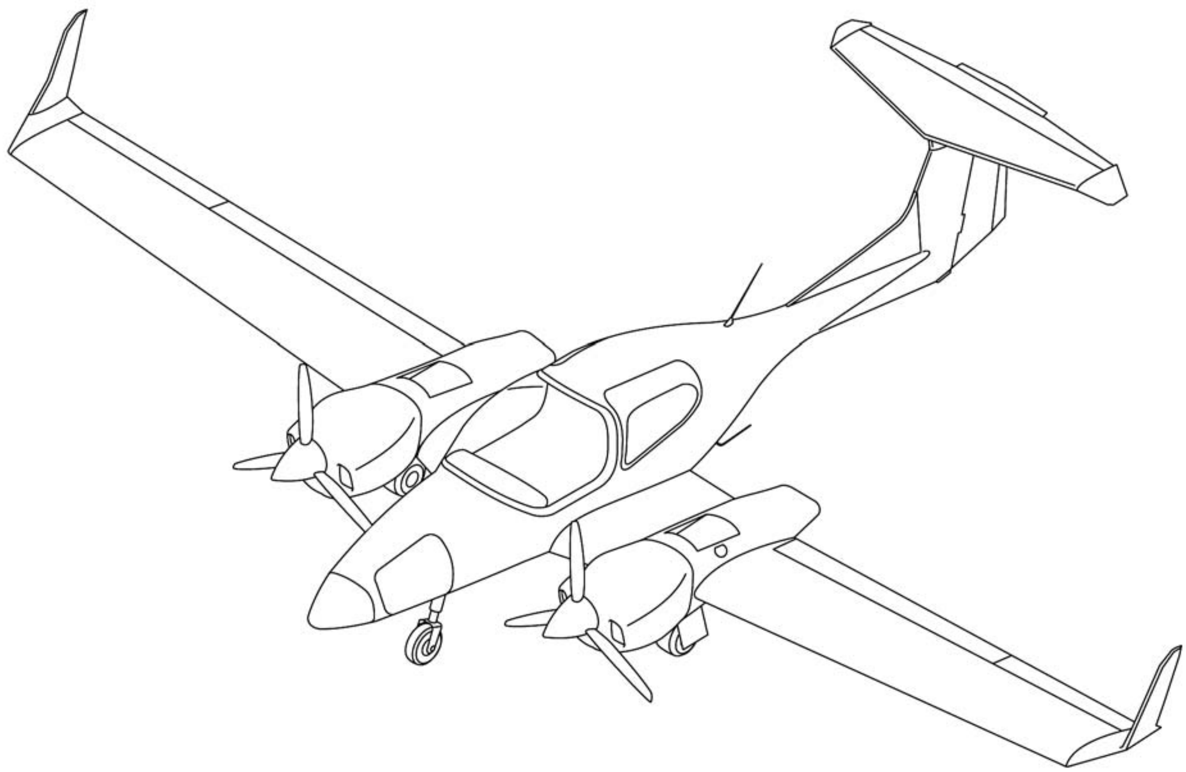
AIRPLANE FLIGHT MANUAL

DA42 L360



D42L-AFM-002

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AIRPLANE FLIGHT MANUAL

DA42 L360

Airworthiness Category	: Normal
Requirement	: Transport Canada AWM Chapter 523
Serial Number	: ____________
Registration	: ____________
Doc. No.	: D42L-AFM-002
Date of Issue	: Rev. 1 - 02-Apr-09 For Flight Test Purposes
Date of Re-issue	: Rev. 3 - 16-Jul-09 TCCA Approved
Date of Re-issue	: Rev. 6 - 18-Aug-10 New authoring environment

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-approved in the List of Effective Pages are approved by:

Signature	:
Authority	: Chief, Flight Test for Director, National Aircraft Certification
Stamp	: TRANSPORT CANADA
Date of approval	: 15 December 2010

DIAMOND AIRCRAFT INDUSTRIES INC.

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London, Ontario, Canada N5V 1S2

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FOREWORD

We congratulate you on the acquisition of your new DIAMOND DA42 L360 airplane.

Skillful operation of an airplane increases both safety and the enjoyment of flying. Please take the time therefore, to familiarize yourself with your new DIAMOND DA42 L360.

This airplane may only be operated in accordance with the procedures and operating limitations of this Airplane Flight Manual.

Before this airplane is operated for the first time, the pilot must familiarize himself with the complete contents of this Airplane Flight Manual.

In the event that you have obtained your DIAMOND DA42 L360 second hand, please let us know your address, so that we can supply you with the publications necessary for the safe operation of your airplane.

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0.1 RECORD OF REVISIONS

All revisions of this manual, with the exception of -

- Temporary Revisions
- Updates of the modification level (Section 1.1)
- Updated mass and balance information (Section 6.3)
- Updates of the Equipment Inventory (Section 6.5), and
- Updates of the List of Supplements (Section 9.2).

must be recorded in the following table. Revisions of approved Chapters require the countersignature of the responsible airworthiness authority.

The new or amended text is indicated by a vertical black line at the left hand side of the revised page, with the revision number and date appearing at the bottom of the page.

If pages are revised which contain information valid for your particular serial number (modification level of the airplane, weighing data, Equipment Inventory, List of Supplements), then this information must be transferred to the new pages in hand-writing.

Temporary Revisions, if applicable, are inserted into this manual. Temporary Revisions are used to provide information on systems or equipment until the next 'permanent' Revision of the Airplane Flight Manual.

RECORD OF REVISIONS

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
Rev. 3	ALL	16-Jul-09	R. Walker A/Chief, Flight Test Transport Canada
Rev. 4	Cover Page, Pages 0-5 to 0-14 Pages 4A-46, 4A-47 Pages 5-1, 5-5, 5-6.	18-Aug-09	Michel Brulotte A/Chief, Flight Test Transport Canada
Rev. 5	Cover Page and Back side Pages 0-5 to 0-18 Pages 1-11, 1-12 Pages 2-7, 2-8 Pages 3-23 to 3-24 Pages 3-27 to 3-68 Pages 4A-5 to 4A-10 Pages 4A-21, 4A-22 Pages 4A-35 to 4A-60 Pages 4B-9, 4B-14 Pages 4B-19, 4B-20 Pages 5-1, 5-2 Pages 5-9, 5-10 Pages 5-39 to 5-48 Pages 6-11, 6-12 Pages 7-7, 7-8 Pages 7-21, 7-22 Pages 7-31, 7-32 Pages 7-53 to 7-56	03-Nov-09	Michel Brulotte A/Chief, Flight Test Transport Canada
TR 09-01	Pages 0-5 and 0-6 Pages 9-1 and 9-2 Pages 9-S1-1 to 9-S1-26	15-Nov-09	Thomas Gretton A/Chief, Flight Test Transport Canada

		Approved	
Rev. No.	**Affected Pages**	**Date**	**Name**
TR 09-02	Pages 0-5 and 0-6 Pages 9-1 and 9-2 Pages 9-S2-1 to 9-S2-16	10-Dec-09	Thomas Gretton Chief, Flight Test Transport Canada
Rev. 6	ALL	15-Dec-10	Walter Istchenko Chief, Flight Test For Director, National Aircraft Certification Transport Canada

REVISION HIGHLIGHTS

This revision (Rev. 6) is a complete reissue of the Airplane Flight Manual (AFM) and all pages have been reissued with a date of 18-Aug-10. Numerous format corrections have been made in the conversion from MS Word to FrameMaker. Changes of technical material are described below and are indicated in the text pages by revision bars in the margin adjacent to the change.

The table below highlights the changes that have been incorporated in Revision 6.

CHAPTER	PAGES	HIGHLIGHTS
Cover Page	Cover Page	Revised to show Rev. 6 with the revision date.
Front Matter	0-1 to 0-16	Record of Revisions, LOEP pages and Table of Contents were revised. Added Revision Highlights pages (these two pages) to the Front Matter.
1	All	Chapter converted to FrameMaker. Pages have a slightly different appearance. No technical content changes.
2	All	Chapter converted to FrameMaker. Pages have a slightly different appearance. No technical content changes.
3	3-4	Table of Contents revised because of page numbering changes.
	3-12	Page 3-12 Changed 3.3.4 to “Revert to the standby airspeed indicator.”
	3-32 and 3-33	Paragraph 3.5.6 (f) - Un-commanded High RPM and paragraph 3.5.6 (g) - Un-commanded Low RPM were revised.
	3-63 and 3-64	Paragraph 3.9.4 - Unlocked Doors has been revised. New page added as a result.
	3-65 to 3-68	Pages renumbered due to pagination.
	All	Chapter converted to FrameMaker. Pages have a slightly different appearance.

CHAPTER	PAGES	HIGHLIGHTS
4A	4A-1 to 4A-58	Pages 4A-32 & 4A-33 4A.6.4 b - Items 13 to 18 reorganized
	All	Chapter converted to FrameMaker. Two fewer pages. Pages have a slightly different appearance.
4B	All	Chapter converted to FrameMaker. Pages have a slightly different appearance. No technical content changes.
5	5-10	“Maximum demonstrated crosswind component” shown on page 5-10. The speed was changed to show “17 knots”.
	All	Page numbering has changed with eight Pages removed from the Chapter and the manual converted to FrameMaker. Tables were able to be formatted in portrait vs landscape.
6	All	Page numbering has changed with two Pages removed from the Chapter and the manual converted to FrameMaker. No technical content changes.
7	7-1 to 7-48	Page 7-47 Graphic of the PFD has been revised. Chapter converted to FrameMaker. Pages have a slightly different appearance
8	All	Chapter converted to FrameMaker. Pages have a slightly different appearance. No technical content changes.
9	9-1 to 9-4	The list of Supplements have been added to the table on Page 9-2.
	All	Chapter converted to FrameMaker. Pages have a slightly different appearance.

0.2 LIST OF EFFECTIVE PAGES

Pages that are DOT-approved (appr) pages are shown before the page number:

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8	8-3	18-Aug-10
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8	8-5	18-Aug-10
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Chapter

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CHAPTER 1

GENERAL

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PAGE

1.1 INTRODUCTION

This Airplane Flight Manual (AFM) has been prepared in order to provide pilots and instructors with all the information required for the safe and efficient operation of the airplane. It is applicable to Diamond DA42 aircraft that have been modified by TCCA STC number SA09-54 and FAA STC number SA02725NY which installs the Lycoming IO-360 engines. It replaces in its entirety the original DA42 Airplane Flight Manual.

The AFM includes all the data which must be made available to the pilot according to the Transport Canada CAR-523 requirement. Beyond this, it contains further data and operating instructions which, in the manufacturer's opinion, could be of value to the pilot.

Equipment and modification level (design details) of the airplane may vary from serial number to serial number. Therefore, some of the information contained in this manual is applicable depending on the respective equipment and modification level.

The exact equipment of your serial number is recorded in the Equipment Inventory in Paragraph 6.5. The modification level is recorded in the following table (as far as necessary for this manual).

Modification	Source	Installed	
Increased Take-Off Mass		[ ] Yes	[ ] No
New Engine Instrument Markings		[ ] Yes	[ ] No
Autopilot Static Source		[ ] Yes	[ ] No
Ice Protection System		[ ] Yes	[ ] No
Oxygen System		[ ] Yes	[ ] No
Auxiliary Fuel Tanks		[ ] Yes	[ ] No
Front Seats with Adjustable Backrest		[ ] Yes	[ ] No
Electrical Rudder Pedal Adjustment		[ ] Yes	[ ] No
Mission Power Supply System		[ ] Yes	[ ] No
Removable Fuselage Nose Cone		[ ] Yes	[ ] No

This Airplane Flight Manual must be kept on board the airplane at all times. Its designated place is the side pocket of the forward left seat. The designated place for the Garmin G1000 Cockpit Reference Guide is in the bag on the rear side of the forward left seat.

CAUTION

THE DA42 L360 IS A TWIN ENGINE AIRPLANE. WHEN THE OPERATING LIMITATIONS AND MAINTENANCE REQUIREMENTS ARE COMPLIED WITH, IT HAS A HIGH DEGREE OF RELIABILITY. NEVERTHELESS, AN ENGINE FAILURE IS NOT COMPLETELY IMPOSSIBLE. FOR THIS REASON IT IS HIGHLY RECOMMENDED FOR VFR FLIGHTS ON TOP, OR ABOVE TERRAIN WHICH IS UNSUITABLE FOR A LANDING, TO SELECT FLIGHT TIMES AND FLIGHT ROUTES SUCH THAT REDUCED PERFORMANCE IN CASE OF SINGLE ENGINE OPERATION DOES NOT CONSTITUTE A RISK.

1.2 CERTIFICATION BASIS

This airplane certification basis is Transport Canada AWM Chapter 523, up to and including Change 523-7 and AWM 516 at Change 516-7.

1.3 WARNINGS, CAUTIONS AND NOTES

Special statements in the Airplane Flight Manual concerning the safety or operation of the airplane are highlighted by being prefixed by one of the following terms:

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 MORE OR LESS 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 DIMENSIONS

NOTE

All dimensions shown below are approximate.

Overall dimensions

Span	: 13.42 m	44 ft
Length	: 8.56 m	28 ft 1 in.
Height	: 2.49 m	8 ft 2 in.

Wing

Airfoil	: Wortmann FX 63-137/20 - W4	
Wing Area	: 16.29 m²	175.3 ft²
Mean aerodynamic chord (MAC)	1.271 m	4 ft 2 in.
Aspect ratio	: 11.06	
Dihedral	: 5°	
Leading edge sweep	1°	

Aileron

Area (total, left + right)	0.66 m²	7.1 ft²

Wing flaps	:	
Area (total, left + right)	2.18 m²	23.4 ft²
Horizontal tail	:	
Area	: 2.35 m²	25.3 ft²
Elevator area	: 0.66 m²	
Angle of incidence	-1.1° relative to longitudinal axis of airplane	
Vertical tail		
Area	: 2.43 m²	26.2 ft²
Rudder area	: 0.78 m²	8.4 ft²
Landing gear		
Track	: 2.894 m	9 ft 6 in.
Wheelbase	: 1.735 m	5 ft 8 in.
Nose Wheel	: 5.00-5; 10 PR, 120 mph	
Main Wheel	: 15x6.0-6; 6 PR, 120 mph	

1.5 DEFINITIONS AND ABBREVIATIONS

(a) Airspeeds

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

IAS: Indicated Airspeed as shown on an airspeed indicator.

KCAS: CAS in knots.

KIAS: IAS 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. 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_{LE}: Maximum Landing Gear Extended Speed. This speed may not be exceeded if the landing gear is extended.

V_{LO}: Maximum Landing Gear Operating Speed. This speed may not be exceeded during the extension or retraction of the landing gear.

V_{MCA}: Minimum Control Speed. Minimum speed necessary to be able to control the airplane in case of one engine inoperative.

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: Stalling Speed, or the minimum continuous speed at which the airplane is still controllable in the given configuration.

V_{SI}: Stalling Speed or the minimum continuous speed at which the airplane is still controllable with flaps and landing gear retracted.

V_{SO}: Stalling Speed, or the minimum continuous speed at which the airplane is still controllable in the landing configuration.

V_{SSE}: Minimum Control Speed for Schooling. Minimum speed necessary in case of one engine intentionally inoperative/idle (training purposes).

V_X: Best Angle-of-Climb Speed.

V_Y: Best Rate-of-Climb Speed.

V_{YSE}: Best Rate of-Climb Speed for one engine inoperative.

(b) Meteorological Terms

Density Altitude:

Altitude in ISA conditions at which the air density is equal to the current air density.

Indicated Pressure Altitude:

Altitude reading with altimeter set to 1,013.25 hPa (29.92 inHg).

ISA: International Standard Atmosphere. Conditions at which air is identified as an ideal dry gas. The temperature at mean sea level is 15 ^{o}C (59 ^{o}F), air pressure at MSL is 1013.25 hPa (29.92 inHg); the temperature gradient up to the altitude at which the temperature reaches -56.5 ^{o}C (69.7 ^{o}F) is 0.0065 ^{o}C/m
(-0.00357 ^{o}F/ft), and above this 0 ^{o}C/m (0 ^{o}F/ft).

MSL: Mean Sea Level.

OAT: Outside Air Temperature.

Pressure Altitude:

Altitude above MSL, indicated by a barometric altimeter which is set to 1013.25 hPa (29.92 inHg). The Pressure Altitude is the Indicated Pressure Altitude corrected for installation and instrument errors. In this AFM altimeter instrument errors are regarded as zero.

QNH: Theoretical atmospheric pressure at MSL, calculated from the elevation of the measuring point above MSL and the actual atmospheric pressure at the measuring point.

Wind: The wind speeds which are shown as variables in the diagrams in this manual should be regarded as headwind or downwind components of the measured wind.

(c) Flight Performance and Flight Planning

AGL: Above Ground Level

Demonstrated Crosswind Component:

The speed of the crosswind component at which adequate maneuverability for take-off and landing has been demonstrated during type certification.

MET: Weather, weather advice.

NAV: Navigation, route planning.

RoC: Rate of Climb.

(d) Mass and Balance

CG: Center of Gravity, also called 'center of mass'. Imaginary point in which the airplane mass is assumed to be concentrated for mass and balance calculations. Its distance from the Datum Plane is equal to the Center of Gravity Moment Arm.

Center of Gravity Limits:

The Center of Gravity range within which the airplane, at a given mass, must be operated.

Center of Gravity Moment Arm:

The Moment Arm which is obtained if one divides the sum of the individual moments of the airplane by its total mass.

DP: Datum Plane; an imaginary vertical plane from which all horizontal distances for center of gravity calculations are measured.

Empty Mass:

The mass of the airplane including unusable fuel, all operating consumables and the maximum quantity of oil.

Maximum Landing Mass:

The highest mass for landing conditions at the maximum descent velocity. This velocity was used in the strength calculations to determine the landing gear loads during a particularly hard landing.

Maximum Take-off Mass:

The maximum permissible mass for take-off.

Moment: The mass of a component multiplied by its moment arm.

Moment Arm:

The horizontal distance from the Datum Plane to the Center of Gravity of a component.

Unusable Fuel:

The quantity of fuel remaining in the tank which cannot be used for flight.

Usable Fuel:

The quantity of fuel available for flight planning.

Useful Load:

The difference between take-off mass and empty mass.

(e) Engine

AEO: All Engines Operating

BHP: Brake Horse Power

CHT: Cylinder Head Temperature.

EGT: Exhaust Gas Temperature.

MCP: Maximum Continuous Power:

Maximum permissible engine output power used continuously during flight.

OEI: One Engine Inoperative

RPM: Revolutions per minute (rotational speed of the propeller).

Take-off Power:

Maximum permissible engine output power for take-off.

(f) Designation of the circuit breakers on the instrument panel.

LH MAIN BUS:

COM1	COM Radio No. 1
GPS/NAV1	Global Positioning System and NAV Rcvr No.1
XPDR	Transponder
ENG INST	Engine Instruments
PITOT	Pitot Heating System
XFR PUMP/DE-ICE	Fuel Transfer Pump / De-Ice
TAXI/MAP/ACL	Taxi-, Map-, Anti Collision Light
FLOOD/OXY	Flood Light / Oxygen System
PFD	Primary Flight Display
ADC	Air Data Computer
AHRS	Attitude Heading Reference System
GEAR WRN ELEV LIMIT	Landing Gear Annunciation and Stick Limiter
GEAR	Landing Gear Control

RH MAIN BUS:

MFD	Multi Function Display
AH	Artificial Horizon
STALL WRN	Stall Warning System
FLAP	Flap System
LDG LT/START	Landing Light / Start
INST LT/ NAV LT	Instrument-, Navigation (Position) Light
AV/CDU/FAN	Avionics-, CDU-Cooling Fans
AVIONIC BUS	Avionic Bus
AV CONT./AP. WRN.	Avionic Control / Autopilot Warning
AC CONT.	Air Conditioning Controller

AVIONICS BUS:

COM2	COM Radio No. 2
GPS/NAV2	Global Positioning System and NAV ReceiverNo 2
AUDIO	Audio Panel
AUTO PILOT	Auto Pilot System
DATA LINK	Data Link System GDL 49
Wx 500	Stormscope
ADF	Automatic Direction Finder
DME	Distance Measuring Equipment
TAS	Traffic Alert System

LH MAIN BUS:

FUEL PUMP	Fuel Pump
ALT CONT	Alternator Control
ALT PROT	Alternator Protection
LH: ALT.	LH Alternator
LH. BATT	Battery
RH: BATT	Battery
ALT. RH	RH Alternator

RH MAIN BUS:

ALT PROT	Alternator Protection
ALT CONT	Alternator Control
FUEL PUMP	Fuel Pump

(g) Equipment

ELT: Emergency Locator transmitter

ACL: Anti-Collision Lights

(h) Design Change Advisories

MÄM: Mandatory Design Change Advisory (Provided by Diamond Austria).

OÄM: Optional Design Change Advisory (Provided by Diamond Austria).

(i) Miscellaneous

ATC: Air Traffic Control.

CAR: Canadian Aviation Regulations.

CFRP: Carbon Fiber Reinforced Plastic.

EASA: European Aviation Safety Agency

EPU: External Power Unit

GFRP: Glass Fiber Reinforced Plastic.

JAR: Joint Aviation Requirements.

JC/VP: Joint Certification/Validation Procedure.

PCA: Primary Certification Authority.

TCCA: Transport Canada Civil Aviation

1.6 UNITS OF MEASUREMENT

1.6.1 CONVERSION FACTORS

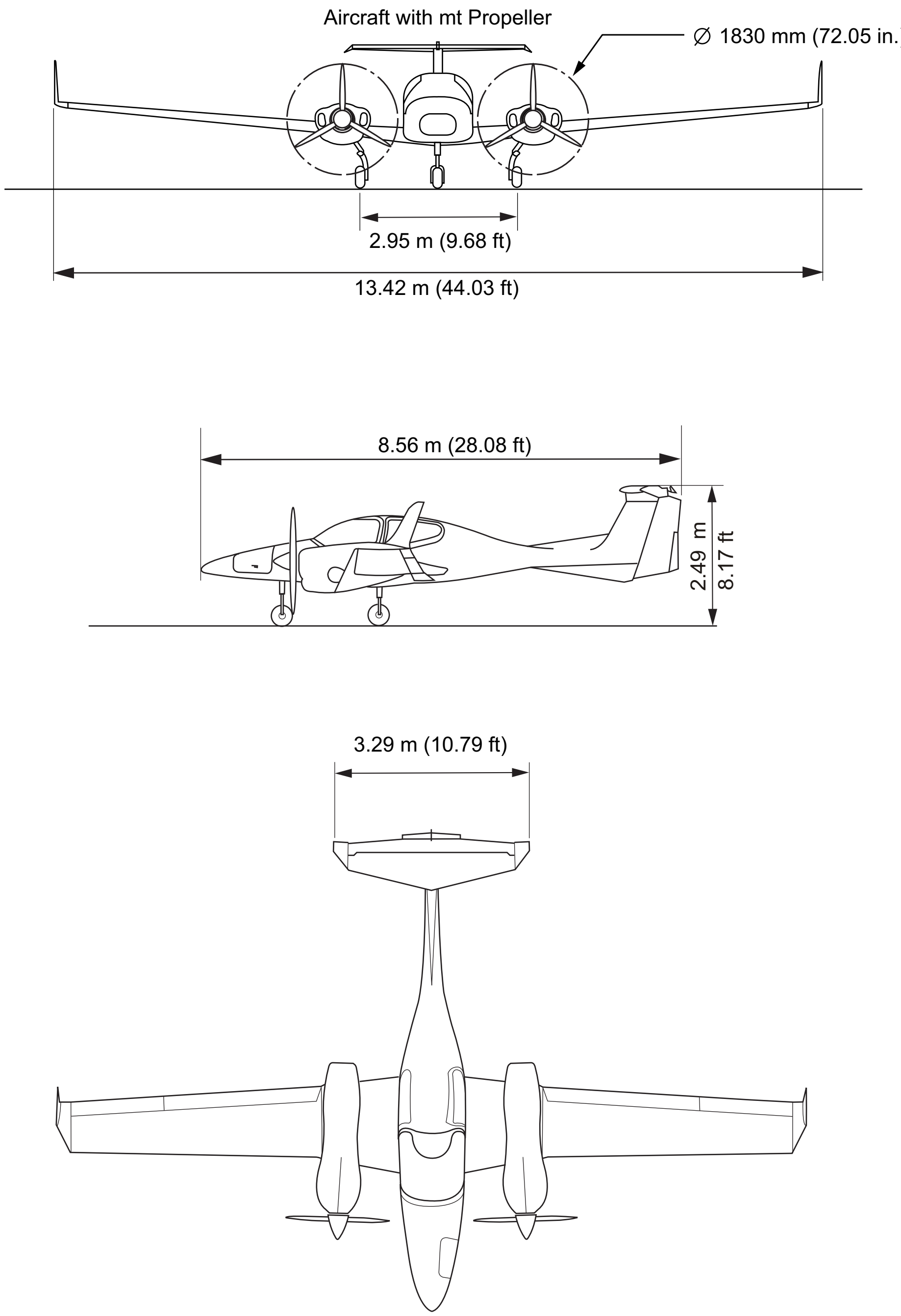
Dimension	SI-Units	US-Units	Conversion
Length	[mm] millimeters [m] meters [km] kilometers	[in] inches [ft] feet [NM] nautical miles	[mm] / 25.4 = [in] [m] / 0.3048 = [ft] [km] / 1.852 = [NM]
Volume	[l] liters	[US gal] US gallons [qts] US quarts	[l] / 3.7854 = [US gal] [l] / 0.9464 = [qts]
Speed	[km/h] kilometers per hour [m/s] meters per second	[kts] knots [mph] miles per hour [fpm] feet per minute	[km/h] / 1.852 = [kts] [km/h] / 1.609 = [mph] [m/s] x 196.85 = [fpm]
Speed of rotation	[RPM] revolutions per minute		--
Mass	[kg] kilograms	[lb] pounds	[kg] x 2.2046 = [lb]
Force weight	[N] newtons	[lbf] pounds force	[N] x 0.2248 = [lbf]
Pressure	[hPa] hectopascals [mbar] millibars [bar] bars	[inHg] inches of mercury [psi] pounds per square inch	[hPa] = [mbar] [hPa] / 33.86 = [inHg] [bar] x 14.504 = [psi]
Temperature	[^{o}C] degrees Celsius	[^{o}F] degrees Fahrenheit	[^{o}C] x 1.8 + 32 = [^{o}F] ([^{o}F] - 32) / 1.8 = [^{o}C]
Intensity of electric current	[A] ampères		--
Electric charge (battery capacity)	[Ah] ampère-hours		--
Electric potential	[V] volts		--
Time	[sec] seconds		--

1.6.2 CONVERSION CHART - LITERS / US GALLONS

Liters	US Gallons
5	1.3
10	2.6
20	5.3
25	6.6
30	7.9
35	9.2
40	10.6
45	11.9
50	13.2
60	15.9
70	18.5
80	21.1
90	23.8
100	26.4
110	29.1
120	31.7
130	34.3
140	37
150	39.6
160	42.3
170	44.9
180	47.6

US Gallons	Liters
1	3.8
2	7.6
6	22.7
8	30.3
10	37.9
12	45.4
14	53
16	60.6
18	68.1
20	75.7
22	83.3
24	90.9
26	98.4
28	106
30	113.6
32	121.1
34	128.7
36	136.3
38	143.8
40	151.4
45	170.3
50	189.3

1.7 THREE-VIEW DRAWING



1.8 G1000 AVIONICS SYSTEM

(a) The G1000 Integrated Avionics System is a fully integrated flight, engine, communication, navigation and surveillance instrumentation system. The system consists of a Primary Flight Display (PFD), Multi-Function Display (MFD), audio panel, Air Data Computer (ADC), Attitude and Heading Reference System (AHRS), engine sensors and processing unit (GEA), and integrated avionics (GIA) containing VHF communications, VHF navigation, and GPS (Global Positioning System).

(b) The primary function of the PFD is to provide attitude, heading, air data, navigation, and alerting information to the pilot. The PFD may also be used for flight planning. The primary function of the MFD is to provide engine information, mapping, terrain information, and for flight planning. The audio panel is used for selection of radios for transmitting and listening, intercom functions, and marker beacon functions.

(c) The primary function of the VHF Communication portion of the G1000 is to enable external radio communication. The primary function of the VOR/ILS Receiver portion of the equipment is to receive and demodulate VOR, Localizer, and Glide Slope signals. The primary function of the GPS portion of the system is to acquire signals from the GPS satellites, recover orbital data, make range and Doppler measurements, and process this information in real-time to obtain the user's position, velocity, and time.

(d) Provided a Garmin G1000 GPS receiver is receiving adequate usable signals, it has been demonstrated capable of and has been shown to meet the accuracy specifications for:

(1) VFR/IFR enroute, oceanic, terminal, and non-precision instrument approach GPS, Loran-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) operation within the U.S. National Airspace System in accordance with AC 20-138A.

(2) RNAV (GPS) Approaches - The G1000 GPS meets the requirements of AC 20 138(A) for GPS based RNAV approaches. This includes RNAV approaches labeled as RNAV (GPS), provided GPS sensor data is valid.

(3) The systems meets RNP5 airspace (BRNAV) requirements of AC 90-96 and in accordance with AC 20-138A, EASA AMC 20-4, and FAA Order 8110.60 for oceanic and remote airspace operations provided it is receiving usable navigation information from the GPS receiver.

Navigation is accomplished using the WGS-84 (NAD-83) coordinate reference datum. GPS navigation data is based upon use of only the GPS operated by the United States of America.

1.9 SOURCE DOCUMENTATION

This section lists documents, manuals and other literatures that were used as sources for the Airplane Flight Manual, and indicates the respective publisher. However, only the information given in the Airplane Flight Manual is valid.

1.9.1 ENGINE

Address:	Textron Lycoming 652 Oliver Street WILLIAMSPORT, PA 17701USA
Phone:	+1-570-323-6181
Documents:	a) Textron Lycoming Operator's Manual, Aircraft Engines IO-360-MIA - Part No. 60297-12 LIO-360-MIA - Part No. 60297-36
	b) Service Bulletins (SB) Service Instructions (SI); (e.g. SI 1014, SI 1070) Service Letters (SL); (e.g. SL114 (subscriptions)).

1.9.2 PROPELLER

Address:	mt-propeller Airport Straubing Wallmühle D-94348 Atting GERMANY
Phone:	+49-(9429)-9409-0 Internet: www.mt-propeller.com
Documents:	E-124, Operation and Installation Manual Hydraulically controlled variable pitch propeller MTV -5, -6, -9, -11, -12, -14, -15, -16, -21, -22, -25

1.9.3 AVIONICS SYSTEM

Address:	Garmin International, Inc. 1200 East 151st Street Olathe, Kansas 66062 USA
Phone:	+1-(913)-3978200
Documents:	Garmin G1000 Cockpit Reference Guide for the DA42 L360 P/N 190-01062-00 Rev. A - March 2009 Garmin G1000 Pilot's Guide for the Diamond DA42 L360 P/N 190-01061-00 Rev. B - March 2009

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CHAPTER 2

OPERATING LIMITATIONS

TABLE OF CONTENTS

2.1 INTRODUCTION

Chapter 2 of this Airplane Flight Manual includes operating limitations, instrument markings, and placards necessary for safe operation of the airplane, its power-plant, standard systems and standard equipment.

The limitations included in this Chapter are approved.

WARNING

OPERATION OF THE AIRPLANE OUTSIDE OF THE APPROVED OPERATING LIMITATIONS IS NOT PERMISSIBLE.

2.2 AIRSPEEDS

	Airspeed		IAS	Remarks
V_A	Maneuvering speed	above 3400 lbs (1542 kg)	126 KIAS	Do not make full or abrupt control surface movements above this speed
		up to 3400 lbs (1542 kg)	120 KIAS	
V_{FE}	Max. flaps extended speed	LDG	111 KIAS	Do not exceed these speeds with the given flap setting
		APP	137 KIAS	
V_{LE}	Max. landing gear extended speed		194 KIAS	Do not exceed this speed with the landing gear extended
V_{LO}	Max. landing gear operating speed	Extension	V_{LOE} 194 KIAS	Do not operate the landing gear above this speed
		Retraction	V_{LOR} 156 KIAS	
V_{MCA}	Minimum control speed airborne		65 KIAS	With one engine inoperative, keep airspeed above this limit
V_{NE}	Never exceed speed in smooth air		194 KIAS	Do not exceed this speed in any operation
V_{NO}	Max. structural cruising speed		155 KIAS	Do not exceed this speed except in smooth air, and then only with caution
V_{SSE}	Minimum Control Speed for Safe single engine training		80 KIAS	Minimum speed authorized in case of one engine intentionally inoperative/idle (training purposes)
V_{YSE}	Best Rate-of-Climb Speed		90 KIAS	Best rate-of-climb speed on one engine

2.3 AIRSPEED INDICATOR MARKINGS

Marking	KIAS	Significance
White band	56 - 111 KIAS	Operating range with flaps fully extended.
Green band	62 - 155 KIAS	Normal operating range.
Yellow band	155 - 194 KIAS	‘Caution’ range - “Only in smooth air”.
Blue band	90 KIAS	Best rate of climb speed, single engine.
Red band	65 KIAS	Minimum control speed, single engine.
Red band	194 KIAS	Maximum speed for all operations V_{NE}.

2.4 POWER-PLANT LIMITATIONS

(a) Number of engines	: 2
(b) Engine manufacturer	: Textron Lycoming
(c) Engine designation	
Left Hand Engine	: IO-360-M1A
Right Hand Engine	: LIO-360-M1A
(d) RPM limitations	
Max. Continuous RPM	: 2700 RPM Max.
(e) Manifold pressure limitations	
Takeoff Power	: FULL throttle
All Engines Operating (AEO)	: 5 minutes
One Engine Inoperative (OEI)	: No limit
Maximum Continuous Power All engines	: 160 horsepower (Sea Level-Standard Day)

NOTE

Refer to Section 5.3.2 (Performance) for further information.

(f) Oil pressure	
Minimum (IDLE)	: 25 psi / 1.72 bar
Maximum	: 115 psi / 7.93 bar
Normal operating range	: 55 to 95 psi / 3.8 to 6.55 bar

(g) Oil quantity

Minimum	:	4 qts / 3.8 liters
Maximum	:	8 qts / 7.6 liters

(h) Oil temperature

Maximum	:	245 °F (118 °C)

(i) Fuel pressure

Minimum	:	14 psi / 0.97 bar
Maximum	:	35 psi / 2.4 bar

(j) Cylinder head temperature

Maximum	:	500 °F (260 °C)

(k) The operation of both engines with both fuel selectors in the crossfeed position, other than for specific test purposes, is prohibited.

MT PROPELLER

(a) Propeller manufacturer	:	mt-Propeller
(b) Propeller designation	:	MTV-12-B-C-F/CF 183-59b and
	:	MTV-12-B-C-F/CFL 183-59b
(c) Propeller diameter	:	72.05 in. (183 cm)

Oil specification:

Airplane engine oil should be used which meets SAEJ1899 (MIL-L-22851) Standard (ashless dispersant type). During the first 50 hours of operation of a new or newly overhauled engine, or after replacement of a cylinder, airplane engine oil should be used which meets SAEJ1966 (MIL-L-6082) Standard (straight mineral type). The viscosity should be selected according to the recommendation given in the following table:

OAT at ground level	During the first 50 hours: SAEJ1966 / MIL-L-6082 Mineral Oil	After 50 hours: SAEJ1899 / MIL-L-22851 Ashless Dispersant Oil
All temperatures	SAE 20-W50 TYPE M	SAE 15-W50, SAE 20-W50
above 80 °F (above 27 °C)	SAE 60	SAE 60
above 60 °F (above 16 °C)	SAE 50	SAE 40 or SAE 50
30 °F to 90 °F (-1 °C to 32 °C)	SAE 40	SAE 40
0 °F to 70 °F (-18 °C to 21 °C)	SAE 30	SAE 30, SAE 40 or SAE 20-W40
below 10 °F (below -12 °C)	SAE 20	SAE 30 or SAE 20-W30

2.5 ENGINE INSTRUMENT MARKINGS

Engine instrument markings and their color code significance are shown in the table below:

NOTE

When an indication lies outside the upper or lower range, the numerical indication will begin flashing as well.

Indication	Red arc/bar = lower prohibited range	Yellow arc/bar = caution range	Green arc/bar = normal operating range	Yellow arc/bar = caution range	Red arc/bar = upper prohibited range
Manifold Pressure	--	--	12 - 31 inHg	--	--
RPM	--	--	500 - 2700 RPM	--	above 2700 RPM
Oil Temp.	--	--	149 - 230 ^{O}F	231 - 245 ^{O}F	above 245 ^{O}F
Cylinder Head Temp	--	--	150 - 475 ^{O}F	475 - 500 ^{O}F	above 500 ^{O}F
Oil Pressure	< 25 psi	25 - 55 psi	56 - 95 psi	96 - 97 psi	above 97 psi
Fuel Flow	--	--	1 - 25 US gal/hr	--	--
Voltage	< 24.1 V	24.1 - 25 V	25.1 - 30 V	30.1 - 32 V	above 32 V
Ammeter	--	--	2 - 75 A	--	--
Fuel Quantity	0 US gal	--	1 - 25 US gal	--	--

2.6 WARNING, CAUTION AND ADVISORY ALERTS ON THE G1000

2.6.1 WARNING, CAUTION AND ADVISORY ALERTS ON THE G1000

The following tables show the color and significance of the Warning, Caution and Advisory alert lights on the G1000.

Color and significance of the Warning alerts on the G1000

Warning alerts (red)	Meaning / Cause
WARNING	One of the Warnings listed below is being indicated.
AP TRIM FAIL	Autopilot automatic trim is inoperative
DOOR OPEN	Front and/or rear canopy and/or baggage door are/is not closed and locked.
L/R ALTN FAIL	Left / Right engine alternator has failed.
L/R FUEL PR HI	Left / Right engine fuel pressure is greater than 35 psi.
L/R FUEL PR LO	Left / Right engine fuel pressure is less than 14 psi.
L/R OIL PRES	Left / Right engine oil pressure is less than 25 psi.
L/R STARTER	Left / Right engine starter is engaged.
When an LRU or an LRU function fails, a large red ‘X’ is typically displayed on windows associated with the failed data, as follows:	
AIRSPEED FAIL	The display system is not receiving airspeed input from the airdata computer.
ALTITUDE FAIL	The display system is not receiving altitude input from the air data computer.
ATTITUDE FAIL	The display system is not receiving attitude reference information from the AHRS.
GPS ENR	Does not show the red X through the display. The system will flag GPS ENR and the G1000 will no longer provide GPS based navigational guidance
HDG	The display system is not receiving valid heading input from the AHRS.

Warning alerts (red)	Meaning / Cause
OAT	Display system is not receiving valid OAT information from the air data computer.
TAS	Display system is not receiving valid true airspeed information from the air data computer
VERT SPEED FAIL	The display system is not receiving vertical speed input from the air data computer.
WARN	RAIM position warning. The nav deviation bar is removed.
XPDR FAIL	Display system is not receiving valid transponder information.

Color and significance of the Caution alerts on the G1000

Caution alerts (amber)	Meaning / Cause
AHRS ALIGN: Keep Wings Level	The AHRS (Attitude and Heading Reference System) is aligning.
DEIC PRES HI	De-icing system pressure is high. (if De-icing system is installed)
DEIC PRES LO	De-icing system pressure is low. (if De-icing system is installed)
DEICE LVL LO	De-icing fluid level is low. (if De-icing system is installed)
INTEG RAIM not available	RAIM (Receiver Autonomous Integrity Monitor) is not available.
L/R AUX FUEL E	Left / Right fuel tank empty, displayed only when FUEL
L/R FUEL LOW	Left / Right engine main tank fuel quantity is low.
L/R VOLTS LOW	Left / Right engine bus voltage is too low (below 25 volts).
PITOT FAIL	Pitot heat has failed.
PITOT HT OFF	Pitot heat is OFF.
STAL HT FAIL	Stall warning heat has failed.
STAL HT OFF	Stall warning heat is OFF.
STICK LIMIT	Stick limiting system has failed.

Color and significance of the Advisory alerts on the G1000

Caution alerts (amber)	Meaning / Cause
GIA FAN FAIL	Cooling fan for the GIAs is inoperative.
L/R FUEL XFER	Fuel transfer from auxiliary to main tank is in progress.
MFD FAN FAIL	Cooling fan for the MFD is inoperative.
PFD FAN FAIL	Cooling fan for the PFD is inoperative.

NOTE

A full list of G1000 system message advisories are available in the Garmin G1000 Pilot's Guide for the Diamond DA42-L360, Part Number 190-01061-00 (Current Revision) and in the Garmin G1000 Cockpit Reference Guide for the DA42-L360, Part Number 190-01062-00 (Current Revision).

2.6.2 OTHER WARNING ALERTS

Warning alerts on the instrument panel

Caution alerts (amber)	Meaning / Cause
GEAR UNSAFE WARNING LIGHT (red)	Illuminates if the landing gear is neither in the final up or down & locked position.

Audible Warning alerts

Caution alerts (amber)	Meaning / Cause
GEAR RETRACTED CHIME TONE (repeating)	Resounds if the landing gear is retracted while the flaps move into the LDG position or when the throttle is placed in a position forward of IDLE, but below approximately 14 inches of manifold pressure.

2.7 MASS (WEIGHT)

Value	Mass (kg)	Weight (lb)
Maximum Ramp	1795	3957
Maximum Take-Off	1785	3935
Maximum Landing	1700	3748
Maximum Zero Fuel	1650	3638
Minimum Flight	1365	3009
Max. Load in Nose Baggage Compartment (in fuselage nose)	30	66
Max. Load in Cockpit Baggage Compartment (behind rear seats)	45	100
Max. Load in Baggage Extension (behind cockpit baggage compartment)	18	40
Max. Load, Cockpit Baggage Compartment and Baggage Extension Together	45	100

WARNING

EXCEEDING THE MASS LIMITS WILL LEAD TO AN OVERSTRESSING OF THE AIRPLANE AS WELL AS TO A DEGRADATION OF FLIGHT CHARACTERISTICS AND FLIGHT PERFORMANCE.

NOTE

At the time of lift-off the maximum permitted take-off mass must not be exceeded.

NOTE

A landing with a mass between 1700 kg (3748 lb) and 1785 kg (3935 lb) is permissible. It constitutes an abnormal landing. A "Hard Landing Check" (refer to section 05-50 of the AMM) is only required after a hard landing regardless of the actual landing mass.

2.8 CENTER OF GRAVITY

Datum Plane

The Datum Plane (DP) is a plane which is normal to the airplane's longitudinal axis and in front of the airplane as seen from the direction of flight. The airplane's longitudinal axis is parallel with the floor of the nose baggage compartment. When the floor of the nose baggage compartment is aligned horizontally, the Datum Plane is vertical. The Datum Plane is located 2.196 meters (86.46 in) forward of the most forward point of the root rib on the stub wing (refer to the figure in Section 6.2).

Center of gravity limitations

The center of gravity (CG position) for flight conditions must be between the following limits:

Most forward flight CG (aft of datum plane):

CG		Mass (Weight)	
(m)	(in)	(kg)	(lb)
2.365	93.11	1365	3009
2.365	93.11	1550	3417
2.388	94.02	1700	3748
2.425	95.47	1785	3935

Most aft flight CG (aft of datum plane):

CG		Mass (Weight)	
(m)	(in)	(kg)	(lb)
2.437	95.93	1365	3009
2.451	96.5	1785	3935

Refer to Paragraph 6.4.4 for a graphical illustration of the CG limitations.

WARNING

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

2.9 APPROVED MANEUVERS

The airplane is certified in the Normal Category in accordance with JAR-23.

(a) Approved maneuvers

(1) All normal flight maneuvers;

(2) Stalling (with the exception of power on stalls with a fuel imbalance); and

(3) Lazy Eights, Chandelles, as well as steep turns and similar maneuvers, in which an angle of bank of not more than 60 is attained.

CAUTION

AEROBATICS, SPINNING, AND FLIGHT MANEUVERS WITH MORE THAN 60 DEGREES OF BANK ARE NOT PERMITTED IN THE NORMAL CATEGORY. STALLING WITH ASYMMETRIC POWER OR ONE ENGINE INOPERATIVE IS NOT PERMITTED.

CAUTION

LARGE SUSTAINED SIDESLIPS ARE PROHIBITED. THEY MAY RESULT IN ENGINE FUEL PRESSURE REDUCTION. RECOVERY FROM THE SIDESLIP IMMEDIATELY CORRECTS CONDITION.

2.10 MANEUVERING LOAD FACTORS

NOTE

The tables below show aircraft structural limitations.

CAUTION

AVOID EXTENDED NEGATIVE G-LOADS DURATION. EXTENDED NEGATIVE G-LOADS CAN CAUSE PROPELLER CONTROL PROBLEMS AND ENGINE SURGING.

	at V_A	at V_{NE}	with flaps in APP or LDG position
Positive	3.8	3.8	2.0
Negative	-1.52	0	

WARNING

EXCEEDING THE MAXIMUM LOAD FACTORS WILL LEAD TO AN OVERSTRESSING OF THE AIRPLANE.

2.11 OPERATING ALTITUDE

The maximum operating altitude is 18,000 ft (5,486 m) pressure altitude.

2.12 FLIGHT CREW

Minimum crew number :1 (one person)

Maximum number of occupants :Including Pilot - 4 (four persons)

2.13 KINDS OF OPERATION

Provided that national operational requirements are met, the following kinds of operation are approved:

- Daytime flights according to Visual Flight Rules (VFR)
- With the appropriate equipment: night flights according to VFR
- With the appropriate equipment: flights according to Instrument Flight Rules (IFR)
- Take-off and landing on paved surfaces
- Take-off and landing on grass runways.

Flights into known or forecast icing conditions are prohibited.

Flights into known thunderstorms are prohibited.

Minimum operational equipment (serviceable)

The following table lists the minimum serviceable equipment required by JAR-23. Additional minimum equipment for the intended operation may be required by national operating rules and also depends on the route to be flown.

NOTE

Many of the items of minimum equipment listed in the following table are integrated in the G1000.

	for daytime VFR flights	in addition for night VFR flights	in addition for IFR flights
flight & navigation instruments	* airspeed indicator (on G1000 PFD or backup) * altimeter (on G1000 PFD or backup) * magnetic compass * one headset, used by pilot in command	* vertical speed indicator (VSI) * attitude gyro (artificial horizon; on G1000 PFD or backup) * turn & bank indicator * (on G1000 PFD) * directional gyro * VHF radio (COM) with speaker and microphone * VOR receiver * transponder (XPDR), mode A and mode C * GPS receiver (part of G1000)	* second airspeed indicator (both, on G1000 PFD and backup) * second altimeter (both, on G1000 PFD and backup) * second attitude gyro (both, on G1000 PFD and backup) * second VHF radio (COM) * VOR-LOC-GP receiver * second GPS receiver (part of G1000)

	for daytime VFR flights	in addition for night VFR flights	in addition for IFR flights
engine instruments	* fuel qty. (2x) * oil press. (2x) * oil temp. (2x) * cylinder head temperature (2x) * manifold pressure (2x) * prop. RPM (2x)	* Ammeter * Voltmeter	
lighting		* position lights * strobe lights (anti collision lights) * landing light * instrument lighting * flood light * flashlight	
other operational minimum equipment	* stall warning system * fuel quantity measuring device * safety belts for each occupied seat * Airplane Flight Manual	* Pitot heating system * Alternate static valve	* emergency battery (for backup attitude gyro and flood light)

NOTE

A list of approved equipment can be found in Chapter 6.

2.14 FUEL

Approved fuel grade :AVGAS 100LL

	Main Tanks		Auxilliary Tanks (if installed)		Total	
	US gal	liters	US gal	liters	US gal	liters
Total fuel quantity	2 x 26.0	2 x 98.4	2 x 13.7	2 x 52.0	2 x 39.7	2 x 150.4
Usable fuel	2 x 25.0	2 x 94.6	2 x 13.2	2 x 50.0	2 x 38.2	2 x 144.6
Maximum permissable difference LH/RH	5.0	18.9				

NOTE

Refer to section 2-9 APPROVED MANEUVERS for additional information on fuel imbalance.

2.15 LIMITATION PLACARDS

All limitation placards are shown below. A list of all placards is included in the Aircraft Maintenance Manual (D42L-AMM-001), Chapter 11 or in the Airplane Maintenance Manual (Doc. No. 7.02.01), Chapter 11.

On the instrument panel:

THIS AIRPLANE MAY ONLY BE OPERATED IN ACCORDANCE WITH THE AIRPLANE FLIGHT MANUAL. IT CAN BE OPERATED IN THE "NORMAL" CATEGORY IN NON-ICING CONDITIONS. PROVIDED THAT NATIONAL OPERATIONAL REQUIREMENTS ARE MET AND THE APPROPRIATE EQUIPMENT IS INSTALLED, THIS AIRPLANE IS APPROVED FOR THE FOLLOWING KIND OF OPERATION: DAY VFR, NIGHT VFR AND IFR. ALL AEROBATIC MANEUVERS INCLUDING SPINNING ARE PROHIBITED. FOR FURTHER OPERATIONAL LIMITATIONS REFER TO THE AIRPLANE FLIGHT MANUAL.

MANEUVERING SPEED:

VA = 126 KIAS (ABOVE 1542 KG / 3400 LB)

VA = 120 KIAS (UP TO 1542 KG / 3400 LB)

LANDING GEAR

V_{LE} / V_{LOE} = 194 KIAS

V_{LOR}= 156 KIAS

On the Emergency Landing Gear Extension Lever:

EMERGENCY
Gear Extension
Max. 156 KIAS

On the instrument panel, next to the fuel quantity indication:

(a) Main Tanks (on those aircraft that do not have auxiliary tanks):

max. usable
fuel: 2 x 25 US gal
max. difference LH/RH
tank: 5 US gal

OR

(b) Auxiliary Tanks (on those aircraft that have auxiliary tanks):

max. usable fuel
main tank:
2 x 25 US gal
auxiliary tank:
2 x 13 US gal
max. difference LH/RH
main tank: 5 US gal

Next to each of the two fuel filler necks:

(a) Main Tanks:

WARNING
APPROVED FUEL
AVGAS 100LL
or see Airplane Flight Manual

(b) Auxiliary Tanks:

WARNING
APPROVED FUEL
AVGAS 100LL
or see Airplane Flight Manual

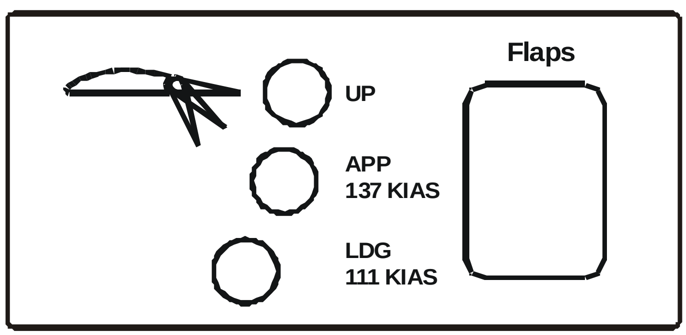
In each cowling, on the inside of the door for the oil filler neck:

OIL

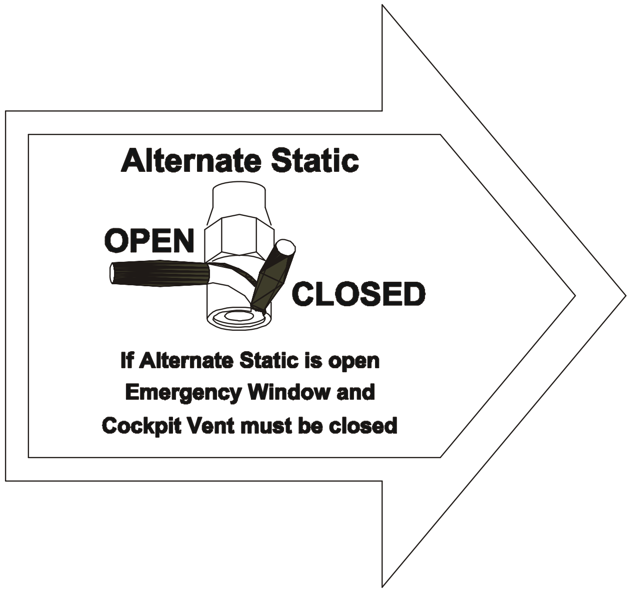
SAE 15W50

ashless dispersant aviation
grade oil (SAE Standard J1899)
or AFM chapter 2
VFR Min./Max.: 4/8 qts (3.8/7.6 liters)
IFR Min./Max.: 6/8 qts (5.7/7.6 liters)
D41-1126-20-21 Rev. "e"

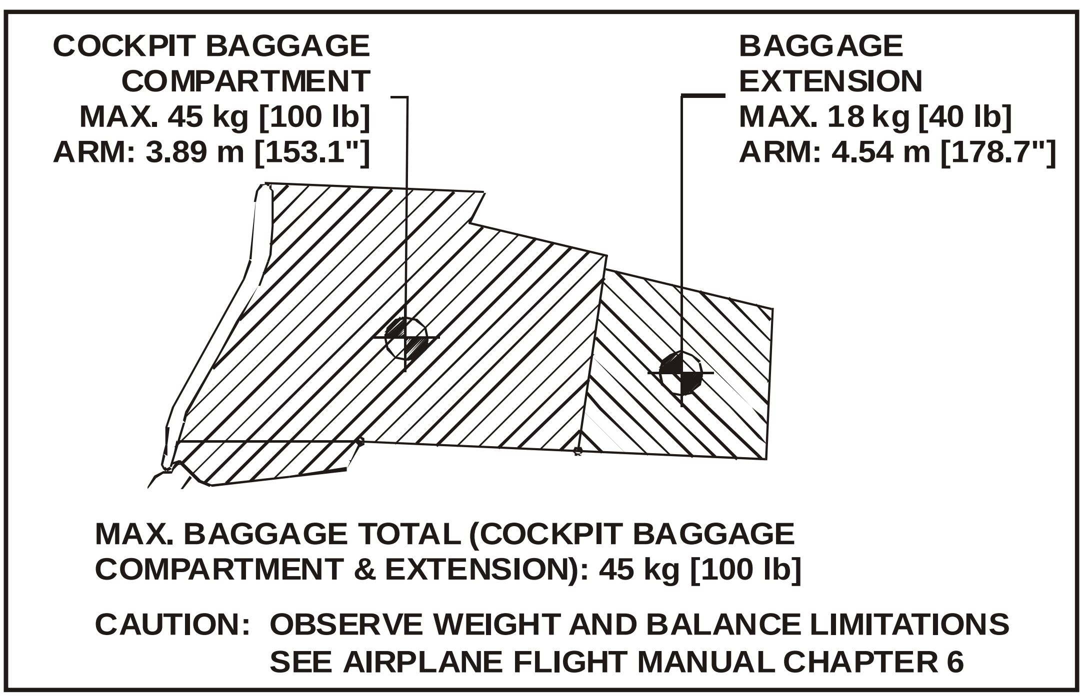
Next to flap selector switch:



In the cockpit, on the left fuselage sidewall:



Next to the cockpit baggage compartment:



In the nose baggage compartment:

Max. Baggage:
30 kg [66 lb]

Beside the door locking device installed in the passengers' door:

EMERGENCY EXIT:
The keylock must be unlocked during flight

On the right-hand side of the instrument panel above the circuit breakers:

----- NO SMOKING -----

2.16 OTHER LIMITATIONS

2.16.1 TEMPERATURE

With the outside temperature is below +15 °C (+59 °F) the use of the winter kit for the aircraft is recommended.

2.16.2 BATTERY CHARGE

Taking off for a Night VFR or IFR flight with a discharged battery is not permitted.

The use of an external power supply for engine starting with a discharged airplane battery is not permitted if the subsequent flight is intended to be an IFR flight. In this case the airplane battery must first be charged.

2.16.3 EMERGENCY SWITCH

IFR flights are not permitted when the seal on the emergency switch is broken.

2.16.4 DOOR LOCKING DEVICE

The canopy and the passenger door must not be locked by the key lock during operation of the airplane.

2.16.5 AUTOPILOT USAGE

At the first indication of an engine failure, the pilot must disengage the autopilot. Use of the AFCS for OEI operations is prohibited.

2.16.6 ELECTRONIC EQUIPMENT

The use and switching on of electronic equipment other than that which is part of the equipment of the airplane is not permitted, as it could lead to interference with the airplane's avionics.

Examples of undesirable items of equipment are:

- Mobile telephones
- Remote radio controls
- Video screens employing CRTs
- Minidisc recorders when in the record mode.

This list is not exhaustive.

The use of laptop computers, including those with CD-ROM drives, CD and minidisc players in the replay mode, cassette players and video cameras is permitted. All this equipment however should be switched off for take-off and landing.

2.16.7 GARMIN G1000 AVIONICS SYSTEM

(a) The Garmin G1000 Cockpit Reference Guide for the DA42 L360, P/N 190-01062-00, Rev A, dated March 2009 or later appropriate revision must be immediately available to the flight crew.

Software Part Number	Approved Version	Function
System		
006-B1054-00	1054.00 *	DA42-L360 System *
Manifest		
006-B0172-01	4.06	GTX 33 MODE S TRANSPONDER
006-B0193-05	2.07	GEA 71 ENGINE AIRFRAME UNIT, NO. 1
006-B0193-05	2.07	GEA 71 ENGINE AIRFRAME UNIT, NO. 2
006-B0261-12 006-C005500	3.02 1.05	GDC 74A AIR DATA COMPUTER

Software Part Number	Approved Version	Function
006-B0224-00 006-C0048-00	2.01 2.00	GMU 44 MAGNETOMETER
006-B0319-6A	8.2	GDU 1040 DISPLAY UNIT, PFD
006-B0319-6A	8.2	GDU 1040 DISPLAY UNIT, MFD
006-B0190-46 006-B0093-xx 006-D0425-03	5.51 3.03 2.03	GIA 63 AVIONICS INTEGRATION UNIT NO. 1
006-B0190-46 006-B0093-xx 006-D0425-03	5.51 3.03 2.03	GIA 63 AVIONICS INTEGRATION UNIT NO. 2
006-B0223-09 006-C0049-00	2.11 2.00	GRS 77 ATTITUDE HEADING REFERENCE SYSTEM
006-B0203-33	3.03	GMA 1347 AUDIO PANEL
006-B0317-14	3.20.00	GDL 69 DATA LINK

* Diamond DA42-L360 System 1054.00 **appears on the MFD splash screen during startup**.

NOTE

The database version is displayed on the MFD power-up page immediately after system power-up and must be acknowledged. The remaining system software versions can be verified on the AUX group sub-page 5, "AUX-SYSTEM STATUS".

(b) IFR enroute, oceanic and terminal navigation predicated upon the G1000 GPS Receiver is prohibited unless the pilot verifies the currency of the database or verifies each selected way point for accuracy by reference to current approved data.

(c) Instrument approach navigation predicated upon the G1000 GPS Receiver must be accomplished in accordance with approved instrument approach procedures that are retrieved from the GPS equipment database. The GPS equipment database must incorporate the current update cycle.

NOTE

Not all published approaches are in the FMS database. The pilot must ensure that the planned approach is in the database.

(1) Instrument approaches utilizing the GPS receiver must be conducted in the approach mode and Receiver Autonomous Integrity Monitoring (RAIM) must be available at the Final Approach Fix.

(2) Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for GPS overlay with the G1000 GPS receiver is not authorized.

(3) Use of the G1000 VOR/ILS receiver to fly approaches not approved for GPS require VOR/ILS navigation data to be present on the display.

(4) When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS or Loran-C navigation, the airplane must have the operational equipment capable of using that navigation aid, and the required navigation aid must be operational.

(5) VNAV information may be utilized for advisory information only. Use of VNAV information for Instrument Approach Procedures does not guarantee step-down fix altitude protection, or arrival at approach minimums in normal position to land.

(6) RNAV (GPS) approaches must be conducted utilizing the GPS sensor.

(7) RNP RNAV operations are not authorized, except as noted in Chapter 1 of this AFM.

(d) If not previously defined, the following default settings must be made in the "SYSTEM SETUP" menu of the G1000 prior to operation (refer to Pilot's Guide for procedure if necessary):

(1) DIS, SPD : nm, kt (sets navigation units to "nautical miles" and "knots")

(2) ALT, VS : ft, fpm (sets altitude units to "feet" and "feet per minute")

(3) MAP DATUM : WGS 84 (sets map datum to WGS-84, see note that follows)

(4) POSITION : deg-min (sets navigation grid units to decimal minutes)

(e) When AHRS is required to meet the items listed in the Minimum operational equipment (serviceable) table in Paragraph 2.13 of this AFM, operation is prohibited in the following areas:

(1) north of 70° N and south of 70° S latitudes,

(2) north of 65° N between 75° W and 120° W longitude, and

(3) south of 55° S between 120° E and 165° E longitude.

When day VFR operations are conducted in the above areas, the MFD must be in a non-Heading Up orientation.

(f) CDI sequencing of the ILS must be set to MANUAL for instrument approaches conducted with the autopilot coupled. If the CDI source is changed when the autopilot is engaged in NAV mode, the autopilot lateral mode will revert to ROLL ATTITUDE mode and NAV mode must be manually reselected by the pilot.

NOTE

The autopilot LOC mode is designed to engage at the Outer Marker using expanded roll authority to capture the LOC, then uses a limited roll authority to maintain the beam. The Autopilot roll commands may lack authority and become unstable in high crosswinds during coupled LOC operations outside the Outer Marker. If this occurs, use Heading mode to establish an intercept with the beam, then re-engage LOC.

(g) The fuel quantity, fuel required, and fuel remaining functions on the Fuel Page (displayed when pushing the FUEL button) of the FMS are supplemental information only and must be verified by the flight crew.

(h) The pilot's altimeter is the primary altitude reference during all operations using advisory vertical navigation (VNAV) information and the autopilot. A flight altitude selected via the autopilot must be verified and corrected according to the indication of the calibrated altimeter.

NOTE

The barometric correction and the altitude preselect are not synchronized between Garmin and Bendix/King units.

2.16.8 SMOKING

Smoking in the airplane is not permitted.

2.16.9 GROUND OPERATION

Take-off and landing has been demonstrated on hard paved surfaces (asphalt, concrete, etc.) and grass runways.

2.16.10 USE OF THE SUN VISORS

The sun visors if installed may only be used during cruise. During all other phases of flight the sun visors must be locked in the fully upward position.

CHAPTER 3

EMERGENCY PROCEDURES

TABLE OF CONTENTS

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NOTE

Procedures for non-critical system faults are given in Chapter 4B ABNORMAL OPERATING PROCEDURES.

3.1 INTRODUCTION

3.1.1 GENERAL

This Chapter contains checklists as well as the description of recommended procedures to be followed in the event of an emergency. Engine failure or other airplane-related emergencies are most unlikely to occur if the prescribed procedures for pre-flight checks and airplane maintenance are followed.

If, nonetheless, an emergency does arise, the guidelines given here should be followed and applied in order to clear the problem.

As it is impossible to foresee all kinds of emergencies and cover them in this Airplane Flight Manual, a thorough understanding of the airplane by the pilot is, in addition to his knowledge and experience, an essential factor in the solution of any problems which may arise.

WARNING

IN EACH EMERGENCY, CONTROL OVER THE FLIGHT ATTITUDE AND THE PREPARATION OF A POSSIBLE EMERGENCY LANDING HAVE PRIORITY OVER ATTEMPTS TO SOLVE THE CURRENT PROBLEM ("FIRST FLY THE AIRCRAFT"). PRIOR TO THE FLIGHT THE PILOT MUST CONSIDER THE SUITABILITY OF THE TERRAIN FOR AN EMERGENCY LANDING FOR EACH PHASE OF THE FLIGHT. FOR A SAFE FLIGHT THE PILOT MUST CONSTANTLY KEEP A SAFE MINIMUM FLIGHT ALTITUDE. SOLUTIONS FOR VARIOUS ADVERSE SCENARIOS SHOULD BE THOUGHT OVER IN ADVANCE. THUS IT SHOULD BE GUARANTEED THAT THE PILOT IS AT NO TIME SHOCKED BY AN ENGINE FAILURE AND THAT HE CAN ACT CALMLY AND WITH DETERMINATION.

3.1.2 CERTAIN AIRSPEEDS IN EMERGENCIES

EVENT	AIRSPEED
One engine inoperative minimum control speed (Air) V_{MCA}	65 KIAS
One engine inoperative speed for best rate of climb V_{YSE}	90 KIAS

3.1.3 SELECTING EMERGENCY FREQUENCY

In an in-flight emergency, depressing and holding the Com transfer button on the G1000 for two seconds will tune the emergency frequency of 121.500 MHz. If the display is available, it will also show it in the "Active" frequency window.

3.2 AIRPLANE-RELATED G1000 WARNINGS

3.2.1 WARNINGS/GENERAL

"Warning" means that the non-observation of the corresponding procedure leads to an immediate or important degradation in flight safety. The warning text is shown in red in the annunciation window. A continuous chime tone will sound with a flashing "WARNING" softkey annunciation. Pressing the WARNING Softkey acknowledges the presence of the warning alert and stops the aural chime.

3.2.2 L/R OIL PRESS

L/R OIL PRES Left / Right engine oil pressure is less than 25 psi.

Oil pressures below the limit value of 25 psi can lead to a total loss of power due to engine failure.

(a) Check the oil pressure warning light and the oil pressure indicator

(b) Check the oil temperature

(1) If the oil pressure indication drops below the green sector and the oil temperature is normal (oil pressure warning light does not illuminate or flash):

(A) Monitor the oil pressure warning light: it is probable that the oil pressure indication is defective

(B) Monitor the oil and cylinder head temperatures.

(2) If the oil pressure indication drops below the green sector while the oil or cylinder head temperature is rising, or
if the oil pressure warning light illuminates or flashes, or
if both of these occur together:

(A) Reduce engine power to the minimum required.

(B) Land as soon as possible.

(C) Be prepared for an engine failure and emergency landing.

CONTINUED

(3) If Oil pressure tending to zero combined with:
Vibration, loss of oil, possibly unusual metallic noise and smoke:

(A) A mechanical failure in the engine is apparent.

(B) Shut off the engine immediately and

(C) Carry out emergency landing in accordance with Paragraph 3.5.10 - ONE ENGINE INOPERATIVE - LANDING.

END OF CHECKLIST

3.2.3 L/R FUEL PR HI

L/R FUEL PR HI Left / Right engine fuel pressure is greater than 35 psi.

- Turn off the fuel pump for the affected engine, if the fuel pump is selected ON.
- Reduce power on the affected engine by reducing the THROTTLE lever as required.

END OF CHECKLIST

3.2.4 L/R FUEL PR LO

L/R FUEL PR LO Left / Right engine fuel pressure is less than 14 psi.

- Turn on the electric fuel pump for the affected engine.

END OF CHECKLIST

3.2.5 L/R STARTER

L/R STARTER Left / Right engine starter is engaged.

If the starter does not disengage from the engine after starting (starter warning message (START) on the G1000 remains illuminated or flashing after the engine has started):

(a) THROTTLE lever.. IDLE

(b) MIXTURE control lever...................................... IDLE cut-off

(c) Ignition switch.. OFF

(d) ELECT. MASTER switch.................................. OFF

Terminate flight preparation.

END OF CHECKLIST

3.2.6 L/R ALTN FAIL

L/R ALTN FAIL Left / Right engine alternator has failed.

(a) One alternator failed

(1) ALT PROT/ALT CONT circuit breakers....... check affected side

(2) ALTERNATOR ON/OFF switch.................. cycle affected side

If the alternator does not come back on line:

(3) ALTERNATOR .... OFF/affected side

(A) Bus voltage.......................... monitor

(4) Electrical consumers.................................. reduce as practicable.

(b) Both alternators failed:

WARNING

IF BOTH ALTERNATORS FAIL AT THE SAME TIME, REDUCE ALL ELECTRICAL EQUIPMENT TO A MINIMUM. EXPECT BATTERY POWER TO LAST 30 MINUTES AND LAND THE AIRPLANE AS SOON AS POSSIBLE. REFER TO PARAGRAPH 3.7.1 (G) - COMPLETE FAILURE OF THE ELECTRICAL SYSTEM.

END OF CHECKLIST

3.2.7 DOOR OPEN

DOOR OPEN Front and/or rear canopy and/or baggage door are/is not closed and locked.

(a) Airspeed .... reduce

(b) Canopy .... check visually if closed

(c) Rear passenger door.. check visually if closed

WARNING

NEVER UNLOCK THE REAR PASSENGER DOOR DURING FLIGHT. IT CAN BREAK AWAY AND CAUSE DAMAGE TO THE AIRCRAFT AND PERSONAL INJURY.

(d) Front baggage doors.. check visually if closed

(e) Land at the nearest suitable airfield.

END OF CHECKLIST

3.2.8 AP TRIM FAIL

AP TRIM FAIL The autopilot automatic trim is inoperative.

Disconnect the autopilot and fly the airplane manually. Trim the airplane manually as required.

END OF CHECKLIST

3.3 G1000 SYSTEM WARNINGS

3.3.1 RED X

A red X through any display field, such as COM frequencies, NAV frequencies, TAS, OAT or engine data, indicates that display field is not receiving valid data.

3.3.2 GPS ENR

GPS ENR Does not show the red X through the display.
The system will flag GPS ENR and no longer provide GPS based navigational guidance.

Revert to the G1000 VOR/ILS receivers or an alternate means of navigation other than the G1000 GPS receivers.

3.3.3 ATTITUDE FAIL

ATTITUDE FAIL The display system is not receiving attitude reference information from the AHRS; accompanied by the removal of sky/ground presentation and a red X over the attitude area.

Revert to the standby attitude indicator.

3.3.4 AIRSPEED FAIL

AIRSPEED FAIL The display system is not receiving airspeed input from the air data computer; accompanied by a red X through the airspeed display.

Revert to the standby airspeed indicator.

3.3.5 ALTITUDE FAIL

ALTITUDE FAIL	The display system is not receiving altitude input from the air data computer; accompanied by a red X through the altimeter display.

Revert to the standby altimeter.

3.3.6 VERTICAL SPEED FAIL

VERTICAL SPEED FAIL	The display system is not receiving vertical speed input from the air data computer; accompanied by a red X through the vertical speed display.

Determine vertical speed based on the change of altitude information.

3.3.7 HEADING FAIL

HEADING FAIL	The display system is not receiving valid heading input from the AHRS; accompanied by a red X through the HDG display.

Revert to the emergency compass.

3.4 G1000 FAILURES

3.4.1 NAVIGATION INFORMATION FAILURE

If Garmin G1000 GPS navigation information is not available or invalid, utilize the remaining operational navigation equipment as required.

3.4.2 PFD OR MFD DISPLAY FAILURE

(a) DISPLAY BACKUP button on audio panel........ PUSH

(b) Automatic Entry of Display Failure

If the PFD and MFD have automatically entered reversionary mode, use the following procedure:

(1) DISPLAY BACKUP
button on the audio panel .... PUSH (Button will be out)

NOTE

After automatic entry of reversionary mode, the pilot must press the DISPLAY BACKUP button on the audio panel. After the DISPLAY BACKUP button has been pushed, the system will remain in reversionary mode even if the problem causing the automatic entry of reversionary mode is resolved. A maximum of one attempt to return to normal mode is approved using the following procedure.

(2) DISPLAY BACKUP
button on the audio panel .... PUSH (Button will be in)

- If the system returns to normal mode, leave the DISPLAY BACKUP button IN and continue.

- If the system remains in reversionary mode, or abnormal display behavior such as display flashing occurs, then return the DISPLAY BACKUP button to the OUT position.

3.4.3 AHRS FAILURE

NOTE

A failure of the Attitude and Heading Reference System (AHRS) is indicated by a removal of the sky/ground presentation and a red X and a yellow "AHRS FAILURE" shown on the PFD. The digital heading presentation will be replaced with a yellow "HDG" and the compass rose digits will be removed. The course pointer will indicate straight up and course may be set using the digital window.

(a) Use the standby attitude indicator, emergency compass and Navigation Map

(b) Course .... Set using digital window.

3.4.4 AIR DATA COMPUTER (ADC) FAILURE

NOTE

A Complete loss of the Air Data Computer is indicated by a red X and yellow text over the airspeed, altimeter, vertical speed, TAS and OAT displays. Some FMS functions, such as true airspeed and wind calculations, will also be lost.

(a) Use the standby airspeed indicator and altimeter.

3.4.5 ERRONEOUS OR LOSS OF ENGINE AND FUEL DISPLAYS

NOTE

Loss of an engine parameter is indicated by a red X through the data field. Erroneous information may be identified by indications which do not agree with other system information. Erroneous indications may be determined by comparing a display with other displays and other system information.

(a) Set power based on THROTTLE lever position, engine noise and speed.

(b) Monitor other indications to determine the health of the engine.

(c) Use known power settings and performance data refer to Paragraph 5.3.2 - FUEL FLOW DIAGRAM for approximate fuel flow values.

(d) Use other system information, such as annunciator messages, fuel quantity and flow, to safely complete the flight.

3.4.6 ERRONEOUS OR LOSS OF WARNING/CAUTION ANNUNCIATORS

NOTE

Loss of an annunciator may be indicated when engine or fuel displays show an abnormal or emergency situation and the annunciator is not present. An erroneous annunciator may be identified when an annunciator appears which does not agree with other displays or system information.

(a) If an annunciator appears, treat it as if the condition exists.
Refer to Chapter 3 - EMERGENCY PROCEDURES or
Chapter 4B - ABNORMAL OPERATING PROCEDURES.

(b) If a display indicates an abnormal condition but no annunciator is present, use other system information, such as engine displays, GPS, fuel quantity and flow, to determine if the condition exists. If it cannot be determined that the condition does not exist, treat the situation as if the condition exists.
Refer to Chapter 3 - EMERGENCY PROCEDURES or
Chapter 4B - ABNORMAL OPERATING PROCEDURES.

3.5 ENGINE INOPERATIVE PROCEDURES

WARNING

IN CERTAIN COMBINATIONS OF AIRCRAFT WEIGHT, CONFIGURATION, AMBIENT CONDITIONS, SPEED AND PILOT SKILL, NEGATIVE CLIMB PERFORMANCE MAY RESULT. REFER TO CHAPTER 5 PERFORMANCE FOR ONE ENGINE INOPERATIVE PERFORMANCE DATA.

IN ANY EVENT THE SUDDEN APPLICATION OF POWER DURING ONE-ENGINE INOPERATIVE OPERATION MAKES THE CONTROL OF THE AIRCRAFT MORE DIFFICULT.

3.5.1 DETECTING THE INOPERATIVE ENGINE

NOTE

One engine inoperative means an asymmetric loss of thrust, resulting in uncommanded yaw and roll in direction of the so-called "dead" engine (with coordinated controls). To handle this situation it is indispensable to maintain directional control by mainly rudder and additional aileron input. The following mnemonic trick can help to identify the failed engine:

"Dead foot - dead engine"

This means that, once directional control is re-established, you feel the control force on your foot pushing the rudder-pedal on the side of the operative engine, while the foot on the side of the failed engine feels no force. Further, the engine instruments can help to analyze the situation.

3.5.2 ENGINE SECURING (FEATHERING) PROCEDURE

NOTE

Depending on the situation, attempts can be made to restore engine power prior to securing the engine.

The minimum control speed (V_{MC}) with one engine inoperative (windmill) and 5^{o} bank angle towards the good engine is 65 KIAS.

The climb speed with one engine inoperative (feather) is 90 KIAS (V_{YSE}).

(a) Maintain lateral & directional control.

(b) MIXTURE control levers .... full forward

(c) PROPELLER RPM levers .... full forward

(d) THROTTLE levers .... full forward

(e) LANDING GEAR & FLAPS .... UP

(f) Inoperative engine .... identify and verify

Shut down and feathering of the affected engine:

(g) Operative engine .... Apply maximum power or power as required to keep safe flight

Securing the feathered engine:

(h) THROTTLE lever .... affected engine IDLE

CONTINUED

CAUTION

THE DESIGN OF THE PROPELLER FEATHERING SYSTEM DOES NOT ALLOW THE FEATHERING OF A PROPELLER WHICH IS NOT TURNING. FOR THIS REASON, IT IS VERY IMPORTANT THAT IF THE PROPELLER IS TO BE FEATHERED, THIS IS DONE BEFORE IT STOPS TURNING, OR FEATHERING WILL NOT BE POSSIBLE.

(i) PROPELLER RPM lever .... affected engine - FEATHER

(j) MIXTURE control lever .... affected engine - IDLE cut-off

(k) Ignition switch (magneto) .... affected engine - OFF

(l) ALTERNATOR .... affected engine - OFF

(m) FUEL PUMP .... inoperative engine - OFF

(n) FUEL SELECTOR .... inoperative engine - OFF

(o) THROTTLE control lever on dead engine .... up enough to silence the gear horn.

CONTINUED

CAUTION

REMOVAL OF GEAR HORN POWER, BY PULLING THE GEAR HORN CB, WILL ALSO REMOVE POWER TO THE STICK LIMITER.

NOTE

The remaining fuel in the tank of the failed engine can be used for the good engine, to extend the range and maintain lateral balance, by setting the good engine fuel selector in the CROSSFEED position.

NOTE

The engine performance data will not be valid if an engine has been stopped and the propeller is not feathered.

END OF CHECKLIST

3.5.3 UNFEATHERING & RESTARTING THE ENGINE IN FLIGHT

NOTE

Restarting the engine is possible at all airspeeds above a safe flying airspeed up to V_{NE} (194 KIAS) and up to the maximum demonstrated operating altitude.

(a) Preparation:

(1) Airspeed .... 90 KIAS minimum

(2) FUEL SELECTORS .... ON

(3) FUEL PUMP .... check ON

(4) THROTTLE lever .... set (3-4 cm forward of IDLE)

(5) ALTERNATE AIR .... as required

(b) Unfeathering the engine:

(1) PROPELLER RPM Lever .... Fully forward

(c) Starting the windmilling engine:

(1) MIXTURE control lever .... Rich

(2) Ignition switch .... BOTH

(3) ALTERNATOR .... ON

(d) If the engine does not windmill:

(1) Ignition switch .... START, until propeller windmills

CONTINUED

(e) If the engine does not start:

(1) MIXTURE control lever .... IDLE cut-off

(2) MIXTURE control lever .... advance forward slowly until the engine starts.

WARNING

IF THE OIL PRESSURE HAS NOT MOVED INTO THE GREEN SECTOR WITHIN 15 SECONDS AFTER STARTING, SWITCH OFF THE ENGINE.

NOTE

If it is not possible to start the engine, continue with Paragraph 3.5.2 - ENGINE SECURING (FEATHERING) PROCEDURE.

END OF CHECKLIST

3.5.4 ENGINE FAILURE DURING TAKE-OFF

(a) Engine failure with the landing gear extended.

During ground roll:

- abort takeoff

(1) THROTTLE levers .... IDLE / BOTH

(2) Rudder .... maintain directional control

(3) Brakes.. as required

If remaining runway / surface is inadequate to stop continue straight ahead, keep clear of obstacles.

CAUTION

IF SUFFICIENT TIME IS REMAINING, THE RISK OF FIRE IN THE EVENT OF A COLLISION WITH OBSTACLES CAN BE REDUCED AS FOLLOWS:

(4) FUEL SELECTORS................................... OFF

(5) MIXTURE control levers .... IDLE cut-off

(6) Ignition switches .... OFF

(7) ELECT. MASTER.. OFF.

END OF CHECKLIST

(b) Engine Failure after lift-off

If the landing gear is still down and the remaining runway/surface is adequate:

- abort the takeoff and land straight ahead, turning to avoid obstacles

If the remaining runway / surface is inadequate:

- decide whether to abort or to continue the take-off.

WARNING

IN CERTAIN COMBINATIONS OF AIRCRAFT WEIGHT, CONFIGURATION, AMBIENT CONDITIONS, SPEED AND PILOT SKILL, THE RESULTING CLIMB PERFORMANCE MAY NEVERTHELESS BE INSUFFICIENT TO CONTINUE THE TAKE-OFF SUCCESSFULLY. THEREFORE, A CONTINUED TAKEOFF WITH A FAILED ENGINE HAS TO BE AVOIDED IF AT ALL POSSIBLE. REFER TO CHAPTER 5 PERFORMANCE, FOR ONE ENGINE INOPERATIVE PERFORMANCE DATA.

Continued takeoff:

(1) MIXTURE control levers .... full forward

(2) PROPELLER RPM levers.......................... full forward

(3) THROTTLE levers .... full forward

(4) Rudder .... maintain directional control

(5) Airspeed.. Vyse 90 KIAS / as required

(6) Ignition switches.. check BOTH

(7) FUEL PUMPS .... ON

CONTINUED

(8) FLAPS .... verify UP

(9) Landing Gear .... UP to achieve a positive ROC

(10)Failed Engine .... identify

For the failed engine, move the controls and switches as follows:

(11)THROTTLE lever .... IDLE, then move it up enough to silence the gear warning horn

(12)PROPELLER RPM lever .... FEATHER

(13)MIXTURE control lever .... IDLE cut-off

(14) FUEL PUMP .... OFF

(15) Ignition switch .... OFF

(16) FUEL CONTROL .... OFF

Continue according to Paragraph 3.5.9 - ONE ENGINE INOPERATIVE FLIGHT and land as soon as possible according to Paragraph 3.5.10 - ONE ENGINE INOPERATIVE LANDING.

If the situation allows, you may climb to a safe altitude for engine troubleshooting (Paragraph 3.5.7 – ENGINE TROUBLESHOOTING) or (Paragraph 3.5.6 - ENGINE PROBLEMS IN FLIGHT) in order to try to restore engine power.

END OF CHECKLIST

3.5.5 ENGINE PROBLEMS ON THE GROUND

(a) THROTTLE lever... IDLE

(b) Brakes .... as required

(c) FUEL SELECTORS .... check ON

(d) Engine instruments... check

(e) PROPELLER RPM levers .... check

(f) MIXTURE control levers.................................. set for smooth running

(g) ALTERNATE AIR .... ON

(h) FUEL PUMPS .... ON

(i) Ignition switches .... check BOTH

(j) THROTTLE/PROPELLER RPM/MIXTURE..... try various settings.

(k) Problem engine .... switch off, if considered necessary; otherwise establish the cause of the problem and re-establish engine performance.

CAUTION

IF THE OIL PRESSURE IS BELOW THE GREEN SECTOR, THE ENGINE MUST BE SWITCHED OFF IMMEDIATELY.

WARNING

IF THE PROBLEM CANNOT BE CLEARED, THE AIRPLANE MUST NOT BE FLOWN.

END OF CHECKLIST

3.5.6 ENGINE PROBLEMS IN FLIGHT

(a) Engine running roughly

(1) Airspeed .... as required, maintain above V_{MC}

(2) FUEL SELECTORS .... check ON

(3) Engine instruments .... check

(4) THROTTLE levers .... check

(5) PROPELLER RPM levers .... check

(6) MIXTURE control levers .... set for smooth running

(7) ALTERNATE AIR .... ON

(8) FUEL PUMP on the affected engine .... ON, check for smooth running

(9) Ignition switches .... check BOTH

(10) THROTTLE/PROPELLER RPM/MIXTURE .. try various settings on the affected engine.

WARNING

IF THE PROBLEM DOES NOT CLEAR IMMEDIATELY, AND THE ENGINE IS NO LONGER PRODUCING SUFFICIENT POWER, SHUTDOWN AND FEATHER THE ENGINE ACCORDING TO PARAGRAPH 3.5.2 - ENGINE SECURING (FEATHERING) PROCEDURE. CONTINUE ACCORDING TO PARAGRAPH 3.5.9 - ONE ENGINE INOPERATIVE – FLIGHT. LAND AS SOON AS POSSIBLE.

CONTINUED

CAUTION

LARGE OR SUSTAINED SIDE SLIPS CAN RESULT IN A REDUCTION IN THE ENGINE FUEL PRESSURE.

RECOVERY FROM THE SIDE SLIP WILL IMMEDIATELY CORRECT THE CONDITION.

END OF CHECKLIST

(b) Loss of oil pressure

(1) Check the Garmin G-1000 message and the flashing gauge indication.

(2) Check the oil temperature.

(A) If the oil pressure indication drops below the green sector and the oil temperature is normal (oil pressure warning light does not illuminate or flash):

- Monitor the oil pressure warning light: it is probable that the oil pressure indication is defective

- Monitor the oil and cylinder head temperatures.

(B) If the oil pressure indication drops below the green sector while the oil or cylinder head temperature is rising, or if the oil pressure warning light illuminates or flashes or if both of these occur together:

- Reduce engine power to the minimum required

- Land as soon as possible

- Be prepared for an engine failure.

(C) Oil pressure tending to zero combined with: Vibration, loss of oil, possibly unusual metallic noise and smoke:

- A mechanical failure in the engine is apparent

- Shut off engine immediately according to Paragraph 3.5.2 - ENGINE SECURING (FEATHERING) PROCEDURE

- Continue according to Paragraph 3.5.9 - ONE ENGINE INOPERATIVE FLIGHT.

END OF CHECKLIST

(c) High oil pressure

Check oil temperature.

- If the oil temperature is normal, it is probable that the fault lies in the oil pressure indication, which should thus be ignored (the airplane should be serviced).

END OF CHECKLIST

(d) High oil temperature

First, attempt to lower the oil temperature by increasing the airspeed.

Check cylinder head and exhaust gas temperature.

(1) If neither the cylinder head nor the exhaust gas temperature is high, it is probable that the fault lies in the oil temperature indication. The airplane should be serviced.

(2) If the cylinder head temperature or exhaust gas temperature is also high:

- Check oil pressure. If the oil pressure is low, proceed as in Paragraph 3.5.6 (b) - Loss of oil pressure.

(A) If the oil pressure is in the green sector:

- Check mixture setting, enrich mixture if necessary
- Reduce power; if this produces no improvement:
    - Shut off engine immediately according to Paragraph 3.5.2 - ENGINE SECURING (FEATHERING) PROCEDURE
    - Continue according to Paragraph 3.5.9 - ONE ENGINE INOPERATIVE FLIGHT.
- Land at the nearest suitable airfield.

END OF CHECKLIST

(e) High cylinder head temperature

Cylinder head temperature in yellow sector or above:

(1) Reduce power, increase speed if possible

(2) Check mixture setting, enrich mixture if necessary.

(3) Check oil temperature.

If the oil temperature is also high:

(4) Check the oil pressure. If the oil pressure is low, proceed as in Paragraph 3.5.6 (b) - Loss of oil pressure.

(5) If the oil pressure is in the green sector:

- Monitor engine. If the condition does not improve, land at the nearest suitable airfield.

END OF CHECKLIST

(f) Un-commanded High RPM

(1) Pull the propeller lever back and listen for an associated drop in RPM.

- If the indication does not change in spite of an audible drop in RPM, it is probable that the RPM indication is defective, which should thus be ignored (the airplane should be serviced).

- If there is no audible drop in RPM, it is probable that the governor system is defective. In this case the RPM should be regulated using the throttle. Monitor to ensure engine RPM stays within limits. Be prepared to shut down the engine.

(2) Check friction adjuster for throttle quadrant.

END OF CHECKLIST

(g) Un-commanded Low RPM

(1) PROPELLER RPM lever............................ HIGH RPM

Listen for a rise in the RPM.

(A) If there is no audible rise in RPM, it is probable that the governor system is defective. In this case the RPM can be regulated within certain limits using the throttle.

- Land at the nearest suitable airfield.

- Be prepared for possible engine failure.

(B) If the indication does not change in spite of an audible rise in RPM, it is probable that the RPM indication is defective, which should thus be ignored (the airplane should be serviced).

(C) Synchronize audibly to the engine with the good indication.

(2) FUEL PUMP .... check ON

(3) FUEL SELECTORS .... check ON

(4) Friction adjuster for throttle quadrant .... check sufficiently tight

(5) Check oil pressure: .... Following loss of oil or oil pressure, the propeller will move to a high pitch position and the governor will not function properly. Proceed as in Paragraph 3.5.6 (b) - Loss of oil pressure.

END OF CHECKLIST

(h) High fuel flow

(1) Fuel pressure .... check

(A) If the fuel pressure is low, (CAS warning message L/R FUEL PR LO) there is possibly a leak (between the injection system and the injectors). Land at the nearest suitable airfield.

NOTE

If may become necessary to shut down the engine to prevent a fire.

(B) If the fuel pressure is in the green sector there is no leak; the likely cause is a defective fuel flow indication, which should thus be ignored (the airplane should be serviced). Fuel flow data should be taken from the engine performance table in Chapter 5.

END OF CHECKLIST

3.5.7 ENGINE TROUBLESHOOTING

WARNING

CONTROL OVER THE FLIGHT ATTITUDE HAS PRIORITY OVER ATTEMPTS TO SOLVE THE CURRENT PROBLEM ("FIRST FLY THE AIRCRAFT").

Depending on the situation the following attempts can be made to restore engine power prior to securing the engine:

(a) THROTTLE lever... IDLE

NOTE

If the loss of power was due to unintentional setting of the THROTTLE lever, you may adjust the friction lock and continue your flight.

(b) If in icing conditions .... ALTERNATE AIR ON – exit icing conditions

(c) Fuel quantity... check

NOTE

In case of low fuel quantity in the affected engines fuel tank you may feed it from the other engine's fuel tank by setting the affected engines fuel selector to CROSSFEED.

(d) FUEL SELECTOR.. check ON/CROSSFEED if required.

CONTINUED

NOTE

If the loss of power was due to unintentional setting of the fuel selector to the OFF position you may continue your flight but have the proper function of the restrainer locks checked prior to next flight.

If the engine power could not be restored by following the procedure of this section prepare for Paragraph 3.5.6 - ENGINE PROBLEMS IN FLIGHT and land as soon as possible.

END OF CHECKLIST

3.5.8 DEFECTIVE ENGINE CONTROLS

(a) Defective Mixture Control Cable

(1) It may be necessary to shut the engine down using the FUEL SELECTORS or the ignition switch when on the ground.

(2) During descent, test the reaction of the engine to a higher power setting. A lean mixture can lead to engine roughness and a loss of power. The landing approach must be planned accordingly.

END OF CHECKLIST

(b) Defective Throttle Control Cable (uncontrollable at high power)

(1) Approach nearest airfield, control engine power with the propeller lever.

(2) If necessary, perform a landing with shut-down engine Paragraph 3.5.2 – ENGINE SECURING (FEATHERING) PROCEDURE.

END OF CHECKLIST

(c) Defective Propeller Lever Control Cable

(1) Approach nearest airfield, control engine power with throttle.

(2) Perform normal landing.

END OF CHECKLIST

3.5.9 ONE ENGINE INOPERATIVE - FLIGHT

CAUTION

EVEN IF CONTINUED SAFE FLIGHT IS POSSIBLE WITH ONE ENGINE INOPERATIVE, LAND AS SOON AS PRACTICAL AT THE NEXT SUITABLE AIRFIELD.

(a) Airspeed .... as required, maintain above VMC (65 KIAS)

(b) Remaining engine .... Monitor engine instruments continuously

(c) Fuel quantity.. monitor continuously

(d) FUEL SELECTORS .... Good engine / set CROSSFEED or ON so as to keep fuel quantity laterally balanced.

NOTE

If the Fuel Selector is set on CROSSFEED, the engine will be supplied with fuel from the main tank on the opposite side.

Land as soon as possible Paragraph 3.5.10 - ONE ENGINE INOPERATIVE - LANDING.

If the situation allows, you may climb to a safe altitude for a troubleshooting (Paragraph 3.5.7 – ENGINE TROUBLESHOOTING) or (Paragraph 3.5.6 - ENGINE PROBLEMS IN FLIGHT) in order to try to restore engine power.

END OF CHECKLIST

3.5.10 ONE ENGINE INOPERATIVE - LANDING

(a) Preparation:

WARNING

FOR EMERGENCY LANDING THE ADJUSTABLE BACKRESTS (IF INSTALLED) MUST BE FIXED IN THE UPRIGHT POSITION.

(1) Adjustable backrests .... adjust to the upright position described by a placard on the roll over bar and verify proper fixation

(2) Safety harnesses .... check fastened & tightened

(3) Landing light.. as required

(4) Gear warning horn .... check function

(b) Operative engine:

(1) FUEL SELECTOR .... check ON / CROSSFEED as required

(c) Failed engine:

(1) Engine.. check secured (feathered) refer to Paragraph 3.5.2 - ENGINE SECURING (FEATHERING) PROCEDURE

CONTINUED

(d) Not before being certain of “making the field”:

WARNING

LOWERING THE LANDING GEAR WILL INCREASE THE AIRPLANE DRAG AND INCREASE THE POWER REQUIRED. LOWERING THE LANDING GEAR SHOULD BE DELAYED UNTIL A SAFE LANDING IS ASSURED.

ONE-ENGINE INOPERATIVE APPROACHES FOR LANDING WITH FLAP SETTINGS OF MORE THAN FLAPS UP ARE NOT RECOMMENDED UNLESS THE SAFE LANDING IS ASSURED (“MAKING THE FIELD”). HIGHER FLAP SETTINGS INCREASE THE LOSS OF ALTITUDE DURING THE TRANSITION TO A ONE ENGINE INOPERATIVE GO-AROUND / BALKED LANDING.

(1) Airspeed... V_{YSE} +10 KIAS

(2) LANDING GEAR.. DOWN, check 3 green

When landing is assured:

(3) FLAPS .... as required, maintain applicable minimum V_{REF}

NOTE

No flap landings with power will have reduced elevator travel due to limiter being engaged above 14.5 inches MP.

CONTINUED

(4) Final approach speed

at 1700 kg (3748 lb) .... 85 KIAS (V_{REF} /FLAPS UP)

at 1785 kg (3935 lb) .... 85 KIAS (V_{REF} /FLAPS UP)

(5) THROTTLE lever .... as required

(6) Trim .... as required / directional trim to neutral

NOTE

Higher approach speeds result in a significantly longer landing distance during flare.

CAUTION

IN CONDITIONS SUCH AS STRONG WIND, DANGER OF WIND SHEAR OR TURBULENCE, A HIGHER APPROACH SPEED SHOULD BE SELECTED.

(e) Perform normal touchdown and deceleration on ground.

(f) If required, the rudder trim can be set back to neutral.

If the approach to land is not successful you may consider Paragraph 3.5.11- ONE ENGINE INOPERATIVE GO-AROUND/BALKED LANDING.

END OF CHECKLIST

3.5.11 ONE ENGINE INOPERATIVE GO-AROUND / BALKED LANDING

CAUTION

ONE-ENGINE INOPERATIVE GO-AROUND / BALKED LANDINGS SHOULD BE AVOIDED IF AT ALL POSSIBLE AS CERTAIN COMBINATIONS OF AIRPLANE WEIGHT, CONFIGURATION, AMBIENT CONDITIONS, SPEED AND PILOT SKILL, MAY RESULT IN NEGATIVE CLIMB PERFORMANCE, MAKING A SUCCESSFUL ONE-ENGINE INOPERATIVE GO-AROUND / BALKED LANDING IMPOSSIBLE. REFER TO CHAPTER 5 PERFORMANCE FOR ONE ENGINE INOPERATIVE PERFORMANCE DATA. IN ANY EVENT THE SUDDEN APPLICATION OF POWER DURING ONE-ENGINE INOPERATIVE OPERATION MAKES THE CONTROL OF THE AIRCRAFT MORE DIFFICULT.

(a) THROTTLE lever .... MAX / as required

(b) Rudder .... maintain directional control

(c) Airspeed .... V_{YSE} 90 KIAS / as required

(d) LANDING GEAR .... UP / retract when positive rate of climb

(e) FLAPS .... UP

Establish minimum sideslip and maneuver for a new attempt to land. This can be done with 5 degrees of bank angle towards the good engine.

If a positive rate of climb cannot be established:

- Land so as to keep clear of obstacles with the landing gear extended.

CONTINUED

If time allows the following steps can reduce the risk of fire in an event of collision with obstacles after touchdown:

(f) FUEL SELECTORS .... OFF

(g) MIXTURE control levers.................................... IDLE cut-off

(h) Ignition switches .... OFF

(i) ELECT. MASTER switch................................... OFF.

END OF CHECKLIST

3.6 LANDING GEAR SYSTEM FAILURES

3.6.1 LANDING GEAR UNSAFE WARNING

NOTE

The landing gear unsafe warning light illuminates if the landing gear is neither in the final up or down and locked position. Illumination of this light is therefore normal during transit.

(a) If the light remains on for longer than 20 seconds during landing gear retraction / extension:

(1) Airspeed.. check below V_{LOR} 156 KIAS

(2) LANDING GEAR....................................... re-cycle if continued illumination occurs

(b) If the landing gear cannot be extended to the down & locked position:

- Continue with Paragraph 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR.

NOTE

If the landing gear cannot be retracted to the final up position you may continue the flight with the landing gear extended in the down & locked position. Expect higher aerodynamic drag, resulting in less flight performance and increased fuel consumption.

In cold ambient temperatures it can help to reduce the airspeed below 113 KIAS for the landing gear operation.

END OF CHECKLIST

3.6.2 MANUAL EXTENSION OF THE LANDING GEAR

NOTE

In case of a failure of the electrically-driven hydraulic gear pump which is driving the landing gear actuators, the landing gear can be extended manually at speeds up to 156 KIAS. The manual extension of the landing gear may take up to 20 seconds.

(a) The following checks can be completed before extending the landing gear manually:

(1) LANDING GEAR indicator lights................. test / push GEAR TEST button

(2) ELECT. MASTER .... check ON

(3) Bus voltage .... check in normal range

(4) Circuit breaker .... check in / reset if necessary

(b) Manual landing gear extension procedure:

(1) LANDING GEAR selector .... select DOWN

(2) Manual gear extension handle.................... pull out

NOTE

The landing gear should now extend by gravity and relief of hydraulic pressure from the system. If one or more landing gear indicator lights do not indicate the gear down & locked after completion of the manual extension procedure steps (1) through (6) reduce airspeed below 110 KIAS and apply moderate yawing and pitching to assist in bringing the landing gear into the locked position.

CONTINUED

(3) LANDING GEAR indicator lights .... check 3 green lights

NOTE

If the landing gear is correctly extended and locked, as indicated by the 3 green lights, the red light is illuminated additionally if the GEAR circuit breaker is pulled.

If the landing gear cannot be extended to the down & locked position continue according to Paragraph 3.6.3 - LANDING GEAR UP LANDING.

END OF CHECKLIST

3.6.3 LANDING GEAR UP LANDING

NOTE

This procedure applies if the landing gear is completely retracted.

(a) Approach .... with power at normal approach airspeeds

(b) THROTTLE levers .... IDLE / just before touchdown

If the time / situation allows, the following steps can help to reduce the risk of fire:

(c) FUEL SELECTORS .... OFF

(d) MIXTURE control levers.................................... IDLE cut-off

(e) Ignition switches .... OFF

(f) ELECT. MASTER switch.................................. OFF

Touchdown:

(g) Touchdown .... Contact surface with minimum airspeed

(h) On ground .... Maintain directional control with rudder as long as possible so as to avoid collision with obstacles.

END OF CHECKLIST

3.6.4 LANDING WITH A DEFECTIVE TIRE ON THE MAIN LANDING GEAR

CAUTION

A DEFECTIVE (E.G. BURST) TIRE IS NOT USUALLY EASY TO DETECT. THE DAMAGE NORMALLY OCCURS DURING TAKE-OFF OR LANDING, AND IS HARDLY NOTICEABLE DURING FAST TAXIING. IT IS ONLY DURING THE ROLL-OUT AFTER LANDING OR AT LOWER TAXIING SPEEDS THAT A TENDENCY TO SWERVE OCCURS. RAPID AND DETERMINED ACTION IS THEN REQUIRED.

(a) Advise ATC.

(b) Land the airplane at the edge of the runway that is located on the side of the intact tire, so that changes in direction which must be expected during roll-out due to the braking action of the defective tire can be corrected on the runway.

(c) Land with one wing low. The wing on the side of the intact tire should be held low.

(d) Direction should be maintained using the rudder. This should be supported by use of the brake. It is possible that the brake must be applied strongly - if necessary to the point where the wheel locks. The wide track of the landing gear will prevent the airplane from tipping over a wide speed range. There is no pronounced tendency to tip even when skidding.

END OF CHECKLIST

3.6.5 LANDING WITH DEFECTIVE BRAKES

Prepare for a greater rolling distance. If there is no pedal pressure before landing, consider the following:

CAUTION

IF SUFFICIENT TIME IS REMAINING, THE RISK OF FIRE IN THE EVENT OF A COLLISION CAN BE REDUCED AS FOLLOWS:

FUEL SELECTORS.....................................BOTH OFF

MIXTURE CONTROL LEVERS....................IDLE CUT-OFF

IGNITION SWITCHES..................................OFF

ELEC. MASTER SWITCH............................OFF

END OF CHECKLIST

3.7 FAILURES IN THE ELECTRICAL SYSTEM

3.7.1 COMPLETE FAILURE OF THE ELECTRICAL SYSTEM

(a) Circuit breakers .... check if all OK (pressed in). If there is still no electrical power available:

(b) HORIZON EMERGENCY SWITCH .... ON

(c) FLOOD light .... ON, as required

(d) Engine controls .... Set (based on lever positions and engine noise)

(e) Prepare landing with flaps in the present position. Refer to Paragraph 4B.5 - FAILURES IN FLAP OPERATING SYSTEM.

(f) Land at the nearest suitable airfield.

NOTE

The landing gear uplock is no longer ensured. The landing gear may slowly extend. The landing gear can be extended manually according to Paragraph 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR.

NOTE

The backup artificial horizon and the flood light will have electrical power for at least 1.5 hours.

Make use of the stand-by airspeed indicator and altimeter. Engine power can be set via visual reference of the THROTTLE lever position.

CONTINUED

(g) Both alternators failed:

WARNING

IF BOTH ALTERNATORS FAIL AT THE SAME TIME, REDUCE ALL ELECTRICAL EQUIPMENT TO A MINIMUM. EXPECT BATTERY POWER TO LAST 30 MINUTES AND LAND THE AIRPLANE AS SOON AS POSSIBLE.

(1) ATC .... advise

(2) LH/RH ALTERNATOR................................ OFF

(3) XPDR .... STBY

(4) LANDING GEAR.. down, when down and locked pull Emergency Release

(5) Stall/PITOT HEAT .... OFF

(6) All lights.. OFF

(7) HORIZON EMERGENCY switch .... ON

(8) AV MASTER .... OFF

NOTE

When the HORIZON EMERGENCY switch is set on, the emergency battery will supply power to the standby attitude gyro (artificial horizon) and the flood light.

CAUTION

IT IS STRONGLY RECOMMENDED TO LEAVE INSTRUMENT METEOROLOGICAL CONDITIONS (IMC). INFORM AIR TRAFFIC CONTROL (ATC) AND IF NECESSARY DECLARE AN EMERGENCY.

END OF CHECKLIST

3.7.2 STARTER MALFUNCTION

If the starter does not disengage from the engine after starting (starter warning message (START) on the G1000 remains illuminated or flashing after the engine has started):

(a) THROTTLE lever .... IDLE

(b) MIXTURE control lever .... IDLE cut-off

(c) Ignition switch.. OFF

(d) ELECT. MASTER switch................................... OFF

Terminate flight preparation.

END OF CHECKLIST

3.7.3 OVERVOLTAGE

If a voltage in the upper red sector (above 32 volts) is indicated with both alternators set to ON:

(a) LH ALTERNATOR .... OFF

If a voltage in the upper red sector (above 32 volts) is still indicated:

(b) LH ALTERNATOR .... ON

(c) RH ALTERNATOR .... OFF

If a voltage in the upper red sector (above 32 volts) is still indicated:

(d) LH ALTERNATOR .... OFF

WARNING

LEAVE THE ELEC. MASTER SWITCH ON.

(e) Equipment that is not required,
in particular, PITOT HEAT................................ OFF

(f) Land at the nearest suitable airfield.

END OF CHECKLIST

3.8 SMOKE AND FIRE

3.8.1 ENGINE FIRE ON THE GROUND

Engine fire when starting on the ground:

(a) FUEL SELECTORs .... OFF

(b) MIXTURE control lever .... IDLE cut-off

(c) THROTTLE lever .... MAX Power

(d) Cabin heat and defrost..................................... OFF

(e) ELECT. MASTER... OFF

When the engine has stopped:

(f) Ignition switch.. OFF

(g) Canopy .... open

(h) Airplane .... evacuate immediately.

END OF CHECKLIST

3.8.2 ENGINE FIRE DURING TAKE-OFF

If take-off can still be abandoned

(a) THROTTLE levers .... IDLE

(b) Cabin heat and defrost .... OFF

(c) Brakes .... apply - bring the airplane to a stop

After stopping:

(d) FUEL SELECTORs .... OFF

(e) MIXTURE control lever...................................... IDLE cut-off

(f) THROTTLE lever... MAX Power

(g) ELECT. MASTER.. OFF

When the engine has stopped:

(h) Ignition switch .... OFF

(i) Canopy .... open

(j) Airplane .... evacuate immediately

If take-off cannot be abandoned

(a) Cabin heat and defrost .... OFF

(b) If possible, fly along a short-cut traffic circuit and land on the airfield.

After climbing to a height from which the selected landing area can be reached safely, continue with: Paragraph 3.5.2 - ENGINE SECURING (FEATHERING) PROCEDURE and reference Paragraph 3.5.10 - perform a ONE ENGINE INOPERATIVE LANDING.

CONTINUED

CAUTION

IN CASE OF EXTREME SMOKE DEVELOPMENT, THE FRONT CANOPY MAY BE UNLATCHED DURING FLIGHT. THIS ALLOWS IT TO PARTIALLY OPEN, IN ORDER TO IMPROVE VENTILATION. THE CANOPY WILL REMAIN OPEN IN THIS POSITION. FLIGHT CHARACTERISTICS WILL NOT BE AFFECTED SIGNIFICANTLY.

THE MAXIMUM DEMONSTRATED AIRSPEED FOR EMERGENCY OPENING THE FRONT CANOPY IN FLIGHT IS 120 KIAS. DO NOT EXCEED 120 KIAS.

END OF CHECKLIST

3.8.3 ENGINE FIRE DURING FLIGHT

(a) Cabin heat and defrost .... OFF

(b) THROTTLE lever .... IDLE

(c) PROPELLER RPM lever .... FEATHER

(d) MIXTURE control lever .... IDLE cut-off

(e) Ignition switch (magneto) .... OFF

(f) ALTERNATOR .... OFF

(g) FUEL PUMP .... OFF

(h) FUEL SELECTOR .... OFF

CAUTION

IN CASE OF EXTREME SMOKE DEVELOPMENT, THE FRONT CANOPY MAY BE UNLATCHED DURING FLIGHT. THIS ALLOWS IT TO PARTIALLY OPEN, IN ORDER TO IMPROVE VENTILATION. THE CANOPY WILL REMAIN OPEN IN THIS POSITION. FLIGHT CHARACTERISTICS WILL NOT BE AFFECTED SIGNIFICANTLY.

THE MAXIMUM DEMONSTRATED AIRSPEED FOR EMERGENCY OPENING THE FRONT CANOPY IN FLIGHT IS 120 KIAS. DO NOT EXCEED 120 KIAS.

END OF CHECKLIST

3.8.4 ELECTRICAL FIRE ON GROUND

(a) ELECT. MASTER switch.................................. OFF

If the engine is running:

(b) THROTTLE lever .... IDLE

(c) MIXTURE control lever .... IDLE Cut-off

When the engine has stopped:

(d) Ignition switch... OFF

(e) Canopy .... open

(f) Airplane .... evacuate immediately.

END OF CHECKLIST

3.8.5 ELECTRICAL FIRE IN FLIGHT

(a) HORIZON EMERGENCY switch....................... ON (if installed)

(b) AV MASTER... OFF

(c) ELECT. MASTER.. OFF

(d) Cabin heat and defrost..................................... OFF

(e) Emergency window(s)...................................... open if required

(f) If feasible and necessary, use the fire bottle to extinguish the fire.

(g) Land at a suitable airfield as soon as possible.

CAUTION

SWITCHING OFF THE MASTER SWITCH WILL SHUT DOWN ALL ELECTRONIC AND ELECTRIC EQUIPMENT.

WITH THE EMERGENCY SWITCH ON, THE EMERGENCY BATTERY WILL SUPPLY POWER TO THE STANDBY ATTITUDE GYRO (ARTIFICIAL HORIZON) AND THE FLOOD LIGHT.

IN CASE OF EXTREME SMOKE DEVELOPMENT, THE FRONT CANOPY MAY BE UNLATCHED DURING FLIGHT. THIS ALLOWS IT TO PARTIALLY OPEN, IN ORDER TO IMPROVE VENTILATION. THE CANOPY WILL REMAIN OPEN IN THIS POSITION. FLIGHT CHARACTERISTICS WILL NOT BE AFFECTED SIGNIFICANTLY.

THE MAXIMUM DEMONSTRATED AIRSPEED FOR EMERGENCY OPENING OF THE FRONT CANOPY IN FLIGHT IS 120 KIAS. DO NOT EXCEED 120 KIAS.

END OF CHECKLIST

3.9 OTHER EMERGENCIES

3.9.1 ICING

Unintentional flight into icing conditions

(a) Leave the icing area (consider an alternate flight path in order to reach zones with a higher ambient temperature.)

(b) PITOT HEAT .... ON

(c) Cabin heat and defrost .... ON

(d) PROPELLER RPM levers .... increase, in order to prevent ice build-up on the propeller blades

(e) ALTERNATE AIR .... ON

(f) Emergency window(s) .... open if required

CAUTION

ICE BUILD-UP INCREASES THE STALLING SPEED.

(g) ATC .... advise if an emergency is expected.

CAUTION

IF THE PITOT HEATING FAILS, AND THE ALTERNATE STATIC VALVE IS INSTALLED:

ALTERNATE STATIC .... OPEN

EMERGENCY WINDOW(S) .... CLOSE.

END OF CHECKLIST

3.9.2 SUSPICION OF CARBON MONOXIDE CONTAMINATION IN THE CABIN

Carbon monoxide (CO) is a gas which is developed during the combustion process. It is poisonous and without smell. Since it usually occurs together with flue gases, it can be detected. Increased concentration of carbon monoxide in closed spaces can be fatal. The occurrence of CO in the cabin is possible only due to a defect. In the case of a CO in the cabin, the CO ALERT annunciator light will come on steady. If a smell similar to exhaust gases is noticed in the cabin, the following measures should be taken:

(a) Cabin heat and defrost .... OFF

(b) Ventilation.. open

(c) Emergency window(s) .... open

(d) Forward canopy... unlatch, push up and lock in "cooling-gap“ position.

CAUTION

IN CASE OF SUSPICION OF CARBON MONOXIDE CONTAMINATION IN THE CABIN, THE FRONT CANOPY MAY BE UNLATCHED DURING FLIGHT. THIS ALLOWS IT TO PARTIALLY OPEN, IN ORDER TO IMPROVE VENTILATION. THE CANOPY WILL REMAIN OPEN IN THIS POSITION. FLIGHT CHARACTERISTICS WILL NOT BE AFFECTED SIGNIFICANTLY.

THE MAXIMUM DEMONSTRATED AIRSPEED FOR EMERGENCY OPENING OF THE FRONT CANOPY IN FLIGHT IS 120 KIAS. DO NOT EXCEED 120 KIAS.

END OF CHECKLIST

3.9.3 RECOVERY FROM AN UNINTENTIONAL SPIN

CAUTION

INTENTIONAL SPINS ARE PROHIBITED IN THIS AIRPLANE. IN THE EVENT A SPIN IS ENCOUNTERED UNINTENTIONALLY, IMMEDIATE RECOVERY ACTIONS MUST BE TAKEN. SINGLE-ENGINE STALLING IS NOT PERMITTED.

CAUTION

STEPS (a) TO (e) THAT FOLLOW MUST BE CARRIED OUT IMMEDIATELY AND SIMULTANEOUSLY.

(a) THROTTLE levers.. IDLE

(b) Rudder .... full deflection against direction of spin

(c) Ailerons .... neutral

(d) Elevator (control stick)...................................... fully forward

(e) FLAPS.. UP

When rotation has stopped:

(f) Rudder .... neutral

(g) Elevator (control stick)...................................... pull carefully

(h) Return the airplane from a descending into a normal flight attitude. Do not exceed the "never exceed speed" V_{NE} = 194 KIAS.

END OF CHECKLIST

3.9.4 UNLOCKED DOORS

(a) Airspeed .... reduce immediately

(b) Canopy .... check visually if closed

(c) Rear passenger door........................ check visually if closed

(d) Front baggage doors .... check visually if closed

Canopy Unlocked

(e) Airspeed .... below 140 KIAS

(f) Land at the next suitable airfield.

END OF CHECKLIST

Rear Passenger Door Unlocked

(e) Airspeed .... below 140 KIAS

(f) Land at the next suitable airfield.

WARNING

DO NOT TRY TO LOCK THE REAR PASSENGER DOOR IN FLIGHT. THE SAFETY LATCH MAY DISENGAGE AND THE DOOR OPENS. USUALLY THIS RESULTS IN A SEPARATION OF THE DOOR FROM THE AIRPLANE.

NOTE

If the door has been lost the airplane can be safely flown to the next suitable airfield.

END OF CHECKLIST

Front Baggage Door Open

(e) Airspeed .... reduce, so that the door is in a stable position

(f) Land at the next suitable airfield.

WARNING

SEPARATION OF THE BAGGAGE DOOR MAY DAMAGE THE PROPELLER AND MAY LEAD TO AN ENGINE FAILURE.

END OF CHECKLIST

3.9.5 DEFECTIVE PROPELLER RPM REGULATING SYSTEM

CAUTION

THE THROTTLE LEVER SHOULD BE MOVED SLOWLY, IN ORDER TO AVOID OVER-SPEEDING AND EXCESSIVELY RAPID RPM CHANGES.

Oscillating RPM

(a) THROTTLE lever setting .... change

NOTE

If the problem does not clear itself, land at the nearest suitable airfield.

Propeller Overspeed

(b) THROTTLE lever setting .... reduce as required

NOTE

If the problem does not clear itself, land at the nearest suitable airfield. Prepare for engine malfunction according to Paragraph 3.5.6 - ENGINE PROBLEMS IN FLIGHT.

END OF CHECKLIST

3.9.6 EMERGENCY DESCENT

(a) FLAPS .... UP

(b) LANDING GEAR .... DOWN

(c) THROTTLE levers... IDLE

(d) Airspeed .... as required

WARNING

MAX. STRUCTURAL CRUISING SPEED: V_{NO} = 155 KIAS.

NEVER EXCEED SPEED IN SMOOTH AIR: V_{NE} = 194 KIAS.

WARNING

THIS EMERGENCY DESCENT PROCEDURE MAY IMPOSE A RISK OF “SHOCK COOLING” THAT COULD CAUSE DAMAGE TO THE ENGINES.

NOTE

The Propeller levers might be set full FWD to increase drag as long as the RPM limits are not exceeded.

END OF CHECKLIST

3.9.7 EMERGENCY EXIT

In case of a roll over of the airplane on the ground, the rear side door can be used as an exit. For this purpose unlock the front hinge of the rear side door. The function is displayed on a placard beside the hinge.

END OF CHECKLIST

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CHAPTER 4A

NORMAL OPERATING PROCEDURES

TABLE OF CONTENTS

PAGE

4A.1 INTRODUCTION

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

4A.2 AIRSPEEDS FOR NORMAL OPERATING PROCEDURES

NOTE

Readability of the G1000 PFD and MFD displays may be degraded when wearing polarized sungasses.

	FLAPS	ALL WEIGHTS
Airspeed for rotation (Take-off run, V_R)	UP	min. 78 KIAS
Airspeed for take-off climb (best rate-of-climb speed, V_Y)	UP	min. 90 KIAS
Airspeed for cruise climb	UP	min. 90 KIAS
Final approach speed	LDG	min. 85 KIAS
Go Around Speed	APP	min. 85 KIAS
Intentional One Engine Inoperative Speed (V_{SSE})	UP	min. 80 KIAS
Maximum structural cruising speed. Do not exceed this speed except in smooth air, and then only with caution	UP	155 KIAS

4A.3 ADVISORY ALERTS ON THE G1000

4A.3.1 ADVISORY GENERAL

CHARACTERISTICS	White color coded text

4A.3.2 L/R FUEL XFER

L/R FUEL XFER	Fuel transfer from auxiliary to main tank is in progress (if aux. tanks are installed)

4A.3.3 PFD/MFD/GIA FAN FAIL

PFD FAN FAIL	Cooling fan for the PFD is inoperative
MFD FAN FAIL	Cooling fan for the MFD is inoperative
GIA FAN FAIL	Cooling fan for the GIA is inoperative

The flight may be continued, but maintenance action is required after landing.

NOTE

A full list of G1000 system message advisories are available in the Garmin G1000 Pilot's Guide for the Diamond DA42-L360, Part Number 190-01061-00 (Current Revision) and in the Garmin G1000 Cockpit Reference Guide for the DA42-L360, Part Number 190-01062-00 (Current Revision).

4A.4 FLIGHT CHARACTERISTICS

The DA42 L360 is to be flown with "the feet on the pedals“, meaning that coordinated flight in all phases and configurations shall be supported by dedicated use of the rudder and ailerons together.

With the landing gear extended and at aft CG-locations, with flaps up and full power applied, the airplane will easily recover from sideslip if the trim is set to neutral (normal procedure), otherwise it may require corrective action with a moderate amount of rudder input.

During large sustained sideslips rapid control inputs may result in engine fuel pressure reduction. Recovery from the sideslip immediately corrects condition.

NOTE

During planned sustained side slips, fuel cross feed to the lower engine will help to improve the condition.

4A.5 DAILY CHECK

Before the first flight of the day it must be ensured that the following checks are performed.

- On-condition check of the canopy, the side door and the baggage compartment doors for cracks and major scratches.
- On-condition check of the hinges for the canopy, the side door and the baggage compartment doors.
- Visual inspection of the locking bolts for proper movement with no backlash.
- Tire inflation pressure check (main wheels: 4.5 bar/65 psi, nose wheel: 6.0 bar/ 87 psi).
- Visual inspection of both spinners and their attachment.
- If OÄM 42-077 (removable fuselage nose-cone) is implemented:
  Check the fuselage nose cone for improper fit and loose attachment screws

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.6.1 PRE-FLIGHT INSPECTION

(a) Cabin check

Preparation:

(1) PARKING BRAKE...................................... Set ON

(2) MET, NAV, Mass & CG .... flight planning completed

(3) Airplane documents .... complete and up-to-date

(4) Front canopy & rear door............................ clean, undamaged, check locking mechanism function

(5) Baggage .... stowed and secure

(6) Foreign objects .... check

CONTINUED

Center Console:

(1) FUEL selectors .... check ON

(2) THROTTLE levers .... check condition, freedom of movement and full travel/ adjust friction, set IDLE

(3) PROPELLER RPM levers........................... Full FWD

(4) MIXTURE control levers .... IDLE cut-off

Below instrument panel in front of left seat:

(1) ALTERNATE STATIC SOURCE.................. check CLOSED

(2) MANUAL GEAR EXTENSION.................... check pushed in

Below instrument panel in front of right seat:

(1) ALTERNATE AIR .... check CLOSED

On the instrument panel:

(1) ALTERNATORS.. check ON

(2) PITOT HEAT .... check OFF

(3) Ignition keys .... check keys are pulled out

(4) FUEL PUMPS .... OFF

(5) ELECT. MASTER....................................... check OFF

(6) AV MASTER .... check OFF

(7) LANDING GEAR selector .... check DOWN

(8) FLAPS selector .... check UP

(9) Circuit breakers.. set in (if one has been pulled, check reason)

CONTINUED

(10) ELT .... armed

(11) HORIZON EMERGENCY Switch .... check OFF and guarded

(12) All electrical equipment .... OFF

Check procedure:

(1) ELECT. MASTER....................................... ON

CAUTION

WHEN SWITCHING THE ELECT. MASTER ON, THE ELECTRICALLY DRIVEN HYDRAULIC GEAR PUMP MAY ACTIVATE ITSELF FOR 5 TO 20 SECONDS IN ORDER TO RESTORE THE SYSTEM PRESSURE. SHOULD THE PUMP CONTINUE TO OPERATE CONTINUOUSLY OR PERIODICALLY, TERMINATE FLIGHT. THERE IS A MALFUNCTION IN THE LANDING GEAR SYSTEM.

(2) Fuel quantity .... check indication, verify using alternate means (See Section 7.10.5)

(3) Position lights, strobe lights (ACL) .... check for correct function

CAUTION

DO NOT LOOK DIRECTLY INTO THE ANTI COLLISION LIGHTS.

(4) Landing/Taxi light .... check for correct function

CONTINUED

(5) Stall warning/stall heat/Pitot heat .... check

NOTE

The stall warning switch gets slightly warmer on ground only and STAL HT FAIL is indicated on the PFD.

(6) Gear warning TEST BUTTON .... PUSH, check aural alert/ CHECK GEAR caution

CAUTION

IF THE AURAL ALERT OR THE WARNING ON THE PFD DOES NOT APPEAR, TERMINATE FLIGHT. UNSCHEDULED MAINTENANCE IS NECESSARY.

(7) Control stick

(A) Flaps .... set to LDG

(B) Control stick... pull fully aft/ hold at backstop

(C) THROTTLE levers .... set MAX - no stick movement

(D) Flaps .... set APP - no stick movement

(E) Flaps .... set UP - stick moves forward limiter ON

(F) THROTTLE levers .... set IDLE - stick moves

(8) ELECT. MASTER...................................... OFF

(9) Flight controls... check free and correct movement up to full deflection

(10) Trims .... check free and correct movement up to full deflection.

END OF CHECKLIST

(b) Walk-around check, visual inspection

CAUTION

A VISUAL INSPECTION MEANS: EXAMINATION FOR DAMAGE, CRACKS, DELAMINATION, EXCESSIVE PLAY, LOAD TRANSMISSION, CORRECT ATTACHMENT AND GENERAL CONDITION. IN ADDITION CONTROL SURFACES SHOULD BE CHECKED FOR FREEDOM OF MOVEMENT.

CAUTION

IN LOW AMBIENT TEMPERATURES THE AIRPLANE SHOULD BE COMPLETELY CLEARED OF ICE, SNOW AND SIMILAR ACCUMULATIONS.

CAUTION

PRIOR TO FLIGHT, REMOVE SUCH ITEMS AS CONTROL SURFACES GUST LOCK, PITOT COVER, STEERING BAR, ETC.

CONTINUED

1 -Left Main Landing Gear
2 -Left Engine Nacelle
3 -Left Wing
4 -Fuselage, Left Side, Underside
5 -Empennage
6 -Fuselage, Right Side
7 -Right Main Landing Gear
8 -Right Wing
9 -Right Engine Nacelle
10 -Front Fuselage And Nose Landing Gear

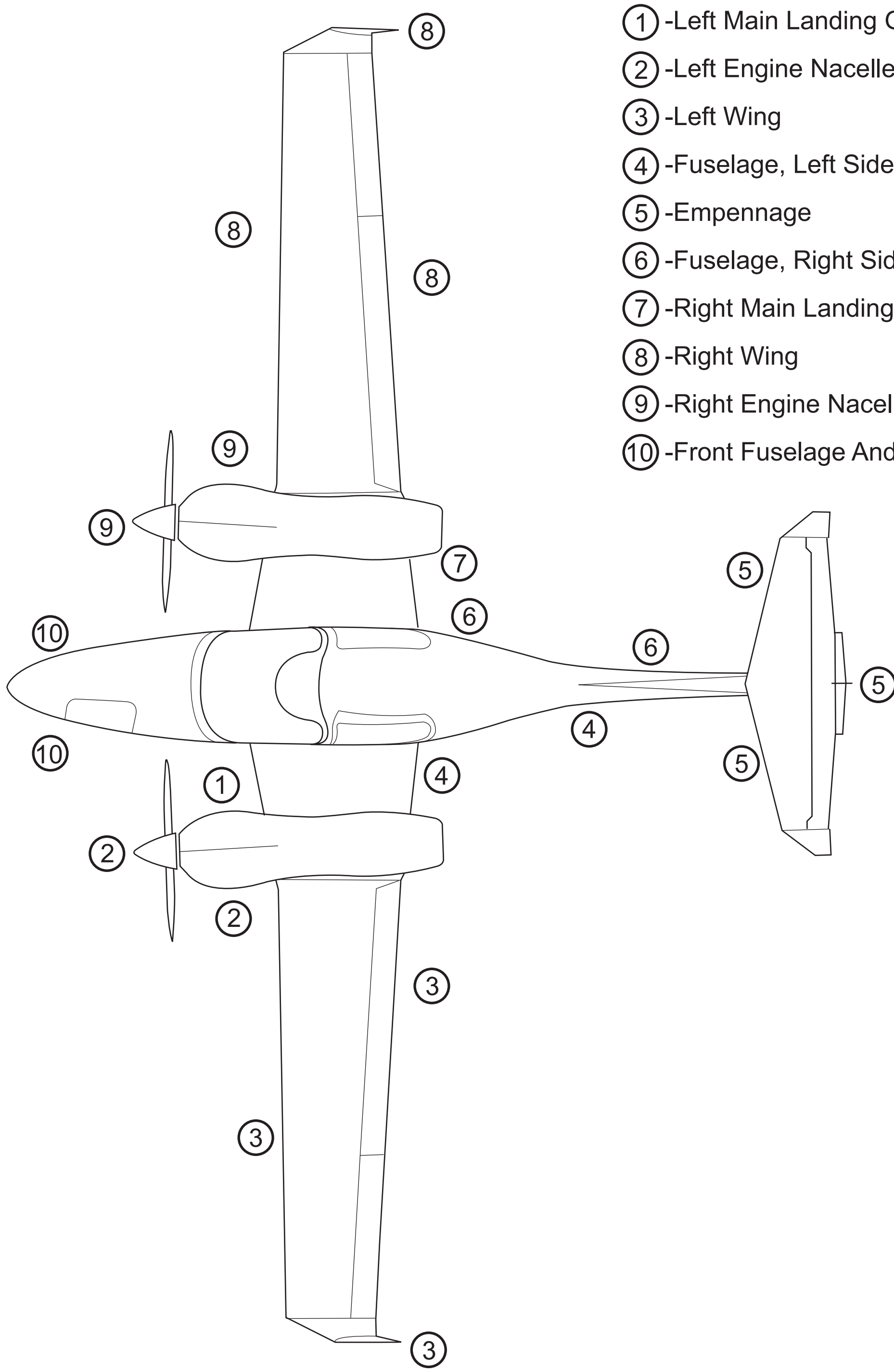

Figure 1 - Walk-around Check – Visual Inspection

(1) Left main landing gear:

(A) Landing gear strut & lock...................... visual inspection, sufficient height (typical visible piston length at least 4cm / 1.6”)

(B) Down and uplock switches (3x)............ visual inspection

(C) Tire wear, tread depth .... visual inspection

(D) Tire, wheel, brake................................ visual inspection

(E) Brake line connection........................... visual inspection

(F) Tire-to-rim slip marks (if installed) .... visual inspection

(G) Landing gear door .... visual inspection

(2) Left engine nacelle:

(A) Fuel gascolator..................................... drain a fuel sample to check for the absence of water and sediment

(B) Crank case venting pipe....................... check for blockage

WARNING

THE EXHAUST CAN CAUSE BURNS WHEN HOT.

(C) Exhaust .... visual inspection

(D) Engine oil level .... check dipstick, door secure
- min. 4 qts for VFR operation
- min. 6 qts for IFR operation

CONTINUED

(E) Cowling & attachment screws .... visual inspection

(F) Air inlets (4x) and outlet........................ check clear

WARNING

DO NOT TURN THE PROPELLER BY HAND. SERIOUS PERSONAL INJURY COULD RESULT.

(G) Propeller.. visual inspection

(H) Spinner & attachment screws............... visual inspection

(I) Auxiliary tank filler .... visual inspection, door closed & locked

(J) Nacelle underside................................. check for excessive contamination particularly by oil, fuel and other fluid.

CONTINUED

(3) Left Wing:

(A) Fuel tank drain.................................... drain a fuel sample to check for the absence of water and sediment.

(B) Entire wing surface.............................. visual inspection

(C) Fuel tank air outlet (lower surface)....... visual inspection

(D) Stall warning device............................. visual inspection

(E) Fuel tank vent...................................... visual inspection

(F) Pitot/static mast (probe if installed) ...... clean, orifices clear, cover off, no deformation

(G) Fuel tank filler...................................... check closed

(H) Wing tip .... visual inspection

(I) Tie down ring....................................... check clear

(J) Position & Strobe light (ACL)................ visual inspection

(K) Static dischargers................................ visual inspection

(L) Aileron paddle .... check clear of foreign objects

(M) Aileron hinges, linkage, safety pins...... visual inspection

(N) Outboard flap, linkage, safety pins....... visual inspection

(O) Left nacelle underside .... visual inspection

(P) Aux fuel tank vent outlet....................... visual inspection

(Q) Left aux fuel tank................................. drain a fuel sample to check for the absence of water and sediment

(R) Inboard flap condition & linkage .... visual inspection

CONTINUED

(4) Fuselage, left side:

(A) Step .... visual inspection

(B) Fuselage, center section .... check for absence of hydraulic fluid

(C) Canopy, left side .... visual inspection

(D) Rear cabin door & window .... visual inspection

(E) Fuselage surface .... visual inspection

(F) Antennae .... visual inspection

(G) Autopilot static source (if installed) .... check for absence of blockage

(5) Empennage:

(A) Tail skid and lower fin (left side) .... visual inspection

(B) Tie down .... check clear

(C) Vertical fin .... visual inspection

(D) Stabilizer & tip .... visual inspection

(E) Static discharger .... visual inspection

(F) Elevator surface, hinges, trim tab .... visual inspection

(G) Rudder surface & trim tab .... visual inspection

(H) Stabilizer tip & static discharger .... visual inspection

(I) Stabilizer surface .... visual inspection

(J) Vertical fin (right side) .... visual inspection

(K) Tail skid & lower fin (right side) .... visual inspection

CONTINUED

(6) Fuselage, right side:

(A) Fuselage surface.................................. visual inspection

(B) Antennae.. visual inspection

(C) Autopilot static source (if installed)....... check for absence of blockage

(D) Canopy, right side................................. visual inspection

(E) Step .... visual inspection

(7) Right Main Landing Gear:

(A) Landing gear strut and lock.................. visual inspection, sufficient height (typical visible piston length at least 4cm / 1.6”)

(B) Down and uplock switches (3x)............ visual inspection

(C) Tire wear, tread depth .... visual inspection

(D) Tire, wheel, brake................................. visual inspection

(E) Brake line connection........................... visual inspection

(F) Tire-to-rim slip marks (if installed) .... visual inspection

(G) Landing gear door .... visual inspection

CONTINUED

(8) Right Wing:

(A) Inboard flap condition & linkage .... visual inspection

(B) Right nacelle underside .... visual inspection

(C) Right aux fuel tank .... drain a fuel sample to check for the absence of water and sediment

(D) Aux fuel tank vent outlet .... visual inspection

(E) Outboard flap, linkage, safety pins .... visual inspection

(F) Aileron hinges, linkage, safety pins ...... visual inspection

(G) Aileron paddle .... check clear of foreign objects

(H) Static dischargers .... visual inspection

(I) Position & strobe light (ACL) .... visual inspection

(J) Wing tip .... visual inspection

(K) Tie down ring .... check clear

(L) Entire wing surface .... visual inspection

(M) Fuel tank filler .... check closed

(N) Fuel tank vent .... visual inspection

(O) Fuel tank air outlet (lower surface) .... visual inspection

(P) Fuel tank drain .... drain a fuel sample to check for the absence of water and sediment

CONTINUED

(9) Right engine nacelle:

(A) Auxiliary tank filler .... visual inspection, door closed & locked

(B) Engine oil level .... check dipstick, door secure
- min 4 qts for VFR operation
- min 6 qts for IFR operation

(C) Cowling & attachment screws .... visual inspection

(D) Nacelle underside................................ check for excessive contamination, particularly by oil, fuel and other fluids

WARNING

THE EXHAUST CAN CAUSE BURNS WHEN HOT.

(E) Exhaust .... visual inspection

(F) Air inlets (4x) and outlet........................ check clear

WARNING

DO NOT TURN THE PROPELLER BY HAND. SERIOUS PERSONAL INJURY COULD RESULT.

(G) Propeller.. visual inspection

(H) Spinner & attachment screws............... visual inspection

(I) Fuel gascolator..................................... drain a fuel sample to check for the absence of water and sediment

CONTINUED

(J) Crank case venting pipe .... check for blockage

(K) Cabin air inlet NACA duct..................... check clear (located at the right inboard wing)

(10) Front fuselage and nose landing gear:

(A) OAT sensor .... visual inspection

(B) Front baggage doors (left & right) .... visual inspection, closed and locked

(C) Nose landing gear strut .... visual inspection, sufficient height (typical visible piston length at least 15 cm / 5.9 in)

(D) Down & uplock switches....................... visual inspection

(E) Tire wear, tread depth........................... visual inspection

(F) Tire, wheel .... visual inspection

(G) Tire-to-rim slip marks (if installed) .... visual inspection

(H) Gear door and linkage.......................... visual inspection

(I) Chocks .... remove

(J) EPU connector .... check

(K) Steering bar .... removed and stowed.

END OF CHECKLIST

4A.6.2 BEFORE STARTING ENGINE

(a) Pre-flight inspection.. complete

(b) Passengers .... briefed

NOTE

Ensure all the passengers have been fully briefed on the use of the seat belts, doors and emergency exits and the ban on smoking.

(c) Rear door .... closed and locked

CAUTION

WHEN OPERATING THE CANOPY, PILOTS/OPERATORS MUST ENSURE THAT THERE ARE NO OBSTRUCTIONS BETWEEN THE CANOPY AND THE MATING FRAME, FOR EXAMPLE SEAT BELTS, CLOTHING, ETC. WHEN OPERATING THE LOCKING HANDLE DO NOT APPLY UNDUE FORCE. A SLIGHT DOWNWARD PRESSURE ON THE CANOPY MAY BE REQUIRED TO EASE THE HANDLE OPERATION.

(d) Front canopy .... Position 1 or 2 (cooling gap)

WARNING

FOR TAKE-OFF THE ADJUSTABLE BACKRESTS (IF INSTALLED) MUST BE FIXED IN THE UPRIGHT POSITION.

CONTINUED

NOTE

The pilot must ensure that a passenger sitting on a front seat is instructed in the operation of the adjustable backrest (if installed).

(e) Adjustable backrests (if installed)...................... adjust to the upright position

(f) Rudder pedals .... adjusted and locked

(g) Safety harnesses... all on and fastened

(h) THROTTLE levers... check IDLE

(i) PROPELLER RPM levers .... full forward

(j) MIXTURE control levers................................... IDLE cut-off

(k) PARKING BRAKE .... set

(l) AVIONIC MASTER... check OFF

(m) GEAR selector.. check DOWN

(n) ELECT. MASTER... ON

(o) CO ALERT .... flashes twice then goes out when airplane power is applied. System can also be tested by pressing the CO ALERT annunciator.

CONTINUED

CAUTION

WHEN SWITCHING THE ELECT. MASTER ON, THE ELECTRICALLY DRIVEN HYDRAULIC GEAR PUMP MAY ACTIVATE ITSELF FOR 5 TO 20 SECONDS IN ORDER TO RESTORE THE SYSTEM PRESSURE. SHOULD THE PUMP CONTINUE TO OPERATE CONTINUOUSLY OR PERIODICALLY, TERMINATE FLIGHT PREPARATION. THERE IS A MALFUNCTION IN THE LANDING GEAR SYSTEM.

(p) G1000 .... wait until power-up completed. Note the database effective dates. Press ENT on MFD to acknowledge.

NOTE

The engine instruments are only available on the MFD after item (p) has been completed

(q) Check fuel and update GARMIN.

(r) Check and input NAV/COM Planning.

END OF CHECKLIST

4A.6.3 STARTING ENGINE

NOTE

The starting engine procedure that follows is applicable to both aircraft engines.

(a) Cold engine:

(1) STROBE lights .... ON

(2) THROTTLE lever .... 3 cm (1.2 in) forward from IDLE (measured from rear of slot)

(3) FUEL PUMP .... ON

(4) MIXTURE control lever .... RICH for 3 – 5 seconds, then LEAN

(5) FUEL PUMP .... OFF

(6) THROTTLE lever .... 1 cm (0.4 in) forward from IDLE (measured from rear of slot)

WARNING

BEFORE STARTING THE ENGINE THE PILOT MUST ENSURE THAT THE PROPELLER AREA IS FREE, AND NO PERSONS CAN BE ENDANGERED.

CONTINUED

CAUTION

DO NOT OVERHEAT THE STARTER MOTOR. DO NOT OPERATE THE STARTER MOTOR FOR MORE THAN 10 SECONDS. AFTER OPERATING THE STARTER MOTOR, LET IT COOL OFF FOR 20 SECONDS. AFTER 6 ATTEMPTS TO START THE ENGINE, LET THE STARTER COOL OFF FOR HALF AN HOUR.

CAUTION

THE USE OF AN EXTERNAL PRE-HEATER AND EXTERNAL POWER SOURCE IS RECOMMENDED WHENEVER POSSIBLE, IN PARTICULAR AT AMBIENT TEMPERATURES BELOW 0 ºC (32 ºF), TO REDUCE WEAR AND ABUSE TO THE ENGINE AND ELECTRICAL SYSTEM. PRE-HEAT WILL THAW THE OIL TRAPPED IN THE OIL COOLER, WHICH CAN BE CONGEALED IN EXTREMELY COLD TEMPERATURES. AFTER A WARM-UP PERIOD OF APPROXIMATELY 2 TO 5 MINUTES (DEPENDING ON THE AMBIENT TEMPERATURE) AT 1500 RPM, THE ENGINE IS READY FOR TAKE-OFF IF IT ACCELERATES SMOOTHLY AND THE OIL PRESSURE IS NORMAL AND STEADY.

(7) Ignition switch .... START

When engine fires:

(8) MIXTURE control lever .... move to full RICH

(9) THROTTLE lever .... adjust to 1000 RPM

CONTINUED

(10) Oil pressure .... green sector within 15 sec

WARNING

IF THE OIL PRESSURE HAS NOT MOVED INTO THE GREEN SECTOR WITHIN 15 SECONDS AFTER STARTING, SWITCH OFF THE ENGINE AND INVESTIGATE PROBLEM.

(11) Ammeter .... check

(12) Annunciator panel .... check

(b) Warm engine:

(1) STROBE light... ON

(2) THROTTLE lever .... 3 cm (1.2 in) forward from IDLE (measured from rear of slot)

(3) FUEL PUMP .... ON

(4) MIXTURE control lever .... RICH for 1 - 2 seconds, then LEAN

(5) FUEL PUMP .... OFF

WARNING

BEFORE STARTING THE ENGINE THE PILOT MUST ENSURE THAT THE PROPELLER AREA IS FREE AND NO PERSONS CAN BE ENDANGERED.

CONTINUED

CAUTION

DO NOT OVERHEAT THE STARTER MOTOR. DO NOT OPERATE THE STARTER MOTOR FOR MORE THAN 10 SECONDS. AFTER OPERATING THE STARTER MOTOR, LET IT COOL OFF FOR 20 SECONDS. AFTER 6 ATTEMPTS TO START THE ENGINE, LET THE STARTER COOL OFF FOR HALF AN HOUR.

(6) Ignition switch .... START

When engine fires:

(7) MIXTURE control lever .... move to full RICH

(8) THROTTLE lever .... adjust to 1000 RPM

(9) Oil pressure .... green sector within 15 sec

WARNING

IF THE OIL PRESSURE HAS NOT MOVED INTO THE GREEN SECTOR WITHIN 15 SECONDS AFTER STARTING, SWITCH OFF ENGINE AND INVESTIGATE THE PROBLEM.

(10) Ammeter .... check

(11) Annunciator panel .... check

CONTINUED

(c) Engine will not start after injection (“flooded engine”):

(1) STROBE light.. ON

(2) FUEL PUMP .... OFF

(3) MIXTURE control lever .... IDLE cut-off

(4) THROTTLE lever .... at mid position

WARNING

BEFORE STARTING THE ENGINE THE PILOT MUST ENSURE THAT THE PROPELLER AREA IS FREE AND NO PERSONS CAN BE ENDANGERED.

CAUTION

DO NOT OVERHEAT THE STARTER MOTOR. DO NOT OPERATE THE STARTER MOTOR FOR MORE THAN 10 SECONDS. AFTER OPERATING THE STARTER MOTOR, LET IT COOL OFF FOR 20 SECONDS. AFTER 6 ATTEMPTS TO START THE ENGINE, LET THE STARTER COOL OFF FOR HALF AN HOUR.

(5) Ignition switch .... START

When engine fires:

(6) THROTTLE lever .... pull back towards IDLE

(7) MIXTURE control lever .... move to full RICH

(8) Oil pressure.. green sector within 15 sec

CONTINUED

WARNING

IF THE OIL PRESSURE HAS NOT MOVED INTO THE GREEN SECTOR WITHIN 15 SECONDS AFTER STARTING, SWITCH OFF ENGINE AND INVESTIGATE THE PROBLEM.

(9) Ammeter .... check

(10) Annunciator panel .... check

END OF CHECKLIST

4A.6.4 STARTING ENGINE WITH EXTERNAL POWER

(a) Before starting engine:

(1) Pre-flight inspection .... complete

(2) Passengers .... briefed

NOTE

Ensure all the passengers have been fully briefed on the use of the seat belts, adjustable backrests (if installed), doors and emergency exits and the ban on smoking.

(3) Rear door .... closed and locked

(4) Front canopy .... Position 1 or 2 (“cooling gap”)

(5) Rudder pedals.. adjusted and locked

(6) Safety harnesses .... fastened

(7) THROTTLE levers .... check IDLE

(8) PROPELLER RPM levers........................... full forward

(9) MIXTURE control levers .... IDLE cut-off

(10) PARKING BRAKE...................................... set

(11) AV MASTER .... check OFF

(12) LANDING GEAR selector .... check DOWN

(13) ALTERNATORS.. check OFF

(14) ELECT. MASTER....................................... check OFF

(15) Ignition switches... check OFF

CONTINUED

(16)Propeller area .... check clear

(17)External power.. connect

CAUTION

WHEN SWITCHING THE EXTERNAL POWER UNIT ON, THE ELECTRICALLY DRIVEN HYDRAULIC GEAR PUMP MAY ACTIVATE ITSELF FOR 5 TO 20 SECONDS IN ORDER TO RESTORE THE SYSTEM PRESSURE. SHOULD THE PUMP CONTINUE TO OPERATE CONTINUOUSLY OR PERIODICALLY, TERMINATE FLIGHT. THERE IS A MALFUNCTION IN THE LANDING GEAR SYSTEM.

NOTE

When switching the External Power Unit ON, all electrical equipment, connected to the LH and RH main busses is powered.

(18)G1000 .... wait until power-up is completed. Note the database effective dates. Press ENT on the MFD to acknowledge.

NOTE

The engine instruments are only available on the MFD after external power has been connected.

END OF CHECKLIST

(b) Starting Engine:

(1) STROBE lights .... ON

(2) ELECT. MASTER .... ON

(3) Annunciations/Engine/System Page .... check OK/normal range

WARNING

BEFORE STARTING THE ENGINE THE PILOT MUST ENSURE THAT THE PROPELLER AREA IS FREE, AND NO PERSONS CAN BE ENDANGERED.

(4) THROTTLE lever .... 3 cm (1.2 in) forward from IDLE (measured from rear of slot)

(5) FUEL PUMP .... ON

(6) MIXTURE control lever .... RICH for 3-5 seconds then LEAN

(7) FUEL PUMP .... OFF

(8) THROTTLE lever .... 1 cm (0.4 in) forward from IDLE (measured from rear of slot)

CAUTION

DO NOT OVERHEAT THE STARTER MOTOR. DO NOT OPERATE THE STARTER MOTOR FOR MORE THAN 10 SECONDS. AFTER OPERATING THE STARTER MOTOR, LET IT COOL OFF FOR 20 SECONDS.

AFTER 6 ATTEMPTS TO START THE ENGINE, LET THE STARTER COOL OFF FOR HALF AN HOUR.

CONTINUED

CAUTION

IF THE "L/R STARTER" ANNUNCIATION DOES NOT EXTINGUISH AFTER THE ENGINE HAS STARTED AND THE START KEY HAS BEEN RELEASED, SET THE ENGINE MASTER TO OFF AND INVESTIGATE THE PROBLEM.

(9) Ignition switch .... START

When engine fires:

(10) MIXTURE control lever .... move to full RICH

(11) THROTTLE lever .... adjust to 1000 RPM

(12) Oil pressure .... green sector within 15 sec

WARNING

IF THE OIL PRESSURE HAS NOT MOVED INTO THE GREEN SECTOR WITHIN 15 SECONDS AFTER STARTING, SWITCH OFF ENGINE AND INVESTIGATE THE PROBLEM.

(13) External Power .... disconnect

(14) ALTERNATOR .... ON (running engine)

CONTINUED

(15) Ammeter .... check

(16) Annunciator panel .... check

(17) Circuit breakers .... check all in / as required

NOTE

In extreme cold conditions it is permissible to start the opposite engine with external power applied to the airplane. External power would be disconnected after the second engine is started.

(18) Opposite engine .... Start with normal procedure.

END OF CHECKLIST

4A.6.5 BEFORE TAXIING

(a) AV MASTER .... ON

(b) Electrical equipment.. ON as required

(c) Flight instruments and avionics......................... set as required

(d) PITOT HEAT .... ON, check annunciator

NOTE

The stall warning switch gets slightly warmer on ground only and STAL HT FAIL is indicated on the PFD.

(e) PITOT HEAT .... OFF

(f) FLOOD light .... ON, test function, as required

(g) STROBE lights .... ON, as required

(h) Position lights, landing and taxi lights .... ON, as required

CAUTION

WHEN TAXIING AT CLOSE RANGE TO OTHER AIRCRAFT, OR DURING NIGHT FLIGHT IN CLOUDS, FOG OR HAZE, THE STROBE LIGHTS SHOULD BE SWITCHED OFF. THE POSITION LIGHTS MUST ALWAYS BE SWITCHED ON DURING NIGHT FLIGHT.

END OF CHECKLIST

4A.6.6 TAXIING

(a) PARKING BRAKE .... release

(b) Brakes .... check

(c) Nose wheel steering .... check for correct function

(d) Flight instrumentation and avionics .... check the G1000 for correct pitch attitude and directional indications

CAUTION

EVERY TIME THE FUEL SELECTOR IS MOVED FROM ON TO CROSSFEED OR FROM CROSSFEED TO ON THE CORRESPONDING FUEL PUMP MUST BE ON.

(e) FUEL SELECTOR... CROSSFEED (LH/RH)

CAUTION

THE FUEL CROSSFEED FUNCTION CAN BE TESTED SIMULTANEOUSLY WITH BOTH ENGINES. PROPER FUNCTION CAN BE TESTED BY RUNNING THE ENGINES FOR APPROX. 30 SECONDS WITH CROSSFEED SELECTED. THE OPERATION OF BOTH ENGINES WITH BOTH FUEL SELECTORS IN CROSSFEED POSITION, OTHER THAN FOR THIS TEST, IS PROHIBITED.

(f) FUEL SELECTOR... ON (LH/RH)

CAUTION

WHEN TAXIING ON A POOR SURFACE SELECT THE LOWEST POSSIBLE RPM TO AVOID DAMAGE TO THE PROPELLER FROM STONES OR SIMILAR ITEMS.

CONTINUED

CAUTION

FOLLOWING EXTENDED OPERATION ON THE GROUND, OR AT HIGH AMBIENT TEMPERATURES ROUGH RUNNING OF THE ENGINE MAY OCCUR, SHOWN BY THE FOLLOWING INDICATIONS:

- **TRANSIENT CHANGES IN IDLE RPM AND FUEL FLOW**
- **SLOW REACTION OF THE ENGINE TO OPERATION OF THROTTLE LEVERS**
- **ENGINE WILL NOT RUN WITH THE THROTTLE LEVERS IN THE IDLE POSITION.**

Remedy for rough running of the engine:

(a) Select the electric fuel pump to the ON position.

(b) For about 1 to 2 minutes, or until the engine settles, run at a speed of 1800 to 2000 RPM. Oil and cylinder head temperatures must stay within limits.

(c) Pull the THROTTLE levers back to IDLE to confirm smooth running.

(d) Set THROTTLE levers to 1200 RPM and mixture for taxiing, i.e., use MIXTURE control levers to set the maximum RPM attainable.

(e) Immediately before the take-off run set the mixture for take-off, apply full throttle and hold this position for 10 seconds prior to brake release.

END OF CHECKLIST

4A.6.7 BEFORE TAKE-OFF

(a) Position the airplane into the wind if possible

(b) PARKING BRAKE .... set

WARNING

FOR TAKE-OFF THE ADJUSTABLE BACKRESTS (IF INSTALLED) MUST BE FIXED IN THE UPRIGHT POSITION.

CAUTION

DO NOT OPERATE WITH BOTH FUEL SELECTOR VALVES IN CROSS FEED POSITION. DO NOT TAKE OFF WITH A FUEL SELECTOR VALVE IN CROSS FEED POSITION.

(c) Adjustable backrests (if installed)...................... verify upright position and proper fixation

(d) Safety harnesses... on and fastened

(e) Rear door .... check closed and locked

CONTINUED

CAUTION

WHEN OPERATING THE CANOPY, PILOTS/ OPERATORS MUST ENSURE THAT THERE ARE NO OBSTRUCTIONS BETWEEN THE CANOPY AND THE MATING FRAME, FOR EXAMPLE SEAT BELTS, CLOTHING, ETC. WHEN OPERATING THE LOCKING HANDLE DO NOT APPLY UNDUE FORCE.

A SLIGHT DOWNWARD PRESSURE ON THE CANOPY MAY BE REQUIRED TO EASE THE HANDLE OPERATION.

(f) Front canopy .... closed and locked

(g) Front baggage doors .... closed (visual check)

(h) Door warning light (DOOR or DOORS)............. check, no indication

(i) Annunciations / Engine / System Page .... check OK / normal range

(j) Circuit breakers .... check pressed in

(k) Longitudinal Trim.. set T/O

(l) FUEL SELECTORS .... check ON (LH/RH)

(m) Directional trim .... neutral

(n) FLAPS... check function & indicator /set UP

(o) Flight controls .... free movement, correct sense

CONTINUED

(p) FUEL PUMPS .... ON

NOTE

If the fuel pump was previously selected ON, select the pump OFF for approximately 30 seconds to verify proper operation of the engine driven fuel pump, then select fuel pump back to the ON position prior to take off.

(q) Engine oil temperature .... at least 100 °F (38 °C)

(r) MIXTURE control levers.................................... RICH (below 5000 ft)

NOTE

At a density altitude of 5000 ft or above or at high ambient temperatures a fully rich mixture can cause rough running of the engine or a loss of performance. The mixture should be set for smooth running of the engine.

(s) THROTTLE levers... 2200 RPM

(t) Magneto check .... L - BOTH - R – BOTH
Max. RPM drop…….175 RPM
Max. difference………50 RPM

CAUTION

THE LACK OF AN RPM DROP SUGGESTS A FAULTY GROUNDING OR INCORRECT IGNITION TIMING. IN CASE OF DOUBT THE MAGNETO CHECK CAN BE REPEATED WITH A LEANER MIXTURE, IN ORDER TO CONFIRM A PROBLEM. EVEN WHEN RUNNING ON ONLY ONE MAGNETO THE ENGINE SHOULD NOT RUN UNDULY ROUGHLY.

CONTINUED

NOTE

If the RPM drop exceeds 175 RPM, slowly lean the mixture until the RPM peaks. Then retard the throttle to 2200 RPM for the magneto check and repeat the check. If the drop-off does not exceed 175 RPM, the difference between the magnetos does not exceed 50 RPM, and the engine is running smoothly, then the ignition system is operating properly. Return the mixture to full rich.

(u) PROPELLER RPM levers .... pull back until a drop of max. 500 RPM is reached - HIGH RPM. Cycle 3 times.

(v) THROTTLE levers.. 1500 RPM

(w) PROPELLER RPM levers .... Feathering check (Do not allow an RPM drop of more than 300 RPM

(x) THROTTLE levers... IDLE RPM

(y) PARKING BRAKE.. release

(z) ALTERNATE AIR .... check CLOSED

(aa) LANDING light.. ON, as required

(ab) PITOT HEAT .... ON, as required

(ac) Transponder... code, as required.

END OF CHECKLIST

4A.6.8 TAKE-OFF

Normal take-off procedure:

(a) MIXTURE control levers .... check - full forward (It may be necessary to lean the mixture if the take-off is from a high altitude airport)

(b) PROPELLER RPM levers .... check - full forward

(c) THROTTLE levers .... MAX PWR (slowly)

WARNING

THE PROPER PERFORMANCE OF THE ENGINE AT FULL POWER SHOULD BE CHECKED EARLY IN THE TAKE-OFF PROCEDURE, SO THAT THE TAKE-OFF CAN BE ABANDONED IF NECESSARY.

A ROUGH ENGINE, SLUGGISH RPM INCREASE, OR FAILURE TO REACH TAKE-OFF RPM (2680 ± 20 RPM) ARE REASONS FOR ABANDONING THE TAKE-OFF.

NOTE

If the engine oil is cold, an oil pressure in the yellow sector is permissible.

(d) Elevator .... neutral

(e) Rudder... maintain direction

CONTINUED

NOTE

In strong crosswinds steering can be augmented by use of the toe brakes. It should be noted, however, that this method increases the take-off roll, and should not generally be used.

(f) Nose wheel lift-off .... at VR = 78 KIAS

(g) Airspeed .... 90 KIAS

NOTE

Take-off airspeed will be the Best Angle-of-Climb Speed (Vx) to clear obstacles, then Best Rate-of-Climb Speed (Vy).

When a safe climb is established:

(h) LANDING GEAR .... apply brakes; UP, check unsafe light off

NOTE

To avoid damage and excessive wear of the main landing gear wheels, firmly apply brakes before selecting gear up.

Above a safe height:

(i) FUEL PUMPS .... OFF

(j) LIGHTS .... as required.

END OF CHECKLIST

4A.6.9 CLIMB

Procedure for best rate of climb:

(a) Airspeed .... 90 KIAS

(b) Engine instruments.. in green sector

(c) THROTTLE levers... MAX continuous power

(d) PROPELLER RPM levers .... 2700 RPM

(e) MIXTURE control levers.................................... RICH, above 5000 ft. Can be adjusted as per mixture adjustment procedures in paragraph 4A.6.12 MIXTURE ADJUSTMENT for best power.

(f) Trim .... as required.

CAUTION

WHEN THE FUEL PRESSURE LOW WARNING MESSAGE COMES ON THE ELECTRICAL FUEL PUMP MUST BE SWITCHED ON.

END OF CHECKLIST

4A.6.10 CRUISE

(a) THROTTLE levers .... set as required

(b) PROPELLER RPM levers .... 2000 - 2700 RPM

NOTE

Favorable combinations of manifold pressure and RPM are given in Chapter 5.

NOTE

To optimize engine life the cylinder head temperature (CHT) should lie between 150 ºF and 400 ºF in continuous operation, and not rise above 435 ºF in fast cruise.

NOTE

The oil temperature in continuous operation should lie between 165 ºF and 220 ºF. If possible, the oil temperature should not remain under 180 ºF for long periods, so as to avoid accumulation of condensation water.

(c) MIXTURE control levers.................................. set in accordance with Paragraph 4A.6.12 MIXTURE ADJUSTMENT

(d) Trim .... as required

(e) Annunciations/Engine/System Page .... monitor

CONTINUED

(f) Fuel quantity .... monitor (max. difference 5 US gal)

CAUTION

WHEN THE FUEL PRESSURE LOW WARNING MESSAGE COMES ON THE ELECTRICAL FUEL PUMP MUST BE SWITCHED ON.

END OF CHECKLIST

4A.6.11 POWER SETTING FOR SINGLE ENGINE TRAINING

The purpose of this procedure is to enable safe single engine training.

The handling characteristics of the DA42 L360 with one engine shut down and feathered may be approximately simulated by setting the power of the desired engine to 11-14 inches of manifold pressure and propeller set to maximum RPM at 100 KIAS. This is valid from sea level to an altitude of 5000 feet.

CAUTION

THIS SETTING DOES NOT GUARANTEE THE SAME PERFORMANCE AS THE ONE OBTAINED WHEN AN ENGINE IS SHUT DOWN AND FEATHERED.

CERTAIN COMBINATIONS OF AIRCRAFT WEIGHT, CONFIGURATION, AMBIENT CONDITIONS, SPEED AND PILOT SKILL, NEGATIVE CLIMB PERFORMANCE MAY RESULT. REFER TO CHAPTER 5 PERFORMANCE FOR ONE ENGINE INOPERATIVE PERFORMANCE DATA.

The use of this power setting enables representative training conditions, while allowing the engine to be rapidly brought back for use if it required. This also prevents risk and potential harm to the engine, resulting from stopping and starting the engine in flight. Operators are strongly cautioned about the very real hazards associated with actually stopping an engine in flight for any reason other than a real emergency.

CONTINUED

The following precautions should be exercised in an actual single engine training flight:

(a) Do not shut down the engine if there is a reason to suspect the starting characteristics of the engine are not normal and restarting in the air may be difficult or impossible.

(b) Do not shut down the engine in conditions of temperature, altitude, weight or turbulence which may prevent single engine flight at altitudes well above the local ground elevation.

(c) Do not shut down the engine at any time when conditions of terrain or other conditions may prevent the airplane from reaching an airport easily, in case the dead engine cannot be restarted.

(d) Do not practice single engine operation without a well qualified pilot in one of the front seats. The pilot must hold a multi-engine rating and have familiarity with the DA42 L360 procedures and characteristics.

END OF POWER SETTING FOR SINGLE ENGINE TRAINING

4A.6.12 MIXTURE ADJUSTMENT

CAUTION

1. **THE MIXTURE CONTROL LEVER SHOULD ALWAYS BE MOVED SLOWLY.**
2. **BEFORE SELECTING A HIGHER POWER SETTING THE MIXTURE CONTROL LEVER SHOULD BE ENRICHED SLIGHTLY.**

Best Economy Mixture

The best economy mixture setting may only be used up to a power setting of 75 %. In order to obtain the lowest specific fuel consumption at a particular power setting proceed as follows: Slowly pull the MIXTURE control levers back towards LEAN until the engine starts to run roughly. Then push the MIXTURE control levers forward just far enough to restore smooth running. At the same time the exhaust gas temperature (EGT) should reach a maximum.

Best Power Mixture

The mixture can be set for maximum performance at all power settings. The mixture should first be set as for ‘best economy’. The mixture should then be enriched until the exhaust gas temperature is approximately 100 ºF lower.

This mixture setting produces the maximum performance for a given manifold pressure and is mainly used for high power settings (approximately 75 %).

END OF MIXTURE ADJUSTMENT

4A.6.13 DESCENT

(a) THROTTLE levers .... as required

(b) PROPELLER RPM levers .... 1800 - 2700 RPM

(c) MIXTURE control levers .... adjust as required for the altitude,
operate slowly

(d) Trim .... as required

(e) Annunciations/Engine/System Page .... monitor

CAUTION

WHEN REDUCING POWER, THE CHANGE IN CYLINDER HEAD TEMPERATURE SHOULD NOT EXCEED 50 ºF PER MINUTE. AN EXCESSIVE COOLING RATE MAY OCCUR WHEN THE ENGINE IS VERY HOT AND THE THROTTLE LEVER IS REDUCED ABRUPTLY IN A FAST DESCENT. THIS WILL BE INDICATED BY A FLASHING CYLINDER HEAD TEMPERATURE INDICATION.

CAUTION

WHEN THE FUEL PRESSURE LOW WARNING MESSAGE ILLUMINATES, THE ELECTRICAL FUEL PUMP MUST BE SWITCHED ON.

NOTE

During descent due to flow over the NLG doors intermittent noises may be heard.

END OF CHECKLIST

4A.6.14 APPROACH AND LANDING

Approach:

WARNING

FOR LANDING THE ADJUSTABLE BACKRESTS (IF INSTALLED) MUST BE FIXED IN THE UPRIGHT POSITION.

(a) Adjustable backrests (if installed)...................... verify upright position and proper fixation

(b) Safety harnesses .... check fastened and tightened

(c) Controls .... no interference by foreign objects

(d) LANDING lights .... as required

(e) Gear warning horn .... check function

(f) FUEL SELECTORS .... check ON

(g) FUEL PUMPS .... ON

(h) LANDING GEAR .... DOWN, check 3 green

(i) PARKING BRAKE .... check released

(j) Elevator trim .... as required

(k) Rudder trim .... as required

CONTINUED

Before landing:

(l) Airspeed .... reduce

(m) FLAPS .... APP (Maximum 137 KIAS)

(n) MIXTURE control levers .... RICH

(o) PROPELLER RPM levers .... HIGH RPM

(p) THROTTLE levers .... as required to hold a 3 degree glide path angle

(q) LANDING GEAR .... extend, check 3 green

(r) FLAPS .... LDG (Maximum 111 KIAS)

(s) Final speed .... it is recommended to cross 50 ft at VREF (85 KIAS minimum)

NOTE

Higher approach speeds result in a significantly longer landing distance during flare.

NOTE

The propellers have significant drag effect at idle power and fine pitch. Adjust power and airspeed accordingly when landing.

NOTE

No flap landings with power will have reduced elevator travel due to limiter being engaged above 14.5 inches MP.

CONTINUED

CAUTION

IN CONDITIONS SUCH AS STRONG WIND, DANGER OF WIND SHEAR OR TURBULENCE A HIGHER APPROACH SPEED SHOULD BE SELECTED.

END OF CHECKLIST

4A.6.15 GO-AROUND

WARNING

DEPENDING ON AIRCRAFT MASS AND/OR DENSITY ALTITUDE, A GO-AROUND WITH FLAPS IN APP OR LDG POSITION MAY BECOME IMPOSSIBLE.

GO-AROUND WITH SPEEDS BELOW V_{REF} – 5 KIAS ARE NOT RECOMMENDED.

(a) THROTTLE levers .... MAX PWR

(b) Airspeed .... 85 KIAS

(c) FLAPS .... APP

When a safe climb is established:

(d) Landing gear .... UP, check unsafe light off

(e) FLAPS .... UP

(f) AIRSPEED .... 90 KIAS

Above a safe height:

(g) FUEL PUMPS .... OFF

END OF CHECKLIST

4A.6.16 AFTER LANDING

(a) Runway .... clear

(b) THROTTLE levers.. IDLE

NOTE

After landing, it is beneficial to operate the engines in the 800 to 1200 RPM range for a short period prior to shutdown to allow the temperatures to stabilize.

(c) Brakes .... as required

(d) PITOT HEAT .... OFF

(e) FUEL PUMPS .... OFF

(f) Avionics.. as required

(g) FLAPS.. UP

(h) LIGHTS .... as required

END OF CHECKLIST

4A.6.17 ENGINES SHUT-DOWN

(a) PARKING BRAKE .... set

(b) THROTTLE levers .... 1000 RPM

(c) Engine/System page .... check

(d) ELT .... check not transmitting

(e) AV MASTER .... OFF

(f) All electrical equipment .... OFF

(g) Ignition check .... OFF until RPM drops noticeably, then immediately BOTH again

(h) MIXTURE control levers .... IDLE cut-off

(i) Ignition switches .... OFF

(j) Anti collision lights (ACL) .... OFF

(k) ELECT. MASTER .... OFF

END OF CHECKLIST

4A.6.18 EXIT AIRPLANE

Exit the airplane to the aft on designated areas on the inner wing section LH or RH.

4A.6.19 POST-FLIGHT INSPECTION

(a) PARKING BRAKE .... release, use chocks

(b) Airplane .... secure, if unsupervised for an extended period

(c) Record any problem found in flight and during the post-flight check in the log book.

NOTE

If the airplane is not operated for more than 5 days, the long-term parking procedure should be applied. If the airplane is not operated for more than 30 days, the storage procedure should be applied. Both procedures are described in Chapter 10 of the Airplane Maintenance Manual (Doc. No. 6.02.01).

END OF CHECKLIST

4A.6.20 PARKING

(a) PARKING BRAKE .... release, use chocks

(b) Airplane .... secure, if unsupervised for an extended period

(c) Pitot probe .... cover

(d) Inlet covers .... installed

END OF CHECKLIST

4A.6.21 FLIGHT IN RAIN

NOTE

Performance deteriorates in rain; this applies particularly to the take-off distance and to the maximum horizontal speed. The effect on the flight characteristics is minimal. Flight through very heavy rain should be avoided because of the associated visibility problems.

4A.6.22 REFUELING

CAUTION

BEFORE REFUELING, THE AIRPLANE MUST BE CONNECTED TO ELECTRICAL GROUND. GROUNDING POINTS: UNPAINTED AREAS ON STEPS, LEFT AND RIGHT.

4A.6.23 FLIGHT AT HIGH ALTITUDE

At high altitudes the provision of oxygen for the occupants is necessary. Legal requirements for the provision of oxygen should be adhered to.

Also see Section 2.11 OPERATING ALTITUDE.

4A.6.24 STALLS

NOTE

Stall warning for the DA42 L360 is provided by an audible tone. Stall warning is activated by an angle of attack sensor on the leading edge of the left wing.

CAUTION

STALL WARNING MAY NOT BE PRESENT DURING POWER ON STALLS WITH A FORWARD CENTRE OF GRAVITY.

NOTE

Stall for the DA 42L is defined by the airplane reaching aft elevator stop or a mild rolling without a nose down pitch break. When either of these cues occurs the pilot should recover the aircraft from the stall.

To recover from the stall, standard techniques should be followed: reduce angle of attack (and pitch angle) by moving stick forward and apply power to increase airspeed.

When executing power on stalls, moving throttles forward and bringing the pitch attitude to approximate level flight should suffice as a recovery technique, while at the same time minimizing altitude lost.

CHAPTER 4B

ABNORMAL OPERATING PROCEDURES

TABLE OF CONTENTS

4B.1 PRECAUTIONARY LANDING

NOTE

A landing of this type is only necessary when there is a reasonable suspicion that due to operational factors such as fuel shortage, weather conditions, etc. the possibility of endangering the airplane and its occupants by continuing the flight cannot be excluded. The pilot is required to decide whether or not a controlled landing in a field represents a lower risk than the attempt to reach the target airfield under all circumstances.

NOTE

If no level landing area is available, a landing on an upward slope should be sought.

(a) Select appropriate landing area.

(b) Consider wind.

(c) Approach:

If possible, the landing area should be overflown at a suitable height in order to identify obstacles. The degree of offset at each part of the circuit will allow the wind speed and direction to be assessed.

CONTINUED

(d) ATC .... advise

Perform procedures according to Normal Procedures Paragraph 4A.6.13 APPROACH & LANDING.

(e) Touchdown.. with the lowest possible airspeed

CAUTION

IF SUFFICIENT TIME IS REMAINING, THE RISK OF FIRE IN THE EVENT OF A COLLISION WITH OBSTACLES CAN BE REDUCED AS FOLLOWS AFTER A SAFE TOUCH-DOWN:

- **MIXTURECONTROL LEVERS............................ SET TO IDLE CUT-OFF**
- **FUEL SELECTORS.......... OFF**
- **IGNITION SWITCHES ...... OFF**
- **ELECT. MASTER.............. OFF**

END OF CHECKLIST

4B.2 CANOPY IN COOLING GAP POSITION

CAUTION

IF TAKE-OFF WAS INADVERTENTLY DONE WITH THE CANOPY IN THE COOLING GAP POSITION, DO NOT ATTEMPT TO CLOSE THE CANOPY IN FLIGHT. LAND THE AIRPLANE AND CLOSE THE CANOPY ON GROUND.

4B.3 ENGINE INSTRUMENT INDICATIONS OUTSIDE OF GREEN RANGE

4B.3.1 RPM

High RPM:

(a) Keep the RPM within the green range using the propeller RPM lever first, then the throttle lever.

If the above mentioned measures do not solve the problem, refer to Paragraph 3.5.6 (f) UNCOMMANDED HIGH RPM or Paragraph 3.5.6 (g) UNCOMMANDED LOW RPM.

(b) Land at the nearest suitable airfield.

END OF CHECKLIST

4B.3.2 OIL TEMPERATURE

High oil temperature:

- Reduce power on affected engine.
- Check oil pressure.

If the oil pressure is outside of the green range (lower limit):

- Expect loss of engine oil.

WARNING

A FURTHER INCREASE IN OIL TEMPERATURE MUST BE EXPECTED. PREPARE FOR AN ENGINE FAILURE IN ACCORDANCE WITH PARAGRAPH 3.5.6 - ENGINE PROBLEMS IN FLIGHT.

If the oil pressure is within the green range:

- Increase airspeed.

CAUTION

IF A HIGH OIL TEMPERATURE IS INDICATED AND THE OIL PRESSURE INDICATION IS WITHIN THE GREEN RANGE, IT IS LIKELY THAT THE ENGINE IS OPERATING NORMALLY. THIS MIGHT NOT BE THE CASE IF THE OIL TEMPERATURE DOES NOT RETURN TO THE GREEN RANGE. IN THIS CASE LAND AT THE NEAREST SUITABLE AIRFIELD. PREPARE FOR AN ENGINE FAILURE IN ACCORDANCE WITH PARAGRAPH 3.5.6 - ENGINE PROBLEMS IN FLIGHT.

CONTINUED

Low oil temperature:

NOTE

During an extended descent from high altitudes with a low power setting oil temperature may decrease. In this case an increase in power can help.

- Increase power

- Reduce airspeed.

END OF CHECKLIST

4B.3.3 OIL PRESSURE

High oil pressure:

- Check oil temperature.

If the temperatures are within the green range:

- Expect false oil pressure indication. Keep monitoring temperatures.

If the temperatures are outside of the green range:

- Reduce power on affected engine.

NOTE

If a reduction of power results in the oil pressure and temperature returning to a normal range, the engine may be operated with caution at a reduced power setting while diverting to the nearest suitable airfield. Closely monitor the engine, and prepare to shut down the applicable engine.

Low oil pressure:

Oil pressures below the limit value can lead to a total loss of power due to engine failure.

- Reduce power on affected engine
- Expect loss of power.

WARNING

LAND AT THE NEAREST SUITABLE AIRFIELD. PREPARE FOR AN ENGINE FAILURE IN ACCORDANCE WITH PARAGRAPH 3.5.6 - ENGINE PROBLEMS IN FLIGHT.

END OF CHECKLIST

4B.3.4 CYLINDER HEAD TEMPERATURE

High cylinder head temperature:

- MIXTURE control lever .... check, enrich if necessary
- Oil temperature .... check

If the oil temperature is also high:

- Oil pressure.. check
- If the oil pressure is low, proceed as in Paragraph 4B.3.3 - Low oil pressure
- If the oil pressure is in the green range: Reduce power.

Low cylinder head temperature:

A very low reading of cylinder head temperature or exhaust gas temperature for a single cylinder may be the result of a loose sensor.

In this case the reading will indicate the temperature of the engine compartment.

The airplane should be serviced.

END OF CHECKLIST

4B.3.5 FUEL PRESSURE

CAUTION

LOW FUEL PRESSURE MIGHT BE EXPECTED DURING UNCOORDINATED OR SIDESLIP FLIGHTS AT CERTAIN FUEL QUANTITES. MONITOR ENGINES PERFORMANCE AND EXPECT ENGINE ROUGHNESS IF PROLONGED UNCOORDINATED OR SIDESLIP MANEUVERS ARE MAINTAINED.

Low fuel pressure:

- FUEL PUMP .... ON for the affected engine

High Fuel Pressure:

- FUEL PUMP .... OFF for the affected engine
- Decrease the power by reducing the throttle lever as required.

END OF CHECKLIST

4B.3.6 VOLTAGE

Low voltage indication on the ground

(a) Circuit breakers .... check

(b) ALTERNATORS .... check ON

(c) THROTTLE lever .... increase the RPM

If LOW VOLTAGE CAUTION (L/R VOLTS LOW / Paragraph 4B.4.3) is still indicated on the G1000:

- Terminate flight preparation.

END OF CHECKLIST

Low voltage during flight:

(a) Circuit breakers .... check

(b) ALTERNATORS .... check ON

(c) Electrical equipment .... OFF if not needed

If LOW VOLTAGE CAUTION (L/R VOLTS LOW / Paragraph 4B.4.3) is still indicated on the G1000:

- Follow procedure in Paragraph 3.7.1.(g) -Both alternators failed.

END OF CHECKLIST

4B.4 CAUTION-ALERTS ON THE G1000

The G1000 provides the following CAUTION-alerts on the PFD in the ALERT area.

4B.4.1 CAUTIONS / GENERAL

CHARACTERISTICS	* Amber color coded text * Single warning chime tone of 1.5 seconds duration

4B.4.2 L/R FUEL FLOW

L/R FUEL FLOW	Left / Right engine main tank fuel quantity is low

(a) Fuel quantity .... check

CAUTION

AS SOON AS THE AMOUNT OF USABLE FUEL IN THE MAIN TANK IS LOW, A CAUTION MESSAGE IS DISPLAYED. THE INDICATION IS CALIBRATED FOR STRAIGHT AND LEVEL FLIGHT. THE CAUTION MESSAGE MAY BE TRIGGERED DURING TURNS, BOTH IN-FLIGHT AND ON THE GROUND.

If the LH & RH fuel quantities are noticeably different in flight:

- Use crossfeed function to ensure fuel supply.

(b) FUEL PUMPS .... ON

(c) FUEL SELECTOR .... crossfeed (engine with LOW FUEL indication)

(d) FUEL PUMPS .... OFF (when fuel quantity is balanced).

CAUTION

MAXIMUM IMBALANCE BETWEEN THE LH AND RH FUEL TANKS IS 5 US GAL. A GREATER IMBALANCE MUST BE CORRECTED BY CROSSFEEDING FUEL, IF CONDITIONS PERMIT.

END OF CHECKLIST

4B.4.3 L/R VOLTS LOW

L/R VOLTS LOW	Left / Right engine bus voltage is low (less than 25.0 Volts)

Possible reasons are:

- A fault in the power supply.
- RPM too low.

Continue with Paragraph 4B.3.6 VOLTAGE.

CAUTION

IF BOTH LOW VOLTAGE INDICATIONS ARE ON, EXPECT FAILURE OF BOTH ALTERNATORS AND FOLLOW PARAGRAPH 3.7.1.(G) - BOTH ALTERNATORS FAILED.

END OF CHECKLIST

4B.4.4 PITOT FAIL / HT OFF

PITOT FAIL	Pitot heating system has failed.
PITOT HT OFF	Pitot heating system is OFF.

(a) PITOT HEAT .... check ON / as required

NOTE

The Pitot heating caution message is displayed when the Pitot heating is switched OFF, or when there is a failure of the Pitot heating system. Prolonged operation of the Pitot heating on the ground can also cause the Pitot heating caution message to be displayed. In this case it indicates the activation of the thermal switch, which prevents overheating of the Pitot heating system on the ground. This is a normal function of the system. After a cooling period, the heating system will be switched on again automatically.

If in icing conditions:

(b) Expect loss of static instruments.

(c) Open Alternate Static.

NOTE

Expect erratic airspeed indications with a loss of the pitot heating system.

(d) Leave icing zone / refer to Paragraph 3.9.1 - UNINTENTIONAL FLIGHT INTO ICING.

END OF CHECKLIST

4B.4.5 STALL HT FAIL / OFF

STALL HT FAIL	Stall warning heat has failed.
STALL HT OFF	Stall warning heat is OFF.

(a) STALL HEAT.. check ON / as required

NOTE

The STALL HT OFF caution message is displayed when the Pitot heating is switched OFF, or STALL HT FAIL when there is a failure of the stall warning heating system. Prolonged operation of the stall warning heating on the ground can also cause the stall warning heating failed caution message to be displayed. In this case it indicates the activation of the thermal switch, which prevents overheating of the stall warning heating system on the ground. This is a normal function of the system. After a cooling period, the heating system will be switched on again automatically.

If in icing conditions:

(b) Expect loss of acoustic stall warning.

(c) Leave icing zone / refer to Paragraph 3.9.1 - UNINTENTIONAL FLIGHT INTO ICING.

END OF CHECKLIST

4B.4.6 L/R AUX FUEL E

L/R AUX FUEL E	Left / Right auxiliary tank is empty (displayed only when the fuel transfer pump switch set to ON)

The auxiliary tank empty caution message indicates an empty auxiliary fuel tank while the fuel pump is switched ON.

(a) LH/RH FUEL TRANSFER .... OFF

END OF CHECKLIST

4B.4.7 STICK LIMIT

STICK LIMIT	Control stick limiting system (variable elevator stop) has failed either ON or OFF.

CAUTION

FAILED OFF:

IN CASE OF STALLING WITH "POWER-ON" THE HANDLING QUALITIES AND STALL CHARACTERISTICS ARE DEGRADED SIGNIFICANTLY. DO NOT STALL THE AIRPLANE IN ANY CONFIGURATION.

FAILED ON:

DO NOT REDUCE AIRSPEED BELOW REQUIRED MINIMUM V_{REF} DURING THE APPROACH FOR LANDING, ESPECIALLY AT LOADING CONDITIONS WITH FORWARD LOCATIONS OF THE CENTER OF GRAVITY.

(a) Do not perform power on stalls

(b) Recommended landing speed V_{REF}

END OF CHECKLIST

4B.5 FAILURES IN FLAP OPERATING SYSTEM

Failure in position indication or function:

(a) FLAPS position .... check visually

(b) Airspeed .... keep in white sector (max. 111 KIAS)

(c) FLAPS switch .... re-check all positions

Modified approach procedure depending on the available flap setting:

NOTE

No flap landings with power will have reduced elevator travel due to limiter being engaged above 14.5 inches MP.

(a) Only UP available:

- Airspeed .... min. 85 KIAS

Land at a flat approach angle, use throttle lever to control airplane speed and rate of descent.

(b) Only APP available:

- Airspeed .... min. 85 KIAS

Land at a flat approach angle, use throttle lever to control airplane speed and rate of descent.

(c) Only LDG available:

- Perform normal landing.

WARNING

DEPENDING ON AIRCRAFT MASS AND/OR DENSITY ALTITUDE, A GO-AROUND WITH FLAPS IN APP OR LDG POSITION MAY BECOME IMPOSSIBLE.

END OF CHECKLIST

4B.6 FAILURES IN HYDRAULIC SYSTEM

4B.6.1 CONTINUOUS HYDRAULIC PUMP OPERATION

(a) LANDING GEAR indication lights .... check

(b) GEAR circuit breaker .... pull

(c) Prepare for manual landing gear extension ...... Refer to Paragraph 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR.

NOTE

The landing gear might extend as the hydraulic system pressure decreases. Expect higher aerodynamic drag, resulting in degraded flight performance, increased fuel consumption and decreased range.

Unscheduled maintenance action is required after landing.

END OF CHECKLIST

4B.6.2 HYDRAULIC PUMP FAILURE

(a) LANDING GEAR indication lights...................... check

(b) GEAR circuit breaker... check

(c) Prepare for manual landing gear extension ...... Refer to Paragraph 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR

NOTE

The landing gear might extend as the hydraulic system pressure decreases. Expect higher aerodynamic drag, resulting in degraded flight performance, increased fuel consumption and decreased range.

Unscheduled maintenance action is required after landing.

END OF CHECKLIST

4B.7 LANDING WITH HIGH LANDING MASS

CAUTION

DAMAGE OF THE LANDING GEAR CAN RESULT FROM A HARD LANDING WITH A FLIGHT MASS ABOVE THE MAXIMUM LANDING MASS.

NOTE

If MÄM 42-088 is carried out, a landing with a mass between 1700 kg (3748 lb) and 1785 kg (3935 lb) is admissible. It constitutes an abnormal operating procedure. A "Hard Landing Check" is only required after a hard landing, regardless of the actual landing mass. Refer to Paragraph 4A.6.13 - APPROACH & LANDING for landings with a mass up to 1700 kg (3748 lb).

Perform landing approach according to Paragraph 4A.6.13 - APPROACH & LANDING, but maintain an increased airspeed during final landing approach.

Approach speed.. min. 90 KIAS with FLAPS APP
min. 100 KIAS with FLAPS UP

Final approach speed .... min. 85 KIAS with FLAPS LDG

Minimum speed on go-around................................. 85 KIAS.

END OF CHECKLIST

4B.8 LIGHTNING STRIKE

(a) Airspeed .... as low as practicable, do not exceed V_A (120 KIAS up to 1542 kg or 3400 lbs) (126 KIAS above 1542 kg)

(b) Grasp the airplane controls firmly

(c) Autopilot .... disengage (check)

(d) PFD / backup instruments .... verify periodically

(e) Continue flight under VMC

(f) Land at the next suitable airfield.

CAUTION

DUE TO POSSIBLE DAMAGE TO THE AIRPLANE, OBEY THE FOLLOWING INSTRUCTIONS:

- **AVOID ABRUPT OR FULL CONTROL SURFACE MOVEMENTS**
- **AVOID HIGH G-LOADS ON THE AIRFRAME**
- **AVOID HIGH YAW ANGLES**
- **AVOID TURBULENT AIR BY AS MUCH DISTANCE AS POSSIBLE (E.G. LEE EFFECTS)**
- **DO NOT FLY INTO AREAS OF KNOWN OR FORECAST ICING**
- **MAINTAIN VMC.**

END OF CHECKLIST

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CHAPTER 5

PERFORMANCE

TABLE OF CONTENTS

5.1 INTRODUCTION

The performance tables and diagrams on the following pages are presented so that, on the one hand, you can see what performance you can expect from your airplane, while on the other they allow comprehensive and sufficiently accurate flight planning. The values in the tables and the diagrams were obtained in the framework of the flight trials using an airplane and power-plant in good condition, and corrected to the conditions of the International Standard Atmosphere (ISA = 15 ^{O}C / 59 ^{O}F and 1013.25 hPa / 29.92 inHg at sea level).

The performance diagrams do not take into account variations in pilot experience or a poorly maintained airplane. The performances given can be attained if the procedures quoted in this manual are applied, and the airplane has been well maintained.

5.2 USE OF THE PERFORMANCE TABLES AND DIAGRAMS

In order to illustrate the influence of a number of different variables, the performance data is reproduced in the form of tables or diagrams. These contain sufficiently detailed information so that conservative values can be selected and used for the determination of adequate performance data for the planned flight.

5.3 PERFORMANCE TABLES AND DIAGRAMS

5.3.1 AIR DATA CALIBRATION

NOTE

The position of the landing gear (extended/retracted) has no influence on the airspeed indicator system.
KIAS is Indicated Airspeed and KCAS is Calibrated Airspeed.

AIRSPEED INDICATOR SYSTEM - FLAPS UP, GEAR UP

KIAS	KCAS	KIAS	KCAS
55	60	130	129
60	65	140	139
70	74	150	148
80	83	160	157
90	92	170	166
100	102	180	176
110	111	190	185
120	120	194 (V_{NE})	189

AIRSPEED INDICATOR SYSTEM

FLAPS APPROACH, GEAR DOWN		FLAPS LANDING, GEAR DOWN	
KIAS	**KCAS**	**KIAS**	**KCAS**
55	60	55	59
60	64	60	63
70	73	65	67
80	82	70	72
90	91	75	76
100	100	80	81
110	109	85	85
120	118	90	89
130	127	95	94
137 (V_{FE})	133	100	98
		111 (V_{FE})	108

5.3.2 TABLES FOR SETTING ENGINE PERFORMANCE

			Engine power as % of maximum take-off power							
			45%			55%				
RPM			2000	2200	2400	2000	2200	2400	2600	2700
Fuel Flow [US gal/hr]	Best Economy		6.0	6.3	6.6	7.0	7.2	7.5	7.7	8.0
	Best Power		-	7.3	7.7	-	8.5	8.7	9.1	9.5
Pressure Alt (ft)	ISA [°C]	ISA [°F]	Manifold Pressure (MP) [inHG]			Manifold Pressure (MP) [inHG]				
0	15	59	21.3	20.2	19.0	23.9	22.4	21.2	20.2	19.6
1000	13	55	21.0	19.9	18.7	23.6	22.2	21.0	20.0	19.4
2000	11	52	20.7	19.6	18.4	23.3	21.9	20.7	19.6	19.0
3000	9	48	20.4	19.3	18.2	23.0	21.6	20.4	19.2	18.6
4000	7	45	20.2	19.0	17.9	22.7	21.1	20.1	18.8	18.4
5000	5	41	19.9	18.7	17.6	22.3	20.9	19.8	18.5	18.0
6000	3	38	19.6	18.4	17.4	22.0	20.6	19.5	18.3	17.8
7000	1	34	19.3	18.2	17.1	21.7	20.3	19.3	18.0	17.6
8000	-1	31	19.0	17.9	16.9	21.3	20.0	19.0	17.7	17.5
9000	-3	27	18.7	17.6	16.6	21.1	19.7	18.7	17.5	17.2
10000	-5	23	18.4	17.3	16.3	-	19.4	18.4	17.3	17.0
11000	-7	19	18.2	17.0	16.1		19.1	18.1	17.0	16.8
12000	-9	16	17.9	16.7	15.8		-	17.8	16.9	16.5
13000	-11	12	17.6	16.4	15.5			17.6	16.5	16.3
14000	-13	9	-	16.1	15.3			-	16.3	16.1
15000	-15	6		15.8	15.0				16.0	15.8
16000	-17	2		15.5	14.7				15.8	15.6
17000	-19	-2		-	14.5				-	15.1
18000	-21	-6			14.3					-

The area shaded grey under each RPM column are the recommended values.

Correcting the Table for Variations from Standard Temperature:

At ISA+15 ^{O}C (ISA+27 ^{O}F), the %Power values fall by approximately 3% of the power selected according to the above table.

At ISA-15 ^{O}C (ISA-27 ^{O}F), the %Power values rise by approximately 3% of the power selected according to the above table.

NOTE

Guidance Only, for Best Economy or Power, follow the correct leaning procedures.

TABLES FOR SETTING ENGINE PERFORMANCE (Continued)

			Engine power as % of maximum take-off power								
			65%					75%			
RPM			2000	2200	2400	2600	2700	2200	2400	2600	2700
Fuel Flow [US gal/hr]	Best Economy		7.9	8.2	8.5	8.7	8.8	9.2	9.5	9.7	9.9
	Best Power		-	9.5	9.8	10.2	10.4	10.7	11.0	11.4	11.6
Pressure Alt (ft)	ISA [°C]	[°F]	Manifold Pressure (MP) [inHG]					Manifold Pressure (MP) [inHG]			
0	15	59	26.8	24.9	23.4	22.3	21.8	27.3	25.8	24.5	23.7
1000	13	55	26.4	24.5	23.2	22.0	21.4	26.8	25.5	24.2	23.5
2000	11	52	26.0	24.2	22.9	21.6	21.0	26.5	25.2	23.8	23.2
3000	9	48	25.7	23.8	22.6	21.4	20.7	26.1	24.8	23.5	22.9
4000	7	45	25.4	23.5	22.3	21.0	20.5	-	24.5	23.1	22.5
5000	5	41	-	23.1	22.0	20.6	20.1		24.1	22.9	22.2
6000	3	38		22.8	21.7	20.4	19.8		-	22.6	21.9
7000	1	34		-	21.4	20.0	19.5			22.4	21.6
8000	-1	31			21.0	19.7	19.3			-	21.4
9000	-3	27			20.7	19.5	19.0				-
10000	-5	23			-	19.2	18.8				
11000	-7	19				19.0	18.5				
12000	-9	16				-	18.4				
13000	-11	12					-				
14000	-13	9									

The area shaded grey under each RPM column are the recommended values.

Correcting the Table for Variations from Standard Temperature:

At ISA+15 ^{O}C (ISA+27 ^{O}F), the %Power values fall by approximately 3% of the power selected according to the above table.

At ISA-15 ^{O}C (ISA-27 ^{O}F), the %Power values rise by approximately 3% of the power selected according to the above table.

NOTE

Guidance Only, for Best Economy or Power, follow the correct leaning procedures.

5.3.3 MAXIMUM CONTINUOUS POWER

The Maximum Continuous Power (MCP) is not to exceed 160 Brake Horse Power (BHP).

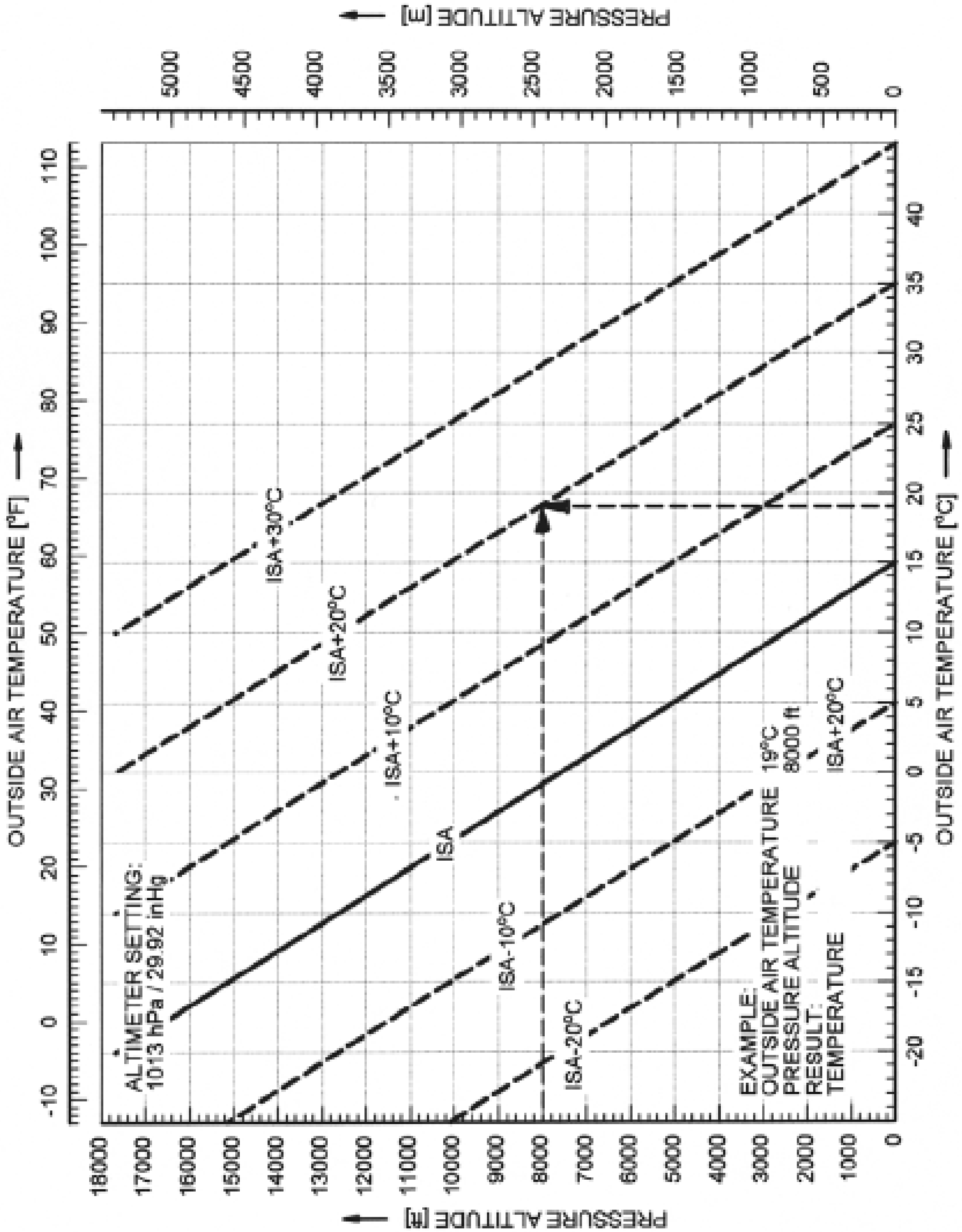
The manifold pressure (MAP) for MCP at 2700 RPM is shown in the table below:

Pressure Altitude Feet	Manifold Pressure (MAP) (in Hg)
Sea Level	26.7
1000	26.3
2000	26.0
3000	25.7
3500	25.5

NOTE

Above 3500 feet pressure altitude, the available power never exceeds MCP.

5.3.4 INTERNATIONAL STANDARD ATMOSPHERE

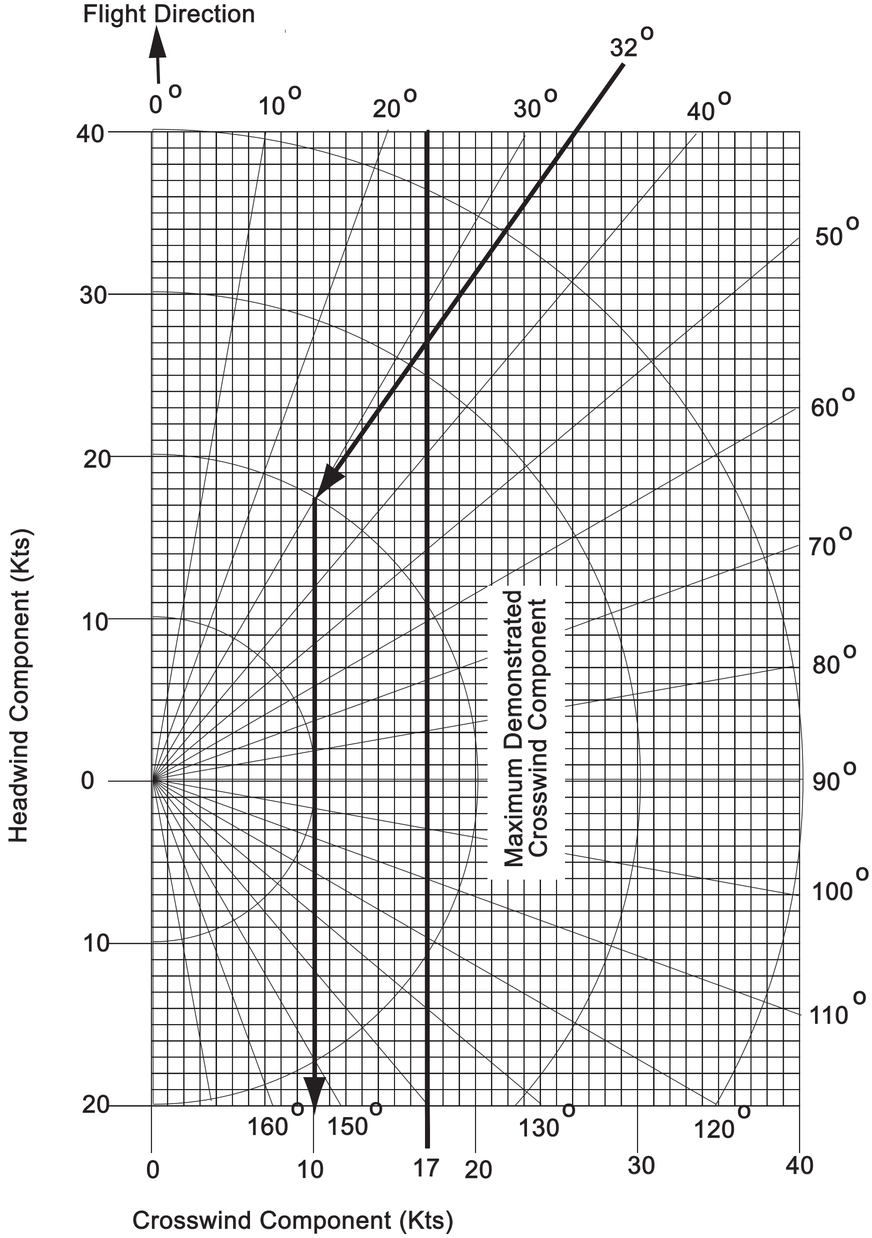


5.3.5 STALLING SPEEDS

STALL SPEEDS FOR IDLE THRUST (KIAS)

FLAPS LAND, GEAR DOWN					
Weight	Bank Angle				
	0 Degrees	15 Degrees	30 Degrees	45 Degrees	60 Degrees
3935	57	58	61	68	81
3748	57	58	61	68	81
3417	56	57	60	67	79
3300	55	56	59	65	78
3200	54	55	58	64	76
3100	53	54	57	63	75
3000	52	53	56	62	74
FLAPS APPROACH, GEAR DOWN					
Weight	Bank Angle				
	0 Degrees	15 Degrees	30 Degrees	45 Degrees	60 Degrees
3935	61	62	66	73	86
3748	61	62	66	73	86
3417	59	60	63	70	83
3300	58	59	62	69	82
3200	57	58	61	68	80
3100	56	57	60	67	79
3000	55	56	59	65	78
FLAPS APPROACH, GEAR UP					
Weight	Bank Angle				
	0 Degrees	15 Degrees	30 Degrees	45 Degrees	60 Degrees
3935	64	65	69	76	91
3748	64	65	69	76	91
3417	62	63	67	74	88
3300	61	62	66	73	86
3200	60	61	64	71	85
3100	59	60	63	70	83
3000	58	59	62	69	82

5.3.6 WIND COMPONENTS



Example:	Flight Direction	:	360 Degrees
	Wind	:	32 Degrees / 20 knots
Result:	Crosswind component	:	10 knots

Maximum demonstrated crosswind component : 17 knots

5.3.7 TAKE-OFF DISTANCE

CONDITIONS:

(a) THROTTLE levers ....both FULL @ 2700 RPM

(b) MIXTURE control levers ....FULL RICH

(c) FLAPS ....UP

(d) LANDING GEAR ....retract after positive climb established

Takeoff Speeds (all weights):

(1) Rotation......................................78 KIAS

(2) 50 feet ....90 KIAS

(3) Runway ....dry, level, hard paved surface

NOTE

1. Decrease the distance 3% for each 4 knots of headwind.
2. Increase the distance 5% for each 2 knots of tailwind.

CAUTION

A GROUND UPSLOPE OF 2 % (2 M PER 100 M, OR 2 FT PER 100 FT) RESULTS IN AN INCREASE IN THE TAKE-OFF DISTANCE OF APPROXIMATELY 10 %.

NOTE

For take-off from dry, short-cut grass covered runways, the following correction must be taken into account, compared to paved runways (see CAUTION above):

- grass up to 5 cm (2 in) long: 10 % increase in take-off ground roll.

CAUTION

ON SNOW, WET GROUND OR WET SOFT GRASS COVERED RUNWAYS THE TAKE-OFF ROLL MAY BE SIGNIFICANTLY LONGER. ALLOW FOR THE CONDITION OF THE RUNWAY TO ENSURE A SAFE TAKE-OFF.

WARNING

FOR A SAFE TAKE-OFF THE AVAILABLE RUNWAY LENGTH MUST BE AT LEAST EQUAL TO THE TAKE-OFF DISTANCE OVER A 50 FT (15 M) OBSTACLE.

The Take-off Distance Tables with weights of 3935 lbs, 3500 lbs and 3000 lbs are shown on the following pages.

TABLE 1 - TAKE-OFF DISTANCES - WEIGHT 3935 LBS

PRESSURE ALTIUTUDE	WEIGHT 3935 LBS -35 °C (-31 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	-25 °C (-13 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	-15 °C (5 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	-5 °C (23 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	5 °C (41 °F) GROUND ROLL	TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet
0	1080	1680	1180	1820	1270	1960	1370	2120	1480	2280
1000	1190	1840	1290	2000	1400	2160	1510	2330	1630	2510
2000	1300	2020	1420	2200	1530	2380	1660	2580	1790	2780
3000	1430	2230	1560	2430	1690	2640	1830	2860	1970	3090
4000	1580	2470	1720	2690	1870	2930	2020	3180	2180	3440
5000	1750	2750	1900	3000	2070	3270	2240	3550	2420	3860
6000	1930	3060	2110	3350	2290	3660	2490	3990	2690	4350
7000	2190	3500	2390	3840	2600	4200	2820	4600	3060	5020
8000	2480	4020	2710	4420	2950	4860	3210	5330	3490	5850
9000	2820	4640	3090	5120	3370	5650	3670	6240	3980	6880
10000	3220	5390	3520	5980	3850	6640	4200	7380	4570	8210

PRESSURE ALTIUTUDE	WEIGHT 3935 LBS 15 °C (59 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	25 °C (77 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	35 °C (95 °F) GROUND ROLL	TOTAL DISTANCE TO 50'	45 °C (113 °F) GROUND ROLL	TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet
0	1590	2450	1710	2630	1830	2820	1950	3010
1000	1750	2710	1880	2910	2010	3120	2150	3340
2000	1930	3000	2070	3230	2220	3470	2370	3730
3000	2130	3340	2290	3600	2450	3880	2630	4170
4000	2350	3730	2530	4030	2720	4350	2920	4690
5000	2610	4190	2810	4540	3020	4910	3240	5320
6000	2910	4730	3130	5140	3370	5590	3620	6070
7000	3310	5490	3570	5990	3840	6540	4130	7140
8000	3770	6420	4080	7050	4400	7740	4740	8510
9000	4320	7600	4670	8400	5050	9310	5440	10340
10000	4960	9140	5380	10220	5820	11470	6280	12960

TABLE 2 - TAKE-OFF DISTANCES - WEIGHT 3500 LBS

	WEIGHT 3500 LBS									
	-35 °C (-31 °F)		-25 °C (-13 °F)		-15 °C (5 °F)		-5 °C (23 °F)		5 °C (41 °F)	
PRESSURE ALTITUDE	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet
0	950	1460	1030	1580	1120	1710	1210	1840	1300	1980
1000	1040	1600	1130	1740	1230	1880	1320	2020	1430	2180
2000	1150	1760	1240	1910	1350	2070	1460	2230	1570	2410
3000	1260	1940	1370	2110	1480	2280	1600	2470	1730	2670
4000	1390	2140	1510	2330	1640	2530	1770	2740	1910	2960
5000	1530	2370	1670	2590	1810	2810	1960	3050	2120	3310
6000	1690	2640	1840	2880	2000	3140	2170	3420	2350	3710
7000	1910	3010	2090	3290	2270	3590	2460	3920	2670	4270
8000	2170	3440	2370	3770	2580	4130	2800	4520	3030	4940
9000	2460	3950	2690	4340	2930	4780	3190	5240	3460	5750
10000	2800	4560	3070	5040	3350	5560	3650	6140	3960	6770

	WEIGHT 3500 LBS							
	15 °C (59 °F)		25 °C (77 °F)		35 °C (95 °F)		45 °C (113 °F)	
PRESSURE ALTITUDE	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet
0	1400	2130	1500	2280	1600	2440	1710	2610
1000	1530	2340	1650	2520	1760	2700	1880	2890
2000	1690	2590	1810	2790	1940	2990	2080	3200
3000	1860	2880	2000	3100	2150	3330	2300	3570
4000	2060	3200	2210	3450	2380	3720	2540	4000
5000	2280	3580	2450	3870	2640	4180	2830	4510
6000	2530	4030	2730	4360	2930	4720	3150	5110
7000	2880	4640	3100	5050	3340	5480	3590	5960
8000	3280	5390	3540	5880	3820	6420	4100	7010
9000	3750	6310	4050	6930	4370	7610	4710	8360
10000	4300	7480	4650	8270	5020	9150	5420	10160

TABLE 3 - TAKE-OFF DISTANCES - WEIGHT 3000 LBS

PRESSURE ALTIUTUDE	WEIGHT 3000 LBS -35 °C (-31 °F) GROUND ROLL	-35 °C (-31 °F) TOTAL DISTANCE TO 50'	-25 °C (-13 °F) GROUND ROLL	-25 °C (-13 °F) TOTAL DISTANCE TO 50'	-15 °C (5 °F) GROUND ROLL	-15 °C (5 °F) TOTAL DISTANCE TO 50'	-5 °C (23 °F) GROUND ROLL	-5 °C (23 °F) TOTAL DISTANCE TO 50'	5 °C (41 °F) GROUND ROLL	5 °C (41 °F) TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet
0	810	1230	880	1330	950	1430	1020	1540	1100	1660
1000	880	1350	960	1460	1040	1570	1120	1690	1200	1820
2000	970	1480	1050	1600	1140	1730	1230	1860	1320	2010
3000	1060	1620	1160	1760	1250	1910	1350	2060	1460	2220
4000	1170	1790	1270	1940	1380	2110	1490	2280	1610	2460
5000	1290	1980	1400	2150	1520	2340	1650	2530	1780	2740
6000	1430	2190	1550	2390	1680	2600	1820	2820	1970	3060
7000	1610	2490	1750	2720	1910	2960	2070	3220	2230	3500
8000	1820	2840	1990	3100	2160	3390	2340	3700	2540	4020
9000	2060	3250	2250	3560	2450	3900	2670	4260	2890	4660
10000	2350	3730	2560	4110	2800	4510	3040	4950	3300	5430

PRESSURE ALTIUTUDE	WEIGHT 3000 LBS 15 °C (59 °F) GROUND ROLL	15 °C (59 °F) TOTAL DISTANCE TO 50'	25 °C (77 °F) GROUND ROLL	25 °C (77 °F) TOTAL DISTANCE TO 50'	35 °C (95 °F) GROUND ROLL	35 °C (95 °F) TOTAL DISTANCE TO 50'	45 °C (113 °F) GROUND ROLL	45 °C (113 °F) TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet
0	1180	1780	1260	1900	1350	2040	1440	2170
1000	1290	1960	1390	2100	1480	2240	1590	2400
2000	1420	2160	1530	2320	1630	2480	1750	2660
3000	1570	2390	1680	2570	1800	2750	1930	2950
4000	1730	2650	1860	2850	1990	3070	2130	3290
5000	1920	2960	2060	3190	2210	3430	2370	3690
6000	2130	3310	2290	3570	2460	3860	2630	4160
7000	2410	3800	2600	4110	2790	4450	3000	4810
8000	2740	4380	2960	4760	3180	5170	3420	5610
9000	3130	5090	3370	5550	3640	6050	3910	6600
10000	3570	5960	3860	6530	4170	7170	4490	7870

5.3.8 CLIMB PERFORMANCE - TAKE-OFF CLIMB

CONDITIONS:

(a) THROTTLE levers............................both FULL at 2700 RPM

(b) FLAPS...UP

(c) Landing Gear....................................retracted

(d) Airspeed (all weights).......................90 KIAS

NOTE

The tables on the following pages show the rate of climb. The gradient of climb can be calculated using the following formulae:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

ALL ENGINES OPERATING - CLIMB RATE FOR 3935 LBS (TAKE-OFF CLIMB)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1542	1525	1508	1492	1475	1458	1441	1424	1407
1000	1473	1456	1439	1422	1404	1387	1370	1353	1335
2000	1404	1386	1369	1351	1334	1316	1298	1281	1263
3000	1334	1316	1298	1281	1263	1245	1227	1209	1191
4000	1265	1246	1228	1210	1191	1173	1155	1136	1118
5000	1194	1176	1157	1138	1120	1101	1082	1064	1045
6000	1124	1105	1086	1067	1048	1029	1010	991	972
7000	1053	1034	1014	995	975	956	937	918	899
8000	982	962	942	923	903	883	864	845	825
9000	911	891	870	850	830	810	791	771	752
10000	839	818	798	778	757	737	717	697	678
11000	767	746	725	705	684	664	643	623	603
12000	695	674	652	632	611	590	570	549	529
13000	622	601	579	558	537	516	495	475	455
14000	549	528	506	484	463	442	421	400	380
15000	476	454	432	411	389	368	347	326	305
16000	403	381	358	337	315	293	272	251	230
17000	329	307	284	262	240	219	197	176	155
18000	256	233	210	188	166	144	122	101	80
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1390	1374	1357	1340	1323	1306	1289	1273	1256
1000	1318	1301	1284	1267	1250	1233	1216	1199	1182
2000	1246	1228	1211	1193	1176	1159	1142	1124	1107
3000	1173	1155	1138	1120	1102	1085	1067	1050	1033
4000	1100	1082	1064	1046	1028	1011	993	975	958
5000	1027	1009	990	972	954	936	918	901	883
6000	954	935	917	898	880	862	844	826	808
7000	880	861	842	824	805	787	769	751	733
8000	806	787	768	749	731	712	694	676	658
9000	732	713	694	675	656	637	619	600	582
10000	658	639	619	600	581	562	544	525	507
11000	584	564	544	525	506	487	468	449	431
12000	509	489	470	450	431	412	393	374	355
13000	434	414	395	375	355	336	317	298	279
14000	360	339	319	300	280	261	241	222	204
15000	285	264	244	224	204	185	166	147	128
16000	209	189	169	149	129	109	90	71	52
17000	134	114	93	73	53	33	14	-5	-24
18000	59	38	18	-3	-23	-43	-62	-81	-101

ALL ENGINES OPERATING - CLIMB RATE FOR 3500 LBS (TAKE-OFF CLIMB)									
Temp °C	-35	-30	-25	-20	-15	-10	-5	0	5
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	1789	1771	1753	1735	1716	1698	1679	1661	1643
1000	1713	1694	1676	1657	1638	1619	1600	1582	1563
2000	1636	1617	1598	1579	1560	1540	1521	1502	1483
3000	1559	1540	1520	1500	1481	1461	1442	1422	1403
4000	1482	1462	1442	1422	1402	1382	1362	1342	1322
5000	1404	1384	1363	1343	1322	1302	1282	1262	1241
6000	1326	1305	1284	1264	1243	1222	1201	1181	1160
7000	1248	1226	1205	1184	1163	1142	1121	1100	1079
8000	1169	1147	1126	1104	1083	1061	1040	1019	998
9000	1090	1068	1046	1024	1002	981	959	938	916
10000	1011	988	966	944	922	900	878	856	835
11000	931	908	886	863	841	818	796	774	753
12000	851	828	805	782	759	737	715	692	670
13000	771	748	724	701	678	655	633	610	588
14000	691	667	643	620	597	574	551	528	506
15000	610	586	562	538	515	492	469	446	423
16000	529	505	480	457	433	409	386	363	341
17000	448	423	399	375	351	327	304	281	258
18000	366	341	317	293	268	245	221	198	175
Temp °C	10	15	20	25	30	35	40	45	50
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	1624	1606	1587	1569	1550	1532	1514	1496	1477
1000	1544	1525	1506	1488	1469	1450	1432	1413	1395
2000	1464	1445	1426	1407	1388	1369	1350	1331	1312
3000	1383	1364	1344	1325	1306	1287	1268	1249	1230
4000	1302	1283	1263	1243	1224	1205	1185	1166	1147
5000	1221	1201	1181	1162	1142	1122	1103	1083	1064
6000	1140	1120	1100	1080	1060	1040	1020	1001	981
7000	1059	1038	1018	997	977	957	937	918	898
8000	977	956	936	915	895	874	854	834	815
9000	895	874	853	833	812	792	771	751	731
10000	813	792	771	750	729	709	688	668	648
11000	731	710	688	667	646	626	605	585	564
12000	649	627	606	584	563	542	522	501	481
13000	566	544	523	501	480	459	438	418	397
14000	484	462	440	418	397	376	355	334	314
15000	401	379	357	335	314	293	271	251	230
16000	318	296	274	252	230	209	188	167	146
17000	235	213	191	169	147	126	104	83	63
18000	152	130	107	85	64	42	21	0	-21

ALL ENGINES OPERATING - CLIMB RATE FOR 3000 LBS (TAKE-OFF CLIMB)									
Temp °C	-35	-30	-25	-20	-15	-10	-5	0	5
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	2153	2132	2112	2091	2070	2050	2029	2008	1987
1000	2065	2044	2023	2002	1981	1959	1938	1917	1895
2000	1977	1955	1934	1912	1890	1869	1847	1825	1803
3000	1888	1866	1844	1822	1800	1777	1755	1733	1711
4000	1799	1777	1754	1731	1709	1686	1664	1641	1619
5000	1710	1687	1664	1641	1618	1595	1572	1549	1526
6000	1620	1597	1573	1550	1526	1503	1479	1456	1433
7000	1530	1506	1482	1458	1434	1410	1387	1363	1340
8000	1440	1415	1391	1366	1342	1318	1294	1270	1246
9000	1349	1324	1299	1275	1250	1225	1201	1177	1153
10000	1258	1233	1207	1182	1157	1132	1108	1083	1059
11000	1167	1141	1115	1090	1065	1039	1014	990	965
12000	1075	1049	1023	997	972	946	921	896	871
13000	983	957	930	904	878	853	827	802	777
14000	891	864	838	811	785	759	733	708	682
15000	799	771	744	718	691	665	639	613	588
16000	706	678	651	624	598	571	545	519	493
17000	613	585	558	531	504	477	451	425	399
18000	520	492	464	437	410	383	356	330	304
Temp °C	10	15	20	25	30	35	40	45	50
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	1966	1945	1924	1904	1883	1862	1841	1820	1800
1000	1874	1853	1831	1810	1789	1768	1747	1726	1705
2000	1782	1760	1738	1717	1695	1674	1653	1631	1610
3000	1689	1667	1645	1623	1601	1580	1558	1537	1515
4000	1596	1574	1552	1529	1507	1485	1464	1442	1420
5000	1503	1480	1458	1435	1413	1391	1369	1347	1325
6000	1410	1387	1364	1341	1319	1296	1274	1252	1230
7000	1316	1293	1270	1247	1224	1201	1179	1157	1134
8000	1223	1199	1176	1153	1130	1107	1084	1061	1039
9000	1129	1105	1081	1058	1035	1012	989	966	943
10000	1035	1011	987	963	940	917	893	871	848
11000	941	916	892	868	845	821	798	775	752
12000	846	822	798	774	750	726	703	680	657
13000	752	727	703	679	655	631	607	584	561
14000	657	633	608	584	560	536	512	489	466
15000	563	538	513	489	464	440	417	393	370
16000	468	443	418	393	369	345	321	298	274
17000	373	348	323	298	274	250	226	202	179
18000	278	253	228	203	179	154	130	107	83

5.3.9 CLIMB PERFORMANCE – MAXIMUM CONTINUOUS POWER

CONDITIONS:

(a) THROTTLE levers .... both at MCP

(b) FLAPS .... UP

(c) Airspeed (all weights) .... 90 KIAS

NOTE

The tables on the following pages show the rate of climb. The gradient of climb can be calculated using the following formulae:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

ALL ENGINES OPERATING - CLIMB RATE FOR 3935 LBS (MAXIMUM CONTINUOUS POWER)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1299	1281	1263	1245	1227	1209	1191	1173	1155
1000	1299	1281	1263	1245	1227	1209	1191	1173	1155
2000	1299	1281	1263	1245	1227	1209	1191	1173	1155
3000	1299	1281	1263	1245	1227	1209	1191	1173	1155
4000	1265	1246	1228	1210	1191	1173	1155	1136	1118
5000	1194	1176	1157	1138	1120	1101	1082	1064	1045
6000	1124	1105	1086	1067	1048	1029	1010	991	972
7000	1053	1034	1014	995	975	956	937	918	899
8000	982	962	942	923	903	883	864	845	825
9000	911	891	870	850	830	810	791	771	752
10000	839	818	798	778	757	737	717	697	678
11000	767	746	725	705	684	664	643	623	603
12000	695	674	652	632	611	590	570	549	529
13000	622	601	579	558	537	516	495	475	455
14000	549	528	506	484	463	442	421	400	380
15000	476	454	432	411	389	368	347	326	305
16000	403	381	358	337	315	293	272	251	230
17000	329	307	284	262	240	219	197	176	155
18000	256	233	210	188	166	144	122	101	80
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1137	1119	1101	1083	1065	1048	1030	1013	995
1000	1137	1119	1101	1083	1065	1048	1030	1013	995
2000	1137	1119	1101	1083	1065	1048	1030	1013	995
3000	1137	1119	1101	1083	1065	1048	1030	1013	995
4000	1100	1082	1064	1046	1028	1011	993	975	958
5000	1027	1009	990	972	954	936	918	901	883
6000	954	935	917	898	880	862	844	826	808
7000	880	861	842	824	805	787	769	751	733
8000	806	787	768	749	731	712	694	676	658
9000	732	713	694	675	656	637	619	600	582
10000	658	639	619	600	581	562	544	525	507
11000	584	564	544	525	506	487	468	449	431
12000	509	489	470	450	431	412	393	374	355
13000	434	414	395	375	355	336	317	298	279
14000	360	339	319	300	280	261	241	222	204
15000	285	264	244	224	204	185	166	147	128
16000	209	189	169	149	129	109	90	71	52
17000	134	114	93	73	53	33	14	-5	-24
18000	59	38	18	-3	-23	-43	-62	-81	-101

ALL ENGINES OPERATING - CLIMB RATE FOR 3500 LBS (MAXIMUM CONTINUOUS POWER)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1521	1501	1481	1461	1441	1422	1402	1382	1362
1000	1521	1501	1481	1461	1441	1422	1402	1382	1362
2000	1521	1501	1481	1461	1441	1422	1402	1382	1362
3000	1521	1501	1481	1461	1441	1422	1402	1382	1362
4000	1482	1462	1442	1422	1402	1382	1362	1342	1322
5000	1404	1384	1363	1343	1322	1302	1282	1262	1241
6000	1326	1305	1284	1264	1243	1222	1201	1181	1160
7000	1248	1226	1205	1184	1163	1142	1121	1100	1079
8000	1169	1147	1126	1104	1083	1061	1040	1019	998
9000	1090	1068	1046	1024	1002	981	959	938	916
10000	1011	988	966	944	922	900	878	856	835
11000	931	908	886	863	841	818	796	774	753
12000	851	828	805	782	759	737	715	692	670
13000	771	748	724	701	678	655	633	610	588
14000	691	667	643	620	597	574	551	528	506
15000	610	586	562	538	515	492	469	446	423
16000	529	505	480	457	433	409	386	363	341
17000	448	423	399	375	351	327	304	281	258
18000	366	341	317	293	268	245	221	198	175
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1343	1323	1304	1284	1265	1246	1226	1207	1188
1000	1343	1323	1304	1284	1265	1246	1226	1207	1188
2000	1343	1323	1304	1284	1265	1246	1226	1207	1188
3000	1343	1323	1304	1284	1265	1246	1226	1207	1188
4000	1302	1283	1263	1243	1224	1205	1185	1166	1147
5000	1221	1201	1181	1162	1142	1122	1103	1083	1064
6000	1140	1120	1100	1080	1060	1040	1020	1001	981
7000	1059	1038	1018	997	977	957	937	918	898
8000	977	956	936	915	895	874	854	834	815
9000	895	874	853	833	812	792	771	751	731
10000	813	792	771	750	729	709	688	668	648
11000	731	710	688	667	646	626	605	585	564
12000	649	627	606	584	563	542	522	501	481
13000	566	544	523	501	480	459	438	418	397
14000	484	462	440	418	397	376	355	334	314
15000	401	379	357	335	314	293	271	251	230
16000	318	296	274	252	230	209	188	167	146
17000	235	213	191	169	147	126	104	83	63
18000	152	130	107	85	64	42	21	0	-21

ALL ENGINES OPERATING - CLIMB RATE FOR 3000 LBS (MAXIMUM CONTINUOUS POWER)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1844	1821	1799	1777	1754	1732	1709	1687	1665
1000	1844	1821	1799	1777	1754	1732	1709	1687	1665
2000	1844	1821	1799	1777	1754	1732	1709	1687	1665
3000	1844	1821	1799	1777	1754	1732	1709	1687	1665
4000	1799	1777	1754	1731	1709	1686	1664	1641	1619
5000	1710	1687	1664	1641	1618	1595	1572	1549	1526
6000	1620	1597	1573	1550	1526	1503	1479	1456	1433
7000	1530	1506	1482	1458	1434	1410	1387	1363	1340
8000	1440	1415	1391	1366	1342	1318	1294	1270	1246
9000	1349	1324	1299	1275	1250	1225	1201	1177	1153
10000	1258	1233	1207	1182	1157	1132	1108	1083	1059
11000	1167	1141	1115	1090	1065	1039	1014	990	965
12000	1075	1049	1023	997	972	946	921	896	871
13000	983	957	930	904	878	853	827	802	777
14000	891	864	838	811	785	759	733	708	682
15000	799	771	744	718	691	665	639	613	588
16000	706	678	651	624	598	571	545	519	493
17000	613	585	558	531	504	477	451	425	399
18000	520	492	464	437	410	383	356	330	304
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	1643	1620	1598	1576	1554	1533	1511	1489	1468
1000	1643	1620	1598	1576	1554	1533	1511	1489	1468
2000	1643	1620	1598	1576	1554	1533	1511	1489	1468
3000	1643	1620	1598	1576	1554	1533	1511	1489	1468
4000	1596	1574	1552	1529	1507	1485	1464	1442	1420
5000	1503	1480	1458	1435	1413	1391	1369	1347	1325
6000	1410	1387	1364	1341	1319	1296	1274	1252	1230
7000	1316	1293	1270	1247	1224	1201	1179	1157	1134
8000	1223	1199	1176	1153	1130	1107	1084	1061	1039
9000	1129	1105	1081	1058	1035	1012	989	966	943
10000	1035	1011	987	963	940	917	893	871	848
11000	941	916	892	868	845	821	798	775	752
12000	846	822	798	774	750	726	703	680	657
13000	752	727	703	679	655	631	607	584	561
14000	657	633	608	584	560	536	512	489	466
15000	563	538	513	489	464	440	417	393	370
16000	468	443	418	393	369	345	321	298	274
17000	373	348	323	298	274	250	226	202	179
18000	278	253	228	203	179	154	130	107	83

5.3.10 CLIMB PERFORMANCE - ONE ENGINE INOPERATIVE – TAKE-OFF

CONDITIONS:

(a) Remaining Engine (RH) .... MAX PWR @ 2700 RPM

(b) Dead Engine..................................... feathered and secured

(c) FLAPS .... UP

(d) Airspeed (all weights) .... 90 KIAS

(e) Landing Gear.................................... retracted

(f) Zero Sideslip .... established

NOTE

The tables on the following pages show the rate of climb. The gradient of climb can be calculated using the following formulae:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

ONE ENGINE INOPERATIVE - CLIMB RATE FOR 3935 LBS (TAKE-OFF CLIMB)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	419	407	394	382	370	358	345	333	322
1000	377	365	352	340	327	315	303	291	279
2000	336	323	310	298	285	273	260	248	236
3000	294	281	268	255	242	230	217	205	193
4000	252	239	226	213	200	187	174	162	149
5000	210	196	183	170	157	144	131	119	106
6000	167	154	140	127	114	101	88	75	63
7000	125	111	98	84	71	58	45	32	19
8000	82	68	55	41	28	15	1	-12	-24
9000	39	26	12	-2	-15	-29	-42	-55	-68
10000	-3	-18	-31	-45	-59	-72	-86	-99	-112
11000	-46	-61	-75	-89	-102	-116	-129	-143	-156
12000	-90	-104	-118	-132	-146	-160	-173	-187	-200
13000	-133	-147	-162	-176	-190	-203	-217	-231	-244
14000	-176	-191	-205	-220	-234	-247	-261	-275	-288
15000	-220	-235	-249	-263	-277	-291	-305	-319	-332
16000	-264	-278	-293	-307	-321	-335	-349	-363	-376
17000	-307	-322	-337	-351	-366	-380	-393	-407	-421
18000	-351	-366	-381	-395	-410	-424	-438	-451	-465
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	310	298	286	275	263	252	240	229	218
1000	267	255	243	231	220	208	197	185	174
2000	224	212	200	188	176	164	153	141	130
3000	180	168	156	144	132	121	109	98	86
4000	137	125	113	101	89	77	65	54	42
5000	94	81	69	57	45	33	21	10	-2
6000	50	38	25	13	1	-11	-23	-35	-46
7000	7	-6	-18	-31	-43	-55	-67	-79	-90
8000	-37	-50	-62	-75	-87	-99	-111	-123	-135
9000	-81	-94	-106	-119	-131	-143	-155	-167	-179
10000	-125	-138	-150	-163	-175	-187	-199	-211	-223
11000	-169	-182	-194	-207	-219	-232	-244	-256	-268
12000	-213	-226	-238	-251	-264	-276	-288	-300	-312
13000	-257	-270	-283	-295	-308	-320	-332	-345	-356
14000	-301	-314	-327	-340	-352	-365	-377	-389	-401
15000	-345	-358	-371	-384	-397	-409	-421	-433	-445
16000	-390	-403	-416	-428	-441	-453	-466	-478	-490
17000	-434	-447	-460	-473	-485	-498	-510	-522	-534
18000	-478	-491	-504	-517	-530	-542	-555	-567	-579

ONE ENGINE INOPERATIVE - CLIMB RATE FOR 3500 LBS (TAKE-OFF CLIMB)									
Temp °C	-35	-30	-25	-20	-15	-10	-5	0	5
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	527	513	500	487	474	461	448	435	422
1000	481	468	454	441	427	414	401	388	375
2000	435	422	408	394	381	367	354	341	328
3000	389	375	362	348	334	320	307	294	280
4000	343	329	315	301	287	273	260	246	233
5000	297	283	268	254	240	226	213	199	185
6000	250	236	222	207	193	179	165	152	138
7000	204	189	175	160	146	132	118	104	90
8000	157	142	128	113	99	85	70	56	43
9000	110	95	81	66	51	37	23	9	-5
10000	63	48	33	19	4	-11	-25	-39	-53
11000	16	1	-14	-29	-44	-58	-73	-87	-101
12000	-31	-46	-61	-76	-91	-106	-120	-135	-149
13000	-78	-94	-109	-124	-139	-154	-168	-183	-197
14000	-125	-141	-156	-172	-187	-202	-216	-231	-245
15000	-173	-189	-204	-219	-235	-249	-264	-279	-293
16000	-221	-236	-252	-267	-282	-297	-312	-327	-341
17000	-268	-284	-300	-315	-330	-345	-360	-375	-389
18000	-316	-332	-348	-363	-378	-393	-408	-423	-437
Temp °C	10	15	20	25	30	35	40	45	50
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	409	396	384	371	359	346	334	322	310
1000	362	349	336	324	311	299	286	274	262
2000	315	302	289	276	263	251	238	226	214
3000	267	254	241	228	215	203	190	178	165
4000	220	206	193	180	168	155	142	130	117
5000	172	159	146	133	120	107	94	81	69
6000	124	111	98	85	72	59	46	33	21
7000	77	63	50	37	24	11	-2	-15	-28
8000	29	15	2	-11	-25	-38	-51	-63	-76
9000	-19	-33	-46	-60	-73	-86	-99	-112	-124
10000	-67	-81	-94	-108	-121	-134	-147	-160	-173
11000	-115	-129	-142	-156	-169	-182	-195	-208	-221
12000	-163	-177	-190	-204	-217	-231	-244	-256	-269
13000	-211	-225	-239	-252	-266	-279	-292	-305	-318
14000	-259	-273	-287	-300	-314	-327	-340	-353	-366
15000	-307	-321	-335	-349	-362	-375	-388	-401	-414
16000	-355	-369	-383	-397	-410	-424	-437	-450	-462
17000	-403	-417	-431	-445	-458	-472	-485	-498	-511
18000	-452	-466	-479	-493	-507	-520	-533	-546	-559

ONE ENGINE INOPERATIVE - CLIMB RATE FOR 3000 LBS (TAKE-OFF CLIMB)									
Temp °C	-35	-30	-25	-20	-15	-10	-5	0	5
Press. Alt (ft)	RATE OF CLIMB (FT/MIN)								
0	680	665	650	636	621	606	592	577	563
1000	628	613	598	583	568	553	538	524	509
2000	576	560	545	530	515	500	485	470	456
3000	523	508	492	477	462	447	431	417	402
4000	471	455	439	424	408	393	378	363	348
5000	418	402	386	371	355	340	324	309	294
6000	365	349	333	317	302	286	270	255	240
7000	312	296	280	264	248	232	217	201	186
8000	259	243	227	210	194	178	163	147	132
9000	206	190	173	157	141	125	109	93	78
10000	153	136	120	103	87	71	55	39	23
11000	100	83	66	49	33	17	1	-15	-31
12000	46	29	12	-4	-21	-37	-53	-69	-85
13000	-7	-25	-42	-58	-75	-91	-107	-123	-139
14000	-61	-78	-95	-112	-129	-145	-162	-178	-193
15000	-115	-132	-149	-166	-183	-199	-216	-232	-248
16000	-168	-186	-203	-220	-237	-253	-270	-286	-302
17000	-222	-240	-257	-274	-291	-308	-324	-340	-356
18000	-276	-294	-311	-328	-345	-362	-378	-394	-410
Temp °C	10	15	20	25	30	35	40	45	50
Press. Alt (ft)	RATE OF CLIMB (FT/MIN)								
0	549	534	520	506	492	479	465	451	438
1000	495	480	466	452	438	424	410	397	383
2000	441	426	412	398	384	370	356	342	328
3000	387	372	358	344	329	315	301	287	274
4000	333	318	304	289	275	261	247	233	219
5000	279	264	249	235	220	206	192	178	164
6000	225	210	195	180	166	152	137	123	109
7000	171	156	141	126	111	97	83	69	55
8000	116	101	86	72	57	42	28	14	0
9000	62	47	32	17	2	-12	-26	-41	-55
10000	8	-7	-22	-37	-52	-67	-81	-95	-109
11000	-46	-62	-77	-92	-106	-121	-136	-150	-164
12000	-101	-116	-131	-146	-161	-176	-190	-204	-218
13000	-155	-170	-185	-200	-215	-230	-244	-259	-273
14000	-209	-225	-240	-255	-270	-284	-299	-313	-327
15000	-263	-279	-294	-309	-324	-339	-353	-368	-382
16000	-318	-333	-348	-363	-378	-393	-407	-422	-436
17000	-372	-387	-403	-418	-432	-447	-462	-476	-490
18000	-426	-441	-457	-472	-487	-501	-516	-530	-544

5.3.11 CLIMB PERFORMANCE - ONE ENGINE INOPERATIVE – MCP

CONDITIONS:

(a) Remaining Engine (RH) .... MAX PWR @ 2700 RPM

(b) Dead Engine..................................... feathered and secured

(c) FLAPS .... UP

(d) Airspeed (all weights)........................ 90 KIAS

(e) Landing Gear.................................... retracted

(f) Zero Sideslip .... established

NOTE

The tables on the following pages show the rate of climb. The gradient of climb can be calculated using the following formulae:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

ONE ENGINE INOPERATIVE - CLIMB RATE FOR 3935 LBS (MAXIMUM CONTINUOUS POWER)									
Temp °C	-35	-30	-25	-20	-15	-10	-5	0	5
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	298	286	275	264	252	241	230	218	207
1000	292	280	268	256	244	233	221	210	198
2000	285	273	260	248	236	224	212	200	188
3000	277	265	252	239	227	214	202	189	177
4000	252	239	226	213	200	187	174	162	149
5000	210	196	183	170	157	144	131	119	106
6000	167	154	140	127	114	101	88	75	63
7000	125	111	98	84	71	58	45	32	19
8000	82	68	55	41	28	15	1	-12	-24
9000	39	26	12	-2	-15	-29	-42	-55	-68
10000	-3	-18	-31	-45	-59	-72	-86	-99	-112
11000	-46	-61	-75	-89	-102	-116	-129	-143	-156
12000	-90	-104	-118	-132	-146	-160	-173	-187	-200
13000	-133	-147	-162	-176	-190	-203	-217	-231	-244
14000	-176	-191	-205	-220	-234	-247	-261	-275	-288
15000	-220	-235	-249	-263	-277	-291	-305	-319	-332
16000	-264	-278	-293	-307	-321	-335	-349	-363	-376
17000	-307	-322	-337	-351	-366	-380	-393	-407	-421
18000	-351	-366	-381	-395	-410	-424	-438	-451	-465
Temp °C	10	15	20	25	30	35	40	45	50
Press. Alt (ft)				RATE OF CLIMB (FT/MIN)					
0	196	185	174	164	153	142	131	121	110
1000	187	175	164	153	142	131	120	109	98
2000	176	165	153	141	130	119	108	96	85
3000	165	153	141	129	118	106	94	83	72
4000	137	125	113	101	89	77	65	54	42
5000	94	81	69	57	45	33	21	10	-2
6000	50	38	25	13	1	-11	-23	-35	-46
7000	7	-6	-18	-31	-43	-55	-67	-79	-90
8000	-37	-50	-62	-75	-87	-99	-111	-123	-135
9000	-81	-94	-106	-119	-131	-143	-155	-167	-179
10000	-125	-138	-150	-163	-175	-187	-199	-211	-223
11000	-169	-182	-194	-207	-219	-232	-244	-256	-268
12000	-213	-226	-238	-251	-264	-276	-288	-300	-312
13000	-257	-270	-283	-295	-308	-320	-332	-345	-356
14000	-301	-314	-327	-340	-352	-365	-377	-389	-401
15000	-345	-358	-371	-384	-397	-409	-421	-433	-445
16000	-390	-403	-416	-428	-441	-453	-466	-478	-490
17000	-434	-447	-460	-473	-485	-498	-510	-522	-534
18000	-478	-491	-504	-517	-530	-542	-555	-567	-579

ONE ENGINE INOPERATIVE - CLIMB RATE FOR 3500 LBS (MAXIMUM CONTINUOUS POWER)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	391	378	366	354	342	330	317	305	293
1000	385	372	359	347	334	321	309	297	284
2000	378	365	352	339	326	313	300	287	274
3000	371	357	343	330	316	303	289	276	263
4000	343	329	315	301	287	273	260	246	233
5000	297	283	268	254	240	226	213	199	185
6000	250	236	222	207	193	179	165	152	138
7000	204	189	175	160	146	132	118	104	90
8000	157	142	128	113	99	85	70	56	43
9000	110	95	81	66	51	37	23	9	-5
10000	63	48	33	19	4	-11	-25	-39	-53
11000	16	1	-14	-29	-44	-58	-73	-87	-101
12000	-31	-46	-61	-76	-91	-106	-120	-135	-149
13000	-78	-94	-109	-124	-139	-154	-168	-183	-197
14000	-125	-141	-156	-172	-187	-202	-216	-231	-245
15000	-173	-189	-204	-219	-235	-249	-264	-279	-293
16000	-221	-236	-252	-267	-282	-297	-312	-327	-341
17000	-268	-284	-300	-315	-330	-345	-360	-375	-389
18000	-316	-332	-348	-363	-378	-393	-408	-423	-437
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	282	270	258	246	235	223	212	200	189
1000	272	260	248	236	224	212	200	188	177
2000	261	249	236	224	212	199	187	175	163
3000	250	237	224	211	199	186	174	161	149
4000	220	206	193	180	168	155	142	130	117
5000	172	159	146	133	120	107	94	81	69
6000	124	111	98	85	72	59	46	33	21
7000	77	63	50	37	24	11	-2	-15	-28
8000	29	15	2	-11	-25	-38	-51	-63	-76
9000	-19	-33	-46	-60	-73	-86	-99	-112	-124
10000	-67	-81	-94	-108	-121	-134	-147	-160	-173
11000	-115	-129	-142	-156	-169	-182	-195	-208	-221
12000	-163	-177	-190	-204	-217	-231	-244	-256	-269
13000	-211	-225	-239	-252	-266	-279	-292	-305	-318
14000	-259	-273	-287	-300	-314	-327	-340	-353	-366
15000	-307	-321	-335	-349	-362	-375	-388	-401	-414
16000	-355	-369	-383	-397	-410	-424	-437	-450	-462
17000	-403	-417	-431	-445	-458	-472	-485	-498	-511
18000	-452	-466	-479	-493	-507	-520	-533	-546	-559

ONE ENGINE INOPERATIVE - CLIMB RATE FOR 3000 LBS (MAXIMUM CONTINUOUS POWER)									
Temp °C	**-35**	**-30**	**-25**	**-20**	**-15**	**-10**	**-5**	**0**	**5**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	521	508	494	480	467	453	440	426	413
1000	516	502	487	473	459	445	431	417	404
2000	509	494	480	465	450	436	422	407	393
3000	502	486	471	456	441	426	411	396	381
4000	471	455	439	424	408	393	378	363	348
5000	418	402	386	371	355	340	324	309	294
6000	365	349	333	317	302	286	270	255	240
7000	312	296	280	264	248	232	217	201	186
8000	259	243	227	210	194	178	163	147	132
9000	206	190	173	157	141	125	109	93	78
10000	153	136	120	103	87	71	55	39	23
11000	100	83	66	49	33	17	1	-15	-31
12000	46	29	12	-4	-21	-37	-53	-69	-85
13000	-7	-25	-42	-58	-75	-91	-107	-123	-139
14000	-61	-78	-95	-112	-129	-145	-162	-178	-193
15000	-115	-132	-149	-166	-183	-199	-216	-232	-248
16000	-168	-186	-203	-220	-237	-253	-270	-286	-302
17000	-222	-240	-257	-274	-291	-308	-324	-340	-356
18000	-276	-294	-311	-328	-345	-362	-378	-394	-410
Temp °C	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Press. Alt (ft)				**RATE OF CLIMB (FT/MIN)**					
0	400	387	374	361	348	335	322	309	297
1000	390	376	363	349	336	323	310	297	284
2000	379	365	351	337	323	310	296	283	270
3000	367	352	338	324	310	296	282	268	255
4000	333	318	304	289	275	261	247	233	219
5000	279	264	249	235	220	206	192	178	164
6000	225	210	195	180	166	152	137	123	109
7000	171	156	141	126	111	97	83	69	55
8000	116	101	86	72	57	42	28	14	0
9000	62	47	32	17	2	-12	-26	-41	-55
10000	8	-7	-22	-37	-52	-67	-81	-95	-109
11000	-46	-62	-77	-92	-106	-121	-136	-150	-164
12000	-101	-116	-131	-146	-161	-176	-190	-204	-218
13000	-155	-170	-185	-200	-215	-230	-244	-259	-273
14000	-209	-225	-240	-255	-270	-284	-299	-313	-327
15000	-263	-279	-294	-309	-324	-339	-353	-368	-382
16000	-318	-333	-348	-363	-378	-393	-407	-422	-436
17000	-372	-387	-403	-418	-432	-447	-462	-476	-490
18000	-426	-441	-457	-472	-487	-501	-516	-530	-544

5.3.12 CRUISE PERFORMANCE - TRUE AIRSPEED

CONDITIONS:

(a) Engines .... All operating

(b) THROTTLE levers .... RPM as required

(c) MIXTURE control levers .... Lean to Best Power (below 75%)

(d) Flaps .... UP

(e) Landing Gear .... Retracted

The Cruise Performance Tables are as follows:

Pressure Altitude ft (m)	**Percent Power**	**-20 ISA -5 °C (23 °F)**	**ISA 15 °C (59 °F)**	**+20 ISA 35 °C (95 °F)**
		Airspeed (KTAS)		
Sea Level	MCP	159	163	166
	75%	149	153	156
	65%	141	144	147
	55%	131	134	137

Pressure Altitude ft (m)	**Percent Power**	**-20 ISA -12 °C (54 °F)**	**ISA 8 °C (48 °F)**	**+20 ISA 28 °C (82 °F)**
		Airspeed (KTAS)		
3500 (1067)	MCP	164	168	172
	75%	154	157	161
	65%	145	148	151
	55%	135	138	141

Pressure Altitude ft (m)	Percent Power	-20 ISA -15 °C (5 °F)	ISA 5 °C (41 °F)	+20 ISA 25 °C (77 °F)
		Airspeed (KTAS)		
5000 (1524)	MCP	163	167	171
	75%	156	160	163
	65%	147	150	153
	55%	137	140	142

Pressure Altitude ft (m)	Percent Power	-20 ISA -21 °C (-6 °F)	ISA 1 °C (34 °F)	+20 ISA 21 °C (70 °F)
		Airspeed (KTAS)		
7000 (2134)	MCP	162	166	169
	75%	159	162	166
	65%	150	153	156
	55%	139	142	145

Pressure Altitude ft (m)	Percent Power	-20 ISA -23 °C (-9 °F)	ISA -3 °C (27 °F)	+20 ISA 17 °C (63 °F)
		Airspeed (KTAS)		
9000 (2743)	MCP	160	164	167
	65%	152	156	159
	55%	141	144	147

Pressure Altitude ft (m)	Percent Power	-20 ISA -27 °C (-17 °F)	ISA -7 °C (19 °F)	+20 ISA 13 °C (55 °F)
		Airspeed (KTAS)		
11000 (3353)	MCP	158	162	165
	65%	155	159	162
	55%	144	147	149

Pressure Altitude ft (m)	Percent Power	-20 ISA -31 °C (-24 °F)	ISA -11 °C (12 °F)	+20 ISA 9 °C (48 °F)
		Airspeed (KTAS)		
13000 (3962)	MCP	156	159	163
	55%	146	149	152

Pressure Altitude ft (m)	Percent Power	-20 ISA -35 °C (-31 °F)	ISA -15 °C (5 °F)	+20 ISA 5°C (41 °F)
		Airspeed (KTAS)		
15000 (4572)	MCP	153	156	159
	55%	149	152	154

Pressure Altitude ft (m)	Percent Power	-20 ISA -35 °C (-31 °F)	ISA -15 °C (5 °F)	+20 ISA 5°C (41 °F)
		Airspeed (KTAS)		
18000 (5486)	MCP	147	150	153

5.3.13 LANDING DISTANCE

The following conditions are recommended to obtain the AFM Landing Distances:

(a) PROPELLER RPM levers ....HGH RPM

(b) THROTTLE levers ....as required to hold a 3 degree glide path angle

(c) LANDING GEAR ....DOWN

(d) FLAPS ....LDG

(e) Runway...dry, level, hard paved surface

(f) Brakes ....maximum effective braking

(g) Landing Speed (all weights) ....cross 50 ft at VREF (85 KIAS)

(h) THROTTLE levers ....reduce power at 20-30 ft AGL.

NOTE

1. Decrease the total distance by 2% for each knot of headwind.

2. Increase the total distance by 4% for each knot of tailwind.

CAUTION

FOR A SAFE LANDING THE AVAILABLE RUNWAY LENGTH MUST BE AT LEAST EQUAL TO THE LANDING DISTANCE OVER A 50 FT (15 M) OBSTACLE.

NOTE

Landing with a mass between the maximum landing weight of 1700 kg (3748 lbs) and the maximum take-off weight of 1785 kg (3935 lbs) is admissible. It constitutes an abnormal operating procedure. The landing distance is unaffected.

CAUTION

DEVIATION FROM THE PRESCRIBED PROCEDURES AND UNFAVORABLE EXTERNAL FACTORS (HIGH TEMPERATURE, RAIN, RUNWAY CONTAMINATION, UNFAVORABLE WIND, ETC.) CAN CONSIDERABLY INCREASE THE LANDING DISTANCE.

CAUTION

A DESCENDING GROUND SLOPE OF 2 % (2 M PER 100 M, OR 2 FT PER 100 FT) RESULTS IN AN INCREASE IN THE LANDING DISTANCE OF APPROXIMATELY 10 %.

NOTE

For landings on dry, short-cut grass covered runways, the following corrections must be taken into account, compared to paved runways (typical values, see CAUTION above):

- grass up to 5 cm (2 in) long: 5 % increase in landing roll.
- grass 5 to 10 cm (2 to 4 in) long: 15 % increase in landing roll.
- grass longer than 10 cm (4 in): at least 25 % increase in landing roll.

NOTE

For wet grass, an additional 10 % increase in landing roll must be expected.

NOTE

Higher approach speeds result in a significant longer landing distance.

LANDING DISTANCE TABLE

PRESSURE ALTIUTUDE	WEIGHT 3750 LBS									
	-35 °C (-31 °F)		-25 °C (-13 °F)		-15 °C (5 °F)		-5 °C (23 °F)		5 °C (41 °F)	
	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet
0	970	2060	1020	2130	1070	2200	1110	2270	1160	2340
1000	1010	2120	1060	2200	1110	2270	1160	2340	1210	2410
2000	1060	2190	1110	2260	1160	2340	1210	2410	1260	2490
3000	1100	2250	1160	2330	1210	2410	1260	2490	1320	2560
4000	1150	2320	1210	2400	1260	2480	1320	2560	1380	2640
5000	1200	2400	1260	2480	1320	2560	1380	2650	1430	2730
6000	1250	2470	1310	2560	1380	2640	1440	2730	1500	2810
7000	1310	2550	1370	2640	1440	2730	1500	2820	1560	2910
8000	1370	2630	1430	2730	1500	2820	1570	2910	1630	3000
9000	1430	2720	1500	2820	1570	2910	1640	3010	1710	3100
10000	1490	2810	1570	2910	1640	3010	1710	3110	1780	3200

PRESSURE ALTIUTUDE	WEIGHT 3750 LBS							
	15 °C (59 °F)		25 °C (77 °F)		35 °C (95 °F)		45 °C (113 °F)	
	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'	GROUND ROLL	TOTAL DISTANCE TO 50'
feet	feet	feet	feet	feet	feet	feet	feet	feet
0	1210	2410	1260	2480	1310	2550	1360	2620
1000	1260	2480	1310	2560	1360	2630	1410	2700
2000	1320	2560	1370	2630	1420	2710	1470	2780
3000	1370	2640	1430	2720	1480	2790	1540	2870
4000	1430	2720	1490	2800	1550	2880	1600	2960
5000	1490	2810	1550	2890	1610	2970	1670	3050
6000	1560	2900	1620	2980	1680	3070	1740	3150
7000	1630	2990	1690	3080	1760	3170	1820	3260
8000	1700	3090	1770	3180	1830	3270	1900	3360
9000	1770	3190	1840	3290	1910	3380	1980	3480
10000	1850	3300	1930	3400	2000	3500	2070	3590

5.3.14 GRADIENT OF CLIMB ON GO-AROUND

CONDITIONS:

(a) THROTTLE levers............................both MAX @ 2700 RPM

(b) FLAPS...LDG

(c) Landing gear ....extended

(d) Airspeed (all weights).......................90 KIAS.

Value for ISA and MSL, at 1785 kg (3935 lb)	
Constant gradient of climb	6.5%

5.3.15 APPROVED NOISE DATA

ICAO Annex 16 Chapter 10, Appendix 6 .... 82.08 dB(A)

Applicable maximum noise level .... 88.00 dB(A)

FAR-36 Appendix G.

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CHAPTER 6

MASS AND BALANCE

TABLE OF CONTENTS

6.1 INTRODUCTION

In order to achieve the performance and flight characteristics described in this Airplane Flight Manual and for safe flight operation, the airplane must be operated within the permissible mass and balance envelope.

The pilot is responsible for adhering to the permissible values for loading and center of gravity (CG). In this, he should note the movement of the CG due to fuel consumption. The permissible CG range during flight is given in Chapter 2.

The procedure for determining the flight mass CG position is described in this chapter. Additionally a comprehensive list of the equipment approved for this airplane exists (Equipment List) with a list of the equipment installed when the airplane was weighed (Equipment Inventory).

Before the airplane is delivered, the empty mass and the corresponding CG position are determined and entered in Section 6.3 MASS AND BALANCE REPORT.

NOTE

Following equipment changes the new empty mass and the corresponding CG position must be determined by calculation or by weighing.

Following repairs or repainting the new empty mass and the corresponding CG position must be determined by weighing.

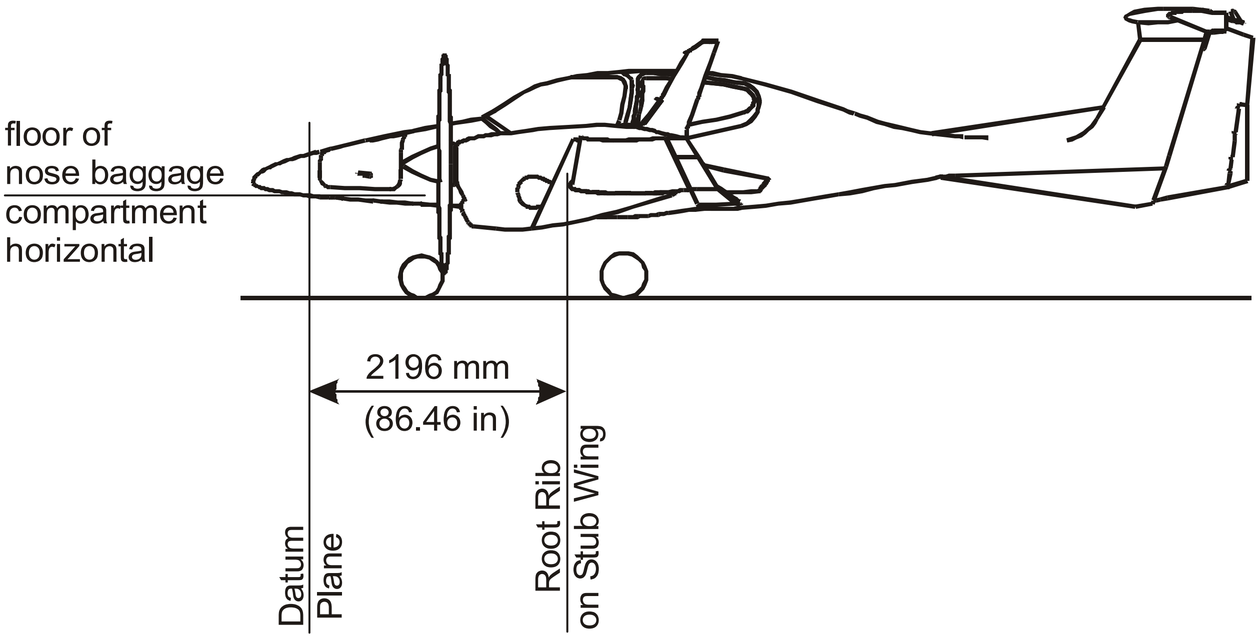
Empty mass, empty mass CG position, and the empty mass moment must be certified in the Mass and Balance Report by authorized personneL.

NOTE

Refer to Section 1.6 UNITS OF MEASUREMENT for conversion of SI units to US units and vice versa.

6.2 DATUM PLANE

The Datum Plane (DP) is a plane which is normal to the airplane's longitudinal axis and in front of the airplane as seen from the direction of flight. The airplane's longitudinal axis is parallel with the floor of the nose baggage compartment. When the floor of the nose baggage compartment is aligned horizontally, the Datum Plane is vertical. The Datum Plane is located 2.196 meters (86.46 in) forward of the most forward point of the root rib on the stub wing.



6.3 MASS AND BALANCE REPORT

The empty mass and the corresponding CG position established before delivery are the first entries in the Mass and Balance Report. Every change in permanently installed equipment, and every repair to the airplane which affects the empty mass or the empty mass CG must be recorded in the Mass and Balance Report.

For the calculation of flight mass and corresponding CG position (or moment), the current empty mass and the corresponding CG position (or moment) in accordance with the Mass and Balance Report must always be used.

Condition of the airplane for establishing the empty mass:

- Equipment as per Equipment Inventory (see Section 6.5)

- Including the following operating fluids:

  Brake hydraulic fluid

  Hydraulic fluid for the retractable gear

  Engine oil (2 x 6.0 liters = 2 x 6.3 qts)

  Unusable fuel in the main fuel tanks
  (1 US gal in each of the L/R main tank = approx. 7.6 liters)

  Unusable fuel in the auxiliary fuel tanks
  (0.5 US gal in each L/R auxiliary tank = approx. 3.8 liters).

MASS AND BALANCE REPORT

(Continuous report on structural or equipment changes)

The chart is shown on the next page.

MASS AND BALANCE REPORT

DA42 L360			Serial No.:			Registration:			Page No.:			
Date	Entry No.		Description of Part or Modification	Changes in Mass						Current Empty Mass		
				Addition (+)			Subtraction (-)					
	IN	OUT		Mass	Moment Arm	Moment	Mass	Moment Arm	Moment	Mass	Moment Arm	Moment
			upon delivery									

6.4 FLIGHT MASS AND CENTER OF GRAVITY

The following information enables you to operate your DA42 L360 within the permissible mass and balance limits. For the calculation of the flight mass and the corresponding CG position the following tables and diagrams are required:

6.4.1 MOMENT ARMS

6.4.2 CALCULATION OF LOADING CONDITION

6.4.3 PERMISSIBLE CENTER OF GRAVITY RANGE

The diagrams should be used as follows:

(a) Take the empty mass and the empty mass moment of your airplane from the Mass and Balance Report, and enter the figures in the appropriate boxes under the column marked ‘Your DA42 L360' in Table 6.4.3 – “CALCULATION OF LOADING CONDITION”.

(b) Read the fuel quantity indicators to determine the fuel quantity in the main fuel tanks.

(c) Determine the fuel quantity in the auxiliary fuel tanks.

To verify an empty auxiliary fuel tank, set the ELECT. MASTER switch and the FUEL TRANSFER switch to ON and check the PFD for the L/R AUX FUEL E caution message.

To verify a full auxiliary fuel tank, open the auxiliary fuel tank filler and check fuel level.

If the auxiliary fuel tank quantity is between empty and full, the exact quantity cannot be determined. If possible, transfer all fuel to the main fuel tank by setting the ELECT. MASTER switch and the FUEL TRANSFER switch to ON until the L/R AUX FUEL E caution message appears on the PFD.

During this procedure, ground power must be used, or at least one engine must be running. The fuel transfer will take a maximum of 10 minutes.

CAUTION

IF THE FUEL QUANTITY IN THE AUXILIARY FUEL TANK IS UNKNOWN, THEN A FULL AUXILIARY FUEL TANK MUST BE ASSUMED FOR THE MASS AND BALANCE CALCULATIONS, AND AN EMPTY AUXILIARY FUEL TANK MUST BE ASSUMED FOR THE RANGE AND DURATION CALCULATIONS.

Multiply the individual masses by the moment arms quoted to obtain the moment for every item of loading and enter these moments in the appropriate boxes in Table 6.4.2 – “CALCULATION OF LOADING CONDITION”.

(d) Add up the masses and moments in the respective columns. The CG position is calculated by dividing the total moment by the total mass (using row 7 for the condition with empty fuel tanks, and row 10 for the pre take-off condition). The resulting CG position must be inside the limits.

As an illustration the total mass and the CG position are entered on Diagram 6.4.4 – “PERMISSIBLE CENTER OF GRAVITY RANGE”. This checks graphically that the current configuration of the airplane is within the permissible range.

6.4.1 MOMENT ARMS

The most important lever arms aft of the Datum Plane:

ITEM		LEVER ARM (m)	LEVER ARM (in)
Occupants on front seats		2.30	90.6
Occupants on rear seats		3.25	128.0
Fuel	In main tanks	2.63	103.5
	In auxiliary tanks	3.20	126.0
Baggage in Compartments	Nose	0.60	23.6
	Cabin	3.89	153.1
	Extension	4.54	178.7

6.4.2 CALCULATION OF LOADING CONDITION

NOTE

If the optional de-icing system (OÄM 42-053 or OÄM 42-054) is installed, the following must be observed:

The consumption of fuel causes a forward movement of the CG. The consumption of de-icing fluid causes a rearward movement of the CG. Depending on the fuel flow and de-icing fluid flow, the overall movement of the CG can be a forward or a rearward movement. In order to cover all possible cases, the following table must be completed twice: with (as shown in the example) and without considering the on-board de-icing fluid. All four CG positions (fuel tank full/empty, de-icing fluid tank full/empty) must fall into the permitted area.

(a) Complete the form on the next page.

(b) Divide the total moments from rows 8 and 11 by the related total mass to obtain the CG positions. In our example:

Empty tanks:
3453 kgm / 1458 kg = 2.369 m (300 in.lb / 3213 lb) X 1000 = 93.27 in

Full tanks:
4140 kgm / 1701 kg = 2.435 m (359 in.lb / 3749 lb) X 1000 = 95.85 in

(c) Locate the values in the diagram in Section 6.4.3 "PERMISSIBLE CENTER OF GRAVITY RANGE"'. If the CG positions and related masses fall into the permitted area, the loading condition is allowable.

Our example shows allowable loading conditions.

CALCULATION OF LOADING CONDITIONS

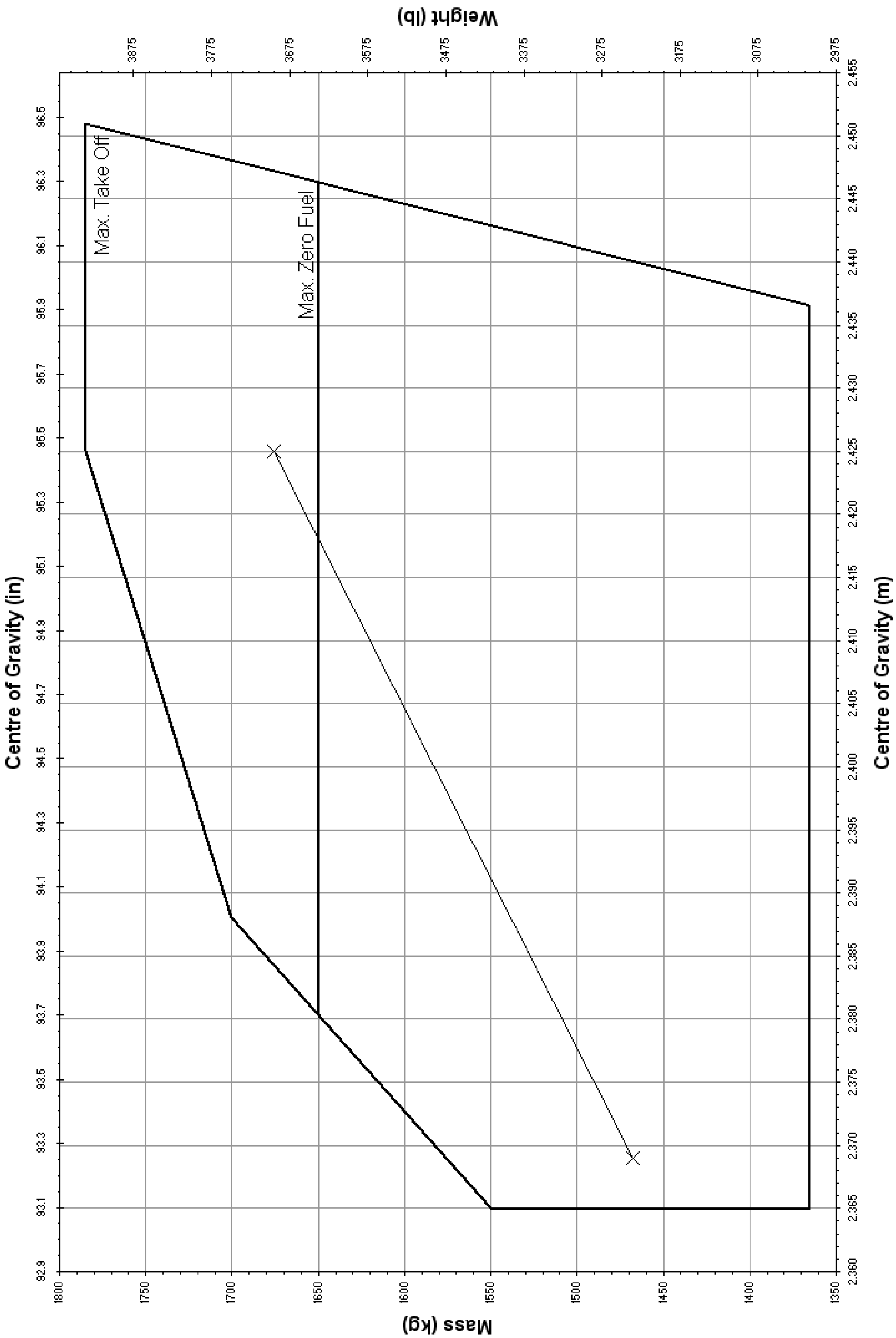
CALCULATION OF LOADING CONDITION	DA42 L360 (EXAMPLE)			YOUR DA42 L360		
	Mass Weight (kg) (lb)	**CG (m)** (in)	**Moment (kg.m)** (in.lb)/1000	**Mass Weight (kg)** (lb)	**CG (m)** (in)	**Moment (kg.m)** (in.lb)/1000
1. **Empty Mass (from Mass & Balance Report)**	**1250** ***2756***	**2.410** **94.88**	**3013** ***261***			
2. Front Seats	160 *353*	2.300 *90.55*	368 *32*		2.300 *90.55*	
3. Rear Seats	0 *0*	3.250 *127.95*	0 *0*		3.250 *127.95*	
4. Nose Baggage Compartment	15 *33*	0.600 *23.62*	9 *1*		0.600 *23.62*	
5. Cockpit Baggage Compartment	15 *33*	3.890 *153.15*	58 *5*		3.890 *153.15*	
6. Baggage Extension	0 *0*	4.540 *178.74*	0 *0*		4.540 *178.74*	
7. De-icing Fluid (if installed; see note on previous page) (1.1 kg/L) *(9.2 lb/USG)*	28 *61*	1.000 *39.37*	28 *2*		1.000 *39.37*	
8. **Zero Fuel Mass (Weight) (Total of 1. through 7.)**	**1468** ***3235***	**2.368** ***93.24***	**3475** ***302***			
9. Usable Fuel Main Tanks (0.72 kg/L) *(6.02 lb/USG)*	136 *300*	2.630 *103.54*	358 *31*		2.630 *103.54*	
10. Usable Fuel Auxiliary Tanks (0.72 kg/L) *(6.02 lb/USG)*	72 *159*	3.200 *125.98*	230 *20*		3.200 *125.98*	
11. **Ramp Weight (Total of 8. through 10.)**	**1676** ***3694***	**2.425** ***95.48***	**4063** ***353***			

6.4.3 PERMISSIBLE CENTER OF GRAVITY RANGE

The Centre of Gravities shown in the diagram on the next page are those from the example in Table 6.4.3 (a) “CALCULATION OF LOADING CONDITION”, rows 8 and 11.

The flight Centre of Gravity (CG) position must be within the limits stated in Chapter 2.

PERMISSIBLE CENTER OF GRAVITY RANGE



6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

All equipment that is approved for installation in the DA42 L360 is shown in the Equipment List that follows.

The items of equipment installed in your particular airplane are indicated in the appropriate column. The set of items marked as “installed” constitutes the Equipment Inventory.

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
AIRPLANE FLIGHT MANUAL		Diamond Aircraft		3.086	1.4	68.031	1.728
AVIONICS COOLING							
Avionics Cooling Fan	SAFE 328	Sandia Aerospace		0.66	0.299	162.007	4.115
PFD Cooling Fan	SAFE 128	Sandia Aerospace		0.25	0.113	64.527	1.639
MFD Cooling Fan	SAFE 128	Sandia Aerospace		0.25	0.113	64.527	1.639
AUTOPILOT SYSTEM – (KAP 140)							
Flight Computer	KC 140	Bendix/King		2.04	0.93	70.08	1.78
Pitch servo	KS 270 C	Bendix/King		2.29	1.04	175.4	4.455
Pitch servo mount	KM 275	Bendix/King		1.077	0.489	175.4	4.455
Roll servo	KS 271 C	Bendix/King		2.29	1.04	124.81	3.17
Roll servo mount	KM 275	Bendix/King		1.077	0.489	124.81	3.17
Trim servo	KS 272 C	Bendix/King		2.29	1.04	88.19	2.24
Trim servo mount	KM 277	Bendix/King		1.097	0.498	88.19	2.24
Configuration module	KCM 100	Bendix/King		0.07	0.032	53.543	1.36
Sonalert		Mallory		0.094	0.043	61.535	1.563
CWS switch		Bendix/King		0.001	0	75.551	1.919
AP-Disc switch		Bendix/King		0.033	0.015	75.551	1.919
Trim switch assy		Bendix/King		0.11	0.05	75.551	1.919
AUTOPILOT – (GFC700							
Pitch Servo	Garmin GFC700 GSA 81	Garmin		2.29	1.039	175.4	4.455
Pitch Servo Mount	Garmin GFC700 GSM 85	Garmin		1.46	0.662	175.4	4.455
Pitch Servo Bridle Cable Assy	Garmin GFC700	Garmin		0.04	0.017	175.4	4.455
Roll Servo	Garmin GFC700 GSA 81	Garmin		2.29	1.039	124.81	3.17
Roll Servo Mount	Garmin GFC700 GSM 85	Garmin		1.46	0.662	124.81	3.17
Roll Servo Bridle Cable Assy	Garmin GFC700	Garmin		0.04	0.017	124.81	3.17
Pitch Trim Servo	Garmin GFC700 GSA 81	Garmin		2.29	1.039	88.19	2.24

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
Pitch trim Servo Mount	Garmin GFC700 GSM 85	Garmin		1.59	0.721	88.19	2.24
Pitch Trim Servo Chain	Garmin GFC700	Garmin		0.88	0.4	88.19	2.24
ELECTRICAL POWER							
Main Battery	G-243(CB24-11M)	Gill (Concorde)		28.1	12.746	49.17	1.249
Emergency Battery		Diamond Aircraft		0.5	0.23	65.157	1.655
External Power Connector		Diamond Aircraft		0.351	0.159	2.953	0.075
LH Alternator		Kelly Aerospace		12.33	5.593	54.606	1.387
RH Alternator		Kelly Aerospace		12.33	5.593	54.606	1.387
LH voltage Regulator		Kelly Aerospace		0.68	0.308	72.834	1.85
RH voltage Regulator		Kelly Aerospace		0.68	0.308	72.834	1.85
Magneto Booster (LH)	Slick Start	Kelly Aerospace		0.68	0.308	75.827	1.926
Magneto Booster (RH)	Slick Start	Kelly Aerospace		0.68	0.308	75.827	1.926
EQUIPMENT							
Safety belt, pilot	5-01-1C0701-LH	Schroth		2.11	0.96	92.52	2.35
Safety belt, copilot	5-01-1C0701-RH	Schroth		2.11	0.96	92.52	2.35
Safety belt, LH pax	5-01-1B0701-LH	Schroth		2.25	1.02	126.77	3.22
Safety belt, RH pax	5-01-1B0701-RH	Schroth		2.25	1.02	126.77	3.22
ELT unit	ME-406	Artex		2.77	1.26	179.73	4.565
ELT remote switch		Artex		0.063	0.028	65.275	1.658
ELT antenna		Artex		0.47	0.213	152.76	3.88
Buzzer		Artex		0.021	0.01	177.204	4.501
SAFETY EQUIPMENT							
Fire extinguisher		Amerex		2.3	1.04	105.039	2.668
First aid kit				3	1.361	141.299	3.589
FLIGHT CONTROLS							
Flaps actuator assy		Krutz		4.167	1.89	116.929	2.97
Lift detector		Safe Flight Instr.		0.32	0.145	87.638	2.226
Stall warning buzzer	SC Series	Mallory		0.1	0.045	61.535	1.563

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
Variable elevator stop		Diamond Aircraft		3.197	1.45	84.252	2.14
HYDRAULIC							
Motor pump unit		Hydraulik Mayer		10.913	4.95	157.126	3.991
Hydraulic fluid tank		Hydraulik Mayer		3.175	1.44	153.891	3.909
Hydraulic control unit		Hydraulik Mayer		4.784	2.17	162.391	4.125
High pressure filter		Hydraulik Mayer		0.639	0.29	171.391	4.353
Hydraulic accumulator		Hydraulik Mayer		7.474	3.39	166.141	4.22
MLG hydraulic cylinder (LH)		Hydraulik Mayer		3.505	1.59	107.086	2.72
MLG hydraulic cylinder (RH)		Hydraulik Mayer		3.505	1.59	107.086	2.72
NLG hydraulic cylinder		Hydraulik Mayer		3.571	1.62	40	1.016
INDICATING / REC. SYSTEM							
Primary Flight Display (PFD)	GDU 1040	Garmin		6.4	2.91	68.031	1.728
Multi Function Display (MFD)	GDU 1040	Garmin		6.4	2.91	68.031	1.728
Garmin Engine / Airframe LRU	GEA 71	Garmin		1.75	0.794	84.094	2.136
Garmin Engine / Airframe LRU	GEA 71	Garmin		1.75	0.794	84.094	2.136
LANDING GEAR							
Main landing gear LH		Diamond Aircraft		65.367	29.65	105.717	2.685
Main landing gear RH		Diamond Aircraft		65.367	29.65	105.717	2.685
Nose landing gear		Diamond Aircraft		76.941	34.9	31.811	0.808
LDG Gear Warning	SC Series	Mallory		0.1	0.045	59.527	1.512
Brake master cylinder 2x		Cleveland		1	0.454	52.031	1.322
Parking valve		Cleveland		0.35	0.159	80.039	2.033
Brake assembly		Cleveland		3.14	1.424	111.575	2.834
Brake assembly		Cleveland		3.1	1.406	111.575	2.834
LIGHTS							
Strobe/Pos. light assy LH	A600-PR-D-28	Whelen		0.8	0.363	108.976	2.768
Strobe/Pos. light assy RH	A600-PG-D-28	Whelen		0.8	0.363	108.976	2.768
Strobe light power supply LH	A490ATS-CF-14/28	Whelen		1.700	0.77	108.976	2.768

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
Strobe light power supply RH	A490ATS-CF-14/28	Whelen		1.700	0 .770	108.976	2.768
Taxi light	Xenon D1S	Aero Vision Int.		0.990	0.449	79.920	2.03
Taxi light power supply	XV1-28	Aero Vision Int.		0.880	0.4	82.283	2.09
Landing light	Xenon D1S	Aero Vision Int.		0.990	0.449	79.920	2.03
Landing light power supply	XV1-28	Aero Vision Int.		0.880	0.4	82.283	2.09
COMMUNICATION/NAVIGATION							
COMM #1 antenna		DM		0.4	0.18	177.1	4.5
COMM #2 antenna		DM		0.4	0.18	155.1	3.94
Audio Panel / Marker / ICS	GMA 1347	Garmin		1.74	0.785	68.031	1.728
Speaker	FRS8 / 4 Ohms	Visaton		0.051	0.023	106.26	2.699
Hand microphone	100 TRA	Telex		0.26	0.118	68.031	1.728
Pitot/Static probe, heated		Diamond Aircraft		1.499	0.68	102.559	2.605
Pitot/Static probe, heated	AN5814-2	Aeroinstruments		1.499	0.68	102.559	2.605
Alternate static valve		Diamond Aircraft		0.06	0.027	64.527	1.639
Backup Altimeter		United Instruments		0.496	0.225	68.031	1.728
Backup airspeed indicator	8030	United Instruments		0.68	0.308	68.031	1.728
Backup artificial horizon	4300	Mid Continent Instr.		2.5	1.132	68.031	1.728
Magnetic compass		SIRS Navigation		0.36	0.165	68.031	1.728
Turn & Bank indicator	1394T100-(12RB)	Mid Continent Instr.		1.41	0.64	68.031	1.728
OAT probe	GTP 59	Garmin		0.37	0.168	47.716	1.212
Digital Air Data System	GDC 74A	Garmin		1.58	0.72	68.031	1.728
Integrated Avionics #1	GIA 63	Garmin		5.29	2.4	154.92	3.935
Integrated Avionics #2	GIA 63	Garmin		5.29	2.4	154.92	3.935
Transponder	GTX 33	Garmin		3.03	1.38	153.15	3.89
Attitude / Heading Reference System	GRS 77	Garmin		2.54	1.15	154.92	3.935
Magnetometer	GMU 44	Garmin		0.379	0.172	103.86	2.638
VOR/LOC/GS antenna	CI 157P	Comant		0.5	0.227	280.7	7.13
dual VOR / dual GS duplexer	CI 1125	Comant		0.25	0.113	197.05	5.005
Transponder antenna	KA 61	Bendix/King		0.22	0.1	91.93	2.335
Marker antenna	CI 102	Comant		0.6	0.272	135.433	3.44

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
GPS #1 antenna	GA 56	Garmin		0.4	0.18	104.14	2.645
GPS #2 antenna	GA 56	Garmin		0.4	0.18	104.14	2.645
DME	KN 63	Bendix/King		2.48	1.12	140.945	3.58
DME antenna	KA 60	Bendix/King		0.22	0.1	91.93	2.335
TAS Processor	TAS 610	Avidyne/Ryan		6.8	3.084	164.37	4.175
Transponder Coupler		Avidyne/Ryan		0.5	0.23	197.64	5.02
TAS antenna, top		Sensor Systems		0.66	0.298	164.89	4.188
TAS antenna, bottom		Sensor Systems		0.75	0.34	104.33	2.65
Data link processor	GDL69A	Garmin		2.49	1.13	159.45	4.05
Antenna	GA55 / GA37	Garmin		0.59	0.268	104.14	2.645
ADF receiver	RA 3502-(01)	Becker		2.08	0.94	155.5	3.95
ADF / RMI converter	AC 3504-(01)	Becker		1.3	0.59	165.4	4.2
ADF antenna	AN 3500	Becker		3.45	1.56	133.9	3.4
Stormscope	WX-500	L-3(Goodrich)		2.29	1.04	140.1	3.56
Stormscope antenna	NY-163	L-3(Goodrich)		0.82	0.37	280.7	7.13
WAAS Engine				0	N/A	N/A	N/A
SVT				0	N/A	N/A	N/A
ENGINE							
LH Engine	IO-360-M1A	Lycoming		300.049	136.1	60.866	1.546
RH Engine	LIO-360-M1A	Lycoming		300.049	136.1	60.866	1.546
Oil cooler LH		Stewart Warner		3.968	1.8	73.228	1.86
Oil cooler RH		Stewart Warner		3.968	1.8	73.228	1.86
Power flow Exhaust (LH)				18.96	8.6	65.866	1.673
Power flow Exhaust (RH)				18.96	8.6	65.866	1.673
LH Starter		SKYTEC		8.5	3.856	52.559	1.335
RH Starter		SKYTEC		8.34	3.783	52.559	1.335
Magneto (LH engine) LH	4300 series	Slick		4.17	1.891	73.858	1.876
Magneto (LH engine) RH	4300 series	Slick		4.17	1.891	73.858	1.876
Magneto (RH engine) LH	4300 series	Slick		4.17	1.891	73.858	1.876
Magneto (RH engine) RH	4300 series	Slick		4.17	1.891	73.858	1.876

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
Fuel Servo - LH	RSA-5A01	Precession Airmotive		5.13	2.327	58.819	1.494
Fuel Servo - RH	RSA-5A01	Precession Airmotive		5.13	2.327	58.819	1.494
PROPELLER							
LH Propeller	MTV-12-B-C-F/CF	MT Propeller		52.911	24	38.976	0.99
RH Propeller	MTV-12-B-C-F/CFL	MT Propeller		52.911	24	38.976	0.99
LH Governor	P-885-3	MT Propeller		2.447	1.11	49.449	1.256
RH Governor	P-875/3	MT Propeller		2.447	1.11	49.449	1.256
Unfeathering Accumulator	P-893-2	MT Propeller		3.704	1.68	77.519	1.969
Unfeathering Accumulator	P-893-2	MT Propeller		3.704	1.68	77.519	1.969
FUEL TANK SYSTEM							
Fuel probe assy., LH inboard		Diamond Aircraft		1.5	0.68	107.48	2.73
Fuel probe assy., RH in-board		Diamond Aircraft		1.5	0.68	107.48	2.73
Fuel probe assy., LH outboard		Diamond Aircraft		0.5	0.227	107.48	2.73
Fuel probe assy., RH outboard		Diamond Aircraft		0.5	0.227	107.48	2.73
Alternate Means for fuel qty.		Diamond Aircraft		0.437	0.198	100.551	2.554
Boost Pump (LH)		Dukes		2.205	1	81.811	2.078
Boost Pump (RH)		Dukes		2.205	1	81.811	2.078
Aux fuel Pump (LH)		Dukes		1.92	0.871	150.511	3.823
Aux fuel Pump (RH)		Dukes		1.92	0.871	150.511	3.823
OXYGEN SYSTEM							
Oxygen cylinder		Aerox		7.401	3.357	32.283	0.82
Single outlet manifold LH		Aerox		0.229	0.104	69.685	1.77
Single outlet manifold RH		Aerox		0.229	0.104	69.685	1.77
Dual outlet manifold		Aerox		0.421	0.191	109.252	2.775
Oxygen pressure regulator		Aerox		0.741	0.336	21.26	0.54
Filling block		Aerox		0.54	0.245	28.15	0.715
Pressure gauge		Aerox		0.11	0.05	70.079	1.78

Airplane Serial No.:	Registration:		Date:	Mass		Lever Arm	
Description	**Type**	**Manufacturer**	**Installed**	**lb**	**kg**	**in**	**m**
ICE PROTECTION SYSTEM							
Porous panel, outer wing, LH		CAV Aerospace		2.205	1	93.701	2.38
Porous panel, outer wing, RH		CAV Aerospace		2.205	1	93.701	2.38
Porous panel, center wing, LH		CAV Aerospace		3.307	1.5	88.976	2.26
Porous panel, center wing, RH		CAV Aerospace		3.307	1.5	88.976	2.26
Porous panel, horizontal tail, LH		CAV Aerospace		1.653	0.75	277.558	7.05
Porous panel, horizontal tail, RH		CAV Aerospace		1.653	0.75	277.558	7.05
Porous panel, vertical tail		CAV Aerospace		1.102	0.5	262.598	6.67
Inlet strainer		CAV Aerospace		0.11	0.05	40.157	1.02
Spray Bar		CAV Aerospace		0.661	0.3	43.307	1.1
Metering pump 1		CAV Aerospace		4.18	1.896	40.157	1.02
Metering pump 2		CAV Aerospace		4.18	1.896	40.157	1.02
De-icing fluid tank		Diamond Aircraft		8.139	3.692	38.386	0.975
Filter 1		CAV Aerospace		0.679	0.308	40.157	1.02
Filter 2		CAV Aerospace		0.679	0.308	40.157	1.02
Solenoid valve		CAV Aerospace		0.871	0.395	40.157	1.02
Solenoid valve		CAV Aerospace		0.871	0.395	40.157	1.02
High pressure switch		CAV Aerospace		0.22	0.1	40.157	1.02
Proportioning unit, nacelle, LH		CAV Aerospace		0.441	0.2	94.488	2.4
Proportioning unit, nacelle, RH		CAV Aerospace		0.441	0.2	94.488	2.4
Tail bracket assembly		CAV Aerospace		1.069	0.485	278.739	7.08
Windshield pump 1		CAV Aerospace		0.65	0.295	40.157	1.02
Windshield pump 2		CAV Aerospace		0.65	0.295	40.157	1.02
De-ice control box		Diamond Aircraft		1.107	0.502	30.709	0.78

Place:________________ Date: ______________ Signature _________________________

CHAPTER 7

DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

TABLE OF CONTENTS

PAGE

7.1 INTRODUCTION

Chapter 7 contains a description of the airplane and its systems, together with operating instructions.

For details about optional equipment see Chapter 9.

7.2 AIRFRAME

Fuselage:

The CFRP fuselage is of semi monocoque molded construction. The center wing is attached to the fuselage with bolts. The two main spars and both nacelles are part of the center wing. The two main spars are CFRP items. The engine compartment in each nacelle is separated from the other structure with a firewall. The fire protection on the firewall is of a special fire-resistant matting, which is covered on the engine side by stainless steel cladding.

Wings:

The wings have a front and rear spar; each wing has a top shell and a bottom shell; The whole wing is ‘fail-safe‘ design. The wings, as well as the ailerons and flaps, are made of GFRP/CFRP, and are principally of sandwich construction. An aluminum fuel tank is installed in each of the wings. The auxiliary tanks are situated in the nacelles.

Empennage:

The airplane has a ‘T’ tail of GFRP/CFRP semi monocoque construction. Both the stabilizers have twin spars. Rudder and elevator are of sandwich construction.

7.3 FLIGHT CONTROLS

The ailerons, elevator and wing flaps are operated through control rods, while the rudder is controlled by cables. The flaps are electrically operated. Elevator forces can be balanced by a trim tab on the elevator, which is operated by a Bowden cable. Rudder forces can be balanced by a trim tab on the rudder, which is operated by a Bowden cable from a control knob on the center console.

Ailerons:

Construction: GFRP/CFRP composite sandwich.

Hinges: There are 4 hinges, which are hinge pins mounted in an aluminum bracket. They are secured in position by a roll pin. The absence of this roll pin can lead to the loss of the hinge pin and a consequent loss of flight safety.

Operation: A rod-end bearing is screwed into a steel push rod and locked by means of a jam nut which has locking varnish applied to it. Damage to this varnish can indicate a twisting and thus a change to the adjustment. The connection between the rod-end bearing and the control horn is a bolt, the nut of which is likewise sealed with locking varnish.
The aluminum control horn is attached to the aileron with 3 screws.

Flaps:

The flaps are a two piece construction. The inner part of the flap is mounted to the center wing and the outer part to the wing. Both parts are connected to each other with a form fit connection.

Construction: GFRP/CFRP composite sandwich.

Hinges: There are 6 hinges at the outer part and 4 hinges at the inner part of the flap. These hinges are hinge pins mounted in an aluminum bracket. They are secured in position by a roll pin. The absence of this roll pin can lead to the loss of the hinge pin and a consequent loss of flight safety.

Operation: Each part is connected with a flap control horn to the push rods of the flap control system. A rod-end bearing is screwed into a steel push rod and locked by means of a jam nut which has locking varnish applied to it. Damage to this varnish can indicate a twisting and thus a change to the adjustment. The connection between the rod-end bearing and the control horn is a bolt, the nut of which is likewise sealed with locking varnish.

Each flap control horn is attached to the flap part with 3 screws.

The flaps are driven by an electric motor and have 3 settings:

- Cruise (UP), totally retracted
- Approach (APP)
- Landing (LDG).

The flaps are operated by means of a 3-position flap selector switch on the instrument panel. The positions of the switch correspond to the positions of the flaps, the Cruise position of the switch being at the top. If the switch is moved to another position, the flaps continue to travel automatically until they have reached the position selected on the switch. The UP and LDG positions are additionally protected by a limit switch to guard against over-running the end positions.

The electrical flap drive has an automatic circuit breaker which can also be operated manually.

Flap position indicator:

The current flap position is indicated by means of three lights beside the flap selector switch.

- When the upper light (green) is illuminated, the flaps are in the Cruise position (UP).
- When the center light (white) is illuminated, the flaps are in Approach position (APP).
- When the lower light (white) is illuminated, the flaps are in Landing position (LDG).
- When two lights are illuminated simultaneously, the flaps are between the two indicated positions. This is the case only when the flaps are in transition.

Elevator:

Construction: GFRP sandwich.

Hinges: 5 hinges.

Operation: Steel push-rods;

Two of the bellcrank bearings are accessible for visual inspection next to the lower hinge of the rudder. The elevator horn and its bearing, as well as the connection to the push-rod, can be visually inspected at the upper end of the rudder.

Variable elevator stop:

The DA42 L360 is equipped with an electrically operated actuator that limits the elevator-up travel to 13 degrees as soon as the power setting of both engines exceeds 14.5“ Hg at sea level with the flaps up. This is 2.5 degrees less than the 15.5 degrees full deflection.

When the power of both engines is reduced below 14.5” Hg, or if the Flaps are set to APP or LDG, the elevator stop will disengage and full elevator deflection is regained. The elevator stop will not engage if the Flaps are in the APP or LDG position. The linear actuator acts as a movable stop and is controlled by two switches, one for each throttle lever.

An amber annunciation (CAUTION) on the G1000 display is provided to inform the pilot in case a malfunction occurs. The annunciation illuminates when the variable stop should be in place and is actually not activated (power on condition) or should be retracted and actually limits the elevator travel (power off condition).

The annunciation circuitry is inoperative when one throttle lever is positioned beyond the approach power setting, while the other is below or in idle position (engine failure or training).

Rudder:

Construction: GFRP sandwich.

Hinges: Upper hinge: One bolt.

Lower hinge: Bearing bracket including rudder stops, held by four screws to the rear web of the vertical stabilizer. The mating part on the rudder is a bracket which is attached to the rudder by two bolts. The bolts and nuts are accessible to visual inspection.

Operation: Steel cables, the eyes of which are connected to the bolts on the bracket.

Elevator Trim

The trim control is a black wheel in the center console to the rear of the throttle lever. To guard against over-rotating, the trim wheel incorporates a friction device. A mark on the wheel shows the take-off (T/O) position.

Turn wheel to the front	= nose down
Turn wheel to the rear	= nose up

Rudder Trim

The trim control is a black wheel in the center console behind the elevator trim controls. A mark on the wheel shows the center position and the direction of movement.

Turn the wheel to the right	= right turn
Turn wheel to the left	= left turn

Pedal Adjustment

NOTE

The pedals may only be adjusted on the ground.

The pedals are unlocked by pulling the black handle which is located behind the rear attachment.

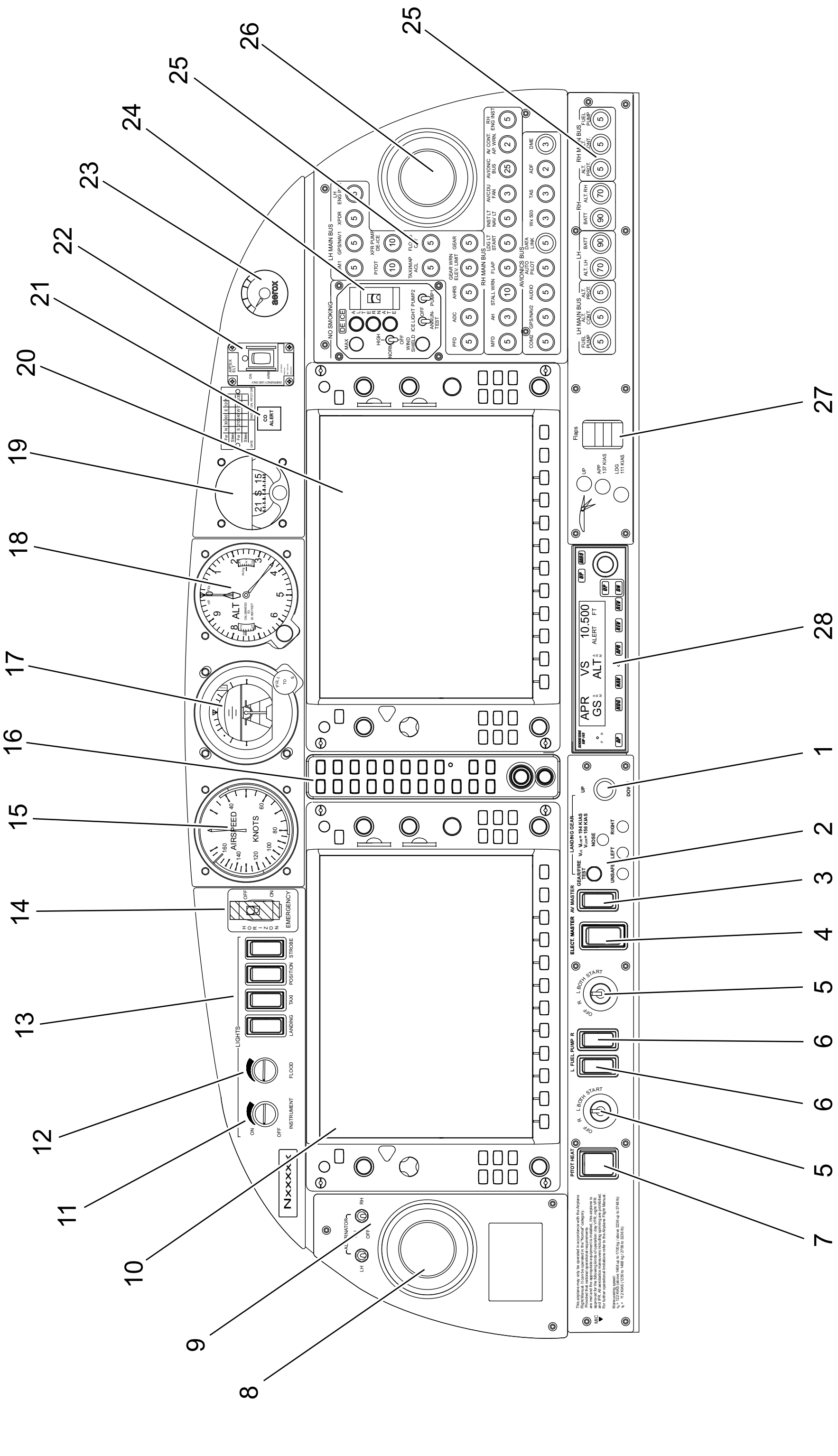
Forward adjustment:

Whilst keeping the handle pulled, push the pedals forward with your feet. Release the handle and allow the pedals to lock into place.

Rearward adjustment:

Using the unlocking handle, pull the pedals back to the desired position. Release the handle and push the pedals forward with your feet until they lock into place

7.4 INSTRUMENT PANEL



Major Instruments and Controls	
1. Landing gear switch	15. Backup airspeed indicator
2. Gear Test button	16. Audio amplifier / Intercom / Marker
3. Avionics Master switch	17. Backup artificial horizon
4. Electric Master switch	18. Backup altimeter
5. Engine Master/Start switches	19. Emergency compass
6. Fuel Pump switches	20. Multi Function Display (MFD)
7. Pitot-/Stall Warning Heat switch	21. Carbon Monoxide (CO) Detector
8. Left Ventilation nozzle	22. ELT control unit
9. Alternator switches	23. Oxygen pressure indicator
10. Primary Flight Display (PFD)	24. De-Ice control panel
11. Rotary button for Instrument lights	25. Circuit breakers
12. Rotary button for Flood lights	26. Right Ventilation nozzle
13. Light switches	27. Flap selector switch
14. Emergency Horizon switch	28. Autopilot control unit

NOTE

The figure on the previous page shows the typical DA42 L360 installation position for the equipment. The actual installation may vary due to the approved equipment version (e.g., there is no oxygen system approved at present).

Cockpit ventilation

Ventilation in the front is provided by spherical ventilation nozzles in the instrument panel. Furthermore there are spherical nozzles in the roll bar on the left and right side next to the front seats as well as on the central console above the passengers' heads. The spherical nozzles are opened and closed by twisting.

7.5 CARBON MONOXIDE DETECTOR

The Carbon Monoxide (CO) Detector is designed to detect, measure, and provide a visual alert to the crew before the cockpit level of carbon monoxide reaches a critical level. The installation consists of a CO Detector located behind the instrument panel, and a test/reset, CO ALERT annunciator light on the top RH side instrument panel. The aircraft supplied DC power and aircraft wiring is protected by a 2 ampere, resettable, trip free, type circuit breaker.

The carbon monoxide alarm level is calibrated to provide a visual alert within 5 minutes or less whenever the carbon monoxide level reaches 50 parts per million (PPM) by volume or greater. The warning time is shortened at higher levels of CO concentrations and becomes approximately instant should the carbon monoxide level reach 400 PPM by volume or greater.

In the case of a carbon monoxide alert, the pilot will receive a red CO ALERT annunciator light. The visual alert will remain on until the carbon monoxide level is reduced below the alert level. The indicator is automatically reset when the CO level drops below 50 PPM.

When airplane power is applied or when the CO ALERT annunciator is pushed, the CO Detector goes through a self-test routine and checks the functionality of critical system components. The self-test will cause the CO ALERT annunciator to flash twice then go out.

7.6 LANDING GEAR

The landing gear is a fully retractable, hydraulically operated, tricycle landing gear. Struts for the landing gear are air-oil assemblies.

The hydraulic pressure for the landing gear operation is provided by an electrically powered hydraulic pump, which is activated by a pressure switch, when the required pressure is too low. Electrically actuated hydraulic valves, which are operated with the gear selector switch, provide the required hydraulic pressure for the movement of the landing gear. The gear selector switch is located on the instrument panel. The switch must be pulled out before it is moved to “UP” or “DOWN” position. Gear extension normally takes 6-10 seconds.

When the landing gear is retracted, the main wheels retract inboard into the center wing and the nose wheel retracts forward into the nose section. Hydraulic pressure on the actuators keeps the landing gear in the retracted position. A pressurized gas container acts as an accumulator which keeps the system pressure constant by replacing the volume lost due to the normal actuator leakages. This prevents a frequent starting of the hydraulic pump in flight.

Springs assist the hydraulic system in gear extension and locking the gear in the down position. After the gears are down and the downlock hooks engage, springs maintain force on each hook to keep it locked until it is released by hydraulic pressure.

When the gears are fully extended or retracted and the gear selector switch is in the corresponding position, electrical limit switches stop the operation. The three green lights directly above the landing gear operating switch illuminate to indicate that each gear is in the correct position and locked. If the gear is in neither the full up nor the full down position, a red warning light on the instrument panel illuminates.

Should one throttle be placed in a position below approximately 14” of manifold pressure while the landing gear is retracted, a warning horn sounds to alert the pilot that the gear is retracted.

The same warning appears if the flaps move into position LDG (fully extended) while the gear is retracted.

To test the gear warning system (refer to 4A.6.1 - PRE FLIGHT INSPECTION) push the test button close by the gear selector switch. The aural gear alert should appear.

CAUTION

IF THE AURAL ALERT DOES NOT APPEAR, AN UNSCHEDULED MAINTENANCE IS NECESSARY.

To prevent inadvertent gear retraction on ground, an electric squat switch prevents the hydraulic valve from switching, if the master switch is on and the gear extension switch is placed in the “UP” position.

After takeoff, the gear should be retracted before an airspeed of 156 KIAS is exceeded. The landing gear may be extended at any speed up to 194 KIAS.

The landing gear is designed to be manually operated in the event of failure. Since the gear is held in the retracted position by hydraulic pressure, gravity will allow the gear to extend if the system fails for any reason. To extend and lock the gear in the event of failure, it is only necessary to relieve the hydraulic pressure by means of the emergency gear extension lever, which is located under the instrument panel to the left of the center console. Pulling this lever releases the hydraulic pressure and allows the gear to fall free. Before pulling the emergency gear extension lever, place the gear selector switch in the “DOWN” position.

NOTE

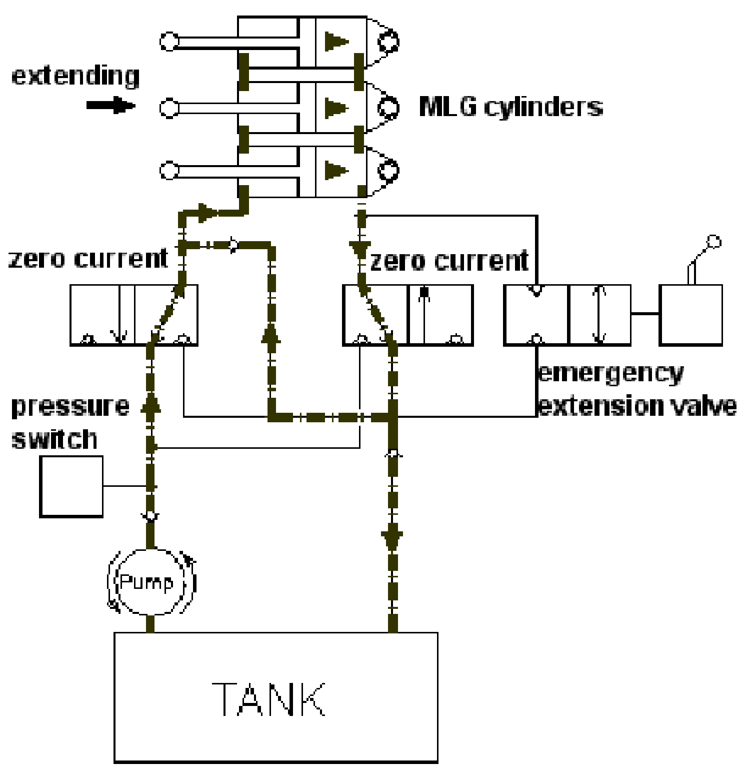
If the emergency gear extension has been pulled due to an emergency, the landing gear system must be serviced before next flight.

The nose gear is steerable by the use of full rudder pedal travel. A gear damping element, incorporated in the nose gear steering system, prevents shimmy tendencies. When the gear is retracted, the nose wheel centers as it enters the wheel well, and the steering linkage disengages to reduce pedal loads in flight.

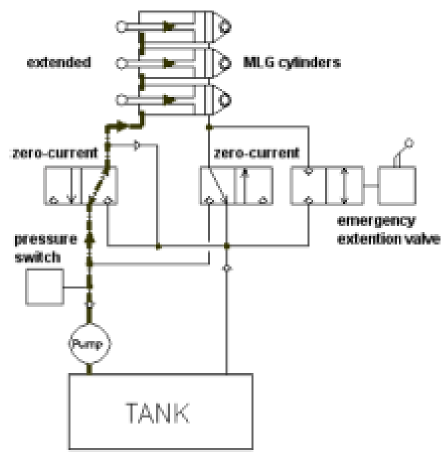
Hydraulic gear extension system schematic:

The main landing gear of the DA42 L360 is extended with three hydraulic cylinders. The following schematic figures show the system conditions for each operating mode.

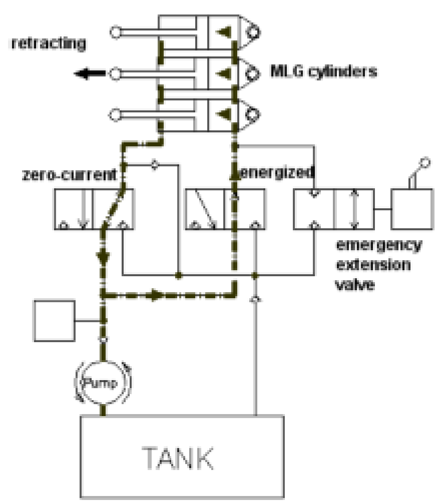
In the figure below, the extension of the landing gear is shown. To reduce the amount of pumped hydraulic fluid during this operation, the return flow is partly led into the feeding flow of the system.



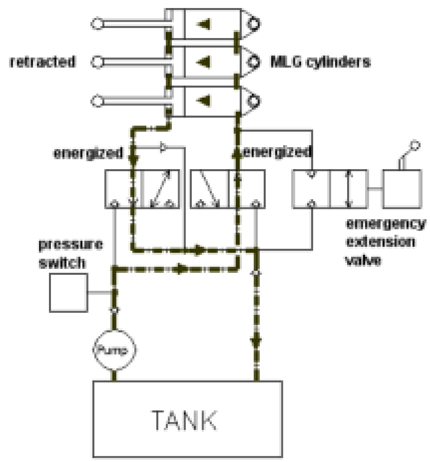
The figure below shows the system status when the landing gear is extended. All hydraulic cylinders are under high pressure.



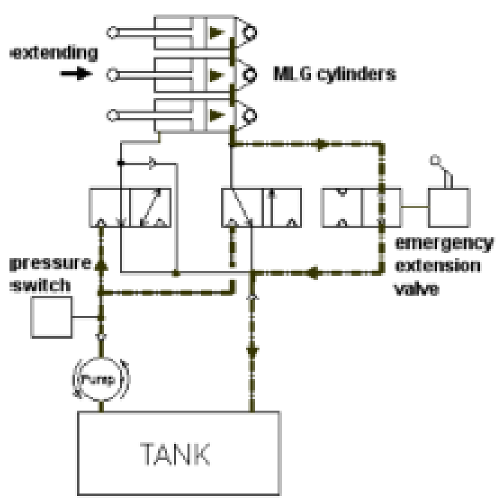
The operating mode for the retraction of the landing gear is shown in the next figure. While energizing the right pressure switch, the fluid flow in the hydraulic system is started due to different piston areas of the landing gear cylinders although the pressure on both sides of the system is equal.



While the landing gear is retracted both valves are energized and excessive hydraulic fluid on one side is drained into the tank. This configuration of the system is shown in the following figure.



For an emergency extension of the landing gear, the hydraulic fluid can pass through an emergency extension valve so that the gear is extended by gravity. The condition of the system is shown in the figure below.

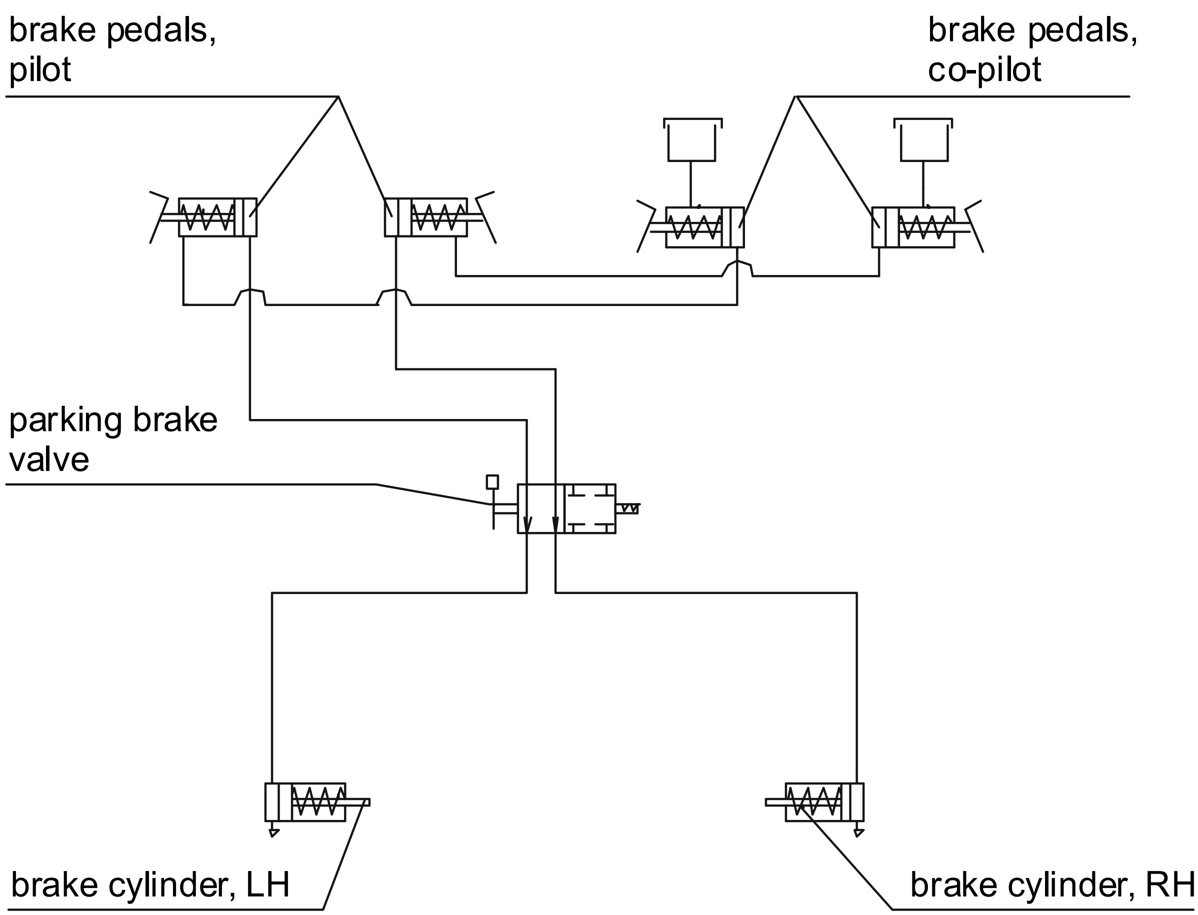


Wheel brakes

Hydraulically operated disk brakes act on the wheels of the main landing gear. The wheel brakes are individually operated by means of toe pedals.

Parking brake

The lever is located on the small center console under the instrument panel and is in the upper position when the brakes are released. To operate the parking brake, pull the lever downwards until it catches. Brake pressure is built up by multiple operation of the toe brake pedals, and is maintained until the parking brake is released. To release, the lever is pushed upwards.



7.7 SEATS AND SAFETY HARNESSES

To increase passive safety, the seats are constructed using a carbon fiber/Kevlar hybrid material and GFRP. The seats are removable to allow the maintenance and inspection of the underlying controls. Covers on the control sticks prevent loose objects from falling into the area of the controls.

The seats have removable furnishings and are equipped with energy-absorbing foam elements.

The seats are fitted with three-part safety harnesses. The harnesses are fastened by inserting the end of the belts in the belt lock, and are opened by pressing the red release on the belt lock.

The backs of the rear seats can be laid forward after pulling upwards on the locking bolt knob.

7.8 BAGGAGE COMPARTMENT

There are two baggage compartments. One is located in the nose section and it is accessible through two compartment doors.

The second baggage compartment is behind the seat backs of the rear seats. Baggage may be loaded there provided it is restrained by means of a baggage net.

7.9 CANOPY, REAR DOOR, AND CABIN INTERIOR

Front canopy

The front canopy is closed by pulling down on the canopy frame, following which it is locked by means of a handle on the left hand side of the frame. On locking, steel bolts lock into mating holes in polyethylene blocks.

“Cooling Gap” position: A second setting allows the bolts to lock in, leaving a gap under the forward canopy.

The canopy can be blocked by a locking device on the left side near the canopy opening lever by turning the key clockwise. The closed and blocked canopy can be opened from inside by pulling the lever inside the opening handle.

WARNING

THE AIRPLANE MAY BE OPERATED WITH THE FRONT CANOPY IN THE "COOLING GAP" POSITION ON THE GROUND ONLY. BEFORE TAKE-OFF THE FRONT CANOPY MUST BE COMPLETELY CLOSED AND LOCKED.

DO NOT BLOCK THE FRONT CANOPY WITH THE LOCKING KEY BEFORE FLIGHT IN ORDER TO ASSURE EMERGENCY EVACUATION FROM OUTSIDE.

A window on the left and right hand side of the canopy can be opened for additional ventilation or as an emergency window.

Rear door

The rear door is closed in the same way, by pulling down on the frame and locking it with the handle. A gas pressure damper prevents the door from dropping; in strong winds the assembly must be securely held. The rear door is protected against unintentional opening by an additional lever.

The door can be blocked by a locking device on the left side near the door opening lever by turning the key clockwise. The closed and blocked door can be opened from inside by pulling the lever inside the opening handle.

WARNING

DO NOT BLOCK THE DOOR WITH THE LOCKING KEY BEFORE FLIGHT IN ORDER TO ASSURE EMERGENCY ACCESS FROM OUTSIDE.

Heating and ventilation

Heating and ventilation are operated using two levers located on the small center console under the instrument panel.

Right lever:	up	=	HEATING ON (Seats, Floor)
	down	=	HEATING OFF
Center lever:	up	=	DEFROST ON (Airflow to canopy)
	down	=	DEFROST OFF

A heat exchanger is used to heat the cabin and to defrost the canopy.

The Air inlet for the Ventilation System is placed on the underside of the RH wing, inboard of the engine nacelle. The air is distributed within the cabin via 6 nozzles (2 on the instrument panel LH/RH side, 2 on the overhead panel and 2 on the LH/RH side of the passenger compartment). The jet direction of each cone can be changed easily and the jet intensity can be regulated by rotation of the nozzle.

7.10 POWER PLANT

7.10.1 ENGINES GENERAL

The DA42 L360 aircraft has two Lycoming IO-360-M1A/LIO-360-M1A horizontally opposed, 4-cylinder engines with overhead valves. The engine has a hollow crankshaft which is directly coupled to the propeller. The left engine operation rotates the propeller clockwise (looking forward) while the right engine operation rotates the propeller counter-clockwise (looking forward). The engine has a fuel injection system and an electric starter. Ignition is provided by 2 Slick magnetos with a Slick-Start ignition booster for starting. The Lycoming IO-360-M1A/LIO-360-M1A has a wet sump oil system.

The principal specifications of these engines are:

Air-cooled four-cylinder four-stroke engine

Horizontally-opposed direct-drive engine with fuel injection.

- Displacement: 5916 cm3 (361 in3)
- Max. power: .... 180 HP (134.2 kW) at 2700 RPM at sea level and ISA
- Max. continuous power: .... 160 HP (119.4 kW) at 2700 RPM at sea level and ISA

The principal engine accessories at the front of the engine are the propeller governor, the starter motor, and the alternator. The ignition, the twin magneto system and the mechanical fuel pump are at the rear of the engine. Fuel is supplied via a fuel injection system.

Further information should be obtained from the engine operating manual.

The indications for monitoring important engine-parameters during operation are integrated within the Garmin G1000 display.

7.10.2 PROPELLER

The DA42 L360 aircraft has the following propeller:

3 blade MT variable pitch and feathering propeller:

The blades of the MT propellers are made from wood and covered with GFRP. The blades have an acrylic lacquer painted finish. The outboard leading-edges of the blades are protected from erosion by a stainless-steel sheath. The stainless-steel sheath is bonded into position. The inboard section of the leading-edge is protected by a self-adhesive rubber strip (PU tape).

CAUTION

OPERATION ON THE GROUND AT HIGH RPM SHOULD BE AVOIDED AS MUCH AS POSSIBLE, AS THE BLADES COULD SUFFER STONE DAMAGE. FOR THIS REASON A SUITABLE SITE FOR ENGINE RUNS SHOULD BE SELECTED, WHERE THERE ARE NO LOOSE STONES OR SIMILAR ITEMS.

WARNING

NEVER MOVE THE PROPELLER BY HAND.

7.10.3 OPERATING CONTROLS

The engine performance is controlled by means of three levers for each engine:

THROTTLE, PROPELLER RPM lever and MIXTURE control lever, situated together as a group on the large center console (also referred to as the throttle quadrant). ‘Front’ and ‘rear’ are defined in relation to the direction of flight. The knobs for each of the controls are shaped differently, as required by design standards, so as to be distinguishable by feel in the dark. Pilots should familiarize themselves with the shapes of the knobs

Throttle:

- Left hand lever with the smooth, round black knob

This lever is used to set the manifold pressure (MP). When the throttle is furthest forward, the engine is being provided with extra fuel for high performance settings.

Lever forward (MAX PWR) .... Full throttle, higher MP

Lever to rear (IDLE) .... Idle, lower MP

High manifold pressure means that a large quantity of fuel-air mixture is being supplied to the engine, while low manifold pressure means a lesser quantity of fuel-air mixture is being supplied.

Propeller RPM lever:

- Center lever with the blue handle that has ridges on the top

Lever forward (HIGH RPM) .... High RPM, fine pitch

Lever to rear (LOW RPM) .... Low RPM, coarse pitch

By means of this lever the propeller governor controls the propeller pitch and thus engine RPM (= propeller RPM). A selected RPM is held constant by the governor independent of the airspeed and the throttle setting (“Constant Speed”).

Feathering and Unfeathering:

By pulling the RPM-lever fully backward past the feathering gate, the oil supply to the propeller is stopped and the propeller blades are moved into the feathering position. At the same time the oil supply to the oil accumulator is closed, thus the oil quantity in the unfeathering accumulator increases. The design of the propeller feathering system does not allow the feathering of a propeller which is not turning. For this reason, it is very important that if the propeller is to be feathered, this is done before it stops turning, or feathering will not be possible.

CAUTION

AN UNFEATHERED PROPELLER ON A STOPPED ENGINE WILL CREATE DRAG SO GREAT, THAT SINGLE ENGINED PERFORMANCE WILL BE NOTICEABLY DEGRADED.

Pushing the RPM-lever forward opens the un-feathering accumulator and oil flows to the propeller, thus the propeller blades are moved towards the fine pitch position.

The propeller governor is flanged onto the front of the engine. It regulates the supply of engine oil to the propeller. The propeller governor oil circulation is an integral part of the engine oil circulation system.

Following a defect in the governor or in the oil system (e.g. no oil available), the blades move into the feather position. In the feathering position less drag is generated and thus the continuation of flight with the remaining engine is ensured.

CAUTION

THE THROTTLE AND RPM LEVER SHOULD BE MOVED SLOWLY, IN ORDER TO PREVENT OVER-SPEEDING AND EXCESSIVELY RAPID RPM CHANGES.

Mixture control lever:

- right hand lever with an octagon shaped red knob

These knobs incorporate a locking feature, which will permit the controls to be advanced to the “rich” position, but not retarded to the “lean”, or “idle cut off” position, without depressing the lock.

This feature prevents inadvertent operation. These controls adjust the ratio of fuel to the air supplied to the engine. They control fuel economy, and engine operating conditions. Prolonged misuse of the mixture control can cause engine damage.

Lever forward (RICH) .... Mixture rich (in fuel)

Lever to rear (LEAN) .... Mixture lean (in fuel)

If the lever is at the forward stop, extra fuel is being supplied to the engine which at higher performance settings contributes to engine cooling.

In cruise, the mixture should be made leaner in order to reach the appropriate fuel-air mixture. The leaning procedure is given in Chapter 4.

To stop the engine, the mixture control (by depressing the lock and retarding) may be move to the idle cut off position. In this position the engine will be starved for fuel, and stop running. Stopping the engine by this means assures that no fuel remains in the cylinders, and the risk of an accidental start is greatly reduced.

Alternate Air:

In the event of a decrease in manifold pressure, or a substantial loss of power, resulting from induction ice or a blocked air filter, the alternate air control may be used to allow the engine to draw unfiltered warmer air from within the engine compartment. As the alternate air is not filtered, it should not be used in dusty conditions on the ground. The operating lever for Alternate Air is located under the instrument panel to the right of the center console. To open Alternate Air the lever is pulled to the rear. Normally, Alternate Air is closed, with the lever in the forward position.

Placard on the lever, forward position:

ALTERNATE AIR

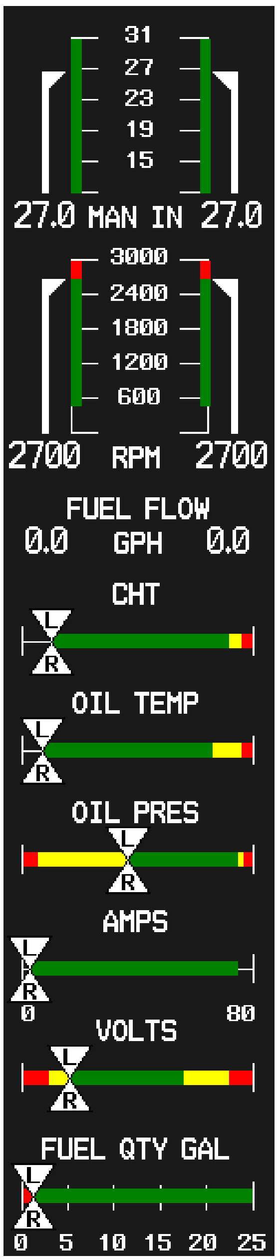
Placard on the lever, visible when lever is in the rearward position:

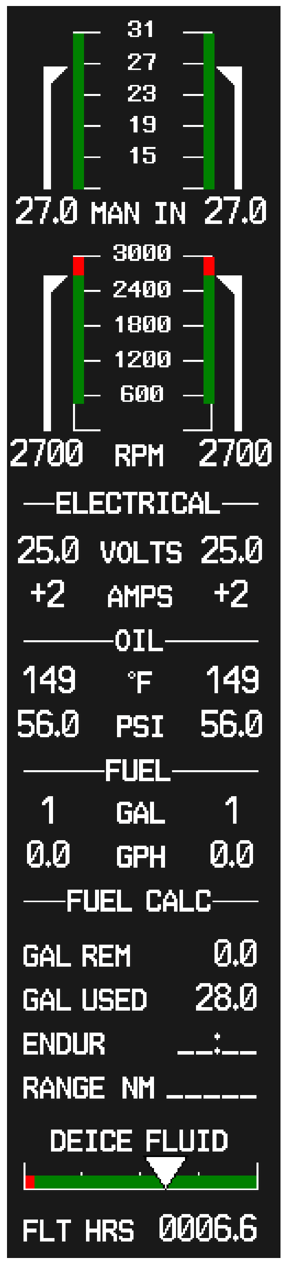
ALTERNATE AIR ON

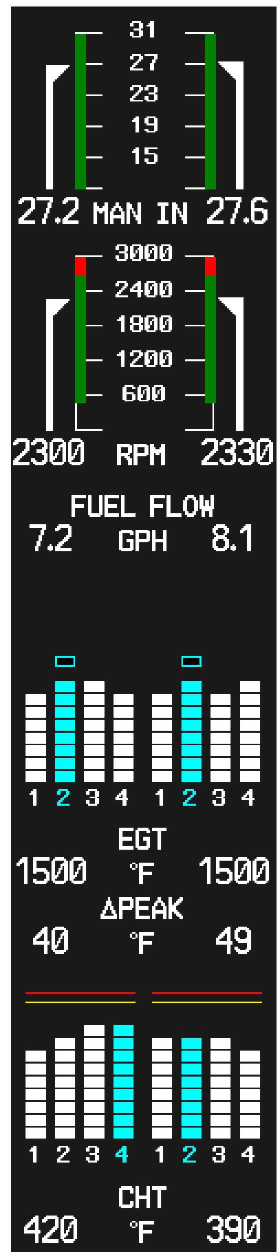
7.10.4 ENGINE INSTRUMENTS

The engine instruments are displayed on the Garmin G1000 MFD. Also refer to Paragraph 7.13.3 - MULTI-FUNCTION DISPLAY (MFD). Indications for the LH engine are on the left side, indications for the RH engine are on the right side.

Default Page Engine Page	Display when pushing the SYSTEM Button	Display for Fuel Flow







NOTE

The figure on the previous page is a general demonstration of a typical G1000 MFD to show the different display modes. The pictured engine instrument markings may not stringently agree with the current engine limitations of the DA42 L360.

NOTE

The fuel calculations on the FUEL CALC portion do not use the airplane's fuel quantity indicators. The values shown are numbers which are calculated from the last fuel quantity update done by the pilot and actual fuel flow data. Therefore, the endurance and range data is for information only, and must not be used for flight planning.

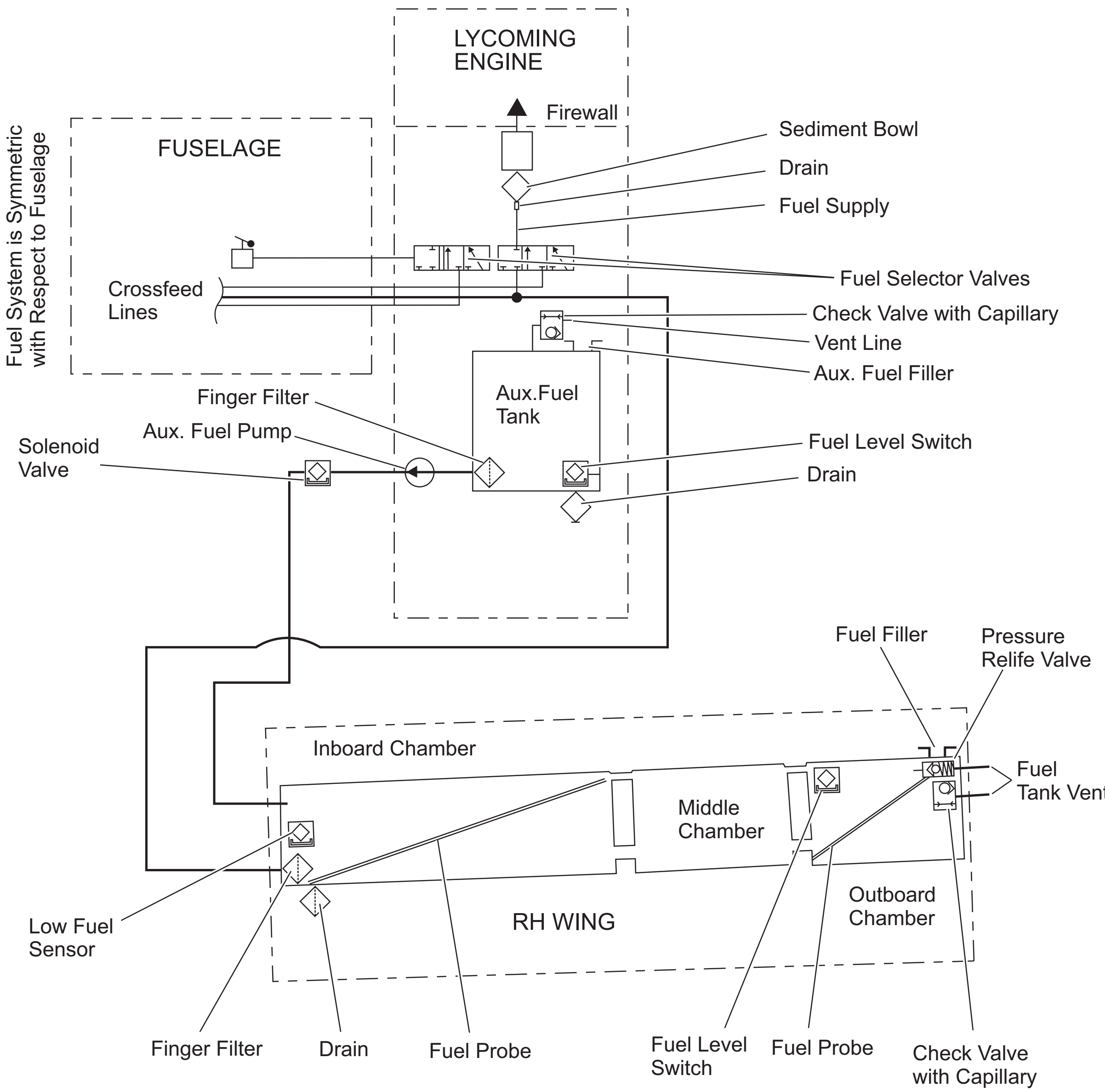
ENGINE INSTRUMENT DISPLAYS

Designation	Indication	Unit
MAN IN	Manifold Pressure	Inches of mercury
RPM	Propeller RPM	1/min
FUEL FLOW	Fuel Flow per hour	US gal / h
CHT	Cylinder Head temperature	°F
OIL TEMP	Engine Oil Temperature	°F
OIL PRES	Engine Oil Pressure	PSI
AMPS	Electrical current in Amperes	A
VOLTS	Electrical: Voltage	V
FUEL QTY GAL	Fuel Quantity	US gal
GAL REM	Fuel Remaining	US gal
GAL USED	Fuel Used	US gal
EGT	Exhaust Gas Temperature	°F

7.10.5 FUEL SYSTEM

General:

Fuel is stored in the main tanks located in the wings and the auxiliary tanks in the nacelles. Normally fuel for the right engine is taken from the right wing tank / right auxiliary tank and for the left engine from the left wing tank / left auxiliary tank.
Both sides of the fuel system are interconnected by cross feed lines.



Fuel selector valves:

For each engine one fuel selector valve is provided. The control levers for the fuel selector valves are situated on the center console behind the engine controls. The positions are ON, CROSS FEED and OFF. During normal operation each engine takes the fuel from the tank on the same side as the engine. When CROSS FEED is selected, the engine will draw fuel from the tank on the opposite side in order to extend range and keep fuel weight balanced during single engine operation.

The desired position is reached by pulling the lever back. To reach the OFF position a safety guard must be twisted. This is to ensure that this selection is not made unintentionally.

Scheme of the fuel selector valve positions:

Possible operating modes for the three fuel selector valves are depicted in the following illustrations. The figures that follow show fuel flows for the RH engine (fuel flows for the LH engine are the same):

Figure 1:

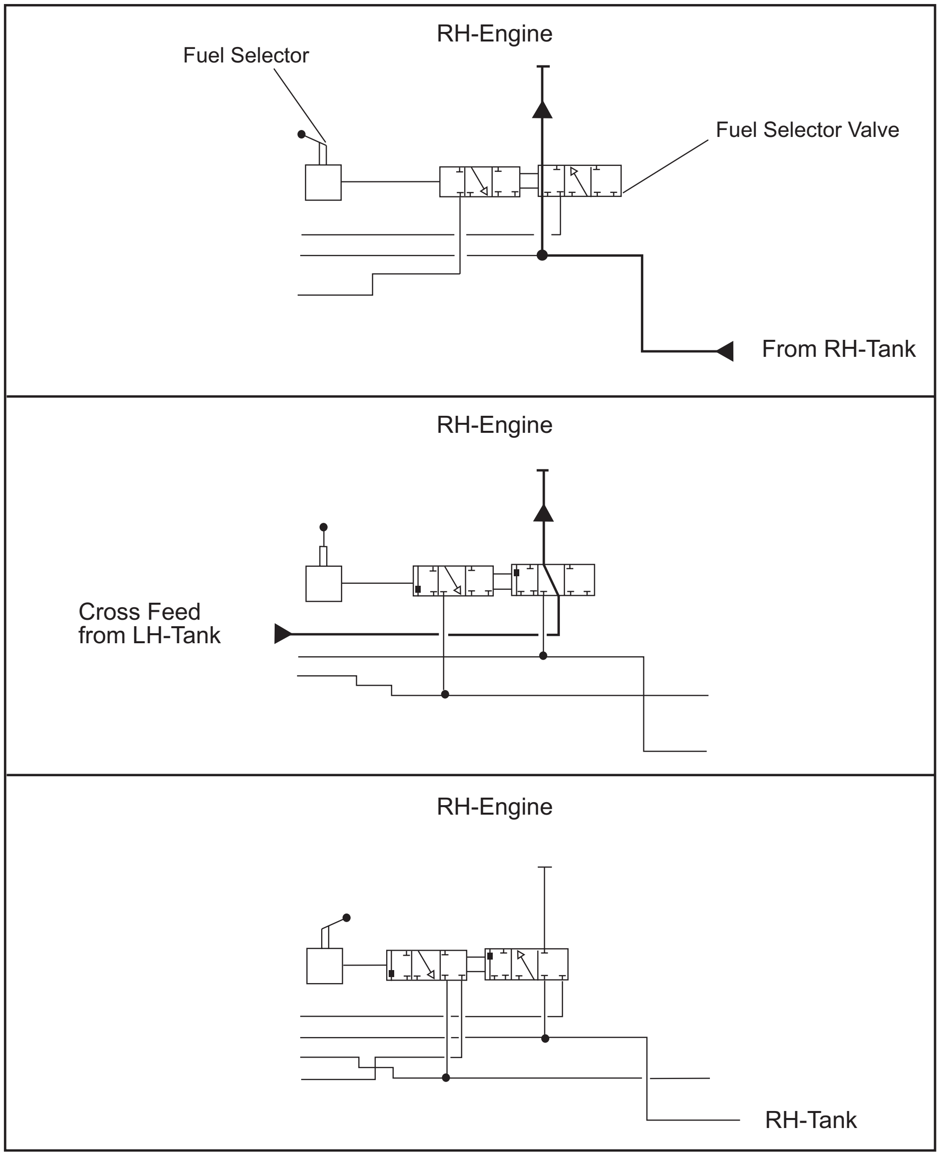
Normal Operation

Figure 2:

Cross-feedl Operation

Figure 3:

Shut-off Position



With the LH fuel selector valve in cross-feed position, the fuel from the RH tank is transferred to the LH engine. Depending on the position of the RH fuel selector valve, the RH tank then feeds both engines (as shown in figure 4 below) or only the LH engine, when the fuel selector valve of the RH engine is in shut-off position (as shown in figure 5 below).

Figure 4:

Fuel Selector Valve
RH normal operation,
LH valve in cross-feed position

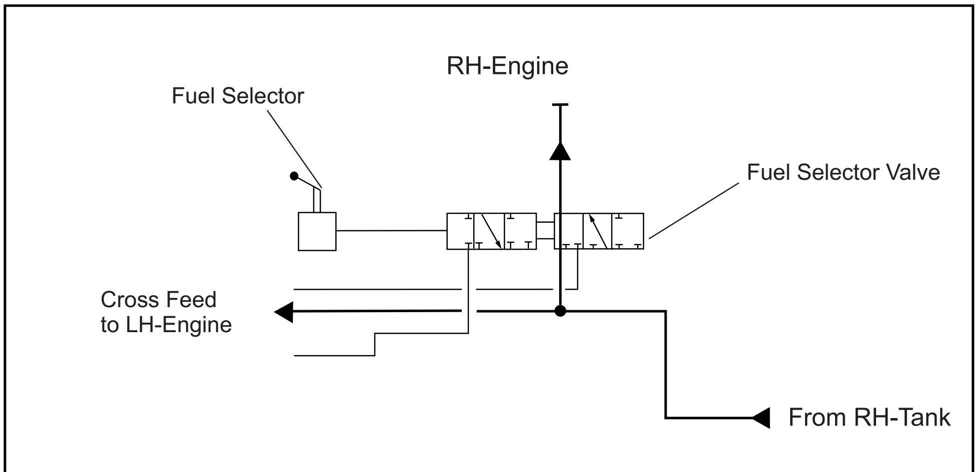
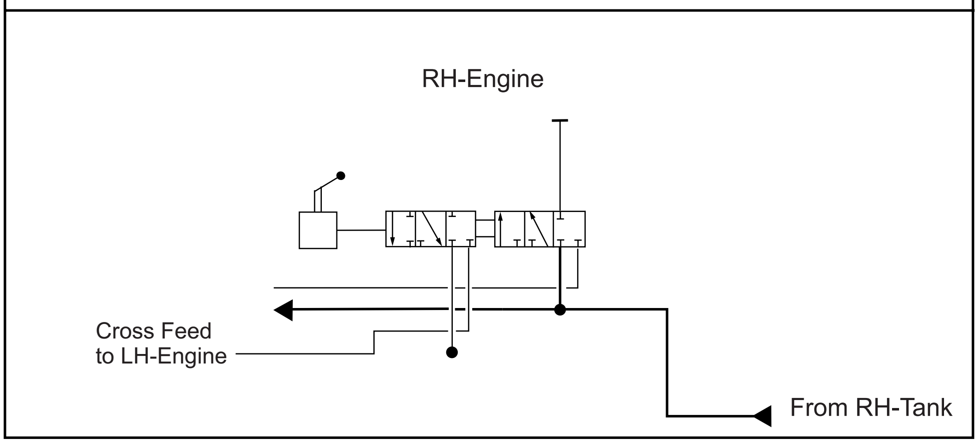


Figure 5:

RH Fuel Selector Valve in shut-off position,
LH valve in cross-feed position



Fuel Tanks:

(a) Main Tanks:

Each tank consists of three aluminum chambers which are connected by a flexible hose. The tank is filled through a filler in the outboard fuel chamber. The fuel capacity of each wing is 98.4 liters (26.0 US gallons). The usable fuel from each wing is 94.6 liters (25.0 US gallons). There is 3.8 liters (1 gallon) of unusable fuel in each wing.

There are two tank vents. One includes a check valve with a capillary and one includes a relief pressure valve, which operates at 150 mbar (2 psi) and allows fuel and air to flow to the outside with higher internal pressure. The relief pressure valve protects the tank against high pressure, if the tank was overfilled in case of an auxiliary fuel transfer failure. The check valve with capillary allows air to enter the tank but prevents flow of fuel to the outside. The capillary equalizes the air pressure during climb. The hose terminals are located on the underside of the wing, approximately 2 meters (7 feet) from the wing tip.

In each tank a coarse filter (finger filter) is fitted before the outlet. To allow draining of the tank, there is an outlet valve at its lowest point.

At the lowest point in each side of the fuel system a fuel filter with a drain valve is installed. This drain valve can be used to remove water and sediment which has collected in the fuel system. The drain valves are fitted in each nacelle behind the firewall, approximately 15 cm (0.56 ft) backward of the wing leading edge.

(b) Auxiliary tanks:

The auxiliary fuel tanks are installed in the rear section of the engine nacelles, above the wing main spars. Each auxiliary fuel tank has a filler cap located on the top surface of the nacelle. The additional fuel capacity is 52 liters (13.7 US gallons) per side. The usable fuel is 50.0 liters (13.2 gallons) from each auxiliary fuel tank. The total fuel capacity (main fuel tanks and auxiliary fuel tanks) is 150.4 liters (39.7 US gallons) per side. The usable fuel is 144.6 liters (38.2 gallons) per side.

The fuel supply connection attaches to a finger filter mounted at the rear of the auxiliary fuel tank. Each auxiliary fuel tank has a fuel transfer pump which pumps fuel into the related main fuel tank.

The vent line for the auxiliary fuel tank has a check valve with capillary. It allows air to enter the tank but prevents flow of fuel to the outside. The capillary equalizes the air pressure during climb. A fuel drain valve is located at the rear of each auxiliary tank.

(c) Operation

Two FUEL TRANSFER switches in the cockpit are used to activate the fuel transfer pumps. The fuel transfer pump pumps the fuel from the auxiliary fuel tank into the related main fuel tank. Fuel level switches shut this pump off automatically when the auxiliary fuel tank is empty or when the main fuel tank is full.

When the fuel transfer pump is defective, the fuel stored in the auxiliary fuel tank is not available. The flight plan must be amended accordingly.

Fuel quantity indication:

(a) Main tanks:

Two capacity probes measure the fuel quantity in each main tank. The indication is provided by the G1000 flight display.

(b) Auxiliary tanks:

The fuel quantity in the auxiliary fuel tanks is not indicated.

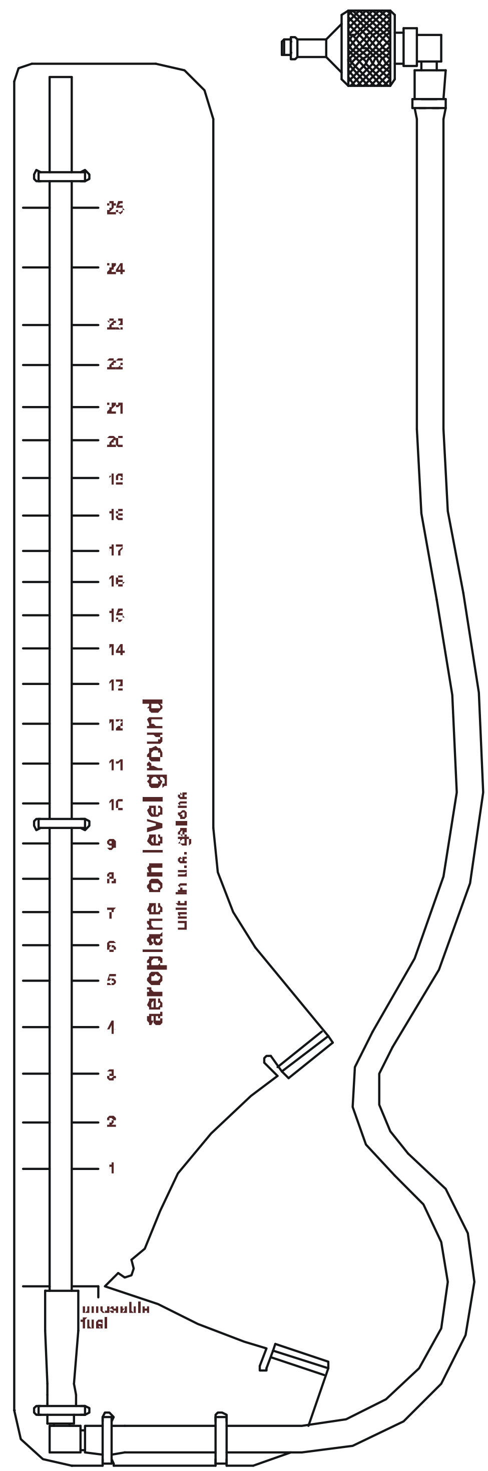
Information about fuel consumption can be found in Chapter 5 - PERFORMANCE.

Alternate means for fuel quantity indication for the main fuel tanks:

The alternate means for fuel quantity indication allows the fuel quantity in the tank to be determined during the pre-flight inspection. It functions according to the principle of communicating containers. The fuel quantity measuring device has a recess which fits the airfoil of the wing. With this recess the device is held against the stall strip at the leading edge of the wing. The exact position is marked by a bore in the stall strip. Then the metal connector is pressed against the drain of the tank. The amount of fuel in the tank can now be read off from the vertical ascending pipe.

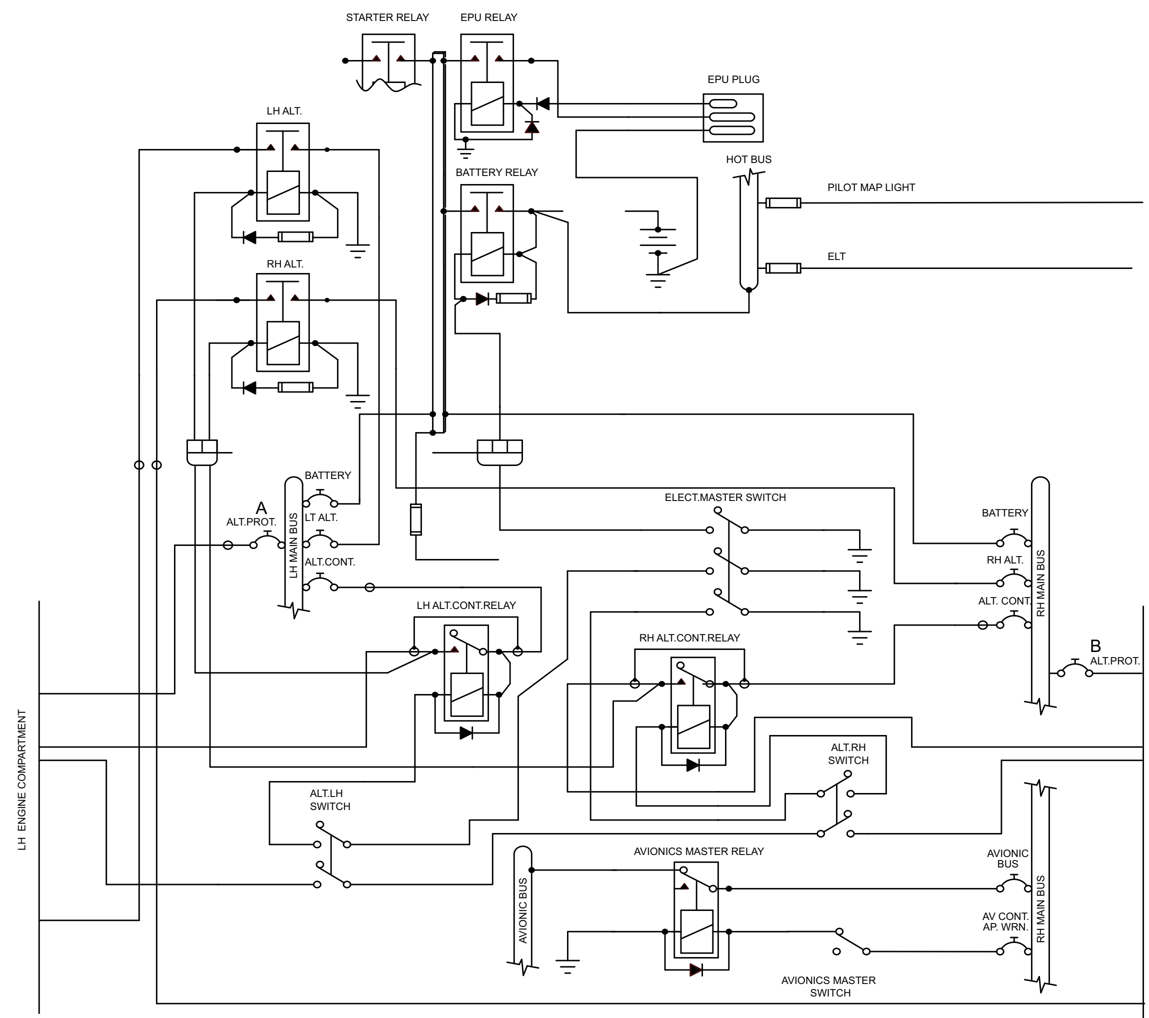
For an exact indication the airplane must stand on level ground.

The designated location for the fuel quantity measuring device is a bag on the rear side of the pilot seat.



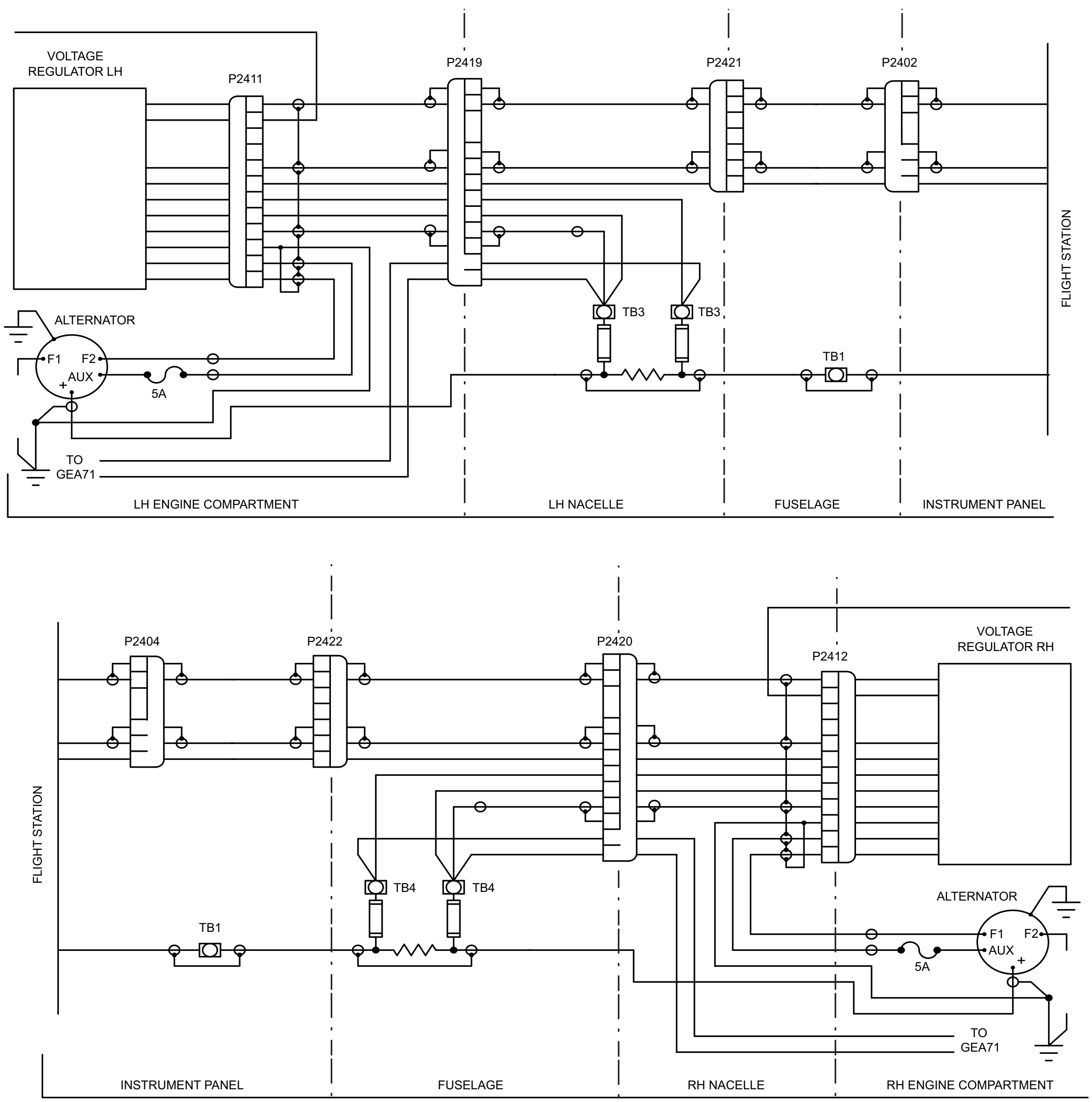
7.10.6 ELECTRICAL SYSTEM

Electrical System Schematic (Sheet 1 of 2)



FLIGHT STATION AREA

Electrical System Schematic (Sheet 2 of 2)



LH (Top) and RH (Bottom) ENGINE COMPARTMENT AND STUB WING

General:

The DA42 L360 aircraft has a 28 volts direct current (DC) electrical system. The system has two integral sources of electrical power and a socket for connecting to an external power source. It has a 28 volts alternator in each engine bay and a 24 volts battery. In normal operation, the alternators supply power for the electrical power system. The alternator attaches to the front of the engine. A flexible belt turns the alternator. The alternator supplies power to the aircraft. The power supplied by the alternator is controlled by the voltage regulator.

All the electrical engine wires are routed from the aircraft cabin into the center wing box to the nacelles. Penetration holes through the engine firewall are provided for the electrical wiring into the engine compartment. The electrical wires have been routed and protected to minimize the probability of contact with flammable fluids or vapors.

Power generation:

There are two 70 ampere alternators, one mounted on the front of each engine. The alternators are driven by V-belts.

The power output line of the left-hand alternator is connected to the 'LH main bus' via the LH alternator relay and a 70 ampere circuit breaker. The power output line of the right-hand alternator is connected to the 'RH main bus' via the RH alternator relay and a 70 ampere circuit breaker. Both 'main busses' are connected to the 'battery bus' via a 90 ampere circuit breaker.

Both generator power output lines also run through a current sensor for each alternator, which provides an indication of the power being supplied to the electrical system by an alternator including the current for battery charging on the G1000.

Alternator control:

Each alternator has an alternator control unit. It measures the alternator output voltage and controls the current through the alternator field coils via a pulse-width modulated signal. To keep the output voltage stable in all load and speed situations, the alternator field signal is modulated accordingly.

The alternator control unit includes a comprehensive set of diagnostic functions that will warn the operator using a caution message (L/R ALTN FAIL) on the G1000 PFD in case of over- or under voltage as well as a couple of other internal warning levels.

Each engine alternator relay has a control switch. The control switches are labeled ALT LH and ALT RH. When the ELECT MASTER switch is set to ON, setting the ALT LH or ALT RH switch to ON supplies power to the related alternator regulator control connection. Setting both the ALT LH and ALT RH to ON will connect the PARALLELING system of both alternator regulators. This enables the load sharing control system of the alternator regulators to control the outputs of the alternators.

Storage:

'Main'-battery power is stored in a 24 V, 10 Ah lead-acid battery mounted on the right-aft side of the front baggage compartment. The 'main' battery is connected to the 'hot battery bus' via a 20 A fuse and to the 'battery bus' via the 'battery'-relay which is installed in the relay junction box on the center-aft side of the front baggage compartment.

The 'battery'-relay is controlled with the 'ELECTRIC MASTER'-switch which is located on the left-hand side of the instrument panel.

In addition, a non-rechargeable dry battery is installed as a further source of power for the attitude gyro (artificial horizon) and the flood light. When the EMERGENCY switch is set to ON, these two systems are supplied with power for at least 1.5 hours, independent of all other electrical consumers. During each 100 hour inspection, this battery is checked for proper functioning. Every 2 years or after use (broken seal on the switch) the battery package must be replaced.

Distribution:

Electrical power is distributed via the 'hot battery bus', the 'battery bus', the 'LH (RH) main bus', and the 'avionics bus'.

Hot battery bus:

The 'hot battery bus' is directly connected to the 'main'-battery via a 20 A fuse installed in the relay junction box and cannot be disconnected from the 'main'-battery. The 'hot battery bus' provides power to the pilot map/reading light which is protected by its own fuse.

Battery bus:

The 'battery bus' is connected to the 'main'-battery via the 'battery'-relay which can be controlled by the 'ELECTRIC MASTER'-switch. The 'battery bus' provides power to the ' LH (RH) main bus' and heavy duty power to both starters.

Main bus:

The 'LH (RH) main bus' is connected to the 'battery bus' via a 90 ampere circuit breaker. The 'LH main bus' provides power to the consumers directly connected to the 'LH main bus'. The 'RH main bus' provides power to the consumers directly connected to the 'RH main bus and the 'avionic bus' via the 'avionics master'-relay.

The 'AVIONIC MASTER'-switch must be set to 'ON' to connect the 'RH main bus' to the 'avionic bus'.

Consumers:

The individual consumers (e.g. radio, position lights, etc.) are connected to the appropriate bus via automatic circuit breakers.

Designations and abbreviations used to identify the circuit breakers are explained in Paragraph 1.5 DEFINITIONS AND ABBREVIATIONS.

Voltmeter:

The voltmeter displays the voltage of the electrical system. Under normal operating conditions the alternator voltage is shown, otherwise it displays the 'main'-battery voltage.

Ammeter:

The ammeter displays the intensity of current which is supplied to the electrical system by the LH (RH) alternator.

Landing and taxi lights:

Landing and taxi lights are built into the wing center section, and are each operated by means of a switch (LANDING, TAXI) located on the row of switches on the instrument panel.

Position and strobe lights:

Combined position and strobe lights (anti collision lights) are installed on both wing tips. Each system is operated by a switch (POSITION, STROBE) located on the row of switches on the instrument panel.

Flood light:

A two-dimensional light emitter is mounted above the instrument panel. It illuminates the instrument panel as well as all levers, switches, etc. The flood light is switched on and its brightness is adjusted by means of a rotary button (FLOOD) in the left-hand section of the instrument panel.

Instrument lighting:

With a rotary button (INSTRUMENT) in the left-hand section of the instrument panel the internal lighting of the instruments is switched on and its brightness is adjusted.

Pitot heating:

The Pitot probe, which provides measurement for the Pitot-static system, is electrically heated. The heating is activated with a switch (PITOT HEAT) located on the row of switches on the instrument panel. The temperature is automatically kept constant by means of a thermal switch on the Pitot probe, and as an additional safety measure a thermal fuse is built in. If this thermal fuse is activated, the Pitot heating can no longer be switched on, and the Pitot heating caution will be displayed. In this case the system should be serviced. The Pitot heat caution light is also on if the Pitot heating is switched off.

External power socket:

The DA42 L360 has an external 28 Volt DC power socket located on the lower surface of the fuselage nose section. When external power is connected, the control relay is energized and the external power comes on-line.

The socket itself has three pins:

- a large negative pin
- a large positive pin
- a small positive pin.

A diode protects the system from reverse polarity.

7.10.7 WARNING, CAUTION AND ADVISORY MESSAGES

Crew Alerting System (CAS):

The G1000 Crew Alerting System (CAS) is designed to provide visual and aural alerts to the flight crew. Alerts are divided into three levels as follows:

- WARNING
- CAUTION
- ADVISORY.

Crew alerts will appear in the Alerts Window on the PFD. In this window Warnings will appear at the top, followed by Cautions and Advisories, respectively. Within the criticality levels, messages will appear from newest (top) to oldest (bottom).

At the low right corner of the display there is a MSG (Message) soft key. The MSG key provides two functions in the CAS:

(a) Pressing the MSG key acknowledges a new master warning / caution / advisory indication.

(b) An additional MSG key press with no master alert indication active will open a pop-up Auxiliary Flight Display (AFD) page that contains information for all active alerts.

This structure allows the crew to scroll through all system alerts if the Alerts Window overflows. This approach displays the most critical alerts close to the pilot´s primary field of view at all times, with the option of allowing lower criticality alerts to overflow and be accessible from the pop-up AFD page/window.

<u>Alert levels</u>:

LEVEL	TEXT COLOR	IMPORTANCE	AUDIBLE TONE
Warning	Red	May require immediate corrective action	Warning chime tone which repeats without delay until acknowledged by the crew
Caution	Amber	May require future corrective action	Single warning chime tone
Annunciation Advisory	White		None
Message Advisory	White		None
Safe Operation Annunciation	Green	Lowest	None

Warning alerts on the G1000:

Warning Alerts	Warning / Cause
AIRSPEED FAIL	The annunciation is active when the display system is not receiving airspeed input from the air data computer.
ALTITUDE FAIL	The annunciation is active when the display system is not receiving altitude input from the air data computer.
AP TRIM FAIL	Autopilot automatic trim is inoperative
ATTITUDE FAIL	The annunciation is active when the display system is not receiving attitude reference information from the AHRS.
DOOR OPEN	The annunciation is used to indicate to the pilot if the baggage-, canopy- or rear door is open.
GPS ENR	The annunciation is active when the G1000 will no longer provide GPS based navigational guidance.
HDG	The annunciation is active when the display system is not receiving valid heading input from the AHRS.
L/R ALTN FAIL	Left / Right engine alternator has failed.
L/R FUEL PR HI	The annunciation is active when the fuel pressure is higher than 35 psi.
L/R FUEL PR LO	The annunciation is active when the fuel pressure is less than 14 psi.
L/R OIL PRES	The annunciation is active when the engine oil pressure is less than 25 psi.
L/R STARTER	The annunciation is active when the corresponding starter is engaged.
VERT SPEED FAIL	The annunciation is active when the display system is not receiving vertical speed input from the air data computer.
WARN	This annunciation constitutes a RAIM position warning. The nav deviation bar is removed.

Audible Warning alerts:

Warning Alerts	Warning / Cause
GEAR RETRACTED CHIME TONE (repeating)	Resounds if the landing gear is retracted while the flaps move into the LDG position or when the throttle is placed in a position forward of IDLE, but below approximately 14 inches of manifold pressure.

Warning alerts on the instrument panel:

Warning Alerts	Warning / Cause
GEAR UNSAFE WARNING LIGHT (red)	Illuminates if the landing gear is neither in the final up or down & locked position.

Caution alerts on the G1000:

Caution Alerts	Meaning / Cause
AHRS ALIGN: Keep Wings Level	The annunciation is active when the AHRS (Attitude and Heading Reference System) is aligning.
DEIC PRES HI	The annunciation is active when the de-icing fluid pressure is high. The de-icing system is an optional equipment (see Supplement S02).
DEIC PRES LO	The annunciation is active when the de-icing fluid pressure is low. The de-icing system is an optional equipment (see Supplement S02).
DEICE LVL LO	The annunciation is active when the de-icing fluid level is low. The de-icing system is an optional equipment.
INTEG RAIM not available	The annunciation is active when RAIM (Receiver Autonomous Integrity Monitor) is not available.
L/R AUX FUEL E	Annunciation is active when the L/R auxiliary tank is empty <u>and</u> the FUEL TRANSFER PUMP is ON.
L/R FUEL LOW	The annunciation is active when the fuel quantity is below 4 ±1 gal usable fuel in the corresponding main tank.
L/R VOLTS LOW	The annunciation is active when bus voltage drops below 25 V.
PITOT FAIL	The annunciation is active when the Pitot heater has failed.
PITOT HT OFF	The annunciation is active when the Pitot heat is off.
STAL HT FAIL	The annunciation is active when the stall heater has failed.
STALL HT OFF	The annunciation is active when the stall heater is off.
STICK LIMIT	The stick limiting system has failed.

Annunciator advisory alerts on the G1000:

Advisory Alerts	Meaning / Cause
GIA FAN FAIL	The annunciation is active when the GIA fan is inoperative.
L/R FUEL XFER	The annunciation is active when fuel transfer from auxiliary to main tank is in progress.
MFD FAN FAIL	The annunciation is active when the MFD fan is inoperative.
PFD FAN FAIL	The annunciation is active when the PFD fan is inoperative.

NOTE

A full list of G1000 system message advisories are available in the Garmin G1000 Pilot's Guide for the Diamond DA42-L360, Part Number 190-01061-00 (Current Revision) and in the Garmin G1000 Cockpit Reference Guide for the DA42-L360, Part Number 190-01062-00 (Current Revision).

7.11 PITOT-STATIC SYSTEM

Total pressure is measured at the leading edge of a Pitot probe under the left wing. Static pressure is measured at two orifices at the lower and rear edges of the same probe. To protect against dirt and condensation there are filters in the system, which are accessible from the wing root. The Pitot probe is electrically heated.

With the alternate static valve, the static pressure in the cabin can be used as static pressure source in the event of a failure of the Pitot-static system.

There are also static ports on both sides of the fuselage behind the wings. These static ports provide static pressure to the autopilot.

7.12 STALL WARNING SYSTEM

The stall warning switch for the DA42 L360 is located on the front edge of the left wing below the wing chord line. It is supplied electrically and provides a stall warning, before the angle of attack becomes critical. The stall status is announced to the pilot by a continuous sound in the cockpit.

The lift detector vane, the mounting plate and the complete housing are heated to prevent icing. Heating is engaged together with the Pitot heating.

7.13 GARMIN G1000 INTEGRATED AVIONICS SYSTEM

7.13.1 GENERAL

The Garmin G1000 is a fully integrated flight, engine, communication, navigation and surveillance instrumentation system. This Integrated Avionics System consists of a Primary Flight Display (PFD), a Multi-Function Display (MFD), an Audio Panel, an Attitude and Heading Reference System (AHRS), an Air Data Computer (ADC) and the sensors and computers to process flight and engine information for display to the pilot. The system contains dual GPS receivers, dual VOR/ILS receivers, dual VHF communications transceivers, a transponder, and an integrated annunciation system to alert the pilot of certain abnormal conditions.

A remote avionics box is located behind the aft baggage compartment frame. A push-to-talk (PTT) button for the COM portion of the G1000 is mounted on the end of each control stick. There are connection facilities for up to 4 headsets between the front seats.

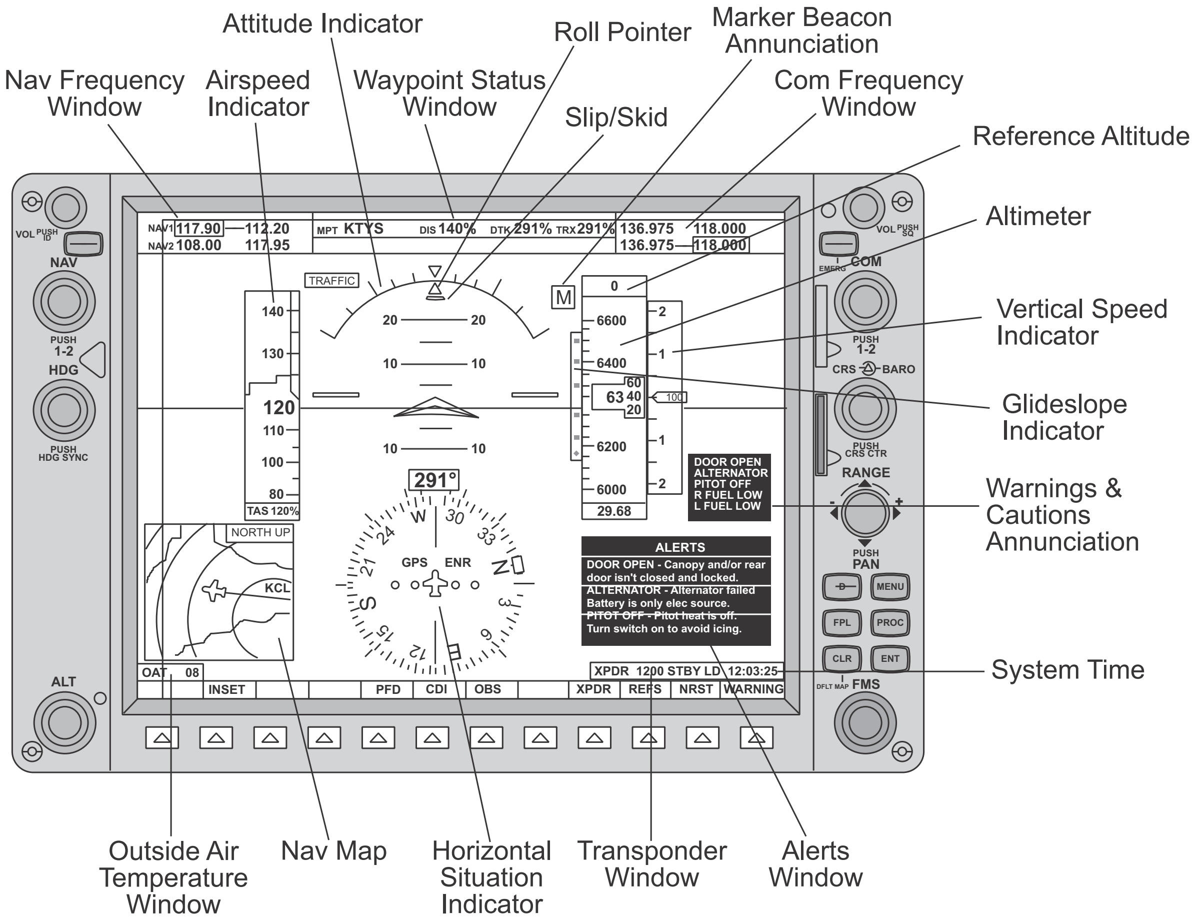
Refer to the Garmin G1000 Pilot’s Guide for the Diamond DA42-L360, Part Number 190-01061-00 (Current Revision) and the Garmin G1000 Cockpit Reference Guide for the DA42-L360, Part Number 190-01062-00 (Current Revision) for complete descriptions of the G1000 system and operating procedures

7.13.2 PRIMARY FLIGHT DISPLAY (PFD)

The Primary Flight Display (PFD, see the figure that follows) typically displays airspeed, attitude, altitude, and heading information in a traditional format. Slip information is shown as a trapezoid under the bank pointer. One width of the trapezoid is equal to a one ball width slip. Rate of turn information is shown on the scale above the compass rose; full scale deflection is equal to a standard rate turn. The following controls are available on the PFD (clockwise from top right):

- Communications frequency volume and squelch knob
- Communications frequency set knobs
- Communications frequency transfer button
- Altimeter setting knob (baro set)
- Course knob
- Map range knob and cursor control
- Flight Management System (FMS) control buttons and knob
- PFD softkey buttons, including master warning/caution acknowledgment
- Altitude reference set knob
- Heading bug control
- Navigation frequency transfer button
- Navigation frequency set knobs
- Navigation frequency volume and Identifier knob.

The PFD displays the crew alerting (annunciator) system. When a warning or caution message is received, a warning or caution annunciator will flash on the PFD, accompanied by an aural tone. A warning is accompanied by a repeating tone, and a caution is accompanied by a single tone. Acknowledging the alert will cancel the flashing and provide a text description of the message.



Refer to Chapter 3 - EMERGENCY PROCEDURES,
Chapter 4B - ABNORMAL OPERATING PROCEDURES,
and Section 7.10.7 - WARNING, CAUTION AND ADVISORY MESSAGES.

Advisory messages related to G1000 system status are shown in white and are accompanied by a white flashing ADVISORY alert. Refer to the G1000 Pilot's Guide and Cockpit Reference Guide for descriptions of the messages and recommended actions (if applicable).

Trend vectors are shown on the airspeed and altimeter displays as a magenta line predicting 6 seconds at the current rate. The turn rate indicator also functions as a trend indicator on the compass scale.

The PFD can be displayed in a composite format for emergency use by pressing the DISPLAY BACKUP button on the audio panel. In the composite mode, the full crew alerting function remains, but no map functions are available.

7.13.3 MULTI-FUNCTION DISPLAY (MFD)

The Multi-Function Display (MFD) typically displays engine data, maps, terrain, traffic and topography displays, and flight planning and progress information. The display unit is identical to the PFD and contains the same controls as previously listed.

Engine instruments are displayed on the MFD. Discrete engine sensor information is processed by the Garmin Engine Airframe (GEA) sub-system. When an engine sensor indicates a value outside the normal operating range, the legend will turn yellow for caution range, and turn red and flash for warning range.

Also refer to Paragraph 7.10.4 - ENGINE INSTRUMENTS.

7.13.4 AUDIO PANEL

The audio panel contains traditional transmitter and receiver selectors, as well as an integral intercom and marker beacon system. The marker beacon lights appear on the PFD. In addition, a clearance recorder records the last 2½ minutes of received audio. Lights above the selections indicate what selections are active. Pressing the red DISPLAY BACKUP button on the audio panel causes both the PFD and MFD to display a composite mode.

7.13.5 ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS)

The Attitude and Heading Reference System (AHRS) uses GPS, rate sensors, air data, and magnetic variation to determine pitch and roll attitude, sideslip and heading. Operation is possible in a degraded mode if the system loses any of these inputs. Status messages alert the crew of the loss of any of these inputs. The AHRS will align while the airplane is in motion, but will align quicker if the wings are kept level during the alignment process.

7.13.6 AIR DATA COMPUTER (ADC)

The Air Data Computer (ADC) provides airspeed, altitude, vertical speed, and air temperature to the display system. In addition to the primary displays, this information is used by the FMS and Traffic Information System (TIS).

CHAPTER 8

AIRPLANE HANDLING, CARE AND MAINTENANCE

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PAGE

8.1 INTRODUCTION

Chapter 8 contains the manufacturer's recommended procedures for proper ground handling and servicing of the airplane. The Aircraft Maintenance Manual (Doc. No. 7.02.01) lists certain inspection and maintenance requirements which must be followed if the airplane is to retain a new plane performance and reliability.

8.2 AIRPLANE INSPECTION INTERVALS

Inspections are scheduled every 50, 100, 200, 1000 and 2000 hours. Independent of the flight hours an annual inspection must be performed every year. The respective inspection checklists are prescribed in the Aircraft Maintenance Manual, Chapter 05.

For maintenance work on engine and propeller, the currently effective Operator's Manuals, Service Instructions, Service Letters and Service Bulletins of the engine and propeller manufacturers must be followed. For airframe inspections, the currently effective checklists/manuals, Service Bulletins and Service Instructions of the manufacturer must be followed.

CAUTION

UNSCHEDULED MAINTENANCE CHECKS ARE REQUIRED AFTER:

- **HARD LANDINGS**
- **PROPELLER STRIKE**
- **ENGINE FIRE**
- **LIGHTNING STRIKE**
- **OCCURRENCE OF OTHER MALFUNCTIONS AND DAMAGE.**

UNSCHEDULED MAINTENANCE CHECKS ARE DESCRIBED IN THE AIRCRAFT MAINTENANCE MANUAL.

8.3 AIRPLANE ALTERATIONS OR REPAIRS

Alterations or repairs to the airplane may be carried out only according to the Aircraft Maintenance Manual, and only by authorized personnel.

8.4 SERVICING

8.4.1 REFUELING

WARNING

DO NOT ALLOW FIRE, SPARKS OR HEAT NEAR FUEL. FUEL BURNS VIOLENTLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE.

WARNING

DO NOT GET FUEL ON YOUR SKIN. FUEL CAN CAUSE SKIN DISEASE.

WARNING

CONNECT THE AIRPLANE AND THE FUEL SUPPLY VEHICLE TO ELECTRICAL GROUND BEFORE REFUELING. IF YOU DO NOT GROUND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE FIRE DURING REFUELING.

WARNING

MAKE SURE THAT A SUITABLE FIRE EXTINGUISHER IS AVAILABLE AT ALL TIMES DURING REFUELING.

WARNING

TURN OFF ALL GROUND EQUIPMENT IN THE REFUELING AREA.

WARNING

DO NOT OPERATE ELECTRICAL SWITCHES IN THE AIRPLANE DURING REFUELING.

CAUTION

USE ONLY APPROVED FUEL TYPES GIVEN IN CHAPTER 2.

(a) Ground the airplane and the fuel supply vehicle electrically.

(b) Remove the fuel filler cap (located on top of the outer wing). Check the cap retaining cable for damage.

(c) Refuel the airplane.

(d) Install the fuel filler cap.

(e) Repeat steps (b) to (d) for the other wing.

(f) Remove the fuel filler cap for the auxiliary fuel tank (located on the top surface of the nacelle).

(g) Refuel the airplane.

(h) Install the fuel filler cap.

(i) Repeat steps (f) to (h) for the other auxiliary fuel tank.

(j) Remove the ground cable from the airplane and the fuel supply vehicle.

8.4.2 ENGINE OIL LEVEL CHECK

(a) Open the inspection door on top of the upper right cowling.

(b) Remove the filler cap.

(c) Clean the oil dip-stick.

(d) Install the filler cap.

(e) Remove the filler cap again.

(f) Read the oil level from the dip-stick.

(g) If necessary, add engine oil and repeat steps (c) to (f).

(h) Install the filler cap.

(i) Close the inspection door.

(j) Repeat steps (a) to (i) for the other engine.

8.4.3 TIRE INFLATION PRESSURE CHECK

(a) Remove the wheel cover (main wheels only).

(b) Remove the dust cap from valve stem by turning counter-clockwise.

(c) Connect tire gauge to valve stem, read the pressure.

(d) Correct the pressure if necessary (nose tire 6.0 bar/87 psi, main tires 4.5 bar/65 psi).

(e) Install the dust cap on valve stem by turning clockwise.

(f) Install the wheel cover (main wheels only).

8.5 GROUND HANDLING / ROAD TRANSPORT

8.5.1 GROUND HANDLING

For pushing the airplane on the ground, it is re¬commended to use the steering bar to steer the aircraft. The steering bar is engaged in the appropriate hole in the nose wheel as shown in the picture. The steering bar is used to steer the airplane during ground handling operations and is available from the manufacturer.

WARNING

THE STEERING BAR MUST BE REMOVED BEFORE STARTING THE ENGINES.

CAUTION

THE STEERING BAR MAY ONLY BE USED TO STEER THE AIRPLANE ON THE GROUND WHEN MOVING THE AIPLANE BY HAND. AFTER MOVING THE AIR¬PLANE, THE STEERING BAR MUST BE REMOVED.

CAUTION

TOWING THE AIRPLANE WITH TOWING VEHICLES IS NOT PERMITTED.

8.5.2 PARKING

For short term parking, the airplane must be positioned into the wind, the parking brake must be engaged and the wing flaps must be in the retracted position. 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. Parking in a hangar is recommended.

Control surfaces gust lock

The manufacturer offers a control surfaces gust lock which can be used to block the primary controls. It is recom¬mended that the control surfaces gust lock be used when parking outdoors, because otherwise the control surfaces can hit the stops in stro¬ng tail wind. This can lead to excessive wear or damage.

WARNING

THE CONTROL SURFACES GUST LOCK MUST BE REMOVED BEFORE FLIGHT.

The control surfaces gust lock is installed as follows:

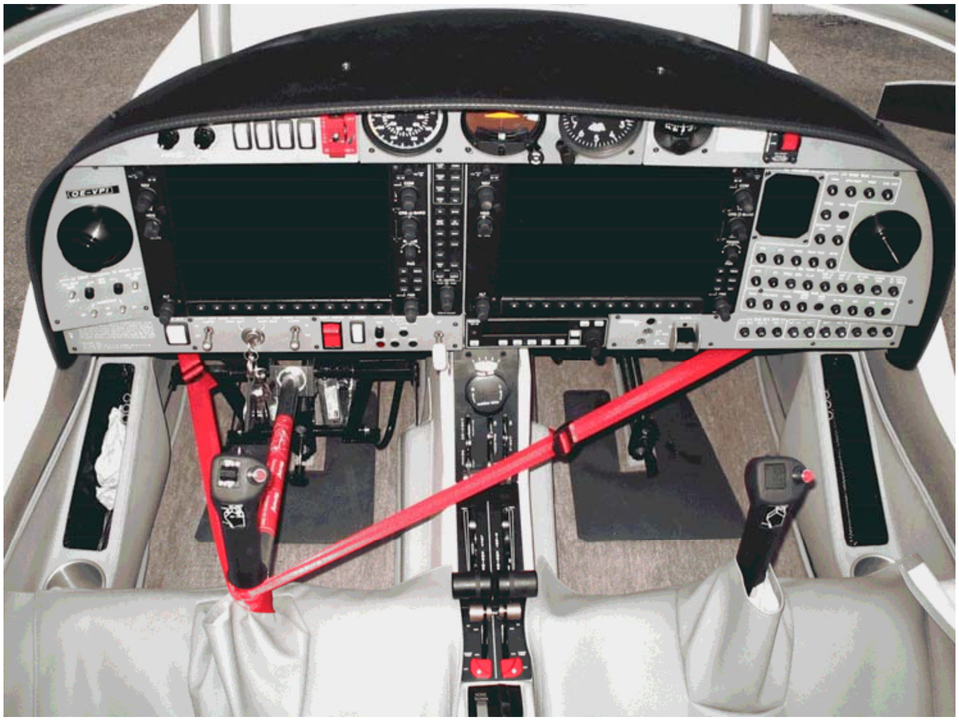
(a) Move the rudder pedals fully aft.

(b) Engage the control surfaces gustlock with the pedals.

(c) Engage the stick, wrap straps around stick once.

(d) Attach the locks and tighten the straps.

For removal reverse the sequence.


OE-VPI


OE-VPI
NAV
HDG
ALT

8.5.3 MOORING

Near the lower end of the tail fin of the airplane there is a rear tie-down point which can be used to tie-down the airplane to the ground. Also on each wing near the wing tip, an eyelet with a metric M8 thread can be installed and used as tie-down points.

8.5.4 JACKING

The airplane can be jacked at the two jack points located on the lower side of the center wing's LH and RH root ribs as well as at the tail fin.

8.6 CLEANING AND CARE

CAUTION

THE AIRPLANE MUST BE KEPT CLEAN. THE BRIGHT SURFACE PREVENTS THE STRUCTURE FROM OVERHEATING.

CAUTION

EXCESSIVE DIRT DETERIORATES THE FLIGHT PERFORMANCE.

8.6.1 PAINTED SURFACES

The entire surface of the airplane is painted with a white weatherproof two component paint. Nevertheless, it is recommended to protect the airplane against moisture and dampness. It is also recommended not to store the airplane outside for long periods of time.

Dirt, insects, etc. can be removed with water alone and if necessary with a mild detergent. An automotive paint cleaner can be used for stubborn spots. For best results, clean the airplane after the day's flying is ended, so that the dirt will not become ingrained.

Oil stains, exhaust stains, etc. on the lower fuselage skin can be removed with a cold detergent. Before starting, ensure that the detergent does not affect the surface finish. Use commercial automotive preservatives without silicone additives to conserve the paint finish.

8.6.2 CANOPY AND REAR DOOR

The canopy, rear door and rear window should be cleaned with 'Plexiklar' or any other acrylic glass detergent if available; otherwise use lukewarm water. Final cleaning should be carried out with a clean piece of chamois-leather or soft cloth. Never rub or polish dry acrylic glass.

8.6.3 PROPELLER

Damage and malfunctions during operation must be inspected by authorized personnel.

Surface

The manufacturer uses PU paint or acrylic paint which is resistant to almost any solvent. The blades may be treated with commercial automotive cleaning agents or preservatives. The penetration of moisture into the wooden core must be avoided by all means. Should doubts arise, an appropriately rated inspector must be consulted.

8.6.4 ENGINE

Engine cleaning is part of the scheduled inspections.

8.6.5 INTERIOR SURFACES

The interior should be cleaned using a vacuum cleaner. All loose items (pens, bags etc.) should be removed or properly stored and secured.

All instruments can be cleaned using a soft dry cloth. Plastic surfaces should be wiped clean using a damp cloth without any cleaning agents.

The leather interior should be treated with leather sealer within 3 months since new, and then at intervals of 3 to 6 months. Clean the leather interior with an appropriate mild leather cleaning agent and a soft cleaning brush for leather.

Note that the acrylic glass windows transmit the ultraviolet radiation from the sun.

8.7 GROUND DE-ICING

Approved de-icing fluids are: :

Manufacturer	Name
kilfrost	TKS 80
Aeroshell	Compound 07
	AL-5 (DTD 406B)

(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

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9.1 INTRODUCTION

Chapter 9 contains information concerning additional (optional) equipment of the DA42 L360

Unless otherwise stated, the procedures given in the Supplements must be applied in addition to the procedures given in the main part of the Airplane Flight Manual.

All approved supplements are listed in the List of Supplements in this Chapter.

The Airplane Flight Manual contains exactly those Supplements which correspond to the installed equipment according to the Equipment Inventory of Section 6.5.

9.2 LIST OF SUPPLEMENTS

Sup No.	Title	Rev No.	Date	Applicable	
				Yes	No
A13	BENDIX/KING KAP 140 AUTOPILOT	0	01-Dec-04		
S02	ICE PROTECTION SYSTEM	2	12-Jan-06		
S04	CONTINUOUS FLOW OXYGEN SYSTEM	2	06-Jun-06		
S1	NOSE FWD BULKHEAD BALLAST INSTALLATION	0	15-Nov-09		
S2	LIGHTED FUEL PUMP SWITCH	0	10-Dec-09		
S06	G1000 SYNTHETIC VISION TECHNOLOGY	0	01-May-10		
S3	WINTERIZATION KIT	0	03-Dec-10		

Sup No.	Title	Rev No.	Date	Applicable	
				Yes	No

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