



AIRPLANE FLIGHT MANUAL

DA 42 NG

Airworthiness Category : Normal
Requirement : JAR-23
Serial Number : 42.N499
Registration : HB-LWA
Doc. No. : 7.01.16-E
Date of Issue : 01-Apr-2012

Signature :

EASA Certification Manager :

European Aviation Safety Agency
Carl Thomas
Certification Manager General Aviation



Stamp :

Date of approval :

(EASA app. date)

This Airplane Flight Manual is approved with EASA Approval No. 10039193.

■ This Airplane Flight Manual is FAA approved for U.S. registered aircraft in accordance with the provisions of 14 CFR Section 21.29, and is required by FAA Type Certificate Data Sheet no.: A 57CE.

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

TEMPORARY REVISION

TR-MÄM-42-1219

New Fuel Pump

This Temporary Revision TR-MÄM-42-1219 is approved in conjunction with the Optional Design Change Advisory MÄM 42-1219 and is valid in conjunction with the latest revision of the DA 42 NG Airplane Flight Manual until this Temporary Revision has been incorporated into the Airplane Flight Manual.

The limitations and information contained herein either supplement or, in the case of conflict, override those in the Airplane Flight Manual or its previous Temporary Revisions.

The technical information contained in this document has been approved under the authority of DOA No. EASA 21J.052.

| Doc. No. | Chapter | Affected Pages |
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| 7.01.16-E | 6 | 6-30a |

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TEMPORARY REVISION
TR-OÄM-42-055/a
CONTINUOUS FLOW OXYGEN SYSTEM

This Temporary Revision TR-OÄM-42-055/a is approved in conjunction with the Optional Design Change Advisory OÄM 42-055/n and is valid in conjunction with the latest revision of the DA 42 NG Airplane Flight Manual until this temporary revision has been incorporated into the Airplane Flight Manual.

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TEMPORARY REVISION

TR-OÄM-42-160/f

Ice Protection System

This Temporary Revision TR-OÄM-42-160/f is approved in conjunction with the Optional Design Change Advisory OAM 42-160/l and is valid in conjunction with the latest revision of the DA 42 NG Airplane Flight Manual until this Temporary Revision has been incorporated into the Airplane Flight Manual.

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TEMPORARY REVISION
TR-OÄM 42-179/a
Integrated Avionics System Garmin G1000,
SBAS and P-RNAV Operation

This Temporary Revision TR-OÄM-42-179/a is approved in conjunction with the Optional Design Change Advisory OÄM 42-179/e and is valid in conjunction with the latest revision of the DA 42 NG Airplane Flight Manual until this Temporary Revision has been incorporated into the Airplane Flight Manual.

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TEMPORARY REVISION

TR-OÄM-42-383

GDC 72 Air Data Computer

This Temporary Revision TR-OÄM-42-383 is approved in conjunction with the Optional Design Change Advisory OÄM 42-383 and is valid in conjunction with the latest revision of the DA 42 NG Airplane Flight Manual until this Temporary Revision has been incorporated into the Airplane Flight Manual.

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FOREWORD

We congratulate you on the acquisition of your new DIAMOND DA 42 NG.

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 NG.

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 NG 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. 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. For example: If Revision 5 covers OÄM 42-039, then the Temporary Revision TR OÄM-42-039 is superseded by the 'permanent' Revision 5.

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | EASA Approval No. | Approval Date | Date Inserted | Signature |
|----------|---|---------|-----------------------|------------------|--|---------------|---------------|-----------|
| 1 | FAA- Approval | 0 | 0-0, 0-0a, 0-3, 0-4 | 19-Jun-2012 | Revision 1 of the AFM Doc. No. 7.01.16-E is approved by EASA under Project No. 0010016964. | 27-Jul-2012 | | |
| 2 | MAM 42-654, 42-685, 42-696, 42-701, 42-757, 42-778, 42-785 OAM 42-055, 42-056, 42-094, 42-119, 42-160/a, 42-179, 42-199, 42-203, 42-204/a & 42-193/a, 42-213, 42-222, 42-224, 42-226, 42-251 Corrections | All | All except Cover Page | 28-Feb-2014 | Revision 2 of the AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA.21J.052 | 18-Mar-2014 | | |
| 3 | MAM 42-659, 42-678, 42-759 OAM 42-253, 42-260 Corrections | All | All except Cover Page | 01-Apr-2014 | Revision 3 of the AFM Doc. No. 7.01.16-E is approved by EASA with Approval No.10048945. | 05-May-2014 | | |

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | EASA Approval No. | Approval Date | Date Inserted | Signature |
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| 4 | <p>MAM 42- -600, -744, -756, -828 & -760, -855, -868, -885, -938/b, -942, -973, -976, -978, -995, -1005, -1030,</p> <p>OAM 42- -111/a & -158/a & -246, -160/b -168, -169, -170, -173, -178, -194, -208, -209, -213/a, -218, -228, -240, -241, -247, -250, -255, -257, -259, -267, -270, -273, -277, -279, -281, -283, -287, -288, -298, -301, -304,</p> <p>Corrections</p> | All | All except Cover Page | 02-Oct-2017 | Revision 4 of the AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA.21J 052 | 27-Oct-2017 | | |

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | EASA Approval No. | Approval Date | Date Inserted | Signature |
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| 5 | <p>MAM 42- -600/b, -1024, -1025,-1034, -1035, -1072,- -1097, -1104, -1114, -1141, -1158, -1179, -1183, -1186, -1191, -1195,</p> <p>OAM 42- -056/a, -160/e, -170/a, -208/a, -228/b , -240/b, -241/a, -250/a, -257/a, -258, -298/b, -303, -304/a -312, -324/a, -333, -334, -337, -339, -342/a, -343, -349,</p> <p>Corrections</p> | All | All except Cover Page | 10-Jun-2021 | Revision 5 of the AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J 052 | 02-Nov-2021 | | |
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CHAPTER 1

GENERAL

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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.

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.

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 | |
|--|-------------|---|--|
| | | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Maximum Landing Mass 1999 kg | MÄM 42-659 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Maximum Take-Off Weight 1999 kg and Maximum Zero Fuel Mass 1835 kg | MÄM 42-678 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Engine Software VC33_2_05_19* | MÄM 42-938 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Garmin Hard- and Software Upgrade I (Garmin G1000 NXi) | MÄM 42-978 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Garmin Hard- and Software Upgrade II (Garmin G1000 NXi) | MÄM 42-1072 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Ice Protection System | OÄM 42-053 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Oxygen System | OÄM 42-055 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Auxiliary Fuel Tanks | OÄM 42-056 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Front Seats with Adjustable Backrest | OÄM 42-067 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |

| Modification | Source | Installed | |
|--|---------------------------------|---|--|
| Electrical Rudder Pedal Adjustment | OÄM 42-070 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Sun Visors | OÄM 42-101 OR OÄM 42-142 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Garmin GWX 68 Weather Radar | OÄM 42-119 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Ice Protection System | OÄM 42-160 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Ice Protection System with TKS Tank in Rear Fuselage | OÄM 42-160 AND OÄM 42-203 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Garmin G1000, SBAS Operation | OÄM 42-179 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Removal of Variable Elevator Stop | OÄM 42-199 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Emergency Axe | OÄM 42-205 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Short Baggage Extension | OÄM 42-207 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Electronic Stability and Protection (ESP) | OÄM 42-209 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Mission Alternator | OÄM 42-218 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Removal of Unfeathering Accumulator | OÄM 42-224 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Diesel Operation | OÄM 42-251 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Garmin GTX 3X5R Transponders for ADS-B | OÄM 42-258 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Front Seats with Adjustable Backrest - Hydrolok | OÄM 42-259 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Maximum Take-Off Weight 2001 kg / 4411 lb | OÄM 42-260 | <input type="checkbox"/> yes | <input checked="" type="checkbox"/> no |
| Mid Continent MD302 Standby Attitude Module | OÄM 42-270 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |

| Modification | Source | Installed | |
|-----------------------------|------------|---|-----------------------------|
| Garmin GWX 70 Weather Radar | OÄM 42-273 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Sear Warning Mute Function | OÄM 42-288 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |
| Emergency Egress Hammer | OÄM 42-304 | <input checked="" type="checkbox"/> yes | <input type="checkbox"/> no |

* Or later approved software

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.

This Airplane Flight Manual is applicable for DA 42 NG airplanes with design change MÄM 42-600 installed.

CAUTION

The DA 42 NG 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.

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. |
|----------------------------|-----------------------|------------|

Wing Flaps

Area (total, left + right) : 2.18 m² 23.5 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, for details refer to the AMM

Main wheel : 15x6.0-6, for details refer to the AMM

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_O :** Operating Maneuvering Speed. Full or abrupt control surface movement is not permissible above this speed.
- v_{FE} :** Maximum Flaps Extended Speed. This speed must not be exceeded with the given flap setting.
- v_{LE} :** Maximum Landing Gear Extended Speed. This speed may not be exceeded if the landing gear is extended.
- v_{LOE} :** Maximum Landing Gear Operating Speed for Extension. This speed may not be exceeded during the extension of the landing gear.
- v_{LOR} :** Maximum Landing Gear Operating Speed for Retraction. This speed may not be exceeded during the retraction of the landing gear.
- v_{MCA} :** Minimum Control Speed - Airborne. 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_{SO} : 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 and tables 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.

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.

(e) Engine

EECU: Electr. Engine Control Unit

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.

OEI: One engine inoperative

(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 |
| XFER PUMP/DE-ICE | Aux Fuel Pump / De-Icing System |
| TAXI/MAP/ACL | Taxi-, Map-, Anti Collision Light |
| FLOOD | Flood Light |
| 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 / Standby Attitude Module |
| 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./AP. WRN. | Avionic Control / Autopilot Warning (not used) |

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 |
| IRIDIUM | GSR 56 Satellite Receiver |

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 |

FUEL PUMPS LH ENGINE:

| | |
|-------------|--------------------|
| FUEL PUMP A | LH ECU A Fuel Pump |
| FUEL PUMP B | LH ECU B Fuel Pump |

RH ENG ECU BUS:

| | |
|---------|------------|
| ECU BUS | RH ECU Bus |
| ECU B | RH ECU B |
| ECU A | RH ECU A |

RH BUS:

| | |
|--------|---------------|
| ALT.RH | RH Alternator |
| BATT | Battery |

FUEL PUMPS RH ENGINE:

| | |
|-------------|--------------------|
| FUEL PUMP A | RH ECU A Fuel Pump |
| FUEL PUMP B | RH ECU B Fuel Pump |

(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 (Austrian Airworthiness Authority) |
| 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 |
| GPS: | Global Positioning System |
| IFR: | Instrument Flight Rules |
| ■ IPL: | Interference Path Loss |
| JAR: | Joint Aviation Requirements |
| JC/VP: | Joint Certification/Validation Procedure |
| PCA: | Primary Certification Authority |
| ■ PED: | Portable Electronic Device |
| ■ PPM | Parts per Million (Dosage) |
| ■ T-PED: | Transmitting Portable Electronic Device |
| VFR: | Visual Flight Rules |

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] |
| | [ml] milliliter | [oz] ounce | [ml] x 0.033814 = [oz] |
| Speed | [km/h] kilometers per hour | [kts] knots | [km/h] / 1.852 = [kts] |
| | | [mph] miles per hour | [km/h] / 1.609 = [mph] |
| | [m/s] meters per second | [fpm] feet per minute | [m/s] x 196.85 = [fpm] [fpm] / 196.85 = [m/s] |
| 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] [hPa] / 33.86 = [inHg] |
| | [mbar] millibars | [psi] pounds per square inch | [bar] x 14.504 = [psi] |
| | [bar] bars | | |
| Temperature | [°C] degrees Celsius | [°F] degrees Fahrenheit | [°C]x1.8 + 32 = [°F] ([°F] - 32)/1.8 = [°C] |

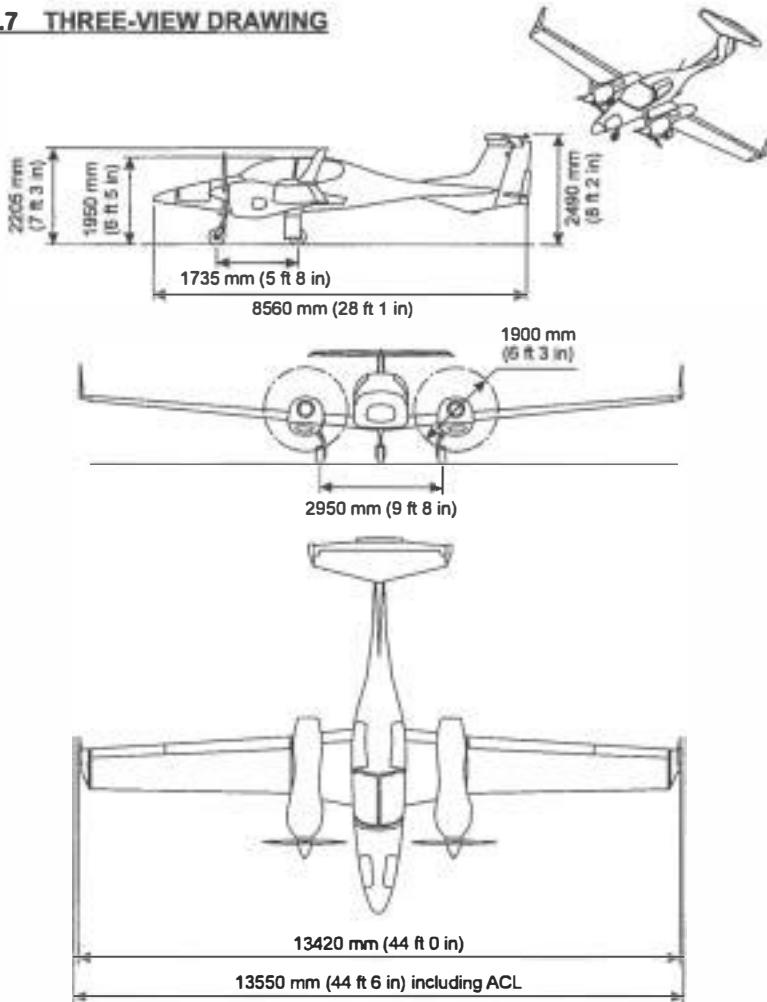
| Dimension | SI-Units | US Units | Conversion |
|------------------------------------|-------------------|----------|------------|
| Intensity of electric current | [A] ampères | | – |
| Electric charge (battery capacity) | [Ah] ampère-hours | | – |
| Electric potential | [V] volts | | – |
| Time | [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. If the Garmin GWX 68 or the GWX 70 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 and the GWX 70 shall be used to avoid severe weather and not for penetrating severe weather. Pulse type weather radar systems like the GWX 68 and the GWX 70 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 NG, the Garmin GWX 68 and the GWX 70 has a demonstrated range of 160 nautical miles. Refer to Garmin G1000 Pilot's Guide for the DA 42 NG, P/N 190-00962-() for Garmin G1000 or P/N 190-02237-() for G1000 NXi (MÄM 42-978) or P/N 190-02526-() for G1000 NXi (MÄM 42-1072) in the latest effective issue for further information.
5. If OÄM 42-257 (Garmin GTX 33 ES transponder) and MÄM 42-828 (G1000 Software P/N 010-00670-12) are implemented, the installed ADS-B Out system is compliant to TSO-C166b / RTCA DO-206B. This constitutes no airworthiness approval.
- If OÄM 42-257 (Garmin GTX 33ES transponder) and MÄM 42-1000 (G1000 Software P/N 010-00670-15) are implemented, the following functions are performed:
- Transmission of ADS-B out data on 1090 extended squitter (1090 MHz)
 - Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
 - GPS Position, Altitude, and Position Integrity
 - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
 - Air Ground Status
 - Flight ID, Call Sign, ICAO Registration Number
 - Capability and Status Information
 - Transponder Squawk Codes between 0000-7777
 - Emergency Status
 - IDENT - initiates SPI (special position identification) pulse for 18 seconds

The Garmin GTX 33ES transponders for ADS-B meet the requirements in EASA AMC 20-24 for ADS-B (Automatic Dependent Surveillance-Broadcast) and ELS.

6. If a Garmin GTX 3X5R transponder for ADS-B (GTX 335R, GTX 345R) is installed the following functions are performed:

- Transmission of ADS-B out data on 1090 extended squitter (1090 MHz)
- Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
 - GPS Position, Altitude, and Position Integrity
 - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
 - Air Ground Status
 - Flight ID, Call Sign, ICAO Registration Number
 - Capability and Status Information
 - Transponder Squawk Codes between 0000-7777
 - Emergency Status
 - IDENT - initiates SPI (special position identification) pulse for 18 seconds

The Garmin GTX 3X5R transponders for ADS-B meet the requirements in EASA AMC 20-24 for ADS-B (Automatic Dependent Surveillance-Broadcast) and ELS.

7. Refer to Garmin G1000 Pilot's Guide for the DA 42 NG, P/N 190-00962-() for Garmin G1000 or P/N 190-02237-() for G1000 NXi (MÄM 42-978) or P/N 190-02526-() for G1000 NXi (MÄM 42-1072) in the latest effective issue for further information.

8. 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: Austro Engine GmbH
Rudolf Diesel-Str. 11
A-2700 Wiener Neustadt
AUSTRIA

Phone: +43-2622-23 000
Fax: +43-2622-23 000 - 2711
Internet: www.austroengine.at

Documents: Operation Manual,
E4.01.01, 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

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 190-00963-(), latest revision

G1000 Pilot's Guide
P/N 190-00962-(), latest revision

■ If MÄM 42-978 is installed:

G1000 NXi Cockpit Reference Guide
P/N 190-02238-(), latest revision

G1000 NXi Pilot's Guide
P/N 190-02237-(), latest revision

■ If MÄM 42-1072 is installed:

G1000 NXi Cockpit Reference Guide
P/N 190-02527-(), latest revision

G1000 NXi Pilot's Guide
P/N 190-02526-(), latest revision

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.

NOTE

Exceeding the operating limitations related to physical properties of the airplane (e.g. speeds, load factors, weights...) requires unscheduled maintenance prior to further operation.

| | | | | |
|--------------------|--------|-------------|------------------|------------|
| Doc. No. 7.01.16-E | Rev. 5 | 10-Jun-2021 | EASA approved | Page 2 - 3 |
|--------------------|--------|-------------|------------------|------------|

2.2 AIRSPEED

| | Airspeed | | KIAS | Remarks |
|------------------|-----------------------------------|--|----------|--|
| V _O | Operating maneuvering speed | above 1800 kg (3968 lb) | 122 KIAS | Do not make full or abrupt control surface movement above this speed. |
| | | above 1700 kg (3748 lb) to 1800 kg (3968 lb) | 119 KIAS | |
| | | up to 1700 kg (3748 lb) | 112 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 _{MCA} | Minimum control speed airborne | APP | 68 KIAS | With one engine inoperative, keep airspeed above this limit. |
| | | UP | 71 KIAS | |
| 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 If MAM 42-678 is carried out: 64 - 113 KIAS | Operating range with flaps fully extended. |
| Green arc | 68 - 151 KIAS If MAM 42-678 is carried out: 72 - 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 : Austro Engine
- c) Engine designation : E4-C
- d) RPM limitations (shown as propeller RPM)
- Maximum take-off (rpm) : 2300 RPM
 - Maximum continuous (rpm) : 2300 RPM
 - Maximum overspeed : 2500 RPM max. 20 sec
- e) Engine power
- Max. take-off power : 100% (123.5 kW) max. 5 min
 - Max. continuous power : 92% (114 kW)
- f) Oil pressure (absolute)
- Minimum < 1500 RPM : 0.9 bar
 - Minimum \geq 1500 RPM : 2.5 bar
 - Maximum : 6.5 bar
 - Normal range : 2.5 bar - 6 bar
- g) Oil quantity
- Minimum : 5.0 l
 - Maximum : 7.0 l
 - Maximum oil consumption : 0.1 liter/hr

h) Oil temperature

| | | |
|--------------|---|----------------|
| Minimum | : | - 30 °C |
| Maximum | : | 140 °C |
| Normal range | : | 50 °C - 135 °C |

i) Gearbox temperature

| | | |
|---------------------|---|---------|
| Minimum | : | - 30 °C |
| Minimum (full load) | : | 35 °C |
| Maximum | : | 120 °C |

NOTE

A cautionary (yellow) gearbox temperature range is not imposed by the engine manufacturer. However, there is a delay between power changes and gearbox temperature. Therefore, a cautionary range has been added to the G1000 gearbox temperature instrument solely to make the pilot attentive to the gearbox temperature approaching the maximum allowable limit. There is no specific time limit associated with operating in the cautionary gearbox temperature range.

j) Coolant temperature

| | | |
|-----------------------|---|---------|
| Minimum (at start-up) | : | - 30 °C |
| Minimum (full load) | : | 60 °C |
| Maximum | : | 105 °C |

k) Fuel temperature

Minimum : - 30 °C

Maximum : 60 °C

l) Fuel pressure

Minimum : 4 bar

Maximum : 7 bar

NOTE

The fuel pressure is not indicated on the G1000; a fuel pressure warning will illuminate on the PFD if the pressure is below limit.

m) Voltage

Minimum : 24.1 V

Maximum : 32.0 V

n) Amperage

Maximum : 70 A

o) Propeller manufacturer : mt-Propeller

p) Propeller designation : MTV-6-R-C-F / CF 190-69

q) Propeller diameter : 190 cm

r) Prop. pitch angle (@ 0.75 R) : 13° ± 0.2° (low pitch)
80° ± 1° (feathered position)

s) Governor : mt-Propeller P-877-16 electrical governor with feather position

- t) Oil specification : SAE Grade 5W-30:
SHELL HELIX ULTRA
ADDINOL SUPER POWER MV 0537
BP VISCO 5000
REPSOL ELITE COMMON RAIL
GULF FORMULA GMX
AEROSHELL Oil Diesel Ultra
CASTROL Edge 5W-30 A3
CASTROL Edge Professional A3
G-Energy F Synth
TOTAL Quartz 9000 Energy
SAE Grade 5W-40:
SHELL HELIX ULTRA
LIQUI MOLY LEICHTLAUF HIGH TECH
MEGOL MOTORENOEL HIGH CONDITION
PETRONAS Syntium 3000
LUKOIL LUXE SYNTHETIC
CASTROL Edge Professional A3
CASTROL Magnatec Professional A3
VALVOLINE SynPower HST
VALVOLINE SynPower
GULF Formula GX
AUSTRO ENGINE Aero
produced by Liqui Moly
recommended by Austro Engine GmbH
SAE Grade 0W-40:
CASTROL SLX PROFESSIONAL LONGTEC
CASTROL Edge 0W-40 A3/B4
CASTROL Edge Professional A3
SHELL Helix Ultra

CAUTION

Only engine oils conforming to MB 229.5 specification are approved by Austro Engine GmbH to be used for operation. Use only one type of approved E4 engine oil for an oil change.

NOTE

It is not recommended to mix different SAE grades.

- u) Gearbox oil (propeller gearbox) : SHELL SPIRAX GSX 75W-80
SHELL SPIRAX S6 GXME 75W-80
- v) Coolant : Distilled water / cooler protection (BASF GlysantinProtectPlus / G48) 1/1. The freezing point of the coolant is - 38°C.

CAUTION

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

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 0.9 bar | 0.9 to 2.5 bar | 2.5 to 6.0 bar | 6.0 to 6.5 bar | above 6.5 bar |
| Oil temp. | below -30°C | -30° to 50°C | 50° to 135°C | 135° to 140°C | above 140°C |
| Coolant temp. | below -30°C | -30° to 60°C | 60° to 95°C | 95° to 105°C | above 105°C |
| Gearbox temp. | below -30°C | -30° to 35°C | 35° to 115°C | 115° to 120°C | above 120°C |
| Load | -- | -- | up to 92% | 92 - 100% | -- |
| Fuel temp. ^{*1)} | below -30°C | -30° to -20°C | -20° to 55°C | 55° to 60°C | above 60°C |
| Fuel temp. ^{*2)} | below -30°C | - | -30° to 55°C | 55° to 60°C | above 60°C |
| Ammeter | -- | -- | up to 60A | 60 to 70A | above 70A |
| Volt- meter | below 24.1V | 24.1 to 25V | 25 to 30V | 30 to 32V | above 32V |

| 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 |
|-------------------------|---|---|---|---|---|
| Fuel qty. | below 1 US gal | — | 1 to 25 US gal | — | — |

*1) If G1000 system software prior to P/N 010-00670-12 is installed.

*2) If G1000 system software P/N 010-00670-12 or later is installed.

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 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 / <0.9 bar). |
| L/R FUEL TEMP | Left / Right fuel temperature is in the upper red range (too high / >60 °C). |
| L/R GBOX TEMP | Left / Right engine gearbox temperature is in the upper red range (too high / >120 °C). |
| L/R FUEL PRESS | Left / Right engine fuel pressure is low. |

| Warning alerts (red) | Meaning / Cause |
|---------------------------------|---|
| L/R ALTN AMPS | Left / Right engine alternator output is in the upper red range (too high / >70 Amps). |
| L/R ENG FIRE | Left / Right engine fire detected. |
| L/R STARTER | Left / Right engine starter is engaged. |
| DOOR OPEN | Front and/or rear canopy and/or baggage door are/is not closed and locked. |
| 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. |
| Red X or yellow X | A red or yellow (if Garmin G1000 NXi is installed) X through any display field, such as com frequencies, nav frequencies, or engine data, indicates that the display field is not receiving valid data. |

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 engine bus voltage is too low (< 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. |
| LOI | GPS integrity is insufficient for the current phase of flight. |
| 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). |

| Caution alerts (amber) | Meaning / Cause |
|-----------------------------------|---|
| CHECK GEAR | Landing gear is not down and locked. |
| 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 AUXPUMP ON | Fuel transfer from auxiliary to main tank is in progress (if installed). |
| 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

| Warning alert (red) | Meaning / Cause |
|--------------------------------|---|
| GEAR UNSAFE WARNING LIGHT | Illuminates if the landing gear is neither in the final up nor in the down & locked position. |

Audible Warning Alerts

| Audible warning alert | Meaning / Cause |
|--|--|
| 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 %. |

2.7 MASS (WEIGHT)

| Value | Mass (Weight) | |
|---|---------------|---------|
| | kg | lb |
| Minimum flight mass | 1450 kg | 3197 lb |
| Maximum take-off mass | 1900 kg | 4189 lb |
| Maximum take-off mass (if MÄM 42-678 is carried out) | 1999 kg | 4407 lb |
| Maximum zero fuel mass | 1765 kg | 3891 lb |
| Maximum zero fuel mass (if MÄM 42-659 is carried out) | 1835 kg | 4045 lb |
| Maximum landing mass | 1805 kg | 3979 lb |
| Maximum landing mass (if MÄM 42-659 is carried out) | 1999 kg | 4407 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 |
| if OÄM 42-207 is carried out: | | |
| Max. load in standard baggage compartment (between rear seats and baggage bulkhead) | 30 kg | 66 lb |
| Max. load in short baggage extension | 15 kg | 33 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.

2.8 CENTER OF GRAVITY

Datum Plane

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

- 2.350 m (92.52 in) aft of datum plane at 1450 kg (3197 lb)
- 2.350 m (92.52 in) aft of datum plane at 1468 kg (3236 lb)
- 2.418 m (95.20 in) aft of datum plane at max. take-off mass 1900 kg (4189 lb)

If MÄM 42-678 is carried out:

- 2.434 m (95.83 in) aft of datum plane at max. take-off mass 1999 kg (4407 lb)
- linear variation in between

Most rearward flight CG:

- 2.454 m (96.61 in) aft of datum plane at 1450 kg (3197 lb)
- 2.480 m (97.64 in) aft of datum plane at 1700 kg (3748 lb)
- 2.480 m (97.64 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.

CAUTION

Intentional negative g - maneuvers are not permitted.

2.10 MANEUVERING LOAD FACTORS

NOTE

The tables below show structural limitations. The load factor limits for the engine must also be observed. Refer to the corresponding Operation Manual for the engine.

| | at v_o | at v_{NE} | with flaps in APP or LDG position |
|----------|----------|-------------|-----------------------------------|
| Positive | 3.8 | 3.8 | 2.0 |
| Negative | -1.52 | -1.52 | 0.0 |

WARNING

Exceeding the maximum structural load factors will lead to overstressing of the airplane.

CAUTION

Intentional negative g- maneuvers are not permitted.

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

Flights into known or forecast 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.

| | for daytime VFR flights | in addition for night VFR flights | in addition for IFR flights |
|---------------------------------|--|--|---|
| Flight & navigation instruments | <ul style="list-style-type: none"> * airspeed indicator (on G1000 PFD or backup) * altimeter (on G1000 PFD or backup) * magnetic compass * 1 headset, used by pilot in command | <ul style="list-style-type: none"> * vertical speed indicator (VSI) * attitude gyro (artificial horizon; on G1000 PFD or backup) * turn & bank indicator (on G1000 PFD) * directional gyro * VHF radio (COM) with speaker and microphone * VOR receiver * transponder (XPDR), mode A and mode C * GPS receiver (part of G1000) | <ul style="list-style-type: none"> * second airspeed indicator (both, on G1000 PFD and backup) * second altimeter (both, on G1000 PFD and backup) * second attitude gyro (both, on G1000 PFD and backup) * second VHF radio (COM) * VOR-LOC-GP receiver * second GPS receiver (part of G1000) |

| | for daytime VFR flights | in addition for night VFR flights | in addition for IFR flights |
|--------------------|---|---|--|
| Engine instruments | <ul style="list-style-type: none"> * 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 * fuel flow (2x) * fuel px warning | <ul style="list-style-type: none"> * ammeter * voltmeter | |
| Lighting | | <ul style="list-style-type: none"> * position lights * strobe lights (anti collision lights) * landing light * instrument lighting * flood light * flashlight | |

| | for daytime VFR flights | in addition for night VFR flights | in addition for IFR flights |
|-------------------------------------|---|--|--|
| Other operational minimum equipment | <ul style="list-style-type: none"> * 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 | <ul style="list-style-type: none"> * Pitot heating system * alternate static valve | <ul style="list-style-type: none"> * emergency battery (for backup attitude gyro and flood light) |

NOTE

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

Engine Systems and Equipment

All engine systems and equipment must be functional prior to airplane take-off. Any engine system or equipment failure must be corrected before next flight.

2.14 FUEL

Approved fuel grades: JET A, JET A-1 (ASTM D 1655)
 TS-1 (Russia, GOST 10227-86)
 TS-1 (Ukraine, GSTU 320.00149943.011-99)
 RT (Russia, GOST 10227-86)
 RT (Ukraine GSTU 320.00149943.007-97)
 No. 3 Jet Fuel (China, GB 6537-2006)
 JP-8 (F34) (USA, MIL-DTL-83133G-2010)

and blends of the above listed fuel grades.

NOTE

A minimum cetane number of 36 determined acc. to EN ISO 5165/ASTM D613 is recommended.

NOTE

Use only uncontaminated fuel from reliable sources.

| | Main Tanks | | Auxiliary Tanks (if installed) | | Total | |
|-----------------------------------|------------|----------|-----------------------------------|----------|----------|-----------|
| | US gal | liters | US gal | liters | US gal | liters |
| Total fuel quantity | 2 x 26.0 | 2 x 98.4 | 2 x 13.7 | 2 x 52.0 | 2 x 39.7 | 2 x 150.4 |
| Usable fuel | 2 x 25.0 | 2 x 94.6 | 2 x 13.2 | 2 x 50.0 | 2 x 38.2 | 2 x 144.6 |
| Max. permissible difference LH/RH | 5.0 | 18.9 | | | | |

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

OPERATION WITH ANTI-MICROBIAL LIFE FUEL ADDITIVES

The application of the following additives is permitted:

- KATHON FP 1.5 : max. 100 ppm
- 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, JET A-1 (ASTM D 1655) and JP-8 (F34).

NOTE

The instructions of the fuel additive supplier must be followed.

2.15 LIMITATION PLACARDS

All *limitation* placards are shown below. A list of *all* placards is included in the Airplane Maintenance Manual (Doc. No. 7.02.15), Chapter 11.

The following limitation placards are 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

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, 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.

Operating maneuvering speed:

$v_o = 122$ KIAS (above 1800 kg / 3968 lb)

$v_o = 119$ KIAS (above 1700 kg / 3748 lb to 1800 kg / 3968 lb)

$v_o = 112$ KIAS (up to 1700 kg / 3748 lb)

LANDING GEAR $v_{LE} / v_{LOE} = 188 \text{ KIAS}$ $v_{LOR} = 152 \text{ KIAS}$

If OÄM 42-179 is not incorporated:

GPS NOT APPROVED
FOR WAAS OPERATIONS**EMERGENCY
Gear Extension
Max. 152 KIAS**On the Emergency Landing Gear Extension Lever:

On the Instrument Panel:

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

(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

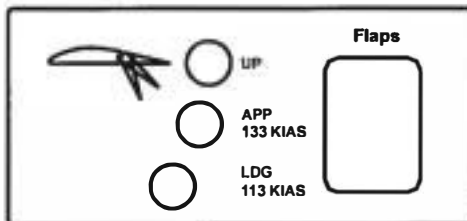
In Each Cowling, on the Door for the Oil Filler Neck:

OIL
AUSTRO ENGINE
Aero
5W-40
or see Airplane
Flight Manual

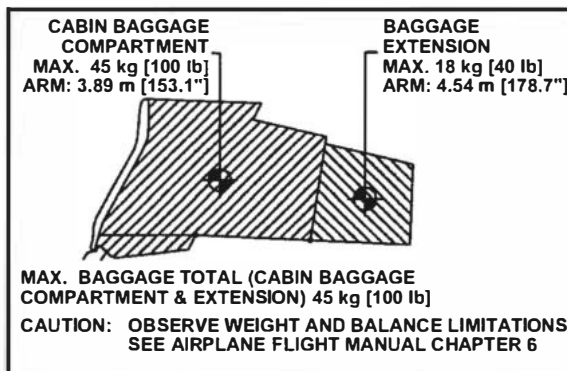
OR

OIL
SHELL HELIX
ULTRA
5W30
or see Airplane
Flight Manual

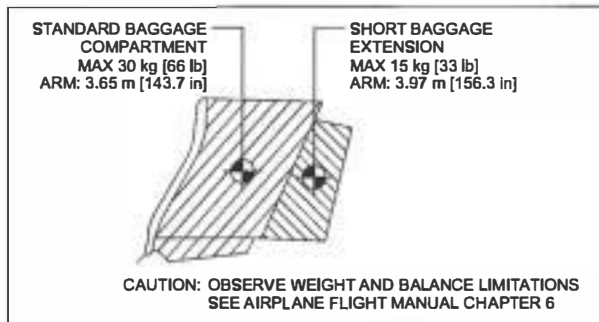
Next to the Flap Selector Switch:



Next to the Cabin Baggage Compartment:



If OÄM 42-207 is carried out:



In the Cabin, on the Left Fuselage Sidewall:



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

From -30 °C to 60 °C (from -22 °F to 140 °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.

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 190-00963-() or Garmin G1000 NXi (MÄM 42-978) Cockpit Reference Guide, P/N 190-02238-() or Garmin G1000 NXi (MÄM 42-1072) Cockpit Reference Guide, P/N 190-02527-(), appropriate revision must be immediately available to the flight crew.
2. The G1000 must utilize the software Garmin 010-00670-(), the Garmin G1000 NXi must utilize the software Garmin 010-01916-(), approved software in accordance with the mandatory service bulletin DAI MSB 42-003, latest approved version.

| Software Part Number | Approved Version | Function |
|---------------------------|--|----------------------|
| System (G1000) | for approved version see DAI MSB 42NG-003 latest version | |
| 010-00670-() | | |
| System (G1000 NXi) | | |
| 010-01916-() | | |
| 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-GAI2 |
| 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-() | | |

| Software Part Number | Approved Version | Function |
|----------------------|------------------|------------|
| 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.

6. When AHRS is required to meet the items listed in the minimum operational equipment (serviceable) table in Section 2.13 of this AFM, 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 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 is NOT approved for GPS WAAS operations including GPS WAAS approach procedures such as "LPV", "LNAV/VNAV", and "LNAV +V".
 - (b) SBAS (WAAS & MSAS) functionality must be disabled on the G 1000 GPS Status page (refer to the G1000 Pilot's Guide for procedure).
9. The availability of SafeTaxi[®], 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. 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.
2. The autopilot and yaw damper must be disconnected (using the DISC button) during take-off, landing and single engine operation.
3. Following an autopilot or electric trim malfunction, reengaging the autopilot or manual electric trim, or resetting the AFCS / ESP / USP circuit breaker is prohibited until the cause of the malfunction has been determined and corrected.
4. The Garmin G1000 Cockpit Reference Guide for the Diamond DA 42 NG, P/N 010-00963-() or Garmin G1000 NXi (MÄM 42-978) Cockpit Reference Guide for the Diamond DA 42 NG, P/N 010-02238-() or Garmin G1000 NXi (MÄM 42-1072) Cockpit Reference Guide for the Diamond DA 42 NG, P/N 010-02527-() approved revision must be immediately available to the flight crew.
5. ILS approaches using the GFC700 / flight director are limited to Category I approaches only.
6. Autopilot maximum airspeed: 180 KIAS
Autopilot minimum airspeed: 90 KIAS
7. Altitude select captures below 1200 feet AGL are prohibited.
8. 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.
9. Overriding the autopilot to change pitch or roll attitude is prohibited. (Disengage or

press CWS while maneuvering.)

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

| Sub-System | Software Version |
|------------|------------------|
| GDU | v9.03 |
| GDC 74 | v3.02 |
| GEA 7X | v2.07 |
| GPS | v3.03 |
| GIA 6X | v5.65 |
| GIA Audio | v2.03 |
| GMAX347 | v4.01 |
| GMU44 | v2.01 |
| GRS 77 | v2.11 |
| GTX 33X | v5.01 |
| GDL 69 | v3.20.00 |
| GSA 8X | v2.20 |
| GFC 700 | v2.00 |

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

11. 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.
12. A pilot with the seat belt fastened must occupy the left pilot's seat during all operations.
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 GARMIN GWX 68 / GWX 70 WEATHER RADAR OPERATION**WARNING**

The Garmin GWX 68 and the GWX 70 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) for the GWX 68. For the GWX 70 the minimum safe distance is 2.3 m (7.4 ft). Never operate the radar in a hangar or other enclosure as radiation can be reflected throughout the area.

2.16.12 MID CONTINENT MD302 STANDBY ATTITUDE MODULE

The Mid Continent MD302 Standby Attitude Module Pilot's Guide, P/N 9017846, latest effective issue must be immediately available to the flight crew.

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 airplane"). 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 | | |
|---|-----------|---------|
| One engine inoperative minimum control speed (air) V_{MCA} | Flaps UP | 71 KIAS |
| | Flaps APP | 68 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 \leftrightarrow 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.

- 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.

CONTINUED

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 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

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 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

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.

- 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
3.7.6 - ENGINE FAILURES IN FLIGHT.

If the oil pressure is within the green range:

- Reduce power on affected engine.
- Increase airspeed.

CONTINUED

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 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

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 0.9 bar). |
|---------------------|---|

Oil pressures below the limit value of 0.9 bar can lead to a total loss of power due to engine failure.

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

WARNING

Land at the nearest suitable airfield. Prepare for an engine failure in accordance with 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

| | | | |
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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.

- 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 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

3.2.6 L/R FUEL TEMP**L/R FUEL TEMP**

Left / Right fuel temperature is in the upper red range (too high / above 60 °C).

Fuel temperatures above the limit value of 60 °C can lead to a noticeable reduction of the high pressure pump efficiency.

- 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.

END OF CHECKLIST

3.2.7 L/R FUEL PRESS

L/R FUEL PRESS

Left / Right engine fuel pressure is low.

1. Fuel quantity check
2. FUEL SELECTOR of affected engine check ON
3. Fuel pump of affected engine ON

if L/R FUEL PRESS warning remains:

4. FUEL SELECTOR of affected engine CROSSFEED

if L/R FUEL PRESS warning still remains:

WARNING

Imminent engine failure must be expected. Prepare for an engine failure in accordance with 3.7.6 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

3.2.8 L/R ALTN AMPS

L/R ALTN AMPS

Left / Right engine alternator output is in the upper red range (too high / above 70 Amps).

Proceed according to:

3.10.2 - HIGH CURRENT

END OF CHECKLIST

3.2.9 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:

3.11.1 - ENGINE FIRE ON GROUND

3.11.2 - ENGINE FIRE DURING TAKE-OFF

3.11.3 - ENGINE FIRE IN FLIGHT

END OF CHECKLIST

3.2.10 L/R STARTER

L/R STARTER

Left / Right engine starter is engaged.

Proceed according to:

3.10.3 - STARTER MALFUNCTION

END OF CHECKLIST

3.2.11 DOOR OPEN

DOOR OPEN

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

Proceed according to:

3.12.2 - UNLOCKED DOORS

END OF CHECKLIST

3.3 AIRPLANE-RELATED G1000 CAUTIONS**3.3.1 L/R ALTN FAIL****L/R ALTN FAIL**

Left / Right engine alternator has failed.

(a) One Alternator Failed

Proceed according to:

4B.4.6 - L/R ALTN FAIL

(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

3.4 G1000 SYSTEM WARNINGS

3.4.1 RED X / YELLOW X

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

3.4.2 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.

3.4.3 AIRSPEED FAIL

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

Revert to the standby airspeed indicator.

3.4.4 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.

3.4.5 VERT SPEED FAIL**VERT SPEED FAIL**

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

Determine vertical speed based on the change of altitude information.

3.4.6 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.

3.5 G1000 FAILURES

3.5.1 NAVIGATION INFORMATION FAILURE

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

3.5.2 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.

CONTINUED

| | | | |
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(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.

END OF CHECKLIST

3.5.3 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

3.5.4 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

3.5.5 ERRONEOUS OR LOSS OF ENGINE AND FUEL DISPLAYS

NOTE

Loss of an engine parameter is indicated by a red or yellow 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 power 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 of the AFM 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

3.5.6 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

3.6 ABNORMAL ENGINE BEHAVIOUR

1. Full power apply

If the abnormal engine behavior sustains, refer to 3.7 - ONE ENGINE INOPERATIVE PROCEDURES.

END OF CHECKLIST

3.7 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.

3.7.1 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.

3.7.2 ENGINE TROUBLESHOOTING

WARNING

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

NOTE

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

If both ECU A and ECU B Cautions Appear Simultaneous

- if the indicated LOAD remains unchanged, and
- if the perceived thrust is reduced, and
- if the engine noise level changes or the engine is running rough

1. POWER lever IDLE for 1 second
2. POWER lever slowly increase to
1975 RPM

If the engine shows a power loss during the POWER lever increases:

3. POWER lever IDLE for 1 second
4. POWER lever slowly increase, stop prior to
the former observed engine
power loss RPM

CONTINUED

| | | | |
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WARNING

Do not increase the POWER lever past the propeller speed of 1975 RPM or the setting determined in step 4. An increase of engine power beyond this setting leads into another power loss.

NOTE

With this power setting the engine can provide up to 65% at the maximum propeller speed of 1975 RPM.

5. Land at the next suitable airfield

Otherwise:

NOTE

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

Depending on the situation the following attempts can be made to restore normal engine operation:

1. Circuit breakers check / reset if necessary

If normal engine operation is restored continue flight and land as soon as possible.

Otherwise:

2. VOTER switch swap between ECU A and B

CONTINUED

| | | | |
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If either ECU A or B setting restores normal engine operation then maintain that ECU setting and land as soon as possible.

Otherwise:

3. VOTER switch switch back to AUTO to retain ECU redundancy

If normal engine operation is restored continue flight and land as soon as possible.

Otherwise:

4. FUEL SELECTOR of affected engine CROSSFEED

If normal engine operation is restored continue flight. Remain within maximum allowable lateral imbalance.

Otherwise:

5. FUEL SELECTOR of affected engine ON / CROSSFEED as required
 6. ALTERNATE AIR OPEN
 7. POWER lever of affected engine apply power as required

If normal engine operation is restored continue flight and land as soon as practicable.

If normal engine operation could not be restored by following the procedures in this section prepare for 3.7.3 - ENGINE SECURING (FEATHERING) PROCEDURE and land as soon as possible.

END OF CHECKLIST

3.7.3 ENGINE SECURING (FEATHERING) PROCEDURE

Shut down and feathering of the affected engine:

1. Affected engine identify & verify
2. ENGINE MASTER affected engine OFF

CAUTION

Do not shutdown an engine with the FUEL SELECTOR valve.
Otherwise the high pressure fuel pump can be damaged.

Securing the feathered engine:

3. Alternator affected engine OFF
4. Fuel pump check OFF
5. FUEL SELECTOR affected engine OFF

NOTE

The remaining fuel in the tank of the secured 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

3.7.4 UNFEATHERING & RESTARTING THE ENGINE IN FLIGHT

If the reason for the shutdown has been ascertained and there is no indication of malfunction or engine fire a restart may be attempted.

Restarting the Engine with the Starter

Maximum restart altitude: 18,000 ft pressure altitude
for immediate restart.
10,000 ft pressure altitude
for restarts within two minutes.

If MÄM 42-938 (engine software
VC33_2_05_19 or later approved
software) is installed:

15,000 ft pressure altitude
for immediate restarts

Up to 10,000 ft pressure altitude:

| OAT | | Max. engine OFF time [minutes] |
|-----------|----------|--------------------------------------|
| [° C] | [° F] | |
| below -15 | below 5 | 2 |
| -15 to -5 | 5 to 23 | 5 |
| above -5 | above 23 | 10 |

Maximum restart airspeed: max. 100 KIAS or airspeed for a stationary
propeller, whichever is lower.

CAUTION

Do not engage the starter when the propeller is windmilling.

CONTINUED

NOTE

At airspeeds below 100 KIAS it is possible that the propeller may windmill intermittently. Therefore, care should be taken to ensure that the propeller is stationary when engaging the starter.

1. POWER lever of affected engine IDLE
2. FUEL SELECTOR of affected engine check ON
3. Alternate air as required
4. ALTERNATOR of affected engine ON
5. ENGINE MASTER of affected engine ON, propeller un-feathers
6. STARTER of affected engine engage when propeller is stationary

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.

7. Circuit breakers check / reset if necessary

END OF CHECKLIST

Restarting the Engine by Windmilling

If the reason for the shutdown has been ascertained and there is no indication of malfunction or engine fire a restart may be attempted.

Maximum restart altitude: 18,000 ft pressure altitude
for immediate restart.
10,000 ft pressure altitude
for restarts within two minutes.

If MÄM 42-938 (engine software
VC33_2_05_19 or later approved
software) is installed:

15,000 ft pressure altitude
for immediate restarts
Up to 10,000 ft pressure altitude:

| OAT | | Max. engine OFF time [minutes] |
|-----------|----------|--------------------------------------|
| [° C] | [° F] | |
| below -15 | below 5 | 2 |
| -15 to -5 | 5 to 23 | 5 |
| above -5 | above 23 | 10 |

Minimum restart airspeed: 125 KIAS
Maximum restart airspeed: 145 KIAS

CAUTION

1. Do not engage the starter when the propeller is windmilling.
2. Do not attempt restart below 125 KIAS.
3. Do not attempt restart above 145 KIAS.

CONTINUED

NOTE

Below 125 KIAS it is possible that the propeller may not windmill continuously. Continuous windmilling is required for a successful restart. Above 145 KIAS a restart can overspeed the propeller.

1. POWER lever of affected engine IDLE
2. FUEL SELECTOR of affected engine check ON
3. Alternate air as required
4. ALTERNATOR of affected engine ON
5. ENGINE MASTER of affected engine ON, propeller un-feathers and restarts by windmilling

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.

CAUTION

After resuming the flight, notify maintenance and make an entry into the airplane Logs, that a windmilling restart was conducted. Conditional engine maintenance requirements for the timing chain are triggered. Refer also to the Austro Engine GmbH Engine Maintenance Manual.

END OF CHECKLIST

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

- Abort the take-off & land straight ahead.

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 5.3.8 - 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

CONTINUED

6. Inoperative engine secure according to
3.7.3 - ENGINE SECURING
(FEATHERING) PROCEDURE

Land as soon as possible according to 3.7.7 - LANDING WITH ONE ENGINE INOPERATIVE. If a diversion is required before landing continue according to Section 3.7.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

END OF CHECKLIST

3.7.6 ENGINE FAILURES IN FLIGHT

(a) Engine Failure During Initial Climb

WARNING

As the climb is a flight condition which is associated with high power settings, airspeeds lower than $v_{MCA} = 71$ KIAS (flaps UP) or 68 KIAS (flaps APP) 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 maintain directional control
2. Airspeed $v_{YSE} = 85$ KIAS/
above $v_{MCA} = 71$ KIAS (flaps UP)
or $v_{MCA} = 68$ KIAS (flaps APP) 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 3.7.3 -
ENGINE SECURING
(FEATHERING) PROCEDURE

Land as soon as possible according to 3.7.7 - LANDING WITH ONE ENGINE INOPERATIVE. If a diversion is required before landing continue according to Section 3.7.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

END OF CHECKLIST

| | | | |
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3.7.7 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 pump remaining engine ON
6. FUEL SELECTOR check ON

Inoperative engine:

7. Engine check secured (feathered) according to 3.7.3 - ENGINE SECURING & FEATHERING PROCEDURE

CONTINUED

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Not before being certain of "making the field":

8. Airspeed as required to operate landing gear
9. Landing gear DOWN, check 3 green
10. Trim as required
11. Airspeed reduce as required
12. FLAPS as required
13. Final approach speed 86 KIAS ($v_{REF}/FLAPS$ UP)
84 KIAS ($v_{REF}/FLAPS$ APP)
84 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 / balked landing.

14. POWER lever as required (both POWER levers simultaneously)
15. Trim as required / directional trim to neutral

CONTINUED

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:

3.7.8 GO-AROUND / BALKED LANDING WITH ONE ENGINE INOPERATIVE

CAUTION

The go-around / balked 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 5.3.8 - 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 / balked landing.

1. POWER lever MAX
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 step 1 of section 3.7.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

CONTINUED

If a positive rate of climb cannot be established:

- Land so as to keep clear of obstacles.

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:
 - Up to 1900 kg (4189 lb) min. 84 KIAS flaps APP
min. 84 KIAS flaps LDG
 - Above 1900 kg (4189 lb) min. 88 KIAS flaps APP
min. 86 KIAS flaps LDG

CONTINUED

If landing with landing gear extended:

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

If landing with landing gear retracted:

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

Immediately after touch down:

- 12. ELECT. MASTER OFF

NOTE

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

END OF CHECKLIST

3.7.9 FLIGHT WITH ONE ENGINE INOPERATIVE

CAUTION

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

CAUTION

Prolonged operation with excessive sideslip/bank angle may cause fuel starvation, which is normally advised by LOW FUEL indication on the G1000. In this case return to coordinated flight or use CROSSFEED on the affected engine.

1. Airspeed above $v_{MCA} = 71$ KIAS (flaps UP)
or $v_{MCA} = 68$ KIAS (flaps APP) to
maintain directional control
2. Remaining engine monitor engine instruments
continuously
3. Fuel quantity monitor continuously
4. Fuel pump LH/RH check OFF
5. FUEL SELECTOR remaining engine / set
CROSSFEED or ON so as to
keep fuel quantity laterally
balanced

CONTINUED

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 3.7.7 - LANDING WITH ONE ENGINE INOPERATIVE.

END OF CHECKLIST

3.8 ENGINES OUT LANDING

1. ENGINE MASTER both OFF
2. Alternator switches both OFF
3. Fuel pumps both OFF
4. FUEL SELECTOR both OFF
5. AVIONIC MASTER OFF
6. Safety harnesses check fastened and tightened

When sure of making landing area:

7. 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.

8. Approach speed:
Up to 1900 kg (4189 lb) min. 84 KIAS flaps APP
min. 84 KIAS flaps LDG

Above 1900 kg (4189 lb) min. 88 KIAS flaps APP
min. 86 KIAS flaps LDG

CONTINUED

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If landing with landing gear extended:

9. LANDING GEAR DOWN, check 3 green
10. POWER lever both IDLE
11. ELECT. MASTER OFF
12. Touch down lowest practical speed

If landing with landing gear retracted:

9. LANDING GEAR UP
10. POWER lever both IDLE
11. Touch down lowest practical speed

Immediately after touch down:

12. ELECT. MASTER OFF

END OF CHECKLIST

3.9 LANDING GEAR SYSTEM FAILURES

3.9.1 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 3.9.2 - MANUAL EXTENSION OF THE LANDING GEAR.

CONTINUED

| | | | |
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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

3.9.2 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.

CONTINUED

| | | | |
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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 3.9.3 - LANDING WITH GEAR UP.

END OF CHECKLIST

3.9.3 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 pumps check OFF
5. FUEL SELECTOR both OFF

Touchdown:

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

Immediately after touchdown:

8. 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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3.9.4 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. 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.
2. Land with one wing low. The wing on the side of the intact tire should be held low.
3. Direction should be maintained using the rudder. This should be supported by use of the brake. It is possible that the brake must be applied strongly - if necessary to the point where the wheel locks. The wide track of the landing gear will prevent the airplane from tipping over a wide speed range. There is no pronounced tendency to tip even when skidding.

END OF CHECKLIST

3.9.5 LANDING WITH DEFECTIVE BRAKES

Consider the greater rolling distance.

1. 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

3.10 FAILURES IN THE ELECTRICAL SYSTEM

3.10.1 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.
 Backup batteries are installed for the ECUs to provide electrical power solely to the ECU and their systems for at least 30 minutes.

NOTE

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

The landing gear can be extended manually according to 3.9.2 - MANUAL EXTENSION OF THE LANDING GEAR.

CONTINUED

NOTE

The backup artificial horizon (or standby attitude module) 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

3.10.2 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

3.10.3 STARTER MALFUNCTION

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

On Ground:

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

Terminate flight preparation.

In flight:

Refer to 3.7.4 - UNFEATHERING & RESTARTING THE ENGINE IN FLIGHT.

If restart is not successful:

Refer to 3.7.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

END OF CHECKLIST

3.11 SMOKE AND FIRE

NOTE

The cabin hand fire extinguisher is located inside the airplane passenger compartment on the RH side of the cabin floor behind the co-pilot seat.

To release the fire extinguisher bottle out of the bracket, it is necessary to catch the bottle at the agent-outlet nozzle near the Y-spring.

3.11.1 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

3.11.2 ENGINE FIRE DURING TAKE-OFF

1. Cabin heat & Defrost OFF

CAUTION

In case of extreme smoke development, the front canopy may be unlatched during flight. This allows it to partially open, in order to improve ventilation. The canopy will remain open in this position. Flight characteristics will not be affected significantly.

Proceed according to 3.7.5 - ENGINE FAILURES DURING TAKE-OFF.

END OF CHECKLIST

3.11.3 ENGINE FIRE IN FLIGHT

1. Cabin heat & Defrost OFF

CAUTION

In case of extreme smoke development, the front canopy may be unlatched during flight. This allows it to partially open, in order to improve ventilation. The canopy will remain open in this position. Flight characteristics will not be affected significantly.

Proceed according to 3.7.6 - ENGINE FAILURES IN FLIGHT and shut down the engine according to 3.7.3 - ENGINE SECURING (FEATHERING) PROCEDURE.

END OF CHECKLIST

3.11.4 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

3.11.5 ELECTRICAL FIRE IN FLIGHT

1. EMERGENCY SWITCH ON
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 ELECT. 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 / module (artificial horizon) and the flood light.

In case of extreme smoke development, the front 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 front canopy in flight is 117 KIAS. Do not exceed 117 KIAS.

END OF CHECKLIST

3.12 OTHER EMERGENCIES

3.12.1 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. Forward canopy unlatch, push up and lock in
"cooling-gap" position

CAUTION

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

END OF CHECKLIST

3.12.2 UNLOCKED DOORS

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

Canopy Unlocked

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

END OF CHECKLIST

Rear Passenger Door Unlocked

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

WARNING

Do not try to lock the rear passenger door in flight. The safety latch may disengage and the door opens. Usually this results in a separation of the door from the airplane.

NOTE

If 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 the next suitable airfield.

WARNING

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

END OF CHECKLIST

3.12.3 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. Garmin G1000 check L/R ECU A/B FAIL caution

If L/R ECU A FAIL indicated:

3. VOTER switch ECU B

If L/R ECU B FAIL indicated:

3. VOTER switch ECU A

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. Garmin G1000 check L/R ECU A/B FAIL caution

If L/R ECU A FAIL indicated:

3. VOTER switch ECU B

If L/R ECU B FAIL indicated:

3. VOTER switch ECU A

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 3.7.6 - ENGINE FAILURES IN FLIGHT.

CONTINUED

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(c) Fixed RPM

1. POWER setting change

If the problem does not clear:

2. Garmin G1000 check L/R ECU A/B FAIL caution

If L/R ECU A FAIL indicated:

3. VOTER switch ECU B

If L/R ECU B FAIL indicated:

3. VOTER switch ECU A

NOTE

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

END OF CHECKLIST

3.12.4 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

3.12.5 FUEL SUPPLY FAILURE

1. FUEL SELECTOR CROSSFEED /
affected engine

WARNING

In case of a fuel supply failure a fuel pump inspection is required prior to the next flight.

2. Fuel quantity monitor
3. Fuel pump of affected engine OFF

If fuel supply failure remains:

4. FUEL SELECTOR ON
5. Fuel pump of affected engine ON
6. Fuel quantity monitor

END OF CHECKLIST

3.12.6 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 |

CONTINUED

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

3.12.7 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

3.12.8 EMERGENCY EXIT

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

3.12.9 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 ROL, 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 190-00963-() and the Garmin G1000 Pilot's Guide for the Diamond DA 42 NG, P/N 190-00962-().

If MÄM 42-978 is installed, normal operating procedures for GFC 700 are described in the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02238-() and the Garmin G1000 NXi Pilot's Guide for the Diamond DA 42 NG, P/N 190-02237-().

If MÄM 42-1072 is installed, normal operating procedures for GFC 700 are described in the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02527-() and the Garmin G1000 NXi Pilot's Guide for the Diamond DA 42 NG, P/N 190-02526-().

4A.2 AIRSPEEDS FOR NORMAL OPERATING PROCEDURES

| | FLAPS | up to 1900 kg (4189 lb) | above 1900 kg (4189 lb) |
|--|-------|----------------------------|----------------------------|
| Airspeed for rotation (take-off run, v_R) | UP | min. 76 KIAS | min. 76 KIAS |
| | APP | min. 71 KIAS | min. 74 KIAS |
| Airspeed for take-off climb (best rate-of-climb speed v_Y) | UP | min. 90 KIAS | min. 92 KIAS |
| Airspeed for take-off climb (best angle-of-climb speed v_X) | APP | min. 77 KIAS | min. 79 KIAS |
| Airspeed for best rate-of-climb (v_Y) | UP | 90 KIAS | 92 KIAS |
| | APP | 85 KIAS | 85 KIAS |
| Airspeed for cruise climb | UP | min. 90 KIAS | min. 92 KIAS |
| Reference landing approach speed | UP | 86 KIAS | 92 KIAS |
| | APP | min. 84 KIAS | min. 88 KIAS |
| Final approach speed | LDG | min. 84 KIAS | min. 86 KIAS |
| Minimum speed during go around | UP | min. 90 KIAS | min. 90 KIAS |
| Max. structural cruising speed Do not exceed this speed except in smooth air, and then only with caution. | UP | 151 KIAS | 151 KIAS |

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. |
|------------------------|-------------------------|

4A.3.2 L/R GLOW ON

| | |
|--------------------|---------------------------------------|
| L/R GLOW ON | Left / Right engine glow plug active. |
|--------------------|---------------------------------------|

4A.3.3 L/R AUXPUMP ON

| | |
|-----------------------|--|
| L/R AUXPUMP ON | Fuel transfer from auxiliary to main tank is in progress (if 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.

4A.4 FLIGHT CHARACTERISTICS

The DA 42 NG 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 side door and the baggage compartment doors for cracks and major scratches.
- * On-condition check of the hinges for the canopy, the side door and the baggage compartment doors.
- * Visual inspection of the locking bolts for proper movement with no backlash.
- * Tire inflation pressure check (main wheels: 4.7 bar / 68 PSI, nose wheel: 6.0 bar / 87 PSI).
- * Visual inspection of both spinners and their attachment.

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) Front canopy and rear door clean, undamaged, check
locking mechanism function
- e) Baggage stowed and secure
- f) Foreign objects check
- g) Emergency axe (if OÄM 42-205 installed) . . . stowed and secure
- h) Emergency egress hammer
(if OÄM 42-304 installed) stowed and secure
- i) Fire extinguisher check ready for use before every
first flight of the week

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

Below instrument panel in front of right seat:

- a) ALTERNATE AIR check CLOSED

On the instrument panel:

- a) ALTERNATOR check ON
- b) VOTER switch check AUTO
- 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

Because the stall warning switch gets slightly warmer on ground, STAL HT FAIL may be indicated on the PFD.

CONTINUED

- f) Gear warning /
fire detector TEST BUTTON PUSH, check aural alert/fire
detection warning and aural alert
and CHECK GEAR caution

CAUTION

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

- g) Control stick pull fully aft/hold at backstop
h) POWER lever set MAX
i) Variable elevator backstop check function/control stick must
move slightly forward during
power lever forward movement

j) POWER lever set IDLE
k) Variable elevator backstop check function/control stick must
regain full movement during
power lever retraction

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 preparation.

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- l) ELECT. MASTER OFF
- m) Flight controls check free and correct movement
up to full deflection

- n) 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 8.7 - GROUND DE-ICING.

CAUTION

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

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 (2 pieces) 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

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2. Left engine nacelle:

- a) 4 air inlets / 2 air outlets clear
- b) Engine oil level check dipstick (inspection hole in the upper cowling)
- c) Gearbox oil level check visually (inspection hole in the upper 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 OAM 42-053 carried out) . check for de-bonding

CONTINUED

- j) Nacelle underside check for excessive contamination particularly by oil, fuel, and other fluids
- k) Auxiliary tank drain (if installed) drain off to check for water and sediment (drain until no water comes out) / visual inspection
- l) Auxiliary tank filler (if installed) visual inspection, tank filler closed

3. Left wing:

- a) Entire wing surface visual inspection
- b) Vortex generators undamaged, 4 pieces, clean
- c) Tank air outlet on lower surface visual inspection
- d) Tank drain/tank air inlet drain off to check for water and sediment (drain until no water comes out)/visual inspection
- e) 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)
- f) Stall warn device visual inspection
- g) Tank filler visual inspection, check closed
- h) Pitot probe clean, orifices clear, cover removed, no deformation
- i) Wing tip visual inspection
- j) Static dischargers visual inspection
- k) Position light, strobe light (ACL) visual inspection

CONTINUED

- l) Tie-down check, clear
- m) Aileron and linkage cover visual inspection
- n) Aileron hinges and safety pin visual inspection
- o) Foreign objects in aileron paddle visual inspection
- p) Flap and linkage covers visual inspection
- q) Flap hinges and safety pin visual inspection
- r) Nacelle underside visual inspection
- s) Step visual inspection

4. Fuselage, left side, underside:

- a) Canopy, left side visual inspection
- b) Rear cabin 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
- h) Rudder gap seal visual inspection

CONTINUED

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

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 (2 pieces) 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

8. *Right wing:*

- a) Entire wing surface visual inspection
- b) Vortex generators undamaged, 4 pieces, clean
- c) Tank air outlet on lower surface visual inspection
- d) Tank drain/tank air inlet drain off to check for water and
sediment (drain until no water
comes out)/visual inspection

CONTINUED

- e) 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)
- f) Tank filler visual inspection, check closed
- g) Wing tip visual inspection
- h) Static dischargers visual inspection
- i) Position light, strobe light (ACL) visual inspection
- j) Tie-down check, clear
- k) Aileron and linkage cover visual inspection
- l) Aileron hinges and safety pin visual inspection
- m) Foreign objects in aileron paddle visual inspection
- n) Flap and linkage covers visual inspection
- o) Flap hinges and safety pin visual inspection
- p) Nacelle underside visual inspection
- q) Step visual inspection
- r) 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.
- s) Winter kit - ventilation check for improper mounting or obvious damage

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9. *Right engine nacelle:*

- a) 4 air inlets / 2 air outlets clear
- b) Engine oil level check dipstick (inspection hole in the upper cowling)
- c) Gearbox oil level check visually (inspection hole in the upper 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 carried out) . . . check for de-bonding

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- j) Nacelle underside check for excessive contamination particularly by oil, fuel, and other fluids
- k) Auxiliary tank drain (if installed) drain off to check for water and sediment (drain until no water comes out)/visual inspection
- l) Auxiliary tank filler (if installed) 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) Nose cone surface (if OÄM 42-119 or OÄM 42-273 is installed) visual inspection
- h) Attachment screws (if OÄM 42-119 or OÄM 42-273 is installed) visual inspection
- i) Lightning protection strips (4 pieces, if OÄM 42-119 or OÄM 42-273 is installed) visual inspection
- j) Chocks remove
- 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. Rear door closed and locked

CAUTION

When operating the canopy, pilots/operators must ensure that there are no obstructions between the canopy and the mating frame, for example seat belts, clothing, etc. When operating the locking handle do NOT apply undue force.

A slight downward pressure on the canopy may be required to ease the handle operation.

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

CAUTION

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

CONTINUED

NOTE

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

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. VOTER switch check AUTO
13. ALTERNATORS check ON
14. Fuel pump LH/RH check OFF
15. 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.

CONTINUED

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

NOTE

The engine instruments are only available on the MFD after
item 16 has been completed.

17. Fuel temperature check

END OF CHECKLIST

4A.6.3 STARTING ENGINE

NOTE

At ambient temperatures below -22°C the engine may not start at the first attempt. In this case wait 60 seconds between the start attempts.

- 1. Strobe lights (ACL) ON
- 2. ENGINE MASTER ON (L)
- 3. Annunciations check "L ENGINE GLOW" ON

NOTE

"L ENGINE GLOW" is indicated only when the engine is cold.

- 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 ENGINE GLOW indication is extinguished:

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

CONTINUED

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CAUTION

Do not overheat the starter motor. Do not operate the starter motor for more than 10 seconds.

At ambient temperatures below -22°C it is possible that the engine will not start at the first attempt. In this case wait 60 seconds between the start attempts.

If the "L 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.

- 9. Circuit breakers check all in/as required
- 10. Idle RPM check, 710 ±30 RPM

Repeat with opposite engine.

END OF CHECKLIST

4A.6.4 BEFORE TAXIING

1. AVIONIC MASTER ON
2. Powerlever as required, max. 50% if engine temperature below green range
3. Electrical equipment ON as required
4. Flight instruments and avionics set as required
5. Flood light ON, test function, as required
6. Pitot and stall warn heating ON, wait up to 20 seconds, check annunciation

NOTE

PITOT HT OFF and STAL HT OFF will extinguish, STAL HT FAIL is indicated on the PFD (this may take up to 20 seconds).

7. Pitot and stall warn heating OFF
8. Strobe lights (ACLs) check ON
9. Position lights, landing and taxi lights as required

CAUTION

When taxiing at close range to other airplane, 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.

10. Primary flight display (PFD) NO AUTOPILOT ANNUNCIATIONS

11. Autopilot disconnect tone NOTE

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.

12. 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.
13. AUTOPILOT engage by pressing AP button
14. AP DISC switch press. verify that the autopilot disconnects
15. 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 pumps LH/RH check OFF
6. 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.

7. 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. Rear 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. Front canopy closed and locked
7. Front baggage doors closed (visual check)
8. Door warning (DOOR) check no indication

CONTINUED

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 set to IDLE)
10. Circuit breakers check pressed in
11. Longitudinal trim set T/O

WARNING

Take-off with CROSSFEED selected is prohibited.

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
16. PITOT HEAT ON, if in rain, snow or visible
 moisture and if OAT is below 5°C
17. Landing light ON, if required

CONTINUED

ECU / fuel pumps test sequence:

CAUTION

If the L/R ECU A/B FAIL indicators do not illuminate 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 (L/R ECU A/B FAIL extinguished after test completion). In case the test procedure aborts with an error indication (one or both ECU A/B FAIL indicators remain ON) terminate flight preparation, even if the engine seems to run smoothly after the test procedure.

NOTE

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

The engine/gearbox oil temperatures have to be in the green range before starting the test sequence. Efficient engine warm up may require higher power settings (max. 50% engine power).

During the test sequence the engines will produce thrust therefore the parking brake must be set.

Releasing the ECU TEST BUTTON or manipulating the power lever before the test sequence is completed will abort the test sequence.

During the following ECU and fuel pump test, a shake of the engine might occur.

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1. Power lever IDLE
2. Propeller RPM check below 1000 rpm
3. Fuel pumps check OFF
4. VOTER switch check AUTO
5. Engine/gearbox oil temperature check in the green range
6. Parking brake check set
7. ECU TEST button press and hold

Annunciations in the following sequence:

- ECU A/B FAIL lights ON
- Propeller RPM increase above 1800 rpm
- Propeller RPM decrease
- Propeller RPM increase above 1800 rpm
- Propeller RPM decrease to idle

At this point, the test transfers from one ECU channel to the other.

- Propeller RPM increase above 1800 rpm
- Propeller RPM decrease
- Propeller RPM increase above 1800 rpm
- Propeller RPM decrease to idle

At this point, control of the engine is returned to the initially active ECU channel. A slight shake of the engine might occur.

- ECU A/B FAIL lights both OFF

Test sequence completed.

CONTINUED

8. ECU TEST button release

NOTE

By switching between ECU A and B the two independent electrical fuel pumps are switched over as well.

9. VOTER switch ECU A
10. Engine check running without a change
(shake may occur)
11. VOTER switch AUTO
12. Engine check running without a change
(shake may occur)
13. VOTER switch ECU B
14. Engine check running without a change
(shake may occur)
15. VOTER switch AUTO

CAUTION

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

16. Parking brake release

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 2250 to 2300 RPM
5. LOAD indication stabilizes at 89% to 100%

CAUTION

The load indications in the table below are minimum values to be indicated with the airplane stationary in no wind conditions. If the engine does not stabilize at the target RPM and the required load indication, terminate flight preparation.

| Altitude [ft] | OAT | | | | | | | | | |
|---------------|----------------|---------------|---------------|-------------|--------------|--------------|--------------|---------------|---------------|--|
| | -35°C -31°F | -20°C -4°F | -10°C 14°F | 0°C 32°F | 10°C 50°F | 20°C 68°F | 30°C 88°F | 40°C 104°F | 50°C 122°F | |
| 0 | 99% | | | | | 97% | 96% | 93% | 91% | |
| 2000 | | | | | | 97% | 96% | 93% | | |
| 4000 | | | | | | 97% | 96% | 93% | | |
| 6000 | | | | | | 97% | 96% | 93% | | |
| 8000 | | | 98% | 98% | 98% | 96% | 95% | 92% | | |
| 10000 | 98% | 97% | 97% | 95% | 94% | 92% | 89% | | | |

6. POWER lever IDLE
7. Engine instruments check in green range

NOTE

With the power lever in IDLE the oil pressure may be in the low yellow range. This is acceptable to continue flight.

8. Fuel pumps LH/RH ON

END OF CHECKLIST

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4A.6.7 TAKE-OFF

a) Standard Procedure (Take-off with Flaps UP)

- 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: v_R min. 76 KIAS
- 6. Airspeed for initial climb:
 - Up to 1900 kg (4189 lb) min. 83 KIAS, recommended 90 KIAS (v_y) when clear of obstacles
 - Above 1900 kg (4189 lb) min. 83 KIAS, recommended 92 KIAS (v_y) 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.

8. Fuel pumps LH/RH OFF
9. ALTERNATE AIR OPEN in rain, snow or visible
moisture

END OF CHECKLIST

b) Short Field Procedure (Take-off with Flaps APP)

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

CONTINUED

NOTE

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

5. Nose wheel lift-off:

Up to 1900 kg (4189 lb) v_R min. 71 KIAS

Above 1900 kg (4189 lb) v_R min. 74 KIAS

6. Airspeed for initial climb:

Up to 1900 kg (4189 lb) min. 77 KIAS, recommended
85 KIAS (v_y) when clear of
obstacles

Above 1900 kg (4189 lb) min. 79 KIAS, recommended
85 KIAS (v_y) when clear of
obstacles

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.

8. Fuel pumps LH/RH OFF

9. ALTERNATE AIR OPEN in rain, snow or visible
moisture

END OF CHECKLIST

4A.6.8 CLIMB

Initial Climb Check

1. Landing light OFF / as required
2. Landing gear check UP
3. FLAPS check UP
4. Airspeed:
 - Up to 1900 kg (4189 lb) 90 KIAS (best rate-of-climb)
 90 KIAS / as required for en route
 (cruise) climb
 - Above 1900 kg (4189 lb) 92 KIAS (best rate-of-climb)
 92 KIAS / as required for en route
 (cruise) climb
5. POWER lever 92%
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.

NOTE

Operating in the gearbox temperature cautionary range is permitted. However, prolonged operation is not recommended.

END OF CHECKLIST

GFC 700 Operation During Climb

NOTE

The NOSE UP and NOSE DN buttons on the mode controller on the MFD are referenced to airplane 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.

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

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 1500 ft/min climb and 3000 ft/minute descent. Use engine power to maintain appropriate airplane 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

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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

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

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) 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

4A.6.9 CRUISE

1. POWER lever up to 92%

NOTE

The engine manufacturer recommends a cruise power setting of 75 %.

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

Use of the Auxiliary Fuel Tanks (if installed)

CAUTION

When operating the AUX PUMP 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 AUX PUMP 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 AUX PUMP 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.

CONTINUED

| | | | |
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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

GFC 700 Operation During Cruise

NOTE

The NOSE UP and NOSE DN buttons on the mode controller on the MFD are referenced to airplane 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.

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

CONTINUED

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 1500 ft/min climb and 3000 ft/min descent. Use engine power to maintain appropriate airplane 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

CONTINUED

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

4A.6.10 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

GFC 700 Operation During Descent**NOTE**

The NOSE UP and NOSE DN buttons on the mode controller on the MFD are referenced to airplane 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.

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

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 1500 ft/min climb and 3000 ft/minute descent. Use engine power to maintain appropriate airplane 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

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

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) 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

4A.6.11 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
2. Safety harnesses check fastened and tightened
3. Yaw damper check OFF
4. Controls no interference by foreign objects
5. Landing light as required
6. Gear warning horn check function
7. FUEL SELECTOR check ON
8. Fuel pumps LH/RH ON
9. LANDING GEAR DOWN, check 3 green
10. Parking brake check released
11. Trim as required, directional trim neutral

CONTINUED

Before landing:

12. Airspeed:

- Up to 1900 kg (4189 lb) min. 86 KIAS with FLAPS UP
min. 84 KIAS with FLAPS APP
- Above 1900 kg (4189 lb) min. 92 KIAS with FLAPS UP
min. 88 KIAS with FLAPS APP

13. FLAPS as required

14. POWER lever as required

15. Trim as required, directional trim
neutral

16. Final approach speed:

- Up to 1900 kg (4189 lb) min. 84 KIAS with FLAPS LDG
- Above 1900 kg (4189 lb) min. 86 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

GFC 700 Operation During Approach and Landing

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 VAPP 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

4A.6.12 GO AROUND

1. POWER lever MAX
2. FLAPS position APP
3. Airspeed min. 90 KIAS

When a positive rate of climb is established:

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

When a safe climb is established:

6. Fuel pumps LH/RH OFF

END OF CHECKLIST

GFC 700 Operation During 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 6° pitch up attitude.

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

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.6.13 AFTER LANDING

1. POWER lever IDLE
2. Brakes as required
3. ALTERNATE AIR CLOSED
4. Pitot heating OFF
5. Avionics as required
6. Lights as required
7. FLAPS UP
8. Fuel pumps LH/RH OFF

END OF CHECKLIST

4A.6.14 SHUT-DOWN

1. Parking brake set
2. POWER lever up to 10 % load for 1 minute
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

CAUTION

After turning the ENGINE MASTER OFF, wait until the G1000 engine indications are red X'd or yellow X'd prior to switching the ELECT. MASTER OFF. This ensures that engine and flight data can be written to non-volatile memory before removing electrical power.

9. ELECT. MASTER OFF

CAUTION

Before shut-down the engine must run for at least 1 minute with the power lever at 10% 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.6.15 EXIT AIRPLANE

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

4A.6.16 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.6.17 PARKING

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

END OF CHECKLIST

4A.6.18 FLIGHT IN RAIN, SNOW OR VISIBLE MOISTURE

1. ALTERNATE AIR OPEN

CAUTION

During operation on ground ALTERNATE AIR must be CLOSED.

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 or snow should be avoided because of the associated visibility problems.

END OF CHECKLIST

4A.6.19 REFUELING

CAUTION

Before refueling, the airplane must be connected to electrical ground. Grounding points: exhaust, left and right. Refer to Section 2.14 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.

CONTINUED

Typical Dosing Quantities:
(a) KATHON FP 1.5

| Fuel Quantity | | | | Fuel Additive * | |
|---------------|--------|-------|--------|-----------------|------|
| Liter | US gal | kg | lb | ml | oz |
| 50 | 13.2 | 40.2 | 88.68 | 3.9 | 0.13 |
| 100 | 26.4 | 80.4 | 177.37 | 7.7 | 0.26 |
| 150 | 39.6 | 120.6 | 266.05 | 11.6 | 0.39 |
| 200 | 52.8 | 160.8 | 354.73 | 15.5 | 0.52 |
| 300 | 79.3 | 241.2 | 532.10 | 23.2 | 0.78 |

* Densities used for calculation: Fuel: 0.804 kg/l, KATHON FP 1.5: 1.04 kg/l

(b) BIOBOR JF

| 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'

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(c) 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

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 & CENTER OF GRAVITY).

END OF CHECKLIST

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4A.6.20 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.6.21 DEMONSTRATION OF ENGINE SHUTDOWN/RESTART

Maximum altitude 10,000 ft pressure altitude
Minimum altitude 3,000 ft above ground level

NOTE

When demonstrating handling qualities with one engine inoperative the left engine is the critical engine.

Restarting the Engine with the Starter

Maximum restart airspeed 100 KIAS or airspeed
for a stationary propeller,
whichever is lower

CAUTION

Do not engage the starter when the propeller is windmilling.

CONTINUED

NOTE

At airspeeds below 100 KIAS it is possible that the propeller may windmill intermittently. Therefore, care should be taken to ensure that the propeller is stationary when engaging the starter.

1. Altitude stabilize in level flight at an altitude within the altitude limits defined above
2. Airspeed trim to 100 KIAS

The following actions must be completed in not more than two minutes.

If MÄM 42-938 (engine software VC33_2_05_19 or later approved software) is installed refer to the times shown in the table below.

| OAT | | Max. engine OFF time |
|-----------|----------|----------------------|
| [° C] | [° F] | [minutes] |
| below -15 | below 5 | 2 |
| -15 to -5 | 5 to 23 | 5 |
| above -5 | above 23 | 10 |

1. ENGINE MASTER of selected engine OFF, propeller feathers
2. POWER lever of selected engine IDLE
3. Airspeed stabilize between 90 to 100 KIAS
4. ENGINE MASTER of selected engine ON, propeller un-feathers
5. STARTER of selected engine engage when propeller is stationary

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CAUTION

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

END OF CHECKLIST

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.6.11 - 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:

6. ENGINE MASTER both OFF
7. FUEL SELECTOR both OFF
8. 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 3.12.3 - DEFECTIVE PROPELLER RPM REGULATING SYSTEM.

3. Land at the nearest suitable airfield.

END OF CHECKLIST

4B.3.2 COOLANT TEMPERATURE**(a) High Coolant Temperature**

Proceed according to:

3.2.2 - L/R ENG TEMP

(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 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

4B.3.3 OIL TEMPERATURE

(a) High Oil Temperature

Proceed according to:

3.2.3 - L/R OIL TEMP

(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 3.7.6 - ENGINE FAILURES IN FLIGHT.

NOTE

At low oil temperatures high oil pressure may occur which could lead to an oil pressure warning. In this case reduce the power setting until the warning disappears and conduct the warm up with this reduced setting.

END OF CHECKLIST**(b) Low Oil Pressure**

Proceed according to:

3.2.4 - L/R OIL PRES

4B.3.5 GEARBOX TEMPERATURE

High Gearbox Temperature

Proceed according to:

3.2.5 - L/R GBOX TEMP

4B.3.6 FUEL TEMPERATURE

(a) High Fuel Temperature

Proceed according to:

3.2.6 - L/R FUEL TEMP

(b) Low Fuel Temperature

- Increase power on affected engine.
- Reduce airspeed.

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 3.7.6 - ENGINE FAILURES IN FLIGHT.

END OF CHECKLIST

4B.3.7 VOLTAGE

(a) Low Voltage Indication on the Ground with Engines Running

1. ALTERNATORS check ON
2. Circuit breakers check

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

- Terminate flight preparation.

(b) Low Voltage During Flight

1. ALTERNATORS check ON
2. Circuit breakers check
3. 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 | <ul style="list-style-type: none">* 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 | <ul style="list-style-type: none">* Left / Right engine ECU A has failedor* is being tested during ECU test procedure before take-off check. |
|-----------------------|--|

Depending on the type of failure, the ECU failure cautions are either 'non latched', i.e. the caution message disappears after the cause of the caution is no longer present or 'latched', i.e. the caution message remains until cleared through maintenance action. A 'non-latched' caution clears itself only on the active ECU. 'Non latched' caution messages can be cleared on the passive ECU by switching to that ECU with the voter switch.

(a) ECU A Caution on the Ground

1. VOTER switch check AUTO
2. ECU B caution check OFF
3. VOTER switch ECU A
4. Wait 5 seconds
5. VOTER switch AUTO

CONTINUED

| | | | |
|--------------|--------|-------------|--------------------|
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|--------------|--------|-------------|--------------------|

If the ECU A caution persists:

- Terminate flight preparation.

END OF CHECKLIST

(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. ALTERNATE AIR OPEN
2. Fuel pumps LH/RH ON
3. Circuit breakers check / reset if necessary
4. VOTER switch AUTO

If the ECU A caution remains, the following ECU caution clearing procedure may be used:

WARNING

In case of a negative single engine climb rate, do not carry out this procedure unless a suitable landing site is available within gliding distance.

Depending on the cause of the ECU caution, switching to the passive (failed) ECU may lead to rough engine run, power fluctuation or temporary loss of power. In this case switch immediately back to AUTO.

When carrying out the clearing procedure be prepared for a loss of engine power.

CONTINUED

| | | | |
|--------------------|--------|-------------|--------------|
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|--------------------|--------|-------------|--------------|

1. Safe altitude check
2. Airspeed min. 85 KIAS
3. FLAPS check UP
4. LANDING GEAR check UP
5. ECU B caution check OFF
6. VOTER switch ECU A
7. Wait 5 seconds
8. VOTER switch AUTO

If the ECU A caution persists:

- Land at the next suitable airfield.

NOTE

An ECU FAIL CAUTION is caused by various types of malfunctions. These include internal ECU problems, sensor failures or insufficient performance of air-, fuel-, or electrical supply system (e.g. air filter icing).

NOTE

If additional engine problems are observed refer to 3.7.2 - ENGINE TROUBLESHOOTING.

END OF CHECKLIST

4B.4.3 L/R ECU B FAIL

| | |
|-----------------------|--|
| L/R ECU B FAIL | <ul style="list-style-type: none"> * Left / Right engine ECU B has failed or * is being tested during ECU test procedure before take-off check. |
|-----------------------|--|

Depending on the type of failure, the ECU failure cautions are either 'non latched', i.e. the caution message disappears after the cause of the caution is no longer present or 'latched', i.e. the caution message remains until cleared through maintenance action. A 'non-latched' caution clears itself only on the active ECU. 'Non latched' caution messages can be cleared on the passive ECU by switching to that ECU with the voter switch.

(a) ECU B Caution on the Ground

1. VOTER switch check AUTO
2. ECU A caution check OFF
3. VOTER switch ECU B
4. Wait 5 seconds
5. VOTER switch AUTO

If the ECU B caution persists:

- Terminate flight preparation.

END OF CHECKLIST

(b) ECU B Caution During Flight

NOTE

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

1. ALTERNATE AIR OPEN
2. Fuel pumps LH/RH ON
3. Circuit breakers check / reset if necessary
4. VOTER switch AUTO

If the ECU B caution remains, the following ECU caution clearing procedure may be used:

WARNING

In case of a negative single engine climb rate, do not carry out this procedure unless a suitable landing site is available within gliding distance.

Depending on the cause of the ECU caution, switching to the passive (failed) ECU may lead to rough engine run, power fluctuation or temporary loss of power. In this case switch immediately back to AUTO.

When carrying out the clearing procedure be prepared for a loss of engine power.

1. Safe altitude check
2. Airspeed min. 85 KIAS
3. FLAPS check UP
4. LANDING GEAR check UP

CONTINUED

5. ECU A caution check OFF
6. VOTER switch ECU B
7. Wait 5 seconds
8. VOTER switch AUTO

If the ECU B caution persists:

- Land at the next suitable airfield.

NOTE

An ECU FAIL CAUTION is caused by various types of malfunctions. These include internal ECU problems, sensor failures or insufficient performance of air-, fuel-, or electrical supply system (e.g. air filter icing).

NOTE

If additional engine problems are observed refer to 3.7.2 - ENGINE TROUBLESHOOTING.

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 L/R FUEL LOW caution is caused by un-coordinated flight:

CAUTION

Prolonged un-coordinated flight can lead to a L/R FUEL LOW caution and subsequent LOWPX warning and L/R ECU FAIL caution and can cause fuel starvation to the engine resulting in a loss of power.

2. Return to coordinated flight (not more than approx. half a ball sideslip, 3°-5° bank)

If LH & RH main tanks 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 engine bus voltage is too low (less than 25 Volts).

Possible reasons are:

- A fault in the power supply.
- ALTERNATORS off.

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.

NOTE

A L/R ALTN FAIL annunciation may be temporarily triggered during ground operation with low engine powersettings. This indicates no system malfunction.

(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

Proceed according to:

3.3.1 - L/R ALTN FAIL

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

(a) PITOT FAIL

PITOT FAIL

Pitot heating system has failed.

1. PITOT HEAT check ON

NOTE

The Pitot heating caution message is displayed 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 3.12.4 - UNINTENTIONAL FLIGHT INTO ICING.

END OF CHECKLIST

I (b) PITOT HT OFF

| | |
|--------------|------------------------------|
| PITOT HT OFF | Pitot heating system is OFF. |
|--------------|------------------------------|

- I 1. PITOT HEAT ON, if in rain, snow or visible
I moisture and if OAT is below 5 °C

I **NOTE**

I The Pitot heating caution message is displayed when the Pitot
I heating is switched OFF. Monitor OAT during the instrument
I scan. Switch Pitot heat ON if in rain, snow or visible moisture
I and if OAT is below 5°C.

END OF CHECKLIST

4B.4.9 STALL HT FAIL / OFF

(a) STAL HT FAIL

STALL HT FAIL

Stall warning heat has failed.

1. PITOT HEAT check ON

NOTE

The STAL HT OFF caution message is displayed 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 / refer to 3.12.4 - UNINTENTIONAL FLIGHT INTO ICING.

END OF CHECKLIST

I (b) STAL HT OFF

| | |
|--------------------|----------------------------|
| STAL HT OFF | Stall warning heat is off. |
|--------------------|----------------------------|

- I 1. PITOT HEAT ON, if in rain, snow or visible
I moisture and if OAT is below 5 °C

NOTE

The STAL HT OFF caution message is displayed when the Pitot heating is switched OFF. Monitor OAT during the instrument scan. Switch pitot heat ON if in rain, snow or visible moisture and if OAT is below 5°C.

END OF CHECKLIST

4B.4.10 L/R AUXILIARY FUEL TANK EMPTY (if installed)

L/R AUX FUEL E

Left / Right auxiliary fuel tank empty (displayed only when AUX PUMP switch is ON).

The auxiliary tank empty caution message indicates an empty auxiliary fuel tank while the aux. 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. 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:

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:

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 $v_{REF} = 84$ KIAS (up to 1900 kg (4189 lb)) or 86 KIAS (above 1900 kg (4189 lb)) during the approach for landing, especially at loading conditions with forward locations of the center of gravity.

END OF CHECKLIST

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 LOI

| | |
|------------|--|
| LOI | GPS integrity is insufficient for the current phase of flight. |
|------------|--|

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

If the LOI 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 LOI annunciation is displayed while on the final approach segment, GPS based navigation will be aborted.

END OF CHECKLIST

| | | | |
|--------------|--------|-------------|--------------------|
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4B.4.14 AHS ALIGNING - KEEP WINGS LEVEL**AHS ALIGN:
Keep Wings
Level**

The AHS (Attitude and Heading Reference System) is aligning.

Keep wings level using standby attitude indicator.

END OF CHECKLIST

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

NOTE

Refer to 5.3.10 - LANDING DISTANCES for landing distances
with abnormal flap positions.

(a) Only UP available:

Airspeed min. 86 KIAS

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

(b) Only APP available:

Airspeed min. 84 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

4B.6 FAILURES IN ELECTRICAL RUDDER PEDAL ADJUSTMENT

Runaway of Electrical Rudder Pedal Adjustment (Optional Equipment, OAM 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 3.9.2 - 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 3.9.2 - 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. Rear door closed and locked
4. Front canopy position 1 or 2 ("cooling gap")
5. Rudder pedals adjusted; if manual pedal adjustment is installed, verify proper locking
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. VOTER switch check AUTO
12. ALTERNATORS check ON
13. ELECT. MASTER check OFF
14. ENGINE MASTER check OFF
15. PROPELLER check clear
16. External power connect

CONTINUED

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. Fuel pumps LH/RH check OFF
3. ELECT. MASTER ON
4. ENGINE MASTER ON, LH side
5. Annunciations check "L ENGINE GLOW" ON

NOTE

L ENGINE GLOW is indicated only when the engine is cold.

6. 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 ENGINE GLOW indication is extinguished:

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

CONTINUED

CAUTION

Do not overheat the starter motor. Do not operate the starter motor for more than 10 seconds.

At ambient temperatures below -20°C it is possible that the engine will not run at the first attempt. In this case wait 60 seconds between the start attempts.

If the L/R STARTER annunciation does not extinguish after the engine has started and the START KEY has been released, set the ENGINE MASTER to OFF and investigate the problem.

- 8. Annunciations / Engine / System Page check OK / normal range
- 9. Annunciations / Starter check OFF
- 10. 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.

- 11. Circuit breakers check all in / as required
- 12. Idle RPM check, 710 ± 30 RPM
- 13. External power disconnect
- 14. RH engine start with normal procedure

END OF CHECKLIST

4B.9 LIGHTNING STRIKE

1. Airspeed as low as practicable, do not exceed v_o (refer to Section 2.2)
2. Grasp airplane controls firmly
3. Autopilot disengage (check)
4. PFD / backup instruments verify periodically
5. Continue flight under VMC
6. Land on the next suitable airfield

CAUTION

Due to possible damage to the airplane obey the following instructions:

- Avoid abrupt or full control surface movements.
- Avoid high g-loads on the airframe.
- Avoid high yaw angles.
- Avoid turbulent air as far as possible (e.g. lee effects).
- Do not fly into areas of known or forecast icing.
- Maintain VMC.

END OF CHECKLIST

4B.10 FAILURES IN THE AUTOPILOT SYSTEM**4B.10.1 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 ROL 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.10.2 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.10.3 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.10.4 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

- 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.

CONTINUED

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

4B.10.5 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

4B.10.6 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.11 L/R AUX 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 AUX PUMPS.
2. Check fuel pump LH/RH OFF.

CAUTION

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

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 liters).
3. Switch the remaining AUX 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 liters).

END OF CHECKLIST

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 hand 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 and tables 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.

For a conversion of units see Chapter 1.6 - UNITS OF MEASUREMENT.

For temperatures, altitudes and weights between those provided, use a linear interpolation between the neighboring values.

■ For weights below 1700 kg (3968 lb), use data for the lowest weight.

For operation in outside air temperature lower than provided in these tables, use data for lowest temperature shown.

Use extreme caution for operation at outside air temperature higher than provided in the tables (areas are indicated with a diagonal line).

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 Calibration | | | |
|---------------------------------------|--|------------|----------------|
| Indicated Airspeed [KIAS] | Calibrated Airspeed [KCAS] at Various Flap Settings | | |
| | UP | APP | LDG |
| 75 | not applicable | | 73 |
| 80 | 79 | 80 | 78 |
| 85 | 85 | 85 | 82 |
| 90 | 90 | 90 | 87 |
| 95 | 96 | 95 | 92 |
| 100 | 101 | 101 | 97 |
| 105 | 106 | 106 | 101 |
| 110 | 112 | 111 | 106 |
| 115 | 117 | 116 | 111 |
| 120 | 122 | 121 | not applicable |
| 125 | 128 | 126 | |
| 130 | 133 | 132 | |
| 135 | 138 | 137 | |
| 140 | 143 | | |
| 150 | 154 | | |
| 160 | 164 | | |
| 170 | 174 | | |
| 180 | 184 | | |
| 190 | 194 | | |

5.3.2 FUEL FLOW

CAUTION

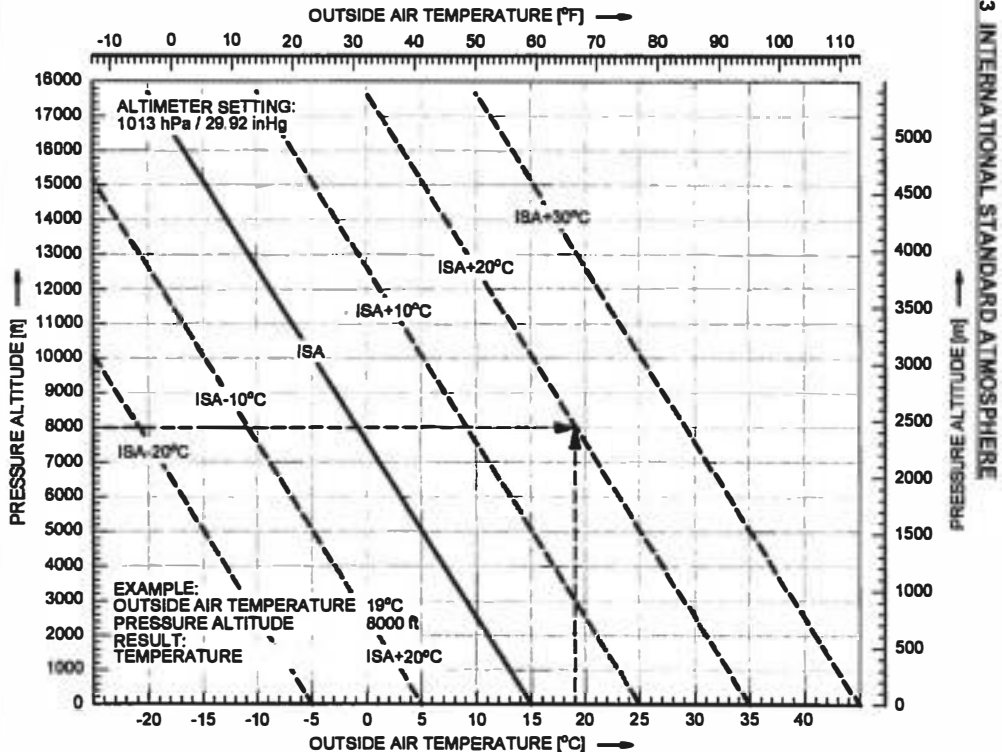
The table shows the fuel flow per hour for one engine.

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 | | |
|-------------------|------------------------|-----------------------|
| Power Setting [%] | Fuel Flow [US gal / h] | Fuel Flow [Liter / h] |
| 30 | 2.9 | 11 |
| 35 | 3.3 | 12.5 |
| 40 | 3.6 | 14 |
| 45 | 4.0 | 15.5 |
| 50 | 4.4 | 16.5 |
| 55 | 4.8 | 18 |
| 60 | 5.2 | 19.5 |
| 65 | 5.6 | 21 |
| 70 | 6.0 | 22.5 |
| 75 | 6.5 | 24.5 |
| 80 | 7.0 | 26.5 |
| 85 | 7.5 | 28.5 |
| 90 | 8.0 | 30.5 |
| 92 | 8.3 | 31.5 |
| 100 | 9.3 | 35.5 |

INTERNATIONAL STANDARD ATMOSPHERE



5.3.4 STALLING SPEEDS

Stalling Speeds at Various Flight Masses

Airspeeds, most forward CG, power off:

| 1510 kg (3329 lb) | | Bank Angle | | | | | | | |
|----------------------|-------|------------|------|------|------|------|------|------|------|
| | | 0° | | 30° | | 45° | | 60° | |
| Gear | Flaps | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS |
| UP | UP | 61 | 59 | 66 | 64 | 72 | 71 | 84 | 84 |
| DOWN | APP | 58 | 57 | 63 | 62 | 69 | 68 | 81 | 81 |
| DOWN | LDG | 54 | 54 | 60 | 59 | 67 | 65 | 79 | 77 |

| 1700 kg (3748 lb) | | Bank Angle | | | | | | | |
|----------------------|-------|------------|------|------|------|------|------|------|------|
| | | 0° | | 30° | | 45° | | 60° | |
| Gear | Flaps | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS |
| UP | UP | 64 | 62 | 68 | 67 | 75 | 74 | 88 | 88 |
| DOWN | APP | 62 | 61 | 66 | 66 | 73 | 73 | 86 | 86 |
| DOWN | LDG | 59 | 58 | 64 | 62 | 71 | 69 | 86 | 82 |

| 1900 kg (4189 lb) | | Bank Angle | | | | | | | |
|----------------------|-------|------------|------|------|------|------|------|------|------|
| | | 0° | | 30° | | 45° | | 60° | |
| Gear | Flaps | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS |
| UP | UP | 68 | 66 | 72 | 71 | 79 | 78 | 93 | 93 |
| DOWN | APP | 65 | 64 | 70 | 69 | 77 | 76 | 90 | 91 |
| DOWN | LDG | 62 | 61 | 67 | 66 | 75 | 73 | 89 | 86 |

DA 42 NG AFM



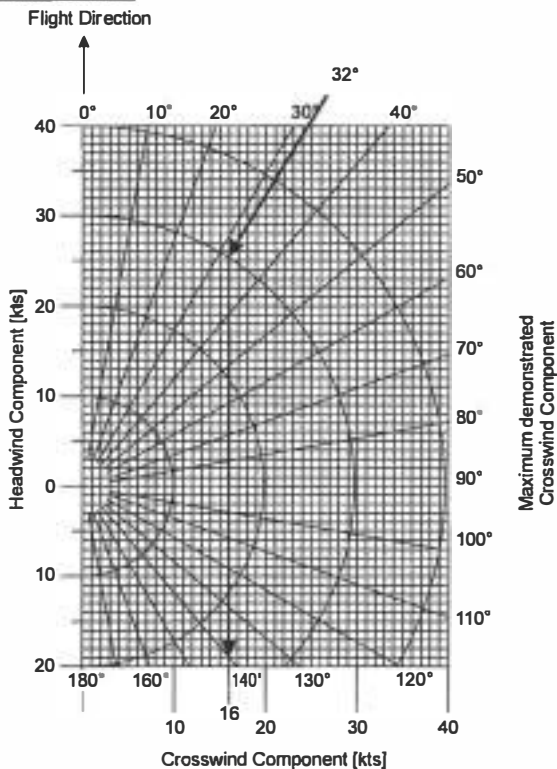
Performance

| 1999 kg (4407 lb) | | Bank Angle | | | | | | | |
|----------------------|-------|------------|------|------|------|------|------|------|------|
| | | 0° | | 30° | | 45° | | 60° | |
| Gear | Flaps | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS |
| UP | UP | 72 | 70 | 76 | 76 | 84 | 84 | 99 | 100 |
| DOWN | APP | 68 | 67 | 73 | 72 | 80 | 80 | 95 | 95 |
| DOWN | LDG | 64 | 62 | 69 | 67 | 76 | 74 | 91 | 88 |

NOTE

KIAS values may not be accurate at stall.

5.3.5 WIND COMPONENTS



Example: Flight direction : 360°
 Wind : 32°/30 kts
 Result: Crosswind component : 16 kts
 Max. demonstrated crosswind component : 25 kts

5.3.6 TAKE-OFF DISTANCE

Conditions:

- Power lever both MAX
- Flaps UP or APP
- Runway dry, paved, level
- Nose wheel lift-off @ v_R
- Airspeed for initial climb @ v_{50}

The following factors are to be applied to the computed take-off distance for the noted condition:

- Headwind: Decrease by 10% for each 14 kt (7.2 m/s) headwind.
- Tailwind: Increase by 10% for each 3 kt (1.5 m/s) tailwind.
- Grass runway, dry, 5 cm (2 in) long: Increase the ground roll by 10%.
- Grass runway, dry, 5 cm (2 in) to 10 cm (3.9 in) long: Increase the ground roll by 15%.
- Grass runway, dry, 25 cm (9.8 in) long: Increase the ground roll by 25%.
- Grass runway, longer than 25 cm (9.8 in): A take-off should not be attempt.
- Grass runway, wet: Increase the dry grass runway distance calculation by 10%.
- Soft ground: Increase the ground roll by 45% (in addition to the grass runway distance calculation, if applicable).
- Uphill slope: Increase the ground roll by 9% for each 1% (1 m per 100 m or 1 ft per 100 ft) slope.

If brakes are not held while applying power, distances apply where full power setting is complete.

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 (rain, unfavorable conditions, including cross-wind) will increase the take-off distance.

CAUTION

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

The above corrections for runway slope should be used with caution since published runway slope data is usually the net slope from one end of the runway to the other. Runways may have positions at their length at greater or lesser slopes than published slope, lengthening (or shortening) the take-off roll estimated with these tables.

NOTE

The effect of 50% of the headwind component and 150% of the tailwind component is already incorporated in the head- and tailwind factors.

Take-Off Distance - Normal Procedure - 1999 kg / 4407 lb

Weight: 1999 kg / 4407 lb

Flaps: UP

V_R: 76 KIAS

Power: MAX

V_{SO}: 83 KIAS

Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 400 | 420 | 440 | 470 | 560 | 680 | 424 |
| | 15 m / 50 ft | 730 | 760 | 790 | 870 | 1050 | 1330 | 776 |
| 1000 305 | Ground Roll | 420 | 440 | 470 | 510 | 610 | 730 | 444 |
| | 15 m / 50 ft | 760 | 800 | 840 | 930 | 1150 | 1450 | 804 |
| 2000 610 | Ground Roll | 440 | 460 | 500 | 540 | 660 | 790 | 462 |
| | 15 m / 50 ft | 800 | 840 | 890 | 1000 | 1260 | 1570 | 836 |
| 3000 914 | Ground Roll | 460 | 490 | 520 | 590 | 710 | 860 | 485 |
| | 15 m / 50 ft | 840 | 880 | 940 | 1080 | 1360 | 1710 | 869 |
| 4000 1219 | Ground Roll | 490 | 520 | 560 | 640 | 780 | 930 | 505 |
| | 15 m / 50 ft | 880 | 920 | 1000 | 1170 | 1490 | 1850 | 906 |
| 5000 1524 | Ground Roll | 520 | 550 | 600 | 690 | 840 | / | 531 |
| | 15 m / 50 ft | 920 | 980 | 1070 | 1280 | 1620 | / | 944 |
| 6000 1829 | Ground Roll | 550 | 580 | 640 | 760 | 920 | / | 556 |
| | 15 m / 50 ft | 970 | 1030 | 1140 | 1400 | 1760 | / | 986 |
| 7000 2134 | Ground Roll | 580 | 620 | 680 | 820 | 990 | / | 582 |
| | 15 m / 50 ft | 1030 | 1100 | 1220 | 1530 | 1910 | / | 1029 |
| 8000 2438 | Ground Roll | 620 | 660 | 730 | 900 | 1080 | / | 611 |
| | 15 m / 50 ft | 1090 | 1170 | 1320 | 1660 | 2080 | / | 1078 |
| 9000 2743 | Ground Roll | 660 | 710 | 800 | 980 | 1180 | / | 642 |
| | 15 m / 50 ft | 1150 | 1240 | 1450 | 1840 | 2280 | / | 1128 |
| 10000 3048 | Ground Roll | 700 | 770 | 900 | 1100 | / | / | 676 |
| | 15 m / 50 ft | 1230 | 1360 | 1640 | 2110 | / | / | 1182 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Take-Off Distance - Normal Procedure - 1900 kg / 4189 lb
Weight: 1900 kg / 4189 lb
Flaps: UP
V_R: 76 KIAS
Power: MAX
V₅₀: 83 KIAS
Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 370 | 390 | 410 | 450 | 520 | 640 | 400 |
| | 15 m / 50 ft | 670 | 710 | 730 | 800 | 960 | 1210 | 716 |
| 1000 305 | Ground Roll | 390 | 410 | 440 | 480 | 570 | 690 | 417 |
| | 15 m / 50 ft | 710 | 740 | 780 | 860 | 1060 | 1310 | 743 |
| 2000 610 | Ground Roll | 420 | 440 | 470 | 510 | 620 | 750 | 435 |
| | 15 m / 50 ft | 740 | 770 | 820 | 920 | 1150 | 1420 | 773 |
| 3000 914 | Ground Roll | 440 | 460 | 490 | 550 | 670 | 810 | 456 |
| | 15 m / 50 ft | 770 | 810 | 870 | 990 | 1250 | 1550 | 803 |
| 4000 1219 | Ground Roll | 460 | 490 | 530 | 600 | 730 | 880 | 477 |
| | 15 m / 50 ft | 810 | 850 | 920 | 1080 | 1350 | 1670 | 838 |
| 5000 1524 | Ground Roll | 490 | 520 | 560 | 650 | 790 | / | 500 |
| | 15 m / 50 ft | 850 | 900 | 990 | 1180 | 1470 | / | 874 |
| 6000 1829 | Ground Roll | 520 | 550 | 600 | 710 | 860 | / | 523 |
| | 15 m / 50 ft | 900 | 950 | 1050 | 1280 | 1600 | / | 910 |
| 7000 2134 | Ground Roll | 550 | 590 | 640 | 780 | 930 | / | 549 |
| | 15 m / 50 ft | 950 | 1010 | 1130 | 1400 | 1740 | / | 951 |
| 8000 2438 | Ground Roll | 580 | 620 | 690 | 840 | 1010 | / | 577 |
| | 15 m / 50 ft | 1000 | 1080 | 1210 | 1520 | 1880 | / | 995 |
| 9000 2743 | Ground Roll | 620 | 670 | 760 | 920 | 1110 | / | 606 |
| | 15 m / 50 ft | 1060 | 1150 | 1330 | 1680 | 2090 | / | 1040 |
| 10000 3048 | Ground Roll | 660 | 720 | 840 | 1030 | / | / | 638 |
| | 15 m / 50 ft | 1140 | 1250 | 1500 | 1910 | / | / | 1094 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Take-Off Distance - Normal Procedure - 1700 kg / 3748 lb

Weight: 1700 kg / 3748 lb

Flaps: UP

V_R: 76 KIAS

Power: MAX

V_{LO}: 83 KIAS

Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|-----|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 330 | 350 | 360 | 390 | 460 | 560 | 350 |
| | 15 m / 50 ft | 580 | 600 | 630 | 680 | 810 | 1010 | 613 |
| 1000 305 | Ground Roll | 350 | 360 | 390 | 420 | 500 | 600 | 367 |
| | 15 m / 50 ft | 598 | 630 | 670 | 730 | 890 | 1100 | 633 |
| 2000 610 | Ground Roll | 370 | 390 | 410 | 450 | 540 | 650 | 384 |
| | 15 m / 50 ft | 630 | 660 | 700 | 780 | 970 | 1190 | 661 |
| 3000 914 | Ground Roll | 390 | 410 | 440 | 480 | 590 | 710 | 401 |
| | 15 m / 50 ft | 660 | 700 | 740 | 840 | 1050 | 1290 | 689 |
| 4000 1219 | Ground Roll | 410 | 430 | 460 | 530 | 640 | 770 | 420 |
| | 15 m / 50 ft | 700 | 730 | 790 | 910 | 1140 | 1390 | 717 |
| 5000 1524 | Ground Roll | 430 | 460 | 490 | 580 | 700 | / | 439 |
| | 15 m / 50 ft | 730 | 770 | 840 | 1000 | 1240 | / | 748 |
| 6000 1829 | Ground Roll | 460 | 490 | 530 | 630 | 760 | / | 461 |
| | 15 m / 50 ft | 770 | 820 | 900 | 1090 | 1340 | / | 779 |
| 7000 2134 | Ground Roll | 480 | 520 | 560 | 680 | 820 | / | 483 |
| | 15 m / 50 ft | 810 | 870 | 960 | 1180 | 1450 | / | 815 |
| 8000 2438 | Ground Roll | 520 | 550 | 610 | 740 | 890 | / | 507 |
| | 15 m / 50 ft | 860 | 920 | 1030 | 1290 | 1570 | / | 853 |
| 9000 2743 | Ground Roll | 550 | 590 | 670 | 810 | 970 | / | 532 |
| | 15 m / 50 ft | 910 | 980 | 1130 | 1410 | 1740 | / | 891 |
| 10000 3048 | Ground Roll | 590 | 640 | 740 | 910 | / | / | 580 |
| | 15 m / 50 ft | 980 | 1070 | 1270 | 1600 | / | / | 935 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Take-Off Distance - Short Field Procedure - 1999 kg / 4407 lb

Weight: 1999 kg / 4407 lb

Flaps: APP

V_R: 74 KIAS

Power: MAX

V_{LOF}: 79 KIAS

Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 350 | 370 | 390 | 420 | 500 | 610 | 375 |
| | 15 m / 50 ft | 600 | 640 | 670 | 730 | 890 | 1120 | 649 |
| 1000 305 | Ground Roll | 370 | 390 | 410 | 450 | 540 | 660 | 392 |
| | 15 m / 50 ft | 640 | 670 | 710 | 790 | 980 | 1230 | 676 |
| 2000 610 | Ground Roll | 390 | 410 | 440 | 490 | 590 | 720 | 411 |
| | 15 m / 50 ft | 670 | 710 | 760 | 850 | 1080 | 1360 | 707 |
| 3000 914 | Ground Roll | 410 | 440 | 470 | 530 | 650 | 790 | 430 |
| | 15 m / 50 ft | 710 | 750 | 810 | 930 | 1180 | 1500 | 739 |
| 4000 1219 | Ground Roll | 440 | 460 | 500 | 580 | 710 | 860 | 453 |
| | 15 m / 50 ft | 750 | 790 | 870 | 1020 | 1300 | 1640 | 776 |
| 5000 1524 | Ground Roll | 470 | 490 | 540 | 630 | 780 | / | 477 |
| | 15 m / 50 ft | 790 | 840 | 930 | 1130 | 1440 | / | 812 |
| 6000 1829 | Ground Roll | 500 | 530 | 580 | 690 | 850 | / | 500 |
| | 15 m / 50 ft | 840 | 900 | 1000 | 1240 | 1590 | / | 854 |
| 7000 2134 | Ground Roll | 530 | 560 | 620 | 760 | 930 | / | 526 |
| | 15 m / 50 ft | 900 | 960 | 1080 | 1380 | 1750 | / | 899 |
| 8000 2438 | Ground Roll | 560 | 600 | 670 | 830 | 1010 | / | 556 |
| | 15 m / 50 ft | 950 | 1030 | 1180 | 1520 | 1940 | / | 948 |
| 9000 2743 | Ground Roll | 600 | 650 | 740 | 920 | 1120 | / | 585 |
| | 15 m / 50 ft | 1020 | 1110 | 1320 | 1710 | 2200 | / | 999 |
| 10000 3048 | Ground Roll | 650 | 710 | 840 | 1040 | / | / | 618 |
| | 15 m / 50 ft | 1100 | 1230 | 1520 | 2010 | / | / | 1055 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Take-Off Distance - Short Field Procedure - 1900 kg / 4189 lb**Weight: 1900 kg / 4189 lb****Flaps: APP****V_R: 71 KIAS****Power: MAX****V_M: 77 KIAS****Runway: dry, paved, level**

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|-----|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 330 | 350 | 370 | 400 | 470 | 570 | 354 |
| | 15 m / 50 ft | 560 | 590 | 620 | 680 | 820 | 1030 | 603 |
| 1000 305 | Ground Roll | 350 | 370 | 390 | 430 | 510 | 630 | 371 |
| | 15 m / 50 ft | 590 | 620 | 660 | 730 | 900 | 1130 | 630 |
| 2000 610 | Ground Roll | 370 | 390 | 420 | 460 | 560 | 680 | 388 |
| | 15 m / 50 ft | 620 | 660 | 700 | 790 | 990 | 1240 | 657 |
| 3000 914 | Ground Roll | 390 | 410 | 440 | 500 | 610 | 740 | 407 |
| | 15 m / 50 ft | 660 | 690 | 750 | 860 | 1090 | 1360 | 686 |
| 4000 1219 | Ground Roll | 410 | 440 | 470 | 540 | 670 | 810 | 427 |
| | 15 m / 50 ft | 700 | 740 | 800 | 940 | 1190 | 1490 | 718 |
| 5000 1524 | Ground Roll | 440 | 470 | 510 | 600 | 730 | | 448 |
| | 15 m / 50 ft | 740 | 780 | 860 | 1040 | 1310 | | 755 |
| 6000 1829 | Ground Roll | 470 | 500 | 540 | 650 | 800 | | 472 |
| | 15 m / 50 ft | 780 | 840 | 930 | 1140 | 1440 | | 793 |
| 7000 2134 | Ground Roll | 500 | 530 | 590 | 720 | 870 | | 496 |
| | 15 m / 50 ft | 830 | 890 | 1000 | 1260 | 1590 | | 833 |
| 8000 2438 | Ground Roll | 530 | 570 | 640 | 780 | 950 | | 524 |
| | 15 m / 50 ft | 890 | 960 | 1090 | 1390 | 1750 | | 877 |
| 9000 2743 | Ground Roll | 570 | 610 | 700 | 860 | 1050 | | 551 |
| | 15 m / 50 ft | 950 | 1030 | 1210 | 1550 | 1980 | | 924 |
| 10000 3048 | Ground Roll | 610 | 670 | 790 | 980 | | | 583 |
| | 15 m / 50 ft | 1020 | 1140 | 1380 | 1810 | | | 977 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Take-Off Distance - Short Field Procedure - 1700 kg / 3748 lb

Weight: 1700 kg / 3748 lb

Flaps: APP

V_R: 71 KIAS

Power: MAX

V_{LO}: 77 KIAS

Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|-----|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 290 | 310 | 320 | 350 | 410 | 500 | 311 |
| | 15 m / 50 ft | 490 | 510 | 540 | 590 | 700 | 870 | 521 |
| 1000 305 | Ground Roll | 310 | 320 | 340 | 380 | 450 | 550 | 326 |
| | 15 m / 50 ft | 510 | 540 | 570 | 630 | 770 | 950 | 544 |
| 2000 610 | Ground Roll | 330 | 350 | 370 | 410 | 490 | 600 | 342 |
| | 15 m / 50 ft | 540 | 570 | 610 | 680 | 840 | 1040 | 567 |
| 3000 914 | Ground Roll | 350 | 360 | 390 | 440 | 540 | 650 | 358 |
| | 15 m / 50 ft | 570 | 600 | 650 | 730 | 920 | 1140 | 592 |
| 4000 1219 | Ground Roll | 370 | 390 | 420 | 480 | 590 | 710 | 376 |
| | 15 m / 50 ft | 600 | 640 | 690 | 810 | 1010 | 1250 | 622 |
| 5000 1524 | Ground Roll | 390 | 410 | 450 | 520 | 640 | | 396 |
| | 15 m / 50 ft | 640 | 680 | 740 | 880 | 1100 | | 651 |
| 6000 1829 | Ground Roll | 410 | 440 | 480 | 580 | 700 | | 416 |
| | 15 m / 50 ft | 680 | 720 | 800 | 970 | 1210 | | 684 |
| 7000 2134 | Ground Roll | 440 | 470 | 520 | 630 | 770 | | 437 |
| | 15 m / 50 ft | 720 | 770 | 860 | 1070 | 1330 | | 719 |
| 8000 2438 | Ground Roll | 470 | 500 | 560 | 690 | 840 | | 461 |
| | 15 m / 50 ft | 760 | 820 | 930 | 1170 | 1460 | | 755 |
| 9000 2743 | Ground Roll | 500 | 540 | 620 | 760 | 930 | | 487 |
| | 15 m / 50 ft | 820 | 880 | 1030 | 1300 | 1630 | | 797 |
| 10000 3048 | Ground Roll | 540 | 590 | 690 | 860 | | | 513 |
| | 15 m / 50 ft | 880 | 970 | 1170 | 1500 | | | 839 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

5.3.7 CLIMB PERFORMANCE (ALL ENGINES OPERATING)

Conditions:

- Power lever both 92%
- Flaps UP or APP
- Landing gear retracted
- Airspeed V_Y

The climb performance tables show the rate of climb. The gradient of climb can be calculated using the following formula:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.98$$

NOTE

Rate of climb at MTOM (1900 kg / 4189 lb) with a power setting of 100% at MSL and ISA conditions:

- 1337 ft/min (6.8 m/s) with flaps UP
- 1267 ft/min (6.4 m/s) with flaps APP

NOTE

If MÄM 42-678 is installed, the rate of climb at MTOM (1999 kg / 4407 lb) with a power setting of 100% at MSL and ISA conditions:

- 1243 ft/min (6.3 m/s) with flaps UP
- 1183 ft/min (6.0 m/s) with flaps APP

All Engines Operating Climb - Flaps UP

Flaps: UP

Power: 92%

v_r: 92 KIAS above 1900 kg (4189 lb)
90 KIAS up to 1900 kg (4189 lb)

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | | |
|--------------------|------------------------|-----------------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|------|-----|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | | ISA |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | | |
| 1999 / 4407 | SL | | 1120 | 1120 | 1120 | 1110 | 1110 | 1100 | 1040 | 880 | 1114 | |
| | 2000 | 610 | 1120 | 1110 | 1110 | 1100 | 1090 | 1090 | 970 | 820 | 1103 | |
| | 4000 | 1219 | 1110 | 1100 | 1090 | 1090 | 1080 | 1050 | 900 | 760 | 1092 | |
| | 6000 | 1829 | 1090 | 1090 | 1080 | 1070 | 1070 | 990 | 840 | / | 1081 | |
| | 8000 | 2438 | 1080 | 1070 | 1060 | 1050 | 1040 | 930 | 780 | / | 1069 | |
| | 10000 | 3048 | 1060 | 1050 | 1040 | 1040 | 990 | 820 | / | / | 1052 | |
| | 12000 | 3658 | 1040 | 1030 | 1020 | 1020 | 850 | 680 | / | / | 1033 | |
| | 14000 | 4267 | 1020 | 1020 | 960 | 830 | 660 | 520 | / | / | 1021 | |
| | 16000 | 4877 | 1010 | 940 | 820 | 680 | 540 | / | / | / | 1007 | |
| 18000 | 5486 | 890 | 800 | 700 | 560 | 410 | / | / | / | 895 | | |
| 1900 / 4189 | SL | | 1210 | 1210 | 1200 | 1200 | 1200 | 1190 | 1130 | 960 | 1203 | |
| | 2000 | 610 | 1200 | 1200 | 1200 | 1190 | 1180 | 1180 | 1050 | 890 | 1193 | |
| | 4000 | 1219 | 1200 | 1190 | 1180 | 1170 | 1170 | 1140 | 98 | 830 | 1181 | |
| | 6000 | 1829 | 1180 | 1170 | 1170 | 1160 | 1150 | 1080 | 920 | / | 1169 | |
| | 8000 | 2438 | 1170 | 1160 | 1150 | 1150 | 1130 | 1010 | 860 | / | 1158 | |
| | 10000 | 3048 | 1150 | 1140 | 1130 | 1130 | 1080 | 900 | / | / | 1144 | |
| | 12000 | 3658 | 1130 | 1120 | 1120 | 1110 | 930 | 750 | / | / | 1124 | |
| | 14000 | 4267 | 1110 | 1110 | 1050 | 920 | 740 | 590 | / | / | 1113 | |
| | 16000 | 4877 | 1100 | 1030 | 910 | 760 | 610 | / | / | / | 1102 | |
| 18000 | 5486 | 980 | 890 | 780 | 630 | 480 | / | / | / | 986 | | |

All Engines Operating Climb - Flaps UP

Flaps: UP

Power: 92%

v_r: 92 KIAS above 1900 kg (4189 lb)
90 KIAS up to 1900 kg (4189 lb)

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | ISA |
|--------------------|------------------------|-----------------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|------|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | |
| 1700 / 3748 | SL | | 1380 | 1380 | 1380 | 1380 | 1370 | 1370 | 1290 | 1100 | 1378 |
| | 2000 | 610 | 1380 | 1380 | 1370 | 1360 | 1360 | 1350 | 1210 | 1030 | 1368 |
| | 4000 | 1219 | 1370 | 1360 | 1360 | 1350 | 1340 | 1320 | 1130 | 960 | 1357 |
| | 6000 | 1829 | 1360 | 1350 | 1340 | 1340 | 1330 | 1240 | 1060 | / | 1345 |
| | 8000 | 2438 | 1340 | 1340 | 1330 | 1320 | 1310 | 1170 | 1000 | / | 1334 |
| | 10000 | 3048 | 1330 | 1320 | 1310 | 1300 | 1250 | 1050 | / | / | 1320 |
| | 12000 | 3658 | 1310 | 1300 | 1290 | 1290 | 1080 | 890 | / | / | 1299 |
| | 14000 | 4267 | 1290 | 1290 | 1220 | 1070 | 870 | 710 | / | / | 1289 |
| | 16000 | 4877 | 1280 | 1200 | 1070 | 900 | 730 | / | / | / | 1278 |
| | 18000 | 5486 | 1140 | 1040 | 930 | 760 | 590 | / | / | / | 1151 |

For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

All Engines Operating Climb - Flaps APP

Flaps: APP

Power: 92%

v_y: 85 KIAS

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | ISA |
|--------------------|------------------|-----------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|------|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | |
| 1999 / 4407 | SL | | 1080 | 1070 | 1060 | 1050 | 1040 | 1030 | 980 | 820 | 1052 |
| | 2000 | 610 | 1060 | 1050 | 1040 | 1030 | 1020 | 1010 | 890 | 750 | 1036 |
| | 4000 | 1219 | 1040 | 1030 | 1020 | 1010 | 1000 | 970 | 820 | 680 | 1020 |
| | 6000 | 1829 | 1020 | 1010 | 1000 | 980 | 970 | 900 | 750 | / | 997 |
| | 8000 | 2438 | 1000 | 980 | 970 | 950 | 940 | 830 | 690 | / | 973 |
| | 10000 | 3048 | 970 | 950 | 940 | 930 | 880 | 720 | / | / | 949 |
| | 12000 | 3658 | 940 | 920 | 910 | 900 | 730 | 570 | / | / | 923 |
| | 14000 | 4267 | 910 | 900 | 840 | 710 | 540 | 410 | / | / | 904 |
| | 16000 | 4877 | 890 | 810 | 700 | 560 | 410 | / | / | / | 883 |
| 18000 | 5486 | 760 | 670 | 570 | 430 | 280 | / | / | / | 769 | |
| 1900 / 4189 | SL | | 1160 | 1150 | 1140 | 1130 | 1120 | 1110 | 1050 | 880 | 1129 |
| | 2000 | 610 | 1140 | 1130 | 1120 | 1110 | 1100 | 1090 | 960 | 810 | 1112 |
| | 4000 | 1219 | 1120 | 1110 | 1100 | 1090 | 1070 | 1050 | 890 | 740 | 1096 |
| | 6000 | 1829 | 1100 | 1090 | 1070 | 1060 | 1050 | 970 | 820 | / | 1073 |
| | 8000 | 2438 | 1070 | 1060 | 1040 | 1030 | 1020 | 900 | 750 | / | 1049 |
| | 10000 | 3048 | 1040 | 1030 | 1010 | 1000 | 950 | 780 | / | / | 1024 |
| | 12000 | 3658 | 1010 | 990 | 980 | 970 | 800 | 620 | / | / | 998 |
| | 14000 | 4267 | 980 | 970 | 910 | 780 | 600 | 460 | / | / | 978 |
| | 16000 | 4877 | 960 | 880 | 760 | 610 | 460 | / | / | / | 957 |
| 18000 | 5486 | 830 | 730 | 630 | 480 | 320 | / | / | / | 838 | |

All Engines Operating Climb - Flaps APP

Flaps: APP

Power: 92%

v_y: 85 KIAS

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | ISA |
|--------------------|------------------|-----------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|------|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | |
| 1700 / 3748 | SL | | 1330 | 1320 | 1300 | 1290 | 1280 | 1270 | 1210 | 1020 | 1294 |
| | 2000 | 610 | 1310 | 1290 | 1280 | 1270 | 1260 | 1250 | 1110 | 930 | 1277 |
| | 4000 | 1219 | 1280 | 1270 | 1260 | 1250 | 1240 | 1210 | 1030 | 860 | 1260 |
| | 6000 | 1829 | 1260 | 1250 | 1240 | 1220 | 1210 | 1130 | 950 | / | 1236 |
| | 8000 | 2438 | 1240 | 1220 | 1200 | 1190 | 1180 | 1050 | 870 | / | 1210 |
| | 10000 | 3048 | 1200 | 1190 | 1170 | 1160 | 1110 | 910 | / | / | 1184 |
| | 12000 | 3658 | 1170 | 1150 | 1140 | 1130 | 930 | 740 | / | / | 1156 |
| | 14000 | 4267 | 1140 | 1130 | 1060 | 910 | 710 | 550 | / | / | 1136 |
| | 16000 | 4877 | 1120 | 1030 | 900 | 730 | 560 | / | / | / | 1114 |
| | 18000 | 5486 | 980 | 870 | 750 | 580 | 410 | / | / | / | 983 |

For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.8 ONE ENGINE INOPERATIVE CLIMB PERFORMANCE

Conditions:

- Remaining engine 92% load
- Dead engine feathered and secured
- Flaps UP
- Landing gear retracted
- Airspeed $V_{YSE} = 85$ KIAS
- Sideslip one ball out, max. 5° bank

NOTE

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

The climb performance tables show the rate of climb. The gradient of climb can be calculated using the following formula:

$$\text{Gradient [\%]} = \frac{\text{ROC [fpm]}}{\text{TAS [KTAS]}} \cdot 0.98$$

One Engine Inoperative Climb

Flaps: UP

Power: feathered / 92%

V_{YSE}: 85 KIAS

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | | ISA |
|--------------------|------------------|-----------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|-----|-----|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | | |
| 1999 / 4407 | SL | | 270 | 255 | 245 | 235 | 225 | 210 | 185 | 120 | 230 | |
| | 2000 | 610 | 245 | 235 | 220 | 210 | 200 | 190 | 140 | 80 | 212 | |
| | 4000 | 1219 | 225 | 210 | 200 | 185 | 175 | 160 | 95 | 40 | 193 | |
| | 6000 | 1829 | 200 | 185 | 175 | 160 | 150 | 120 | 55 | / | 170 | |
| | 8000 | 2438 | 175 | 160 | 145 | 130 | 120 | 75 | 15 | / | 147 | |
| | 10000 | 3048 | 145 | 130 | 115 | 100 | 80 | 10 | / | / | 123 | |
| | 12000 | 3658 | 115 | 95 | 85 | 70 | 0 | -70 | / | / | 97 | |
| | 14000 | 4267 | 85 | 70 | 35 | -30 | -105 | -160 | / | / | 75 | |
| | 16000 | 4877 | 55 | 10 | -50 | -120 | -180 | / | / | / | 50 | |
| | 18000 | 5486 | -25 | -75 | -135 | -195 | -255 | / | / | / | -19 | |
| 1900 / 4189 | SL | | 305 | 295 | 285 | 270 | 260 | 250 | 225 | 155 | 269 | |
| | 2000 | 610 | 285 | 270 | 260 | 250 | 240 | 225 | 175 | 110 | 250 | |
| | 4000 | 1219 | 260 | 250 | 235 | 225 | 210 | 195 | 130 | 70 | 231 | |
| | 6000 | 1829 | 235 | 225 | 210 | 195 | 185 | 155 | 90 | / | 208 | |
| | 8000 | 2438 | 210 | 195 | 180 | 165 | 155 | 110 | 45 | / | 184 | |
| | 10000 | 3048 | 180 | 165 | 150 | 140 | 115 | 40 | / | / | 160 | |
| | 12000 | 3658 | 150 | 135 | 120 | 110 | 30 | -45 | / | / | 134 | |
| | 14000 | 4267 | 120 | 105 | 70 | 0 | -75 | -135 | / | / | 111 | |
| | 16000 | 4877 | 90 | 45 | -20 | -90 | -155 | / | / | / | 86 | |
| | 18000 | 5486 | 10 | -45 | -105 | -170 | -235 | / | / | / | 14 | |

One Engine Inoperative Climb

Flaps: UP

Power: feathered / 92%

V_{YSE}: 85 KIAS

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - (ft/min) | | | | | | | | ISA |
|--------------------|------------------|-----------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|-----|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | |
| 1700 / 3748 | SL | | 390 | 375 | 365 | 355 | 345 | 330 | 300 | 220 | 350 |
| | 2000 | 610 | 365 | 355 | 340 | 330 | 320 | 305 | 245 | 170 | 331 |
| | 4000 | 1219 | 340 | 330 | 315 | 305 | 290 | 275 | 200 | 125 | 311 |
| | 6000 | 1829 | 320 | 305 | 290 | 275 | 265 | 225 | 150 | | 287 |
| | 8000 | 2438 | 290 | 275 | 260 | 245 | 230 | 180 | 105 | | 263 |
| | 10000 | 3048 | 260 | 245 | 230 | 215 | 190 | 100 | | | 237 |
| | 12000 | 3658 | 225 | 210 | 195 | 185 | 95 | 10 | | | 210 |
| | 14000 | 4267 | 195 | 180 | 140 | 65 | -25 | -90 | | | 186 |
| | 16000 | 4877 | 165 | 115 | 45 | -35 | -110 | | | | 161 |
| 18000 | 5486 | 80 | 20 | -45 | -120 | -195 | | | | 83 | |

CAUTION: Dark grey shaded areas indicate a climb rate of less than 50 ft/min.
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.9 TIME, FUEL AND DISTANCE TO CLIMB

Conditions:

- Power lever both 92%
- Flaps UP
- Landing gear retracted
- Airspeed V_Y

NOTE

Distances shown are based on zero wind. Fuel for start, taxi and take-off not included. Add 10% to the time, fuel and distance for each 10° C (12° F) increase in OAT.

Example:

OAT at take-off 11°C (52°F)
 Airfield pressure altitude 2000 ft (1200 m)
 Initial climb weight 1900 kg (4189 lb)
 OAT at cruise -17° C (2° F)
 Cruise altitude 16000 ft (4900 m)

Time, fuel and distance to climb at airfield: 2 min, 0.5 US gal and 3 NM (1)

Time, fuel and distance to climb at cruise: 14 min, 3.8 US gal and 24 NM (2)

Subtract (1) from (2) to obtain time, fuel and distance to climb from airfield to cruise:

Time to cruise altitude: 14 min - 2 min = 12 min

Fuel to cruise altitude: 3.8 US gal - 0.5 US gal = 3.3 US gal

Distance to cruise altitude: 24 NM - 3 NM = 21 NM

Time, Fuel and Distance to Climb

Flaps: UP

v_r: 92 KIAS (above 1900 kg / 4189 lb)

Power: 92%

v_y: 90 KIAS (up to 1900 kg / 4189 lb)

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. | Press. Alt. | OAT | OAT | TAS | RoC | RoC | Time | Fuel | Distance |
|--------------------|-------------|-------------|------|------|------|----------|-------|-------|----------|----------|
| | [ft] | [m] | [°C] | [°F] | [kt] | [ft/min] | [m/s] | [min] | [US gal] | [NM] |
| 1999 / 4407 | SL | | 15 | 59 | 92 | 1115 | 5.7 | 0 | 0 | 0 |
| | 2000 | 600 | 11 | 52 | 93 | 1110 | 5.6 | 2 | 0.5 | 3 |
| | 4000 | 1219 | 7 | 45 | 95 | 1105 | 5.6 | 4 | 1 | 6 |
| | 6000 | 1829 | 3 | 38 | 96 | 1095 | 5.6 | 5 | 1.5 | 9 |
| | 8000 | 2438 | -1 | 30 | 98 | 1090 | 5.5 | 7 | 2 | 12 |
| | 10000 | 3048 | -5 | 23 | 99 | 1085 | 5.5 | 9 | 2.5 | 15 |
| | 12000 | 3658 | -9 | 16 | 101 | 1080 | 5.5 | 11 | 3.1 | 19 |
| | 14000 | 4267 | -13 | 9 | 102 | 1070 | 5.4 | 13 | 3.6 | 22 |
| | 16000 | 4877 | -17 | 2 | 104 | 1065 | 5.4 | 15 | 4.2 | 26 |
| | 18000 | 5486 | -21 | -5 | 106 | 1050 | 5.3 | 17 | 4.7 | 30 |
| 1900 / 4189 | SL | | 15 | 59 | 90 | 1205 | 6.1 | 0 | 0 | 0 |
| | 2000 | 600 | 11 | 52 | 91 | 1200 | 6.1 | 2 | 0.5 | 3 |
| | 4000 | 1219 | 7 | 45 | 93 | 1195 | 6.1 | 3 | 0.9 | 5 |
| | 6000 | 1829 | 3 | 38 | 94 | 1185 | 6.0 | 5 | 1.4 | 8 |
| | 8000 | 2438 | -1 | 30 | 96 | 1180 | 6.0 | 7 | 1.9 | 11 |
| | 10000 | 3048 | -5 | 23 | 97 | 1175 | 6.0 | 9 | 2.4 | 14 |
| | 12000 | 3658 | -9 | 16 | 99 | 1170 | 5.9 | 10 | 2.8 | 17 |
| | 14000 | 4267 | -13 | 9 | 100 | 1160 | 5.9 | 12 | 3.3 | 20 |
| | 16000 | 4877 | -17 | 2 | 102 | 1155 | 5.9 | 14 | 3.8 | 24 |
| | 18000 | 5486 | -21 | -5 | 104 | 1140 | 5.8 | 16 | 4.4 | 27 |

Time, Fuel and Distance to Climb

Flaps: UP

v_y: 92 KIAS (above 1900 kg / 4189 lb)

Power: 92%

v_x: 90 KIAS (up to 1900 kg / 4189 lb)

Gear: retracted

| Weight [kg] / [lb] | Press. Alt. | Press. Alt. | OAT | OAT | TAS | RoC | RoC | Time | Fuel | Dist- ance |
|--------------------|-------------|-------------|------|------|------|----------|-------|-------|----------|---------------|
| | [ft] | [m] | [°C] | [°F] | [kt] | [ft/min] | [m/s] | [min] | [US gal] | [NM] |
| 1700 / 3748 | SL | | 15 | 59 | 90 | 1380 | 7.0 | 0 | 0 | 0 |
| | 2000 | 600 | 11 | 52 | 91 | 1375 | 7.0 | 1 | 0.4 | 2 |
| | 4000 | 1219 | 7 | 45 | 93 | 1370 | 6.9 | 3 | 0.8 | 5 |
| | 6000 | 1829 | 3 | 38 | 94 | 1360 | 6.9 | 4 | 1.2 | 7 |
| | 8000 | 2438 | -1 | 30 | 96 | 1355 | 6.9 | 6 | 1.6 | 9 |
| | 10000 | 3048 | -5 | 23 | 97 | 1350 | 6.9 | 7 | 2.0 | 12 |
| | 12000 | 3658 | -9 | 16 | 99 | 1345 | 6.8 | 9 | 2.5 | 15 |
| | 14000 | 4267 | -13 | 9 | 100 | 1335 | 6.8 | 10 | 2.9 | 17 |
| | 16000 | 4877 | -17 | 2 | 102 | 1330 | 6.8 | 12 | 3.3 | 20 |
| | 18000 | 5486 | -21 | -5 | 104 | 1315 | 6.7 | 14 | 3.8 | 24 |

5.3.10 CRUISE PERFORMANCE

Conditions:

- Flaps UP
- Landing gear retracted
- Weight 1999 kg

For conversion of OAT to delta-ISA temperatures refer to Chapter 5.3.3 - INTERNATIONAL STANDARD ATMOSPHERE.

| Cruise Performance | | | | | | | | | | | | | | | | |
|--------------------------|----|--------------------------------|-------------------|-------------|------------|-------------------|-------------|------------|-------------------|-------------|------------|-------------------|-------------|------------|-------------------|-------------|
| Press. Alt [ft] / [m] | | Outside Air Temperature - [°C] | | | | | | | | | | | | | | |
| | | ISA-10 | | | ISA | | | ISA+10 | | | ISA+20 | | | ISA+30 | | |
| | | Pwr [%] | FF [US gph] | TAS [kt] | Pwr [%] | FF [US gph] | TAS [kt] | Pwr [%] | FF [US gph] | TAS [kt] | Pwr [%] | FF [US gph] | TAS [kt] | Pwr [%] | FF [US gph] | TAS [kt] |
| 2000 610 | 92 | 16.6 | 164 | 92 | 16.6 | 166 | 92 | 16.6 | 168 | 92 | 16.7 | 170 | 89 | 16.3 | 169 | |
| | 75 | 13.2 | 152 | 75 | 13.2 | 153 | 75 | 13.2 | 155 | 75 | 13.2 | 157 | 75 | 13.2 | 158 | |
| | 60 | 10.3 | 138 | 60 | 10.3 | 139 | 60 | 10.3 | 141 | 60 | 10.3 | 142 | 60 | 10.3 | 144 | |
| | 35 | 6.5 | 102 | 35 | 6.5 | 103 | 35 | 6.5 | 103 | 35 | 6.5 | 104 | 35 | 6.5 | 104 | |
| 4000 1219 | 92 | 16.6 | 168 | 92 | 16.6 | 169 | 92 | 16.6 | 171 | 92 | 16.7 | 173 | 90 | 16.5 | 173 | |
| | 75 | 13.2 | 154 | 75 | 13.2 | 156 | 75 | 13.2 | 158 | 75 | 13.2 | 159 | 75 | 13.2 | 161 | |
| | 60 | 10.3 | 140 | 60 | 10.3 | 142 | 60 | 10.3 | 143 | 60 | 10.3 | 145 | 60 | 10.3 | 146 | |
| | 35 | 6.5 | 103 | 35 | 6.5 | 104 | 35 | 6.5 | 104 | 35 | 6.5 | 104 | 35 | 6.5 | 105 | |
| 6000 1829 | 92 | 16.6 | 171 | 92 | 16.6 | 173 | 92 | 16.6 | 175 | 92 | 16.7 | 176 | 90 | 16.4 | 176 | |
| | 75 | 13.2 | 157 | 75 | 13.2 | 159 | 75 | 13.2 | 161 | 75 | 13.2 | 163 | 75 | 13.2 | 164 | |
| | 60 | 10.3 | 143 | 60 | 10.3 | 144 | 60 | 10.3 | 146 | 60 | 10.3 | 147 | 60 | 10.3 | 149 | |
| | 35 | 6.5 | 104 | 35 | 6.5 | 104 | 35 | 6.5 | 105 | 35 | 6.5 | 105 | 35 | 6.5 | 105 | |
| 8000 2438 | 92 | 16.6 | 174 | 92 | 16.6 | 176 | 92 | 16.6 | 178 | 92 | 16.7 | 180 | 92 | 16.8 | 181 | |
| | 75 | 13.2 | 160 | 75 | 13.2 | 162 | 75 | 13.2 | 164 | 75 | 13.2 | 166 | 75 | 13.2 | 167 | |
| | 60 | 10.3 | 145 | 60 | 10.3 | 147 | 60 | 10.3 | 149 | 60 | 10.3 | 150 | 60 | 10.3 | 151 | |
| | 40 | 7.3 | 117 | 40 | 7.3 | 118 | 40 | 7.3 | 118 | 40 | 7.3 | 119 | 40 | 7.3 | 120 | |
| 10000 3048 | 92 | 16.6 | 177 | 92 | 16.6 | 179 | 92 | 16.6 | 181 | 92 | 16.7 | 183 | 90 | 16.4 | 183 | |
| | 75 | 13.2 | 163 | 75 | 13.2 | 165 | 75 | 13.2 | 167 | 75 | 13.2 | 169 | 75 | 13.2 | 170 | |
| | 60 | 10.3 | 148 | 60 | 10.3 | 150 | 60 | 10.3 | 151 | 60 | 10.3 | 153 | 60 | 10.3 | 154 | |
| | 45 | 8.1 | 128 | 45 | 8.1 | 129 | 45 | 8.1 | 130 | 45 | 8.1 | 131 | 45 | 8.1 | 131 | |
| 12000 3658 | 92 | 16.6 | 181 | 92 | 16.6 | 183 | 92 | 16.6 | 185 | 92 | 16.8 | 187 | 90 | 16.2 | 184 | |
| | 75 | 13.2 | 166 | 75 | 13.2 | 168 | 75 | 13.2 | 170 | 75 | 13.2 | 172 | 75 | 13.2 | 173 | |
| | 60 | 10.3 | 151 | 60 | 10.3 | 152 | 60 | 10.3 | 154 | 60 | 10.3 | 155 | 60 | 10.3 | 157 | |
| | 45 | 8.1 | 129 | 45 | 8.1 | 130 | 45 | 8.1 | 131 | 45 | 8.1 | 132 | 45 | 8.1 | 133 | |
| 14000 4267 | 92 | 16.7 | 184 | 92 | 16.7 | 186 | 92 | 16.8 | 188 | 85 | 15.4 | 184 | 80 | 14.5 | 182 | |
| | 75 | 13.2 | 169 | 75 | 13.2 | 171 | 75 | 13.2 | 173 | 75 | 13.2 | 175 | 75 | 13.2 | 177 | |
| | 60 | 10.3 | 153 | 60 | 10.3 | 155 | 60 | 10.3 | 156 | 60 | 10.3 | 158 | 60 | 10.3 | 159 | |
| | 45 | 8.1 | 131 | 45 | 8.1 | 132 | 50 | 8.8 | 142 | 50 | 8.8 | 143 | 50 | 8.8 | 144 | |

| Cruise Performance | | | | | | | | | | | | | | | | |
|---------------------------|--|--------------------------------|----------------------|-------------|------------|----------------------|-------------|------------|----------------------|-------------|------------|----------------------|-------------|------------|----------------------|-------------|
| Press. Alt. [ft] / [m] | | Outside Air Temperature - [°C] | | | | | | | | | | | | | | |
| | | ISA-10 | | | ISA | | | ISA+10 | | | ISA+20 | | | ISA+30 | | |
| | | Pwr [%] | FF [US gal/hr] | TAS [kt] | Pwr [%] | FF [US gal/hr] | TAS [kt] | Pwr [%] | FF [US gal/hr] | TAS [kt] | Pwr [%] | FF [US gal/hr] | TAS [kt] | Pwr [%] | FF [US gal/hr] | TAS [kt] |
| 16000 4877 | | 92 | 16.8 | 188 | 92 | 16.8 | 190 | 90 | 16.5 | 189 | 85 | 15.5 | 186 | 80 | 14.5 | 183 |
| | | 75 | 13.2 | 173 | 75 | 13.2 | 175 | 75 | 13.2 | 176 | 75 | 13.2 | 178 | 75 | 13.2 | 180 |
| | | 60 | 10.3 | 156 | 60 | 10.3 | 157 | 60 | 10.3 | 159 | 60 | 10.3 | 161 | 60 | 10.3 | 162 |
| | | 50 | 8.7 | 142 | 50 | 8.7 | 143 | 50 | 8.7 | 144 | 50 | 8.7 | 145 | 50 | 8.7 | 146 |
| 18000 5486 | | 85 | 15.4 | 185 | 85 | 15.4 | 188 | 85 | 15.5 | 189 | 80 | 14.5 | 186 | 80 | 14.0 | 184 |
| | | 75 | 13.2 | 176 | 75 | 13.2 | 178 | 75 | 13.2 | 180 | 75 | 13.2 | 182 | 75 | 13.5 | 183 |
| | | 60 | 10.3 | 159 | 60 | 10.3 | 160 | 60 | 10.3 | 162 | 60 | 10.3 | 163 | 60 | 10.3 | 165 |
| | | 50 | 8.7 | 144 | 50 | 8.7 | 145 | 50 | 8.7 | 146 | 50 | 8.7 | 147 | 50 | 8.7 | 148 |

5.3.11 LANDING DISTANCES

Conditions:

- Power lever both IDLE
- Flaps LDG, APP or UP
- Runway dry, paved, level
- Approach speed V_{REF}

The following factors are to be applied to the computed landing distance for the noted condition:

- Headwind: Decrease by 10% for each 14 kt (7.2 m/s) headwind.
- Tailwind: Increase by 10% for each 3 kt (1.5 m/s) tailwind.
- Paved runway, wet: Increase by 15%.
- Grass runway, dry, 5 cm (2 in) long: Increase the ground roll by 10%.
- Grass runway, dry, 5 cm (2 in) to 10 cm (3.9 in) long: Increase the ground roll by 15%.
- Grass runway, dry, longer than 10 cm (3.9 in): Increase the ground roll at least by 25%.
- Grass runway, wet or soft runway: Increase the ground roll by 10%.
- Downhill slope: Increase the ground roll by 9% for each 1% (1 m per 100 m or 1 ft per 100 ft) of slope.

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 (rain, unfavorable wind conditions, including cross-wind) will increase the landing distance.

CAUTION

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

The above corrections for runway slope should be used with caution since published runway slope data is usually the net slope from one end of the runway to the other. Runways may have positions at their length at greater or lesser slopes than published slope, lengthening (or shortening) the landing roll estimated with these tables.

NOTE

The effect of 50% of the headwind component and 150% of the tailwind component is already incorporated in the head- and tailwind factors.

| Landing Distance - Flaps LDG - 1999 kg / 4407 lb | | | | | | | | |
|--|-----------------|---------------------------------------|---------|---------|--------------------|----------|----------|-----|
| Weight: | | 1999 kg / 4407 lb | | | Flaps: LDG | | | |
| V_{REF}: | | 86 KIAS | | | Power: IDLE | | | |
| Runway: dry, paved, level | | | | | | | | |
| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 370 | 380 | 400 | 410 | 440 | 500 | 387 |
| | 15 m / 50 ft | 620 | 640 | 660 | 680 | 730 | 820 | 647 |
| 1000 305 | Ground Roll | 380 | 400 | 410 | 420 | 470 | 530 | 399 |
| | 15 m / 50 ft | 640 | 660 | 680 | 700 | 770 | 860 | 662 |
| 2000 610 | Ground Roll | 400 | 410 | 430 | 440 | 490 | 550 | 411 |
| | 15 m / 50 ft | 660 | 680 | 700 | 720 | 810 | 900 | 680 |
| 3000 914 | Ground Roll | 410 | 430 | 440 | 460 | 520 | 580 | 422 |
| | 15 m / 50 ft | 680 | 700 | 720 | 750 | 840 | 940 | 697 |
| 4000 1219 | Ground Roll | 430 | 440 | 460 | 490 | 550 | 610 | 435 |
| | 15 m / 50 ft | 700 | 720 | 750 | 790 | 890 | 990 | 715 |
| 5000 1524 | Ground Roll | 440 | 460 | 480 | 510 | 580 | | 449 |
| | 15 m / 50 ft | 730 | 750 | 770 | 830 | 930 | | 734 |
| 6000 1829 | Ground Roll | 460 | 480 | 490 | 540 | 610 | | 461 |
| | 15 m / 50 ft | 750 | 770 | 800 | 870 | 980 | | 753 |
| 7000 2134 | Ground Roll | 480 | 500 | 520 | 580 | 650 | | 479 |
| | 15 m / 50 ft | 780 | 810 | 830 | 930 | 1030 | | 780 |
| 8000 2438 | Ground Roll | 510 | 530 | 550 | 630 | 700 | | 507 |
| | 15 m / 50 ft | 820 | 850 | 880 | 990 | 1110 | | 818 |
| 9000 2743 | Ground Roll | 550 | 570 | 610 | 690 | 770 | | 542 |
| | 15 m / 50 ft | 870 | 900 | 950 | 1070 | 1200 | | 862 |
| 10000 3048 | Ground Roll | 600 | 620 | 670 | 750 | | | 584 |
| | 15 m / 50 ft | 930 | 960 | 1040 | 1160 | | | 913 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Landing Distance - Flaps LDG - 1900 kg / 4189 lb
Weight: 1900 kg / 4189 lb**Flaps:** LDG**V_{REF}:** 84 KIAS**Power:** IDLE**Runway:** dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|-----|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 360 | 370 | 380 | 390 | 430 | 480 | 372 |
| | 15 m / 50 ft | 600 | 620 | 630 | 650 | 700 | 780 | 620 |
| 1000 305 | Ground Roll | 370 | 380 | 390 | 410 | 450 | 500 | 381 |
| | 15 m / 50 ft | 620 | 630 | 650 | 670 | 740 | 820 | 635 |
| 2000 610 | Ground Roll | 380 | 390 | 410 | 420 | 470 | 530 | 392 |
| | 15 m / 50 ft | 630 | 650 | 670 | 690 | 770 | 860 | 652 |
| 3000 914 | Ground Roll | 400 | 410 | 420 | 440 | 500 | 560 | 405 |
| | 15 m / 50 ft | 650 | 670 | 690 | 720 | 810 | 910 | 668 |
| 4000 1219 | Ground Roll | 410 | 420 | 440 | 460 | 520 | 590 | 415 |
| | 15 m / 50 ft | 670 | 700 | 720 | 760 | 850 | 950 | 685 |
| 5000 1524 | Ground Roll | 420 | 440 | 450 | 490 | 550 | / | 428 |
| | 15 m / 50 ft | 700 | 720 | 740 | 800 | 900 | / | 704 |
| 6000 1829 | Ground Roll | 440 | 450 | 470 | 520 | 580 | / | 442 |
| | 15 m / 50 ft | 720 | 740 | 770 | 840 | 940 | / | 722 |
| 7000 2134 | Ground Roll | 460 | 480 | 490 | 550 | 620 | / | 459 |
| | 15 m / 50 ft | 750 | 780 | 800 | 890 | 1000 | / | 751 |
| 8000 2438 | Ground Roll | 490 | 510 | 530 | 600 | 670 | / | 488 |
| | 15 m / 50 ft | 790 | 820 | 850 | 960 | 1070 | / | 788 |
| 9000 2743 | Ground Roll | 530 | 550 | 580 | 660 | 740 | / | 523 |
| | 15 m / 50 ft | 840 | 870 | 920 | 1030 | 1160 | / | 832 |
| 10000 3048 | Ground Roll | 580 | 590 | 640 | 730 | / | / | 582 |
| | 15 m / 50 ft | 900 | 930 | 1000 | 1120 | / | / | 884 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

| Landing Distance - Flaps LDG - 1805 kg / 3979 lb | | | | | | | | |
|--|-----------------|---------------------------------------|--------------------|---------|---------|----------|-----|----------|
| Weight: 1805 kg / 3979 lb | | | Flaps: LDG | | | | | |
| V_{ref}: 84 KIAS | | | Power: IDLE | | | | | |
| Runway: dry, paved, level | | | | | | | | |
| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | ISA | |
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | | 50 / 122 |
| SL | Ground Roll | 334 | 347 | 360 | 370 | 401 | 451 | 353 |
| | 15 m / 50 ft | 573 | 590 | 607 | 625 | 672 | 753 | 598 |
| 1000 305 | Ground Roll | 347 | 360 | 371 | 384 | 423 | 473 | 364 |
| | 15 m / 50 ft | 590 | 608 | 626 | 644 | 705 | 790 | 613 |
| 2000 610 | Ground Roll | 360 | 371 | 385 | 399 | 445 | 500 | 373 |
| | 15 m / 50 ft | 608 | 627 | 645 | 663 | 741 | 827 | 629 |
| 3000 914 | Ground Roll | 372 | 386 | 400 | 415 | 470 | 528 | 385 |
| | 15 m / 50 ft | 628 | 646 | 665 | 691 | 777 | 866 | 645 |
| 4000 1219 | Ground Roll | 386 | 401 | 413 | 440 | 494 | 553 | 397 |
| | 15 m / 50 ft | 647 | 667 | 687 | 726 | 816 | 909 | 661 |
| 5000 1524 | Ground Roll | 399 | 414 | 429 | 463 | 522 | | 407 |
| | 15 m / 50 ft | 668 | 689 | 709 | 764 | 856 | | 679 |
| 6000 1829 | Ground Roll | 415 | 431 | 444 | 490 | 552 | | 420 |
| | 15 m / 50 ft | 690 | 710 | 732 | 803 | 898 | | 696 |
| 7000 2134 | Ground Roll | 435 | 451 | 465 | 523 | 588 | | 437 |
| | 15 m / 50 ft | 719 | 741 | 764 | 852 | 952 | | 721 |
| 8000 2438 | Ground Roll | 466 | 484 | 503 | 571 | 638 | | 465 |
| | 15 m / 50 ft | 760 | 783 | 814 | 917 | 1025 | | 758 |
| 9000 2743 | Ground Roll | 506 | 522 | 556 | 626 | 703 | | 500 |
| | 15 m / 50 ft | 809 | 835 | 884 | 995 | 1109 | | 802 |
| 10000 3048 | Ground Roll | 550 | 570 | 615 | 694 | | | 540 |
| | 15 m / 50 ft | 868 | 894 | 964 | 1082 | | | 855 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Landing Distance - Flaps LDG - 1700 kg / 3748 lb
Weight: 1700 kg / 3748 lb
Flaps: LDG
Speed: 84 KIAS
Power: IDLE
Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|-----|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 320 | 340 | 350 | 360 | 390 | 430 | 335 |
| | 15 m / 50 ft | 550 | 570 | 590 | 600 | 650 | 730 | 577 |
| 1000 305 | Ground Roll | 340 | 350 | 360 | 370 | 410 | 460 | 346 |
| | 15 m / 50 ft | 570 | 590 | 610 | 620 | 680 | 760 | 591 |
| 2000 610 | Ground Roll | 350 | 360 | 370 | 380 | 430 | 480 | 356 |
| | 15 m / 50 ft | 590 | 610 | 630 | 640 | 720 | 800 | 605 |
| 3000 914 | Ground Roll | 360 | 370 | 380 | 400 | 450 | 500 | 367 |
| | 15 m / 50 ft | 610 | 630 | 640 | 670 | 750 | 840 | 621 |
| 4000 1219 | Ground Roll | 370 | 380 | 400 | 420 | 480 | 530 | 376 |
| | 15 m / 50 ft | 630 | 650 | 660 | 700 | 790 | 880 | 636 |
| 5000 1524 | Ground Roll | 390 | 400 | 410 | 450 | 500 | | 388 |
| | 15 m / 50 ft | 650 | 670 | 690 | 740 | 830 | | 652 |
| 6000 1829 | Ground Roll | 400 | 410 | 430 | 470 | 530 | | 401 |
| | 15 m / 50 ft | 670 | 690 | 710 | 780 | 870 | | 670 |
| 7000 2134 | Ground Roll | 420 | 440 | 450 | 500 | 560 | | 417 |
| | 15 m / 50 ft | 690 | 720 | 740 | 820 | 920 | | 693 |
| 8000 2438 | Ground Roll | 450 | 460 | 490 | 550 | 610 | | 445 |
| | 15 m / 50 ft | 740 | 760 | 790 | 890 | 990 | | 731 |
| 9000 2743 | Ground Roll | 490 | 510 | 540 | 610 | 680 | | 481 |
| | 15 m / 50 ft | 790 | 810 | 860 | 960 | 1070 | | 775 |
| 10000 3048 | Ground Roll | 530 | 550 | 600 | 670 | | | 522 |
| | 15 m / 50 ft | 850 | 870 | 940 | 1050 | | | 828 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Landing Distance - Abnormal Flap Position - 1999 kg / 4407 lb

| | | | |
|----------------------------------|--------------------------|---------------|------------------|
| Weight: | 1999 kg / 4407 lb | Flaps: | APP or UP |
| V_{REF}: | 92 KIAS | Power: | IDLE |
| Runway: dry, paved, level | | | |

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 510 | 530 | 550 | 560 | 610 | 680 | 532 |
| | 15 m / 50 ft | 860 | 880 | 910 | 940 | 1010 | 1130 | 894 |
| 1000 305 | Ground Roll | 530 | 550 | 570 | 580 | 640 | 720 | 548 |
| | 15 m / 50 ft | 880 | 910 | 940 | 970 | 1060 | 1180 | 916 |
| 2000 610 | Ground Roll | 550 | 570 | 580 | 610 | 680 | 760 | 565 |
| | 15 m / 50 ft | 910 | 940 | 970 | 1000 | 1110 | 1240 | 938 |
| 3000 914 | Ground Roll | 570 | 590 | 610 | 630 | 710 | 800 | 580 |
| | 15 m / 50 ft | 940 | 970 | 1000 | 1040 | 1160 | 1300 | 963 |
| 4000 1219 | Ground Roll | 590 | 610 | 630 | 670 | 750 | 840 | 598 |
| | 15 m / 50 ft | 970 | 1000 | 1030 | 1090 | 1220 | 1360 | 987 |
| 5000 1524 | Ground Roll | 610 | 630 | 650 | 700 | 790 | | 614 |
| | 15 m / 50 ft | 1000 | 1030 | 1060 | 1150 | 1290 | | 1014 |
| 6000 1829 | Ground Roll | 630 | 650 | 680 | 740 | 830 | | 634 |
| | 15 m / 50 ft | 1030 | 1070 | 1100 | 1200 | 1350 | | 1040 |
| 7000 2134 | Ground Roll | 660 | 680 | 710 | 790 | 890 | | 659 |
| | 15 m / 50 ft | 1080 | 1110 | 1150 | 1280 | 1430 | | 1080 |
| 8000 2438 | Ground Roll | 700 | 730 | 760 | 860 | 960 | | 698 |
| | 15 m / 50 ft | 1140 | 1180 | 1220 | 1380 | 1540 | | 1136 |
| 9000 2743 | Ground Roll | 760 | 780 | 830 | 940 | 1050 | | 745 |
| | 15 m / 50 ft | 1210 | 1250 | 1320 | 1490 | 1660 | | 1200 |
| 10000 3048 | Ground Roll | 810 | 840 | 910 | 1030 | | | 799 |
| | 15 m / 50 ft | 1300 | 1340 | 1440 | 1620 | | | 1276 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Landing Distance - Abnormal Flap Position - 1900 kg / 4189 lb

| | | | |
|----------------------------------|--------------------------|---------------|------------------|
| Weight: | 1900 kg / 4189 lb | Flaps: | APP or UP |
| V_{REF}: | 88 KIAS | Power: | IDLE |
| Runway: dry, paved, level | | | |

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 490 | 510 | 520 | 540 | 580 | 650 | 511 |
| | 15 m / 50 ft | 820 | 840 | 870 | 890 | 960 | 1080 | 852 |
| 1000 305 | Ground Roll | 510 | 520 | 540 | 560 | 610 | 690 | 524 |
| | 15 m / 50 ft | 840 | 870 | 900 | 920 | 1010 | 1130 | 874 |
| 2000 610 | Ground Roll | 520 | 540 | 560 | 580 | 650 | 730 | 540 |
| | 15 m / 50 ft | 870 | 900 | 920 | 950 | 1060 | 1180 | 895 |
| 3000 914 | Ground Roll | 540 | 560 | 580 | 610 | 680 | 760 | 554 |
| | 15 m / 50 ft | 900 | 930 | 950 | 990 | 1110 | 1240 | 919 |
| 4000 1219 | Ground Roll | 560 | 580 | 600 | 640 | 720 | 800 | 572 |
| | 15 m / 50 ft | 930 | 950 | 980 | 1040 | 1170 | 1300 | 942 |
| 5000 1524 | Ground Roll | 580 | 600 | 620 | 670 | 760 | | 590 |
| | 15 m / 50 ft | 960 | 990 | 1010 | 1090 | 1220 | | 966 |
| 6000 1829 | Ground Roll | 600 | 630 | 650 | 710 | 800 | | 606 |
| | 15 m / 50 ft | 990 | 1020 | 1050 | 1150 | 1290 | | 992 |
| 7000 2134 | Ground Roll | 630 | 660 | 680 | 760 | 850 | | 633 |
| | 15 m / 50 ft | 1030 | 1060 | 1090 | 1220 | 1360 | | 1030 |
| 8000 2438 | Ground Roll | 680 | 700 | 730 | 830 | 920 | | 672 |
| | 15 m / 50 ft | 1090 | 1130 | 1170 | 1320 | 1470 | | 1085 |
| 9000 2743 | Ground Roll | 730 | 750 | 800 | 900 | 1010 | | 717 |
| | 15 m / 50 ft | 1160 | 1200 | 1270 | 1430 | 1590 | | 1150 |
| 10000 3048 | Ground Roll | 790 | 820 | 880 | 990 | | | 772 |
| | 15 m / 50 ft | 1250 | 1290 | 1390 | 1560 | | | 1227 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Landing Distance - Abnormal Flap Position - 1805 kg / 3979 lb
Weight: 1805 kg / 3979 lb
Flaps: APP or UP
V_{ref}: 86 KIAS
Power: IDLE
Runway: dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 462 | 477 | 494 | 511 | 551 | 621 | 485 |
| | 15 m / 50 ft | 780 | 804 | 827 | 850 | 916 | 1025 | 816 |
| 1000 305 | Ground Roll | 477 | 495 | 513 | 528 | 582 | 652 | 500 |
| | 15 m / 50 ft | 804 | 828 | 852 | 877 | 961 | 1076 | 835 |
| 2000 610 | Ground Roll | 495 | 514 | 530 | 548 | 613 | 688 | 516 |
| | 15 m / 50 ft | 829 | 853 | 879 | 904 | 1010 | 1127 | 856 |
| 3000 914 | Ground Roll | 514 | 531 | 550 | 572 | 647 | 723 | 529 |
| | 15 m / 50 ft | 854 | 881 | 906 | 942 | 1059 | 1182 | 879 |
| 4000 1219 | Ground Roll | 532 | 552 | 569 | 605 | 681 | 763 | 546 |
| | 15 m / 50 ft | 882 | 908 | 936 | 989 | 1112 | 1239 | 901 |
| 5000 1524 | Ground Roll | 552 | 571 | 591 | 638 | 720 | / | 560 |
| | 15 m / 50 ft | 909 | 938 | 966 | 1041 | 1167 | / | 925 |
| 6000 1829 | Ground Roll | 572 | 593 | 612 | 675 | 757 | / | 578 |
| | 15 m / 50 ft | 940 | 968 | 998 | 1093 | 1226 | / | 948 |
| 7000 2134 | Ground Roll | 599 | 622 | 642 | 720 | 810 | / | 602 |
| | 15 m / 50 ft | 983 | 1013 | 1044 | 1165 | 1302 | / | 987 |
| 8000 2438 | Ground Roll | 643 | 667 | 694 | 786 | 880 | / | 641 |
| | 15 m / 50 ft | 1044 | 1075 | 1118 | 1258 | 1406 | / | 1041 |
| 9000 2743 | Ground Roll | 693 | 719 | 762 | 862 | 963 | / | 688 |
| | 15 m / 50 ft | 1116 | 1150 | 1217 | 1368 | 1527 | / | 1104 |
| 10000 3048 | Ground Roll | 755 | 783 | 844 | 953 | / | / | 742 |
| | 15 m / 50 ft | 1201 | 1236 | 1332 | 1494 | / | / | 1183 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

Landing Distance - Abnormal Flap Position - 1700 kg / 3748 lb
Weight: 1700 kg / 3748 lb**Flaps:** APP or UP**V_{REF}:** 86 KIAS**Power:** IDLE**Runway:** dry, paved, level

| Press. Alt. [ft] / [m] | Distance [m] | Outside Air Temperature - [°C] / [°F] | | | | | | ISA |
|---------------------------|-----------------|---------------------------------------|---------|---------|---------|----------|----------|------|
| | | 0 / 32 | 10 / 50 | 20 / 68 | 30 / 86 | 40 / 104 | 50 / 122 | |
| SL | Ground Roll | 450 | 460 | 480 | 490 | 530 | 600 | 464 |
| | 15 m / 50 ft | 750 | 780 | 800 | 820 | 880 | 990 | 783 |
| 1000 305 | Ground Roll | 460 | 480 | 490 | 510 | 560 | 630 | 478 |
| | 15 m / 50 ft | 780 | 800 | 820 | 850 | 930 | 1040 | 802 |
| 2000 610 | Ground Roll | 480 | 490 | 510 | 530 | 590 | 660 | 492 |
| | 15 m / 50 ft | 800 | 820 | 850 | 870 | 970 | 1080 | 821 |
| 3000 914 | Ground Roll | 490 | 510 | 530 | 550 | 620 | 690 | 505 |
| | 15 m / 50 ft | 820 | 850 | 870 | 910 | 1020 | 1140 | 843 |
| 4000 1219 | Ground Roll | 510 | 530 | 550 | 580 | 650 | 730 | 521 |
| | 15 m / 50 ft | 850 | 880 | 900 | 950 | 1070 | 1190 | 864 |
| 5000 1524 | Ground Roll | 530 | 550 | 570 | 610 | 690 | | 535 |
| | 15 m / 50 ft | 880 | 900 | 930 | 1000 | 1120 | | 887 |
| 6000 1829 | Ground Roll | 550 | 570 | 590 | 650 | 730 | | 552 |
| | 15 m / 50 ft | 910 | 930 | 960 | 1050 | 1180 | | 910 |
| 7000 2134 | Ground Roll | 580 | 600 | 620 | 690 | 780 | | 577 |
| | 15 m / 50 ft | 950 | 980 | 1000 | 1120 | 1250 | | 945 |
| 8000 2438 | Ground Roll | 620 | 640 | 670 | 760 | 850 | | 614 |
| | 15 m / 50 ft | 1010 | 1040 | 1080 | 1210 | 1360 | | 1001 |
| 9000 2743 | Ground Roll | 670 | 700 | 740 | 830 | 930 | | 662 |
| | 15 m / 50 ft | 1080 | 1110 | 1170 | 1320 | 1470 | | 1064 |
| 10000 3048 | Ground Roll | 730 | 760 | 820 | 920 | | | 717 |
| | 15 m / 50 ft | 1160 | 1200 | 1290 | 1450 | | | 1144 |

For the distance in [ft] divide by 0.3048 or multiply by 3.28.

5.3.12 GO-AROUND CLIMB PERFORMANCE

Conditions:

- Power lever both MAX
- Flaps LDG
- Landing gear extended
- Airspeed:
 - Up to 1900 kg (4189 lb) $v_{REF} = 84$ KIAS
 - Above 1900 kg (4189 lb) $v_{REF} = 86$ KIAS

The climb performance charts show the rate of climb. The gradient and angle of climb can be calculated using the following formula:

$$Gradient [\%] = \frac{ROC [fpm]}{TAS [KTAS]} \cdot 0.98$$

NOTE

The angles of climb at MSL and ISA condition are:

4.7° for Maximum Take-Off Mass (1900 kg / 4189 lb)

5.1° for Maximum Landing Mass (1805 kg / 3979 lb)

If MÄM 42-678 is carried out:

3.9° for Maximum Take-Off Mass (1999 kg / 4407 lb)

Go-Around Climb Performance

Flaps: LDG

Power: MAX

V_{REF}: 86 KIAS above 1900 kg (4189 lb)

Gear: extended

84 KIAS up to 1900 kg (4189 lb)

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | ISA |
|--------------------|------------------|-----------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|-----|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | |
| 1999 / 4407 | SL | | 635 | 620 | 600 | 585 | 570 | 505 | 375 | 240 | 580 |
| | 2000 | 610 | 605 | 585 | 570 | 550 | 515 | 425 | 280 | 155 | 552 |
| | 4000 | 1219 | 570 | 550 | 530 | 510 | 450 | 340 | 200 | 80 | 517 |
| | 6000 | 1829 | 530 | 505 | 485 | 455 | 380 | 250 | 120 | / | 480 |
| | 8000 | 2438 | 485 | 460 | 440 | 400 | 310 | 170 | 45 | / | 443 |
| | 10000 | 3048 | 440 | 415 | 380 | 310 | 190 | 40 | / | / | 405 |
| 1900 / 4189 | SL | | 735 | 715 | 700 | 685 | 670 | 605 | 470 | 325 | 678 |
| | 2000 | 610 | 700 | 685 | 665 | 650 | 620 | 525 | 375 | 240 | 652 |
| | 4000 | 1219 | 670 | 650 | 635 | 615 | 555 | 440 | 290 | 160 | 622 |
| | 6000 | 1829 | 635 | 610 | 590 | 560 | 485 | 345 | 210 | / | 585 |
| | 8000 | 2438 | 590 | 565 | 545 | 505 | 410 | 265 | 135 | / | 548 |
| | 10000 | 3048 | 545 | 520 | 485 | 415 | 290 | 135 | / | / | 509 |
| 1805 / 3979 | SL | | 794 | 777 | 760 | 744 | 728 | 659 | 518 | 366 | 735 |
| | 2000 | 610 | 761 | 744 | 726 | 710 | 675 | 578 | 420 | 276 | 708 |
| | 4000 | 1219 | 727 | 709 | 693 | 671 | 611 | 488 | 330 | 193 | 677 |
| | 6000 | 1829 | 693 | 670 | 647 | 614 | 536 | 390 | 244 | / | 640 |
| | 8000 | 2438 | 647 | 623 | 600 | 557 | 462 | 304 | 165 | / | 602 |
| | 10000 | 3048 | 599 | 574 | 539 | 465 | 333 | 169 | / | / | 562 |

Go-Around Climb Performance

Flaps: LDG

Power: MAX

V_{REF}: 88 KIAS above 1900 kg (4189 lb)

Gear: extended

84 KIAS up to 1900 kg (4189 lb)

| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | | ISA |
|--------------------|------------------|-----------------|---------------------------------------|-----------|---------|----------|----------|----------|-----------|-----------|-----|
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | | |
| | | | -20 -4 | -10 14 | 0 32 | 10 50 | 20 68 | 30 86 | 40 104 | 50 122 | |
| 1700 / 3748 | SL | | 865 | 845 | 830 | 810 | 795 | 725 | 575 | 410 | 805 |
| | 2000 | 610 | 830 | 810 | 795 | 775 | 740 | 640 | 470 | 315 | 777 |
| | 4000 | 1219 | 795 | 775 | 760 | 735 | 675 | 545 | 375 | 225 | 746 |
| | 6000 | 1829 | 760 | 735 | 710 | 680 | 595 | 440 | 285 | / | 707 |
| | 8000 | 2438 | 710 | 685 | 665 | 620 | 520 | 350 | 200 | / | 667 |
| | 10000 | 3048 | 660 | 635 | 600 | 520 | 380 | 205 | / | / | 626 |

For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.13 APPROVED NOISE DATA

Max. Flight Mass 1900 kg (4189 lb)

ICAO Annex 16 Chapter X, App.6 73.8 dB(A)

If MÄM 42-678 is installed:

Max. Flight Mass 1999 kg (4407 lb)

ICAO Annex 16 Chapter X, App.6 75.0 dB(A)

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

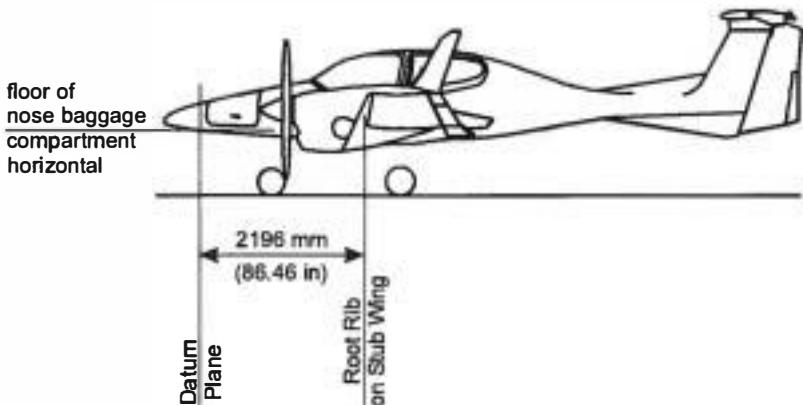
Refer to Section 1.6 - UNITS OF MEASUREMENT for conversion of SI units to US units and vice versa.

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 meters (86.46 in) forward of the most forward point of the root rib on the stub wing.



6.3 MASS AND BALANCE REPORT

The empty mass and the corresponding CG position established before delivery are the first entries in the Mass and Balance Report. Every change in permanently installed equipment, and every repair to the airplane which affects the empty mass or the empty mass CG must be recorded in the Mass and Balance Report.

For the calculation of flight mass and corresponding CG position (or moment), the *current* empty mass and the corresponding CG position (or moment) in accordance with the Mass and Balance Report must always be used.

Condition of the airplane for establishing the empty mass:

- Equipment as per Equipment Inventory (see Section 6.5)
- Including the following full operating fluids:
 - brake fluid
 - hydraulic fluid (for the retractable gear)
 - engine oil (2 x 7 liters = 2 x 7.4 qts)
 - coolant
 - gearbox oil
 - unusable fuel in main fuel tanks (2 x 1 US gal = 2 x 3.79 liters)
 - unusable fuel in auxiliary fuel tanks (if installed, 2 x 0.5 US gal = 2 x 1.89 liters)

6.4 FLIGHT MASS AND CENTER OF GRAVITY

The following information enables you to operate your DA 42 NG 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 NG' 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 AUX PUMP 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 AUX PUMP 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 11 for the condition with empty fuel tanks, and row 14 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.

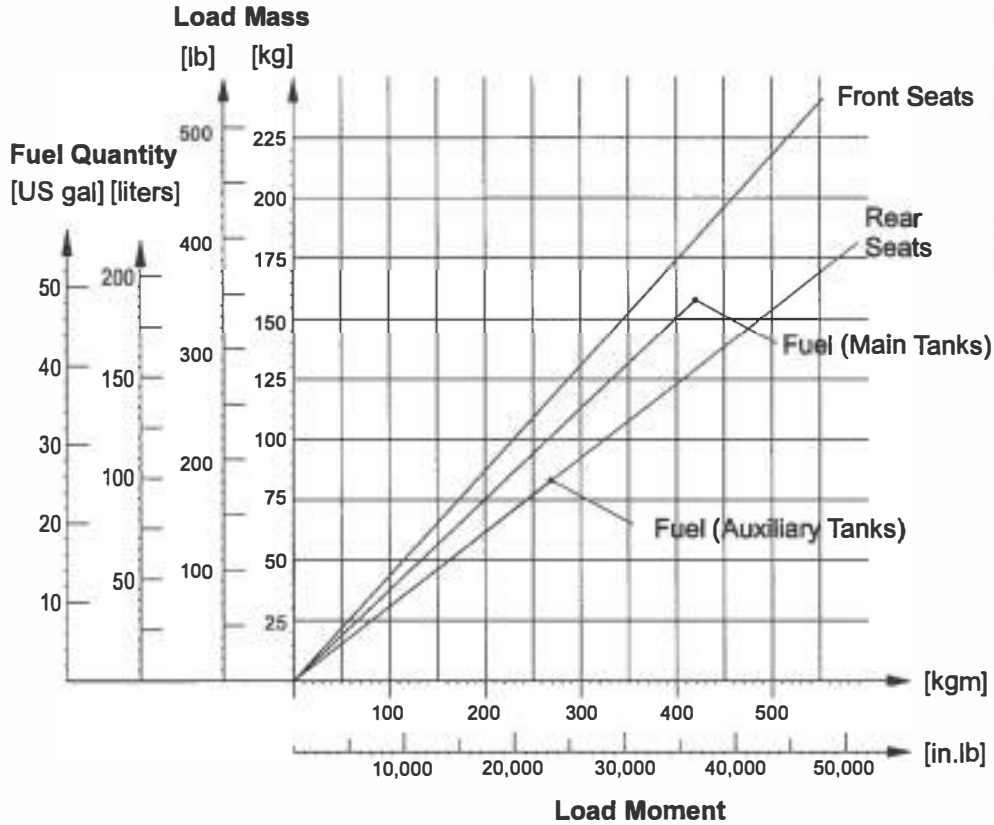
The result found with the graphical method is however inaccurate. In doubtful cases the result must be verified using the exact method given above.

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 (if installed) | 3.20 | 126.0 |
| De-icing fluid | Tank in nose baggage compartment (if only OÄM 42-160 installed) | 1.00 | 39.4 |
| | Tank in rear fuselage (if OÄM 42-160 AND OÄM 42-203 are installed) | 4.52 | 178.0 |

| Item | Lever Arm | | |
|-------------------------|------------------------------|------|-------|
| | [m] | [in] | |
| Baggage in compartments | Standard: | | |
| | Nose | 0.60 | 23.6 |
| | Cabin | 3.89 | 153.1 |
| | Extension | 4.54 | 178.7 |
| | OÄM 42-207 carried out: | | |
| | Standard baggage compartment | 3.65 | 143.7 |
| | Short extension | 3.97 | 156.3 |

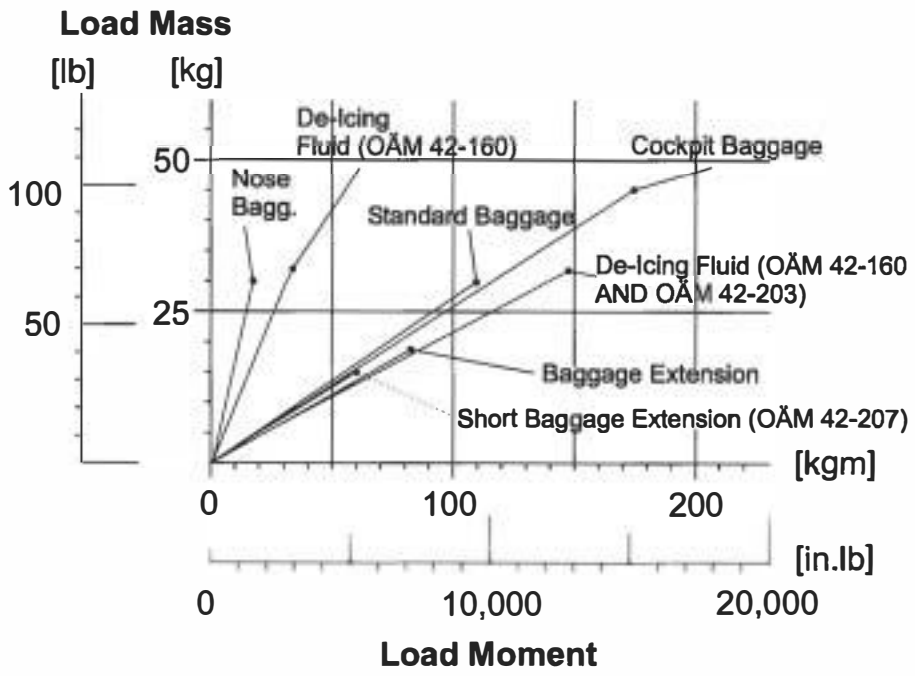


6.4.2 LOADING DIAGRAM

Mass and Balance



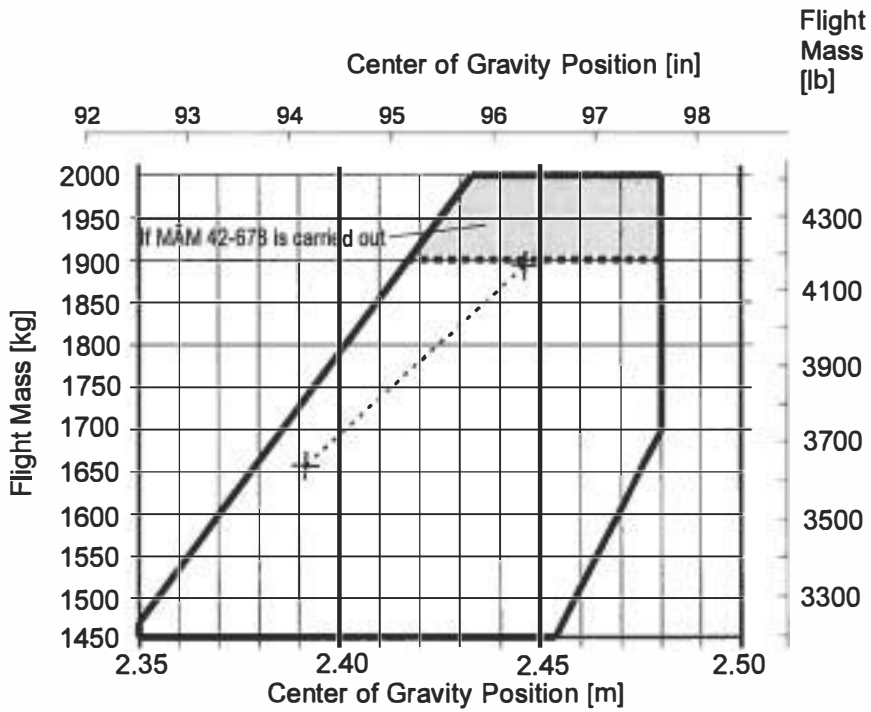
DA 42 NG AFM



| CALCULATION OF LOADING CONDITION | DA 42NG (Example) | | Your DA 42 NG | |
|---|----------------------|----------------------------|----------------------|----------------------------|
| | Mass [kg] [lb] | Moment [kgm] [In.lb] | Mass [kg] [lb] | Moment [kgm] [In.lb] |
| 1. Empty mass (from Mass and Balance Report) | 1450 3197 | 3488.0 302.747 | | |
| 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) | 0 0 | 0.0 0.0 | | |
| 4. Nose baggage compt. Lever arm: 0.60 m (23.6 in) | 0 0 | 0.0 0.0 | | |
| 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) | 8 18 | 36.3 3.217 | | |
| 7. Standard baggage compartment Lever arm: 3.65 m (143.7 in) | 0 0 | 0.0 0.0 | | |
| 8. Short baggage extension (if OÄM 42-207 is carried out) Lever arm: 3.97 m (156.3 in) | 0 0 | 0.0 0.0 | | |
| 9. De-icing fluid (if only OÄM 42-160 is 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 | | |

| CALCULATION OF LOADING CONDITION | DA 42 NG (Example) | | Your DA 42 NG | |
|--|-----------------------|-------------------|---------------|------------------|
| | Mass | Moment | Maas | Moment |
| | [kg] [lb] | [kgm] [in.lb] | [kg] [lb] | [kgm] [in.lb] |
| 10. De-icing fluid (if OÄM 42-160 AND OÄM 42-203 are installed; see NOTE on previous page) (1.1 kg/liter) (9.2 lb/US gal) Lever arm: 4.52 m (178.0 in) | 0 0 | 0.0 0.0 | | |
| 11. Total mass & total moment with empty fuel tanks (Total of 1.through 10.) | 1655.5 3651 | 3958.7 343,717 | | |
| 12. 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 | | |
| 13. Usable fuel, auxiliary tanks (if installed) (0.84 kg/liter) (7.01 lb/US gal) Lever arm: 3.20 m (126.0 in) | 84 185 | 268.8 23,310 | | |
| 14. Total mass & total moment with fuel & de-icing fluid (Total of 11. through 13.) | 1898.5 4187 | 4645.7 403,356 | | |

The CG's shown in the following diagrams are those from the example in Section 6.4.3 - CALCULATION OF LOADING CONDITION, rows 11 and 14.



6.4.4 PERMISSIBLE CENTER OF GRAVITY RANGE

DA 42 NG AFM



Mass and Balance

The flight CG position must be within the following limits:

Most forward flight CG:

2.350 m (92.52 in) aft of datum plane at 1450 kg (3197 lb)

2.350 m (92.52 in) aft of datum plane at 1468 kg (3236 lb)

2.418 m (95.20 in) aft of datum plane at max. take-off mass 1900 kg (4189 lb)

If MÄM 42-678 is carried out:

2.434 m (95.83 in) aft of datum plane at max. take-off mass 1999 kg (4407 lb)

linear variation in between

Most rearward flight CG:

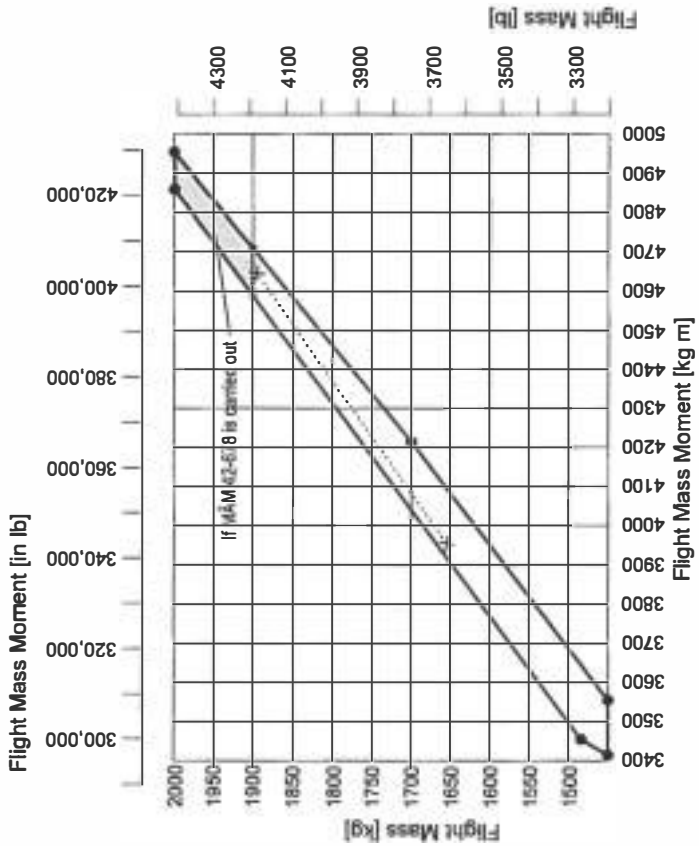
2.454 m (96.61 in) aft of datum plane at 1450 kg (3197 lb)

2.480 m (97.64 in) aft of datum plane at 1700 kg (3748 lb)

2.480 m (97.64 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 11 and 14.

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

All equipment that is approved for installation in the DA 42 NG 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.: 42.N499 | | Registration: | | Date: 08. Mär. 23 | | Mass | | Lever Arm | |
|------------------------------|----------|---------------|------------------|-------------------|-------------------------------------|------|----|-----------|---|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| AVIONICS COOLING | | | | | | | | | |
| Avionics cooling fan | SAFE 328 | 305 467-00 | Sandia Aerospace | | <input checked="" type="checkbox"/> | | | | |
| PFD cooling fan | SAFE 128 | 305 468-00 | Sandia Aerospace | | <input checked="" type="checkbox"/> | | | | |
| MFD cooling fan | SAFE 128 | 305 468-00 | Sandia Aerospace | | <input checked="" type="checkbox"/> | | | | |
| AUTOPILOT SYSTEM | | | | | | | | | |
| Pitch servo | GSA 81 | 011-00878-00 | Garmin | | <input type="checkbox"/> | | | | |
| Pitch servo | GSA 81 | 011-00878-20 | Garmin | 1A1037160 | <input checked="" type="checkbox"/> | | | | |
| Pitch servo mount | GSM 85 | 011-00894-07 | Garmin | | <input type="checkbox"/> | | | | |
| Pitch servo mount | GSM 86 | 011-01904-03 | Garmin | 28K007926 | <input checked="" type="checkbox"/> | | | | |
| Pitch clutch cartridge | | 011-02147-11 | Garmin | | <input checked="" type="checkbox"/> | | | | |
| Roll servo | GSA 81 | 011-00878-00 | Garmin | | <input type="checkbox"/> | | | | |
| Roll servo | GSA 81 | 011-00878-20 | Garmin | 1A1037034 | <input checked="" type="checkbox"/> | | | | |
| Roll servo mount | GSM 85 | 011-00894-07 | Garmin | | <input type="checkbox"/> | | | | |
| Roll servo mount | GSM 86 | 011-01904-03 | Garmin | 28K012434 | <input checked="" type="checkbox"/> | | | | |
| Roll clutch cartridge | | 011-02147-09 | Garmin | | <input checked="" type="checkbox"/> | | | | |
| Pitch trim servo | GSA 81 | 011-00878-00 | Garmin | | <input type="checkbox"/> | | | | |
| Pitch trim servo | GSA 81 | 011-00878-20 | Garmin | 1A1035337 | <input checked="" type="checkbox"/> | | | | |
| Pitch trim servo mount | GSM 85 | 011-00894-04 | Garmin | | <input type="checkbox"/> | | | | |
| Pitch trim servo mount | GSM 86 | 011-01904-03 | Garmin | 28K011961 | <input checked="" type="checkbox"/> | | | | |
| Pitch trim clutch cartridge | | 011-02147-09 | Garmin | | <input checked="" type="checkbox"/> | | | | |
| Yaw servo | GSA 80 | 011-00877-00 | Garmin | | <input type="checkbox"/> | | | | |
| Yaw servo | GSA 80 | 011-00877-20 | Garmin | 19Z017385 | <input checked="" type="checkbox"/> | | | | |
| Yaw servo mount | GSM 85 | 011-00894-08 | Garmin | | <input type="checkbox"/> | | | | |
| Yaw servo mount | GSM 86 | 011-01904-03 | Garmin | 28K012486 | <input checked="" type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär. 23 | | Mass | | Lever Arm | |
|---------------------------------|---------------|-------------------|---------------------|-------------------|-------------------------------------|------|----|-----------|---|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | in | m |
| Yaw clutch cartridge | | 011-02147-03 | Garmin | | <input checked="" type="checkbox"/> | | | | |
| Control stick | | DA4-2213-12-90 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| CWS switch | | 031-00514-0000 | Bendix/King | | <input type="checkbox"/> | | | | |
| AP-disc switch | | 031-00428-0000 | Bendix/King | | <input type="checkbox"/> | | | | |
| Trim switch assy | | 200-09187-0000 | Bendix/King | | <input type="checkbox"/> | | | | |
| ELECTRICAL POWER | | | | | | | | | |
| Main battery | RG24-15(M) | | Concorde | | <input checked="" type="checkbox"/> | | | | |
| Emergency battery | | D60-2560-91-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Emergency battery (10 pcs.) | CR 123 A | | Panasonic | | <input checked="" type="checkbox"/> | | | | |
| ECU backup battery LH (2 pcs.) | LC-R127R2P | | Panasonic | | <input type="checkbox"/> | | | | |
| ECU backup battery RH (2 pcs.) | LC-R127R2P | | Panasonic | | <input type="checkbox"/> | | | | |
| ECU backup battery RH (2 pcs.) | LC-RA1212P(1) | | Panasonic | | <input type="checkbox"/> | | | | |
| ECU backup battery LH (2 pcs.) | NP7-12 | | Yuasa | | <input checked="" type="checkbox"/> | | | | |
| ECU backup battery RH (2 pcs.) | NP7-12 | | Yuasa | | <input type="checkbox"/> | | | | |
| ECU backup battery RH (2 pcs.) | NP12-12 | | Yuasa | | <input checked="" type="checkbox"/> | | | | |
| External power connector | | DA4-2443-10-00 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Additional Alternator | | ES-100248-2 | Kelly Aerospace | | <input type="checkbox"/> | | | | |
| Alternator Pulley | | D44-2416-00-34X01 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Gear Box Fan Assy | | D44-2416-20-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Prop. Flange Pulley Support | | D44-2416-00-52_1 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Additional Alternator V-belt | | ISO 4184 XPZ | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Additional Alternator Regulator | | VR2000-28-1 | Electrosystems Inc. | | <input type="checkbox"/> | | | | |
| USB Charging Port (2 pcs.) | TA 202 | 6430202-9 | True Blue Power | | <input checked="" type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mar. 23 | | Mass | | Lever Arm | |
|------------------------------|----------------|---------------|--------------|-------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | SN | Installed | lb | kg | in | m |
| EQUIPMENT | | | | | | | | | |
| Safety belt, pilot | 5-01-0 Series | 5-01-1C0710 | Schroth | | <input type="checkbox"/> | 2.110 | 0.960 | 92.520 | 2.350 |
| Safety belt, co-pilot | 5-01-0 Series | 5-01-1C5710 | Schroth | | <input type="checkbox"/> | 2.110 | 0.960 | 92.520 | 2.350 |
| Safety belt, LH pax | 5-01-0 Series | 5-01-1B5710 | Schroth | | <input type="checkbox"/> | 2.250 | 1.020 | 126.800 | 3.220 |
| Safety belt, RH pax | 5-01-0 Series | 5-01-1B0710 | Schroth | | <input type="checkbox"/> | 2.250 | 1.020 | 126.800 | 3.220 |
| Safety belt, pilot | 5-01-0 Series | 5-01-2G0710 | Schroth | | <input type="checkbox"/> | 2.110 | 0.960 | 92.520 | 2.350 |
| Safety belt, co-pilot | 5-01-0 Series | 5-01-2G5710 | Schroth | | <input type="checkbox"/> | 2.110 | 0.960 | 92.520 | 2.350 |
| Safety belt, LH pax | 5-01-0 Series | 5-01-2H5710 | Schroth | | <input type="checkbox"/> | 2.250 | 1.020 | 126.800 | 3.220 |
| Safety belt, RH pax | 5-01-0 Series | 5-01-2H0710 | Schroth | | <input type="checkbox"/> | 2.250 | 1.020 | 126.800 | 3.220 |
| Safety belt, pilot | 5-01-0 Series | 5-01-2G0701 | Schroth | 10/22 | <input checked="" type="checkbox"/> | 2.110 | 0.960 | 92.520 | 2.350 |
| Safety belt, co-pilot | 5-01-0 Series | 5-01-2G5701 | Schroth | 21/22 | <input checked="" type="checkbox"/> | 2.110 | 0.960 | 92.520 | 2.350 |
| Safety belt, LH pax | 5-01-0 Series | 5-01-2H5701 | Schroth | 21/22 | <input checked="" type="checkbox"/> | 2.250 | 1.020 | 126.800 | 3.220 |
| Safety belt, RH pax | 5-01-0 Series | 5-01-2H0701 | Schroth | 21/22 | <input checked="" type="checkbox"/> | 2.250 | 1.020 | 126.800 | 3.220 |
| ELT unit | ME406 | 453-6803 | Artex | | <input type="checkbox"/> | 2.064 | 0.936 | 179.700 | 4.565 |
| ELT unit | C406-1 | 453-5002 | Artex | | <input type="checkbox"/> | 2.064 | 0.936 | 179.700 | 4.565 |
| ELT remote switch | | 345-6196-04 | Artex | | <input type="checkbox"/> | | | | |
| ELT antenna | | 110-338 | Artex | | <input type="checkbox"/> | 0.470 | 0.213 | 152.800 | 3.880 |
| ELT unit | 406 AF-Compact | S1840501-01 | Kennad | | <input type="checkbox"/> | 1.874 | 0.874 | 179.700 | 4.565 |
| ELT unit | AF-Integra | S185150102 | Kennad | TM0000272379 | <input checked="" type="checkbox"/> | | | | |
| ELT remote switch | RC 200 | S1820513-11 | Kennad | | <input checked="" type="checkbox"/> | | | | |
| ELT antenna | AV-300 | 0124220 | Kennad | | <input type="checkbox"/> | 0.330 | 0.150 | 152.800 | 3.880 |
| ELT antenna | AV-300 | 0146151 | Kennad | | <input checked="" type="checkbox"/> | 0.330 | 0.150 | 152.800 | 3.880 |
| Buzzer | | 452-6505 | Artex | | <input type="checkbox"/> | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär. 23 | Mass | | Lever Arm | | |
|--|-----------|----------------------|--------------------|-------------------|-------------------------------------|----|-----------|----|---|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| SAFETY EQUIPMENT | | | | | | | | | |
| Fire extinguisher | | HAL 1 | AIR Total | | <input checked="" type="checkbox"/> | | | | |
| Fire extinguisher, portable ¹ | | A 620 T | Amenex | | <input type="checkbox"/> | | | | |
| First aid kit | | | | | <input checked="" type="checkbox"/> | | | | |
| Emergency axe | | G45912 | Fiskars | | <input type="checkbox"/> | | | | |
| Emergency egress hammer | | D67-2560-80-50 | Diamond | | <input type="checkbox"/> | | | | |
| Emergency egress hammer | | D64-2560-70-50 | Diamond | | <input checked="" type="checkbox"/> | | | | |
| FLIGHT CONTROLS | | | | | | | | | |
| Flaps actuator assy | | 43655 | Knutz | | <input checked="" type="checkbox"/> | | | | |
| Lift detector | | C-99701-1 | Safe Flight Instr. | | <input checked="" type="checkbox"/> | | | | |
| Stall warning buzzer | SC Series | SC 628 ND | Malbury | | <input checked="" type="checkbox"/> | | | | |
| Variable elevator stop | | D64-2733-12-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Variable elevator stop | | D64-2733-12-00_1 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| HYDRAULIC | | | | | | | | | |
| Motor pump unit | | X11-0001-00-00.00R0 | Hydraulik Mayer | 0345 | <input checked="" type="checkbox"/> | | | | |
| Hydraulic fluid tank | | X11-0002-00-00.00R0 | Hydraulik Mayer | 0632 | <input checked="" type="checkbox"/> | | | | |
| Hydraulic control unit | | X11-0003-00-00.00R0 | Hydraulik Mayer | 0347 | <input checked="" type="checkbox"/> | | | | |
| High pressure filter | | X11-0004-00-00.00R0 | Hydraulik Mayer | 0634 | <input checked="" type="checkbox"/> | | | | |
| Hydraulic pressure accumulator | | X11-0005-00-00.00R0 | Hydraulik Mayer | 0677 | <input checked="" type="checkbox"/> | | | | |
| MLG hydraulic cylinder, LH | | X11-0006-00-00.001R0 | Hydraulik Mayer | 0738 | <input checked="" type="checkbox"/> | | | | |
| MLG hydraulic cylinder, RH | | X11-0006-00-00.001R0 | Hydraulik Mayer | 0738 | <input checked="" type="checkbox"/> | | | | |
| NLG hydraulic cylinder | | X11-0006-00-00.002R0 | Hydraulik Mayer | | <input type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär 23 | | Mass | | Lever Arm | |
|---------------------------------|----------|---------------------|------------------|------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| NL.G hydraulic cylinder | | X11-0006-00-0000/2A | Hydraulik Mayer | | <input type="checkbox"/> | | | | |
| NL.G hydraulic cylinder | | D60-9029-03-01_1 | Hydraulik Mayer | | <input type="checkbox"/> | | | | |
| NL.G hydraulic cylinder | | D60-9029-03-01_2 | Hydraulik Mayer | 0721 | <input checked="" type="checkbox"/> | | | | |
| Brake master cylinder (2 pcs) | | 10-54A | Cleveland | | <input checked="" type="checkbox"/> | | | | |
| Parking valve | | 60-5D | Cleveland | | <input checked="" type="checkbox"/> | | | | |
| Brake assembly | | 30-52Z | Cleveland | | <input checked="" type="checkbox"/> | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| INDICATING / REC. SYSTEM | | | | | | | | | |
| Primary flight display (PFD) | GDU 1040 | 011-00972-03 | Garmin | | <input type="checkbox"/> | 6 400 | 2 900 | 70.080 | 1.780 |
| Multi function display (MFD) | GDU 1045 | 011-00819-04 | Garmin | | <input type="checkbox"/> | 6 400 | 2 900 | 70.080 | 1.780 |
| Primary flight display (PFD) | GDU 1040 | 011-00972-10 | Garmin | | <input type="checkbox"/> | 6 400 | 2 900 | 70.080 | 1.780 |
| Multi function display (MFD) | GDU 1045 | 011-00819-10 | Garmin | | <input type="checkbox"/> | 6 400 | 2 900 | 70.080 | 1.780 |
| Primary flight display (PFD) | GDU 1040 | 011-00972-02 | Garmin | | <input type="checkbox"/> | 6 400 | 2 910 | 70.080 | 1.780 |
| Primary flight display (PFD) | GDU 1050 | 011-03470-00 | Garmin | 494009116 | <input checked="" type="checkbox"/> | 4 700 | 2 130 | 70.080 | 1.780 |
| Multi function display (MFD) | GDU 1055 | 011-03470-80 | Garmin | 494805643 | <input checked="" type="checkbox"/> | 4 700 | 2 130 | 70.080 | 1.780 |
| Chronometer | | 09CH | Adriatica | | <input type="checkbox"/> | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| LANDING GEAR | | | | | | | | | |
| Main landing gear LH | | D64-3217-11-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Main landing gear RH | | D64-3217-12-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Nose landing gear | | D64-3223-00-00_1 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Nose landing gear | | D64-3223-00-00_2 | Diamond Aircraft | | <input type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär. 23 | | Mass | | Lever Arm | |
|---------------------------------|------------------|--------------------|------------------|-------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| Nose landing gear | | D64-3223-00-00_04 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| LDG gear warning | SC Series | SC 628 NDP | Mellony | | <input checked="" type="checkbox"/> | | | | |
| Main landing gear LH | | D64-3217-11-00_04 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Main landing gear RH | | D64-3217-12-00_04 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Nose landing gear | | D64-3223-10-00_04 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| LIGHTS | | | | | | | | | |
| Map / Reading light assy crew | | W1461.0.010 | Rivort | | <input type="checkbox"/> | | | | |
| Map / Reading Light | | RL6980-1 | Bok Aerosystems | | <input checked="" type="checkbox"/> | | | | |
| Map Light Assy | | D60-3313-11-00- 01 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Cabin Light | | W1461.0.010 | Rivort | | <input type="checkbox"/> | | | | |
| Strobe / Pos. light assy LH | A600-PR-D-28 | 01-0790006-05 | Whelen | | <input type="checkbox"/> | 0.800 | 0.363 | 103.800 | 2.638 |
| Strobe / Pos. light assy RH | A600-PG-D-28 | 01-0790006-07 | Whelen | | <input type="checkbox"/> | 0.800 | 0.363 | 103.800 | 2.638 |
| Strobe / Pos. light assy LH | OR6002R | 01-0771733-12 | Whelen | | <input checked="" type="checkbox"/> | 0.400 | 0.181 | 103.800 | 2.638 |
| Strobe / Pos. light assy RH | OR6002G | 01-0771733-11 | Whelen | | <input checked="" type="checkbox"/> | 0.400 | 0.181 | 103.800 | 2.638 |
| Strobe light power supply LH/RH | A490ATS-CF-14/28 | 01-0770062-05 | Whelen | | <input type="checkbox"/> | | | | |
| Taxi light | Xenon D1S | | Aero Vision Int. | | <input checked="" type="checkbox"/> | 0.990 | 0.449 | 79.920 | 2.030 |
| Taxi light power supply | XV1-28 | | Aero Vision Int. | | <input type="checkbox"/> | 0.880 | 0.400 | 82.290 | 2.090 |
| Landing light | Xenon D1S | | Aero Vision Int. | | <input checked="" type="checkbox"/> | 0.990 | 0.449 | 79.920 | 2.030 |
| Landing light power supply | XV1-28 | | Aero Vision Int. | | <input type="checkbox"/> | 0.880 | 0.400 | 82.290 | 2.090 |
| Taxi light power supply | | XV4D-35 | XeVision | | <input checked="" type="checkbox"/> | | | | |
| Landing light power supply | | XV4D-35 | XeVision | | <input checked="" type="checkbox"/> | | | | |
| Glareshield lamp assy | | DA4-3311-10-02 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Glareshield light inverter | | APVL328-4-1-L-SOF | Quantiflex | | <input checked="" type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär 23 | | Mass | | Lever Arm | |
|-----------------------------------|---------------|--------------------|--------------------|------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| Placards inverter | | APVL328-4-1-L-15QF | Quantaflex | | <input checked="" type="checkbox"/> | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| COMMUNICATION / NAVIGATION | | | | | | | | | |
| COMM #1 antenna | DMC63-1A | | DM | | <input type="checkbox"/> | 0.400 | 0.180 | 177.100 | 4.500 |
| COMM #2 antenna | DMC63-2 | | DM | | <input type="checkbox"/> | 0.400 | 0.180 | 155.100 | 3.940 |
| COMM #1 antenna | CI 291 | | Conquest | | <input checked="" type="checkbox"/> | 0.500 | 0.227 | 177.160 | 4.500 |
| COMM #2 antenna | CI 292-2 | | Conquest | | <input checked="" type="checkbox"/> | 0.500 | 0.227 | 161.420 | 4.100 |
| Audio panel / Marker / ICS | GMA 1347 | 011-00809-00 | Garmin | | <input type="checkbox"/> | | | | |
| Audio panel / Marker / ICS | GMA 1360 | 011-03568-00 | Garmin | 4QF008001 | <input checked="" type="checkbox"/> | | | | |
| Headset, pilot | Echelon 100 | | Telex | | <input type="checkbox"/> | | | | |
| Headset, pilot | HMEC25-KAP-2 | 025-230-715 | Sennheiser | | <input type="checkbox"/> | | | | |
| Headset, co-pilot | Echelon 100 | | Telex | | <input type="checkbox"/> | | | | |
| Headset, co-pilot | HMEC25-KAP-2 | 025-230-715 | Sennheiser | | <input type="checkbox"/> | | | | |
| Headset, LH pax | Echelon 100 | | Telex | | <input type="checkbox"/> | | | | |
| Headset, LH pax | HMEC25-KAP-2 | 025-230-715 | Sennheiser | | <input type="checkbox"/> | | | | |
| Headset, RH pax | Echelon 100 | | Telex | | <input type="checkbox"/> | | | | |
| Headset, RH pax | HMEC25-KAP-2 | 025-230-715 | Sennheiser | | <input type="checkbox"/> | | | | |
| Speaker | FRS8 / 4 Ohms | | Visaton | | <input checked="" type="checkbox"/> | | | | |
| Handmic | 100 TRA | 62800-001 | Telex | | <input checked="" type="checkbox"/> | | | | |
| Pitot / Static probe, heated | AN5814-2 | PST-305 | Aeroinstruments | AS02227301 | <input checked="" type="checkbox"/> | | | | |
| Alemale static valve | | DA4-3111-51-00 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Backup altimeter | | 5934PD-3 | United Instruments | | <input type="checkbox"/> | 0.496 | 0.225 | 70.080 | 1.780 |
| Backup altimeter | LUN 1120 | 1120.23B2X | Mikrotechna | | <input type="checkbox"/> | | | | |
| Backup altimeter | LUN 1128 | 1128.1086 | Mikrotechna | | <input type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08 Mär. 23 | | Mass | | Lever Arm | |
|-------------------------------------|-----------|---------------|----------------------|------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| Backup airspeed indicator | 8030 | 8030-B 879 | United Instruments | | <input type="checkbox"/> | 0.680 | 0.308 | 70.080 | 1.780 |
| Backup airspeed indicator | 8030 | 8030-B 910 | United Instruments | | <input type="checkbox"/> | 0.680 | 0.308 | 70.080 | 1.780 |
| Backup artificial horizon | 4300 | 4300-206 | Mid Continent Instr. | | <input type="checkbox"/> | 2.500 | 1.134 | 70.080 | 1.780 |
| Backup artificial horizon | LUN 1241 | 1241.G800R | Mikrotechna | | <input type="checkbox"/> | | | | |
| Standby Altitude Module | MD302 | 6420302-2 | Mid Continent Instr. | H22-13691 | <input checked="" type="checkbox"/> | 1.600 | 0.730 | 70.08 | 1.78 |
| Magnetic compass | | PG2C-28V | SIRS Navigation | | <input checked="" type="checkbox"/> | | | | |
| Magnetic compass | | NV23-2400-28V | SIRS Navigation | | <input type="checkbox"/> | | | | |
| OAT probe | GTP 59 | 011-00978-00 | Garmin | 47978579 | <input checked="" type="checkbox"/> | | | | |
| Digital air data system | GDC74A | 011-00882-00 | Garmin | | <input type="checkbox"/> | 1.690 | 0.770 | 70.080 | 1.780 |
| Digital air data system | GDC 74A | 011-00882-10 | Garmin | | <input type="checkbox"/> | 1.690 | 0.770 | 70.080 | 1.780 |
| Digital air data system | GDC 72 | 011-03734-00 | Garmin | TR-DÄM-42-383 | <input type="checkbox"/> | 1.260 | 0.570 | 70.080 | 1.780 |
| Integrated avionics #1 | GIA 63 W | 011-01105-20 | Garmin | | <input type="checkbox"/> | 5.290 | 2.400 | 154.900 | 3.935 |
| Integrated avionics #2 | GIA 63 W | 011-01105-20 | Garmin | | <input type="checkbox"/> | 5.290 | 2.400 | 154.900 | 3.935 |
| Integrated avionics #1 | GIA 63W | 011-01105-01 | Garmin | | <input type="checkbox"/> | 5.290 | 2.400 | 154.900 | 3.935 |
| Integrated avionics #2 | GIA 63W | 011-01105-01 | Garmin | | <input type="checkbox"/> | 5.290 | 2.400 | 154.900 | 3.935 |
| Integrated avionics #1 | GIA 63 | 011-00781-01 | Garmin | | <input type="checkbox"/> | 5.290 | 2.400 | 154.900 | 3.935 |
| Integrated avionics #2 | GIA 63 | 011-00781-01 | Garmin | | <input type="checkbox"/> | 5.290 | 2.400 | 154.900 | 3.935 |
| Integrated avionics #1 | GIA 64W | 011-03711-00 | Garmin | 4SK014370 | <input checked="" type="checkbox"/> | 5.400 | 2.450 | 154.900 | 3.935 |
| Integrated avionics #2 | GIA 64W | 011-03711-00 | Garmin | 4SK014358 | <input checked="" type="checkbox"/> | 5.400 | 2.450 | 154.900 | 3.935 |
| Transponder | GTX 33 | 011-00779-10 | Garmin | | <input type="checkbox"/> | 3.100 | 1.410 | 153.100 | 3.890 |
| Transponder | GTX 33 | 011-00779-00 | Garmin | | <input type="checkbox"/> | 3.030 | 1.380 | 153.100 | 3.890 |
| Transponder | GTX 335 R | 011-03301-00 | Garmin | | <input type="checkbox"/> | 1.900 | 0.860 | 153.100 | 3.890 |
| Transponder | GTX 33 ES | 011-00779-30 | Garmin | | <input type="checkbox"/> | 3.100 | 1.410 | 153.100 | 3.890 |
| Transponder | GTX 345R | 011-03303-00 | Garmin | 3EH031027 | <input checked="" type="checkbox"/> | 2.200 | 1.000 | 153.100 | 3.890 |
| Altitude / Heading reference system | GRS 77 | 011-00868-10 | Garmin | | <input type="checkbox"/> | 2.800 | 1.270 | 154.900 | 3.935 |
| Altitude / Heading reference system | GRS 77 | 011-00868-00 | Garmin | | <input type="checkbox"/> | 2.540 | 1.150 | 154.900 | 3.935 |

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following item is added to the Equipment List:

| Airplane Serial No.: 42 N499 | | Registration: | | | Date: 6.3.2023 | | Mass | | Lever Arm | |
|------------------------------|--------|---------------|--------------|------------|-------------------------------------|-------|-------|--------|-----------|--|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m | |
| Digital air data system | GDC 72 | 011-03734-01 | Garmin | 1578100061 | <input checked="" type="checkbox"/> | 1.200 | 0.570 | 70.000 | 1.780 | |



| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär. 23 | | Mass | | Lever Arm | |
|-------------------------------------|--------------|----------------|----------------|-------------------|-------------------------------------|-------|-------|-----------|--------|
| Description | Type | Part No. | Manufacturer | SN | Installed | lb | kg | in | m |
| Altitude / Heading reference system | GRS 73 | 011-03732-00 | Garmin | 45T007433 | <input checked="" type="checkbox"/> | 1 080 | 0 490 | 154.900 | 3.935 |
| Magnetometer | GMU 44 | 011-00870-00 | Garmin | | <input type="checkbox"/> | 0 350 | 0 160 | 103.800 | 2 638 |
| Magnetometer | GMU 44 | 011-00870-10 | Garmin | 1CM03B784 | <input checked="" type="checkbox"/> | 0 350 | 0 160 | 103.800 | 2 638 |
| VOR / LOC / GS antenna | CI 157P | | Comant | | <input checked="" type="checkbox"/> | | | | |
| Dual VOR / dual GS duplexer | CI 1125 | | Comant | | <input checked="" type="checkbox"/> | | | | |
| LH: VOR / LOC / GS antenna | CI120-1 | | Comant | | <input type="checkbox"/> | | | | |
| RH: VOR / LOC / GS antenna | CI120-1 | | Comant | | <input type="checkbox"/> | | | | |
| VOR / LOC / GS PWR combiner | CI120-3 | | Comant | | <input type="checkbox"/> | | | | |
| Transponder antenna | KA 61 | 071-00221-0010 | Bendix/King | | <input type="checkbox"/> | | | | |
| Marker antenna | CI 102 | | Comant | | <input type="checkbox"/> | | | | |
| GPS #1 antenna | GA 36 | 013-00244-00 | Garmin | | <input checked="" type="checkbox"/> | 0 470 | 0 210 | 104.100 | 2 645 |
| GPS #2 antenna | GA 36 | 013-00244-00 | Garmin | | <input checked="" type="checkbox"/> | 0 470 | 0 210 | 104.100 | 2 645 |
| DME | KN 63 | 066-1070-01 | Bendix/King | 45723 | <input checked="" type="checkbox"/> | 2 800 | 1 270 | 141.100 | 3 580 |
| DME antenna | KA 61 | 071-00221-0010 | Bendix/King | | <input type="checkbox"/> | | | | |
| Transponder antenna | KA 60 | 071-01591-0001 | Bendix/King | | <input type="checkbox"/> | 0 220 | 0 100 | 91.930 | 2 335 |
| Transponder antenna | CI 105-16 | | Comant | 47584 | <input checked="" type="checkbox"/> | 0 200 | 0 091 | 91.930 | 2 335 |
| GPS #1 antenna | GA 56 | 010-10040-01 | Garmin | | <input type="checkbox"/> | 0 400 | 0 180 | 104.100 | 2 645 |
| GPS #2 antenna | GA 56 | 010-10040-01 | Garmin | | <input type="checkbox"/> | 0 400 | 0 180 | 104.100 | 2 645 |
| DME antenna | KA 60 | 071-01591-0001 | Bendix/King | | <input type="checkbox"/> | 0 220 | 0 100 | 91.930 | 2 335 |
| DME antenna | CI 105-16 | | Comant | 47697 | <input checked="" type="checkbox"/> | 0 200 | 0 091 | 91.930 | 2 335 |
| ADF receiver | RA 3502-(01) | 0505.757-912 | Becker | | <input type="checkbox"/> | 2 200 | 1 000 | 155.500 | 3 950 |
| ADF / RMI converter | AC 3504-(01) | 0856 010-912 | Becker | | <input type="checkbox"/> | 1.650 | 0 750 | 165.400 | 4 200 |
| ADF antenna | AN 3500 | 0832.601-912 | Becker | | <input type="checkbox"/> | 0 375 | 0 170 | 133.900 | 3 400 |
| Stormscope | WX-500 | 805-11500-001 | L-3 (Goodrich) | | <input type="checkbox"/> | 2 500 | 1.130 | 140.100 | 3 560 |
| Stormscope antenna | NY-163 | 805-10930-001 | L-3 (Goodrich) | | <input type="checkbox"/> | 0 640 | 0 380 | 280.700 | 7 130 |
| Weather radar | GNX 68 | 011-00883-00 | Garmin | | <input type="checkbox"/> | 9 000 | 4 080 | -2.362 | -0.060 |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08 Mär. 23 | | Mass | | Lever Arm | |
|------------------------------|------------|------------------|------------------|------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| Weather radar | GWX 70 | 011-01768-00 | Gamin | 1DP010326 | <input checked="" type="checkbox"/> | | | | |
| Weather radar antenne | | 117-00254-00 | Gamin | | <input checked="" type="checkbox"/> | | | | |
| Radome | | 064-5340-65-00 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| TAS processor | TAS 600 | 70-2420-x TAS600 | Avidyne/Ryan | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 605 | 70-2420-x TAS605 | Avidyne/Ryan | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 610 | 70-2420-x TAS610 | Avidyne/Ryan | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 615 | 70-2420-x TAS615 | Avidyne/Ryan | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 620 | 70-2420-x TAS620 | Avidyne/Ryan | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | 9900BX | 70-2420-x | Avidyne/Ryan | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 600A | 700-00185-000 | Avidyne | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 605A | 700-00185-001 | Avidyne | M224430495 | <input checked="" type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 610A | 700-00185-002 | Avidyne | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 615A | 700-00185-003 | Avidyne | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| TAS processor | TAS 620A | 700-00185-004 | Avidyne | | <input type="checkbox"/> | 6.800 | 3.100 | 164.300 | 4.175 |
| Transponder coupler | | 70-2040 | Avidyne/Ryan | M224229971 | <input checked="" type="checkbox"/> | 0.500 | 0.230 | 197.600 | 5.020 |
| TAS antenna, top | | S72-1750-31L | Sensor Systems | 14832 | <input checked="" type="checkbox"/> | 0.660 | 0.298 | 164.800 | 4.188 |
| TAS antenna, bottom | | S72-1750-32L | Sensor Systems | 14878 | <input checked="" type="checkbox"/> | 0.750 | 0.340 | 104.300 | 2.650 |
| EMI filter LH | | D64-3454-10-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| EMI filter RH | | D64-3454-10-00 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Satellite Transceiver | CSR 56 | 011-02268-00 | Gamin | 1NZ010999 | <input checked="" type="checkbox"/> | | | | |
| Indium antenna | CI 490-1 | | Comant | | <input type="checkbox"/> | | | | |
| Indium antenna | CI 490-490 | | Comant | | <input checked="" type="checkbox"/> | | | | |
| Flight Stream 510 | | 011-03595-00 | Gamin | | <input checked="" type="checkbox"/> | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: | 08. Mär. 23 | Mass | | Lever Arm | |
|------------------------------|------------|--|---------------|--------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| OXYGEN SYSTEM | | | | | | | | | |
| Oxygen cylinder (empty) | | 1270152-2 | Aerox | | <input type="checkbox"/> | 7.400 | 3.357 | 32.280 | 0.820 |
| Oxygen cylinder (empty) | | 4110-200-2 | Aerox | 12099 | <input checked="" type="checkbox"/> | 7.400 | 3.357 | 32.280 | 0.820 |
| Single outlet manifold LH | | 4110-401-2 | Aerox | | <input type="checkbox"/> | 0.230 | 0.104 | 69.690 | 1.770 |
| Single outlet manifold LH | | 4110-401-2-01 | Aerox | | <input checked="" type="checkbox"/> | 0.230 | 0.104 | 69.690 | 1.770 |
| Single outlet manifold RH | | 4110-401-2 | Aerox | | <input type="checkbox"/> | 0.230 | 0.104 | 69.690 | 1.770 |
| Single outlet manifold RH | | 4110-401-2-01 | Aerox | | <input checked="" type="checkbox"/> | 0.230 | 0.104 | 69.690 | 1.770 |
| Dual outlet manifold | | 4110-400-2 | Aerox | | <input checked="" type="checkbox"/> | 0.420 | 0.191 | 109.300 | 2.775 |
| Oxygen pressure regulator | | 4110-110 | Aerox | | <input type="checkbox"/> | 0.740 | 0.336 | 21.260 | 0.540 |
| Oxygen pressure regulator | | 4110-140-2 | Aerox | 18767 | <input checked="" type="checkbox"/> | 0.740 | 0.336 | 21.260 | 0.540 |
| Filling block | | 4110-405 | Aerox | | <input checked="" type="checkbox"/> | 0.540 | 0.245 | 28.150 | 0.715 |
| Pressure gauge | | 4110-490 | Aerox | | <input type="checkbox"/> | 0.110 | 0.050 | 70.980 | 1.780 |
| Pressure gauge | | 4110-486 | Aerox | | <input checked="" type="checkbox"/> | 0.110 | 0.050 | 70.980 | 1.780 |
| ENGINE | | | | | | | | | |
| LH engine | E4 | E4-C | Austro Engine | E4-C-06336 | <input checked="" type="checkbox"/> | | | | |
| RH engine | E4 | E4-C | Austro Engine | E4-C-06343 | <input checked="" type="checkbox"/> | | | | |
| LH engine control unit | EECU-E4-01 | E4A-92-100-000 | Austro Engine | 5128 | <input checked="" type="checkbox"/> | | | | |
| RH engine control unit | EECU-E4-01 | E4A-92-100-000 | Austro Engine | 5044 | <input checked="" type="checkbox"/> | | | | |
| ECU software | | Refer to DDU Service Bulletin MSB-42NG-002 | Austro Engine | VC33_2_07_25 | <input checked="" type="checkbox"/> | | | | |
| Engine airframe unit | GEA71B | 011-03682-00 | Garmin | 497008874 | <input checked="" type="checkbox"/> | | | | |
| ENGINE STARTING | | | | | | | | | |
| Glow plug control unit LH/RH | | E4A-94-200-000 | Austro Engine | | <input checked="" type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: | 08 Mär 23 | Mass | | Lever Arm | |
|------------------------------|-------|----------------|------------------------|-------|-------------------------------------|------|----|-----------|---|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| Start LH / RH | | E4A-93-000-000 | Austro Engine | | <input checked="" type="checkbox"/> | | | | |
| ELECTRICAL POWER | | | | | | | | | |
| LH alternator | | E4A-91-000-000 | Austro Engine | | <input type="checkbox"/> | | | | |
| RH alternator | | E4A-91-000-000 | Austro Engine | | <input type="checkbox"/> | | | | |
| LH alternator | | E4A-91-400-000 | Austro Engine | 04575 | <input checked="" type="checkbox"/> | | | | |
| RH alternator | | E4A-91-400-000 | Austro Engine | 04817 | <input checked="" type="checkbox"/> | | | | |
| LH alternator regulator | | E4A-91-200-000 | Austro Engine | 3902 | <input checked="" type="checkbox"/> | | | | |
| RH alternator regulator | | E4A-91-200-000 | Austro Engine | 4088 | <input checked="" type="checkbox"/> | | | | |
| ENGINE FUEL PUMPS | | | | | | | | | |
| LH fuel pumps (2x) | | 0-580-054-001 | Bosch | | <input type="checkbox"/> | | | | |
| RH fuel pumps (2x) | | 0-580-054-001 | Bosch | | <input type="checkbox"/> | | | | |
| ENGINE FIRE WARNING | | | | | | | | | |
| LH overheat detector | | X 2003-2 | Control Products, Inc. | | <input type="checkbox"/> | | | | |
| RH overheat detector | | X 2003-2 | Control Products, Inc. | | <input type="checkbox"/> | | | | |
| LH overheat detector | | X 2003-506 | Control Products, Inc. | | <input checked="" type="checkbox"/> | | | | |
| RH overheat detector | | X 2003-506 | Control Products, Inc. | | <input checked="" type="checkbox"/> | | | | |
| ENGINE INDICATING | | | | | | | | | |
| Engine / Airframe unit | GEA71 | 011-00831-00 | Gamm | | <input type="checkbox"/> | | | | |

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following items are added to the Equipment List:

| Airplane Serial No.: 42. N499 | | Registration: | | Date: 6-3-2023 | | Mass | | Lever Arm | |
|-------------------------------|------|-----------------|--------------|----------------|-----------|------|----|-----------|---|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | in | m |
| LH fuel pumps (2x) | | F033 B00 186-01 | Bosch | | / | | | | |
| RH fuel pumps (2x) | | F033 B00 186-01 | Bosch | | / | | | | |



| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08 Mar. 23 | | Mass | | Lever Arm | |
|-------------------------------|----------------------|--------------------|------------------|------------------|-------------------------------------|------|----|-----------|---|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | in | m |
| ENGINE EXHAUST | | | | | | | | | |
| LH Exhaust pipe with muffler | | D64-7806-12-00 () | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| RH Exhaust pipe with muffler | | D64-7806-12-00 () | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| LH Exhaust pipe | | D65-7806-10-00 () | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| RH Exhaust pipe | | D65-7806-10-00 () | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| PROPELLER | | | | | | | | | |
| Propeller LH | MTV-6-R-C-F/CF190-69 | | mt-propeller | 221259 | <input checked="" type="checkbox"/> | | | | |
| Propeller RH | MTV-6-R-C-F/CF190-69 | | mt-propeller | 221306 | <input checked="" type="checkbox"/> | | | | |
| Unfeathering accumulator LH | | P-893-3 | mt-propeller | | <input checked="" type="checkbox"/> | | | | |
| Unfeathering accumulator RH | | P-893-3 | mt-propeller | | <input checked="" type="checkbox"/> | | | | |
| Governor LH | | P-877-16 | mt-propeller | 23G038-K/G | <input checked="" type="checkbox"/> | | | | |
| Governor RH | | P-877-16 | mt-propeller | 23G039-K/G | <input checked="" type="checkbox"/> | | | | |
| FUEL TANK SYSTEM | | | | | | | | | |
| Fuel probe assy , LH inboard | | D60-2817-13-00_1 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Fuel probe assy , RH inboard | | D60-2817-13-00_1 | Diamond Aircraft | | <input type="checkbox"/> | | | | |
| Fuel probe assy, LH inboard | | D64-2817-13-00 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Fuel probe assy, RH inboard | | D64-2817-13-00 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |
| Fuel probe assy , LH outboard | | D60-2817-14-00_1 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: | 08. Mär. 23 | | Mass | | Lever Arm | |
|-----------------------------------|------|-------------------|------------------|-------|-------------------------------------|----|------|----|-----------|--|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m | |
| Fuel probe assy., RH outboard | | D60-2817-14-00_1 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | | |
| Alternate means for fuel qty. | | D60-2817-90-00 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | | |
| Alternate means for fuel qty. II | | D60-2817-90-00_01 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | | |
| AUX FUEL SYSTEM | | | | | | | | | | |
| LH auxiliary fuel pump | | PX375-TC-28V | Andair | | <input checked="" type="checkbox"/> | | | | | |
| RH auxiliary fuel pump | | PX375-TC-28V | Andair | | <input type="checkbox"/> | | | | | |
| LH auxiliary fuel pump | | 5100-9 | Dukes | | <input type="checkbox"/> | | | | | |
| RH auxiliary fuel pump | | 5100-9 | Dukes | | <input type="checkbox"/> | | | | | |
| LH auxiliary fuel pump | | PX375-TC-28V-G2 | Andair | | <input checked="" type="checkbox"/> | | | | | |
| RH auxiliary fuel pump | | PX375-TC-28V-G2 | Andair | | <input checked="" type="checkbox"/> | | | | | |
| LH check valve | | X11-0013-00-00.00 | Hydraulic Mayer | | <input checked="" type="checkbox"/> | | | | | |
| RH check valve | | X11-0013-00-00.00 | Hydraulic Mayer | | <input checked="" type="checkbox"/> | | | | | |
| LH fuel inline filter | | FX375-MK | Andair | | <input checked="" type="checkbox"/> | | | | | |
| RH fuel inline filter | | FX375-MK | Andair | | <input checked="" type="checkbox"/> | | | | | |
| LH solenoid valve | | VE 131,4 GV | Parker | | <input checked="" type="checkbox"/> | | | | | |
| RH solenoid valve | | VE 131,4 GV | Parker | | <input checked="" type="checkbox"/> | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| ICE PROTECTION SYSTEM | | | | | | | | | | |
| Porous panel, outer wing, LH | | 12102-21 | CAV Aerospace | | <input type="checkbox"/> | | | | | |
| Porous panel, outer wing, RH | | 12102-22 | CAV Aerospace | | <input type="checkbox"/> | | | | | |
| Porous panel, center wing, LH | | 12102-23 | CAV Aerospace | | <input type="checkbox"/> | | | | | |
| Porous panel, center wing, RH | | 12102-24 | CAV Aerospace | | <input type="checkbox"/> | | | | | |
| Porous panel, horizontal tail, LH | | 12102-25 | CAV Aerospace | | <input type="checkbox"/> | | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08. Mär. 23 | | Mass | | Lever Arm | |
|-----------------------------------|------|----------------|------------------|-------------------|-------------------------------------|-------|-------|-----------|-------|
| Description | Type | Part No. | Manufacturer | SN | Installed | lb | kg | In | m |
| Porous panel, horizontal tail, RH | | 12102-26 | CAV Aerospace | | <input type="checkbox"/> | | | | |
| Porous panel, vertical tail | | 12102-27 | CAV Aerospace | | <input type="checkbox"/> | | | | |
| Porous panel, outer wing, LH | | 12102-31 | CAV Aerospace | CAV122021164 | <input checked="" type="checkbox"/> | | | | |
| Porous panel, outer wing, RH | | 12102-32 | CAV Aerospace | CAV121101439 | <input checked="" type="checkbox"/> | | | | |
| Porous panel, center wing, LH | | 12102-33 | CAV Aerospace | CAV121081093 | <input checked="" type="checkbox"/> | | | | |
| Porous panel, center wing, RH | | 12102-34 | CAV Aerospace | CAV122010691 | <input checked="" type="checkbox"/> | | | | |
| Porous panel, horizontal tail, LH | | 12102-35 | CAV Aerospace | CAV121030331 | <input checked="" type="checkbox"/> | | | | |
| Porous panel, horizontal tail, RH | | 12102-36 | CAV Aerospace | CAV122010763 | <input checked="" type="checkbox"/> | | | | |
| Porous panel, vertical tail | | 12102-37 | CAV Aerospace | CAV122050420 | <input checked="" type="checkbox"/> | | | | |
| Inlet strainer | | 12121-02 | CAV Aerospace | | <input checked="" type="checkbox"/> | | | | |
| Spray bar | | 12124-10 | CAV Aerospace | | <input checked="" type="checkbox"/> | | | | |
| Metering pump 1 | | 9513A-386 | CAV Aerospace | CAV122010915 | <input checked="" type="checkbox"/> | 4.180 | 1.896 | 40.160 | 1.020 |
| Metering pump 2 | | 9513A-386 | CAV Aerospace | CAV122010917 | <input checked="" type="checkbox"/> | 4.180 | 1.896 | 40.160 | 1.020 |
| De-icing fluid tank | | D60-3013-24-50 | Diamond Aircraft | | <input checked="" type="checkbox"/> | 8.140 | 3.692 | 38.390 | 0.975 |
| Mod filter assy 1 | | D60-3013-11-90 | Diamond Aircraft | | <input checked="" type="checkbox"/> | 0.680 | 0.308 | 40.160 | 1.020 |
| Mod filter assy 2 | | D60-3013-11-90 | Diamond Aircraft | | <input checked="" type="checkbox"/> | 0.680 | 0.308 | 40.160 | 1.020 |
| Solenoid valve | | FV158H-28V | CAV Aerospace | CAV122030929 | <input checked="" type="checkbox"/> | 0.870 | 0.395 | 40.160 | 1.020 |
| Solenoid valve | | FV158H-28V | CAV Aerospace | CAV122030927 | <input checked="" type="checkbox"/> | 0.870 | 0.395 | 40.160 | 1.020 |
| High pressure switch | | P041ED850 | CAV Aerospace | CAV122020698 | <input checked="" type="checkbox"/> | | | | |
| Proportioning unit, nacelle, LH | | PU300DW142 | CAV Aerospace | CAV121121402 | <input checked="" type="checkbox"/> | | | | |
| Proportioning unit, nacelle, RH | | PU300DW142 | CAV Aerospace | CAV121100520 | <input checked="" type="checkbox"/> | | | | |
| Tail bracket assembly | | 12132-03 | CAV Aerospace | | <input type="checkbox"/> | 1.070 | 0.485 | 278.700 | 7.080 |
| Tail bracket assembly | | 12132-14 | CAV Aerospace | CAV121121402 | <input checked="" type="checkbox"/> | 0.750 | 0.340 | 278.700 | 7.080 |
| Windshield pump 1 | | WP209A | CAV Aerospace | CAV122031088 | <input checked="" type="checkbox"/> | 0.650 | 0.295 | 40.160 | 1.020 |
| Windshield pump 2 | | WP209A | CAV Aerospace | CAV122031086 | <input checked="" type="checkbox"/> | 0.650 | 0.295 | 40.160 | 1.020 |
| De-ice control box | | DAI-9030-00-01 | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |

| Airplane Serial No.: 42.N499 | | Registration: | | Date: 08 Mär. 23 | | Mass | | Lever Arm | |
|------------------------------|------|--------------------|------------------|------------------|-------------------------------------|------|------|-----------|------|
| Description | Type | Part No. | Manufacturer | S/N | Installed | lb | kg | In | m |
| CABIN COOLING SYSTEM | | | | | | | | | |
| Cabin cooling central unit | | D44-2151-00-00 | Diamond Aircraft | | <input type="checkbox"/> | 633 | 28.7 | 178.0 | 4.52 |
| Cabin cooling central unit | | D44-2153-00-00 | Diamond Aircraft | | <input type="checkbox"/> | 467 | 21.2 | 178.0 | 4.52 |
| | | | | | | | | | |
| AIRPLANE FLIGHT MANUAL | | Doc. No. 7.01.16-E | Diamond Aircraft | | <input checked="" type="checkbox"/> | | | | |

1. The Amerex A 620 T is UL approved and can be used in airplanes registered in Canada and the USA. For airplanes registered in other countries contact the local Airworthiness Authority.

Place: LOAN

Date: 08.03.2023

Signature: 

The following temporary revisions with relevance to the equipment list are include

TR-MAM-42-1219, TR-OAM-42-383

First Issue Equipment List:

Changes:

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: Each aileron is connected with a aileron control horn to the push rods of the aileron 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. The aileron control horn is fully covered by a fairing mounted to the aileron control horn with three screws.

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. The flap control horn is fully covered by a fairing mounted to the flap control horn with three screws in the outer wings and four screws in the center wing.

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).

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 DA42 NG 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). This is 2.5° less than the 15.5° full deflection.

The linear actuator acts as a movable stop and is controlled by two switches, one for each power lever. When the power of one engine is reduced below approximately 20 % 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.

The gap between the vertical tail and the rudder is sealed with gap seal tape made of PTFE/Teflon® on both sides.

Elevator Trim

The trim control is a black wheel in the center console to the rear of the power lever. To guard against overrotating, 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 handle which is located behind the rear attachment.

Forward Adjustment:

Whilst keeping the handle pulled, push the pedals forward with your feet. Release the handle and allow the pedals to lock into place.

Rearward Adjustment:

Using the unlocking handle, pull the pedals back to the desired position. Release the handle and push the pedals forward with your feet until they lock into place.

Electrical Pedal Adjustment (Optional Equipment, OAM 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.

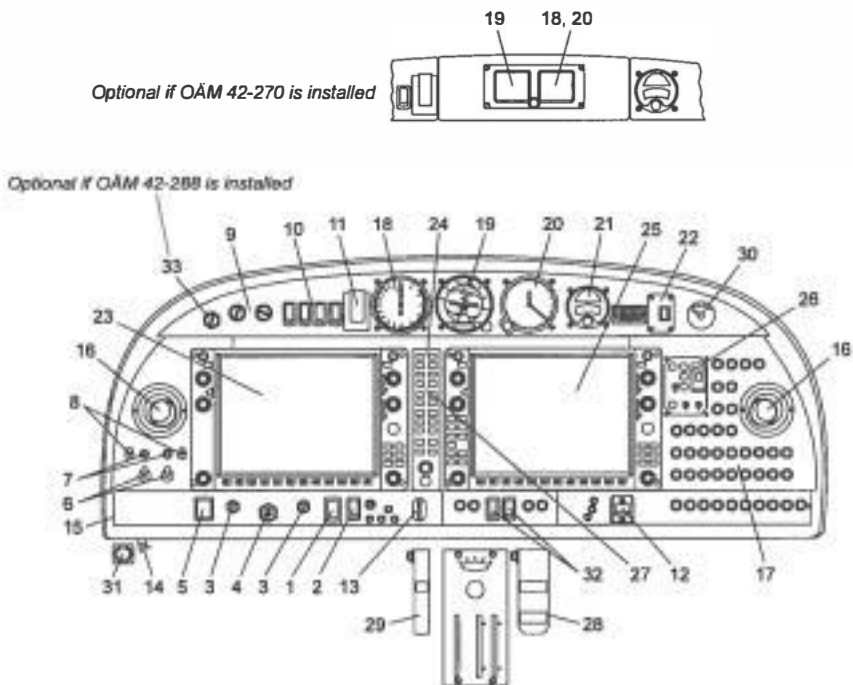
Rearward Adjustment:

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.

7.4 INSTRUMENT PANEL



NOTE

The figure above shows the typical DA 42 NG installation position for the equipment. The actual installation may vary due to the approved equipment version.

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 | VOTER 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 | 32 | Fuel pump switches |
| | | 33 | Gear warning mute button (if installed) |

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

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.

If OÄM 42-288 is installed and the aural gear warning is activated, the aural alert can be deactivated by pressing the GEAR WARNING MUTE button. The aural gear warning is reset to normal operation, if one of the power levers is moved to a position of 20 % \pm 5 % or higher. Thus the aural gear warning alert will sound again, if one of the power levers is moved to a position of 20 % \pm 5 % or lower.

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.

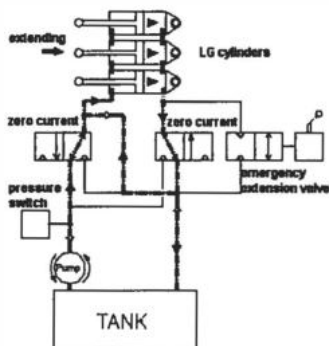
NOTE

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

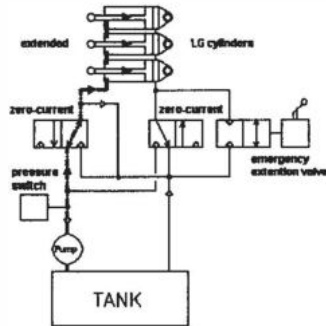
The nose gear is steerable by the use of full rudder pedal travel. A gear damping element, incorporated in the nose gear steering system, prevents shimmy tendencies. When the gear is retracted, the nose wheel centers as it enters the wheel well, and the steering linkage disengages to reduce pedal loads in flight.

Hydraulic Gear Extension System Schematic

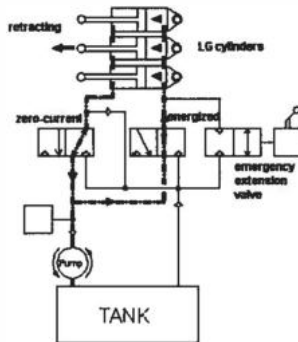
The main landing gear of the DA 42 NG is extended with three hydraulic cylinders. The following schematic figures show the system conditions for each operating mode. The figure below shows the extension of the landing gear. To reduce the amount of pumped hydraulic fluid during this operation, the return flow is partly led into the feeding flow of the system.



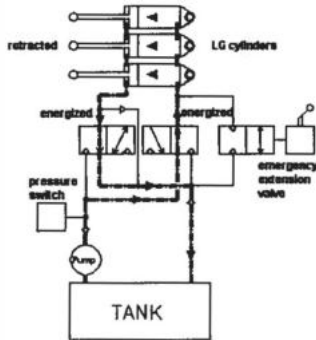
The figure below shows the system status when the landing gear is extended. All hydraulic cylinders are under high pressure.



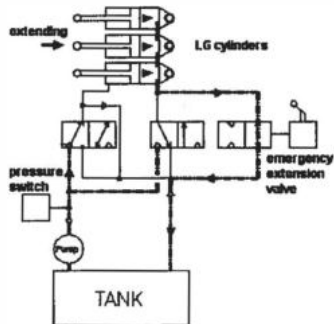
The operating mode for the retraction of the landing gear is shown in the next figure. While energizing the right hydraulic valve, the fluid flow in the hydraulic system is started due to different piston areas of the landing gear cylinders although the pressure on both sides of the system is equal.



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.

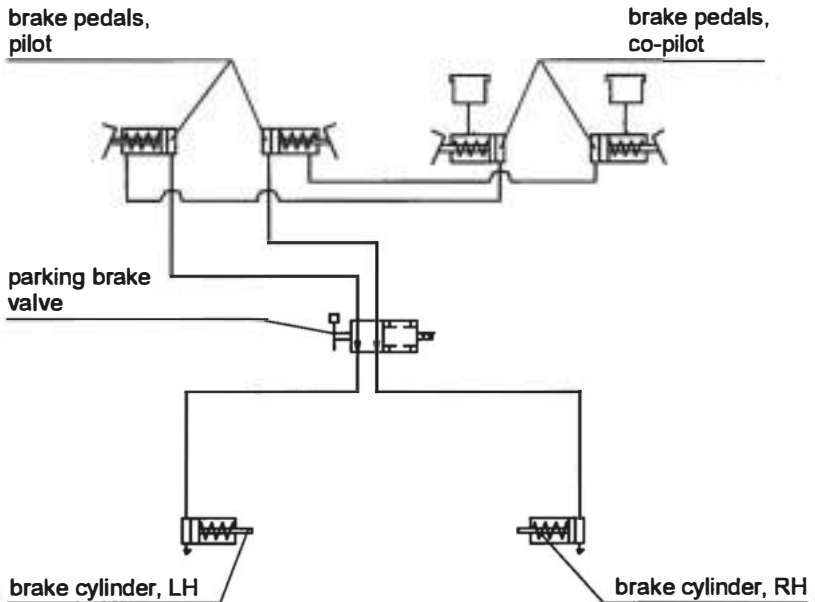


Wheel Brakes

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

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

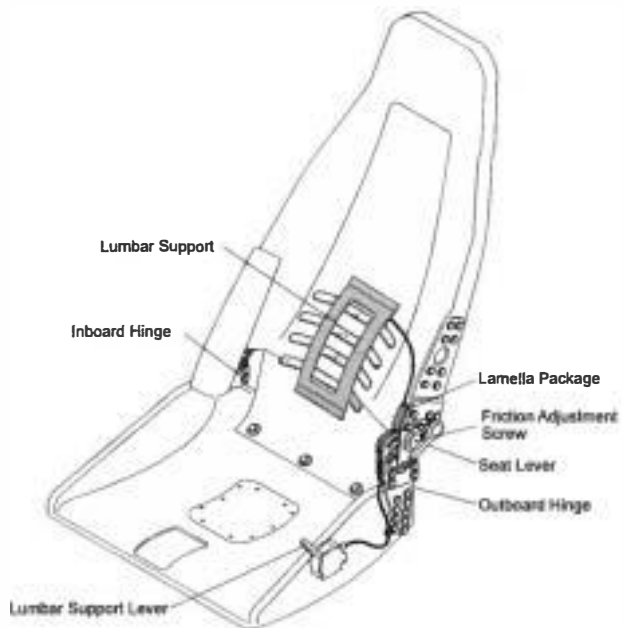
For adjustment lift the backrest lever or press the button and bend the backrest forward or backward to the desired backrest angle. For fixing the position press down the backrest lever or release the button.

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 (480 N) in flight (FWD) direction.

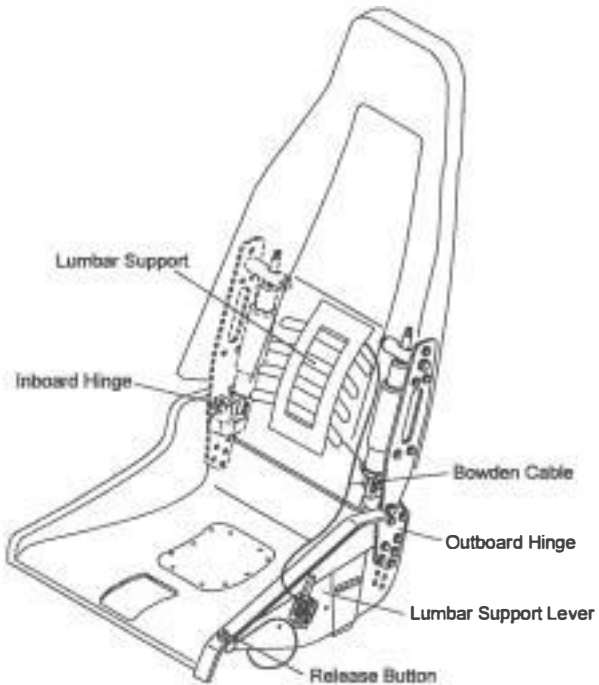
If OÄM 42-067 is installed and in case of a defective adjustment mechanism the outboard friction adjustment screw can be tightened with a 10 mm hexagon nut in clockwise direction in order to fix the backrest in the upright position.

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 (OAM 42-067):



If seats with adjustable backrest are installed (OAM 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. As an option a short baggage extension (OÄM 42-207) may be installed.

Baggage may be loaded there and must be restrained by means of a baggage net.

NOTE

If OÄM 42-207 is installed, make sure that the baggage does not block the air vents in the back wall of the short baggage extension.

7.8 CANOPY, REAR DOOR, AND CABIN INTERIOR

Front Canopy

The front canopy is closed by pulling down on the canopy frame, following which it is locked by means of a handle on the left hand side of the frame. On locking, steel bolts lock into mating holes in polyethylene blocks.

"Cooling gap" position: a second setting allows the bolts to lock in, leaving a gap under the forward canopy.

The canopy can be blocked by a locking device on the left side near the canopy opening lever by turning the key clockwise. The closed and blocked canopy can be opened from inside by pulling the lever inside the opening handle.

WARNING

The airplane may be operated with the front canopy in the "cooling gap" position on the ground only. Before take-off the front canopy must be completely closed and locked.

Do not block the front canopy with the locking key before flight in order to assure emergency evacuation from outside.

A window on the left and right hand side of the canopy can be opened for additional ventilation or as an emergency window.

Rear Door

The rear door is closed in the same way, by pulling down on the frame and locking it with the handle. A gas pressure damper prevents the door from dropping; in strong winds the assembly must be securely held. The rear door is protected against unintentional opening by an additional lever.

The door can be blocked by a locking device on the left side near the door opening lever by turning the key clockwise. The closed and blocked door can be opened from inside by pulling the lever inside the opening handle.

WARNING

Do not block the door with the locking key before flight in order to assure emergency access from outside.

Heating and Ventilation

Heating and ventilation are operated using two levers located on the small center console under the instrument panel.

| | | |
|----------------|------|----------------------------------|
| Right lever: | up | = HEATING ON (seats, floor) |
| | down | = HEATING OFF |
| Center lever : | up | = DEFROST ON (airflow to canopy) |
| | down | = DEFROST OFF |

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).

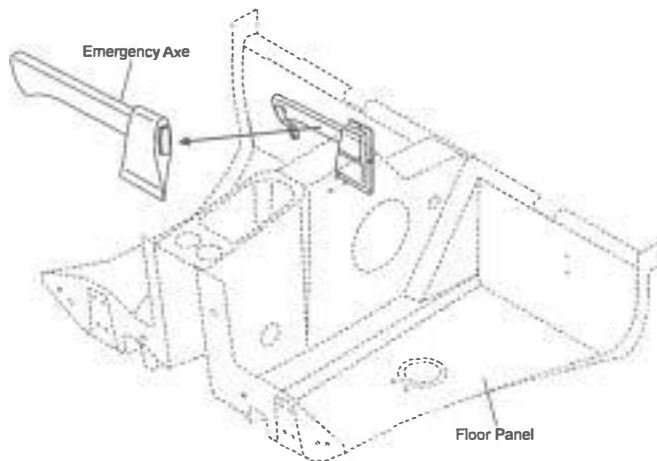
If the canopy can not be opened in case of an emergency use the emergency axe to break through the canopy.

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.

| First Aid Kit

| The first aid kit is stored under the removable base plate of the baggage compartment.

7.9 POWER PLANT

7.9.1 ENGINES, GENERAL

There are two Austro Engine E4-C engines installed, which have the following specifications:

- Liquid-cooled four-cylinder four-stroke 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: 123.5 kW (165.6 DIN-HP) at 2300 RPM at sea level and ISA

Max. continuous power: 113.6 kW (152.3 DIN-HP) 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 (Electronic 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

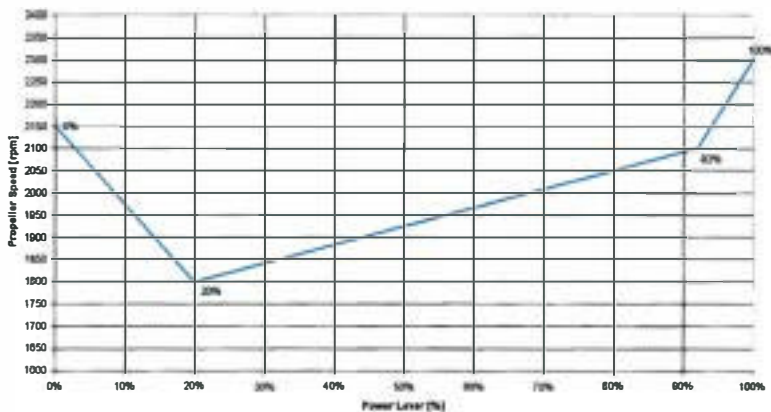
Two mt-Propeller MTV-6-R-C-F / CF 190-69 hydraulically regulated 3-bladed constant speed feathering propellers are installed. Each propeller has wood composite blades with fiber-reinforced plastic coating and stainless steel edge cladding; in the region of the propeller hub the leading edge is coated with adhesive PU foil. These blades combine the lowest weight whilst minimizing vibration.

Propeller Control

The propeller pitch control system consists of the P-877-16 mt-Propeller governor valve. The pitch is set by the ECU via an electro-mechanical actuator on the governor. To change the blade pitch angle gearbox oil is pumped into the propeller hub. 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.

Propeller Setpoint Curve



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. 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 3.12.3 - 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 keyswitch to the left starts the LH engine. Turning it to the right starts the RH engine.

ECU VOTER

There are two VOTER switches, one for each engine. For normal operation both switches are set to AUTO. Each engine is controlled by either ECU A or ECU B. In case of a failure of the active electronic engine control unit (ECU) there should be an automatic switch-over to the other ECU. If the automatic switch over fails, switch over can be done manually by switching to ECU A or ECU B. This procedure should only be applied in an emergency.

ECU TEST

There are two ECU TEST buttons, one for each engine.

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 only. Otherwise the test will not start. During the procedure the ECU performs a switch from ECU A to ECU B or ECU B to ECU A, whichever is active at the moment, 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. After that both caution lights must extinguish and the engine must run without a change.

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 7.13.3 - MULTI FUNCTION DISPLAY (MFD). Indications for the LH engine are on the left side, indications for the RH engine are on the right side.

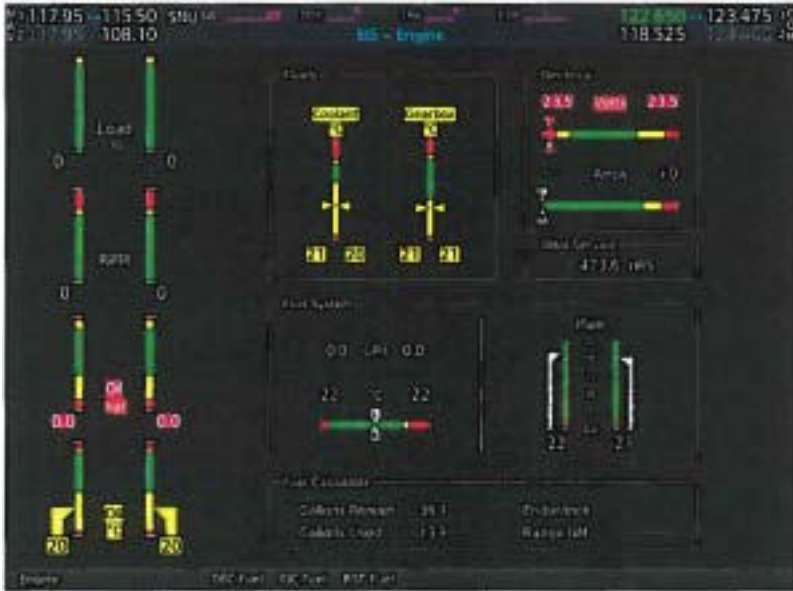
Default page
Engine

Display when pushing
the SYSTEM button
If Garmin G1000 NXi is
NOT installed

Display when pushing
the FUEL button
If Garmin G1000 NXi is
NOT installed



Display when pushing the ENGINE button (if Garmin G1000 NXi is installed):



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 NG.

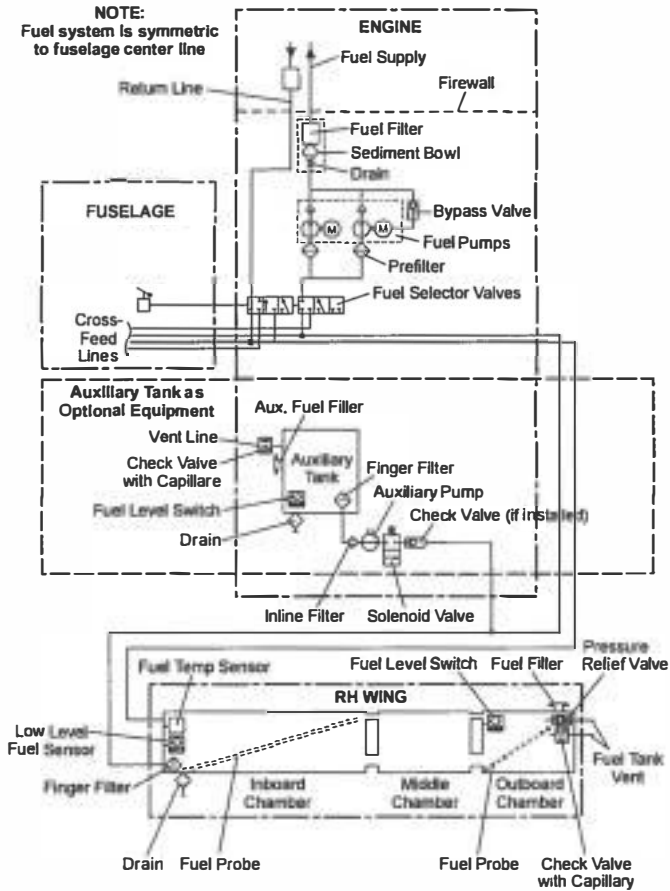
NOTE

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 two independent low pressure fuel pumps. Both pumps are powered electrically. Depending on the powersetting the rail pressure is controlled by the ECU through an electric metering valve. 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.

Fuel Pumps

Each engine is feed by two parallel installed independent electrically driven low pressure fuel pumps. During normal operation one of the two fuel pumps is working. In case of a low fuel pressure failure the ECU switches automatically to the second fuel pump. During landing and take-off, or in case of a fuel pressure failure both fuel pumps can be activated by the FUEL PUMP switch. If both fuel pumps are activated the fuel pressure increases.

Each fuel pump is electrically connected to the LH/RH ECU BUS and protected by a 7.5 A circuit breaker.

NOTE

By switching between ECU A and B the two independent electrically driven fuel pumps are switched over as well. In case of an emergency both pumps can be activated simultaneously by using the fuel pump switch.

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. Before crossfeed operation check fuel pump is OFF. 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

If 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 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 crossfeed 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).

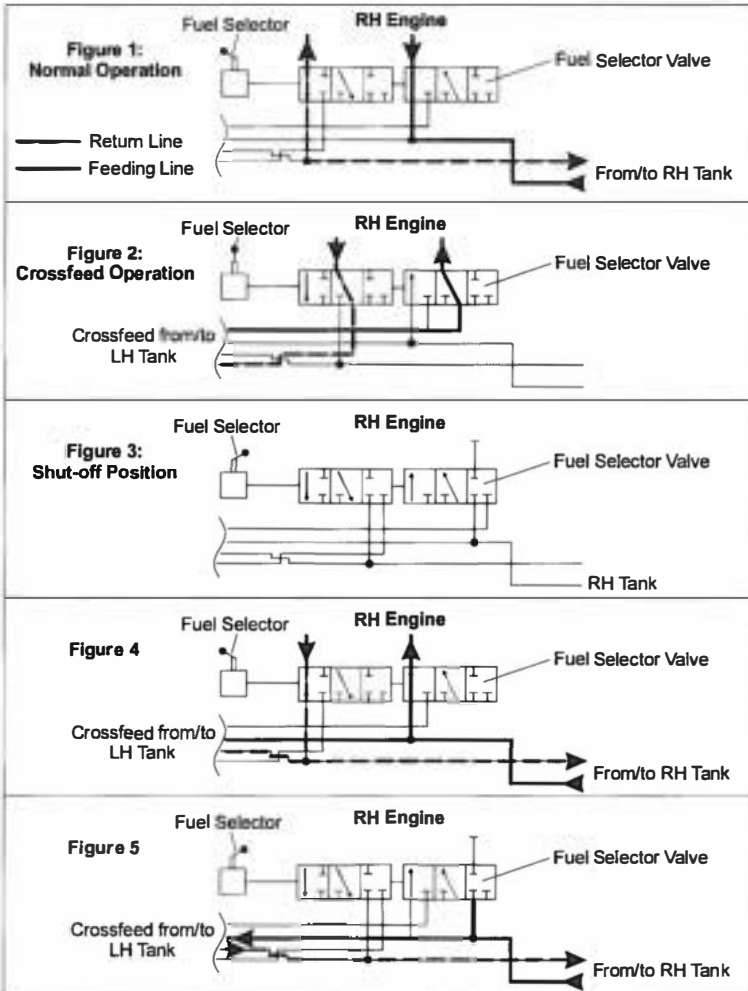
Figure 1: Normal Operation.

Figure 2: Crossfeed Operation.

Figure 3: Shut-off.

Figure 4: Fuel selector valve RH normal operation position, fuel selector valve LH crossfeed position.

Figure 5: Fuel selector RH valve shut-off position, fuel selector valve LH crossfeed 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 liters (1 US gal) of fuel in each wing are unusable, so that a total quantity of 96 liters (25.4 US gal) in each wing is usable.

There are two tank vents. One includes a check valve with a capillary and one includes a pressure relief valve (bleed type), which operates at 150 mbar (2 PSI) and allows fuel and air to flow to the outside with higher internal pressure. The pressure relief valve protects the tank against high pressure, if the tank was overfilled in case of an auxiliary fuel transfer failure. The check valve with capillary allows air to enter the tank but prevents flow of fuel to the outside. The capillary equalizes the air pressure during climb. The hose terminals are located on the underside of the wing, approximately 2 meters (7 ft) from the wing tip.

In each tank a coarse filter (finger filter) is fitted before the outlet. To allow draining of the tank, a drain valve is located at the lowest point of the fuel tank.

At the lowest point on 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 13.7 US gallons (52 liters) per side. The total fuel capacity (main fuel tanks and auxiliary fuel tanks) is 39.7 US gallons (150.4 liters) 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 auxiliary pump which transfers fuel into the related main fuel tank.

The vent line for the auxiliary fuel tank has a check valve with capillary. It allows air to enter the tank but prevents flow of fuel to the outside. The capillary equalizes the air pressure during climb. A fuel drain valve is located at the rear of each auxiliary tank.

Operation

Two AUX PUMP switches in the cockpit are used to activate the auxiliary pumps. The switches are located behind the elevator trim wheel on the centerconsole. Both auxiliary pumps are intended to be used simultaneously to prevent the airplane from additional lateral imbalance. Switch on the auxiliary pumps separated by 10 seconds to prevent the fuse from being tripped by increase starting currents. The auxiliary pump transfers the fuel from the auxiliary fuel tank into the related main fuel tank. The fuel level switch shuts off this pump automatically when the auxiliary fuel tank is empty or when 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 auxiliary pumps must be switched OFF.

When one auxiliary 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.12 - L/R FUEL TRANSFER FAIL. The flight plan must be amended accordingly.

The auxiliary pumps are electrically connected to the LH MAIN BUS and protected by a 5A circuit breaker, if no ice protection system (OÄM 42-053) is installed.

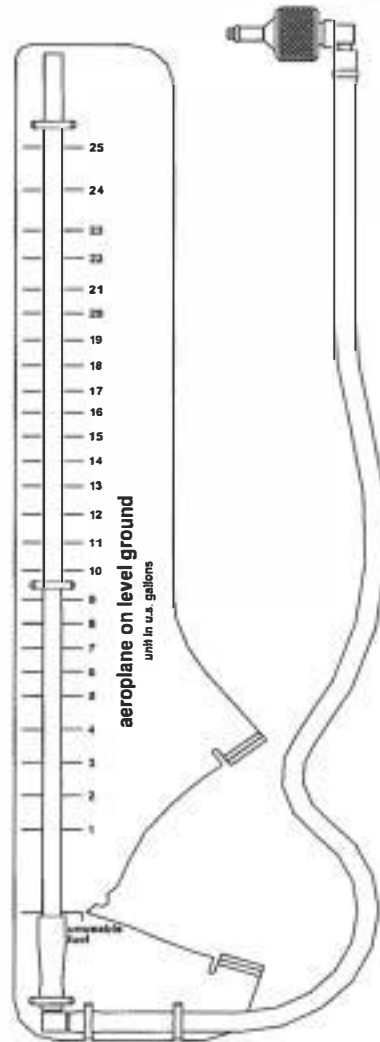
If the ice protection system is installed, both systems are protected by a 10 A circuit breaker and an additional 7A fuse for the auxiliary pumps. The circuit breaker is labeled XFER PUMP/DE ICE.

*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.

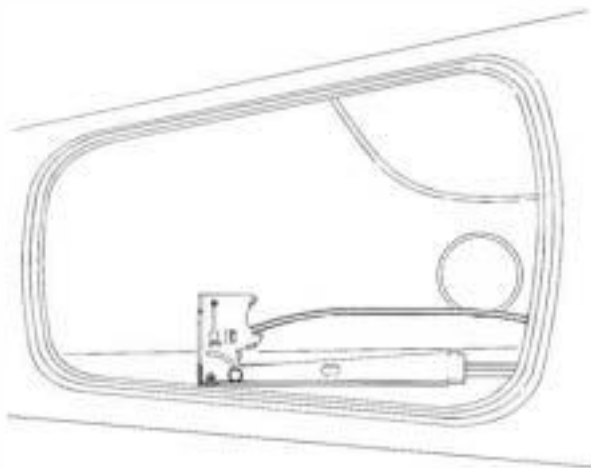
The fuel indicator II includes a protractor for an additional pitch angle measurement. The fuel indicator II is placed on the LH nose baggage compartment floor. The lower edge of the fuel indicator II must be supported by the nose baggage compartment for the entire length. Read and record the pitch angle.

Standard Tanks:

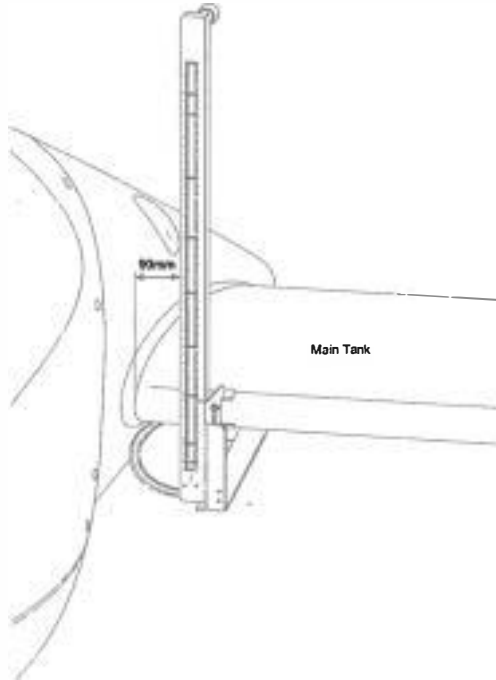
Unfold the fuel indicator II and center it at the nose of wing. Read the fuel level on the scale and refer to the tables provided in order to determine the exact fuel quantity.

Auxiliary Tanks (if installed):

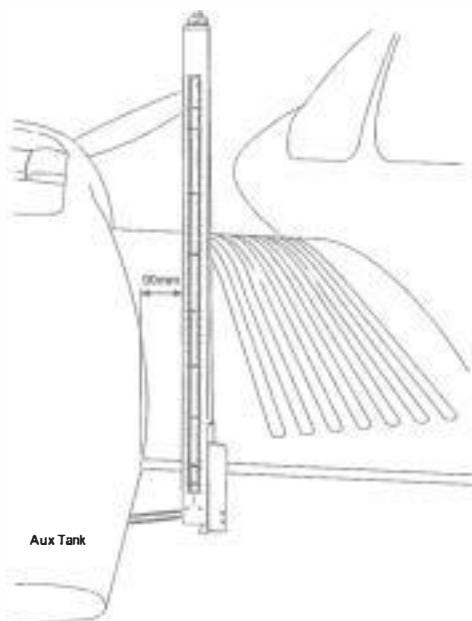
Unfold the fuel indicator II and place it on the trailing edge of the center wing. Read the fuel level on the scale and refer to the tables provided in order to determine the exact fuel quantity.



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 |
| 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 |

Fuel Temperature

Max. fuel temperature: 60 °C (140 °F)

Fuel Grade

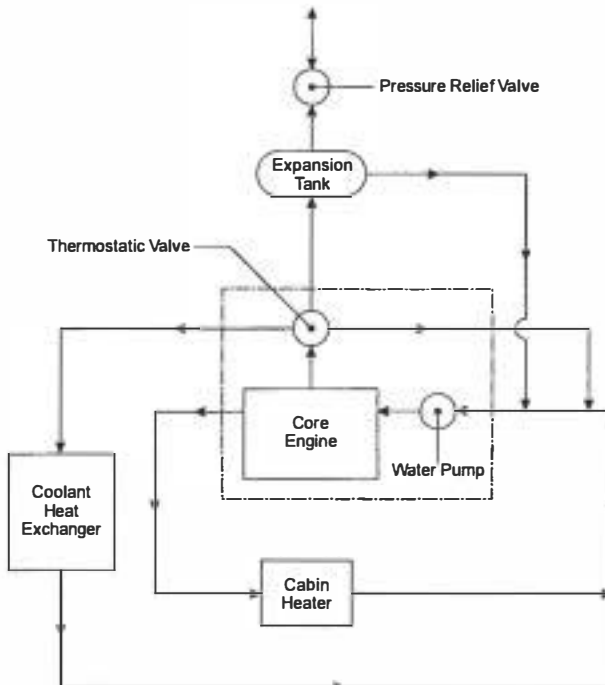
Approved fuel grades are listed in Section 2.14 - FUEL.

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.

7.9.6 COOLING SYSTEM

Each engine is liquid cooled. The liquid cooling system consists of a radiator (coolant heat exchange) 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 thermostat 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 water/oil-cooler on the upperside of the engine.

A dip-stick is provided to check the oil quantity through an inspection hole in the left 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

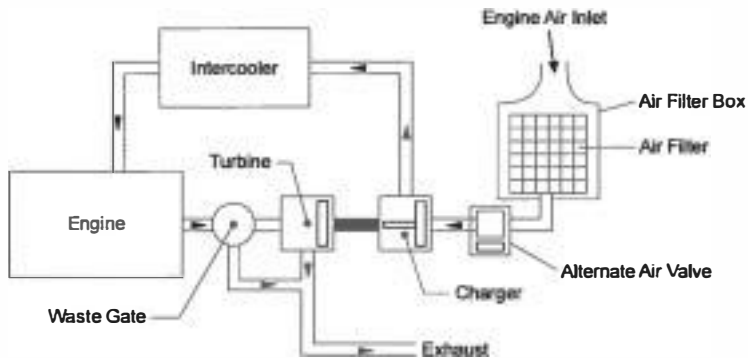
The second oil circuit lubricates the gearbox and serves the governor system and the regulation of the propeller.

The gearbox oil quantity can be checked with the help of an inspection glass which can be reached through an inspection hole on the left side of the 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 wastegate valve. A manifold pressure sensor behind the compressor allows the ECU to calculate the correct position of the wastegate 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

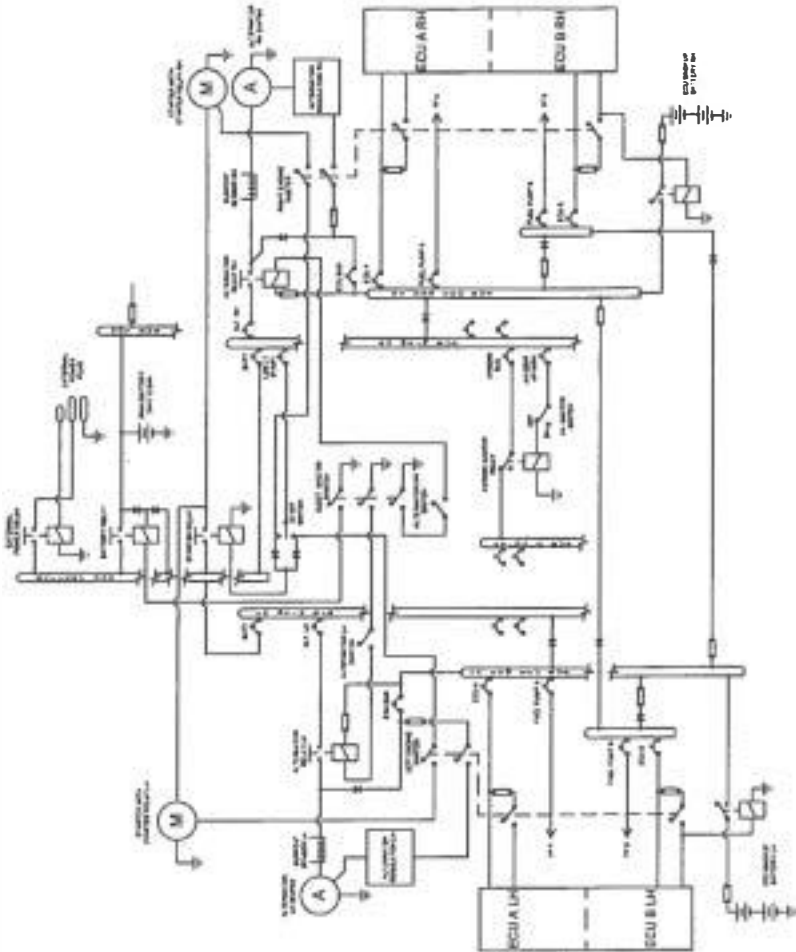
The fire detection system in the DA 42 NG consists of an overheat detector in the hot area of each engine. In case of an increase of the engine compartment temperature above 250 °C (480 °F) the overheat detector closes the electric circuit and a warning message appears in the annunciation window of the G1000 PFD.

To test the fire detectors (refer to Section 4A.6.1 - 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 warning does not appear, an unscheduled maintenance is necessary.

7.10 ELECTRICAL SYSTEM



7.10.1 GENERAL

The DA 42 NG has 28 Volt DC system, which can be sub-divided into:

- Power generation
- Storage
- Distribution
- Consumers

Power Generation

Power generation is provided by two 70 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 60 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 60 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, 7.2 Ah sealed lead acid batteries (ECU backup battery) connected in series, which are installed under the passengers' seats. The ECU backup batteries provide also electrical power for the ECU for a time of 30 minutes (condition).

The ENGINE MASTER LH (RH) switches connect the ECU backup 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 left alternator regulator also measures the power output of both (LH and RH) alternators via separate current sensors. Based on the current measurements, the LH alternator regulator controls the output of its associated alternator, providing paralleling between the alternators.

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.

Storage

Main battery power is stored in a 24 V, 13.6 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 or standby attitude module) and the flood light. When the EMERGENCY switch is set to ON, these two systems are supplied with power for at least 1.5 hours, independent of all other electrical consumers. During each 100 hour inspection, this battery is checked for proper functioning. Every 2 years or after use (broken seal on the switch) the battery package must be replaced.

Distribution

Electrical power is distributed via the HOT BATTERY BUS, the BATTERY BUS, the LH (RH) 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 directly to ECU A and its fuel pump. ECU B and its fuel pump derive their electrical power from their associated ECU BUS via an additional diode and fuse.

Additionally, each ECU B and its fuel pump is supplied with electrical power from the opposite engine side ECU BUS via a diode and fuse.

The LH (RH) ENGINE MASTER switch must be set to ON to activate the engine EECU.

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.

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 NG 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.

USB Charging Ports

If MÄM 42-1035 is installed, single USB charging ports are installed on the bottom of the instrument panel on the pilot's and co-pilot's side. The USB charging ports are an accessory that converts the DC electrical power from the aircraft to standard 5 V power for any electronic product that charges using an USB connector. Each USB port provides one Universal Serial Bus-A port, capable of providing up to 3.0 A.

7.10.2 ELECTRONIC ENGINE CONTROL UNIT / ECU

Engine Control and Regulation

The electronic ECU is used to control the engine actuators (e.g. fuel injectors) according to the engine sensor information. 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
- VOTER 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:

- 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

The electronic ECU consists of two ECUs per engine. A VOTER switch is integrated in the electronic ECU and proposes (if set to AUTO) an ECU to control the engine regarding the ECU operating hours or - in case of a failure - the ECU with better engine control capability. If the VOTER switch is set to A or B, the related EECU is forced to control the corresponding engine with ECU A respectively ECU B.

A fault in one of the ECUs is indicated by a caution message on the PFD

(L/R ECU A/B FAIL). Two types of faults are known:

- Faults which lead to a latched caution indication
- Faults which lead to a non-latched indication

In case of a latched caution an unscheduled maintenance is necessary and Austro Engine GmbH has to be informed.

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 |

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 0.9 bar. |
| L/R FUEL TEMP | The annunciation is active when the fuel temperature is greater than 60 °C. |
| L/R GBOX TEMP | The annunciation is active when the gearbox oil temperature is greater than 120 °C. |
| L/R FUEL PRES | The annunciation is active when the engine fuel pressure is low. |
| L/R ALTN AMPS | The annunciation is active when the alternator load is greater than 70 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 rear 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. |

| Warning Alerts | Meaning / Cause |
|-----------------|--|
| VERT SPEED FAIL | The annunciation is active when the display system is not receiving vertical speed input from the air data computer. |
| 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 %. |

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 heat 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 equipment) is installed. The annunciation is active when the L/R auxiliary fuel tank is empty and the AUX 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. |

| 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 AUXPUMP ON | The annunciation is active when fuel transfer from auxiliary to main tank is in progress (if installed). |

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. 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 NG is located on the front edge of the left wing below the wing chord line. It is supplied electrically and provides a stall warning, before the angle of attack becomes critical. The stall status is announced to the pilot by a continuous sound in the cockpit.

The lift detector vane, the mounting plate and the complete housing are heated to prevent icing. Heating is engaged together with the Pitot heating.

7.13 GARMIN G1000 INTEGRATED AVIONICS SYSTEM

7.13.1 GENERAL

The Garmin G1000 is a fully integrated flight, engine, communication, navigation and surveillance instrumentation system. This integrated avionics system consists of a primary flight display (PFD), a multi-function display (MFD), an audio panel, an attitude and heading reference system (AHRS), an air data computer (ADC) and the sensors and computers to process flight and engine information for display to the pilot. The system contains dual GPS receivers, dual VOR/ILS receivers, dual VHF communications transceivers, a transponder, and an integrated annunciation system to alert the pilot of certain abnormal conditions.

A remote 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 190-00963-() and Garmin G1000 Pilot's Guide for the Diamond DA 42 NG, P/N 190-00962-() for complete descriptions of the G1000 system and operating procedures.

If MÄM 42-978 is installed, refer to the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02238-() and Garmin G1000 NXi Pilot's Guide for the Diamond DA 42 NG, P/N 190-02237-() for complete descriptions of the G1000 NXi system and operating procedures.

- If MÄM 42-1072 is installed, refer to the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02527-() and Garmin G1000 NXi Pilot's Guide for the Diamond DA 42 NG, P/N 190-02526-() for complete descriptions of the G1000 NXi 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.

NOTE

Under adverse meteorological conditions, the WX-500 stormscope may indicate false strikes triggered by interference with airplane systems. Thus, it is recommended to use range settings below 100 NM and carefully verify if the indicated strikes are real. Never use the WX-500 stormscope to penetrate a thunderstorm and avoid by at least 20 NM any thunderstorm activity.

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 MESSAGES.

Advisory messages related to G1000 system status are shown in white and are accompanied by a white flashing ADVISORY alert. Refer to the G1000 Pilot's Guide and Cockpit Reference Guide for descriptions of the messages and recommended actions (if applicable).

Trend vectors are shown on the airspeed and altimeter displays as a magenta line predicting 6 seconds at the current rate. The turn rate indicator also functions as a trend indicator on the compass scale.

The PFD can be displayed in a composite format for emergency use by pressing the DISPLAY BACKUP button on the audio panel. In the composite mode, the full crew alerting function remains, but no map functions are available.

7.13.3 MULTI-FUNCTION DISPLAY (MFD)

The multi-function display (MFD) typically displays engine data, maps, terrain, traffic and topography displays, and flight planning and progress information. The display unit is, 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 / GWX 70 WEATHER RADAR

The Garmin GWX 68 and the GWX 70 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 / GWX 70 system is displayed on the Garmin G1000 MFD. Refer to the Garmin G1000 Pilot's Guide, P/N 190-00962-() or Garmin G1000 NXi (MÄM 42-978) Pilot's Guide, P/N 190-02237-() or Garmin NXi (MÄM 42-1072) Pilot's Guide, P/N 190-02526-() in the 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 co-pilot'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 NG 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.

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 (if ESP / USP is NOT installed). 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 190-00963-(), and Garmin G1000 Pilot's Guide for the Diamond DA 42 NG, P/N 190-00962-(), for complete descriptions of the G1000 system and operating procedures.

If MÄM 42-978 is installed, refer to the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02238-() and Garmin G1000 NXi Pilot's Guide for the Diamond DA 42 NG, P/N 190-02237-() for complete descriptions of the G1000 NXi system and operating procedures.

■ If MÄM 42-1072 is installed, refer to the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02527-() and Garmin G1000 NXi Pilot's Guide for the Diamond DA 42 NG, P/N 190-02526-() for complete descriptions of the G1000 NXi 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. |
| ROL | 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. |

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 | 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. |

7.15 MID CONTINENT MD302 STANDBY ATTITUDE MODULE



The Mid Continent MD302 standby attitude module is a self-contained situational awareness instrument that provides aircraft attitude, altitude, airspeed and slip indication.

The standby attitude module consists of two separate LCD displays. The left display serves as artificial horizon and the right display as airspeed indicator and altimeter. The user interface of the standby attitude module allows for simple, intuitive operation using a single push-and-turn control knob. The MD302 is connected to the airplane's emergency battery which provides power to the standby attitude module for at least 1.5 hour in case of a total electrical failure.

Refer to the Mid Continent MD302 Standby Attitude Module Pilot's Guide, P/N 9017846 in the latest effective issue for more information.

1. The descriptions, procedures and figures (e.g. battery icon) of the internal battery of the MD302 standby attitude module, shown in the Pilot's Guide are not applicable to the DA 42 NG, due to the use of the external emergency battery.
2. The MD302 standby attitude module is not connected to an external ARINC 429 source (Garmin G1000), thus heading information and automatic BARO synchronization is not available in the DA 42 NG.

CHAPTER 8

AIRPLANE HANDLING, CARE AND MAINTENANCE

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| 8.2 AIRPLANE INSPECTION INTERVALS | 8-2 |
| 8.3 AIRPLANE ALTERATIONS OR REPAIRS | 8-3 |
| 8.4 SERVICING | 8-3 |
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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. 7.02.15) 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 Austro Engine 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. 7.02.15; 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. 7.02.15, 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

1. Open the inspection door on the bottom 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 bottom of the upper left cowling.
2. Check gearbox oil level in inspection window by using a flashlight.
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 wheel 6.0 bar/87 PSI, main wheels 4.7 bar/68 PSI).
4. Install dust cap on valve stem by turning clockwise.

8.5 GROUND HANDLING / ROAD TRANSPORT

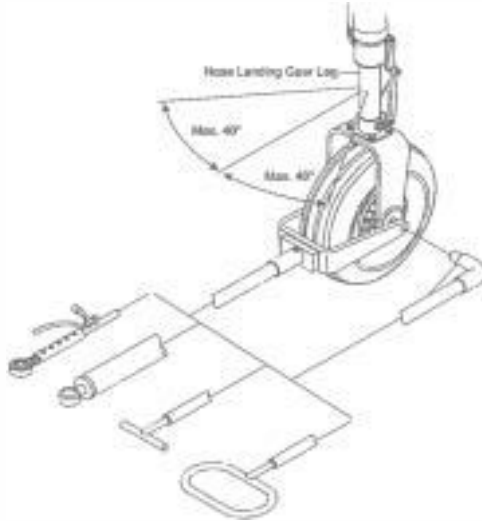
8.5.1 GROUND HANDLING

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.

CAUTION

Do not damage the vortex generators when you push on the center wing.



Steering Bar or Tow Bar Attachment

CAUTION

If the airplane is towed by a tow vehicle, do not turn the nose wheel more than 40 degrees to either side from the center position. Otherwise damage to the 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 engine.

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. 7.02.15, 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 engine is not used for more than 4 weeks an engine ground run must be performed. Refer to AE Operation Manual, Doc. No. E4.01.01, 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.

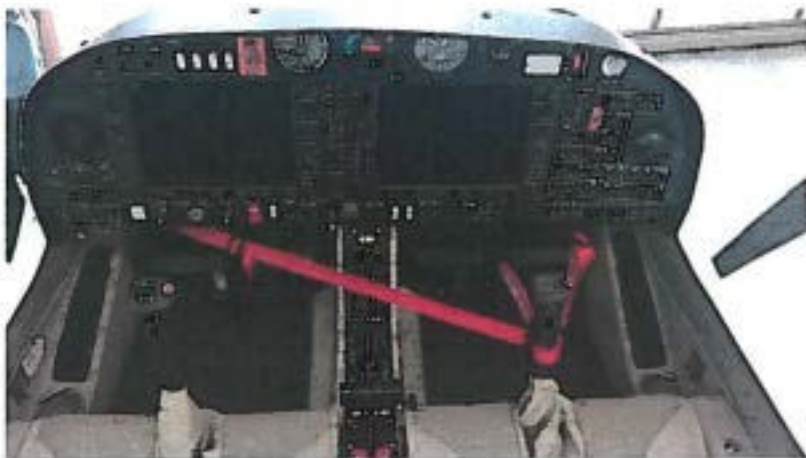
WARNING

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 REAR DOOR

The canopy, rear door and rear window should be cleaned with 'Plexiklar' or any other acrylic glass detergent if available; otherwise use lukewarm water. Final cleaning should be carried out with a clean piece of chamois leather or soft cloth. Never rub or polish dry acrylic glass.

8.6.3 PROPELLER

Damage and malfunctions during operation must be inspected by authorized personnel.

Surface

The manufacturer uses PU paint or acrylic paint which is resistant to almost any solvent. The blades may be treated with commercial automotive cleaning agents or preservatives. The penetration of moisture into the wooden core must be avoided by all means. Should doubts arise, an appropriately rated inspector must be consulted.

8.6.4 ENGINE

Engine cleaning is part of the scheduled inspections.

8.6.5 INTERIOR SURFACES

The interior should be cleaned using a vacuum cleaner. All loose items (pens, bags etc.) should be removed or properly stored and secured.

All instruments can be cleaned using a soft dry cloth. Plastic surfaces should be wiped clean using a damp cloth without any cleaning agents.

The leather interior should be treated with leather sealer within 3 months since new, and then at intervals of 3 to 6 months. Clean the leather interior with an appropriate mild leather cleaning agent and a soft cleaning brush for leather.

Note that the acrylic glass windows transmit the ultraviolet radiation from the sun.

8.7 GROUND DE-ICING

Approved deicing fluids are:

| Manufacturer | Name |
|---------------------|-----------------|
| Kilfrost | TKS 80 |
| Aeroshell | Compound 07 |
| | 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.

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CHAPTER 9 SUPPLEMENTS

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|-------------------------------|------|
| 9.1 INTRODUCTION | 9-2 |
| 9.2 LIST OF SUPPLEMENTS | 9-3 |

9.1 INTRODUCTION

Chapter 9 contains information concerning additional (optional) equipment of the DA 42 NG.

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.

DA 42 NG AFM



Temporary Revision
Garmin G1000, SBAS
and P-RNAV Operation

9.2 LIST OF SUPPLEMENTS

The existing entry is amended to read:

| Airplane S/N: 42 N499 Registration: | | | Date: 3.3.2023 | | |
|-------------------------------------|--|----------|----------------|-------------------------------------|--------------------------|
| Sup. No. | Title | Rev. No. | Date | Applicable | |
| | | | | YES | NO |
| A33 | Integrated Avionics System Garmin G1000, SBAS & P-RNAV Operation | 4 | 12-Apr-2022 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |



| | | | |
|-----------------|-----------------|-------------|--------|
| Doc # 7.01 16-E | TR-OAM 42-179/a | 12-Apr-2022 | 9 - 3a |
|-----------------|-----------------|-------------|--------|

9.2 LIST OF SUPPLEMENTS

The entry for Supplement S03 is amended to read:

| Airplane S/N <i>42.N499</i> | | Registration | | Date <i>6.3.2023</i> | |
|-----------------------------|-----------------------|--------------|------------------------|-------------------------------------|--------------------------|
| Sup. No. | Title | Rev. No. | Date | applicable | |
| | | | | YES | NO |
| S03 | Ice Protection System | 9 | 07-Feb-2023 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |



9.2 LIST OF SUPPLEMENTS

The following entry is amended to read:

| Airplane S/N: 42 N499 | | Registration: | | Date: 63.2023 | |
|-----------------------|-------------------------------|---------------|-------------|---------------|----|
| Sup. No. | Title | Rev. No. | Date | applicable | |
| | | | | YES | NO |
| S04 | Continuous Flow Oxygen System | 1 | 09-Mar-2021 | x | |



9.2 LIST OF SUPPLEMENTS

| Airplane S/N: 42 N499 Registration: | | | | Date: 6.3.2023 | |
|-------------------------------------|--|----------|-------------|-------------------------------------|-------------------------------------|
| Sup. No. | Title | Rev. No. | Date | applicable | |
| | | | | YES | NO |
| A33 | Integrated Avionics System Garmin G1000 and G1000 NXi, SBAS and P-RNAV Operation | 3 | 05-Nov-2018 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| A34 | Electronic Stability and Protection (ESP) | 0 | 28-Mar-2014 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| M00 | DA 42 M - NG | 2 | 28-Oct-2019 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M01 | Belly Pod | 0 | 03-Mar-2015 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M05 | Universal Nose (STD-TC) | 2 | 28-Oct-2019 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M06 | Nose Pod (STD-TC) | 2 | 28-Oct-2019 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M07 | Belly Pod (STD-TC) | 1 | 28-Oct-2019 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M09 | Geo-Star Pod (Std. TC) | 1 | 21-Apr-2020 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M10 | Operator Desk | 1 | 20-Apr-2015 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M15 | On Top Exhaust System | 0 | 03-Mar-2015 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Doc. No. 7.01.16-E | | Rev. 5 | 10-Jun-2021 | Page 9 - 3 | |

Airplane S/N: 42.N499 Registration:Date: 6.3.2023

| Sup. No. | Title | Rev. No. | Date | applicable | |
|------------|--|----------|-------------|--------------------------|-------------------------------------|
| | | | | YES | NO |
| M20 | Large Satellite Uplink | 0 | 03-Mar-2015 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M30 | Universal Nose | 2 | 02-Feb-2018 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M40 | TerraStar Configuration | 0 | 06-Nov-2017 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M60 | Nose Pod | 1 | 03-Oct-2016 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M62 | Geo-Star Pod | 1 | 03-Oct-2017 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| M160 | Nose Pod with Standard Baggage Compartment | 1 | 03-Oct-2017 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| O04 | Operation without Unfeathering Accumulator | 0 | 15-Nov-2013 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| O05 | Diesel Operation | 0 | 06-Dec-2013 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| O06 | MTOM 2001 kg / 4411 lb | 0 | 01-Apr-2014 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| O07 | RH Stick Removal | 0 | 10-Dec-2014 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <u>C08</u> | Pilot's Removable Stick | 0 | 30-Jun-2015 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Airplane S/N: 42N499 Registration:

Date: 6.3.2023

| Sup. No. | Title | Rev. No. | Date | applicable | |
|----------|---|----------|-------------|-------------------------------------|-------------------------------------|
| | | | | YES | NO |
| O11 | Secondary Power Lever | 0 | 28-Jun-2017 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S02 | Ice Protection System | 2 | 22-Oct-2020 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S03 | Ice Protection System | 8 | 22-Oct-2020 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S04 | Continuous Flow Oxygen System | 0 | 01-Apr-2012 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S06 | G1000 Synthetic Vision Technology | 0 | 01-Apr-2012 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| S07 | Recirculating Cabin - Air Cooling | 1 | 01-Apr-2014 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S08 | Removal of Variable Elevator Stop | 1 | 01-Apr-2014 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S10 | Flight Data Logging Device | 0 | 03-Mar-2015 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S11 | Canopy Jettison System | 0 | 28-Jun-2017 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S12 | AmSafe Aviation Inflatable Restraint AAIR V23 | 2 | 20-Mar-2019 | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| S13 | Flight Stream 510 | 0 | 31-Jan-2019 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

| Airplane S/N: | | Registration: | | Date: | |
|---------------|-------|---------------|------|--------------------------|--------------------------|
| Sup. No. | Title | Rev. No. | Date | applicable | |
| | | | | YES | NO |
| | | | | <input type="checkbox"/> | <input type="checkbox"/> |
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DA 42 NG AFM
Supplement A33



Garmin G1000 and
G1000 NXi, SBAS and
P-RNAV Operation

SUPPLEMENT A33
TO THE AIRPLANE FLIGHT MANUAL

DA 42 NG
Integrated Avionics System Garmin G1000 and
G1000 NXi,
SBAS and P-RNAV Operation

Doc. No. : 7.01.16-E
Date of Issue : 01-Apr-2012
Design Change Advisory : OÄM 42-179, MÄM 42-978,
MÄM 42-1072

This Supplement to the Airplane Flight Manual is EASA approved under Approval Number 10031969, 10039193, 10061665 and under the authority of DOA No. EASA.21J.052.

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

9-A33-1



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0.1 RECORD OF REVISIONS

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | Approval Note | Date of Approval | Date Inserted | Signature |
|----------|---|---------|-------------------------------|------------------|--|------------------|---------------|-----------|
| 1 | Type acceptance for airspace other than EU and US | 0, 1 | 9-A33-3 9-A33-4 9-A33-7 | 17-Dec-2013 | Rev 1 to AFM Supplement A33 to AFM Doc.No. 7 01 16-E is approved under the authority of DOA No. EASA 21J.052 | 17-Dec-2013 | | |
| 2 | MAM 42-978 | All | All | 31-Jan-2017 | Rev 2 to AFM Supplement A33 to AFM Doc.No 7 01 16-E is approved by EASA with EASA No. 10061665 | 26-Apr-2017 | | |
| 3 | MAM 42-1072 | All | All | 05-Nov-2018 | Rev 3 to AFM Supplement A33 to AFM Doc.No. 7 01.16-E is approved under the authority of DOA No EASA 21J 052 | 08-Nov-2018 | | |

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | Approval Note | Date of Approval | Date inserted | Signature |
|----------|-----------------|---------|--------------------------|------------------|--|------------------|---------------|-----------|
| 4 | OÄM 42-179/e | All | All except cover page | 12-Apr-2022 | Rev. 4 to AFM Supplement A33 to AFM Doc.No. 7.01.16-E is approved under the authority of DOANo. EASA 21J.052 | 06-May-2022 | | |

0.2 LIST OF EFFECTIVE PAGES

| Chapter | Page | Date |
|------------|------------------------|-------------|
| 0 | 9-A33-1 | 05-Nov-2018 |
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1. GENERAL

1.5 DEFINITIONS AND ABBREVIATIONS

(i) Miscellaneous

| | |
|------------|--|
| AC: | Advisory Circular |
| AMC: | Acceptable Means of Compliance |
| AIRAC: | Aeronautical Information Regulation and Control |
| SBAS: | Satellite Based Augmentation System |
| WAAS: | Wide Area Augmentation System |
| EGNOS: | European Geostationary Navigation Overlay Service |
| MSAS: | Multi-functional Satellite Augmentation System |
| RNAV: | Area Navigation |
| P-RNAV: | Precision Area Navigation |
| B-RNAV: | Basic Area Navigation |
| LPV: | Localizer Performance with Vertical Guidance |
| LNAV/VNAV: | Lateral Navigation / Vertical Navigation |
| LNAV+V: | Lateral Navigation with Advisory Vertical Guidance |
| RNP: | Required Navigation Performance |
| GNSS: | Global Navigation Satellite System |
| STAR: | Standard Terminal Arrival Route |
| SID: | Standard Instrument Departure |
| ETSO: | European Technical Standard Order |
| RAIM: | Receiver Autonomous Integrity Monitoring |
| WFDE: | WAAS Fault Detection/Exclusion |

1.8 G1000 AVIONICS SYSTEM

The DA 42 NG airplane is equipped with a Garmin G1000 or a Garmin G1000 NXi Avionics System.

If Garmin G1000 is installed:

The Garmin GNSS navigation system installed in this airplane is a GPS system with a Satellite Based Augmentation System (SBAS) comprised of two TSO-C145a Class 3 approved Garmin GIA 63Ws, TSO-C146a Class 3 approved Garmin GDU 104X Display Units, two Garmin GA36 antennas, and GPS/WAAS software version 5.0 or later approved version. The Garmin G1000 Integrated Avionics GNSS navigation system in this airplane is installed in accordance with FAA AC 20-138A and EASA AMC 20-28.

If Garmin G1000 NXi is installed:

The Garmin GNSS navigation system installed in this airplane is a GPS system with a Satellite Based Augmentation System (SBAS) comprised of two TSO-C145a Class 3 approved Garmin GIA 63Ws, or two TSO-C145d Class 3 approved Garmin GIA 64Ws, TSO-C146d Class 3 approved Garmin GDU 105X Display Units, two Garmin GA36 antennas, and GPS software version 5.1 or later approved version. The Garmin G1000 NXi Integrated Avionics GNSS navigation system in this airplane is installed in accordance with FAA AC 20-138D, EASA AMC 20-28 and EASA AMC 20-27.

NOTE

The following listing of the Garmin G1000 and G1000 NXi operational capabilities does not constitute an operational approval. For the operational approval of the aircraft contact the appropriate governing authority.



The Garmin G1000 and G1000 NXi Integrated Avionics GNSS navigation system as installed in this airplane is approved for navigation using GPS and GPS/SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en-route, terminal area, non-precision approach, and approach procedures with vertical guidance operation.

The Garmin G1000 and G1000 NXi Integrated Avionics GNSS navigation system as installed in this airplane complies with the equipment, performance and functional requirements to conduct RNAV and RNP operations in accordance with the applicable requirements of the reference documents listed in the following table.

| Specification | Reference Document | | ICAO Flight Plan Code | Integrated flight deck G1000 with SBAS |
|--------------------------------------|---------------------|-------------------------------|-----------------------|--|
| | FAA | EASA or JAA | | |
| RNAV 10 (RNP 10) Oceanic | FAA Order 8400.12B | - | A1 | Yes |
| B-RNAV/RNAV 5 (operations in Europe) | FAA AC 90-96A CHG 1 | EASA AMC 20-4 | B2 | Yes |
| RNAV 2 | FAA AC 90-100A | - | C2 | Yes |
| RNAV 1 | FAA AC 90-100A | - | D2 | Yes |
| P-RNAV (operations in Europe) | FAA AC 90-96A CHG 1 | JAA TGL 10 Rev 1 | D2 | Yes |
| RNP 4 (Oceanic) | FAA Order 8400.33 | - | L1 | Yes |
| RNP 1 | FAA AC 90-105 | - | O2 | No |
| RNP APCH LNAV | FAA AC 90-105 | EASA AMC 20-27 | S1 | Yes |
| RNP APCH LNAV/VNAV | FAA AC 90-105 | EASA AMC 20-27 with CM-AS-002 | S2 | Yes |
| LP | FAA AC 90-107 | - | N/A | Yes (Note 1) |
| LPV | FAA AC 90-107 | EASA AMC 20-28 | N/A | Yes |
| RNP AR APCH | FAA AC 90-101A | EASA 20-26 | T1 | No |

Note 1: When GDU software version 13.00 or later is installed.



Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with RTCA/DO-200A and AC 20-153B for database Integrity, quality, and database management processes for many of its aviation databases. Pilots and operators can view the LOA status and RTCA/DO-200A List of Applicable Avionics (190-01999-00) at www.FlyGarmin.com > Aviation Databases > Type 2 LOA Status.

Navigation information is referenced to WGS-84 reference system.

2. OPERATING LIMITATIONS

2.16 OTHER LIMITATIONS

2.16.11 G1000 GPS NAVIGATION SYSTEM LIMITATIONS

NOTE

The following set of limitations supersedes the limitations addressing the same functions of the G1000 in the basic AFM limitation section. All other Garmin G1000 Avionic System limitations remain effective.

The following placard is no longer applicable:

GPS NOT APPROVED
FOR WAAS OPERATIONS

Flight preparation phase:

For flight planning purposes, operations on RNP and RNAV procedures when SBAS signals are not available, the availability of GPS integrity RAIM shall be confirmed for the intended route of flight. In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended route of flight, the flight should be delayed, cancelled, or re-routed on a track where RAIM requirements can be met.

For flight planning purposes for operations within European B-RNAV and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of GPS integrity RAIM shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended flight, the flight should be delayed, cancelled, or re-routed on a track where RAIM requirements can be met.

For flight planning purposes, operations where the route requires Class II

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navigation the airplane's operator or pilot-in-command must use the Garmin WFDE Prediction program to demonstrate that there are no outages on the specified route that would prevent the Garmin GNSS navigation system to provide primary means of Class II navigation in oceanic and remote areas of operation that requires (RNP-10 or RNP-4) capability. If the Garmin WFDE Prediction program indicates fault exclusion (FDE) unavailability will exceed 34 minutes in accordance with FAA Order 8400.12A for RNP-10 requirements, or 25 minutes in accordance with FAA Order 8400.33 for RNP-4 requirements, then the operation must be rescheduled when FDE is available.

NOTE

Within the United States, RAIM availability can be determined using the Garmin WFDE Prediction program 3.00 or later approved version with Garmin GA36 or Comant CI 2580-200 antenna selected, or the FAA's en route and terminal RAIM prediction website: <http://sapt.faa.gov>, or by contacting a Flight Service Station.

NOTE

Within Europe, RAIM availability can be determined using the Garmin WFDE Prediction program or Europe's AUGER GPS RAIM Prediction Tool at <http://augur.eurocontrol.int/status>. For other areas, use the Garmin WFDE Prediction program. This requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight. The route planning and WFDE prediction program may be downloaded from the GARMIN website on the internet. For information on using the WFDE Prediction Program, refer to GARMIN WAAS FDE Prediction Program, part number 190-00643-01, 'WFDE Prediction Program Instructions'.

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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) conform to WGS-84 or equivalent.

Preflight phase

SBAS functionality must be enabled on the G1000 GPS Status page (refer to the G1000 Pilot's Guide for procedure).

The pilot must confirm at system initialization that the Navigation database is current. GPS/SBAS based IFR enroute, oceanic, and terminal navigation is prohibited unless the pilot verifies and uses a valid, compatible, and current Navigation database or verifies each waypoint for accuracy by reference to current approved data.

Navigation database is expected to be current for the duration of the flight. If the AIRAC cycle will change during flight, the pilot must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

NOTE

Discrepancies that invalidate a procedure must be reported to Garmin International. The affected procedure is prohibited from being flown using data from the Navigation database until a new Navigation database is installed in the airplane and verified that the discrepancy has been corrected. Contact information to report Navigation database discrepancies can be found at www.Garmin.com>Support>Contact Garmin Support>Aviation. Pilots and operators can view navigation data base alerts at www.Garmin.com > In the Air> NavData Alerts.

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Both Garmin GPS navigation receivers must be operating and providing GPS navigation guidance to their PFD for operations requiring RNP-4 performance.

North Atlantic (NAT) Minimum Navigational Performance Specifications (MNPS) Airspace operations per FAA AC 91-49 and FAA AC 120-33 require both GPS/SBAS receivers to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor.

In flight phase

Manual entry of waypoints using latitude/longitude or place/bearing is prohibited.

NOTE

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs) and Obstacle Departure Procedures (ODPs), Standard Terminal Arrival (STAR), and enroute RNAV "Q" and RNAV "T" routes should be loaded into the flight plan from the database in their entirety, rather than loading route waypoints from the database into the flight plan individually. Selecting and inserting individual named fixes from the database is permitted, provided all fixes along the published route to be flown are inserted.

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Approach phase

GPS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is loaded from the Navigation database.

NOTE

Not all published Instrument Approach Procedures (IAP) are in the Navigation database. Pilots planning on flying an RNAV instrument approach must ensure that the Navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the Navigation database into the FMS flight plan by its name.

IFR non-precision approach approval using the GPS/SBAS sensor is limited to published approaches authorized by the appropriate governing authority.

The navigation equipment required to join and fly an instrument approach procedure is indicated by the title of the procedure and notes on the IAP chart. Use of the Garmin GPS/SBAS receivers to provide navigation guidance during the final approach segment of an ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for "or GPS" navigation is prohibited. When using the Garmin VOR/LOC/GS receivers to fly the final approach segment, VOR/LOC/GS navigation data must be selected and presented on the CDI of the pilot flying.

3. EMERGENCY PROCEDURES

No changes.

4A. NORMAL OPERATING PROCEDURES

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.6.11 APPROACH & LANDING

GFC 700 Operation During Approach and Landing

c) GPS

1. Navigation sourceselect GPS using CDI button
on PFD
2. Approachload in FMS and ACTIVATE
3. Intercept headingestablish in HDG or ROL mode
(if required)
4. Mode controllerselect APR on mode controller
5. Green or white GPS annunciation.....note on PFD
6. Green or white GP annunciationnote on PFD

END OF CHECKLIST

4B. ABNORMAL OPERATING PROCEDURES

NOTE

If LOI annunciation is displayed and GPS based navigation is aborted while on the final approach segment, the missed approach procedure must be executed.

5. PERFORMANCE

No changes.

6. MASS AND BALANCE

No changes.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

No changes.

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

No changes.

**SUPPLEMENT S03
TO THE AIRPLANE FLIGHT MANUAL
DA 42 NG**

ICE PROTECTION SYSTEM

Doc. No. : 7.01.16-E
Date of Issue of the Supplement : 01-Apr-2012
Design Change Advisory : OÄM 42-160

This Supplement to the Airplane Flight Manual is EASA approved under Approval Number EASA.AC.11243 and 10039193.

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0.1 RECORD OF REVISIONS

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | Approval Note | Date of Approval | Date Inserted | Signature |
|----------|--|--------------|---|------------------|--|------------------|---------------|-----------|
| 1 | Adaptation of Abnormal Operating Procedures, Corrections | 0, 4B | All except Cover Page | 13-Nov-2012 | Rev 1 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J 052 | 14-Nov-2012 | | |
| 2 | Procedures integrated into AFM | 0, 4B | All except Cover Page | 17-Dec-2012 | Rev.2 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J 052 | | | |
| 3 | OAM 42-203 | All | All except Cover Page | 02-Apr-2013 | Rev. 4 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J 052 | 28-Jun-2013 | | |
| 4 | MAM 42-659, MAM 42-678, MAM 42-759, OAM 42-253, OAM 42-260 | All | All except Cover Page | 01-Apr-2014 | Rev 4 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved by EASA with EASA approval No.10048945. | 05-May-2014 | | |
| 5 | OAM 42-160h | 0, 4A, 4B, 7 | 9-S03-03 through 9-S03-06, 9-S03-32, 9-S03-41, 9-S03-60 | 27-May-2015 | Rev 5 to AFM Supplement S03 to AFM Doc. No. 7 01 16-E is approved under the authority of DOA No. EASA 21J 052 | 16-Jul-2015 | | |

| Rev. No. | Reason | Chapter | Page(s) | Date of Revision | Approval Note | Date of Approval | Date Inserted | Signature |
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| 6 | MAM 42-978 | All | All except Cover Page | 06-Dec-2017 | Rev.6 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J.052 | 08-Jan-2018 | | |
| 7 | OAM 42-054i, Corrections | All | All except Cover Page | 26-Feb-2018 | Rev.7 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J.052 | 06-Apr-2018 | | |
| 8 | OAM 42-160k, Corrections | All | All except Cover Page | 22-Oct-2020 | Rev 8 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J.052 | 27-May-2021 | | |
| 9 | OAM 42-160l | All | All except Cover Page | 07-Feb-2023 | Rev.9 to AFM Supplement S03 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J.052 | | | |
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1. GENERAL

1.1 INTRODUCTION

This Supplement to the Airplane Flight Manual contains all necessary information to operate the ice protection system of the DA 42 NG in known icing conditions.

The DA 42 NG can be equipped with an optional ice protection system in accordance with the Optional Design Change Advisory OÄM 42-160. It distributes a thin film of de-icing fluid on the wings, vertical stabilizer, horizontal stabilizer, propellers and canopy. This prevents the formation and accumulation of ice.

NOTE

The ice protection system is not a "de-icing" system in the usual sense. It can remove only small accumulations of ice. Its main purpose is to *prevent* the accretion of ice.

WARNING

Known icing conditions are defined by CS 25 / FAR Part 25, Appendix C. These conditions do not include, nor were tests conducted in, all icing conditions that may be encountered (e.g., freezing rain, freezing drizzle, mixed phase icing conditions or conditions defined as severe). Flight in these conditions must be avoided. Some icing conditions not defined in CS 25 / FAR part 25 have the potential of producing hazardous ice accumulations, which (1) exceed the capabilities of the airplane's ice protections equipment, and/or (2) create unacceptable airplane performance. Inadvertent operation in these conditions may be detected by heavy ice accumulation on the windshield, or when ice forms on the side areas of the canopy. Another indication are the rapid formation and shedding of bars of ice (6 mm or 1/4 inch thickness or larger) from the porous panels. If these conditions are encountered, the pilot should take immediate action to select HIGH/MAX flow rate and leave these conditions by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead.

1.4 DEFINITIONS AND ABBREVIATIONS

(b) Meteorological Terms

De-Ice or De-Icing: The periodic shedding or removal of ice accumulations from a surface, by destroying the bond between the ice and the protection surface.

Freezing Drizzle: Drizzle is precipitation on the ground or aloft in the form of liquid water drops that have diameters less than 0.5 mm and greater than 0.05 mm (50 μ m to 500 μ m, 0.002 to 0.02 in). Freezing drizzle is drizzle that exists at air temperatures less than 0 °C or 32 °F (supercooled water), remains in liquid form, and freezes upon contact with objects on the surface or airborne.

Freezing Rain: Rain is precipitation on the ground or aloft in the form of liquid water drops which have diameters greater than 0.5 mm (0.02 in). Freezing rain is rain that exists at air temperatures less than zero degrees C (supercooled water), remains in liquid form, and freezes upon contact with objects on the surface or airborne.

Ice Crystals: Any one of a number of macroscopic, crystalline forms in which ice appears. Examples are hail and snow.

Icing Conditions: An icing condition is defined as visually detected ice, or the presence of visible moisture in any form at an indicated outside air temperature (OAT) of +3 °C (37.4 °F) or below.

LWC: Liquid water content. The total mass of water contained in liquid drops within a unit volume or mass of air.

Mixed Phase Icing Conditions:

A homogeneous mixture of supercooled water drops and ice crystals existing within the same cloud environment.

Supercooled Water: Liquid water at a temperature below the freezing point of 0 °C (32 °F).

(c) Flight Performance and Flight Planning**Continuous Operation:**

Typical continuous operations in icing conditions are holding and cruise.

(i) Miscellaneous**CS 25 / FAR Part 25, Appendix C:**

Certification icing condition standard for approving ice protection provisions on airplanes. The conditions are specified in terms of altitude, temperature, LWC, representative droplet size, and cloud horizontal extent.

ICTS: Ice contaminated tailplane stall.

Protected Surface: A surface containing ice protection, typically located at the surface's leading edge.

Residual Ice: Ice that remains on a protected surface immediately following the actuation of a deicing system.

2. OPERATING LIMITATIONS

2.1 INTRODUCTION

2.1.1 METEOROLOGICAL CONDITIONS

Flight in meteorological conditions described as freezing rain or freezing drizzle, as determined by the following visual cues, is prohibited:

- (1) Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice.
- (2) Accumulation of ice on the upper surface of the wing aft of the protected area.
- (3) Accumulation of ice on the propeller spinner further back than normally observed.

If the airplane encounters conditions that are determined to contain freezing rain or freezing drizzle, the pilot must immediately exit the freezing rain or freezing drizzle conditions by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead.

NOTE

The prohibition on flight in freezing rain or freezing drizzle is not intended to prohibit purely inadvertent encounters with the specified meteorological conditions; however, pilots should make all reasonable efforts to avoid such encounters and must immediately exit the conditions if they are encountered.

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2.1.2 USE OF THE AUTOPILOT

Use of the autopilot is prohibited when any ice is observed forming aft of the protected surfaces of the wing, or when unusual lateral trim requirements or autopilot trim warnings are encountered.

NOTE

The autopilot may mask tactile cues that indicate adverse changes in handling characteristics; therefore, the pilot should consider not using the autopilot when any ice is visible on the airplane.

2.2 AIRSPEED

| Airspeed | IAS | Remarks |
|---|----------|--|
| Minimum airspeed for continuous operation in icing conditions | 118 KIAS | These limitations do not apply for take-off and landing. |
| Maximum airspeed for continuous operation in icing conditions | 156 KIAS | |
| Minimum airspeed for continuous climb in icing conditions | 118 KIAS | Flaps UP. |
| Minimum airspeed during approach in icing conditions | 90 KIAS | Flaps APP. |

WARNING

If 118 KIAS cannot be maintained, Paragraph 2.1.1 applies.

NOTE

Typical continuous operations in icing conditions are holding and cruise.

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 includes a detailed description of the alerts.

The following table shows the color and significance of the warning, caution and advisory alert lights on the G1000.

Color and Significance of the Caution Alerts on the G1000

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

2.7 MASS (WEIGHT)

| Value | Mass (Weight) | |
|---|---------------|---------|
| With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist: | | |
| Maximum landing mass (if MAM 42-659 is carried out) | 1900 kg | 4189 lb |

2.8 CENTER OF GRAVITY

Center of Gravity Limitations

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

Most forward flight CG:

2.368 m (93.22 in) aft of datum plane at 1450 kg (3197 lb)

2.425 m (95.47 in) aft of datum plane at max. take-off mass 1900 kg (4189 lb)

If MÄM 42-678 is carried out:

2.438 m (95.98 in) aft of datum plane at max. take-off mass 1999 kg (4407 lb)
linear variation in between

Most rearward flight CG:

2.454 m (96.61 in) aft of datum plane at 1450 kg (3197 lb)

2.480 m (97.64 in) aft of datum plane at 1700 kg (3748 lb)

2.480 m (97.64 in) aft of datum plane at max. take-off mass (see Section 2.7)
linear variation in between

2.13 KINDS OF OPERATION

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

- Flights into known or forecast icing conditions.

2.15 LIMITATION PLACARDS

On the Door of the RH Nose Baggage Compartment (if only OÄM 42-160 is carried out)

DE-ICING FLUID

Refer to AFM for approved fluids.

Next to the Filler Cap

DE-ICING FLUID

Max. 31.5 liters (8.3 US gal).

Usable 30 liters (7.9 US gal).

Refer to AFM for approved fluids.

2.16 OTHER LIMITATIONS

2.16.12 OPERATION IN ICING CONDITIONS

General

The DA 42 NG is approved for flight into known or forecast icing conditions as defined by CS 25 / FAR Part 25, Appendix C "Continuous Maximum and Intermittent Icing Envelope" only if the ice protection system is installed and serviceable.

Temperature Limitation

Minimum operation temperature for the ice protection system is -30°C (-22°F).

Take-Off

Take-off with ice or snow accumulation or any frost on the airplane is prohibited.

Flight into Known or Forecast Icing Conditions

NOTE

The flaps and landing gear should only be extended and retracted for landing.

During flights in icing conditions and/or with residual ice on protected or unprotected surfaces, setting flap to LDG position is prohibited.

Intentional single-engine operation during flights under known or forecast icing conditions is prohibited.

Minimum Operational Equipment (Serviceable)

Flight into known or forecast icing condition requires the following equipment to be installed and serviceable:

- * Ice protection system installed in accordance with the Optional Design Advisory OAM 42-160.

NOTE

The wing ice inspection light must be operative prior to flight into known or forecast icing conditions at night. This supersedes any relief provided by the table given in the main part of the AFM in Section 2.13.

2.17 DE-ICING FLUIDS FOR SYSTEM OPERATION

2.17.1 MINIMUM DE-ICING FLUID QUANTITY FOR DISPATCH

The minimum de-icing fluid quantity for dispatch is 22 liter (5.8 US gal). This amount corresponds to an indication of 3/4 full on the G1000.

NOTE

This minimum allows at least 90 minutes of ice protection with NORM selected. The pilot must ensure adequate fluid quantity before each flight.

NOTE

The maximum usable tank capacity is 30 liter (7.9 US gal).
 The maximum tank capacity is 31.5 liter (8.3 US gal).
 Maximum system operating times with maximum usable quantity of de-icing fluid:

NORM mode 2 hrs. 30 min.

HIGH mode 1 hr.

MAX mode 30 min.

2.17.2 DE-ICING FLUIDS

Approved de-icing fluids for use in the ice protection system are:

- AL-5 (DTD 406B)
- Aeroshell Compound 07

WARNING

The approved de-icing fluids are harmful. They are Glycol based with different additives. Refer to the Material Safety Data Sheets for proper handling which are available from the supplier of the de-icing fluid.

CAUTION

The use of other fluids will provide a correspondingly lower standard of ice protection or may cause damage to the ice protection system.

3. EMERGENCY PROCEDURES

3.1 INTRODUCTION

3.1.2 CERTAIN AIRSPEEDS IN EMERGENCIES

If icing conditions do exist:

| Event | | |
|---|-------------------------|---------|
| One engine inoperative speed for best rate of climb v_{YSE} | Up to 1900 kg (4189 lb) | 88 KIAS |
| | Above 1900 kg (4189 lb) | 90 KIAS |

3.5 G1000 FAILURES

3.5.7 ERRONEOUS OR LOSS OF DE-ICING FLUID DISPLAY

If the de-icing fluid quantity is known, the remaining system operating time can be estimated based on the durations given in Section 2.17.2 - DE-ICING FLUIDS.

1. Icing conditions leave the icing area as soon as practicable

3.7 ONE ENGINE INOPERATIVE PROCEDURES

3.7.6 ENGINE FAILURES IN FLIGHT

If icing conditions do exist:

1. Leave the icing area (by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead).
2. DE-ICE HIGH

3. Proceed in accordance with the procedure given in Section 3.7.6 - ENGINE FAILURES IN FLIGHT in the main part of the AFM.

3.7.7 LANDING WITH ONE ENGINE INOPERATIVE

No change to the main part of the AFM, except for the approach speed as follows, with residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist:

Final approach speed:

| | |
|-----------------------------------|---------------------------------|
| Up to 1900 kg (4189 lb) | 94 KIAS (v_{REF} /FLAPS UP) |
| | 90 KIAS (v_{REF} /FLAPS APP) |
| Above 1900 kg (4189 lb) | 97 KIAS (v_{REF} /FLAPS UP) |
| | 93 KIAS (v_{REF} /FLAPS APP) |

3.7.8 GO-AROUND / BALKED LANDING WITH ONE ENGINE INOPERATIVE

No change to the main part of the AFM, except for the airspeed as follows, with residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist:

Airspeed:

| | |
|-----------------------------------|-----------------------|
| Up to 1900 kg (4189 lb) | 88 KIAS / as required |
| Above 1900 kg (4189 lb) | 90 KIAS / as required |

3.10 FAILURES IN THE ELECTRICAL SYSTEM

3.10.1 COMPLETE FAILURE OF THE ELECTRICAL SYSTEM

1. Leave the icing area (by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead).
2. Proceed in accordance with the procedure given in Section 3.10.1 - COMPLETE FAILURE OF THE ELECTRICAL SYSTEM in the main part of the AFM.



3.13 ICE PROTECTION SYSTEM EMERGENCIES

3.13.1 INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION

- 1. DE-ICE..... HIGH
- 2. MAX press push button, to dissipate ice build-up

NOTE

The MAX push button activates the maximum possible system flow rate for 120 seconds.

- 3. Pitot heating..... check ON
- 4. ICE LIGHT ON, as required
- 5. Cabin heat & defrost ON
- 6. WINDSHIELD press push button, as required

If the system does not work properly:

Continue with Section 3.13.2 - FAILURE OF THE ICE PROTECTION SYSTEM.

If the system works properly, proceed as follows:

- 7. De-icing fluid level check periodically
- 8. DE-ICE NORM or HIGH, as required. Monitor ice build-up.

END OF CHECKLIST

3.13.2 FAILURE OF THE ICE PROTECTION SYSTEM

A "failure" of the ice protection system is any condition in which the system fails to remove ice from protected surfaces including the propellers and any system malfunction not covered in the abnormal operating procedures given in Chapter 4B of this Supplement.

1. Leave the icing area (by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead).
2. Airspeed maintain 118 to 156 KIAS until
final approach and landing

WARNING

With an inoperative ice protection system, set both POWER levers to 92% or max. 2100 RPM and leave icing conditions as soon as possible. In heavy icing conditions, it may not be possible to maintain altitude or proper glide path on approach; in this case, it is imperative that a safe airspeed be maintained, the stall warning system may not function and there may be little or no pre-stall buffet with heavy ice loads on the wing leading edges.

Before landing:

3. FLAPS APP
4. Final approach speed:
Up to 1900 kg (4189 lb) min. 90 KIAS
Above 1900 kg (4189 lb) min. 93 KIAS

4A. NORMAL OPERATING PROCEDURES

WARNING

If ice is observed forming aft of the protected surfaces of the wing, or if unusual lateral trim requirements or autopilot trim warnings are encountered, accomplish the following:

- * The flight crew should reduce the angle of attack by increasing speed as much as the airplane configuration and weather allow, without exceeding design maneuvering speed.
- * If the autopilot is engaged, hold the control stick firmly and disengage the autopilot. Do not re-engage the autopilot until the airframe is clear of ice.
- * Leave the icing area immediately by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead; and
- * Report these weather conditions to air traffic control.

WARNING

Flight in freezing rain, freezing drizzle, or mixed phase icing conditions (supercooled water and ice crystals) may result in hazardous ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and it may seriously degrade the performance and controllability of the airplane.

CAUTION

Do not delay activation of the ice protection system if icing conditions are encountered. For best operation, the system should be activated prior to accumulation of ice on protected surfaces.

Identification of Freezing Rain/Freezing Drizzle Icing Conditions

The following shall be used to identify freezing rain/freezing drizzle icing conditions:

- (1) Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice.
- (2) Accumulation of ice on the upper surface of the wing aft of the protected area.
- (3) Accumulation of ice on the propeller spinner farther back than normally observed.

Identification of Possible Freezing Rain/Freezing Drizzle Conditions

The following may be used to identify possible freezing rain/freezing drizzle conditions:

- (1) Visible rain at temperatures below +5 °C (41 °F) outside air temperature (OAT).
- (2) Droplets that splash or splatter on impact at temperatures below +5 °C (41 °F) OAT.
- (3) Performance losses larger than normally encountered in icing conditions. It is possible to experience severe ice accretions not visible to the flight crew, such as wing lower surface accretion or propeller blade accretion.

Procedures for Exiting the Freezing Rain/Freezing Drizzle Environment

These procedures are applicable to all flight phases from take-off to landing. Monitor the outside air temperature. While ice may form in freezing drizzle or freezing rain at temperatures as cold as -18 °C (0 °F), increased vigilance is warranted at temperatures around freezing with visible moisture present. If the visual cues specified above for identifying possible freezing rain or freezing drizzle conditions are observed, accomplish the following:

- (1) Exit the freezing rain or freezing drizzle icing conditions immediately to avoid extended exposure to flight conditions outside of those for which the airplane has been certificated for operation. Asking for priority to leave the area is fully justified under these conditions.
- (2) Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
- (3) Do not engage the autopilot. The autopilot may mask unusual control system forces.
- (4) If the autopilot is engaged, hold the control stick firmly and disengage the autopilot.
- (5) If an unusual roll response or uncommanded control movement is observed, reduce the angle of attack by increasing airspeed or rolling wings level (if in a turn), and apply additional power, if needed.
- (6) Avoid extending flaps during extended operation in icing conditions. Operation with flaps extended can result in a reduced wing angle of attack, with ice forming on the upper surface further aft on the wing than normal, possibly aft of the protected area.
- (7) If the flaps are extended, do not retract them until the airframe is clear of ice.
- (8) Report these weather conditions to air traffic control.

4A.2 AIRSPEEDS FOR NORMAL OPERATING PROCEDURES

With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane:

| | FLAPS | Speed up to 1900 kg (4189 lb) |
|----------------------------------|--------------|--|
| Reference landing approach speed | UP | 94 KIAS |
| | APP | min. 90 KIAS |
| Final approach speed | APP | min. 90 KIAS |

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

CAUTION

It is extremely important to visually inspect each TKS panel for proper fluid distribution across the active area of each panel prior flight into known icing.

4A.6.1 PRE-FLIGHT INSPECTION

I. Cabin Check

Ice Protection System:

- a) ELECT. MASTER ON
- b) DEICE FLUID check quantity
- c) Canopy closed

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WARNING

De-icing fluids are harmful. Do not press the WINDSHIELD push button when the canopy is open. Otherwise the de-icing fluid may be sprayed into the cabin. For proper handling refer to the Material Safety Data Sheets which are available from the supplier of the de-icing fluid.

- d) WINDSHIELD press push button
- e) Spraybar evidence of de-icing fluid

NOTE

If the system has been inoperative for a while, has been drained or has run dry, trapped air - suspected in the feeder lines to the main pumps - can be removed from the feeder lines to the main pumps by activating the windshield pumps several times.

NOTE

Do not operate the main pumps with an empty de-icing fluid tank. Operating the main system pumps with an empty de-icing fluid tank can cause a future system malfunction. To reestablish full system function special maintenance action is required.

- f) ANNUN-TEST ON

NOTE

The ANNUN-TEST mode activates the DEICE LVL LO caution immediately if the de-ice fluid quantity is low and the DEIC PRES LO caution after 120 seconds.

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- g) DEIC PRES HI..... verify NOT ILLUMINATED
- h) DEICE LVL LO check (must be annunciated if de-icing fluid quantity is below 6.0 liter (1.59 US gal))
- i) DEIC PRES LO check, ILLUMINATED (refer to NOTE)
- j) ANNUN-TEST OFF
- k) PUMP 1 select
- l) DE-ICE HIGH
- m) DEIC PRES LO verify NOT ILLUMINATED

NOTE

The ice protection system is approved for operation with de-icing fluid that has a very temperature dependant viscosity characteristic. The viscosity decreases with rising temperature above 0°C (32°F) and passes the porous membrane of the panels with less resistance. The decrease in pressure drop reduces the pressure in the panel reservoir which may not be adequate to wet-out the entire panel active area if the preflight inspection is performed at warmer outside temperatures.

NOTE

If at ambient temperature above 10°C (50°F) and below 20°C (68°F) DEIC PRES LO warning appears in HIGH mode activate DE-ICE on MAX to cancel the warning. Above 20°C (68°F) ambient temperature warning cancellation may not be possible.

- n) PUMP 2 select

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- o) ICE LIGHT ON
- p) Ice lights visual inspection, check
- q) DEIC PRES HI verify NOT ILLUMINATED
- r) DEIC PRES LO verify NOT ILLUMINATED
- s) DE-ICE OFF
- t) ICE LIGHT OFF
- u) ELECT. MASTER OFF

END OF CHECKLIST

II. Walk-Around Check, Visual Inspection

Ice Protection System:

- a) De-icing fluid tank visually check quantity through transparent tank (in RH baggage compartment); remove carpet if necessary. If OÄM 42-160 AND OÄM 42-203 are installed: visually check through filler cap on LH side of fuselage
- b) Filler cap check secure (if only OÄM 42-160 is installed) and locked (only if OÄM 42-160 AND OÄM 42-203 are installed)
- c) Deflector and spraybar visually check, free from dirt
- d) Porous panels on wings visually check no damage and no holes blocked, evidence of de-icing fluid along entire panel

NOTE

If required, activate DE-ICE on MAX until fluid is evident along entire panel.

- e) Porous panels on horizontal and vertical tail . visually check no damage and no holes blocked, evidence of de-icing fluid along entire panel

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| | | | |
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NOTE

If required, activate DE-ICE on MAX to provide fluid evidence along entire porous panel active area.

- f) Slinger rings and/or nozzle at propeller visually check no damage and no holes blocked
- g) Wing, tail, propellers, windshield verify free from ice

END OF CHECKLIST

4A.6.5 TAXIING

NOTE

De-icing fluid will remain on the windshield for a while after operating windshield de-ice. For an unobstructed view, do not operate the windshield de-ice during taxiing.

4A.6.6 BEFORE TAKE-OFF

If icing conditions are anticipated immediately after take-off:

- 1. DE-ICE NORM
- 2. Pitot heating ON
- 3. ICE LIGHT ON, as required
- 4. Cabin heat & defrost ON

NOTE

NORM mode is cycled. Therefore temporary ice build-up and subsequent shedding will occur on protected surfaces.

END OF CHECKLIST

| | | | |
|---------------|-------------|--------|------------------|
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|---------------|-------------|--------|------------------|

4A.6.8 CLIMB

If icing conditions do exist:

1. DE-ICE NORM, monitor ice build-up
HIGH, if no shedding, or to
prevent excessive ice build up

NOTE

NORM mode is cycled. Therefore temporary ice build-up and subsequent shedding will occur on protected surfaces.

If no shedding in HIGH mode:

2. Proceed with Section 3.13.1 - INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION

Whilst in icing conditions:

3. Airspeed maintain 118 KIAS
4. Pitot heating..... check ON
5. ICE LIGHT ON, as required
6. Cabin heat & defrost check ON
7. WINDSHIELD press push button, as required
8. De-icing fluid level check periodically

After leaving icing conditions:

9. DE-ICE OFF
10. Pitot heating..... OFF, as required
11. ICE LIGHT OFF, as required
12. Cabin heat & defrost OFF, as required

END OF CHECKLIST

4A.6.9 CRUISE

If icing conditions do exist:

1. DE-ICE NORM, monitor ice build-up
HIGH, if no shedding, or to
prevent excessive ice build up

If no shedding in HIGH mode:

2. Proceed with section 3.13.1 - INADVERTENT ICING ENCOUNTER &
EXCESSIVE ICE ACCUMULATION

Whilst in icing conditions:

3. Pitot heating check ON
4. ICE LIGHT ON, as required
5. Cabin heat & defrost check ON
6. WINDSHIELD press push button, as required
7. De-icing fluid level check periodically
8. Airspeed. maintain 118 to 156 KIAS

WARNING

When disconnecting the autopilot with ice accretions on the airplane, the pilot should be alert for out-of-trim forces. Pilot control stick input should be applied as required to prevent potential undesired flight path deviations.

CONTINUED

NOTE

During prolonged icing encounters in cruise, increase engine power to maintain cruise speed as ice accumulates on the unprotected areas, and to preclude the ice build-up on the fuselage under surface.

NOTE

The autopilot may be used in icing conditions. However, every 10-15 minutes the autopilot should be disconnected to detect any out of trim conditions caused by ice build-up. If significant out of trim conditions are detected, the autopilot should remain off for the remainder of the icing encounter so that the pilot may monitor for additional force build-up.

After leaving icing conditions:

- 9. DE-ICE OFF
- 10. Pitot heating..... OFF, as required
- 11. ICE LIGHT..... OFF, as required
- 12. Cabin heat & defrost OFF, as required

END OF CHECKLIST

4A.6.11 APPROACH AND LANDING*If icing conditions do exist:*

- DE-ICE HIGH

If no shedding in HIGH mode:

- Proceed with Section 3.13.1 - INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION

Whilst in icing conditions:

- ICE LIGHT ON, as required
- WINDSHIELD press push button, as required

NOTE

De-icing fluid will remain on the windshield for a period after operating windshield de-ice. For an unobstructed view, do not operate the windshield de-ice within 30 seconds prior to landing.

- Airspeed maintain 118 to 156 KIAS
until final approach and landing
- FLAPS UP or APP, as required

Before landing:

- FLAPS APP
- Final approach speed min. 90 KIAS

END OF CHECKLIST

4A.6.13 AFTER LANDING

1. DE-ICE OFF
2. ICE LIGHT OFF

END OF CHECKLIST

4A.6.15 EXIT AIRPLANE

CAUTION

When the ice protection system has been enabled in flight, the walkways on the inner wings may be slippery.

4A.6.17 PARKING

NOTE

When the ice protection system has been enabled in flight, special care must be taken when touching the airframe structure or canopy as they may be partially contaminated with de-icing fluid.

Clean the de-icing fluid from the canopy and the porous panels. Refer to Chapter 8 for appropriate procedures.

4B. ABNORMAL OPERATING PROCEDURES**4B.4 CAUTION-ALERTS ON THE G1000****4B.4.6 L/R ALTN FAIL****L/R ALTN FAIL**

Left/Right engine alternator has failed.

(a) One alternator failed

1. Icing Conditions leave the icing area as soon as practicable
2. Proceed in accordance with the procedure given in section 4B.4.6 L/R ALTN FAIL in the main part of the AFM.

4B.4.15 DE-ICE PRESS LOW**DEIC PRES LO**

De-icing pressure is low.

1. DE-ICE HIGH

If DEIC PRES LO indication does not extinguish on the G1000:

2. PUMP1 / PUMP2 select other main pump

NOTE

Activate the WINDSHIELD pump to prime the alternate main pump if necessary.

CONTINUED

If DEIC PRES LO indication still does not extinguish on the G1000:

3. ALTERNATE switch on de-ice panel. open guard, toggle switch

If DEIC PRES LO indication still does not extinguish on the G1000:

4. Activate DE-ICE on MAX and proceed with Section 3.13.2 - FAILURE OF THE ICE PROTECTION SYSTEM.

If DEIC PRES LO indication extinguishes on the G1000 and normal operation is achieved:

5. Continue flight, allow for a de-icing fluid flow of 30 liter (7.9 US gal) per hour (HIGH mode)
6. Ice Protection System monitor operation
7. De-icing fluid level check periodically

CAUTION

If at ambient temperature above 10°C (50°F) and below 20°C (68°F) DEIC PRES LO warning appears in HIGH mode activate DE-ICE on MAX to cancel the warning. Above 20°C (68°F) ambient temperature warning cancellation may not be possible.

END OF CHECKLIST

4B.4.16 DE-ICE PRESSURE HIGH

| | |
|--------------|----------------------------|
| DEIC PRES HI | De-icing pressure is high. |
|--------------|----------------------------|

1. Icing conditions leave the icing area as soon as practicable

NOTE

Reduced system performance may occur. Unscheduled maintenance is required.

4B.4.17 DE-ICE LEVEL LOW

| | |
|--------------|------------------------------|
| DEICE LVL LO | De-icing fluid level is low. |
|--------------|------------------------------|

Maximum remaining system operating times after first annunciation of the DEICE LVL LO caution message:

NORM mode 30 min.
HIGH mode 15 min.

4B.4.18 FAILURE OF INDICATION LIGHTS

The indication lights (MAX, NORM, HIGH) on the de-ice panel are only used to indicate the selected operating mode. Failure to illuminate does not indicate a malfunction of the system.

1. Continue flight.
2. Unscheduled maintenance is required.

4B.4.19 FAILURE OF THE WINDSHIELD DE-ICE

A "failure" of the windshield de-ice is any condition in which the system fails to remove ice from the windshield.

1. Continue flight, viewing through the unobstructed areas on the side of the canopy. Open the emergency window if necessary.

4B.5 FAILURES IN FLAP OPERATING SYSTEM

Failure in Position Indication or Function

1. FLAPS position check visually
2. Airspeed maintain below max. speed at current Flap position
3. FLAPS switch re-check flap positions

Modified Approach Procedure Depending on the Available Flap Setting

NOTE

Refer to 5.3.10 - LANDING DISTANCES in the main part of the AFM for landing distances with abnormal flap positions.

Before landing, with residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist:

Airspeed up to 1900 kg (4189 lb) min. 94 KIAS

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

END OF CHECKLIST

5. PERFORMANCE

5.1 INTRODUCTION

Airplane performance and stall speeds in clear air are unchanged with the installation of the ice protection system.

Significant climb and cruise performance degradation, range reduction, as well as buffet and stalling speed increase must be expected if ice accumulates on the airframe.

Residual ice on the protected surfaces and ice accumulation on the unprotected areas of the airplane can cause noticeable performance losses, even with the ice protection system operating.

5.3 PERFORMANCE TABLES AND DIAGRAMS

NOTE

The performance data is valid for ice accumulation on unprotected airplane surfaces in maximum continuous icing conditions defined by CS 25 / FAR Part 25 Appendix C. Greater accumulation of ice can result in further loss of flight performance.

5.3.4 STALLING SPEEDS

Airspeeds in KIAS at idle power:

| 1900 kg (4189 lb) | | Bank Angle | | | |
|-------------------|-------|------------|-----|-----|-----|
| Gear | Flaps | 0° | 30° | 45° | 60° |
| UP | UP | 74 | 80 | 88 | 105 |
| DOWN | APP | 70 | 75 | 83 | 99 |

| 1999 kg (4407 lb) | | Bank Angle | | | |
|-------------------|-------|------------|-----|-----|-----|
| Gear | Flaps | 0° | 30° | 45° | 60° |
| UP | UP | 76 | 81 | 90 | 106 |
| DOWN | APP | 72 | 77 | 85 | 101 |

5.3.5 WIND COMPONENTS

The maximum demonstrated cross wind component is 20 knots.

5.3.7 CLIMB PERFORMANCE

| All Engines Operating Climb - Flaps UP @ 118 KIAS with 45 min. Ice Accretion | | | | | | | | | | |
|---|-------------------------|------------------------|--|------------|------------|------------|-------------|------------|------------|------------|
| Flaps: UP | | | | | | | | | | |
| Airspeed: 118 KIAS | | | | | | | | | | |
| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | ISA |
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | |
| | | | -40 | -30 | -20 | -10 | 0 | 10 | | |
| | | | -40 | -22 | -4 | 14 | 32 | 50 | | |
| 1999 / 4407 | SL | | 790 | 760 | 730 | 700 | 670 | 640 | 632 | |
| | 2000 | 610 | 750 | 720 | 690 | 660 | 630 | 600 | 597 | |
| | 4000 | 1219 | 710 | 680 | 640 | 610 | 580 | 550 | 563 | |
| | 6000 | 1829 | 660 | 630 | 600 | 560 | 530 | 500 | 523 | |
| | 8000 | 2438 | 620 | 580 | 550 | 510 | 470 | 440 | 482 | |
| | 10000 | 3048 | 570 | 530 | 490 | 450 | 420 | 380 | 439 | |
| | 12000 | 3658 | 500 | 460 | 420 | 370 | 310 | 260 | 364 | |
| | 14000 | 4267 | 430 | 380 | 330 | 270 | 210 | 140 | 293 | |
| | 16000 | 4877 | 280 | 240 | 180 | 130 | 60 | -30 | 170 | |
| 18000 | 5486 | 140 | 90 | 40 | -10 | -80 | -190 | 46 | | |
| 1900 / 4189 | SL | | 850 | 820 | 780 | 750 | 720 | 690 | 681 | |
| | 2000 | 610 | 810 | 770 | 740 | 710 | 670 | 640 | 645 | |
| | 4000 | 1219 | 760 | 730 | 690 | 660 | 630 | 590 | 609 | |
| | 6000 | 1829 | 710 | 680 | 640 | 610 | 570 | 540 | 568 | |
| | 8000 | 2438 | 670 | 630 | 590 | 550 | 520 | 480 | 525 | |
| | 10000 | 3048 | 610 | 570 | 530 | 490 | 460 | 420 | 480 | |
| | 12000 | 3658 | 550 | 500 | 460 | 400 | 350 | 300 | 402 | |
| | 14000 | 4267 | 470 | 420 | 370 | 310 | 240 | 160 | 327 | |
| | 16000 | 4877 | 320 | 270 | 210 | 160 | 90 | -10 | 199 | |
| 18000 | 5486 | 170 | 110 | 60 | 10 | -60 | -180 | 69 | | |

| All Engines Operating Climb - Flaps UP @ 118 KIAS with 45 min. Ice Accretion | | | | | | | | | | |
|---|------------------|-----------------|---------------------------------------|------------|-----------|-----------|---------|----------|-----|-----|
| Flaps: UP | | | | | | | | | | |
| Airspeed: 118 KIAS | | | | | | | | | | |
| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | ISA |
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | |
| | | | -40 -40 | -30 -22 | -20 -4 | -10 14 | 0 32 | 10 50 | | |
| 1700 / 3748 | SL | | 980 | 940 | 910 | 870 | 840 | 800 | 792 | |
| | 2000 | 610 | 930 | 890 | 860 | 820 | 790 | 750 | 753 | |
| | 4000 | 1219 | 880 | 840 | 810 | 770 | 730 | 700 | 713 | |
| | 6000 | 1829 | 830 | 790 | 750 | 710 | 680 | 640 | 668 | |
| | 8000 | 2438 | 780 | 740 | 690 | 650 | 610 | 580 | 622 | |
| | 10000 | 3048 | 720 | 670 | 630 | 590 | 550 | 500 | 572 | |
| | 12000 | 3658 | 650 | 600 | 550 | 490 | 430 | 370 | 486 | |
| | 14000 | 4267 | 560 | 510 | 450 | 380 | 310 | 220 | 403 | |
| | 16000 | 4877 | 390 | 340 | 280 | 210 | 140 | 30 | 261 | |
| 18000 | 5486 | 230 | 170 | 110 | 50 | -30 | -160 | 117 | | |

Dark shaded areas indicate a climb rate of less than 50 ft/min.
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.8 ONE ENGINE INOPERATIVE CLIMB PERFORMANCE

With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist:

NOTE

Due to ice build-up on unprotected areas and/or residual ice on the airplane, a positive rate of climb cannot be expected.

| One Engine Inoperative Climb - Flaps UP @ 88 KIAS with 45 min. Ice Accretion | | | | | | | | | | |
|---|-------------------------|------------------------|--|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| Flaps: UP | | | | | | | | | | |
| Airspeed: 88 KIAS | | | | | | | | | | |
| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | ISA |
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | |
| | | | -40 | -30 | -20 | -10 | 0 | 10 | | |
| | | | -40 | -22 | -4 | 14 | 32 | 50 | | |
| 1999 / 4407 | SL | | 110 | 95 | 80 | 65 | 55 | 40 | 35 | |
| | 2000 | 610 | 80 | 65 | 50 | 35 | 15 | 0 | 2 | |
| | 4000 | 1219 | 45 | 30 | 10 | -5 | -25 | -40 | -33 | |
| | 6000 | 1829 | 5 | -10 | -30 | -50 | -85 | -85 | -69 | |
| | 8000 | 2438 | -35 | -55 | -75 | -90 | -110 | -130 | -107 | |
| | 10000 | 3048 | -80 | -100 | -120 | -140 | -160 | -160 | -149 | |
| | 12000 | 3658 | -130 | -150 | -175 | -205 | -230 | -255 | -204 | |
| | 14000 | 4267 | -185 | -210 | -240 | -270 | -300 | -335 | -259 | |
| | 16000 | 4877 | -270 | -300 | -325 | -355 | -390 | -430 | -335 | |
| 18000 | 5486 | -360 | -390 | -420 | -445 | -480 | -525 | -414 | | |

| One Engine Inoperative Climb - Flaps UP @ 88 KIAS with 45 min. Ice Accretion | | | | | | | | | | |
|---|------------------|-----------------|---------------------------------------|------------|-----------|-----------|---------|----------|------|-----|
| Flaps: UP | | | | | | | | | | |
| Airspeed: 88 KIAS | | | | | | | | | | |
| Weight [kg] / [lb] | Press. Alt. [ft] | Press. Alt. [m] | Rate of Climb - [ft/min] | | | | | | | ISA |
| | | | Outside Air Temperature - [°C] / [°F] | | | | | | | |
| | | | -40 -40 | -30 -22 | -20 -4 | -10 14 | 0 32 | 10 50 | | |
| 1900 / 4189 | SL | | 150 | 140 | 125 | 110 | 95 | 85 | 79 | |
| | 2000 | 610 | 120 | 105 | 90 | 75 | 60 | 45 | 47 | |
| | 4000 | 1219 | 85 | 70 | 55 | 40 | 20 | 5 | 13 | |
| | 6000 | 1829 | 50 | 35 | 15 | 0 | -20 | -40 | -24 | |
| | 8000 | 2438 | 10 | -10 | -25 | -45 | -65 | -85 | -81 | |
| | 10000 | 3048 | -35 | -55 | -75 | -95 | -115 | -135 | -102 | |
| | 12000 | 3658 | -80 | -105 | -130 | -155 | -180 | -210 | -156 | |
| | 14000 | 4267 | -140 | -165 | -190 | -220 | -255 | -285 | -211 | |
| | 16000 | 4877 | -225 | -250 | -280 | -310 | -340 | -380 | -287 | |
| | 18000 | 5486 | -310 | -340 | -370 | -400 | -435 | -480 | -366 | |
| 1700 / 3748 | SL | | 220 | 205 | 190 | 175 | 160 | 150 | 143 | |
| | 2000 | 610 | 185 | 170 | 155 | 140 | 125 | 110 | 110 | |
| | 4000 | 1219 | 150 | 135 | 120 | 100 | 85 | 65 | 73 | |
| | 6000 | 1829 | 115 | 95 | 75 | 55 | 40 | 20 | 34 | |
| | 8000 | 2438 | 70 | 50 | 30 | 10 | -10 | -30 | -6 | |
| | 10000 | 3048 | 25 | 0 | -20 | -40 | -60 | -85 | -49 | |
| | 12000 | 3658 | -30 | -50 | -80 | -105 | -135 | -165 | -108 | |
| | 14000 | 4267 | -80 | -115 | -145 | -180 | -210 | -250 | -167 | |
| | 16000 | 4877 | -165 | -210 | -240 | -270 | -310 | -350 | -249 | |
| | 18000 | 5486 | -280 | -310 | -340 | -370 | -410 | -480 | -335 | |

Dark shaded areas indicate a climb rate of less than 50 ft/min.
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.9 TIME, FUEL AND DISTANCE TO CLIMB

NOTE

Performance information not published for icing conditions.

5.3.10 CRUISING (TRUE AIRSPEED TAS)

With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist:

Reduce cruise performance by 20 %.

5.3.11 LANDING DISTANCES

With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist::

- Power lever. both IDLE
- Flaps APP

Use FLAPS LDG information of the main part of the AFM and increase by 20%.

5.3.12 GRADIENT OF CLIMB ON GO-AROUND

With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane or if icing conditions do exist::

- Power lever both MAX
- Flaps APP
- Landing gear extended
- Airspeed: 90 KIAS

Value for ISA and MSL, at 1805 kg (3979 lb)

| | |
|----------------------------|--|
| Constant gradient of climb | 9.0 % (equals 5.1 climb angle) or 818 ft/min |
|----------------------------|--|

Value for ISA and MSL, at 1900 kg (4189 lb)

| | |
|----------------------------|--|
| Constant gradient of climb | 8.2 % (equals 4.7 climb angle) or 746 ft/min |
|----------------------------|--|

6. MASS AND BALANCE

6.4 FLIGHT MASS AND CENTER OF GRAVITY

6.4.1 MOMENT ARMS

| Item | Lever Arm | |
|--|-----------|-------|
| | [m] | [In] |
| De-icing fluid tank (if only OÄM 42-160 is carried out) | 1.00 | 39.4 |
| De-icing fluid tank (if OÄM 42-160 AND OÄM 42-203 are carried out) | 4.52 | 178.0 |

The mass (weight) of the de-icing fluid is obtained as follows:

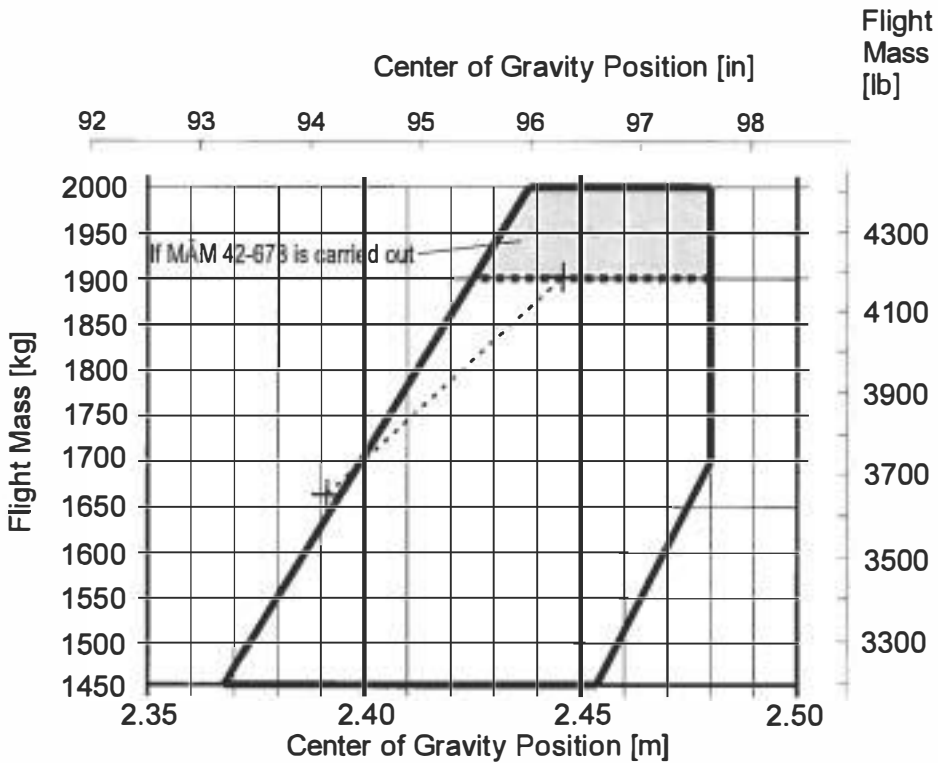
Multiply the fluid quantity in liter by 1.1 to obtain kilograms (kg), or
 multiply the fluid quantity in US gallon by 9.2 to obtain pound (lb).

6.4.3 CALCULATION OF LOADING CONDITION

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.

NOTE

Our example shows a loading condition outside the permitted range for weights below approximately 1700 kg (3748 lb).



6.4.4 PERMISSIBLE GRAVITY RANGE

Ice Protection System



DA 42 NG AFM
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The center of gravity (CG position) for flight conditions must be between the following limits:

Most forward flight CG:

2.368 m (93.22 in) aft of datum plane at 1450 kg (3197 lb)

2.425 m (95.47 in) aft of datum plane at max. take-off mass 1900 kg (4189 lb)

If MÄM 42-678 is carried out:

2.438 m (95.98 in) aft of datum plane at max. take-off mass 1999 kg (4407 lb)

linear variation in between

Most rearward flight CG:

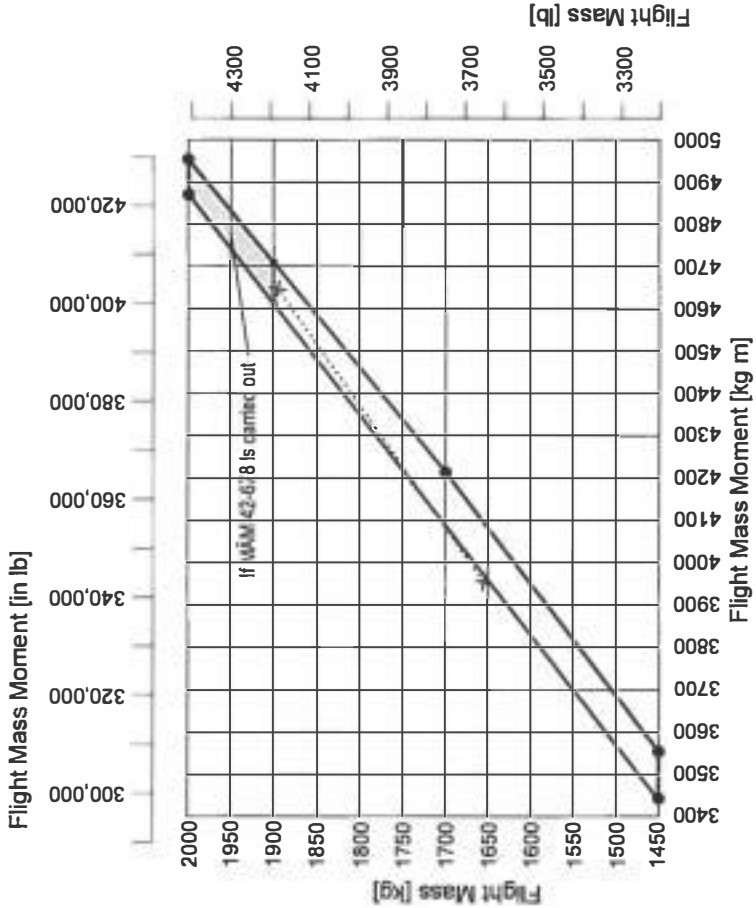
2.454 m (96.61 in) aft of datum plane at 1450 kg (3197 lb)

2.480 m (97.64 in) aft of datum plane at 1700 kg (3748 lb)

2.480 m (97.64 in) aft of datum plane at max. take-off mass (see Section 2.7)

linear variation in between

6.4.5 PERMISSIBLE MOMENT RANGE



7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

7.9 POWER PLANT

7.9.4 ENGINE INSTRUMENTS

On the Garmin G1000 MFD the de-icing fluid level indication is displayed on the system page. Indication markings indicate (from left to right) 1/4, 2/4, 3/4 and 4/4 of the usable fluid quantity (30 liter or 7.9 US gal).

Display when pushing the SYSTEM button:

If MÄM 42-978 is NOT installed:

If MÄM 42-978 and OÄM 42-160
are installed, on the second page:



7.10 ELECTRICAL SYSTEM**7.10.3 ~~WARNING~~, CAUTION AND ADVISORY MESSAGES****Caution Alerts on the G1000**

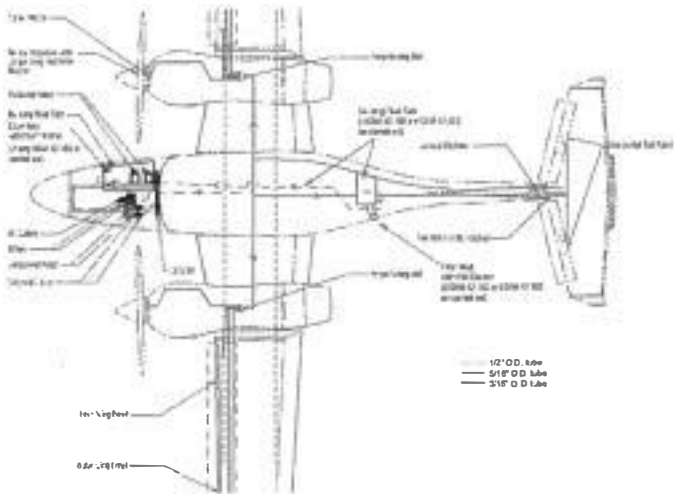
| Caution alerts (amber) | Meaning / Cause |
|-----------------------------------|--|
| DEIC PRES LO | System pressure upstream of the porous panels on the horizontal or vertical tail is too low. |
| DEIC PRES HI | System pressure upstream of the de-icing fluid filter is too high. |
| DEICE LVL LO | De-icing fluid level in the tank is below 6.0 liter (1.59 US gal). |

7.15 DE-ICING SYSTEM

Description

The ice protection system is electrically operated. It is supplied with power via the XFR PUMP/DE-ICE circuit breaker. The airframe and propellers are grouped and operate together. Windshield de-icing is a separate system and operates independently. All systems draw fluid from a common tank.

Mechanical Overview



- * Two main pumps, installed in the nose compartment of the airplane, under an inspection lid on the RH side.

The pumps take de-icing fluid from the tank and feed it to :

- the airframe ice protection system (see below), and
- the windshield de-icing system (see below).

In the NORM mode both main pumps run simultaneously and are cycled on and off by two time delay relays.

In the HIGH mode only the selected main pump runs continuously.

In the MAX mode both pumps run simultaneously and continuously.

A switch in the cockpit selects the modes NORM and HIGH. In the HIGH mode the MAX mode can be engaged by pressing a push button on the de-ice panel in the cockpit. This mode is activated for 2 minutes.

The information which mode is currently in use is indicated by three lights on the ice protection control unit on the instrument panel.

- * The airframe/propeller ice protection system consists of the following components:
 - Two de-icing fluid filters, installed in the nose compartment of the airplane, under an inspection lid on the LH side. The active main pump feeds the de-icing fluid through the filters to the proportioning units. The filters prevent the proportioning units from fouling.

- Proportioning units in each nacelle (between the main spars) and in the upper vertical tail (forward of the front spar). The proportioning units regulate the flow of de-icing fluid to the porous panels and to the propeller slinger rings by means of capillaries.
 - TKS porous panels are fitted to the leading edge of the outer wings, the vertical tail, and the horizontal tail. The porous panels weep the fluid at a low rate through fine holes.
 - Nozzles and slinger rings on the propellers. The nozzle sprays fluid into the slinger ring which is mounted to the spinner backplate. The fluid is then distributed to the propeller blades by centrifugal force through notches in the slinger ring.
 - Three low pressure sensors which detect malfunctions of the system. Refer to Section 7.10 in this Supplement.
 - One high pressure sensor which activates an indication when the filter cartridges need to be replaced. Refer to Section 7.10 in this Supplement.
- * The windshield ice protection system consists of:
- Two windshield de-icing pumps with solenoid valves, installed in the nose compartment of the airplane, under an inspection lid on the LH side. The active windshield de-icing pump supplies the fluid to the spraybar.
- Only one windshield de-icing pump is operative at a time. A switch in the cockpit selects the active pump (PUMP1/PUMP2). The second pump is installed for redundancy.
- One de-icing fluid spraybar for the canopy.

Unlike the airframe de-icing system, the windshield de-icing system does not spray fluid continuously, but is activated for 5 seconds by operating a push button, even when the main switch of the ice protection system is in the OFF position.

* The electrical system consists of:

- An ice protection control box which is mounted under the LH baggage compartment floor. The ice protection control box contains all necessary relays to operate and cycle the pumps.
- A de-ice panel, mounted on the RH side of the instrument panel, enables the complete control of the whole de-icing system.
- Two ice lights are installed for monitoring ice accretion on both wings in low lighting conditions.

Replenishing

Refer to Section 2.17 in this Supplement for approved de-icing fluids.

NOTE

The de-icing fluid must be considered for the mass and balance calculations. Refer to Chapter 6 in this Supplement.

If OÄM 42-160 is carried out, the de-icing fluid is replenished through the filler which is located in the fuselage nose on the RH side, aft of the nose baggage door. The tank has a usable capacity of 30 liter (7.9 US gal).

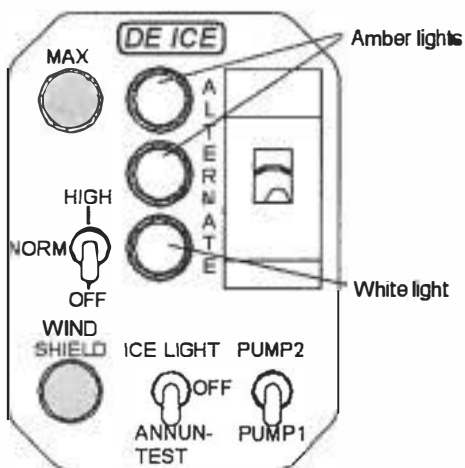
If OÄM 42-160 AND OÄM 42-203 are carried out, the de-icing fluid is replenished through the filler which is located on the LH side of the fuselage aft of the short baggage compartment.

Operation

The system is operated through four toggle switches and two push buttons located on the ice protection control unit in the RH section of the instrument panel.

The current operating mode is indicated by the following indication lights:

- NORM : lower white light only
- HIGH : center amber light only
- MAX : both (top and center) amber lights



OFF/NORM/HIGH Switch

The OFF/NORM/HIGH switch operates the selected main pump and thus activates the system. It has 3 positions:

Down position: OFF.

Center position: NORM (normal). The main pumps produce a cycled fluid flow: the main pumps provide fluid to the system for 30 seconds, followed by a 90 seconds break. This mode is designed to cover the more frequent but less severe known icing conditions as defined by CS 25/FAR Part 25, Appendix C, and is selected when icing conditions are encountered and prior to ice formation. Maximum system operating time is approximately 2 hours and 30 minutes.

Up position: HIGH. The active main pump produces a continuous fluid flow. This mode is designed to cover all known icing conditions as defined by CS 25/FAR Part 25, Appendix C, and is selected when icing conditions are more demanding or if ice has already accumulated. Maximum system operating time is approximately 1 hour.

MAX Push Button

The upper push button activates the MAX mode of the ice protection system when the system is presently in the HIGH mode. This mode is designed to provide maximum possible protection for conditions outside the icing envelope as defined by CS 25/FAR Part 25, Appendix C, and is only active for 2 minutes after each activation. In this mode both pumps are active simultaneously and provide fluid to the system. Maximum system operating time with continuous MAX mode activation is approximately 30 minutes.

PUMP1/PUMP2 Switch

The RH bottom switch selects one of the two main pumps and one of the two windshield pumps. It has 2 positions.

Down position: PUMP 1. Main pump 1 is selected as the active pump in HIGH mode. Pump 2 is standby. Also windshield pump 1 is selected in case the windshield switch is activated. Windshield pump 2 is inoperative.

Up position: PUMP 2. Main pump 2 is selected as the active pump in HIGH mode. Pump 1 is standby. Also windshield pump 2 is selected in case the windshield switch is activated. Windshield pump 1 is inoperative.

WINDSHIELD Push Button

The WINDSHIELD push button activates the selected windshield de-icing pump for a duration of 5 seconds. During this time it feeds de-icing fluid to the spraybar in front of the canopy.

The windshield de-icing works even when the OFF/NORM/HIGH switch of the ice protection system is set OFF. Purging air from the ice protection system is also provided from these pumps by continuously pressing the WINDSHIELD push button.

ALTERNATE Switch

The ALTERNATE switch connects the main pump no. 2 directly to the RH main bus. Thus, in case of a total loss of the LH main bus in icing conditions, operation of the ice protection system similar to the HIGH mode is possible.

ANNUN-TEST/OFF/ICE LIGHT

This switch activates the ice-lights or the annunciation test procedure (refer to Section 4A.6.1).

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

The porous panels can be cleaned with soap and water using a clean, lint-free cloth. Isopropyl alcohol, ethyl alcohol or methylated spirit may be used to remove oil or grease. Furthermore approved de-icing fluids, AVGAS and jet fuel are permitted for use on the panels.

CAUTION

Do not apply polish or wax to the panels. Certain solvents, particularly methyl ethyl ketone (MEK), acetone, lacquer thinner and other types of thinners and solvents damage the inner membrane of the panels. Mask active area of panels with a low tack tape when using solvents or painting the airplane in the proximity of the panels or when the airplane is stored in a dusty environment.

NOTE

The ice protection system should be checked for excessive de-icing fluid leaks after each use. Due to the dihedral wing small amounts of de-icing fluid can evaporate from the inner wing panels over a period of several days. Contamination precautions must be done if the airplane is stored in a hangar.

8.4.5 REPLENISHMENT OF THE DE-ICING FLUID TANK

For approved de-icing fluids refer to Section 2.17 in this Supplement.

To preclude the possibility of contaminated fluid do not remove the inlet strainer, always clean the top of the fluid tank before replenishing. Secure the filler cap immediately after replenishment.

If only OÄM 42-160 is carried out

The tank is located in the baggage compartment and the filler cap is on top of the filler neck of the tank, accessible via the open RH baggage door.

If OÄM 42-160 AND OÄM 42-203 are carried out

The tank is located aft of the short baggage compartment and the filler cap is located on the LH side of the fuselage.

8.6.6. PROLONGED OUT OF SERVICE OR DE-ICING SYSTEM RUN DRY

To avoid the need to reprime the system and to provide a quick response when turned to service, maintain at least 2 liter (0.5 US gal) in the tank. To ensure that all system components are filled with fluid, operate the system at least once in a month. If necessary, operate the pumps until all air is purged from components and pipelines.

Priming of the Main Pumps

The main pumps may not be self priming and are primed, when required, by the operation of either windshield pump. Windshield pump 1 or 2 will prime main pump 1 or 2.

Priming of the Porous Panels

In flight:

WARNING

Priming of the porous panels in icing conditions is not permitted.

Priming of the porous panels is best done during climb or descent, at ambient temperatures up to 4 °C (39 °F). To prime the porous panels, activate the MAX mode. Repeat the procedure in intervals of approximately 5 minutes until fluid dissipates from all porous panels.

By special maintenance:

At ambient temperatures above 4 °C (39 °F), special maintenance may be required to prime the porous panels.

DA 42 NG AFM
Supplement S04



Continuous Flow
Oxygen System

SUPPLEMENT S04
TO THE AIRPLANE FLIGHT MANUAL
DA 42 NG
CONTINUOUS FLOW OXYGEN SYSTEM

Doc. No. : 7.01.16-E

Date of Issue : 01-Apr-2012

Design Change Advisories : VÄM-42-004 and OÄM 42-055

This Supplement is EASA approved under EASA Approval Number EASA AC.09012 and 10039193.

DIAMOND AIRCRAFT INDUSTRIES GMBH
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AUSTRIA

9-S04-1

0.1 RECORD OF REVISIONS

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|----------|---|---------|---|------------------|---|------------------|---------------|-----------|
| 1 | OAM 42-055/n Correction of max. filling pressure | 0, 7 | 9-S04-03, 9-S04-04, 9-S04-05, 9-S04-24 | 09-Mar-2021 | The technical content of this document is approved under the authority of the DOA ref EASA. 21J 052 | 06-May-2021 | | |
| | | | | | | | | |

0.2 LIST OF EFFECTIVE PAGES

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| | 9-S04-4 | 09-Mar-2021 |
| | 9-S04-5 | 09-Mar-2021 |
| | 9-S04-6 | 01-Apr-2012 |
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| 2 | Appr. 9-S04-7 | 01-Apr-2012 |
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1. GENERAL

The DA 42 NG can be equipped with an optional continuous flow oxygen system. It distributes supplemental oxygen for each pilot and passenger up to 18,000 ft.

2. OPERATING LIMITATIONS

No Change.

3. EMERGENCY PROCEDURES

3.11 SMOKE AND FIRE

3.11.6 CABIN SMOKE ABOVE 10,000 FT

1. OXYGEN check ON

Initiate an emergency descent:

2. FLAPS UP
3. LANDING GEAR DOWN
4. POWER lever IDLE
5. Airspeed as required

WARNING

Max. structural cruising speed V_{NO} = 151 KIAS

Never exceed speed in smooth air V_{NE} = 188 KIAS

When passing 10,000 ft:

6. OXYGEN OFF
7. Land at the nearest suitable airfield.

END OF CHECKLIST

3.10.7 CABIN FIRE ABOVE 10,000 FT

1. OXYGENpush OFF

Initiate an emergency descent:

2. FLAPSUP
3. LANDING GEAR.....DOWN
4. POWER leverIDLE
5. Airspeed.....as required

WARNING

Max. structural cruising speed V_{NO} = 151 KIAS
Never exceed speed in smooth air V_{NE} = 188 KIAS

6. Land at the nearest suitable airfield.

END OF CHECKLIST

3.12 OTHER EMERGENCIES

3.12.10 OXYGEN PRESSURE LOSS ABOVE 10,000 FT

1. OXYGENpush OFF
2. Oxygen pressure.....checked, note down

Initiate an emergency descent:

3. FLAPSUP
4. LANDING GEAR.....DOWN
5. POWER leverIDLE
6. Airspeed.....as required

CONTINUED

| | | | |
|------------------|-------------|--------|--------------|
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|------------------|-------------|--------|--------------|

WARNING

Max. structural cruising speed V_{NO} = 151 KIAS

Never exceed speed in smooth air V_{NE} = 188 KIAS

When passing 10,000 ft:

- 7. Oxygen pressure check

If oxygen pressure is constant, continue flight:

- 8. Airspeed check
- 9. LANDING GEAR UP
- 10. POWER lever..... as required
- 11. Airspeed as required

If oxygen pressure drops, abort flight:

- 8. Land at the nearest suitable airfield.

WARNING

A leak in the oxygen system may excessively increase the risk of fire.

END OF CHECKLIST

4A. NORMAL OPERATING PROCEDURES

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

NOTE

This supplement has been created in compliance with the requirement and rules of JAR-23; limit altitude according rules of JAR-OPS1.

4A.6.1 PRE-FLIGHT INSPECTION

I. Cabin check

Front baggage compartment:

- a) Front baggage compartmentcheck, no flammable fluids, oils and greases are in the nose baggage compartment.

Oxygen system:

- a) Cannulasvisual inspection
b) Maskvisual inspection

NOTE

There must be 4 cannulas (or at least one for each occupant) and 1 mask (type: MSK-AEM) on board. Further 4 connection hoses are required. The cannulas and masks must be accessible during flight.

- c) Oxygen pressure.....check, note down
d) Oxygen duration chartobserve/ calculate duration (refer to Chapter 5)

END OF CHECKLIST

4A.6.23 FLIGHT ABOVE 10,000 FT USING OXYGEN SYSTEM

Before climbing above 10,000 ft:

1. Oxygen pressure check
2. Cannula, mask and hose adjust to face (refer to Chapter 7)
3. Delivery hose..... plug into outlet assigned to seat
4. OXYGEN push/pull knob pull ON

NOTE

When the oxygen system is turned on, oxygen will flow continuously at the appropriate rate of flow selected for the altitude with minor adjustments to the needle valve thumb wheel.

5. Cannula hose flowmeter..... adjust to altitude

NOTE

Check each occupant's oxygen cannula adjustment and flowmeter setting. Recheck oxygen pressure indication from time to time.

NOTE

Always place the flowmeter in a position where it is in the normal scan area of the user.

WARNING

Smoking is in no case permitted in the DA 42 NG. It is especially dangerous while the oxygen system is in use.

CONTINUED

WARNING

If the oxygen pressure gauge indicates a cylinder pressure of 200 psi, initiate descent to reach an altitude below 10,000 ft.

After descending below 10,000 ft:

1. Delivery hoseunplug, or turn needle valve thumb wheel clockwise
2. OXYGEN push/pull knobPUSH OFF
3. Cannula, mask and hosedisplace from face, as required

END OF CHECKLIST

4B. ABNORMAL OPERATING PROCEDURES

No Change.

5. PERFORMANCE

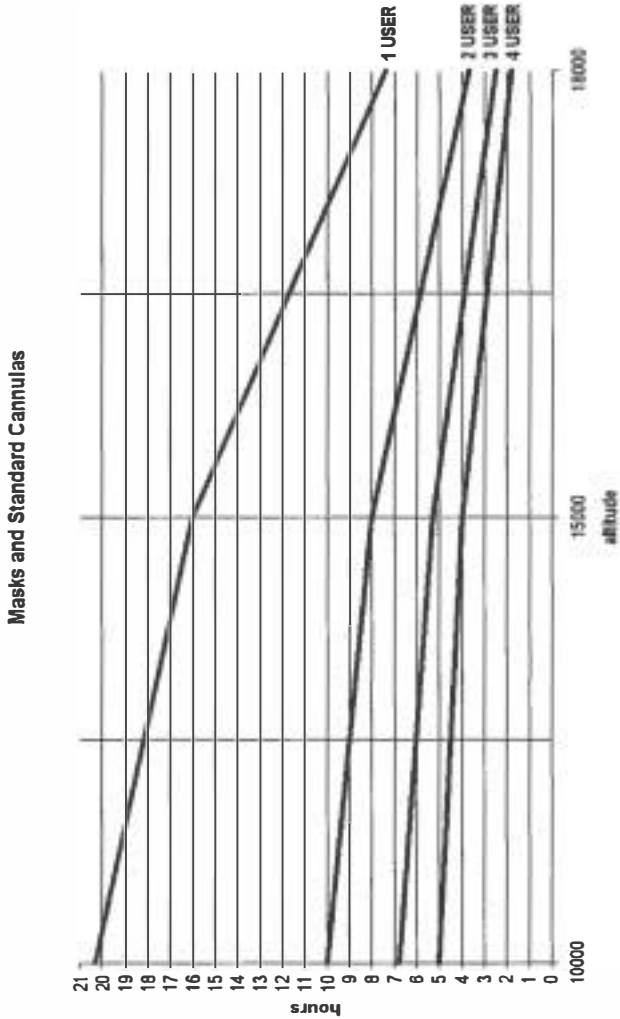
5.3 PERFORMANCE TABLES AND DIAGRAMS

5.3.13 OXYGEN SYSTEM

a) Duration Quick Check Table and Diagram - Masks and Standard Cannulas

**Duration using masks and standard cannulas (hours), Oxygen cylinder filled
with 1850 PSI,**

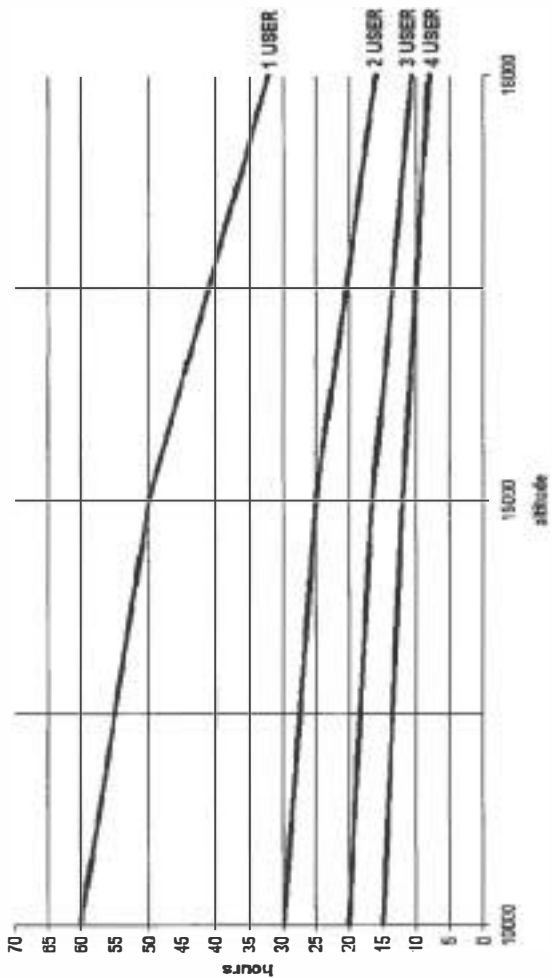
| Number of users | 10,000 ft (MSL) | 15,000 ft (MSL) | 18,000 ft (MSL) |
|----------------------------|----------------------------|----------------------------|----------------------------|
| 1 | 20.3 | 16 | 7.4 |
| 2 | 10 | 8 | 3.7 |
| 3 | 6.8 | 5.3 | 2.5 |
| 4 | 5 | 4 | 1.8 |



b) Duration Quick Check Table and Diagram – Oxysaver® Cannulas

Duration using Oxysaver® cannulas (hours),
Oxygen cylinder filled with 1850 PSI

| Number of users | 10,000 ft (MSL) | 15,000 ft (MSL) | 18,000 ft (MSL) |
|-----------------|-----------------|-----------------|-----------------|
| 1 | 60 | 50 | 32 |
| 2 | 29.8 | 25 | 16 |
| 3 | 20 | 16.5 | 10.6 |
| 4 | 15 | 12 | 8 |



c) Exact Duration Calculation of the Oxygen System

The duration of supplying supplemental oxygen to the occupants provided by the Aerox continuous flow oxygen system depends on the following facts:

-) Oxygen cylinder pressure
-) number of users- and types of dispensing equipment- individual oxygen mass flow
-) flight altitude

The exact calculation of the oxygen duration is shown below step by step:

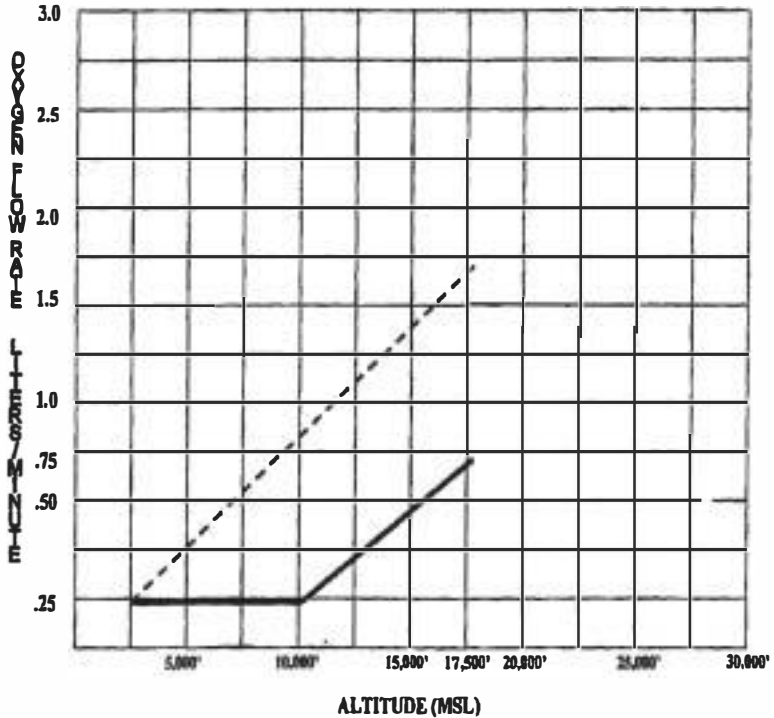
Step 1- Evaluation of the Oxygen Cylinder Pressure

The actual oxygen cylinder pressure is indicated on the oxygen pressure gauges, one installed on the upper right hand side of the instrument panel and the other installed in the oxygen compartment next to the filler port. Resultant of this pressure the oxygen pressure variable P_o can be calculated:

$$P_o = \frac{\text{Pressure} - 200\text{PSI}}{1850}$$

Step 2- Evaluation of the Individual Oxygen Mass Flow

The individual mass flow depends on the type of the dispensing equipment and on the expected main flight altitude:



Mask or Regular Cannula - - - - -
OxySaver® Cannula —————

The figure mentioned above and the table below shows the required mass flow depending on the flight altitude and the used dispensing equipment:

| Main flight altitude | Mass flow [l/min] Oxysaver cannula | Mass flow [l/min] Mask or regular/ standard cannula |
|----------------------|---------------------------------------|---|
| 10,000ft | 0.25 | 0.80 |
| 11,000ft | 0.31 | 0.92 |
| 12,000ft | 0.37 | 1.04 |
| 13,000ft | 0.43 | 1.16 |
| 14,000ft | 0.48 | 1.28 |
| 15,000ft | 0.53 | 1.40 |
| 16,000ft | 0.59 | 1.52 |
| 17,000ft | 0.65 | 1.64 |
| 18,000ft | 0.70 | 1.76 |

The mass-flow-variable F_m is calculated as shown below:

$$F_m = \frac{1}{User1 + User2 + User3 + User4}$$

"User X" is the required individual mass flow according to the chart / diagram mentioned above.

Step 3- Final calculation

Finally the oxygen duration is calculated as shown below:

$$P_o \times F_m \times 23.6 = \text{duration [hours]}$$

Example:

Oxygen pressure: 1650 PSI

Expected flight altitude: 16,000ft

Number of persons on board: 3

Used dispensing equipment: 2x Oxsaver cannulas , 1 x Mask

Step 1:

$$P_o = \frac{1650 - 200 \text{ PSI}}{1850} = 0.784$$

Step 2:

$$F_m = \frac{1}{0.59 + 0.59 + 1.52} = 0.3704$$

Step 3:

$$0.784 \times 0.3704 \times 23.6 = 6.9h$$

Result: The oxygen system is able to supply 6.9 h supplemental oxygen to the occupants in 16,000ft. After 6.9h 200 PSI will be left in the oxygen cylinder.

6. MASS AND BALANCE

6.4 FLIGHT MASS AND CENTER OF GRAVITY

6.4.1 MOMENT ARMS

The most important lever arms aft of the Datum Plane:

| Item | Lever Arm | |
|-----------------|-----------|------|
| | [m] | [in] |
| Oxygen cylinder | 0.82 | 32.3 |

6.4.3 CALCULATION OF LOADING CONDITION

When operating the airplane near the forward flight mass CG limit, note that a full oxygen tank shifts the CG approximately 2 mm (0.08 in) forward.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

7.15 OXYGEN SYSTEM

7.15.1 GENERAL

A four-place oxygen system provides the supplementary oxygen necessary for continuous flight at high altitude. An oxygen cylinder is located in the center section of the forward baggage compartment, in its own enclosed, vented compartment. A combined pressure regulator/shutoff valve attached to the cylinder automatically reduces pressure to the delivery pressure required for the operating altitude. The oxygen cylinder filler valve is located on the LH side of the oxygen compartment next to the cylinder in the forward baggage compartment.

The 50 cubic feet (1.41 cubic meters) capacity oxygen cylinder may be filled to 1850 psi while installed in the airplane and has a pressure gauge located next to the filler valve to indicate the amount of oxygen in the cylinder. An identical gauge is located on the upper RH side of the instrument panel (above the circuit breaker panel).

The oxygen supply shut-off control is located on the LH side below the instrument panel. It is cable connected to the oxygen regulator valve, controlling the oxygen system by pulling the green control knob out for "ON" and pushing the same knob in for system supply "OFF". The system should be left "OFF" when not in use.

Four (4) oxygen ports, two forward and two aft, are located in positions convenient to all four occupants. These ports are serviced directly from the oxygen cylinder.

The oxygen ports are located (1 each) in the map pocket recess for the pilot and co-pilot. The passenger oxygen ports are located overhead in the "roll-over bar" next to the cabin speaker. The individual cannula or mask supply tubes are plug-in connected to each port and contain the individual flow adjustments (flow meter-needle valve) for each occupant. Note that these ports are serviced directly from the oxygen regulator valve.

It is the pilot's responsibility to instruct each passenger in the use of this oxygen system prior to flight and to assure that there is adequate and comfortable supply of oxygen aboard for each occupant.

The oxygen cylinder, when fully charged, contains 50 cubic feet (1.41 cubic meters) of aviator's breathing oxygen under a pressure of 1850 psi at 21 °C (70 °F). Filling pressures will vary due to the ambient temperatures in the filling area and the rise of temperature resulting from the compression of the oxygen. Due to these factors merely filling the cylinder to 1850 psi will not result in a properly filled cylinder. Fill oxygen cylinders to the pressures indicated in the table shown below, based of the filling area's ambient temperature.

The oxygen system is limited to 1850 psi at 21°C (70 °F) ambient temperature.

| Ambient Temperature °C (°F) | Max. Filling Pressure [psi] | Ambient Temperature °C (°F) | Max. Filling Pressure [psi] |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| -18 (0) | 1515 | 16 (60) | 1800 |
| -12 (10) | 1565 | 21 (70) | 1850 |
| -7 (20) | 1610 | 27 (80) | 1900 |
| -1 (30) | 1660 | 32 (90) | 1945 |
| 4 (40) | 1705 | 38 (100) | 1995 |
| 10 (50) | 1755 | 43 (110) | 2040 |

WARNING

Oil, grease or other lubricants in contact with oxygen creates a serious hazard. Such contact must be avoided when handling oxygen equipment.

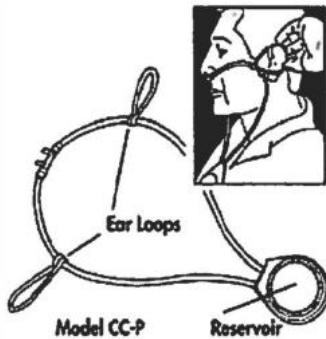
7.15.2 USE OF CANNULAS AND MASKS

Attachment and Adjustment

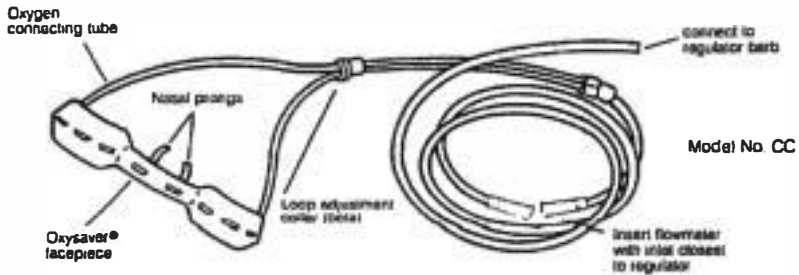
a) *Standard cannulas*



b) *Oxysaver® cannulas – Pendant model*



c) Oxysaver® cannulas



1. Slide the loop adjustment collar (bola) down to enlarge the size of the loop:



2. With the back of the facepiece toward you, pick up the Oxysaver with one of the small flexible plastic tubes in each hand, as if putting on eyeglasses:



3. Place the flexible plastic tubing over your ears (as if putting on glasses) and under your chin or pass the tubing over your ears and around the back of your head:



4. The facepiece should rest on your upper lip under your nose, with the oxygen delivering prongs extending well into and pointing towards the back of your nose. You may rotate these prongs for maximum comfort.



5. Slide the bola up toward your chin to hold the cannula snugly and comfortably against your face.

6. Screw the brass hose tip onto the manifold

NOTE

The use of each Oxysaver cannula system is to be logged by the hour and the system replaced with a new unit at 200 hours of use!
Use the LOG delivered with each Oxysaver cannula.

c) *Masks*

1. Remove the rubber band from the reservoir bag and allow it to deploy.
2. Attach Aerox flowmeter to the oxygen hose of mask and then to the oxygen system.

NOTE

The reservoir bag must be in good condition and inflated before use!

3. Position the bottom of the mask as low as possible under the chin while positioning the narrow portion of the mask on the bridge of the nose.
4. Position the cradle above the ears so that it straddles the crown of the head.
5. Hook the lower headband straps below the ears and around the back of the neck.
6. Adjust the upper headband by pulling both straps at the same time.
7. Adjust the lower headband straps in the same manner.
8. Remove the mask to adjust the straps.
9. Do not over-tighten the straps.



NOTE

Return mask to Aerox for service 3 years from manufacture date.
Manufacture date code is located on the re-breather bag.

10. Plug in the microphone plug in the applicable microphone jack (type: MSK-AEM only)

d) *Flowmeter installation/adjustment*

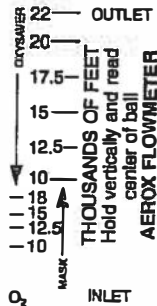
1. Connect the flowmeter between the cannula /mask tube (outlet) and the delivery hose (inlet).

NOTE

When assembling the tube to the flowmeter, only push the tube as far as the second ferrule.

2. Connect the cannula/mask assembly to the assigned outlet manifold.

3. Hold the flowmeter in vertical position and turn the needle valve screw installed on the connector counterclockwise. Adjust flowrate to current altitude by using the correct flowmeter scale.



NOTE

For regular / "standard"- cannulas the "MASK" scale must be used.

CAUTION

Failure to use appropriate scale will result in incorrect oxygen consumption.

NOTE

When adjusted to the correct altitude the dispensing unit will deliver enough supplemental oxygen as required by "normal" people. Some people will require more oxygen. In that case adjust the flowmeter to a higher altitude.

4. Check flowmeter regularly to ensure adequate flow.

7.15.3 APPROVED OXYGEN

The AEROX continuous oxygen system uses aviator's breathing oxygen in accordance with MIL-PRF-27210 only.

CAUTION

Do not use oxygen with a lower purity grade than prescribed by MIL-PRF-27210.

CAUTION

The oxygen cylinder is limited to a pressure of 1850 psi at 21°C (70 °F) ambient temperature.

7.15.4 APPROVED DISPENSING EQUIPMENT

| Type | Description | Man. |
|-------------|--|-------------|
| CC | Conserving cannula Oxysaver brand (adult) | AEROX |
| CC-P | Conserving cannula Oxysaver brand (adult) pendant | AEROX |
| CR-A | Cannula regular style (adult)/ "standard"- cannula | AEROX |
| CR-C | Cannula regular style (child)/ "standard"- cannula | AEROX |
| MSK-AS | Silicone mask without microphone, (Quick Donning Type) | AEROX |
| MSK-AEM | Silicone mask with microphone, (Quick Donning Type) | AEROX |

NOTE

Each cannula and mask must be equipped with a Puritan Bennett style connector and an Aerox flowmeter (type: FM or FMNV)

NOTE

The Aerox oxygen system, installed in the DA 42 NG must not be used with any other dispensing equipment.

NOTE

There must be 4 cannulas (or at least one for each occupant) and 1 mask (type: MSK-AEM) on board. The cannulas and masks must be accessible during flight.

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

The cannulas and masks can be cleaned with soap and water using a clean, lint-free cloth.

8.4 SERVICING

8.4.5 REPLENISHMENT OF THE CYLINDER

CAUTION

Do not carry flammable fluids, oils and greases, in the nose baggage compartment!

1. Oxygen gauge (instrument panel) check
2. LH front baggage door open

WARNING

Do not smoke during refilling!

3. Baggage compartment..... all items removed
4. Baggage compartment..... check for oil or oil residue

WARNING

Oxygen in conjunction with oil will result in a fire hazard!

5. De-icing fluid tank..... check, closed and clean
6. Refill cover open
7. Refill valve cover open

CONTINUED

8. Oxygen gauge (refill panel).....checked, same pressure as indicated
on instrument panel gauge
9. Filling station outlet port.....connect
10. Filling station outlet port.....check fixed

Slightly open the cylinder valve of the filling station and check oxygen flow. The oxygen cylinder is limited to a pressure of 1850 psi at 21°C (70 °F) ambient temperature.

WARNING

Do not fill the cylinder to a pressure above 1850 psi at 21°C (70°F) ambient temperature.

NOTE

Refilling of a fully depleted cylinder will take about 3.5 minutes.

When the pressure is reached:

11. Filling station valve.....close
12. Filling station outlet port.....disconnect slightly
13. Refill valve cover.....fixed
14. Refill cover.....close
15. Baggage compartment.....close, as required

END OF CHECKLIST

**SUPPLEMENT S06
TO THE AIRPLANE FLIGHT MANUAL
DA 42 NG**

G1000 SYNTHETIC VISION TECHNOLOGY

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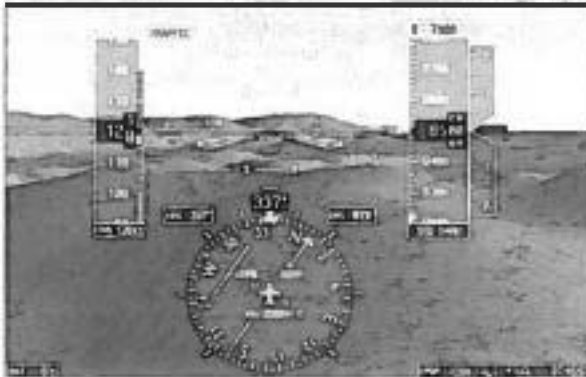
1. GENERAL

1.8 G1000 AVIONICS SYSTEM

SYNTHETIC VISION TECHNOLOGY

This document describes the Synthetic Vision Technology (SVT) which is an optional part of the Garmin G1000 Integrated Avionics System. This information supplements the information presented in the Airplane Flight Manual.

The purpose of the SVT system is to assist the pilot in maintaining situational awareness with regard to the terrain and traffic surrounding the airplane and the navigational situation relative to the programmed flight plan. A typical SVT display is shown below.



SVT provides additional features on the G1000 primary flight display (PFD) which displays the following information:

- Synthetic Terrain; an artificial, database derived, three dimensional view of the terrain ahead of the airplane within a field of view of approximately 30 degree left and 35 degree right of the airplane heading.
- Obstacles; obstacles such as towers, including buildings higher than 200 ft above ground level that are within the depicted synthetic terrain field of view.
- Flight Path Marker (FPM); an indication of the current lateral and vertical path of the airplane. The FPM is always displayed when synthetic terrain is selected for display.
- Pathway; a pilot selectable three dimensional representation of the programmed flight plan path that can be selected for display alone or with the flight director anytime synthetic terrain is selected for display.
- Traffic; a display on the PFD indicating the position of other airplane detected by the Traffic Information System (TIS) component of the G1000 system.
- Horizon Line; a white line indicating the true horizon is always displayed on the SVT display.
- Horizon Heading; a pilot selectable display of heading marks displayed just above the horizon line on the PFD.
- Airport Signs; pilot selectable "signposts" displayed on the synthetic terrain display indicating the position of nearby airports which are in the G1000 database.
- Runway Highlight; a highlighted presentation of the location and orientation of the runway(s) at the destination airport.

WARNING

The Synthetic Terrain display is intended to aid the pilot awareness of the terrain and obstacles in front of the airplane. It may not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid terrain or obstacles. The synthetic vision elements are not intended to be used for primary airplane control in place of the primary flight instruments.

WARNING

The pathway presentation is intended only to aid the pilot's awareness of the programmed flight path location relative to the airplane's current position. No vertical pathway information is presented for climbs.

NOTE

The synthetic terrain depiction displays an area approximating the view from the pilot's eye position when looking directly ahead out of the windshield in front of the pilot. Terrain features outside this field of view are not shown on the display.

2. OPERATING LIMITATIONS

2.16 OTHER LIMITATIONS

2.16.6 GARMIN G1000 AVIONICS SYSTEM

USE OF THE SYNTHETIC VISION TECHNOLOGY

1. Use of the Synthetic Vision Technology display elements alone for airplane control without reference to the G1000 primary flight instruments or the airplane standby instruments is prohibited.
2. Use of the Synthetic Vision Technology alone for navigation, or obstacle or terrain avoidance is prohibited.
3. Use of the Synthetic Vision Technology traffic display alone to avoid collision with other airplanes is prohibited.
4. The Garmin G1000 Cockpit Reference Guide, P/N 190-00963-00, Rev. B or later must be immediately available to the flight crew.

3. EMERGENCY PROCEDURES

No change.

4A. NORMAL OPERATING PROCEDURES

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.6.22 SYNTHETIC VISION TECHNOLOGY

Turn Synthetic Vision on/off

The SVT system may be turned on or off as desired.

To turn the synthetic vision system on or off:

On the PFD:

1. PFD key press
2. SYN VIS key press
3. SYN TERR key press as desired

The synthetic vision system will cycle on or off with each press of the SYN TERR key. The Flight Path Marker is displayed anytime SYN TERR is selected for display.

Turn Pathways on/off

On the PFD:

1. PFD key press
2. SYN VIS key press
3. PATHWAY key press as desired

The pathway display will cycle on or off with each press of the PATHWAY key. The pathway can be displayed separately or in conjunction with the flight director.

NOTE

If displayed, the pathway may be quickly turned off by pressing the PFD softkey at the bottom of the PFD followed by two presses of the far left PFD soft key.

Turn Horizon Heading on/off

On the PFD:

1. PFD key press
2. SYN VIS key press
3. HRZN HDG key press as desired

The horizon heading display will cycle on or off with each press of the HRZN HDG key.

Turn Airport Signs on/off

On the PFD:

1. PFD key press
2. SYN VIS key press
3. APTSIGNS key press as desired

The horizon heading display will cycle on or off with each press of the APTSIGNS key.

Use of Pathway

If Synthetic Terrain is displayed on the PFD, the pathway may be used to assist the pilot's awareness of the programmed lateral and vertical navigation path. The following sections describe the basic use of the pathway in various flight phases. For more detailed information, consult the G1000 Pilot's Guide.

Departure:

Prior to departure, load and activate the desired flight plan into the G1000 FMS, set the initial altitude on the G1000 altitude selector and select GPS on the HSI display just as you would without the SVT system.

The programmed flight path will be displayed as a series of magenta boxes along the path at the flight plan altitude subject to the following conditions;

- If the first segment of the flight plan is a heading to altitude leg, the pathway will not be displayed for that segment. The first pathway segment displayed will be the first GPS course leg.
- The pathway must be within the SVT field of view of 30 degrees left and 35 degrees right. If the programmed path is outside of that field of view, the pathway will not be visible on the display until the airplane has turned towards the course.
- The pathway will be displayed at either the altitude selected on the G1000 selector OR the altitude published for the procedure (e.g. SID), WHICHEVER IS HIGHER.

After departure, the primary airplane control must be by reference to the primary airplane instruments. The SVT and pathway displays should be used to aid in awareness of the terrain and programmed flight path.

Prior to intercepting the programmed course, the pathway will be displayed as a series of magenta "boxes" with pointers at each corner that point in the direction of the programmed course. The pathway boxes will not be displayed on portions of the course line that would lead the pilot to intercept the course in the wrong direction.

As the airplane approaches the center of the programmed course and altitude, the number of pathway boxes will decrease to a minimum of four.

Enroute:

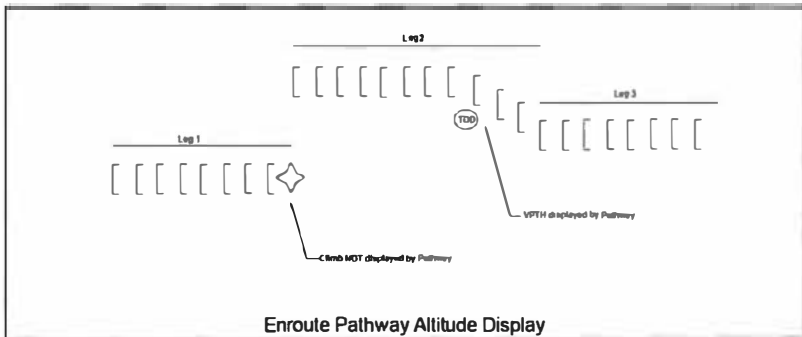
When enroute, the pathway will be displayed along the lateral path defined by the flight plan, at the altitude selected on the G1000 altitude selector.

Flight plan changes in altitude that require a climb will be indicated by the pathway being displayed as a level path at the altitude entered for the current flight plan leg. Because the G1000 system has no airplane performance information, climb profiles are not displayed by the pathway.

If the programmed flight plan includes one or more defined VNAV descent segments, the descent path(s) will be displayed by the Pathway System as prompted by the G1000 FMS.

If the flight plan includes a significant change in course at a waypoint, the pathway boxes toward the currently active waypoint will be magenta in color. The boxes defining the next flight plan segment may be visible, but will be displayed in white color.

The following figure shows an example for an Enroute Pathway Altitude Display.



Approach:

During approach, the SVT and pathway displays should only be used to maintain awareness with regard to the surrounding terrain and the programmed flight path. Primary airplane control must be accomplished by reference to the primary flight instruments and, if desired, the flight director.

GPS approach:

During a GPS approach, the lateral path and altitude will be displayed by the pathway in magenta along each segment including the path required to track course reversals that are part of the approach procedure (such as a holding pattern). Approach descent segments will be displayed by the pathway as published in the approach procedure.

If Vectors-To-Final is selected as the approach transition, the pathway will display the final approach course inbound to the Missed Approach Point (MAP). The pathway will be shown level at the altitude set in the G1000 altitude selector, or the Final Approach Fix (FAF) crossing altitude (whichever is higher), up to the point along the final approach course where that altitude intercepts the extended VPTH or GP. If the altitude selector indicates an altitude below the airplane's current altitude, the pathway will appear below the airplane altitude and the pilot must use normal descent techniques to intercept the VPTH or GP. If the altitude selector is left at an altitude above the current airplane altitude, the airplane will intercept the final approach course below the extended VPTH or GP, such that the pathway will be displayed above the airplane until the airplane intercepts the VPTH or GP. From the VPTH or GP intercept point, the pathway will be shown inbound to the Missed Approach Point along the published lateral and vertical descent path.

ILS approach:

When an ILS approach is programmed into the G1000 FMS, the initial approach segments will be displayed by the pathway in magenta at the procedure segment altitudes if they are being flown by reference to a GPS path. When the G1000 system switches to the localizer inbound to the final approach fix, the pathway will be displayed along the localizer inbound path and glideslope in green.

If Vectors-To-Final is selected as the approach transition, the pathway will display the final approach course inbound to the Missed Approach Point (MAP). The pathway will be shown level at the altitude set in the G1000 altitude selector, or the Final Approach Fix (FAF) crossing altitude (whichever is higher), up to the point along the final approach course where that altitude intercepts the extended GS. If the altitude selector indicates an altitude below the airplane's current altitude, the pathway will appear below the airplane altitude and the pilot must use normal descent techniques to intercept the GS. If the altitude selector is left at an altitude above the current airplane altitude, the airplane will intercept the final approach course below the extended GS, such that the pathway will be displayed above the airplane until the airplane intercepts the GS. From the GS intercept point, the pathway will be shown inbound to the MAP along the published localizer and glideslope.

VOR, LOC BC, or other approach:

Approach segments for a VOR, LOC BC, ADF or other approach that are approved to be flown by reference to GPS will be displayed by the pathway in a magenta color. Approach segments that are defined by other than a GPS or ILS, such as heading legs or VOR defined final approach course, will not be displayed by the pathway.

Missed approach:

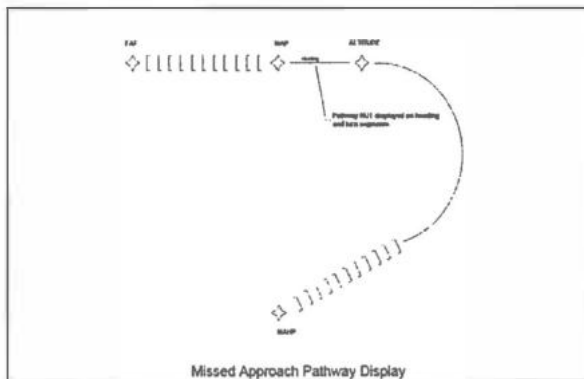
When the missed approach is selected on the G1000 FMS, the pathway to the Missed Approach Holding Point will be displayed just as described for the departure segment.

The pilot must assure that the airplane path will, at all times, comply with the requirements of the published missed approach procedure.

If the initial missed approach leg is heading-to-altitude or a leg defined by other than a GPS course, the pathway will not be displayed for that segment.

If the course to the Missed Approach Holding Point is out of the SVT field of view during the initial missed approach climb, the pathway will not be visible on the PFD until the airplane is turned toward the course.

The pathway will be displayed at the published missed approach altitude OR the altitude set on the G1000 altitude selector WHICHEVER IS HIGHER. If the G1000 altitude selector is set to MDA on the final approach segment and not reset during the initial missed approach, the pathway will still be displayed at the published missed approach altitude.



4B. ABNORMAL OPERATING PROCEDURES

4B.13 FAILURES IN THE SYNTHETIC VISION TECHNOLOGY

SVT Displays information inconsistent with G1000 primary flight instrumentation

On the PFD:

1. PFD key press
2. SYN VIS key press
3. SYN TERR key press as desired
3. SVT is removed from the PFD verify

Use G1000 primary displays for navigation and airplane control.

G1000 operation in display backup mode is required

Select display backup mode on the G1000 system.

NOTE

When display backup mode is selected, the MFD will initially present a non-SVT (blue sky over solid brown ground) display. SVT will be presented on the MFD within 20 seconds if it was enabled on the PFD when display backup was selected.

5. PERFORMANCE

No change.

6. MASS AND BALANCE

No change.

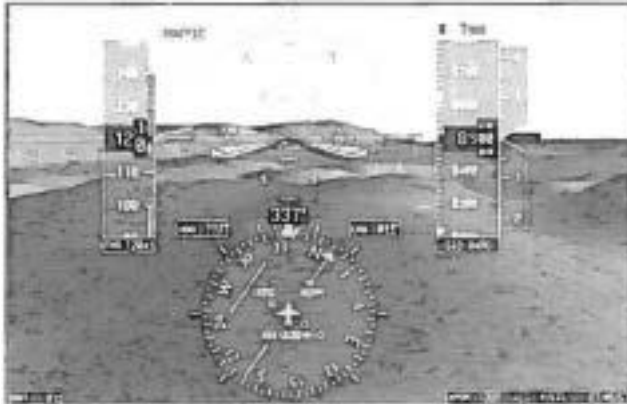
7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

7.13 GARMIN G1000 INTEGRATED AVIONICS SYSTEM

7.13.7 SYNTHETIC VISION TECHNOLOGY

General

The SVT sub system is dependent upon terrain data provided by the underlying G1000 system. If, for some reason, the terrain data is not available from the G1000, all of the components of the SVT system will be unavailable. The flight path marker, horizon heading, and airport signs are all sub-components of the Synthetic Terrain display and are only available when Synthetic Terrain is enabled. Those features are selected or de-selected using the PFD softkeys on the SVT menu.



Synthetic Terrain

The Synthetic (3D) Terrain display on the PFD provides a perspective view of the terrain ahead of the airplane showing ground features up to 30 degrees left and 35 degrees right of the airplane heading. The terrain display is derived from the same terrain data contained in the G1000 system that is optionally used to display terrain on the MFD map display. The terrain data has a resolution of 9 arc-seconds, this means that the terrain elevation contours in the database are stored broken down into squares 9 arc-seconds on each side. That data is processed and smoothed by the G1000 system to provide the synthetic terrain display. In some instances, terrain features such as lakes in mountainous areas may be presented by the SVT system as if the lake water extends somewhat up the mountainside. This is due to the limitations of the terrain database resolution but is not significant for the approved uses of the SVT system.

The SVT terrain display will show land contours; large water features; and, towers and other obstacles over 200 ft above ground level (including buildings), that are included in the G1000 obstacle database. In order to provide a clean, uncluttered PFD display, cultural features on the ground such as; roads and highways, railroad tracks, cities, and political boundaries (state / county lines) are not displayed on the PFD even if those features are selected for display on the MFD. The colors used to display the terrain elevation contours are similar to those used on the MFD map. The terrain display also includes a north-south, east-west grid to assist in orientation relative to the terrain.

The terrain display is intended to serve as an awareness tool only. It may not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid terrain or obstacles. Navigation must not be predicated solely upon the use of the TAWS, Terrain or Obstacle data displayed by the G1000 SVT system.

The Terrain/Obstacle/Airport databases have an area of coverage as detailed below:

- The Terrain Database has an area of coverage from North 75° Latitude to South 60° Latitude in all longitudes.
- The Airport Terrain Database has an area of coverage that includes the United States, Canada, Mexico, Latin America, and South America.
- The Obstacle Database has an area of coverage that includes the United States.

NOTE

The area of coverage may be modified, as additional terrain data sources become available.

Obstacle and Terrain Alerts and Warnings

Obstacles and terrain displayed on the SVT system may be highlighted if an alert or warning is generated by the G1000 Terrain or TAWS system. If an obstacle alert is presented for an obstacle that is in the SVT field of view, the obstacle symbol on the PFD will turn yellow in color. If an obstacle warning is generated by the G1000 system, the obstacle symbol on the PFD will turn red.

If the G1000 Terrain or TAWS system generates a terrain alert or warning, the terrain feature displayed on the PFD will be colored yellow for an alert or red for a warning for as long as the alert remains valid.

Because the area monitored by the Terrain or TAWS system can be wider than the field of view that can be displayed by the SVT system, it is possible to receive an obstacle or terrain audible alert for an obstacle or terrain that is not shown on the SVT display. In those cases, the object generating the alert will be left or right of the airplane. Refer to the other displays in the airplane to determine the cause of the message.

Flight Path Marker

The SVT display includes a green circular barbed symbol called the Flight Path Marker (FPM) that represents the current path of the airplane relative to the terrain display. The FPM is always displayed when synthetic terrain is displayed and the airplane ground speed exceeds 30 kt. The FPM indicates the current lateral and vertical path of the airplane as determined by the GPS sensor. If the FPM is above the horizon line, the airplane is climbing, and similarly if the FPM is below the horizon line, the airplane is descending. If the airplane is flying in a crosswind, the FPM will be offset from the center of the display. In that case, the center of the PFD airplane reference symbol indicates the airplane heading and the FPM indicates the direction that the airplane is actually moving, taking into account the crosswind.

The FPM indicates the current path of the airplane but does not predict the future path. If airplane attitude, power setting, airspeed, crosswind, etc. are changed, the FPM will move to indicate the new path resulting from those changes.

If the FPM is below the terrain or obstacle displayed behind it on the PFD, the current airplane path will not clear that terrain or obstacle.

CAUTION

If the FPM is above that terrain or obstacle, the airplane will clear the terrain or obstacle if, and only if, the current airplane configuration is maintained, and the airplane performance will permit you to maintain the current vertical (Climb) gradient until past the terrain or obstacle.

Pathway

If PATHWAY is enabled on the SVT menu of the PFD and a defined navigation path has been entered on the G1000, the SVT system will display a pathway, sometimes called a "highway in the sky" or HITS. The pathway is a perspective representation of the programmed flight path. When the airplane is well off course, the pathway will be displayed as a number boxes floating in the sky along the programmed lateral and vertical path. As the airplane intercepts the programmed flight path, the number of boxes displayed will be reduced to a maximum of four to avoid cluttering the PFD display. The pathway is only displayed for navigation paths that are fully defined by the sensor in use, including GPS and ILS paths. Because a fully defined lateral and vertical path through space is not defined by them, a pathway is not displayed for heading legs, VOR, LOC, BC or ADF segments. When the pathway is displayed, the color of the boxes indicates the sensor generating the path. If the GPS sensor is in use, the boxes will be magenta colored. If the ILS sensor is defining the path in use, the boxes will be green.

The pathway boxes are +/- 100 ft in vertical dimension and approximately +/-380 ft horizontally from the center of the box. The pathway presentation is intended only to aid the pilot in awareness of the programmed flight path location relative to the airplane's current position. The pathway is not intended for use as a primary reference in tracking the navigation path.

If a GPS based descent profile has been programmed either on the G1000 flight plan page or as part of an approach or STAR, the descent will be displayed by the pathway. Climb paths are never displayed by the pathway. If a profile requires a climb, the pathway will be displayed as a level segment at the higher of the altitude defined by the programmed path or the G1000 altitude selector.

Traffic

If traffic that is within the SVT field of view is detected by the G1000 TIS system, a symbol will be displayed on the PFD indicating the direction and relative altitude of the traffic. The traffic will be displayed as a white diamond unless it generates a traffic alert. Traffic that causes an alert will be displayed as a solid yellow circle accompanied by a yellow TRAFFIC annunciator to the right of top of the airspeed display tape.

Horizon line

The SVT display includes an always visible white horizon line that represents the true horizon. Terrain will be presented behind the horizon line, and terrain shown above the horizon line is above the current airplane altitude. Terrain that is shown below the horizon line is below the airplane altitude.

Horizon Heading

A heading scale may be displayed on the PFD horizon line, if selected by the pilot. The heading marks are spaced in even 30 degree increments and are presented just above the horizon line with tic marks that intersect the horizon line. The horizon heading will correspond to that presented by the Horizontal Situation Indicator. Because the horizon heading is only displayed in 30 degree increments, it should only be used for general heading awareness and not be used to establish the airplane heading.

Airport Signs and runway highlight

If APTSIGNS is selected, a "sign post" along with a representation of the runways will be plotted on the SVT display for nearby airports that are contained in the G1000 airport database. The signpost will become visible when you are within approximately 15nm of the airport. The text identifier for the airport will be displayed inside the airport sign when the airplane reaches approximately 8 nm from the airport. Once the airplane reaches approximately 4.5 nm from the airport, the airport sign will be removed but the runways presentation will remain. If an approach to a specific runway has been loaded and activated, that runway will be highlighted on the SVT display.

When on an approach, the highlight for the approach runway will be considerably larger than "normal" to assist in visually acquiring the runway. The oversized highlight will automatically shrink around the runway depiction so that the runway is proportionally displayed when the airplane is within approximately ½ nm of the threshold. Runway highlighting is displayed even if APTSIGNS are turned off.

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

No change.

SUPPLEMENT S13
TO THE AIRPLANE FLIGHT MANUAL
DA 42 NG
FLIGHT STREAM 510

Doc. No. : 7.01.16-E
Date of Issue : 31 Jan 2019
Design Change Advisory : OÄM 42-337

This Supplement to the Airplane Flight Manual is EASA approved under Approval
No. 10069299.

0.3 LIST OF EFFECTIVE PAGES

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1. GENERAL

With OÄM 42-337 the installation and operation of the Garmin Flight Stream 510 System is approved.

The Flight Stream 510 is a wireless device which is inserted into the bottom MFD card slot. It enables Bluetooth and Wi-Fi connection between a Portable Electronic Device (PED) such as a tablet or smart phone and the G1000 NXi system.

Refer to the G1000 NXi Pilot's Guide P/N 190-02526-(), latest revision, for more information regarding connecting and using portable electronic devices with the Flight Stream 510.

This Supplement is a permanent part of the AFM and must remain in the AFM at all times when the FLIGHT STREAM 510 is installed.

1.5 DEFINITIONS AND ABBREVIATIONS

| | |
|------|-----------------------------------|
| PED | Portable Electronic Device |
| EFB | Electronic Flight Bag |
| GFID | Garmin Flight Information Display |
| MFD | Multi Function Display |

2. OPERATING LIMITATIONS

Flight Stream 510

Flight Plan Transfer

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

Data received by Portable Electronic Devices

- The PED is not approved as the sole source of information to base tactical or strategic decision making and is not approved to replace the information provided by the G1000 NXi GFID system.
- The Flight Stream 510 interface and data provided to a Portable Electronic Device (PED) is not approved to replace any installed or required aircraft display equipment, including navigation or traffic/weather display equipment. The data presented on the PED may not have the required integrity to be used as the sole source of information to base tactical or strategic decision making.

Electronic Flight Bag (EFB)

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

3. EMERGENCY PROCEDURES

No change.

4A. NORMAL OPERATING PROCEDURES

No change.

4B. ABNORMAL OPERATING PROCEDURES

No change.

5. PERFORMANCE

No change.

6. MASS AND BALANCE / EQUIPMENT LIST

No change.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

7.16 FLIGHT STREAM 510

FLIGHT STREAM 510

The Flight Stream 510 is a wireless device which is inserted into the bottom MFD card slot. It enables Bluetooth and Wi-Fi connection between a portable electronic device such as a tablet or smart phone and the G1000 NXi system. Various tasks may be accomplished through these connections, such as transferring flight plans, viewing weather information on a connected device, avionics system data logging, or transferring databases to the G1000 NXi system.

In normal operation, the Flight Stream 510 should remain inserted in the bottom MFD card slot and should only be removed for maintenance purposes. Removal of the Flight Stream 510 will result in loss of Bluetooth and Wi-Fi connections, and will interrupt any data transfer that may be occurring to or from the portable electronic device.

Refer to the G1000 NXi Pilot's Guide P/N 190-02526-(), latest revision, for more information regarding connecting and using portable electronic devices with the Flight Stream 510.

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

No change.