



AIRPLANE FLIGHT MANUAL
DA 42
with Garmin GFC 700 (OÄM 42-102)

Airworthiness Category : Normal
Requirement : JAR-23
Serial Number : _____
Registration : _____
Doc. No. : 7.01.06-E
Date of Issue : 20 December 2007

Signature :  _____

EASA Project Manager :  _____

Stamp :  _____

Date of approval :  _____

(EASA app. date)

This Airplane Flight Manual is approved with EASA approval No. A.C. 04008.

DIAMOND AIRCRAFT INDUSTRIES GMBH
N.A. OTTO-STR. 5
A-2700 WIENER NEUSTADT
AUSTRIA

NOTE

This Airplane Flight Manual is valid for DIAMOND DA 42
Airplanes with a Garmin GFC700 Autopilot System in
accordance with OÄM 42-102 installed.

FOREWORD

We congratulate you on the acquisition of your new DIAMOND DA 42 equipped with Garmin GFC700 Autopilot.

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 DA 42.

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 DA 42 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 APPROVAL

The content of approved chapters is approved by EASA. All other content is approved by DAI under the authority of EASA DOA No. EASA.21J.052 in accordance with Part 21.

0.2 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.

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.

The cover pages of Temporary Revisions, if applicable, are inserted behind the cover page of this manual; the following pages of the Temporary Revision are inserted in front of the corresponding pages of this AFM. Temporary Revisions are used to provide information on systems or equipment until the next 'permanent' Revision of the Airplane Flight Manual. When a 'permanent' Revision covers a Mandatory or Optional Design Change Advisory (MÄM or OÄM), then the corresponding Temporary Revision is superseded. Example: If Revision 3 covers OÄM 42-XXX, then the Temporary Revision TR-OÄM-42-XXX is superseded by the 'permanent' Revision 3.

Rev. No.	Reason	Chapter	Page(s)	Date of Revision	Approval Note	Date of Approval	Date Inserted	Signature
1	MÄM 42- -268/a, -270, -272, -284, -292, -294, -301, -304, -336, -347, -377, -405, -405/a, -443, OÄM 42- -053/e & -054/e, -056/e, -107/d, -108/a, -111& -158, -125, -127, -134, -141/a, -142, -146/a, -175, -188, -195, - 205, -208, corrections	all	all except cover page	30-Apr-2011	Revision No. 1 of the AFM Doc. No. 7.01.06-E is approved under the authority of DOA No. EASA.21J. 052			

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2	MÄM 42- -529, -542, -545/a, -546, -575, -584, -641, -685, -716, -756, -764/d, -814, -861, OÄM 42- -053/f & -054/f, -055/b, -056/f, -094, -107/f, -111/a& -158/a&-246, -119, -178, -185, -215, -252, -253, -259, -279, -280, -283, corrections	all	all except cover page	30 Nov 2015	Revision No. 2 of the AFM Doc. No. 7.01.06-E is approved under the authority of DOA No. EASA.21J.052			
3	OÄM 42- -222, -252/b, -304/a, corrections	all	all except cover page	15 Dec 2017	Revision No. 3 of the AFM Doc. No. 7.01.06-E is approved under the authority of DOA No. EASA.21J.052	09 Feb 2018		

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4	MÄM 42- -983, -1024, -1025, -1034, -1111, -1114, -1186, -1191, -1199, -1200, OÄM 42- -053/g & -054/g, -055/c, -324/a, -334, -339, corrections	all	all except cover page	14 Feb 2022	Revision No. 4 of the AFM Doc. No. 7.01.06-E is approved under the authority of DOA No. EASA.21J. 052	17 Feb 2022		
5	MÄM 42- -1265, -1310, -1325, OÄM 42- -134/a, -179, -211, -252/c, -280/a, corrections	all	all except cover page	25 Nov 2024	Revision No. 5 of the AFM Doc. No. 7.01.06-E is approved under the authority of DOA ref. EASA.21J. 052	28 Nov 2024		

Doc. No. 7.01.06-E

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25-Nov-2024

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1.1 INTRODUCTION

This Airplane Flight Manual has been prepared in order to provide pilots and instructors with all the information required for the safe and efficient operation of the airplane with the Garmin GFC 700 Autopilot System installed.

The Airplane Flight Manual includes all the data which must be made available to the pilot according to the JAR-23 requirement. Beyond this, it contains further data and operating instructions which, in the manufacturer's opinion, could be of value to the pilot.

This Airplane Flight Manual is valid for serial numbers equipped with the Garmin GFC 700 Autopilot System.

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 Section 6.5. The modification level is recorded in the following table (as far as necessary for this manual).

Modification	Source	Installed	
Firmware 2.7, Mapping O28V273DA42	MÄM 42-284	☐ yes	☐ no
Firmware 2.91, Mapping O28V291DA42	MÄM 42-304	☐ yes	☐ no
Firmware 2.91, Mapping O28V294DA42	MÄM 42-529	☐ yes	☐ no
Ice Protection System	OÄM 42-053	☐ yes	☐ no
Ice Protection System (Known Icing)	OÄM 42-054	☐ yes	☐ no
Oxygen System	OÄM 42-055	☐ yes	☐ no
Auxiliary Fuel Tanks	OÄM 42-056	☐ yes	☐ no

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General

Modification	Source	Installed	
Front Seats with Adjustable Backrest	OÄM 42-067	☐ yes	☐ no
Electrical Rudder Pedal Adjustment	OÄM 42-070	☐ yes	☐ no
Mission Power Supply System	OÄM 42-074	☐ yes	☐ no
Removable Fuselage Nose Cone	OÄM 42-077	☐ yes	☐ no
Operator Desk (Full CFRP Version)	OÄM 42-111	☐ yes	☐ no
Operator Desk (CFRP Version with Aluminum Joint)	OÄM 42-111/a	☐ yes	☐ no
Garmin GWX 68 Weather Radar	OÄM 42-119	☐ yes	☐ no
ECU Backup Battery	OÄM 42-129	☐ yes	☐ no
Operator Desk (Full Aluminum Version)	OÄM 42-158	☐ yes	☐ no
Increase of Maximum Zero Fuel Mass	OÄM 42-188	☐ yes	☐ no
Maximum Landing Mass 1785 kg	OÄM 42-195	☐ yes	☐ no
Emergency Axe	OÄM 42-205	☐ yes	☐ no
TAE 125-02-114 Engine	OÄM 42-252/c	☐ yes	☐ no
Front Seats with Adjustable Backrest - Hydroluk	OÄM 42-259	☐ yes	☐ no
Emergency Egress Hammer	OÄM 42-304	☐ yes	☐ no

NOTE

The use of ECU Mapping O28V273DA42, ECU Mapping O28V291DA42 and ECU Mapping O28V294DA42 is limited to TAE 125-02-99 engines (MÄM 42-198, latest revision carried out).

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

CAUTION

The DA 42 is a twin engine airplane. When the operating limitations and maintenance requirements are complied with, it has the high degree of reliability which is required by the certification basis. Nevertheless, an engine failure is not completely impossible. For this reason it is highly recommended for flights during the night, on top, under IMC, 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

The certification basis is JAR-23, published on 11-Mar-1994, including Amdt. 1, and additional requirements as laid down in CRI A-01.

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

means that the non-observation of the corresponding procedure leads to an immediate or important degradation in flight safety.

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

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

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1.4 DIMENSIONS

NOTE

All dimensions shown below are approximate.

Overall Dimensions

Span	: 13.42 m	44 ft
	: 13.55 m	44.5 ft including ACL
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 m ²	175.3 sq.ft.
Mean aerodynamic chord	: 1.271 m	4 ft 2 in
Aspect ratio	: 11.06	
Dihedral	: 5°	
Leading edge sweep	: 1°	

Aileron

Area (total, left + right)	: 0.66 m ²	7.1 sq.ft.
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Wing Flaps

Area (total, left + right) : 2.18 m² 23.4 sq.ft.

Horizontal Tail

Area : 2.35 m² 25.3 sq.ft.

Elevator area : 0.66 m² 7.1 sq.ft.

Angle of incidence : -1.1° relative to longitudinal axis of airplane

Vertical Tail

Area : 2.43 m² 26.2 sq.ft.

Rudder area : 0.78 m² 8.4 sq.ft.

Landing Gear

Track : 2.95 m (9 ft 8 in)

Wheelbase : 1.735 m (5 ft 8 in)

Nose wheel : 5.00-5*

Main wheel : 15x6.0-6*

* for details refer to the Airplane Maintenance
Manual, Doc. No. 7.02.01, latest revision

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

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

V_{MC} : 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_S : Stalling Speed, or the minimum continuous speed at which the airplane is still controllable in the given configuration.
- V_{S0} : Stalling Speed, or the minimum continuous speed at which the airplane is still controllable in the landing configuration.
- V_{S1} : Stalling Speed, or the minimum continuous speed at which the airplane is still controllable with flaps and landing gear retracted.
- 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

- ISA: International Standard Atmosphere. Conditions at which air is identified as an ideal dry gas. The temperature at mean sea level is 15 °C (59 °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 °C (-69.7 °F) is -0.0065 °C/m (-0.00357 °F/ft), and above this 0 °C/m (0 °F/ft).
- MSL: Mean Sea Level.
- OAT: Outside Air Temperature.
- 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.

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 1013.25 hPa (29.92 inHg).

Pressure Altitude:

Altitude 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 Airplane Flight Manual altimeter instrument errors are regarded as zero.

Wind:

The wind speeds which are shown as variables in the diagrams in this manual should be regarded as headwind or tailwind 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 Moment Arm:

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

Center of Gravity Limits:

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

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 fluids and the maximum quantity of oil.

Maximum Take-off Mass:

The maximum permissible mass for take-off.

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.

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

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

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Usable fuel: The quantity of fuel available for flight planning.

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

Useful load: The difference between take-off mass and empty mass.

■ Aux. tanks: Auxiliary tanks.

(e) Engine

ECU: Engine Control Unit

FADEC: Full Authority Digital Engine Control

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

Engine starting fuel temperature:

Above this fuel temperature the engine may be started.

Take-off fuel temperature:

Above this fuel temperature take-off power setting is permitted.

(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 Receiver No. 1
XPDR	Transponder
ENG INST	Engine Instruments
PITOT	Pitot Heating System
XFR PUMP/DE-ICE	Fuel Transfer Pump / De-Icing System
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 / Variable Elevator Stop
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	Avionic-, CDU-Cooling Fans
AVIONIC BUS	Avionic Bus
AV CONT.	Avionic Control

AVIONICS BUS:

COM2	COM Radio No. 2
GPS/NAV2	Global Positioning System and NAV Receiver No. 2
AUDIO	Audio Panel
AUTO PILOT	Auto Pilot System
Wx 500	Stormscope
ADF	Automatic Direction Finder
DME	Distance Measuring Equipment
Wx RDR	Weather Radar
TAS	Traffic Advisory System
DATA LINK	GDL 69A Data Link System

LH ENG ECU BUS:

ECU BUS	LH ECU Bus
ECU B	LH ECU B
ECU A	LH ECU A

LH BUS:

ALT.LH	LH Alternator
BATT	Battery

RH BUS:

ALT.RH	RH Alternator
BATT	Battery

RH ENG ECU BUS:

ECU BUS	RH ECU Bus
ECU B	RH ECU B
ECU A	RH ECU A

(g) Equipment

ELT: Emergency Locator Transmitter

(h) Design Change Advisories

MÄM: Mandatory Design Change Advisory

OÄM: Optional Design Change Advisory

VÄM: Variant Design Change Advisory

(i) Miscellaneous

ACG: Austro Control GmbH

ATC: Air Traffic Control

CFRP: Carbon Fiber Reinforced Plastic

EASA: European Aviation Safety Agency

EFB: Electronic Flight Bag

EPU: External Power Unit

GIA: Garmin Integrated Avionics

GFRP: Glass Fiber Reinforced Plastic

IPL: Interference Path Loss

JAR: Joint Aviation Requirements

JC/VP: Joint Certification/Validation Procedure

PCA: Primary Certification Authority

PED: Portable Electronic Device

T-PED: Transmitting Portable Electronic Device

1.6 UNITS OF MEASUREMENT

1.6.1 CONVERSION FACTORS

Dimension	SI-Units	US Units	Conversion
Length	[mm] millimeters	[in] inches	[mm] / 25.4 = [in]
	[m] meters	[ft] feet	[m] / 0.3048 = [ft]
	[km] kilometers	[NM] nautical miles	[km] / 1.852 = [NM]
Volume	[l] liters	[US gal] US gallons	[l] / 3.7854 = [US gal]
		[qts] US quarts	[l] / 0.9464 = [qts]
Speed	[km/h] kilometers per hour	[kts] knots	[km/h] / 1.852 = [kts]
	[m/s] meters per second	[mph] miles per hour	[km/h] / 1.609 = [mph]
		[fpm] feet per minute	[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] hecto-pascals	[inHg] inches of mercury	[hPa] = [mbar]
	[mbar] millibars	[psi] pounds per square inch	[hPa] / 33.86 = [inHg]
	[bar] bars		[bar] x 14.504 = [psi]
Temperature	[°C] degrees Celsius	[°F] degrees Fahrenheit	[°C] x 1.8 + 32 = [°F] ([°F] - 32) / 1.8 = [°C]

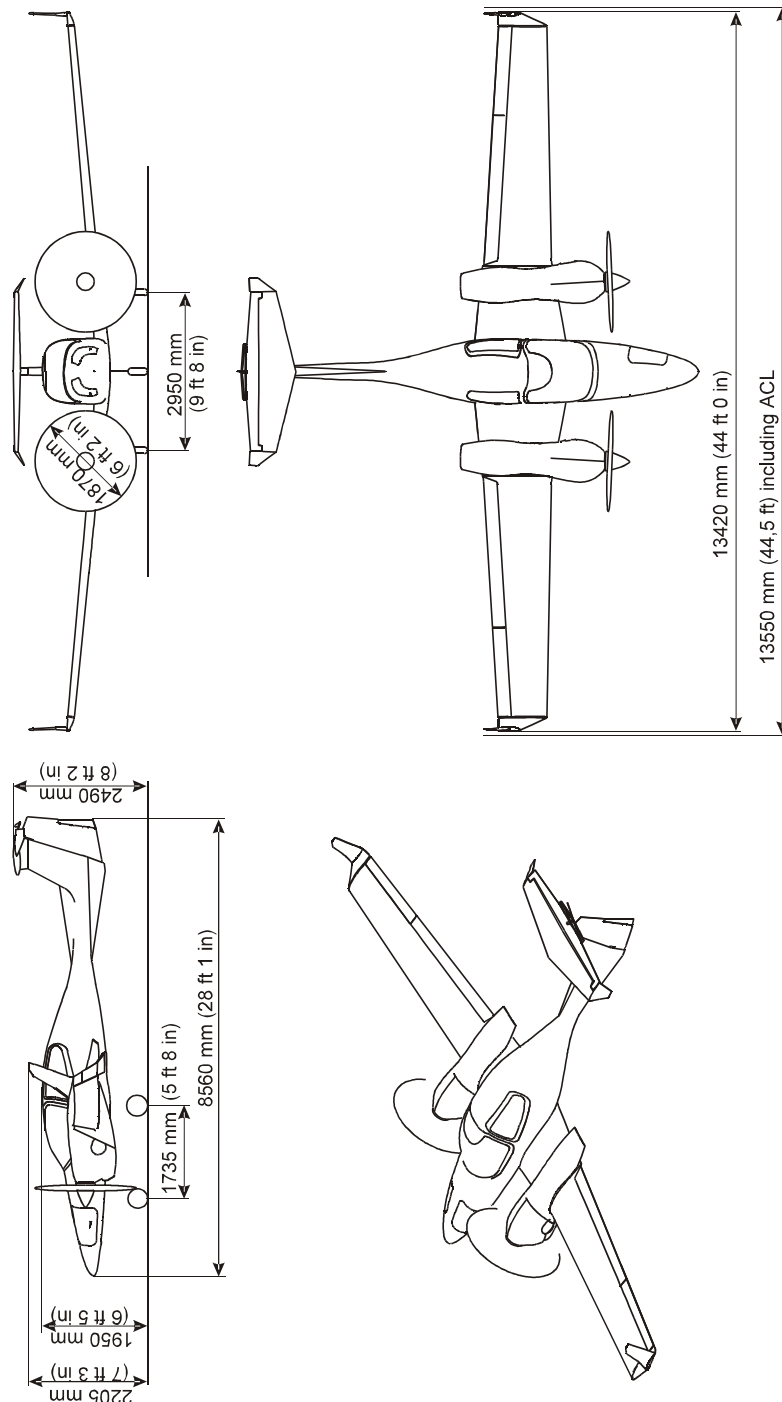
Dimension	SI-Units	US Units	Conversion
Intensity of electric current	[A] ampères		--
Electric charge (battery capacity)	[Ah] ampère-hours		--
Electric potential	[V] volts		--
Time	[sec] seconds		--

1.6.2 CONVERSION CHART LITERS / US GALLONS

Liters	US Gallons
5	1.3
10	2.6
15	4.0
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	37.0
150	39.6
160	42.3
170	44.9
180	47.6

US Gallons	Liters
1	3.8
2	7.6
4	15.1
6	22.7
8	30.3
10	37.9
12	45.4
14	53.0
16	60.6
18	68.1
20	75.7
22	83.3
24	90.9
26	98.4
28	106.0
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

1. 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).
2. 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, autopilot operation, and for flight planning. The audio panel is used for selection of radios for transmitting and listening, intercom functions, and marker beacon functions.
3. 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.
4. 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:
 - (a) 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.

- (b) The systems meets RNP5 airspace (BRNAV) requirements of AC 90-96 and in accordance with AC 20-138A, and FAA Order 8110.60 for oceanic and remote airspace operations, provided it is receiving useable navigation information from the GPS receiver. The system meets the accuracy requirements of EASA AMC 20-4 for Basic RNAV.
- (c) The Garmin GNSS navigation system as installed in this airplane complies with the equipment requirements of FAA AC 90-100A for RNAV 2 and RNAV 1 operations.
- (d) The Garmin GNSS navigation system as installed in this airplane complies with the equipment requirements of FAA AC 90-105 and meets the equipment performance and functional requirements to conduct RNP terminal departure and arrival procedures and RNP approach procedures without RF (radius to fix) legs. (RNP1, RNP APCH0.3 LNAV).
- (e) The Garmin GNSS navigation system as installed in this airplane has been found to comply with the requirements for primary means of Class II navigation in oceanic and remote navigation (RNP-10) without time limitations in accordance with FAA AC 20-138A and FAA Order 8400.12A. The Garmin GNSS navigation system can be used without reliance on other long-range navigation system.

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.

5. If the Garmin GWX 68 Weather Radar System is installed, it can be used to aid the pilot in avoiding thunderstorms and associated turbulence or for ground mapping. The GWX 68 shall be used to avoid severe weather and not for penetrating severe weather. Pulse type weather radar systems like the GWX 68 detect precipitation only, not clouds or turbulence. The display may indicate clear areas between intense returns, but this does not necessarily mean it is safe to fly between them. As installed on the DA 42, the Garmin GWX 68 has a demonstrated range of 160 nautical miles. Refer to Garmin G1000 Pilot's Guide for the DA 42, P/N 190-00649-(), latest effective issue for further information.
6. The airplane has been assessed for back door coupling susceptibility in accordance with EUROCAE ED-239 Section 3 and found PED tolerant for back door coupling. The airplane has been assessed for front door coupling susceptibility in accordance with EUROCAE ED-130A Appendix A. No IPL determination was made.

1.9 SOURCE DOCUMENTATION

This section lists documents, manuals and other literature 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: Technify Motors GmbH
 Platanenstrasse 14
 D-09356 St. Egidien
 GERMANY

Phone: +49-37204-696-0
Fax: +49-37204-696-2910
Website: www.technify.de

Documents: TAE 125-02-99 Operation and Maintenance Manual (latest revision)

1.9.2 PROPELLER

Address: mt-propeller
 Airport Straubing Wallmühle
 D-94348 Atting
 GERMANY

Phone: +49-9429-9409-0
E-mail: sales@mt-propeller.com
Website: www.mt-propeller.de

Documents: E-124, Operation and Installation Manual
 Hydraulically controlled variable pitch propeller
 MTV -5, -6, -9, -11, -12, -14, -15, -16, -21, -22, -25

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1.9.3 AVIONICS SYSTEM

Address: Garmin International, Inc.
1200 East 151st Street
Olathe, Kansas 66062
USA

Phone: +1-(913)-3978200

Fax: +1-(913)-3978282

Website: www.garmin.com

Documents: G1000 Cockpit Reference Guide
P/N 190-00406-(), latest effective issue

G1000 Pilot's Guide
P/N 190-00649-(), latest effective issue

CHAPTER 2

OPERATING LIMITATIONS

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2.1 INTRODUCTION

Chapter 2 of this Airplane Flight Manual provides operating limitations, instrument markings and placards necessary for the safe operation of the airplane, its powerplants, 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 AIRSPEED

	Airspeed		IAS	Remarks
V _A	Maneuvering speed	above 1542 kg (3400 lb)	123 KIAS	Do not make full or abrupt control surface movement above this speed.
		up to 1542 kg (3400 lb)	117 KIAS	
V _{FE}	Max. flaps extended speed	LDG	113 KIAS	Do not exceed these speeds with the given flap setting.
		APP	133 KIAS	
V _{LO}	Max. landing gear operating speed	Extension v _{LOE}	188 KIAS	Do not operate the landing gear above this speed.
		Retraction v _{LOR}	152 KIAS	
V _{LE}	Max. landing gear extended speed		188 KIAS	Do not exceed this speed with the landing gear extended.
V _{MC A}	Minimum control speed airborne		71 KIAS	With one engine inoperative, keep airspeed above this limit.
V _{NO}	Max. structural cruising speed		151 KIAS	Do not exceed this speed except in smooth air, and then only with caution.
V _{NE}	Never exceed speed in smooth air		188 KIAS	Do not exceed this speed in any operation.

2.3 AIRSPEED INDICATOR MARKINGS

Marking	KIAS	Significance
White arc	62 - 113 KIAS	Operating range with flaps fully extended.
Green arc	69 - 151 KIAS	Normal operating range.
Yellow arc	151 - 188 KIAS	‘Caution’ range - “Only in smooth air”.
Blue radial	85 KIAS	Best rate of climb speed, single engine.
Red radial	71 KIAS	Minimum control speed, single engine.
Red radial	188 KIAS	Maximum speed for all operations - V_{NE} .

2.4 POWER-PLANT LIMITATIONS

- a) Number of engines : 2
- b) Engine manufacturer : Thielert Aircraft Engines
- c) Engine designation : TAE 125-02-99
(P/N see Equipment List in Chapter 6)
- d) RPM limitations (shown as propeller RPM)
Maximum : 2300 RPM
Maximum overspeed : 2500 RPM (max. 20 sec.)
- e) Engine power
Max. take-off power : 99 kW (135 DIN-hp) at 2300 RPM (100 % load)
Max. continuous power : 99 kW (135 DIN-hp) at 2300 RPM (100 % load)
- f) Fuel temperature
Minimum : -30 °C
Maximum : +75 °C
- g) Oil pressure (indicated values are corrected for pressure altitude)
Minimum : 1.0 bar
Maximum : 6.5 bar
- h) Oil quantity (per engine)
Minimum : 4.5 liter (appr. 4.8 US qts)
Maximum : 6.0 liter (appr. 6.3 US qts)
Maximum oil consumption : 0.1 liter/hr (appr. 0.1 US qts/hr)
- i) Oil temperature
Minimum : -30 °C
Maximum : +140 °C

- j) Gearbox temperature
Maximum : 120 °C
- k) Coolant temperature
Minimum : -30 °C
Maximum : +105 °C
- l) Voltage
Minimum : 24.1 V
Maximum : 32.0 V
- m) Amperage
Maximum : 60 A
- n) Propeller manufacturer : mt-Propeller
- o) Propeller designation : MTV-6-A-C-F/CF 187-129
- p) Propeller diameter : 187 cm (6 ft 2 in)
- q) Prop. pitch angle (@ 0.75 R) : 12° (low pitch)
15° (start lock position)
81° (feathered position)
- r) Approved fuel grades : see Section 2.14, - FUEL
- s) Oil specification : SHELL Helix Ultra 5W-30
SHELL Helix Ultra 5W-40
AERO SHELL Oil Diesel 10W-40
AERO SHELL Oil Diesel Ultra 5W-30

- t) Gearbox oil (propeller gearbox): SHELL EP 75W90 API GL-4
SHELL Spirax GSX 75W-80 GL-4
SHELL SPIRAX S4 G 75W-90
SHELL SPIRAX S6 GXME 75W-80 APT GL-4
CENTURION Gearbox Oil N1
SHELL SPIRAX S6 ATF ZM API-GL-4
- u) Coolant : Water / Cooler protection (BASF Glysantin Protect Plus/G48) 1/1. The freezing point of the coolant is -36 °C (-32.8 °F).

CAUTION

If the coolant or gearbox oil level is low, the reason must be determined and the problem must be corrected by authorized personnel.

- v) Maximum restart altitude : 8000 ft
- w) Restart airspeed : 110 to 120 KIAS

2.5 ENGINE INSTRUMENT MARKINGS

Engine instrument markings and their color code significance are shown in the tables below.

Indi- cation	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
RPM	--	--	up to 2300 RPM	--	above 2300 RPM
Oil pressure	below 1.0 bar	1.0 to 2.3 bar	2.3 to 5.8 bar	5.8 to 6.5 bar	above 6.5 bar
Oil temp.	below -30 °C	-30 to 50 °C	50 to 130 °C	131 to 140 °C	above 140 °C
Coolant temp.	below -30 °C	-30 to 60 °C	60 to 101 °C	102 to 105 °C	above 105 °C
Gearbox temp.	--	--	up to 115 °C	115 to 120 °C	above 120 °C
Load	--	--	0 to 100 %	--	--
Fuel temp.	below -30 °C	-30 to +4 °C	+5 to 69 °C	70 to 75 °C	above 75 °C
Ammeter	--	--	up to 60 A	--	above 60 A
Volt- meter	below 24.1 V	24.1 to 25 V	25 to 30 V	30 to 32 V	above 32 V
Fuel qty.	0 US gal	--	0 to 25 US gal	--	--

2.6 WARNING, CAUTION AND ADVISORY ALERTS

2.6.1 WARNING, CAUTION AND ADVISORY ALERTS ON THE G1000

NOTE

The alerts described in the following are displayed on the Garmin G1000. Section 7.10.3 - WARNING, CAUTION AND ADVISORY MESSAGES includes a detailed description of the alerts.

The following tables show the color and significance of the warning, caution and advisory alerts 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.
L/R ENG TEMP	Left / Right engine coolant temperature is in the upper red range (too high/>105 °C).
L/R OIL TEMP	Left / Right engine oil temperature is in the upper red range (too high/>140 °C).
L/R OIL PRES	Left / Right engine oil pressure is in the lower red range (too low/<1.0 bar).
L/R FUEL TEMP	Left / Right fuel temperature is in the upper red range (too high/>75 °C).
L/R GBOX TEMP	Left / Right engine gearbox temperature is in the upper red range (too high/>120 °C).
L/R ALTN AMPS	Left / Right engine alternator output is in the upper red range (too high/>60 amps).
L/R ENG FIRE	Left / Right engine fire detected.

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Warning Alerts (red)	Meaning / Cause
L/R STARTER	Left / Right engine starter is engaged.
DOOR OPEN	Canopy and/or passenger door and/or baggage door are/is not closed and locked.
POSN ERROR	G1000 will no longer provide GPS based navigational guidance.
ATTITUDE FAIL	The display system is not receiving attitude reference information from the AHRS.
AIRSPEED FAIL	The display system is not receiving airspeed input from the air data computer.
ALTITUDE FAIL	The display system is not receiving altitude input from the air data computer.
VERT SPEED FAIL	The display system is not receiving vertical speed input from the air data computer.
HDG	The display system is not receiving valid heading input from the AHRS.
WARN	RAIM position warning. The nav deviation bar is removed.

Color and Significance of the Caution Alerts on the G1000

Caution Alerts (amber)	Meaning / Cause
L/R ECU A FAIL	* A fault has occurred in the left/right engine ECU A (one reset of minor faults is possible) or * ECU A is being tested during FADEC-test procedure during the 'before take-off check.'
L/R ECU B FAIL	* A fault has occurred in the left/right engine ECU B (one reset of minor faults is possible) or * ECU B is being tested during FADEC-test procedure during the 'before take-off check.'
L/R FUEL LOW	Left / Right main tank fuel quantity is low.
L/R ALTN FAIL	Left / Right engine alternator has failed.
L/R VOLTS LOW	Left / Right bus voltage is less than 25 Volts.
L/R COOL LVL	Left / Right engine coolant level is low.
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	Control stick limiting system (variable elevator stop) has failed.
INTEG RAIM not available	RAIM (Receiver Autonomous Integrity Monitor) is not available.
AHRS ALIGN: Keep Wings Level	The AHRS (Attitude and Heading Reference System) is aligning.
L/R AUX FUEL E	Left / Right auxiliary fuel tank empty (if installed).
CHECK GEAR	Landing gear is not down and locked.

Caution Alerts (amber)	Meaning / Cause
DEICE LVL LO	De-icing fluid level is low. (if installed)
DEIC PRES HI	De-icing pressure is high. (if installed)
DEIC PRES LO	De-icing pressure is low. (if installed)

Color and Significance of the Advisory Alerts on the G1000

Advisory Alerts (white)	Meaning / Cause
L/R GLOW ON	Left / Right engine glow plug active.
L/R FUEL XFER	Fuel transfer from auxiliary to main tank is in progress.
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 GIAs is inoperative.

2.6.2 OTHER WARNING ALERTS

Warning Alerts on the Instrument Panel

GEAR UNSAFE WARNING LIGHT (red)	Illuminates if the landing gear is neither in the final up nor in the down & locked position.
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Audible Warning Alerts

GEAR RETRACTED CHIME TONE (repeating)	Resounds if the landing gear is retracted while the flaps move into position LDG or when the power lever is placed in a position below approx. 20%.
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2.7 MASS (WEIGHT)

Value	Mass (Weight)	
Minimum flight mass	1250 kg	2756 lb
Maximum take-off mass	1785 kg	3935 lb
Maximum zero fuel mass	1650 kg	3638 lb
Maximum zero fuel mass, if OÄM 42-188 is carried out (see NOTE below)	1674 kg	3690 lb
Maximum zero fuel mass, if OÄM 42-188 and OÄM 42-195 are carried out (see NOTE below)	1730 kg	3814 lb
Maximum landing mass (see NOTE below)	1700 kg	3748 lb
Maximum landing mass, if OÄM 42-195 is carried out	1785 kg	3935 lb
Max. load in nose baggage compartment (in fuselage nose)	30 kg	66 lb
Max. load in cabin baggage compartment (behind rear seats)	45 kg	100 lb
Max. load in baggage extension (behind cabin baggage compartment)	18 kg	40 lb
Max. load, cabin baggage compartment and baggage extension together	45 kg	100 lb

WARNING

Exceeding the mass limits will lead to overstressing of the airplane as well as to degradation of flight characteristics and flight performance.

NOTE

In some countries the beginning of a flight is defined by starting the powerplant. In those countries a ramp mass of maximal MTOM + 8 kg (MTOM + 18 lb) is approved. At the time of lift-off the maximum permitted take-off mass must not be exceeded.

NOTE

If OÄM 42-195 is not carried out a landing with a mass between 1700 kg (3748 lb) and 1785 kg (3935 lb) constitutes an abnormal operating procedure.

NOTE

For a zero fuel mass above 1650 kg (3638 lb) a structural temperature limit has been established which must be observed before flight.

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 meter (86.46 in) forward of the most forward point of the root rib on the stub wing (refer to 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:

- 2.35 m (92.52 in) aft of Datum Plane at 1250 kg (2756 lb)
- 2.35 m (92.52 in) aft of Datum Plane at 1468 kg (3236 lb)
- 2.40 m (94.49 in) aft of Datum Plane at max. take-off mass (see Section 2.7)
- linear variation in between

Most rearward flight CG:

- 2.42 m (95.28 in) aft of Datum Plane at 1250 kg (2756 lb)
- 2.49 m (98.03 in) aft of Datum Plane at 1600 kg (3527 lb)
- 2.49 m (98.03 in) aft of Datum Plane at max. take-off mass (see Section 2.7)
- linear variation in between

Refer to Section 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.

Approved Maneuvers

- 1) All normal flight maneuvers;
- 2) Stalling (with the exception of dynamic stalling); 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° of bank are not permitted in the Normal Category. Stalling with asymmetric power or one engine inoperative is not permitted.

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2.10 MANEUVERING LOAD FACTORS

NOTE

The tables below show structural limitations. The load factor limits for the TAE 125-02-99 engine must also be observed. Refer to the corresponding Operation & Maintenance Manual for the engine.

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 structural load factors will lead to overstressing of the airplane.

CAUTION

Exceeding the maximum powerplant load factors and time limits listed below will lead to a L/R OIL PRES warning.

Load Factor	Time Limit
-0.2	5 seconds
-0.3	4 seconds
-0.4	3 seconds
-0.5	2 seconds

2.11 OPERATING ALTITUDE

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

2.12 FLIGHT CREW

Minimum crew : 1 (one person)

Maximum number of occupants : 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 Visual Flight Rules (NVFR).
- With the appropriate equipment: flights according to Instrument Flight Rules (IFR).
- Take-off and landing on paved surfaces.
- Take-off and landing on grass surfaces.
- If OÄM 42-054 is carried out: flight into known or forecast icing conditions. Refer to Supplement S03, latest revision.

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.

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NOTE

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

Minimum Operational Equipment (Serviceable)			
	For Daytime VFR Flights	In Addition for Night VFR Flights	In addition for IFR Flights
Flight and Navigation Instruments	* Airspeed indicator (on G1000 PFD or backup) * Altimeter (on G1000 PFD or backup) * Magnetic compass * 1 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 * Chronometer with indication of hours, minutes, and seconds * 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)

Minimum Operational Equipment (Serviceable)			
	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) * Coolant temp. (2x) * Coolant level indicator (2x) * Gearbox temp. (2x) * Load (2x) * Prop. RPM (2x) * Fuel temp. left & right tank	* Ammeter * Voltmeter	
Lighting		* Position lights * Strobe lights (anti collision lights) * Landing light * Instrument lighting * Flood light * Flashlight	

Minimum Operational Equipment (Serviceable)

	For Daytime VFR Flights	In Addition for Night VFR Flights	In addition for IFR Flights
Other Operational Minimum Equipment	* Stall warning system * Variable elevator stop * Alternate means for fuel quantity indication (see Section 7.9) * 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 Grades:

JET Fuel:

JET A-1 (ASTM D 1655),
JET A (ASTM D 1655),
JET Fuel No. 3 (China, GB 6537-2006),
JP-8 (MIL-DTL-83133),
TS-1 (GOST 10227-86),
TS-1 (Ukraine GSTU 320.00 1U9943011-99),
and blends of the above listed Jet Fuel grades.

Diesel Fuel:

Only if MÄM 42-037 is incorporated: Diesel (EN 590),
and blends of the above listed Jet Fuel grades,
and Diesel.

CAUTION

Limitations for DA 42 registered and/or operated in the
following countries:

Indonesia, Malaysia: Use of Diesel Fuel is NOT approved.

CAUTION

If the airplane is operated with Diesel Fuel or a blend of
Diesel Fuel with Jet Fuel, the use of the auxiliary tanks, if
installed (OÄM 42-056), is not permitted.

CAUTION

Additional temperature limitations must be observed if the
airplane is operated with Diesel Fuel or blends of Diesel Fuel
with Jet Fuel. Refer to Section 2.16.1 - FUEL
TEMPERATURE.

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Any mixture of the different types of fuel additives is not permitted.

OPERATION WITH ANTI-MICROBIAL LIFE FUEL ADDITIVE (only if MÄM 42-198 is installed)

The application of the following additive is permitted:

- BIOBOR JF : max. 270 ppm for initial treatment
max. 135 ppm for permanent use after initial treatment

CAUTION

In case of an unknown or an over dosage of the fuel additives the fuel system must be purged until the dosage is within the permitted limits.

NOTE

The specified additives are qualified for the operation with the certified fuel grades.

To clean the fuel system of the airplane a higher dosage of the specified additive is allowed under consideration of the instructions of the additive supplier. During cleaning the engine must not be operated.

NOTE

The instructions of the fuel additive supplier must be followed.

OPERATION WITH ANTI-ICING FUEL ADDITIVES

The application of the following additive is permitted:

-PRIST Hi-Flash : max. 1500 ppm

CAUTION

The use of PRIST Hi-Flash fuel additive is only permitted with JET A (ASTM D 1655).

NOTE

The instructions of the fuel additive supplier must be followed.

NOTE

Use only uncontaminated fuel from reliable sources.

	Main Tanks		Auxiliary Tanks (if installed)		Total	
	US gal	liter	US gal	liter	US gal	liter
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
Max. permissible difference LH/RH	5.0	18.9				

2.15 LIMITATION PLACARDS

All *limitation* placards are shown below. A list of *all* placards is included in the Airplane Maintenance Manual (Doc. No. 7.02.01), Chapter 11.

The following limitation placard is in the forward view of the pilot:

Limitations for GFC 700 Autopilot System:

Autopilot / Yaw Damper DISC during take-off and landing.

Do not use AP during single engine operation.

Maximum speed for autopilot operation is 180 KIAS.

Minimum speed for autopilot operation is 90 KIAS.

Minimum Altitude for Autopilot Operation:

Cruise, Climb, Descent and Maneuvering : 800 feet AGL

Approach : 200 feet AGL

Departure : 200 feet AGL

On the Instrument Panel:

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

MANEUVERING SPEED:

$V_A = 123$ KIAS (ABOVE 1542 KG / 3400 LB)

$V_A = 117$ KIAS (UP TO 1542 KG / 3400 LB)

LANDING GEAR

$V_{LE} / V_{LOE} = 188$ KIAS

$V_{LOR} = 152$ KIAS

On the Emergency Landing Gear Extension Lever:

**EMERGENCY
Gear Extension
Max. 152 KIAS**

On the Instrument Panel, Next to the Fuel Quantity Indication:

(a) Standard Tank:

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

(b) Auxiliary Tank (if installed):

**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 the Fuel Temperature Indication:

**Diesel Fuel or
Unknown Fuel Blend:**
Below -5 °C:
No engine start permitted.
Below +5 °C:
No take-off permitted.

(a) Next to Each of the Two Fuel Filler Necks:

(b) In Addition Next to Each of the Two Auxiliary Fuel Filler Necks (if installed):

WARNING

APPROVED FUEL

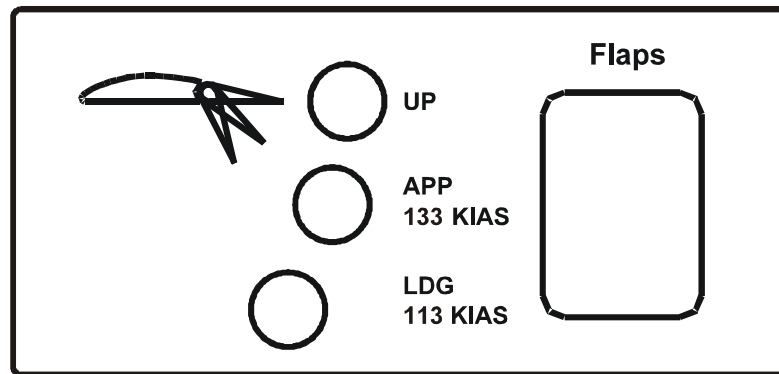
JET-A1

or see Airplane Flight Manual

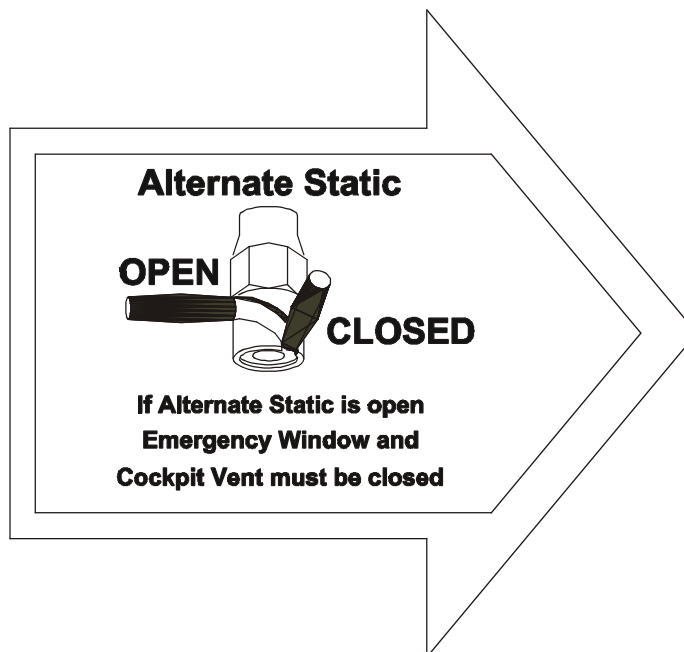
In Each Cowling, on the Door for the Oil Filler Neck:

OIL
Shell Helix Ultra
5W-30
or see AFM

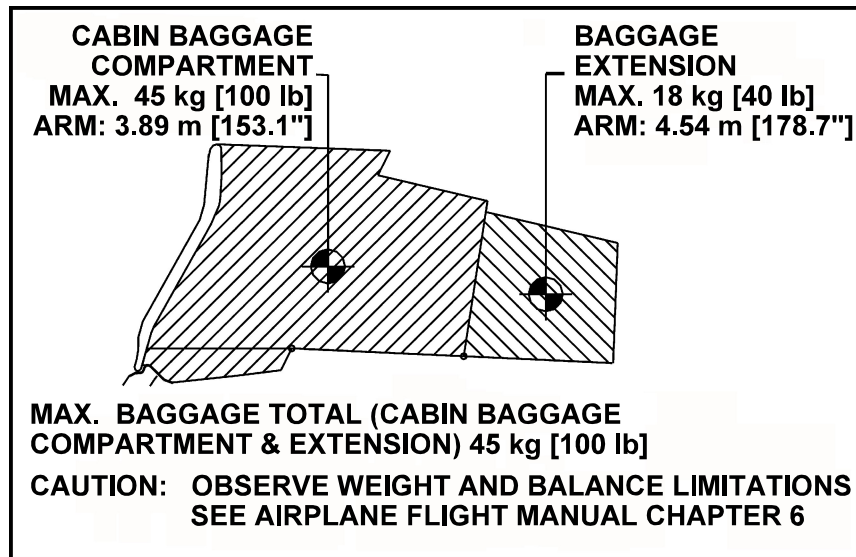
Next to the Flap Selector Switch:



In the Cabin, on the Left Fuselage Sidewall:



Next to the Cabin 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 FUEL TEMPERATURE

JET Fuel grades and blends thereof:

from -30 °C to +75 °C (from -22 °F to +167 °F)

NOTE

Operation with Diesel Fuel, or blends of Diesel Fuel with Jet Fuel, is only approved if MÄM 42-037 is incorporated.

Diesel Fuel, Blends of Diesel Fuel with Jet Fuel grades, or unknown fuel grade:

Engine starting fuel temperature min. -5 °C (+23 °F)

Take-off fuel temperature min.+5 °C (+41 °F)

Maximum fuel temperature +75 °C (+167 °F)

2.16.2 BATTERY CHARGE

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

The use of an external power supply for engine starting with an empty airplane battery is also not permitted if the subsequent flight is intended to be a Night VFR or 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 blocked by the key lock during operation of the airplane.

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2.16.5 PORTABLE ELECTRONIC DEVICES

The use of Portable Electronic Devices (PED) during low visibility approaches is prohibited.

NOTE

Refer to EASA AMC 20-25 or FAA AC 120.76A for the use of PED associated to electronic flight bag (EFB) operation.

The use of any device as an EFB may require separate approvals.

2.16.6 GARMIN G1000 AVIONICS SYSTEM

1. The Garmin G1000 Cockpit Reference Guide, P/N 190-00406-(), latest effective issue must be immediately available to the flight crew.
2. The G1000 must utilize the software Garmin P/N 010-00370-18, or later approved software in accordance with the mandatory service bulletin DAI MSB42-008, latest version.

Software Part Number	Approved Version	Function
System	for approved version see DAI MSB 42-008, latest version	
010-00370-()		
Manifest		
006-B0093-()		GPS1, GPS2
006-B0172-()		GTX1-GIA1, GTX1-GIA2
006-B0190-()		GIA1, GIA2
006-B0193-()		GEA1-GIA1, GEA1-GIA2
006-B0203-()		GMA1-GIA1, GMA1-GIA2
006-B0223-()		GRS1-GIA1, GRS1-GIA2
006-B0224-()		GMU1
006-B0319-()		PFD1, MFD1
006-B0328-()		
006-B0329-()		
006-C0048-()		GMU1 FPGA
006-C0049-()		GRS1 FPGA
006-C0055-()		GDC1 FPGA
006-D0159-()		GRS1 MV DB
006-D0202-()		
006-B0261-()		GDC1-GIA1
006-B0081-()		COM1, COM2
006-B0083-()		GS1, GS2
006-B0082-()		NAV1, NAV2

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.

3. 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.
4. 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.

- (a) 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.
- (b) 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.
- (c) 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.

- (d) 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.
 - (e) 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.
 - (f) RNAV (GPS) approaches must be conducted utilizing the GPS sensor.
 - (g) RNP RNAV operations are not authorized, except as noted in Chapter 1 of this AFM.
5. 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):
- (a) DIS, SPD : nm, kt (sets navigation units to "nautical miles" and "knots")
 - (b) ALT, VS : ft, fpm (sets altitude units to "feet" and "feet per minute")
 - (c) POSITION : deg-min (sets navigation grid units to decimal minutes)

NOTE

Navigation Information is referenced to WGS-84 reference system, and should only be used where the Aeronautical Information Publication (including electronic data and aeronautical charts) conforms to WGS-84 or equivalent.

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6. When AHRS is required to meet the items listed in the minimum operational equipment (serviceable) table in Section 2.13 - KINDS OF OPERATION, operation is prohibited in the following areas:
- (a) North of 72° N latitude at all longitudes.
 - (b) South of 70° S latitude at all longitudes.
 - (c) North of 65° N latitude between longitude 75° W and 120° W (Northern Canada).
 - (d) North of 70° N latitude between longitude 70° W and 128° W (Northern Canada).
 - (e) North of 70° N latitude between longitude 85° E and 114° E (Northern Russia).
 - (f) South of 55° S latitude between longitude 120° E and 165° E (Region south of Australia and New Zealand).

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

7. The fuel quantity, fuel required, and fuel remaining functions on the Fuel Page (displayed when pushing the FUEL button as shown in Section 7.13 - GARMIN G1000 INTEGRATED AVIONICS SYSTEM) of the FMS are supplemental information only and must be verified by the flight crew.
8. The GPS is not approved for WAAS operations
- (a) The G1000 integrated avionics system as installed according to OÄM 42-134 is NOT approved for GPS WAAS operations including GPS WAAS approach procedures such as “LPV”, “LNAV/VNAV”, and “LNAV+V”.
 - (b) WAAS functionality must be disabled on the G1000 GPS status page (refer to the G1000 Pilot’s Guide for procedure).
9. The availability of Safe Taxi®, ChartView, or FliteCharts® in electronic form on the G1000 is for information purposes only, it is still mandatory to carry another source of charts on-board the airplane.

2.16.7 AUTOPILOT LIMITATIONS

1. The autopilot and yaw damper must be disconnected (using the DISC button) during take-off, landing and single engine operation.
2. Following an autopilot or electric trim malfunction, reengaging the autopilot or manual electric trim, or resetting the AUTOPILOT circuit breaker is prohibited until the cause of the malfunction has been determined and corrected.
3. The Garmin G1000 Cockpit Reference Guide for the Diamond DA42, P/N 190-00406-(), latest effective issue must be immediately available to the flight crew.
4. ILS approaches using the GFC700 / flight director are limited to Category I approaches only.
5. Autopilot maximum airspeed: 180 KIAS
Autopilot minimum airspeed: 90 KIAS
6. Altitude select captures below 1200 feet AGL are prohibited.
7. The autopilot must be disengaged:
 - below 200 ft AGL during approach,
 - below 200 ft AGL during departure,
 - below 800 ft AGL for all other phases of flight,
 - during single engine operation.
8. Overriding the autopilot to change pitch or roll attitude is prohibited. (Disengage or press CWS while maneuvering.)

9. The GFC 700 components must utilize the following or later approved software versions:

Sub-System	Software Version
GDU	v6.13
GDC 74	v3.01
GEA 7X	v2.07
GPS	v3.03
GIA 6X	v4.71
GIA Audio	v2.02
GMAX347	v2.11
GMU44	v2.01
GRS 77	v2.09
GTX 33X	v4.05
GDL 69	v3.10
GSA 8X	v2.10
GFC 700	v2.00

The system software versions can be verified on the AUX group sub-page 5, "AUX - SYSTEM STATUS".

10. The GFC 700 AFCS pre-flight test must be successfully completed prior to use of the autopilot, flight director, yaw damper or manual electric trim.
11. A pilot with the seat belt fastened must occupy the left pilot's seat during all operations.

12. CDI mode sequencing (GPS-to-ILS) must be set to manual for instrument approaches conducted with the autopilot coupled.
13. The yaw damper is an integral part of the autopilot system and must not be used separately.

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, OÄM 42-101 or OÄM 42-142) may only be used during cruise. During all other phases of flight the sun visors must be locked in the fully upward position.

2.16.11 STRUCTURAL TEMPERATURE

CAUTION

The max. zero fuel mass of 1650 kg (3638 lb) may only be exceeded if OÄM 42-188 is carried out.

If the zero fuel mass exceeds 1650 kg (3638 lb) the maximum permissible structural temperature of 55 °C (131 °F) must not be exceeded before flight. Temperature indicators in the LH and RH landing gear bays indicate the structural temperature.

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2.16.12 GARMIN GWX 68 WEATHER RADAR OPERATION**WARNING**

The Garmin GWX 68 Weather Radar System (if installed) must not be operated on ground. If the system is transmitting, it may result in bodily injury if persons are within the minimum safe distance of 2.8 m (9.16 ft). Never operate the radar in a hangar or other enclosure as radiation can be reflected throughout the area.

CHAPTER 3

EMERGENCY PROCEDURES

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NOTE

Procedures for uncritical 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 in this chapter 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. This should prevent a situation where the pilot is faced with an emergency he cannot handle calmly and with determination.

3.1.2 CERTAIN AIRSPEEDS IN EMERGENCIES

Event	Airspeed
One engine inoperative minimum control speed (air) v_{mCA}	71 KIAS
One engine inoperative speed for best rate of climb v_{YSE}	85 KIAS

3.1.3 SELECTING EMERGENCY FREQUENCY

In an in-flight emergency, depressing and holding the Com transfer button  on the G1000 for 2 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 displayed in red color. A warning chime tone of 1.5 seconds duration will sound and repeat without delay until the alarm is acknowledged by the crew.

3.2.2 L/R ENG TEMP

L/R ENG TEMP	Left / Right engine coolant temperature is in the upper red range (too high / above 105 °C).
---------------------	--

Coolant temperatures above the limit value of 105 °C can lead to a total loss of power due to engine failure.

Proceed according to:

4B.3.2 - COOLANT TEMPERATURE.

3.2.3 L/R OIL TEMP

L/R OIL TEMP	Left / Right engine oil temperature is in the upper red range (too high / above 140 °C).
---------------------	--

Oil temperatures above the limit value of 140 °C can lead to a total loss of power due to engine failure.

Proceed according to:

4B.3.3 - OIL TEMPERATURE.

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3.2.4 L/R OIL PRES

L/R OIL PRES	Left / Right engine oil pressure is in the lower red range (too low / below 1 bar).
---------------------	---

Oil pressures below the limit value of 1 bar can lead to a total loss of power due to engine failure.

Proceed according to:

4B.3.4 - OIL PRESSURE.

3.2.5 L/R GBOX TEMP

L/R GBOX TEMP	Left / Right engine gearbox temperature is in the upper red range (too high / above 120 °C).
----------------------	--

Gearbox temperatures above the limit value of 120 °C can lead to a total loss of power due to engine failure.

Proceed according to:

4B.3.5 - GEARBOX TEMPERATURE.

3.2.6 L/R FUEL TEMP

L/R FUEL TEMP	Left / Right fuel temperature is in the upper red range (too high / above 75 °C).
----------------------	---

Fuel temperatures above the limit value of 75 °C can lead to a noticeable reduction of the high pressure pump efficiency.

Proceed according to:

4B.3.6 - FUEL TEMPERATURE.

3.2.7 L/R ALTN AMPS

L/R ALTN AMPS	Left / Right engine alternator output is in the upper red range (too high / above 60 amps).
----------------------	---

Proceed according to:

3.7.2 - HIGH CURRENT.

3.2.8 L/R ENG FIRE

L/R ENG FIRE	Left / Right engine fire detected.
---------------------	------------------------------------

Engine fire can lead to a total loss of power due to engine failure as well as severe structural damage:

Proceed according to the following procedures as applicable:

3.8.1 - ENGINE FIRE ON GROUND.

3.8.2 - ENGINE FIRE DURING TAKE-OFF.

3.8.3 - ENGINE FIRE IN FLIGHT.

3.2.9 L/R STARTER

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

Proceed according to:

3.7.3 - STARTER MALFUNCTION.

3.2.10 DOOR OPEN

DOOR OPEN	Canopy and/or passenger door and/or baggage door are/is not closed and locked.
------------------	--

Proceed according to:

3.9.2 - UNLOCKED DOORS.

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3.3 G1000 SYSTEM WARNINGS

3.3.1 RED X

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

3.3.2 POSN ERROR

POSN ERROR	The system will flag 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.

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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 VERT SPEED FAIL

VERT 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 HDG

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

Revert to the emergency compass.

3.3.8 WARN

WARN	RAIM position warning - nav deviation bar removed.
-------------	--

1. CDI softkey switch to VOR/LOC

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3.4 G1000 FAILURES

3.4.1 NAVIGATION INFORMATION FAILURE

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

3.4.2 PFD OR MFD DISPLAY FAILURE

1. DISPLAY BACKUP button on audio panel . . PUSH

Automatic Entry of Display Reversionary Mode

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

- (a) DISPLAY BACKUP Button on 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.

- (b) DISPLAY BACKUP Button on 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.

1. Use standby attitude indicator, emergency compass and Navigation Map
2. Course set using digital window

END OF CHECKLIST

3.4.4 AIR DATA COMPUTER (ADC) FAILURE

NOTE

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.

1. Use standby airspeed indicator and altimeter.

END OF CHECKLIST

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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.

1. Set power based on throttle lever position, engine noise and speed.
2. Monitor other indications to determine the health of the engine.
3. Use known power settings and Section 5.3.2 - FUEL FLOW DIAGRAM for approximate fuel flow values.
4. Use other system information, such as annunciator messages, GPS fuel quantity and flow, to safely complete the flight.

END OF CHECKLIST

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.

1. If an annunciator appears, treat it as if the condition exists. Refer to Chapter 3 - EMERGENCY PROCEDURES or Chapter 4B - ABNORMAL OPERATING PROCEDURES.
2. 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.

END OF CHECKLIST

3.5 ONE ENGINE INOPERATIVE PROCEDURES

WARNING

In certain combinations of airplane 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 airplane 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 vital to maintain directional control by mainly rudder and additional aileron input. The following mnemonic can help to identify the failed engine:

"Dead foot - dead engine"

This means that, once directional control is re-established, the pilot can feel the control force on the 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 TROUBLESHOOTING

WARNING

Control over the flight attitude has priority over attempts to solve the current problem ("first fly the aircraft").

NOTE

With respect to handling and performance, the left-hand engine (pilots view) is considered the "critical" engine.

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

CAUTION

Once the engine has been shut down for longer than 30 seconds, it can only be restarted below 8000 ft pressure altitude. Proceed in accordance with 3.5.4 - UNFEATHERING & RESTARTING THE ENGINE IN FLIGHT.

1. POWER lever. IDLE

NOTE

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

2. If in icing conditions ALTERNATE AIR ON
3. Fuel quantity check

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NOTE

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

4. FUEL SELECTOR check ON / CROSSFEED if required

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.

5. ECU SWAP ECU B

NOTE

If the swap to ECU B has restored engine power land as soon as possible. If selecting ECU B does not solve the problem, switch back to AUTOMATIC in order to maintain the engine control system redundancy.

6. Circuit breakers check / reset if necessary

NOTE

If resetting the circuit breakers has restored engine power land as soon as possible.

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

END OF CHECKLIST

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3.5.3 ENGINE SECURING (FEATHERING) PROCEDURE

Depending on the situation attempts can be made to restore engine power prior to securing the engine (see Section 3.5.2 - ENGINE TROUBLESHOOTING).

Shut down and feathering of the affected engine:

1. Inoperative engine identify & verify
2. ENGINE MASTER inoperative engine OFF

CAUTION

Do not shut down an engine with the FUEL SELECTOR valve. The high pressure fuel pump can otherwise be damaged.

Securing the feathered engine:

3. Alternator inoperative engine OFF
4. FUEL SELECTOR inoperative engine OFF

NOTE

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

If one of the POWER levers is set to low settings the landing gear warning horn is activated. Set the POWER lever of the secured engine forward as required to mute the warning horn.

END OF CHECKLIST

3.5.4 UNFEATHERING & RESTARTING THE ENGINE IN FLIGHT

WARNING

Do not attempt to restart the feathered engine when the reason of the engine failure cannot be identified since the un-feathered propeller of an inoperative engine might not be able to be feathered again.

WARNING

An unfeathered propeller causes increased drag and reduces/increases climb/sink rate up to 200 ft/min.

NOTE

Restarting the engine in flight is possible at altitudes below 8000 ft pressure altitude.

Above 8000 ft pressure altitude restart in flight has not been demonstrated.

If the reason of the engine failure can be identified as the result of an improper handling by the pilot and there is no indication of malfunction or engine fire a restart may be attempted. Refer to 3.5.2 - ENGINE TROUBLE SHOOTING to check for possible causes.

1. Airspeed below 90 KIAS
2. POWER lever affected engine IDLE
3. FUEL SELECTOR affected engine check ON
4. ALTERNATE AIR as required
5. Alternator ON
6. ENGINE MASTER affected engine ON

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7. Starter affected engine. engage until propeller speed
reaches 500 RPM / if propeller
does not start windmilling
by itself

CAUTION

If the dual mass flywheel is installed, disengaging the starter
below 500 RPM propeller speed might damage the gearbox.

CAUTION

Do not engage the starter if the propeller is windmilling! This
might damage the starter.

CAUTION

After the engine has started, the power lever should be set
to a moderate power setting, until engine temperatures have
reached the green range.

8. Circuit breakers check

Restarting the engine by windmilling:

9. Airspeed. 125 KIAS to 145 KIAS
10. POWER lever affected engine. IDLE
11. FUEL SELECTOR affected engine check ON
12. ALTERNATE AIR. as required
13. Alternator ON
14. ENGINE MASTER affected engine ON

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CAUTION

After the engine has started, the power lever should be set to a moderate power setting, until engine temperatures have reached the green range.

15. Circuit breakers check

Feathering the engine, if engine does not start:

WARNING

One attempt to feather the engine results in a loss of altitude of up to 800 ft. Do not attempt to feather the engine if the altitude is insufficient to execute the procedure.

CAUTION

If the propeller does not feather after the first attempt, do not carry out further attempts to feather the propeller to avoid further loss of altitude.

NOTE

To feather the propeller the propeller RPM must be above 1300 RPM. Below 1300 RPM the start locks will not disengage and the propeller will keep wind-milling.

To avoid unsuccessful attempts, the procedure instructs to feather the propeller at 1800 RPM.

Increase the airspeed swiftly to minimize altitude loss. In case of shaking rotation, continue to accelerate the airplane until 1800 RPM is reached.

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16. Airspeed. 85 KIAS
17. POWER lever affected engine. 100%
18. ENGINE MASTER affected engine check ON
19. Airspeed. increase to propeller wind-milling
speed of above 1800 RPM
20. ENGINE MASTER affected engine OFF
21. Airspeed. reduce to 85 KIAS
22. Propeller. check feathered
23. Alternator inoperative engine OFF
24. FUEL SELECTOR inoperative engine OFF
25. Proceed with 3.5.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

NOTE

The remaining fuel in the tank of the failed engine can be used for the remaining engine, to extend range and maintain lateral balance by setting the fuel selector of the remaining engine to the CROSSFEED position. If one of the power levers is set to low settings the landing gear warning horn is activated. Set the power lever of the secured engine forward as required to mute the warning horn.

END OF CHECKLIST

3.5.5 ENGINE FAILURE DURING TAKE-OFF

(a) Engine Failure During Ground Roll

- Abort take-off.

1. POWER lever IDLE / BOTH
2. Rudder maintain directional control
3. Brakes as required

CAUTION

If sufficient time is remaining, the risk of fire in the event of
a collision with obstacles can be reduced as follows:

4. ENGINE MASTER both OFF
5. FUEL SELECTOR both OFF
6. ELECT. MASTER OFF

END OF CHECKLIST

(b) Engine Failure after Lift-Off

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

- Abort the take-off & land straight ahead, turning to avoid obstacles.

If the remaining runway / surface is inadequate:

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

Continued take-off:

WARNING

A continued take-off is not recommended if the steady rate of climb according to Section 5.3.9 - ONE ENGINE INOPERATIVE CLIMB PERFORMANCE is less than 3.3 %. Under certain combinations of ambient conditions, such as turbulence, crosswinds and wind shear as well as pilot skill the resulting climb performance may nevertheless be insufficient to continue the take-off successfully. Therefore a continued take-off with a failed engine has to be avoided if at all possible.

1. POWER lever. MAX
2. Rudder maintain directional control
3. Airspeed. $v_{YSE} = 85$ KIAS / as required
4. Landing gear UP to achieve a positive ROC
5. FLAPS check UP
6. Inoperative engine secure according to
3.5.3 - ENGINE SECURING
(FEATHERING) PROCEDURE

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Continue according to Section 3.5.9 - FLIGHT WITH ONE ENGINE INOPERATIVE and land as soon as possible according to 3.5.7 - LANDING WITH ONE ENGINE INOPERATIVE.

If the situation allows, you may climb to a safe altitude for troubleshooting (3.5.2 - ENGINE TROUBLESHOOTING) in order to try to restore engine power.

END OF CHECKLIST

3.5.6 ENGINE FAILURES IN FLIGHT

(a) Engine Failure During Initial Climb at Airspeeds Below $v_{mCA} = 71$ KIAS

WARNING

As the climb is a flight condition which is associated with high power settings, airspeeds lower than $v_{mCA} = 71$ KIAS should be avoided as a sudden engine failure can lead to loss of control. In this case it is very important to reduce the asymmetry in thrust to regain directional control.

1. Rudder apply for directional control
2. POWER levers retard as required to maintain directional control
3. Airspeed $v_{YSE} = 85$ KIAS /
above $v_{mCA} = 71$ KIAS as required
4. Operative engine increase power as required if directional control has been re-established

Establish minimum / zero sideslip condition. (approx. half ball towards good engine; 3° to 5° bank)

5. Inoperative engine secure according to 3.5.3 -
ENGINE SECURING
(FEATHERING) PROCEDURE

Continue according to Section 3.5.9 - FLIGHT WITH ONE ENGINE INOPERATIVE and land as soon as possible according to Section 3.5.7 - LANDING WITH ONE ENGINE INOPERATIVE.

If the situation allows, you may climb to a safe altitude for troubleshooting (3.5.2 - ENGINE TROUBLESHOOTING) in order to try to restore engine power.

END OF CHECKLIST

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(b) Engine Failure During Initial Climb at Airspeeds Above $v_{mCA} = 71$ KIAS

1. Rudder maintain directional control
2. Airspeed $v_{YSE} = 85$ KIAS /
above $v_{mCA} = 71$ KIAS as required
3. Operative engine increase power as required if
directional control has been
established

Establish minimum / zero sideslip condition. (approx. half ball towards good engine;
3° to 5° bank)

4. Inoperative engine secure according to 3.5.3 -
ENGINE SECURING
(FEATHERING) PROCEDURE

Continue according to Section 3.5.9 - FLIGHT WITH ONE ENGINE INOPERATIVE and
land as soon as possible according to Section 3.5.7 - LANDING WITH ONE ENGINE
INOPERATIVE.

If the situation allows, you may climb to a safe altitude for troubleshooting (3.5.2 - ENGINE
TROUBLESHOOTING) in order to try to restore engine power.

END OF CHECKLIST

(c) Engine Failure During Flight

1. Rudder maintain directional control
2. Airspeed as required /
above $v_{mCA} = 71$ KIAS
3. Operative engine increase power as required if
directional control has been
established

Establish minimum / zero sideslip condition. (approx. half ball towards good engine;
3° to 5° bank)

4. Inoperative engine secure according to 3.5.3 -
ENGINE SECURING
(FEATHERING) PROCEDURE

Continue according to Section 3.5.9 - FLIGHT WITH ONE ENGINE INOPERATIVE and
land as soon as possible according to Section 3.5.7 - LANDING WITH ONE ENGINE
INOPERATIVE.

If the situation allows, you may climb to a safe altitude for troubleshooting (3.5.2 - ENGINE
TROUBLESHOOTING) in order to try to restore engine power.

END OF CHECKLIST

3.5.7 LANDING WITH ONE ENGINE INOPERATIVE

Preparation:

CAUTION

For emergency landing the adjustable backrests (if installed) must be fixed in the upright position.

- 1. Adjustable backrests (if installed) 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

Operative engine:

- 5. FUEL SELECTOR check ON / CROSSFEED as required

Inoperative engine:

- 6. Engine check secured (feathered) according to 3.5.3 - ENGINE SECURING & FEATHERING PROCEDURE

Not before being certain of "making the field":

- 7. Airspeed reduce to operate landing gear
- 8. Landing gear DOWN, check 3 green
- 9. Trim as required

CONTINUED

- | | |
|--------------------------|---------------------------------|
| 10. Airspeed | reduce as required |
| 11. FLAPS | as required |
| 12. Final approach speed | |
| at 1700 kg (3748 lb) | 87 KIAS (v_{REF} /FLAPS UP) |
| | 83 KIAS (v_{REF} /FLAPS APP) |
| | 79 KIAS (v_{REF} /FLAPS LDG) |
| at 1785 kg (3935 lb) | 88 KIAS (v_{REF} /FLAPS UP) |
| | 83 KIAS (v_{REF} /FLAPS APP) |
| | 82 KIAS (v_{REF} /FLAPS LDG) |

WARNING

One-engine inoperative approaches for landing with flap settings of more than flaps UP are not recommended unless a 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 / bailed landing.

13. POWER lever. as required
14. 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 (e.g.) strong wind, danger of wind shear or turbulence a higher approach speed should be selected.

- Perform normal touchdown and deceleration on ground.

END OF CHECKLIST

If the approach to land is not successful you may consider:

3.5.8 GO-AROUND / BALKED LANDING WITH ONE ENGINE INOPERATIVE

CAUTION

The go-around / bailed landing is not recommended to be initiated below a minimum of 800 ft above ground.

For performance data with one engine inoperative and flaps and gear UP refer to 5.3.9 - ONE ENGINE INOPERATIVE CLIMB PERFORMANCE.

Under certain combinations of ambient conditions, such as turbulence, cross wind and windshear, as well as pilot skill, the resulting climb performance may nevertheless be insufficient for a successful go-around / bailed landing.

1. POWER lever MAX / as required
2. Rudder maintain directional control
3. Airspeed $v_{YSE} = 85$ KIAS / as required
4. Landing gear UP / retract
5. FLAPS UP

- Establish minimum sideslip and manoeuvre for a new attempt to land. Repeat from Section 3.5.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

If a positive rate of climb cannot be established:

- Land so as to keep clear of obstacles.

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

6. ENGINE MASTER both OFF
7. FUEL SELECTOR both OFF
8. FLAPS APP or LDG, as required

NOTE

If landing is performed off airfield, depending on the surface condition it may be beneficial to land with the gear UP. Note that the energy absorbing function of the landing gear is lost in such cases.

NOTE

Extending the gear and extending the flaps to LDG will increase drag and incur a high sink rate. Only when the landing area can be reached safely, landing with flaps LDG is advisable.

9. Approach speed:
at 1700 kg (3748 lb) 83 KIAS (v_{REF} /FLAPS APP)
79 KIAS (v_{REF} /FLAPS LDG)
at 1785 kg (3935 lb) 83 KIAS (v_{REF} /FLAPS APP)
82 KIAS (v_{REF} /FLAPS LDG)

If landing with landing gear extended:

10. LANDING GEAR DOWN, check 3 green
11. ELECT. MASTER OFF
12. Touch down lowest practical speed

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If landing with landing gear retracted:

- 10. LANDING GEAR UP
- 11. Touch down lowest practical speed

Immediately after touchdown:

- 12. ELECT. MASTER OFF

NOTE

If the ELECT. MASTER is switched OFF before touchdown
the landing gear will extend slowly.

END OF CHECKLIST

3.5.9 FLIGHT WITH ONE ENGINE INOPERATIVE

CAUTION

Even if a positive flight performance can be established with one engine inoperative, land as soon as practicable at the next suitable airfield / airport.

1. Airspeed. above v_{mCA} = 71 KIAS to
maintain directional control
2. Remaining engine monitor engine instruments
continuously
3. Fuel quantity monitor continuously
4. FUEL SELECTOR remaining 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.

This will extend range and helps to keep the wings laterally balanced (see 2.14 - FUEL).

Land as soon as possible according to Section 3.5.7 - LANDING WITH ONE ENGINE INOPERATIVE.

If the situation allows, you may climb to a safe altitude for troubleshooting (3.5.2 - ENGINE TROUBLESHOOTING) in order to try to restore engine power.

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 & locked position. Illumination of this light is therefore normal during transit.

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

1. Airspeed check below v_{LOR} 152 KIAS
2. Gear selector re-cycle if continued illumination occurs

If the landing gear cannot be extended to the down & locked position or red light does not extinguish:

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

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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. Consider for higher aerodynamic drag, resulting in degraded flight performance, increased fuel consumption and decreased range.

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.

In cold ambient temperatures it may help to reduce the airspeed below 110 KIAS for landing gear operation.

END OF CHECKLIST

3.6.2 MANUAL EXTENSION OF THE LANDING GEAR

NOTE

In case of a failure of the electrical pump, which is driving the landing gear actuators, the landing gear can be extended manually at speeds up to 152 KIAS. The manual extension of the landing gear may take up to 20 seconds.

The following checks shall be completed before extending the landing gear manually:

1. Gear indicator lights. test / push test button
2. ELECT. MASTER check ON
3. Bus voltage check in normal range
4. Circuit breaker check in / reset if necessary

Manual landing gear extension procedure:

5. Gear selector select DOWN
6. 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 - 6 reduce airspeed below 110 KIAS and apply moderate yawing and pitching to bring the landing gear into the locked position.

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7. 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 3.6.3 - LANDING WITH GEAR UP.

END OF CHECKLIST

3.6.3 LANDING WITH GEAR UP

NOTE

This procedure applies if the landing gear is completely retracted.

1. Approach with power at normal approach
airspeeds and flap settings
2. POWER lever IDLE / just before
touchdown

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

3. ENGINE MASTER both OFF
4. FUEL SELECTOR both OFF

Touchdown:

5. Touchdown contact surface with minimum
airspeed
6. On ground maintain directional control with
rudder as long as possible so as
to avoid collision with obstacles

Immediately after touchdown:

7. ELECT. MASTER OFF

NOTE

If the ELECT. MASTER is switched OFF before touchdown
the landing gear will extend slowly.

END OF CHECKLIST

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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.

1. Advise ATC.
2. 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.
3. Land with one wing low. The wing on the side of the intact tire should be held low.
4. 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

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3.6.5 LANDING WITH DEFECTIVE BRAKES

Consider the greater rolling distance.

Safety harness check fastened and tightened

CAUTION

If sufficient time is remaining, the risk of fire in the event of a collision can be reduced as follows after a safe touch-down:

- ENGINE MASTER both OFF
- FUEL SELECTOR both OFF
- ELECT. MASTER OFF

END OF CHECKLIST

3.7 FAILURES IN THE ELECTRICAL SYSTEM

3.7.1 COMPLETE FAILURE OF THE ELECTRICAL SYSTEM

1. Circuit breakers check if all OK (pressed in)

If there is still no electrical power available:

2. EMERGENCY switch ON
3. Flood light, if necessary ON
4. POWER set based on lever positions
and engine noise
5. Prepare landing with flaps in the given position. Refer to 4B.5 - FAILURES IN
FLAP OPERATING SYSTEM.
6. Land on the nearest suitable airfield.

WARNING

Engine stoppage may occur, depending on the failure mode.

NOTE

The landing gear uplock is no longer ensured. The landing gear may slowly extend.

The landing gear can be extended manually according to 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 POWER lever position.

END OF CHECKLIST

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3.7.2 HIGH CURRENT

If high current is indicated on the G1000:

1. Circuit breakers check
2. Reduce electric load to minimum required for continued safe flight.
3. Land on the nearest suitable airfield.

END OF CHECKLIST

3.7.3 STARTER MALFUNCTION

If the starter does not disengage from the engine after starting (starter engaged warning (STARTER L/R) on the G1000 annunciator field illuminates after the engine has started):

1. POWER lever affected engine IDLE
2. ENGINE MASTER affected engine OFF
3. ELECT. MASTER OFF

Terminate flight preparation!

END OF CHECKLIST

3.8 SMOKE AND FIRE

NOTE

In the event of smoke or fire, prepare to land the airplane without delay while completing fire suppression and/or smoke evacuation procedures. If it cannot be visually verified that the fire has been completely extinguished, whether the smoke has cleared or not, land immediately at the nearest suitable airfield or landing site.

NOTE

The cabin hand fire extinguisher is located on the cabin floor behind the co-pilot's seat.

If AIR TOTAL HAL 1 is installed: To release the fire extinguisher out of the fire extinguisher mount, pull the fire extinguisher at the nozzle near the Y-spring.

If Amerex A620T (OÄM 42-127) or Amerex 337TS (MÄM 42-1265) is installed: To release the fire extinguisher out of the fire extinguisher mount, open the holding strap and pull the fire extinguisher out.

3.8.1 ENGINE FIRE ON GROUND

1. ENGINE MASTER..... both OFF
2. FUEL SELECTOR..... both OFF
3. ELECT. MASTER OFF

After standstill:

4. Canopy open
5. Airplane evacuate immediately

END OF CHECKLIST

3.8.2 ENGINE FIRE DURING TAKE-OFF

Proceed according to 3.5.5 - ENGINE FAILURES DURING TAKE-OFF

1. Cabin heat & defrost OFF

CAUTION

I In case of extreme smoke development, the 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.

END OF CHECKLIST

3.8.3 ENGINE FIRE IN FLIGHT

1. Cabin heat & defrost OFF

Proceed according to 3.5.6 - ENGINE FAILURES IN FLIGHT and shut down the engine according to 3.5.3 - ENGINE SECURING (FEATHERING) PROCEDURE.

CAUTION

In case of extreme smoke development, the 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.

END OF CHECKLIST

3.8.4 ELECTRICAL FIRE ON GROUND

1. ELECT. MASTER OFF

If the engine is running:

2. POWER lever. both IDLE
3. ENGINE MASTER both OFF
4. FUEL SELECTOR both OFF

When the engine has stopped / after standstill:

5. Canopy. open
6. Airplane evacuate immediately

END OF CHECKLIST

3.8.5 ELECTRICAL FIRE IN FLIGHT

1. EMERGENCY switch. ON, if installed
2. AVIONIC MASTER OFF
3. ELECT. MASTER OFF
4. Cabin heat & defrost OFF
5. Emergency windows open if required
6. Land at the next suitable airfield.

CAUTION

Switching OFF the ELECTRIC MASTER will lead to total failure of all electronic and electric equipment. The attitude and heading reference system (AHRS) will also be affected.

However, by switching 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 canopy may be unlatched during flight. This allows it to be partially opened, 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 canopy in flight is 117 KIAS. Do not exceed 117 KIAS.

END OF CHECKLIST

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3.9 OTHER EMERGENCIES

3.9.1 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. Increased concentration of carbon monoxide gas can be fatal. The occurrence of CO in the cabin is possible only due to a defect. If a smell similar to exhaust gases is noticed in the cabin, the following measures should be taken:

1. Cabin heat & defrost OFF
2. Ventilation open
3. Emergency windows open
4. Canopy. unlatch, push up and lock in
"cooling-gap" position

CAUTION

The maximum demonstrated airspeed for emergency opening the canopy in flight is 117 KIAS. Do not exceed 117 KIAS.

END OF CHECKLIST

3.9.2 UNLOCKED DOORS

1. Airspeed reduce immediately
2. Canopy check visually if closed
3. Passenger door check visually if closed
4. Front baggage doors check visually if closed

Canopy Unlocked

5. Airspeed below 140 KIAS
6. Land at next suitable airfield.

END OF CHECKLIST

Passenger Door Unlocked

5. Airspeed below 140 KIAS
6. Land at next suitable airfield.

WARNING

Do not try to lock the 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 door has been lost the airplane can be safely flown to the next suitable airfield.

END OF CHECKLIST

Front Baggage Door Open

5. Airspeed. reduce, so that door is in a
stable position
6. Land at next suitable airfield.

WARNING

Separation of the baggage door may damage the propeller
and may lead to an engine failure.

END OF CHECKLIST

3.9.3 DEFECTIVE PROPELLER RPM REGULATING SYSTEM

CAUTION

The POWER lever should be moved slowly, in order to avoid over-speeding and excessively rapid RPM changes. The light wooden propeller blades produce more rapid RPM changes than metal blades.

WARNING

In case of a malfunction of the engine control unit it is possible that the propeller blades will remain in the position of highest pitch. In this case the reduced engine performance should be taken into consideration.

(a) Oscillating RPM

1. POWER setting change

If the problem does not clear:

2. ECU SWAP ECU B

NOTE

If the problem does not clear itself, switch back to AUTO and land on the nearest suitable airfield.

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(b) Propeller Overspeed

NOTE

This procedure applies for continued propeller overspeed due to a malfunction in the propeller constant speed unit or a engine control unit malfunction.

1. POWER setting reduce as required

If the problem does not clear:

2. ECU SWAP ECU B

CAUTION

If the problem does not clear itself, switch back to AUTO and land on the nearest suitable airfield. Prepare for engine malfunction according to 3.5.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

3.9.4 UNINTENTIONAL FLIGHT INTO ICING

1. Leave the icing area (by changing altitude or turning back, in order to reach zones with a higher ambient temperature).
2. PITOT HEAT ON
3. Cabin heat & defrost ON
4. POWER lever increase power, in order to prevent ice build up on the propeller blades, apply power changes periodically.
5. ALTERNATE AIR OPEN
6. Emergency windows open if required

CAUTION

Ice build-up increases the stalling speed.

7. ATC advise if an emergency is expected

END OF CHECKLIST

3.9.5 FUEL SUPPLY FAILURE

1. FUEL SELECTOR CROSSFEED /
affected engine

WARNING

When the high pressure fuel pump of the engine takes in air
an inspection of the pump is necessary prior to next flight.

2. Fuel quantity monitor

END OF CHECKLIST

3.9.6 RECOVERY FROM AN UNINTENTIONAL SPIN

CAUTION

Spin recovery has NOT been shown during certification as it is NOT required for this airplane category. The given recovery method is based on general experience!

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 1 to 4 must be carried out **immediately** and **simultaneously**.

1. POWER lever IDLE
2. Rudder..... full deflection against
direction of spin
3. Elevator (control stick)..... fully forward
4. Ailerons neutral
5. FLAPS..... UP

When rotation has stopped:

6. Rudder..... neutral
7. Elevator (control stick)..... pull carefully
8. Return the airplane from a descending into a normal flight attitude. Do not exceed the 'never exceed speed', $v_{NE} = 188$ KIAS.

END OF CHECKLIST

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3.9.7 EMERGENCY DESCENT

1. FLAPS UP
2. Gear DOWN
3. POWER lever IDLE
4. Airspeed as required

WARNING

Max. structural cruising speed $v_{NO} = 151$ KIAS

Never exceed speed in smooth air. $v_{NE} = 188$ KIAS

END OF CHECKLIST

3.9.8 EMERGENCY EXIT

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

3.9.9 AUTOPILOT OR ELECTRIC TRIM MALFUNCTION / FAILURE

NOTE

An autopilot or electric trim malfunction may be recognized by an unexpected deviation from the desired flight path, abnormal flight control or trim wheel movement, or flight director commands which cause unexpected or contradictory information on the other cockpit displays. It may be accompanied by the aural autopilot disconnect tone, a red AFCS, red PTCH, red ROLL, red YAW, red AP or yellow AP indication on the PFD, or a yellow CHECK ATTITUDE on the PFD. The autopilot and AHRS monitors normally detect failures and automatically disconnect the autopilot.

Failure of the electric pitch trim, indicated by a red boxed PTRM flashing on the PFD, may not cause the autopilot to disconnect. Be alert to possible autopilot out of trim conditions (see AUTOPILOT OUT OF TRIM procedure below), and expect residual control forces upon disconnect. The autopilot will not re-engage after disconnect with failed pitch trim. If AUTOPILOT OUT OF TRIM ELE indication is present, expect substantial elevator forces on autopilot disconnect.

NOTE

Accomplish items 1 and 2 simultaneously!

1. Airplane control stick grasp firmly and regain airplane control
2. AP DISC switch DEPRESS AND HOLD
3. Trim retrim airplane manually as required
4. AUTOPILOT circuit breaker pull
5. AP DISC switch RELEASE

NOTE

When the AUTOPILOT circuit breaker is pulled, the manual electric trim and autopilot autotrim systems will be disabled. The steps of disengaging the autopilot should be committed to memory and the pilot should be able to accomplish all steps without reference to a manual or other pilot documentation.

WARNING

Do not attempt to re-engage the autopilot following an autopilot, autotrim, or manual electric trim malfunction until the cause for the malfunction has been corrected.

END OF CHECKLIST

CHAPTER 4A

NORMAL OPERATING PROCEDURES

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4A.1 INTRODUCTION

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

NOTE

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

NOTE

Normal operating procedures for GFC 700 are described in the Garmin G1000 Cockpit Reference Guide, P/N 190-00406-(), latest effective issue and the Garmin G1000 Pilot's Guide for the Diamond DA 42, P/N 190-00649-(), latest effective issue.

4A.2 AIRSPEEDS FOR NORMAL OPERATING PROCEDURES

	FLAPS	up to 1700 kg (3748 lb)	above 1700 kg ¹ (3748 lb)
Airspeed for rotation (take-off run, v_R)	UP	min. 75 KIAS	min. 76 KIAS
Airspeed for take-off climb (best rate-of-climb speed v_Y)	UP	min. 81 KIAS	min. 82 KIAS
Airspeed for best angle of climb ²	UP	81 KIAS	82 KIAS
Airspeed for cruise climb	UP	min. 87 KIAS	min. 88 KIAS
Reference landing approach speed	UP	87 KIAS	88 KIAS
	APP	min. 83 KIAS	min. 83 KIAS
Final approach speed	LDG	min. 79 KIAS	min. 82 KIAS
Minimum speed during go around	UP	min. 85 KIAS	min. 85 KIAS
Max. structural cruising speed Do not exceed this speed except in smooth air, and then only with caution.	UP	151 KIAS	151 KIAS

^{1), 2)} see NOTES below

NOTE

If OÄM 42-195 is not carried out a landing with a mass between 1700 kg (3748 lb) and 1785 kg (3935 lb) constitutes an abnormal operating procedure.

NOTE

v_x is always less than v_y . For the DA 42 however, the actual value of v_x would be below the minimum safe speed. The minimum airspeed for best angle of climb was therefore raised to the value of v_y .

4A.3 ADVISORY ALERTS ON THE G1000

The G1000 provides the following advisory-alerts on the PFD in the alert area:

4A.3.1 ADVISORY/GENERAL

CHARACTERISTICS	White color coded text.
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4A.3.2 L/R GLOW ON

L/R GLOW ON	Left / Right engine glow plug active.
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4A.3.3 L/R FUEL XFER

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

4A.3.4 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.

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4A.4 FLIGHT CHARACTERISTICS

The DA 42 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.

4A.5 DAILY CHECK

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

- * On-condition check of the canopy, the passenger door and the baggage compartment doors for cracks and major scratches.
- * On-condition check of the hinges for the canopy, the passenger door and the baggage compartment doors.
- * Visual inspection of the locking bolts for proper movement with no backlash.
- * Tire inflation pressure check

 (main wheels: 4.7 bar / 68 PSI if OÄM 42-195 is installed,
 4.5 bar / 65 PSI if OÄM 42-195 is not installed,
 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 fuselage nose cone for improper fit and loose attachment screws.

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.6.1 PRE-FLIGHT INSPECTION

I. Cabin Check

Preparation:

- a) Parking brake set ON
- b) MET, NAV, mass and balance flight planning completed
- c) Airplane documents. complete and up to date
- d) Canopy and passenger door clean, undamaged, check
locking mechanism function
- e) Baggage stowed and secured
- f) Foreign objects check
- g) Emergency axe (if OÄM 42-205 installed) . . . stowed and secured
- h) Emergency egress hammer
(if OÄM 42-304 installed). stowed and secured
- i) Fire extinguisher (if installed). stowed and secured
pressure in green arc
if AIR TOTAL HAL 1 is installed no damage of the tamper seal

Center Console:

- a) FUEL SELECTOR. check ON
- b) POWER lever check condition, freedom of
movement and full travel /
adjust friction, set IDLE

Below Instrument Panel in Front of Left Seat:

- a) ALTERNATE STATIC SOURCE check CLOSED
- b) MANUAL GEAR EXTENSION HANDLE . . . check pushed in

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Below Instrument Panel in Front of Right Seat:

- a) ALTERNATE AIR..... check CLOSED

On the Instrument Panel:

- a) ALTERNATOR..... check ON
b) ECU SWAP check AUTOMATIC
c) PITOT HEAT check OFF
d) ENGINE MASTER..... check both OFF
e) START KEY..... check key is pulled out
f) ELECT. MASTER check OFF
g) AVIONIC MASTER check OFF
h) GEAR SELECTOR check DOWN
i) FLAP SELECTOR check UP
j) Circuit breakers set in (if one has been pulled,
check reason)
k) All electrical equipment OFF
l) EMERGENCY switch..... check OFF and guarded
m) ELT armed

CONTINUED

Check Procedure:

- a) 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.

- b) Fuel quantity check indication, verify using
alternate means (see Section
7.9.5)
- c) Position lights, strobe lights (ACL). check for correct function

CAUTION

Do not look directly into the anti collision lights.

- d) Landing /Taxi light check for correct function
- e) Stall warning / stall heat / Pitot heat. check

NOTE

■ An automatic protection reduces the heating of the lift
■ transducer on ground. STALL HT FAIL is indicated on the
■ PFD.

CONTINUED

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- f) Gear warning /
fire detector TEST BUTTON PUSH, check aural alert /
L/R ENG FIRE warnings and
aural alert and CHECK GEAR
caution

CAUTION

If the aural alert or the warnings on the PFD does not appear,
terminate flight. Unscheduled maintenance is necessary.

- g) Control stick pull fully aft / hold at backstop
h) FLAPS set LDG position
i) POWER lever. set MAX
j) Variable elevator backstop. check function/control stick must
move slightly forward during
POWER lever forward movement
k) POWER lever. set IDLE
l) Variable elevator backstop. check function / control stick must
regain full movement during
POWER lever retraction
m) FLAPS set UP position

CAUTION

The proper function of the variable elevator backstop is
indispensable for the safety of flight, as the handling qualities
during power-on stalls are degraded significantly. For more
details see Chapter 7 - AIRPLANE DESCRIPTION AND
SYSTEMS.

If the variable elevator backstop does not function properly,
terminate flight.

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- n) ELECT. MASTER OFF
- o) Flight controls check free and correct movement
up to full deflection
- p) Trims check free and correct movement
up to full deflection

END OF CHECKLIST

II. 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 must be completely cleared of ice, snow and similar accumulations. For approved de-icing fluids refer to Section 8.6 - DE-ICING.

CAUTION

Prior to flight, remove such items as control surfaces gust lock, Pitot cover, tow bar, etc.

CONTINUED

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1. Left Main Landing Gear:

- a) Landing gear strut and lock visual inspection, sufficient height
(typical visible length of bare
piston: at least 4 cm / 1.6 in)
- b) Down and uplock switches (2x) visual inspection
- c) Wear, tread depth of tire visual inspection
- d) Tire, wheel, brake visual inspection
- e) Brake line connection. check for leaks
- f) Slip marks visual inspection
- g) Chocks remove
- h) Landing gear door visual inspection
- i) Structural temperature indicator
(Only if zero fuel mass exceeds
1650 kg (3638 lb)) check that structural temperature
does not exceed 55 °C (131 °F),
a red '55' indicates a temperature
above the limit.

2. Left Engine Nacelle:

- a) 3 air inlets / 2 air outlets clear
- b) Engine oil level check dipstick (inspection hole in
the upper cowling)

CAUTION

Do not check the engine oil level within 5 minutes after engine shut down. The engine oil returns to the oil pan slowly; after 5 minutes 80 %, after 15 minutes 90 % and after 30 minutes 100 % of the engine oil has returned to the oil pan.

Do not overfill the engine with engine oil.

CONTINUED

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- c) Gearbox oil level check visually (inspection hole in the lower cowling)
- d) Cowling visual inspection
- e) Gascolator / air inlet. drain off to check for water and sediment (drain until no water comes out) / clear
- f) Venting pipe. check for blockage
- g) Exhaust visual inspection

WARNING

The exhaust can cause burns when hot.

- h) Propeller visual inspection

WARNING

Never move the propeller by hand while the ENGINE MASTER switch is ON! Also do not move the propeller by hand while the ENGINE MASTER is OFF immediately after operation (remaining pressure in the injection system rail). Serious personal injury may result.

- i) De-Icing boots (if OÄM 42-053 or OÄM 42-054 carried out). check for de-bonding
- j) Nacelle underside check for excessive contamination particularly by oil, fuel, and other fluids
- k) Auxiliary tank vent outlet on lower surface . . visual inspection
- l) Auxiliary tank drain drain off to check for water and sediment (drain until no water comes out) / visual inspection
- m) Auxiliary tank filler visual inspection, tank filler closed

CONTINUED

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3. Left Wing:

- a) Entire wing surface visual inspection
- b) Tank air outlet on lower surface visual inspection
- c) Tank drain / tank air inlet drain off to check for water and
sediment (drain until no water
comes out) / visual inspection
- d) Openings on lower surface check for foreign objects and for
traces of fuel (if tank is full, fuel
may spill over through the tank
vent)
- e) Stall warn device visual inspection
- f) Tank filler visual inspection, check closed
- g) Pitot probe clean, orifices clear, cover
removed, no deformation
- h) Wing tip visual inspection
- i) Static dischargers visual inspection
- j) Position light, strobe light (ACL) visual inspection
- k) Tie-down check, clear
- l) Aileron and linkage visual inspection
- m) Aileron hinges and safety pin visual inspection
- n) Foreign objects in aileron paddle visual inspection
- o) Flap and linkage visual inspection
- p) Flap hinges and safety pin visual inspection
- q) Nacelle underside fuel cooler air in- & outlet . check clear
- r) Step visual inspection

CONTINUED

4. Fuselage, Left Side, Underside:

- a) Canopy, left side visual inspection
- b) Passenger door & window visual inspection
- c) Fuselage skin visual inspection
- d) Antennas visual inspection
- e) Fuselage check for contamination
(hydraulic fluid)
- f) Static source check for blockage

5. Empennage:

- a) Stabilizers and control surfaces,
elevator tips visual inspection
- b) Hinges visual inspection
- c) Elevator trim tab visual inspection, check safetying
- d) Rudder trim tab visual inspection, check safetying
- e) Tie-down check, clear
- f) Tail skid and lower fin visual inspection
- g) Static dischargers visual inspection

6. Fuselage, Right Side:

- a) Fuselage skin visual inspection
- b) Rear window visual inspection
- c) Canopy, right side visual inspection
- d) Static source check for blockage

CONTINUED

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7. Right Main Landing Gear:

- a) Landing gear strut and lock visual inspection, sufficient height
(typical visible length of bare
piston: at least 4 cm / 1.6 in)
- b) Down and uplock switches (2x) visual inspection
- c) Wear, tread depth of tire visual inspection
- d) Tire, wheel, brake visual inspection
- e) Brake line connection. check for leaks
- f) Slip marks visual inspection
- g) Chocks remove
- h) Landing gear door visual inspection
- i) Structural temperature indicator
(Only if zero fuel mass exceeds
1650 kg (3638 lb)) check that structural temperature
does not exceed 55 °C (131 °F),
a red '55' indicates a temperature
above the limit.

8. Right Wing:

- a) Entire wing surface visual inspection
- b) Tank air outlet on lower surface. visual inspection
- c) Tank drain / tank air inlet drain off to check for water and
sediment (drain until no water
comes out) / visual inspection
- d) Openings on lower surface check for foreign objects and for
traces of fuel (if tank is full, fuel
may spill over through the tank
vent)

CONTINUED

- e) Tank filler visual inspection, check closed
- f) Wing tip visual inspection
- g) Static dischargers visual inspection
- h) Position light, strobe light (ACL) visual inspection
- i) Tie-down check, clear
- j) Aileron and linkage visual inspection
- k) Aileron hinges and safety pin visual inspection
- l) Foreign objects in aileron paddle. visual inspection
- m) Flap and linkage visual inspection
- n) Flap hinges and safety pin. visual inspection
- o) Nacelle underside fuel cooler air in- & outlet. check clear
- p) Step visual inspection
- q) Cabin vent air inlet. check clear

if OÄM 42-279 is installed:

- Verify the outside air temperature, determine the recommended use of the winter kit-ventilation.
- r) Winter kit - ventilation check for improper mounting or obvious damage

9. Right Engine Nacelle:

- a) 3 air inlets / 2 air outlets. clear
- b) Engine oil level check dipstick (inspection hole in the upper cowling)

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CAUTION

Do not check the engine oil level within 5 minutes after engine shut down. The engine oil returns to the oil pan slowly; after 5 minutes 80 %, after 15 minutes 90 % and after 30 minutes 100 % of the engine oil has returned to the oil pan.

Do not overfill the engine with engine oil.

- c) Gearbox oil level check visually (inspection hole in the lower cowling)
- d) Cowling visual inspection
- e) Gascolator / air inlet. drain off to check for water and sediment (drain until no water comes out) / clear
- f) Venting pipe check for blockage
- g) Exhaust visual inspection

WARNING

The exhaust can cause burns when hot.

- h) Propeller. visual inspection

WARNING

Never move the propeller by hand while the ENGINE MASTER switch is ON! Also do not move the propeller by hand while the ENGINE MASTER is OFF immediately after operation (remaining pressure in the injection system rail). Serious personal injury may result.

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- i) De-Icing boots (if OÄM 42-053 or
OÄM 42-054 carried out) check for de-bonding
- j) Nacelle underside check for excessive
contamination particularly by oil,
fuel, and other fluids
- k) Auxiliary tank vent outlet on lower surface . . visual inspection
- l) Auxiliary tank drain drain off to check for water and
sediment (drain until no water
comes out) / visual inspection
- m) Auxiliary tank filler visual inspection, tank filler closed

10. Front Fuselage and Nose Landing Gear:

- a) Left and right front baggage door visual inspection, closed and
locked
- b) Nose landing gear strut visual inspection, sufficient height
(typical visible length of bare
piston: at least 15 cm / 5.9 in)
- c) Down & uplock switches visual inspection
- d) Wear, tread depth of tire check
- e) Slip marks visual inspection
- f) Gear door and linkage visual inspection
- g) Chocks. remove
- h) Nose cone surface
(if OÄM 42-119 is installed) visual inspection
- i) Attachment screws
(if OÄM 42-119 is installed) visual inspection

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- j) Lightning protection strips (4 pieces)
(if OÄM 42-119 is installed) visual inspection
- k) OAT sensor check
- l) EPU connector. check
- m) Tow bar remove

END OF CHECKLIST

4A.6.2 BEFORE STARTING ENGINE

1. Preflight inspection complete
2. Passengers instructed

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.

- 3. Passenger 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.

- 4. Canopy Position 1 or 2 (“cooling gap”)

CAUTION

For take-off the adjustable backrests (if installed) must be fixed in the upright position.

NOTE

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

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5. Adjustable backrests (if installed) adjust to the upright
position described by a placard
on the roll-over bar and verify
proper fixation
6. Rudder pedals adjusted;
if manual pedal adjustment is
installed: verify proper locking
7. Safety harnesses all on and fastened
8. POWER lever check IDLE
9. Parking brake set
10. AVIONIC MASTER check OFF
11. GEAR selector check DOWN
12. ECU SWAP check AUTOMATIC
13. ALTERNATORS check ON
14. 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 preparation. There is a malfunction in the landing gear system.

15. G1000 wait until power-up completed.
Press ENT on MFD to
acknowledge.

NOTE

The engine instruments are only available on the MFD after item 15 has been completed.

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16. Fuel temperature check

WARNING

If Diesel Fuel or a blend of Diesel Fuel with Jet Fuel is used or if the fuel grade is unknown, the engine must not be started if the fuel temperature indication prior to operation is below -5 °C (+23 °F).

Operation with a fuel temperature below -5 °C (+23 °F) is not permitted, as safe operation of the engine under those conditions cannot be ensured and the engine can stop.

NOTE

Make sure which fuel grade is being used (see Section 7.9.5). If it is not possible to determine the fuel grade, the Diesel Fuel temperature limitations must be observed.

END OF CHECKLIST

4A.6.3 STARTING ENGINE

1. Strobe lights (ACL). ON
2. ENGINE MASTER ON (L/R)

NOTE

It is recommended to start the LH engine (pilot side) first. If required by operational reasons, the RH engine can also be started first.

3. Annunciations check L/R GLOW ON
4. 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.

After the L/R GLOW ON indication is extinguished:

5. START KEY START L/R as required / release
when propeller speed has
reached 500 RPM

CAUTION

If the dual mass flywheel is installed, disengaging the starter below 500 RPM propeller speed might damage the gear box.

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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.

If the L/R STARTER annunciation comes on after the engine has started and the START KEY has been released, set the ENGINE MASTER to OFF and investigate the problem.

6. Annunciations / Engine / System Page check OK / normal range
7. Annunciations / Starter check OFF
8. Annunciations / Oil pressure check OK

WARNING

If the oil pressure has not moved from the red range within 3 seconds after starting, set the ENGINE MASTER switch to OFF and investigate problem. When starting the cold engine, the oil pressure can be as high as 6.5 bar for a maximum of 20 seconds.

9. Circuit breakers check all in / as required
10. Idle RPM check, 900 ± 20 RPM

Repeat with opposite engine.

11. Warm up IDLE for 2 minutes /
thereafter 1400 RPM

END OF CHECKLIST

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4A.6.4 BEFORE TAXIING

1. AVIONIC MASTER ON
2. Electrical equipment. ON as required
3. Flight instruments and avionics set as required
4. Flood light ON, test function, as
required
5. Pitot and stall warn heating ON, check annunciation

NOTE

An automatic protection reduces the heating of the lift
transducer on ground. STALL HT FAIL is indicated on the
PFD.

6. Pitot and stall warn heating OFF
7. Strobe lights (ACL). check ON
8. Position lights, landing and taxi lights 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.

9. Primary Flight Display (PFD) NO AUTOPILOT
ANNUNCIATIONS
10. Autopilot disconnect tone. NOTE

CONTINUED

NOTE

The AFCS system automatically conducts a preflight self-test upon initial power application. The preflight test is indicated by a white boxed PFT on the PFD. Upon successful completion of the preflight test, the PFT is removed, the red AFCS annunciation is removed, and the autopilot disconnect tone sounds. If AFCS annunciation remains on or a failure of the preflight test is indicated terminate flight preparation and investigate the problem.

11. MANUAL ELECTRIC TRIM - TEST as follows:
Press the AP DISC button down and hold while commanding trim. Manual electric trim should not operate either nose up or nose down.
12. AUTOPILOT - ENGAGE by pressing AP button.
13. AP DISC switch - PRESS. Verify that the autopilot disconnects.
14. TRIM - SET to take-off position manually.

END OF CHECKLIST

4A.6.5 TAXIING

1. Parking brake release
2. Brakes test on moving off
3. Nose wheel steering. check for proper function
4. Flight instrumentation and avionics check for correct indications
5. 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.

6. 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.

END OF CHECKLIST

4A.6.6 BEFORE TAKE-OFF

1. Position airplane into wind if possible.
2. Parking brake set

CAUTION

For take-off the adjustable backrests (if installed) must be fixed in the upright position.

3. Adjustable backrests (if installed) verify upright position
and proper fixation
4. Safety harnesses on and fastened
5. Passenger door check 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.

6. Canopy closed and locked
7. Front baggage doors closed (visual check)
8. Door warning (DOOR OPEN) check no indication

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9. Annunciations / Engine / System Page check OK / normal range
(except oil pressure may be in the
yellow range with a warm engine
and POWER lever at IDLE)
10. Circuit breakers check pressed in
11. Longitudinal trim. set T/O
12. FUEL SELECTOR check ON (LH/RH)
13. Directional trim. neutral
14. FLAPS check function & indicator /
set UP
15. Flight controls. unrestricted free movement,
correct sense

NOTE

The following test sequence can be executed for both engines simultaneously, or in sequence.

FADEC Test Sequence:

CAUTION

If the L/R ECU A/B FAIL do not illuminate and extinguish during the test sequence there is a malfunction in the engine control system. Terminate flight preparation.

The whole test procedure must be completed without any error. In case of an error terminate flight preparation, even when the engine seems to run smoothly after the test procedure.

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1. POWER lever IDLE
2. ECU SWAP ECU B
3. Engine check running without a change
4. ECU SWAP AUTOMATIC
5. ECU TEST BUTTON press and hold

Annunciations in the following sequence:

6. ECU A/B FAIL LIGHTS ON
7. Propeller RPM increase
8. ECU A/B FAIL LIGHTS OFF
9. ECU B FAIL LIGHT ON
10. Propeller RPM decrease / increase
11. ECU B FAIL LIGHT OFF
12. ECU A FAIL LIGHT ON
13. Propeller RPM decrease / increase
14. ECU A FAIL LIGHT OFF
15. Propeller RPM decrease to idle

Test sequence completed.

CONTINUED

CAUTION

When switching from one ECU to the other a slight shake of the engine may occur. In case of longer dropouts of the engine, or if the engine stops during the test, terminate flight preparation.

16. ECU TEST BUTTON release

NOTE

When switching from one ECU to the other a slight shake of the engine may occur.

CAUTION

Running the engine with the ECU SWAP on ECU B, other than for this test or in an emergency is prohibited. The engines control system redundancy is only given with the ECU SWAP set on AUTO.

17. Pitot heating ON, if required

NOTE

An automatic protection reduces the heating of the lift transducer on ground. STALL HT FAIL is indicated on the PFD.

18. Landing light. ON, if required

CONTINUED

Available Power Check:

1. POWER lever MAX for 10 seconds
2. Annunciations check OK / normal range
3. Instruments check within normal range
4. RPM. stabilizes at 2240 to 2300 RPM
5. LOAD indication. stabilizes at 90 % to 100 %
6. POWER lever IDLE

CAUTION

Under high temperature and high altitude conditions, load indications below 90 % are possible. If the engine does not stabilize at the target RPM of 2240 to 2300 RPM terminate flight preparation.

7. Engine instruments check in green range (except oil pressure may be in yellow range with a warm engine and POWER lever at IDLE, and fuel temp may be in the low yellow range if the airplane is operated with Jet Fuel)

WARNING

If the airplane is operated with Diesel Fuel or a blend of Diesel Fuel with Jet Fuel (only approved if MÄM 42-037 is incorporated), or if the fuel grade is unknown, the fuel temperature must be in the green range before take-off.

END OF CHECKLIST

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4A.6.7 TAKE-OFF

1. Transponder. as required
2. POWER lever. MAX

NOTE

The proper and symmetric performance of the engines at MAX should be checked early during the take-off run, so that the take-off can be aborted if necessary.

3. Elevator neutral
4. Rudder maintain direction

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.

5. Nose wheel lift-off:
 up to 1700 kg (3748 lb) v_R minimum 75 KIAS
 above 1700 kg (3748 lb) v_R minimum 76 KIAS
6. Airspeed for initial climb:
 up to 1700 kg (3748 lb) minimum 81 KIAS, recommended
 85 KIAS (v_{ySE}) when clear of
 obstacles
 above 1700 kg (3748 lb) minimum 82 KIAS, recommended
 85 KIAS (v_{ySE}) when clear of
 obstacles

CONTINUED

When safe climb is established:

7. 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.

END OF CHECKLIST

4A.6.8 GFC 700 OPERATION DURING CLIMB, CRUISE and DESCENT

WARNING

It is the responsibility of the pilot in command to monitor the autopilot when it is engaged. The pilot should be prepared to immediately disconnect the autopilot and to take prompt corrective action in the event of unexpected or unusual autopilot behavior. Do not attempt to manually fly the airplane with the autopilot engaged. The autopilot servos will oppose pilot input and will trim opposite the direction of pilot input (pitch axis only). This could lead to a significant out-of-trim condition. Disconnect the autopilot if manual control is desired. The pilot in command must use proper autopilot modes and proper engine power settings to ensure that airplane speed is maintained between 90 KIAS and 180 KIAS. It will be necessary to change engine power to maintain the desired rate of descent when operating at 180 KIAS. Observe the minimum autopilot operating speed of 90 KIAS. Operation in pitch (PIT) or vertical speed (VS) modes below this speed can result in an airplane stall. If indications of an airplane stall are present, including stall warning horn, loss of control effectiveness or airframe buffet, disconnect the autopilot and manually return the airplane to stabilized flight prior to re-engaging the autopilot.

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NOTE

The NOSE UP and NOSE DN buttons on the mode controller on the MFD are referenced to aircraft movement. The NOSE UP button will increase the reference pitch attitude, increase the reference vertical speed and decrease the reference airspeed. Likewise, the NOSE DN button will decrease the reference pitch attitude, decrease the reference vertical speed, and increase the reference airspeed.

1. CLIMB, CRUISE and DESCENT

a) Vertical Speed (VS)

- | | |
|---|--|
| 1. Altitude preselect | set to desired altitude |
| 2. Mode controller | select VS on mode controller |
| 3. Vertical speed reference | adjust using NOSE UP and NOSE DN buttons |
| 4. White ALT (altitude preselect armed) | note on PFD |
| 5. Green ALT | verify upon altitude capture |

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NOTE

If the altitude preselect is not changed before selecting VS, the autopilot may re-capture the current altitude immediately after entering VS mode. Always ensure that the altitude preselect is adjusted prior to selecting VS.

The vertical speed mode is limited to 1,500 ft/min climb and 3,000 ft/minute descent. Use engine power to maintain appropriate aircraft speed. If the CWS switch is used while in VS mode, the VS reference will change to the vertical speed when the CWS switch is released.

END OF CHECKLIST

b) Flight Level Change (FLC)

- 1. Altitude preselect set to desired altitude
- 2. Mode controller. select FLC on mode controller
- 3. Airspeed speed reference adjust using NOSE UP and NOSE DN buttons
- 4. White ALT (altitude preselect armed). note on PFD
- 5. Green ALT verify upon altitude capture

CONTINUED

NOTE

If the altitude preselect is not changed before selecting FLC, the autopilot may re-capture the current altitude immediately after entering FLC mode. Always ensure that the altitude preselect is adjusted prior to selecting FLC.

If the airspeed reference cannot be maintained without deviating away from the selected altitude, the system will maintain level flight until the power or reference is changed to allow climbing or descending towards the selected altitude.

The FLC mode is limited to airspeeds between 90 KIAS and 180 KIAS. Use engine power to maintain appropriate vertical speed. If the CWS switch is used while in FLC mode, the airspeed reference will change to the airspeed when the CWS switch is released.

END OF CHECKLIST

c) To capture a selected altitude:

1. Altimeter setting adjust to appropriate value
2. Altitude preselect set to desired altitude
3. Vertical mode and reference select on mode controller
4. White ALT(altitude preselect armed) note on PFD
5. Green ALT verify upon altitude capture

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NOTE

In ALT mode, the autopilot will maintain the reference altitude shown in the autopilot window of the PFD regardless of the altitude in the altitude preselect window or the altimeter's barometric pressure setting. If the altimeter setting is changed, the autopilot will climb or descend to maintain the reference altitude.

END OF CHECKLIST

d) Altitude Hold

To maintain a selected altitude:

1. Altimeter setting adjust to appropriate value
2. Reaching desired altitude select ALT on mode controller
3. Green ALT verify on PFD

END OF CHECKLIST

e) Navigation Capture and Track:

1. Navigation source select VOR or GPS using
CDI button on PFD
2. Course bearing pointer set using course knob
(VOR only)
3. Intercept heading establish in HDG or ROL
mode (if required)
4. Mode controller select NAV on mode
controller
5. Green or White VOR or GPS annunciation . . note on PFD
6. Vertical mode and reference select on mode controller

NOTE

If the Course Deviation Indicator (CDI) is greater than one dot from center, the autopilot will arm the NAV mode and indicate VOR or GPS in white on the PFD. The pilot must ensure that the current heading will result in a capture of the selected course. If the CDI is one dot or less from center, the autopilot will enter the capture mode when the NAV button is pressed and annunciate VOR or GPS in green on the PFD.

END OF CHECKLIST

2. APPROACH

a) VOR

1. Navigation source. select VOR using CDI
button on PFD
2. Course bearing pointer set using course knob
3. Intercept heading establish in HDG or ROL
mode (if required)
4. Mode controller select APR on mode
controller
5. Green or white VAPP annunciation note on PFD
6. Vertical mode and reference select on mode controller

NOTE

If the Course Deviation Indicator (CDI) is greater than one dot from center, the autopilot will arm the VAPP mode and indicate VAPP in white on the PFD. The pilot must ensure that the current heading will result in a capture of the selected course. If the CDI is one dot or less from center, the autopilot will enter the capture mode when the APR button is pressed and annunciate VAPP in green on the PFD.

END OF CHECKLIST

b) ILS

1. Navigation source select LOC using CDI
button on PFD
2. Course bearing pointer set using course knob
3. Intercept heading establish in HDG or ROL
mode (if required)
4. Mode controller select APR on mode
controller
5. Green or white LOC and GS annunciation. . . note on PFD
6. Vertical mode and reference select on mode controller

NOTE

When the selected navigation source is a valid ILS, glideslope coupling is automatically armed when tracking the localizer. The glideslope cannot be captured until the localizer is captured. The autopilot can capture the glideslope from above or below the glideslope.

END OF CHECKLIST

c) GPS

1. Navigation source. select GPS using CDI
button on PFD
2. Approach load in FMS and
ACTIVATE
3. Intercept heading establish in HDG or ROL
mode (if required)
4. Mode controller select APR on mode
controller
5. Green or white GPS annunciation note on PFD
6. Vertical mode and reference select on mode controller

END OF CHECKLIST

d) Back Course (BC)

1. Navigation source. select LOC using CDI
button on PFD
2. Course bearing pointer set to ILS front course
using course knob
3. Intercept heading establish in HDG or ROL
mode (if required)
4. Mode controller select NAV on mode
controller
5. Green or white BC annunciation. note on PFD

CONTINUED

NOTE

The course pointer must be at least 115° from the current magnetic heading before BC will be annunciated in the lateral mode field. Until that point, LOC will be annunciated.

Selecting NAV mode for back course approaches inhibits the glideslope from coupling.

6. Vertical mode and reference select on mode controller

END OF CHECKLIST

3. GO-AROUND

1. Control stick GRASP FIRMLY
2. GA button PUSH - verify GA / GA on
PFD in lateral and vertical
mode fields

NOTE

After the GA button is pressed, the autopilot disconnects and the flight director indicates a 4° pitch up altitude.

3. Balked landing execute
4. Missed approach procedure execute (as applicable)
5. Altitude preseselect. set to appropriate altitude

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At an appropriate safe altitude:

6. Autopilot mode controller select appropriate lateral
and vertical mode on
controller
7. Autopilot RE-ENGAGE if desired

NOTE

If the missed approach procedure requires tracking the
localizer outbound from the airport, use NAV mode to prevent
inadvertent coupling to glideslope.

END OF CHECKLIST

4A.6.9 CLIMB

Initial Climb Check

1. Landing light OFF / as required
2. Landing gear check UP
3. FLAPS check UP
4. Airspeed:
 - up to 1700 kg (3748 lb). 81 KIAS (best rate-of-climb)
87 KIAS / as required for en route
(cruise) climb
 - above 1700 kg (3748 lb). 82 KIAS (best rate-of-climb)
88 KIAS / as required for en-route
(cruise) climb
5. POWER lever MAX
6. Trim as required (ball centered)
7. Annunciations / Engine / System Page monitor

CAUTION

If the oil temperature and / or coolant temperature reaches the yellow range during climb, flight should be continued with the airspeed increased by 10 kts and power reduced by 10 % (reduced climb rate) for better engine cooling.

END OF CHECKLIST

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4A.6.10 CRUISE

1. POWER lever. performance as required

NOTE

The engine manufacturer recommends a cruise power setting of 70 %.

2. Trim as required
3. Annunciations / Engine / System Page monitor

Use of the Auxiliary Fuel Tanks (if installed)

The auxiliary fuel tanks are optional equipment (OÄM 42-056).

CAUTION

When operating the FUEL TRANSFER LH/RH switch, make sure not to exceed the fuel imbalance limitations given in Section 2.14 - FUEL.

To avoid additional imbalance in the auxiliary tanks both FUEL TRANSFER switches must be operated simultaneously.

1. Transfer the first half of the auxiliary fuel:

As soon as the fuel quantity in each main fuel tank is 17 US gal or less, set both FUEL TRANSFER switches to ON until the main tanks are full again.

Monitor the fuel quantity indicator to verify that fuel is properly transferred to both main fuel tanks (approx. 1 US gal per minute). If the fuel quantity in a main tank does not increase during fuel transfer, proceed according to Section 4B.12 - L/R FUEL TRANSFER FAIL.

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2. Transfer the second half of the auxiliary fuel:

Repeat the procedure described above.

NOTE

Transfer the fuel from the auxiliary tanks to the main tanks as soon as possible. The fuel in the auxiliary tanks must be transferred to the main tanks to become available for the current flight mission.

END OF CHECKLIST

4A.6.11 DESCENT

1. POWER lever. as required
2. Airspeed. as required
3. Trim as required
4. PEDs OFF, if low visibility approach
5. Annunciations / Engine / System Page monitor

NOTE

Definition of the switched-off status for PEDs:

Many PEDs are not completely disconnected from the internal power source when switched off. The switching function may leave some remaining functionality e.g. data storage, timer, clock, etc.

These devices can be considered switched off when in the deactivated status. The same applies to devices having no transmitting capability and are operated by coin cells without further deactivation capability, e.g. wrist watches.

END OF CHECKLIST

4A.6.12 APPROACH & LANDING

Approach:

CAUTION

For landing the adjustable backrests (if installed) must be fixed in the upright position.

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

NOTE

If the landing mass exceeds 1700 kg (3748 lb) and OÄM 42-195 is not carried out, the landing constitutes an abnormal operating procedure. Refer to Section 4B.11 - LANDING WITH MASS ABOVE MAXIMUM LANDING MASS.

2. Safety harnesses check fastened and tightened
3. Controls no interference by foreign objects
4. Landing light as required
5. Gear warning horn check function
6. FUEL SELECTOR check ON
7. Landing gear DOWN, check 3 green
8. Parking brake check released
9. Trim as required, directional trim neutral

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Before landing:

10. Airspeed

up to 1700 kg (3748 lb) min. 83 KIAS with FLAPS APP
above 1700 kg (3748 lb) min. 83 KIAS with FLAPS APP
up to 1700 kg (3748 lb) min. 87 KIAS with FLAPS UP
above 1700 kg (3748 lb) min. 88 KIAS with FLAPS UP

11. FLAPS as required

12. POWER lever. as required

13. Trim as required, directional trim
neutral

14. Final approach speed

up to 1700 kg (3748 lb) min. 79 KIAS with FLAPS LDG
above 1700 kg (3748 lb) min. 82 KIAS with FLAPS LDG

NOTE

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

CAUTION

In conditions such as (e.g.) strong wind, danger of wind shear or turbulence a higher approach speed should be selected.

END OF CHECKLIST

4A.6.13 GO AROUND

1. POWER lever MAX
2. FLAPS position APP
3. Airspeed min. 85 KIAS

When a positive rate of climb is established:

4. Landing gear UP, check unsafe light off
5. FLAPS retract, position UP

END OF CHECKLIST

4A.6.14 AFTER LANDING

1. POWER lever IDLE
2. Brakes as required
3. Pitot heating OFF
4. Avionics as required
5. Lights as required
6. FLAPS UP

END OF CHECKLIST

4A.6.15 SHUT-DOWN

1. Parking brake set
2. POWER lever IDLE for 2 minutes
3. Engine / System Page check
4. ELT check not transmitting on
121.5 MHz
5. AVIONIC MASTER OFF
6. Electrical consumers OFF
7. ENGINE MASTER OFF
8. Anti collision lights (ACL) OFF
9. ELECT. MASTER OFF

CAUTION

Before shut-down the engine must run for at least 2 minutes with the POWER lever at IDLE to avoid heat damage of the turbo charger.

CAUTION

Do not shut down an engine with the FUEL SELECTOR valve. The high pressure fuel pump can otherwise be damaged.

END OF CHECKLIST

4A.6.16 EXIT AIRPLANE

Exit the airplane to the aft on designated areas on the inner wing section LH or RH.

4A.6.17 POST FLIGHT INSPECTION

1. Record any problem found in flight and during the post-flight check in the log book.
2. Park the airplane.
3. If necessary, moor the airplane.

END OF CHECKLIST

4A.6.18 PARKING

1. Parking brake release, use chocks
2. Airplane moor, if unsupervised for
extended period
3. PITOT probe cover

END OF CHECKLIST

4A.6.19 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.6.20 REFUELING

CAUTION

Before refueling, the airplane must be connected to electrical ground. Grounding points: exhausts, left and right. Refer to Section 2.14 - FUEL for approved fuel grades.

Use of Fuel Additives

CAUTION

Only approved fuel additives not exceeding the approved concentrations may be used; refer to Section 2.14 FUEL. The instructions of the fuel additive supplier must be followed. Failure to exactly follow the fuel additive mixing procedures during refueling can result in incorrect fuel additive concentrations, fuel system contamination and possible engine stoppage.

Fuel additives may have been already mixed into the fuel when stored. In this case make sure that the brand is approved and the concentration does not exceed the approved values.

Anti-microbial life fuel additives may be manually batch-blended into the fuel tanks. In this case introduce the additive while filling the tank after approximately the half tank is filled.

Anti-icing fuel additives should not be batch-blended into the fuel tank. The fuel additive should be injected into a stream of fuel.

Record the brand and amount of fuel additives in the airplane log every time fuel additives are added.

Typical Dosing Quantities:

(a) BIOBOR JF (only if MÄM 42-198 is installed)

Fuel Quantity				Fuel Additive BIOBOR JF*			
				135 ppm		270 ppm	
Liter	US gal	kg	lb	ml	oz	ml	oz
50	13.2	40.2	88.68	5.2	0.18	10.4	0.35
100	26.4	80.4	177.37	10.4	0.35	20.9	0.71
150	39.6	120.6	266.05	15.6	0.53	31.3	1.06
200	52.8	160.8	354.73	20.9	0.71	41.8	1.42
300	79.3	241.2	532.10	31.3	1.06	62.7	2.13

* Calculation according to SB No. 982, 'Instructions for use of BIOBOR JF'

(b) PRIST Hi-Flash

Fuel Quantity				Fuel Additive *,** PRIST Hi-Flash (1500 ppm)	
Liter	US gal	kg	lb	ml	oz
50	13.2	40.2	88.68	58.9	1.99
100	26.4	80.4	177.37	117.9	3.99
150	39.6	120.6	266.05	176.8	5.98
200	52.8	160.8	354.73	235.8	7.97
300	79.3	241.2	532.10	353.7	11.96

* Densities used for calculation: Fuel: 0.804 kg/l, PRIST Hi-Flash: 1.05 kg/l

** Do not batch blend

NOTE

If the airplane is operated with Diesel Fuel additional temperature limitations (refer to Section 2.16.1 - FUEL TEMPERATURE) must be observed.

If Jet Fuel is used, make sure that no Diesel Fuel is remaining in the tanks, neither in the left nor in the right tank (see fuel grade, Section 7.9.5 - FUEL SYSTEM). Otherwise the temperature limitations for Diesel Fuel operation must be observed.

Refueling of the Auxiliary Tanks (if installed)

CAUTION

If the auxiliary tanks are used, then both tanks must be refueled to the maximum level. Only then the pilot has proper information concerning the fuel quantity in the auxiliary tanks.

If the auxiliary tanks are not in use, make sure that they are empty (refer to Section 6.4 - FLIGHT MASS AND CENTER OF GRAVITY).

CAUTION

If the airplane is operated with Diesel Fuel or a blend of Diesel Fuel with Jet Fuel the use of the auxiliary tanks is not permitted.

4A.6.21 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.6.22 STALL RECOVERY PROCEDURE

Stall Recognition

The approach to stall is accompanied by the onset of a continuous stall warning.
Other observations include buffeting, reduced control forces, less response to control input, high attitude. Apply stall recovery by adjusting pitch and power on first indication of stall.

CAUTION

Intentional stalling during single engine operation is not permitted.

NOTE

Do intentional stalls only in a training or skill examination environment.

Disregard the stall warning during the landing flare immediately before touchdown.

1. AP DISC switch DEPRESS and HOLD
2. Elevator (control stick) forward / relax back pressure
3. Ailerons wings level
4. POWER lever. as necessary to return to
controlled flight

CHAPTER 4B

ABNORMAL OPERATING PROCEDURES

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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 nearest airfield under all circumstances.

NOTE

If no level landing area is available, a landing on an upward slope should be sought.

1. Select appropriate landing area.
2. Consider wind.
3. Approach:

If possible, the landing area should be overflown at a suitable height in order to recognize obstacles. The degree of offset at each part of the circuit will allow the wind speed and direction to be assessed.

4. ATC advise

Perform procedures according to Normal Procedures
4A.6.12 - APPROACH & LANDING.

5. Touchdown with the lowest possible airspeed

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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:

- ENGINE MASTER both OFF
- FUEL SELECTOR both 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 ON THE G1000

4B.3.1 RPM

High RPM

1. Reduce power of affected engine.
2. Keep RPM within the green range using the POWER lever.

If the above mentioned measures do not solve the problem, refer to 3.9.3 - DEFECTIVE PROPELLER RPM REGULATING SYSTEM.

3. Land at the nearest suitable airfield.

END OF CHECKLIST

4B.3.2 COOLANT TEMPERATURE

(a) High Coolant Temperature

- Check G1000 for L/R COOL LVL caution message (low coolant level).

L/R COOL LVL caution message not displayed:

During climb:

- Reduce power on affected engine by 10 % or more as required.
- Increase airspeed by 10 KIAS or more as required.
- If the coolant temperature does not reach the green range within 60 seconds, reduce power on affected engine as far as possible and increase airspeed.

During cruise:

- Reduce power on affected engine.
- Increase airspeed.
- Check coolant temperature in green range.

CAUTION

If high coolant temperature is indicated and the L/R COOL LVL caution message is not displayed, it can be assumed that there is no technical defect in the cooling system and that the above mentioned procedure can decrease the temperature(s). This might not be the case if the coolant temperature does not return to the green range. In this case perform a precautionary landing on the nearest suitable airfield. Prepare for an engine failure in accordance with 3.5.6

- ENGINE FAILURES IN FLIGHT.

CONTINUED

L/R COOL LVL caution message displayed:

- Reduce power on affected engine.
- Expect loss of coolant.

WARNING

A further increase in coolant temperature must be expected.
Prepare for an engine failure in accordance with 3.5.6 -
ENGINE FAILURES IN FLIGHT.

(b) Low Coolant Temperature

- Check G1000 for L/R COOL LVL caution message (low coolant level).

NOTE

During an extended descent from high altitudes with a low power setting coolant temperature may decrease. In this case an increase in power and a decrease in airspeed can help.

L/R COOL LVL caution message displayed:

- Reduce power on affected engine.
- Expect loss of coolant.

WARNING

A further decrease in coolant temperature must be expected.
Prepare for an engine failure in accordance with 3.5.6 -
ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

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4B.3.3 OIL TEMPERATURE

(a) High Oil Temperature

- Check oil pressure.

If the oil pressure is outside of the green range (lower limit):

- Reduce power on affected engine.
- Expect loss of engine oil.

WARNING

A further increase in oil temperature must be expected.
Prepare for an engine failure in accordance with 3.5.6 -
ENGINE FAILURES IN FLIGHT.

If the oil pressure is within the green range:

- Reduce power on affected engine.
- Increase airspeed.

CAUTION

If high oil temperature is announced and the oil pressure indication is within the green range, it can be assumed that there is no technical defect in the engine oil system and that the above mentioned procedure can decrease the temperature(s). This might not be the case if the oil temperature does not return to the green range. In this case perform a precautionary landing on the nearest suitable airfield. Prepare for an engine failure in accordance with 3.5.6 - ENGINE FAILURES IN FLIGHT.

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(b) 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.3.4 OIL PRESSURE

(a) High Oil Pressure

- Check oil temperature.
- Check coolant 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.

WARNING

Land at the nearest suitable airfield. Prepare for an engine failure in accordance with 3.5.6 - ENGINE FAILURES IN FLIGHT.

CAUTION

When starting a cold engine, the oil pressure can be as high as 6.5 bar for a maximum of 20 seconds.

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(b) Low Oil Pressure

- Reduce power on affected engine.
- Expect loss of oil.

WARNING

Land at the nearest suitable airfield. Prepare for an engine failure in accordance with 3.5.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

4B.3.5 GEARBOX TEMPERATURE

High Gearbox Temperature

- Reduce power on affected engine.
- Increase airspeed.

CAUTION

At high ambient temperature conditions and/or at low airspeeds with high power settings, it can be assumed that there is no technical defect in the gearbox and that the above mentioned procedure will decrease the temperature(s). This might not be the case if the gearbox temperature does not return to the green range. In this case perform a precautionary landing on the nearest suitable airfield. Prepare for an engine failure in accordance with 3.5.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

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4B.3.6 FUEL TEMPERATURE

(a) High Fuel Temperature

- Reduce power on affected engine.
- Increase airspeed.

CAUTION

At high ambient temperature conditions and/or at low airspeeds with high power settings and low fuel quantities, it can be assumed that the above mentioned procedure will decrease the temperature(s). If the fuel temperature does not return to the green range, perform a precautionary landing on the nearest suitable airfield.

NOTE

Increased fuel temperature can occur when the fuel quantity in the main tank is low. If the auxiliary tank is installed the fuel temperature can be decreased by transferring fuel from the auxiliary to the main tank.

(b) Low Fuel Temperature

- Increase power on affected engine.
- Reduce airspeed.

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CAUTION

At low ambient temperature conditions and/or at high airspeeds with low power settings, it can be assumed that the above mentioned procedure will increase the temperature(s). If the fuel temperature does not return to the green range perform a precautionary landing on the nearest suitable airfield. Prepare for an engine failure in accordance with 3.5.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

4B.3.7 VOLTAGE

(a) Low Voltage Indication on the Ground

1. Circuit breakers check
2. POWER lever increase RPM

If LOW VOLTAGE CAUTION (LOW VOLTS / 4B.4.5) is still indicated on the G1000:

Terminate flight preparation.

(b) Low Voltage During Flight

1. Circuit breakers check
2. Electrical equipment OFF if not needed

If LOW VOLTAGE CAUTION (LOW VOLTS / 4B.4.5) is still indicated on the G1000:

Follow procedure in 4B.4.6 - L/R ALTN FAIL.

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 ECU A FAIL

L/R ECU A FAIL	* Left / Right engine ECU A has failed or * is being tested during FADEC test procedure before take-off check.
-----------------------	--

(a) 'ECU A' Caution on the Ground

- Terminate flight preparation.

(b) 'ECU A' Caution During Flight

NOTE

In case of a failure in the electronic ECU (Engine Control Unit)
'A' the system automatically switches to ECU 'B'.

1. Press the ECU TEST button for more than 2 seconds to reset the caution message.

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If the ECU A caution message reappears, or cannot be reset:

2. Land on the nearest suitable airfield.
3. The engine must be serviced after landing.

If the ECU A caution message can be reset:

2. Continue flight.
3. The engine must be serviced after landing.

END OF CHECKLIST

4B.4.3 L/R ECU B FAIL

L/R ECU B FAIL	* Left / Right engine ECU B has failed - or * is being tested during FADEC test procedure before take-off check.
-----------------------	--

(a) 'ECU B' Caution on the Ground

- Terminate flight preparation.

(b) 'ECU B' Caution During Flight

1. Press the ECU TEST button for more than 2 seconds to reset the caution message.

If the ECU B caution message reappears, or cannot be reset:

2. Land on the nearest suitable airfield.
3. The engine must be serviced after landing.

If the ECU B caution message can be reset:

2. Continue flight.
3. The engine must be serviced after landing.

END OF CHECKLIST

4B.4.4 L/R FUEL LOW

L/R FUEL LOW	Left / Right engine main tank fuel quantity is low.
---------------------	---

1. 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 which are flown with slip, or while taxiing in curves.

If fuel quantities of LH & RH engines show remarkable different fuel quantities in flight:

- Expect loss of fuel on side with lower indication.
- Use CROSSFEED function to ensure fuel supply.

2. FUEL SELECTOR CROSSFEED (engine with LOW FUEL indication)

END OF CHECKLIST

4B.4.5 LOW VOLTAGE CAUTION (LOW VOLTS)

L/R VOLTS LOW	Left / Right bus voltage is less than 25 Volts.
----------------------	---

Possible reasons are:

- A fault in the power supply.
- RPM too low.

Continue with 4B.3.7 - VOLTAGE.

CAUTION

If both low voltage indications are ON, expect failure of both alternators and follow 4B.4.6 - L/R ALTN FAIL.

END OF CHECKLIST

4B.4.6 L/R ALTN FAIL

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

(a) One Alternator Failed

1. ALTERNATOR OFF / affected side
2. Bus voltage monitor
3. Electrical consumers reduce as practicable

END OF CHECKLIST

(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. Expect engine stoppage after this period of time.

1. Avionics Master OFF
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

END OF CHECKLIST

4B.4.7 L/R COOL LVL

L/R COOL LVL	Left / Right engine coolant level is low.
---------------------	---

A low coolant caution alert may indicate a loss of coolant. This will subsequently lead to decreased engine cooling capability / loss of engine power due to engine failure.

- 1. Annunciations/Engine instruments. monitor

See 4B.3.2 - COOLANT TEMPERATURE.

NOTE

The indication is calibrated for straight and level flight. The caution message may be triggered during turns which are flown with slip, or while taxiing in curves.

END OF CHECKLIST

4B.4.8 PITOT FAIL / HT OFF

PITOT FAIL	Pitot heating system has failed.
PITOT HT OFF	Pitot heating system is OFF.

1. 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:

2. Expect loss of static instruments.
3. Leave icing zone / refer to 3.9.4 - UNINTENTIONAL FLIGHT INTO ICING.

END OF CHECKLIST

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4B.4.9 STALL HT FAIL/OFF

STAL HT FAIL	Stall warning heat has failed.
STAL HT OFF	Stall warning heat is OFF.

1. PITOT HEAT check ON / as required

NOTE

The STAL HT OFF caution message is displayed when the Pitot heating is switched OFF, or STAL HT FAIL when there is a failure of the stall warning heating system. Operation of the stall warning heating on the ground also causes the stall warning heating failed caution message to be displayed. In this case it indicates the activation of the thermal protection relay, which prevents overheating of the stall warning heating system on the ground. This is a normal function of the system.

If in icing conditions:

2. Expect loss of acoustic stall warning.
3. Leave icing zone / See 3.9.4 - UNINTENTIONAL FLIGHT INTO ICING.

END OF CHECKLIST

4B.4.10 L/R AUXILIARY FUEL TANK EMPTY (IF AUX. TANKS INSTALLED)

L/R AUX FUEL E

Left / Right auxiliary fuel tank empty (displayed only
when FUEL TRANSFER pump is ON).

The auxiliary tank empty caution message indicates an empty auxiliary fuel tank while the fuel pump is switched ON.

1. L/R auxiliary fuel pump OFF

END OF CHECKLIST

4B.4.11 STICK LIMIT

STICK LIMIT	Control stick limiting system (variable elevator stop) has failed.
-------------	--

The variable elevator backstop is activated depending on the position of the POWER levers and the position of the flap selector switch. The system has two failure modes which can be identified as follows:

- (a) Both POWER Levers Are in a Position for a Power Setting of More than Approximately 20 % LOAD, and the FLAP Selector Switch Is in LDG Position:

CAUTION

The variable elevator backstop is inoperative. In case of stalling with "power-on" the handling qualities and stall-characteristics are degraded significantly.

Do not stall the airplane in any configuration.

- (b) At Least One POWER Lever Is in a Position for a Power Setting of Less than Approximately 20 % LOAD, or the FLAP Selector Switch Is Not in LDG Position:

CAUTION

The variable elevator backstop is active all the time, reducing the maximum elevator "pull"-deflection. This results in reduced elevator capacity. In this case it is important not to reduce airspeed below required minimum v_{REF} during the approach for landing, especially at loading conditions with forward locations of the center of gravity.

up to 1700 kg (3748 lb) $v_{REF} = 79$ KIAS

above 1700 kg (3748 lb) $v_{REF} = 82$ KIAS

(see Section 4B.11)

END OF CHECKLIST

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4B.4.12 CHECK GEAR

CHECK GEAR	Landing gear is not down and locked.
-------------------	--------------------------------------

1. Landing gear down / as required

NOTE

The Check Gear caution message is displayed when either the flaps are in LDG position or one POWER lever is less than approx. 20 % and the landing gear is not down and locked.

END OF CHECKLIST

4B.4.13 RAIM UNAVAIL

INTEG RAIM not available	RAIM (Receiver Autonomous Integrity Monitor) is not available.
---	--

(a) Enroute, Oceanic, Terminal, or Initial Approach Phase of Flight

If the "RAIM UNAVAIL" annunciation is displayed in the enroute, oceanic, terminal, or initial approach phase of flight, continue to navigate using the GPS equipment or revert to an alternate means of navigation other than the G1000 GPS receiver appropriate to the route and phase of flight. When continuing to use GPS navigation, position must be verified every 15 minutes using the G1000 VOR / ILS receiver or another IFR-approved navigation system.

(b) Final Approach

If the "RAIM UNAVAIL" annunciation is displayed while on the final approach segment, GPS based navigation will continue for up to 5 minutes with approach CDI sensitivity (0.3 nautical miles). After 5 minutes the system will flag and no longer provide course guidance with approach sensitivity. Missed approach course guidance may still be available with 1 nautical mile CDI sensitivity and integrity by executing the missed approach.

END OF CHECKLIST

4B.4.14 AHRS ALIGNING - KEEP WINGS LEVEL

AHRS ALIGN: Keep Wings Level	The AHRS (Attitude and Heading Reference System) is aligning.
---	---

Keep wings level using standby attitude indicator.

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4B.5 FAILURES IN FLAP OPERATING SYSTEM

Failure in Position Indication or Function

1. FLAPS position check visually
2. Airspeed keep in white sector
(max. 113 KIAS)
3. FLAPS switch re-check all positions

Modified Approach Procedure Depending on the Available Flap Setting

(a) Only UP available:

Airspeed

- up to 1700 kg (3748 lb). min. 87 KIAS
- above 1700 kg (3748 lb). min. 88 KIAS (see Section 4B.11)

Land at a flat approach angle, use POWER lever to control airplane speed and rate of descent.

(b) Only APP available:

Airspeed min. 83 KIAS

Land at a flat approach angle, use POWER lever to control airplane speed and rate of descent.

(c) Only LDG available:

Perform normal landing.

END OF CHECKLIST

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4B.6 FAILURES IN ELECTRICAL RUDDER PEDAL ADJUSTMENT

Runaway of Electrical Rudder Pedal Adjustment (Optional Equipment, OÄM 42-070)

NOTE

The circuit breaker for the rudder pedal adjustment is located below the related switch, on the rear wall of the leg room.

1. Circuit breaker pull

END OF CHECKLIST

4B.7 FAILURES IN HYDRAULIC SYSTEM

4B.7.1 CONTINUOUS HYDRAULIC PUMP OPERATION

1. Landing gear indication lights check
2. Prepare for manual landing gear extension. Refer to Section 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR.

NOTE

The landing gear might extend as the hydraulic system pressure decreases. Consider for 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.7.2 HYDRAULIC PUMP FAILURE

1. Landing gear indication lights. check
2. Prepare for manual landing gear extension. Refer to Section 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR.

NOTE

The landing gear might extend as the hydraulic system pressure decreases. Consider for 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.8 STARTING ENGINE WITH EXTERNAL POWER

4B.8.1 BEFORE STARTING ENGINE

1. Pre-flight inspection complete
2. Passengers instructed

NOTE

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

3. Passenger door closed and locked
4. Canopy position 1 or 2 ("cooling gap")
5. Rudder pedals adjusted and locked
6. Safety harnesses all on and fastened
7. POWER lever check IDLE
8. Parking brake set
9. AVIONIC MASTER check OFF
10. GEAR selector check DOWN
11. ECU SWAP check AUTOMATIC
12. ALTERNATORS check ON
13. ELECT. MASTER check OFF
14. ENGINE MASTER check OFF
15. PROPELLER check clear
16. External power connect

CONTINUED

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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 buses is powered.

17. G1000 wait until power-up completed.
Press ENT on MFD to
acknowledge.

NOTE

The engine instruments are only available on the MFD after item 17 has been completed.

END OF CHECKLIST

4B.8.2 STARTING ENGINE

1. Strobe lights (ACL) ON
2. ELECT. MASTER ON
3. ENGINE MASTER ON (LH side)
4. Annunciations check L GLOW ON
5. 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.

After the L GLOW ON indication is extinguished:

6. START KEY START L as required / release
when engine has started

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.

If the L 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.

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7. Annunciations/Engine/System Page check OK / normal range
8. Annunciations/Starter. check OFF
9. Annunciations/Oil pressure check OK

WARNING

If the oil pressure has not moved from the red range within 3 seconds after starting, set the ENGINE MASTER switch to OFF and investigate problem. When starting the cold engine, the oil pressure can be as high as 6.5 bar for a maximum of 20 seconds.

10. Circuit breakers check all in / as required
11. Idle RPM check, 900 ± 20 RPM
12. External power. disconnect
13. Opposite engine. start with normal procedure
14. Warm up IDLE for 2 minutes /
thereafter 1400 RPM

END OF CHECKLIST

4B.9 FAILURES IN THE AUTOPILOT SYSTEM

4B.9.1 AUTOPILOT DISCONNECT (yellow AP flashing on PFD)

1. AP DISC switch. DEPRESS AND RELEASE
(to cancel disconnect tone)
2. Pitch trim retrim if necessary, using
the trim wheel

NOTE

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

END OF CHECKLIST

4B.9.2 AUTOPILOT OVERSPEED RECOVERY (yellow MAXSPD on PFD)

1. POWER lever reduce power

When overspeed condition is corrected:

2. Autopilot reselect VERTICAL MODE
(if necessary)

NOTE

Overspeed recovery mode provides a pitch up command to decelerate the airplane at or below the maximum autopilot operating speed (180 KIAS). Overspeed recovery is not active in altitude hold (ALT) or glideslope (GS) modes.

END OF CHECKLIST

**4B.9.3 LOSS OF NAVIGATION INFORMATION (Yellow VOR, VAPP, GPS or LOC
flashing on PFD)**

NOTE

If a navigation signal is lost while the autopilot is tracking it,
the autopilot will roll the airplane wings level and default to
roll mode (ROL).

1. Autopilot select HDG on mode
controller
2. Nav source select a valid NAV source
3. Autopilot select NAV on mode
controller

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

4. Missed approach procedure EXECUTE (as applicable)

END OF CHECKLIST

4B.9.4 AUTOPILOT OUT OF TRIM (Yellow ←AIL, →AIL, ↑ELE, ↓ELE, ←RUD or →RUD on PFD)

For ↑ELE, or ↓ELE Indication:

WARNING

Do not attempt to overpower the autopilot in the event of a pitch mistrim. The autopilot servos will oppose pilot input and will cause pitch trim to run opposite the direction of pilot input. This will lead to a significant out-of-trim condition resulting in large control stick force when disengaging the autopilot.

CAUTION

Be prepared for significant sustained control forces in the direction of the annunciation arrow. For example, an arrow pointing down indicates nose down control stick force will be required upon autopilot disconnect.

NOTE

Momentary illumination (5 sec or less) of the ↑ELE or ↓ELE indication during configuration or large airspeed changes is normal.

If the annunciation remains:

1. AP DISC switch DEPRESS AND HOLD
while grasping control stick
firmly

CONTINUED

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2. Airplane attitude maintain / regain
airplane control,
use standby attitude
indicator if necessary
3. Pitch trim retrim if necessary, using
the trim wheel
4. AUTOPILOT circuit breaker PULL
5. AP DISC switch. RELEASE

WARNING

Following an autopilot, autotrim or manual electric trim system malfunction, do not engage the autopilot or operate the manual electric trim until the cause of the malfunction has been corrected.

END OF CHECKLIST

For →AIL, ←AIL or →RUD, ←RUD Indication:

1. Rudder trim VERIFY slip / skid indicator is
centered, trim is necessary

NOTE

Observe the maximum fuel imbalance limitation.

END OF CHECKLIST

If annunciation remains:

2. Control stick. GRASP FIRMLY with both
hands

CAUTION

Be prepared for sustained control forces in the direction of the annunciation arrow. For example, an →AIL indicates that sustained right wing down control stick force or for →RUD sustained right rudder force will be required upon autopilot disconnect.

3. AP DISC switch DEPRESS
4. Autopilot RE-ENGAGE if lateral trim is
re-established

END OF CHECKLIST

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4B.9.5 FLASHING YELLOW MODE ANNUNCIATION

NOTE

Abnormal mode transitions (those not initiated by the pilot or by normal sequencing of the autopilot) will be annunciated by flashing the disengaged mode in yellow on the PFD. Upon loss of a selected mode, the system will revert to the default mode for the affected axis, either ROL or PIT. After 10 seconds, the new mode (PIT or ROL) will be annunciated in green. Loss of selected vertical mode (FLC, VS, ALT, GS)

1. Autopilot mode controls select another vertical mode

If on an instrument approach:

2. Autopilot DISCONNECT and continue manually or execute missed approach

Loss of Selected Lateral Mode (HDG, NAV, GPS, LOC, VAPP, BC):

1. Autopilot mode controls select another lateral mode

If on an instrument approach:

2. Autopilot DISCONNECT and continue manually or execute missed approach

END OF CHECKLIST

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4B.9.6 EFFECTS OF G1000 LOSSES UPON AUTOPILOT OPERATION

G1000 System Loss	Effect upon Autopilot Operation
AHRS	The autopilot disconnects and autopilot, yaw damper and flight director are inoperative. Manual electric trim is available.
HDG function of AHRS	The autopilot will remain engaged with the loss of the HDG mode.
MFD	The autopilot will remain engaged with limited functionality.
PFD	The autopilot disconnects and autopilot and flight director are inoperative. Manual electric trim is available.
GIA No. 1	The autopilot disconnects and autopilot, flight director and manual electric trim are inoperative.
GIA No. 2	The autopilot disconnects and autopilot and manual electric trim are inoperative. Flight director is available.
GPS No. 1 and 2	The autopilot and flight director operates in NAV modes only (LOC, BC, VOR, VAPP) with reduced accuracy.
ADC	The autopilot disconnects and autopilot is inoperative. The flight director is available except for air data modes (ALT, VS, FLC). Manual electric trim is available.

4B.10 LIGHTNING STRIKE

1. Airspeed as low as practicable, do not exceed v_A (117 KIAS)
2. Grasp airplane controls firmly.
3. Autopilot. disengage (check)
4. PFD / backup instruments verify periodically
5. Continue flight under VMC.
6. Land on 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 as far as possible (e.g. lee effects).
- Do not fly into areas of known or forecast icing.
- Maintain VMC.

4B.11 LANDING WITH MASS ABOVE MAXIMUM LANDING MASS

NOTE

Refer to Section 4A.6.12 - APPROACH & LANDING if
OÄM 42-195 is carried out and for landings with a mass up
to 1700 kg (3748 lb).

Perform landing approach according to Section 4A.6.12 - APPROACH & LANDING, but
maintain an increased airspeed during final landing approach.

1. Approach speed min. 83 KIAS with FLAPS APP
min. 88 KIAS with FLAPS UP
2. Final approach speed min. 82 KIAS with FLAPS LDG
3. Minimum speed on go-around 85 KIAS

END OF CHECKLIST

4B.12 L/R FUEL TRANSFER FAIL (IF AUX. TANKS ARE INSTALLED)

If the fuel quantity in a main tank does not increase during fuel transfer:

1. Switch OFF both fuel transfer pumps.

CAUTION

An imbalance in the auxiliary tanks is approved when the imbalance in the main tanks is less than 1 US gal (3.8 liter).

2. Check fuel imbalance in the main tanks; use CROSSFEED function to keep the LH and RH main tank imbalance within the permissible limit of 1 US gal (3.8 liter).
3. Switch the remaining fuel pump ON.
4. Use CROSSFEED function to keep the LH and RH main tank imbalance within the permissible limit of 1 US gal (3.8 liter).

END OF CHECKLIST

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CHAPTER 5

PERFORMANCE

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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 °C / 59 °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.

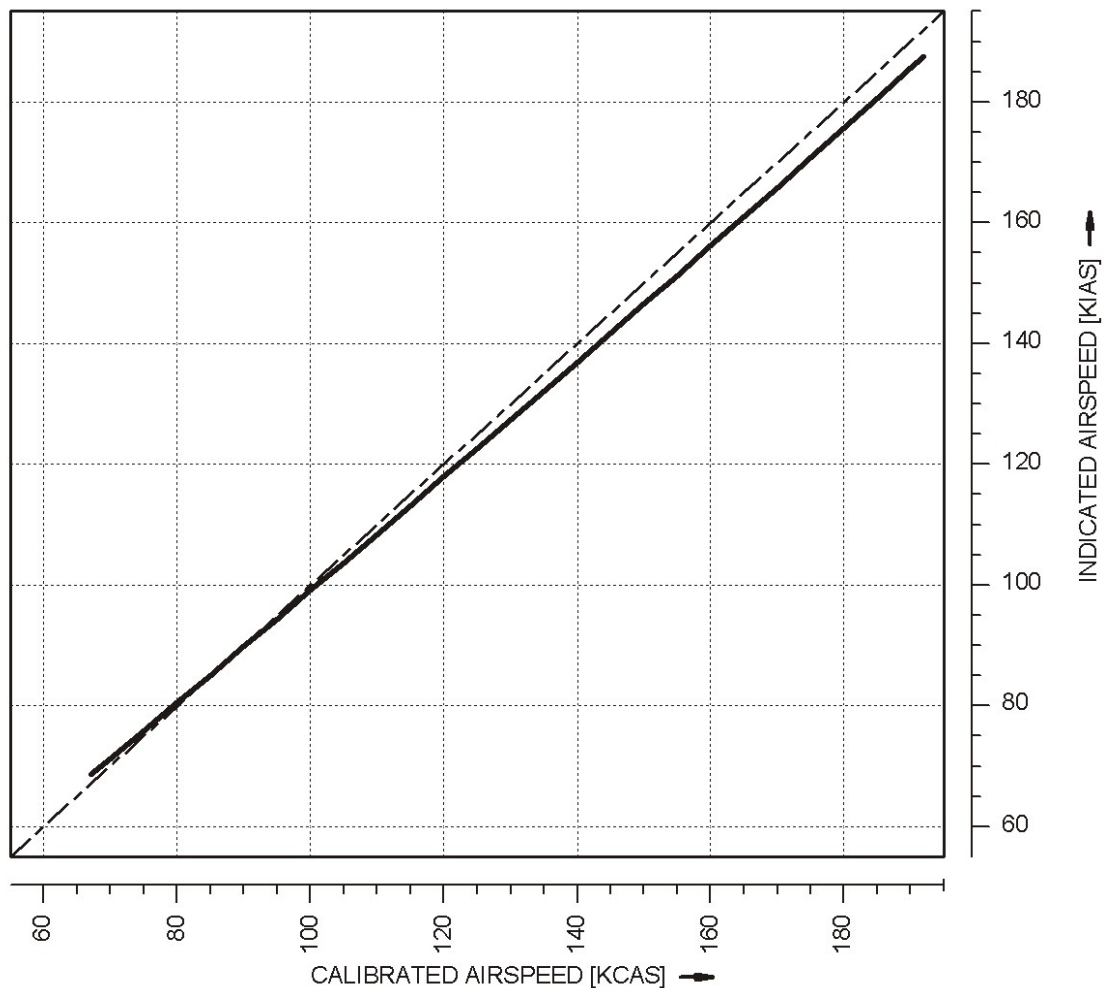
5.3 PERFORMANCE TABLES AND DIAGRAMS

5.3.1 AIRSPEED CALIBRATION

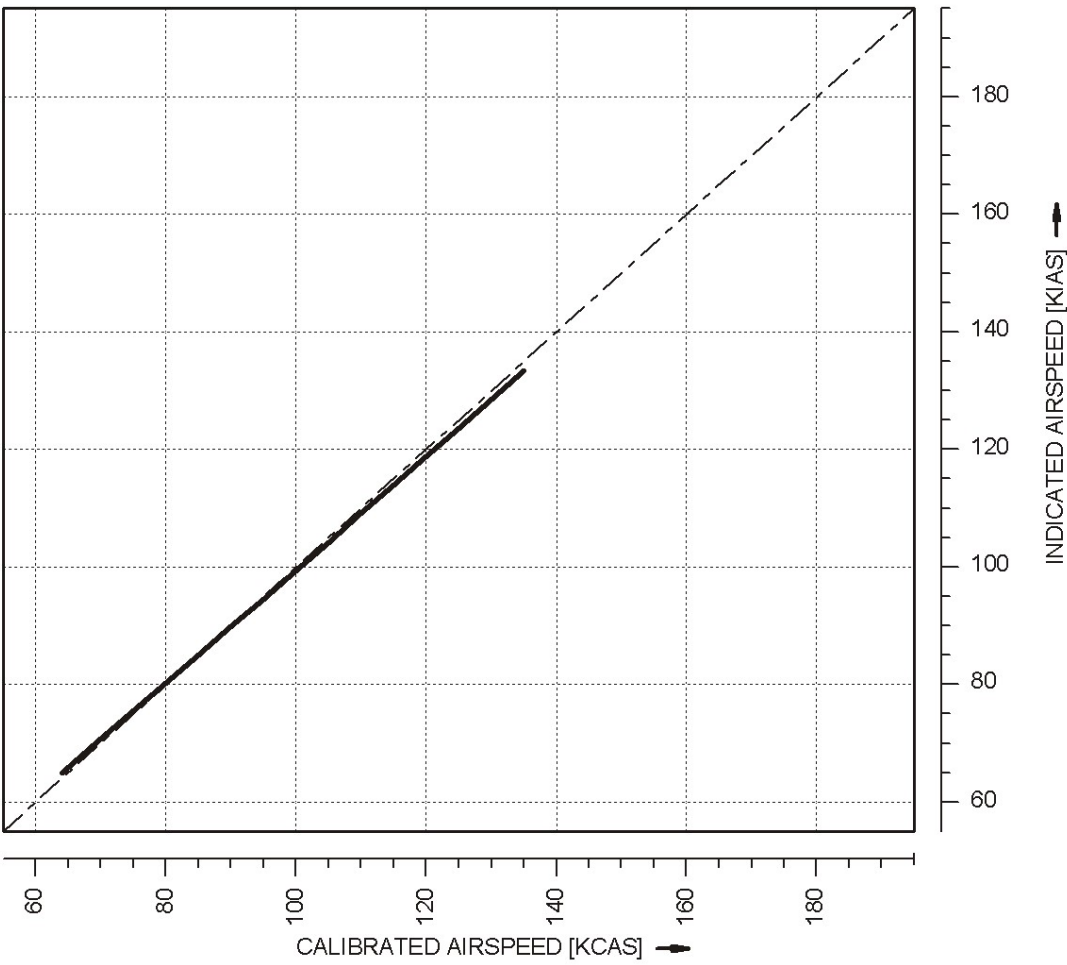
NOTE

The position of the landing gear (extended/retracted) has no significant influence on the airspeed indicator system.

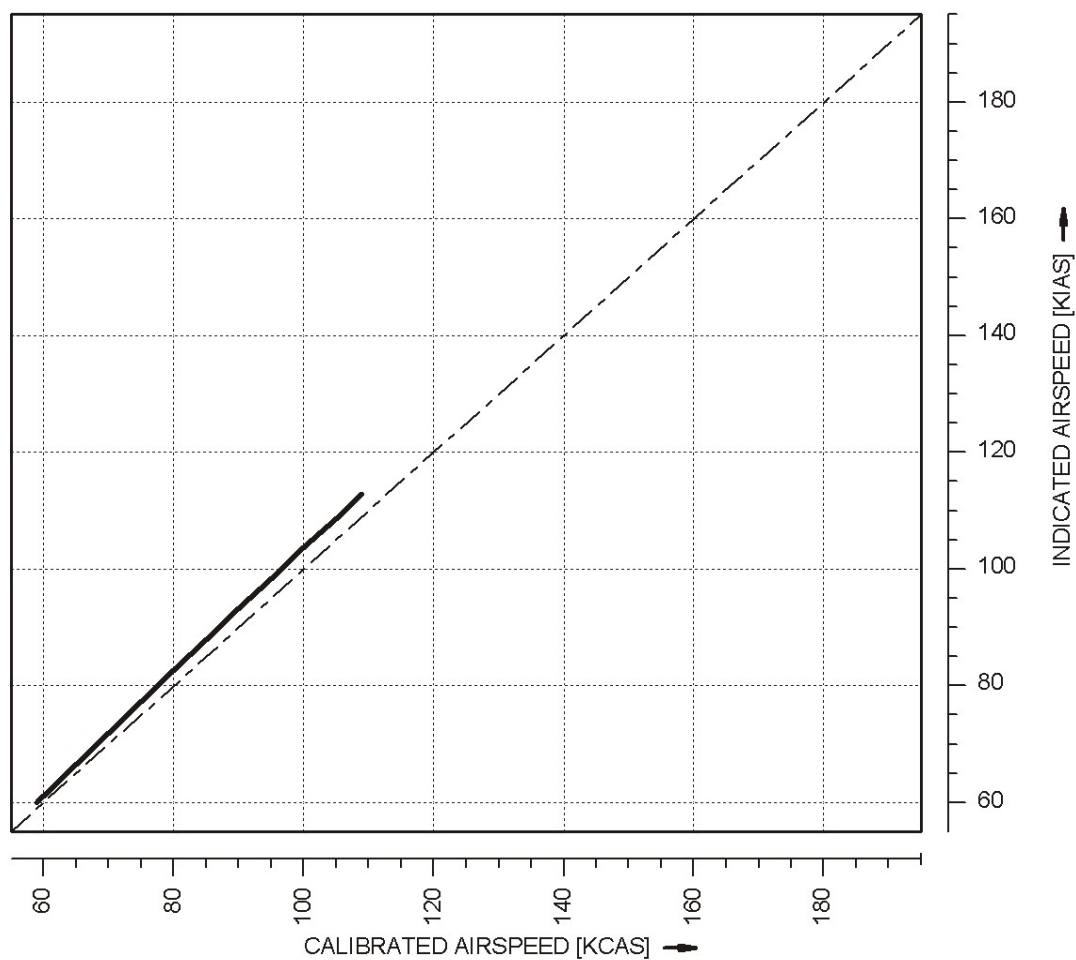
AIRSPEED INDICATOR SYSTEM
FLAPS UP



AIRSPPEED INDICATOR SYSTEM
FLAPS APP



AIRSPEED INDICATOR SYSTEM
FLAPS LDG



5.3.2 FUEL FLOW DIAGRAM

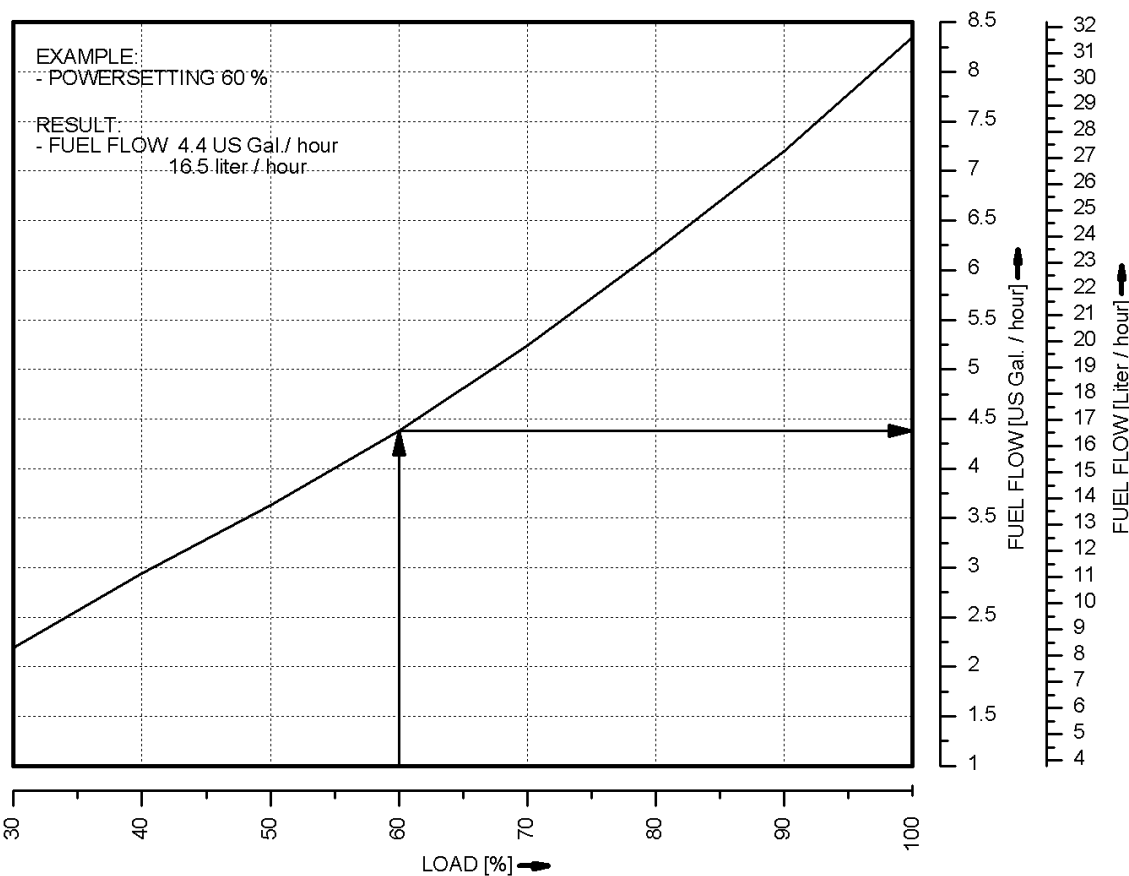
CAUTION

The diagram shows the fuel flow per hour for one engine.

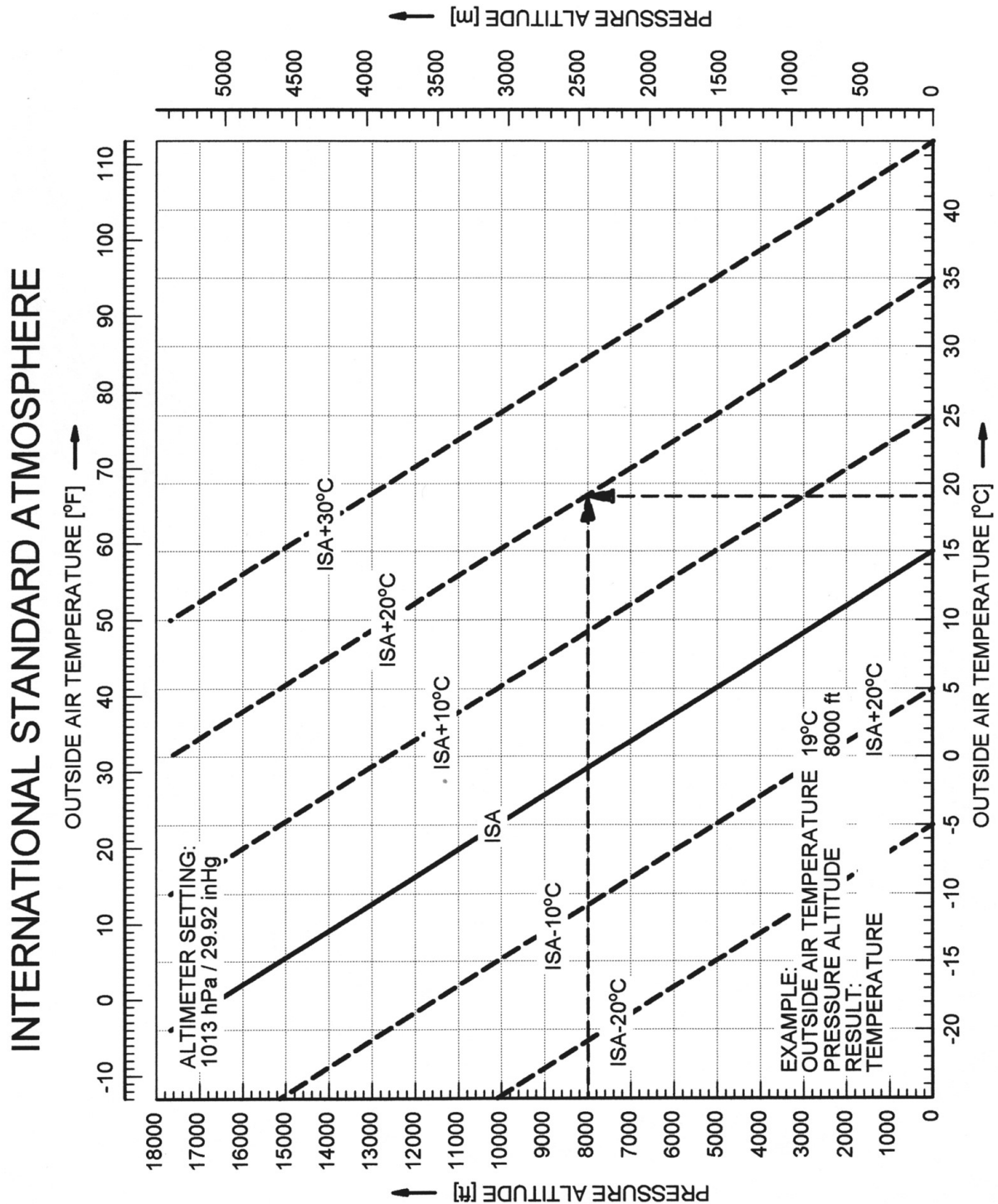
NOTE

The fuel calculations on the FUEL CALC portion of the G1000 MFD 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.

FUEL FLOW



5.3.3 INTERNATIONAL STANDARD ATMOSPHERE



5.3.4 STALLING SPEEDS

CAUTION

The calculated stalling speeds may be higher than the maximum approved / limiting flap-extended and / or maneuvering airspeeds.

Stalling Speeds at Various Flight Masses

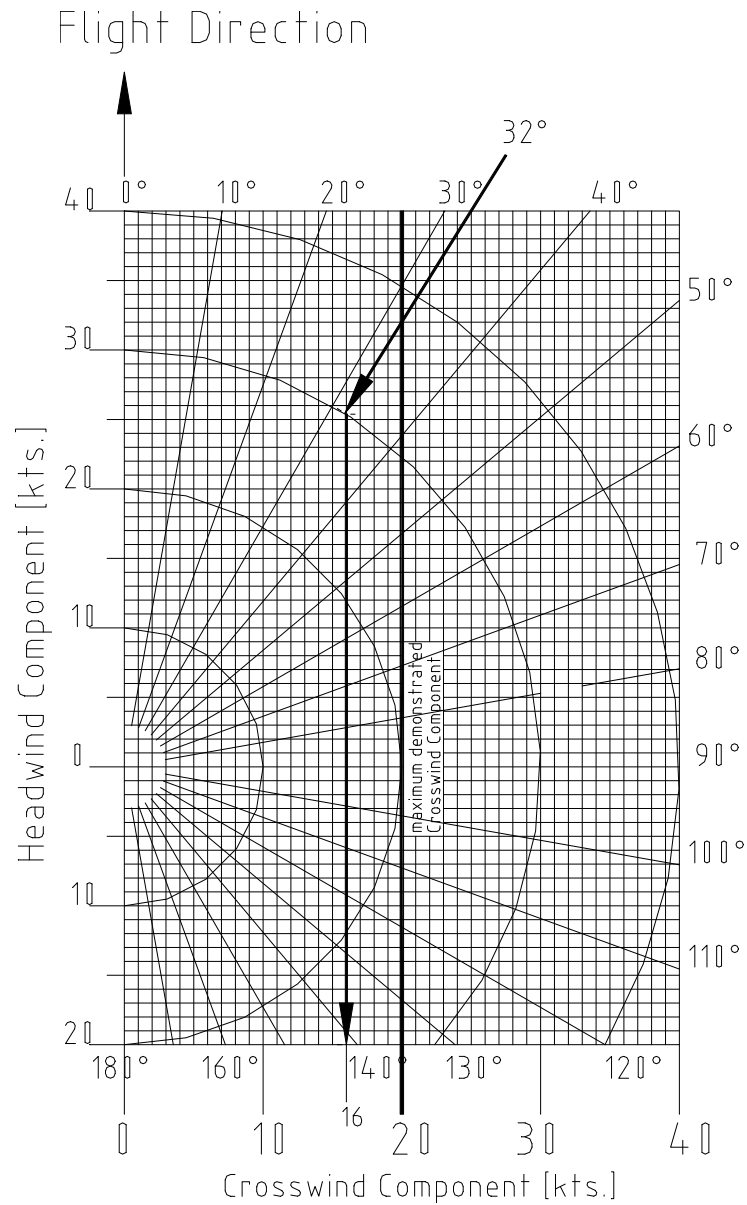
Airspeeds in KIAS at idle power:

1400 kg (3086 lb)		Bank Angle			
Gear	Flaps	0°	30°	45°	60°
UP	UP	63	67	73	86
DOWN	APP	59	63	70	82
DOWN	LDG	54	58	65	78

1700 kg (3748 lb)		Bank Angle			
Gear	Flaps	0°	30°	45°	60°
UP	UP	69	73	80	94
DOWN	APP	65	70	77	90
DOWN	LDG	60	65	72	86

1785 kg (3935 lb)		Bank Angle			
Gear	Flaps	0°	30°	45°	60°
UP	UP	69	74	81	95
DOWN	APP	64	69	75	89
DOWN	LDG	62	67	75	89

5.3.5 WIND COMPONENTS



Example: Flight direction : 360°
Wind : 32°/30 kts
Result: Crosswind component : 16 kts
Max. demonstrated crosswind component : 20 kts

5.3.6 TAKE-OFF DISTANCE

Conditions:

- POWER lever both MAX @ 2300 RPM
- Flaps UP
- Nose wheel lift-off
 - up to 1700 kg (3748 lb) @ $v_R = 75$ KIAS
 - above 1700 kg (3748 lb) @ $v_R = 76$ KIAS
- Airspeed for initial climb
 - up to 1700 kg (3748 lb) 81 KIAS
 - above 1700 kg (3748 lb) 82 KIAS
- Runway level, hard paved surface
(concrete, asphalt, etc.)

Values for ISA and MSL, at 1700 kg (3748 lb)

Take-off distance over a 50 ft (15 m) obstacle	530 m (1739 ft)
Take-off ground roll	348 m (1142 ft)

Values for ISA and MSL, at 1785 kg (3935 lb)

Take-off distance over a 50 ft (15 m) obstacle	691 m (2267 ft)
Take-off ground roll	427 m (1401 ft)

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.

WARNING

Poor maintenance condition of the airplane, deviation from the given procedures, uneven runway, as well as unfavorable external factors (high temperature, rain, unfavorable wind conditions, including cross-wind) will increase the take-off distance.

CAUTION

The figures in the following NOTE are typical values. On wet ground or wet soft grass covered runways the take-off roll may become significantly longer than stated below. In any case the pilot must allow for the condition of the runway to ensure a safe take-off.

NOTE

For take-off from 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: 10 % increase in take-off roll.
- Grass 5 to 10 cm (2 to 4 in) long: 15 % increase in take-off roll.
- Grass longer than 10 cm (4 in): at least 25 % increase in take-off roll.
- On grass longer than 25 cm (10 in), a take-off should not be attempted.

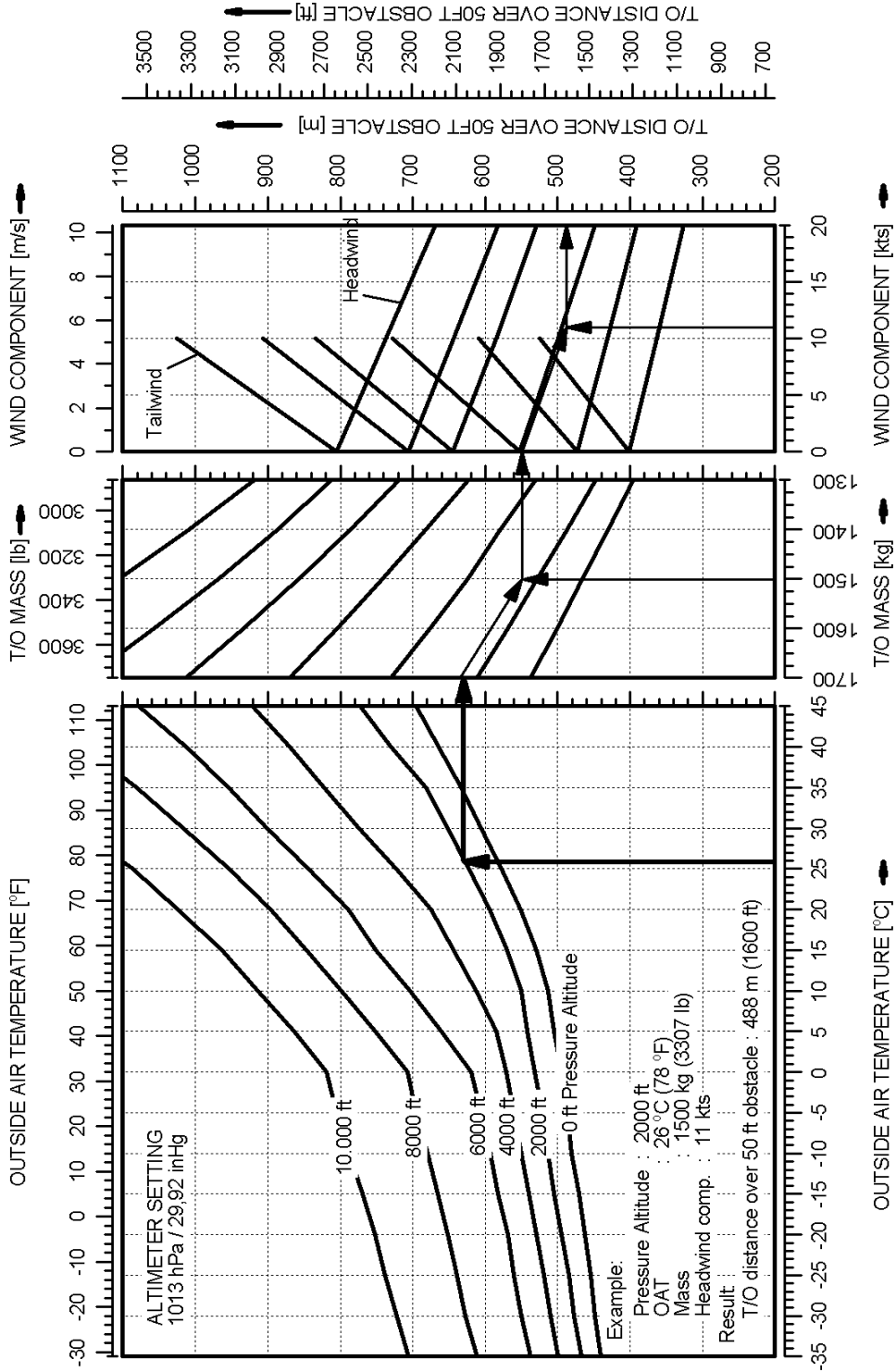
NOTE

For wet grass, an additional 10 % increase in take-off roll must be expected.

NOTE

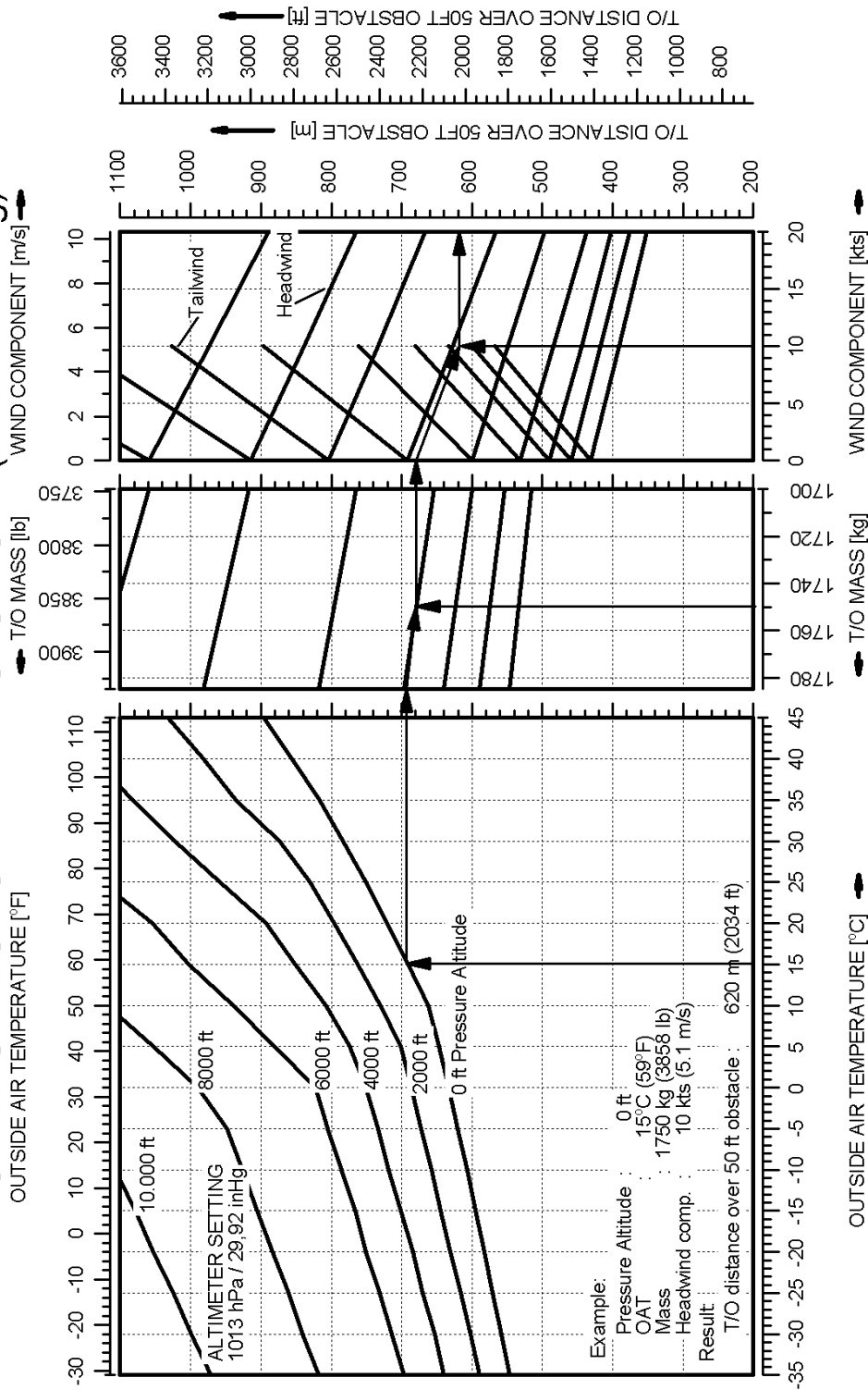
An uphill slope of 2 % (2 m per 100 m or 2 ft per 100 ft) results in an increase in the take-off distance of approximately 10 %. The effect on the take-off roll can be greater.

TAKE-OFF DISTANCE OVER 50 ft OBSTACLE



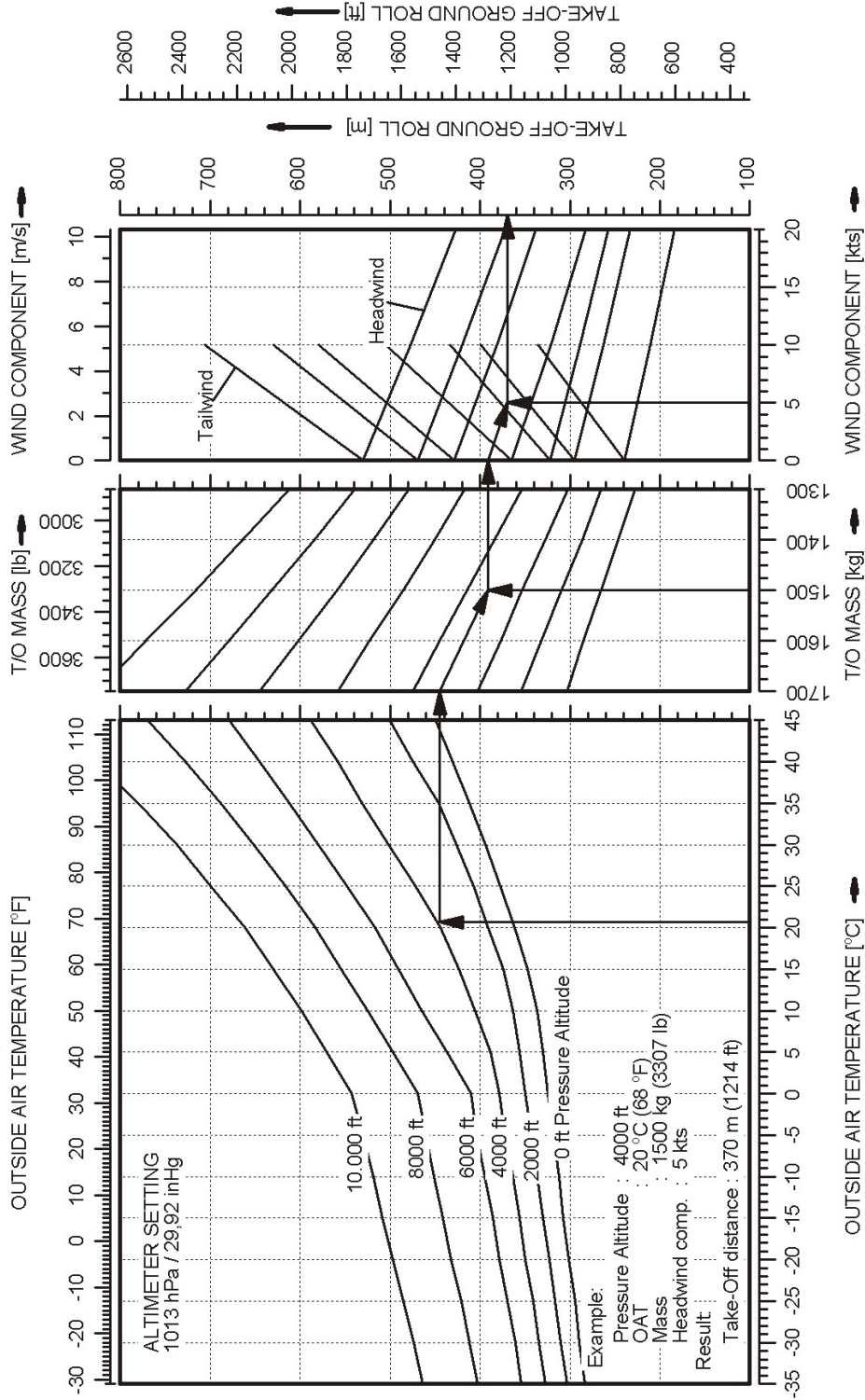
Conditions: Flaps: UP, Power: both MAX @ 2300 RPM, v_R : 75 KIAS, Airspeed: 81 KIAS, Runway: hard, paved

TAKE-OFF DISTANCE OVER 50 ft OBSTACLE (above 1700 kg)

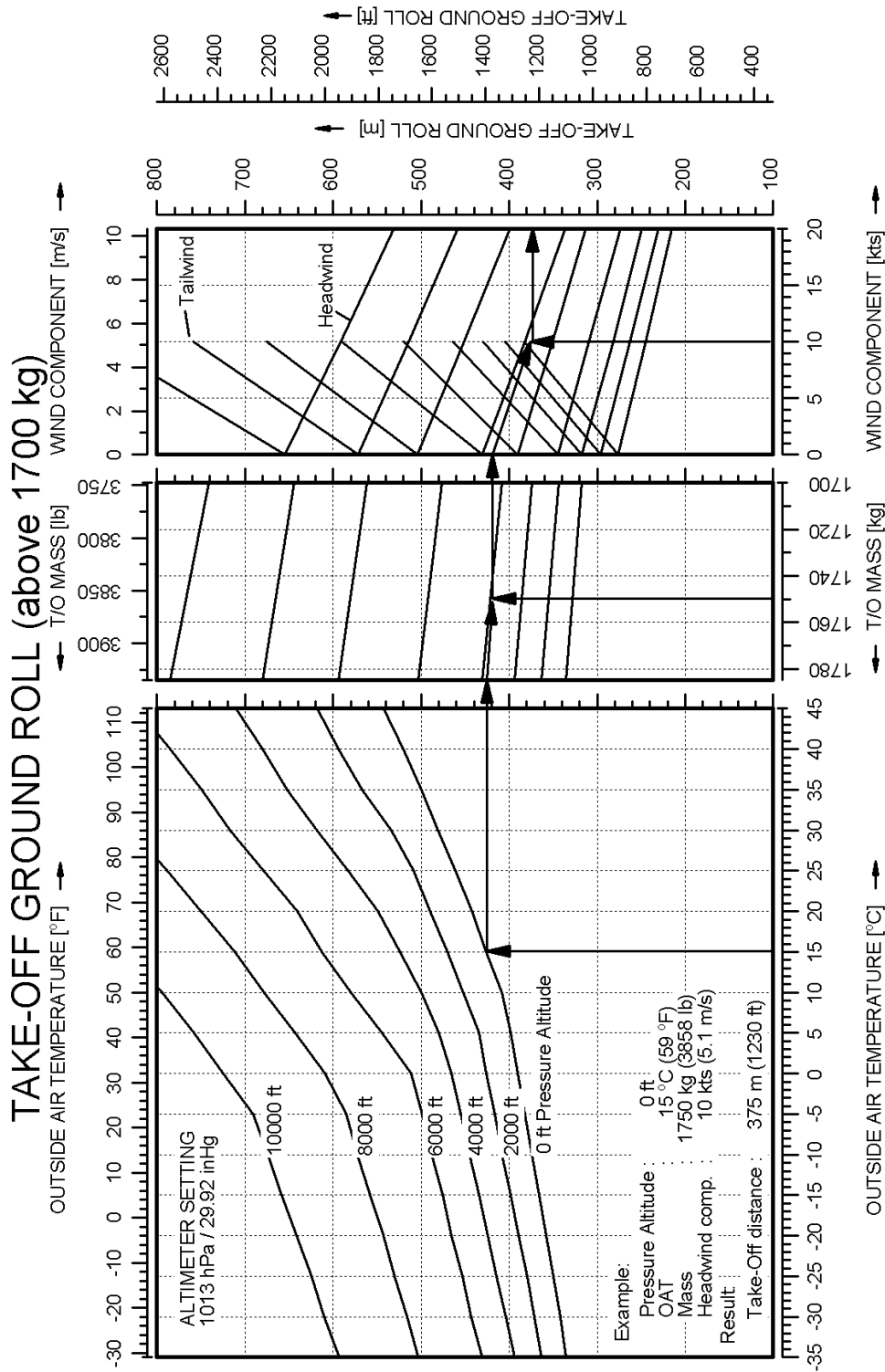


Conditions: Flaps: UP, Power: both MAX @ 2300 RPM, v_R : 76 KIAS, Airspeed: 82 KIAS, Runway: hard, paved

TAKE-OFF GROUND ROLL



Conditions: Flaps: UP, Power: both MAX @ 2300 RPM, v_R : 75 KIAS, Airspeed: 81 KIAS, Runway: hard, paved



Conditions: Flaps: UP, Power: both MAX @ 2300 RPM, v_R : 76 KIAS, Airspeed: 82 KIAS, Runway: hard, paved

5.3.7 CLIMB PERFORMANCE - TAKE-OFF CLIMB

Conditions:

- POWER lever both MAX @ 2300 RPM
- Flaps UP
- Landing gear retracted
- Airspeed
 - up to 1700 kg (3748 lb) 81 KIAS
 - above 1700 kg (3748 lb) 82 KIAS

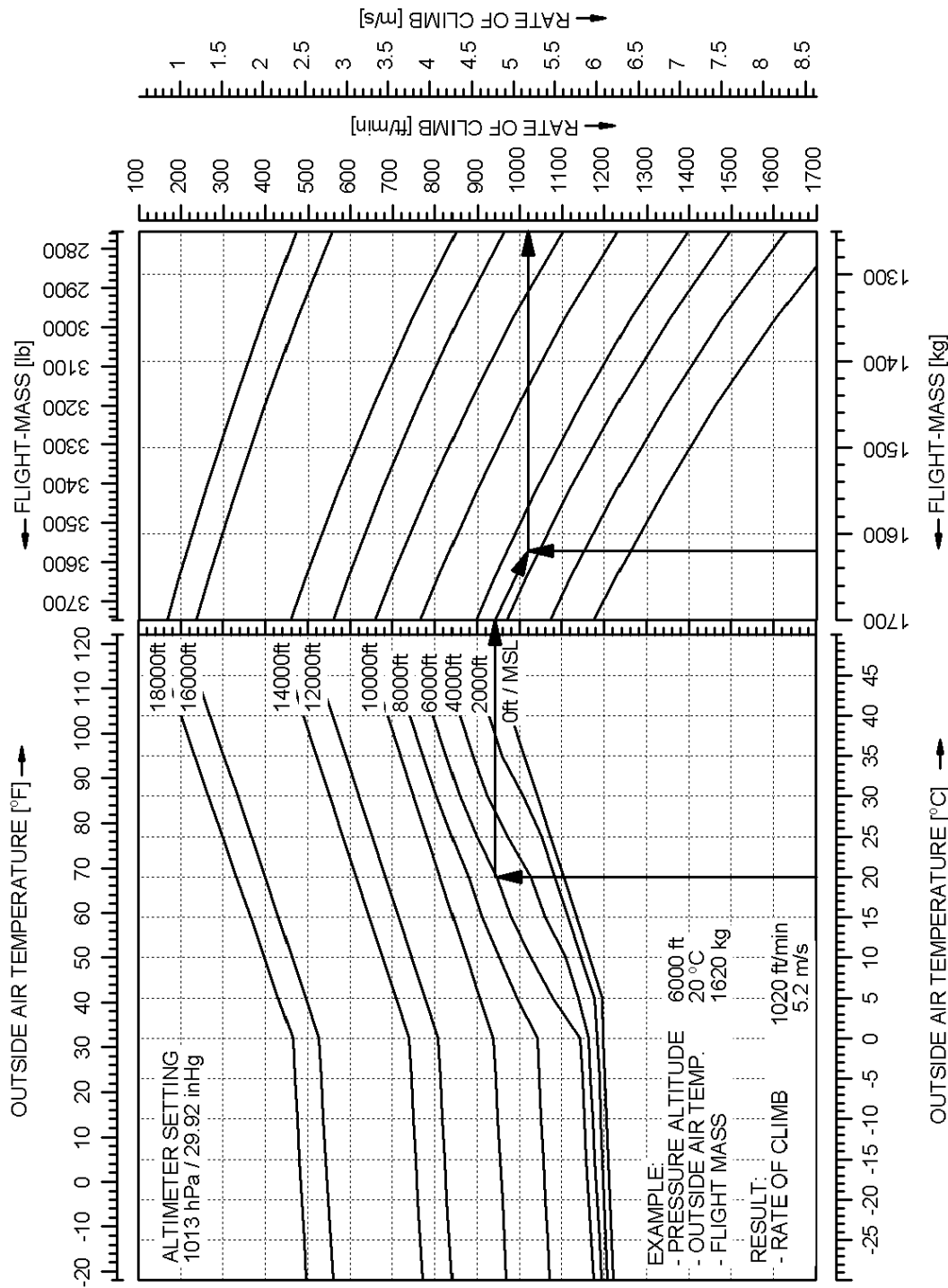
NOTE

The charts on the following pages show the *rate* of climb. The *gradient* of climb cannot easily be determined with a chart, but it can be calculated using the following formulae:

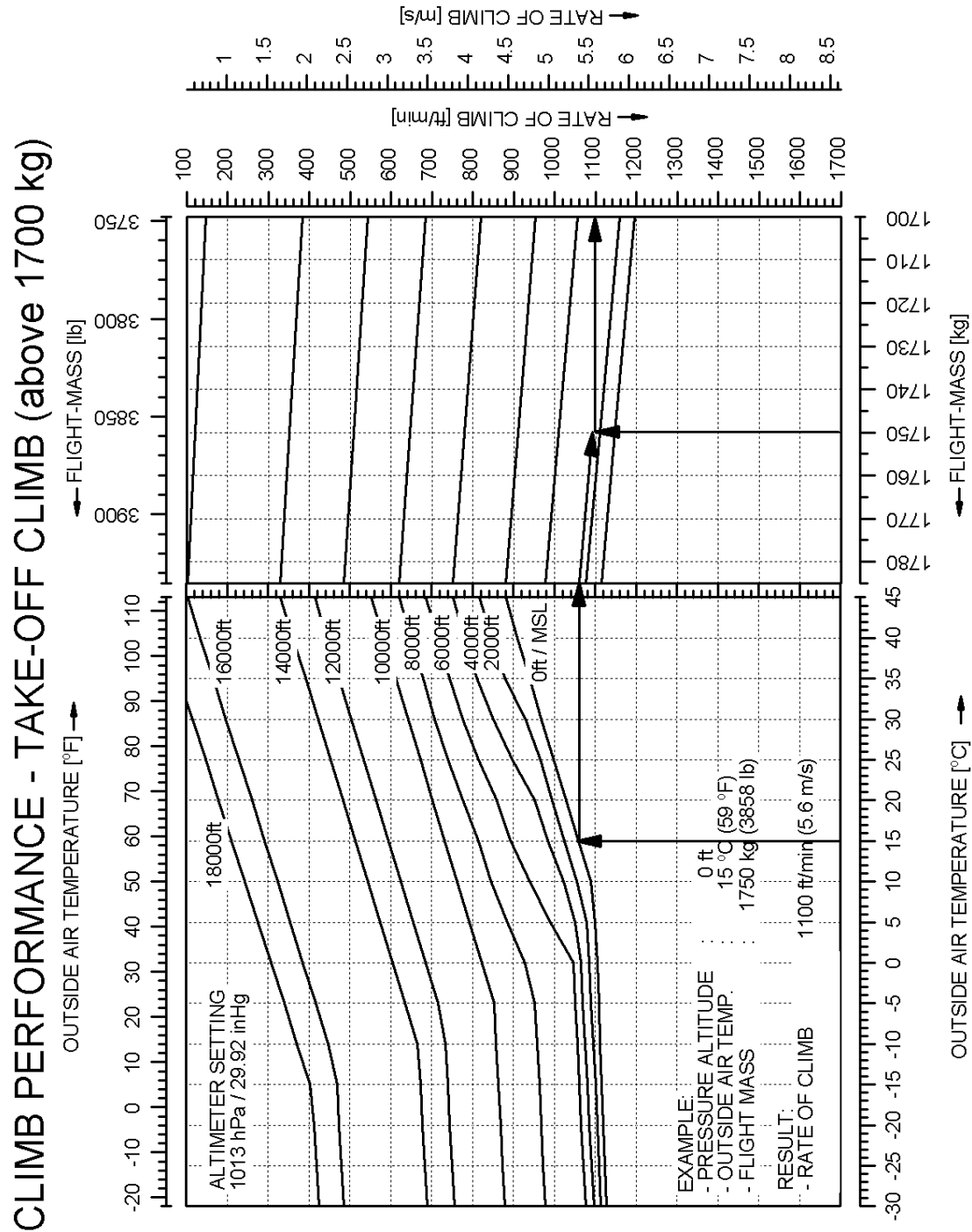
$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

CLIMB PERFORMANCE - TAKE-OFF CLIMB



Conditions: Flaps: UP, Power: both MAX @ 2300 RPM, Landing gear: retracted, Airspeed: 81 KIAS



5.3.8 CLIMB PERFORMANCE - CRUISE CLIMB

Conditions:

- POWER lever both MAX @ 2300 RPM
- Flaps UP
- Airspeed
 - up to 1700 kg (3748 lb) 87 KIAS
 - above 1700 kg (3748 lb) 88 KIAS

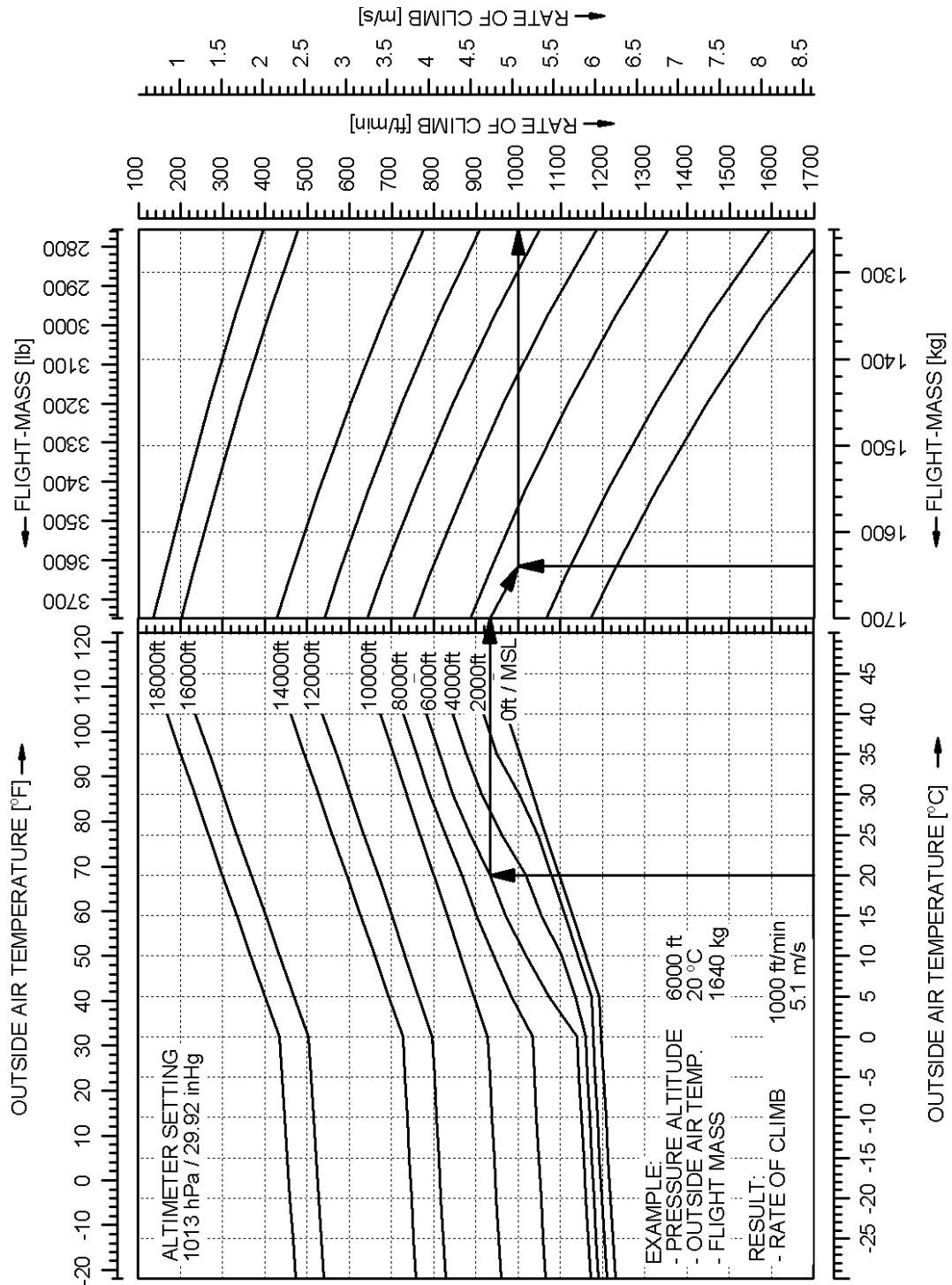
NOTE

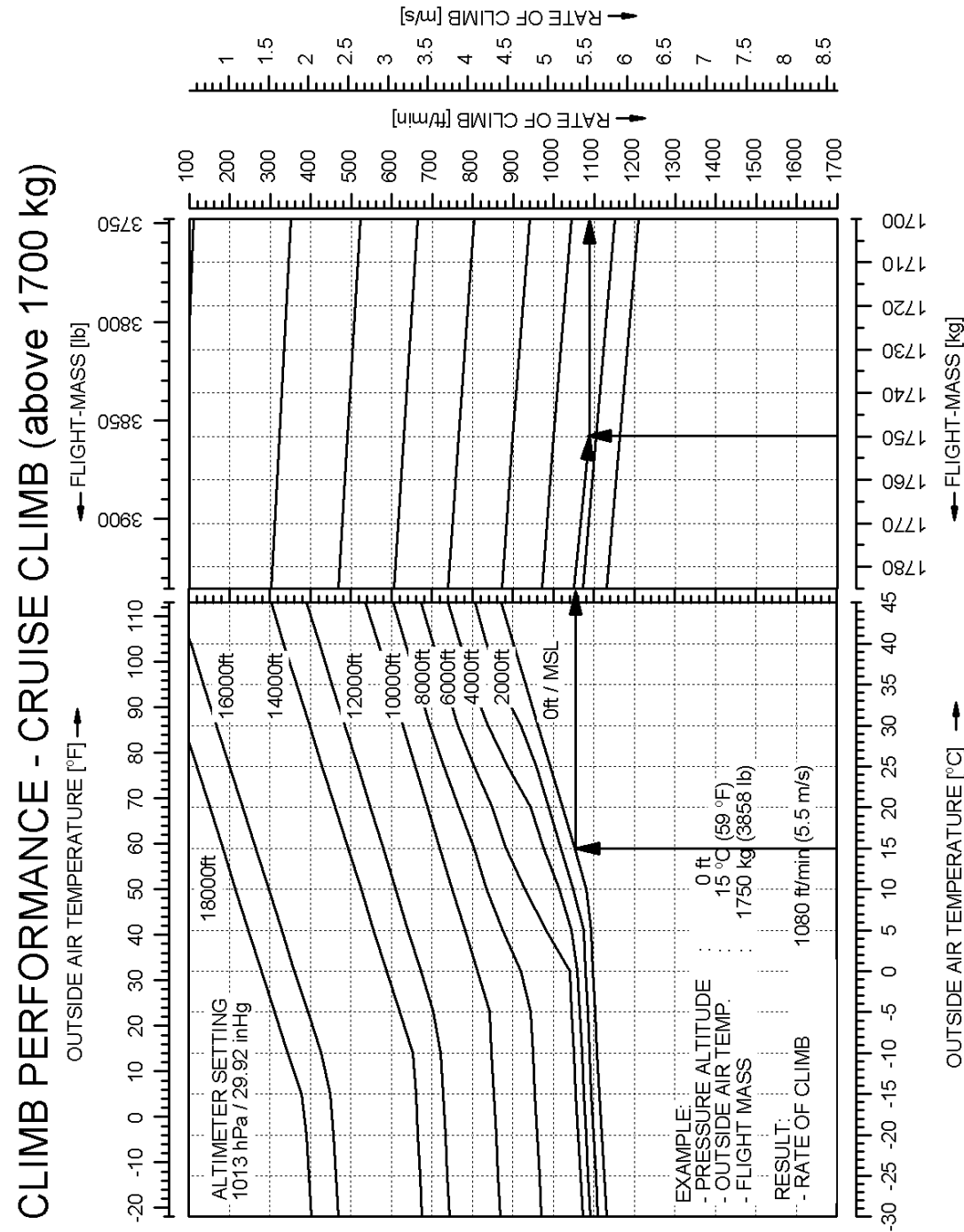
The graphs on the following pages show the *rate* of climb.
 The *gradient* of climb cannot easily be determined with a graph, but it can be calculated using the following formulae:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

CLIMB PERFORMANCE - CRUISE CLIMB





Conditions: Flaps: UP, Power: both MAX @ 2300 RPM, Airspeed: 88 KIAS

5.3.9 ONE ENGINE INOPERATIVE CLIMB PERFORMANCE

Conditions:

- Remaining engine (RH) MAX @ 2300 RPM
- Dead engine feathered and secured
- Flaps UP
- Airspeed 85 KIAS
- Landing gear retracted
- Zero sideslip established

NOTE

With respect to handling and performance, the left-hand engine (pilots view) is considered the "critical" engine.

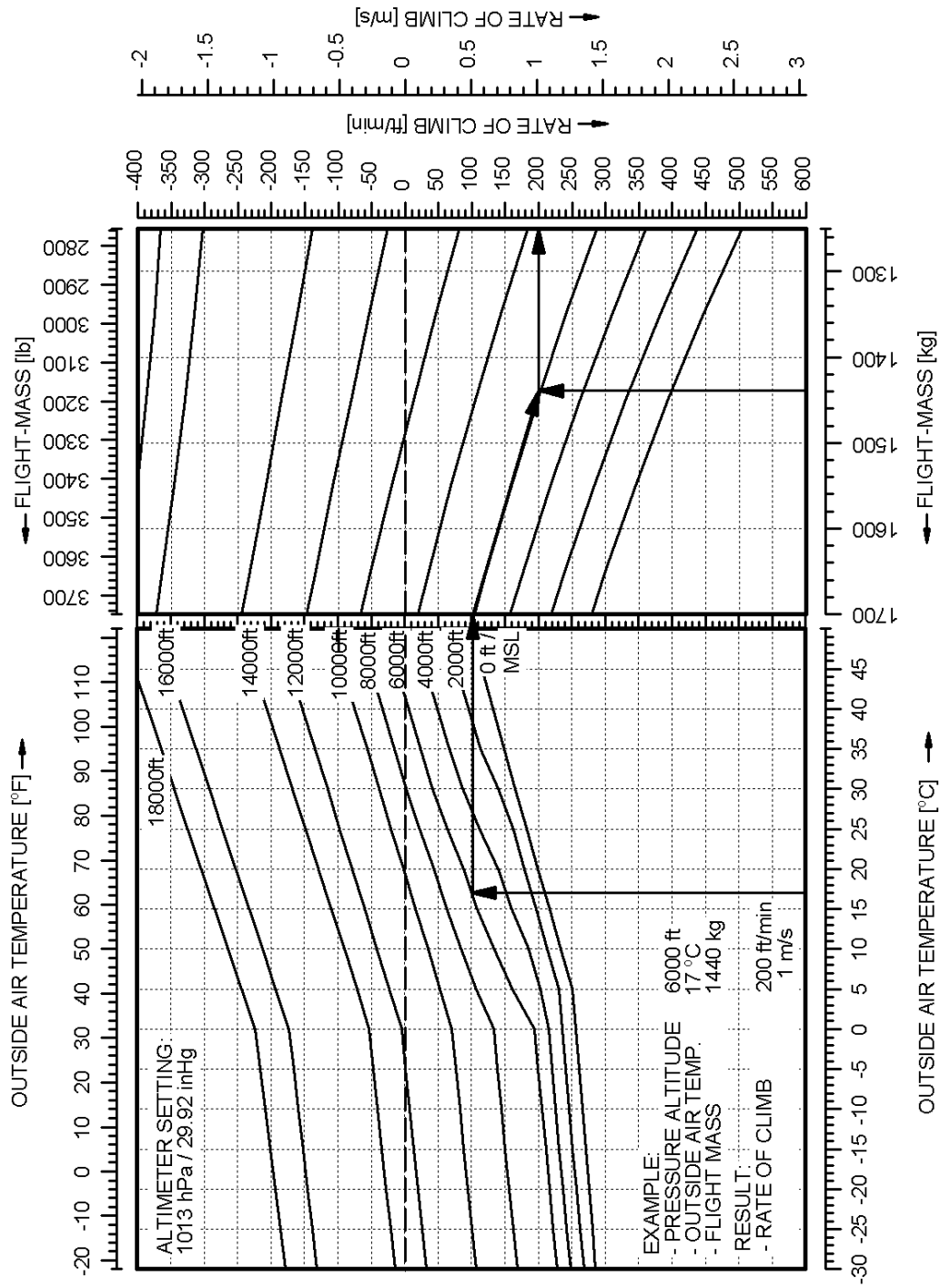
NOTE

The graphs on the following pages show the *rate* of climb. The *gradient* of climb cannot easily be determined with a graph, but it can be calculated using the following formulae:

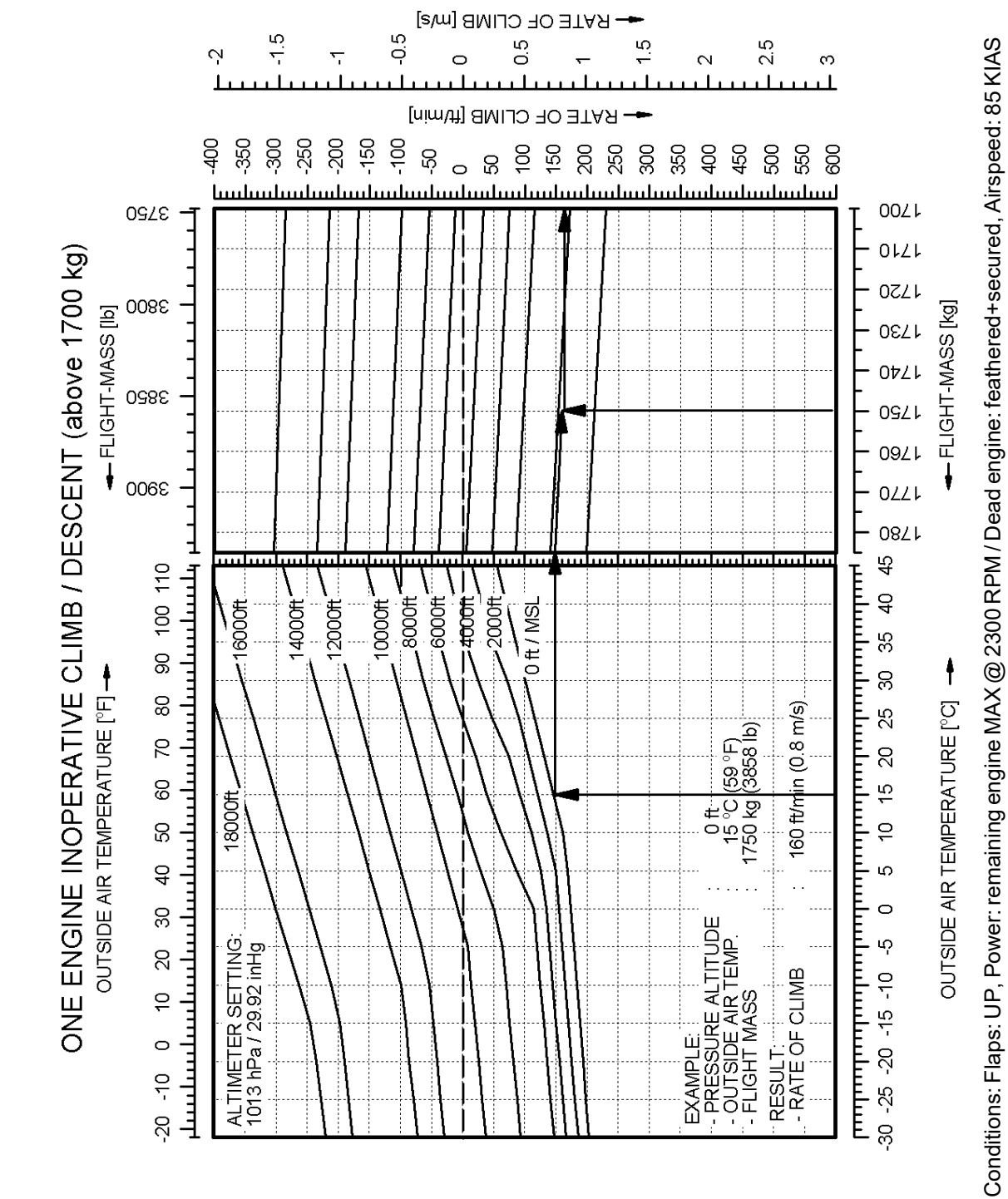
$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.95$$

$$\text{Gradient [\%]} = \frac{\text{ROC [m/s]}}{\text{TAS [KTAS]}} \cdot 190$$

ONE ENGINE INOPERATIVE CLIMB / DESCENT



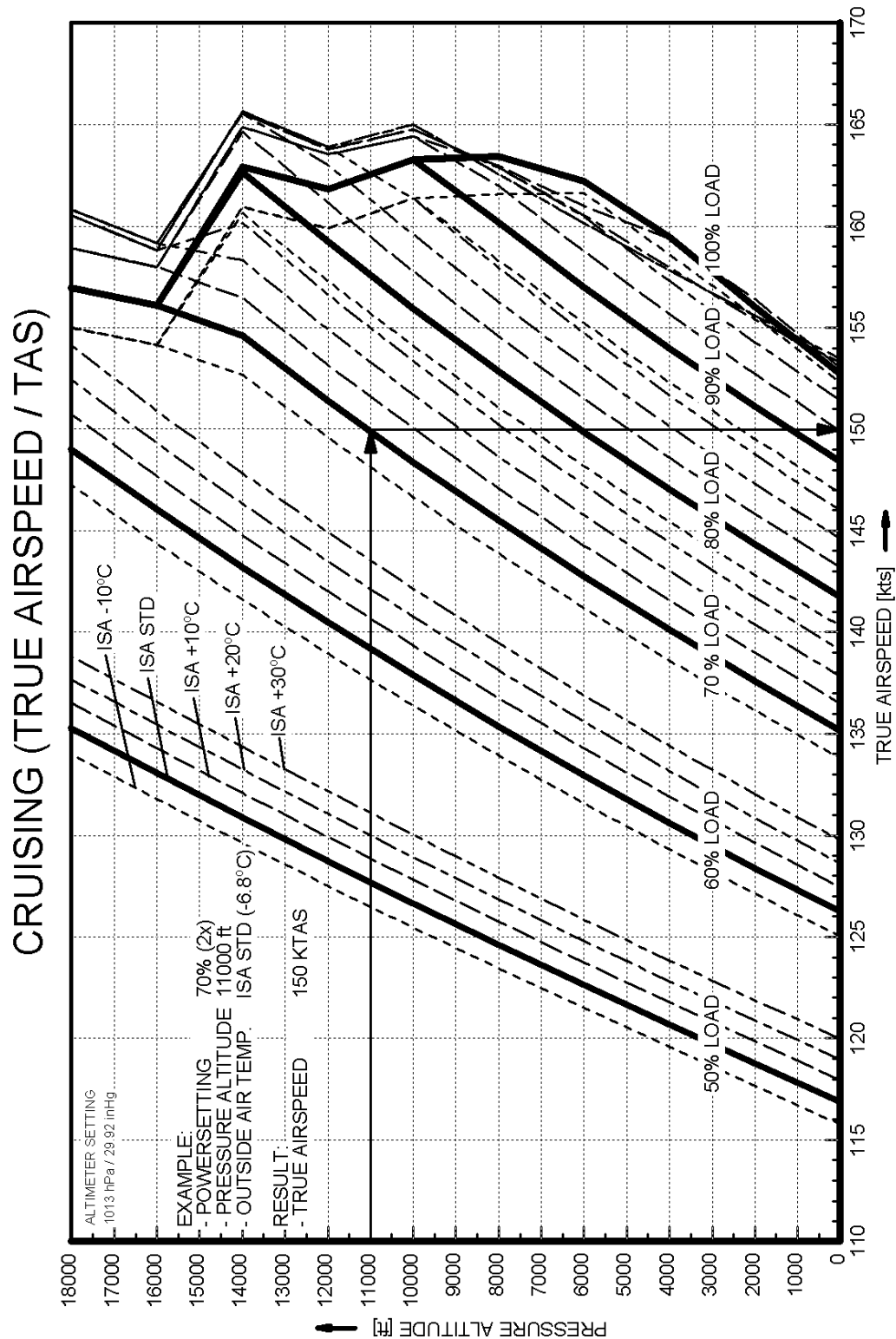
Conditions: Flaps: UP, Power: remaining engine MAX @ 2300 RPM / Dead engine: feathered+secured, Airspeed: 85 KIAS



5.3.10 CRUISING (TRUE AIRSPEED TAS)

Conditions:

- Engines all operating
- POWER lever as required to adjust selected
displayed LOAD [%]
- Flaps UP
- Landing gear retracted



Conditions: Engines: all operating, Power: as required to adjust selected LOAD [%], Flaps: UP, Landing gear: retracted

5.3.11 LANDING DISTANCE

Conditions:

- POWER lever both IDLE
- Flaps LDG
- Runway level, asphalt surface, dry

Values for ISA and MSL, at 1700 kg (3748 lb), Approach Speed 79 KIAS	
Landing distance over a 50 ft (15 m) obstacle	572 m (1877 ft)
Ground roll	323 m (1060 ft)

NOTE

If OÄM 42-195 is not carried out a landing with a mass between 1700 kg (3748 lb) and 1785 kg (3935 lb) constitutes an abnormal operating procedure.

Values for ISA and MSL, at 1785 kg (3935 lb), Approach Speed 82 KIAS	
Landing distance over a 50 ft (15 m) obstacle	710 m (2329 ft)
Ground roll	397 m (1302 ft)

WARNING

For a safe landing the available runway length must be at least equal to the landing distance over a 50 ft (15 m) obstacle.

WARNING

Poor maintenance condition of the airplane, deviation from the given procedures, uneven runway, as well as unfavorable external factors (high temperature, rain, unfavorable wind conditions, including cross-wind) will increase the landing distance.

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CAUTION

The figures in the following NOTE are typical values. On wet ground or wet soft grass covered runways the landing distance may become significantly longer than stated below. In any case the pilot must allow for the condition of the runway to ensure a safe landing.

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.

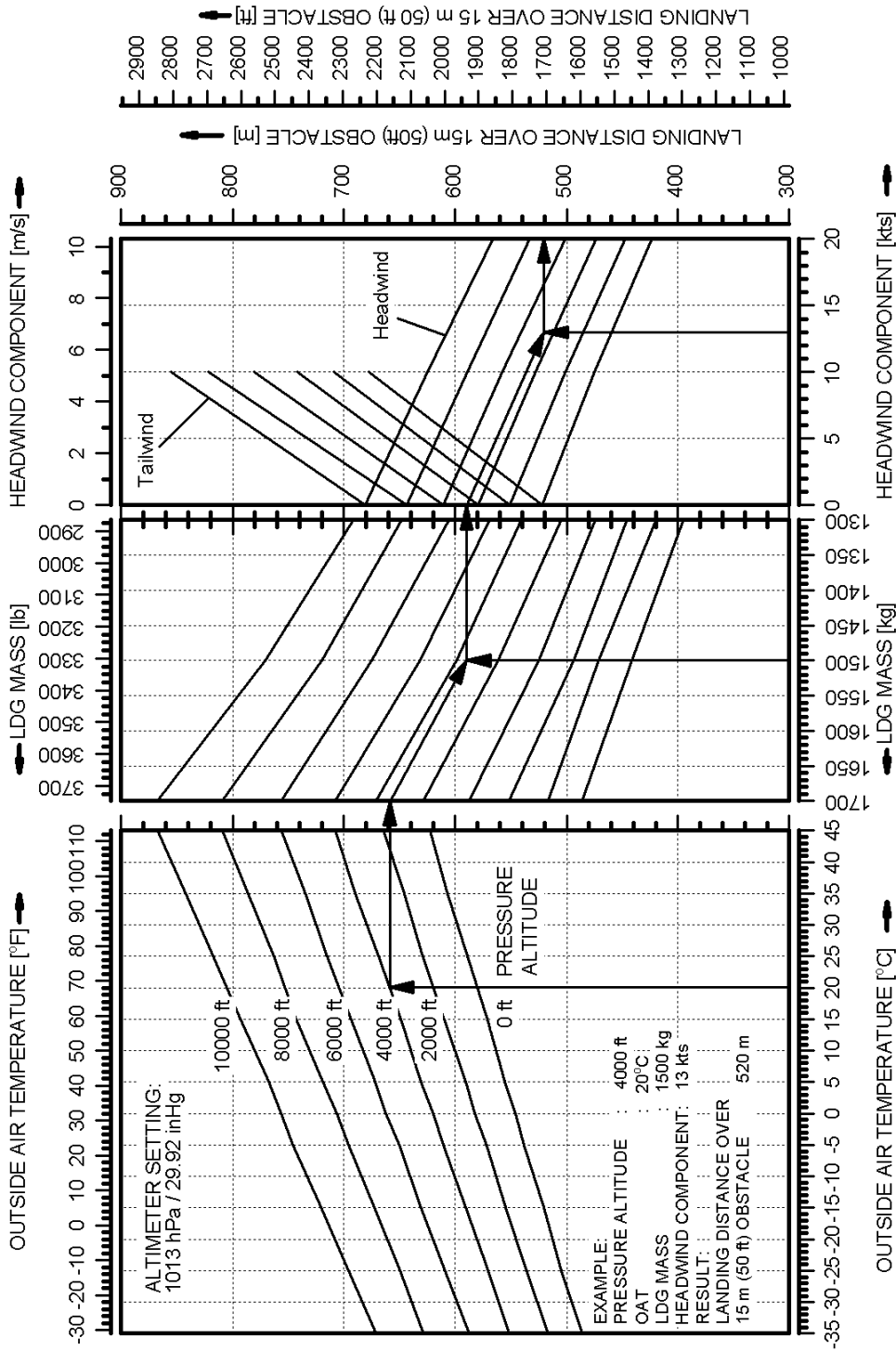
NOTE

For wet grass, an additional 10 % increase in landing roll must be expected.

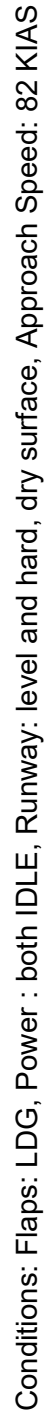
NOTE

A downhill 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 %. The effect on the landing roll can be greater.

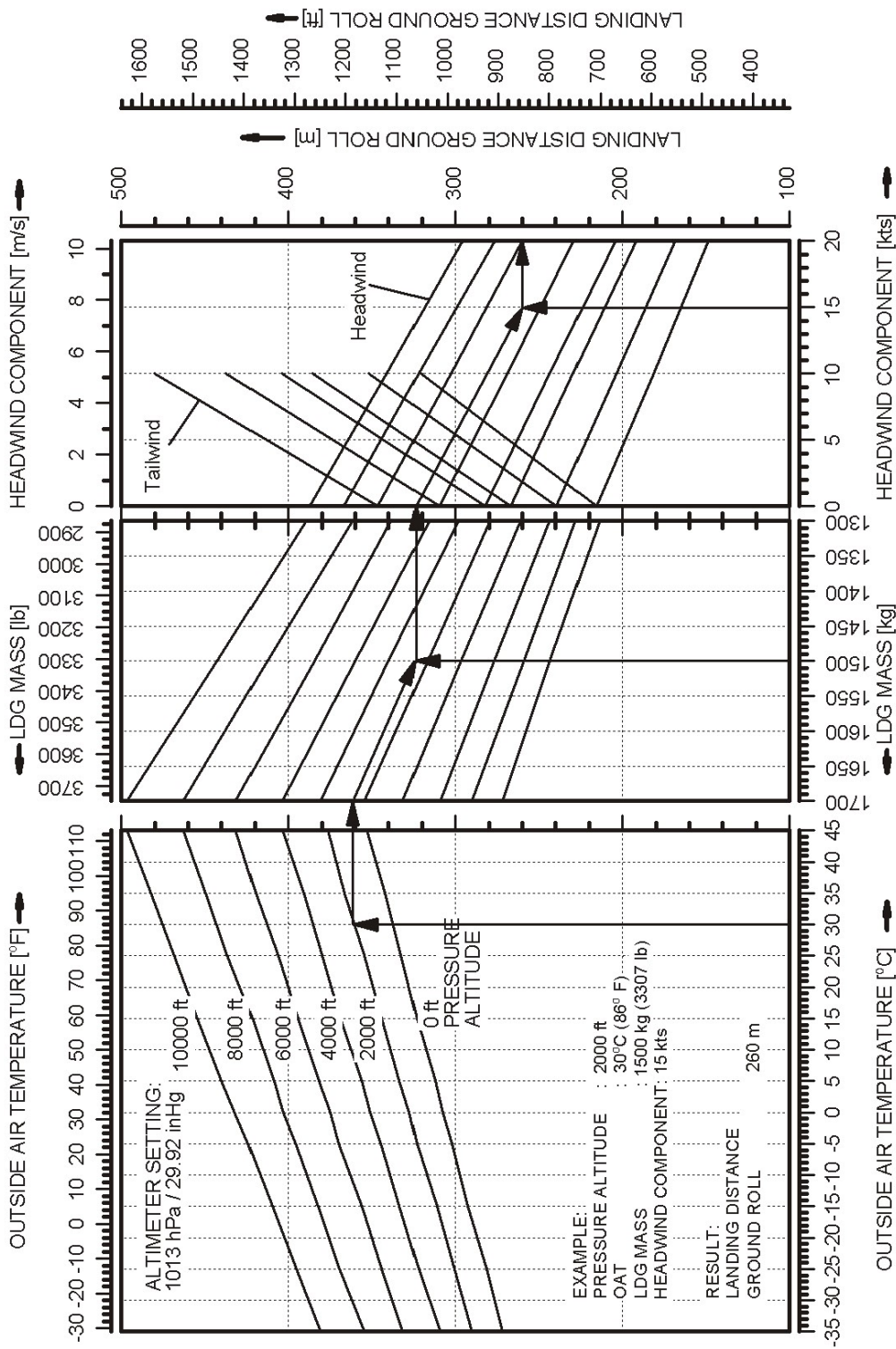
LANDING DISTANCE OVER 15 m (50 ft) OBSTACLE



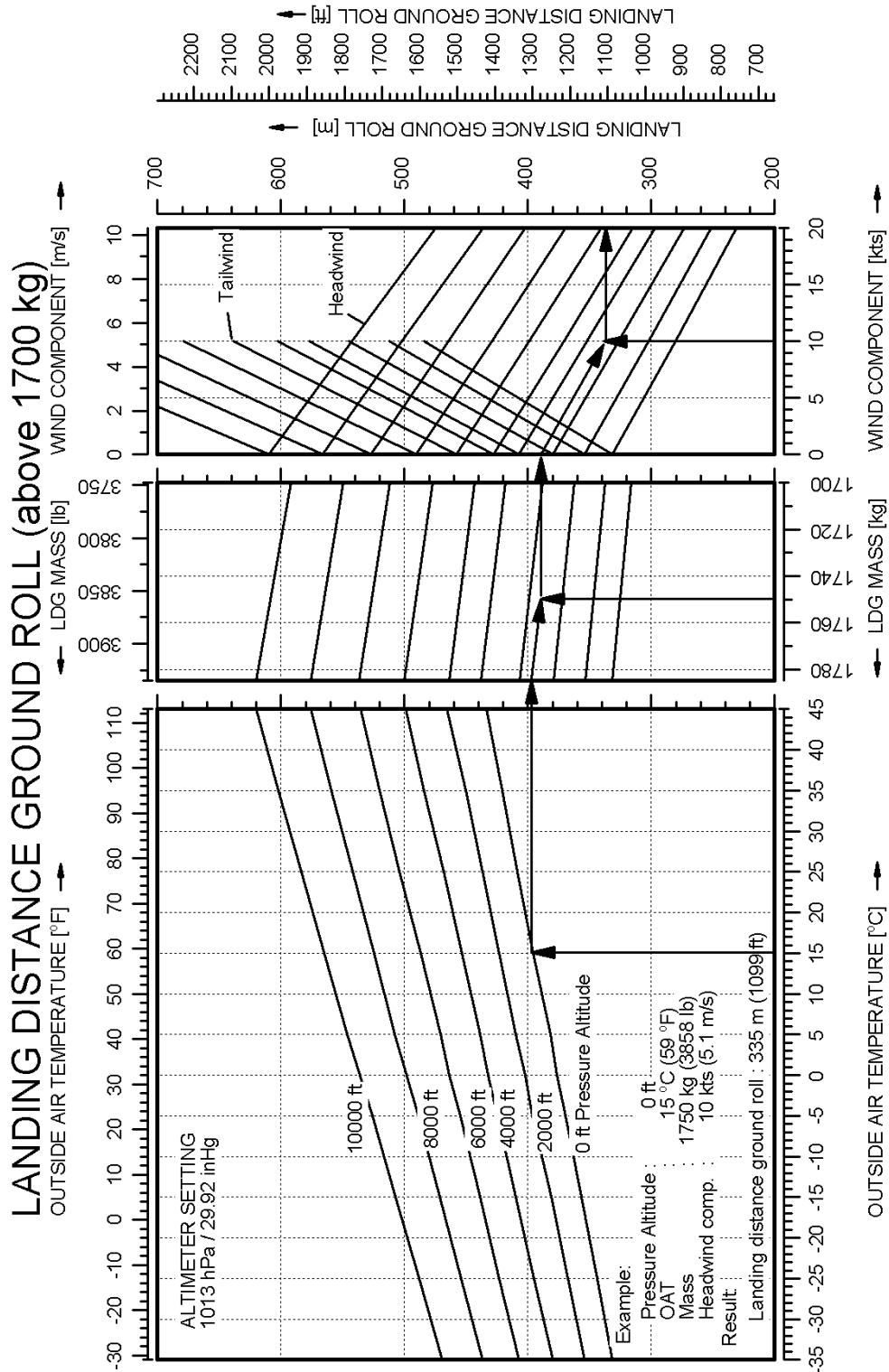
Conditions: Flaps: LDG, Power: both IDLE, Runway: level and hard, dry surface, Approach Speed: 79 KIAS



LANDING DISTANCE GROUND ROLL



Conditions: Flaps: LDG, Power: both IDLE, Runway: level and hard, dry surface, Approach Speed: 79 KIAS



Conditions: Flaps: LDG, Power: both IDLE, Runway: level and hard, dry surface, Approach Speed: 82 KIAS

5.3.12 GRADIENT OF CLIMB ON GO-AROUND

Conditions:

- POWER lever both MAX @ 2300 RPM
- Flaps LDG
- Landing gear extended
- Airspeed:
 - up to 1700 kg (3748 lb) 79 KIAS
 - above 1700 kg (3748 lb) 82 KIAS

Value for ISA and MSL, at 1700 kg (3748 lb)	
Constant gradient of climb	5.25 % (equals 3.0° climb angle) or 400 ft/min

NOTE

If OÄM 42-195 is not carried out a landing with a mass between 1700 kg (3748 lb) and 1785 kg (3935 lb) constitutes an abnormal operating procedure.

Value for ISA and MSL, at 1785 kg (3935 lb)	
Constant gradient of climb	4.30 % (equals 2.5° climb angle) or 340 ft/min

5.3.13 APPROVED NOISE DATA

Max. Flight Mass 1785 kg (3935 lb)

ICAO Annex 16 Chapter X, App.6 79.1 dB(A)

JAR-36 Subpart C 79.1 dB(A)

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CHAPTER 6

MASS AND BALANCE

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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). The set of items marked as 'installed' constitutes the *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

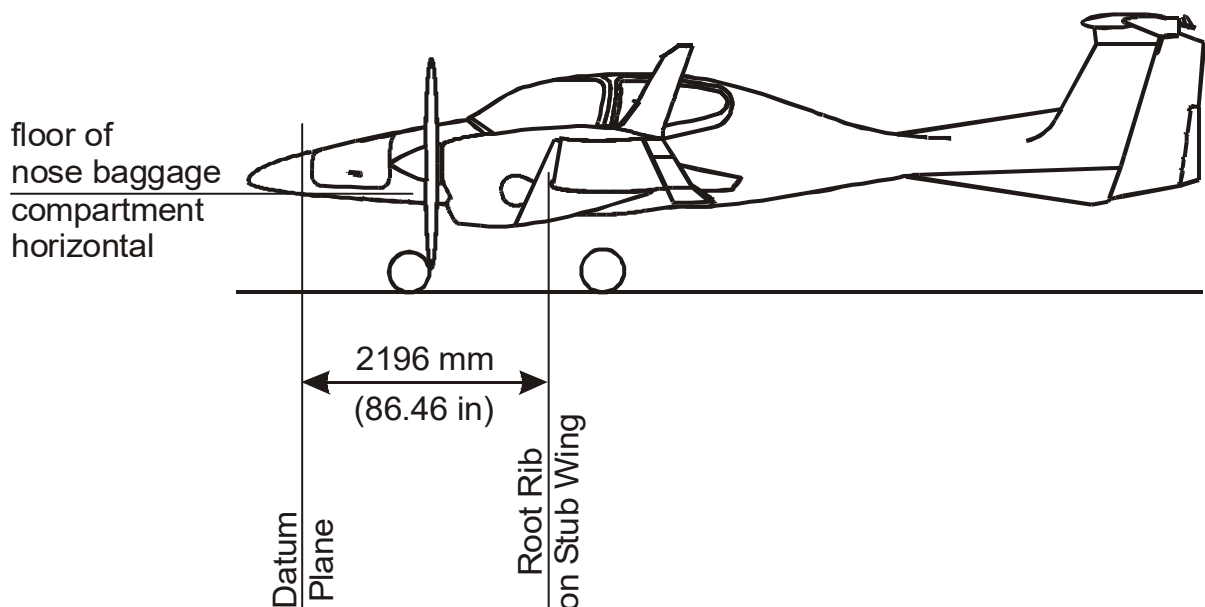
Refer to Section 1.6 - UNITS OF MEASUREMENT for conversion of SI units to US units and vice versa.

NOTE

The mass of the winter kit - ventilation is negligible. The mass and balance data of the airplane therefore remain unchanged.

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 m (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 fluid.

Hydraulic fluid (for the retractable gear).

Engine oil (2 x 6.0 liter = 2 x 6.3 qts).

Coolant (2 x 6.0 liter = 2 x 6.3 qts).

Gearbox oil (2 x 0.9 liter = 2 x 0.95 qts).

Unusable fuel in main fuel tanks (2 x 1.0 US gal = 2 x 3.8 liter).

Unusable fuel in auxiliary fuel tanks (if installed, 2 x 0.5 US gal = 2 x 1.9 liter).

DA 42 AFM with OÄM 42-102 Garmin GFC 700	 <i>Diamond</i> AIRCRAFT	Mass and Balance
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DA 42 AFM with OÄM 42-102 Garmin GFC 700	 <i>Diamond</i> AIRCRAFT	Mass and Balance
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MASS AND BALANCE REPORT

[illegible]

6.4 FLIGHT MASS AND CENTER OF GRAVITY

The following information enables you to operate your DA 42 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 - LOADING DIAGRAM

6.4.3 - CALCULATION OF LOADING CONDITION

6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE

6.4.5 - PERMISSIBLE MOMENT RANGE

The diagrams should be used as follows:

1. 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 DA 42' in Table 6.4.3 - CALCULATION OF LOADING CONDITION.
2. Read the fuel quantity indicators to determine the fuel quantity in the main fuel tanks.
3. Determine the fuel quantity in the auxiliary fuel tanks (if installed).

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 in 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 auxiliary tanks are in use, both tanks must be refueled to the maximum level to provide proper information for the pilot about the fuel quantity in the auxiliary fuel tanks.

If the auxiliary tanks are not in use, the pilot must ensure that they are empty.

4. 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 6.4.3 - CALCULATION OF LOADING CONDITION.
5. 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 8 for the condition with empty fuel tanks, and row 11 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. Graphical method:

Diagram 6.4.2 - LOADING DIAGRAM is used to determine the moments. The masses and moments for the individual items of loading are added. Then Diagram 6.4.5 - PERMISSIBLE MOMENT RANGE is used to check whether the total moment associated with the total mass is in the permissible range.

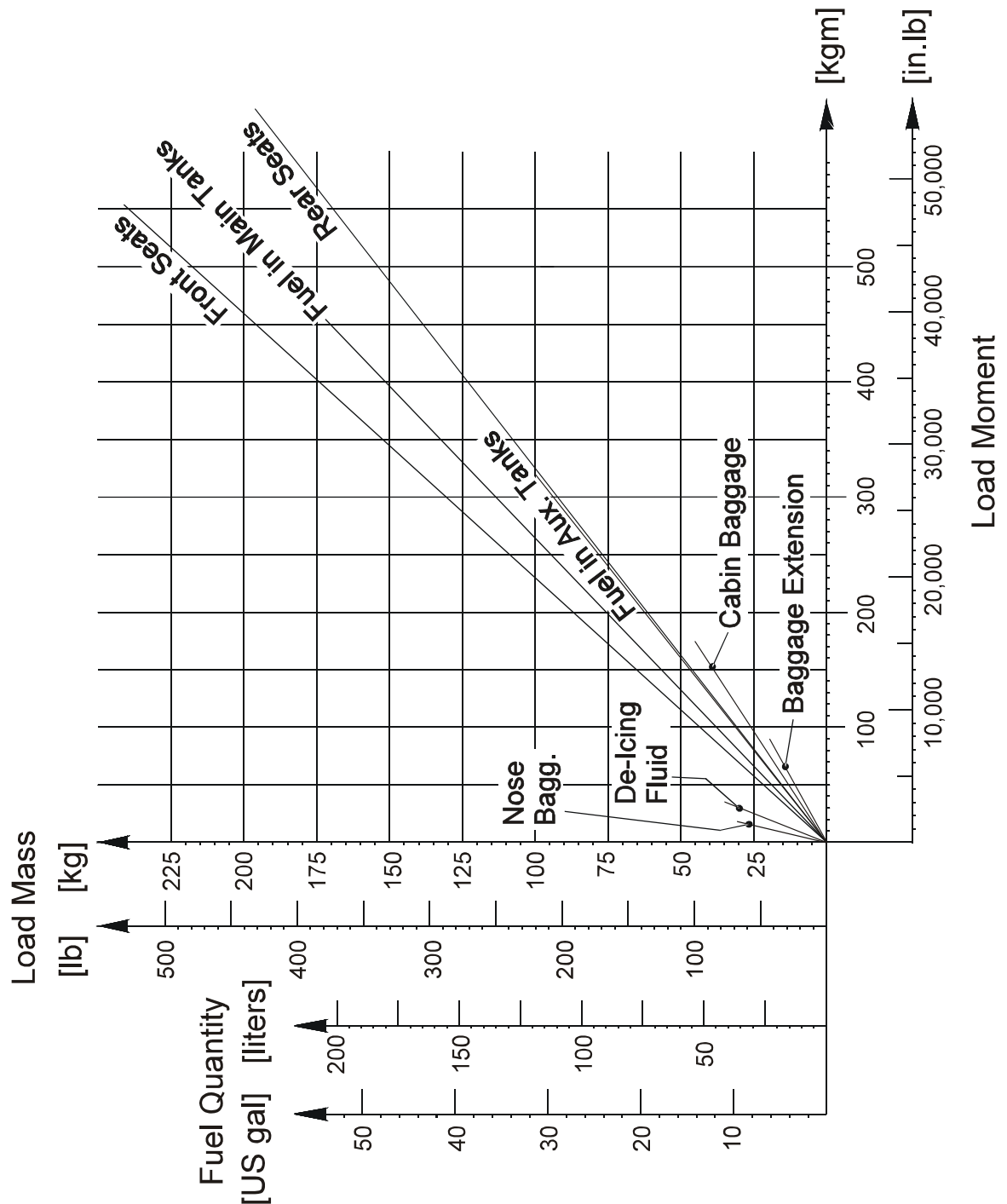
The result found with the graphical method is however inaccurate. In doubtful cases the result must be verified using the exact method given above.

6.4.1 MOMENT ARMS

The most important lever arms aft of the Datum Plane:

Item		Lever Arm	
		[m]	[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
De-Icing Fluid (if equipment installed, OÄM 42-053 or OÄM 42-054)		1.00	39.4
Baggage in Compartments	Nose	0.60	23.6
	Cabin	3.89	153.1
	Extension	4.54	178.7

6.4.2 LOADING DIAGRAM



6.4.3 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.

1. Complete the form on the next page.
2. Divide the total moments from rows 8 and 11 by the related total mass to obtain the CG positions.

In our example:

empty tanks:		$3625.1 \text{ kgm} / 1527.5 \text{ kg} = 2.373 \text{ m}$
		$314,656 \text{ in.lb} / 3368 \text{ lb} = 93.43 \text{ in}$

full tanks: $4312.1 \text{ kgm} / 1770.5 \text{ kg} = 2.436 \text{ m}$
 $374.295 \text{ in.lb} / 3904 \text{ lb} = 95.87 \text{ in}$

3. Locate the values in the diagram in Section 6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE. If the CG positions and related masses fall into the permitted area, the loading condition is allowable.

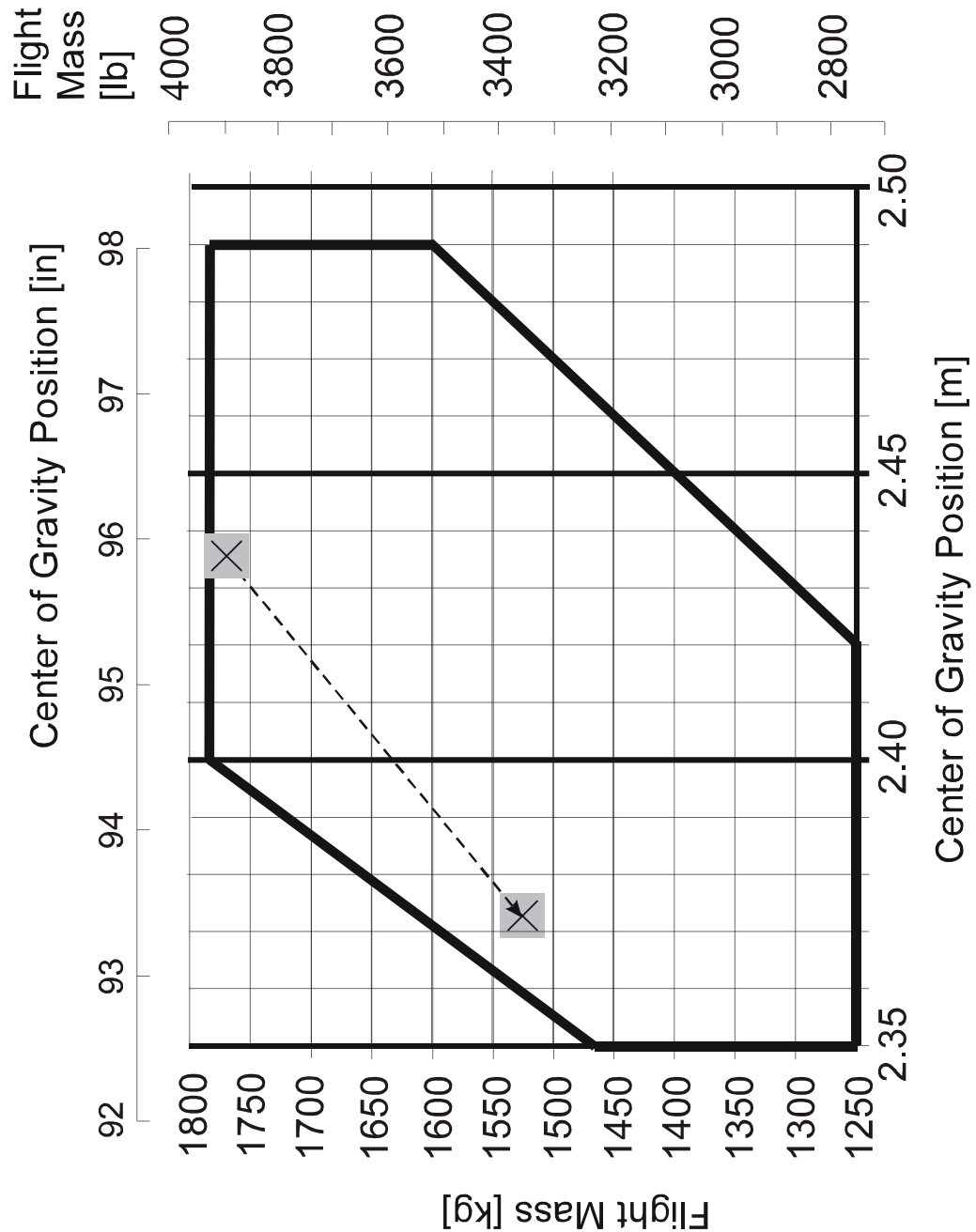
Our example shows allowable loading conditions.

CALCULATION OF LOADING CONDITION	DA 42 (Example)		Your DA 42	
	Mass [kg] [lb]	Moment [kgm] [in.lb]	Mass [kg] [lb]	Moment [kgm] [in.lb]
1. Empty mass (from Mass and Balance Report)	1250 2756	2937.5 254,965		
2. Front seats Lever arm: 2.30 m (90.6 in)	160 353	368.0 31,982		
3. Rear seats Lever arm: 3.25 m (128.0 in)	70 154	227.5 19,712		
4. Nose baggage compt. Lever arm: 0.60 m (23.6 in)	5 11	3.0 260		
5. Cabin baggage compt. Lever arm: 3.89 m (153.1 in)	10 22	38.9 3,368		
6. Baggage extension Lever arm: 4.54 m (178.7 in)	5 11	22.7 1,966		
7. De-icing fluid (if installed; see NOTE on previous page) (1.1 kg/liter) (9.2 lb/US gal) Lever arm: 1.00 m (39.4 in)	27.5 61	27.5 2,403		
8. Total mass & total moment with empty fuel tanks (Total of 1.-7.) Note: Maximum zero fuel masses: -1650 kg (3638 lb) -1674 kg (3690 lb) if OÄM 42-188 is carried out -1730 kg (3814 lb) if OÄM 42-188 and OÄM 42-195 are carried out	1527.5 3368	3625.1 314,656		
9. Usable fuel, main tanks (0.84 kg/liter) (7.01 lb/US gal) Lever arm: 2.63 m (103.5 in)	159 351	418.2 36,329		
10. Usable fuel, auxiliary tanks (if installed; OÄM 42-056) (0.84 kg/liter) (7.01 lb/US gal) Lever arm: 3.20 m (126.0 in)	84 185	268.8 23,310		

CALCULATION OF LOADING CONDITION	DA 42 (Example)		Your DA 42	
	Mass [kg] [lb]	Moment [kgm] [in.lb]	Mass [kg] [lb]	Moment [kgm] [in.lb]
11. Total mass & total moment with fuel & de-icing fluid (Total of 8. through 10)	1770.5 3904	4312.1 374,295		

The CG's shown in the following diagrams are those from the example in Section 6.4.3 - CALCULATION OF LOADING CONDITION, rows 8 and 11.

6.4.4 PERMISSIBLE CENTER OF GRAVITY RANGE



The flight CG position must be within the following limits:

Most forward flight CG:

2.35 m (92.52 in) aft of Datum Plane at 1250 kg (2756 lb)

2.35 m (92.52 in) aft of Datum Plane at 1468 kg (3236 lb)

2.40 m (94.49 in) aft of Datum Plane at max. take-off mass (see Section 2.7)

linear variation in between

Most rearward flight CG:

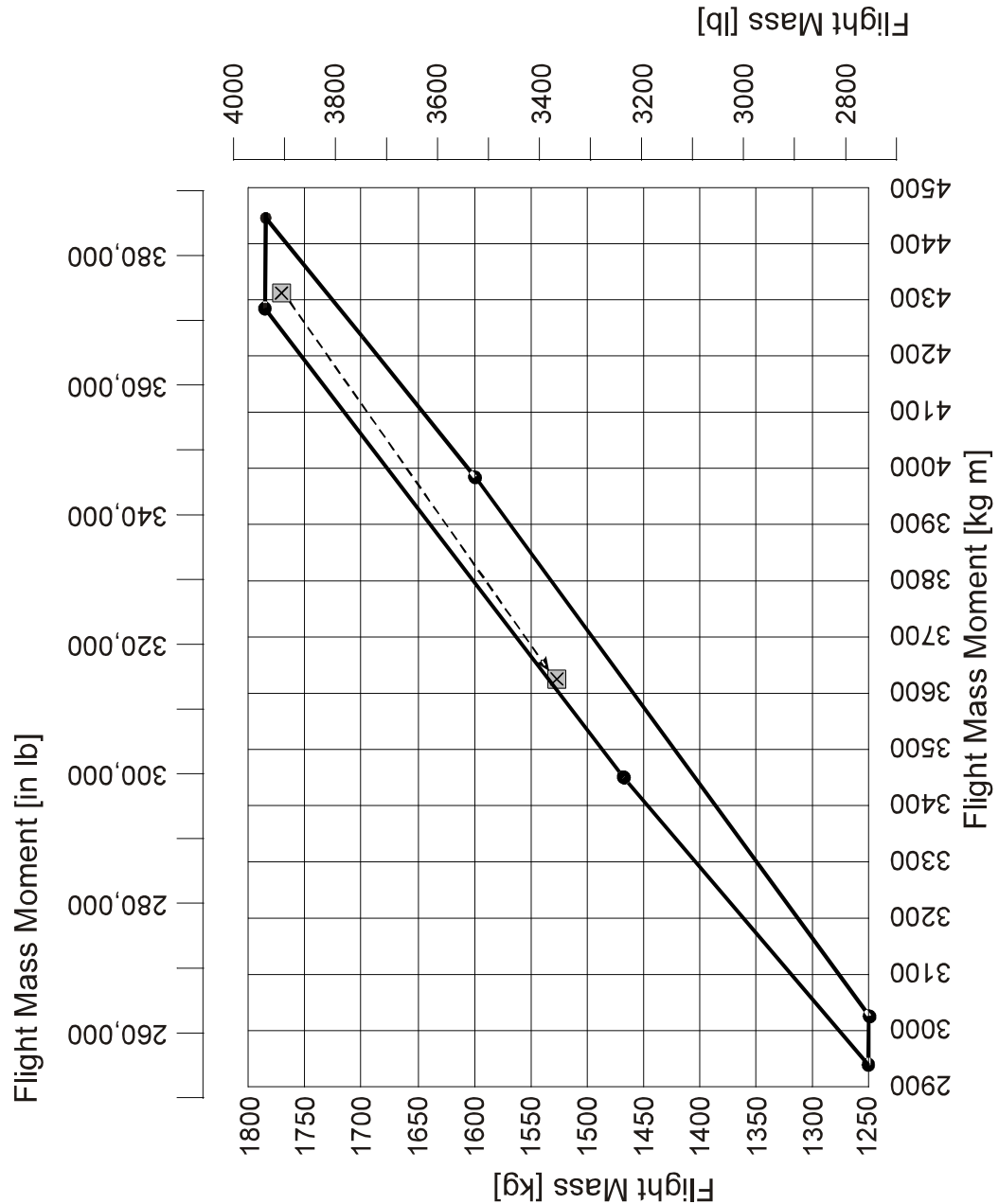
2.42 m (95.28 in) aft of Datum Plane at 1250 kg (2756 lb)

2.49 m (98.03 in) aft of Datum Plane at 1600 kg (3527 lb)

2.49 m (98.03 in) aft of Datum Plane at max. take-off mass (see Section 2.7)

linear variation in between

6.4.5 PERMISSIBLE MOMENT RANGE



The flight mass moments shown in the diagram are those from the example in Table 6.4.3

(a) CALCULATION OF LOADING CONDITION, rows 8 and 11.

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

All equipment that is approved for installation in the DA 42 is shown in the *Equipment List* below.

NOTE

The equipment listed below cannot be installed in any arbitrary combination. The airplane manufacturer must be contacted before removing or installing equipment, with the exception of replacing a unit by an identical unit.

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	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
AVIONICS COOLING									
Avionics Cooling Fan	SAFE 328	305 467-00	Sandia Aerospace						
PFD Cooling Fan	SAFE 128	305 468-00	Sandia Aerospace						
MFD Cooling Fan	SAFE 128	305 468-00	Sandia Aerospace						
AUTOPILOT SYSTEM									
Pitch servo	GSA 81	011-00878-00	Garmin						
Pitch servo mount	GSM 85	011-00894-07	Garmin						
Roll servo	GSA 81	011-00878-00	Garmin						
Roll servo mount	GSM 85	011-00894-07	Garmin						
Pitch trim servo	GSA 81	011-00878-00	Garmin						
Pitch trim servo mount	GSM 85	011-00894-04	Garmin						
Yaw servo	GSA 80	011-00877-00	Garmin						
Yaw servo mount	GSM 85	011-00894-08	Garmin						
Control stick		DA4-2213-12-90	Diamond Aircraft						
CWS switch		031-00514-0000	Bendix/King						
AP-Disc switch		031-00428-0000	Bendix/King						
Trim switch assy		200-09187-0000	Bendix/King						
ELECTRICAL POWER									
Main Battery	G-243 (CB24-11M)		Gill (Concorde)			28.0	12.7	49.170	1.249
Main Battery	RG24-11M		Concorde			26.5	12.0	49.170	1.249
Main Battery	RG24-15M		Concorde			29.5	13.4	49.170	1.249
Excitation Battery (2 pcs.)	LC-R121R3P		Panasonic						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Excitation Battery (2 pcs.)	NP1.2-12		Yuasa						
Emergency Battery		D60-2560-91-00	Diamond Aircraft						
Emergency Battery (10 pcs.)	CR 123 A		Panasonic						
ECU Backup Battery LH (2 pcs.)	LC-R121R3P		Panasonic						
ECU Backup Battery RH (2 pcs.)	LC-R121R3P		Panasonic						
ECU Backup Battery LH (2 pcs.)	LC-R127R2P		Panasonic						
ECU Backup Battery RH (2 pcs.)	LC-R127R2P		Panasonic						
ECU Backup Battery LH (2 pcs.)	NP1.2-12		Yuasa						
ECU Backup Battery RH (2 pcs.)	NP1.2-12		Yuasa						
ECU Backup Battery LH (2 pcs.)	NP7-12		Yuasa						
ECU Backup Battery RH (2 pcs.)	NP7-12		Yuasa						
External Power Connector		DA4-2443-10-00	Diamond Aircraft						
MISSION EQUIPMENT									
DC-DC Converter		AK 551-9M	Ameri King						
EQUIPMENT									
Safety belt, pilot	5-01-() Series	5-01-1C0710	Schroth			2.110	0.960	92.520	2.350
Safety belt, copilot	5-01-() Series	5-01-1C5710	Schroth			2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-1B5710	Schroth			2.250	1.020	126.800	3.220
Safety belt, RH pax	5-01-() Series	5-01-1B0710	Schroth			2.250	1.020	126.800	3.220
Safety belt, pilot	5-01-() Series	5-01-2G0710	Schroth			2.110	0.960	92.520	2.350
Safety belt, copilot	5-01-() Series	5-01-2G5710	Schroth			2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-2H5710	Schroth			2.250	1.020	126.800	3.220

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Safety belt, RH pax	5-01-() Series	5-01-2H0710	Schroth			2.250	1.020	126.800	3.220
Safety belt, pilot	5-01-() Series	5-01-2G0701	Schroth			2.110	0.960	92.520	2.350
Safety belt, copilot	5-01-() Series	5-01-2G5701	Schroth			2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-2H5701	Schroth			2.250	1.020	126.800	3.220
Safety belt, RH pax	5-01-() Series	5-01-2H0701	Schroth			2.250	1.020	126.800	3.220
ELT unit	C406-1	453-5002-	Artex			3.362	1.525	179.700	4.565
ELT unit	ME406	453-6603-	Artex			2.770	1.260	179.700	4.565
ELT remote switch		345-6196-04	Artex						
ELT antenna		110-338	Artex			0.470	0.213	152.800	3.880
Buzzer		452-6505	Artex						
SAFETY EQUIPMENT									
Fire extinguisher		AIR TOTAL HAL 1	TOTAL Feuerschutz						
Fire extinguisher, portable ¹		A 620 T	Amerex						
Fire extinguisher		337TS	Amerex						
First aid kit									
Emergency axe		G45912	Fiskars						
Emergency egress hammer		D67-2560-80-50	Diamond Aircraft						
Emergency egress hammer		D64-2560-70-50	Diamond Aircraft						
FLIGHT CONTROLS									
Lift detector		C-99701-1	Safe Flight Instr.						
Stall warning buzzer	SC Series	SC 628 ND	Mallory						
Variable elevator stop		D60-2733-12-00	Diamond Aircraft						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Variable elevator stop		D60-2733-12-00_01	Diamond Aircraft						
HYDRAULIC									
Motor pump unit		X11-0001-00-00.00	Hydraulik Mayer						
Hydraulic fluid tank		X11-0002-00-00.00	Hydraulik Mayer						
Hydraulic control unit		X11-0003-00-00.00	Hydraulik Mayer						
High pressure filter		X11-0004-00-00.00	Hydraulik Mayer						
Hydraulic pressure accumulator		X11-0005-00-00.00	Hydraulik Mayer						
MLG hydraulic cylinder, LH		X11-0006-00-00.00/1	Hydraulik Mayer						
MLG hydraulic cylinder, RH		X11-0006-00-00.00/1	Hydraulik Mayer						
NLG hydraulic cylinder		X11-0006-00-00.00/2	Hydraulik Mayer						
NLG hydraulic cylinder		X11-0006-00-00.00/2A	Hydraulik Mayer						
Brake master cylinder (2 pcs.)		10-54A	Cleveland						
Parking valve		60-5D	Cleveland						
Brake assembly		30-52Z	Cleveland						
INDICATING / REC. SYSTEM									
Primary Flight Display (PFD)	GDU 1040	011-00972-02	Garmin			6.400	2.910	70.080	1.780
Primary Flight Display (PFD)	GDU 1040	011-00972-03	Garmin			6.400	2.910	70.080	1.780
Multi Function Display (MFD)	GDU 1043	011-01079-00	Garmin			6.400	2.910	70.080	1.780
Multi Function Display (MFD)	GDU 1045	011-00819-04	Garmin						
LANDING GEAR									
Main landing gear LH		D60-3217-11-00	Diamond Aircraft						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Main landing gear RH		D60-3217-12-00	Diamond Aircraft						
Nose landing gear		D60-3223-00-00	Diamond Aircraft						
Nose landing gear		D60-3223-00-00_1	Diamond Aircraft						
Main landing gear LH		D64-3217-11-00	Diamond Aircraft						
Main landing gear RH		D64-3217-12-00	Diamond Aircraft						
Nose landing gear		D64-3223-00-00_1	Diamond Aircraft						
LIGHTS									
Map / Reading light assy crew		W1461.0.010	Rivoret						
Map Light Assy		D60-3313-11-00_01	Diamond Aircraft						
Cabin Light		W1461.0.010	Rivoret						
Strobe / Pos. light assy LH	A600-PR-D-28	01-0790006-05	Whelen			1.590	0.719	103.800	2.638
Strobe / Pos. light assy RH	A600-PG-D-28	01-0790006-07	Whelen			1.590	0.719	103.800	2.638
Strobe / Pos. light assy LH	OR6002R	01-0771733-12	Whelen						
Strobe / Pos. light assy RH	OR6002G	01-0771733-11	Whelen						
Strobe light power supply LH/RH	A490ATS-CF-14/28	01-0770062-05	Whelen						
Taxi light	Xenon D1S		Aero Vision Int.			0.990	0.449	79.920	2.030
Taxi light power supply	XV1-28		Aero Vision Int.			0.880	0.400	82.290	2.090
Taxi light power supply	XV4D-35		XeVision			0.880	0.400	82.290	2.090
Landing light	Xenon D1S		Aero Vision Int.			0.990	0.449	79.920	2.030
Landing light power supply	XV1-28		Aero Vision Int.			0.880	0.400	82.290	2.090
Landing light power supply	XV4D-35		XeVision			0.880	0.400	82.290	2.090
Glareshield lamp assy		DA4-3311-10-02	Diamond Aircraft						
Glareshield light inverter		APVL328-4-1-L-5QF	Quantaflux						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Placards inverter		APVL328-4-1-L-15QF	Quantaflex						
COMMUNICATION / NAVIGATION									
COMM #1 antenna	DMC63-1/A		DM			0.400	0.180	177.160	4.500
COMM #2 antenna	DMC63-2		DM			0.400	0.180	161.420	4.100
COMM #1 antenna	CI 291		Comant			0.500	0.227	177.160	4.500
COMM #2 antenna	CI 292-2		Comant			0.500	0.227	161.420	4.100
Audio Panel / Marker / ICS	GMA 1347	011-00809-00	Garmin						
Headset, pilot	Echelon 100		Telex						
Headset, pilot	HMEC25-KAP-2	025-230-715	Sennheiser						
Headset, copilot	Echelon 100		Telex						
Headset, copilot	HMEC25-KAP-2	025-230-715	Sennheiser						
Headset, LH pax	Echelon 100		Telex						
Headset, LH pax	HMEC25-KAP-2	025-230-715	Sennheiser						
Headset, RH pax	Echelon 100		Telex						
Headset, RH pax	HMEC25-KAP-2	025-230-715	Sennheiser						
Speaker	FRS8 / 4 Ohms		Visaton						
Handmic	100 TRA	62800-001	Telex						
Pitot/Static probe, heated		DAI-9034-57-00	Diamond Aircraft						
Pitot/Static probe, heated	AN5814-2	PST-305	Aeroinstruments						
Alternate static valve		DA4-3111-51-00	Diamond Aircraft						
Backup Altimeter		5934PD-3	United Instruments			0.496	0.225	70.080	1.780
Backup Altimeter	LUN 1128	1128.10B6	Mikrotechna						
Backup Altimeter	LUN 1120	1120.23B2X	Mikrotechna						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Backup airspeed indicator	8030	8030-B.879	United Instruments			0.680	0.308	70.080	1.780
Backup artificial horizon	4300	4300-206	Mid Continent Instr.			2.500	1.132	70.080	1.780
Backup artificial horizon	LUN 1241	1241.G8D0R	Mikrotechna						
Magnetic compass		PG2C-28V	SIRS Navigation						
Turn & Bank indicator	1394T100-(12RZ)		Mid Continent Instr.			1.410	0.640	70.080	1.780
Turn & Bank indicator	1394T100-(12RA)		Mid Continent Instr.			1.410	0.640	70.080	1.780
Turn & Bank indicator	1394T100-(12RB)		Mid Continent Instr.			1.410	0.640	70.080	1.780
OAT probe	GTP 59	011-00978-00	Garmin						
Digital Air Data System	GDC 74A	011-00882-00	Garmin			1.580	0.720	70.080	1.780
Digital Air Data System	GDC 74A	011-00882-10	Garmin			1.580	0.720	70.080	1.780
Integrated Avionics #1	GIA 63	011-00781-01	Garmin			5.290	2.400	154.900	3.935
Integrated Avionics #2	GIA 63	011-00781-01	Garmin			5.290	2.400	154.900	3.935
Integrated Avionics #1	GIA 63 W	011-01105-01	Garmin			5.290	2.400	154.900	3.935
Integrated Avionics #2	GIA 63 W	011-01105-01	Garmin			5.290	2.400	154.900	3.935
Integrated Avionics #1	GIA 63 W	011-01105-20	Garmin			5.290	2.400	154.900	3.935
Integrated Avionics #2	GIA 63 W	011-01105-20	Garmin			5.290	2.400	154.900	3.935
Transponder	GTX 33	011-00779-00	Garmin			3.030	1.380	153.100	3.890
Transponder	GTX 33	011-00779-10	Garmin			3.030	1.380	153.100	3.890
Attitude / Heading Reference System GRS 77	GRS 77	011-00868-00	Garmin			2.540	1.150	154.900	3.935
Attitude / Heading Reference System GRS 77	GRS 77	011-00868-10	Garmin			2.540	1.150	154.900	3.935
Magnetometer	GMU 44	011-00870-00	Garmin			0.379	0.172	103.800	2.638
VOR / LOC / GS antenna	CI 157P		Comant						
Dual VOR / dual GS duplexer	CI 1125		Comant						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
LH: VOR / LOC / GS antenna	CI120-1		Comant						
RH: VOR / LOC / GS antenna	CI120-1		Comant						
VOR / LOC / GS PWR combiner	CI120-3		Comant						
Transponder antenna	KA 60	071-01591-0001	Bendix/King			0.220	0.100	91.930	2.335
Transponder antenna	KA 61	071-00221-0010	Bendix/King						
Transponder antenna	CI 105-16		Comant			0.200	0.091	91.930	2.335
Marker antenna	CI 102		Comant						
GPS #1 antenna	GA 56	010-10040-01	Garmin			0.400	0.180	104.100	2.645
GPS #2 antenna	GA 56	010-10040-01	Garmin			0.400	0.180	104.100	2.645
GPS #1 antenna	GA 36	013-00244-00	Garmin			0.470	0.210	104.100	2.645
GPS #2 antenna	GA 36	013-00244-00	Garmin			0.470	0.210	104.100	2.645
GPS #1 antenna	GA 35	013-00235-00	Garmin			0.470	0.210	104.100	2.645
GPS #2 antenna	GA 35	013-00235-00	Garmin			0.470	0.210	104.100	2.645
DME	KN 63	066-1070-01	Bendix/King			2.480	1.120	141.100	3.580
DME antenna	KA 60	071-01591-0001	Bendix/King			0.220	0.100	91.930	2.335
DME antenna	KA 61	071-00221-0010	Bendix/King						
DME antenna	CI 105-16		Comant			0.200	0.091	91.930	2.335
ADF receiver	RA 3502-(01)	0505.757-912	Becker			2.080	0.940	155.500	3.950
ADF / RMI converter	AC 3504-(01)	0856.010-912	Becker			1.300	0.590	165.400	4.200
ADF antenna	AN 3500	0832.601-912	Becker			3.450	1.560	133.900	3.400
Stormscope	WX-500	805-11500-001	L-3 (Goodrich)			2.290	1.040	140.100	3.560
Stormscope antenna	NY-163	805-10930-001	L-3 (Goodrich)			0.820	0.370	280.700	7.130
TAS Processor	TAS 600	70-2420-x TAS600	Avidyne/Ryan						
TAS Processor	TAS 605	70-2420-x TAS605	Avidyne/Ryan						

DA 42 AFM
with OÄM 42-102
Garmin GFC 700



Mass and Balance

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
TAS Processor	TAS 610	70-2420-x TAS610	Avidyne/Ryan			6.800	3.100	164.300	4.175
TAS Processor	TAS 615	70-2420-x TAS615	Avidyne/Ryan						
TAS Processor	TAS 620	70-2420-x TAS620	Avidyne/Ryan						
TAS Processor	9900BX	70-2420-x	Avidyne/Ryan						
Transponder coupler		70-2040	Avidyne/Ryan			0.500	0.230	197.600	5.020
TAS antenna, top		S72-1750-31L	Sensor Systems			0.660	0.298	164.800	4.188
TAS antenna, bottom		S72-1750-32L	Sensor Systems			0.750	0.340	104.300	2.650
Data link processor	GDL69A	011-00987-00	Garmin			2.490	1.130	159.400	4.050
GDL antenna	GA 57	011-01032-00	Garmin			0.470	0.210	105.500	2.680
GDL antenna	GA 37	013-00245-00	Garmin			0.500	0.230	105.500	2.680
Weather radar	GWX 68	011-00883-00	Garmin						
Radome		D64-5340-65-00	Diamond Aircraft						
OXYGEN SYSTEM									
Oxygen cylinder (empty)		1270152-2	Aerox			7.400	3.357	32.280	0.820
Single outlet manifold LH		4110-401-2	Aerox			0.230	0.104	69.690	1.770
Single outlet manifold RH		4110-401-2	Aerox			0.230	0.104	69.690	1.770
Dual outlet manifold		4110-400-2	Aerox			0.420	0.191	109.300	2.775
Oxygen pressure regulator		4110-110	Aerox			0.740	0.336	21.260	0.540
Filling block		4110-405	Aerox			0.540	0.245	28.150	0.715
Pressure gauge		4110-490	Aerox			0.110	0.050	70.080	1.780
Oxygen cylinder (empty)		4110-200-2	Aerox			7.400	3.357	32.280	0.820
Single outlet manifold LH		4110-401-2-01	Aerox			0.230	0.104	69.690	1.770
Single outlet manifold RH		4110-401-2-01	Aerox			0.230	0.104	69.690	1.770
Oxygen pressure regulator		4110-140-2	Aerox			0.740	0.336	21.260	0.540

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Pressure gauge		4110-486	Aerox			0.110	0.050	70.080	1.780
ENGINE									
LH Engine	TAE-125-02-99	125-02-99-(0003)-(01)	Thielert/Technify						
RH Engine	TAE-125-02-99	125-02-99-(0003)-(01)	Thielert/Technify						
LH ENGINE CONTROL UNIT	ECU	05-7610-E000201	Thielert/Technify						
	ECU	05-7611-001903	Technify						
	ECU	05-7611-001904	Technify						
	ECU Firmware	*	Thielert/Technify						
	ECU Mapping	*	Thielert/Technify						
RH ENGINE CONTROL UNIT	ECU	05-7610-E000201	Thielert/Technify						
	ECU	05-7611-001903	Technify						
	ECU	05-7611-001904	Technify						
	ECU Firmware	*	Thielert/Technify						
	ECU Mapping	*	Thielert/Technify						
ENGINE STARTING									
Glow Plug Control Unit LH/RH		05-7151-E0004 01	Thielert/Technify						
Starter LH/RH		05-8010-E0028 01	Thielert/Technify						
ENGINE FIRE WARNING									
LH overheat detector		X 2003-2	Control Products, Inc.						
RH overheat detector		X 2003-2	Control Products, Inc.						

DA 42 AFM
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Garmin GFC 700



Mass and Balance

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
LH overheat detector		X 2003-506	Control Products, Inc.						
RH overheat detector		X 2003-506	Control Products, Inc.						
<i>ENGINE INDICATING</i>									
Engine / Airframe Unit	GEA 71	011-00831-00	Garmin						
PROPELLER									
Propeller LH	MTV-6-A-C-F/CF187-129		mt-propeller						
Propeller RH	MTV-6-A-C-F/CF187-129		mt-propeller						
Unfeathering accumulator LH		X11-0007-00-00	Hydraulik Mayer						
Unfeathering accumulator RH		X11-0007-00-00	Hydraulik Mayer						
Unfeathering accumulator LH		P-893	mt-propeller						
Unfeathering accumulator RH		P-893	mt-propeller						
FUEL TANK SYSTEM									
Fuel probe assy., LH inboard		D60-2817-13-00	Diamond Aircraft						
Fuel probe assy., LH inboard		D60-2817-13-00_1	Diamond Aircraft						
Fuel probe assy., LH inboard		D64-2817-13-00	Diamond Aircraft						
Fuel probe assy., RH inboard		D60-2817-13-00	Diamond Aircraft						
Fuel probe assy., RH inboard		D60-2817-13-00_1	Diamond Aircraft						
Fuel probe assy., RH inboard		D64-2817-13-00	Diamond Aircraft						
Fuel probe assy., LH outboard		D60-2817-14-00	Diamond Aircraft						
Fuel probe assy., LH outboard		D60-2817-14-00_1	Diamond Aircraft						
Fuel probe assy., RH outboard		D60-2817-14-00	Diamond Aircraft						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Fuel probe assy., RH outboard		D60-2817-14-00_1	Diamond Aircraft						
Alternate means for fuel qty.		D60-2817-90-00	Diamond Aircraft						
Alternate means for fuel qty. II		D60-2817-90-00_01	Diamond Aircraft						
AUX FUEL SYSTEM									
LH auxiliary fuel pump		5100-09	Dukes			1.940	0.878	151.400	3.846
RH auxiliary fuel pump		5100-09	Dukes			1.940	0.878	151.400	3.846
LH auxiliary fuel pump		18002-B	Weldon			1.940	0.878	151.400	3.846
RH auxiliary fuel pump		18002-B	Weldon			1.940	0.878	151.400	3.846
ICE PROTECTION SYSTEM									
Porous panel, outer wing, LH		12102-21	CAV Aerospace						
Porous panel, outer wing, RH		12102-22	CAV Aerospace						
Porous panel, center wing, LH		12102-23	CAV Aerospace						
Porous panel, center wing, RH		12102-24	CAV Aerospace						
Porous panel, horizontal tail, LH		12102-25	CAV Aerospace						
Porous panel, horizontal tail, RH		12102-26	CAV Aerospace						
Porous panel, vertical tail		12102-27	CAV Aerospace						
Porous panel, outer wing, LH		12102-31	CAV Aerospace						
Porous panel, outer wing, RH		12102-32	CAV Aerospace						
Porous panel, center wing, LH		12102-33	CAV Aerospace						
Porous panel, center wing, RH		12102-34	CAV Aerospace						
Porous panel, horizontal tail, LH		12102-35	CAV Aerospace						
Porous panel, horizontal tail, RH		12102-36	CAV Aerospace						

Airplane Serial No.		Registration:		Date:		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	inst'd	lbs	kg	in	m
Porous panel, vertical tail		12102-37	CAV Aerospace						
Mod filter assy 1		D60-3013-11-90	Diamond Aircraft						
Mod filter assy 2		D60-3013-11-90	Diamond Aircraft						
Inlet strainer		12121-02	CAV Aerospace						
Spray bar		12124-10	CAV Aerospace						
Metering pump 1		9513A-386	CAV Aerospace			4.180	1.896	40.160	1.020
Metering pump 2		9513A-386	CAV Aerospace			4.180	1.896	40.160	1.020
De-icing fluid tank		D60-3013-24-50	Diamond Aircraft			8.140	3.692	38.390	0.975
Filter 1		F908R	CAV Aerospace			0.680	0.308	40.160	1.020
Filter 2		F908R	CAV Aerospace			0.680	0.308	40.160	1.020
Solenoid valve		FV158H-28V	CAV Aerospace			0.870	0.395	40.160	1.020
Solenoid valve		FV158H-28V	CAV Aerospace			0.870	0.395	40.160	1.020
High pressure switch		P041ED850	CAV Aerospace						
Proportioning unit, nacelle, LH		PU300DW142	CAV Aerospace						
Proportioning unit, nacelle, RH		PU300DW142	CAV Aerospace						
Tail bracket assembly		12132-03	CAV Aerospace			1.070	0.485	278.700	7.080
Tail bracket assembly		12132-14	CAV Aerospace			0.750	0.340	278.700	7.080
Windshield pump 1		WP209A	CAV Aerospace			0.650	0.295	40.160	1.020
Windshield pump 2		WP209A	CAV Aerospace			0.650	0.295	40.160	1.020
De-ice control box		DAI-9030-00-01	Diamond Aircraft						
AIRPLANE FLIGHT MANUAL		Doc. No. 7.01.06-E	Diamond Aircraft						

*) Refer to Service Bulletin SB 42-007 latest effective issue for approved ECU firmware and mapping.

1. The Amerex A620T is UL approved and may be used in airplanes registered in Canada and the USA. For airplanes registered in other countries contact the local Airworthiness Authority.

Place: _____

Date: _____

Signature: _____

CHAPTER 7

DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

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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.

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 also operated by a Bowden cable.

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), and
- Landing (LDG).

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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 pushrods;

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 pushrod, can be visually inspected at the upper end of the rudder.

Variable Elevator Stop:

The DA 42 is equipped with an electrically operated actuator that limits the elevator-up travel to 13° as soon as the power setting of both engines exceeds approximately 20 % (approach power setting) and the flap selector switch is set to LDG. This is 2.5° less than the 15.5° full deflection.

The linear actuator acts as a movable stop and is controlled by three switches, one for each POWER lever and one for the flap selector. When the power of one engine is reduced below approximately 20 %, or the flap selector is not in the LDG position, full elevator deflection is regained.

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).

Rudder

Construction: GFRP sandwich.

Hinges: Upper hinge: One bolt.

Lower hinge: Bearing bracket including rudder stops, held by 4 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 2 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 POWER 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 below the instrument panel. A mark on the wheel shows the center position and the direction of movement.

Turn 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 T-grip handle which is located behind the rear attachment, straight back.

NOTE

When adjusting rudder pedals to install the control surfaces
gust lock pull straight back on T-grip, do not pull up.

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.

Airplane Description	 Diamond AIRCRAFT	DA 42 AFM with OÄM 42-102 Garmin GFC 700
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Electrical Pedal Adjustment (Optional Equipment, OÄM 42-070)

NOTE

The pedals may only be adjusted on the ground!

The pedals are adjusted using a rocker switch, located on the rear wall of the leg room.
The related circuit breaker is located below the switch.

Forward Adjustment:

To move the pedals forward, depress lower side of switch. When pedals are in correct position, release switch.

Rearward Adjustment:

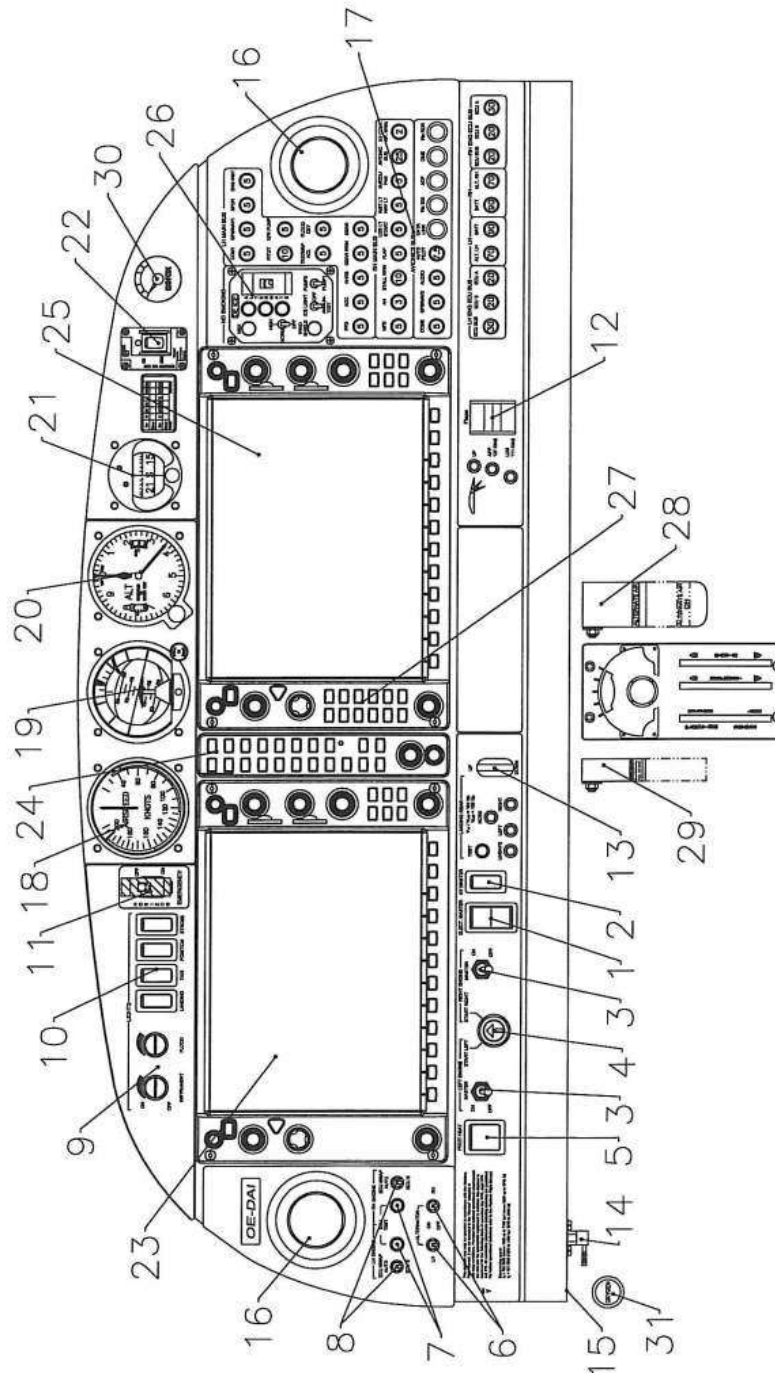
To move the pedals in the rearward direction, depress upper side of switch. When pedals are in correct position, release switch.

Locking:

Upon release the switch moves automatically to the POWER OFF position, so locking the pedals in the present position.

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7.4 INSTRUMENT PANEL



Airplane Description	 Diamond AIRCRAFT	DA 42 AFM with OÄM 42-102 Garmin GFC 700
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Major Instruments and Controls	
1 Electric Master switch	17 Circuit breakers*
2 Avionic Master switch	18 Backup airspeed indicator
3 Engine Master switches	19 Backup artificial horizon
4 Start switch	20 Backup altimeter
5 Pitot-/Stall Warning Heat switch	21 Emergency compass
6 Alternator switches	22 ELT control unit
7 ECU Test buttons	23 Primary Flight Display (PFD)
8 ECU Swap switches	24 Audio amplifier / Intercom / Marker beacon receiver
9 Rotary buttons for instrument lighting and flood light	25 Multi-Function Display (MFD)
10 Light switches	26 De-Ice control panel
11 Emergency switch	27 Autopilot control unit (part of MFD)
12 Flap selector switch	28 Alt air lever
13 Landing gear switch	29 Landing gear emergency extension lever
14 Alternate static valve	30 Oxygen pressure indicator
15 Microphone socket	31 Oxygen control knob
16 Ventilation nozzles	

*) Designations and abbreviations used to identify the circuit breakers are explained in Section 1.5 - DEFINITIONS AND ABBREVIATIONS.

NOTE

The Figure on previous page shows the typical DA 42 installation position for the equipment. The actual installation may vary due to the approved equipment version.

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Cockpit Ventilation

Ventilation in the front is provided by spherical ventilation nozzles (16) 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.

Unconditioned ambient air is supplied to the interior through an inlet on the lower side of the RH center wing stub. To increase cabin temperatures when operating at low outside air temperatures, a winter kit - ventilation may be installed at the inlet.

The winter kit - ventilation consists of a metal plate with rubber edging and is attached to the lower side of the RH center wing stub by a camloc.

7.5 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 permanent 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.

The three green lights directly next to 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 POWER lever be placed in a position below approx. 20 % while the landing gear is retracted, a warning horn sounds to alert the pilot that the gear is retracted. Additionally, a CHECK GEAR caution is indicated on the PFD. 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 take-off, the gear should be retracted before an airspeed of 152 KIAS is exceeded. The landing gear may be extended at any speed up to 188 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 gears 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

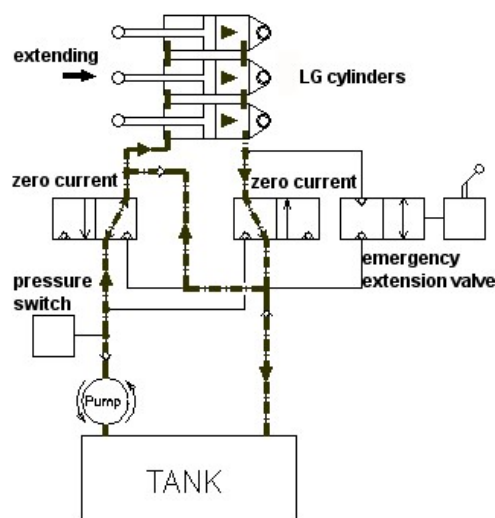
If the emergency gear extension has been pulled due to an emergency, the system has to be checked before pushing the lever in again.

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.

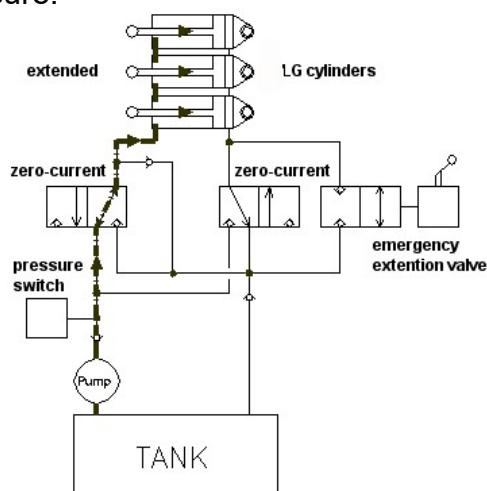
Hydraulic Gear Extension System Schematic

The main landing gear of the DA 42 is extended with three hydraulic cylinders. The following schematic figures show the system conditions for each operating mode.

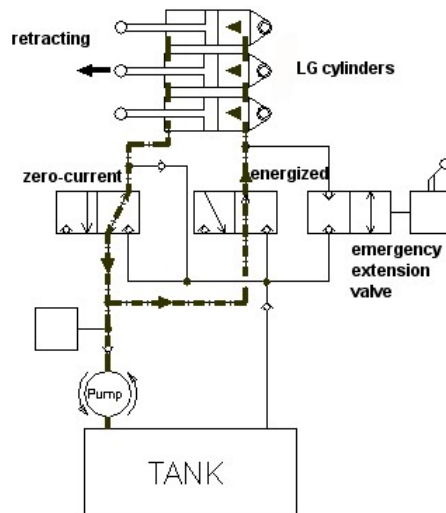
In Figure 1 the extension of the landing gear is shown. To reduce the amount of pumped hydraulic fluid during this operation, the return flow is partly led into the feeding flow of the system.



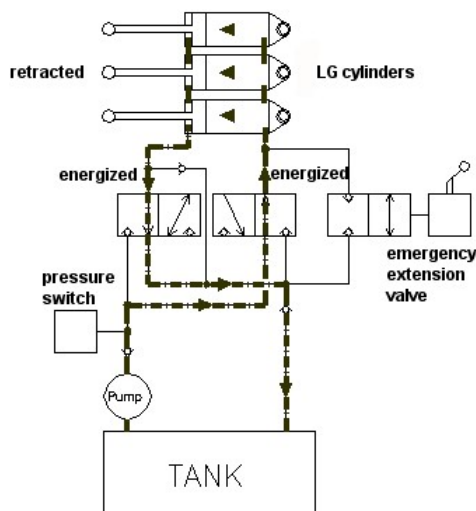
The Figure below shows the system status when the landing gear is extended. All hydraulic cylinders are under high pressure.



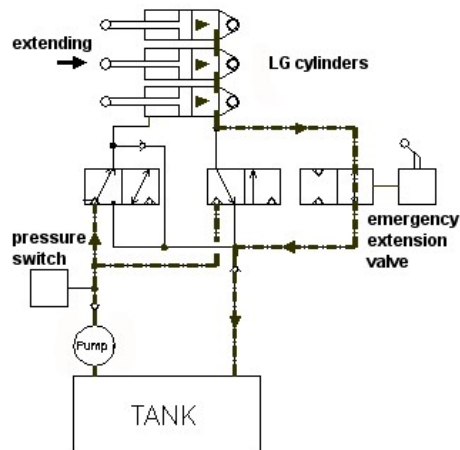
The operating mode for the retraction of the landing gear is shown in the next Figure. While energizing the right hydraulic valve, the fluid flow in the hydraulic system is started due to different piston areas of the landing gear cylinders although the pressure on both sides of the system is equal.



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.

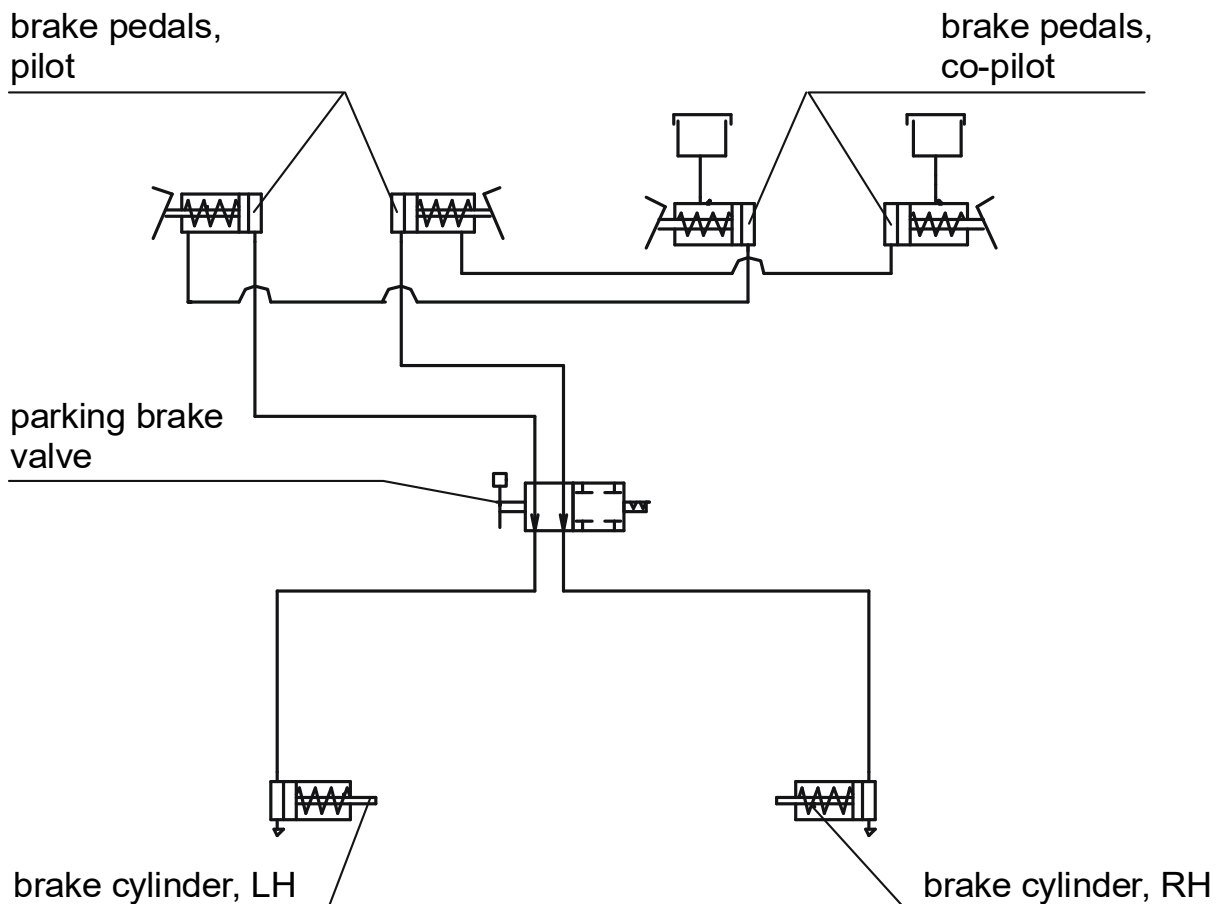


Wheel Brakes

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.



7.6 SEATS AND SAFETY HARNESSSES

To increase passive safety, the seats are constructed using a carbon fiber/Kevlar hybrid material and GFRP. The seats are removable to allow 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.

If front seats with adjustable backrests are installed (OÄM 42-067 or OÄM 42-259), the angle of the backrest and the lumbar can be adjusted for best comfort. The backrest control lever is situated on the outboard side of the backrest if OÄM 42-067 is installed. The backrest release button, in case of OÄM 42-259 is situated on the upper side of the seat's side frame. However, during take-off, landing and emergency landing the backrests must be fixed in the upright position designated by a placard on the roll-over bar.

The lumbar support can be adjusted by operating the lumbar support lever mounted on the outboard side of the seat pan.

CAUTION

Before adjusting the angle, lean against the backrest to counteract the spring load; otherwise the backrest may slap forward.

CAUTION

Do not apply a load of more than 90 daN (202 lbf) to the top of the backrest. Otherwise damage of the adjustment mechanism may result.

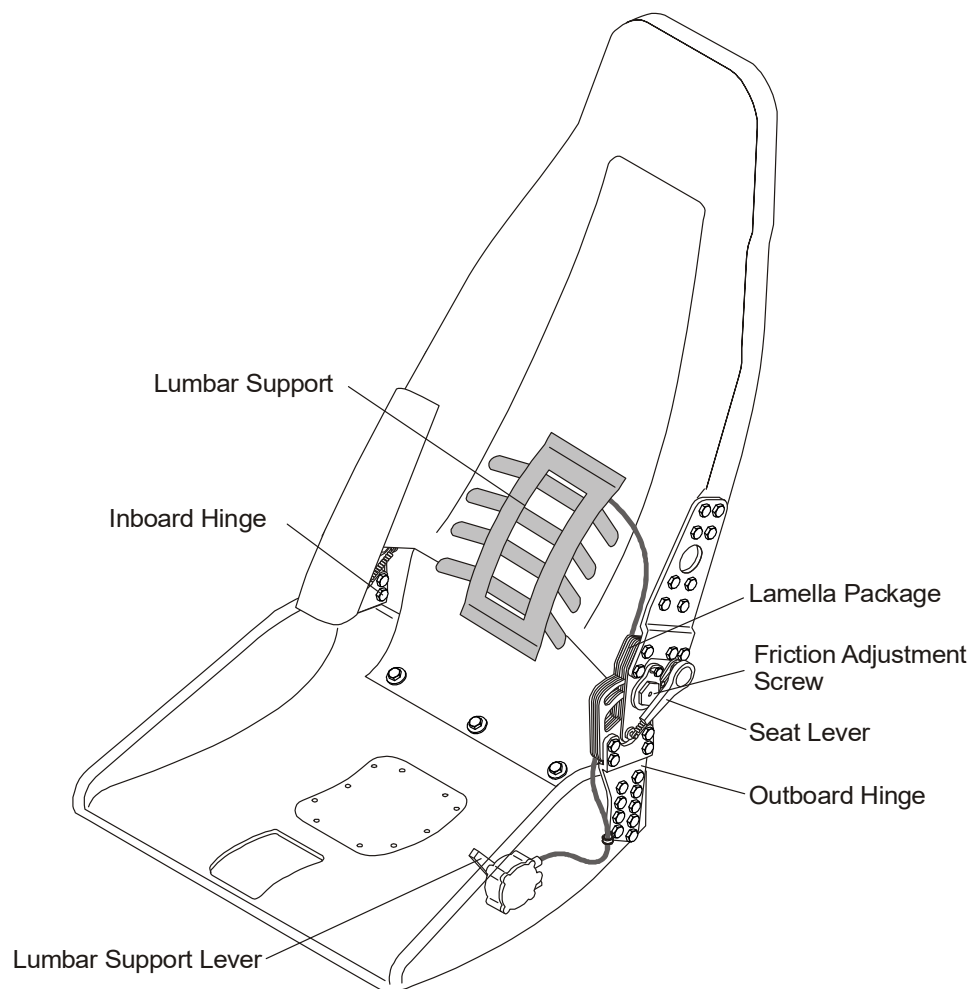
For adjustment lift the backrest lever or press the button and bend the backrest forward or backward to the desired backrest angle. For fixing the position press down the backrest lever or release the button.

If OÄM 42-259 is installed and in case of a malfunction of the release button the backrest can be moved into the upright position by pulling the backrest (48 daN [108 lbf]) in flight (FWD) direction.

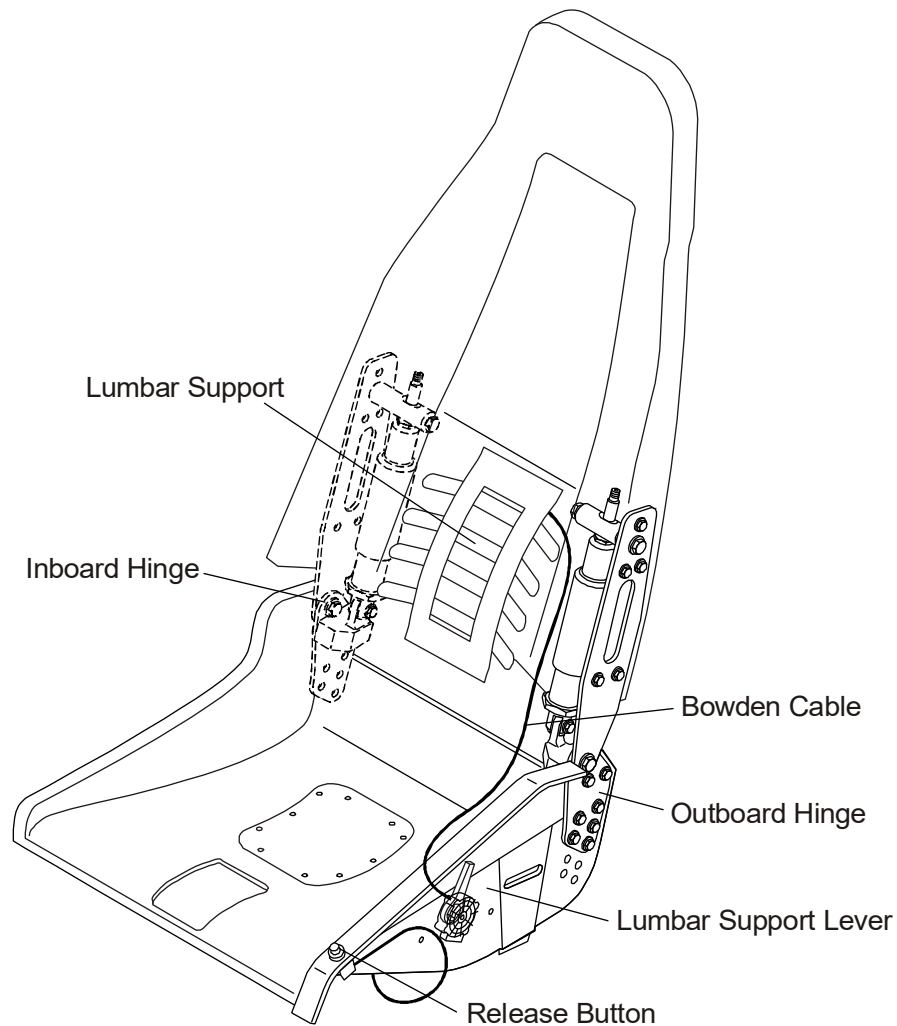
If OÄM 42-067 is installed and In case of a defective adjustment mechanism the outboard friction adjustment screw can be tightened with a 10 mm hexagon nut in clockwise direction in order to fix the backrest in the upright position.

If possible, set the backrest lever to the “locked” position. The mechanism must be repaired at the next scheduled inspection.

If seats with adjustable backrests are installed (OÄM 42-067):



If seats with adjustable backrest are installed (OÄM 42-259):



7.7 BAGGAGE COMPARTMENT

There are two baggage compartments. One is located in the nose section and it is accessible through two compartment doors.

The other 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.

7.8 CANOPY, PASSENGER DOOR, AND CABIN INTERIOR

Canopy

The 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 canopy in the “cooling gap” position on the ground only. Before take-off the canopy must be completely closed and locked.

Do not block the 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.

Passenger Door

The passenger 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 passenger 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

The heat of the RH engine is used for the front seats and floor, the heat of the LH engine is used 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.

Emergency Axe

If OÄM 42-205 is incorporated an emergency axe is installed on the floor panel under the co-pilot's seat (see Figure below).

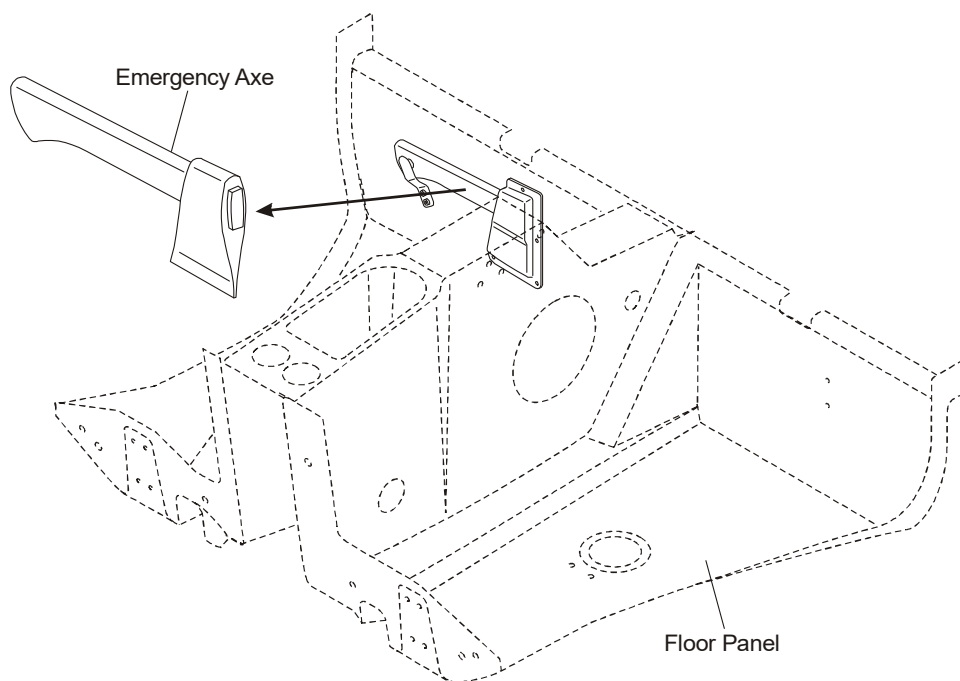
If the canopy can not be opened in case of an emergency use the emergency axe to break through the canopy.

WARNING

Make sure not to harm other persons by using the emergency axe.

WARNING

Beware of sharp edges and fragments of the broken canopy.



Emergency Egress Hammer

If OÄM 42-304 is incorporated an emergency egress hammer is installed on the floor panel under the co-pilot's seat.

If the canopy can not be opened in case of an emergency use the emergency egress hammer to break through the canopy.

WARNING

Make sure not to harm other persons by using the emergency egress hammer.

WARNING

Beware of sharp edges and fragments of the broken canopy.

7.9 POWER PLANT

7.9.1 ENGINES, GENERAL

There are two TAE125-02-99 engines installed, which have the following principal specifications:

- Liquid-cooled four-cylinder four-stroke Diesel-cycle engine with wet sump lubrication
- Inline construction
- Common rail direct injection.
- Propeller speed reducing gear 1:1.69
- Digital engine control with integrated propeller governor (separate oil system)
- Turbo charger with intercooler

Displacement:

Max. power: 99 kW (135 DIN-HP) at 2300 RPM at sea level and ISA

Max. continuous power: 99 kW (135 DIN-HP) at 2300 RPM at sea level and ISA

The indications for monitoring important engine parameters during operation are integrated within the Garmin G1000 display. Each engine can only be operated with the ENGINE MASTER switch ON. Each engine has an own ECU (Engine Control Unit) which receives its electrical power from the generator when at least one engine is running. When both engines are at standstill, the ECU receives its electrical power from the battery.

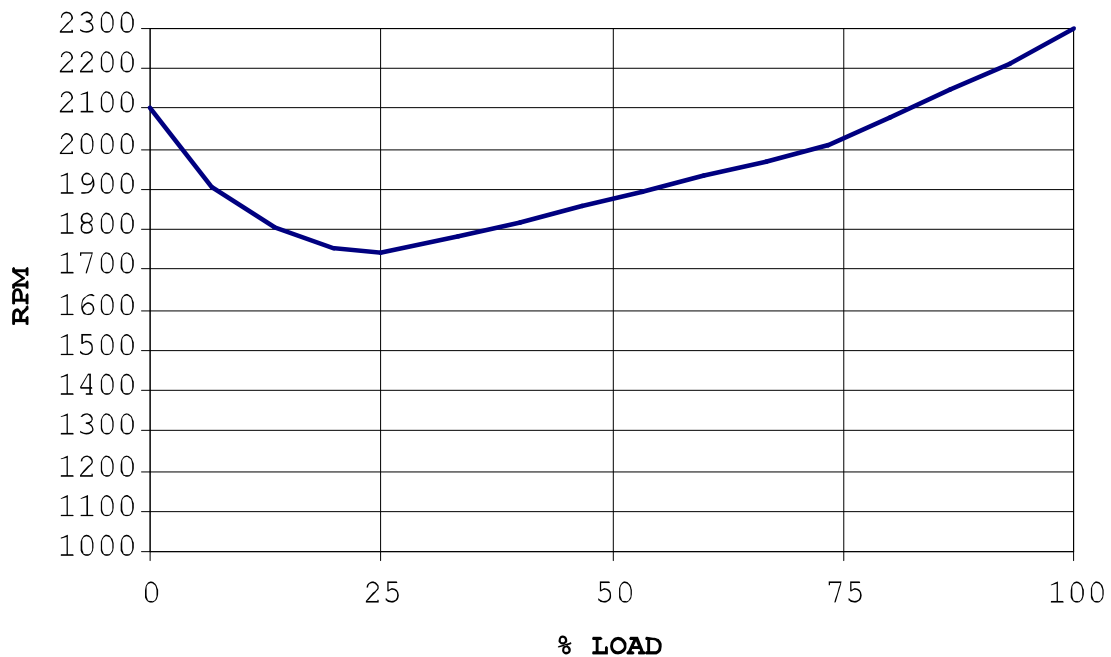
7.9.2 PROPELLER

Two mt-Propeller MTV-6-A-C-F/CF187-129 hydraulically regulated 3-bladed constant speed feathering propellers are installed. Each propeller has wood composite blades with fiber-reinforced plastic coating and stainless steel edge cladding; in the region of the propeller hub the leading edge is coated with adhesive PU foil. These blades combine the lowest weight whilst minimizing vibration.

Propeller Control

The propeller pitch control system is integrated into the engine. The pitch is controlled automatically by the ECU. To change the blade pitch angle gearbox oil is pumped into the propeller hub. The oil pressure is regulated by an electrically operated valve, the governor valve, which is controlled by the ECU. Increasing the oil pressure leads to a decrease of pitch and a higher RPM. Decreasing the pressure leads to higher pitch and a lower RPM.

Depending on the power setting the propeller pitch is adjusted such that the required RPM will be obtained as shown in the following diagram.



Pressure Accumulator:

The pressure accumulator is a nitrogen oil type. It is connected to the gearbox oil circuit via an electric valve at the accumulator, which is operated with the ENGINE MASTER switch.

When the ENGINE MASTER switch is set to ON the valve is opened. When the engine is running, the accumulator is filled with oil at a pressure of approximately 20 bar (290 PSI). During engine operation the accumulator makes sure that enough oil pressure is available even if the oil feed by the gearbox oil pump is decreasing due to negative acceleration. The hydraulic pressure keeps the propeller pitch angle below the start lock position, or moves the propeller blades beyond the start lock position.

Feathering:

To feather the propeller the engine must be shut down with the appropriate ENGINE MASTER switch. This will open the electric governor valve. All oil will flow back from the propeller hub, allowing the blades to move into the feathered pitch position. At the same time the electric valve at the pressure accumulator closes, and the oil pressure is restored in the accumulator.

Feathering is only possible at propeller speeds above 1300 RPM.

CAUTION

If the engine is shut down below an RPM of 1300 the propeller pitch remains below the start lock position. In this case the speed must be increased to increase the propeller RPM.

Unfeathering:

To unfeather the propeller, the associated ENGINE MASTER switch must be set to ON. This will open the electric valve at the pressure accumulator. The pressure stored in the accumulator will move the propeller blades into a low pitch position. As soon as the propeller starts turning and the gearbox oil operates, the accumulator will be refilled.

Ground Operation:

CAUTION

Operation on the ground at high RPM should be avoided as far 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.

7.9.3 OPERATING CONTROLS

Power Lever

Engine performance is controlled by a power lever for each engine. Both power levers are situated on the large center console. 'Front' and 'rear' are defined in relation to the direction of flight.

Each POWER lever is used to set the desired engine power LOAD (%)

Lever forward (MAX) = Full power

Lever to rear (IDLE) = Idle

A separate ECU for each engine controls manifold pressure, injected fuel quantity and propeller speed according to the desired engine power preselected with the power lever. If the power lever is in a low power position - as for a landing approach - while the landing gear is retracted, an aural warning alerts the pilot to the retracted landing gear. Additionally, a CHECK GEAR caution is indicated on the PFD.

A propeller governor, which is controlled by the ECU, is flanged onto the front of each engine. The propeller governor oil circuit is supplied with oil by the gearbox oil pump (also see Section 7.9.2 - PROPELLER). A loss of oil pressure leads to a feathering of the propeller blades, thus allowing continuation of the flight according to 3.7.3 - DEFECTIVE PROPELLER RPM REGULATING SYSTEM.

CAUTION

Following governor failure the RPM should be adjusted using the POWER lever. Every effort should be made not to exceed 2300 RPM.

CAUTION

The POWER lever should be moved slowly, in order to avoid over-speeding and excessively rapid RPM changes. The light wooden propeller blades produce more rapid RPM changes than metal blades.

WARNING

It is possible that the propeller blades remain in the position of highest pitch in case of a malfunction of the engine control unit. In this case the reduced engine performance should be taken into consideration.

ELECT. MASTER

The ELECT. MASTER switch has two positions:

OFF disconnecting battery power

ON connecting battery power to the power distribution system

ENGINE MASTER

Each engine can only be cranked with its ENGINE MASTER switched to ON. When activated, the ENGINE MASTER provides the power supply for the preheat system, the unfeathering accumulator valve and the engine itself. To shut down the engine the appropriate ENGINE MASTER is switched to OFF.

START

Turning START key switch to the left starts the LH engine. Turning it to the right side starts the RH engine.

ECU SWAP

There are two ECU SWAP switches, one for each engine. For normal operation both switches are set to AUTOMATIC. Each engine is controlled by its ECU A. In case of a failure of the active engine control unit (ECU) there should be an automatic switch-over to the appropriate ECU B. If the automatic switch over fails, switch over can be done manually by switching to ECU B. This procedure should only be applied in an emergency.

ECU TEST

There are two ECU TEST buttons, one for each engine. Depending on the position of the POWER lever and the engine speed, the ECU TEST button has two different functions.

POWER lever at IDLE and RPM below approximately 900:

By pushing and holding the button until the end of the procedure, the self-test of each engine control unit is started. The procedure is possible on the ground as well as during flight, but only if the POWER lever is in the IDLE position. Otherwise the test will not start. During the procedure the ECU performs a switch from ECU A to ECU B with the propeller cycling. The propeller RPM is monitored automatically by the ECU. When switching from one ECU to the other, a slight shake of the engine may occur. Finally the ECU switches back from ECU B to ECU A. After that both caution lights must extinguish and the engine must run without a change.

POWER lever above IDLE, or RPM above approximately 900:

If an ECU A or ECU B caution message is displayed, the ECU TEST button can be pressed for more than 2 seconds to reset the message. The reset is possible only once, and only in case of system faults of minor criticality.

Alternate Air

In the event of power loss because of icing or blocking of the air filter, there is the possibility of drawing air from the engine compartment. The ALTERNATE AIR operating lever which serves both engines simultaneously is located under the instrument panel to the right of the center console. To open the alternate air source the lever is pulled to the rear. Normally, the alternate air source 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**

7.9.4 ENGINE INSTRUMENTS

The engine instruments are displayed on the Garmin G1000 MFD. Also refer to Section 7.10.3 - MULTI FUNCTION DISPLAY (MFD). Indications for the LH engine are on the left side, indications for the RH engine are on the right side.

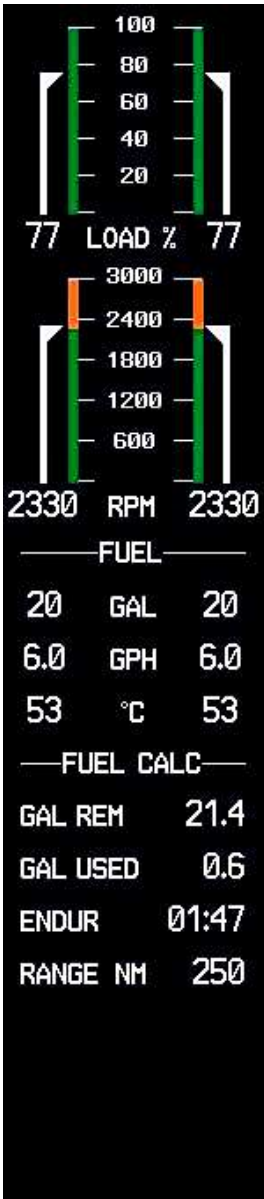
Default page
Engine



Display when pushing
the SYSTEM button



Display when pushing
the FUEL button



NOTE

The Figure on 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 DA 42.

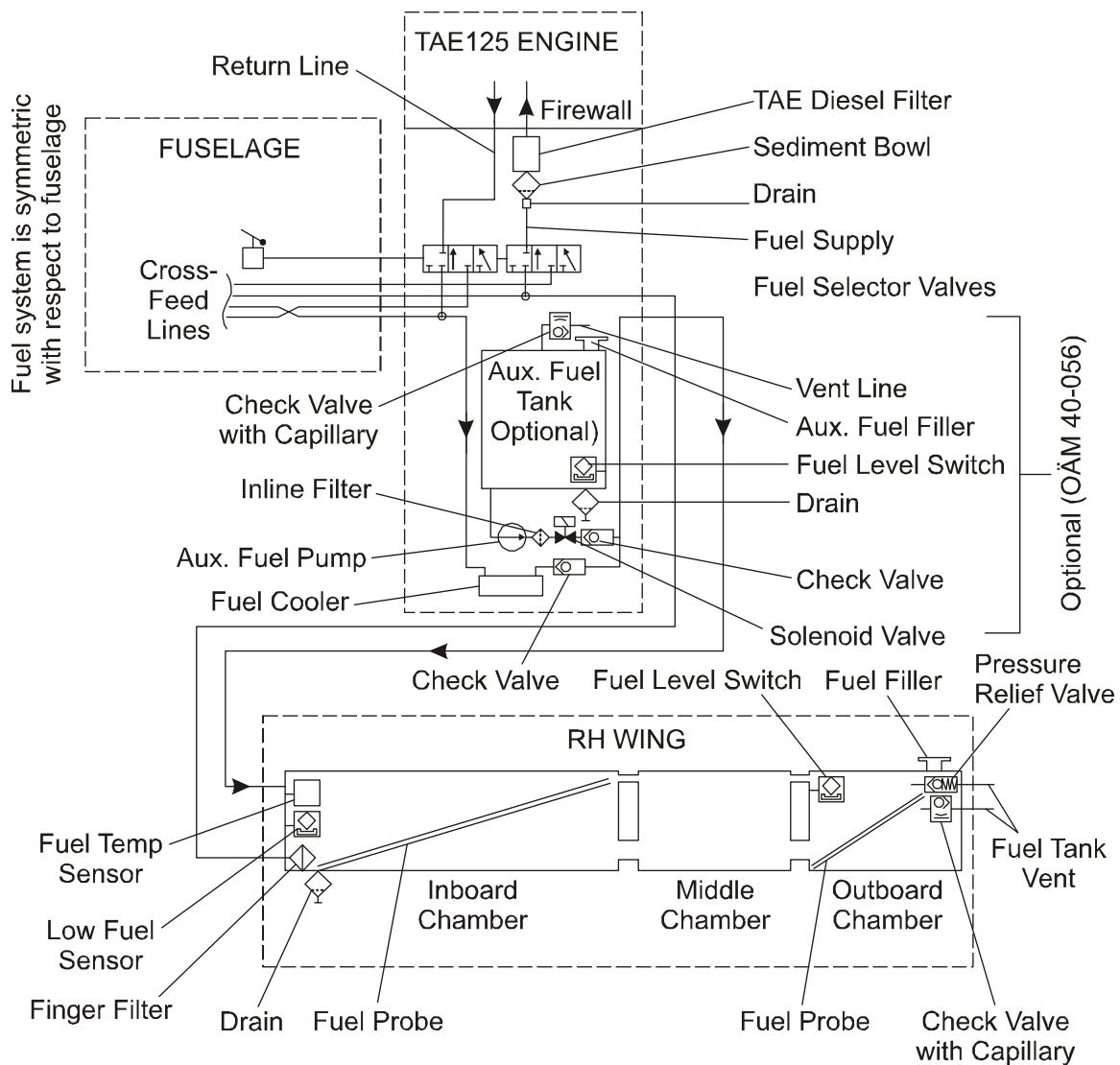
NOTE

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.

Designation	Indication	Unit
LOAD %	Available power	%
RPM	Propeller RPM	1/min
VOLTS	Volts	V
AMPS	Ampères	A
COOLANT TEMP	Coolant temperature	°C
GEARBOX	Gearbox temperature	°C
OIL TEMP	Engine oil temperature	°C
OIL PRES	Oil pressure	bar
FUEL QTY GAL	Fuel quantity	US gal
FUEL FLOW	Fuel flow	US gal/hr
FUEL TEMP	Fuel temperature	°C

7.9.5 FUEL SYSTEM

General



Fuel is stored in the tanks which are located in the wings.

Normally fuel for the right engine is taken from the right wing main tank and for the left engine from the left wing main tank.

On each engine fuel is injected with high pressure directly into the cylinders. The injection nozzles (one per cylinder) are supplied with fuel by the common rail. Pressure inside the rail is generated by a high pressure pump which receives fuel from a low pressure pump. Depending on the power setting the rail pressure is controlled by the ECU through an electric valve. Both pumps are powered mechanically by the engine. Fuel that is not injected is fed back into the appropriate wing tank.

Both sides of the fuel system are interconnected by CROSSFEED lines.

In each engine nacelle an auxiliary fuel tank may be installed (OÄM 42-056 carried out).

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 POWER levers. The positions are ON, CROSSFEED and OFF. During normal operation each engine takes the fuel from the tank on the same side as the engine. When CROSSFEED 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. With the FUEL SELECTOR valve both the feeding and the return line are switched.

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.

NOTE

When one engine is inoperative the FUEL SELECTOR valve for this engine must be in the OFF position.

CAUTION

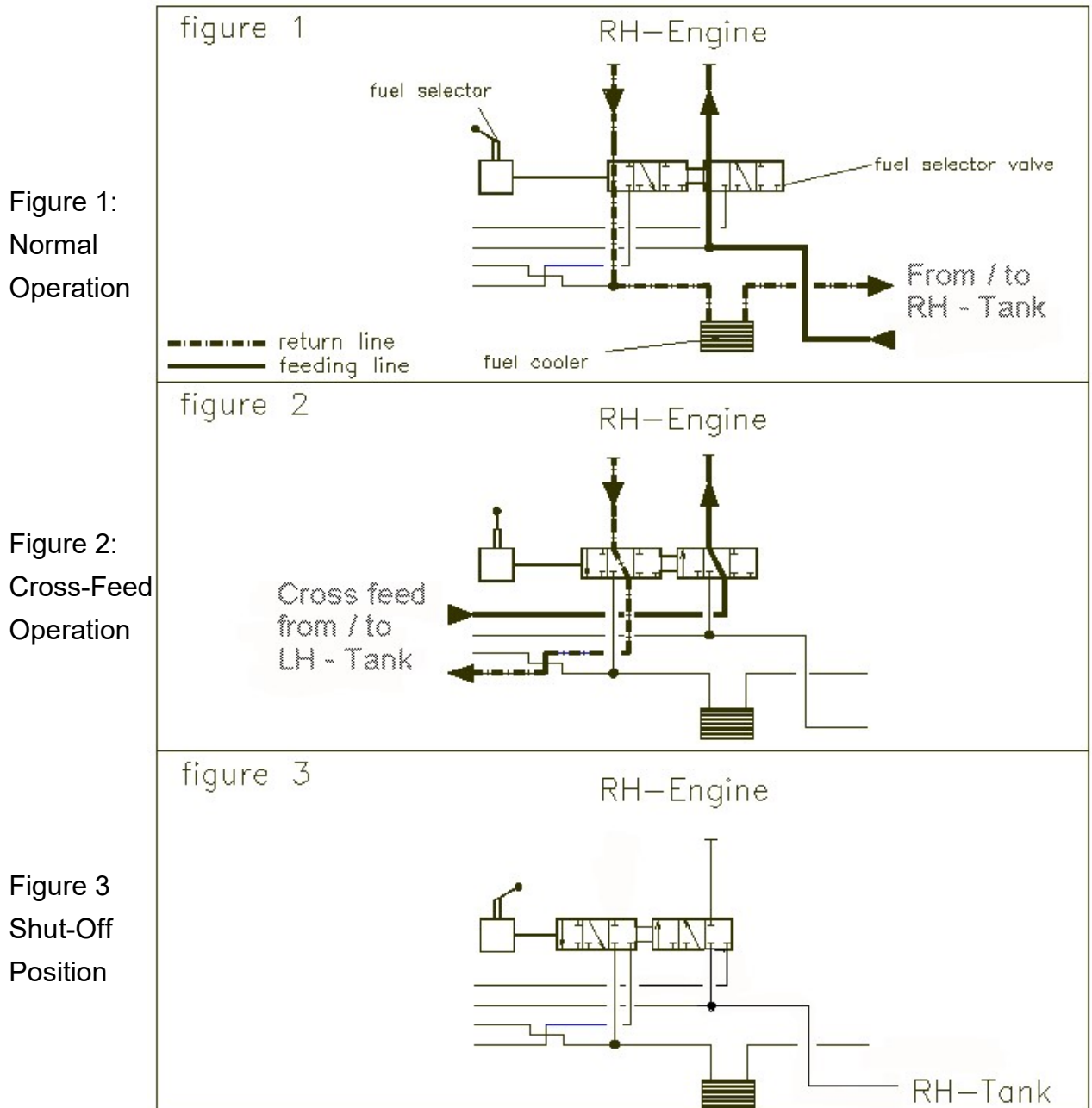
Do not operate with both FUEL SELECTOR valves in CROSSFEED position. Do not take-off with a FUEL SELECTOR valve in CROSSFEED position.

CAUTION

Do not shut down an engine with the FUEL SELECTOR valve. The high pressure fuel pump can otherwise be damaged.

Scheme of the FUEL SELECTOR Valve Positions:

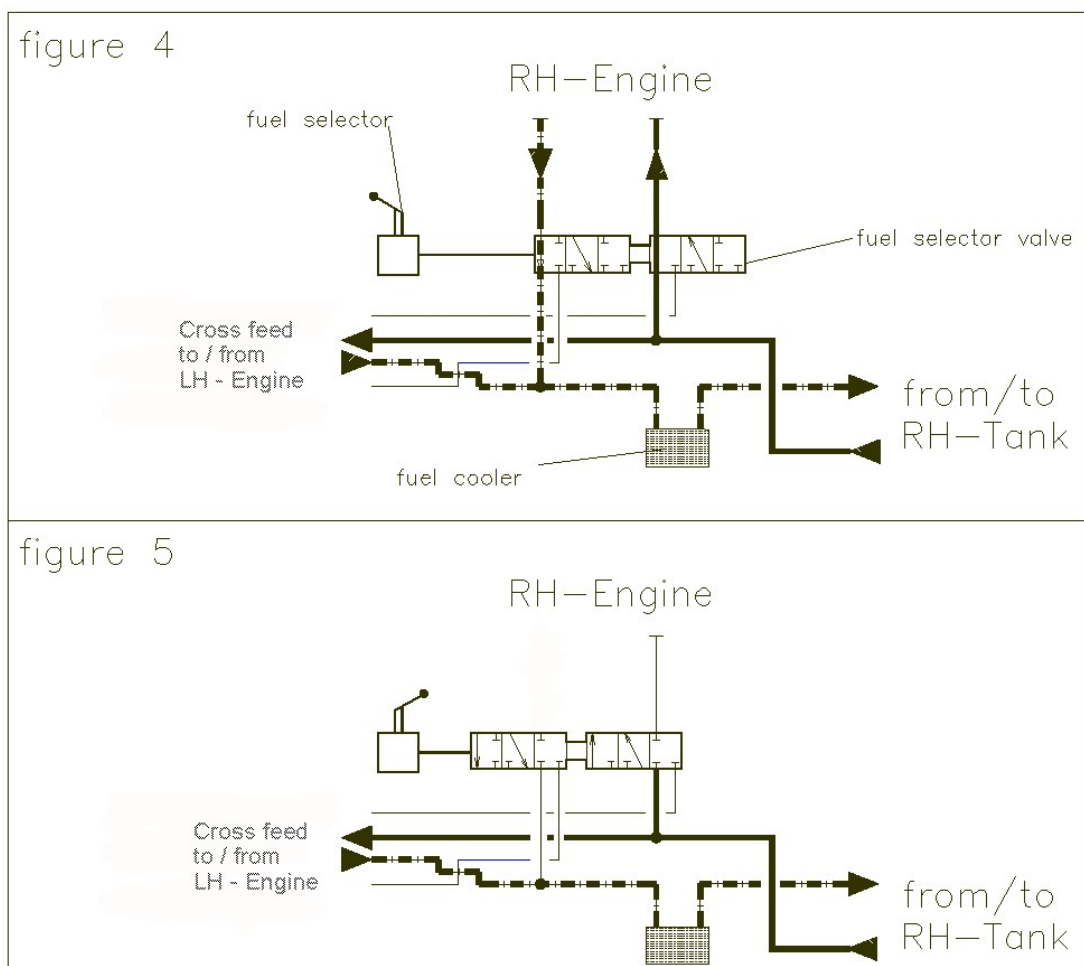
Possible operating modes of the three FUEL SELECTOR valve positions are outlined systematically in the following scheme. The Figures below show fuel flows for the RH engine (fuel flows LH are alike):



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 position, FUEL SELECTOR valve LH cross feed position

Figure 5: FUEL SELECTOR RH valve shut-off position, FUEL SELECTOR valve LH cross feed position



Main Fuel 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. Only four liter (1 US gal) of fuel in each wing are unusable, so that a total quantity of 94.6 liter (25 US gal) in each wing is usable.

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 m (7 ft) 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.

Fuel Quantity Indication

Two capacity probes measure the fuel quantity in each main tank. The indication is provided by the G1000 flight display. Information about fuel consumption can be found in Chapter 5 - PERFORMANCE.

Auxiliary Fuel Tanks (if installed)

The auxiliary fuel tanks are optional equipment (OÄM 42-056).

Description

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 liter (13.7 US gal) per side. The total fuel capacity (main fuel tanks and auxiliary fuel tanks) is 150.4 liter (39.7 US gal) 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. Upstream of the fuel transfer pump an inline filter, a solenoid valve and a check valve are installed. The valves prevent fuel from flowing back out of the main tank into the auxiliary 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.

Operation

Two FUEL TRANSFER switches in the cockpit are used to activate the fuel transfer pumps and to open the solenoid valves. The switches are located behind the elevator trim wheel on the center console. Both switches are intended to be used simultaneously to prevent the airplane from additional lateral imbalance. The fuel transfer pump pumps the fuel from the auxiliary fuel tank into the related main fuel tank. Fuel level switches shut this pump and the related solenoid valves off automatically, if the auxiliary fuel tank is empty or if the main fuel tank is full. During operation of the pumps an advisory alert on the Garmin G1000 indicates that the fuel transfer is in progress.

If the auxiliary fuel tank is empty, a caution alert appears on the Garmin G1000. In this case the fuel pumps must be switched OFF.

When one fuel transfer pump is defective, the fuel stored in the related auxiliary fuel tank is not available. For use of the remaining fuel pump refer to Section 4B.9 - L/R FUEL TRANSFER FAIL. The flight plan must be amended accordingly.

The fuel transfer pumps and the solenoid valves are electrically connected to the LH main bus and protected by a 5 A or 7.5 A circuit breaker, if no ice protection system (OÄM 42-053) is installed.

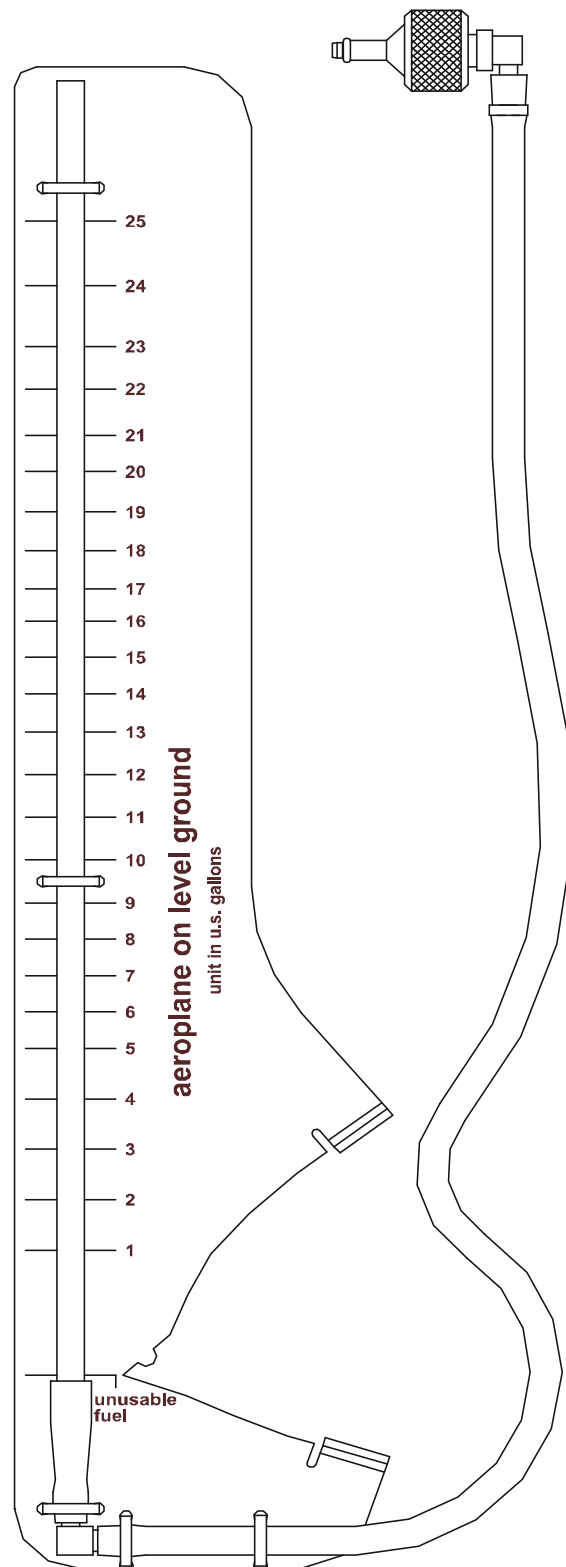
If the ice protection system is installed, both systems are protected by a 10 A circuit breaker and an additional 7 A fuse for the fuel transfer pumps. The circuit breaker is labeled XFER PUMP/DE ICE.

*Alternate Means for Fuel Quantity
Indication for the Fuel Tank:*

The alternate means for fuel quantity indication allows the fuel quantity in the tank to be determined during the preflight 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 in front of the fuel tank drain, which lies approximately 10 cm (4 in) outboard of the engine nacelle. 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 and the measuring device must be held vertically.

The designated location for the fuel quantity measuring device is a bag on the rear side of the pilot seat.



Alternate Means II for Fuel Quantity Indication for the Fuel Tank:

For an exact indication the airplane must stand on horizontal ground with the wings level.

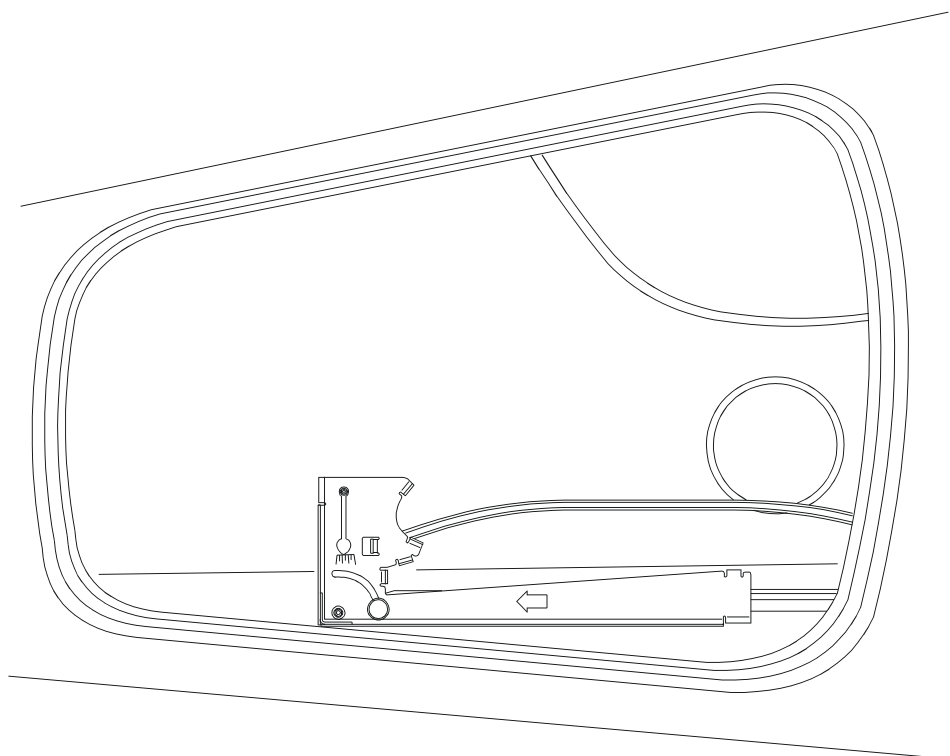
The fuel indicator II includes a protractor for an additional pitch angle measurement. The fuel indicator II is placed on the LH nose baggage compartment floor. The lower edge of the fuel indicator II must be supported by the nose baggage compartment for the entire length. Read and record the pitch angle.

Standard Tanks:

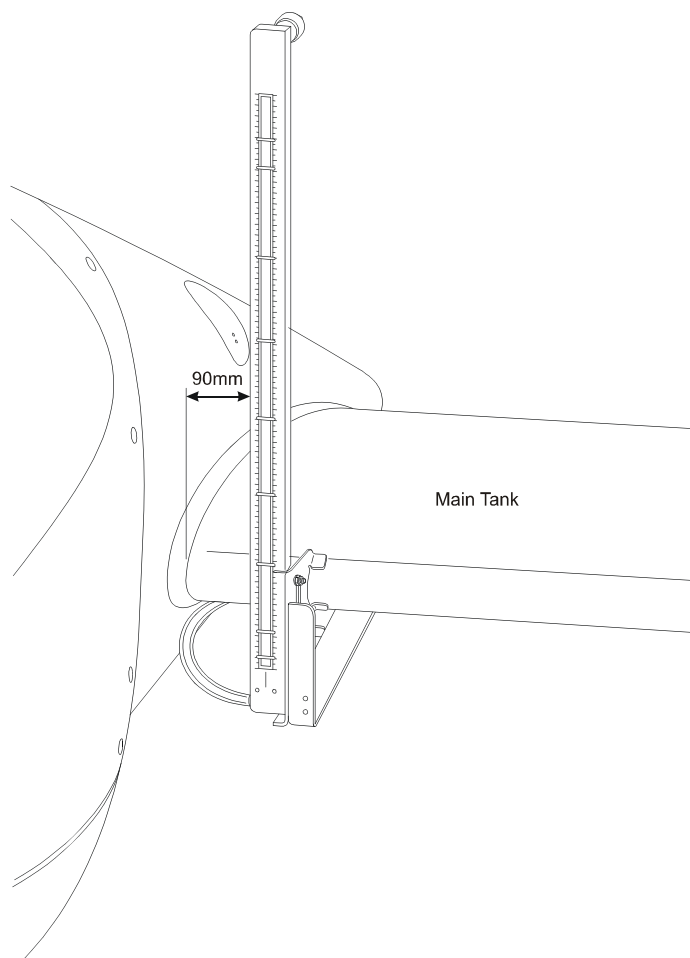
Unfold the fuel indicator II and center it at the nose of wing. Read the fuel level on the scale and refer to the tables provided in order to determine the exact fuel quantity.

Auxiliary Tanks (if installed):

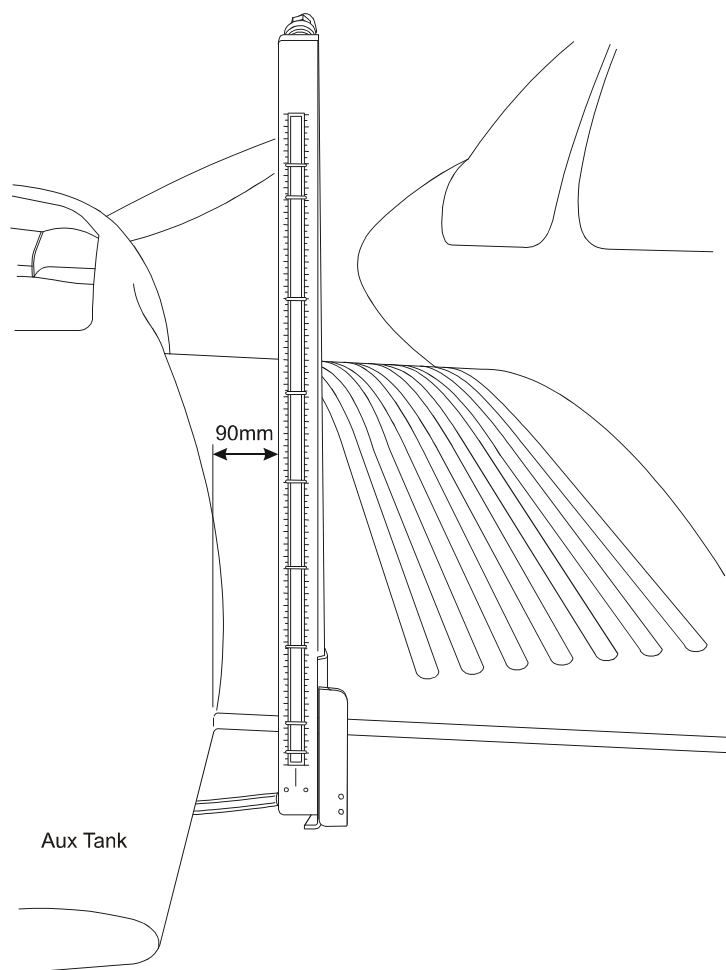
Unfold the fuel indicator II and place it on the trailing edge of the center wing. Read the fuel level on the scale and refer to the tables provided in order to determine the exact fuel quantity.



Fuel Quantity Indicator II, Pitch Angle Measurement in Baggage Compartment



Fuel Quantity Indicator II, Main Tank

**Fuel Quantity Indicator II, Aux.Tank**

Standard Tank Configuration

Fuel Quantity Indicator II: Pitch Angle Reading						Usable Fuel Quantity	
0°	1°	2°	3°	4°	5°	US gal	Liter
120	112	103	97	90	80	1	3.8
132	128	117	110	102	95	2	7.6
150	141	135	120	116	106	3	11.4
160	147	140	136	128	120	4	15.1
174	165	155	150	140	135	5	18.9
186	175	165	160	149	140	6	22.7
200	185	178	171	160	152	7	26.5
210	198	192	183	175	165	8	30.3
218	210	205	195	184	175	9	34.1
230	225	215	205	198	185	10	37.9
242	230	225	215	209	200	11	41.6
255	245	235	230	222	212	12	45.4
260	255	250	244	232	225	13	49.2
278	270	260	254	243	235	14	53.0
289	280	271	263	255	244	15	56.8
300	290	284	275	270	260	16	60.6
314	308	296	290	285	275	17	64.4
328	321	310	305	298	287	18	68.1
340	334	325	319	310	304	19	71.9
358	342	336	328	320	312	20	75.7
368	360	350	344	335	326	21	79.5
380	372	364	357	347	336	22	83.3
391	385	378	370	361	355	23	87.1
415	408	398	388	380	372	24	90.8

Aux Tank (if installed) Configuration

Fuel Quantity Indicator II: Pitch Angle Reading						Usable Fuel Quantity	
0°	1°	2°	3°	4°	5°	US gal	Liter
100	100	102	105	108	110	1	3.8
110	119	120	128	130	132	2	7.6
135	140	142	145	150	152	3	11.4
145	150	158	162	168	172	4	15.1
160	165	170	175	185	190	5	18.9
170	180	185	195	205	210	6	22.7
190	195	205	210	220	230	7	26.5
200	205	215	225	235	245	8	30.3
212	225	235	245	255	270	9	34.1
225	235	250	260	270	285	10	37.9
235	250	265	275	290	305	11	41.6
245	265	280	290	305	320	12	45.4
260	275	290	305	320	340	13	49.2

Fuel Temperature

A fuel temperature sensor measures the fuel temperature in each main tank. The indication is provided by the G1000 flight display. Information about fuel temperature limitations can be found in Chapter 2 - OPERATING LIMITATIONS.

The lower yellow bar indicates that the airplane is not ready for take-off if Diesel Fuel or a blend of Diesel Fuel with Jet Fuel is used (approved only if MÄM 42-037 is incorporated). If the fuel grade is uncertain, take-off is not allowed in this temperature range either.

In the temperature range below -5 °C (23 °F) the engine must not be started if Diesel Fuel or a blend of Diesel Fuel with Jet Fuel is used. If the fuel blend is uncertain, the engine must not be started in this temperature range either.

If the airplane is being operated with Jet Fuel, operation in the yellow temperature range is permissible.

Fuel Grade

Approved fuel grades are listed in Section 2.14 - FUEL. As the fuel grade is important concerning operating temperature limitations, the pilot must be sure about the fuel grade. Cold Diesel Fuel tends to flocculate, which can lead to clogging of the fuel filter. The fuel filter is not heated.

If the airplane is operated in a cold environment, it must be changed from Diesel Fuel operation to Jet Fuel operation. To ensure that no blend of Jet Fuel with Diesel Fuel is in one of the tanks, each tank must be refilled at least twice with more than 17.2 US gal (65 liter) of Jet Fuel. Otherwise both tanks must be drained before refueling with Jet Fuel.

NOTE

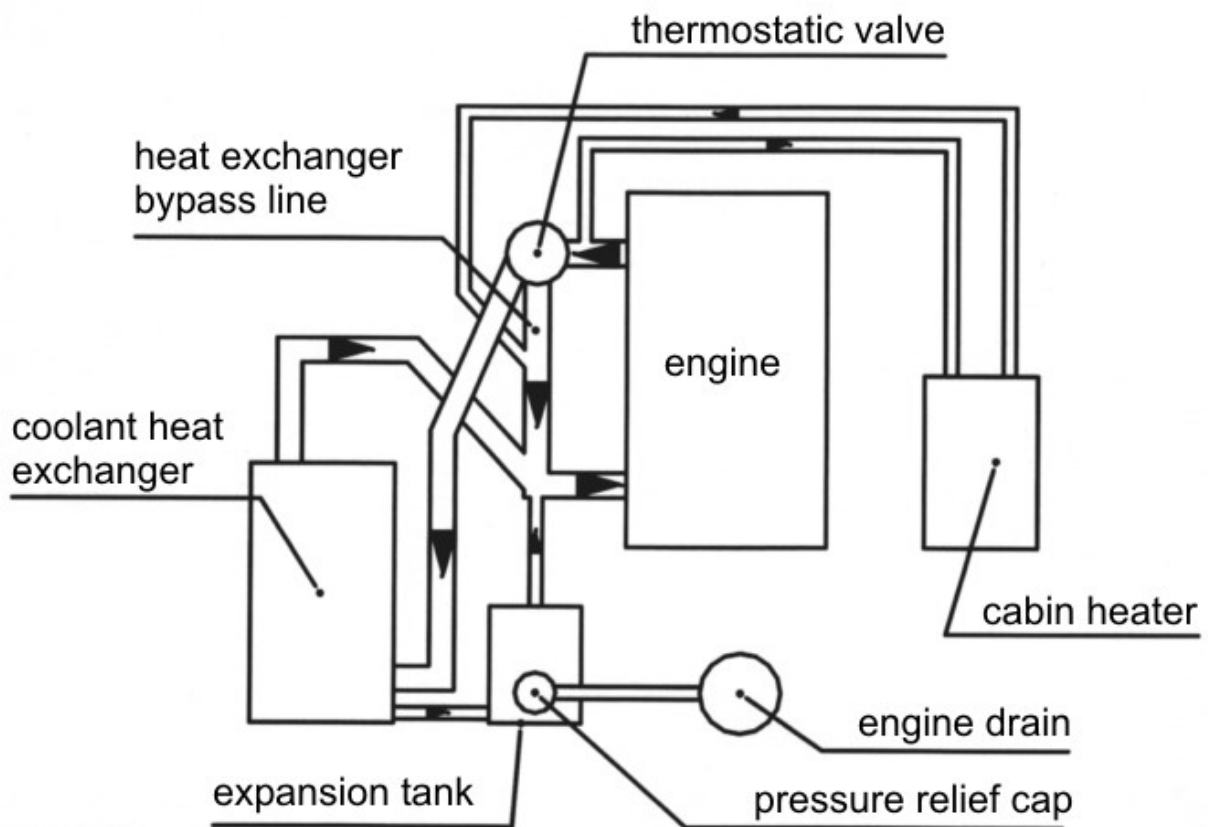
In order to provide information about the fuel grade it is recommended to enter the fuel grade in the airplane log each time fuel is refilled.

CAUTION

If the airplane is operated with Diesel Fuel or a blend of Diesel Fuel with Jet Fuel the use of the auxiliary tanks, if installed (OÄM 42-056), is not permitted.

7.9.6 COOLING SYSTEM

Each engine is liquid cooled. The liquid cooling system consists of a radiator and a bypass to this radiator. The bypass is in operation when coolant temperatures are low. It therefore allows the engine to warm-up quickly. Upon reaching a certain temperature (approximately 88 °C or 190 °F) the radiator is activated by a thermostatic valve. Additionally a coolant to air heat exchanger is provided for the cabin heat system. The flow through the heat exchanger is independent of the coolant temperature. An expansion tank helps to adjust the pressure in the system. The system is protected against overpressure by means of a pressure relief valve.



7.9.7 OIL SYSTEMS

Each engine has two separate oil systems.

Lubrication System (Engine and Turbo-Charger)

The engine lubrication is a wet sump lubrication system. The oil is cooled by a separate cooler on the underside of the engine.

A dip-stick is provided to check the oil quantity through an inspection hole in the upper cowling. If required, oil can also be filled in there (for approved oil grades refer to Section 2.4 - POWER-PLANT LIMITATIONS).

Gearbox and Propeller Governor System

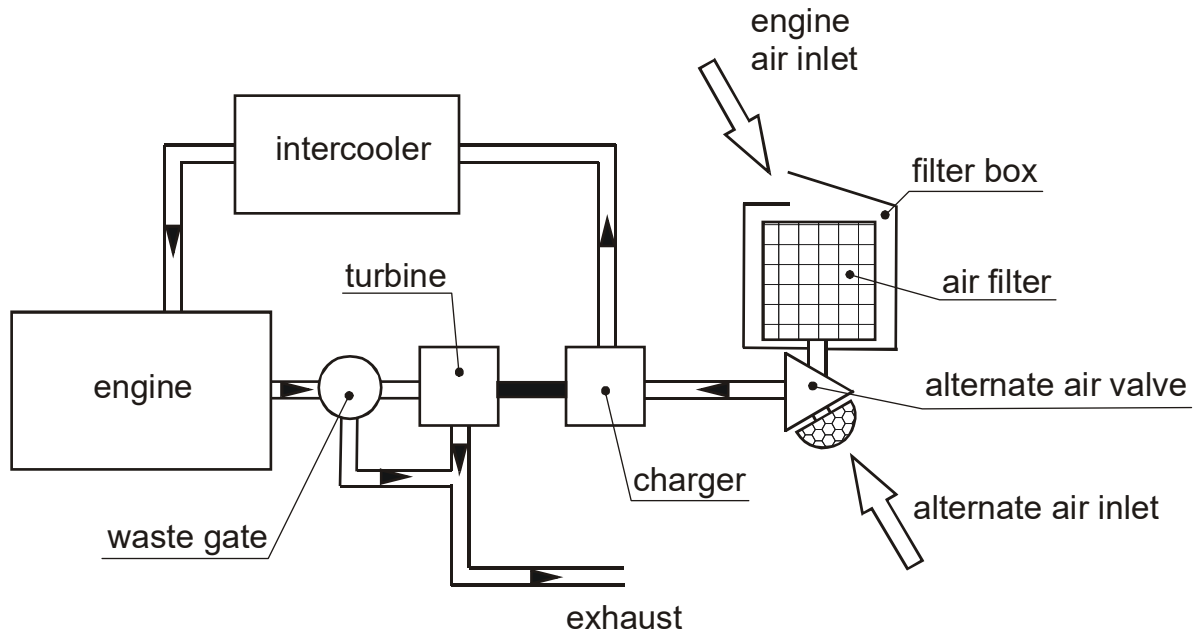
The second oil circuit lubricates the gearbox and serves the governor system and the regulation of the propeller.

The gearbox oil quantity can be checked with the help of an inspection glass which can be reached through an inspection hole on the front side of the lower cowling.

CAUTION

If the gearbox oil quantity is too low, an unscheduled maintenance is necessary (for approved oil grades refer to Section 2.4 - POWER-PLANT LIMITATIONS).

7.9.8 TURBO-CHARGER SYSTEM



The exhaust system contains a manifold which collects exhaust gases from the outlets of the cylinders and feeds them to the turbine of the turbo charger. Behind the turbine the exhaust gases are guided through the lower cowling to the exterior of the airplane. Excess exhaust gases bypass the turbine. The bypass is controlled by the ECU through the waste gate valve. A manifold pressure sensor behind the compressor allows the ECU to calculate the correct position of the waste gate valve. This prevents excessive manifold pressures at low density altitudes. The intake air is compressed in the compressor which is driven by the turbine, and is subsequently cooled down in the intercooler to increase power. Cooling the air increases efficiency through the higher density of the cooler air.

7.9.9 FIRE DETECTION SYSTEM

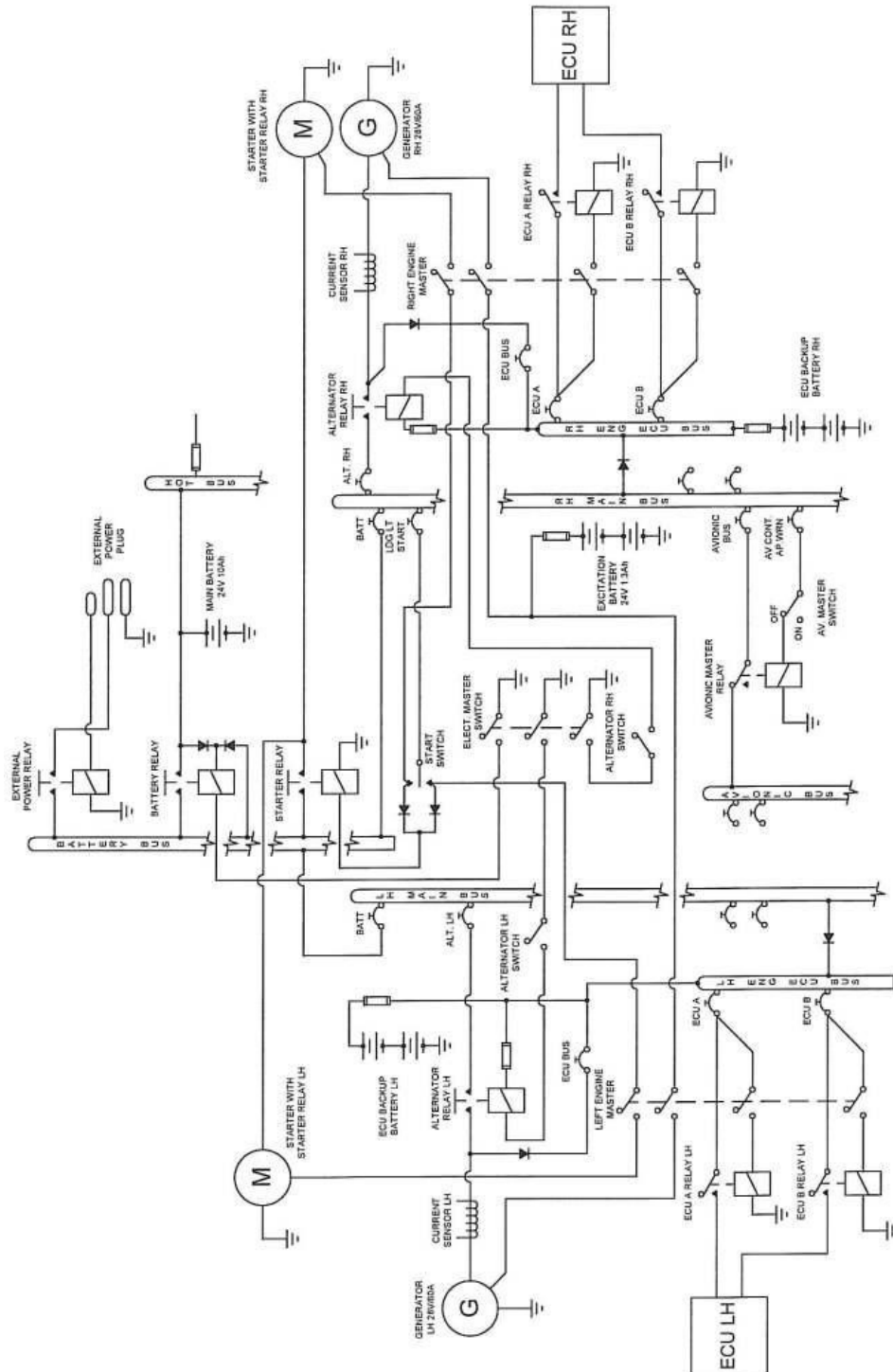
The fire detection system in the DA 42 consists of an overheat detector in the hot area of each engine. In case of an increase of the engine compartment temperature above 250 °C (480 °F) the overheat detector closes the electric circuit and a warning message appears in the annunciation window of the G1000 PFD.

To test the fire detectors (refer to Section 4A.5.1 - PREFLIGHT INSPECTION) push the test button located next to the gear selector switch. An aural alert and the fire warning message for the LH and RH engine should appear in the annunciation window of the G1000 PFD.

CAUTION

If the aural alert or the warning does not appear, an unscheduled maintenance is necessary.

7.10 ELECTRICAL SYSTEM



7.10.1 GENERAL

The DA 42 has 28 Volt DC system, which can be sub-divided into:

- Power generation
- Storage
- Distribution
- Consumers

Power Generation

Power generation is provided by two 60 Ampère alternators (generators) which are mounted on the bottom left side of each engine. The alternators are driven by a flat belt.

The power output line of the left hand alternator is connected to the LH MAIN BUS via the LH alternator relay and a 70 Ampère circuit breaker. The power output line of the RH alternator is connected to the RH MAIN BUS via the RH alternator relay and a 70 Ampère circuit breaker. Both MAIN BUSSES are connected to the BATTERY BUS via a 90 Ampère 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. In the event of a main battery failure the field of each alternator is energized by two 12 V, 1.3 Ah sealed lead acid batteries (excitation battery) connected in series, which are installed in the nose baggage compartment.

The ENGINE MASTER LH (RH) switches connect the excitation battery to the alternator field via a 10 Ampère fuse.

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 undervoltage as well as a couple of other internal warning levels.

Load balancing: The alternator control unit supports load balancing across the two alternators via the internal alternator temperature. The temperature is measured and the alternator control unit slightly decreases alternator voltage output at higher internal alternator temperatures. Thus the load is partly shifted to the alternator with the lower internal temperature. This system is able to balance the actual load within a few amps between the two alternators installed.

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 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 ELECT. 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 backup 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.

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Distribution

Electrical power is distributed via the HOT BATTERY BUS, the BATTERY BUS, the LH (RH) ECU BUS, the LH (RH) MAIN BUS, and the AVIONIC BUS.

HOT BATTERY BUS:

The HOT BATTERY BUS is directly connected to the main battery and cannot be disconnected from the main battery. The HOT BATTERY BUS provides power to the pilot map/reading light and ELT RCPI unit which are protected by their own fuses.

BATTERY BUS:

The BATTERY BUS is connected to the main battery via the battery relay which can be controlled by the ELECT. MASTER switch. The BATTERY BUS provides power to the LH (RH) MAIN BUS and heavy duty power to both starters.

ECU BUS:

The LH (RH) ECU BUS is connected to the LH (RH) MAIN BUS via a diode and connected to the power output line of the alternator via diode and a 30 Ampère circuit breaker and provides power for the ECU A and ECU B via the LH (RH) ECU A (B) relays which are controlled by the LH (RH) ENGINE MASTER switch. The LH (RH) ENGINE MASTER switch must be set to ON to connect the ECU A and ECU B to the ECU BUS.

To support the alternator electrical power supply to the ECUs in case of a malfunction of the main battery, additional sealed-lead-acid batteries (ECU backup battery) are connected to the RH and LH ECU bus.

If OÄM 42-129 is carried out:

These batteries are able to provide 30 minutes of engine operation in case of a complete airplane electrical failure. Both engines may stop if the 30 minutes have elapsed.

MAIN BUS:

The LH (RH) MAIN BUS is connected to the BATTERY BUS via a 90 Ampère 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 Section 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 LH section of the instrument panel.

Instrument Lighting

With a rotary button (INSTRUMENT) in the LH 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 FAIL will be displayed. In this case the system should be serviced. The PITOT HT OFF is on if the Pitot heating is switched off.

External Power Socket

The DA 42 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 online.

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.

7.10.2 ENGINE CONTROL UNIT / ECU

Engine Control and Regulation

The ECU monitors, controls and regulates all important parameters for engine operation.

Sensors installed are:

- Oil temperature (lubrication system engine) / OIL TEMP
- Oil pressure (lubrication system engine) / OIL PRES
- Coolant temperature / COOLANT TEMP
- Gearbox temperature / GEARBOX
- Camshaft RPM (twice)
- Crankshaft RPM (twice)
- Fuel pressure in the common rail
- Manifold pressure
- Manifold air temperature
- Ambient air pressure
- Propeller governor / oil pressure
- POWER lever position (twice)
- Voltage
- Starter switch signal
- Fuel pressure
- ECU Swap switch signal
- ECU Test switch signal

In accordance with the received signals and a comparison with the programmed characteristic diagrams the necessary inputs are calculated and transmitted by the following signal lines to the engine:

- Activation of starter (relay)
- Signal for propeller governor pressure valve
- Signal for the rail-pressure regulation valve
- Signal for each of the 4 injection nozzles
- Activation of the glow plugs
- Signal for the waste gate valve

The following alerts are displayed on PFD of the G1000:

- Glow sparks active
- Status ECU A
- Status ECU B

Normally each engine is controlled and regulated by the appropriate ECU A. The ECU B is a backup system to ensure redundancy. In case of an internal error during operation or the loss of a sensor signal the system automatically switches to ECU B. If the loss of the sensor signal was the cause for the error, the system automatically switches back to ECU A.

A fault in one of the ECUs is indicated by a caution message on the PFD (L/R ECU A/B FAIL). In case of minor faults, the annunciation can be reset once by pressing the ECU TEST button for more than 2 seconds. However, the annunciation will re-appear upon the next attempt to start the engine. After the indication of the L/R ECU A/B FAIL caution message, the engine must be serviced, even if the caution message could be reset.

7.10.3 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:

1. Pressing the MSG key acknowledges a new master warning / caution / advisory indication.
2. 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.

Alert Levels

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

Airplane Description	 Diamond AIRCRAFT	DA 42 AFM with OÄM 42-102 Garmin GFC 700
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Warning Alerts on the G1000

Warning Alerts	Meaning / Cause
L/R ENG TEMP	The annunciation is active when the engine coolant temperature is greater than 105 °C.
L/R OIL TEMP	The annunciation is active when the engine oil temperature is greater than 140 °C.
L/R OIL PRES	The annunciation is active when the engine oil pressure is less than 1 bar.
L/R FUEL TEMP	The annunciation is active when the fuel temperature is greater than 75 °C.
L/R GBOX TEMP	The annunciation is active when the gearbox oil temperature is greater than 120 °C.
L/R ALTN AMPS	The annunciation is active when the alternator load is greater than 60 amps.
L/R ENG FIRE	The annunciation is active when an engine fire is detected.
L/R STARTER	This annunciation is used to indicate to the pilot that the starter is engaged when it should not be.
DOOR OPEN	The annunciation is used to indicate to the pilot if the baggage-, canopy- or passenger door is open.
POSN ERROR	The annunciation is active when the G1000 will no longer provide GPS based navigational guidance.
ATTITUDE FAIL	The annunciation is active when the display system is not receiving attitude reference information from the AHRS.
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.
VERT SPEED FAIL	The annunciation is active when the display system is not receiving vertical speed input from the air data computer.

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Warning Alerts	Meaning / Cause
HDG	The annunciation is active when the display system is not receiving valid heading input from the AHRS.
WARN	This annunciation constitutes a RAIM position warning. The nav deviation bar is removed.

Audible Warning Alerts

Warning Alerts	Meaning / Cause
Landing gear retracted	A warning chime tone which repeats without delay is active when the landing gear is retracted while the flaps move into the LDG position or when the POWER lever is placed in a position below approx. 20 %.

Airplane Description		DA 42 AFM with OÄM 42-102 Garmin GFC 700
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Caution Alerts on the G1000

Caution Alerts	Meaning / Cause
L/R ECU A FAIL or L/R ECU B FAIL	The annunciation is active when a fault in ECU A or ECU B has occurred. In case of minor faults, the annunciation can be reset once by pressing the ECU TEST button for more than 2 seconds. However, the annunciation will re-appear upon the next attempt to start the engine.
L/R FUEL LOW	The annunciation is active when the fuel quantity is below 4 ± 1 US gal usable fuel.
L/R VOLTS LOW	The annunciation is active when bus voltage is less than 25 Volts.
L/R ALTN FAIL	The annunciation is active when the alternator has failed.
L/R COOL LVL	The annunciation is active when engine coolant level is low.
PITOT FAIL	The annunciation is active when the Pitot heater is failed.
PITOT HT OFF	The annunciation is active when the Pitot heater is off.
STAL HT FAIL	The annunciation is active when the stall heater is failed.
STAL HT OFF	The annunciation is active when the stall heater is off.
STICK LIMIT	Control stick limiting system (variable elevator stop) has failed.
L/R AUX FUEL E	This annunciation can only occur when the auxiliary fuel tank system (optional) is installed. The annunciation is active when the L/R auxiliary fuel tank is empty and the FUEL TRANSFER pump is ON.
INTEG RAIM not available	The annunciation is active when RAIM (Receiver Autonomous Integrity Monitor) is not available.
AHRS ALIGN: Keep Wings Level	The annunciation is active when the AHRS (Attitude and Heading Reference System) is aligning.
CHECK GEAR	Landing gear is not down and locked.

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Caution Alerts	Meaning / Cause
DEICE LVL LO	De-icing fluid level is low (if installed).
DEICE PRES HI	De-icing pressure is high (if installed).
DEICE PRES LO	De-icing pressure is low (if installed).

Annunciation Advisory Alerts on the G1000

Advisory Alerts	Meaning / Cause
L/R GLOW ON	The annunciation is active when the glow plugs are powered.
L/R FUEL XFER	The annunciation is active when fuel transfer from auxiliary to main tank is in progress.

Message Advisory Alerts on the G1000

Advisory Alerts	Meaning / Cause
PFD FAN FAIL	The annunciation is active when the PFD fan is inoperative.
MFD FAN FAIL	The annunciation is active when the MFD fan is inoperative.
GIA FAN FAIL	The annunciation is active when the GIA fan is inoperative.

7.11 PITOT-STATIC SYSTEM

Total pressure is measured at the leading edge of a Pitot probe under the left wing. With the Garmin autopilot system installed, the static pressure is measured through the static ports in the rear fuselage. To protect against dirt and condensation there are filters in the system. 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.

7.12 STALL WARNING SYSTEM

The lift detector of the DA 42 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. When the PITOT/HEAT switch is set to "ON" position and the aircraft is operated on ground, an automatic protection reduces the heating of the lift transducer.

7.13 GARMIN G1000 INTEGRATED AVIONICS SYSTEM

7.13.1 GENERAL

The Gamin 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 avionic 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 Cockpit Reference Guide, P/N 190-00406-(), latest effective issue and Garmin G1000 Pilot's Guide for the Diamond DA 42, P/N 190-00649-(), latest effective issue for complete descriptions of the G1000 system and operating procedures.

NOTE

Near the DME ground station, it can happen under certain adverse conditions that the Bendix/King KN 63 DME loses the direct signal from the ground station and locks onto an "echo". This will result in an inaccurate indication of the distance.

NOTE

During retraction and extension of the landing gear the ADF-indication may be inaccurate.

7.13.2 PRIMARY FLIGHT DISPLAY (PFD)

The primary flight display (PFD; see Figure below) 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
- * 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 7.10.3 - WARNING, CAUTION AND ADVISORY LIGHTS.

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, nearly identical to the PFD and contains the same controls as previously listed. Additionally the MFD incorporates the controls for the Autopilot System.

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 Section 7.9.4 - 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 2 ½ 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 TIS systems.

7.13.7 GWX 68 WEATHER RADAR

The Garmin GWX 68 Weather Radar System provides information about precipitation conditions ahead of the airplane. The system consists of a combined microwave transmitter and receiver system in the nose cone, mounted to the front baggage compartment bulkhead. The system is connected to the electrical system of the airplane via a circuit breaker on the instrument panel. The processed data of the GWX 68 system is displayed on the Garmin G1000 MFD. Refer to the Garmin G1000 Pilot's Guide, P/N 190-00649-(), latest effective issue for more information.

7.14 AVIONICS

7.14.1 AUTOPILOT SYSTEM

General

The GFC 700 automatic flight control system (AFCS) is a 3 axis autopilot and flight director system which provides the pilot with the following features: altitude preselect and altitude hold (ALT); yaw damper; flight level change with airspeed hold (FLC); vertical speed hold (VS); navigation tracking for VOR (NAV) and GPS (GPS); heading hold (HDG); approach mode and go around (GA) pitch/roll guidance. The system consists of autopilot controls on the multi-function display (MFD), servos with autopilot processing logic, flight director processing logic in the GIAs, a control stick-mounted elevator trim switch, a control stick mounted trim interrupt and autopilot disconnect switch, a control stick mounted CWS (control wheel steering) switch, a POWER lever mounted GA (go-around) switch, and PFD/MFD-mounted altitude preselect, heading, and course knobs.

The GFC 700 autopilot contains an electric pitch trim system which is used by the autopilot for automatic pitch trim during autopilot operation and by the pilot for manual electric pitch trim when the autopilot is not engaged. The manual electric pitch trim is operated by a split switch on the pilot's control stick.

The GFC 700 autopilot and manual electric trim (MET) will not operate until the system has satisfactorily completed a preflight test. The preflight test begins automatically with initial power application to the autopilot (AVIONIC MASTER switch is set to the ON position).

The following conditions will cause the autopilot to automatically disconnect:

- Electrical power failure
- Internal autopilot system failure
- AHRS malfunction
- Loss of air data computer information

The GFC 700 may be manually disconnected by any of the following means:

- Depressing the red AP DISC button on the pilot's or copilot's control stick
- Moving the left (outboard) side of the manual electric trim switch on the pilot's control stick
- Pushing the AP button on the autopilot mode controller when the autopilot is engaged
- Depressing the GA button on the left side of the POWER lever
- Pulling the AUTOPILOT circuit breaker
- Turning off the AVIONICS MASTER switch
- Turning off the ELECT. MASTER switch

In addition, the CWS (control wheel steering) switch on the pilot's control stick will disconnect the autopilot servos from the airplane flight controls as long as the CWS switch is depressed.

Power to the GFC 700 autopilot and electric trim system is supplied through the AVIONIC MASTER switch and the AUTOPILOT circuit breaker. The AVIONIC MASTER switch can be used as an additional means to disable the autopilot and electric trim system. The red AP DISC switch on the pilot's control stick will interrupt power to the manual electric trim for as long as the switch is depressed.

Loss of instruments or components of the G1000 system will affect the GFC 700 AFCS as follows:

- Loss of the AHRS will cause the autopilot to disconnect. The autopilot and flight director will be inoperative. Manual electric trim will be available.
- Loss of the heading function of the AHRS will result in loss of the HDG mode. If in HDG mode at the time heading is lost, the autopilot will revert to basic roll mode (ROL).
- Loss of the MFD will not cause the autopilot to disconnect, and will remain engaged with limited functionality, but the autopilot cannot be re-engaged after disconnect by the pilot.

- Loss of the PFD will cause the autopilot to disconnect. The autopilot and flight director will be inoperative. Manual electric trim will be available.
- Loss of air data computer information will cause the autopilot to disconnect. The autopilot will be inoperative. The flight director will be available except for air data modes (ALT, VS, FLC). Manual electric trim is available.
- Loss of GIA #1 will cause the autopilot to disconnect. The autopilot, flight director and manual electric trim will be inoperative. Loss of GIA #2 will also prevent autopilot and manual electric trim operation, but flight director will be available.
- Loss of the standby airspeed indicator, standby attitude indicator, standby altimeter, or compass will have no effect on the autopilot.
- Loss of both GPS systems will cause the autopilot and flight director to operate in NAV modes (LOC, BC, VOR, VAPP) with reduced accuracy. Course intercept and station crossing performance may be improved by executing intercepts and station crossings in HDG mode, then reselecting NAV mode.

The GFC 700 Automatic Flight Control system (AFCS) installed in the Diamond DA 42 consists of the following components:

- One GDU which contains the following mode control buttons:

AP (Autopilot engage/disengage)

FD (Flight Director On/Off)

HDG (Heading mode On/Off)

NAV (Nav mode On/Off)

APR (Approach mode On/Off)

ALT (Altitude Hold mode On/Off)

VS (Vertical Speed mode On/Off)

FLC (Flight Level Change mode On/Off)

NOSE UP and NOSE DN (Vertical mode reference change)

YD (Yaw Damper On/Off)

This GDU is installed as the MFD.

- Servos with autopilot processing logic in the pitch, roll, yaw and pitch trim control systems
- Servo mounts and brackets
- Flight director processing logic in the GIAs
- Control stick-mounted manual electric trim (MET) switch (split switch) for pitch trim
- Control stick-mounted trim interrupt and autopilot disconnect switch
- Control stick-mounted CWS (control wheel steering) switch
- Remote-mounted go-around switch (on the left side of the POWER lever knob)
- PFD/MFD mounted altitude preselect knob (ALT)
- PFD/MFD mounted heading select knob (HDG)

Flight director commands and autopilot modes are displayed on the PFD. Full AFCS functionality is only available with both displays operating, and will disconnect under certain reversionary conditions.

Upon initial system power-up, the system undergoes a preflight test. At the end of the test, the autopilot disconnect tone sounds and the PFT and AFCS annunciations are removed. Successful completion of the preflight test is required for the autopilot and manual electric trim to engage.

Annunciation of the flight director and autopilot modes is shown in the lower status field of the PFD. In general, green indicates active modes and white indicates armed modes. When a mode is directly selected by the pilot, no flashing of the mode will occur. When automatic mode changes occur, they will be annunciated with a flashing annunciation of the new mode for ten seconds in green. If a mode becomes unavailable for whatever reason, the mode will flash for ten seconds in yellow and be replaced by the new mode in green.

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Normal autopilot disconnects are annunciated with a yellow flashing AP on the PFD accompanied by a two second autopilot disconnect tone. Normal disconnects are those initiated by the pilot with the AP DISC switch, the MET switch, the AP button on the MFD mode controller, or the GA button. Abnormal disconnects will be accompanied by a red flashing AP on the PFD accompanied by a continuous autopilot disconnect tone. The disconnect tone and flashing alert may be cancelled by pressing the AP DISC switch or the left side of the MET switch.

Refer to the Garmin G1000 Cockpit Reference Guide, P/N 190-00406-(), latest effective issue and Garmin G1000 Pilot's Guide for the Diamond DA 42, P/N 190-00649-(), latest effective issue for complete descriptions of the G1000 system and operating procedures.

Power Supply

The AVIONIC MASTER switch supplies power to the avionics bus bar of the radio circuit breakers and the autopilot circuit breaker.

The following circuit breaker is used to protect the following element of the GFC 700 autopilot:

Circuit Breaker	Function
AUTOPILOT	Supplies power to the autopilot pitch, roll, yaw and pitch trim servos.

7.14.2 AUTOMATIC FLIGHT CONTROL SYSTEM ANNUNCIATIONS AND ALERTS

Automatic Flight Control System (AFCS) Status Alerts

The following annunciations can appear on the PFD above the airspeed and attitude indicators. Only one annunciation occurs at a time, and messages are prioritized by criticality.

Warning Alerts on the Automatic Flight Control System (AFCS)

Warning Alerts	Meaning / Cause
PFT	PREFLIGHT TEST - Preflight system test failed; aural alert sounds at failure.
AFCS	SYSTEM FAILURE - AP and MET are unavailable; FD may still be available.
PTCH	PITCH FAILURE - Pitch axis control failure; AP inoperative.
ROLL	ROLL FAILURE - Roll axis control failure; AP inoperative.
YAW	YAW DAMPER FAILURE - Yaw damper control failure; AP inoperative.
PTRM	PITCH TRIM FAILURE (or stuck AP TRIM switch) - if AP engaged, take control of the airplane and disengage AP. If AP disengaged, move AP TRIM switches separately to release.

Airplane Description		DA 42 AFM with OÄM 42-102 Garmin GFC 700
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Caution Alerts on the Automatic Flight Control System (AFCS)

Caution Alerts	Meaning / Cause
↑ELE	ELEVATOR MISTRIM UP - Pitch servo providing sustained force in the indicated direction.
↓ELE	ELEVATOR MISTRIM DOWN - Pitch servo providing sustained force in the indicated direction.
←AIL	AILERON MISTRIM LEFT - Roll servo providing sustained force in indicated direction.
AIL→	AILERON MISTRIM RIGHT - Roll servo providing sustained force in indicated direction.
←RUD	RUDDER MISTRIM LEFT - Yaw servo providing sustained force in the indicated direction.
RUD→	RUDDER MISTRIM RIGHT - Yaw servo providing sustained force in the indicated direction.

Advisory Alerts on the Automatic Flight Control System (AFCS)

Advisory Alerts	Meaning / Cause
PFT	PREFLIGHT TEST - Performing preflight system test; aural alert sounds at completion. Do not press the AP DISC switch during servo power-up and preflight system tests as this may cause the preflight system test to fail or never to start (if servos fail their power-up tests). Power must be cycled to the servos to remedy the situation.

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7.15 STRUCTURAL TEMPERATURE INDICATOR

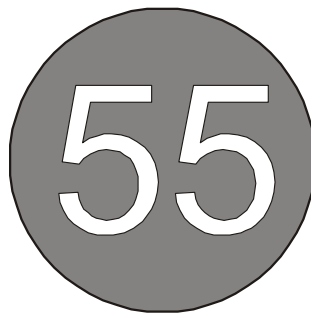
If OÄM 42-188 is carried out a structural temperature indicator, installed in the LH and RH main landing gear bay (see Figure below) indicates when the structural temperature limitation is exceeded (refer to Section 2.16.1). The indicator needs to be checked if the zero fuel mass exceeds 1650 kg (3638 lb).

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

NOTE

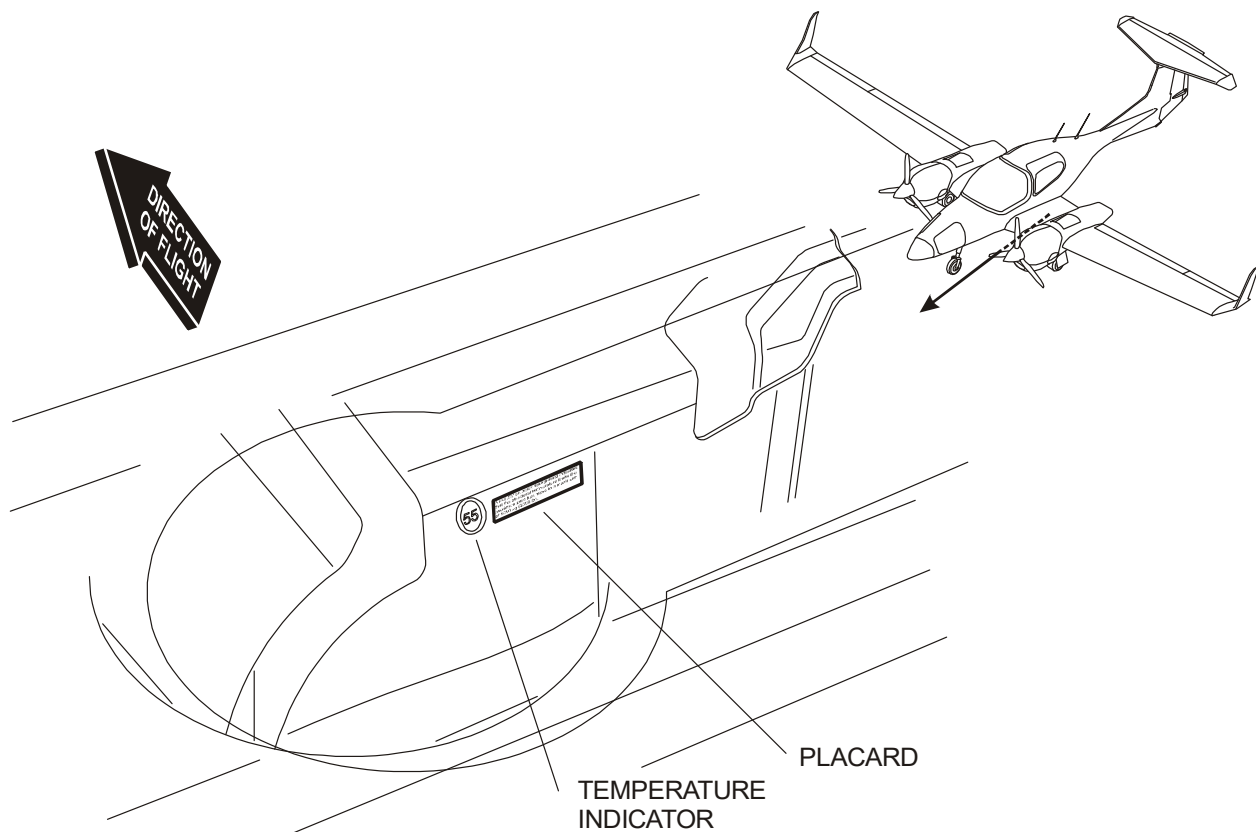
At temperatures approaching the limit, the background will progressively darken prior to turning black; this indicates acceptable temperatures.

A red "55" on black background indicates that the structural temperature limit is exceeded. In this case the maximum zero fuel mass is 1650 kg (3638 lb):



Location of Temperature Indicator and Placard

LH MLG bay shown, RH MLG bay opposite



CHAPTER 8

AIRPLANE HANDLING, CARE AND MAINTENANCE

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8.1 INTRODUCTION

Chapter 8 contains the manufacturer's recommended procedures for proper ground handling and servicing of the airplane. The Airplane 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 100, 200, 1000 and 2000 hours. Independent of the flight hours an annual inspection must be performed every year. A non-recurring engine inspection must be performed on new engines after 3 to 6 hours. The respective inspection checklists are prescribed in the Airplane 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 TAE and mt-Propeller 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 Airplane Maintenance Manual (Doc. No. 7.02.01; Section 05-50).

8.3 AIRPLANE ALTERATIONS OR REPAIRS

Alterations or repairs to the airplane may be carried out only according to the Airplane Maintenance Manual, Doc. No. 7.02.01, 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.

1. Ground the airplane and the fuel supply vehicle electrically.
2. Remove the fuel filler cap (located on top of the outer wing). Check cap retaining cable for damage.
3. Refuel the airplane.
4. Install the fuel filler cap.
5. Repeat steps 2 to 4 for the other wing.
6. Remove the ground cable from the airplane and the fuel supply vehicle.

8.4.2 ENGINE OIL LEVEL CHECK

CAUTION

Do not check the engine oil level within 5 minutes after engine shut down. The engine oil returns to the oil pan slowly; after 5 minutes 80 %, after 15 minutes 90 % and after 30 minutes 100 % of the engine oil has returned to the oil pan.

Do not overfill the engine with engine oil.

1. Open the inspection door on top of the upper left cowling.
2. Remove the filler cap.
3. Clean the oil dip-stick.
4. Install the filler cap.
5. Remove the filler cap again.
6. Read the oil level from the dip-stick.
7. If necessary, add engine oil and repeat steps 3 to 6.
8. Install the filler cap.
9. Close the inspection door.
10. Repeat steps 1 to 9 for the other engine.

8.4.3 GEARBOX OIL LEVEL CHECK

1. Open the inspection door on the forward left side of the lower cowling.
2. Check gearbox oil level in inspection window.
3. Close the inspection door.
4. Repeat steps 1 to 3 for the other engine.

8.4.4 TIRE INFLATION PRESSURE CHECK

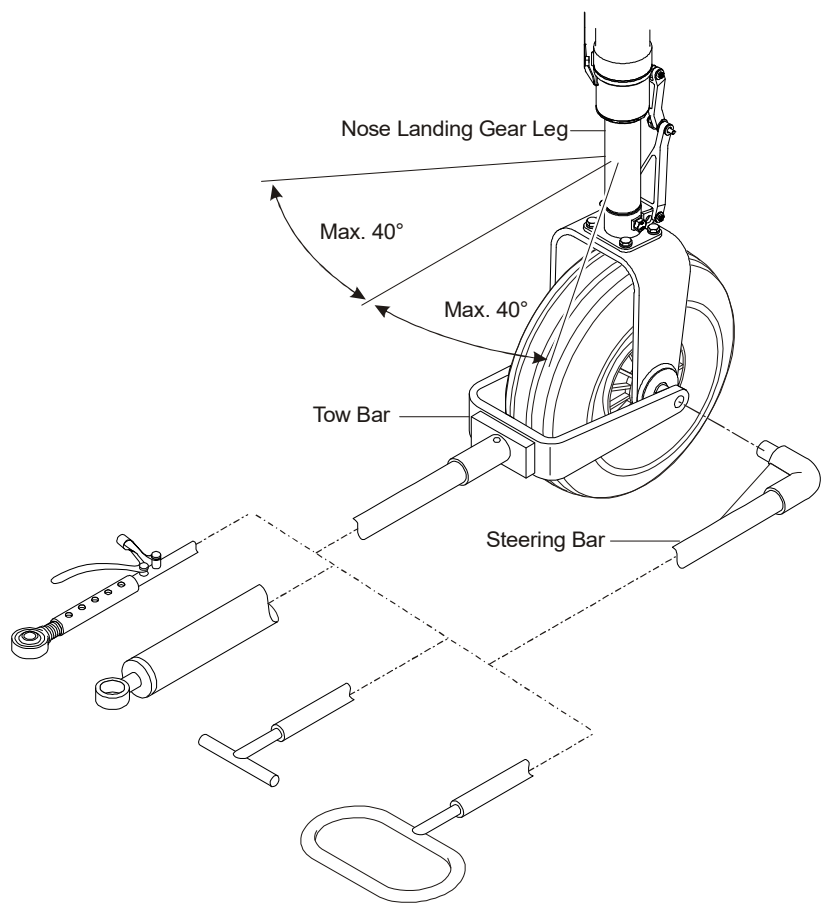
1. Remove dust cap from valve stem by turning counterclockwise.
2. Connect tire gauge to valve stem, read pressure.
3. Correct pressure if necessary
(nose tire 6.0 bar / 87 PSI,
main tires 4.7 bar / 68 PSI if OÄM 42-195 is installed,
4.5 bar / 65 PSI if OÄM 42-195 is not installed).
4. Install dust cap on valve stem by turning clockwise.

8.5 GROUND HANDLING / ROAD TRANSPORT

8.5.1 GROUND HANDLING

To move the airplane on ground, it can be pushed or pulled by hand on the inner section of the propeller blades near the spinner or pushed at the wing nose and at the rough surface of the center wing, inboard of the nacelles. Do not push on the spinners, as you may damage the spinner which can cause vibration and damage to the engine. Do not use force on the propeller tips or on the airplane control surfaces and do not push on the de-icing nozzles (if installed) on the propeller blade root, as you may damage the propeller, the control surfaces or the de-icing nozzles.

It is recommended to use the steering bar or a tow bar which is available from the manufacturer to assist steering and towing. The tow bar is engaged in the appropriate hole in the nosewheel as shown in the figure below.



Steering Bar or Tow Bar Attachment

CAUTION

If the airplane is towed by steering / tow bar by hand or a tow vehicle, do not turn the nose wheel more than 40 degrees to either side from the center position. Otherwise damage to the torque links of the nose landing gear will result.

When towing the airplane with a tow vehicle, a qualified person must sit in the cockpit ready for immediate braking action, in the event that the tow vehicle becomes uncoupled. The movement of the tow vehicle should always be started and stopped slowly to avoid shock loads on the nose landing gear. The maximum steering angle of 40 degrees to either side must not be exceeded.

WARNING

The tow bar must be removed before starting the engine.

If the airplane must be pulled out of soft ground or deep snow, towing lines must be used. The towing lines should be attached to the main landing gear struts as high as possible without interfering with the brake lines. The ropes should be long enough to sufficiently clear the nose or tail. A qualified person must sit in the cockpit to maintain control of the airplane using the nose wheel steering and brakes.

WARNING

All towing lines must be removed before starting the engines.

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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.

Refer to the Airplane Maintenance Manual, Doc. No. 7.02.01, latest revision for necessary parking procedures. Use the short term parking procedure when the airplane will be parked for less than 5 days. Use the long term parking procedure when the airplane will be parked for 5 to 30 days. Use the storage procedure when the airplane will be parked for more than 30 days.

NOTE

If the airplane is not used for more than 4 weeks an engine ground run must be performed. Refer to the Engine Operation and Maintenance Manual, latest revision.

Control Surfaces Gust Lock

The manufacturer offers a control surfaces gust lock which can be used to block the primary controls. It is recommended that the control surfaces gust lock be used when parking outdoors, because otherwise the control surfaces can hit the stops in strong 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:

1. Move the rudder pedals fully forward.
2. Engage the control surfaces gustlock with the pedals.
3. Engage the stick, wrap straps around stick once.
4. Attach the locks and tighten the straps.

For removal reverse the sequence.



8.5.3 MOORING

Near the lower end of the tail fin of the airplane there is a hole 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 jackpoints 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 PASSENGER DOOR

The canopy, passenger 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 deicing fluids are:

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

1. Remove any snow from the airplane using a soft brush.
2. Spray deicing fluid onto ice-covered surfaces using a suitable spray bottle.
3. Use a soft piece of cloth to wipe the airplane dry.

CHAPTER 9

SUPPLEMENTS

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9.1 INTRODUCTION

Chapter 9 contains information concerning additional (optional) equipment of the DA 42.

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

Airplane S/N:		Registration:		Date:	
Sup. No.	Title	Rev. No.	Date	applicable	
				YES	NO
A33	Integrated Avionics System Garmin G1000 SBAS and P-RNAV Operation	0	28-Mar-2022	☐	☐
M00	DA 42 M with Garmin GFC 700	2	05-Sep-2011	☐	☐
M10	Operator Desk	1	20-Apr-2015	☐	☐
M30	Universal Nose	1	23-Jan-2012	☐	☐
M60	Nose Pod	1	19-Nov-2010	☐	☐
M130	Universal Nose	2	20-Dec-2010	☐	☐
M160	Nose Pod with Standard Baggage Compartment	0	18-Feb-2011	☐	☐
O08	Pilot's Removable Stick	0	30-Jun-2015	☐	☐
O09	Cooling - Baffle for Cold Weather Operation	1	24-Mar-2021	☐	☐
S02	Ice Protection System (if OÄM 42-053 is installed and OÄM 42-054 is not installed)	1	26-Feb-2018	☐	☐

Airplane S/N:

Registration:

Date:

Sup. No.	Title	Rev. No.	Date	applicable	
				YES	NO
S03	Ice Protection System - Known Icing (if OÄM 42-053 <u>and</u> OÄM 42-054 are installed)	4	26-Feb-2018	☐	☐
S04	Continuous Flow Oxygen System	2	09-Mar-2021	☐	☐
S05	Mission Power Supply System	0	20-Dec-2007	☐	☐
S06	G1000 Synthetic Vision Technology	0	01-May-2010	☐	☐
S07	TAE 125-02-114 Engine	3	04-Oct-2022	☐	☐
S10	Flight Data Logging Device	0	29-Jan-2016	☐	☐
S12	AmSafe Aviation Inflatable Restraint AAIR V23	2	20-Mar-2019	☐	☐
				☐	☐

DA 42 AFM
with OÄM 42-102
Garmin GFC 700



Supplements

Airplane S/N:		Registration:		Date:	
Sup. No.	Title	Rev. No.	Date	applicable	
				YES	NO
				☐	☐
				☐	☐

NOTE

Information contained in Supplement M00 supersedes the information contained in Supplement S05. If Supplement M00 is applicable Supplement S05 has to be removed.

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