean them.

8.35 CLEANING (continued)

(b) Cleaning Landing Gear (continued)

(3) Allow the solvent to remain on the gear from five to ten minutes. Then rinse the gear with additional solvent and allow to dry.

(4) Remove the cover from the wheel and remove the catch pan.

(5) Lubricate the gear in accordance with the Lubrication Chart in the PA-46-600TP Maintenance Manual..

(c) Cleaning Exterior Surfaces

The airplane should be washed with a mild soap and water. Harsh abrasives or alkaline soaps or detergents could make scratches on painted or plastic surfaces or could cause corrosion of metal. Cover areas where cleaning solutions could cause damage. To wash the airplane, use the following procedure:

CAUTION

Do not direct any stream of water or cleaning solutions at the openings in the pitot head, static ports, alternate static ports or fuselage belly drains.

(1) Flush away loose dirt with water.

(2) Apply cleaning solution with a soft cloth, a sponge or a soft bristle brush.

(3) To remove exhaust stains, allow the solution to remain on the surface longer.

(4) To remove stubborn oil and grease, use a cloth dampened with naphtha.

(5) Rinse all surfaces thoroughly.

(6) Any good automotive wax may be used to preserve painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing. A heavier coating of wax on the leading surfaces will reduce the abrasion problems in these areas.

8.35 CLEANING (continued)

(d) Cleaning Windshield and Windows

CAUTION

Use only mild soap and water when cleaning the HEATED windshield. Use of ANY other cleaning agent or material may cause distortion or damage to windshield coatings.

(1) Remove dirt, mud and other loose particles from exterior surfaces with clean water.

(2) Wash Acrylic windows with mild soap and warm water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.

CAUTION

Do not use gasoline, alcohol, benzene, carbon tetrachloride, thinner, acetone, or window cleaning sprays.

(3) After cleaning Acrylic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.

(4) A minor scratch or mar in Acrylic can be removed by rubbing out the scratch with jeweler's rouge. Smooth both sides and apply wax. Deep scratches may lead to failure when pressurized.

(5) If a deep scratch or crack is found in any of the windshields or windows, do not pressurize cabin until serviced at authorized repair station.

(e) Cleaning Headliner, Side Panels and Seats

(1) For normal soiling and smudges, simply use the dry cleaning pad provided.

Squeeze and twist the pad so the powder sifts through the meshes and adheres to the cloth. Then rub the soiled part in any direction, as hard as necessary to clean.

Even though the pad eventually becomes soiled, this soil will not transfer back to the headliner.

8.35 CLEANING (continued)

(2) For simple stains (e.g. coffee, cola) clean headliner with a sponge and a common household suds detergent (e.g. Tide). Dirty grease stains should be first spot cleaned with a lighter fluid containing Naphtha to remove the solvent soluble matter. Any stain residue should then be shampooed with a household upholstery cleaner (e.g. Carbona upholstery and rug shampoo).

CAUTION

Solvent cleaners require adequate ventilation.

(3) Leather should be cleaned with saddle soap or a mild hand soap and water.

(f) Cleaning Carpets

To clean carpets, first remove loose dirt with a whisk broom or vacuum. For soiled spots and stubborn stains use a noninflammable dry cleaning fluid. Floor carpets may be cleaned like any household carpet.

(g) Cleaning Oxygen Equipment

(1) Clean the mask assemblies with a suitable oil-free disinfectant.

(2) Wipe dirt and foreign particles from the unit with a clean, dry, lint-free cloth.

(h) Cleaning Surface Deicing Equipment

The deicers should be cleaned when the aircraft is washed using a mild soap and water solution.

In cold weather, wash the boots with the airplane inside a warm hangar if possible. If the cleaning is to be done outdoors, heat the soap and water solution before taking it out to the airplane. If difficulty is encountered with the water freezing on boots, direct a blast of warm air along the region being cleaned using a portable ground heater.

8.35 CLEANING (continued)

Petroleum products are injurious to rubber and their use as cleaning agents should be avoided. Limited use of Mineral Spirits or non-leaded (NOT LOW LEAD) gasoline is not harmful in cleaning the deicers, if the cloth is dampened (not dripping) with solvent, and a dry cloth is used to wipe the deicer before the solvent has time to soak into the rubber.

With the deicer boots properly cleaned, a coating of Agemaster No. 1 should be applied to the boots, as described in the PA-46-600TP Maintenance Manual. This treatment helps protect the neoprene deice boots from ozone attack, aging and weathering.

Icex may be applied to all of the boots if icing conditions are anticipated. Any boots treated with Agemaster should be allowed to dry before application of Icex. For specific instructions refer to the PA-46-600TP Maintenance Manual.

(i) Cleaning Executive Table

The executive table is hydro dipped and should be cleaned only as follows:

Dry: Wipe surface with a Micro Fiber cloth to remove dust or debris.

Wet: Use a mild soap and water solution or Windex with a Micro Fiber cloth.

8.37 CLEANING AND MAINTENANCE OF RELIEF TUBE SYSTEM

The corrosive effects of urine or other liquids poured through the relief tube system are extreme and require cleaning after each use.

NOTE

The corrosive affects of urine on painted and unpainted surfaces cannot be understated. Corrosion may appear in surrounding areas if allowed to go uncleaned for one day.

(a) Interior

After each use of the relief tube, the area surrounding the relief tube should be examined for spillage and cleaned according to the cleaning procedures listed in paragraphs 8.35(e) and (f) above. Clean area inside the box and access door, funnel and tube using mild soap and water. After cleaning, assure that no soapy residue remains by flushing with clean water. Dry system thoroughly.

CAUTION

Should spillage extending into the fuselage be evident, maintenance actions must occur which include removing panels to access the floor structure to neutralize urine spillage in the aircraft structure.

Prepare to flush the relief tube assembly by placing a container underneath the relief tube outlet. Flush tube by pouring a solution of baking soda (10%) and water through the tube, flushing out the entire system. Flush again with at least 1/2 gallon of clear water. (Shop air, at low pressure, may be blown through the relief tube system to dry the system.)

8.37 CLEANING AND MAINTENANCE OF RELIEF TUBE SYSTEM (continued)

(b) Exterior

Exterior bottom painted surfaces of the aircraft must be cleaned from the firewall to the tip of the tail including the bottom of the tail surfaces, at termination of each flight when the relief tube system has been used. Cleaning should occur in accordance with paragraph 8.35(c) with the following exception: After completion of washing, a solution of baking soda (10%) and water should be applied to the entire area and allowed to remain for a few minutes. The area then must be thoroughly rinsed with clean water. The area should be thoroughly dried and observed for paint chips and corrosion, with touch up as necessary.

8.39 CLEANING GARMIN PFD AND MFD DISPLAYS

The Garmin Primary Flight Display (PFD) and Multi-Function Display (MFD) use a lens coated with a special anti-reflective coating that is very sensitive to skin oils, waxes and abrasive cleaners.

CAUTION

Cleaners containing ammonia will harm the anti-reflective coating. It is very important to clean the display lenses using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

The GTC Touchscreen can be cleaned using a microfiber or soft cotton cloth lightly dampened with clean water. Do not use chemical cleaning agents, as these may damage the coating on the glass surface.

8.41 CLEANING AND MAINTENANCE OF THE PT6A COMPRESSOR AND COMPRESSOR TURBINE

Cleaning of the compressor and turbine sections is required to maintain the engine, by reducing the onset of sulphidation attacks on the turbine blades and preventing salt deposits from damaging the compressor section. Reference Piper Service Letter No. 1110 dated March 28, 2008 for additional maintenance information pertaining to the importance of conducting compressor and turbine blade washes.

Sulphidation occurs at engine operating temperatures with sodium and sulphur present. Most aviation turbine fuels contain sulphur in sufficient amounts for sulphidation to occur. Common sources of sodium are seawater, atmospheric pollutants and volcanic discharges. Initially, sulphidation attacks the oxide protective coating of the turbine blade and, as the oxidation accelerates, blister scale begins to form. The important point to remember is that sulphidation is a hot-corrosion phenomenon and therefore turbine blades are most susceptible to it.

Compressor blades are also affected by salt deposits; however, the corrosion mode does not require high temperatures. Extended exposure to wet deposits of salt can lead to rust and pitting which affect aerodynamic efficiency and fatigue life. If not addressed, corrosion will progress to the point where compressor components will need to be replaced.

Magnesium components such as the compressor inlet case and the reduction gearbox housing are also susceptible to corrosion should the protective epoxy paint become chipped, scratched or eroded.

CAUTION

If a turbine wash is to be performed in conjunction with a compressor wash, ensure that the compressor is washed first.

(a) Perform compressor and turbine wash in accordance with Engine Maintenance Manual (EMM) section 71-00-00.

(b) Recommended wash schedule is found in the EMM Table "Wash Schedule Recommendation".

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SUPPLEMENTS

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SECTION 9

SUPPLEMENTS

9.1 GENERAL

This section provides information in the form of supplements which are necessary for efficient operation of the airplane when it is equipped with one or more of the various optional systems and equipment not approved with the standard airplane.

All of the supplements provided in this section are FAA Approved and consecutively numbered as a permanent part of this handbook. The information contained in each supplement applies only when the related equipment is installed in the airplane.

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PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL

SUPPLEMENT NO. 1 FOR

AMSAFE INFLATABLE SEAT RESTRAINTS (FAA STC SA02276AK) (EASA STC 10031010)

The FAA approved operational supplement for the AMSAFE Inflatable Seat Restraints, installed in accordance with STC SA02276AK, is required for operation of this system. AMSAFE will be responsible to supply and revise the operational supplement. It is permitted to include the AMSAFE Inflatable Seat Restraints supplement in this location of the Pilot's Operating Handbook unless otherwise stated by AMSAFE. The information contained in the AMSAFE Inflatable Seat Restraints supplement may supersede or supplement the information in the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual with respect to the operation of the AMSAFE Inflatable Seat Restraints system. For limitations, procedures and performance information not contained in the AMSAFE supplement, consult the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

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PILOT'S OPERATING HANDBOOK
AND
FAA APPROVED AIRPLANE FLIGHT MANUAL

SUPPLEMENT NO. 2
FOR

HARTZELL 5D3-N338A1/78D01B PROPELLER

This supplement must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when operating the Piper PA-46-600TP M600 airplane with the Hartzell 5D3-N338A1/78D01B propeller installed.

The information contained in this document supplements or supersedes the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only in those areas listed herein. For limitations, procedures, performance and loading information not contained in this supplement, consult the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA APPROVED: ______________________
ERIC A. WRIGHT
ODA-510620-CE
PIPER AIRCRAFT, INC.
VERO BEACH, FLORIDA

DATE OF APPROVAL: July 3, 2018

SECTION 1 - GENERAL

Propeller

Number of Propellers 1
Propeller Manufacturer .... Hartzell
Propeller Hub and Blade Model 5D3-N338A1/78D01B
Propeller Diameter .... 82.5 in. (2.096 m)
No additional reduction permitted

Propeller Type
The propeller assembly consists of a hub unit and five composite blades, and is a hydraulically actuated, constant speed, full feathering and reversible type.

SECTION 2 - LIMITATIONS

2.7 POWER PLANT LIMITATIONS

Propeller Limitations

Propeller Manufacturer .... Hartzell
Propeller Model Number.. 5D3-N338A1/78D01B
Number of Propeller Blades.. 5
Number of Propellers 1
Propeller Diameter .... 82.5 in. (2.096 m)
No additional reduction permitted

Propeller Operating Limits
Maximum Normal Operation .... 2000 RPM
Maximum Reverse .... 1900 RPM
Minimum Operation During Ground Operation .... 1180 RPM

CAUTION

Propeller operation below 1180 RPM is prohibited.

CAUTION

When the engine is not running, do not allow the propeller de-ice boots to be heated for more than 10 seconds or severe damage to the composite blades may result.

Blade Angle limits measured at 30 inch station:
Low Pitch .... $17.7 \pm 0.1°$
Reverse Angle .... $-11.0 \pm 0.5°$
Feather .... $83.2 \pm 0.5°$

SECTION 3 - EMERGENCY PROCEDURES

No change.

SECTION 4 - NORMAL PROCEDURES

CAUTION

Operation of the propeller de-ice system without the engine running is limited to 10 seconds or severe damage to the composite blades may result.

4.9 NOISE LEVEL

The corrected noise level of this aircraft is 75.8 dB(A) as measured per ICAO Annex 16, Volume I, 7th edition, Amendment 11-B, Part II, Chapter 10, and 14 CFR Part 36, Appendix G, Amendment 36-28.

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

The noise level stated above has been verified by and approved by the Federal Aviation Administration in accordance with 14 CFR Part 36, Noise Standards - Aircraft Type and Airworthiness Certification. This aircraft model is in compliance with all 14 CFR Part 36 noise standards applicable to this type.

SECTION 5 - PERFORMANCE

No change.

SECTION 6 - WEIGHT AND BALANCE

No change.

SECTION 7 - DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

ENGINE AND PROPELLER

PROPELLER

The propeller is an 82.5 inch diameter, constant speed, full feathering, reversing unit that features five composite blades in an aluminum hub. A detailed discussion of the propeller governor and propeller operation can be found in Section 7 of the basic POH.

PROPELLER DEICING SYSTEM

Propeller deicing is accomplished through electrical heating of deice boots affixed to the blade roots. Each deice boot is divided into two sectors; inboard and outboard. The propeller deice system operates cyclically by alternately heating the inboard and outboard sector of all five blades.

A more detailed discussion of system components and system operation can be found in Section 7 of the basic POH.

SECTION 8 - AIRPLANE HANDLING, SERVICING, AND MAINTENANCE

8.19 PROPELLER SERVICE

The spinner and backing plate should be cleaned and inspected for cracks frequently. Before each flight the propeller should be inspected for nicks and scratches. Significant damage must be repaired by a qualified mechanic prior to flight.

SECTION 10 - OPERATING TIPS

No change.

PILOT'S OPERATING HANDBOOK
AND
FAA APPROVED AIRPLANE FLIGHT MANUAL

SUPPLEMENT NO. 3
FOR

GARMIN GRA 55 RADAR ALTIMETER

This supplement must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when operating the Piper PA-46-600TP M600 airplane with the Garmin GRA 55 radar altimeter installed.

The information contained in this document supplements or supersedes the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only in those areas listed herein. For limitations, procedures, performance and loading information not contained in this supplement, consult the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA APPROVED: ______________________
ERIC A. WRIGHT
ODA-510620-CE
PIPER AIRCRAFT, INC.
VERO BEACH, FLORIDA

DATE OF APPROVAL: December 6, 2019

SECTION 1 - GENERAL

No change.

SECTION 2 - LIMITATIONS

No change.

SECTION 3 - EMERGENCY PROCEDURES

3.1 GENERAL

PFD Annunciations and Alerts

Miscellaneous Annunciations

Text	Condition
RA FAIL	Radar altimeter data becomes invalid.

SECTION 4 - NORMAL PROCEDURES

No change.

SECTION 5 - PERFORMANCE

No change.

SECTION 6 - WEIGHT AND BALANCE

No change.

SECTION 7 - DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

When the RA height (the aircraft altitude above ground level detected by the RA) is between zero and 2500 feet, the current value is displayed in white to the upper right of the HSI. Display of RA height becomes more sensitive as the height above ground decreases. When the RA is selected as the altitude source for the minimum altitude alerting function, the color of the RA height changes to amber upon reaching (or descending below) the altitude entered. A ground line with diagonal stripes below it appears on the Altimeter to show the aircraft's height above the ground. If the RA data becomes invalid, the message "RA FAIL" is displayed in amber in place of the current RA height.

NOTE

The radar altimeter is to be used for general situational awareness only.

SECTION 8 - AIRPLANE HANDLING, SERVICING, AND MAINTENANCE

No change.

SECTION 10 - OPERATING TIPS

No change.

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SECTION 10

OPERATING TIPS

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SECTION 10

OPERATING TIPS

10.1 GENERAL

This section provides operating tips of particular value in the operation of the M600.

10.3 OPERATING TIPS

(a) On takeoff, do not retract the gear until 95 KIAS and positive rate of climb. The airplane may settle and make contact with the ground because of lack of flying speed, atmospheric conditions, or rolling terrain.

(b) To slow the airplane while taxiing and to save the brakes, it is recommended to move the prop into beta and reverse.

(c) To reduce flap operating loads, it is desirable to have the airplane at a speed slower than the maximum allowable before extending the flaps.

(d) The pilot should only reset a tripped circuit breaker if the system/component is considered essential for safety of flight or if called for by an emergency checklist. Prior to resetting the circuit breaker, wait at least one minute and verify there is no smoke or burning smell. If the circuit breaker opens a second time, leave the circuit breaker out. Have a maintenance inspection performed prior to resetting the circuit breaker. Do not reset any nonessential circuit breakers in flight.

(e) Before starting the engine, check that AVIONICS switch, light switches (except STROBE LIGHT) and the pitot heat switch are in the off position so as not to create an overloaded condition when the starter is engaged.

(f) Strobe lights should not be operating when flying through cloud, fog or haze, since reflected light can produce spatial disorientation. Strobe lights should not be used in close proximity to the ground, such as during taxiing, takeoff or landing.

10.3 OPERATING TIPS (continued)

(g) In extreme turbulence, reduce power setting to obtain design operating speed (Vo). See Section 2 Limitations for correct speeds.

(h) In an effort to avoid accidents, pilots should obtain and study the safety related information made available in FAA publications, such as regulations, advisory circulars, Aviation News, AIM and safety aids.

(i) Avoid prolonged slips, skids or other extreme maneuvers which can cause fuel flow interruption to the engine.

(j) In order to prevent propeller strikes while taxiing on rough terrain or crossing over rises, the airplane should be taxied slowly with minimum power and rises should be crossed at an acute angle. Tires and struts should be properly inflated.

(k) All pilots who plan to fly above 10,000 feet should take initial high altitude physiological training and then take refresher training every two or three years.