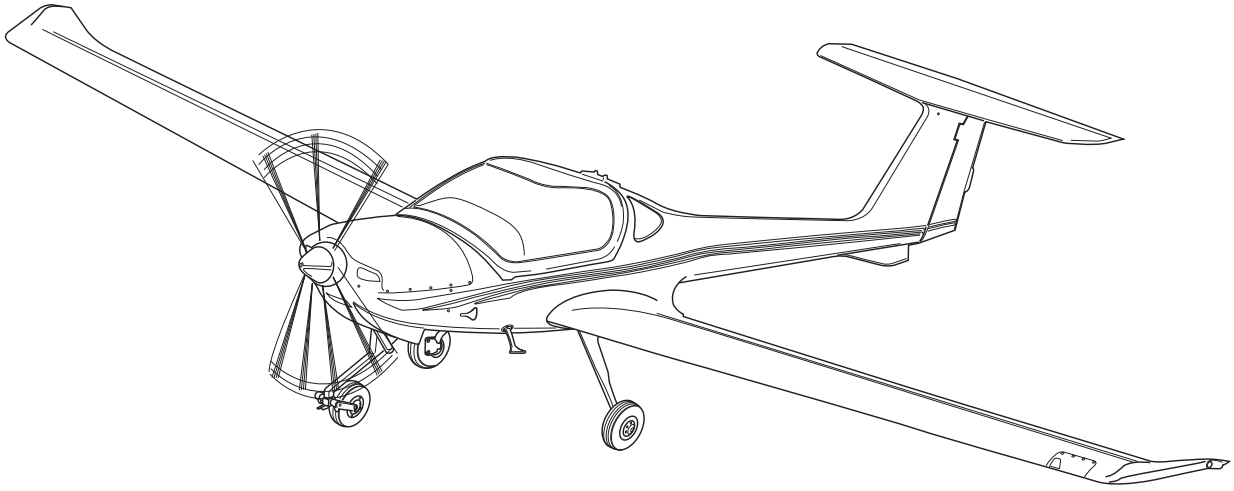
AIRPLANE FLIGHT MANUAL



DA20-C1

DOC # DA202-C1

DIAMOND AIRCRAFT INDUSTRIES INC.
1560 CRUMLIN SIDEROAD, LONDON, ONTARIO
CANADA N5V 1S2

REV 28

INITIAL ISSUE: December 19, 1997
February 28, 2014

This manual contains the maintenance information required by JAR-VLA. Contents and revision status can be found in the TABLE OF CONTENTS and the RECORD OF REVISIONS.

DIAMOND AIRCRAFT INDUSTRIES INC.
1560 CRUMLIN SIDEROAD
London, Ontario, Canada N5V 1S2

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AIRPLANE FLIGHT MANUAL

DA20-C1

Category of Airworthiness : UTILITY

Applicable Airworthiness Requirements : AWM Chapter 523-VLA

Serial Number : _____

Registration : _____

Doc. No. : DA202-C1

Date of Issue : 19 December 1997

Date of Re-issue : Revision 26 - 15 May 2012

This manual must be carried in the aircraft at all times! Scope and revision status can be found in the List of Effective Pages and in the Record of Revisions.

The pages identified as “DOT-appr.” in the List of Effective Pages are approved by:

Signature : William Jupp

Authority : For, Chief, Flight Test
For, Director, Aircraft Certification
Transport Canada

Date of approval : 19 December1997

This airplane is to be operated in compliance with the information and limitations contained herein.

_____

DIAMOND AIRCRAFT INDUSTRIES INC.

1560 CRUMLIN SIDEROAD

London, Ontario, Canada N5V 1S2

PREFACE

Congratulations on your choice of the DA20-C1.

Safe handling of an airplane increases and ensures your safety and provides you with many hours of enjoyment. For this reason you should take the time to familiarize yourself with your new airplane.

We ask that you carefully read this Flight Manual and pay special attention to the recommendations given. A careful study of the manual will reward you with many hours of trouble-free flight operation of your airplane.

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SUPPLEMENTS
LIST OF EFFECTIVE PAGES

NOTE

It is only necessary to maintain those Supplements which pertain to optional equipment that may be installed in your airplane.

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RECORD OF REVISIONS

Revisions and Temporary Revisions to this manual, with the exception of actual weighing data, are recorded in the following table. Revisions and Temporary Revisions of approved sections must be endorsed by the responsible airworthiness authority.

In the Manual Revision, new or amended text will be indicated by a bold black vertical line in the left hand margin of a revised page. The Manual Revision number and Document number will be shown on the bottom right hand corner of the page on even pages and will be shown on the bottom left hand corner of the page on odd pages. Page numbers will show on the opposite corner of the pages.

Temporary Revisions are used to provide information on systems or equipment until the next permanent Revision of the Airplane Flight Manual.

The airplane may only be operated if the Flight Manual is up to date.

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
Rev 17	0-4, 0-5, 0-6, 0-9, 2 -7, 2-17, 4-16, 7-12, 7-13, S2-1, S2-2, S2-3, S2-4, S4-4.	19 Mar 04	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 18	0-4, 0-5, 0-9 6-13, 6-14, 6-15, 6-16.	22 Mar 05	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 19	0-4, 0-5, 0-9, 2-5, 7-15, 7-16.	24 Jun 05	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 20	0-4, 0-6, 0-9, S4-1,S4-2, S4-3, S4-4, S4-5, S4-6, S4-7, S4-8, S4-9, S4-10, S4-11, S4-12, S4-13, S4-14, S4-15.	18 Aug 05	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
Rev 21	0-4, 0-5, 0-10 , 0-11, 0-12, 6-15, 6-16, 7-6.	05 Sep 06	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR-1	0-10, 2-5.	02 Oct 07	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 22	0-4, 0-5, 0-6, 0-10, 2-4, 2-7, 2-17, 4-14, 4-20, 5-20, S4-4, S4-12, S4-13.	02 Nov 07	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 23	0-4, 0-6, 0-10, 0-11, 2-1, 2-4, 2-7, 2-8,2-9,2-10, 2-11, 2-12, 2-13, 2-14, 2-15, 2-16, 2-17, 2-18, 2-19, 4-14, 4-20, S4-1, S4-4, S4-5, S4-6, S4-7, S4-8, S4-9, S4-10, S4-11, S4-12, S4-13, S4-14, S4-15, S4-16.	11 Dec 07	W. Jupp Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 08-01	0-10, 2-19, 4-5, 6-13, 6-14, 6-15, 6-16.	25 Aug 08	R. Walker A/Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 24	All	30 Apr 09	R. Walker A/Chief, Flight Test for Director, Aircraft Certification Transport Canada

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
TR 09-02	4-10, 4-11, 4-12.	30 Jun 09	R. Walker A/Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 09-03	0-9, 0-10, 6-13 thru 6-20, 9-1, 9-2 and 9-S13-1 thru 9-S13-24.	12 Nov 09	D. Stephen A/Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 10-01	0-10, 6-3 and 6-5.	26 Feb 10	Jim Martin for Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 10-02	0-10, 4-9, 7-11.	28 Feb 10	Jim Martin for Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 25	Cover Page, 0-1, 0-2, 0-5 thru 0-20, 1-1 thru 1-14, 2-1, 2-5, 2-10 thru 2-20, 4-9 thru 4-12, 4-14, 5-8, 5-10, 5-12, 6-3, 6-5, 6-16, 6-17, 7-1, 7-2, 7-9, 7-12 thru 7-24, 8-1 thru 8-10, 9-1, 9-2. S4-14, S4-16, S11-1 thru S11-6, S12-1 thru S12-8 S13-1 thru S13-22.	07 Apr 10	W. Istchenko Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 10-03	0-13, 2-19, 3-5, 4-10 thru 4-12A, 7-14, S1-8 thru S1-11.	20 Dec 10	W. Istchenko Chief, Flight Test for Director, Aircraft Certification Transport Canada

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
TR 11-01	0-13, 2-10, S4-13.	01 Aug 11	W. Istchenko Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 11-02	0-13, 2-9, 2-10.	15 Aug 11	W. Istchenko Chief, Flight Test for Director, Aircraft Certification Transport Canada
TR 11-03	0-13, S4-16.	20 Dec 11	W. Istchenko Chief, Flight Test for Director, Aircraft Certification Transport Canada
Rev 26	ALL	03 Jul 12	W. Istchenko Chief, Flight Test for Director, National Aircraft Certification Transport Canada
TR12-01	0-20, 2-5, 2-12, 6-15, and 6-19.	14 Aug 12	W. Istchenko Chief, Flight Test for Director, National Aircraft Certification Transport Canada
TR12-02	0-20, 2-7 and 4-25.	23 Nov 12	W. Istchenko Chief, Flight Test for Director, National Aircraft Certification Transport Canada

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
Rev 27	Cover Pages. 0-5 thru 0-22, and 0-24 thru 0-28. 2-1, 2-2, 2-5, 2-7, 2-8 2-10 and 2-12 thru 2-32. 3-15, 4-4, 4-9, 4-25. 5-1 and 5-6 thru 5-18. 6-10 and 6-15 thru 6-20. 7-1, 7-2, 7-3 and 7-10 thru 7-32. 9-4, 9-5, 9-6. S1-16, S3-3, S5-10, S6-6, S7-7, S8-3, S9-4, S10-3, S11-7, S12-9, S13-19, S14-7, S15-1 thru S15-14. S16-1 thru S16-6. S17-1 thru S17-6.	4 Apr 13	W. Istchenko Chief, Flight Test for Director, National Aircraft Certification Transport Canada
Rev 28	Cover Pages 0-5 thru 0-10, 0-13, 0-15 thru 0-22 2-28 thru 2-34 5-9 6-15 thru 6-22 S13-4 and S13-10 thru s13-28	14 March 2014	Chief, Flight Test for Director, National Aircraft Certification TRANSPORT CANADA

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REVISIONS LOG

This Revisions Log should be used to record all Permanent Revisions issued and inserted into this manual. The affected pages of any revision must be inserted into the manual as well as the Record of Revisions upon receipt. The pages superseded by the revision must be removed and destroyed. The Revisions Log should be updated by hand.
Changes are identified on those pages affected by a revision bar.

Rev. No.	Date Issued:	Inserted On:	Inserted By:
Issue 1	19 Dec 97	19 Dec 97	Diamond Aircraft
Rev 1	13 Aug 98	13 Aug 98	Diamond Aircraft
Rev 2	28 Aug 98	28 Aug 98	Diamond Aircraft
Rev 3	08 Dec 98	08 Dec 98	Diamond Aircraft
Rev 4	05 Jan 99	05 Jan 99	Diamond Aircraft
Rev 5	10 Mar 99	10 Mar 99	Diamond Aircraft
Rev 6	07 Apr 99	07 Apr 99	Diamond Aircraft
Rev 7	21 Jun 99	21 Jun 99	Diamond Aircraft
Rev 8	07 Dec 99	07 Dec 99	Diamond Aircraft
Rev 9	11 Apr 00	11 Apr 00	Diamond Aircraft
Rev 10	14 Aug 00	14 Aug 00	Diamond Aircraft
Rev 11	20 Mar 01	20 Mar 01	Diamond Aircraft
Rev 12	16 Apr 01	16 Apr 01	Diamond Aircraft
Rev 13	28 May 01	28 May 01	Diamond Aircraft
Rev 14	09 Aug 01	09 Aug 01	Diamond Aircraft
Rev 15	23 Apr 02	23 Apr 02	Diamond Aircraft
Rev 16	18 Oct 02	18 Oct 02	Diamond Aircraft
Rev 17	19 Mar 04	19 Mar 04	Diamond Aircraft
Rev 18	22 Mar 05	22 Mar 05	Diamond Aircraft

Rev. No.	Date Issued:	Inserted On:	Inserted By:
Rev 19	24 Jun 05	24 Jun 05	Diamond Aircraft
Rev 20	18 Aug 05	18 Aug 05	Diamond Aircraft
Rev 21	05 Sep 06	05 Sep 06	Diamond Aircraft
Rev 22	02 Nov 07	02 Nov 07	Diamond Aircraft
Rev 23	11 Dec 07	11 Dec 07	Diamond Aircraft
Rev 24	16 Apr 09	26 Jun 09	Diamond Aircraft
Rev 25	06 Apr 10	16 Apr 10	Diamond Aircraft
Rev 26	15 May 12	10 Jul 12	Diamond Aircraft
Rev 27	12 Feb 13	01 Apr 2013	Diamond Aircraft
Rev 28	28 Feb 14		

REVISION HIGHLIGHTS

GENERAL

The table below highlights the changes that have been incorporated into Revision 28.

CHAPTER	PAGES	HIGHLIGHTS
Cover Page	Cover page	Cover Page revised to show Revision 28, dated February 28, 2014.
0	0-5 thru 0-10 and 0-13	List of Effective Pages (LOEP) and Supplements LOEP revised. Rev bars inserted adjacent to the changed pages.
	0-15-0-20	Removed old revision information which reduced record of revision pages by 2 New Revision information added on page 0-19.
	0-21 and 0-22	Pagination and Revision Log entries.
	0-23 and 0-24	Pagination and Revision Highlights pages for Revision 28.
	0-25 and 0-28	Pagination
2	2-28 and 2-29	Added new instrument panel graphics
	2-30 thru 2-34	Pagination
5	5-9	Revised Take Off chart to correct wind component
6	6-15 thru 6-21	Revised equipment list
Supplement 13	S13-4	Added new equipment software version
	S13-10	Added new instrument panel graphic
	S13-11 thru S13-22	Pagination
	S13-23 and S13-24	Added New Instrument panel graphic
	S13-25 and S13-26	GTN 650 Details

CHAPTER	PAGES	HIGHLIGHTS
Supplement 13	S13-27 andS13-28	Pagination

TEMPORARY REVISIONS LOG

All Temporary Revisions (TRs) to this manual must be inserted and signed as being inserted into the manual in the following table.

Temporary Revision Number	Date Issued	Inserted	
		Date	Name
TR-1	02 Oct 07	02 Oct 07	Diamond Aircraft
TR 08-01	25 Aug 08	25 Aug 08	Diamond Aircraft
TR 09-02	30 Jun 09	30 Jun 09	Diamond Aircraft
TR 09-03	12 Nov 09	12 Nov 09	Diamond Aircraft
TR 10-01	26 Feb 10	26 Feb 10	Diamond Aircraft
TR 10-02	28 Feb 10	28 Feb 10	Diamond Aircraft
TR 10-03	20 Dec 10	20 Dec 10	Diamond Aircraft
TR 11-01	01 Aug 11	01 Aug 11	Diamond Aircraft
TR 11-02	15 Aug 11	15 Aug 11	Diamond Aircraft
TR 11-03	20 Dec 11	20 Dec 11	Diamond Aircraft
NOTE: All the Temporary Revisions above have been incorporated into the AFM at Rev 26.			
TR 12-01	01 Aug 12	14 Aug 12	Diamond Aircraft
TR 12-02	09 Oct 12	23 Nov 12	Diamond Aircraft
NOTE: The Temporary Revisions above have been incorporated into the AFM at Rev 27.			

Temporary Revision Number	Date Issued	Inserted	
		Date	Name

SUBSCRIPTION SERVICE

Diamond Aircraft Publications Revision Subscription Contacts

To ensure safe operation and maintenance of the DA20-C1 aircraft, it is recommended that operators verify that their documentation is at the correct revision levels. For revision and subscription service please contact the following:

1. **DA20-C1 related manuals and publications.**

North America, Australia and Africa:

Diamond Aircraft Industries Inc.
Customer Support
1560 Crumlin Sideroad
London, Ontario
Canada.
N5V 1S2
Phone: 519-457-4041
Fax: 519-457-4060

Other:

Diamond Aircraft Industries GmbH
Customer Support
N.A. Otto-Strasse 5
A-2700 Wiener Neustadt
Austria

Phone: +43-(0) 2622-26700
Fax: +43-(0) 2622-26780

2. **Teledyne Continental Motors IO 240B related manuals and publications.**

North America:

Teledyne Continental Motors
P.O. Box 90
Mobile, Alabama
36601
Phone: 334-438-3411

Other:

Contact a Teledyne Continental Motors distributor.

3. **Sensenich Propeller**

Model W69EK7-63, W69EK7-63G, W69EK-63 related manuals and publications.

North America:

Sensenich Wood Propeller Company
2008 Wood Court
Plant City, Florida
USA
Phone: 813-752-3711
Fax: 813-752-2818

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CHAPTER 1

GENERAL

TABLE OF CONTENTS

PAGE

1.1 INTRODUCTION

The Airplane Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of this airplane.

This Manual includes the material required by JAR-VLA and Transport Canada Airworthiness Manual (AWM) Chapter 523-VLA. It also contains supplemental data supplied by the airplane manufacturer which can be useful to the pilot.

The Flight Manual conforms to a standard equipped DA20-C1 airplane. Any optional equipment installed on request of the customer (COMM, NAV, etc.) is not considered.

For the operation of optional equipment the Operation Manual of the respective vendor must be used.

For permissible accessories refer to the Equipment List, Section 6.5.

1.2 CERTIFICATION BASIS

The DA20-C1 has been approved by Transport Canada in accordance with the Canadian Airworthiness Manual (AWM) Chapter 523-VLA., Type Certificate No. A-191.

Category of Airworthiness:	UTILITY
Noise Certification Basis:	(a) Canadian Airworthiness Manual Chapter 516
	(b) FAA Part 36
	(c) ICAO Annex 16.

1.3 WARNINGS, CAUTIONS AND NOTES

The following definitions apply to warnings, cautions, and notes used in the Flight Manual::

WARNING

A WARNING MEANS THAT THE NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO AN IMMEDIATE OR IMPORTANT DEGRADATION IN FLIGHT SAFETY.

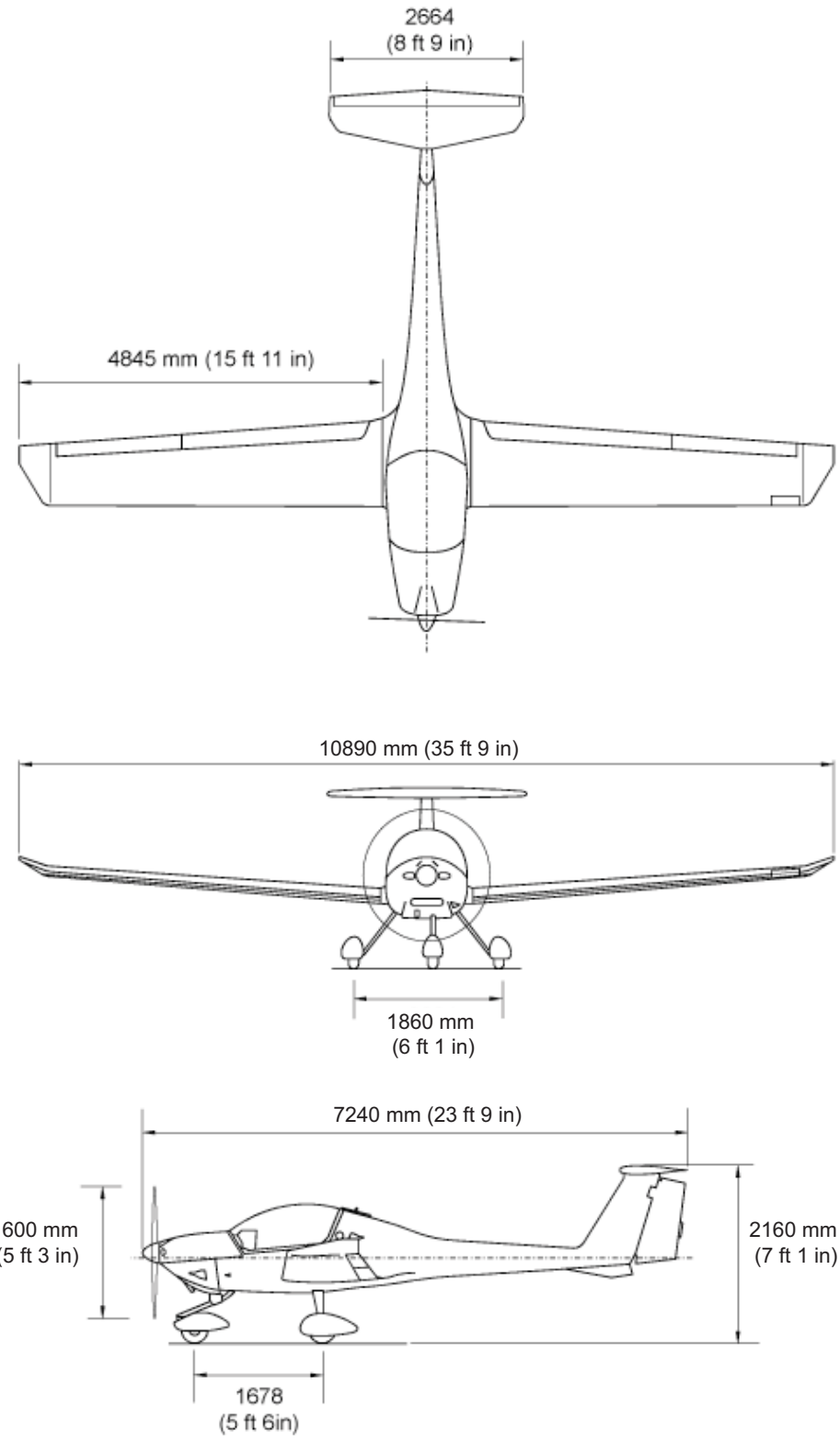
CAUTION

A CAUTION MEANS THAT THE NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO A MINOR OR TO A LONG TERM DEGRADATION IN FLIGHT SAFETY.

NOTE

A Note draws the attention to any special item not directly related to safety but which is important or unusual.

1.4 THREE-VIEW-DRAWING OF THE AIRPLANE



1.5 DIMENSIONS

1.5.1 Overall Dimensions

Span:	35 ft 9 in	(10.89 m)
Length:	23 ft 9 in	(7.24 m)
Height:	7 ft 1 in	(2.16 m)

1.5.2 WING

Airfoil:	Wortmann FX 63-137/20 HOAC
Wing Area:	125 sq ft (11.6 m2)
Mean Aerodynamic Chord (MAC):	3 ft 6.9 in (1.09 m)
Aspect Ratio:	10.0
Dihedral:	+4° nominal
Sweep of Leading Edge:	+1° nominal

1.5.3 HORIZONTAL STABILIZER

Angle of Incidence :	-4° ± 0.25°
Span:	8 ft 9 in (2.66 m)

1.5.4 LANDING GEAR

Track:		6 ft 1 in (1.86 m)
Wheel Base:		5 ft 6 in (1.67 m)
Tire Size:	Nose:	5.00-4, 6 ply
	Main:	5.00-5, 6 ply
Tire Pressure:	Nose:	26 psi (1.8 bar)
	Main:	33 psi (2.3 bar)

1.6 ENGINE

Continental IO 240, naturally aspirated, 4 cylinder, 4 stroke-engine, fuel injected, horizontally opposed, air cooled.

Propeller drive direct from engine crankshaft.

Displacement:	239.8 cu.in. (3.9 liters)
Output Power:	125 hp (93.2 kW)
At	2800 RPM

1.7 PROPELLER

Two-bladed fixed pitch propeller, manufactured by Sensenich:	Model W69EK7-63, W69EK7-63G or W69EK-63
Diameter:	5 ft 9 in (1.752 m)

1.8 FUEL

Approved Fuel Grades:	AVGAS 100 or 100LL
Total Fuel Capacity:	24.5 US gal. (93 liters)
Usable Fuel:	24.0 US gal. (91 liters)
Unusable Fuel:	0.5 US gal. (2 liters)

1.9 LUBRICANT AND COOLANT

1.9.1 Lubricant

Use only the lubricating oils conforming to TCM specifications listed in Service Information Letter SIL99-2B. See Table 1 below for approved brands.

Table 1
Qualified Lubricating Oil – Ashless Dispersant (SAE J 1899)

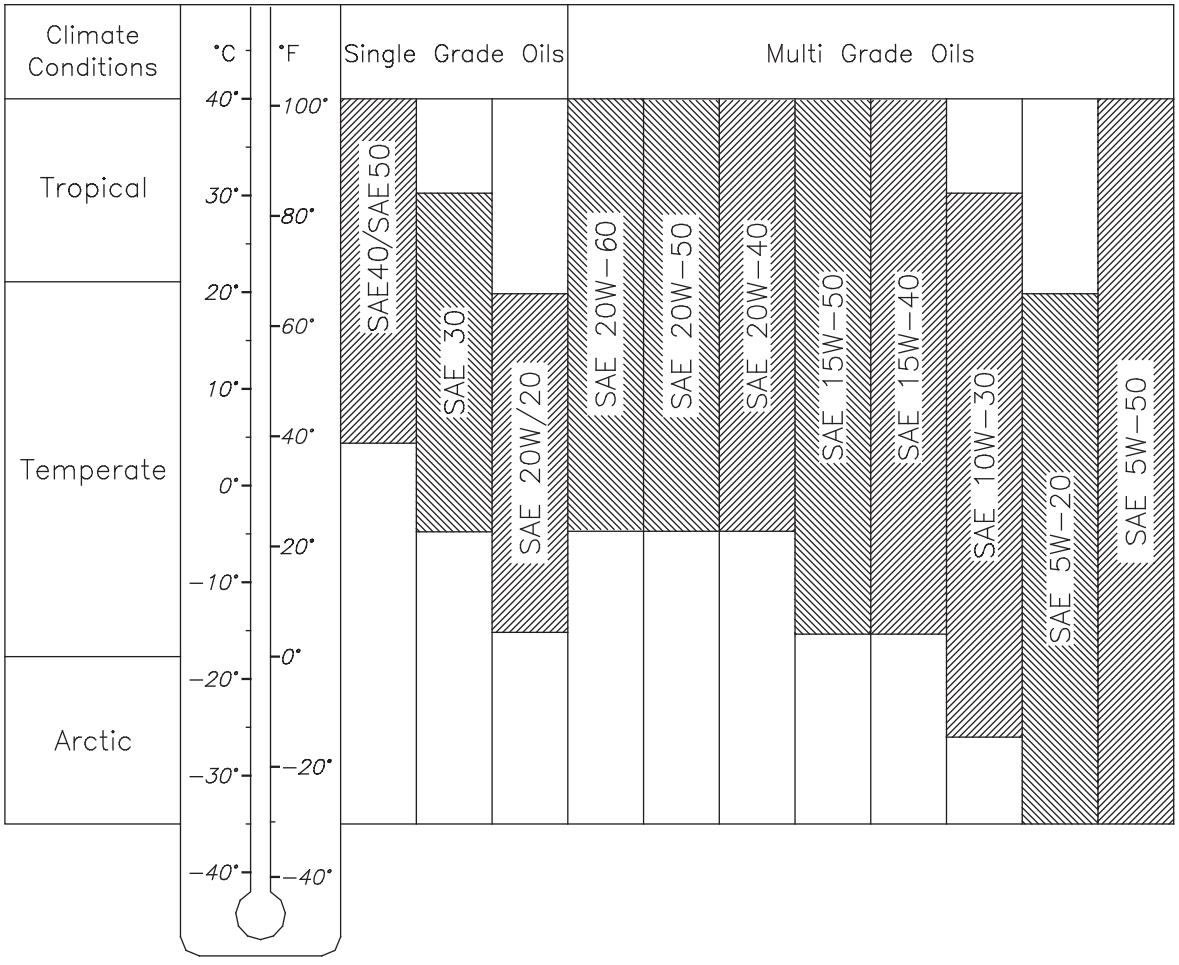
SUPPLIER	BRAND (if applicable)	TYPE (if applicable)
BP Oil Corporation	BP Aero Oil	--
Castrol	Castrol Aero AD Oil	--
Castrol Limited (Australia)	Castrol Aero AD Oil	--
Chevron U.S.A.	Chevron Aero Oil	--
Continental Oil	Conco Aero S	--
Delta Petroleum Company	Delta Avoil Oil	--
Exxon Company, U.S.A.	Exxon Elite	--
Exxon Company, U.S.A.	Exxon Aviation Oil EE	--
Gulf Oil Company	Gulfpride Aviation AD	--
Mobil Oil Company	Mobil Aero Oil	--
NYCO SA	Turbonycoil 3570	--
Pennzoil Company	Pennzoil Aircraft Engine Oil	--
Phillips Petroleum Company	Phillips 66 Aviation Oil	Type A 100AD, 120 AD
Phillips Petroleum Company	X/C Aviation Multiviscosity Oil	SAE 20W-50, SAE 20W-60
Quaker State Oil & Refining Co.	Quaker State AD Aviation OIL	--
Red Ram Limited (Canada)	Red Ram X/C Aviation Oil	20W-50
Shell Australia	Aeroshell (R) W	--
Shell Canada Limited	Aeroshell Oil W,	15W-50 Anti-Wear Formulation
Shell U.S.A.	Aeroshell Oil W,	15W-50 Anti-Wear Formulation
Shell U.S.A.	Aeroshell Oil W100 Plus, W80 Plus	--
Sinclair Oil Company	Sinclair Avoil	--
Texaco Inc.	Texaco Aircraft Engine Oil-Premium AD	--
Total France	Total Aero DM	15W-50
Union Oil Company of California	Union Aircraft Engine Oil HD	--

The viscosity should be selected according to the various climatic conditions using Table 2.

NOTE

When selecting oil, the supplier's documentation must be consulted to make sure that the oil is appropriate for the climactic conditions.

Table 2



Use only the oils specified in TCM SIL99-2B.

Oil Capacity: Maximum : 6.0 US qt (5.68 liters)
Minimum : 4.0 US qt (3.78 liters)

1.10 WEIGHT

Maximum Ramp Weight	: 1770 lbs (803 kg)
Maximum Take-off Weight	: 1764 lbs (800 kg)
Maximum Landing Weight	: 1764 lbs (800 kg)
Empty Weight	: See Chapter 6
Maximum Weight in Baggage Compartment	: 44 lbs (20 kg) only if restraining devices available
Wing Loading	
At Maximum Take-off Weight	: 14.11 lbs/sq.ft. (68.96 kg/m2)
Performance Load at Maximum Take-off Weight	: 14.11 lbs/hp (8.58 kg/kW)

1.11 LIST OF DEFINITIONS AND ABBREVIATIONS

1.11.1 Airspeeds

CAS: Calibrated Airspeed. Indicated airspeed, corrected for installation and instrument errors. CAS equals TAS at standard atmospheric conditions (ISA) at MSL.

GS: Ground Speed. Speed of the airplane relative to the ground.

IAS: Indicated Airspeed as shown on an airspeed indicator.

KCAS: CAS indicated in knots.

KIAS: IAS indicated in knots.

TAS: True Airspeed. The speed of the airplane relative to the air. TAS is CAS corrected for errors due to altitude and temperature.

V_A: Maneuvering Speed. Maximum speed at which the airplane is not overstressed at full deflection of control surfaces. Full or abrupt control surface movement is not permissible above this speed.

V_{FE}: Maximum Flaps Extended Speed. This speed must not be exceeded with the given flap setting.

V_{NE}: Never Exceed Speed in smooth air. This speed must not be exceeded in any operation.

V_{NO}: Maximum Structural Cruising Speed. This speed may be exceeded only in smooth air, and then only with caution.

V_R: Rotation Speed or Takeoff Speed

V_{REF}: Reference Speed

V_S: The power-off stall speed with the airplane in its standard configuration.

V_{SO}: The power-off stall speed with the airplane in landing configuration.

V_X: Best Angle-of-Climb Speed.

V_Y: Best Rate-of-Climb Speed.

1.11.2 Meteorological Terms

AGL:	Above Ground Level
Indicated Pressure Altitude:	Altitude reading with altimeter set to 1013.25 hPa (29.92 inHg).
ISA:	International Standard Atmosphere at which air is identified as a dry gas. The temperature at mean sea level is 15° C (59° F), the air pressure at sea level is 1013.25 mbar (29.92 inHg), the temperature gradient up to the altitude at which the temperature reaches -56.5° C (-67.9° F) is -0.0065° C/m (-0.0036° F/ft) and 0° C/m (0° F/ft) above.
OAT:	Outside Air Temperature.
Pressure Altitude:	Altitude measured at standard pressure at MSL (1013.25 mbar / 29.92 inHg) using a barometric altimeter. Pressure altitude is the indicated altitude corrected for installation and instrument errors. Within this manual the instrument errors are assumed to be zero.
Aerodrome/Airport Pressure:	Actual atmospheric pressure at the aerodrome/ airport altitude.
Wind:	The wind speeds used in the diagrams in this manual should be referred to as headwind or tailwind components of the measured wind.

1.11.3 Powerplant

Take-off Power:	Maximum engine power for take-off.
Maximum Continuous Power:	Maximum permissible continuous engine output power during flight.

1.11.4 Flight Performance and Flight Planning

Demonstrated Crosswind Component:	The maximum speed of the crosswind component at which the manoeuvrability of the airplane during take-off and landing has been demonstrated during type certification test flights.
Service Ceiling:	The altitude at which the maximum rate of climb is 0.5 m/s (100 ft/min.)

1.11.5 Weight and Balance

Reference Datum (RD):	An imaginary vertical plane from which all horizontal distances for the center of gravity calculations are measured. It is the plane through the leading edge of the wing root rib, perpendicular to the longitudinal axis of the airplane.
Station:	A defined point along the longitudinal axis which is generally presented as a specific distance from the reference datum.
Lever Arm:	The horizontal distance from the reference datum to the center of gravity (of a component).
Moment:	The weight of a component multiplied by its lever arm.
Center of Gravity (CG):	Point of equilibrium for the airplane weight.
CG position:	Distance from the reference datum to the CG. It is determined by dividing the total moment (sum of the individual moments) by the total weight.
Center of Gravity Limits:	The CG range within which an airplane with a given weight must be operated.
Usable Fuel:	The amount of fuel available for the flight plan calculation.
Unusable Fuel:	The amount of fuel remaining in the tank, which cannot be safely used in flight.

Empty Weight:	Weight of the airplane including unusable fuel, all operating fluids and maximum amount of oil.
Useful Load:	The difference between take-off weight and empty weight.
Maximum Take-off Weight:	Maximum weight permissible for take-off.

1.11.6 Equipment

ACL: Anti collision light

1.11.7 Miscellaneous

GFRP: Glass Fibre Reinforced Plastic

CFRP: Carbon Fibre Reinforced Plastic

1.12 CONVERSION FACTORS

1.12.1 Length or Altitude

1 [ft.] = 0.3048 [m]

1 [in.] = 25.4 [mm]

1.12.2 Speed

1 [kts] = 1.852 [km/h]

1 [mph] = 1.609 [km/h]

1.12.3 Pressure

1 [hPa] = 100 [N/m2] = 1 [mbar]

1 [in. Hg] = 33.865 [hPa]

1 [psi] = 68.97 [mbar]

1.12.4 Weight

1 [lbs] = 0.454 [kg]

1.12.5 Volume

1 [US gallon] = 3.785 [liters]

1 [Imperial gallon] = 4.546 [liters]

CONVERSION CHART - LITERS/US GALLONS

Liter	US Gallon	US Gallon	Liter
5	1.3	1	3.8
10	2.6	2	7.6
15	4.0	4	15.1
20	5.3	6	22.7
25	6.6	8	30.3
30	7.9	10	37.9
35	9.2	12	45.4
40	10.6	14	53.0
45	11.9	16	60.6
50	13.2	18	68.1
60	15.9	20	75.7
70	18.5	22	83.3
80	21.1	24	90.9
90	23.8	26	98.4
100	26.4	28	106.0

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CHAPTER 2

OPERATING LIMITATIONS

TABLE OF CONTENTS

PAGE

2.1 INTRODUCTION

Chapter 2 of this Flight Manual comprises of the operating limitations, instrument markings, airspeed indicator markings, and the limitation placards which are necessary for the safe operation of the airplane, its engine, and standard systems and equipment.

The operating limitations in this Chapter and Chapter 9 have been approved by the Department of Transport (DOT), and must be complied with for all operations.

.

WARNING

ALL LIMITATIONS GIVEN IN THIS CHAPTER MUST BE COMPLIED WITH FOR ALL OPERATIONS.

2.2 AIRSPEED LIMITATIONS

Speed	KIAS	Remarks
V_A Maneuvering Speed	106	Do not make full or abrupt control movement above this speed. Under certain conditions the airplane may be overstressed by full control movement.
V_{FE} Maximum Flap Extended Speed		
V_{FE} (Takeoff)	100	Do not exceed this speed with flaps in take-off position.
V_{FE} (Landing)	78	Do not exceed this speed with flaps in landing position.
V_{NO} Maximum Structural Cruising Speed	118	Do not exceed this speed except in smooth air, and then only with caution.
V_{NE} Never Exceed Speed	164	Do not exceed this speed in any operation

2.3 AIRSPEED INDICATOR MARKINGS

Marking	KIAS	Explanation
White Arc	34 - 78	Operating range with flaps fully extended.
Green Arc	42 - 118	Normal operating range.
Yellow Arc	118 - 164	Maneuvers must be conducted with caution and only in smooth air.
Red Line	164	Maximum permissable speed for all operating modes.

2.4 POWER-PLANT LIMITATIONS

2.4.1 Engine

(a) Engine Manufacturer	: Continental Motors
(b) Engine Type Designation	: IO-240-B
(c) Engine Operating Limitations	
Max. T/O Power (5 min.)	: 125 BHP / 93.2 kW
Max. Permissible T/O RPM	: 2800 RPM
Max. Continuous Power	: 125 BHP / 93.2 kW
Max. Permissible Continuous RPM	: 2800 RPM
(d) Oil pressure	
Minimum	: 10 psi (1.5 bar)
Maximum	: 100 psi (6.9 bar) Ambient temperature below 32°F (0°C), Full power operation oil pressure 70 psi max
Normal Operating	: 30 psi (2.1 bar) to 60 psi (4.1 bar)
(e) Oil temperature	
Minimum	: 75°F (24°C) Full power operation, oil temperature normal 100°F (38°C)
Maximum :	: 240°F (115°C)
(f) Cylinder head temperature	
Maximum	: 460°F (238°C)
Minimum	: 240°F (115°C) takeoff

(g) Fuel Specifications

Approved Fuel Grades : AVGAS 100LL or 100

(h) Oil Grades : Reference TCM IO-240-B operator and installation manual (form X30620) or TCM specification MHS-24. Refer to Chapter 1, Section 1.9.1. Lubricant, Table 1.

2.4.2 Additional for aircraft equipped with altitude compensating fuel system.

(a) Mandatory Preflight Idle Mixture Rise : 50 RPM Minimum: See Normal Procedures-Before Takeoff (Section 4.4.6.)

NOTE

Less than 50 RPM Mixture Rise indicates an excessively lean idle mixture that can result in engine stoppage at idle.

(b) Minimum Ground Idle Speed : 975 RPM Minimum

NOTE

Recommended minimum flight idle speed 1400 RPM, during idle power flight conditions and maneuvers.

2.4.3 Propeller (SENSENICH)

(a) Propeller Manufacturer : Sensenich Propeller, Plant City/Florida

(b) Propeller Type : Fixed Pitch W69EK7-63, W69EK7-63G or W69EK-63

(c) Propeller Diameter : 69.0 inches (1752mm)

(d) Propeller Pitch (at 3/4 radius) : 62.8 inches (1595mm)

2.5 POWERPLANT INSTRUMENT MARKINGS

Powerplant instrument markings and their color code significance are shown below:

Instrument	Red Line/ Lower Limit	Green Arc/ Normal Operating Range	Yellow Arc/ Caution Range	Red Line/ Upper Limit
Tachometer	-	700 - 2800 RPM	-	2801 RPM
Oil Temperature Indicator	75° F	170 - 220° F	75 - 170° F 220 - 240° F	240° F
Cylinder Head Temperature Indicator	-	360 - 420° F	240 - 360° F 420 - 460° F	460° F
Oil Pressure Indicator	10 psi	30 - 60 psi RPM > 2100	10 - 30 psi 60 - 100 psi	100 psi
Fuel Pressure Indicator	3.5 psi	-	-	16.5 psi
	3.5 psi	-	-	Top of Red Line (See NOTE)

NOTE

The allowable operating fuel pressure is greater than 32.5 psi. Operation to the top of the Red Line is permitted. This change is temporary pending installation of modified fuel pressure gauge.

Powerplant instrument markings for instruments delivered after July 1999.

Instrument	Red Line/ Lower Limit	Green Arc/ Normal Operating Range	Yellow Arc/ Caution Range	Red Line/ Upper Limit
Oil Temperature Indicator	75° F	170 - 220° F	-	240° F
Cylinder Head Temperature Indicator	-	300 - 420° F	420 - 460° F	460° F
Oil Pressure Indicator	10 psi	30 - 60 psi RPM > 2100	-	100 psi

2.6 MISCELLANEOUS INSTRUMENT MARKINGS

Instrument	Red Arc/ = Lower Limit	Yellow Arc/ = Caution Range	Green Arc/ = Normal Operating Range	Red Line/ = Upper Limit
Voltmeter	8 - 11 Volts	11 - 12.5 Volts	12.5 - 16.1 Volts	16.1 Volts

2.7 WEIGHT

Maximum Ramp Weight : 1770 lbs (803 kg)

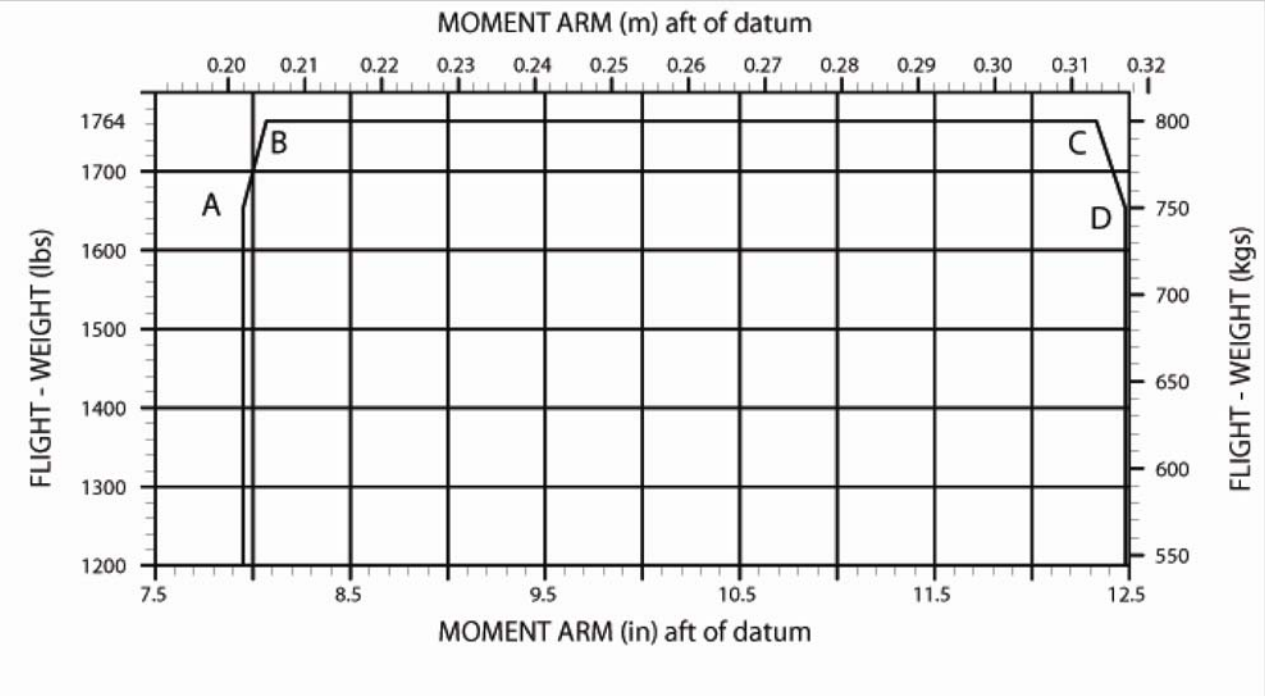
Maximum permissible weight : 1764 lbs (800 kg)

Maximum permissible weight in the baggage compartment (including baggage extension) : 44 lbs (20 kg) only permissable with baggage harness

WARNING

EXCEEDING WEIGHT LIMITATIONS MAY LEAD TO OVERLOADING OF THE AIRPLANE AND CAUSE LOSS OF CONTROL OF THE AIRPLANE AND/OR STRUCTURAL DAMAGE.

2.8 CENTER OF GRAVITY



Points	Gross Weight		Arm (aft of datum)	
	(lbs)	(kgs)	(in)	(m)
A	1653	750	7.95	.202
B	1764	800	8.07	.205
C	1764	800	12.16	.309
D	1653	750	12.48	.317

WARNING

EXCEEDING THE CENTER OF GRAVITY LIMITATIONS REDUCES THE MANEUVERABILITY AND STABILITY OF THE AIRPLANE.

The procedure used to determine the center of gravity is described in Chapter 6.

2.9 APPROVED MANEUVERS

This airplane is certified in the UTILITY Category in accordance with Canadian Airworthiness Manual Chapter 523-VLA.

Permissible Utility Category Maneuvers:

(a) All normal flight maneuvers

(b) The following maneuvers in which the angle of bank is not more than 60°:

Lazy Eights	Entry speed	: 116 KIAS
Chandelles	Entry speed	: 116 KIAS
Steep turns		

(c) Spinning NOT approved for aircraft equipped with altitude compensating fuel system.

(d) Spinning (with Wing Flaps UP) approved for aircraft NOT equipped with altitude compensating fuel system.

Note removed.

(e) Stalls NOT approved for aircraft equipped with altitude compensating fuel system and not in compliance with MSB DAC1-73-05 latest approved revision.

(f) Stalls (except whip stalls) approved for aircraft NOT equipped with altitude compensating fuel system.

(g) Stalls (except whip stalls) approved for aircraft equipped with altitude compensating fuel system in compliance with MSB DAC1-73-05 latest approved revision.

(h) Intentional Side Slips, except as required for landings, NOT approved for aircraft equipped with altitude compensating fuel system and not in compliance with MSB DAC1-73-05 latest approved revision.

NOTE

Aerobatics are prohibited.

2.10 MANEUVERING LOAD FACTORS

Table of structural maximum permissible load factors:

	at V_A	V_{NE}	with flaps in T/O or LDG position
Positive	+ 4.4	+ 4.4	+ 2.0
Negative	- 2.2	- 2.2	0

WARNING

EXCEEDING THE MAXIMUM LOAD FACTORS WILL RESULT IN OVERSTRESSING OF THE AIRPLANE. SIMULTANEOUS FULL DEFLECTION OF MORE THAN ONE CONTROL SURFACE CAN RESULT IN OVERSTRESSING OF THE STRUCTURE, EVEN AT SPEEDS BELOW THE MANEUVERING SPEED.

2.11 MAXIMUM PASSENGER SEATING

Maximum Passenger Seating : one passenger.

2.12 FLIGHT CREW

Minimum Flight Crew : one pilot.

2.13 KINDS OF OPERATION

Flights are permissible in accordance with visual flight rules.

Minimum Equipment, Flight and Navigation Instruments:

Airspeed Indicator	
Altimeter	
Attitude Gyro (Artificial Horizon)	(not mandatory for Day-VFR only)
Outside Air Temperature Indicator	(mandatory for Night-VFR only)
Vertical Speed Indicator	(mandatory for Night-VFR only)
Magnetic Compass	
Turn and Bank Indicator	(not mandatory for Day-VFR only)
Directional Gyro	(not mandatory for Day-VFR only)

Minimum Equipment, Powerplant Instruments:

Fuel Quantity Indicator
Fuel Pressure Indicator
Oil Pressure Indicator
Oil Temperature Indicator
Cylinder Head Temperature Indicator
Tachometer
Voltmeter
Ammeter
Generator Warning Light

Minimum Equipment, Lighting:

Instrument Lighting	(not mandatory for Day-VFR only)
Instrument Panel and Map Lighting	(mandatory for Night-VFR only)
Landing Light	(mandatory for Night-VFR only)
Position and Anti-Collision Lights	(mandatory for Night-VFR only)
Illuminated Placards	(mandatory for Night-VFR operations in EASA member countries)

NOTE

Additional equipment may be required for compliance with specific operational or specific national requirements. It is the operators responsibility to ensure compliance with any such specific equipment requirements.

2.14 FUEL

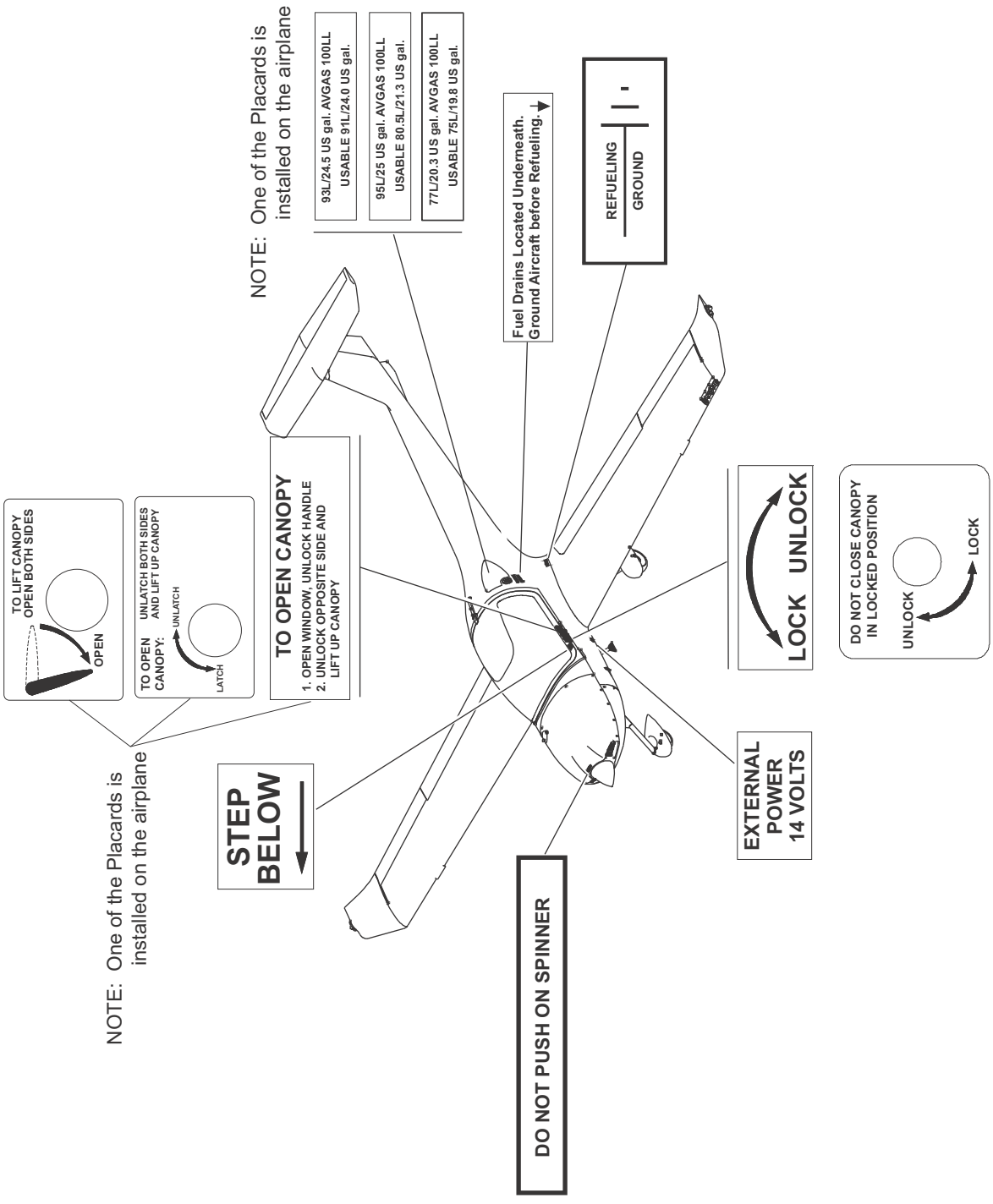
Fuel Capacity

Total Fuel Quantity:	: 24.5 US gal. (93.0 liters)
Usable Fuel:	: 24.0 US gal. (91.0 liters)
Unusable Fuel:	: 0.5 US gal. (2.0 liters)

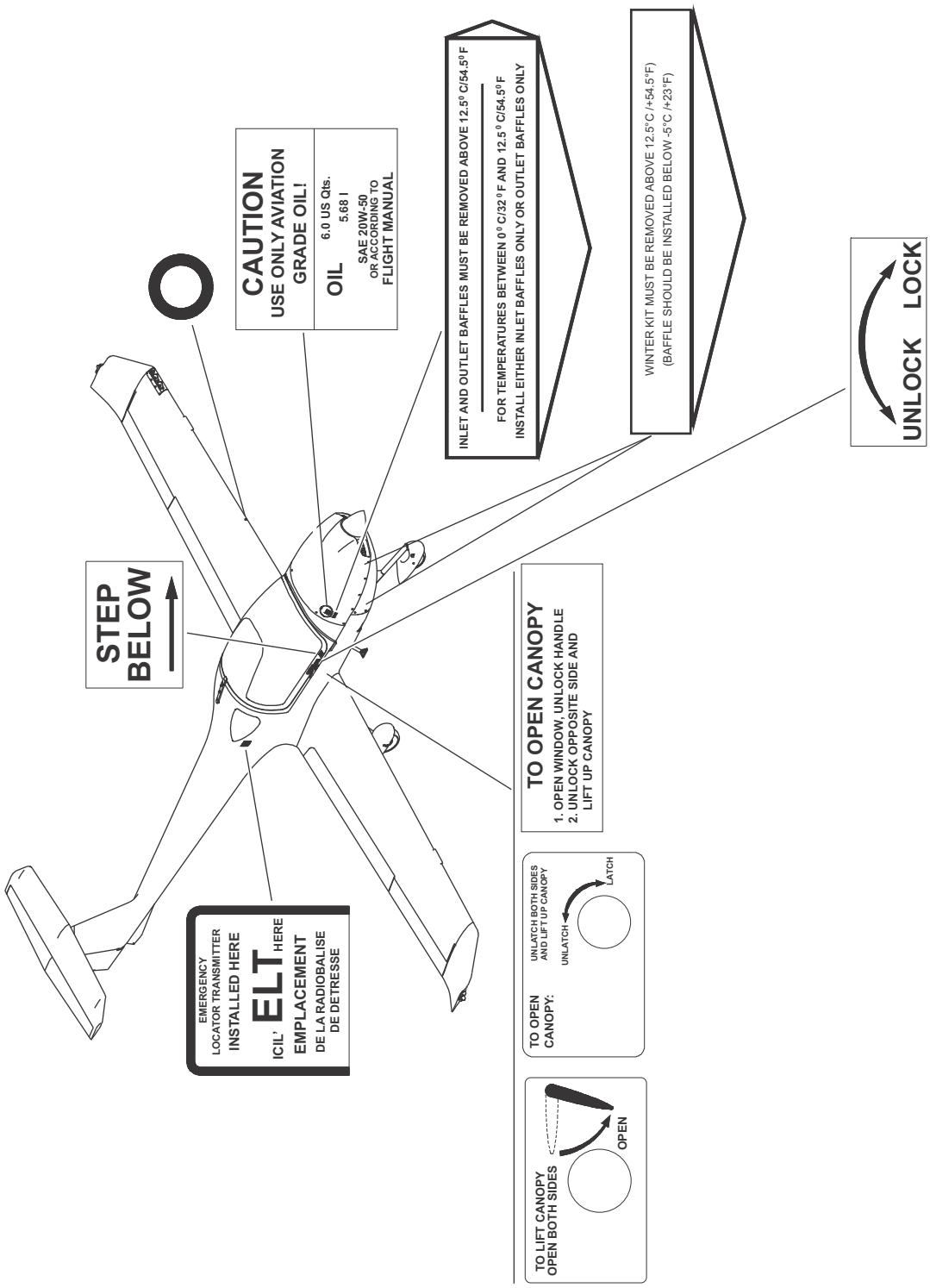
2.15 PLACARDS

The following placards must be installed on the airplane:

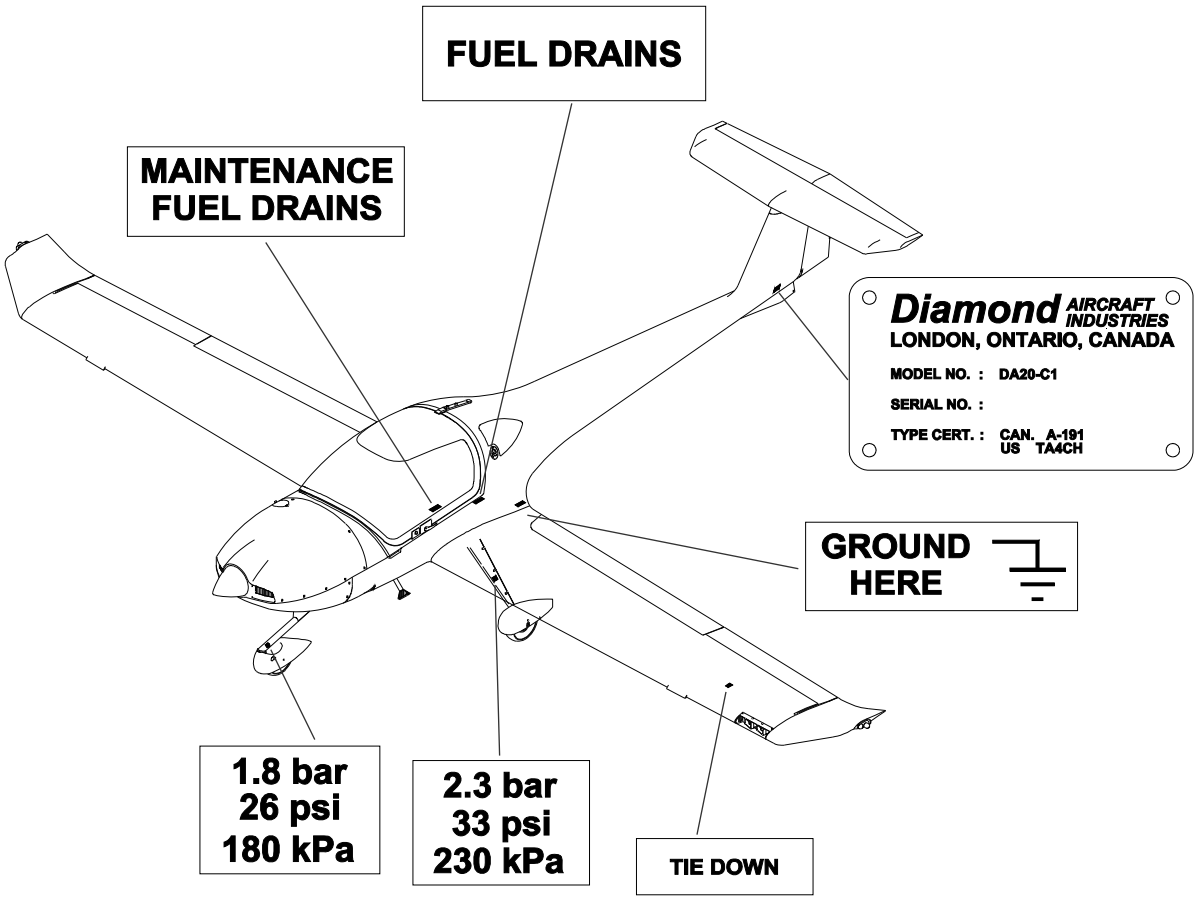
(a) On the exterior of the airplane - Upper surfaces placards and markings.



(b) On the exterior of the airplane - Upper surfaces placards and markings.

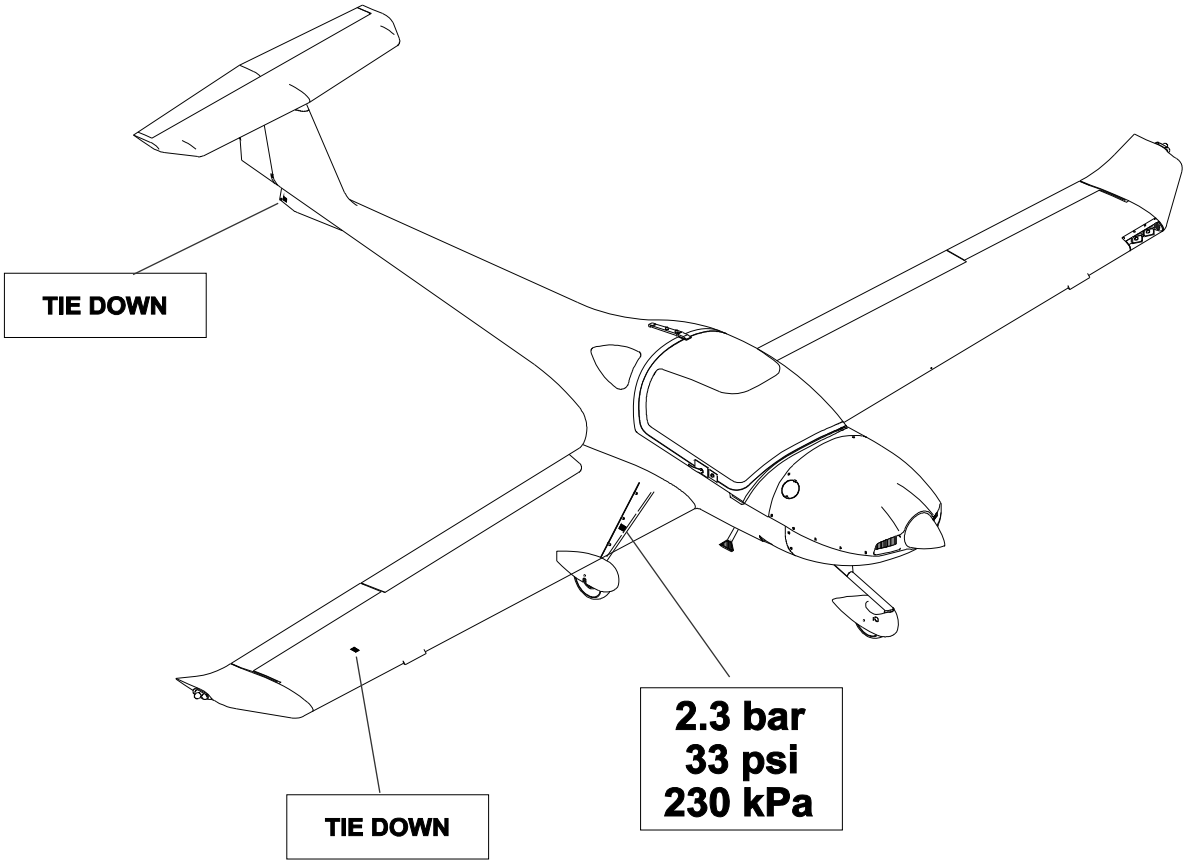


(c) On the exterior of the airplane - Lower surfaces placards and markings.



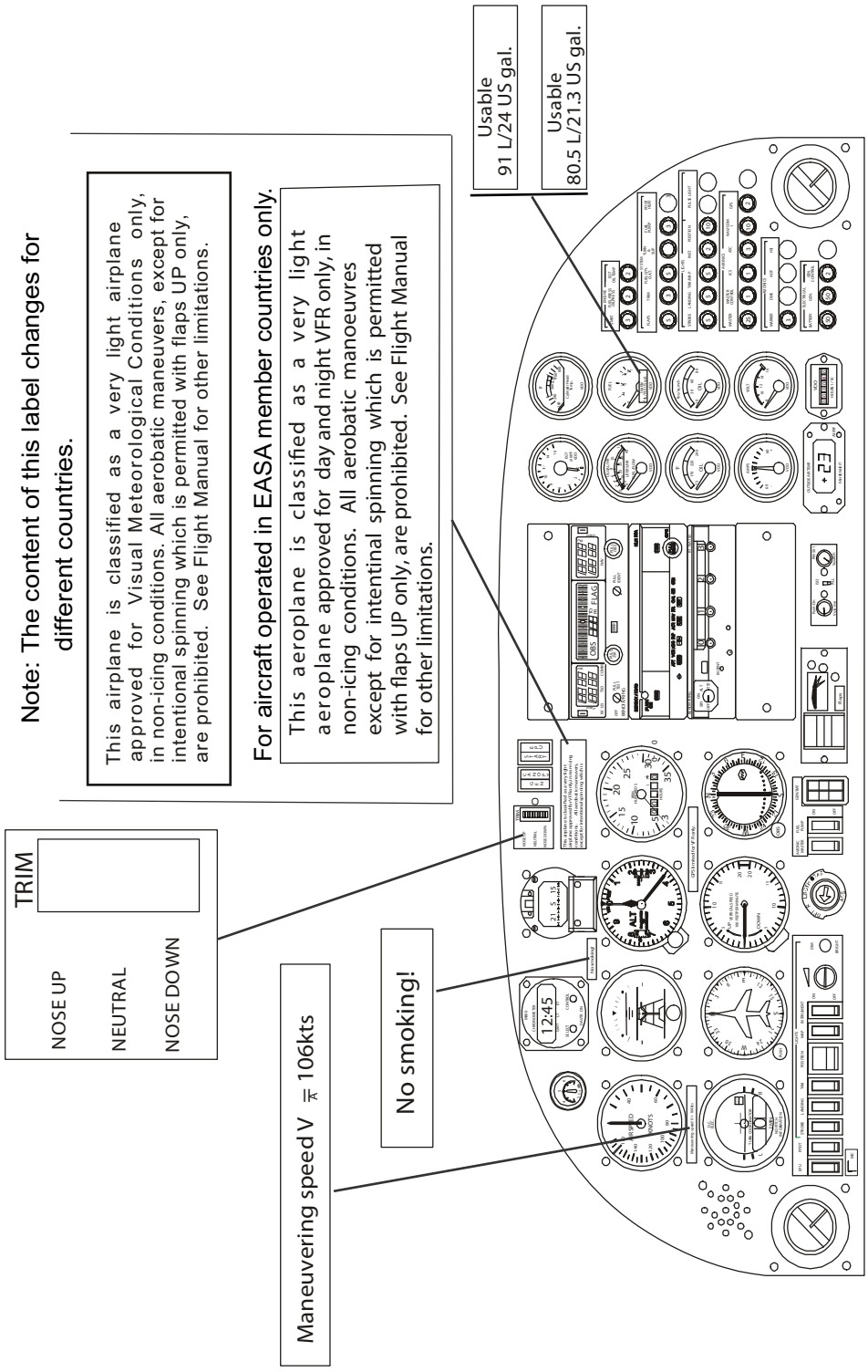
NOTE: The Placards and Markings shown are on the lower surfaces of the airplane.

(d) On the exterior of the airplane - Lower surfaces placards and markings.

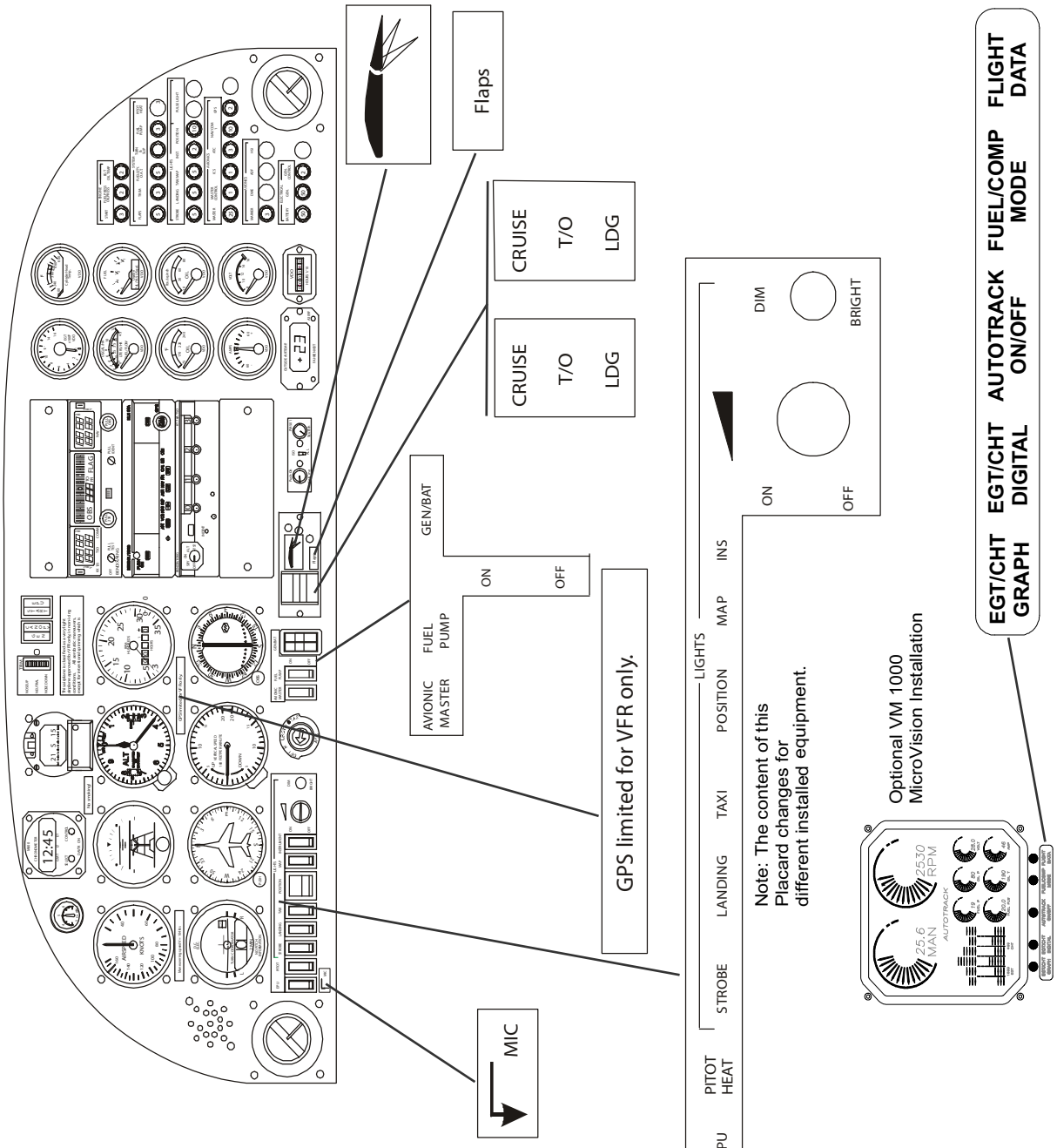


NOTE: The Placards and Markings shown are on the lower surfaces of the airplane.

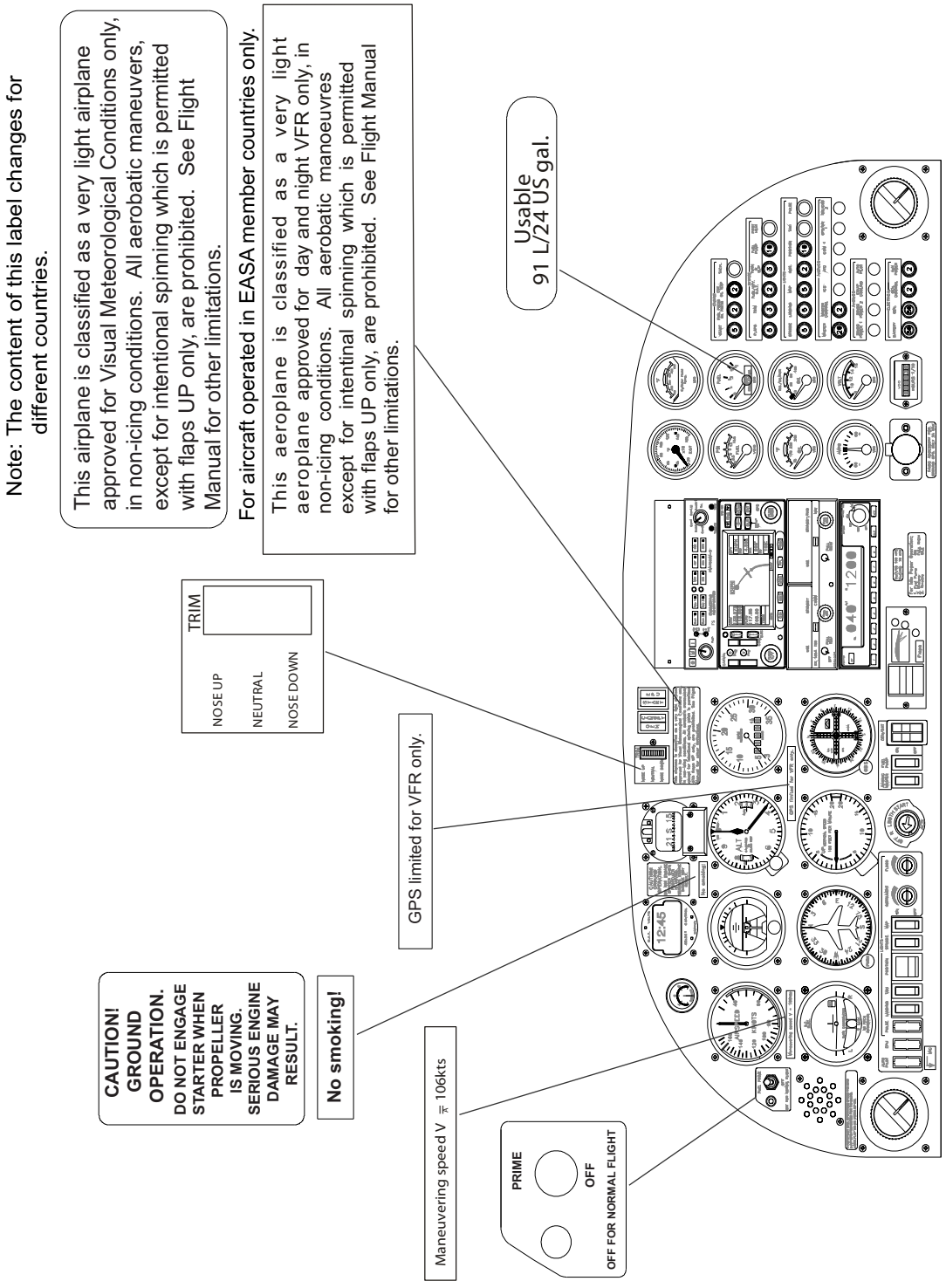
(e) On the instrument panel - Up to airplane serial number C0149.



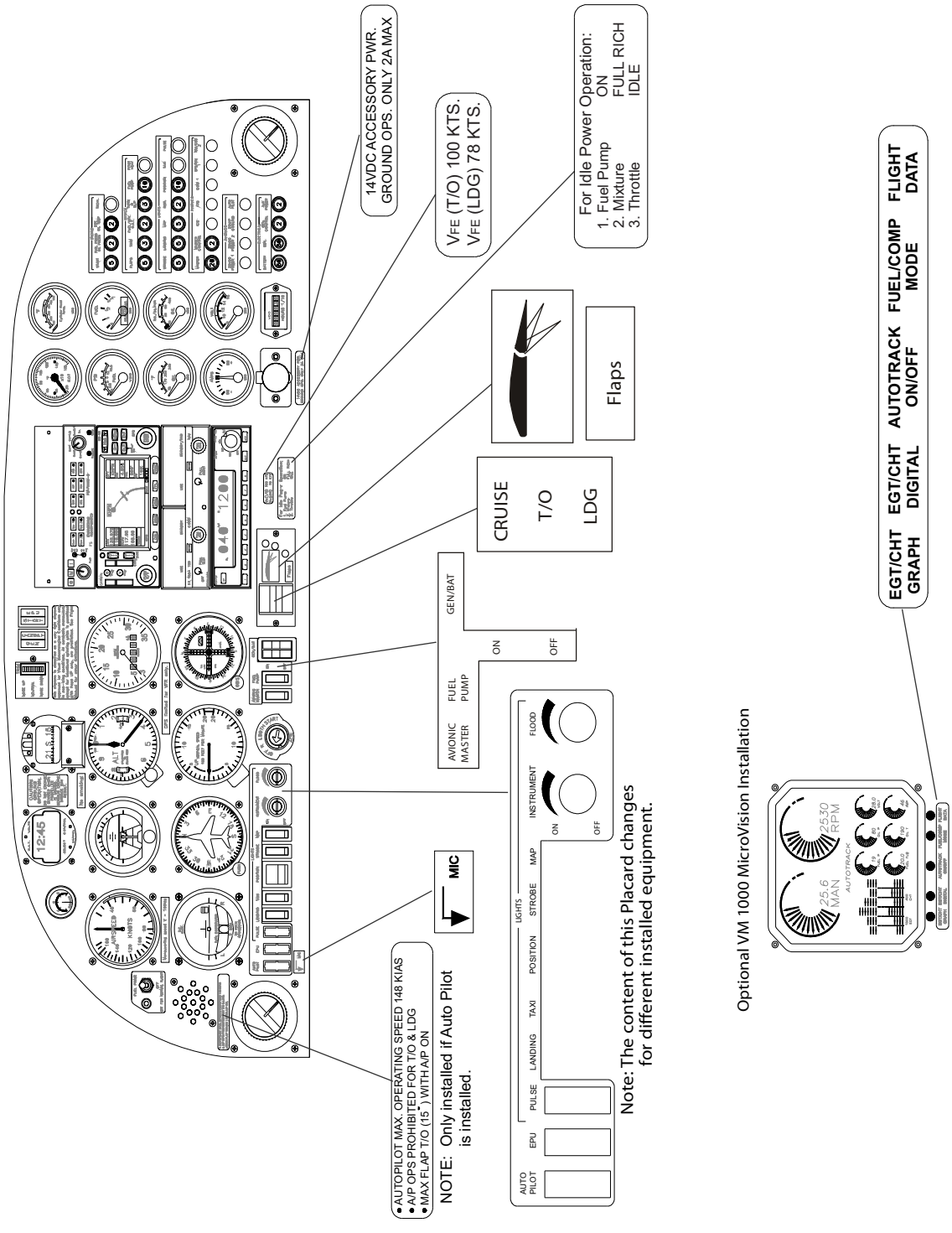
(f) On the instrument panel - Up to airplane serial number C0149.



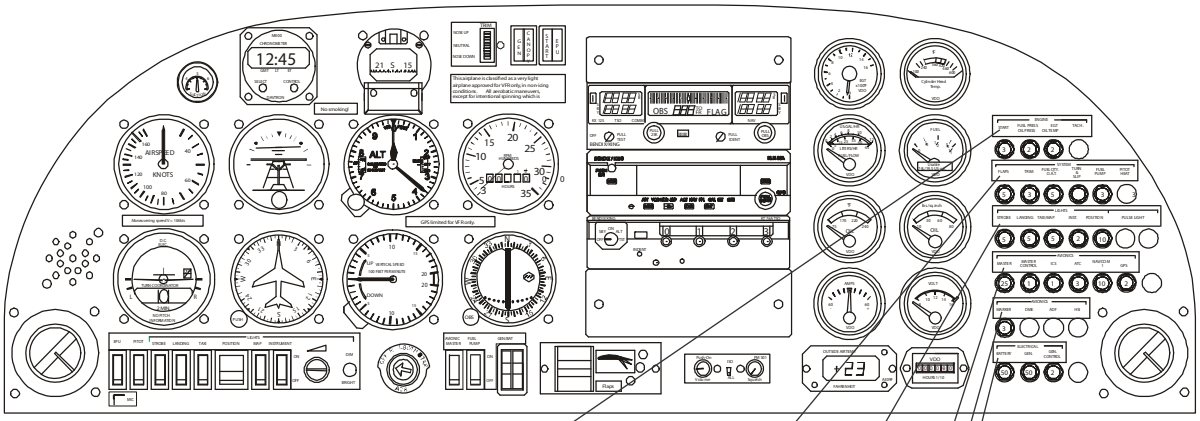
(g) On the instrument panel - Airplane serial number C0150 and subs.



(h) On the instrument panel - Airplane serial number C0150 and subs.



(i) On the instrument panel - Circuit Breakers.



ENGINE

START | FUEL PRESS OIL PRESS | EGT OIL TEMP | TACH.

SYSTEM

FLAPS | TRIM | FUEL/QTY. O.A.T. | TURN & SLIP | FUEL PUMP | PITOT HEAT

LIGHTS

STROBE | LANDING | MAP/TAXI | INST. | POSITION | PULSE LIGHT

Note: The content of the Avionics Placard changes depending on installed equipment.

Note: The content of the Avionics Placard changes depending on installed equipment.

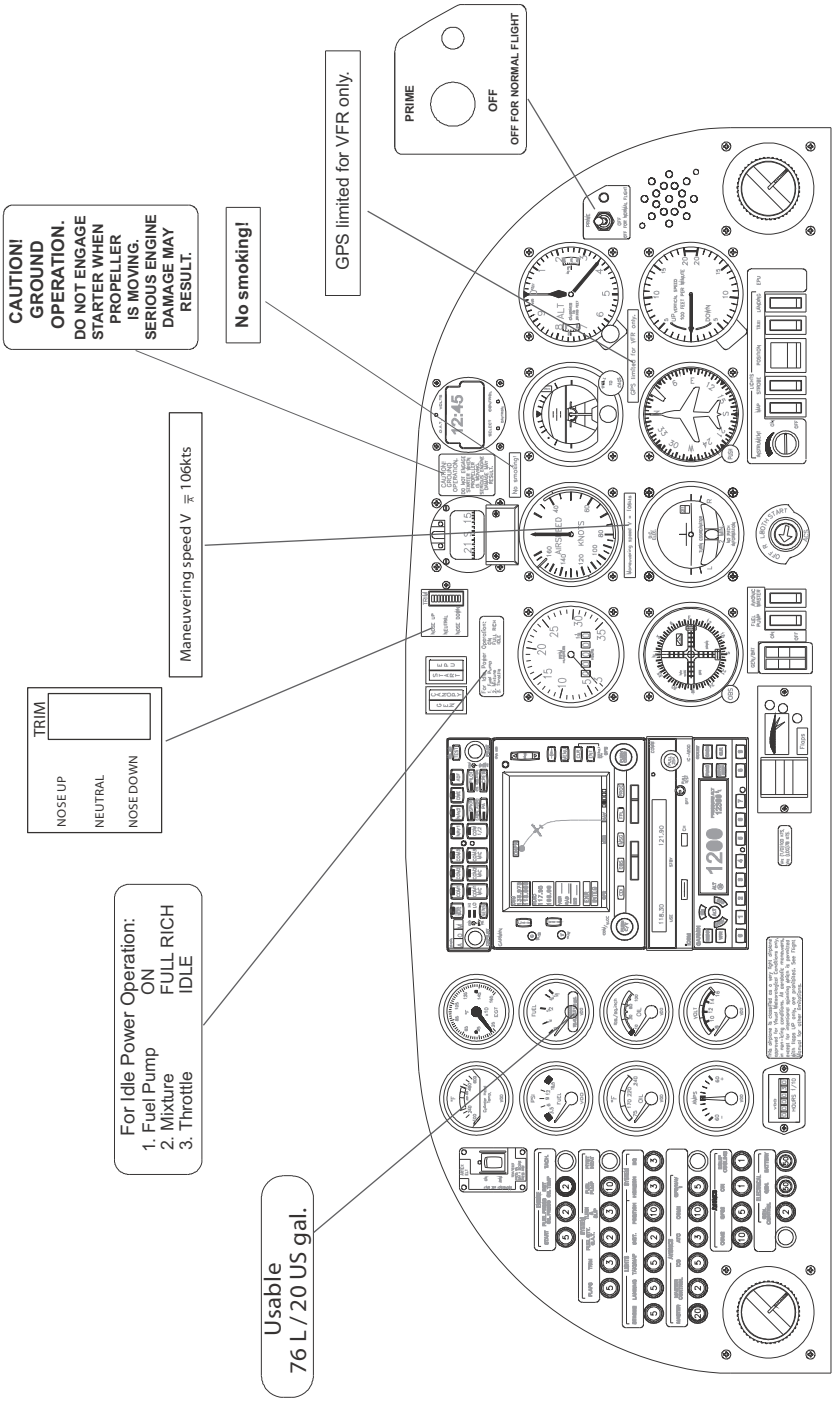
ELECTRICAL

BATTERY | GEN. | GEN. CONTROL

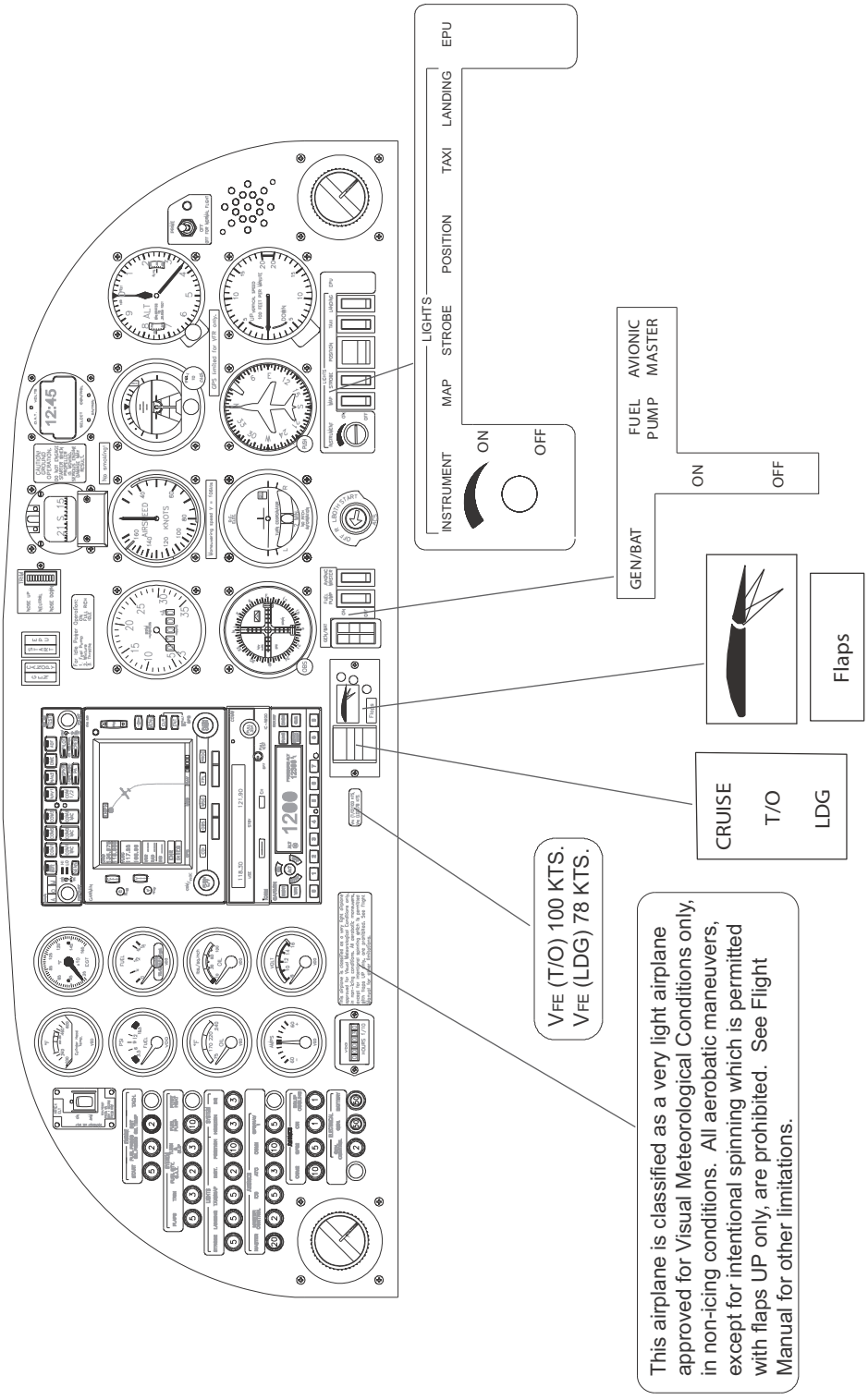
ELECTRICAL

BATTERY | GEN. | GEN. CONTROL | AUX POWER

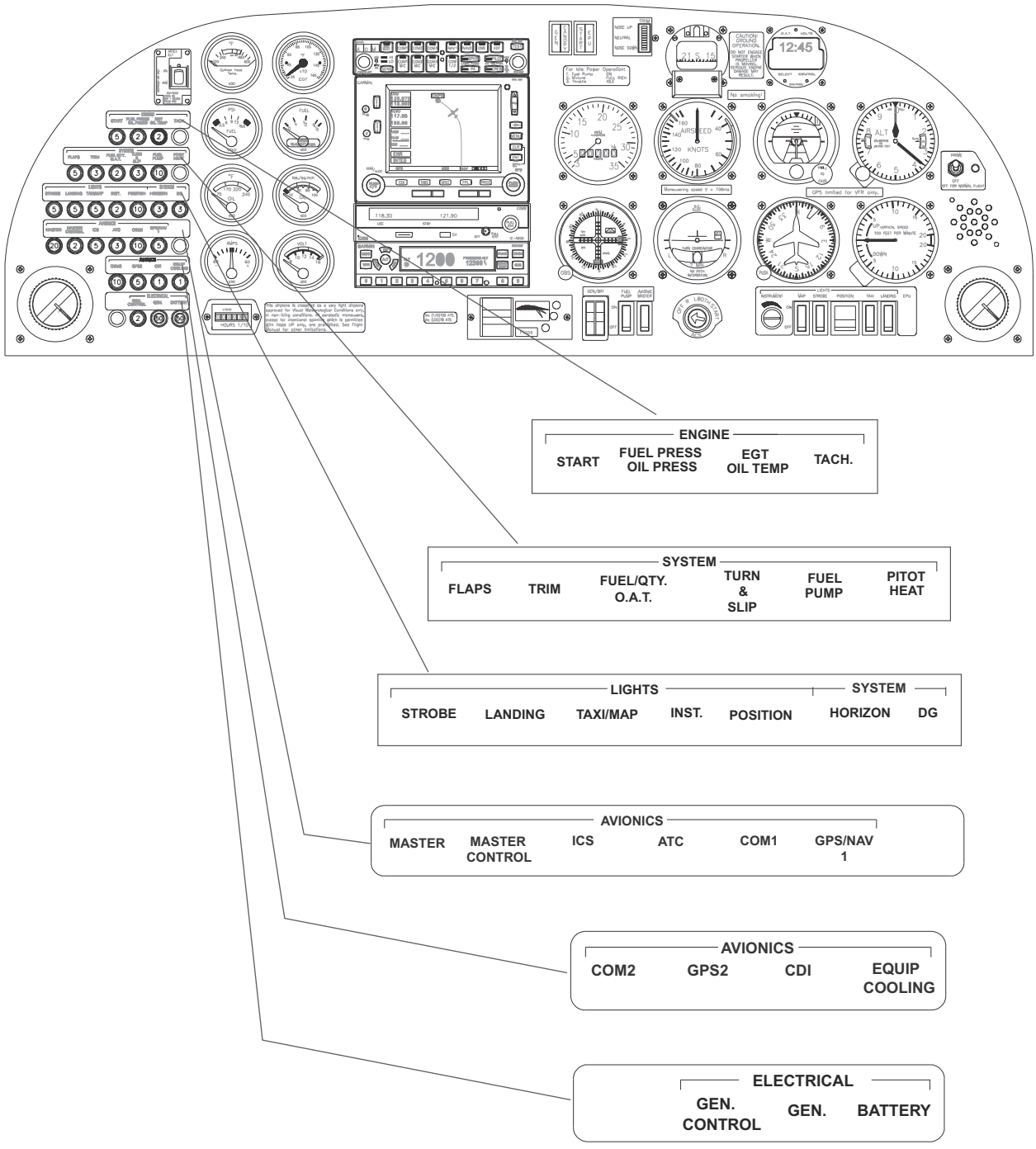
(j) Reversed instrument panel installation.



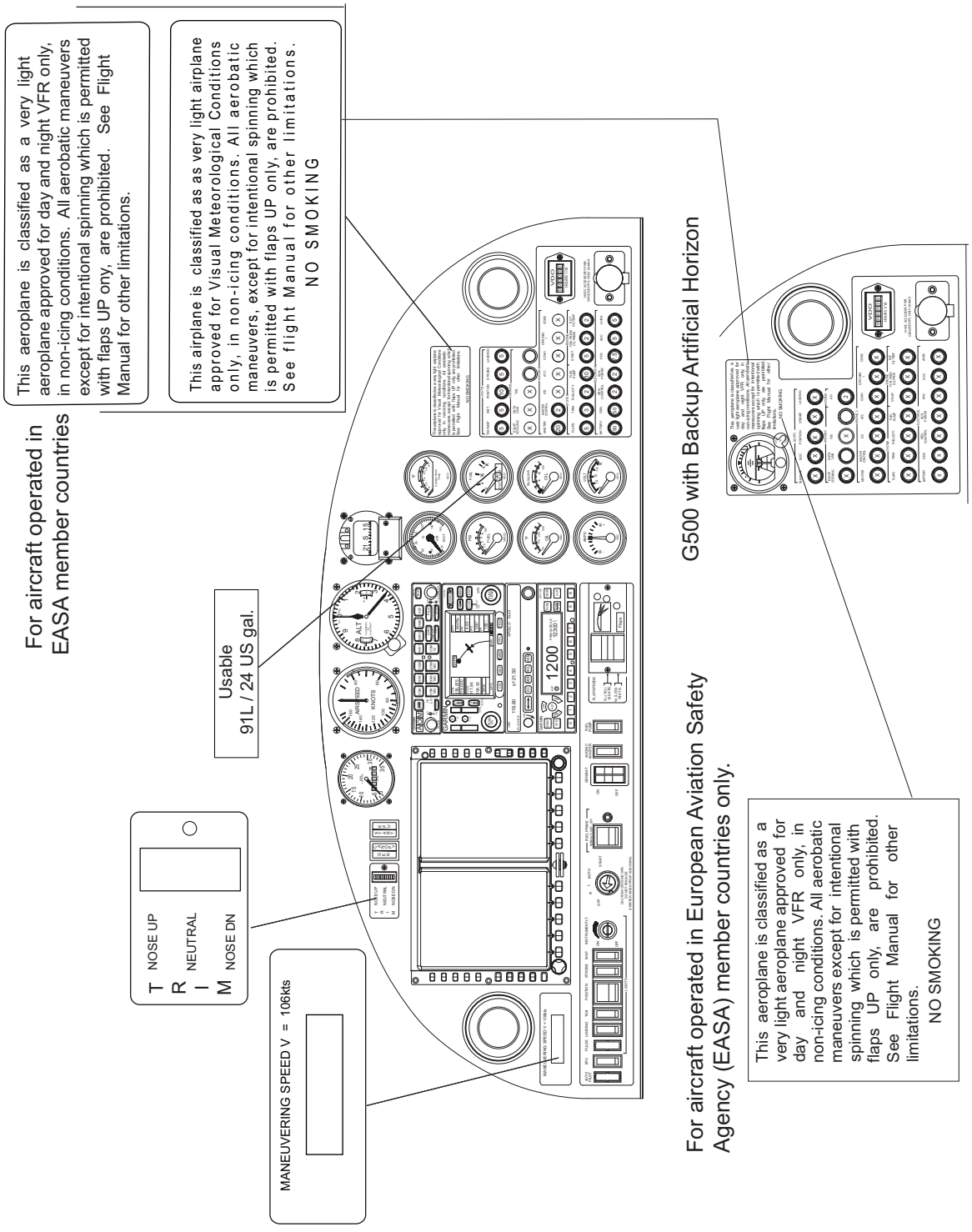
(k) Reversed instrument panel installation.



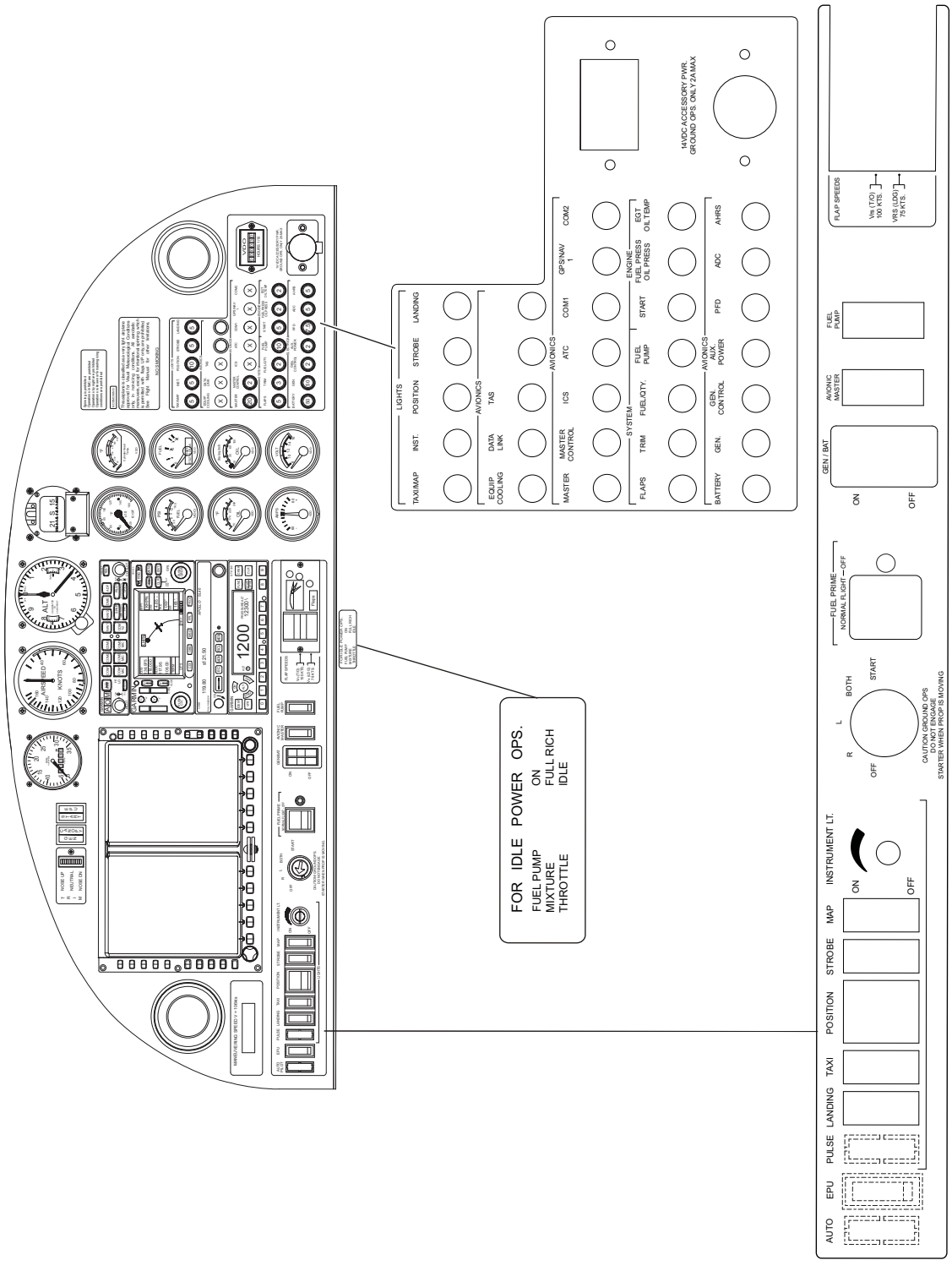
(l) Reversed instrument panel installation - Circuit Breakers.



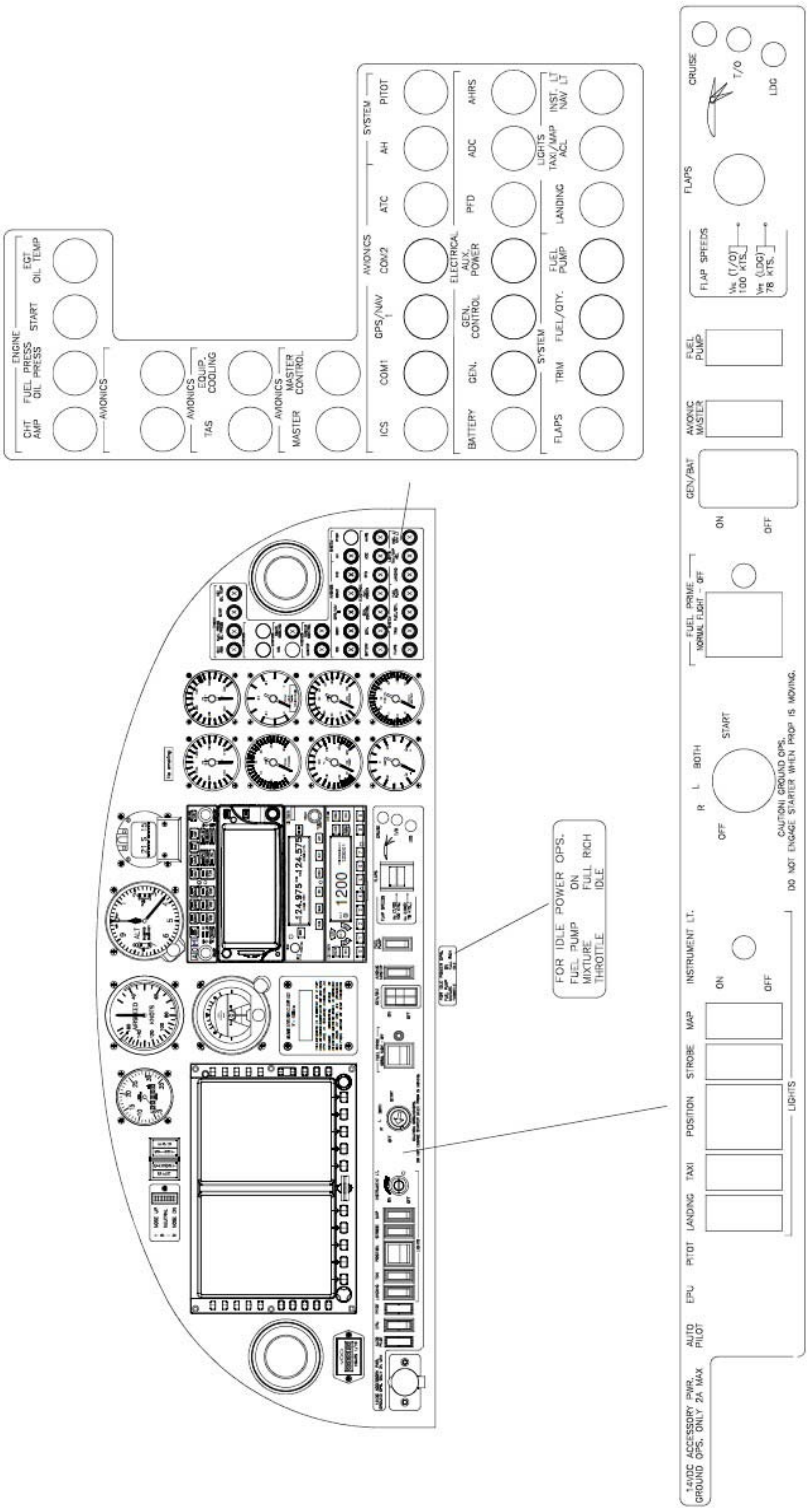
(m) Instrument panel with Garmin G500 installation. Refer to Supplement 13.



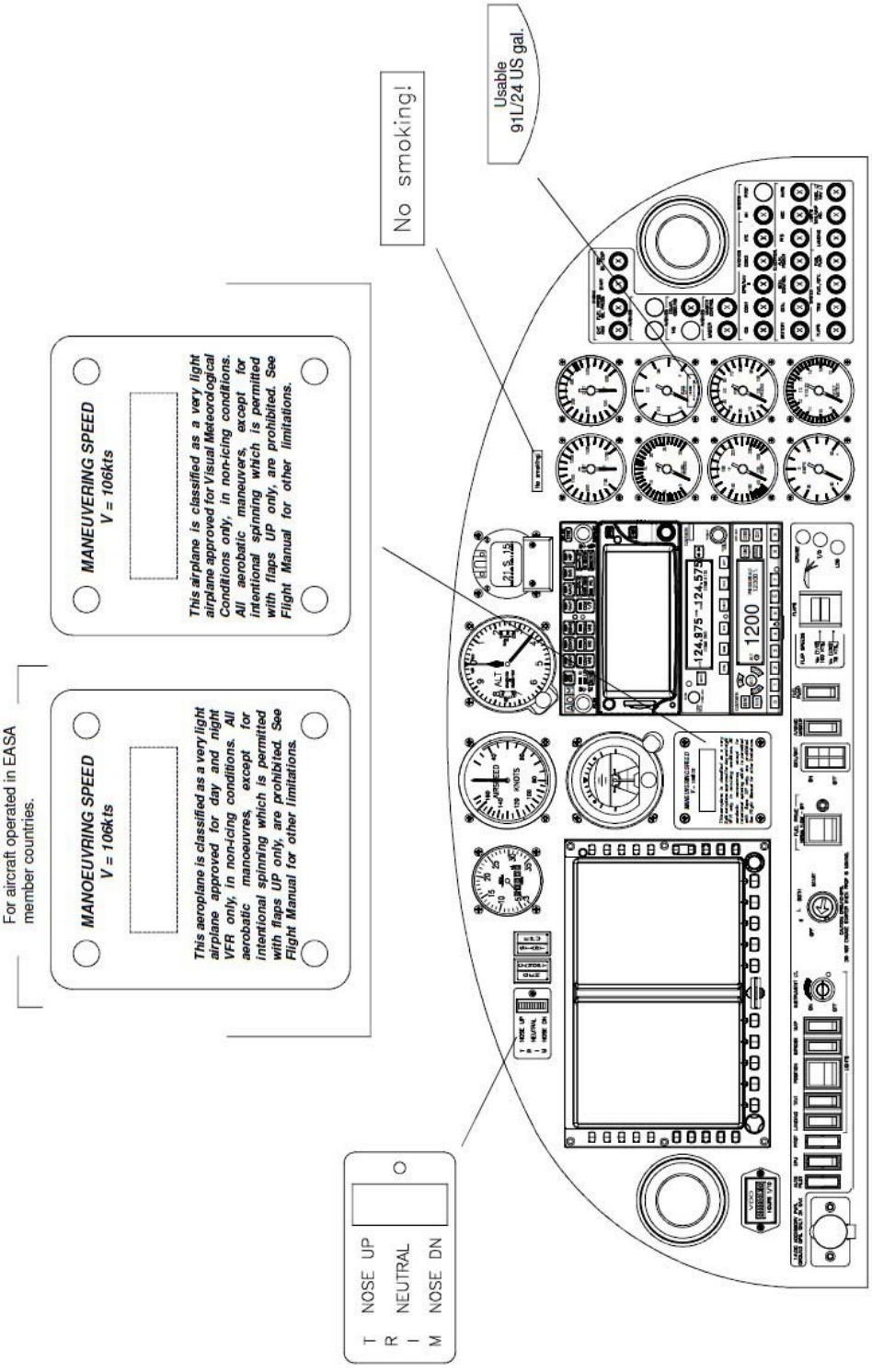
(n) Instrument panel with Garmin G500 installation. Refer to Supplement 13.



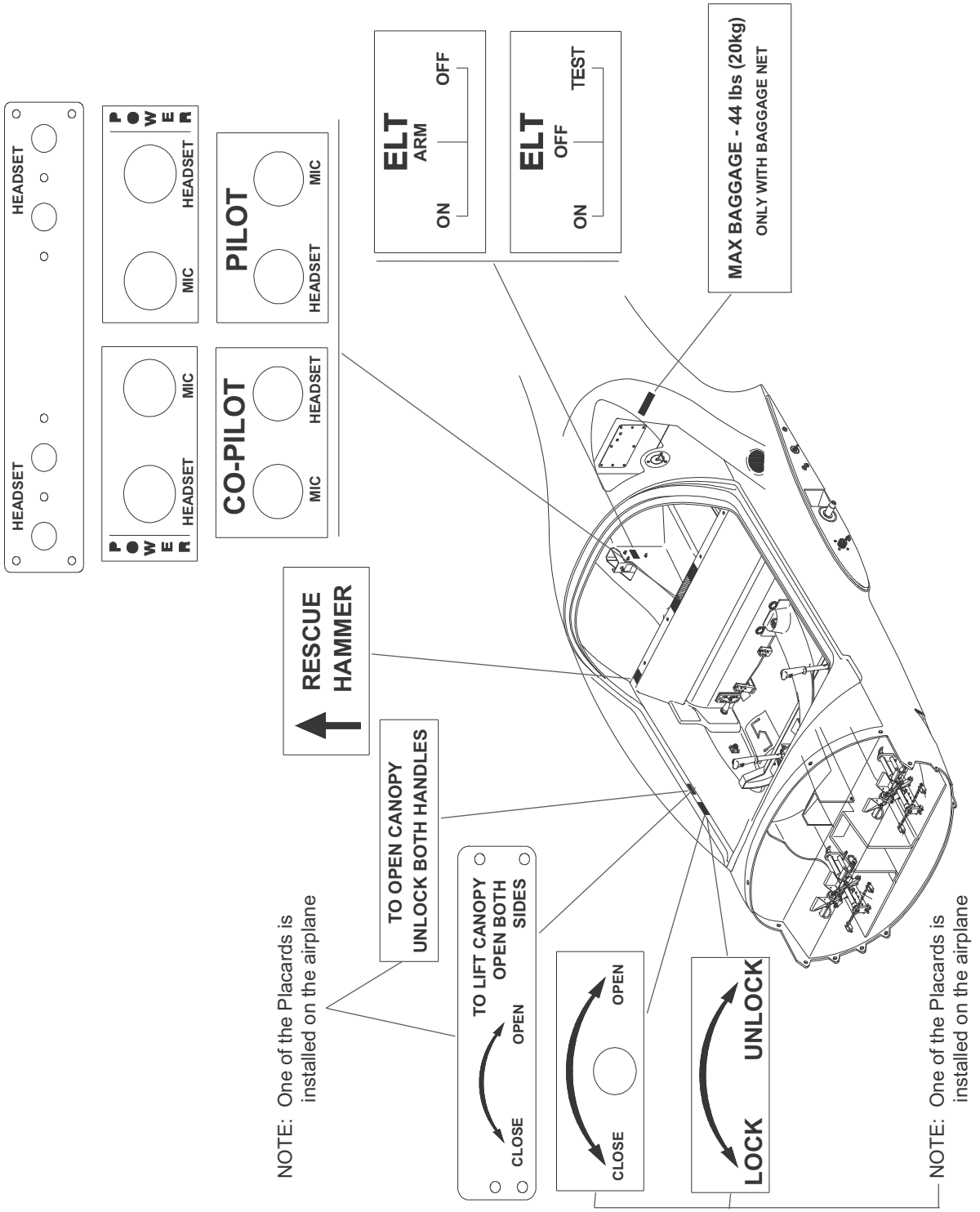
(o) Instrument panel with Garmin G500, UMA engine instruments and Garmin GTN 650/GTR 225installed



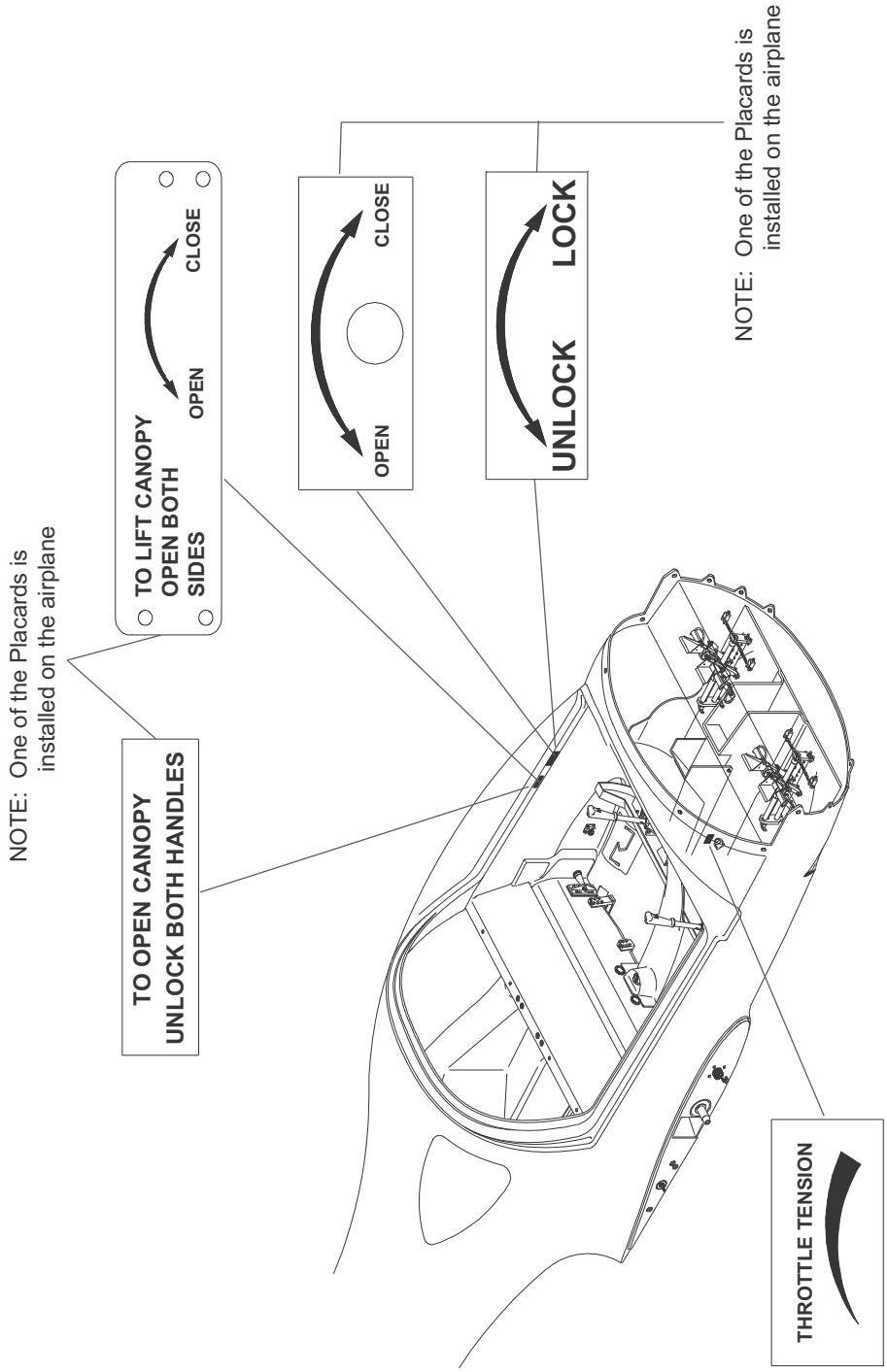
(p) Instrument panel with Garmin G500, UMA engine instruments and Garmin GTN 650/GTR 225installed



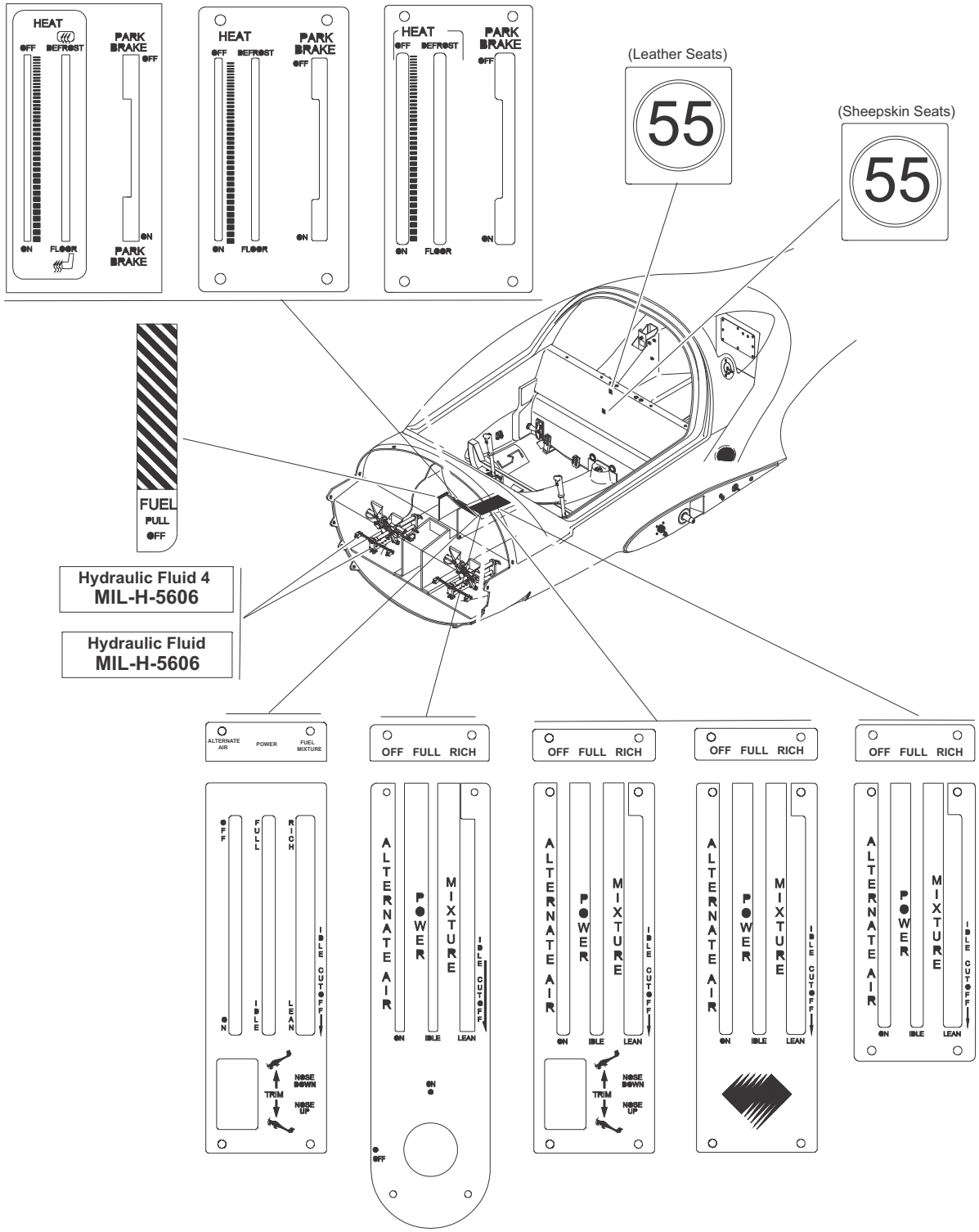
(q) Airplane interior - General placards and markings.



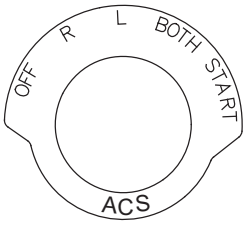
(r) Airplane interior - General placards and markings.



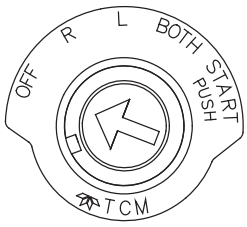
(s) Airplane interior - General placards and markings.



(t) Around the ignition switch on the instrument panel.



Optional Ignition Switch (Push-to-Start Feature)



(u) On the instrument panel. If equipped with an altitude compensating fuel pump.

This aircraft is equipped with an altitude compensating fuel system. See AFM Chapter 2, 4, & 7 for limitation and operating instructions.

(v) On the instrument panel. If equipped with an altitude compensating fuel pump.

GROUND IDLE SPEED:
975 RPM MINIMUM

IDLE MIXTURE RISE:
50 RPM MINIMUM

RECOMMENDED MINIMUM FLIGHT IDLE SPEED: 1400 RPM

(w) On the instrument panel. If equipped with an altitude compensating fuel pump.

This airplane is classified as a very light airplane approved for Visual Meteorological Conditions only, in non-icing conditions. All aerobatic maneuvers, including intentional spinning are prohibited See Flight Manual for other limitations.

2.16 DEMONSTRATED CROSSWIND COMPONENT

The maximum demonstrated crosswind component is 20 kts. (37 km/h).

2.17 TEMPERATURE LIMITS

CAUTION

FOR AIRCRAFT WITH OTHER THAN WHITE UNDERSIDES. PARKING THE AIRCRAFT OVER A LIGHT COLOURED OR REFLECTIVE SURFACE IN CONDITIONS OF BRIGHT SUNLIGHT, PARTICULARLY AT HIGH OAT, IS NOT RECOMMENDED.

Temperature limit of the structure for the operation of the airplane:

Maximum T/O Temperature : 131°F (55°C)
Structural Temperature

CHAPTER 3

EMERGENCY PROCEDURES

TABLE OF CONTENTS

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3.1 INTRODUCTION

The following chapter contains check-lists as well as descriptions of the recommended procedures in case of an emergency. However, engine failure or other airplane related emergency situations will most likely never occur if the mandatory pre-flight check and maintenance are performed properly.

In the event that an emergency situation does appear, the procedures presented in this manual should be used to rectify such problems. Since it is impossible to present in the Flight Manual all emergency situations which may occur, knowledge of the airplane and experience of the pilot are essential in rectifying any problems.

3.2 AIRSPEEDS DURING EMERGENCY PROCEDURES

	KIAS
Engine failure after take-off with flaps in T/O position	60
Maneuvering Speed	106
Airspeed for best glide angle Maximum Gross Weight – 1764 lbs (800 kg) Wing Flaps in CRUISE position	73
Precautionary Landing (with power and Wing Flaps in landing position)	55
Emergency landing with engine off (Wing Flaps in T/O position)	60
Emergency landing with engine off (Wing Flaps in LDG position)	55
Emergency landing with engine off (Wing Flaps CRUISE)	64

3.3 EMERGENCY PROCEDURES - CHECKLISTS

3.3.1 Engine Failures

(a) Engine Failure during Take-off Run

(1) Throttle..... IDLE

(2) Brakes .....as required

(3) Flaps .....CRUISE

(4) Mixture .....IDLE CUT-OFF

(5) Ignition Switch .....OFF

(6) GEN/BAT Master Switch .....OFF

(b) Engine Failure after Take-Off

INSUFFICIENT ENGINE POWER

(1) Airspeed ..... 60 KIAS

(2) Throttle .....FULL

(3) Mixture .....FULL RICH

(4) Alternate Air .....OPEN

(5) Fuel Shut-off Valve .....OPEN

(6) Ignition Switch .....BOTH

(7) Fuel Pump .....ON

WARNING

IF ADEQUATE ENGINE PERFORMANCE CANNOT BE RESTORED IMMEDIATELY, PREPARE FOR AN EMERGENCY LANDING. IF POSSIBLE, LAND STRAIGHT AHEAD, AVOIDING OBSTACLES.

SHORTLY BEFORE LANDING

(8) Mixture ..... IDLE CUTOFF

(9) Fuel Shut-off Valve ..... CLOSED

(10) Ignition Switch ..... OFF

(11) Flaps ..... as required

(12) GEN/BAT Master Switch ..... OFF

ENGINE INOPERATIVE

Perform emergency landing according to paragraph 3.3.3.

(c) Engine Failure during Flight

ENGINE RUNNING ROUGHLY

(1) Mixture ..... FULL RICH

(2) Alternate Air ..... OPEN

(3) Fuel Shut-off ..... OPEN

(4) Fuel Pump ..... ON

(5) Ignition Switch ..... cycle L - BOTH - R - BOTH

(6) Throttle ..... at present position

(7) No Improvement ..... reduce throttle to minimum required power, land as soon as possible.

LOSS OF OIL PRESSURE

(1) Oil Temperature ..... check

(2) If Oil Pressure drops below .....land at the nearest suitable
Green Arc above 2100RPM. .....airport.

(3) If Oil Pressure drops below .....reduce throttle to minimum
Green Arc and oil temperature .....required power and land as
is rising .....soon as possible. Be prepared
.....for engine failure and
.....an emergency landing.

LOSS OF FUEL PRESSURE

(1) Fuel Pump ..... ON, and land at the nearest suitable airport.

(2) If fuel pressure is not restored. .....Land at nearest suitable airport. Be prepared for engine failure and an emergency landing.

CAUTION

DO NOT ENGAGE STARTER IF PROPELLER IS WINDMILLING. ENGINE DAMAGE MAY RESULT.

The propeller will continue to windmill as long as the airspeed is at least 60 KIAS.

RESTARTING THE ENGINE WITH PROPELLER WINDMILLING

(1) Airspeed (VIAS) ..... 73 kts

(2) Mixture ..... FULL RICH

(3) Fuel Shut-off Valve ..... OPEN

(4) Ignition Switch ..... BOTH

(5) Fuel Pump ..... ON

(6) Fuel Prime ..... ON

(7) Throttle ..... 3/4 in (2cm) forward

AFTER SUCCESSFUL RE-START:

(8) Oil Pressure ..... check

(9) Oil Temperature ..... check

(10) Fuel Prime ..... OFF

(11) Electrically Powered Equipment ..... ON if required

RESTARTING THE ENGINE WITH PROPELLER AT FULL STOP

(1) Airspeed ..... 73 kts.

(2) Electrically Powered Equipment .....OFF

(3) GEN/BAT Master Switch .....ON

(4) Mixture .....FULL RICH

(5) Fuel shut off valve .....OPEN

(6) Fuel Pump .....ON

(7) Fuel Prime .....ON

(8) Throttle .....3/4 in (2 cm) forward

(9) Ignition Switch .....START

(10) Ignition Switch with Push-to-Start (Optional) START (TURN then PUSH)

NOTE

The engine may also be re-started by increasing the airspeed by pushing the airplane into a descent. A loss of 1000 ft/300 m altitude must be taken into account.

AN AIRSPEED OF 137 KIAS IS REQUIRED TO RESTART THE ENGINE.

AFTER SUCCESSFUL RE-START:

(11) Oil Pressure .....check

(12) Oil Temperature .....check

(13) Fuel Prime .....OFF

(14) Electrically Powered Equipment .....ON if required

3.3.2 Gliding

(a) Wing Flaps ..... CRUISE

(b) Airspeed at 1764 lbs (800 kg) ..... 73 KIAS

(c) Glide Ratio 11:1

Example: For every 1000 feet of altitude the aircraft can move forward 11,000 feet or 1.8 NM (3.4 km).

3.3.3 Emergency Landing

(a) Emergency Landing with Engine off

(1) Airspeed (Flaps in T/O position) ..... 60 KIAS

(2) Airspeed (Flaps in LDG position) ..... 55 KIAS

(3) Airspeed (Flaps CRUISE) ..... 64 KIAS

(4) Fuel Shut-off Valve ..... CLOSED

(5) Mixture ..... IDLE CUTOFF

(6) Ignition Switch ..... OFF

(7) Safety Belts ..... secured

(8) Radio ..... Transmit, 121.5 Mhz, giving location and intentions

(9) Flaps ..... as required

(10) GEN/BAT Master Switch ..... OFF

(11) After Touch – Down ..... Apply brakes

(b) Precautionary Landing with Engine Power Available

NOTE

A precautionary landing would be required if continuing the flight would endanger the aircraft or its occupants. Circumstances, including mechanical defects, low fuel quantity or deteriorating weather conditions could require a precautionary landing.

(1) Search for a suitable place to land. Special attention must be given to wind direction and obstacles in the approach path.

(2) Safety Belts .....secured

(3) Initiate Descent

(4) Mixture .....FULL RICH

(5) Throttle .....as required

(6) Trim .....as required

(7) Wing Flaps .....as required
(observe permissable speed)

(8) Over fly selected landing area (not below 500 ft / 150 m above ground) to confirm suitability and that approach route is free of obstacles.

(9) Climb up to pattern altitude.

(10) Low pass over flight at a safe altitude to observe any possible obstacles, such as cables, fences, ditches.

(11) Climb up to pattern altitude.

(12) Radio .....Transmit, giving location and intentions.

(13) Final Approach:

(A) Mixture ..... FULL RICH

(B) Throttle ..... as required

(C) Fuel Pump ..... ON

(D) Wing Flaps ..... LDG

(E) Airspeed ..... 55 KIAS

(14) Touch-down is to be made with minimum airspeed, nose wheel should be kept above ground as long as possible.

(15) After Touch-down:

(A) Brake ..... as required

(B) Fuel Shut-off Valve ..... CLOSED

(C) Mixture ..... IDLE CUT-OFF

(D) Ignition Switch ..... OFF

(E) GEN/BAT Master Switch ..... OFF

NOTE

If no suitable level landing area can be found, an up-hill landing should be performed, if possible.

3.3.4 Fire

(a) Engine Fire during Engine-Start-Up on the Ground

(1) Fuel Shut-off Valve ..... CLOSED

(2) Cabin Heat .....CLOSED

(3) Mixture .....IDLE CUTOFF

(4) GEN/BAT Master Switch .....OFF

(5) Ignition Switch .....OFF

(6) Evacuate Airplane immediately

(b) Engine Fire during Flight

(1) Fuel Shut-off Valve ..... CLOSED

(2) Cabin Heat .....CLOSED

(3) Airspeed .....73 KIAS

NOTE

Airspeed is for best glide with flaps in CRUISE position. If a suitable landing area is available and can be safely reached, airspeed can be increased in an attempt to extinguish the fire. Do not exceed airspeeds given for structural limitations.

(4) Fuel Pump .....OFF

(5) Perform emergency landing with engine off according to paragraph 3.3.3.

(c) Electrical Fire including Smoke during Flight

(1) GEN/BAT Master Switch ..... OFF

(2) Cabin Air ..... OPEN

(3) Fire Extinguisher ..... use only if smoke development continues.

CAUTION

IF FIRE EXTINGUISHER IS USED, THE CABIN MUST BE VENTILATED.

In case the fire is extinguished and electric power is required for continuation of the flight:

(4) Avionics Master Switch ..... OFF

(5) Electrically Powered Equipment ..... OFF

NOTE

Restore electrical power systematically allowing time to monitor the system voltmeter and amp meter between the reconnection of loads. Watch carefully for smoke.

(6) Circuit Breakers ..... Push all circuit breakers

(7) Circuit Breakers ..... Push BATTERY

(8) GEN/BAT Master Switch ..... ON BAT 1/2 only

(9) Circuit Breakers ..... Push GEN & GEN CONTROL

(10) GEN/BAT Master Switch ..... ON

(11) Circuit Breakers ..... Push AVIONICS and AVIONICS MASTER

(12) Avionics Master Switch ..... ON

(13) Circuit Breakers .....Push to activate systems as required.

(14) Radio .....ON

(15) Land as soon as possible.

(d) Electrical Fire including Smoke on the Ground

(1) GEN/BAT Master Switch ..... OFF

IF ENGINE IS RUNNING:

(2) Throttle .....IDLE

(3) Mixture .....IDLE CUTOFF

(4) Fuel Shut-off Valve .....CLOSED

(5) Ignition Switch .....OFF

(6) Canopy .....open

(7) Fire Extinguisher .....discharge as required

(e) Cabin Fire during Flight

(1) GEN/BAT Master Switch ..... OFF

(2) Cabin Air .....OPEN

(3) Cabin Heat .....CLOSED

(4) Fire Extinguisher .....discharge as required

(5) Land as soon as possible

CAUTION

IF THE FIRE EXTINGUISHER IS USED, THE CABIN MUST BE VENTILATED.

3.3.5 Icing

Unintentional Flight Into Icing Area

(a) Leave icing area (through change of altitude or change of flight direction to reach area with higher outside air temp).

(b) Continue to move control surfaces to maintain their moveability.

(c) Alternate Air .....ON

(d) Increase RPM to avoid icing of propeller blades (observe maximum RPM).

(e) Cabin Heat .....ON DEFROST

CAUTION

IN CASE OF ICING ON THE LEADING EDGE OF THE WING, THE STALL SPEED WILL INCREASE.

CAUTION

IN CASE OF ICING ON THE LEADING EDGE OF THE WING, ERRONEOUS INDICATING OF THE AIRSPEED, ALTIMETER, RATE OF CLIMB AND STALL WARNING SHOULD BE EXPECTED.

3.3.6 Recovery from Unintentional Spin

(a) Throttle ..... IDLE

(b) Rudder ..... fully applied opposite to direction of spin

(c) Control Stick ..... ease forward

(d) Rudder ..... neutral, after rotation has stopped

(e) Wing Flaps ..... CRUISE

(f) Elevator ..... pull cautiously. Bring airplane from descent into level flight position. Do not exceed maximum permissible speed (V_{NE}).

3.3.7 Landing with Defective Tire on Main Landing Gear

(a) Final approach with wing flaps in landing position.

(b) Land airplane on the side of runway opposite to the side with the defective tire to compensate for change in direction which is to be expected during final rolling.

(c) Land with wing slightly tipped in the direction of the non-defective tire. To increase the maneuverability during rolling, the nose-wheel should be brought to the ground as soon as possible after touch-down.

(d) To ease the load on the defective tire, the aileron should be fully applied in the direction of the non-defective tire.

3.3.8 Electrical Power Failure

(a) Total Electrical Power Failure

(1) Battery Circuit Breaker ..... If tripped, reset

(2) GEN/BAT Master Switch ..... check ON

(3) Master Switch ..... OFF if power not restored

(4) If Unsuccessful ..... Land at nearest suitable airport

(b) Generator Failure

GEN. ANNUNCIATOR ILLUMINATED

(1) GEN/BAT Master Switch ..... Cycle Generator Master Switch OFF - ON

(2) Generator Circuit Breaker ..... If tripped, reset

(3) Generator CONTROL Circuit Breaker ..... If tripped, reset

(4) If Generator can not be brought on-line ..... Switch OFF all non-flight essential electrical consumers. Monitor Ammeter and Voltmeter. Land at nearest suitable airport.

NOTE

There is 30 minutes of battery power at a discharge load of 20 amperes when the battery is fully charged and properly maintained.

(c) Low Voltage Indication (needle in yellow Arc)

LOW VOLTAGE INDICATION (NEEDLE IN YELLOW ARC) WHILE AIRPLANE IS ON THE GROUND

(1) Engine RPM ..... Increase RPM until needle is in the Green Arc. This should occur before exceeding 1100 RPM.

(2) Non-flight essential electrical consumers ....Switch OFF consumers until needle is in the Green Arc.

(3) If needle remains in the yellow arc and the ammeter is indicating to the left of center (discharge). .....Discontinue any planned flight activity

LOW VOLTAGE INDICATION (NEEDLE IN YELLOW ARC) DURING FLIGHT

(1) All non-flight essential electrical..... Switch OFF consumers

(2) If needle is remaining in the yellow arc and the ammeter is indicating to the left of center (Discharge). .....Generator Failure Refer to paragraph 3.3.8.C.

LOW VOLTAGE INDICATION (NEEDLE IN YELLOW ARC) DURING LANDING

(1) After landing ..... proceed in accordance with paragraph 3.3.8.C.

WARNING

IF AT ANY TIME THE VOLTMETER NEEDLE INDICATES IN THE RED ARC, THE PILOT SHOULD LAND AT THE NEAREST SUITABLE AIRPORT AND SERVICE THE AIRCRAFT ACCORDINGLY BEFORE CONTINUING THE FLIGHT.

3.3.9 Flap System Failure

Flap Position Indicator Failure

(a) Visual check of the flap position

(b) Select airspeed within the range of the white arc marked on the airspeed indicator

(c) Check all positions of the flap toggle switch (flap stops are fail-safe)

(d) Modify approach and landing as follows:

(1) only CRUISE available: .....- raise approach speed by 10 kts
- throttle as required
- flat approach angle

(2) only T/O available: .....- normal approach speed
- throttle as required
- flat approach angle

(3) only LDG available: .....- normal landing

3.3.10 Starter Relay Failure

Starter does not disengage after starting the engine (start light remains illuminated).

(a) Throttle .....IDLE

(b) Mixture .....IDLE CUTOFF

(c) Ignition Switch .....OFF
discontinue any planned flight.
Maintenance action is required.

3.3.11 Avionics System Failure

TOTAL AVIONICS FAILURE:

(a) Check Avionics Master Circuit Breaker ..... If popped, press and monitor status. If it pops again, land at the nearest suitable airport.

(b) Check Avionics Master Switch ..... Toggle avionics master switch, if avionics system remains off-line, pull avionics master control circuit breaker. Land at the nearest suitable airport if operation is not restored.

RADIO SYSTEM OPERATIVE, NO RECEPTION:

(a) Microphone Key ..... check for stuck Microphone Key on transceiver display.

(b) Headphones ..... check, deactivate SQUELCH for a few moments,
if SQUELCH not heard, check headset connection.

RADIO SYSTEM OPERATIVE, TRANSMITTING NOT POSSIBLE:

(a) Selected Frequency ..... check if correct

(b) Microphone ..... Install handheld mike as follows:
- Unplug and remove headset.
- Plug handheld mike in.
- Turn up speaker volume on audio panel.

Check, if available use a different headset.

Problem cannot be resolved: .....
- switch transponder (if available) to "COMM FAILURE"
- code if required by the situation and permitted by applicable national regulations.

3.3.12 Trim System Failure

STUCK TRIM:

(a) Circuit breaker ..... check, press if breaker is tripped

(b) Rocker switch ..... depress in both directions, wait 5 minutes, try again

NOTE

Full range of travel is available for elevator, but expect higher forces on control stick.

(c) Land at the nearest suitable airport

RUNAWAY OF TRIM:

(a) Control Stick ..... Grip stick and maintain control of the airplane.

(b) Trim motor circuit breaker ..... Pull circuit breaker.

(c) Rocker Switch ..... Check if depressed.

If the reason for the runaway condition is obvious and has been resolved, push in (engage) the circuit breaker.

NOTE

Full travel of the elevator trim system will take approximately 10 seconds.

3.3.13 Instrument Panel Lighting Failure

(a) Rocker Switch, map light ..... ON

(b) Rocker Switch, I-panel lighting ..... Cycle Rocker Switch OFF-ON

(c) Dimming Control ..... Turn fully clockwise

(d) Internal Lighting Circuit Breaker ..... If tripped, reset

(e) If NOT Successful ..... Use flashlight

Expect an electrical power failure. Refer to paragraph 3.3.8.

CHAPTER 4

NORMAL OPERATING PROCEDURES

TABLE OF CONTENTS

PAGE

4.1 INTRODUCTION

Chapter 4 contains checklists and describes extended procedures for the normal operation of the airplane.

4.2 AIRSPEEDS FOR NORMAL FLIGHT OPERATION

Unless stated otherwise, the following table contains the applicable airspeeds for maximum take-off and landing weight. The airspeeds may also be used for lower flight weights.

TAKE-OFF	KIAS
Climb Speed during normal take-off for 50 ft (15 m) obstacle	58
Best Rate-of-Climb speed at sea level V_Y. Wing Flaps CRUISE	75
Best Angle-of-Climb speed at sea level V_X. Wing Flaps CRUISE	60
Best Rate-of-Climb speed at sea level V_Y. Wing Flaps T/O	68
Best Angle-of-Climb speed at sea level V_X. Wing Flaps T/O	57

LANDING	KIAS
Approach speed for normal landing. Wing Flaps LDG	55
Balked landing climb speed. Wing Flaps LDG	52
Maximum demonstrated crosswind speed during take-off and landing	20

CRUISE	KIAS
Maximum permissible speed in rough air V_{NO}	118
Maximum permissible speed with full control surface deflections V_A	106
Maximum permissible speed with Wing Flaps in T/O Position (V_{FE} T/O)	100
Maximum permissible speed with Wing Flaps in LDG Position (V_{FE} LDG)	78

4.3 STRUCTURAL TEMPERATURE INDICATOR

A structural temperature indicator, installed on the spar bridge, indicates when the structural temperature limitation is exceeded (refer to Section 2.17). The indicator need only be checked if the OAT exceeds 38º C (100º F).

The indicator is accessed by lifting the flap between the two seat-back cushions. The indicator is visible through the cut out in the seat shell backs (see Figure 4.2).

At temperatures below the 55º C (131º F) limit, the indicator appears all red with a faint indication of “55” (º C). At temperatures exceeding the 55º C (131º F) limit, the indicator displays a clearly contrasting red “55” (º C) on a black background (see Figure 4.1).

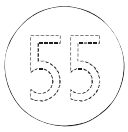
NOTE

At temperatures approaching the limit, the background will progressively darken prior to turning black; this indicates acceptable temperatures.

NOTE

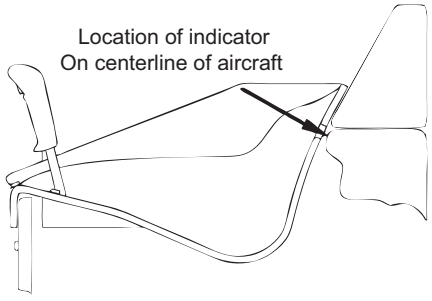
Aircraft with other than white undersides have an additional structural temperature indicator installed adjacent to the fuel drains.

Red “55” on black background indicates that structural temperature limit is exceeded. Flight is prohibited.



All red indicates that structural temperature is below limit. Flight is permitted.

Figure 4.1



NOTE: Refer to Page 2-30 for the actual Location of the indicator.

Figure 4.2

4.4 NORMAL OPERATION CHECKLIST

4.4.1 Preflight Inspection

(a) In-Cabin Check

(1) Structural Temperature Indicator (if OAT exceeds 38º C (100º F)) ..... check that Structural Temperature does not exceed 55º C (131º F)

(2) Airplane Documents ..... check

(3) Flight Control Lock ..... removed

(4) Flight Controls ..... check for proper direction of movement

(5) Ignition Key ..... pulled out

(6) Cabin Heat ..... free

(7) Parking Brake ..... free

(8) Throttle ..... free, IDLE

(9) Mixture ..... free, IDLE CUTOFF

(10) GEN/BAT Master Switch ..... ON

(11) Warning Lights (Gen. and Canopy) ..... illuminated

(12) Fuel Quantity ..... sufficient

(13) Engine Gauges, Ammeter and Voltmeter ..... check

(14) Circuit Breakers ..... pressed in

(15) Map Light ..... operational

(16) Instrument Lights ..... operational and dimmable

(17) Trim ..... NEUTRAL

(18) Wing Flaps (Indicator- andflap Actuation) ..... check, extend and retract fully

(19) Trim and Flap Indicator Lights ..... operational and dimmable

(20) Exterior Lights ..... operational as required

(21) GEN/BAT Master Switch ..... OFF

(22) Foreign Object Inspection ..... done

(23) Emergency Locator Transmitter (ELT):

ARTEX ELT-200 ..... ARM

EBC Model 502 - ..... ARM

EBC Model 102A - ..... OFF

ARTEX ME 406 ..... ARM

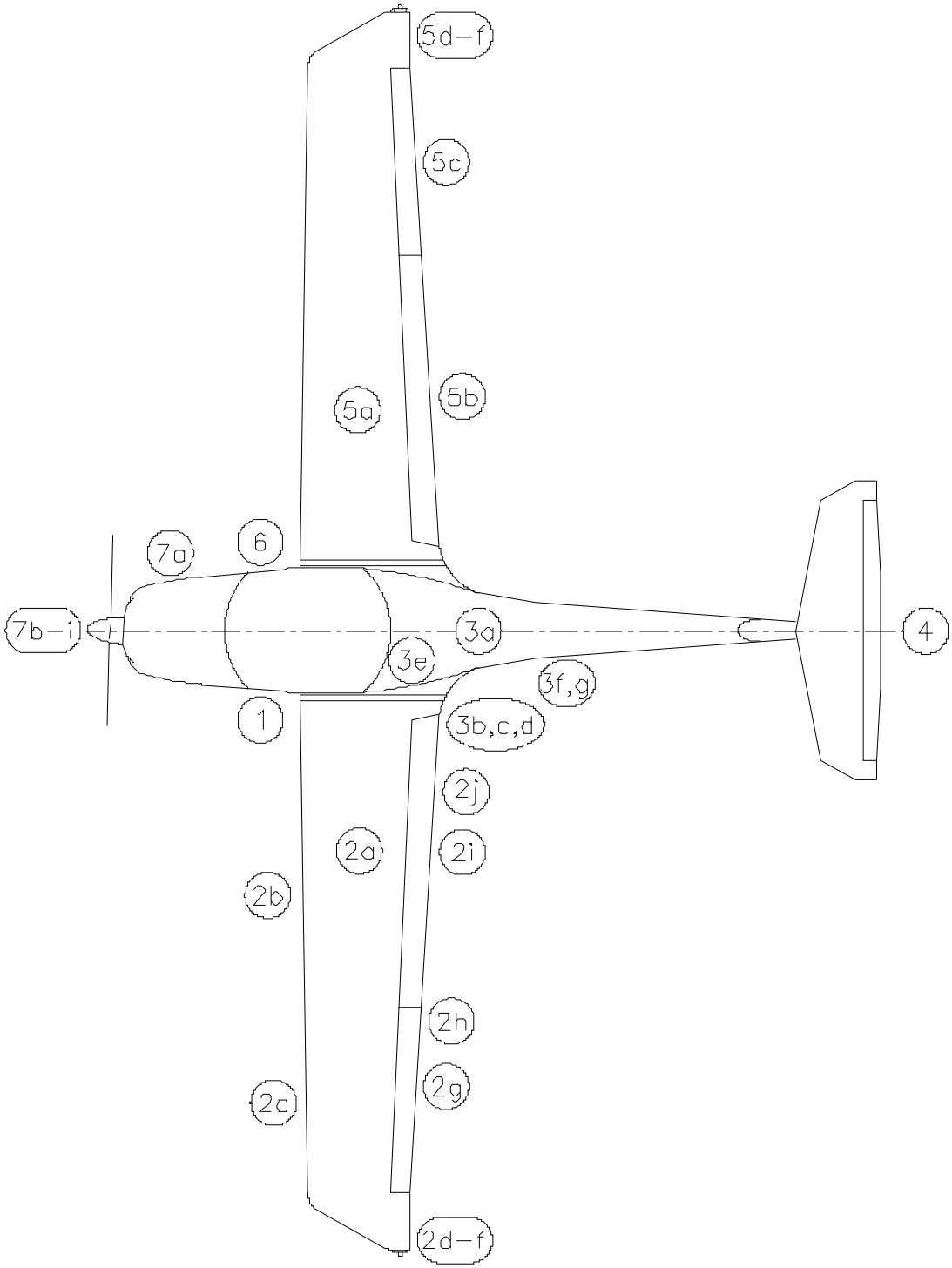
(24) Fire Extinguisher ..... check

(25) Rescue Hammer ..... check

(26) Baggage ..... stowed, baggage net attached

(27) Canopy ..... clean, undamaged

(b) Walk Around Check and Visual Inspection



CAUTION

VISUALLY INSPECT FOR THE FOLLOWING CONDITIONS: DEFECTS, CONTAMINATION, CRACKS, DELAMINATIONS, EXCESSIVE PLAY, INSECURE OR IMPROPER MOUNTING AND GENERAL CONDITION.

ADDITIONALLY, CHECK THE CONTROL SURFACES FOR FREEDOM OF MOVEMENT.

CAUTION

SET THE PARKING BRAKE PRIOR TO REMOVING THE WHEEL CHOCKS.

(1) Left Main Landing Gear

(A) Landing Gear Strut .....visual inspection

(B) Wheel Fairing .....visual inspection

(C) Tire Pressure (33 psi / 2.3 bar) .....check

(D) Tire, Wheel, Brake .....visual inspection

(E) Wheel Chocks .....remove

(2) Left Wing

(A) Entire Wing .....visual inspection

(B) Stall Warning .....check (suck on opening)

(C) Pitot-Static Probe .....clean, holes open

(D) Tie down .....remove

(E) Taxi and Landing Lights .....visual inspection

(F) Wing Tip, Position Lights and Strobe .....visual inspection

(G) Aileron Balancing Weight .....visual inspection

(H) Aileron including Inspection Panel .....visual inspection

(I) Wing Flap including Inspection Panel .....visual inspection

(3) Fuselage

(A) Skin .....visual inspection

(B) Fuel Tank Vent .....check

(C) Fuel Drains .....drain water

(D) Structural Temperature Indicator ..... check that the structural temperature does not exceed 55º C (131º F)
(for aircraft with other than white Undersides)

(E) Maintenance Fuel Drains .....no leaks

(F) Fuel Quantity .....visual inspection (use fuel dipstick)

(G) Antennas .....visual inspection

(4) Empennage

(A) Stabilizers and Control Surfaces .....visual inspection

(B) Tie down .....remove

(C) Fixed Tab on Rudder .....visual inspection

(5) Right Wing

(A) Entire Wing .....visual inspection

(B) Wing Flap including Inspection Panel .....visual inspection

(C) Aileron including Inspection Panel .....visual inspection

(D) Aileron Balancing Weight .....visual inspection

(E) Wing Tip, Position Lights and Strobe .....visual inspection

(F) Tie down .....remove

(6) Right Main Landing Gear

(A) Landing Gear Strut ..... visual inspection

(B) Wheel Fairing ..... visual inspection

(C) Tire Pressure (33 psi / 2.3 bar) ..... check

(D) Tire, Wheel, Brake ..... visual inspection

(E) Wheel Chocks ..... remove

(7) Nose

(A) Oil ..... check level by using dipstick.
Max level is 6 US quarts
Min level is 4 US quarts

(B) Cowling ..... visual inspection

(C) Air Intakes ..... clear

(D) Propeller ..... visual inspection, Ground Clearance; minimum: approx. 25 cm (10 in.)

(E) Propeller Blades ..... check for damage

(F) Spinner ..... visual inspection

(G) Nose Gear ..... visual inspection, towbar removed

(H) Wheel Fairing ..... visual inspection

(I) Tire Pressure (26 psi / 1.8 bar) ..... check

(J) Tire and Wheel ..... visual inspection

(K) Wheel Chocks ..... remove

4.4.2 Before Starting Engine

CAUTION

BEFORE STARTING THE ENGINE, THE CANOPY MUST BE CLOSED AND LATCHED. THE RED HANDLES MUST BE MOVED FULLY FORWARD.

AFTER STARTING THE ENGINE, THE CANOPY MUST STAY IN THE CLOSED AND LATCHED POSITION UNTIL THE ENGINE IS SHUT DOWN.

DURING ENGINE OPERATION IT IS PROHIBITED TO ENTER OR EXIT THE AIRPLANE.

(a) Preflight Inspection ..... performed

(b) Pedals ..... adjust, lock – pull T-grip straight back

(c) Passenger Briefing ..... performed

(d) Safety Belts ..... fastened

(e) Parking Brake ..... set

(f) Flight Controls ..... free

(g) Fuel Shut-off Valve ..... OPEN

(h) Mixture ..... FULL RICH

(i) Throttle ..... IDLE

(j) Friction Device of Throttle Quadrant ..... adjust

(k) Avionics Master Switch ..... OFF

(l) GEN/BAT Master Switch ..... ON

(m) Generator Warning Light ..... illuminated

(n) Exterior Lights ..... as required

(o) Instrument Panel Lighting ..... as required

(p) Canopy ..... Close and Secure

(q) Canopy Unlock Warning Light ..... OFF

4.4.3 Starting Engine

(a) Starting Engine Cold

NOTE

It is recommended that the engine be preheated if it has been cold soaked for 2 hours or more at temperatures of -4º C (25º F) or less.

(1) Throttle ..... IDLE

(2) Mixture ..... FULL RICH

(3) Toe Brakes ..... hold

(4) Propeller Area ..... clear

WARNING

MAKE SURE THAT THE PROPELLER AREA IS CLEAR

CAUTION

DO NOT ENGAGE STARTER IF THE PROPELLER IS MOVING. SERIOUS ENGINE DAMAGE CAN RESULT.

NOTE

Steps (5), (6), (7), (8), (9), and (10) are to be performed without delay between the steps.

NOTE

Colder ambient temperatures require longer priming.

(5) Fuel Pump ..... ON

(6) Fuel Prime ..... ON

(7) Throttle ..... FULL for prime
prime for 5 -10 seconds minimum before starting)

(8) Throttle ..... Full IDLE to ¼ inch OPEN
(adjust as required)

(9) Ignition Switch ..... START, hold until engine starts or for 10 seconds maximum (if engine does not start, release ignition key, push throttle to full power for 3 seconds minimum for more priming, then repeat from Step (8)

NOTE

If the optional Push-to-Start ignition switch is installed, then additional "PUSH" action is required after the ignition switch is turned to the START position when implementing start.

(10) Starter Warning Light ..... illuminated while ignition is in the START position

NOTE

Activate the starter for a maximum of 30 seconds only, followed by a cooling period of 3-5 minutes.

(11) Throttle ..... 1000 ± 25 RPM

CAUTION

DO NOT OPERATE ENGINE ABOVE 1000 RPM UNTIL AN OIL TEMPERATURE INDICATION IS REGISTERED.

(12) Fuel Prime ..... OFF

(13) Engine Instruments ..... check

NOTE

Excessive priming can result in a flooded engine. To clear a flooded engine, turn off the fuel pump and fuel prime, open the throttle 1/2 to 1 inch and engage the starter. The engine should start for a short period and then stop. Excess fuel has now been cleared and engine start from item (1) can be performed.

CAUTION

IF OIL PRESSURE IS BELOW 10 PSI, SHUT DOWN THE ENGINE IMMEDIATELY (MAXIMUM 30 SECONDS DELAY).

NOTE

Oil Pressure may advance above the green arc until Oil Temperature reaches normal operating temperatures.

Regulate warm up RPM to maintain pressure below 100 psi limit. At ambient temperatures below 32º F (0º C) DO NOT apply full power if oil pressure is above 70 psi.

(14) Starter Warning Light ..... check OFF

(b) Starting Engine Warm

(1) Throttle ..... IDLE

(2) Mixture ..... FULL RICH

(3) Toe Brakes ..... hold

(4) Propeller Area ..... clear

WARNING

MAKE SURE THAT THE PROPELLER AREA IS CLEAR.

CAUTION

DO NOT ENGAGE THE STARTER IF THE PROPELLER IS MOVING. SERIOUS DAMAGE CAN RESULT.

NOTE

Steps (5), (6), (7), (8), (9), and (10) are to be performed without delay between the steps.

(5) Fuel Pump ..... ON

(6) Fuel Prime ..... ON

(7) Throttle ..... FULL for prime (prime for 1 to 3 seconds before starting)

(8) Throttle ..... ½ to 1 inch OPEN (approximately)

(9) Ignition Switch ..... START, hold until the engine starts or for 10 seconds maximum (repeat from Step (7) if the engine does not start)

NOTE

If the optional Push-to-Start ignition switch is installed, then additional “PUSH” action is required after the ignition switch is turned to the START position when implementing start.

(10) Starter Warning Light ..... illuminated while ignition is in the START position

NOTE

Activate the starter for a maximum of 30 seconds only, followed by a cooling period of 3-5 minutes.

(11) Throttle ..... 1000 ± 25 RPM .

(12) Fuel Prime ..... OFF

(13) Engine Instruments ..... check

NOTE

Excessive priming can result in a flooded engine. To clear a flooded engine, turn off the fuel pump and fuel prime, open the throttle 1/2 to 1 inch and engage the starter. The engine should start for a short period and then stop. Excess fuel has now been cleared and engine start from item (1) can be performed.

CAUTION

IF OIL PRESSURE IS BELOW 10 PSI, SHUT DOWN THE ENGINE IMMEDIATELY (MAXIMUM 30 SECONDS DELAY).

NOTE

Oil Pressure may advance above the green arc until Oil Temperature reaches normal operating temperatures.

Regulate warm up RPM to maintain pressure below 100 psi limit. At ambient temperatures below 32º F (0º C) DO NOT apply full power if oil pressure is above 70 psi.

(14) Starter Warning Light ..... check OFF

4.4.4 Before Taxiing

(a) Avionics Master Switch ..... ON

(b) Flight Instruments and Avionics ..... set

(c) Engine Gauges ..... check

(d) Voltmeter ..... check, ensure needle is in the green arc. Increase RPM to achieve or turn OFF non-flight essential electrical consumers

(e) Warning Lights, Gen, Canopy, Start,..... push to test
EPU (if installed)

(f) Fuel Prime check ..... OFF

(g) Fuel Pump ..... check ON

(h) Parking Brake ..... release

CAUTION

WARM-UP ENGINE TO A MINIMUM OIL TEMPERATURE OF 75° F AT 1000 TO 1200 RPM (ALSO POSSIBLE DURING TAXI). DO NOT OPERATE ENGINE ABOVE 1000 RPM UNTIL AN OIL TEMPERATURE INDICATION IS REGISTERED.

4.4.5 Taxiing

(a) Brake ..... check

(b) Mixture ..... FULL RICH

(c) Throttle ..... As required

(d) Direction Control ..... check

(e) Flight Instruments and Avionics ..... check

(f) Compass ..... check

CAUTION

AT HIGH ENGINE RPM THE PROPELLER CAN BE DAMAGED BY LOOSE SAND, GRAVEL OR WATER.

4.4.6 Before Take-off (Engine Run-up)

NOTE

For OAT's less than -5º F (-20º C) turn cabin heat on for at least 10 minutes prior to take-off.

(a) Brakes ..... apply

(b) Safety Belts ..... fastened

(c) Canopy ..... closed and locked

(d) Canopy Unlock Warning Light ..... OFF

(e) Fuel Pressure ..... check

(f) Fuel Shut-off Valve ..... check OPEN

(g) Fuel Quantity Indicator ..... check

(h) Fuel Prime check ..... OFF

(i) Fuel Pump check ..... ON

(j) Trim ..... NEUTRAL

(k) Flight Controls ..... free

(l) Oil Temp. ..... 75º minimum

(m) Mixture ..... FULL RICH

(n) Throttle ..... 1700 RPM

(o) Magneto Check ..... Cycle L - BOTH - R – BOTH (RPM drop: 25-150 RPM) (Max. RPM difference (L/R): 50 RPM)

(p) Mixture ..... check

(q) Alt. Load ..... check

(r) Oil Pressure ..... 30-60 psi

(s) Vacuum Gauge (if installed) ..... within green range

(t) Throttle ..... IDLE (975 RPM Minimum, for aircraft with altitude compensating fuel system)

(u) Mixture ..... Move slowly toward lean cut off (RPM increase) (50 RPM Minimum, for aircraft with altitude compensating fuel system)

(v) Mixture ..... FULL RICH

(w) Circuit Breakers ..... check pressed IN

(x) Wing Flaps ..... T/O

(y) Parking Brake ..... release

CAUTION

SHUT THE VENT WINDOW SCOOP PRIOR TO TAKE-OFF. IF THE VENT WINDOW SCOOP IS LEFT OPEN DURING FLIGHT IT CAN BE BLOWN OFF AND CAUSE DAMAGE TO THE AIRCRAFT.

4.4.7 Take-off

(a) Fuel Prime ..... check OFF

(b) Fuel Pump ..... check ON

(c) Mixture ..... check FULL RICH

(d) GEN/BAT Master Switch ..... check ON

(e) Ignition Switch ..... check BOTH

(f) Wing Flaps ..... check T/O

(g) Trim ..... NEUTRAL

(h) Throttle ..... FULL
Check RPM min 2000 RPM

(i) Elevator - at beginning of rolling ..... NEUTRAL

(j) Directional Control ..... maintain with rudder

NOTE

In crosswind conditions, directional control can be enhanced by using the single wheel brakes. Note that using the brakes for directional control increases the take-off roll distance.

(k) Rotate ..... 44 KIAS

(l) Climb Speed to clear 50 ft. obstacle ..... 58 KIAS

CAUTION

FOR THE SHORTEST POSSIBLE TAKE-OFF DISTANCE TO CLEAR A 15 M (50 FT) OBSTACLE:

Lift-off Speed..... 52 KIAS
Climb Speed to clear 50 ft. obstacle..... 58 KIAS

4.4.8 Climb

(a) Mixture ..... FULL RICH

NOTE

For aircraft without the altitude compensating fuel pump, at full throttle settings with power less than 75%, it is necessary to lean the engine with the mixture control. It should be noted that with the engine set to full throttle, it can produce less than 75% power, depending on pressure altitude.
Refer to the Section 5.3.2., Performance to determine the engine performance as a function of altitude and temperature. Expect engines without altitude compensating fuel pump to require leaning at full throttle above 5000 ft pressure altitude.

(b) Throttle ..... FULL

(c) Engine Gauges ..... within green range

(d) Wing Flaps (400 ft AGL) ..... CRUISE

(e) Airspeed ..... 75 KIAS

(f) Trim ..... adjust

4.4.9 Cruise

(a) Fuel Pump ..... OFF

(b) Throttle ..... as required

(c) Mixture ..... lean to 25º F rich of peak EGT. DO NOT lean by EGT above 75% power

(d) Wing Flaps ..... CRUISE

(e) Trim ..... as required

(f) Engine Gauges ..... check

4.4.10 Descent

(a) Flight Instruments and Avionics ..... adjust

(b) Fuel Pump ..... ON

(c) Mixture ..... FULL RICH

(d) Throttle ..... as required

CAUTION

ADJUST DESCENT PROFILE (ANGLE, AIRSPEED, AND POWER) AS REQUIRED TO AVOID ENGINE SHOCK COOLING.

NOTE

To achieve a fast descent:

Throttle ..... IDLE

Wing Flaps ..... CRUISE

Airspeed ..... 118 KIAS

4.4.11 Landing Approach

(a) Seat Belts ..... fastened

(b) Lights ..... as required

(c) GEN/BAT Master Switch ..... check ON

(d) Ignition Switch ..... check BOTH

(e) Fuel Pump ..... check ON

(f) Mixture ..... FULL RICH

(g) Throttle ..... as required

(h) Airspeed ..... max. 78 KIAS

(i) Wing Flaps ..... T/O

(j) Trim ..... as required

(k) Wing Flaps ..... LDG

(l) Approach Speed ..... 55 KIAS

CAUTION

FOR STRONG HEADWIND, CROSSWIND, DANGER OF WINDSHEAR OR TURBULENCE, A HIGHER APPROACH SPEED SHOULD BE SELECTED.

4.4.12 Balked Landing

(a) Throttle ..... FULL

(b) Mixture ..... FULL RICH

(c) Wing Flaps ..... T/O

(d) Airspeed ..... 58 KIAS

4.4.13 After Landing

(a) Throttle ..... as required

(b) Mixture ..... FULL RICH

(c) Wing Flaps ..... CRUISE

(d) Avionics ..... as required

(e) Exterior Lights ..... as required

4.4.14 Engine Shut-down

(a) Parking Brake ..... set

(b) Throttle ..... IDLE

(c) Fuel Pump ..... OFF

(d) Mixture ..... IDLE CUT-OFF

(e) Ignition Switch ..... OFF

(f) ELT ..... Check (by listening to 121.5 MHZ for signal)

(g) Avionics Master Switch ..... OFF

(h) Electric Consumers ..... OFF

(i) GEN/BAT Master Switch ..... OFF

(j) Tie Downs and Wheel Chocks ..... as required

4.4.15 Flight in Rain

NOTE

Flight performance might be reduced, especially for the T/O distance and the maximum horizontal air speed. The influence on flight characteristics of the airplane is negligible. Flights through heavy rain should be avoided due to the reduced visibility.

4.4.16 Spinning

(a) Spin Entry

(1) Loose Items ..... stowed

(2) Seat Belts ..... fastened

(3) Altitude and Airspace ..... check

(4) Fuel Pump ..... ON

(5) Wing Flaps ..... CRUISE

(6) Mixture ..... FULL RICH

(7) Throttle ..... IDLE

(8) Entry Speed ..... trim to 58 KIAS

(9) Reduce speed with elevator ..... speed reduction rate 2-3 kts per second

(10) When stall warning sounds ..... apply simultaneously, full aft stick and full rudder

CAUTION

INTENTIONAL SPINNING IS ONLY PERMITTED WITH THE FLAPS IN CRUISE POSITION.

CAUTION

DEPENDING ON CG AND SPIN ENTRY TECHNIQUE, ATTEMPTS TO ENTER SPINS MAY DEVELOP INTO SPIRAL DIVES. MONITOR THE AIRSPEED DURING THE FIRST TURN AND RECOVER IMMEDIATELY IF IT INCREASES TO 65 KIAS.

NOTE

Spins with aft CG may oscillate in yaw rate and pitch attitude. This has no effect on recovery procedure or recovery time.

(b) Recovery from Spinning

(1) Throttle	IDLE
(2) Rudder	fully applied in opposite to direction of spin
(3) Control Stick	ease stick forward until spinning stops
(4) Rudder	neutral, immediately after rotation has stopped
(5) Wing Flaps	check CRUISE
(6) Control Stick	ease stick backward cautiously Bring airplane from descent into level flight position. Do not exceed maximum permissible speed (V_{NE}).

4.4.17 Idle Power Operations

NOTE

Turn the fuel pump on for all low throttle operations, including taxiing and all flight operations when engine speed could fall below 1400 RPM (eg. stalls, descents, spins, landings, etc.).

(a) Fuel Pump ..... ON

(b) Mixture ..... FULL RICH

(c) Throttle ..... IDLE

NOTE

For aircraft with altitude compensating fuel system the minimum recommended flight idle is 1400 RPM, during idle power flight conditions and maneuvres.

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CHAPTER 5

PERFORMANCE

TABLE OF CONTENTS

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5.1 INTRODUCTION

This chapter contains the performance data required by the basis of certification. This data which has been approved by Transport Canada is marked 'DOT Approved' in the footer of the page. Where additional performance data has been provided, beyond the basis for certification, it has not been reviewed or approved by Transport Canada.

The performance data contained in the following pages has been prepared to illustrate the performance you may expect from your airplane and to assist you in precise flight planning. The data presented has been derived from test-flights using an airplane and engine in good operating condition. The data is corrected to standard atmospheric conditions 59° F (15° C) and 29.92 in. Hg (1013.25 mbar) at sea level) except where noted.

The performance data do not take into account the expertise of the pilot or the maintenance condition of the airplane. The performance described can be achieved if the indicated procedures are followed and the airplane is maintained in good condition.

5.2 USE OF THE PERFORMANCE TABLES AND DIAGRAMS

The performance data is shown in the form of tables and diagrams to illustrate the influence of different variables. The tables contain sufficiently detailed information to plan flights with precision and safety. Where the performance differs due to the type of propeller that is installed, the table or graph is printed for each propeller and clearly identified.

5.3 PERFORMANCE TABLES AND DIAGRAMS

5.3.1 Airspeed System Calibration

Assumes zero indicator error.

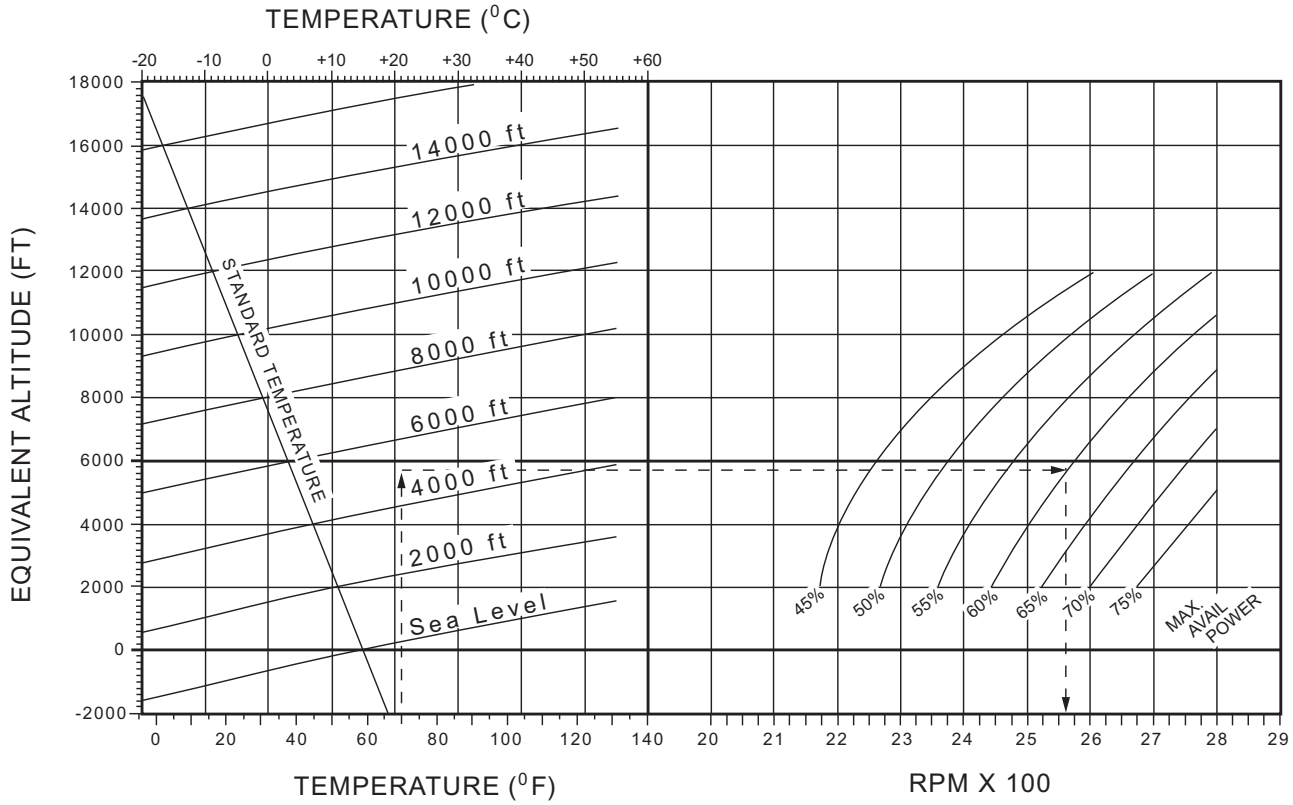
Table 1 - Airspeed System Calibration

Flaps Cruise																	
KIAS	44	50	55	60	65	70	75	80	90	100	110	120	130	140	150	160	164
KCAS	54 V_{S1}	58	62	66	70	75	79	83	92	101	110	120	129	138	147	156	159 V_{NE}
Flaps Take-Off (T/O)																	
KIAS	40	45	50	55	60	65	70	75	80	85	90	95	100	105	---	---	---
KCAS	50 V_{S1}	53	57	61	65	69	73	77	81	85	89	93	96	100 V_{FE}	---	---	---
Flaps Landing (LDG)																	
KIAS	36	40	45	50	55	60	65	70	75	82	---	---	---	---	---	---	---
KCAS	45 V_{S0}	48	52	55	59	64	68	72	76	81 V_{FE}	---	---	---	---	---	---	---

Example: CRUISE Flap KIAS = 90 kts, therefore KCAS = 92 kts from chart

5.3.2 Cruising Performance

Maximum RPM is 2800.



Example: OAT: ..... 70° F
Pressure Altitude:..... 5000 ft
Desired Power Setting: 60%

Result: Set RPM: 2560

Figure 5.1 - Cruising Performance

5.3.3 Equivalent Altitude Chart

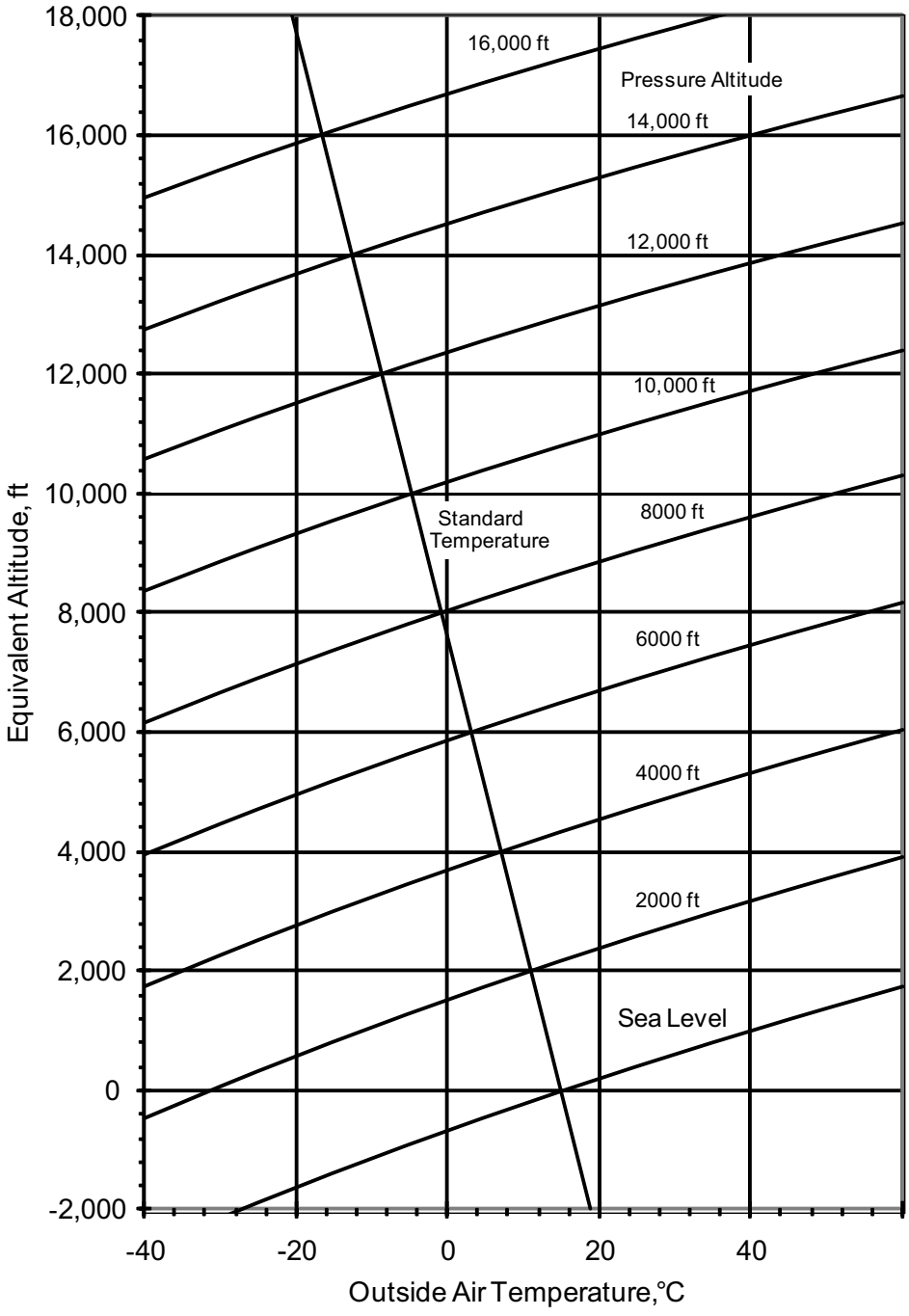


Figure 5.2 - Equivalent Altitude Chart

5.3.4 Stall Speeds

Configuration:

Idle, most forward center of gravity, max. weight of 1764 lbs (800 kg).

(This is the most adverse configuration)

Table 2 - Stall Speeds

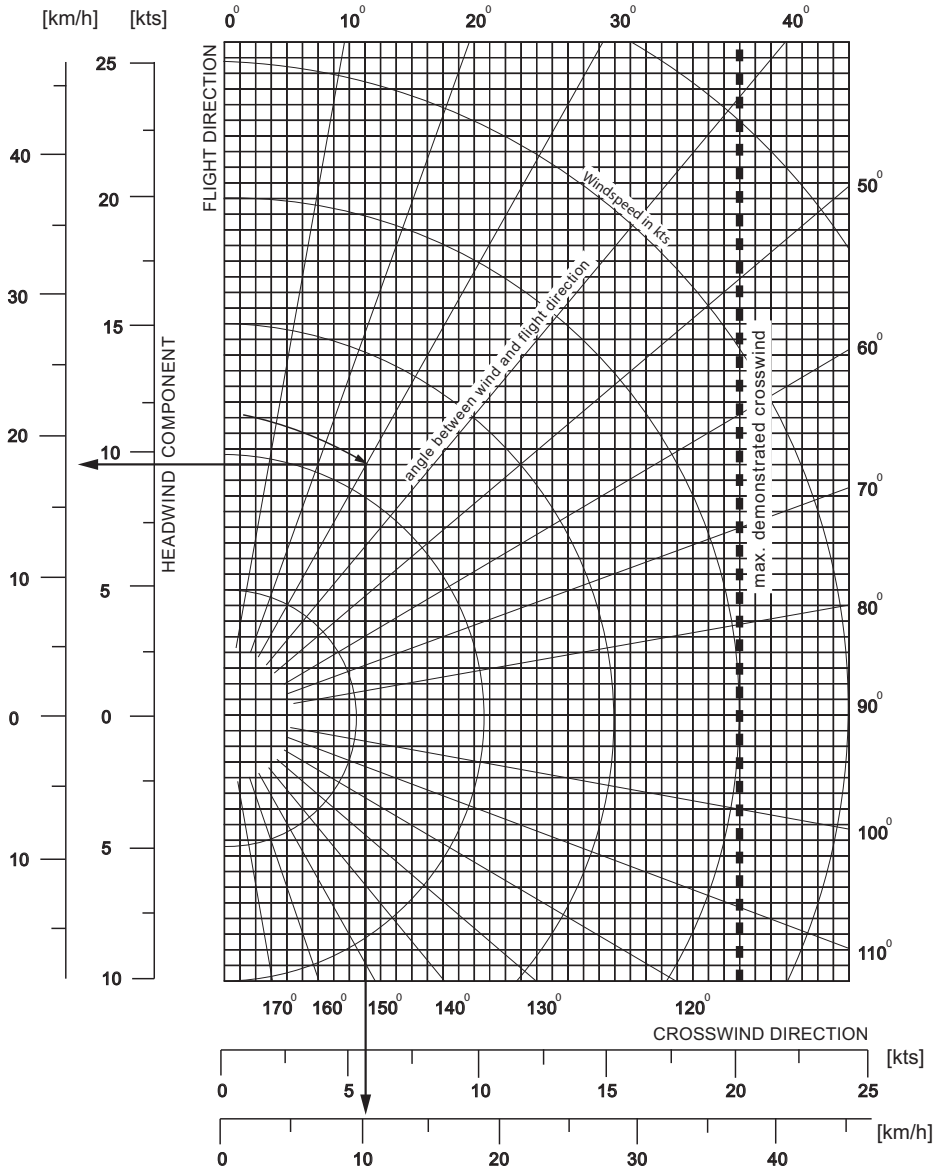
Most Forward Center of Gravity								
Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
Cruise	44	54	49	58	57	64	72	76
Take-off	40	50	46	53	53	59	66	70
Landing	36	45	41	49	48	54	61	64

NOTE

The Stall Speeds are in kts.

5.3.5 Wind Components

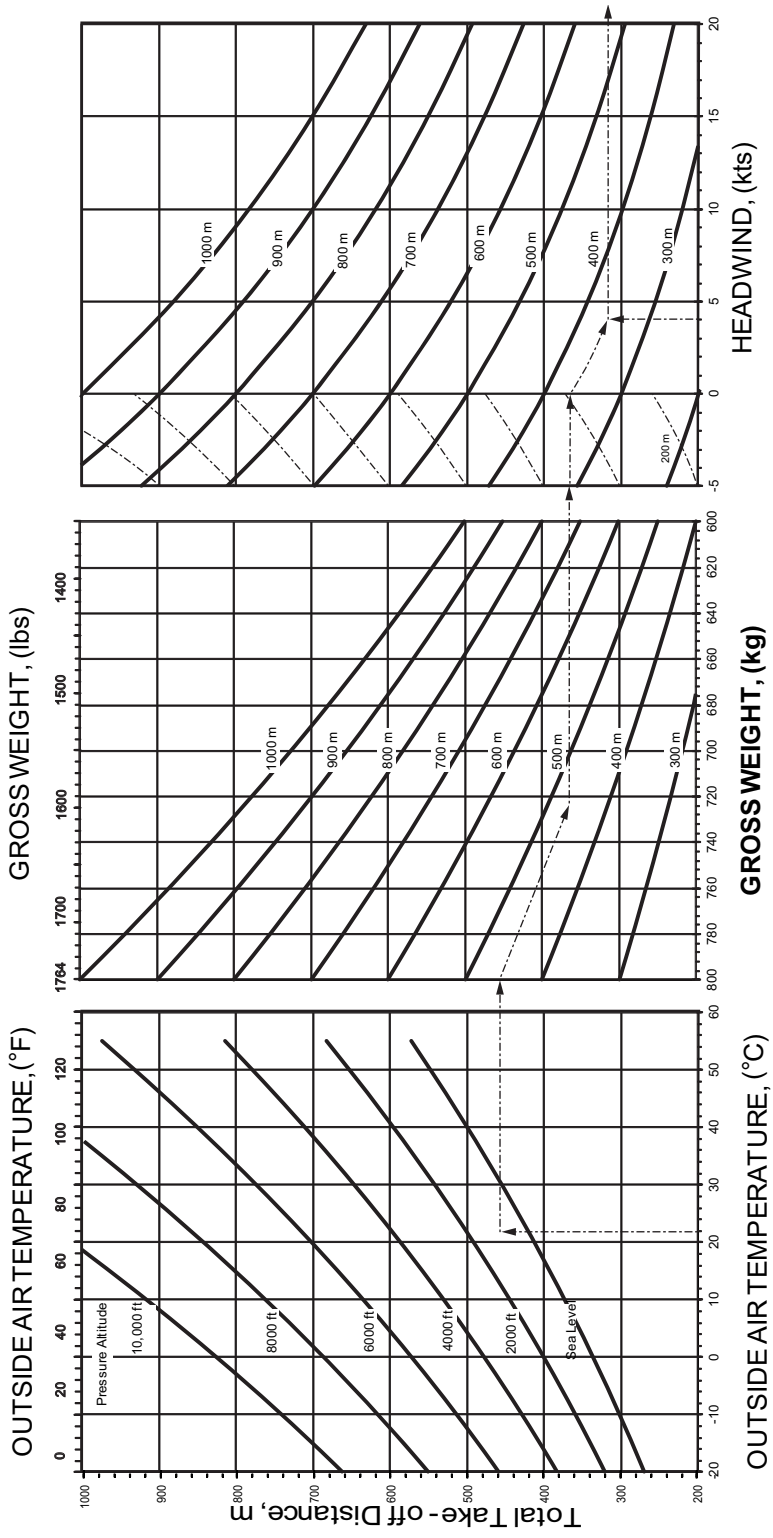
Maximum demonstrated crosswind component:.....20 kts (37 km/h)



Example: Wind Speed:..... 11 kts (20 km/h)
Angle between wind direction and flight direction: . 30 degrees
Headwind Component:..... 9.5 kts (18 km/h)
Crosswind Component:..... 5.5 kts (10 km/h)

Figure 5.3 - Wind Components

5.3.6 Take-off Distance



EXAMPLE:
- Pressure altitude .....1000 ft
- Outside air temperature 72
- Weight .....1600 lbs (725 kg)
- Wind .....4 kt headwind

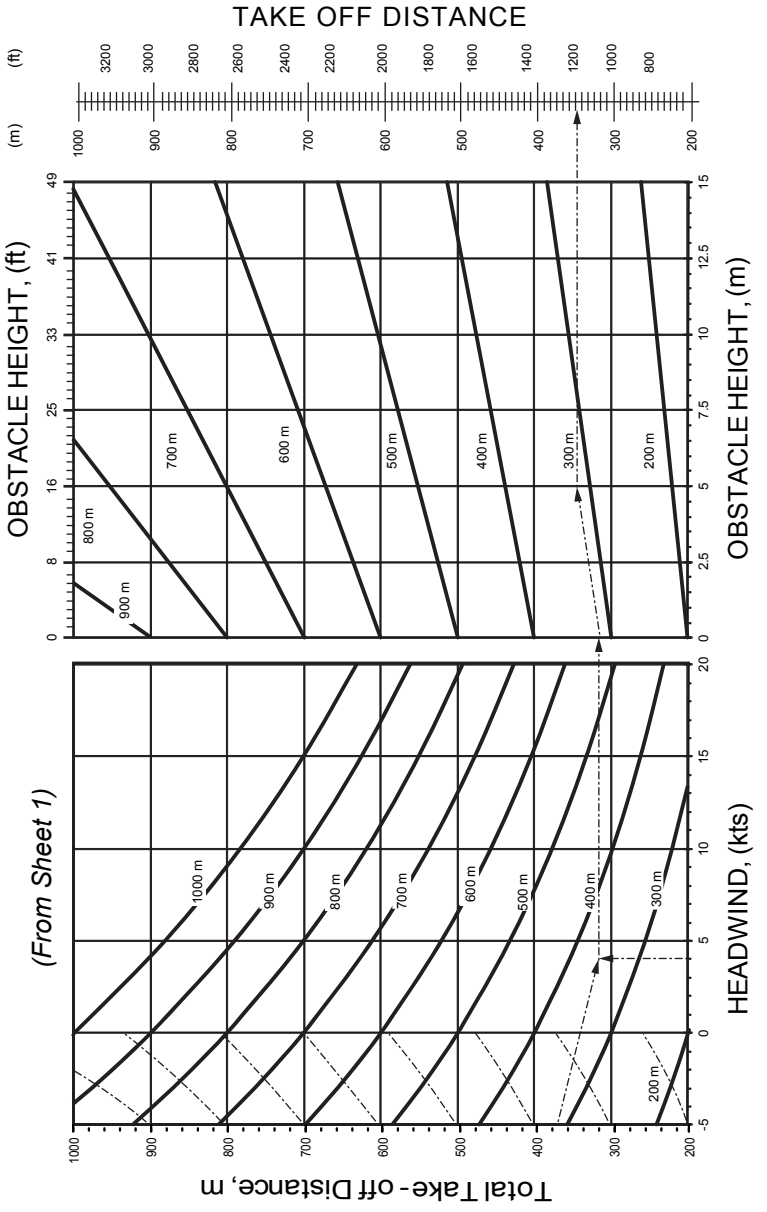
RESULT:
- Take-off distance to clear a 16 ft (5 m) obstacle 1122 ft (341 m)

CONDITIONS:
- Maximum take-off power
- Lift-off speed 52 KIAS and speed for climb over obstacle 58 KIAS
- Level runway, paved
- Wing flaps in T/O postition

NOTE

Poor maintenance condition of the airplane, deviation from the given procedures as well as unfavorable conditions (i.e. high temperature, rain, unfavorable wind conditions, including cross wind) can increase the take-off distance considerably.

Figure 5.4 - Take-off Distance (Sheet 1 of 2)



CONDITIONS:
- Maximum take-off power
- Lift-off speed 52 KIAS and speed for climb over obstacle 58 KIAS
- Level runway, paved
- Wing flaps in T/O postition

EXAMPLE:
- Pressure altitude .....1000 ft
- Outside air temperature 72
- Weight .....1600 lbs (725 kg)
- Wind .....4 kt headwind

RESULT:
- Take-off distance to clear a 16 ft (5 m) obstacle 1141 ft (348 m)

NOTE

Poor maintenance condition of the airplane, deviation from the given procedures as well as unfavorable conditions (i.e. high temperature, rain, unfavorable wind conditions, including cross wind) can increase the take-off distance considerably.

Figure 5.4 - Take-off Distance (Sheet 2 of 2)

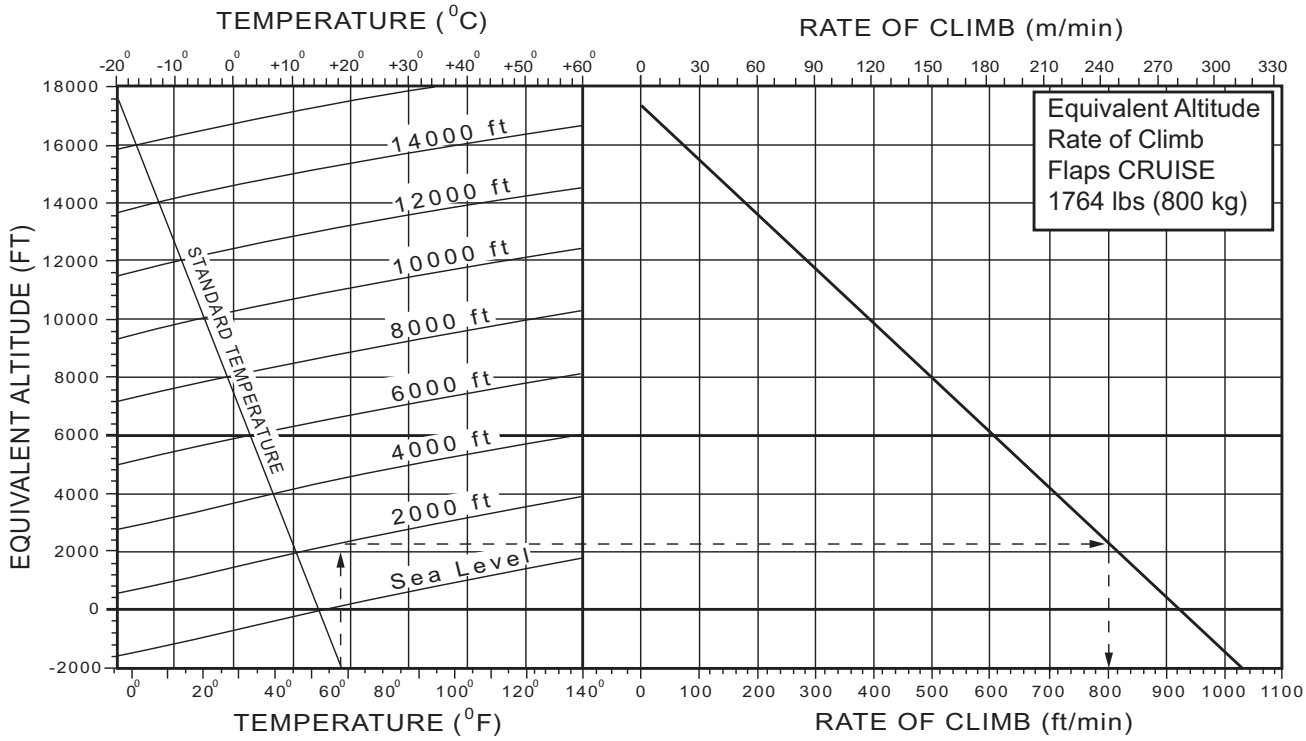
5.3.7 Climb Performance /Cruising Altitudes

Max. Cruising Altitude (in standard conditions): .....13120 ft (4000 m)

Best Rate-of-Climb Speed with Wing Flaps CRUISE .....75 KIAS

CAUTION

IN AIRPLANE OPERATIONS WITHOUT THE OPTIONAL WHEEL FAIRINGS INSTALLED, THE CLIMB PERFORMANCE IS REDUCED BY APPROXIMATELY 3%.



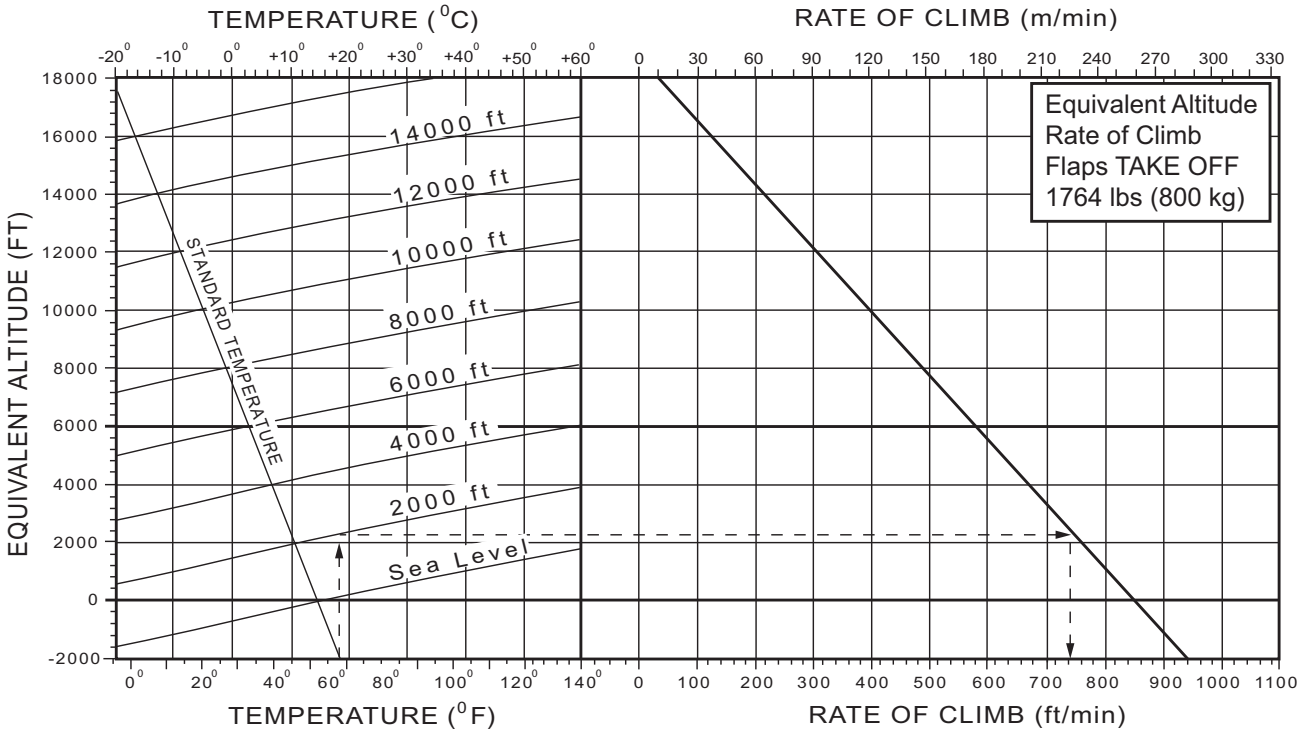
Example: Pressure Altitude: .....2000 ft
OAT: .....65º F
Weight : .....1764 lbs (800 kg)

Result: Climb performance: .....800 ft/min

Figure 5.5 - Climb Performance / Cruising Altitudes

5.3.8 Climb Performance / Take off

Best Rate-of-Climb Speed with Wing Flaps T/O: ..... 68 KIAS



Example: Pressure Altitude: ..... 2000 ft
OAT: ..... 65° F
Weight : ..... 1764 lbs

Result: Climb performance: ..... 744 ft/min

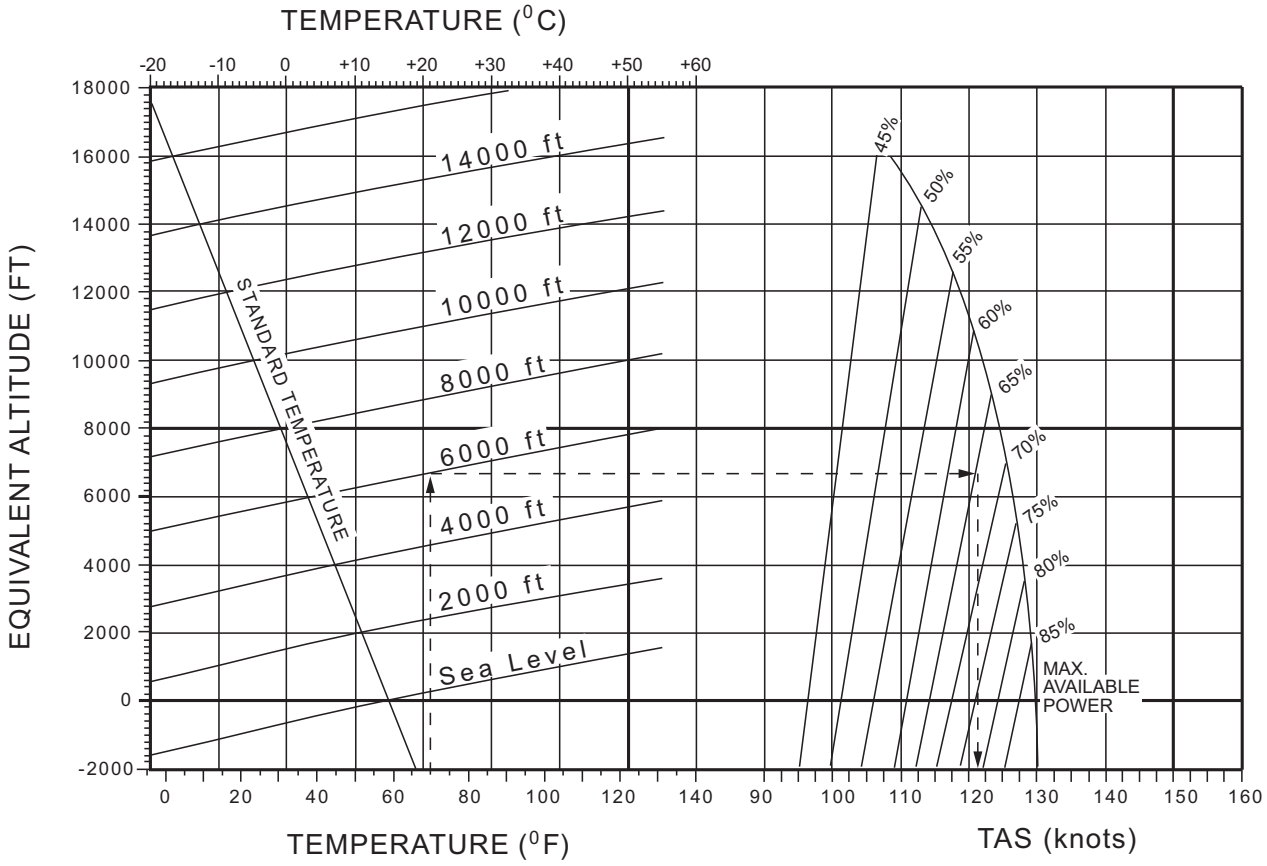
Figure 5.6 - Climb Performance / Take off

5.3.9 Cruising Speed (True Airspeed)

Diagram for true airspeed (TAS) calculation at selected power level.

CAUTION

IN AIRPLANE OPERATIONS WITHOUT THE OPTIONAL WHEEL FAIRINGS INSTALLED, THE MAXIMUM CRUISING SPEED IS REDUCED BY APPROXIMATELY 5%..



Example: Pressure Altitude: ..... 6000 ft
OAT: ..... 70º F
Power Setting: 65%

Result: True airspeed (TAS): 121kts

Figure 5.7 - Cruising Speed (True Airspeed)

5.3.10 Maximum Flight Duration

Table for calculation of the **Maximum Flight Duration** depending on fuel availability.

Table 3 - Cruise Performance Table

Press Alt ft	RPM	20º C Below Standard Temp			Standard Temperature			10º C Above Standard Temp		
		%bhp	KTAS	GPH	%bhp	KTAS	GPH	%bhp	KTAS	GPH
2,000	2800	87	128	8.8	83	129	8.7	80	130	8.6
	2700	78	123	7.7	74	124	6.8	72	125	6.6
	2600	69	118	6.4	66	119	6.2	64	120	6.1
	2500	61	113	5.9	59	113	5.7	57	114	5.6
	2400	54	107	5.3	52	108	5.2	50	109	5.1
4,000	2800	79	126	8.6	76	127	8.6	74	129	6.8
	2700	71	121	6.6	68	122	6.4	66	123	6.2
	2600	63	116	6	61	117	5.9	59	118	5.7
	2500	56	111	5.5	55	112	5.4	53	113	5.3
	2450	53	108	5.3	51	109	5.1	50	110	5.1
6,000	2800	73	125	6.7	70	126	6.5	69	128	6.4
	2700	66	120	6.2	64	121	6	62	123	5.9
	2600	59	115	5.7	57	116	5.6	56	117	5.5
	2500	53	110	5.2	51	111	5.1	50	112	5
8,000	2800	68	124	6.4	66	125	6.2	65	127	6.1
	2700	61	119	5.9	60	121	5.8	59	122	5.7
	2600	55	114	5.4	54	116	5.3	53	117	5.3
	2550	53	112	5.2	51	113	5.1	50	114	5.1

Cruise Performance Table - Continued

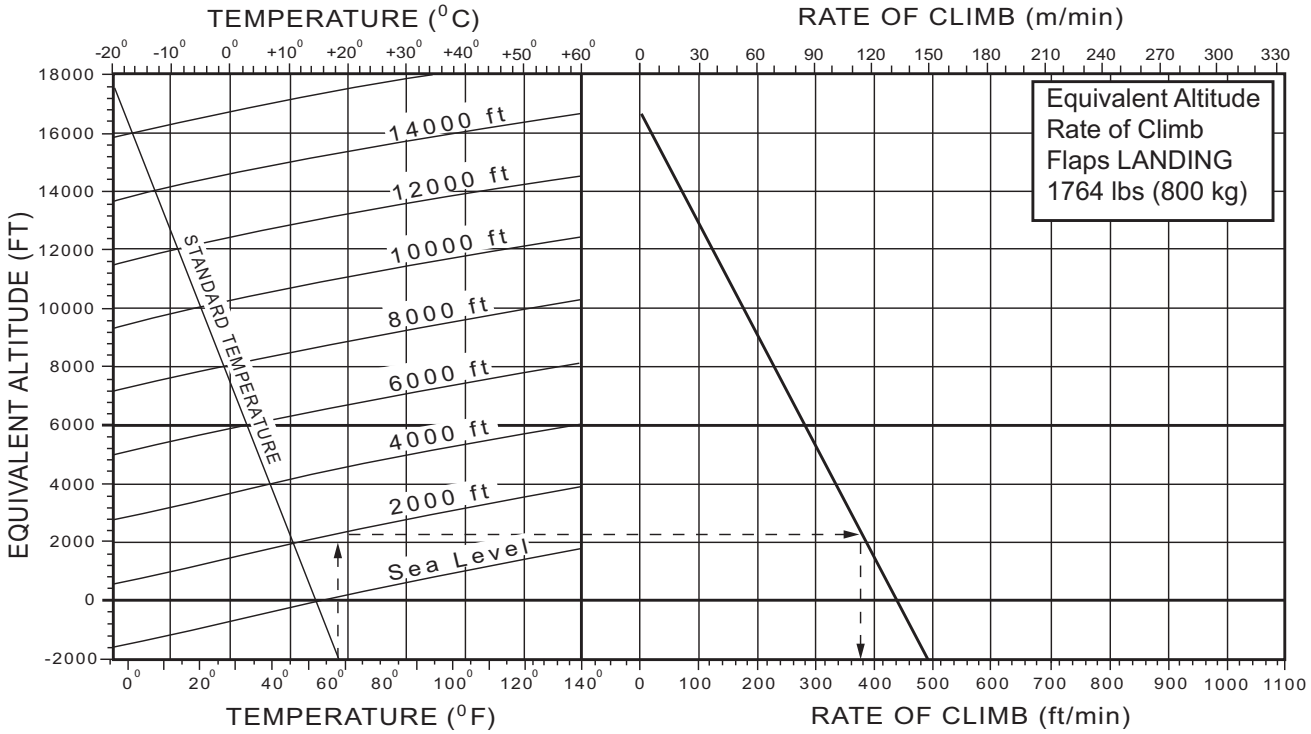
Press Alt ft	RPM	20º C Below Standard Temp			Standard Temperature			10º C Above Standard Temp		
		%bhp	KTAS	GPH	%bhp	KTAS	GPH	%bhp	KTAS	GPH
10,000	2800	64	123	6.1	63	125	6	61	127	5.9
	2750	61	121	5.9	60	123	5.8	59	124	5.7
	2700	58	119	5.6	57	120	5.5	56	122	5.5
	2650	55	116	5.4	54	118	5.3	53	119	5.3
	2600	53	114	5.2	51	115	5.1	51	117	5.1
12,000	2800	61	123	5.8	60	125	5.8	59	127	5.7
	2750	58	121	5.6	57	123	5.6	56	124	5.5
	2700	55	118	5.4	54	120	5.4	53	122	5.3
	2650	53	116	5.2	52	118	5.2	51	119	5.1

5.3.11 Climb Performance / Balked Landing

Conditions: Speed = 52 KIAS
Wing Flaps in Landing Position (LDG)
maximum take-off power

CAUTION

IN AIRPLANE OPERATIONS WITHOUT THE OPTIONAL WHEEL FAIRINGS INSTALLED, THE CLIMB PERFORMANCE IS REDUCED BY APPROXIMATELY 3%.



Example: Pressure altitude: ..... 2000 ft
Outside temperature: ..... 70º F

Result: Climb performance during balked landing: ..... 374 ft/min

Figure 5.8 - Climb Performance / Balked Landing

5.3.12 Landing Distance

Conditions:
- Throttle at Idle
- Maximum T/O Weight
- Approach Speed ..... 55 KIAS
- Level Runway, paved
- Wing Flaps in Landing position (LDG)
- Standard Setting, MSL

Landing distance over a 50 ft (15 m) obstacle: ..... approx. 1360 ft (414m)
Landing roll distance: ..... approx. 661 ft (201m)

Table 4 - Landing and Rolling Distances for Heights Above MSL

Height above MSL	ft.	0	1000	2000	3000	4000	5000	6000	7000
	(m)	(0)	(305)	(610)	(914)	(1219)	(1524)	(1829)	(2134)
Landing Distance	ft.	1360	1387	1417	1447	1478	1511	1545	1580
	(m)	(415)	(423)	(432)	(441)	(450)	(461)	(471)	(482)
Landing Roll Distance	ft.	661	680	701	722	744	767	791	815
	(m)	(201)	(207)	(214)	(220)	(227)	(234)	(241)	(248)

NOTE

Poor maintenance condition of the airplane, deviation from the given procedures as well as unfavorable outside conditions (i. e. high temperature, rain, unfavorable wind conditions, slippery runway) could increase the landing distance considerably.

NOTE

Aircraft with ground idle speed set to 1000 RPM, landing distance increased approx. 5% and ground roll increased approx. 7%.

5.4 NOISE DATA

Table 5 - Noise Data

Noise Measurement Method	Noise Value	Maximum Allowable
FAR36 Appendix G	71.7 dBA	75.7 dBA
ICAO Annex 16, Appendix 6 Paragraph 10.4(a)	74.4 dBA	80.1 dBA
ICAO Annex 16, Appendix 6 Paragraph 10.4(b) (EASA Approval)	75.25 dBA	75.25 dBA

MT-Propeller Entwicklung GmbH
Flugplatzstr.1
94348 Atting
GERMANY

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

Doc. No. E-1342

FOR

Diamond Aircraft Industries Inc.
DA 20-C1

WITH

MT 175 R 150 - 2Ca
2-Blade Wood Composite Fixed Pitch Propeller

Serial No. C 0225

Registration No. N225DA

This supplement must be attached to the FAA Approved Airplane Flight Manual when the MT 175 R 150 -2Ca propeller has been installed in accordance with STC No. SA03373AT

The information contained in this document supplements or supersedes the information of the basic Airplane Flight Manual only in those areas listed. For Limitations, Procedures, and Performance Data not contained in this supplement, consult the basic Airplane Flight Manual.

Approved: Clint Walden
for Manager, ACE-115A
Atlanta Aircraft Certification Office
Atlanta, GA 30249

Date: January 8, 2007

Airplane Flight Manual Supplement
Log of revisions

Rev. No.	Description	Pages Revised	Approved by / Date

SECTION 1 - GENERAL

The information contained in this document, together with the basic Airplane Flight Manual or later approved versions is applicable and must be carried in the airplane.
For further information concerning the MT 175 R 150 - 2Ca propeller refer to Section 2 and Section 7.

SECTION 2 - LIMITATIONS

Engine Limits:	No change.
Propeller:	MT 175 R 150 - 2Ca Note: Static rpm at full throttle, ISA, SL, no wind (carburator heat off and mixture leaned to max. rpm) : 2000 to 2200 rpm
Diameter:	175 cm (68.9 in) No cut-off approved.
Propeller Pitch:	At station 65.6 cm (25.8 in): 150 cm (59.1 in)
Tachometer:	No change.
Placards:	Markings and signs concerning other propellers are obsolete.
Noise Characteristics:	The corrected noise level of this aircraft with this engine and propeller is equal to or better than production Diamond model DA20-C1 airplanes. No determination has been made by the Federal Aviation Administration that the noise levels of this aircraft are or should be acceptable or unacceptable for operation at, into, or out of, any airport

SECTION 3 - EMERGENCY PROCEDURES

No change.

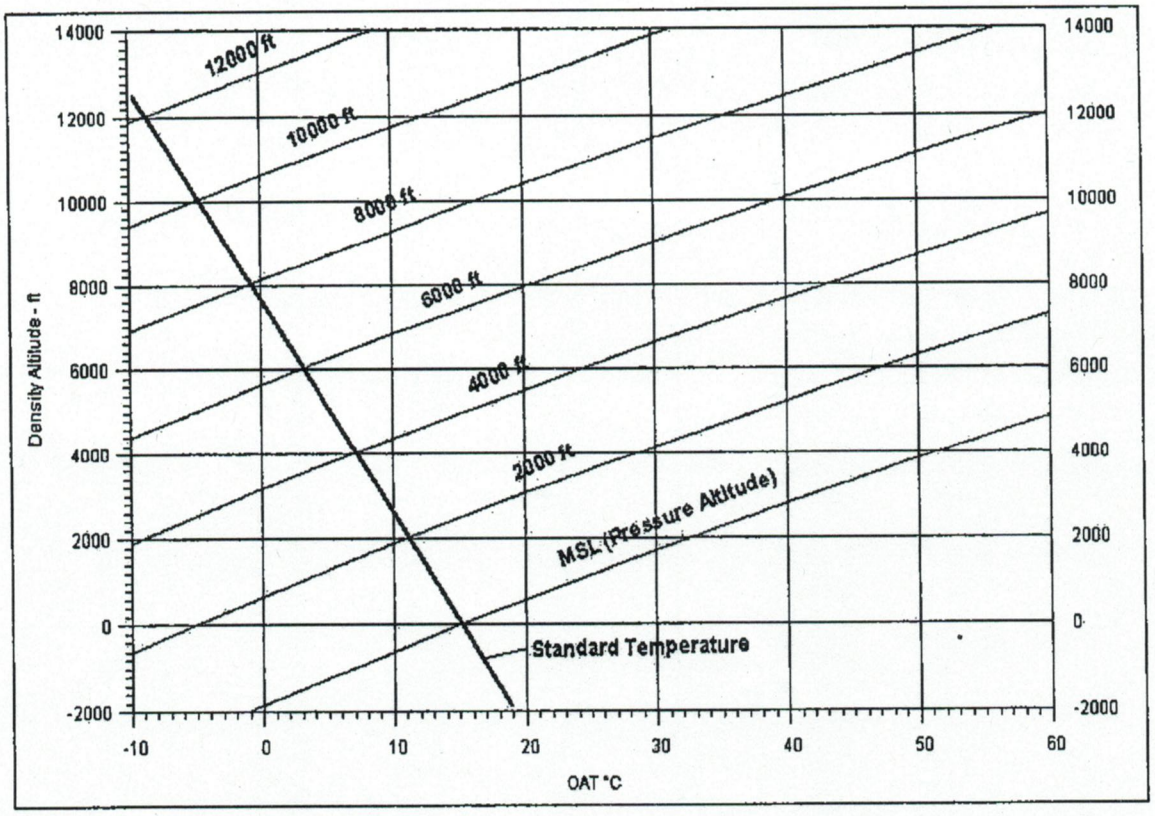
SECTION 4 - NORMAL PROCEDURES

No change.

SECTION 5 - PERFORMANCE

No change to the basic airplane except Cruise Performance.
Note: Performance Data is not FAA Approved.

Figure 1: Density Altitude Chart:

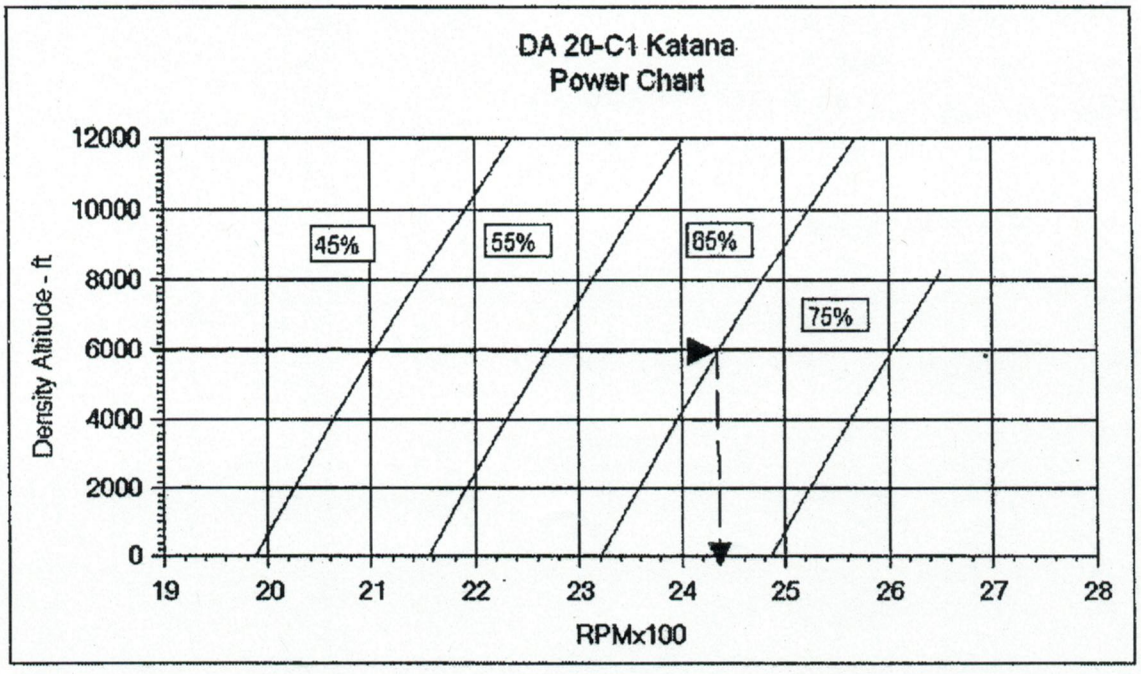


Example:	Pressure Altitude:	6000 ft
	Outside Air Temperature:	15 °C
	Density Altitude:	7391 ft

SECTION 5 - PERFORMANCE

Maximum propeller speed: 2800 RPM
Note: Performance Data is not FAA Approved.

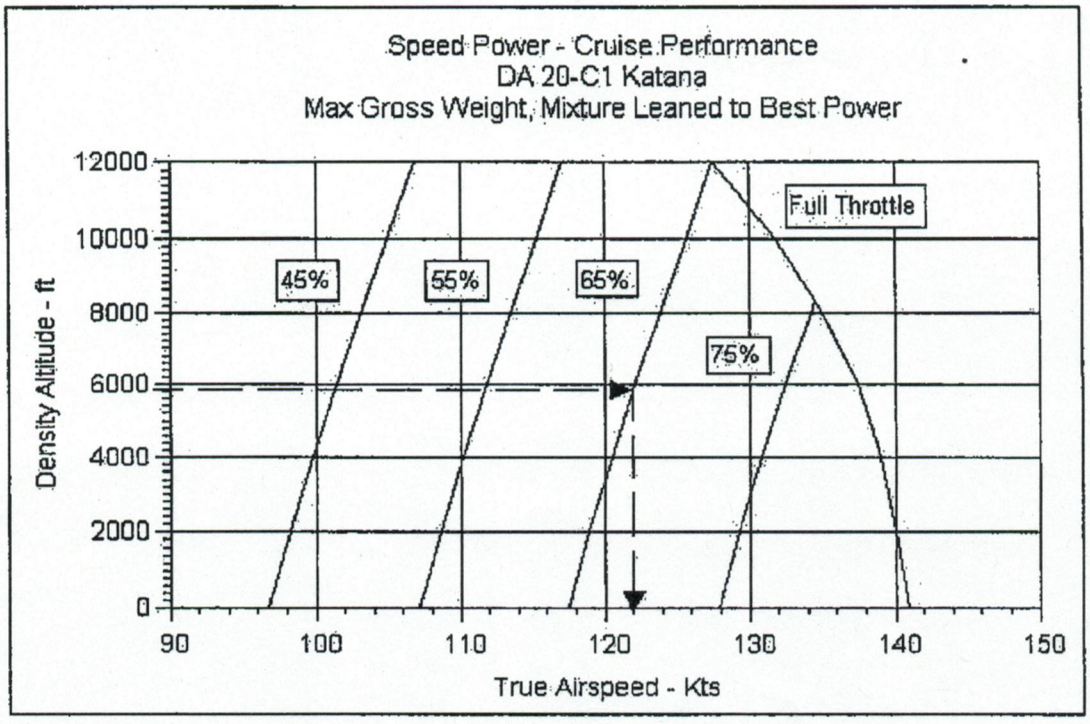
Figure 2: Power Chart



Example:	Density Altitude:	6000 ft
	Desired BHP:	65%
	Engine RPM:	2440 RPM

SECTION 5 - PERFORMANCE

Figure 3: Speed Power – Cruise Performance
Note: Performance Data is not FAA Approved.



Example:	Density Altitude:	6000 ft
	Desired BHP:	65%
	True Airspeed:	122 knots

Note:
The cruise performance while not a certification requirement, are based on actual flight tests. The actual performance attained will vary from airplane to airplane depending on age and condition of the airframe and powerplants, aircraft rigging and operator technique.

SECTION 5 - PERFORMANCE

Figure 4: Cruise Performance
Table to calculate maximum endurance and range depending on the available fuel.
Note: Performance Data is not FAA Approved.

Density Altitude ft	RPM	Standard Temperature		
		% BHP	KTAS	GPH
2000	2700	85	140	8.7
2000	2600	79	134	8.4
2000	2500	73	128	7.3
2000	2400	67	121	6.2
2000	2300	61	115	5.7
2000	2200	55	109	5.4
4000	2700	83	139	8.8
4000	2600	77	133	8.0
4000	2500	71	127	6.9
4000	2400	65	120	6.0
4000	2300	59	114	5.6
4000	2200	53	108	5.3
6000	2700	80	139	8.7
6000	2600	74	132	7.6
6000	2500	68	126	6.5
6000	2400	63	120	5.9
6000	2300	57	114	5.6
6000	2200	51	107	5.0

Density Altitude ft	RPM	Standard Temperature		
		% BHP	KTAS	GPH
8000	2650	75	135	7.7
8000	2600	72	132	7.1
8000	2500	66	125	6.2
8000	2400	60	119	5.7
8000	2300	54	113	5.4
8000	2200	48	107	4.4
10000	2550	66	127	6.2
10000	2500	63	124	5.9
10000	2400	57	118	5.6
10000	2300	51	112	5.1
10000	2200	45	105	3.3
12000	2450	58	120	5.7
12000	2400	55	117	5.5
12000	2300	49	111	4.6
12000	2200	43	104	1.7

SECTION 6 - WEIGHT AND BALANCE AND EQUIPMENT LIST

Refer to the latest revised empty weight and center of gravity data for effect on loading instructions.

SECTION 7 - DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

Propeller:

The MT 175 R 150 - 2Ca is a 2-blade wood composite fixed pitch propeller.

Note:
The airplane may be operated without a spinner but in this case the front plate must cover the central bore of the propeller completely.

FAA APPROVED

DATE: January 8, 2007

CHAPTER 6

WEIGHT AND BALANCE

TABLE OF CONTENTS

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6.1 INTRODUCTION

To obtain the performance, flight characteristics and safe operation described in this Flight Manual, the airplane must be operated within the permissible weight and balance envelope as described in Chapter 2. It is the pilot's responsibility to adhere to the weight and balance limitations and to take into consideration the change of the center of gravity (CG) position due to fuel consumption.

The procedure for weighing the airplane and calculating the empty weight CG position are given in this Chapter.

The aircraft is weighed when new and should be weighed again in accordance with applicable air regulations. Empty weight and the center of gravity are recorded in a Weighing Report and in the Weight & Balance Report, included at the back of this manual.

In case of equipment changes, the new weight and empty weight CG position must be determined by calculation or by weighing and must be entered in the Weight & Balance Report. These sample forms are included in this manual and can be used for airplane weighing, calculation of the empty weight CG position, and for the determination of the useful load.

NOTE

After every repair, painting or change of equipment, the new empty weight must be determined as required by applicable air regulations. Weight, empty weight, CG position, and useful load must be entered in the Weight & Balance Report by an authorized personnel.

6.2 AIRPLANE WEIGHING

Pre-weighing conditions:

- equipment must be in accordance with the airplane equipment list
- brake fluid, lubricant (6 US qt / 5.7 liters) and
- unusable fuel, included (2 liters unusable, 3.18 lbs/1.44 Kg)

To determine the empty weight and the empty weight CG position, the airplane must be positioned in the above mentioned pre-weighing condition, with the nose gear and each main gear on a scale. Ensure that the aircraft is level longitudinally and laterally as illustrated in Figures 6.1 and 6.2.

With the airplane correctly positioned, a plumb line is dropped from the leading edge of each wing at the root rib to the floor; join these two points to determine the reference datum (RD). From this line use a suspended plumb line aligned with each landing axle gear to measure the distances X (nose gear), X_{2LH} (left main gear) and X_{2RH} (right main gear).

The following formulas apply:

Finding Empty - Center of Gravity (X_{CG})

Empty Weight: $G = G_1 + G_{2LH} + G_{2RH}$ lbs [kg]

Empty Weight CG Formula:

$$X_{CG} = \frac{(G_1 \times X_1)+(G_{2LH} \times X_{2LH})+(G_{2RH} \times X_{2RH})}{G_1 + G_{2LH} + G_{2RH}}$$

Finding Empty - Weight Moment

Empty-weight Moment: M = Empty Weight (G) x Empty-weight CG (X_{CG})

CAUTION

ITEMS FORWARD OF THE REFERENCE DATUM ARE CONSIDERED TO HAVE A NEGATIVE LEVER ARM. ITEMS AFT OF THE REFERENCE DATUM ARE CONSIDERED TO HAVE A POSITIVE LEVER ARM.

Record the data in the Weighing Report included at the back of this manual. Figure 6.3, Sample Weighing Report is for reference only.

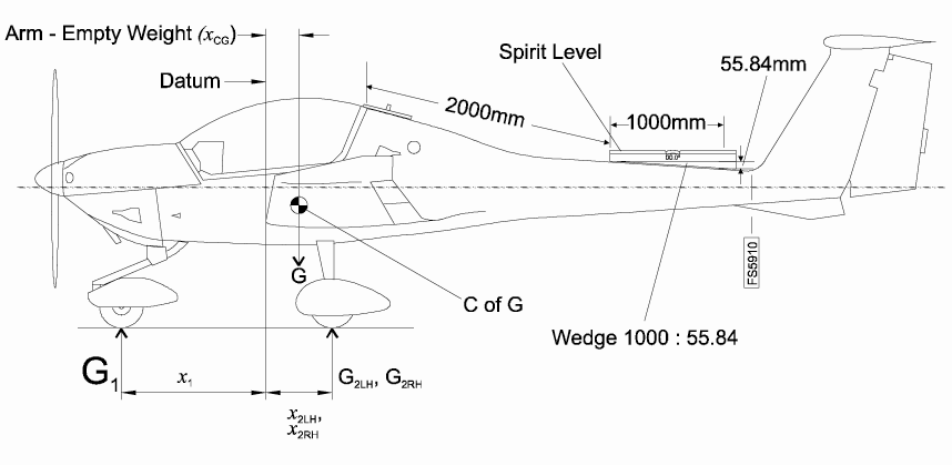


Figure 6.1 - Longitudinal Leveling Diagram

Legend:

X1 Arm - Datum to center line nose wheel

X2 Arm - Datum to C/L main wheels (LH and RH)

G1 Net weight - Nose wheel

G2 Net weight - Main wheels (LH and RH)

G Empty weight

XCG Arm - Empty - weight (Calculated)

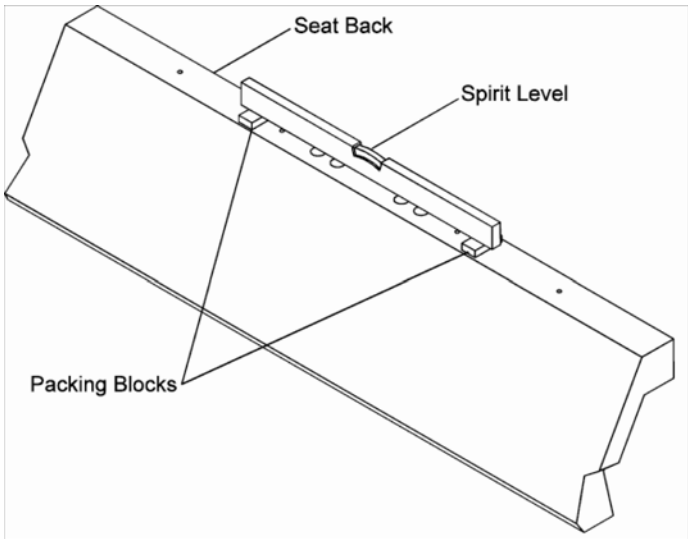


Figure 6.2 - Lateral Leveling Diagram

Model: DA20-C1 Serial Number _____ Registration _____

Data with reference to the Type Certificate Data Sheet and the Flight Manual

Reference Datum: Leading edge of wing at root rib.

Horizontal reference line: Wedge 1000:55.84, 2000mm (78.7 in) aft of the step in the fuselage at the canopy edge.

Equipment list - dated _____ Cause for Weighing _____

Weight and Balance Calculations

Weight Condition:

Include brake fluid, engine oil and Unusable fuel (Type 2 system, 2 liters unusable, 3.18 lbs/1.44 Kg)

Finding Empty Weight:

Finding Arm: (Measured)

Support	Gross ([kg]) (lbs)	Tare ([kg]) (lbs)	Net Weight ([kg]) (lbs)
Front G_1			
Rear G_{2LH}			
Rear G_{2RH}			
		EMPTY WEIGHT (G)	

Lever Arm ([m]) (in)
X^1 =
X_{2LH} =
X_{2RH} =

Finding Empty - Center of Gravity (X_{CG})

Empty Weight CG Formula:

$$X_{CG} = \frac{(G_1 \times X_1)+(G_{2LH} \times X_{2LH})+(G_{2RH} \times X_{2RH})}{G_1 + G_{2LH} + G_{2RH}}$$

Finding Empty - Weight Moment

Empty-weight Moment: M = Empty Weight (G) x Empty-weight CG
(Positive results indicate, that CG is located aft of RD) _____

Finding the Maximum Permitted Useful Load:

Maximum Weight [kg] (lbs)	800 kg/1764 lbs
Empty Weight [kg] (lbs)	
Maximum useful Load [kg] (lbs)	

Empty Weight (G): ([kg]) (lbs)		Empty-weight Moment (M): ([kg.m]) (in.lbs)
Place/Date	Authorizing Stamp	Authorizing Signature

Figure 6.3 - Weighing Report

6.3 WEIGHT AND BALANCE REPORT

The empty weight and Empty Weight CG position data determined prior to delivery of the airplane is the first entry in the Weight and Balance Report. Each change of the installed equipment as well as each repair affecting the empty weight, the CG position of the empty weight or the empty weight moment must be entered in the Weight and Balance Report included at the back of this manual. The following Sample Weight and Balance Report (see Figure 6.4) is for reference only.

Ensure that you are using the latest weight and balance information when performing a weight and balance calculation

.

Continuous report of structural changes or change of equipment

DA 20-C1			Serial No.:			Registration:			Page No.:				
			Changes of Weight						Actual				Signature
Date	Entry No.		Description of Part or Modification	Addition (+)			Subtraction (-)			Empty Weight			
	IN	OUT		Weight lbs (kg)	Arm in (m)	Moment in.lbs (kg.m)	Weight lbs (kg)	Arm in (m)	Moment in.lbs (kg.m)	Weight lbs (kg)	Arm in (m)	Moment in.lbs (kg.m)	
			Original										

Figure 6.4 - Sample Weight and Balance Report

6.4 FLIGHT WEIGHT AND CENTER OF GRAVITY

The following data enables the pilot to operate the DA20-C1 within the required weight and center of gravity limitations.

The following diagrams,

Figure 6.5 Loading Plan

Figure 6.6 Weight & Balance Diagram

Figure 6.7 Calculation of Loading Condition

Figure 6.8 Permissible Center of Gravity Range and permissible Flight-Weight-Moment

are to be used for calculations of the flight-weight and the center of gravity as follows:

(a) The empty weight and the empty-weight-moment of the airplane should be taken from the weighing report or from the weight & balance report and entered into the form “Calculation of Loading Condition” (see Figure 6.7) in the columns identified with “Your DA20-C1”.

(b) Using the Weight & Balance Diagram (see Figure 6.6) determine the moment for each part to be loaded, and enter it in the respective column in Figure 6.7.

(c) Add the weights and the moments of each column (point 4 and point 6 in Figure 6.7) and enter the sum in Figure 6.8 “Permissible CG Range and Permissible Flight-Weight-Moment” to check if the values are within the permissible limits of the loading range.

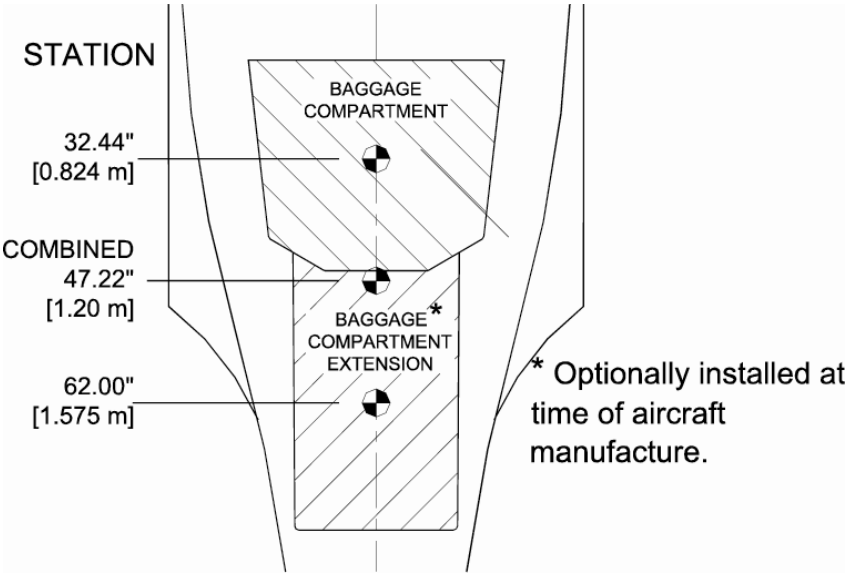
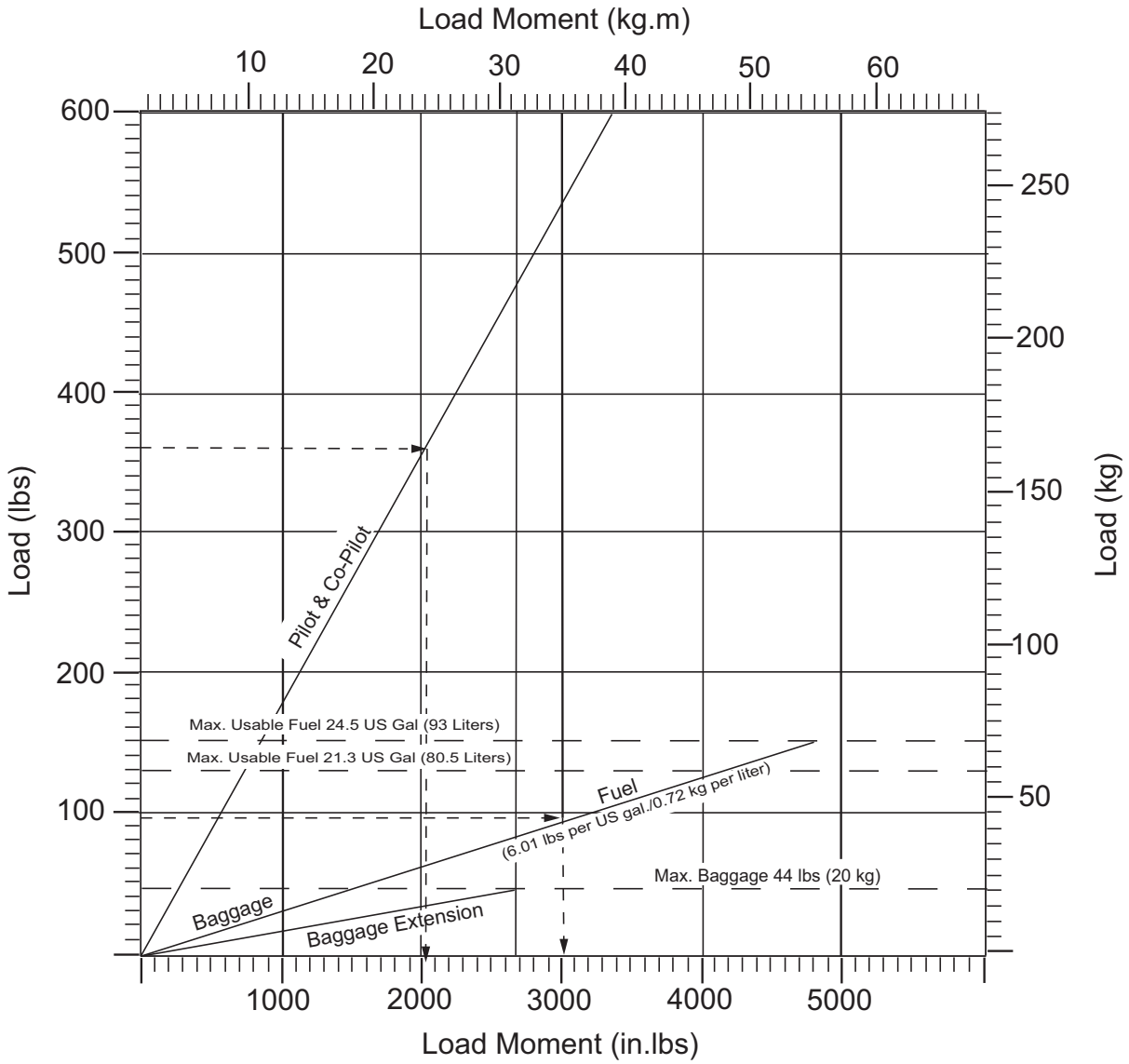


Figure 6.5 - Loading Plan



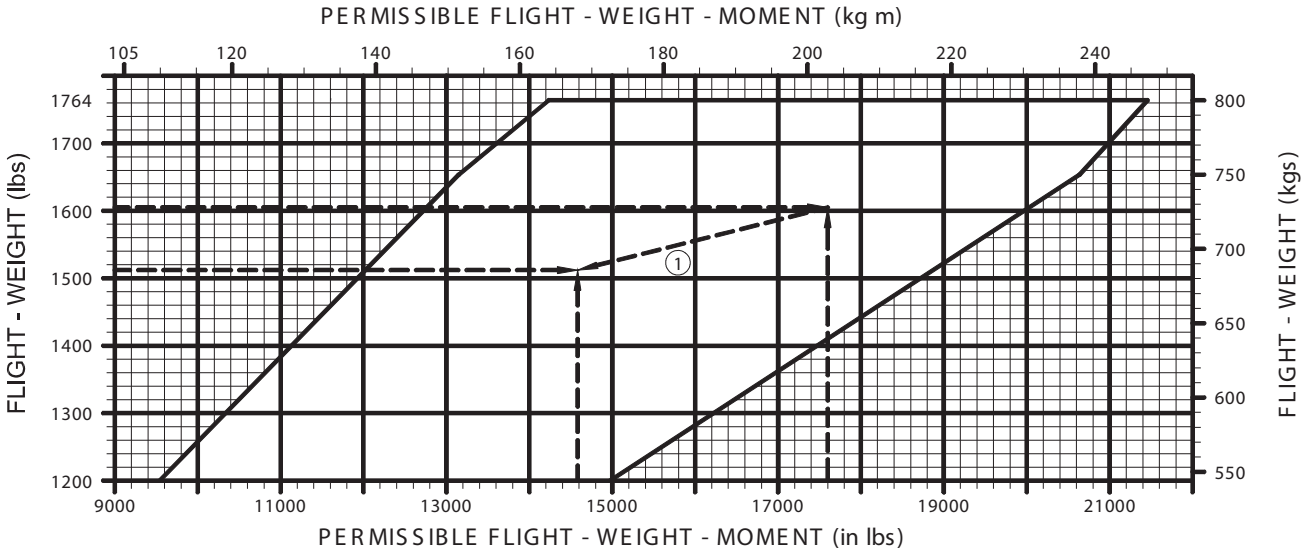
Example:	Pilot and Passenger:	359 lbs. (163 kg)
	Fuel 14.0 US gal. / 52.9 liters:	93 lbs. (42 kg)
	(6.01 lbs. per US gal./0.72 kg per liter)	
Result:	Moment of Pilot and Passenger:	2021 in. lbs. (24.4 kgm)
	Moment of Fuel:	3017 in. lbs. (34.8 kgm)

Figure 6.6 - Weight & Balance Diagram

	Calculation of the Load Limits	DA20-C1 (EXAMPLE)		YOUR DA20-C1	
		Weight [lbs] (Weight [kg])	Moment [in.lbs] ([kgm])	Weight [lbs] (Weight [kg])	Moment [in.lbs] ([kgm])
1.	Empty Weight (use the data for your airplane recorded in the equipment list, including unusable fuel and lubricant).	1153 (523)	12562 (144.740)		
2.	Pilot and Passenger: Lever Arm: 0.143 m (5.63 in)	359 (163)	2021 (23.286)		
3.	Baggage: Max. Wt. 44 lbs (20 kg) Lever Arm: 0.824 m (32.44 in)	-- (--)	-- (--)		
4.	Baggage Compartment Extension: Max. Wt. 44 lbs (20 kg) Lever Arm: 1.575 m (62.0 in)	-- (--)	-- (--)		
5.	*Combined Baggage Max. Wt. 44 lbs (20 kg) Lever Arm: 1.20 m (47.22 in)	-- (--)	-- (--)		
6.	Total Weight and Total Moment with empty fuel tank (sum of 1. - 3.)	1512 (686)	14583 (168.026)		
7.	Usable Fuel Load (6.01 lbs. per US gal./0.72 kg per liter) Lever Arm (32.44 in) (0.824 m)	93 (42)	3017 (34.762)		
8.	Total Weight and Total Moment, taking fuel into account (sum of 6. and 7.)	1605 (728)	17600 (202.788)		
9.	Find the values for the total weight (1512 lbs and 1605 lbs) and the total moment (14583 in lbs and 17600 in. lbs) in the center of gravity diagram. Since they are within the limitation range, the loading is permissible.				

* Combined Baggage: For convenience of calculation use this line if baggage is to be located in both the baggage compartment and the baggage extension.
The combined total of the baggage must not exceed 44 lbs (20 kg).

Figure 6.7 - Calculation of Loading Condition



See an example calculation of loading condition in Figure 6.7. Change in center of gravity is due to fuel consumption

Figure 6.8 - Permissible Center of Gravity Range and Permissible Flight-Weight-Moment

6.5 EQUIPMENT LIST

The following table lists all the equipment available for this airplane. An Equipment Record of items installed in your specific airplane is included in the back of this manual.

The equipment list comprises the following data:

- The item No. containing an ATA Specification 100 reference number for the equipment group and a sequential number.

- Abbreviations:

  A Avionics

  I Instruments

  M Miscellaneous (any equipment other than avionics or instruments)

Weight and lever arm of the equipment items are shown in the columns “Weight” and “Arm”.

NOTE

Additional installation of equipment must be carried out in compliance with the specifications in the Maintenance Manual. The columns “Weight” and “Arm” show the weight and the CG position of the equipment with respect to the reference datum.
A positive value shows the distance aft of the reference datum.
A negative value shows the distance forward of the reference datum.

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
22-001	Autopilot Turn Coordinator/Roll Computer	2.2	-16.4
	S-TEC 01260-12-0-14	(1.0)	(-0.42)
22-002	Autopilot Pitch Computer	1.1	-27.4
	S-TEC 01261-54-14	(0.5)	(-0.69)
22-003	Autopilot Roll Servo	2.9	43.5
	S-TEC 0105-R2	(1.3)	(1.11)
22-004	Autopilot Pitch Servo	2.9	43.5
	S-TEC 0107-P4	(1.3)	(1.11)
23-001	GPS Antenna	0.4	64
	King KA 92	(0.1)	(1.63)
23-002	Intercom	0.5	-15.5
	PS Engineering PM501	(0.2)	(-0.39)
23-003	Nav / Com	3.9	-20.5
	Bendix/King KX 125	(1.8)	(-0.52)
23-004	VHF Comm Antenna	0.5	43.5
	Comant CI 122	(0.2)	(1.11)
23-005	Audio Panel	0.8	-16.4
	Bendix/King KA 134	(0.4)	(-0.42)
23-006	Audio Panel w/ Marker Receiver	1.7	-17.2
	Bendix/King KMA 24	(0.8)	(-0.44)
23-007	Nav / Com w/ GS	5.5	-19.5
	Bendix/King KX 155	(2.5)	(-0.49)
23-008	GPS/Comm	4.4	-20.5
	Bendix/King KLX 135A	(2.0)	(-0.52)
23-009	GPS Antenna	0.4	64
	Garmin GA56	(0.1)	(1.6)
23-010	GPS Antenna	0.2	-20.5
	Garmin GPS 150	(0.1)	(-0.52)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
23-011	Audio Panel w/Marker Receiver	0.8	-17.2
	PMA 6000	(0.4)	(-0.44)
23-012	Audio Panel	1.0	-20.5
	Garmin GMA 340	(0.4)	(-0.52)
23-013	Com	2.8	-20.5
	Bendix/King KY97A	(1.3)	(-0.52)
23-014	Com	2.4	-20.5
	Icom IC A200 TSO	(1.1)	(-0.52)
23-015	Com	2.1	-20.5
	GARMIN AT SL 40	(0.95)	(-0.52)
24-001	Ammeter	0.2	-16.4
	VDO 190-031SB2	(0.1)	(-0.42)
24-002	EPU Kit (S/N C0001-C0148, C0150)	4.5	45.6
	Diamond Service Bulletin # DAC1-24-02	(2.0)	(1.16)
24-003	Battery, GIL G-35M	26.3	57.5
	Diamond Service Bulletin # DAC1-24-03	(11.9)	(1.46)
24-004	Battery, standard C0001-C0148, C0150	15.3	57.5
	Yuasa Y50N18L-A-CX	(6.9)	(1.46)
	Battery, standard (S/N C0149, C0151 onwards)	15.3	-35
	Yuasa Y50N18L-A-CX	(6.9)	(-0.89)
24-005	EPU Installation (S/N C0149, C0151 onwards) Diamond	2.6	-23.6
	Service Bulletin # DAC1-24-06”	(1.2)	(-0.6)
24-006	Battery, B&C Specialty Products	22.5	56
	BC100-1 (S/N C0001 to C0148, C0150)	(10.2)	(1.42)
24-007	Voltmeter	0.3	-16.4
	VDO 332-041-SB2	(0.1)	(-0.42)
24-008	Ammeter	0.3	-17.4
	22-2430-02-00	(0.14)	(-0.44)
24-009	Voltemeter	0.3	-17.4
	22-2430-01-00	(0.14)	(-0.44)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
25-001	Emergency Locator Transmitter EBC 502	2.8 (1.3)	44.8 (1.14)
25-002	Seat Cushion, standard RH 22-2510-20-00 , LH 22-2510-19-00	4.5 (2.1)	12 (0.30)
25-003	Seat Cushion, leather RH 22-2510-10-00 , LH 22-2510-09-00	5.6 (2.6)	12 (0.30)
25-004	Fire Extinguisher AMEREX A620	2.3 (1.0)	28 (0.71)
25-005	ELT Installation Artex ELT-200 (Includes ELT, Antenna, Remote Switch and Harness)	3.2 (1.5)	158.0 (4.0)
25-006	ELT Installation Artex ME406 (Includes ELT, Antenna, Remote Switch and Harness)	3.7 (1.68)	40.3 (1.02)
27-001	Flap Control Module 22-2753-00-00	0.12 (0.05)	-19.4 (-0.49)
28-001	Fuel Quantity Indicator 22-2840-00-00	0.2 (0.1)	-16.4 (-0.42)
28-002	Auxiliary Fuel Quantity Indicator VDO 301-035	0.2 (0.1)	-16.4 (-0.42)
28-003	Fuel Quantity Indicator 22-2840-01-00	0.25 (0.11)	-17.4 (-0.44)
31-001	Hour Meter Hobbs 85000	0.5 (0.2)	-15.5 (-0.39)
31-002	Chronometer Davtron M800	0.2 (0.1)	-15.5 (-0.39)
31-003	Chronometer Davtron M803	0.3 (0.1)	-15.5 (-0.39)
32-001	Wheel Fairing, Main Gear RH 22-3210-06-00 , LH 22-3210-05-00	2.7 (1.2)	27.6 (0.70)
32-002	Wheel Fairing, Nose Gear 20-3220-13-00	2.7 (1.2)	-44.8 (-1.14)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
33-001	Recognition Light Kit	2.5	0
	Diamond Service Bulletin # DAC1-33-01	(1.1)	0
33-002	Light Dimmer Module	0.6	16.4
	White Wire WW-LCM 001	(0.3)	(-0.42)
33-003	Flood Light	0.6	-16.4
	Aero Enhancements	(0.3)	(-0.42)
33.004	Light Dimmer Assembly	0.15	-21.4
	22-3313-00-00	(0.7)	(-0.54)
34-001	Encoder	0.8	-22.5
	SSD 120-20	(0.4)	(-0.57)
34-002	Encoder	0.6	-22.5
	SSD 120-30	(0.3)	(-0.57)
34-002a	Encoder	0.4	-20.0
	SSD 120-30N	(0.2)	(-0.51)
34-003	Nav Indicator	1.1	-16.4
	King KI 208	(0.5)	(-0.42)
34-004	Outside Air Temperature Indicator (F)	0.5	-15.5
	Davtron 301F	(0.2)	(-0.39)
34-005	Outside Air Temperature Indicator (C)	0.5	-15.5
	Davtron 301C	(0.2)	(-0.39)
34-006	Transponder	3.0	-20.5
	Bendix/King KT 76A	(1.4)	(-0.52)
34-007	GPS	2.1	-20.5
	Garmin GPS150	(1.0)	(-0.52)
34-008	GPS	2.1	-20.5
	Bendix/King KLN 35A	(1.0)	(-0.52)
34-009	Nav Indicator	1.2	-17.4
	King KI 209	(0.5)	(-0.44)
34-010	Transponder Antenna	0.2	54.1
	KA 60	(0.1)	(1.37)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
34-011	Altimeter	0.9	-16.4
	United 5934PD3	(0.4)	(-0.42)
34-012	Compass	0.8	-15
	Airpath C2300L4	(0.3)	(-0.38)
34-013	Turn Coordinator	1.2	-16.4
	EGC 1394T100-7Z	(0.5)	(-0.42)
34-013a	Turn Coordinator	1.4	-16.4
	MCI 1394T100-7B	(0.6)	(-0.42)
34-014	Airspeed Indicator	0.7	-16.4
	United 8000B800	(0.3)	(-0.42)
34-015	Vertical Speed Indicator	0.8	-16.4
	United 7000	(0.4)	(-0.42)
34-016	Artificial Horizon	2.0	-16.4
	Sigma Tek 23-501-06-16	(0.9)	(-0.42)
34-017	Artificial Horizon	2.3	-16.4
	Sigma Tek 23-501-035-5	(1.0)	(-0.42)
34-018	Directional Gyro	2.6	-16.4
	Sigma Tek 1U262-001-39	(1.2)	(-0.42)
34-019	Directional Gyro	2.7	-16.4
	Sigma Tek 1U262-007-40	(1.2)	(-0.42)
34-020	Vacuum Gauge	0.3	-16.4
	Varga 5001	(0.1)	(-0.42)
34-021	Chronometer Marker Beacon Antenna	0.25	-153.6
	Davtron M800KA 26	(0.1)	(-3.90)
34-022	Transponder Antenna	0.2	-38.5
	Bendix/King KA60	(0.1)	(-0.98)
34-023	Transponder	1.6	-18.0
	Garmin GTX320	(0.7)	(-0.46)
34-024	Transponder	3.0	-20.5
	Bendix/King KT76C	(1.3)	(-0.52)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
34-025	Digital Transponder Garmin GTX 327	2.2 (1.0)	-20.5 (-0.52)
34-026	GPS/Nav/Com Garmin GNS 430	6.5 (3.0)	-20.5 (-0.42)
34-027	GPS/Com Garmin GNC 420	5.8 (2.6)	-20.5 (-0.42)
34-028	GPS/Com Garmin GNC 300XL	3.4 (1.5)	-20.5 (-0.42)
34-029	TCAD (Traffic Collision Alerting Device) Ryan 8800 Gold	3.6 (1.6)	-20.5 (-0.42)
34-030	CDI Garmin GI106A	1.4 (0.6)	-17.4 (-0.44)
34-031	GPS/Nav/Com Garmin GNS 530	8.5 (3.8)	20.5 (0.42)
34-032	Traffic Advisory System Processor Avidyne 70-2420-7 TAS600	6.8 (3.1)	55.5 (1.41)
34-033	Traffic Advisory System Antenna, Top Sensor Systems S72-1750-31L	0.66 (0.3)	64.6 (1.64)
34-034	Traffic Advisory System Antenna, Bottom Sensor Systems S72-1750-32L	0.75 (0.3)	7.9 (0.20)
34-035	Traffic Advisory System Transponder Coupler Avidyne 70-2040	0.5 (0.2)	56.7 (1.44)
34-036	Digital Transponder Garmin GTX 328	4.2 (1.9)	-20.5 (-0.52)
34-037	Intercom System PS Engineering Incorporated PM 1000	0.75 (0.3)	-15.5 (-0.39)
34-038	Artificial Horizon Indicator Mid Continent	1.6 (0.7)	-20.5 (-0.52)
34-039	Garmin Display Unit (GDU) 620 (PFD/MFD) Garmin G500	6.4 (2.9)	-20.5 (-0.52)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
34-040	Garmin Data Computer (GDC) 74A (Air Data Computer)	1.6	-15.0
	Garmin G500	(0.7)	(-0.38)
34-041	Garmin Reference System (GRS) 77 [(Attitude and Heading Reference System (AHRS)]	2.8	63.0
	Garmin G500	(1.27)	(1.6)
34-042	Garmin Magnetometer Unit (GMU) 44	0.35	110.2
	Garmin G500	(0.2)	(2.8)
34-043	Outside Air Temperature (OAT) Probe	0.05	-23.5
	Garmin GTP 59	(0.02)	(-0.60)
34-044	GPS/Nav/Comm	4.2	-21.5
	Garmin GTN 650	(1.9)	(-0.54)
34-045	Comm	2.36	-21.5
	Garmin GTR 225	(1.07)	(-0.54)
34-046	Artificial Horizon	2.5	-17.4
	Mid Continent 4300-206	(1.13)	(-0.44)
61-002	Propeller and Spinner	11.9	-60.8
	Sensenich W69EK-63	(5.4)	(-1.54)
61-003	Propeller and Spinner	12.7	60.8
	Sensenich W69EK7-63 and W69EK7-63G	(5.7)	(-1.54)
71-001	Heater	1.1	45.5
	Tanis TAS100-29	(0.5)	(1.16)
71-002	Winter Kit	0.4	-33.5
	Diamond Service Bulletin # DAC1-71-01	(0.2)	(-0.85)
73-001	Fuel Pressure Indicator	0.3	-15.5
	22-7330-00-01	(0.1)	(-0.39)
73-002	Fuel Pressure Indicator	0.3	-17.4
	22-7330-03-00	(0.14)	(-0.44)
77-001	Cylinder Head Temp. Indicator	0.3	-16.4
	22-7720-00-00	(0.1)	(-0.42)
77-002	RPM Indicator 22-7710-20-00 or	0.8	-16.4
	Mitchell CD-122-4020	(0.4)	(-0.42)

Equipment List			
Item Number	**Part Description, Manufacturer Part/Model No.**	**Weight lbs (kg)**	**Arm in (m)**
77-003	RPM Indicator – Recording	0.8	-16.4
	Superior Labs SL1010-55000-13-N00	(0.4)	(-0.42)
77-004	Vision Microsystems VM-1000	0.8	-16.4
	4010050 Main Display	(0.4)	(-0.42)
77-005	Vision Microsystems VM-1000	0.2	-16.4
	4010320 Fuel Display	(0.1)	(-0.42)
77-006	Vision Microsystems VM-1000	0.7	-16.4
	4010055 EC 100	(0.3)	(-0.42)
77-007	Vision Microsystems VM-1000	1.3	-20
	4010066 Data Processing Unit	(0.6)	(-0.51)
77-008	Lighted RPM Indicator – Recording	0.7	-16.4
	Superior Labs SL1010-5503-13-H03	(0.3)	(-0.42)
78-001	EGT Indicator	0.3	-15.5
	22-7720-00-02	(0.1)	(-0.39)
78-002	EGT Indicator	0.25	-17.4
	22-7720-04-00	(0.11)	(-0.44)
78-003	CHT Indicator	0.25	-17.4
	22-7720-03-00	(0.11)	(-0.44)
79-001	Oil Pressure Kit (Indicator only)	0.3	-16.4
	22-7930-10-00	(0.1)	(-0.42)
79-002	Oil Temperature Indicator	0.3	-16.4
	22-7930-00-01	(0.1)	(-0.42)
79-003	Oil Temperature Indicator	0.25	-17.4
	22-7931-02-00	(0.11)	(-0.44)
79-004	Oil Pressure Indicator	0.25	-17.4
	22-7930-04-00	(0.11)	(-0.44)

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CHAPTER 7

DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

TABLE OF CONTENTS

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7.1 INTRODUCTION

Chapter 7 provides a description and operation of the airplane and its systems. Refer to Chapter 9, Supplements, for details of optional systems and equipment.

7.2 AIRFRAME

7.2.1 Fuselage

The GFRP-fuselage is of semi-monocoque construction. The fire protection cover on the fire wall is made from a special fire retarding ceramic fiber that is covered by a stainless steel plate on the engine side. The main bulkhead is of CFRP/GFRP construction.

The instrument panel is made of aluminum.

7.2.2 Wings

The GFRP-wings are of semi-monocoque sandwich construction, and contain a CFRP-spar. The ailerons and flaps are made from CFRP and are attached to the wings using stainless steel and aluminum hinges.

The wing-fuselage connection is made with three bolts each. The A- and B- bolts are fixed to the fuselage's root rib. The A-bolt is placed in front of the spar bridge; the B-bolt is near the trailing edge on each side of the fuselage. The two main bolts are placed in the middle of the spar bridge structure. They are accessible behind the seats and are inserted from the front side. A spring-loaded hook locks both bolt handles, securing them in place.

7.2.3 Empennage

The rudder and elevator units are of semi-monocoque sandwich construction. The vertical stabilizer contains a di-pole antenna for the VHF radio equipment. The horizontal stabilizer contains an antenna for the NAV equipment (VOR).

7.3 FLIGHT CONTROLS

The ailerons and elevator are actuated via push rods. The rudder is controlled using control cables. The flaps have three positions, CRUISE, T/O (take-off), LDG (landing), and are electrically operated. The switch is located on the instrument panel. The flap control circuit breaker can be manually 'tripped' to disable the flap system. Elevator forces may be balanced using the electric trim system.

7.3.1 Trim System

The Rocker switch is located on center console behind the throttle quadrant. The digital trim indicator is located in the upper instrument panel.

The switch controls an electrical actuator beside the vertical push rod in the vertical stabilizer. The actuator applies a load to compression springs on the elevator pushrod. The trim circuit breaker is located in the circuit breaker panel and can be tripped manually to disable the system.

switch forward = nose down

7.3.2 Flaps

The flaps are driven by an electric motor. The flaps are controlled by a three position flap operating switch on the instrument panel. The three positions of the switch correspond to the position of the flaps. The top position of the switch is used during cruise flight. When the switch is moved to a different position, the flaps move until the selected position is reached. The cruise (fully retracted) and landing (fully extended) positions are equipped with position switches to prevent over-traveling.

The electric flap actuator is protected by a circuit breaker (5 Amp), located on the right side of the instrument panel, which can be manually tripped to disable the system.

7.3.3 Flap Position Indicator

The current flap position is indicated by three control lights beside the flap operating switch.

Wing Flap Position	Light	Degrees
CRUISE	green	0 degrees
T/O	yellow	15 degrees
LDG	yellow	45 degrees

When two lights are illuminated at the same time, the flaps are in-between positions.

7.3.4 Pedal Adjustment

NOTE

The pedals can only be adjusted on the ground.

The pedals for rudder and brakes are unlocked by pulling the T-grip located in front of the rudder pedal sledge tubes.

NOTE

Pull the T-grip straight back. Do not pull upwards.

Forward adjustment: Push both pedals forward with your feet while pulling lightly on the T-grip to disengage the latch.

Backward adjustment: Pull pedals backward to desired position by pulling on the T-grip.

NOTE

After the T-grip is released, push the pedals forward with your feet until they lock in place.

7.3.5 Flight Control Lock

A flight control lock, P/N 20-2770-00-00_1, is provided with each aircraft and should be installed whenever the aircraft is parked. See Figure 1, Installation and Removal of the Control Stick.

CAUTION

FAILURE TO INSTALL THE FLIGHT CONTROL LOCK WHENEVER THE AIRCRAFT IS PARKED MAY RESULT IN CONTROL SYSTEM DAMAGE, DUE TO GUSTS OR TURBULENCE.

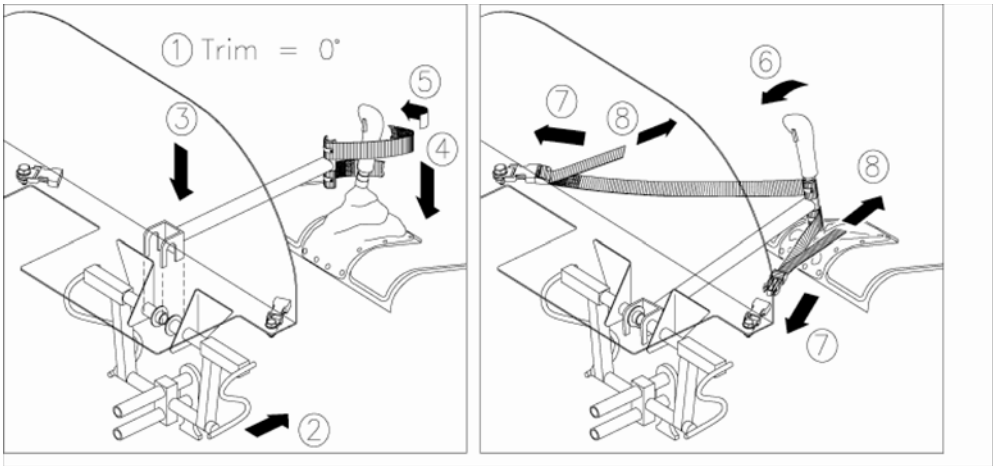


Figure 7.1 - Installation and Removal of the Control Lock

(a) Trim the aircraft to neutral.

(b) Pull the left rudder pedals fully aft and check that they are locked in position.

(c) Hook the Control Lock's forks over the rudder pedal tubes as shown above.

(d) Push down the Control Stick's leather boot to expose the Control Stick tube, and push the Control Stick forward against the Control Lock.

(e) Loop the straps around the Control Stick as shown, and push forward on the Control Stick.

(f) Clip the straps into the left and right buckle receptacles located under the instrument panel.

(g) Adjust the straps as required. Straps should be tight to secure the controls properly.

(h) TO REMOVE, push the Control Stick forward (to relieve strap tension). Unclip the straps and remove the Control Lock. Store in the aircraft's baggage compartment.

7.4 INSTRUMENT PANEL

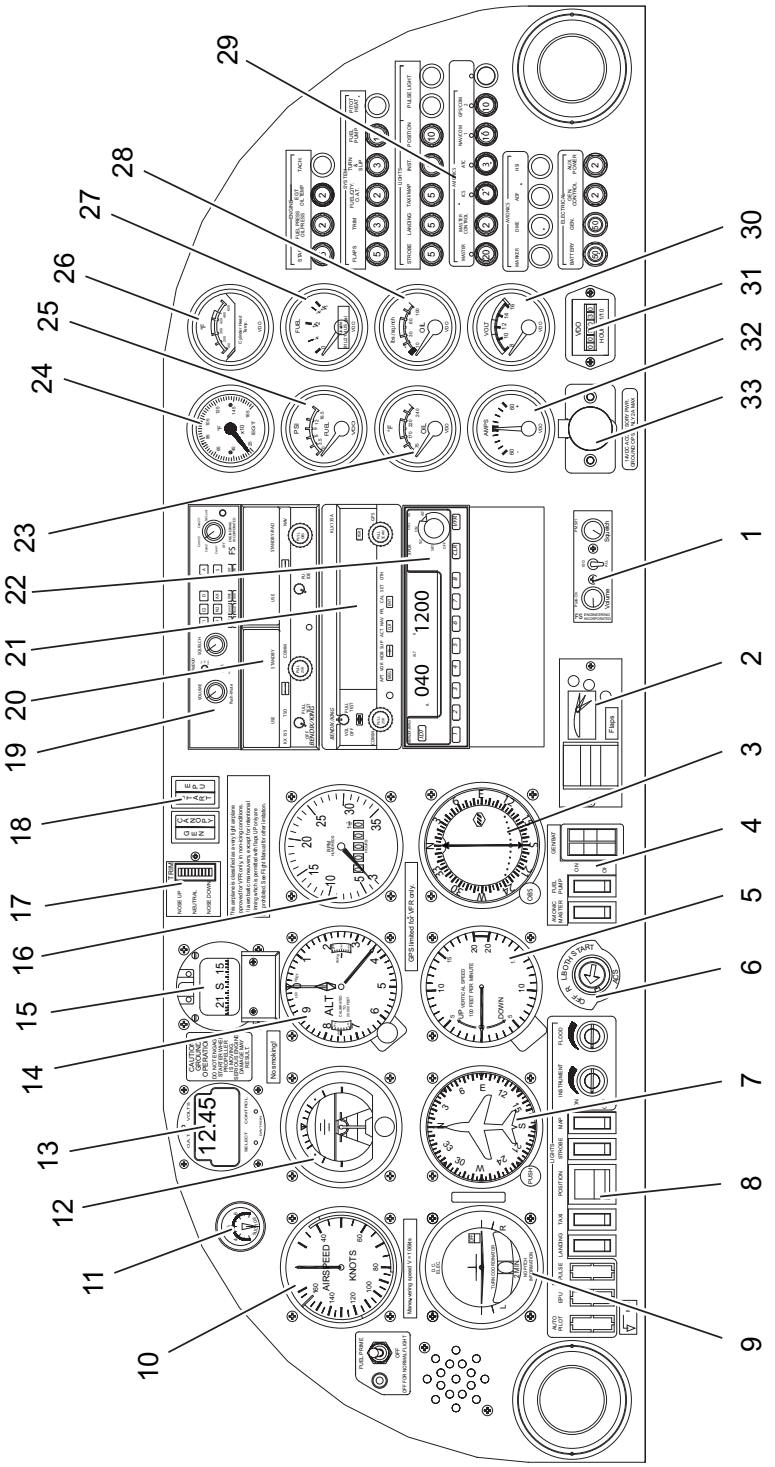


Figure 7.2 - Instrument Panel

Instrument Panel Components - For Figure 7.2

Legend:

1	Intercom	9	Turn Coordinator	22	Transponder
2	Flap Switch	10	Airspeed Indicator	23	Oil Temperature Indicator
3	NAV Indicator	11	Vacuum Gauge	24	Exhaust Gas Temperature
4	Master Switch Panel	12	Artificial Horizon Indicator	25	Fuel Pressure Indicator
	- AVIONICS MASTER	13	Clock	26	Cylinder Head Temperature
	- FUEL PUMP Switch	14	Altimeter	27	Fuel Contents Indicator
	- GEN/BAT Switch	15	Magnetic Compass	28	Oil Pressure Indicator
5	Vertical Speed Indicator	16	RPM Indicator	29	Circuit-Breaker Panel
6	Ignition Switch	17	Trim Indicator	30	Voltmeter
7	Directional Gyro	18	Annunciator Lights	31	Engine Operated Hour Meter
8	Light Switch Panel	19	Auto Selector	32	Ammeter
	- Optional Switch*	20	NAV/COM GPS	33	Accessory Jack
	- STROBE Light Switch	21	Transceiver		
	- LANDING Light Switch				
	- TAXI Light Switch				
	- POSITION Light Switch				

NOTE: Optional Switch* can be one of the following:

- Auto Pilot
- Pulse Lights
- EPU
- MAP Light
- INSTRUMENT Light
- FLOOD Light

7.4.1 Flight Instruments

The flight instruments are installed on the pilot's side of the instrument panel.

7.4.2 Cabin Heat

The cabin heat and defrost system, directs ram air through the exhaust heat shroud into the cabin heat valve. The warm air is then directed to the window defrosting vents and to the cabin floor as selected by the Floor/Defrost lever.

The cabin heat selector, located in the center console, is used to regulate the flow of heated air.
Lever down = cabin heat FULL ON

The Floor/Defrost lever directs the heated air to the defrost and floor vents.
Lever down = all cabin heat to Floor

7.4.3 Cabin Air

The cabin aeration is controlled by two adjustable air-vent nozzles. The two sliding windows in the canopy can be opened for additional ventilation.

7.5 LANDING GEAR SYSTEM

The landing gear system consists of the two main landing gear wheels mounted to aluminum spring struts and a 60° castering nose wheel. The suspension of the nose wheel is provided by an elastomer spring.

The wheel fairings for the landing gear are removable. When flying without wheel fairings, it should be noted that there is a reduction in some areas of performance (refer to Chapter 5).

7.5.1 Wheel Brakes

CAUTION

WHEN PLACING YOUR FEET ON THE BRAKE PEDALS, CARE SHOULD BE TAKEN TO USE ONLY THE TOE OF YOUR SHOE SO YOU DO NOT CONTACT THE STRUCTURE ABOVE THE PEDALS, WHICH COULD PREVENT EFFECTIVE APPLICATION OF THE BRAKE(S).

Hydraulically operated disc brakes act on the wheels of the main landing gear. The wheel brakes are operated individually using the toe-brake pedals either on the pilot's or on the copilot's side. If either the left or right wheel brake system on the pilot's side fail, the co-pilot's brakes fail too. If the co-pilots brake master cylinder or input lines to the pilots master cylinder fails the pilots brakes will still operate.
See Figure 7.3, Brake System Schematic Diagram.

7.5.2 Parking Brake

The Parking Brake knob is located on the center console in front of the throttle quadrant, and is pushed up when the brakes are to be released. To set the parking brake, pull the knob down to the stop. Repeated pushing of the toe-brake pedals will build up the required brake pressure, which will remain in effect until the parking brake is released.

To release the parking brake, push on the toe-brake pedals before releasing the parking brake knob.

NOTE

When parking the aircraft for longer than 12 hours place wheel chocks in front of and behind the main landing gear wheels. Tie down ropes should also be used if you are uncertain of favourable climatic conditions for the duration of the park.

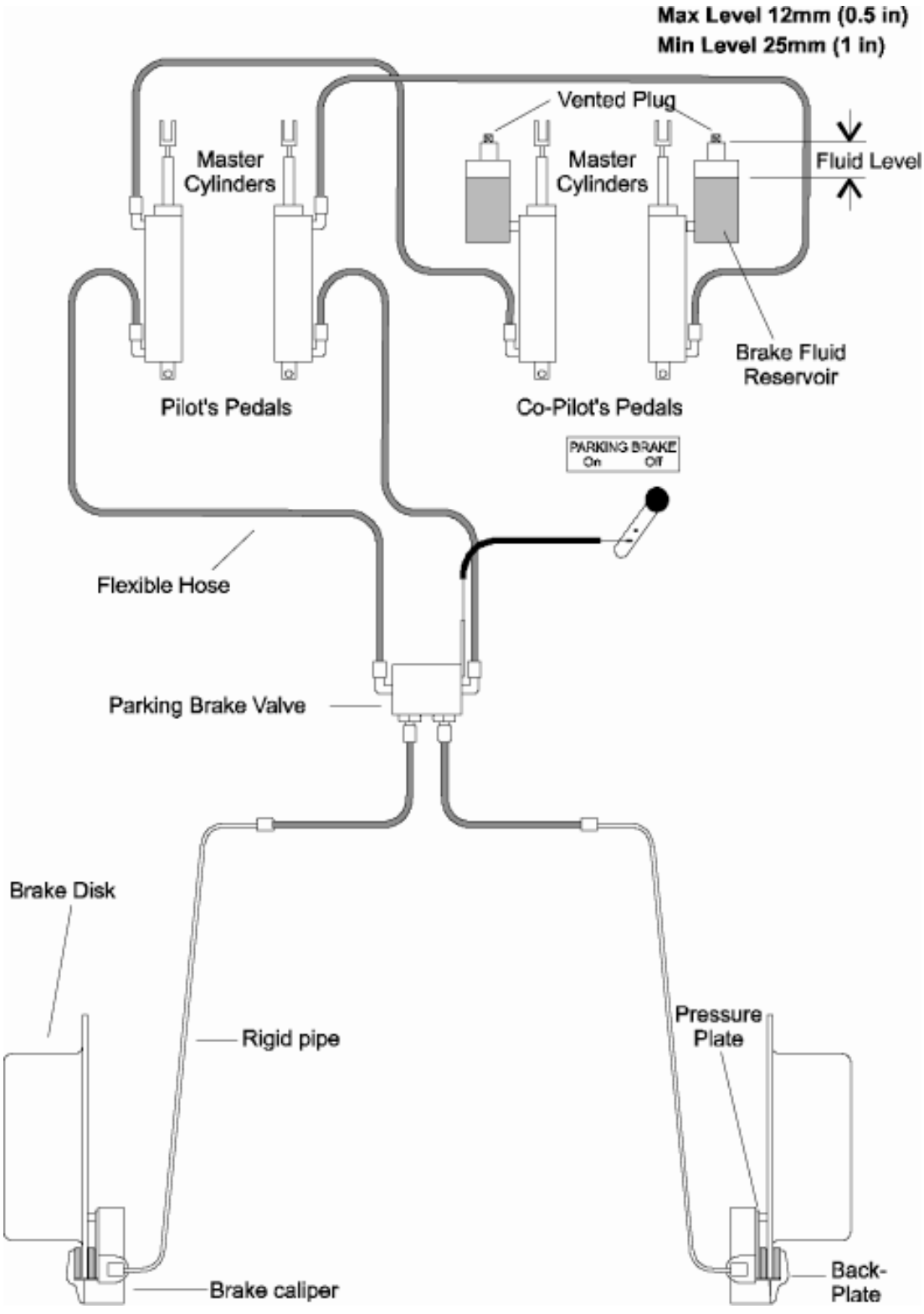


Figure 7.3 - Brake System Schematic Diagram

7.6 SEATS AND SAFETY BELTS

The seats are removable to facilitate the maintenance and inspection of the underlying controls. Covers on the control sticks prevent loose objects from entering the control area.

The seats have removable cushions.

Every seat is equipped with a four-point safety belt. To put on the safety belt, slip the lap belt through the shoulder belt-ends and insert the lap belt-end into the belt lock. Adjust the length of the belts so that the buckle is centered around your waist. Tighten the belts securely. The belt is opened by pulling the lock cover.

7.7 BAGGAGE COMPARTMENT

CAUTION

MAKE SURE THAT BAGGAGE COMPARTMENT LIMITATIONS (44 LBS/20 KG MAX.) AND AIRCRAFT WEIGHT AND BALANCE LIMITATIONS ARE NOT EXCEEDED.

The baggage compartment is located behind the seat above the fuel tank. Baggage should be distributed evenly in the baggage compartment. The baggage net must be secured.

7.8 CANOPY

CAUTION

BEFORE STARTING THE ENGINE, THE CANOPY MUST BE CLOSED AND LATCHED. THE RED HANDLES MUST BE MOVED FULLY FORWARD.

AFTER STARTING THE ENGINE, THE CANOPY MUST STAY IN THE CLOSED AND LATCHED POSITION UNTIL THE ENGINE IS SHUT DOWN.

DURING ENGINE OPERATION IT IS PROHIBITED TO ENTER OR EXIT THE AIRPLANE.

Closing the canopy - Close the canopy by pulling down on the canopy frame (see Figure 7.4). Latching the canopy is accomplished by moving the two latching handles on the left and right side of the frame to the CLOSE position.

Opening the canopy - To open the canopy, move the two latching handles on the left and right side of the frame to the OPEN position and push up on the canopy.

NOTE

The Master Switch must be ON for the Canopy Warning Light to be operational.

NOTE

Some aircraft are equipped with external canopy locking handles. These do not affect operation of the inside locking handles.

Closing the canopy from outside - Move both the LH and RH external latching handles in the Aft – Up direction to the closed position.

Opening the canopy from outside - Move both the LH and RH external latching handles in the Fwd – Down direction to the OPEN position and lift the canopy.

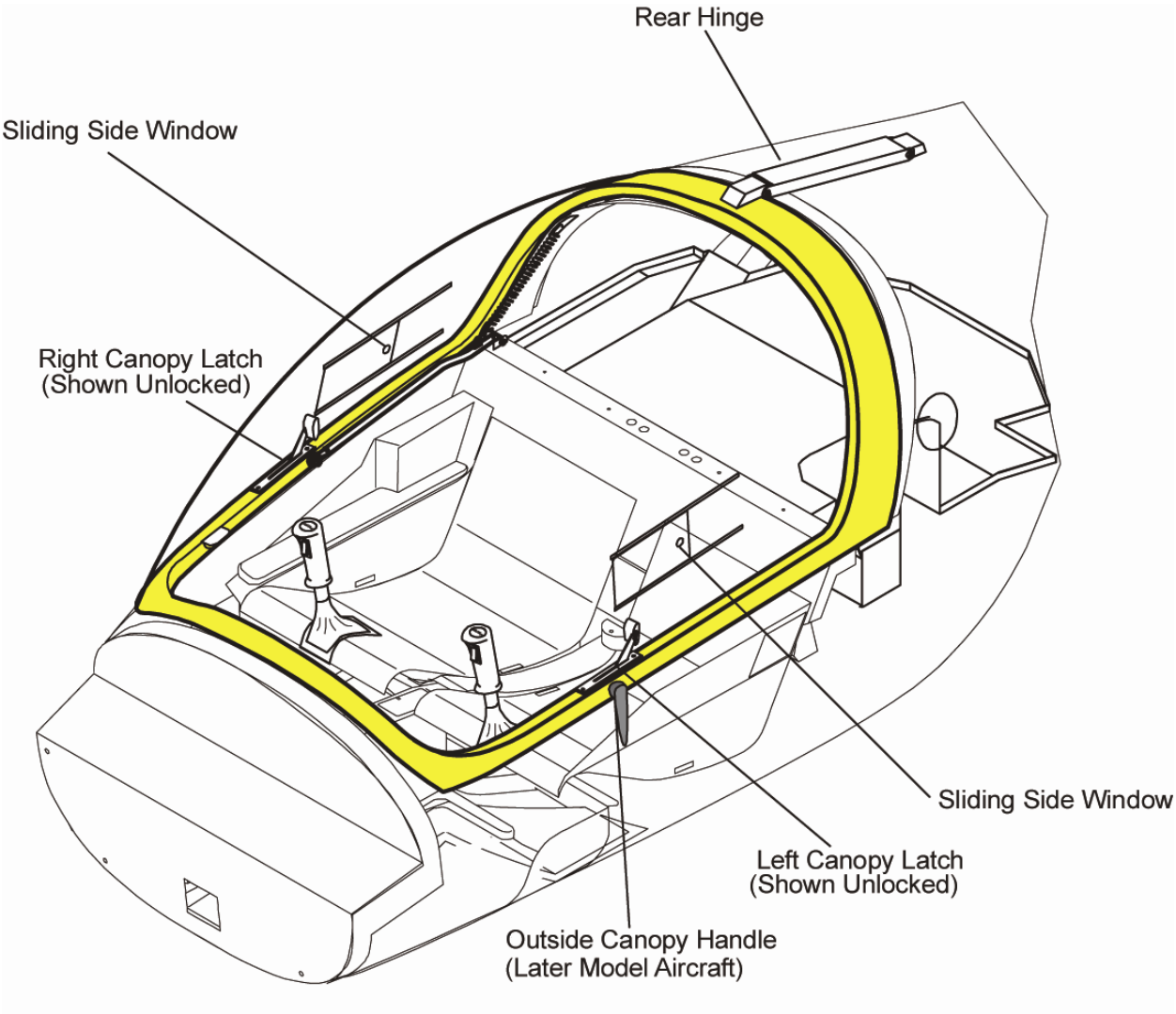


Figure 7.4 - Canopy

7.9 POWERPLANT

7.9.1 Engine

DA20-C1 aircraft are equipped with the Continental IO-240-B engine. The IO-240-B is a fuel injected, 4 cylinder, 4 stroke engine with horizontally opposed, air cooled cylinders and heads. The propeller drive is direct from the crankshaft.

Displacement:.....239.8 cu.in. (3.9 liters)

Max. Continuous Power: ..... 125 HP / 93.25 kW at 2800 RPM

Additional information can be found in the Engine Operating Manual.

The power plant instruments are located on the instrument panel on the co-pilot's side. The ignition switch is a key switch located on the instrument panel in front of the pilot. The ignition is turned on by turning the key to position BOTH. The starter is operated by turning the switch against the spring loaded start position. If the optional Push-to-Start ignition switch is installed, then an additional “PUSH” action is required after the ignition switch is turned to the START position to start the aircraft. The engine is shut off by moving the mixture control to the idle cutoff position then turning the ignition switch to the off position.

The DA20-C1 may be equipped with an optional altitude compensating fuel pump. A placard on the instrument panel indicates if this system is installed. With this system it is not necessary to manually lean the mixture with altitude.

7.9.2 Engine Controls

The Mixture, Throttle, and Alternate Air Control levers are grouped together in the center console. The tension/friction for the controls can be adjusted using the friction knob located on the right side of the center console.

Mixture Lever: right lever with red cylindrical handle and integral lock out lever

lever full forward = Full Rich

lever full aft = Idle Cutoff

The mixture control lever features a safety lock which prevents inadvertent leaning of the mixture. To release, squeeze the safety lock lever and the control knob together.

Throttle: center lever with "T" handle

lever full forward = FULL throttle

lever full aft = IDLE

Alternate Air: left lever with square handle

lever full forward = Primary air intake

lever full aft = Alternate air intake

The alternate air control selects a second induction air intake in case of restriction of the primary air intake (filter).

7.9.3 Mixture Control

(a) Cruise

The mixture control allows leaning of the fuel mixture to maximize fuel economy during cruise conditions. Teledyne Continental Motors specifies that above 75% of maximum rated power, the mixture must be set at FULL RICH. It should be noted that even with the throttle set at the full power position, actual power may be less than 75% of maximum rated power and then leaning is required (reference Section 5.3.2, Cruise Performance).

(b) Reduced Throttle Settings

When operating at reduced throttle settings, other than steady state cruise, the mixture should always be set to FULL RICH. This applies to maneuvers (e.g.: stalls, spins, slow flight), descents, landing approaches, after landing and while taxiing.

The only exception to this is for engines without the altitude compensating fuel pump, operating at very high altitudes, where the low air density may require leaning to maintain satisfactory engine operation.

(c) Full Throttle

When operating at full throttle, the mixture must be set at FULL RICH. This applies to take-off, balked landings and climb.

The only exception is for engines without the altitude compensating fuel pump the mixture should be leaned as actual power falls below 75% of maximum rated power, as may be the case in an extended climb (reference Section 5.3.2, Cruise Performance).

NOTE

All adjustment of the mixture control should be done in small increments.

7.9.4 Propeller

The propeller is a fixed pitch Sensenich wood propeller.

7.9.5 Lubricating

CAUTION

NEVER OPERATE THE ENGINE WITH THE OIL FILLER CAP REMOVED. OBSERVE NORMAL PROCEDURES AND LIMITATIONS WHILE RUNNING ENGINE.

The engine has high pressure wet sump lubrication. The oil is pumped by a mechanical, engine driven pump. An oil dipstick indicates the level of oil in the tank. The dipstick is marked for US quarts.

With the engine stopped, check the oil level on the dipstick. The oil level must be between the 6 US quarts and 4 US quart level as indicated by the markings on the dip stick. See Figure 7.5, Oil System Schematic Diagram.

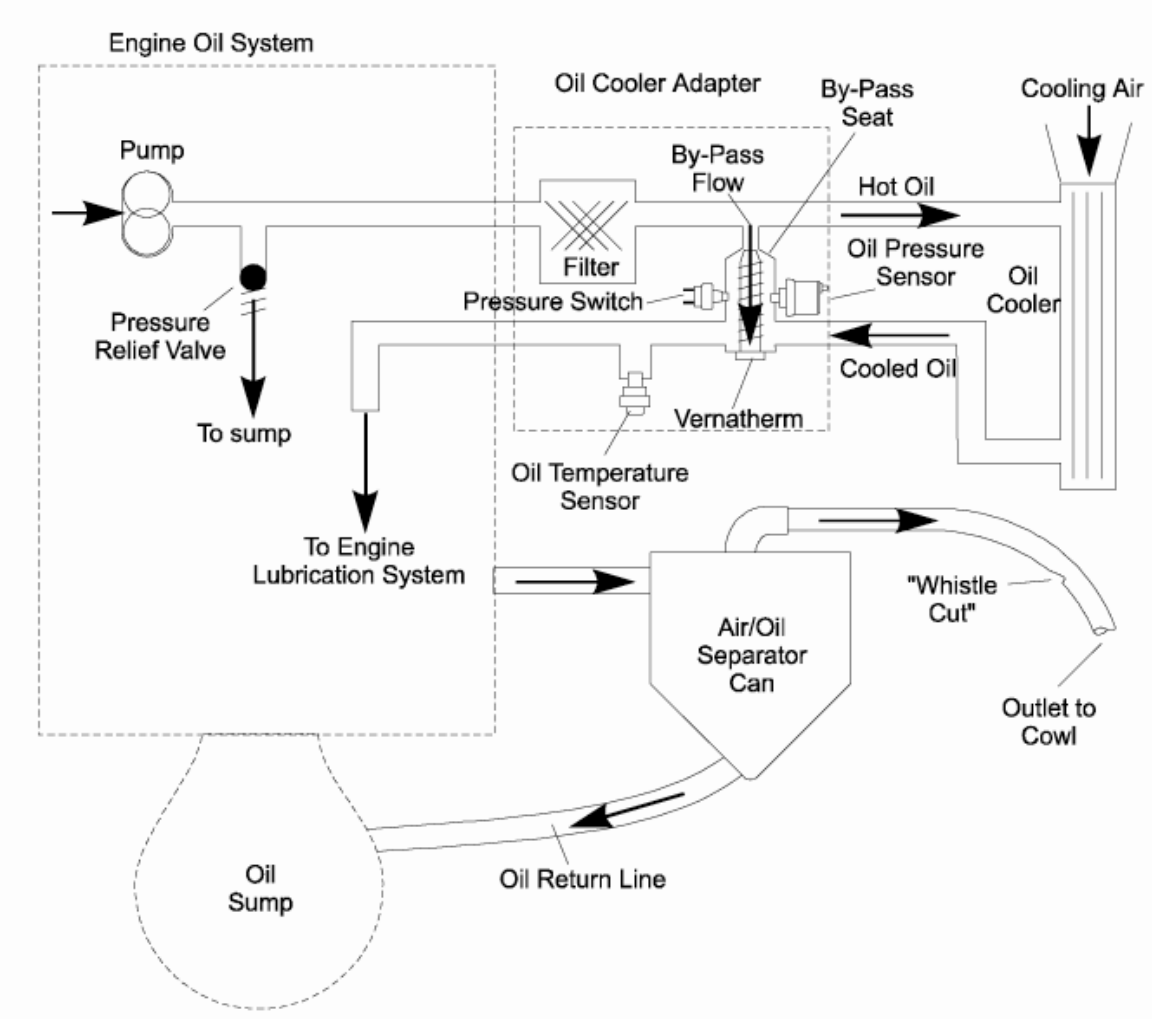


Figure 7.5 - Oil System Schematic Diagram

7.10 FUEL SYSTEM

The aluminum tank is located behind the seats, below the baggage compartment. The capacity is specified in Section 2 of this manual. The tank filler on the left side of the fuselage behind the canopy is connected to the tank with a rubber hose. A grounding stud is located on the under side of the fuselage near the trailing edge of the left hand wing. The aircraft must be grounded prior to any fueling operation.

The tank vent line runs from the filler neck through the fuselage bottom skin to the exterior of the airplane. The vent line is the translucent plastic hose adjacent to the left wing root. The vent line must be clear for proper fuel system operation. The tank has an integral sump which must be drained prior to each flight, by pushing up on the brass tube which protrudes through the underside of the fuselage, forward of the trailing edge of the left hand wing.

Two outlets with finger filters, one left and one right, are installed at the bottom of the tank (see Figure 7.6). Fuel is gravity fed from these outlets to a filter bowl (gascolator) and then to the electric fuel pump. The filter bowl must be drained prior to each flight, by pushing up on the black rubber tube that protrudes through the underside of the fuselage, adjacent to the fuel tank drain. The electric fuel pump primes the engine for engine starting (Prime ON) and is used for low throttle operations (Fuel Pump ON). When the pump is OFF, fuel flows through the pump's internal bypass. From the electric pump, fuel is delivered to the engine's mechanical fuel pump by the fuel supply line. Fuel is metered by the fuel control unit and flows via the fuel distribution manifold to the injector nozzles.

Closing the fuel shut-off valve, located either on the aft side of the firewall or at the maintenance drain manifold, will cause the engine to stop within a few seconds.

A return line from the mechanical pump's fuel vapor separator returns vapor and excess fuel to the tank.

Fuel pressure is measured at the fuel distribution manifold and displayed on the fuel pressure indicator, which is calibrated in PSI.

Some DA20-C1 aircraft also have a fuel vapor separator in the distribution manifold. These aircraft have a second vapor return line from the distribution manifold to the firewall.

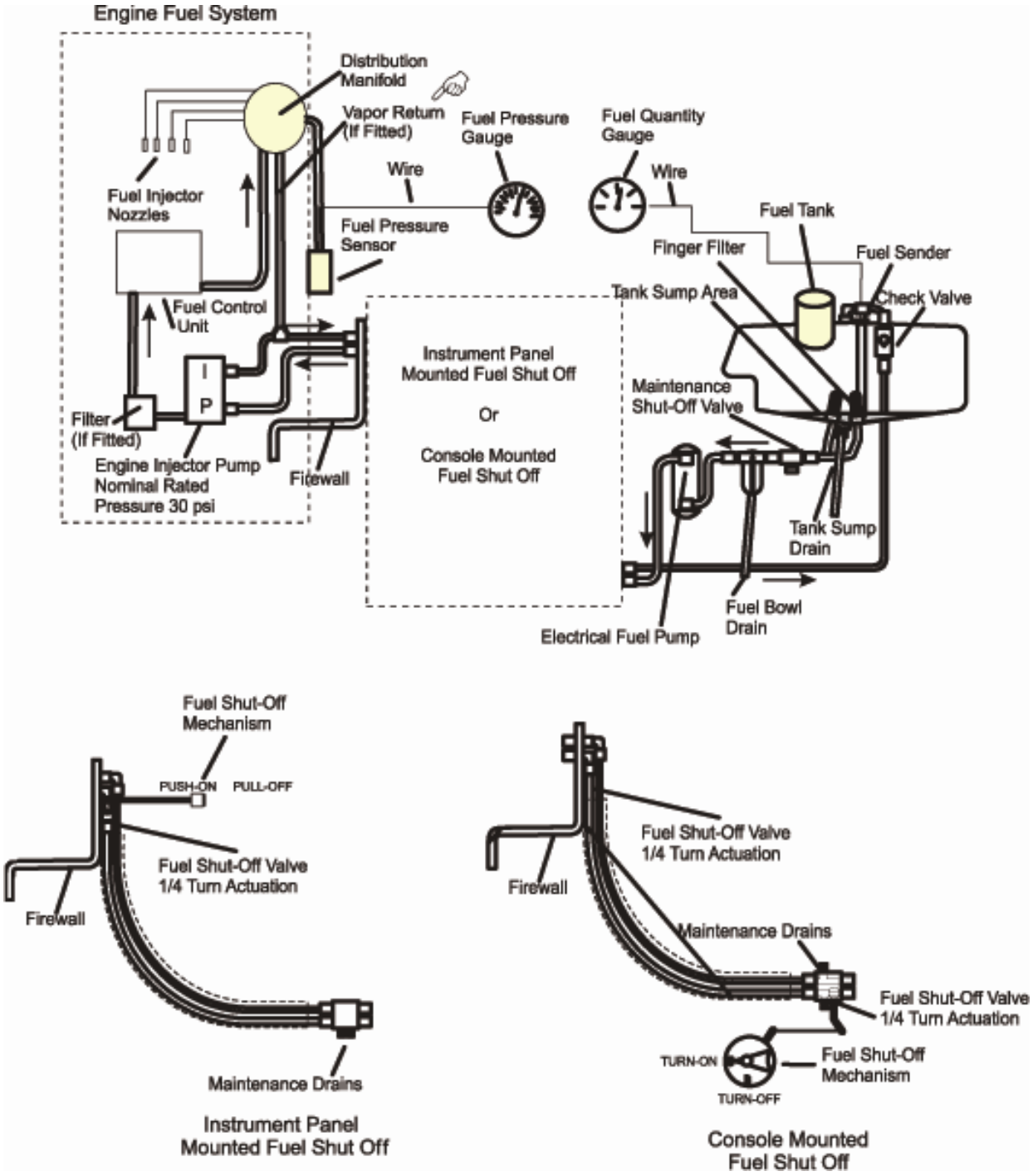


Figure 7.6 - Fuel System Schematic Diagram

7.10.1 Fuel Shut-off Valve

WARNING

THE FUEL SHUT-OFF VALVE SHOULD ONLY BE CLOSED FOR EMERGENCIES OR FUEL SYSTEM MAINTENANCE.

There are two different versions of fuel shut-off valves in the DA20-C1.

Version 1

The fuel shut-off valve is located on the cabin side of the firewall and is controlled by a handle on the right side center pedestal. To activate the fuel shutoff valve, lift the handle release lock and pull the handle out. In the open position the knob is in. In the closed position the knob is out.

Version 2

The fuel shut-off valve is integral to the maintenance drain manifold, located below the fuel tank. It is actuated by the center console mounted rotary lever, via a rigid pushrod. To activate the valve, rotate the lever clockwise from OFF to ON or lift the lockout knob and rotate the lever counterclockwise from ON to OFF. The safety lockout knob prevents accidental actuation of the valve.

7.10.2 TANK DRAIN

To drain the tank sump, activate the spring loaded drain by pushing the brass tube in with a drain container. The brass tube protrudes approximately 1 1/6 in (30 mm) from the fuselage contour and is located on the left side of the fuselage, approximately at the same station as the fuel filler cap.

7.10.3 FUEL FILTER BOWL

The fuel filter bowl is between the tank and the fuel pump. The bowl acts as a trap for sediment and water that has entered the fuel line from the tank.

7.10.4 FUEL FILTER BOWL DRAIN

The filter bowl drain is next to the fuel tank drain. It operates in the same manner as the fuel tank drain.

7.10.5 FUEL DIPSTICK

A fuel dipstick, P/N 22-2550-14-00, is supplied with all aircraft to permit direct measurement of fuel level during the preflight check. On serial numbers C0056, C0066, C0067 and C0069 use fuel dipstick P/N 22-2550-17-00.

NOTE

Electric fuel gauges may malfunction. Check fuel quantity with the fuel dipstick before each flight.

To check the fuel level:

(a) Insert the graduated end of the fuel dipstick into the tank through the fuel filler opening until the dipstick touches the bottom.

(b) Withdraw the dipstick from the fuel tank.

(c) Read the fuel quantity. The dipstick is calibrated in increments of 1/4 of useable fuel capacity. (21.3 US gallons/80.5 liters for Type 1 Fuel System or 24.0 US gallons/91 liters for Type 2 Fuel System).

NOTE

Several readings should be taken to confirm accuracy.

7.10.6 ELECTRIC FUEL PUMP (PRIMING PUMP) OPERATION

The DA20-C1 is equipped with a DUKES constant flow, vane type, two speed, and electric fuel pump. This pump emits an audible whine when it is switched on.

(a) Fuel Prime

The pump's high speed setting is used for priming the engine prior to engine start. The prime setting is selected by turning the FUEL PRIME switch ON. An amber annunciator indicates that FUEL PRIME ON is selected.

(b) Fuel Pump

The pump's low speed setting is required for maintaining positive fuel supply system pressures at low throttle settings. This setting is selected by turning the FUEL PUMP switch ON. This setting should be selected for any low throttle operations, including taxiing and any flight operations when engine speed may fall below 1000 RPM (e.g. stalls, spins, descents, landings, etc.).

The FUEL PUMP may also be selected ON to suppress suspected vapour formation in the fuel supply system. Smooth engine operation at high ambient temperatures with heat soaked fuel and up to and exceeding the service ceiling has been demonstrated without use of the electric pump.

NOTE

Turning the priming pump on while the engine is running, will enriches the mixture considerably. Although the effect is less noticeable at high power settings when the fuel flow rate is high, the effect at low and idle throttle settings is an over rich mixture, which may cause rough engine operation or engine stoppage. It is therefore recommended that for normal operations, the FUEL PRIME be turned OFF.

7.11 ELECTRICAL SYSTEM

Simplified Schematic (see Figure 7.7)

7.11.1 Power Supply

A 12 V battery is connected to the master bus via the battery circuit breaker (50 Amps). The 40 amp. generator is attached to the engine near the propeller hub. The generator feeds the main bus via the generator circuit breaker (50 Amps). Both circuit breakers can be triggered manually. The generator warning light is activated by an internal voltage regulator monitoring circuit and illuminates when a generator fault occurs.

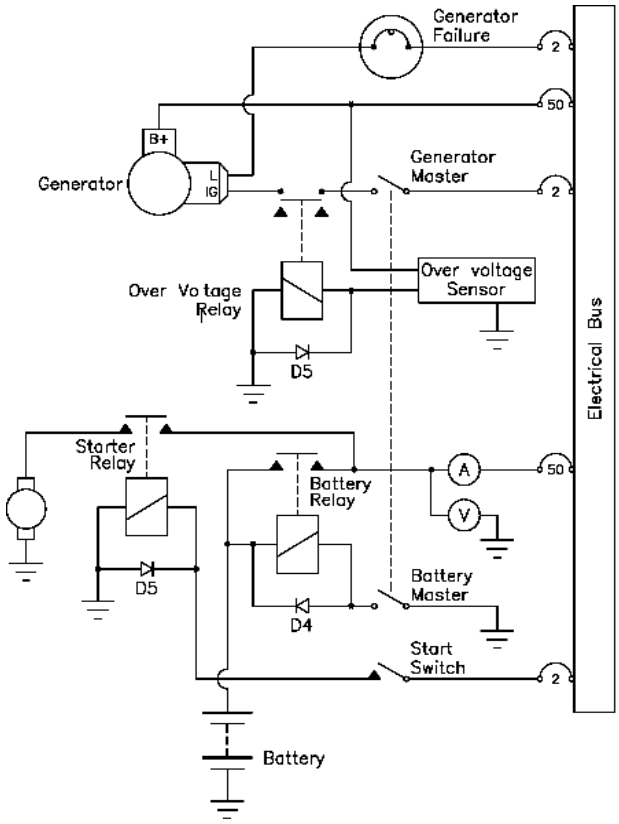


Figure 7.7 - Simplified Schematic

7.11.2 Ignition System

The engine is provided with two independent ignition systems. The two magnetos are independent from the power supply system, and are in operation as soon as the propeller is turning and the ignition switch is not off. This ensures safe engine operation even in case of an electrical power failure.

WARNING

IF THE IGNITION KEY IS TURNED TO L, R OR BOTH, THE RESPECTIVE MAGNETO IS "HOT". IF THE PROPELLER IS MOVED DURING THIS TIME THE ENGINE MAY START AND CAUSE SERIOUS OR FATAL INJURY TO PERSONNEL. THE POSSIBILITY OF A 'HOT' MAGNETO MAY EXIST DUE TO A FAULTY SWITCH OR AIRCRAFT WIRING. USE EXTREME CARE AND RESPECT WHEN IN THE VICINITY OF A PROPELLER!

7.11.3 Electrical Powered Equipment

The individual consumers (e.g. Radio, Fuel Pump, Position Lights, etc.) are connected in series with their respective circuit breakers. See Figure 7.2 for an illustration of the instrument panel.

7.11.4 Voltmeter

The voltmeter indicates the status of the electrical bus. It consists of a dial that is marked numerically from 8 - 16 volts in divisions of 2.

The scale is divided into three colored arcs to indicate the seriousness of the bus condition. These arcs are:

Red ..... for 8.0 - 11.0 volts,

Yellow ..... for 11.0 - 12.5 volts,

Green ..... for 12.5 - 16.0 volts,

Redline ..... at 16.1 volts.

7.11.5 Ammeter

The ammeter indicates the charging (+) and discharging (-) of the battery.
It consists of a dial, which is marked numerically from -60 to 60 amps.

7.11.6 Generator Warning Light

The generator warning light (red) illuminates during:

- Generator failure, no output from the generator

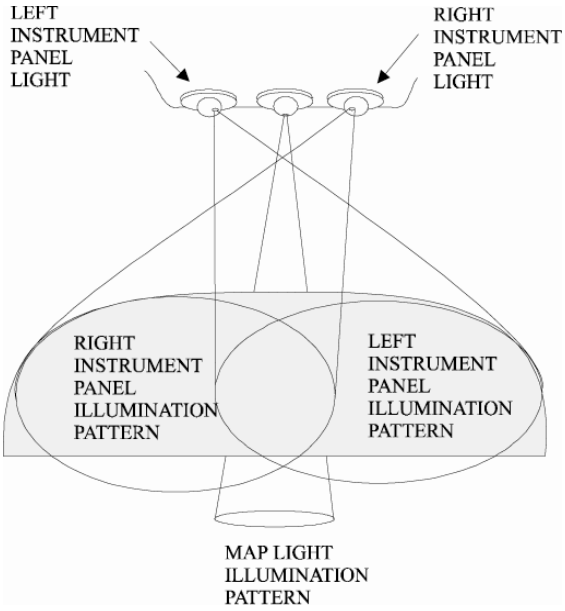
The only remaining power source is the battery (20 amps. for 30 minutes)

7.11.7 Instruments

The instruments for temperatures, pressures, and fuel quantity are connected to their respective sensors. When the electrical resistance of a sensor changes it causes a corresponding change (needle deflection) in its respective indicator.

7.11.8 Internal Lighting

The internal lighting of the DA20-C1 is provided by a lighting module located aft of the Pilot's head and on the centerline of the aircraft. Included in this module are two panel illumination lights and one map light. The switches for the lights are located on the instrument panel. There is a dimming control located on the left side of the instrument panel for adjusting the intensity of the lighting. There is a toggle switch located beside the dimming control that controls the intensity of the Wing Flap and Trim Annunciator. See Figure 7.8.



Care must be taken when adjusting the lights to maintain proper illumination. The Illumination Pattern and Adjustment shows how the lights are aimed in order to provide proper panel illumination.

Aircraft equipped with supplemental lighting (MOD 32) have a Light Dimmer Module and a Glare Shield mounted Flood Light. Control of the Dimmer for backlit instruments is through the Instrument lighting potentiometer. Control of the flood light is through a potentiometer marked FLOOD.

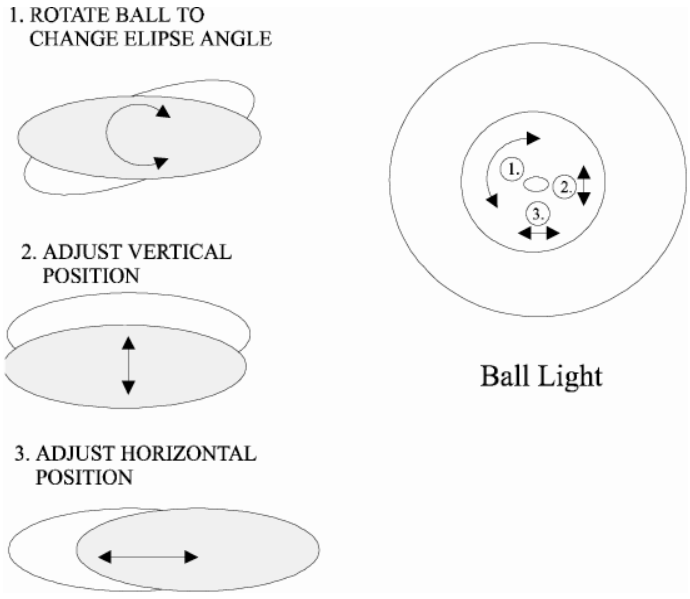


Figure 7.8 - Illumination Pattern and Adjustment

7.12 PITOT AND STATIC PRESSURE SYSTEMS

The pitot pressure is measured on the leading edge of a calibrated probe below the left wing. The static pressure is measured by the same probe. For protection against water and humidity, water sumps are installed within the line. These water sumps are accessible beneath the left seat shell.

The error in the static pressure system is negligible. For the error of the airspeed indicating system refer to Chapter 5.

The pitot static pressure probe should be protected whenever the aircraft is parked to prevent contamination and subsequent malfunction of the aircraft systems relying on its proper functioning.

NOTE

Use only the factory supplied pitot static probe cover, P/N G-659-200 with the “Remove before Flight” flag attached.

7.13 STALL WARNING SYSTEM

A stall warning horn, located in the left instrument panel, will operate at a minimum airspeed of 5 kts before a stall. The horn grows louder as the speed approaches the stall speed. The horn is activated by air from a suction hose that connects to a hole in the leading edge of the left wing. The hole has a red circle around it. The stall warning hole should be plugged whenever the aircraft is parked to prevent contamination and subsequent malfunction of the stall warning system.

NOTE

Use only the factory supplied stall warning plug, Part Number 22-1010-01-00 with the “Remove before Flight” flag attached.

7.14 AVIONICS

The center of the instrument panel contains the radio and navigation equipment. The microphone key for the radio is installed in the control stick. There are two connectors for headsets on the backrest of the seat.

CAUTION

HEADSETS WITH A PRESS TO TALK (PTT) SWITCH MUST NOT BE USED IN THE HAND HELD MICROPHONE JACK. IT CAN CAUSE DAMAGE TO EQUIPMENT.

HAND HELD MICROPHONES MUST NOT BE PLUGGED INTO CREW POSITION MICROPHONE JACKS. DAMAGE TO THE GMA 340 AUDIO PANEL CAN OCCUR.

There is a hand-held microphone jack installed on the pilot's side, on the seat bulkhead between the fuselage and the speaker.

Operating instructions for individual avionics equipment should be taken from the manuals of the respective manufacturers.

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CHAPTER 8

AIRPLANE HANDLING, CARE AND MAINTENANCE

TABLE OF CONTENTS

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8.1 INTRODUCTION

This Chapter contains factory-recommended procedures for proper ground handling and servicing of the airplane. It also identifies certain inspection and maintenance requirements which must be followed if the airplane is to retain its' original performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2 AIRPLANE INSPECTION PERIOD

Inspection intervals are every 50, 100 hrs, 200 hrs and 1000 hrs of flight time and a special 25 hour check on new airplanes. The respective maintenance procedure can be found in the Engine Manual or the Aircraft Maintenance Manual.

8.3 AIRPLANE ALTERATIONS OR REPAIRS

It is essential that the responsible airworthiness authority be contacted prior to any alterations on the airplane to ensure that the airworthiness of the airplane is not affected. For repairs and painting refer to the applicable Aircraft Maintenance Manual Doc. No. DA201-C1.

8.4 GROUND HANDLING / ROAD TRANSPORT

8.4.1 Ground Handling

(a) Towing Forward

The airplane is most easily and safely maneuvered by hand with the tow-bar attached to the nose wheel. See Figure 8.1 for installation of tow bar.

If the aircraft is towed forward without using the tow-bar, the nose-wheel will follow the movement of the airplane. It is recommended that the tow-bar be used to pull the aircraft forward. Towing the aircraft can be assisted by pulling on the propeller at the root just next to the propeller spinner. If any additional assistance is required, the aircraft may only be pushed on the trailing edge of the wing tip.

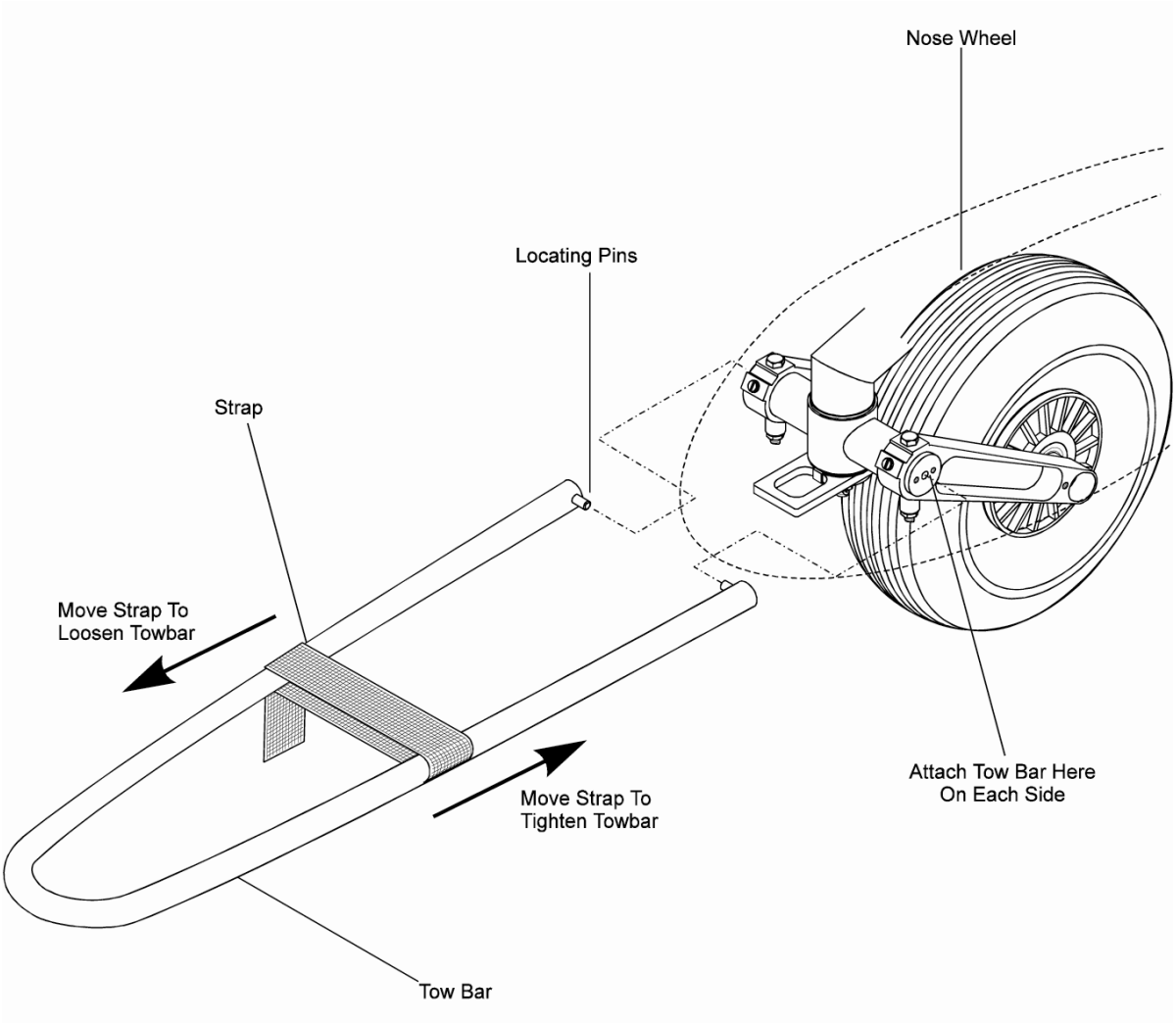

Figure 8.1 - Tow Bar Installation

(b) Moving Backward

By following a simple procedure it is very easy to move the airplane backwards.

CAUTION

DO NOT PUSH OR LIFT ON THE SPINNER!

CAUTION

DO NOT PUSH ON CONTROL SURFACES!

(1) Push down with one hand on the aft section of the fuselage near the vertical stabilizer, to lift the nose wheel.

(2) Push back on the leading edge of the horizontal stabilizer, close to its center.

(3) Using this technique the aircraft can easily be turned and pushed backward. If additional assistance is required, a second person may push on the leading edge of the wings.

8.4.2 Parking

For short time parking, the airplane must be positioned in a headwind direction, the parking brake must be engaged, the wing flaps must be in the retracted position and the wheels must be chocked.

For extended and unattended parking, as well as in unpredictable wind conditions, the airplane must be anchored to the ground or placed in a hangar.

When parking the airplane, the flight controls lock, P/N 20-1000-01-00 must be installed and pitot static probe cover and stall warning plug should be fitted (refer to Chapter 7, Aircraft Description).

NOTE

When adjusting the rudder pedals to install the Flight Controls Lock, pull straight back on the T-Grip. Do not pull up.

Parking in a hangar is recommended.

8.4.3 Mooring

The tail skid of the airplane has a tie down hole which can be used to moor airplane. Tie-down rings are also installed near the midpoint on each wing for tie-down mooring ropes. See Figure 8.2.

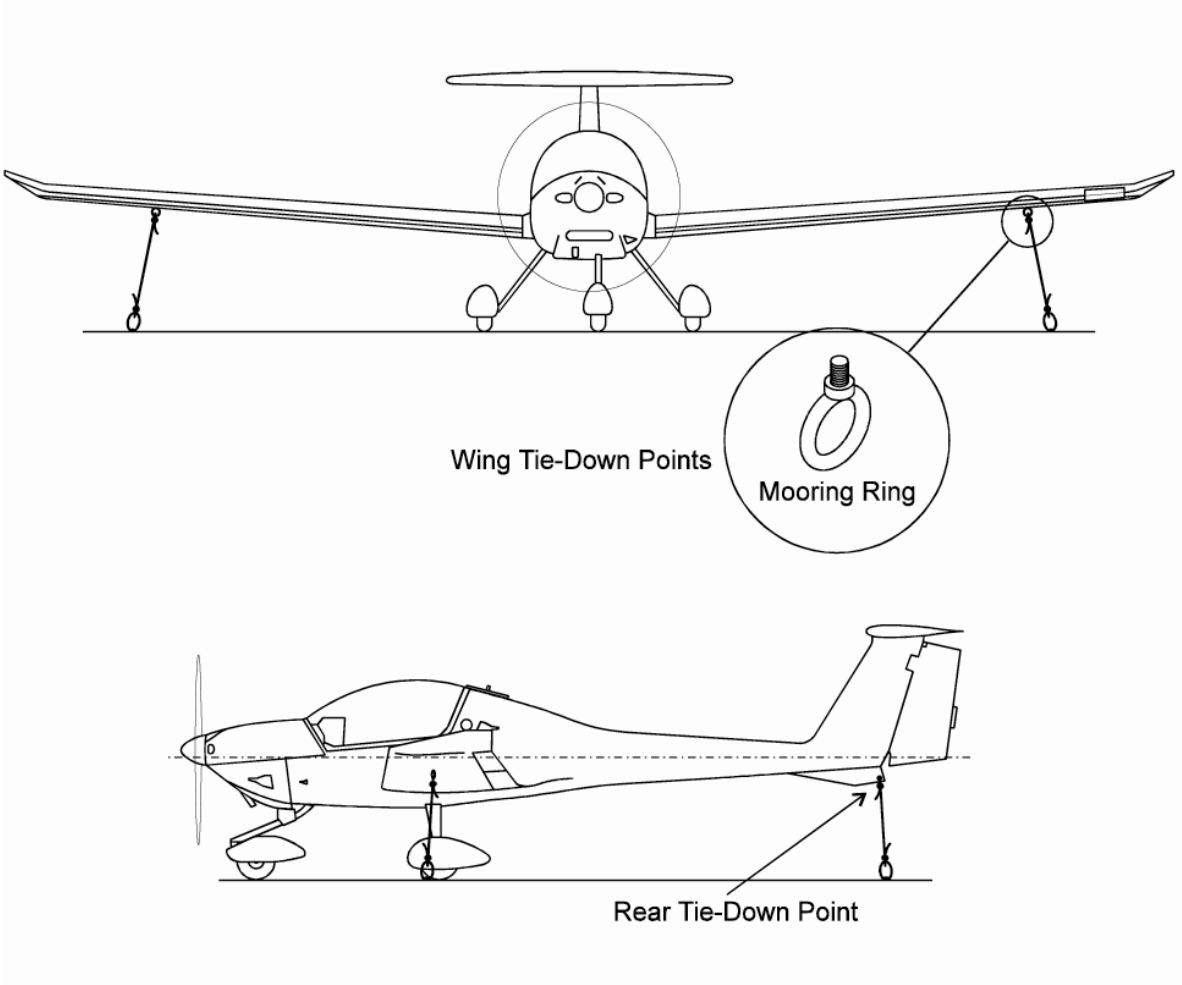

Figure 8.2 - Mooring Points Locations

8.4.4 Jacking

The DA20-C1 can be jacked at the two jack points located on the lower side of the fuselage's root ribs and at the tail fin. See Figure 8.3.

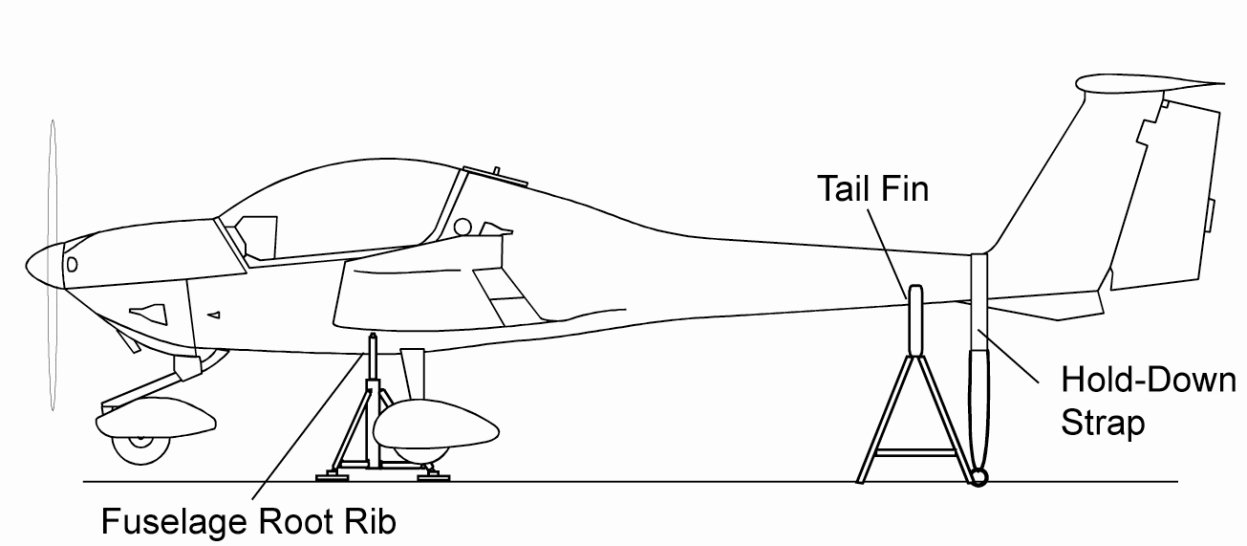

Figure 8.3 - Jacking Point Locations

8.4.5 Road Transport

When transporting the airplane on the road, it is recommended that you use an open trailer. All airplane components must be stored on a cushioned surface and secured to avoid any movement during transport.

(a) Fuselage

The fuselage should be secured on the trailer standing on its wheels. Ensure that the propeller has sufficient free space so it cannot be damaged if the fuselage were to move.

(b) Wings

For transportation, both wings must be removed from the fuselage.

To avoid any damage, the wings are stored in upright position on the leading edge with the root rib area positioned on an upholstered profiled surface of at least 1 ft. 4 in. (400 mm) width. The outside wing area (approximately 10 ft. (3 m) from the root rib area) is placed on an upholstered profiled surface of a minimum of 12 in. (305 mm) width.

The wings must be secured against movement rearward or forward.

(c) Horizontal Stabilizer

The horizontal stabilizer is stored flat on the trailer and secured, or in an upright position sitting on the leading edge on a profiled surface. All supports must be upholstered with felt or foam rubber.

8.5 CLEANING AND CARE

CAUTION

EXCESSIVE DIRT DETERIORATES THE FLIGHT PERFORMANCE.

8.5.1 Painted Surfaces

CAUTION

DO NOT USE ANY CLEANING AGENTS CONTAINING SILICON BASED MATERIALS. ONCE APPLIED, SILICONE IS DIFFICULT TO REMOVE. SILICONE CAN RESULT IN CONTAMINATED BONDING SURFACES IF THE AIRCRAFT, EVER IN FUTURE, IS IN NEED OF STRUCTURAL REPAIR.

To achieve the best flight characteristics for the DA20-C1, a clean external surface is most important. For this reason it is highly recommended that the airplane, especially the leading edge of the wings are kept clean at all times.

For best results, the cleaning is performed using a generous amount of water. If necessary, a mild cleaning agent can be added. Excessive dirt such as insects etc. are best cleaned off immediately after flight, because once dried they are difficult to remove.

Approximately once a year, the surface of the airplane should be treated and buffed using a silicon free automotive polish.

8.5.2 Canopy

The DA20-C1 offers excellent vision through a large plexiglass canopy. It is essential that care be taken while cleaning the canopy, as it is easily scratched. If scratched, the vision will be reduced.

In principal the same rules should be applied to clean the canopy as for the outside surface of the airplane. To remove excessive dirt, plenty of water should be used; make sure to use only clean sponges and chamois. Even the smallest dust particle can cause scratches.

In order to achieve clarity, plastic cleaners such as Permatex Part No. 403D® or Mirror Glaze® may be used according to the manufacturer's instructions. Do not wipe in circles, but only in one direction.

8.5.3 Propeller

Refer to the Sensenich Propeller, W69EK7-63, W69EK7-63G and W69EK-63 Instruction Manual.

8.5.4 Engine

See Operator's Manual for the Continental IO 240B aircraft engine Form # X30620.

8.5.5 Interior Surfaces, Seats and Carpets

The interior should be cleaned using a vacuum cleaner. All loose items (pens, bags etc.) should be properly stored and secured. All instruments must be cleaned using a soft dry cloth. Plastic surfaces should be wiped clean using a damp cloth without any cleaning agents.

8.6 GROUND DE-ICING

Approved de-icing fluids are:

Manufacturer	Name
Kilfrost	TKS 80
Aeroshell	Compound 07
Any Source	AL-5 (DTD 406B)

Remove the snow from the aircraft as follows:

(a) Remove any snow from the airplane using a soft brush.

(b) Spray de-icing fluid onto ice-covered surfaces using a suitable spray bottle.

(c) Use a soft piece of cloth to wipe the airplane dry.

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CHAPTER 9

SUPPLEMENTS

TABLE OF CONTENTS

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9.1 GENERAL

This Chapter contains information regarding optional equipment which may be installed in your airplane.

Individual supplements address each optional equipment installation.

It is only necessary to maintain those supplements which pertain to your specific airplane's configuration.

9.2 INDEX OF SUPPLEMENTS

NOTE

It is only necessary to maintain those supplements which pertain to optional equipment that may be installed in your airplane.

Supplement No.	Title	Pages
1	External Power Operation	16
2	Winterization Kit	6
3	Recognition Lights	6
4	~~Gross Weight Increase (800 kg)~~ This Supplement has been incorporated into the AFM and is no longer required.	N/A
5	S-Tec Autopilot	14
6	VM1000 Engine Instruments	10
7	Auxiliary Fuel System	10
8	Stick Mounted Trim Switches	4
9	20 US Gallon Fuel Tank	4
10	Reversed Instrument Panel	4
11	Pitot Heat Operation	8
12	Brazilian Placards and Markings	10
13	Garmin G500 Integrated Display System	26
14	French Placards and Markings	8
15	German Placards and Markings	14
16	Spanish Placards and Markings	6

Supplement No.	Title	Pages
17	Chinese Placards and Markings	6

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CHAPTER 9

SUPPLEMENT 1

EXTERNAL POWER OPERATION

TABLE OF CONTENTS

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1. GENERAL

This supplement addresses the operating procedure for a DA20-C1 aircraft equipped with an optional External Power Unit (EPU). The EPU receptacle and related circuits provide for the connection of an external power source for various ground operations, e.g. maintenance, battery charging, starting.

CAUTION

OVER-VOLTAGE PROTECTION DOES NOT EXIST. DO NOT CONNECT ANY POWER SOURCE OTHER THAN 12 VOLT DC BATTERY OR 14 VOLT (NOMINAL) DC GROUND POWER CART.

The circuit provides protection in the event that the external power source is connected in reverse polarity. A switch in the cockpit to the left of the light switches allows the EPU relay to close once the external power source is connected and power is available. A light in the cockpit indicates that power is available at the receptacle or that the EPU relay has remained closed following a disconnect (see normal procedures).

On aircraft C0001 through C0148 and C0150 with an EPU installed, a relay bypass circuit is provided to enable the battery relay to be closed if the battery has been discharged so much that it does not have enough power to close the relay by itself. Depending on the state of battery discharge, the battery relay may take several minutes to close. This circuit is not installed on aircraft C0149 and C0151 onwards. See Figure S1.1 for location and Figure S1.2 for a simplified schematic. EPU plug Cole Hersee P/N 11042 is required to connect to the receptacle. This receptacle is located in one of two locations. Aircraft serial numbers C0001 through C0148 and C0150 have this receptacle located on the fuselage at the rear portion of the wing root. Aircraft serial numbers C0149 and C0151 onwards have this receptacle located on the fuselage in front of the left-hand wing root

.

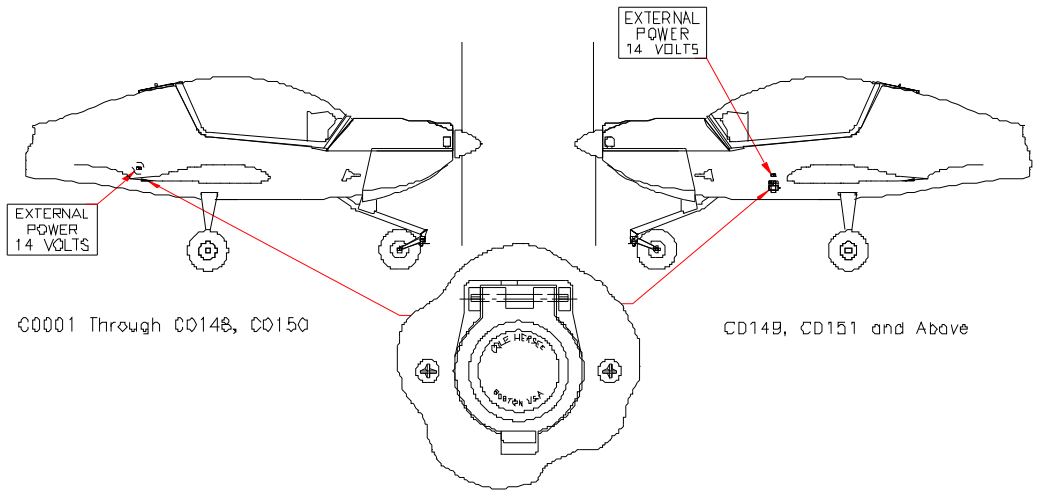


Figure S1-1 - Location of External Power Receptacle

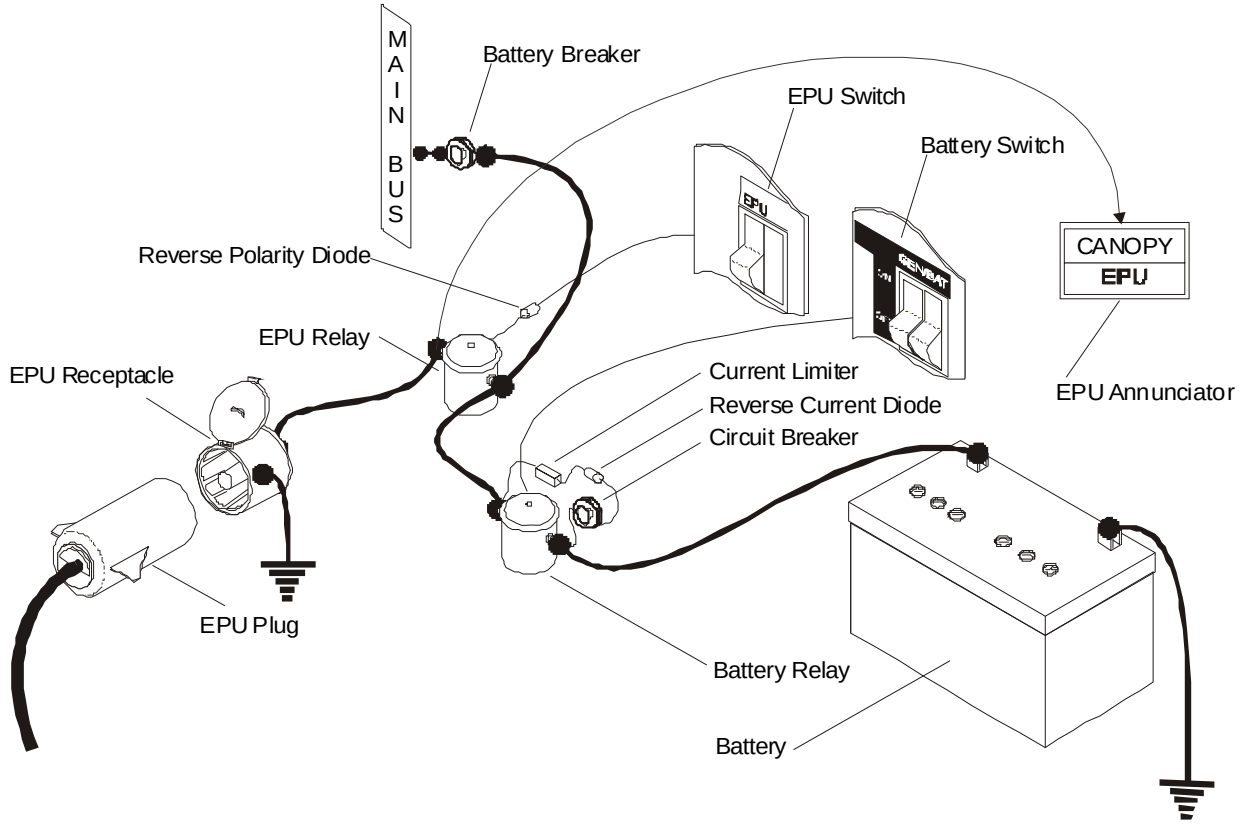


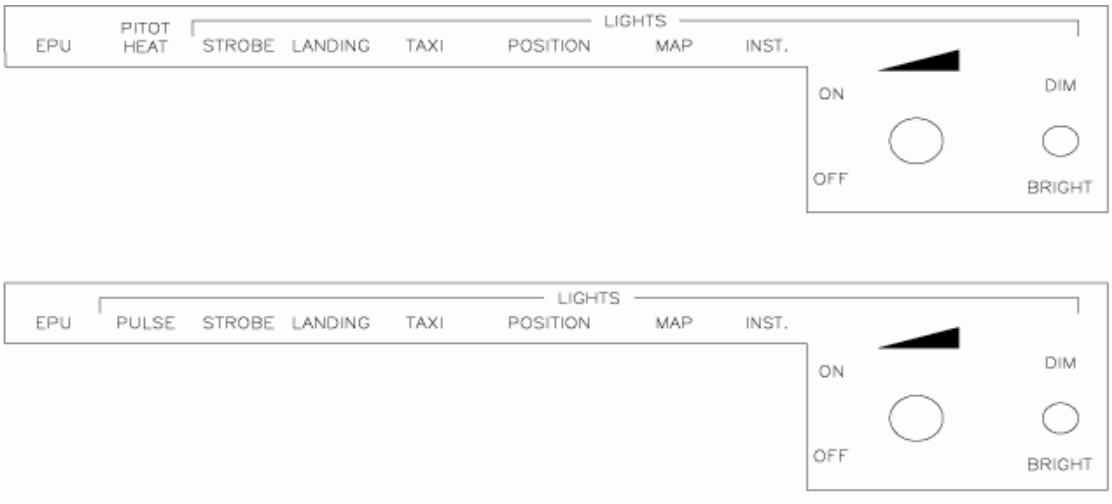
Figure S1-2 - Simplified Schematic

2. OPERATING LIMITATIONS

Voltage supplied to the EPU receptacle should be 12-14 volts nominal.

2.15 PLACARDS

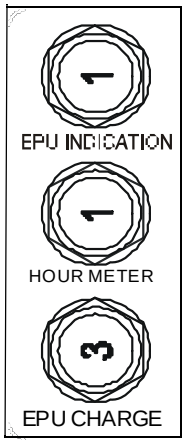
(a) On the lower left side of the instrument panel above the switches.



(b) On the right side of the aircraft above the EPU receptacle.

EXTERNAL
POWER
14 VOLTS

(c) On the EPU/FUSE mounting bracket in the Relay box. (Aircraft S/N C001 through C0148 and C0150 only).



3. EMERGENCY PROCEDURES

3.3.4 Fire

(a) Engine Fire during Engine-Start-Up on the Ground (EPU power connected).

(1) Fuel Shut-off Valve..... CLOSED

(2) Cabin Heat..... CLOSED

(3) Mixture..... IDLE CUTOFF

(4) Throttle..... FULL

(5) GEN/BAT Master Switch..... OFF

(6) Ignition Switch..... OFF

(7) EPU Switch..... OFF

(8) Evacuate Airplane immediately

4. NORMAL PROCEDURES

4.1 GENERAL

The following general procedure should be used to supply External Power to the aircraft for purposes other than engine starting.

Power ON

(a) Connect external power source to the EPU receptacle. ..... EPU light ON

(b) EPU switch ..... ON

(c) GEN/BAT Master Switch ..... ON if desired for charging (Battery only)

(d) Avionics Master Switch ..... ON if desired

CAUTION

IF THE BATTERY HAS BEEN DISCHARGED, IT IS ADVISABLE TO LEAVE THE BATTERY ON CHARGE FOR A PERIOD OF TIME LONG ENOUGH TO CHARGE THE BATTERY. CONSULT MAINTENANCE PERSONNEL IF THE STATE OF CHARGE OF THE BATTERY IS IN QUESTION. DO NOT FLY THE AIRCRAFT WITH THE BATTERY IN A DISCHARGED STATE.

Power OFF

(a) Electrical loads ..... OFF

(b) Avionics Master Switch ..... OFF

(c) GEN/ BAT Master Switch ..... OFF

(d) EPU switch ..... OFF

(e) LIFT EPU receptacle cover, PULL external power plug. ..... EPU light OFF

4.4 NORMAL OPERATION CHECKLIST

In addition to those items contained in Section 4, Normal Operating Procedures, Preflight Inspection, check the following items if this supplement is applicable to the aircraft you are operating:

(a) In-Cabin Check

Caution Lights (EPU)..... illuminated if EPU power available

(b) Walk Around Check and Visual Inspection

Right Wing (C0001 to C0148, C0150)

Left Side of Fuselage (C0149, C0151 and Above)

EPU Receptacle ..... check EPU connector inserted and
(For EPU START) secure. Adequate power source available.

EPU Receptacle ..... check EPU power cord
(EPU not required for starting) disconnected and power cart clear of aircraft.

Before Starting Engine

The Before Starting Engine checklist from Section 4.4.2 is repeated in this section and includes the steps for starting the engine with an external power source connected.

4.4.2 Before Starting Engine

(a) Preflight Inspection ..... performed

(b) Pedals ..... adjust, lock

(c) Passenger Briefing ..... performed

(d) Safety Belts ..... fasten

(e) Parking Brake ..... set

(f) Flight Controls ..... free

(g) Fuel Shut-off Valve ..... OPEN

(h) Mixture ..... FULL RICH

(i) Throttle ..... IDLE

(j) Friction Device of Throttle Quadrant ..... adjust

(k) Avionics Master Switch ..... OFF

(l) EPU light ..... check ON

(m) EPU Switch ..... ON

(n) Voltmeter ..... check 12-14 volts

(o) GEN/BAT Master Switch ..... ON

(p) Generator Warning Light ..... illuminated

(q) Exterior Lights ..... as required

(r) Instrument Panel Lighting ..... as required

(s) Canopy ..... close and secure

(t) Canopy Unlocking Warning Light ..... OFF

Starting Engine

The Starting Engine checklist from Section 4.4.3 is repeated in this section and includes the steps for starting the engine with an external power source connected.

4.4.3 Starting Engine

(a) Starting Engine Cold

NOTE

It is recommended that the engine be preheated if it has been cold soaked for 2 hours or more at temperatures of -4º C (25º F) or less.

(1) Throttle..... IDLE

(2) Mixture ..... FULL RICH

(3) Toe Brakes..... hold

(4) Propeller Area..... clear

WARNING

MAKE SURE THAT PROPELLER AREA IS CLEAR!

CAUTION

DO NOT ENGAGE STARTER IF THE PROPELLER IS MOVING. SERIOUS ENGINE DAMAGE CAN RESULT

NOTE

Steps (5), (6), (7), (8) and (9) are to be performed without delay between steps.

NOTE

Colder ambient temperatures require longer priming.

(5) Fuel Pump..... ON

(6) Fuel Prime..... ON

(7) Throttle..... FULL for prime (prime for 3 seconds minimum before starting)

(8) Throttle..... Full IDLE to 1/4 inch OPEN as required

(9) Ignition Switch..... START, hold until engine starts or for 10 seconds maximum (if engine does not start, release ignition key, then push throttle to full power for 3 seconds minimum for more priming, then repeat from Step (8))

NOTE

If the optional Push-to-Start ignition switch is installed, then an additional “PUSH” action is required after the ignition switch is turned to the START position when implementing start.

(10) Starter Warning Light ..... illuminated while ignition is in START position

NOTE

Activate the starter for a maximum of 30 seconds only, followed by a cooling period of 3-5 minutes.

(11) Throttle..... 800 to 1000 RPM

CAUTION

DO NOT OPERATE ENGINE ABOVE 1000 RPM UNTIL AN OIL TEMPERATURE INDICATION IS REGISTERED.

(12) Fuel Prime..... OFF

(13)Engine Instruments..... check

NOTE

Excessive priming can result in a flooded engine. To clear a flooded engine, turn off fuel pump and fuel prime, open throttle 1/2 - 1 inch and engage starter. The engine should start for a short period and then stop. Excess fuel has now been cleared and engine start from item (1) can be performed.

.

CAUTION

IF OIL PRESSURE IS BELOW 10 PSI, SHUT DOWN THE ENGINE IMMEDIATELY (MAXIMUM 30 SECONDS DELAY).

NOTE

Oil Pressure may advance above the green arc until the Oil Temp. reaches normal operating temperatures.

Regulate warm up RPM to maintain pressure below 100 psi limit. At ambient temperatures below 32º F (0º C) DO NOT apply full power if oil pressure is above 70 psi.

(14)Starter Warning Light ..... check OFF

(b) Starting Engine Warm

(1) Throttle..... IDLE

(2) Mixture ..... FULL RICH

(3) Toe Brakes ..... hold

(4) Propeller Area ..... clear

WARNING

MAKE SURE THAT PROPELLER AREA IS CLEAR!

CAUTION

DO NOT ENGAGE STARTER IF THE PROPELLER IS MOVING. SERIOUS ENGINE DAMAGE CAN RESULT

NOTE

Steps (5), (6), (7), (8) and (9) are to be performed without delay between steps.

(5) Fuel Pump..... ON

(6) Fuel Prime..... ON

(7) Throttle..... FULL for prime, 1 to 3 seconds before starting)

(8) Throttle..... 1/2 - 1 inch OPEN (approx.)

(9) Ignition Switch..... START, hold until engine starts or for 10 seconds maximum (repeat from Step (7) if engine does not start)

NOTE

If the optional Push-to-Start ignition switch is installed, then an additional “PUSH” action is required after the ignition switch is turned to the START position when implementing start.

(10) Starter Warning Light ..... illuminated while ignition is in START position

NOTE

Activate starter for a maximum of 30 seconds only, followed by a cooling period of 3-5 minutes.

(11) Throttle..... 800 to 1000 RPM

(12) Fuel Prime ..... OFF

(13) Engine Instruments..... check

NOTE

Excessive priming can result in a flooded engine. To clear a flooded engine, turn off the fuel pump and fuel prime, open throttle 1/2 - 1 inch and engage starter. The engine should start for a short period and then stop. Excess fuel has now been cleared and engine start from item (1) can be performed..

CAUTION

IF OIL PRESSURE IS BELOW 10 PSI, SHUT DOWN THE ENGINE IMMEDIATELY (MAXIMUM 30 SECONDS DELAY).

NOTE

Oil Pressure may advance above the green arc until the Oil Temp. reaches normal operating temperatures.

Regulate warm up RPM to maintain pressure below 100 psi limit. At ambient temperatures below 32º F (0º C) DO NOT apply full power if oil pressure is above 70 psi.

(c) After Engine has Started

CAUTION

IT IS DANGEROUS TO APPROACH AN AIRCRAFT WITH ITS ENGINE OPERATING. ONLY GROUND PERSONNEL PROPERLY TRAINED ON PROCEDURES FOR APPROACHING OPERATING AIRCRAFT SHOULD BE ALLOWED TO DISCONNECT EPU SOURCE. PRACTICE THE REMOVAL OF THE POWER CORD BEFORE ATTEMPTING WITH ENGINE OPERATING. NEVER APPROACH THE AIRCRAFT WITHOUT A SIGNAL FROM THE PILOT. ENSURE THE AIRCRAFT IS PARKED OVER AN AREA OF PAVEMENT WHERE THERE IS A SURE FOOTING. PROTECT EYES AND EARS WHEN NEAR THE OPERATING ENGINE.

(1) Select the EPU switch to OFF. ..... EPU light ON

(2) Signal the ground crew to PULL the EPU cord. ..... EPU light OFF

(3) Master Switch (GEN) ..... OFF

(4) Battery Voltage..... check approx. 12 volts

(5) Master Switch (GEN) ..... ON, check approx. 14 volts

(6) GEN warning light ..... check OFF

5. PERFORMANCE

There is no change in airplane performance associated with EPU operations.

6. WEIGHT AND BALANCE / EQUIPMENT LIST

Refer to the Equipment List, Chapter 6.5,

- Item Number 24-002 (Aircraft S/N C0001 through C0148 and C0150)
- Item Number 24-005 (Aircraft S/N C0149 and C0151 onwards)

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

There is no change in description of the airplane and its systems.

8. HANDLING, PREVENTATIVE AND CORRECTIVE MAINTENANCE

There is no change in handling, preventave or corrective maintenance.

CHAPTER 9

SUPPLEMENT 2

WINTERIZATION KIT

TABLE OF CONTENTS

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1. GENERAL

The Winterization Kit consists of cowling inlet and outlet baffles. The inlet baffles are attached to the upper cowling with two winged 1/4-turn fasteners. The outlet baffles are attached to the lower cowling with screws. At take-off outside air temperatures below 14°F/-10°C it is recommended to use both inlet and outlet baffles together. At temperatures between 32°F/0°C and 54.5°F/12.5°C it is not permissible to use both inlet and outlet baffles together. Either the inlet baffles only or the outlet baffles only may be used in this temperature range.

At temperatures above 54°F (12.5°C) both inlet baffles and outlet baffles must be removed. These temperature ranges have been established by test to prevent the engine from overheating during a prolonged climb.

It is recommended to install the outlet baffles during periods when the take-off temperatures are consistently below 32°F/0°C. The inlet baffles can be installed or removed as required.

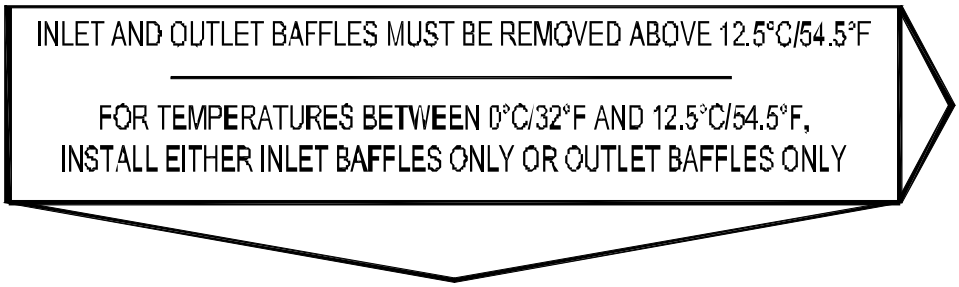
The installation is defined by Service Bulletin DAC1-71-03.

2. OPERATING LIMITATIONS

Maximum T/O outside air temperature with either inlet or outlet baffles installed is 54°F (12.5°C).

Maximum T/O outside air temperature with both inlet and outlet baffles installed is 32°F (0°C).

The following placard must be installed on the cowling, immediately below the oil filler door and on the removable baffles:



3. EMERGENCY PROCEDURES

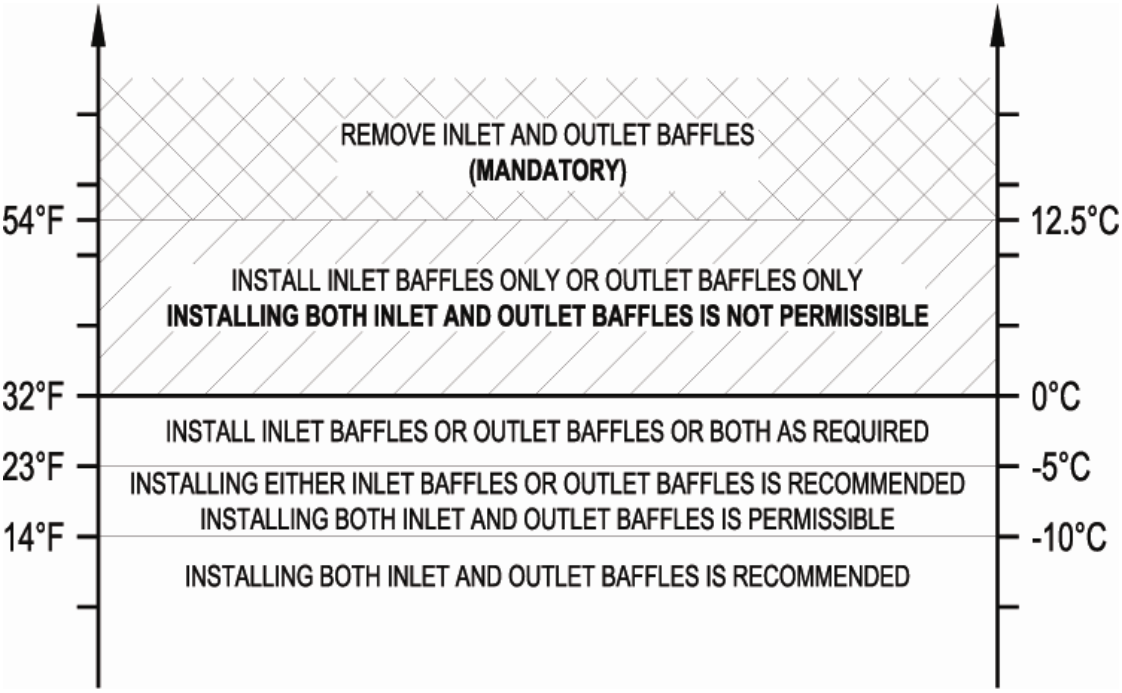
There is no change to the airplane emergency procedures when the Winterization Kit is installed.

4. NORMAL PROCEDURES

4.4.1 Preflight Inspection

Insert after Item (7) (c) of the Walk-around inspection (refer to section 4.4.1 of the Airplane Flight Manual)]

Install or remove winter kit baffles according to the following chart:



5. PERFORMANCE

There is no change in airplane performance when the Winterization Kit is installed.

6. WEIGHT AND BALANCE

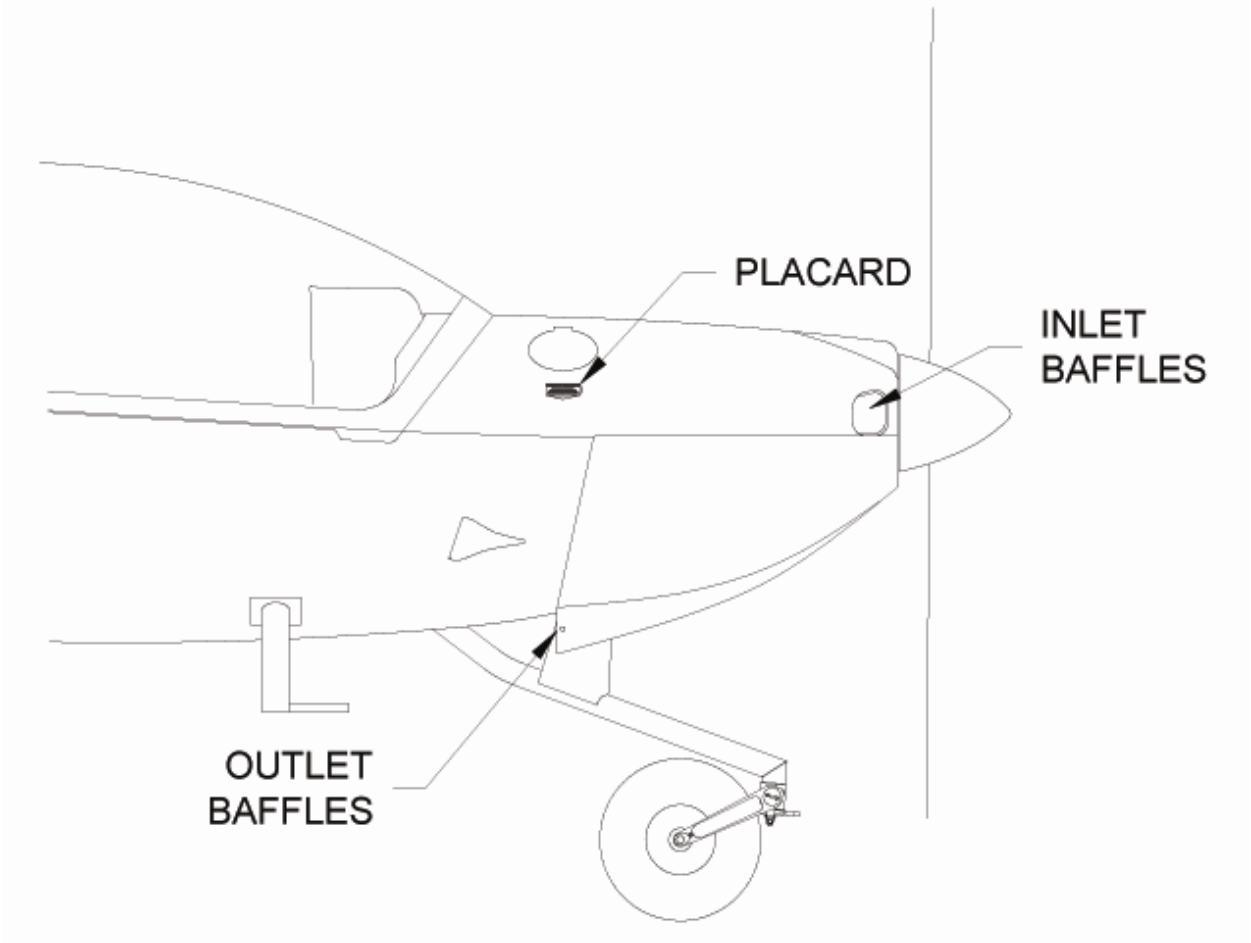
The effect of the Winterization Kit on weight and balance is negligible.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

The Winterization Kit consists of:

- left and right baffles installed in the forward cowling inlets,
- left and right baffles installed in the aft outlet opening of the lower cowling, and
- a placard located on the cowling below the oil door.

The baffles reduce the flow of cooling air through the cowling, thereby increasing the operating temperature of the engine. At moderate temperatures either the inlet or outlet baffles may be installed. At lower temperatures both inlet and outlet baffles should be installed.



8. HANDLING, PREVENTATIVE AND CORRECTIVE MAINTENANCE

The inlet baffles are removed by unfastening two 1/4-turn fasteners on each baffle. The outlet baffles are removed by unscrewing 5 attaching screws from the lower cowling. Store the screws and washers in the baffle rivnuts and store baffles in the baggage compartment.

CHAPTER 9

SUPPLEMENT 8

STICK MOUNTED TRIM SWITCHES

TABLE OF CONTENTS

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1. GENERAL

This supplement addresses the optional installation of a stick mounted trim switch system. Only portions of the flight manual affected by the installation are included in this supplement.

2. OPERATING LIMITATIONS

There is no change to the operating limitations with the stick mounted trim switch installed.

3. EMERGENCY PROCEDURES

There is no change to the emergency procedures with the stick mounted trim switch installed.

4. NORMAL PROCEDURES

There is no change to the normal procedures with the stick mounted trim switch installed.

5. PERFORMANCE

There is no change in airplane performance with the trim switch installed.

6. WEIGHT AND BALANCE / EQUIPMENT LIST

The change in weight and balance is negligible with the installation of the stick mounted trim switches.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

Trim Switches are located on top of each Control Stick, aft of centre. The switches are positioned so that they can be easily operated by thumb. Forward movement of either switch gives nose down trimming and aft movement of the switch gives nose up trim. The trim switches control electrical relays that supply electrical power to the electric pitch trim motor. If the switches are operated in opposing directions at the same time, the trim motor will not operate. Operation of the trim switches in the same direction and at the same time will cause the trim motor to operate in that direction.

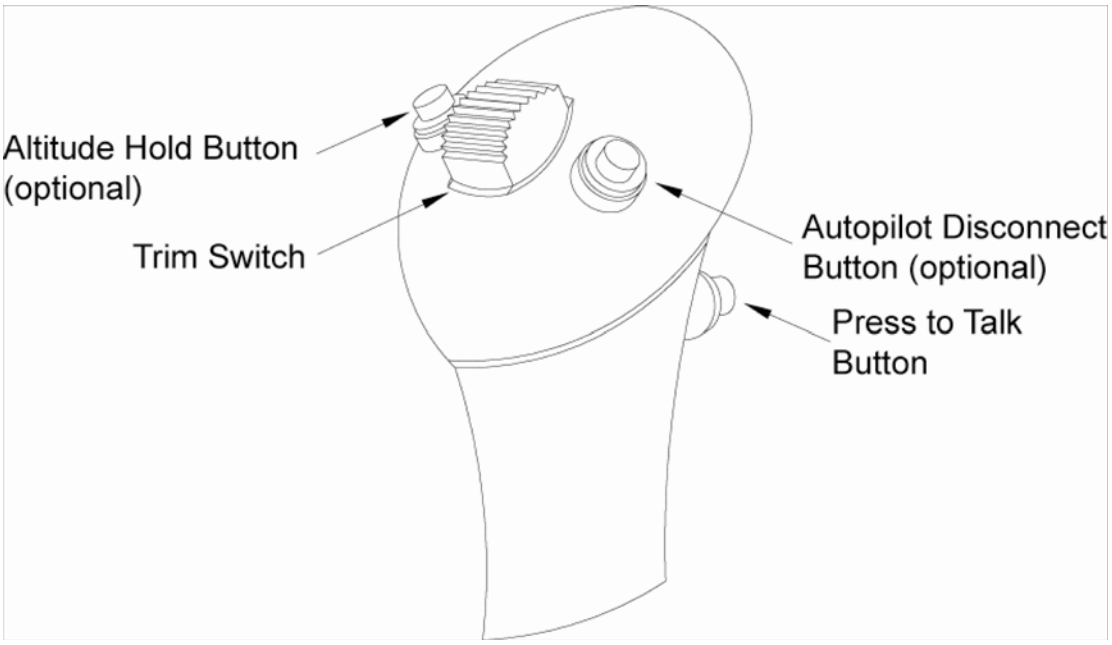

Figure S8-1 - Control Stick Grip (Left Hand Shown)

8. HANDLING, PREVENTIVE AND CORRECTIVE MAINTENANCE

Service and maintenance of the Stick Mounted Trim Switches shall be performed according to the Aircraft Maintenance Manual (Document number DA201-C1).