AIRPLANE FLIGHT MANUAL
DA 40 NG

Airworthiness Category:	Normal
Applicable Airworthiness Requirement:	AWM 523
Serial Number:	40.N482
Registration	HB-SHC
Doc. No.:	6.01.15-E TR-17-04
Date of Issue:	15 November 2017

This temporary revision to the DA 40 NG AFM 6.01.15-E must be inserted into the front of the manual and carried in the aircraft at all time.

Signature:

FOR

Authority:	Chief Flight Test Transport Canada Civil Aviation
Date of approval:	15 November 2017

This temporary revision is prepared to identify that the type design holder for the DA 40 NG has been transferred to Diamond Aircraft Industries Inc. from Diamond Aircraft Industries GmbH and that Transport Canada is now responsible for the continuing airworthiness of the aircraft.

Diamond Aircraft Industries Inc. is now responsible for the content and publishing of the AFM for the DA 40 NG aircraft. A new AFM is being prepared that will replace the manual prepared by Diamond Aircraft Industries GmbH. All contents of the AFM, Doc. No. 6.01.15-E are applicable and remain the requirements to operate the DA 40 NG aircraft properly.

This airplane may only be operated in accordance with the procedures and operating limitations of the Airplane Flight Manual, 6.01.15-E.

Any questions or concerns regarding the AFM for the DA 40 NG aircraft please contact:

Diamond Aircraft Industries Inc.
1560 Crumlin Sideroad
London, Ontario, Canada N5V 1S2

http://www.diamondair.com/

For more information contact:

Diamond Aircraft Industries Inc.
Technical Publications
+1-519-457-4000
techpubs@diamondair.com

TEMPORARY REVISION
TR-17-04
Change in Type Design Responsibility

This Temporary Revision TR-17-04 is approved and is valid in conjunction with the latest revision of the DA 40 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 the Minister of Transportation

Doc. No.	Chapter	Affected Page
6.01.15-E	Cover Page, Forward	Cover Page, 0-0

Instruction

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
- Insert the other pages of this TR in front of the corresponding AFM pages.

AIRPLANE FLIGHT MANUAL
DA 40 NG

Airworthiness Category	:	**Normal**
Requirement	:	**JAR-23**
Serial Number	:	40.N482
Registration	:	HB-SHC
Doc. No.	:	**6.01.15-E**
Date of Issue	:	**01-Apr-2010**

Signature	:	
EASA Project Manager	:	RJ Hardy
Stamp	:	European Aviation Safety Agency General Aviation
Date of Approval (EASA App. Date)	:	16 June 2011

This Airplane Flight Manual is approved with EASA Approval No. 10025781.

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 47CE.

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

TEMPORARY REVISION
TR-MÄM 40-447
Garmin G1000 Avionics System

This Temporary Revision TR-MÄM 40-447 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-447/b and is valid in conjunction with the latest revision of the DA 40 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.

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

Affected Pages:

Doc. No.	Chapter	Page
6.01.15-E	9	9-3k

Instruction:

- Print this document on yellow paper (single-sided).
- Insert the cover page of this Temporary Revision as the first page of the manual.
- Insert the other pages of the Temporary Revision in front of the original manual page.

TEMPORARY REVISION
TR-MÄM 40-580
Equipment List:
Landing Gear Components

This Temporary Revision TR-MÄM-40-580 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-580 and is valid in conjunction with the latest revision of the DA 40 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.

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

Doc. No.	Chapter	Affected Pages
6.01.15-E	1	1-6b
	6	6-19c

Instruction

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
- Insert the other pages of this Temporary Revision in front of the corresponding AFM pages.

TEMPORARY REVISION
TR-MÄM 40-780
Coolant Temperature Upper Caution Range
100°C-105°C

This Temporary Revision TR-MÄM 40-780 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-780 and is valid in conjunction with the latest revision of the DA 40 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.

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

Affected Pages:

Doc. No.	Chapter	Page
6.01.15-E	2	2-11a

Instruction:

- Print this document on yellow paper (single-sided).
- Insert the cover page of this Temporary Revision as the first page of the manual.
- Insert the other pages of the Temporary Revision in front of the original manual page.

TEMPORARY REVISION
TR-MÄM 40-805
Removal of High Current Procedure

This Temporary Revision TR-MÄM 40-805 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-805 and is valid in conjunction with the latest revision of the DA 40 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 Page
6.01.15-E	3	3-31a

Instruction

- Print this document on yellow paper (single-sided).
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TEMPORARY REVISION
TR-MÄM-40-816
Alternate Means for Fuel Quantity Measurement

This Temporary Revision TR-MÄM-40-816 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-816 and is valid in conjunction with the latest revision of the DA 40 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
6.01.15-E	6	6-26a
	7	7-34a thru 7-34d

Instruction

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
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TEMPORARY REVISION
TR-MÄM 40-833
Electronic Equipment

This Temporary Revision TR-MÄM 40-833 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-833 and is valid in conjunction with the latest revision of the DA 40 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 Page
6.01.15-E	2	2-36a

Instruction:

- Print this document on yellow paper (single-sided).
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TEMPORARY REVISION

TR-MÄM 40-838/a

supersedes TR-MÄM 40-838

EECU Software VC33_1_05_19

This Temporary Revision TR-MÄM 40-838/a is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-838/a and is valid in conjunction with the latest revision of the DA 40 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.

The technical information contained in this document has been approved by EASA with EASA Approval No. 10059343.

Affected Pages:

Doc. No.	Chapter	Page
6.01.15-E	1	1-2b
	2	2-10a, 2-26a
	3	3-22a

Instruction:

- Print this document on yellow paper (single-sided).
- Insert the cover page of this Temporary Revision as the first page of the manual.
- Insert the other pages of the Temporary Revision in front of the original manual page.

TEMPORARY REVISION
TR-MÄM-40-866
Types of ECU-Cautions

This Temporary Revision TR-MÄM-40-866 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-866 and is valid in conjunction with the latest revision of the DA 40 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
6.01.15-E	7	7-47a

<u>Instruction</u>

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
- Insert the other page of this TR in front of the corresponding AFM page.

TEMPORARY REVISION
TR-MÄM 40-868
Garmin G1000 NXi Avionics System

This Temporary Revision TR-MÄM 40-868 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-868 and is valid in conjunction with the latest revision of the DA 40 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 by EASA with approval No. 10061866.

Doc. No.	Chapter	Affected Page
6.01.15-E	1	1-2f
	2	2-13a
	4A	4A-3b, 4A-35a
	6	6-15a, 6-19b, 6-21a
	9	9-3d

Instruction:

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
- Insert the other pages of this TR in front of the corresponding AFM pages.

TEMPORARY REVISION
TR-MÄM 40-874
Engine Oils

This Temporary Revision TR-MÄM 40-874 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-874 and is valid in conjunction with the latest revision of the DA 40 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.

The technical information contained in this document has been approved by EASA with approval No. 10061452.

Affected Pages:

Doc. No.	Chapter	Page
6.01.15-E	2	2-8a, 2-31a

Instruction:

- Print this document on yellow paper (single-sided).
- Insert the cover page of this Temporary Revision as the first page of the manual.
- Insert the other pages of the Temporary Revision in front of the original manual page.

TEMPORARY REVISION
TR-MÄM 40-879
Adaption of ECU Selftest RPM

This Temporary Revision TR-MÄM 40-879 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-879 and is valid in conjunction with the latest revision of the DA 40 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.

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

Affected Pages:

Doc. No.	Chapter	Page
6.01.15-E	4A	4A-22a

Instruction:

- Print this document on yellow paper (single-sided).
- Insert the cover page of this Temporary Revision as the first page of the manual.
- Insert the other pages of the Temporary Revision in front of the original manual page.

TEMPORARY REVISION
TR-MÄM 40-880
Adaption of Cruise Performance Conditions

This Temporary Revision TR-MÄM 40-880 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-880 and is valid in conjunction with the latest revision of the DA 40 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.

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

Affected Pages:

Doc. No.	Chapter	Page
6.01.15-E	5	5-26a

Instruction:

- Print this document on yellow paper (single-sided).
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TEMPORARY REVISION
TR-MÄM 40-1007
GARMIN G1000 NXi PHASE II

This temporary revision TR-MÄM 40-1007 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-1007, and is valid in conjunction with the latest revision of the DA 40 NG Airplane Flight Manual (AFM), until this temporary revision has been incorporated into the AFM.

The limitations and information contained herein either supplement, or in the case of conflict, override those in the AFM.

The technical information contained in this document has been approved by the Canadian Department of Transport.

Doc. No.	Chapter	Affected Pages
6.01.15-E	1	1-3a
	6	6-22b, 6-23b, 6-25a
	9	9-3f

Instructions:

- Print this document on 8.5" x 11" yellow paper (single sided).
- Copy on yellow paper (single sided) at a reduced size of 72% to get the correct size for the AFM.
- Cut the paper to 6" x 8.5" and punch the holes on the left side of each page.
- Insert the cover page as the first page of the AFM.
- Insert the pages of this temporary revision in front of the corresponding pages in the AFM.
- Sign the Temporary Revision Log as having inserted this temporary revision.
- Keep this temporary revision until the information has been incorporated into the DA 40 NG AFM.

TEMPORARY REVISION
TR-MÄM 40-1020
Removal of Pilot Gust Lock Mount

This Temporary Revision TR-MÄM 40-1020 is approved in conjunction with the Mandatory Design Change Advisory MÄM 40-1020 and is valid in conjunction with the latest revision of the DA 40 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.

Doc. No.	Chapter	Affected Pages
6.01.15-E	8	8-8a

Instruction

- Print this document on yellow paper (single sided).
- Insert this cover page as the first page of the AFM.
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TEMPORARY REVISION

TR-OÄM-40-375

FRONT SEATS WITH ADJUSTABLE BACKREST-HYDROLOK

This Temporary Revision TR-OÄM-40-375 is approved in conjunction with the Optional Design Change Advisory OÄM 40-375 and is valid in conjunction with the latest revision of the DA 40 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
6.01.15-E	1	1-2a
	7	7-16a, 7-16b, 7-16c

Instruction

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
- Insert the other pages of this TR in front of the corresponding AFM pages.

TEMPORARY REVISION
TR-OÄM-40-401
Emergency Egress Hammer

This Temporary Revision TR-OÄM-40-401 is approved in conjunction with the Optional Design Change Advisory OÄM-40-401 and is valid in conjunction with the latest revision of the DA 40 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.

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

Doc. No.	Chapter	Affected Pages
6.01.15-E	1	1-2c
	4A	4A-5a
	6	6-19a
	7	7-20a

Instruction

- Print this document on yellow paper (single-sided).
- Insert this cover page as the first page of the AFM.
- Insert the other pages of this Temporary Revision in front of the corresponding AFM pages.

TEMPORARY REVISION
TR-OÄM 40-1003
GARMIN GTX 335R/345R WITH ADS-B

This temporary revision TR-OÄM 40-1003 is approved in conjunction with the Optional Design Change Advisory OÄM 40-1003, and is valid in conjunction with the latest revision of the DA 40 NG Airplane Flight Manual (AFM), until this temporary revision has been incorporated into the AFM.

The limitations and information contained herein either supplement, or in the case of conflict, override those in the AFM.

The technical information contained in this document has been approved by the Canadian Department of Transport.

Doc. No.	Chapter	Affected Pages
6.01.15-E	6	6-21b
	9	9-3g

Instructions:

- Print this document on 8.5" x 11" yellow paper (single sided).
- Copy on yellow paper (single sided) at a reduced size of 72% to get the correct size for the AFM.
- Cut the paper to 6" x 8.5" and punch the holes on the left side of each page.
- Insert the cover page as the first page of the AFM.
- Insert the pages of this temporary revision in front of the corresponding pages in the AFM.
- Sign the Temporary Revision Log as having inserted this temporary revision.
- Keep this temporary revision until the information has been incorporated into the DA 40 NG AFM.

GARMIN.

SERVICE ALERT

NO.: 1228

TO: Owner/Operators of Garmin - Integrated Flight Deck Systems, G500/G600, GNS 400W/500W-series, GTN-series, and Garmin Dealers/Installers

DATE: October 9, 2012

SUBJECT: SIDs and STARs non-JETs Limitation

AFFECTED PRODUCTS

All Garmin Integrated Flight Deck Systems, G500/G600, GNS 400W/500W-series, and GTN-series navigation systems are affected.

PURPOSE

In some cases, published Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs) contain specific instructions within the Departure Route Description or arrival procedures that differ according to aircraft type, such as "JETS" or "ALL OTHERS." In cases where more than one aircraft type-specific instruction is provided within the same procedure, only the "JETS" aircraft type-specific instructions are provided in the source data and encoded in the Navigation Database. Therefore, the navigation system will only provide guidance information according to the JETS-specific instructions. These instructions may differ significantly from departure or arrival instructions that are appropriate for your aircraft type and erroneously following the resulting guidance information may create a safety issue.

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RWYS 1L/R: Climb heading 003°, or as assigned by ATC, Thence...
TAKEOFF RWY 10: Climb heading 093°, Thence...
TAKEOFF RWY 19L: JETS: Climb heading 213°, Thence... ALL OTHERS: Climb heading 183° to cross PIE R-116 at or above 2600, Thence...
TAKEOFF RWY 19R: JETS: Climb heading 203°, Thence... ALL OTHERS: Climb heading 183° to cross PIE R-116 at or above 2600, Thence...
TAKEOFF RWY 28: Climb heading 273°, Thence...

Expect radar vectors to join filed/assigned route. JETS: Maintain 6000. ALL OTHERS: Maintain 3000. Expect clearance to filed altitude/flight level within 10 minutes after departure.

TAMPA FIVE DEPARTURE
(TPA5.TPA) 11069

TAMPA, FLORIDA
TAMPA INTL (TPA)

Figure 1. Example Aircraft Type-specific Departure Route Description

PILOT ACTION REQUIRED

Always crosscheck the displayed route information with the published procedure prior to using any SID or STAR guidance information provided by the navigation system. Do not load a SID or STAR that contains JETS-specific instructions (or other procedures that are not applicable to your operation or ATC clearance) into navigation systems that are installed in non-jet aircraft.

GARMIN.

SERVICE ADVISORY

NO.: 1344 Revision B

TO:	Garmin Aviation Service Centers and Owner/Operators of all SBAS (WAAS) enabled GNS 4XX/5XX (GNS 480 is not included) series , GTN 6XX/7XX series, Cirrus Perspective®, Embraer Prodigy™, G1000, G2000, G3000, G5000, G900X, G950 products
DATE:	December 06, 2013
SUBJECT:	LPV and LNAV/VNAV Approach Full Scale Deflection
REVISION B:	Added TSO-C146 statement

AFFECTED PRODUCTS

All SBAS (WAAS) enabled GNS 4XX/5XX (GNS 480 is not included) series, GTN 6XX/7XX series, Cirrus Perspective®, Embraer Prodigy™, G1000, G2000, G3000, G5000, G900X, G950 products are affected by this advisory.

DESCRIPTION

CDI (Course Deviation Indicator)/HSI (Horizontal Situation Indicator) scaling on a limited number of LPV and LNAV/VNAV approaches are incorrect. Vertical guidance is not affected by this issue. As this behavior is not in strict compliance with TSO-C146, Garmin has applied for and received a TSO deviation from the FAA as the affected equipment provides an equivalent level of safety. With the granted deviation the affected equipment is fully compliant with the applicable regulatory regulations.

This issue affects only LPV and LNAV/VNAV approaches where the final approach segment termination waypoint is offset from the landing threshold.

A list of affected LPV and LNAV/VNAV approaches can be found here:
http://www8.garmin.com/aviation/notices/garmin_data_exclusions.pdf

RESOLUTION

Beginning with database cycle 1307, Garmin has removed the capability of selecting the affected approaches for LPV or LNAV/VNAV use until this issue is addressed in a future software release.

GARMIN.
1200 E. 151st Street
Olathe, KS 66062
913-397-8200

SERVICE ADVISORY

NO.: 1363 Rev A

TO: Garmin authorized dealers and owners/operators of G1000, Cirrus Perspective®, Embraer Prodigy™, G950, G900X, G2000, G3000, and G5000 Integrated Avionics Systems, GTN series, and GNS 400W/500W series navigation systems

DATE: November 19, 2013

SUBJECT: User-modified terminal procedure stored in a Flight Plan may cause error condition

AFFECTED PRODUCTS

This issue affects all G1000, Cirrus Perspective®, Embraer Prodigy™, G950, G900X, G2000, G3000, and G5000 Integrated Avionics Systems, GTN series, and GNS 400W/500W series navigation systems.

ISSUE

In some cases, a user-modified published procedure saved by the operator as part of a stored flight plan can be corrupted after the Navigation Database is updated. Activating this corrupted flight plan can cause intermittent recurring "red-x's" to appear on the displays and/or intermittent recurring loss of displayed navigation data.

PILOT ACTION

Never modify or delete waypoints within a published procedure and then save the procedure as part of a stored flight plan for later use. Additionally, the crew should ensure that any saved flight plans that contain an instrument approach procedure from the database that has been modified are deleted.

If corruption of an active stored flight plan is suspected, activate a Direct-to flight plan to any point that is not a waypoint in the affected flight plan. Next, delete the affected stored flight plan. The same flight plan may be recreated and flown. If the flight plan meets the criteria above, do not store the flight plan for later re-use.

RESOLUTION

This issue will be resolved in future software releases.

GARMIN.
1200 E. 151st Street
Olathe, KS 66062
913-397-8200

SERVICE ADVISORY

NO.: 1449 Rev A

TO: Owners/operators of G1000, G950, G900X, Embraer Prodigy, Cirrus Perspective, G2000, G3000, and G5000 Integrated Avionics Systems

DATE: August 29, 2014

SUBJECT: Unexpected flight path when sequencing to some vectors transition approaches

---

PRODUCTS AFFECTED

All Garmin G1000, G950, G900X, Embraer Prodigy and Cirrus Perspective Integrated Avionics Systems with GDU software Version 11.10 and later and all Garmin G2000, G3000, and G5000 Integrated Avionics Systems are affected.

ISSUE

Under certain conditions, the FMS may incorrectly calculate, and in some cases display a course from the last waypoint in a flight plan to the final approach course of a procedure loaded with a vectors transition. This can cause the AFCS, if coupled, to command a turn in the opposite direction from the desired course upon sequencing to the vectors leg of the procedure.

PILOT ACTION

Always select HDG Mode prior to reaching the end of the final leg of a flight plan prior to an approach procedure when an approach with a vectors transition is loaded.

RESOLUTION

Future software releases will include a remedy for this issue.

GARMIN.
1200 E. 151st Street
Olathe, KS 66062
913-397-8200

SERVICE ALERT

NO.: 1538 Rev A

TO: Owners and Operators of Garmin G900X, G950, G1000(H), G2000, G3000, G5000, Cirrus Perspective™, Embraer Prodigy™, and Embraer Prodigy Touch Integrated Avionics Systems

DATE: July 23, 2015

SUBJECT: Operations with Altimeter Set to QFE (height above field elevation)

PRODUCTS AFFECTED

Garmin G900X, G950, G1000(H), G2000, G3000, G5000, Cirrus Perspective™, Embraer Prodigy™, and Embraer Prodigy Touch Integrated Avionics Systems are affected.

NOTE

Most locations utilize the QNH altitude that provides altitude above mean sea level. However QFE altitude may be used in some locations (e.g. Russian Federation and the People's Republic of China). In many locations that normally utilize QFE, the flight crew may request the QNH altimeter setting.

ISSUE

System functions will not operate properly with a QFE altimeter setting.

PILOT ACTION

Do not use a QFE altimeter setting with this system. Use only a QNH altimeter setting for height above mean sea level, or the standard pressure setting, as applicable.

RESOLUTION

Support for QFE altimeter settings will be added in a future software release.

FOREWORD

We congratulate you on the acquisition of your new DIAMOND DA 40 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 40 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 40 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.

N.A. Otto-Strasse 5
A-2700 Wiener Neustadt, Austria
Phone. : +43-2622-26700
Fax : +43-2622-26780
E-Mail : office@diamond-air.at

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.

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 40-039, then the Temporary Revision TR OÄM-40-039 is superseded by the 'permanent' Revision 5.

Cover pages of Temporary Revisions, if applicable, are inserted behind the cover page of this manual, all other pages are inserted in front of the affected pages of this manual.

Rev. No.	Reason	Chap-ter	Page(s)	Date of Revision	Approval Note	Date of Approval	Date Inserted	Signature
1	MÄM 40-415, 40-432, 40-440, 40-448, 40-460, 40-466, 40-447, 40-514, OÄM 40-311, 40-313, 40-314 & 40-316, 40-321, 40-326, 40-327, 40-329, 40-330, 40-331, 40-333, Corrections	all	all, except cover page	15-Mar-2011	Revision 1 of the AFM Doc. No. 6.01.15-E is approved with EASA Approval No. 10034114.	08-Mar-2011		
2	MÄM 40-434 & OÄM 40-310, MÄM 40-451, MÄM40-321/a FAA- Approval	0, 1, 2, 5, 6	0-0, 0-0a, 0-3, 0-5, 0-6, 0-9, 0-10, 1-2, 1-3, 2-24, 5-1, 5-31, 5-32, 6-16 through 6-26	15-Jun-2011	Revision 2 of the AFM Doc. No. 6.01.15-E is approved by EASA under project No. 0010005331.	24-Nov-2011		

Rev. No.	Reason	Chap-ter	Page(s)	Date of Revision	Approval Note	Date of Approval	Date Inserted	Signature
3	MÄM 40-777/a, 40-766, 40-765, 40-754, 40-751, 40-742, 40-731, 40-710/a, 40-674, 40-672, 40-662, 40-638, 40-631, 40-632, 40-618/a & OÄM 40-321/b, 40-574, 40-563, 40-562, 40-561,40-559, 40-558, 40-547, 40-533, 40-488, 40-429/a, 40-551 OÄM 40-321/b,40-237, 40-183, 40-334/a, 40-314/d & 40-316/d, 40-340, 40-341, 40-336/a, 40-326/a, 40-252, 40-258, 40-312, 40-362, 40-369, 40-370, 40-371, 40-377, 40-381, Corrections	all	All, except Cover Page	01-Jul-2014	Revision 3 of the AFM Doc. No. 6.01.15-E is approved under the authority of DOA No. EASA.21J.052	29-Jan-2015		

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0.4 TABLE OF CONTENTS

CHAPTER 1
GENERAL

Page

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.

This Airplane Flight Manual is valid for all serial numbers. 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	
Exhaust Pipe with Muffler	MÄM 40-434 or OÄM 40-310	☒ yes	☐ no
Garmin G1000 Avionics System	MÄM 40-447	☒ yes	☐ no
Long Range Tanks	OÄM 40-130	☒ yes	☐ no
Baggage Tray (Extended Baggage Compartment)	OÄM 40-164	☒ yes	☐ no
Baggage Tube	Basic Design	☐ yes	☒ no
Winter Baffle Fresh Air Inlet	OÄM 40-183	☐ yes	☒ no
Nose Landing Gear Tie-down	OÄM 40-200	☐ yes	☒ no
Front Seats with Adjustable Backrest	OÄM 40-252	☐ yes	☒ no
Maximum Landing Mass 1280 kg	MÄM 40-574	☒ yes	☐ no

1.1 INTRODUCTION

The following line is added to the existing table:

Modification	Source	Installed	
Front seats with adjustable backrest - Hydrolok	OÄM 40-375	☒ yes	☐ no

Diamond Aircraft Kleinreit 4070 ... Production Organisation

Affected Chapters:

1.1 INTRODUCTION

The following item and the footnote are added:

Modification	Source	Installed	
Engine Software VC33_1_05_19 *	MÄM 40-838	☒ yes	☐ no

* Or later approved software

1.1 INTRODUCTION

The following is added to the Modification List:

Modification	Source	Installed	
Emergency Egress Hammer	OÄM 40-401	☒ yes	☐ no

Affected Chapters:

1.1 INTRODUCTION

The following is added to the existing Modification Table:

Modification	Source	Installed	
Garmin G1000 NXi Avionics System	MÄM 40-868	☒ yes	☐ no

1.1 INTRODUCTION

The following is added to the existing table:

Modification	Source	Installed	
Garmin GDL 69A SXM	OÄM 40-1000	☐ Yes	☒ No
Garmin G1000 NXi Phase II	MÄM 40-1007	☒ Yes	☐ No

Diamond Aircraft · Production Organization · Klagenfurt A070 ·

Modification	Source	Installed	
Shorter NLG Damper	MÄM 40-631	☒ yes	☐ no
Maximum Take-Off Mass 1310 kg	MÄM 40-662	☒ yes	☐ no
Conventional Cockpit DA 40 NG Club	OÄM 40-321	☐ yes	☒ no
Emergency Axe	OÄM 40-326	☐ yes	☒ no
Retrofit with Autopilot KAP 140	OÄM 40-329	☐ yes	☒ no
Retrofit without Autopilot GFC 700	OÄM 40-330	☐ yes	☒ no
Short Baggage Extension	OÄM 40-331	☐ yes	☒ no
DA 40 NG without Autopilot GFC 700	OÄM 40-333	☐ yes	☒ no
Landing Gear with Large Tyres and 1280 kg Maximum Landing Mass	OÄM 40-334	☐ yes	☒ no
Diesel Operation	OÄM 40-370	☐ yes	☒ no

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.

CAUTION

The DA 40 NG is a single 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, flights during the night, on top, under instrument meteorological conditions (IMC), or above terrain which is unsuitable for a landing, constitute a risk. It is therefore highly recommended to select flight times and flight routes such that this risk is minimized.

1.2 CERTIFICATION BASIS

This airplane has been type certified in accordance with the procedures established by EASA. The certification basis is JAR-23, published on 11-Mar-1994 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	:	11.63 m	38 ft 2 in
Length	:	8.06 m	26 ft 5 in
Height	:	1.97 m	6 ft 6 in

Wing

Airfoil	:	Wortmann FX 63-137/20 - W4	
Wing area	:	13.244 m²	142.6 sq.ft.
Mean aerodynamic chord (MAC)	:	1.171 m	3 ft 10 in
Aspect ratio	:	10.223	
Dihedral	:	5°	
Leading edge sweep	:	1°	

Aileron

Area (total, left + right)	:	0.654 m²	7.0 sq.ft.

Wing Flaps

Area (total, left + right)	:	1.56 m²	16.8 sq.ft.

Horizontal Tail

Area	:	2.34 m^2	25.2 sq.ft.
Elevator area	:	0.665 m^2	7.2 sq.ft.
Angle of incidence	:	-3.0° relative to longitudinal axis of airplane	

Vertical Tail

Area	:	1.60 m^2	17.2 sq.ft.
Rudder area	:	0.47 m^2	5.1 sq.ft.

Landing Gear

Track	:	2.97 m	9 ft 9 in
Wheelbase	:	1.68 m	5 ft 6 in
Wheelbase (if MÄM 40-574 is installed)			
	:	1.85 m	6 ft 8 in
Nose wheel	:	5.00-5; 6 PR, TT, 120 mph	
Main wheel	:	15x6.0-6; 6 PR, TT, 160 mph	

Affected Chapters:

1.4 DIMENSIONS

Landing Gear

The following items are amended to read:

Nose wheel	:	5.00-5; 6 PR; TT; 120 mph
Main wheel	:	15x6.0-6; 6 PR; TT; 160 mph

1.5 DEFINITIONS AND ABBREVIATIONS

(a) Airspeeds

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

IAS: Indicated Airspeed as shown on an airspeed indicator.

KCAS: CAS in knots.

KIAS: IAS in knots.

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

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

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

v_R: Rotation Speed. Speed at which the nose wheel lifts off.

v_{50}: Speed at 50 ft (15 m)above the take-off surface.

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

v_{S0}: Stalling Speed, or the minimum continuous speed at which the airplane is still controllable in the landing configuration.

v_x: Best Angle-of-Climb Speed.

v_y: Best Rate-of-Climb Speed.

(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 1,013.25 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 1,013.25 hPa (29.92 inHg).

Pressure Altitude:

Altitude above MSL, indicated by a barometric altimeter which is set to 1,013.25 hPa (29.92 inHg). The pressure altitude is the indicated pressure altitude corrected for installation and instrument errors.

In this Airplane Flight Manual altimeter instrument errors are regarded as zero.

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

(c) Flight Performance and Flight Planning

AGL: Above ground level.

Demonstrated Crosswind Component:

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

MET: Weather, weather advice.

NAV: Navigation, route planning.

(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 consumables 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 condition was used in the strength calculations to determine the landing gear loads during a particularly hard landing.

Maximum Zero Fuel Mass:
The highest permissible mass with empty fuel tanks.

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

CT: Coolant Temperature.

EECU: Electronic Engine Control Unit.

GT: Gearbox Temperature.

LOAD: Engine output power in percent of take-off power.

MED: Main Engine Display.

OP: Oil Pressure (oil pressure in the lubrication system of the engine).

OT: Oil Temperature (oil temperature in the lubrication system of the engine).

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

SED: Secondary Engine Display.

FT: Fuel Temperature.

(f) Designation of the Circuit Breakers on the Instrument Panel

ADC: Air Data Computer.
ADF: Automatic Direction Finder.
AHRS: Attitude and Heading Reference System.
ANNUN: Annunciator Panel.
AV/CDU FAN: Avionic-, CDU-Cooling Fans.
AV. BUS: Avionic Bus.
AUDIO: Audio Panel / Marker Beacon Receiver.
AUTOPILOT: Autopilot System.
COM: COM Radio.
COM1: COM Radio No. 1.
COM2: COM Radio No. 2.
DG: Directional Gyro.
DME: Distance Measuring Equipment.
EECU A: ECU A.
EECU B: ECU B.
ENG INST: Engine Instruments.
ESS TIE: Bus Interconnection.
FAN/OAT: Fan / Outside Air Temperature.
FLAPS: Flap System.
FLOOD: Flood Light.
FUEL PUMP A: ECU A Fuel Pump.
FUEL PUMP B: ECU B Fuel Pump.
GPS: Global Positioning System.
GPS/NAV1: Global Positioning System and NAV Receiver No. 1.
GPS/NAV2: Global Positioning System and NAV Receiver No. 2.
HORIZON: Artificial Horizon (Attitude Gyro).

INST.1: Engine Instrument.
INST. LT: Instrument Lights.
LANDING: Landing Light.
MAIN TIE: Bus Interconnection.
MASTER CONTROL:
Master Control (Avionics Relay).
MFD: Multi Function Display.
NAV: NAV Receiver.
PFD: Primary Flight Display.
PITOT: Pitot Heating System.
POSITION: Position Lights.
PWR: Power.
START: Starter.
STROBE: Strobe Lights (= Anti Collision Lights).
T & B: Turn and Bank Indicator.
TAS: Traffic Advisory System.
TAXI/MAP: Taxi Light / Map Lights.
WX500: Stormscope.
XFR PUMP: Fuel Transfer Pump.
XPDR Transponder.

(g) Equipment

ELT: Emergency Locator Transmitter.

(h) Design Change Advisories

MÄM: Mandatory Design Change Advisory.

OÄM: Optional Design Change Advisory.

(i) Miscellaneous

ACG: Austro Control GmbH (formerly BAZ, Federal Office of Civil Aviation).

ATC: Air Traffic Control.

CFRP: Carbon Fiber Reinforced Plastic.

EASA: European Aviation Safety Agency.

GFRP: Glass Fiber Reinforced Plastic.

GIA: Garmin Integrated Avionics.

JAR: Joint Aviation Requirements.

1.6 UNITS OF MEASUREMENT

1.6.1 CONVERSION FACTORS

Dimension	SI-Units		US Units		Conversion
Length	[mm]	millimeter	[in]	inch	[mm] / 25.4 = [in]
	[m]	meter	[ft]	feet	[m] / 0.3048 = [ft]
	[km]	kilometer	[NM]	nautical mile	[km] / 1.852 = [NM]
Volume	[l]	liter	[US gal]	US gallon	[l] / 3.7854 = [US gal]
			[qts]	US quarts	[l] / 0.9464 = [qts]
	[ml]	milliliter	[oz]	ounce	[ml] x 0.033814 = [oz]
Speed	[km/h]	kilometer per hour	[kt]	knot	[km/h] / 1.852 = [kt]
			[mph]	mile per hour	[km/h] / 1.609 = [mph]
	[m/s]	meter per second	[fpm]	feet per minute	[m/s] x 196.85 = [fpm]
Speed of rotation	[RPM] revolutions per minute				--
Mass	[kg]	kilogram	[lb]	pound	[kg] x 2.2046 = [lb]
Force, weight	[N]	newton	[lbf]	pound force	[N] x 0.2248 = [lbf]
Pressure	[hPa]	hecto-pascal	[inHg]	inches of mercury	[hPa] = [mbar]
					[hPa] / 33.86 = [inHg]
	[mbar]	millibar	[psi]	pound per square inch	[bar] x 14.504 = [psi]
	[bar]	bar			
Temperature	[°C]	degree Celsius	[°F]	degree Fahrenheit	[°C]x1.8 + 32 = [°F]
					([°F] - 32)/1.8 = [°C]

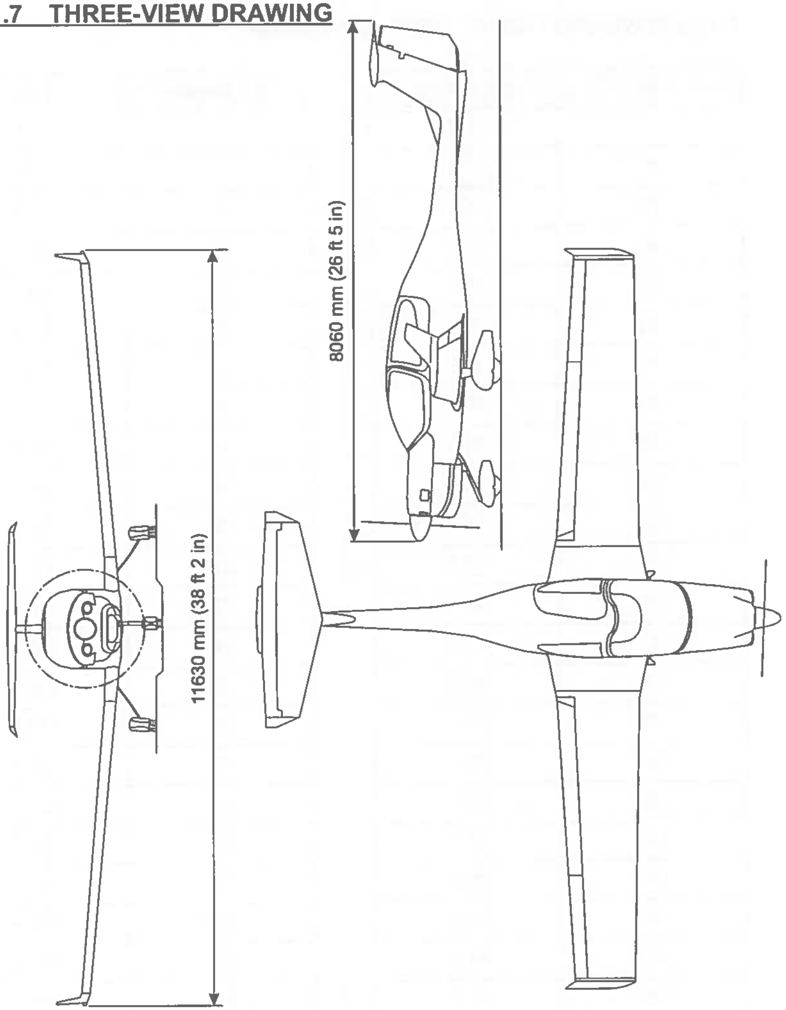
Dimension	SI-Units	US Units	Conversion
Intensity of electric current	[A] ampère		--
Electric charge (battery capacity)	[Ah] ampère-hour		--
Electric potential	[V] volt		--
Time	[sec] second		--

1.6.2 CONVERSION CHART LITER / US GALLON

Liter	US Gallon
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 Gallon	Liter
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 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.

1.8.1 ENGINE AND ENGINE INSTRUMENTS

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 AE300, E4.01.01 Maintenance Manual AE300, E4.08.04 Installation Manual AE300, E4.02.01

1.8.2 PROPELLER

Address:	mt-propeller Airport Straubing Wallmühle D-94348 ATTING GERMANY
Phone:	+49-9429-9409-0
E-mail:	sales@mt-propeller.com
Internet:	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

CHAPTER 2
OPERATING LIMITATIONS

2.1 INTRODUCTION

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

The limitations included in this Chapter are approved.

WARNING

Operation of the airplane outside of the approved operating limitations is not permissible.

2.2 AIRSPEED

<table>
<tr><th></th><th colspan="2">Airspeed</th><th>KIAS</th><th>Remarks</th></tr>
<tr><td rowspan="3">v_O</td><td rowspan="3">Operating maneuvering speed</td><td>up to 1080 kg (2381 lb)</td><td>101 KIAS</td><td rowspan="3">Do not make full or abrupt control surface movement above this speed.</td></tr>
<tr><td>above 1080 kg (2381 lb) to 1180 kg (2601 lb)</td><td>108 KIAS</td></tr>
<tr><td>above 1180 kg (2601 lb)</td><td>113 KIAS</td></tr>
<tr><td rowspan="2">v_{FE}</td><td rowspan="2">Max. flaps extended speed</td><td>LDG</td><td>98 KIAS</td><td rowspan="2">Do not exceed these speeds with the given flap setting.</td></tr>
<tr><td>T/O</td><td>110 KIAS</td></tr>
<tr><td>v_{NO} = v_C</td><td colspan="2">Max. structural cruising speed</td><td>130 KIAS</td><td>Do not exceed this speed except in smooth air, and then only with caution.</td></tr>
<tr><td>v_{NE}</td><td colspan="2">Never exceed speed in smooth air</td><td>172 KIAS</td><td>Do not exceed this speed in any operation.</td></tr>
</table>

2.3 AIRSPEED INDICATOR MARKINGS

Marking	IAS	Significance
White arc	60 KIAS - 98 KIAS	Operating range with flaps fully extended
Green arc	66 KIAS - 130 KIAS	Normal operating range.
Yellow arc	130 KIAS - 172 KIAS	'Caution' range - "Only in smooth air".
Red line	172 KIAS	Maximum speed for all operations - v_{NE}.

2.4 POWER-PLANT LIMITATIONS

a) Engine manufacturer : Austro Engine

b) Engine designation : E4-A

c) RPM limitations (shown as propeller RPM)

Maximum take-off (RPM)	:	2300 RPM max. 5 min
Max. continuous power (RPM)	:	2100 RPM
Max. overspeed	:	2500 RPM max. 20 sec

d) Engine power

Max. take-off power	:	100% (123.5 kW) max. 5 min
Max. continuous power	:	92% (114 kW)

e) Oil pressure

Minimum at idle	:	0.9 bar
Minimum at max. continuous conditions	:	2.5 bar
Maximum	:	6.5 bar
Normal range	:	2.5 bar - 6.0 bar

f) Oil quantity

Minimum	:	5.0 l
Maximum	:	7.0 l
Maximum oil consumption	:	0.1 liter/hour

g) Oil temperature

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

h) 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 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.

i) Coolant temperature

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

j) Fuel temperature

Minimum	:	- 25 °C
Maximum	:	60 °C

k) Fuel pressure (absolute pressure)

Minimum	:	4 bar

NOTE

The fuel pressure is not indicated; a fuel pressure warning will illuminate on the PFD (if G1000 is installed) or SED (if installed) if the pressure is below the limit.

Maximum	:	7 bar

NOTE

The fuel pressure is not indicated; the fuel pressure caution ECU A/B FAIL on the PFD (if G1000 is installed) or ECU A/B on the White Wire annunciator panel (if installed) will illuminate if the pressure is above the limit.

l) Voltage

Minimum	:	24.1 V
Maximum	:	32.0 V

m) Amperage

Maximum	:	70 A

n) Propeller manufacturer	:	mt-Propeller
o) Propeller designation	:	MTV-6-R/190-69
p) Propeller diameter	:	190 cm (6 ft 3 in)
q) Prop. pitch angle (@ 0.75 R)	:	Low Pitch 14.5° ± 0.2°
		High Pitch 35° ± 1.0°

r) Governor : mt-Propeller P-853-16 electrical governor

s) Oil specification :

Approved Engine Oil Types	SAE Grade
SHELL HELIX ULTRA	5W-30
ADDINOL SUPER POWER MV 0537	5W-30
BP Visco 5000 5W-30	5W-30
REPSOL ELITE Common Rail 5W30	5W-30
Gulf Formula GMX	5W-30
G-Energy F Synth 5W-30	5W-30
QUARTZ 9000 ENERGY 5W-30	5W-30
Gulf Formula GX	5W-30
AEROSHELL Oil Diesel Ultra	5W-30
CASTROL Edge 5W-30 A3	5W-30
CASTROL Edge Professional A3	5W-30
SHELL HELIX ULTRA	5W-40
LIQUI MOLY 5W-40 LEICHTLAUF HIGH TECH	5W-40
megol Motorenoel High Condition	5W-40
PETRONAS Syntium 3000	5W-40
LUKOIL LUXE synthetic	5W-40
CASTROL Edge Professional A3	5W-40
CASTROL Magnatec Professional A3	5W-40
VALVOLINE SynPower HST	5W-40
VALVOLINE SynPower	5W-40
GULF Formula GX	5W-40
Castrol SLX Professional Longtec 0W-40	0W-40

Affected Chapters:

2.4 POWER-PLANT LIMITATIONS

s) Oil specification:

The following items are amended to read:

Approved Engine Oil Types	SAE Grade
BP Visco 5000	5W-30
REPSOL ELITE Common Rail	5W-30
G-Energy F Synth	5W-30
TOTAL QUARTZ 9000 ENERGY	5W-30
LIQUI MOLY LEICHTLAUF HIGH TECH	5W-40
Castrol SLX Professional Longtech	0W-40

The following entry is added to the existing table:

Approved Engine Oil Types	SAE Grade
AUSTRO ENGINE Aero produced by Liqui Moly recommended by Austro Engine GmbH	5W-40

CASTROL Edge 0W-40 A3/B4	0W-40
CASTROL Edge Professional A3	0W-40
SHELL HELIX Ultra	0W-40

CAUTION

Only engine oils conforming to MB 229.5 specification are approved by Austro Engine GmbH to be used for operation.

NOTE

It is not recommended to mix different SAE grades.

t) Gearbox oil (propeller gearbox) : SHELL SPIRAX GSX 75W-80

SHELL SPIRAX S6 GXME 75W-80

u) Coolant : Distilled water / Cooler protection (BASF Glysantin Protect Plus / G48):

- Mixture ratio 50% / 50% for freezing point -38°C (-36°F).
- Mixture ratio 40% / 60% (MÄM 40-638 is carried out) freezing point -53 °C (-63°F)

CAUTION

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

v) Maximum restart altitude	:	16,400 ft pressure altitude for immediate restarts 10,000 ft pressure altitude for restarts within 2 minutes

2.4. POWER-PLANT LIMITATIONS

v) Maximum restart altitude :

The Paragraph is amended to read:

16,400 ft pressure altitude for immediate restarts

15,000 ft pressure altitude (if MÄM 40-838 or later approved Software is installed) for immediate restarts

10,000 ft pressure altitude for restarts within 2 minutes

Affected Chapters:

2.5 ENGINE INSTRUMENT MARKINGS

The item 'Coolant temp.' is amended to read:

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
Coolant temp.	below -30°C	-30° to 60°C	60° to 100°C	100° to 105°C	above 105°C

2.5 ENGINE INSTRUMENT MARKINGS

Engine instrument markings and their color code significance are shown in the table 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 2100 RPM	2100 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° to140°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.	below -25°C	-25° to -20°C	-20° 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
Fuel qty.	below 1 US gal	--	1 to 14 US gal	--	--

2.6 WARNING, CAUTION AND STATUS LIGHTS

The following tables show the color and significance of the warning, caution and advisory alert lights. There are two variants: G1000 annunciation or SED, MED and 'White Wire' annunciator panel.

Color and Significance of the Warning Lights (Red)

Warning Alerts (Red)		Meaning / Cause
G1000 installed	SED, MED, White Wire installed	
WARNING	WARNING	One of the warnings listed below is being indicated.
ENG TEMP	-	Engine coolant temperature is in the upper red range (too high / > 105 °C).
OIL TEMP	-	Engine oil temperature is in the upper red range (too high / > 140 °C).
OIL PRES	-	Engine oil pressure is in the lower red range (too low / < 0.9 bar).
L/R FUEL TEMP	-	Fuel temperature is in the upper red range (too high / > 60 °C).
GBOX TEMP	-	Engine gearbox temperature is in the upper red range (too high / > 120 °C).
FUEL PRESS	FUELPRESS	Engine fuel pressure is low.
ALTN AMPS	-	Engine alternator output is in the upper red range (too high / > 70 A).
ALTN FAIL	ALTERNATOR	Engine alternator has failed.
STARTER	START	Engine starter is engaged.

2.6 WARNING, CAUTION AND STATUS LIGHTS

Color and Significance of the Warning Alerts on the G1000

The last item of the existing table is amended to read:

Warning alerts (red)	SED, MED, White Wire installed	Meaning / Cause
Red X or Yellow X	-	A red or yellow (if MÄM 40-868 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.

Warning Alerts (Red)		Meaning / Cause
G1000 installed	SED, MED, White Wire installed	
DOOR OPEN	DOORS	Canopy and/or rear door are/is not closed and locked.
ATTITUDE FAIL	-	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.
AIRSPEED FAIL	-	Display system is not receiving airspeed input from the air data computer; accompanied by a red X through the airspeed display.
ALTITUDE FAIL	-	Display system is not receiving altitude input from the air data computer; accompanied by a red X through the altimeter display.
VERT SPEED FAIL	-	Display system is not receiving vertical speed input from the air data computer; accompanied by a red X through the vertical speed display.
HDG	-	Display system is not receiving valid heading input from the AHRS; accompanied by a red X through the digital heading display.
Red X	-	A red X through any display field, such as com frequencies, nav frequencies, or engine data, indicates that display field is not receiving valid data.

Color and Significance of the Caution Lights (Amber)

Caution Alerts (Amber)		Meaning / Cause
G1000 installed	**SED, MED, White Wire installed**	
CAUTION	CAUTION	One of the cautions below is being indicated.
ECU A FAIL	ECU A	A fault has occurred in the engine ECU A or ECU A is being tested during FADEC-test procedure during the 'Before Take-Off Check'.
ECU B FAIL	ECU B	A fault has occurred in the engine ECU B or ECU B is being tested during FADEC-test procedure during the 'Before Take-Off Check'.
FUEL LOW	LOW FUEL	Left fuel quantity is low.
VOLTS LOW	LOW VOLTS	Engine bus voltage is too low (< 25 V).
COOL LVL	WATERLEV	Engine coolant level is low.
PITOT FAIL	PITOT	Pitot heat has failed.
PITOT HT OFF	-	Pitot heat is OFF.
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.
-	ENGINE	Engine limit exceeded.

Color and Significance of the Status Lights (White)

Advisory Alerts (White)		Meaning / Cause
G1000 installed	**SED, MED, White Wire installed**	
GLOW ON	GLOW	Engine glow plug active.
FUEL XFER	FUEL TRANS	Fuel transfer from auxiliary to main tank is in progress.
PFD FAN FAIL	-	Cooling fan for the PFD is inoperative.
MFD FAN FAIL	-	Cooling fan for the MFD is inoperative.
GIA FAN FAIL	-	Cooling fan for the GIAs is inoperative.

2.7 MASS (WEIGHT)

Value	Mass (Weight)	
Maximum take-off mass	1280 kg	2822 lb
Maximum take-off mass (if MÄM 40-662 is installed)	1310 kg	2888 lb
Maximum landing mass if MÄM 40-574 is installed	1216 kg 1280 kg	2681 lb 2822 lb
Minimum flight mass	940 kg	2072 lb
Maximum zero fuel mass if MÄM 40-574 is installed	1200 kg 1265 kg	2646 lb 2789 lb
Standard:		
Max. load in baggage compartment (between rear seats and baggage frame)	30 kg	66 lb
Max. load in baggage tube compartment (if installed)	5 kg	11 lb
Max. load in short baggage extension (if OÄM 40-331 is installed)	15 kg	33 lb
Extended baggage compartment (if OÄM 40-164 is installed):		
Max. load in cockpit baggage compartment (behind rear seats)	45 kg	100 lb
Max. load in extended baggage compartment (behind cabin baggage compartment)	18 kg	40 lb
Max. load in cockpit baggage compartment and extended baggage compartment	45 kg	100 lb

WARNING

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

NOTE

In some countries the beginning of a flight is defined by starting the engine. In those countries a maximum ramp mass 4 kg (9 lb) above the maximum take-off mass is approved. At the time of lift-off the maximum permitted take-off mass must not be exceeded.

NOTE

The maximum zero fuel mass is the highest mass with empty fuel tanks.

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 upper surface of a 600:31 wedge which is placed on top of the rear fuselage in front of the vertical stabilizer. When the upper surface of the wedge is aligned horizontally, the Datum Plane is vertical. The Datum Plane is located 2.194 meter (86.38 in) forward of the most forward point of the root rib on the stub wing.

Center of Gravity Limitations

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

Most forward CG:

2.40 m (94.5 in) aft of DP from 940 kg to 1080 kg (2072 lb to 2381 lb)
2.46 m (96.9 in) aft of DP at 1280 kg (2822 lb)

If MÄM 40-662 is installed:

2.469 m (97.2 in) aft of DP at 1310 kg (2888 lb)

linear variation between these values

Most rearward CG:

2.53 m (99.6 in) aft of DP from 940 kg (2072 lb) to 1310 kg (2888 lb)

WARNING

Exceeding the center of gravity limitations reduces the controllability and stability of the airplane.

2.9 APPROVED MANEUVERS

The airplane is to be operated 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.

CAUTION

Intentional negative g-maneuvers are not permitted.

2.10 MANEUVERING LOAD FACTORS

WARNING

The table below shows structural limitations. Exceeding the maximum load factors will lead to an overstressing of the airplane.

CAUTION

Intentional negative g-maneuvers are not permitted.

	at v_O	at v_{NE}	with flaps in T/O or LDG position
Positive	3.8	3.8	2.0
Negative	-1.52	0	0

2.11 OPERATING ALTITUDE

The maximum operating altitude is 16,400 ft (5,000 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 unpaved surfaces

Flights into known or forecast icing conditions are prohibited.

Flights into known thunderstorms are prohibited.

Minimum Operational Equipment (Serviceable)

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

NOTE

Many of the items of minimum equipment listed in the following table are integrated in the G1000 (if installed).

	For daytime VFR flights	In addition for night VFR flights	In addition for IFR flights
Flight & naviga-tion instru-ments	• Airspeed indicator • Altimeter • Magnetic compass • 1 headset, used by pilot in command	• Vertical speed indicator (VSI) • Attitude gyro • Turn & bank indicator • Directional gyro • VHF radio (COM) • VOR receiver • Transponder (XPDR) • GPS receiver (part of G1000, if installed) • Second headset (if PM 1000 intercom is installed)	• Second airspeed indicator (on PFD and backup, if G1000 is installed) • Second altimeter • Second attitude gyro (on PFD and backup, if G1000 is installed) • Second VHF radio (COM) • VOR-LOC-GP receiver • Second GPS receiver (part of G1000, if installed)

	For daytime VFR flights	In addition for night VFR flights	In addition for IFR flights
Engine instru-ments	• Fuel qty. • Oil press. • Oil temp. • Coolant temp. • Coolant level indicator • Gearbox temp. • Load • Prop. RPM • Fuel temp. left & right tank • Fuel flow • Fuel pressure warning • ECU A/B Caution • ENGINE Caution (if White Wire annunciator panel is installed)	• Ammeter • Voltmeter	

	For daytime VFR flights	In addition for night VFR flights	In addition for IFR flights
Lighting		• Position lights • Strobe lights (anti collision lights) • Landing light • Instrument lighting • Flood light • Flashlight	
Other operational minimum equipment	• Stall warning system • Alternate means for fuel quantity indication (see Section 7.9) • Safety belts for each occupied seat • Airplane Flight Manual	• Pitot heating system • Alternate static valve	• Emergency battery (for backup attitude gyro and flood light)

NOTE

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

<u>Engine Systems and Equipment</u>

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 37 determined acc. to EN ISO 5165/ASTM D613 is recommended.

NOTE

Use only uncontaminated fuel from reliable sources.

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

<u>OPERATION WITH ANTI-MICROBIAL LIFE FUEL ADDITIVES</u>

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

2.14 FUEL

The first NOTE is amended to read:

NOTE

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

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.

Standard Tank Configuration:

Total fuel quantity	:	2 x 15.0 US gal (2 x 56.8 liter)
Usable fuel	:	2 x 14.0 US gal (2 x 53.0 liter)

Long Range Tank (if installed) Configuration:

Total fuel quantity	:	2 x 20.5 US gal (2 x 77.6 liter)
Usable fuel	:	2 x 19.5 US gal (2 x 73.8 liter)
Max. indicated fuel quantity	:	14 US gal (53 liter) per tank
Max. permissible difference between right and left tank	:	9 US gal (approx. 34 liter)

CAUTION

If an indicator shows 14 US gal, then 19.5 US gal must be assumed for the calculation of the difference between right and left tank.

2.15 LIMITATION PLACARDS

All *limitation* placards relevant for the base DA 40 NG airplane are shown below. A list of all placards is included in the Airplane Maintenance Manual (Doc. No. 6.02.15), Chapter 11.

On the Instrument Panel:

THIS AIRPLANE MAY ONLY BE OPERATED IN ACCORDANCE WITH THE AIRPLANE FLIGHT MANUAL IN THE "NORMAL" CATEGORY IN NON-ICING CONDITIONS. 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. ALL AEROBATIC MANEUVERS INCLUDING SPINNING ARE PROHIBITED. FOR FURTHER OPERATIONAL LIMITATIONS REFER TO THE AIRPLANE FLIGHT MANUAL.

OPERATING MANEUVERING SPEED:
V_O = 113 KIAS (ABOVE 1180 KG / 2601 LB)
V_O = 108 KIAS (ABOVE 1080 KG / 2381 LB TO 1180 KG / 2601 LB)
V_O = 101 KIAS (UP TO 1080 KG / 2381 LB)

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

Long Range Tank (if installed):

max. usable fuel: 2 x 19.5 US gal

* Max. indicated fuel quantity: 2 x 14 US gal
* Refer to AFM to use entire tank capacity
* Max. difference LH/RH tank: 9 US gal

Next to Each of the Two Fuel Filler Necks:

WARNING **APPROVED FUEL** **JET-A1** **or see Airplane Flight Manual**

Next to the Essential Bus Switch:

Ess. Bus NOT for normal operation. See AFM.

2.15 LIMITATION PLACARDS

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

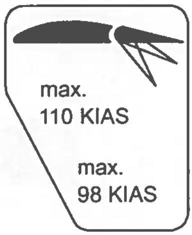
The Paragraph is amended to read:

OIL **AUSTRO ENGINE Aero** **5W-40** or see Airplane Flight Manual	**OR**	**OIL** **SHELL HELIX** **ULTRA** **5W30** or see Airplane Flight Manual

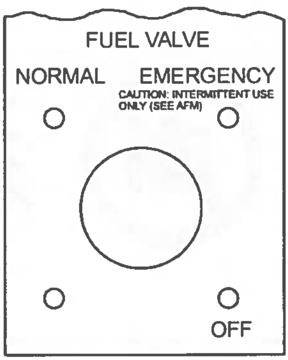
In the Cowling, on the Door for the Oil Filler Neck:

OIL
SHELL HELIX
ULTRA
5W30
or see Airplane
Flight Manual

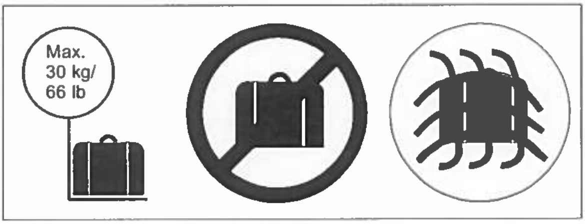
Next to the Flap Selector Switch:



On the Fuel Valve:

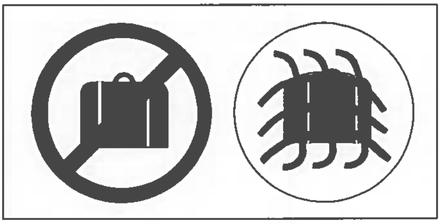


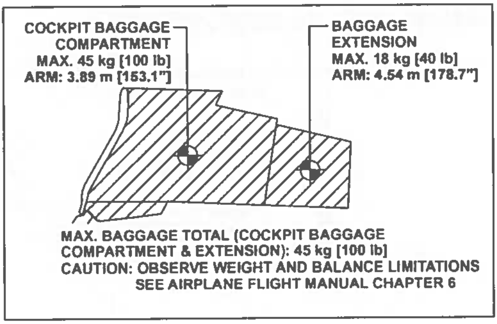
Next to the Baggage Compartment:



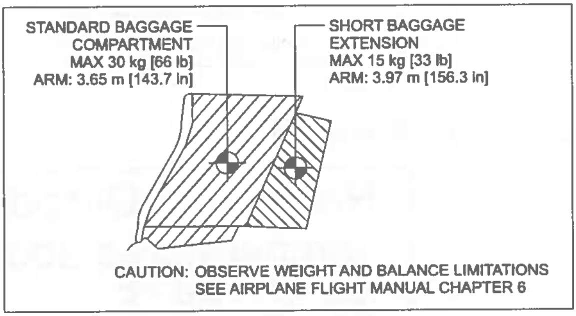
Baggage Tube Compartment:

Baggage Tray (if OÄM 40-164 installed, extended baggage compartment):

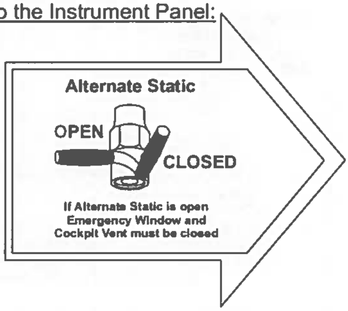




If Short Baggage Extension (OÄM 40-331) is carried out:



On the Left Sidewall, Next to the Instrument Panel:



Beside the Door Locking Device:

EMERGENCY EXIT:
The keylock must be
unlocked during flight

On Fuel Cooler Inlet Baffle (if installed):

Remove at Outside
Temperatures above
20 °C / 68 °F

On the Instrument Panel:

—— NO SMOKING ——

2.16 OTHER LIMITATIONS

2.16.1 TEMPERATURE

The airplane may only be operated when its temperature prior to operation is not less than -40 °C (-40 °F).

With the airplane cold soaked and its temperature below -20 °C (-4 °F) the use of an external pre-heater for the engine and pilot compartment prior to operation is mandatory.

The airplane may only be operated with the fuel cooler inlet baffle installed when the outside air temperature at take-off does not exceed 20 °C (68 °F).

If the outside air temperature at take-off is below -30°C (-22°F) the coolant radiator inlet baffle (OÄM 40-364) must be installed. The airplane may only be operated with the coolant radiator inlet baffle, if the outside air temperature at take-off does not exceed 0°C (32°F).

With the airplane cold soaked and its temperature below -30°C (-22°F) the batterries must be pre-heated (OÄM 40-363) prior to operation.

2.16.2 BATTERY CHARGE

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

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

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 key locked during operation of the airplane.

2.16.5 ELECTRONIC EQUIPMENT

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

Examples of undesirable items of equipment are:

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

This list is not exhaustive.

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

2.16.6 SMOKING

Smoking in the airplane is not permitted.

2.16.7 USE OF THE SUN VISORS

The sun visors (if installed, OÄM 40-327) may only be used during cruise. During all other phases of flight the sun visors must be locked in the fully upward position.

Affected Chapter:

2.16 OTHER LIMITATIONS

2.16.5 ELECTRONIC EQUIPMENT

The third Paragraph is amended to read and the NOTE is added:

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

NOTE

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

CHAPTER 3
EMERGENCY PROCEDURES

Page

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 here should be followed and applied in order to clear the problem.

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

WARNING

In each emergency, control over the flight attitude and the preparation of a possible emergency landing have priority over attempts to solve the current problem ("first fly the aircraft"). Prior to the flight the pilot must consider the suitability of the terrain for an emergency landing for each phase of the flight. For a safe flight the pilot must constantly keep a safe minimum flight altitude. Solutions for various adverse scenarios should be thought over in advance. Thus it should be guaranteed that the pilot is at no time shocked by an engine failure and that he can act calmly and with determination.

3.1.2 CERTAIN AIRSPEEDS IN EMERGENCIES

Event		KIAS
Airspeed for best glide angle (Flaps UP)		88 KIAS
Airspeed for emergency landing with engine off	Flaps UP	83 KIAS
	Flaps T/O	78 KIAS
	Flaps LDG	77 KIAS

3.2 INSTRUMENT INDICATIONS IN PROHIBITED (RED) RANGE

3.2.1 ENGINE TEMPERATURE

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 for COOL LVL (if G1000 is installed) or WATERLEV (if SED is installed) caution message (low coolant level).

COOL LVL (if G1000 is installed) or WATERLEV (if SED is installed) Caution Message Not Displayed:

During climb:

- Reduce power 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 as far as possible and increase airspeed.

CONTINUED

During cruise:

- Reduce power, or
- Increase airspeed, if necessary by initiating a descent.
- Check coolant temperature in green range.

CAUTION

If high coolant temperature is indicated and the COOL LVL *(if G1000 is installed) or WATERLEV (if SED is installed)* 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 3.3.4 - ENGINE FAILURE IN FLIGHT.

COOL LVL (if G1000 is installed) or WATERLEV (if SED is installed) Caution Message Displayed:

- Reduce power.
- Expect loss of coolant.

WARNING

A further increase in coolant temperature must be expected. Prepare for an engine failure in accordance with 3.3.4 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

3.2.2 OIL TEMPERATURE

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.
- Expect loss of engine oil.

WARNING

A further increase in oil temperature must be expected. Prepare for an engine failure in accordance with 3.3.4 - ENGINE FAILURE IN FLIGHT.

If the Oil Pressure Is Within the Green Range:

- Reduce power.
- 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 3.3.4 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

3.2.3 OIL PRESSURE

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.
- Expect loss of oil.

WARNING

Land at the nearest suitable airfield. Prepare for an engine failure in accordance with 3.3.4 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

3.2.4 GEARBOX TEMPERATURE

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.
- 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 3.3.4 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

3.2.5 L/R FUEL TEMPERATURE

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.
- 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. The fuel temperature can be decreased by transferring fuel from the auxiliary to the main tank.

END OF CHECKLIST

3.2.6 FUEL PRESSURE

Engine fuel pressure is low.

1. Fuel quantity .... check
2. Fuel valve .... check ON
3. Fuel pumps .... ON

If FUEL PRESS (if G1000 is installed) or FUELPRESS (if SED is installed) Warning Remains:

4. Fuel valve .... EMERGENCY
5. Fuel pumps .... OFF

If FUEL PRESS (if G1000 is installed) or FUELPRESS (if SED is installed) Warning Still Remains:

WARNING

Imminent engine failure must be expected. Prepare for an engine failure in accordance with 3.3.4 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

3.2.7 ALTERNATOR AMPS

Engine alternator output is in the upper red range (too high / above 70 A).

This warning is indicated when the consumption of electrical power is too high.

Possible reasons are:

- A fault in wiring or equipment.

1. Electrical equipment .... switch OFF as necessary and possible to reduce electric load

If the problem does not clear itself:

2. Land on the nearest suitable airfield.

END OF CHECKLIST

3.2.8 ALTERNATOR FAIL

Engine alternator has failed.

The batteries are the last remaining source of electrical power for about 30 minutes.

1. Circuit breakers . . . . check
2. ESSENTIAL BUS . . . . ON
3. Electrical equipment . . . . switch OFF all equipment which is not needed
4. Land on the nearest suitable airfield.

WARNING

The ECU which is absolutely necessary for engine operation needs electrical power. It is recommended to switch off all electrical consumers and to land as soon as possible. Be prepared for an engine failure and an emergency landing. For a severe electrical failure a ECU backup battery system is installed.

CAUTION

For cases in which the battery capacity is not sufficient to reach a suitable airfield, an emergency battery is installed, serving as an additional back-up system for the backup attitude gyro (artificial horizon) and flood light. This battery is switched on with the EMERGENCY switch, located on the top left side of the instrument panel.

END OF CHECKLIST

3.3 ENGINE PROBLEMS

3.3.1 ENGINE PROBLEMS ON GROUND

1. POWER lever . . . . IDLE
2. Brakes . . . . as required

NOTE

If considered necessary, the engine must be shut down. Otherwise the cause of the problem must be established in order to re-establish engine performance.

CAUTION

If the oil pressure is in the red range, the engine must be shut down immediately.

WARNING

If the problem cannot be cleared, the airplane must not be flown.

END OF CHECKLIST

3.3.2 ENGINE PROBLEMS DURING TAKE-OFF

(a) Take-Off Can Still Be Aborted (Sufficient Runway Length Available)

Land Straight Ahead:

1. POWER lever . . . . IDLE

On the Ground:

2. Brakes . . . . as required

WARNING

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

- Fuel valve . . . . OFF
- ENGINE MASTER . . . . OFF
- ELECTRIC MASTER . . . . OFF

END OF CHECKLIST

(b) Take-Off Can No Longer Be Aborted

1. Airspeed . . . . immediate pitch down to avoid airspeed reduction

WARNING

If, in the event of an engine problem occurring during take-off, the take-off can no longer be aborted and a safe height has not been reached, then a straight-ahead emergency landing should be considered. Do not attempt to turn back to the airfield. Turning back can be fatal.

If Time Allows:

2. POWER lever . . . . check MAX
3. Fuel pumps . . . . check ON
5. VOTER switch . . . . check AUTO

WARNING

If the problem does not clear itself immediately, and the engine is no longer producing sufficient power, then an emergency landing must be carried out in accordance with 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

END OF CHECKLIST

3.3.3 ENGINE TROUBLESHOOTING IN FLIGHT

WARNING

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

1. Airspeed . . . . 88 KIAS
2. POWER lever . . . . MAX

NOTE

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

If ECU A and ECU B Cautions Appear Simultaneously

- 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:

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

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

5. POWER lever . . . . IDLE for 1 second
6. POWER lever . . . . slowly increase, stop prior to the previously observed engine power loss RPM

CONTINUED

WARNING

Do not increase the POWER lever past the propeller speed of 1975 RPM or the setting determined in step 6. 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 % load at the maximum propeller speed of 1975 RPM.

7. Land at the next suitable airfield.

Otherwise:

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

3. Circuit breakers . . . . check / reset if necessary

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

Otherwise:

4. VOTER switch . . . . swap between ECU A and B

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

CONTINUED

Otherwise:

5. 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:

6. Fuel valve . . . . EMERGENCY

If normal engine operation is restored continue flight and land as soon as possible. Remain within maximum allowable lateral imbalance.

Otherwise:

7. Fuel valve . . . . NORMAL
8. Alternate air . . . . OPEN
9. POWER lever . . . . 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 3.3.4 - ENGINE FAILURE IN FLIGHT and land as soon as possible.

END OF CHECKLIST

3.3.4 ENGINE FAILURE IN FLIGHT

WARNING

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

NOTE

As long as there is no major mechanical engine defect, the propeller will continue to windmill.

1. Airspeed . . . . 88 KIAS
2. Flaps . . . . UP

If the Remaining Altitude is Sufficient for an Restart Attempt:

Try to restart the engine, refer to 3.3.5 - RESTARTING THE ENGINE IN FLIGHT.

If the Remaining Altitude is NOT Sufficient for an Restart Attempt:

Carry out an emergency landing in accordance with 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

END OF CHECKLIST

3.3.5 RESTARTING THE ENGINE IN FLIGHT

NOTE

With a failed engine the propeller continues to windmill. A stopped propeller indicates a major mechanical engine defect. Starter assisted restart shall not be considered.

Maximum restart altitude:

16,400 ft pressure altitude . . . . for immediate restarts

10,000 ft pressure altitude . . . . for restarts within two minutes

NOTE

If the engine is allowed to cool down for more than two minutes, a successful restart may not be possible.

1. Airspeed . . . . 88 KIAS
2. POWER lever . . . . IDLE
3. VOTER switch . . . . check AUTO
4. Fuel valve . . . . check NORMAL
5. Alternate air . . . . as required
6. Fuel quantity . . . . check
7. Fuel transfer pump . . . . as required
8. ELECTRIC MASTER . . . . check ON
9. ENGINE MASTER . . . . check ON

CONTINUED

3.3.5 RESTARTING THE ENGINE IN FLIGHT

Maximum restart altitude:

The checklist is amended to read:

16,400 ft pressure altitude	for immediate restarts
15,000 ft pressure altitude	for immediate restarts (if MÄM 40-838 or later approved Software is installed)
10,000 ft pressure altitude	for restarts within two minutes

If Engine Does Not Start:

10. Fuel valve .... EMERGENCY

If Engine Does Not Start Adopt Glide Configuration:

11. Flaps .... UP
12. Airspeed88 KIAS

NOTE

The glide ratio is 9.7; i.e., for every 1000 ft (305 m) of altitude loss the maximum horizontal distance traveled in still air is 1.59 NM (2.94 km). During this the propeller will continue to windmill.

Carry out an emergency landing in accordance with 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

CAUTION

Engine restart following an engine fire should only be attempted if it is unlikely that a safe emergency landing can be made. It must be expected that engine restart is impossible after an engine fire.

13. AVIONIC MASTER .... ON, if required

END OF CHECKLIST

3.3.6 DEFECTIVE RPM REGULATING SYSTEM

WARNING

In case of defective RPM regulating system, reduced engine performance should be anticipated.

CAUTION

Following a failure of the governor the RPM should be adjusted with the POWER lever.

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.

(a) Oscillating RPM

1. Power setting .... change

If the Problem Does Not Clear:

2. VOTER switch .... swap between ECU A and B

If the Problem Does Not Clear:

3. VOTER switch .... AUTO
4. Land on the nearest suitable airfield.

END OF CHECKLIST

(b) Propeller Overspeed

CAUTION

Climb performance will be reduced.

NOTE

The propeller now works like a fixed pitch propeller. RPM is controlled by the engine power setting. Flight to the nearest airfield can be continued with a lower power setting and at a lower airspeed. Climb and go-around may not be possible under all conditions.

1. POWER lever .... reduce to not exceed 2300 RPM
2. Airspeed .... 88 KIAS
3. Flaps .... check UP

After RPM has Stabilized Below 2300 RPM:

4. Airspeed .... as required, do not exceed 2300 RPM
5. POWER lever .... as required, do not exceed 2300 RPM

If the Problem Does Not Clear:

6. VOTER switch .... swap between ECU A and B

NOTE

If selecting ECU A or ECU B does not solve the problem, switch back to AUTO. Keep controlling the climb/sink rate with the POWER lever and do not exceed 2300 RPM.

CONTINUED

If the Problem Does Not Clear:

7. Land on the nearest suitable airfield.

If an Increased Climb Rate is Required:

8. Flaps . . . . T/O position
9. Airspeed . . . . 72 KIAS
10. POWER lever . . . . as required, do not exceed 2300 RPM

END OF CHECKLIST

(c) Propeller Underspeed

1. POWER lever . . . . as required

If the Problem Does Not Clear

2. VOTER switch . . . . swap between ECU A and B

If the Problem Does Not Clear:

3. VOTER switch . . . . AUTO
4. POWER lever . . . . as required

WARNING

Due to this problem the propeller RPM will drop. There may be no climb performance and no go-around power available.

5. Land on the nearest suitable airfield.

END OF CHECKLIST

3.3.7 FUEL TRANSFER PUMP FAILURE

1. Fuel quantity . . . . check

If Main Tank Fuel Quantity Low:

2. Fuel valve . . . . EMERGENCY
3. Fuel pumps . . . . OFF

WARNING

The fuel valve must be switched back to NORMAL before the auxiliary tank indication reads zero! Otherwise, the engine will stop during flight when the auxiliary tank is empty.

WARNING

When the fuel pump takes in air (e.g. when the fuel valve is not switched back and the auxiliary tank is empty), an inspection of the pump is necessary prior to next flight.

CAUTION

When set to EMERGENCY, fuel is transferred from the auxiliary tank to the main tank at a rate of approximately 45 US gal/h (170 liter/h).

4. AUX tank . . . . monitor quantity
5. MAIN tank . . . . monitor quantity

CONTINUED

NOTE

AUX tank quantity must not be less than 1 US gal and MAIN tank quantity must not be more than 14 US gal.

6. Fuel valve . . . . NORMAL
7. Land as soon as practicable.

END OF CHECKLIST

3.4 FAILURES IN THE ELECTRICAL SYSTEM

3.4.1 COMPLETE FAILURE OF THE ELECTRICAL SYSTEM

1. Circuit breakers .... check IN
2. ESSENTIAL BUS .... ON

If There Is Still No Electrical Power Available:

2. EMERGENCY switch (if installed) .... 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. A backup battery is installed for the ECU to provide electrical power solely to ECU B and its system for at least 30 minutes.

NOTE

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

If G1000 is installed 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

Affected Chapter:

3.4 FAILURES IN THE ELECTRICAL SYSTEM

Sub-Chapter 3.4.2 is deleted:

~~3.4.2 HIGH CURRENT~~

~~If HIGH CURRENT (> 70 A) is indicated on the G1000 (if installed) or SED (if installed):~~

~~1. ESSENTIAL BUS~~ . . . . ~~ON~~
~~2. ENGINE SYSTEM DISPLAY~~
~~(if G1000 is installed)~~ . . . . ~~select by pressing ENGINE and SYSTEM softkey on MFD~~

~~3. Circuit breakers~~ . . . . ~~check IN~~
~~4. Ammeter/Voltmeter~~ . . . . ~~monitor~~
~~5. Land on the nearest suitable airfield.~~

~~END OF CHECKLIST~~

3.4.2 HIGH CURRENT

If HIGH CURRENT (> 70 A) is indicated on the G1000 (if installed) or SED (if installed):

1. ESSENTIAL BUS . . . . ON
2. ENGINE SYSTEM DISPLAY
   (if G1000 is installed) . . . . select by pressing ENGINE and SYSTEM softkey on MFD
3. Circuit breakers . . . . check IN
4. Ammeter/Voltmeter . . . . monitor
5. Land on the nearest suitable airfield.

END OF CHECKLIST

3.4.3 STARTER MALFUNCTION

If the starter does not disengage from the engine after starting (Starter engaged warning (STARTER) on the G1000 (if installed) or START on the White Wire annunciator (if installed) illuminates after the engine has started):

On Ground:

1. POWER lever . . . . IDLE
2. ENGINE MASTER . . . . OFF
3. ELECTRIC MASTER . . . . OFF

Terminate flight preparation!

In Flight:

Land as soon as possible.

END OF CHECKLIST

3.5 SMOKE AND FIRE

3.5.1 SMOKE AND FIRE ON GROUND

(a) Engine Fire When Starting on the Ground

1. Fuel valve .... OFF
2. Fuel transfer pump .... OFF
3. ENGINE MASTER .... OFF
4. Fuel pumps .... OFF
5. ELECTRIC MASTER .... OFF

After Standstill:

6. Canopy .... open
7. Airplane .... evacuate immediately

END OF CHECKLIST

(b) Electrical Fire with Smoke on the Ground

1. ELECTRIC MASTER .... OFF

If the Engine Is Running:

2. POWER lever .... IDLE
3. ENGINE MASTER .... OFF
4. Fuel pumps .... OFF

When the Engine Has Stopped:

6. Canopy .... open
7. Airplane .... evacuate immediately

END OF CHECKLIST

3.5.2 SMOKE AND FIRE DURING TAKE-OFF

(a) If Take-Off Can Still Be Aborted

1. POWER lever .... IDLE
2. Cabin heat .... OFF
3. Brakes .... apply - bring the airplane to a stop
4. Fuel valve .... OFF
5. Fuel transfer pump .... OFF
6. ENGINE MASTER .... OFF
7. Fuel pumps .... OFF
8. ELECTRIC MASTER .... OFF

After Standstill:

9. Canopy .... open
10. Airplane .... evacuate immediately

END OF CHECKLIST

(b) If Take-Off Cannot Be Aborted

1. Cabin heat . . . . OFF
2. If possible, fly along a short-cut traffic circuit and land on the airfield.

WARNING

If, in the event of an engine problem occurring during take-off, the take-off can no longer be aborted and a safe height has not been reached, then a straight-ahead emergency landing should be carried out. Do not attempt to turn back to the airfield. Turning back can be fatal. Refer to 3.3.2 - ENGINE PROBLEMS DURING TAKE-OFF.

After Climbing to a Height From Which the Selected Landing Area Can Be Reached Safely:

3. Fuel valve . . . . OFF
4. Fuel transfer pump . . . . OFF
5. Cabin heat . . . . OFF
6. ENGINE MASTER . . . . OFF
7. Fuel pumps . . . . OFF
8. ELECTRIC MASTER . . . . OFF
9. Emergency windows . . . . open if necessary
10. Carry out an emergency landing with engine off. Allow for increased landing distance due to the flap position. Refer to 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

CONTINUED

CAUTION

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

When Airplane Has Stopped:

11. Canopy .... open
12. Airplane .... evacuate immediately

END OF CHECKLIST

3.5.3 SMOKE AND FIRE IN FLIGHT

WARNING

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

(a) Engine Fire in Flight

1. Cabin heat .... OFF
2. Select appropriate emergency landing area.

When it Seems Certain That the Landing Area Will Be Reached:

3. Fuel valve .... OFF
4. POWER lever .... MAX
5. Emergency windows .... open if required
6. Land immediately. Refer to 3.7.1 - EMERGENCY LANDING WITH ENGINE 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.

When Airplane Has Stopped:

7. Canopy .... open
8. Airplane .... evacuate immediately

END OF CHECKLIST

(b) Electrical Fire with Smoke in Flight

1. EMERGENCY switch (if installed) .... ON
2. AVIONIC MASTER .... OFF
3. ELECTRIC MASTER .... OFF
4. Cabin heat .... OFF
5. Emergency windows .... open if required
6. Land immediately. Refer to 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

WARNING

Switching OFF the ELECTRIC MASTER will lead to total failure of all electronic and electric equipment. Also affected from this is the attitude gyro (artificial horizon).

However, by switching the EMERGENCY switch ON, if installed, the emergency battery, if installed will supply power to the attitude gyro (artificial horizon) and the flood light.

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

When Airplane Has Stopped:

7. Canopy .... open
8. Airplane .... evacuate immediately

END OF CHECKLIST

3.6 GLIDING

1. Flaps . . . . UP
2. Airspeed . . . . 88 KIAS

NOTE

The glide ratio is 9.7; i.e., for every 1000 ft (305 m) of altitude loss the maximum horizontal distance traveled in still air is 1.59 NM (2.94 km). During this the propeller will continue to windmill.

NOTE

For operation without wheel fairings the glide ratio is reduced to 9.4; i.e., for every 1000 ft (305 m) of altitude loss the maximum horizontal distance traveled in still air is 1.54 NM (2.85 km). During this the propeller will continue to windmill.

END OF CHECKLIST

3.7 EMERGENCY LANDINGS

NOTE

For all airspeed tables in the following sections apply linear variations between weights.

3.7.1 EMERGENCY LANDING WITH ENGINE OFF

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. ENGINE MASTER . . . . check OFF
3. Fuel transfer pump . . . . OFF
4. Fuel pumps . . . . OFF
5. Fuel valve . . . . OFF
6. AVIONIC MASTER . . . . OFF
7. Safety harnesses . . . . check fastened and tightened

When Sure of Making Landing Area:

8. FLAPS . . . . T/O or LDG, as required

NOTE

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

CONTINUED

9. Approach speed .... see table below:

Flaps	940 kg (2072 lb)	1000 kg (2205 lb)	1080 kg (2381 lb)	1160 kg (2557 lb)	1216 kg (2681 lb)	up to 1280 kg (2822 lb)
T/O	68 KIAS	70 KIAS	73 KIAS	76 KIAS	77 KIAS	78 KIAS
LDG	66 KIAS	69 KIAS	72 KIAS	74 KIAS	76 KIAS	77 KIAS

10. ELECTRIC MASTER .... OFF
11. Touch down .... lowest practical speed

END OF CHECKLIST

3.7.2 LANDING WITH A DEFECTIVE TIRE ON THE MAIN LANDING GEAR

CAUTION

A defective (e.g. burst) tire is not usually easy to detect. The damage normally occurs during take-off or landing, and is hardly noticeable during fast taxiing. It is only during the roll-out after landing or at lower taxiing speeds that a tendency to swerve occurs. Rapid and determined action is then required.

1. Advise ATC.
2. Land the airplane at the edge of the runway that is located on the side of the intact tire, so that changes in direction which must be expected during roll-out due to the braking action of the defective tire can be corrected on the runway.
3. Land with one wing low. The wing on the side of the intact tire should be held low.
4. Direction should be maintained using the rudder. This should be supported by use of the brake. It is possible that the brake must be applied strongly - if necessary to the point where the wheel locks. The wide track of the landing gear will prevent the airplane from tipping over a wide speed range. There is no pronounced tendency to tip even when skidding.

END OF CHECKLIST

3.7.3 LANDING WITH DEFECTIVE BRAKES

In general, a landing on grass is recommended in order to reduce the landing run due to the greater rolling resistance.

WARNING

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:

- Fuel valve .... OFF
- ENGINE MASTER .... OFF
- Fuel pumps .... OFF
- ELECTRIC MASTER .... OFF

END OF CHECKLIST

3.8 RECOVERY FROM AN UNINTENTIONAL SPIN

CAUTION

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

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

When Rotation Has Stopped:

5. Flaps . . . . UP
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} = 172 KIAS.

END OF CHECKLIST

3.9 OTHER EMERGENCIES

3.9.1 ICING

Unintentional Flight Into Icing Conditions

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

CAUTION

Ice build-up increases the stalling speed.

8. ATC . . . . advise if an emergency is expected

CAUTION

When the Pitot heating fails expect loss of airspeed indication.

END OF CHECKLIST

3.9.2 SUSPICION OF CARBON MONOXIDE CONTAMINATION IN THE CABIN

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

1. Cabin heat . . . . 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 opening the front canopy in flight is 117 KIAS.

NOTE

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

END OF CHECKLIST

3.9.3 UNLOCKED DOORS

1. Airspeed . . . . reduce immediately
2. Canopy . . . . check visually if closed
3. Rear door . . . . check visually if closed

Canopy Unlocked

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

END OF CHECKLIST

Rear Door Unlocked

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

WARNING

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

NOTE

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

END OF CHECKLIST

CHAPTER 4A
NORMAL OPERATING PROCEDURES

4A.1 INTRODUCTION

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

4A.2 AIRSPEEDS FOR NORMAL OPERATING PROCEDURES

NOTE

For all airspeed tables in the following Sections apply linear variations between weights.

Flight Mass	940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1280 kg (2822 lb) and above
Airspeed for rotation (Take-off run, v_R) (Flaps T/O)	56 KIAS	58 KIAS	61 KIAS	65 KIAS	67 KIAS
Airspeed for initial climb (v_{50}) (Flaps T/O)	62 KIAS	65 KIAS	67 KIAS	70 KIAS	72 KIAS
Airspeed for take-off climb (best rate-of-climb speed v_Y) (Flaps T/O)	72 KIAS	72 KIAS	72 KIAS	72 KIAS	72 KIAS
Airspeed for cruise climb (Flaps UP)	88 KIAS	88 KIAS	88 KIAS	88 KIAS	88 KIAS

4A.1 INTRODUCTION

The NOTE is added:

NOTE

Normal operating procedures for GFC 700 are described in the Garmin G1000 Cockpit Reference Guide, P/N 190-00953-() or later and the Garmin G1000 Pilot's Guide for the Diamond DA 40 NG, P/N 190-00952-() or later. If MÄM 40-868 is installed, normal operating procedures for GFC 700 are described in the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02258-() or later and the Garmin G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02257-() or later.

Flight Mass	940 kg (2072 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1216 kg (2681 lb)	1280 kg (2822 lb)
Approach speed for normal landing (Flaps LDG)	66 KIAS	72 KIAS	76 KIAS	76 KIAS	77 KIAS
Minimum speed during go-around (Flaps T/O)	72 KIAS	72 KIAS	72 KIAS	72 KIAS	72 KIAS

4A.3 FLIGHT CHARACTERISTICS

The DA 40 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.

4A.4 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 rear door for cracks and major scratches.
- On-condition check of the lever arms of the canopy and the hinges of the rear door.
- Visual inspection of the locking bolts for proper movement with no backlash.
- Visual inspection of the rear door safety hook.
- Tire inflation pressure check :

main wheels:	3.3 bar (48 PSI)
nose wheel :	3.1 bar (45 PSI)
nose wheel (if MÄM 40-631 is carried out):	2.4 bar (35 PSI)

- Visual inspection of the spinner and its attachment (including screws).

4A.5 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.5.1 PRE-FLIGHT INSPECTION

I. Cabin Check

a) MET, NAV, Mass & CG . . . . flight planning completed
b) Airplane documents . . . . complete and up-to-date
c) ELECTRIC MASTER . . . . OFF, pull out key
d) ENGINE MASTER . . . . check OFF
e) VOTER switch . . . . check AUTO
f) Fuel valve . . . . locked, in NORMAL position
g) Front canopy & rear door . . . . clean, undamaged, check locking mechanism function
h) All electrical equipment . . . . OFF
i) Circuit breakers . . . . check all IN (if one has popped: investigate)
j) POWER lever . . . . check condition, freedom of movement, full travel and friction adjustment
k) POWER lever . . . . IDLE
l) ELECTRIC MASTER . . . . ON
m) Fuel quantity . . . . check, use alternate mean

NOTE

If the fuel quantity indicator reads 14 US gal, the correct fuel quantity must be determined with the fuel quantity measuring device. If this measurement is not carried out, the fuel quantity available for flight planning is 14 US gal.

CONTINUED

4A.5 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.5.1. PRE-FLIGHT INSPECTION

I. Cabin Check

The following is added to the Checklist:

u) Emergency Egress Hammer (if OÄM 40-401 installed) ... stowed and secured

n) Position lights, strobe lights (ACL) . . . . check OFF
o) Taxi lights, landing lights . . . . check OFF
p) ELECTRIC MASTER . . . . OFF
q) Foreign objects . . . . check
r) Controls and trim . . . . free and correct
s) Emergency axe (if installed) . . . . stowed and secured
t) Baggage . . . . stowed and secured

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 should be completely cleared of ice, snow and similar accumulations.

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 or fairing (if installed) . . . . visual inspection
b) Wear, tread depth of tire . . . . check
c) Tire, wheel, brake . . . . visual inspection
d) Brakes . . . . check for leaks
e) Slip marks . . . . visual inspection
f) Chocks . . . . remove

CONTINUED

2. Left Wing:

a) Entire wing surface	visual inspection
b) Step	visual inspection
c) Air intake on lower wing surface	visual inspection
d) Winter baffle of air intake on lower wing surface (if installed)	consider removal depending on outside air temperature and verify proper mounting
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 drain	drain to check for water and sediment (drain until free of contamination)
g) Stall warning	check function (suction)
h) Tank filler	check closed (for fuel qty. check use alternate means)
i) Tank air outlet in lower surface	visual inspection
j) Pitot probe	clean, orifices clear, attachment secure (no loose or missing screws)
k) Landing/taxi light	visual inspection
l) Winglet	visual inspection
m) Position light, strobe light (ACL)	visual inspection
n) Tie-down	check, clear
o) 2 stall strips on wing	visual inspection
p) Aileron and linkage	visual inspection
q) Aileron hinges and safety pin	visual inspection

CONTINUED

r) Foreign objects in aileron paddle .... visual inspection
s) Trim tab .... visual inspection
t) Flap and linkage .... visual inspection
u) Flap hinges and safety pin .... visual inspection
v) Static discharger .... visual inspection
w) Fuel cooler inlet baffle (if installed) .... verify that the outside air temperature permits the use
x) Fuel cooler inlet baffle (if installed) .... check for improper mounting or obvious damage

3. Fuselage, Left Side:

a) Canopy, left side .... visual inspection
b) Door lock (if installed) .... unlocked, key removed
c) Rear cabin door & window .... visual inspection
d) Fuselage skin .... visual inspection
e) Antennas .... visual inspection
f) Static source .... check for blockage

4. Empennage:

a) Stabilizers and control surfaces .... visual inspection
b) Hinges .... visual inspection
c) Elevator trim tab .... visual inspection, check for movement and safety wire
d) Rudder tab .... visual inspection
e) Tie-down .... check, clear
f) Tail skid and lower fin .... visual inspection
g) Static dischargers .... visual inspection

CONTINUED

5. Fuselage, Right Side:

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

6. Right Wing:

a) Flap and linkage . . . . visual inspection
b) Flap hinges and safety pin . . . . visual inspection
c) Aileron and linkage . . . . visual inspection
d) Aileron hinges and safety pin . . . . visual inspection
e) Foreign objects in aileron paddle . . . . visual inspection
f) Wing let . . . . visual inspection
g) Position light, strobe light (ACL) . . . . visual inspection
h) Tie-down . . . . check, clear
i) Entire wing surface . . . . visual inspection
j) 2 stall strips on wing . . . . visual inspection
k) Tank air outlet in lower surface . . . . visual inspection
l) Tank filler . . . . visual check (for fuel qty. check use alternate means)
m) 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)
n) Tank drain . . . . drain to check for water and sediment (drain until free of contamination)
o) Step . . . . visual inspection
p) Static discharger . . . . visual inspection

CONTINUED

7. Right Main Landing Gear:

a) Landing gear strut or fairing (if installed) .... visual inspection
b) Wear, tread depth of tires .... check
c) Tire, wheel, brake .... visual inspection
d) Brakes .... check for leaks
e) Slip marks .... visual inspection
f) Chocks .... remove

8. Front Fuselage:

a) Engine oil level .... check dipstick (inspection door on left side)
b) Gearbox oil level .... check visually (inspection door on left side)
c) Cowling .... visual inspection
d) 4 air intakes on front cowling .... check
e) 2 air intakes on RH fuselage and cowling ... check
f) 1 air intake on LH fuselage .... check
g) Propeller .... visual inspection

WARNING

Never rotate the propeller by hand.

h) Spinner including attachment screws .... visual inspection
i) Nose landing gear strut .... visual inspection
j) Tie-down (if installed) .... check, clear
k) Tire and wheel .... visual inspection, check slip marks

CONTINUED

l) Wear, tread depth of tire .... check
m) Wheel fairing (if installed) .... visual inspection
n) Tow bar .... removed
o) Chocks .... remove
p) Exhaust .... visual inspection

WARNING

The exhaust can cause burns when it is hot.

9. Underside:

a) Antennas .... visual inspection
b) Gascolator .... pull down on drain to check for water and sediment (drain until free of contamination)
c) Venting pipes .... check for blockage
d) Fuselage underside .... check for excessive contamination particularly by oil, fuel or other fluids

END OF CHECKLIST

4A.5.2 BEFORE STARTING ENGINE

CAUTION

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

NOTE

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

1. Pre-flight inspection .... complete
2. Rudder pedals .... adjusted and locked
3. Passengers .... instructed
4. Adjustable backrests (if installed) .... adjust to the upright position described on the roll-over bar and verify proper fixation
5. Safety harnesses .... all fastened
6. Rear door .... closed and locked
7. Door lock (if installed) .... unlocked, key removed
8. Front canopy .... Position 1 or 2 ("cooling gap")
9. Canopy lock (if installed) .... unlocked, key removed

CAUTION

When operating the canopy, pilots / operators are to 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.

CONTINUED

NOTE

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

10. Parking brake .... set
11. Flight controls .... free movement
12. Trim wheel .... T/O
13. POWER lever .... check IDLE
14. Friction device on POWER lever .... adjusted
15. Alternate air .... check CLOSED
16. Alternate static valve .... check CLOSED
17. VOTER switch .... check AUTO
18. Fuel pumps .... check OFF
19. AVIONIC MASTER .... check OFF
20. ELECTRIC MASTER .... ON
21. G1000 (if installed) .... wait until power-up completed. Press ENT on MFD to acknowledge

NOTE

If the G1000 avionics system is installed, the engine instruments are only available on the MFD after item 21 has been completed.

22. White Wire annunciator panel (if installed) . . . check and press acknowledge button
23. COOL LVL caution on G1000 (if installed) or WATERLEV caution on SED (if installed) . . check OFF
24. Fuel temperature .... check

WARNING

Never rotate the propeller by hand.

END OF CHECKLIST

4A.5.3 STARTING ENGINE

CAUTION

Before starting the engine and until the engine is shut down, the canopy must be closed and latched in position 1 or 2 ('cooling gap') and the door must be closed and latched.

During engine operation it is prohibited to enter or exit the airplane.

CAUTION

Do not operate the engine starter motor for more than 10 seconds, because of possible overheating of the starter motor.

If the STARTER annunciation on the G1000 (if installed) or START on the White Wire annunciator panel (if installed) comes on after the engine has started and the START KEY has been released, set the ENGINE MASTER to OFF and investigate the problem.

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.

NOTE

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

CONTINUED

1. Strobe lights (ACL) . . . . ON
2. ENGINE MASTER . . . . ON
3. Annunciations / GLOW ON (if G1000 is installed) or GLOW (if White Wire annunciator panel is installed) . . . . check ON

NOTE

GLOW ON (if G1000 is installed) or GLOW (if White Wire annunciator panel is installed) is indicated only when the engine is cold.

4. Annunciations / engine indications . . . . check

WARNING

Before starting the engine the pilot must ensure that the propeller area is free, and no persons can be endangered.

After the GLOW ON (if G1000 is installed) or GLOW (if White Wire annunciator panel is installed) indication is extinguished:

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

6. Annunciations / engine indications . . . . check OK/normal range

CONTINUED

7. Annunciations / STARTER (if G1000 is installed) or START (if White Wire annunciator panel is installed) . . check OFF
8. Annunciations / Oil pressure . . . . check OK
9. Circuit breakers . . . . check all IN

10. Idle RPM . . . . check, 710 ±30 RPM (above 7,000 ft pressure altitude idle RPM might be higher)

END OF CHECKLIST

4A.5.4 BEFORE TAXIING

1. AVIONIC MASTER .... ON
2. Power lever .... 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 heating .... ON, check annunciation and observe an increase in alternator load
7. Pitot 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 airplanes, 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) (if G1000 and autopilot GFC 700 are installed) .... NO AUTOPILOT ANNUNCIATIONS
11. Autopilot disconnect tone (if autopilot GFC 700 is installed) .... NOTE

CONTINUED

NOTE

If the G1000 avionics system and the autopilot GFC 700 are installed, the AFCS 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 (if G1000 and autopilot GFC 700 are installed):

    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 (if G1000 and autopilot GFC 700 are installed) . . . . engage by pressing AP button

14. AP DISC switch (if G1000 and autopilot GFC 700 are installed) . . . . press. verify that the autopilot disconnects, check tone

15. TRIM . . . . set to take-off position manually

END OF CHECKLIST

4A.5.5 TAXIING

1. Parking brake .... release
2. Brakes .... test
3. Flight instrumentation and avionics .... check for correct indications
4. Fuel pumps .... check OFF

CAUTION

When taxiing on a poor surface select the lowest possible RPM to avoid damage to the propeller from stones or similar items.

CAUTION

Avoid prolonged permanent braking while taxiing. Prolonged permanent braking while taxiing will overheat the brakes and may cause loss of brake capacity and subsequent damage to the airplane.

END OF CHECKLIST

4A.5.6 BEFORE TAKE-OFF

CAUTION

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

1. Position airplane into wind if possible.
2. Parking brake . . . . set
3. Adjustable backrests (if installed) . . . . verify upright position and proper fixation
4. Safety harnesses . . . . 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. Door warning (DOOR OPEN (if G1000 is installed) DOORS (if White Wire annunciator panel is installed) . . . . check no indication
8. Annunciations / engine indications . . . . check OK / normal range (except oil pressure may be in the yellow range with a warm engine and POWER lever set to IDLE)
9. Circuit breakers . . . . check pressed in
10. Longitudinal trim . . . . set T/O

11. Fuel valve . . . . check NORMAL
12. FLAPS . . . . check function & indicator / set T/O
13. Flight controls . . . . unrestricted free movement, correct sense
14. Pitot heating . . . . ON, if required
15. Landing light . . . . ON, if required

ECU / Fuel Pump Test Sequence:

CAUTION

If the ECU A/B FAIL (if G1000 is installed) or ECU A/B (if White Wire annunciator panel is installed) 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 (ECU A/B FAIL (if G1000 is installed) or ECU A/B (if White Wire annunciator panel is installed) extinguished after test completion). In case the test procedure aborts with an error indication (one or both ECU A/B FAIL (if G1000 is installed) or ECU A/B (if White Wire annunciator panel is installed) indicators remain ON) terminate flight preparation, even if the engine seems to run smoothly after the test procedure.

CAUTION

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

CONTINUED

NOTE

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

1. POWER lever . . . . IDLE
2. Propeller RPM . . . . check below 1000 RPM
3. Fuel pumps . . . . check OFF
4. VOTER switch . . . . check AUTO

NOTE

If the VOTER switch is not in the AUTO position, the ECU test will not start.

5. All engine temperatures . . . . check in the green range
6. Parking brake . . . . check set
7. ECU TEST button . . . . press and hold

NOTE

The ECU test consists of the following sequence: the propeller RPM will increase to above 1900 RPM. This is followed by a slight RPM drop, than a recovery before returning to idle RPM. At this point the ECU switches back to the other ECU channel and the sequence is repeated. At the end of the test, the control of the engine is returned to the initially active ECU channel. A slight shake of the engine may occur during ECU switching.

CONTINUED

Affected Chapters:

4A.5 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.5.6 BEFORE TAKE OFF

ECU / Fuel Pumps Test Sequence:

The NOTE 'The ECU test consists of ...' is amended to read:

NOTE

The ECU test consists of the following sequence: the propeller RPM will increase to above 1800 RPM. This is followed by a slight RPM drop, than a recovery before returning to idle RPM. At this point the ECU switches back to the other ECU channel and the sequence is repeated. At the end of the test, the control of the engine is returned to the initially active ECU channel. A slight shake of the engine may occur during ECU switching.

8. ECU A/B FAIL (if G1000 is installed) or ECU A/B (if White Wire annunciator panel is installed) lights . . . . verify both OFF

Test sequence completed.

9. ECU TEST button . . . . release

NOTE

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

10. VOTER switch . . . . ECU A
11. Engine . . . . check running without a change (shake may occur)
12. VOTER switch . . . . AUTO
13. Engine . . . . check running without a change (shake may occur)
14. VOTER switch . . . . ECU B
15. Engine . . . . check running without a change (shake may occur)
16. 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.

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 2200 to 2300 RPM, min.
   . . . . 2100 RPM below -10°C (14°F)
5. LOAD indication . . . . stabilizes at 88% 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.

	OAT								
Altitude [ft]	**-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 86°F**	**40°C 104°F**	**50°C 122°F**
0		94%					95%	92%	90%
2000							95%	92%	
4000							95%	92%	
6000				96%			95%	92%	
8000						95%	94%	91%	
10000				94%	93%	91%	88%		

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 . . . . ON
9. Parking brake . . . . release

END OF CHECKLIST

4A.5.7 TAKE-OFF

Normal Take-Off Procedure

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

WARNING

The proper performance of the engine at MAX should be checked early in the take-off procedure, 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.

NOTE

For soft field take-off hold elevator back pressure during take-off roll until nose lift-off. Accelerate to initial climb speed after lift-off.

5. Nose wheel lift-off (v_R) . . . . see table below:

940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1280 kg (2822 lb) and above
56 KIAS	58 KIAS	61 KIAS	65 KIAS	67 KIAS

CONTINUED

NOTE

A spurious activation of the stall warning during take-off in crosswind conditions, operation on unpaved surfaces and gusty conditions may occur.

6. Airspeed for initial climb . . . . see table below:

940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1280 kg (2822 lb) and above
62 KIAS	65 KIAS	67 KIAS	70 KIAS	72 KIAS

Above a Safe Height:

7. Landing light . . . . OFF
8. Fuel pumps . . . . OFF
9. POWER lever . . . . reduce to 92% load

END OF CHECKLIST

4A.5.8 CLIMB

Procedure for Take-Off Climb

1. Flaps . . . . T/O
2. Airspeed . . . . 72 KIAS
3. POWER lever . . . . 92% or maximum 2100 RPM
4. Annunciations / engine indications . . . . monitor
5. Rudder . . . . as required

CAUTION

If the oil temperature and/or coolant temperature reaches the yellow range during climb, flight should be continued with an airspeed increased by 5 kt and power reduced by 10 % (reduced climb rate) for better engine cooling.

NOTE

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

END OF CHECKLIST

Cruise Climb

1. Flaps . . . . UP
2. Airspeed . . . . 88 KIAS
3. POWER lever . . . . 92% or maximum 2100 RPM
4. Annunciations / engine indications . . . . monitor
5. Rudder . . . . as required

END OF CHECKLIST

4A.5.9 CRUISE

1. Flaps .... UP
2. POWER lever .... up to 92% or maximum 2100 RPM
3. Trim .... as required
4. Fuel transfer .... repeat as required (in accordance with 4A.5.10 - FUEL TRANSFER)

NOTE

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

NOTE

Proper operation of the transfer pump must be checked by monitoring the fuel quantities (increasing in the MAIN tank, decreasing in the AUX tank, approx. 1 US gal per minute).

END OF CHECKLIST

4A.5.10 FUEL TRANSFER

CAUTION

During normal operation fuel is taken from the main tank only. Therefore fuel must be transferred from the auxiliary tank to the main tank by activating the fuel transfer pump. The transfer rate is approximately 60 US gal/h (227 liter/h).

1. Fuel transfer switch .... ON

NOTE

The transfer pump turns off automatically to avoid overfilling the main tank. The switch remains in its position. If the pump is not turned off, it will continue pumping each time the fuel level in the main tank drops, but only as long as there is fuel in the auxiliary tank. The fuel transfer status light is illuminated only while the pump is running.

2. Fuel transfer switch .... OFF, if required

NOTE

If the fuel transfer status light starts to blink, the fuel transfer pump must be switched off.

END OF CHECKLIST

4A.5.11 DESCENT

1. POWER lever . . . . as required
2. Airspeed . . . . as required
3. Trim . . . . as required
4. Annunciations / engine indications . . . . monitor

END OF CHECKLIST

4A.5.12 APPROACH & LANDING

Approach:

NOTE

If MÄM 40-574 is NOT carried out, a landing with a mass between 1216 kg (2681 lb) and 1280 kg (2822 lb) constitutes an abnormal operating procedure. Refer to Section 4B.7 - LANDING WITH HIGH LANDING MASS.

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. Controls . . . . no interference by foreign objects
4. Landing light . . . . as required
5. Fuel pumps . . . . ON
6. Parking brake . . . . check released
7. Trim . . . . as required

CONTINUED

Before Landing:

8. Airspeed .... see table below:

Flaps	940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1216 kg (2681 lb)	1280 kg (2822 lb)
T/O	68 KIAS	70 KIAS	74 KIAS	77 KIAS	77 KIAS	78 KIAS
LDG	66 KIAS	68 KIAS	72 KIAS	76 KIAS	76 KIAS	77 KIAS

9. FLAPS .... as required
10. POWER lever .... as required
11. Trim .... as required
12. Final approach speed .... see table below:

Flaps	940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1216 kg (2681 lb)	1280 kg (2822 lb)
LDG	66 KIAS	68 KIAS	72 KIAS	76 KIAS	76 KIAS	77 KIAS

NOTE

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

CAUTION

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

END OF CHECKLIST

4A.5.13 GO-AROUND

1. POWER lever . . . . MAX
2. Airspeed . . . . 72 KIAS
3. Flaps . . . . T/O

Above a Safe Height:

4. Airspeed . . . . 88 KIAS
5. Flaps . . . . UP

END OF CHECKLIST

4A.5.14 AFTER LANDING

1. POWER lever . . . . IDLE
2. Brakes . . . . as required
3. Transponder . . . . OFF / STBY
4. Pitot heating . . . . OFF
5. Avionics . . . . as required
6. Lights . . . . as required
7. Flaps . . . . UP
8. Fuel pumps . . . . OFF

END OF CHECKLIST

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.6.15 ENGINE SHUT-DOWN

The first CAUTION is amended to read:

CAUTION

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

4A.5.15 ENGINE SHUT-DOWN

1. Parking brake . . . . set
2. POWER lever . . . . up to 10 % load for 1 minute
3. Engine indications . . . . check
4. ELT . . . . check not transmitting on 121.5 MHz
5. AVIONIC MASTER . . . . OFF
6. Electrical consumers . . . . OFF
7. ENGINE MASTER . . . . OFF
8. Strobe . . . . OFF

CAUTION

After turning the ENGINE MASTER OFF, wait until the engine indications on the G1000 MFD (if installed) or MED (if installed) disappear prior to switching the ELECTRIC MASTER OFF. This ensures that engine and flight data can be written to non-volatile memory before removing electrical power.

9. ELECTRIC MASTER . . . . OFF

CAUTION

Do not shut down an engine by placing the FUEL VALVE in the OFF position. The high pressure fuel pump can otherwise be damaged.

NOTE

Before shut-down the engine must run for at least 1 minute with the POWER lever set up to 10% load to avoid heat damage of the turbo charger.

END OF CHECKLIST

4A.5.16 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.5.17 PARKING

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

END OF CHECKLIST

4A.5.18 FLIGHT IN RAIN

NOTE

Performance deteriorates in rain; this applies particularly to the take-off distance and to the maximum horizontal speed. The effect on the flight characteristics is minimal. Flight through very heavy rain should be avoided because of the associated visibility problems.

4A.5.19 REFUELING

CAUTION

Before refueling, the airplane must be connected to electrical ground. Grounding points: unpainted areas on steps, left and right.

Use of Fuel Additives

CAUTION

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

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

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

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

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

Typical Dosing Quantities:

(a) KATHON FP 1.5

Fuel Quantity				Fuel Additive * KATHON FP 1.5 (100 ppm)	
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

* 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

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

(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

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

** Do not batch blend

4A.5.20 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.

CHAPTER 4B
ABNORMAL OPERATING PROCEDURES

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.5.12 - APPROACH & LANDING.

5. Touchdown .... with the lowest possible airspeed

CONTINUED

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 .... OFF
7. Fuel valve .... OFF
8. ELECTRIC MASTER .... OFF

END OF CHECKLIST

4B.2 INSTRUMENT INDICATIONS OUTSIDE OF GREEN RANGE

4B.2.1 RPM

High RPM

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

NOTE

An RPM in the yellow range is permissible for up to 5 minutes if required, e.g. for go-around or take-off.

If the above mentioned measures do not solve the problem refer to Section 3.3.6 - DEFECTIVE RPM REGULATING SYSTEM.

3. Land at the nearest suitable airfield.

END OF CHECKLIST

4B.2.2 COOLANT TEMPERATURE

(a) High Coolant Temperature

Proceed according to:

Section 3.2.1 - ENGINE TEMPERATURE.

(b) Low Coolant Temperature

- Check for COOL LVL (if G1000 is installed) or WATERLEV (if SED is installed) 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.

COOL LVL (if G1000 is installed) or WATERLEV (if SED is installed) Caution Message Displayed:

- Reduce power.
- Expect loss of coolant.

WARNING

A further decrease in coolant temperature must be expected. Prepare for an engine failure in accordance with Section 3.3.3 - ENGINE TROUBLESHOOTING IN FLIGHT.

END OF CHECKLIST

4B.2.3 OIL TEMPERATURE

a) High Oil Temperature

Proceed according to:

Section 3.2.2 - OIL TEMPERATURE.

(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.2.4 OIL PRESSURE

High Oil Pressure

- Check oil temperature.
- Check coolant temperature.

If the temperature is within the green range:

- Expect false oil pressure indication. Keep monitoring temperatures.

If the temperature is outside of the green range:

- Reduce power on engine.

WARNING

Land at the nearest suitable airfield. Prepare for an engine failure in accordance with 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

NOTE

At low oil temperature 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

4B.2.5 GEARBOX TEMPERATURE

High Gearbox Temperature

Proceed according to:

Section 3.2.4 - GEARBOX TEMPERATURE.

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 (if installed) or MED (if installed) 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.

END OF CHECKLIST

4B.2.6 FUEL TEMPERATURE

(a) High Fuel Temperature

Proceed according to:

Section 3.2.5 - L/R FUEL TEMPERATURE.

(b) Low Fuel Temperature

- Increase power.
- 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 Section 3.3.4 - ENGINE FAILURE IN FLIGHT.

END OF CHECKLIST

4B.2.7 VOLTAGE

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

- Terminate flight preparation.

(b) Low Voltage During Flight

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

If Low Voltage Condition Still Exists:

- Follow procedure in Section 3.2.8 - ALTERNATOR FAIL.

NOTE

This procedure is applicable if either the voltmeter is out of the green range or VOLTS LOW (if G1000 is installed) or LOW VOLTS (if White Wire annunciator panel is installed) is indicated.

END OF CHECKLIST

4B.2.8 CURRENT

This caution is indicated when the consumption of electric power exceeds 60 A.

1. Electrical equipment . . . . switch OFF as necessary and possible to reduce electric load

If the problem does not clear:

2. Land on nearest suitable airfield.

END OF CHECKLIST

4B.3 CAUTION-ALERTS

4B.3.1 ECU A FAILURE

* Engine ECU A has failed or
* is being tested during FADEC 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 massage 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. ALTERNATE AIR .... check CLOSED
2. Fuel pump .... OFF
3. VOTER switch .... check AUTO
4. ECU B caution .... check OFF
5. VOTER switch .... ECU A
6. Wait .... 5 seconds
7. VOTER switch .... AUTO

If the ECU A caution persists: - terminate flight preparation.

(b) ECU A Caution During Flight

NOTE

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

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

If the ECU A caution persists: - land at the next suitable airfield. After landing, you may use (a) ECU A Caution on the ground as ECU caution clearing procedure.

NOTE

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

NOTE

If additional engine problems are observed refer to Section 3.3.3 - ENGINE TROUBLESHOOTING IN FLIGHT.

END OF CHECKLIST

4B.3.2 ECU B FAILURE

* Engine ECU B has failed or
* is being tested during FADEC 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 massage 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. ALTERNATE AIR .... check CLOSED
2. Fuel Pump .... OFF
3. VOTER switch .... check AUTO
4. ECU A caution .... check OFF
5. VOTER switch .... ECU B
6. Wait .... 5 seconds
7. VOTER switch .... AUTO

If the ECU B caution persists: - terminate flight preparation.

(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'.

CONTINUED

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

If the ECU B caution persists: - land at the next suitable airfield. After landing, you may use (a) ECU B Caution on the ground as ECU caution clearing procedure.

NOTE

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

NOTE

If additional engine problems are observed refer to Section 3.3.3 - ENGINE TROUBLESHOOTING IN FLIGHT.

END OF CHECKLIST

4B.3.3 FUEL QUANTITY LOW

Left fuel quantity is low.

1. Fuel transfer pump .... ON
2. Fuel quantity .... check

CAUTION

As soon as the amount of usable fuel in the main tank is low, a caution message is displayed. The indication is calibrated for straight and level flight. The caution message may be triggered during turns which are flown with slip, or while taxiing in curves.

If FUEL LOW (if G1000 is installed) or LOW FUEL (if White Wire Annunciator Panel is installed) Caution Is Caused By Un-Coordinated Flight:

CAUTION

Prolonged un-coordinated flight can cause fuel starvation to the engine resulting in a loss of power.

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

If the Caution Does Not Extinguish:

- Expect loss of fuel.

4. Fuel valve .... EMERGENCY
5. Fuel transfer pump .... OFF

CONTINUED

If the Caution Does Not Extinguish:

- Be prepared for an emergency landing.
- Proceed in accordance with Section 3.7.1 - EMERGENCY LANDING WITH ENGINE OFF.

WARNING

If air enters the high pressure fuel pump (e.g. empty fuel tank), an inspection of the pump is necessary prior to next flight.

END OF CHECKLIST

4B.3.4 COOLANT LEVEL

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

Refer to Section 4B.2.2 - 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.3.5 PITOT HEATING FAILURE

Pitot heating system has failed.

If in Icing Conditions:

1. Expect loss of airspeed indication.
2. Leave icing zone / refer to Section 3.9.1 - ICING.

END OF CHECKLIST

4B.3.6 ENGINE CAUTION (IF WHITE WIRE ANNUNCIATOR PANEL IS INSTALLED)

Engine limit exceeded.

1. Engine indications .... check
2. Acknowledge button .... press

NOTE

If an indication is near the end of the green range, it may happen that it switches over to the yellow or red range for a short time. This will also cause the ENGINE caution light to illuminate.

NOTE

If an indication is outside of the green range, proceed in accordance with 4B.2 - INSTRUMENT INDICATIONS OUTSIDE OF THE GREEN RANGE.

END OF CHECKLIST

4B.4 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.5 FAILURES IN FLAP OPERATING SYSTEM

Failure in Position Indication or Function

1. FLAPS position .... check visually
2. Airspeed .... keep in white range (max. 98 KIAS)
3. FLAPS switch .... re-check all positions

Modified Approach Procedure Depending on the Available Flap Setting

NOTE

For landing distances with an abnormal flap position refer to 5.3.12 - LANDING DISTANCE - ABNORMAL FLAP POSITION.

(a) Only UP Available:

Airspeed .... see table below:

940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1216 kg (2681 lb)	1280 kg (2822 lb) and above
71 KIAS	73 KIAS	78 KIAS	82 KIAS	82 KIAS	83 KIAS

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

CONTINUED

(b) Only T/O Available:

Airspeed . . . . see table below:

940 kg (2072 lb)	1000 kg (2205 lb)	1100 kg (2425 lb)	1200 kg (2646 lb)	1216 kg (2681 lb)	1280 kg (2822 lb) and above
68 KIAS	70 KIAS	74 KIAS	77 KIAS	77 KIAS	78 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 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 (if installed) .... disengage (check)
4. PFD (if G1000 is installed) / backup instruments .... verify periodically
5. Continue flight below v_O (refer to Section 2.2)
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.

END OF CHECKLIST

4B.7 LANDING WITH MASS ABOVE MAXIMUM LANDING MASS

NOTE

Refer to Section 4A.5.12 - APPROACH AND LANDING for landings with a mass up to 1216 kg (2681 lb), and if MÄM 40-574 is carried out for landings with a mass up to 1280 kg (2822 lb).

Perform landing approach and landing according to Chapter 4A, but maintain an increased airspeed during final landing approach.

Approach speed .... 77 KIAS for a mass above 1280 kg
.... (2822 lb), flaps LDG

END OF CHECKLIST

4B.8 STARTING ENGINE WITH EXTERNAL POWER

4B.8.1 BEFORE STARTING ENGINE

1. Pre-flight inspection . . . . complete
2. Rudder pedals . . . . adjusted and locked
3. Passengers . . . . instructed
4. Safety harnesses . . . . all fastened
5. Rear door . . . . closed and locked
6. Door lock (if installed) . . . . unlocked, key removed
7. Front canopy . . . . Position 1 or 2 ("cooling gap")
8. Canopy lock (if installed) . . . . unlocked, key removed

CAUTION

When operating the canopy, pilots / operators are to 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.

NOTE

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

9. Parking brake . . . . set
10. Flight controls . . . . free movement
11. Trim wheel . . . . T/O
12. POWER lever . . . . check IDLE

CONTINUED

13. Friction device on POWER lever . . . . adjusted
14. Alternate air . . . . check CLOSED
15. Alternate static valve . . . . check CLOSED
16. VOTER switch . . . . check AUTO
17. Fuel pumps . . . . check OFF
18. ELECTRIC MASTER . . . . check OFF
19. AVIONIC MASTER . . . . check OFF
20. External power . . . . connect
21. ELECTRIC MASTER . . . . ON
22. G1000 (if installed) . . . . wait until power-up completed. Press ENT on MFD to acknowledge

NOTE

If the G1000 avionics system is installed, the engine instruments are only available on the MFD after item 22 has been completed.

23. White Wire annunciator panel (if installed) . . . check and press acknowledge button
24. COOL LVL caution on G1000 (if installed) or WATERLEV caution on SED (if installed) . . check OFF
25. Fuel temperature . . . . check

WARNING

Never rotate the propeller by hand.

END OF CHECKLIST

4B.8.2 STARTING ENGINE

CAUTION

Do not operate the engine starter motor for more than 10 seconds, because of possible overheating of the starter motor.

If the STARTER annunciation on the G1000 (if installed) or START on the White Wire annunciator panel (if installed) comes on after the engine has started and the START KEY has been released, set the ENGINE MASTER to OFF and investigate the problem.

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.

NOTE

At low ambient temperatures it is possible that the engine will 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

CONTINUED

3. Annunciations / GLOW ON (if G1000 is installed) or GLOW (if White Wire annunciator panel is installed) . . . . check ON

NOTE

GLOW ON (if G1000 is installed) or GLOW (if White Wire annunciator panel is installed) is indicated only when the engine is cold.

4. Annunciations / engine indications . . . . check

WARNING

Before starting the engine the pilot must ensure that the propeller area is free, and no persons can be endangered.

After the GLOW ON (if G1000 is installed) or GLOW (if White Wire annunciator panel is installed) indication is extinguished:

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

6. Annunciations / engine indications . . . . check OK/normal range

7. Annunciations / STARTER (if G1000 is installed) or START (if White Wire annunciator panel is installed) . . check OFF

CONTINUED

8. Annunciations / Oil pressure .... check OK
9. Circuit breakers .... check all IN
10. Idle RPM .... check, 710 ±30 RPM (above 7,000 ft pressure altitude idle RPM might be higher)
11. External power .... disconnect
12. External power unit .... check disconnected and moved clear of the airplane

END OF CHECKLIST

CHAPTER 5
PERFORMANCE

5.1 INTRODUCTION

The performance tables and diagrams on the following pages are presented so that, on the one hand, you can see what performance you can expect from your airplane, while on the other they allow comprehensive and sufficiently accurate flight planning. The values in the tables and the diagrams were obtained in the framework of the flight trials using an airplane and power-plant in good condition, and corrected to the conditions of the International Standard Atmosphere (ISA = 15 °C / 59 °F and 1,013.25 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.

Where appropriate, any flight performance degradation resulting from the absence of wheel fairings is given as a percentage or different value.

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 1100 kg (2425 lb), use data for the lowest weight.

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

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

5.3 PERFORMANCE TABLES AND DIAGRAMS

5.3.1 AIRSPEED CALIBRATION

Airspeed Indicator Calibration			
Indicated Airspeed [KIAS]	Calibrated Airspeed [KCAS] at Various Flap Settings		
	UP	T/O	LDG
65	Not applicable	64	64
70	70	69	69
75	75	74	74
80	79	79	78
85	84	84	83
90	89	89	89
95	93	94	94
100	98	99	100
105	103	104	Not applicable
110	108	109	Not applicable
120	118	Not applicable	Not applicable
130	128	Not applicable	Not applicable
140	138	Not applicable	Not applicable
150	149	Not applicable	Not applicable
160	159	Not applicable	Not applicable
170	170	Not applicable	Not applicable

5.3.2 FUEL FLOW

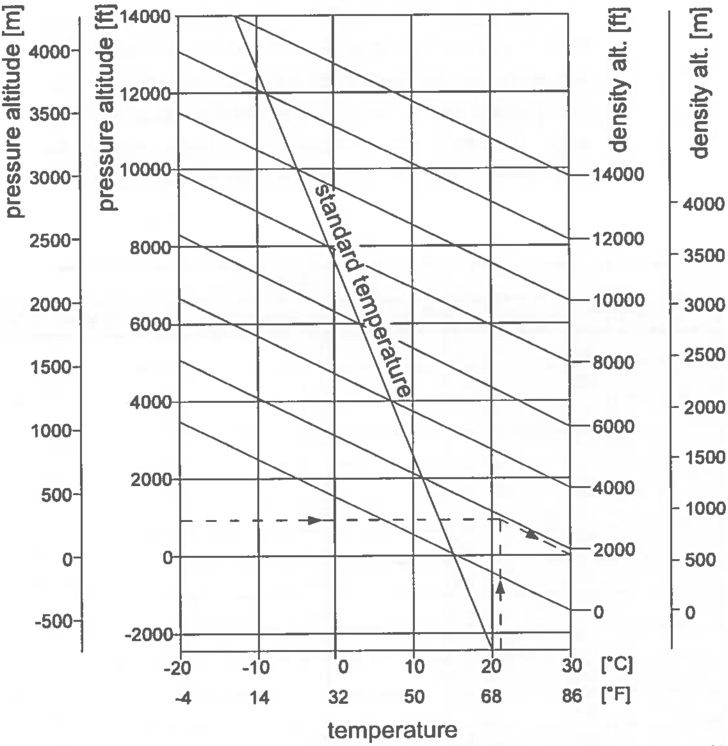
NOTE

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	11.0
35	3.3	12.5
40	3.7	14.0
45	4.0	15.5
50	4.4	16.5
55	4.7	18.0
60	5.1	19.5
65	5.6	21.5
70	6.1	23.0
75	6.6	25.0
80	7.1	27.0
85	7.6	28.5
90	8.1	30.5
92	8.3	31.5
100	9.4	35.5

5.3.3 PRESSURE ALTITUDE - DENSITY ALTITUDE

Conversion from pressure altitude to density altitude.

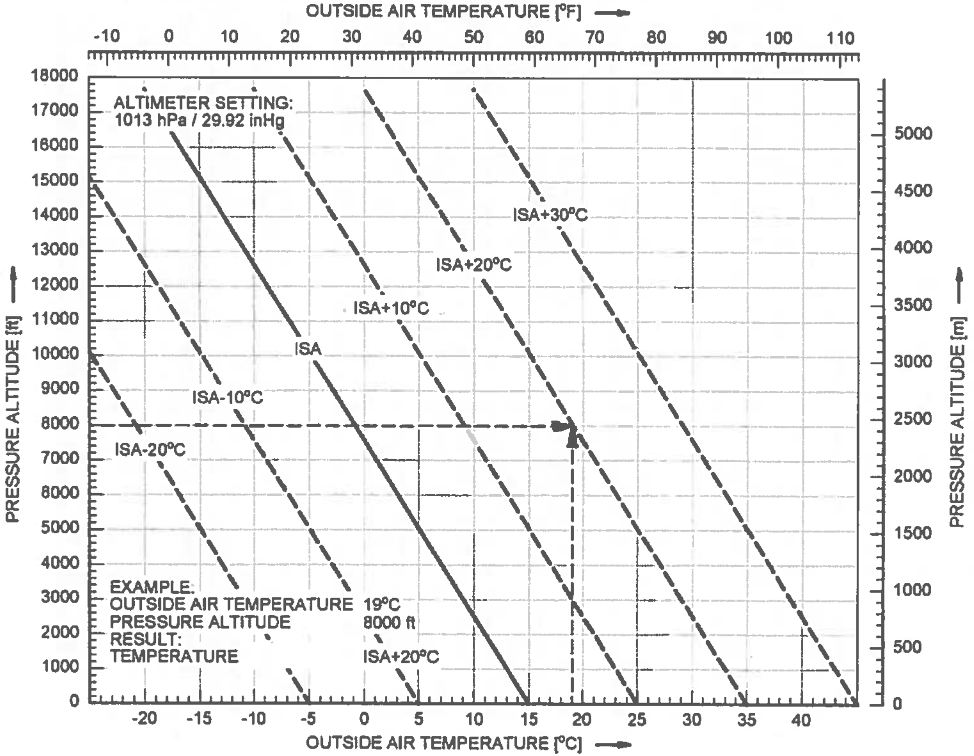


Example: 1. Set 1,013.25 hPa on altimeter and read pressure altitude (900 ft).
2. Establish ambient temperature (+21 °C).
3. Read off density altitude (1800 ft).

Result: From a performance calculation standpoint the airplane is at 1800 ft.

5.3.4 INTERNATIONAL STANDARD ATMOSPHERE

INTERNATIONAL STANDARD ATMOSPHERE



5.3.5 STALLING SPEEDS

Stalling Speeds at Various Flight Masses

Indicated airspeed may not be accurate at stall.

Airspeeds, most forward CG, power off:

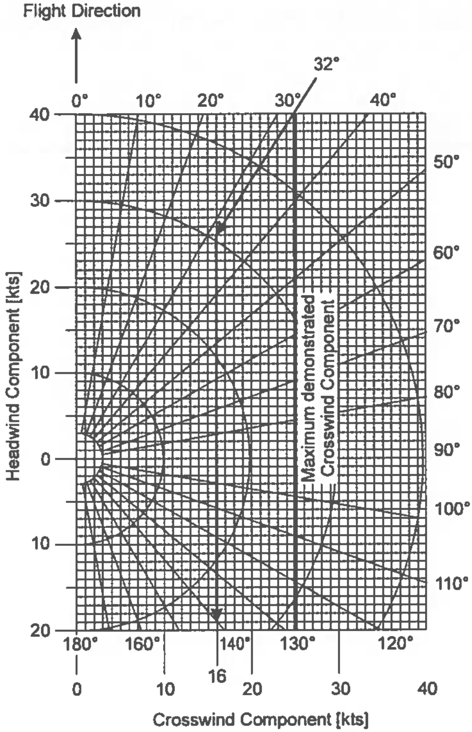
1000 kg (2205 lb)	Bank Angle							
	0°		30°		45°		60°	
Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	58	56	59	60	64	66	76	79
T/O	54	53	58	57	63	63	75	74
LDG	55	52	56	55	61	61	72	73

1100 kg (2425 lb)	Bank Angle							
	0°		30°		45°		60°	
Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	61	59	63	64	70	71	83	84
T/O	56	55	60	60	66	66	79	78
LDG	57	54	59	58	65	65	77	77

1200 kg (2646 lb)	Bank Angle							
	0°		30°		45°		60°	
Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	64	61	67	66	73	73	86	87
T/O	60	57	64	62	69	68	82	81
LDG	59	56	62	61	68	67	81	80

1310 kg (2888 lb)	Bank Angle							
	0°		30°		45°		60°	
Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	66	63	68	68	74	75	88	89
T/O	62	59	65	63	71	70	84	83
LDG	60	58	63	62	69	69	82	82

5.3.6 WIND COMPONENTS



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

5.3.7 TAKE-OFF DISTANCE

Conditions:

- POWER lever . . . . MAX
- Flaps . . . . T/O
- 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 12 kt (6.2 m/s) headwind.
- Tailwind:	Increase by 10% for each 2 kt (1.0 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 30%.
- Grass runway, dry, 25 cm (9.8 in) long:	Increase the ground roll by 45%.
- 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 20%.
- Soft ground:	Increase the ground roll by 50% (in addition to the grass runway distance calculation, if applicable)
- Uphill slope:	Increase the ground roll by 15% for each 1% (1 m per 100 m or 1 ft per 100 ft) slope.
- Without wheel fairings:	Increase ground roll by 20 m. Increase take - off distance over a 50 ft obstacle by 30 m.

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 wind 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. 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 - 1310 kg / 2888 lb								
Weight: 1310 kg / 2888 lb						Flaps: T/O		
v_R: 67 KIAS						Power: MAX		
v_{50}: 72 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	365	385	410	430	460	495	397
	15 m / 50 ft	550	580	610	640	680	720	590
1000	Ground Roll	390	410	435	465	500	535	418
305	15 m / 50 ft	580	610	640	680	730	770	616
2000	Ground Roll	415	440	465	500	540	575	439
610	15 m / 50 ft	610	640	680	730	780	830	646
3000	Ground Roll	440	470	500	540	580	625	463
914	15 m / 50 ft	650	680	720	780	840	890	677
4000	Ground Roll	470	500	540	590	630	680	490
1219	15 m / 50 ft	690	720	780	840	900	960	708
5000	Ground Roll	505	535	585	640	685		519
1524	15 m / 50 ft	730	770	840	910	970		745
6000	Ground Roll	540	585	640	700	750		549
1829	15 m / 50 ft	770	830	900	980	1040		783
7000	Ground Roll	580	640	700	765	820		585
2134	15 m / 50 ft	820	900	980	1060	1130		828
8000	Ground Roll	635	700	770	845	900		628
2438	15 m / 50 ft	890	970	1060	1160	1230		881
9000	Ground Roll	695	770	850	915	990		674
2743	15 m / 50 ft	970	1060	1160	1250	1330		937
10000	Ground Roll	765	850	910	995			729
3048	15 m / 50 ft	1050	1160	1240	1340			1000
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Take-Off Distance - Normal Procedure - 1280 kg / 2822 lb								
Weight: 1280 kg / 2822 lb v_R: 67 KIAS v_{50}: 72 KIAS					Flaps: T/O Power: MAX 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	365	385	405	425	460	490	391
	15 m / 50 ft	540	570	600	630	670	710	581
1000	Ground Roll	385	410	430	460	495	530	413
305	15 m / 50 ft	580	600	630	670	720	760	609
2000	Ground Roll	410	435	460	495	535	570	436
610	15 m / 50 ft	610	640	670	720	770	820	636
3000	Ground Roll	435	465	495	535	580	620	460
914	15 m / 50 ft	640	670	710	770	820	880	668
4000	Ground Roll	470	495	535	585	625	675	486
1219	15 m / 50 ft	680	720	770	830	890	950	701
5000	Ground Roll	500	535	580	635	680		513
1524	15 m / 50 ft	720	760	830	890	950		735
6000	Ground Roll	535	580	635	695	740		544
1829	15 m / 50 ft	760	820	890	970	1030		772
7000	Ground Roll	575	635	695	760	810		581
2134	15 m / 50 ft	810	890	970	1050	1120		820
8000	Ground Roll	630	695	765	840	895		623
2438	15 m / 50 ft	880	960	1050	1150	1220		870
9000	Ground Roll	690	765	845	910	980		668
2743	15 m / 50 ft	960	1050	1150	1230	1320		927
10000	Ground Roll	765	845	905	985			723
3048	15 m / 50 ft	1040	1140	1230	1330			992
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Take-Off Distance - Normal Procedure - 1200 kg / 2645 lb								
Weight: 1200 kg / 2645 lb						Flaps: T/O		
v_R: 65 KIAS						Power: MAX		
v_{50}: 70 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	325	345	365	385	410	440	352
	15 m / 50 ft	490	520	540	570	610	640	524
1000	Ground Roll	345	365	390	415	445	475	371
305	15 m / 50 ft	520	550	570	610	650	690	548
2000	Ground Roll	365	390	415	445	480	515	391
610	15 m / 50 ft	550	580	610	650	700	740	576
3000	Ground Roll	390	415	445	485	520	560	413
914	15 m / 50 ft	580	610	650	700	750	800	602
4000	Ground Roll	420	445	480	525	565	610	438
1219	15 m / 50 ft	610	640	700	750	800	860	633
5000	Ground Roll	450	480	525	575	615		462
1524	15 m / 50 ft	650	690	750	810	870		666
6000	Ground Roll	480	525	575	630	670		491
1829	15 m / 50 ft	690	740	810	880	940		700
7000	Ground Roll	520	570	630	690	735		524
2134	15 m / 50 ft	740	800	880	960	1010		741
8000	Ground Roll	570	630	695	760	810		563
2438	15 m / 50 ft	800	870	960	1040	1110		789
9000	Ground Roll	625	695	765	830	895		606
2743	15 m / 50 ft	870	950	1050	1120	1200		839
10000	Ground Roll	690	765	825	900			656
3048	15 m / 50 ft	950	1040	1110	1210			899
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Take-Off Distance - Normal Procedure - 1100 kg / 2425 lb								
Weight: 1100 kg / 2425 lb; v_R: 61 KIAS; v_{50}: 67 KIAS						Flaps: T/O; Power: MAX; 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	280	295	310	330	355	380	303
	15 m / 50 ft	430	450	470	490	530	560	457
1000	Ground Roll	295	315	335	355	385	410	318
305	15 m / 50 ft	450	470	500	530	570	600	478
2000	Ground Roll	315	335	355	385	415	445	336
610	15 m / 50 ft	480	500	530	570	600	650	498
3000	Ground Roll	340	360	385	415	450	480	356
914	15 m / 50 ft	500	530	560	610	650	690	523
4000	Ground Roll	360	385	415	455	490	525	377
1219	15 m / 50 ft	530	560	600	650	700	750	549
5000	Ground Roll	385	415	455	495	530		399
1524	15 m / 50 ft	560	600	650	710	750		578
6000	Ground Roll	415	455	495	545	580		423
1829	15 m / 50 ft	600	650	700	770	820		608
7000	Ground Roll	450	495	545	600	640		452
2134	15 m / 50 ft	640	700	770	830	890		644
8000	Ground Roll	490	545	605	660	705		485
2438	15 m / 50 ft	690	760	840	910	970		684
9000	Ground Roll	540	600	665	725	780		523
2743	15 m / 50 ft	760	830	910	980	1050		730
10000	Ground Roll	600	665	715	785			567
3048	15 m / 50 ft	830	910	970	1060			786
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

5.3.8 CLIMB PERFORMANCE - TAKE-OFF CLIMB

Conditions:
- POWER lever .... 92% or max. 2100 RPM
- Flaps .... T/O
- Airspeed .... 72 KIAS

NOTE

The tables on the following pages show the *rate* of climb. The *gradient* of climb can be calculated using the following formulae:

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

NOTE

For operation without wheel fairings a climb rate decreased by 20 ft/min must be expected.

NOTE

If MÄM 40-662 is installed, the rate of climb at MTOM (1310 kg / 2888 lb) with a power setting of 100% at MSL and ISA conditions: 714 ft/min (3,6 m/s).

Take - Off Climb - Flaps T/O

Flaps: T/O

v_Y: 72 KIAS

Power: 92% or max. 2100 RPM

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	
1310 / 2888	SL		660	650	640	630	620	615	590	550	629
	2000	610	640	630	620	610	605	595	555	515	613
	4000	1219	620	610	600	595	585	560	520	475	597
	6000	1829	600	590	580	570	555	520	475		580
	8000	2438	580	570	555	540	525	480	435		557
	10000	3048	555	540	525	510	480	435			533
	12000	3658	525	510	495	480	435	400			509
	14000	4267	500	485	475	460	425	360			492
	16000	4877	490	470	440	385	325				487
	16400	4999	475	450	420	370	305				471
1280 / 2822	SL		675	665	655	645	635	625	600	560	643
	2000	610	655	645	635	625	615	605	570	525	627
	4000	1219	635	625	615	605	595	575	530	485	611
	6000	1829	615	605	595	580	570	535	485		593
	8000	2438	595	580	565	550	535	490	445		570
	10000	3048	565	550	535	520	490	445			545
	12000	3658	535	520	505	490	445	410			520
	14000	4267	510	495	485	470	430	370			503
	16000	4877	500	480	450	395	330				498
	16400	4999	485	460	430	375	310				482

Take - Off Climb - Flaps T/O

Flaps: T/O

v_Y: 72 KIAS

Power: 92% or max. 2100 RPM

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	
1200 / 2645	SL		740	730	720	710	700	690	665	620	707
	2000	610	720	710	700	690	680	670	630	585	691
	4000	1219	700	690	680	670	660	635	590	540	675
	6000	1829	680	670	660	645	630	595	545		657
	8000	2438	660	645	630	615	600	545	500		633
	10000	3048	630	615	600	585	550	500			607
	12000	3658	595	580	565	550	505	460			581
	14000	4267	575	560	545	530	490	420			564
	16000	4877	560	540	510	450	380				560
	16400	4999	545	520	490	430	360				543
1100 / 2425	SL		835	825	815	800	795	785	755	705	800
	2000	610	815	805	790	780	770	760	715	665	782
	4000	1219	795	780	770	760	750	725	670	615	765
	6000	1829	770	760	750	735	720	680	625		747
	8000	2438	750	735	720	705	685	630	575		722
	10000	3048	720	700	685	670	635	580			695
	12000	3658	685	665	650	635	585	535			667
	14000	4267	660	645	630	615	570	495			649
	16000	4877	650	625	590	530	455				646
	16400	4999	630	605	570	505	430				627

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

5.3.9 CLIMB PERFORMANCE - CRUISE CLIMB

Conditions:
- POWER lever . . . . 92% or max. 2100 RPM
- Flaps . . . . UP
- Airspeed . . . . 88 KIAS

NOTE

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

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

NOTE

For operation without wheel fairings a climb rate decreased by 40 ft/min must be expected.

Cruise Climb - Flaps UP											
Flaps: UP v_Y: 88 KIAS								Power: 92% or max. 2100 RPM			
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	
1310 / 2888	SL		665	660	655	650	645	645	620	585	651
	2000	610	655	650	645	640	635	630	595	555	644
	4000	1219	645	640	635	630	620	605	565	525	633
	6000	1829	635	630	620	615	605	580	540		621
	8000	2438	620	615	605	600	590	550	505		609
	10000	3048	605	600	590	580	555	510			596
	12000	3658	590	580	570	560	520	480			581
	14000	4267	575	565	555	540	500	445			568
	16000	4877	560	550	520	470	405				561
	16400	4999	545	535	500	450	380				546
1280 / 2822	SL		690	685	680	675	670	665	645	605	674
	2000	610	680	675	670	665	660	655	615	575	667
	4000	1219	670	665	660	650	645	630	590	545	656
	6000	1829	660	650	645	635	630	600	560		644
	8000	2438	645	635	630	620	610	570	525		632
	10000	3048	630	620	615	605	580	535			619
	12000	3658	615	605	590	580	540	500			604
	14000	4267	595	585	580	560	525	465			591
	16000	4877	585	575	545	490	425				583
	16400	4999	570	555	525	470	400				568

Cruise Climb - Flaps UP											
Flaps: UP v_Y: 88 KIAS								Power: 92% or max. 2100 RPM			
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	
1200 / 2645	SL		750	750	745	740	735	730	705	665	739
	2000	610	745	740	735	730	725	720	680	635	732
	4000	1219	735	730	725	715	710	690	650	605	721
	6000	1829	725	715	710	700	695	660	620		709
	8000	2438	710	700	695	685	675	630	585		697
	10000	3048	695	685	680	670	640	590			684
	12000	3658	680	665	655	645	600	560			668
	14000	4267	660	650	640	625	585	520			655
	16000	4877	650	640	605	550	480				648
	16400	4999	635	620	585	525	455				632
1100 / 2425	SL		845	840	835	830	825	825	795	750	831
	2000	610	835	830	825	820	815	810	765	715	824
	4000	1219	825	820	815	810	800	785	735	685	814
	6000	1829	815	810	800	795	785	750	700		801
	8000	2438	800	795	785	780	765	715	665		788
	10000	3048	785	775	770	760	730	675			775
	12000	3658	770	760	745	735	685	640			759
	14000	4267	750	740	730	715	665	600			746
	16000	4877	740	730	695	630	555				739
	16400	4999	725	705	675	605	525				722
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.											

5.3.10 TIME, FUEL AND DISTANCE TO CLIMB

Conditions:

- Power lever .... 92% or max. 2100 RPM
- Flaps .... UP
- Airspeed .... 88 KIAS

NOTE

Distances shown are based on zero wind. Fuel for start, taxi and take-off not included. Add 5% to the time and fuel and 10% to the distance for each 10° C (18° F) increase in OAT.

Example:

OAT at take-off .... 11°C (52°F)
Airfield pressure altitude .... 2000 ft (1200 m)
Initial climb weight .... 1310 kg (2888 lb)
OAT at cruise .... -17° C (2° F)
Cruise altitude .... 16000 ft (4900 m)

Time, fuel and distance to climb at airfield: 3 min, 0.4 US gal and 5 NM (1)

Time, fuel and distance to climb at cruise: 26 min, 3.7 US gal and 43 NM (2)

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

Time to cruise altitude: 26 min - 3 min = 23 min

Fuel to cruise altitude: 3.7 US gal - 0.4 US gal = 3.3 US gal

Distance to cruise altitude: 43 NM - 5 NM = 38 NM

Time, Fuel and Distance to Climb											
Flaps: UP v_Y: 88 KIAS								Power: 92% or max. 2100 RPM			
Weight [kg] / [lb]	Press. Alt. [ft]	Press. Alt. [m]	OAT [°C]	OAT [°F]	TAS [kt]	RoC [ft/min]	RoC [m/s]	Time [min]	Fuel [US gal]	Distance [NM]	
1310 / 2888	SL		15	59	87	650	3.3	0	0.0	0	
	2000	600	11	52	88	645	3.3	3	0.4	5	
	4000	1219	7	45	90	645	3.3	6	0.9	9	
	6000	1829	3	38	91	640	3.2	9	1.3	14	
	8000	2438	-1	30	92	630	3.2	13	1.8	19	
	10000	3048	-5	23	94	625	3.2	16	2.2	25	
	12000	3658	-9	16	95	620	3.2	19	2.7	31	
	14000	4267	-13	9	97	615	3.1	23	3.1	37	
	16000	4877	-17	2	98	605	3.1	26	3.7	43	
1280 / 2825	SL		15	59	87	675	3.4	0	0.0	0	
	2000	600	11	52	88	670	3.4	3	0.4	4	
	4000	1219	7	45	90	665	3.4	6	0.8	9	
	6000	1829	3	38	91	660	3.4	9	1.3	14	
	8000	2438	-1	30	92	655	3.3	12	1.7	19	
	10000	3048	-5	23	94	650	3.3	15	2.1	24	
	12000	3658	-9	16	95	645	3.3	19	2.6	29	
	14000	4267	-13	9	97	635	3.2	22	3.0	36	
	16000	4877	-17	2	98	630	3.2	25	3.5	41	

Time, Fuel and Distance to Climb											
Flaps: UP v_Y: 88 KIAS								Power: 92% or max. 2100 RPM			
Weight [kg] / [lb]	Press. Alt. [ft]	Press. Alt. [m]	OAT [°C]	OAT [°F]	TAS [kt]	RoC [ft/min]	RoC [m/s]	Time [min]	Fuel [US gal]	Dist-ance [NM]
1200 / 2645	SL		15	59	87	740	3.8	0	0.0	0
	2000	600	11	52	88	735	3.7	3	0.4	4
	4000	1219	7	45	90	730	3.7	5	0.8	8
	6000	1829	3	38	91	725	3.7	8	1.1	13
	8000	2438	-1	30	92	720	3.7	11	1.5	17
	10000	3048	-5	23	94	715	3.6	14	1.9	22
	12000	3658	-9	16	95	710	3.6	17	2.3	27
	14000	4267	-13	9	97	700	3.6	20	2.8	32
	16000	4877	-17	2	98	695	3.5	23	3.2	38
1100 / 2425	SL		15	59	87	830	4.2	0	0.0	0
	2000	600	11	52	88	830	4.2	2	0.3	4
	4000	1219	7	45	90	825	4.2	5	0.7	7
	6000	1829	3	38	91	820	4.2	7	1.0	11
	8000	2438	-1	30	92	810	4.1	10	1.4	15
	10000	3048	-5	23	94	805	4.1	12	1.7	19
	12000	3658	-9	16	95	800	4.1	15	2.1	24
	14000	4267	-13	9	97	795	4.0	18	2.4	28
	16000	4877	-17	2	98	785	4.0	20	2.8	33

5.3.11 CRUISE PERFORMANCE

NOTE

For operation without wheel fairings a performance reduction of 4% TAS at all power settings must be expected.

Conditions:

- Flaps .... UP
- Landing gear .... retracted
- Weight .... 1310 kg (2888 lb)

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

Affected Chapters:

5.3 PERFORMANCE TABLES and DIAGRAMS

5.3.11 CRUISE PERFORMANCE

Conditions:

The 'Conditions' are amended to read:

- Flaps . . . . UP
- Weight . . . . 1310 kg (2888 lb)

Cruise Performance

Outside Air Temperature - [°C]

Press. Alt. [ft] / [m]	ISA-10			ISA			ISA+10			ISA+20			ISA+30		
	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]
2000 610	92	8.3	134	92	8.3	136	92	8.3	137	92	8.3	138	92	8.3	140
	75	6.6	123	75	6.6	125	75	6.6	126	75	6.6	127	75	6.6	128
	60	5.1	112	60	5.1	113	60	5.1	114	60	5.1	115	60	5.1	116
	45	4.0	95	45	4.0	96	45	4.0	97	45	4.0	97	45	4.0	98
4000 1219	92	8.3	137	92	8.3	138	92	8.3	140	92	8.3	141	92	8.3	142
	75	6.6	126	75	6.6	127	75	6.6	128	75	6.6	129	75	6.6	131
	60	5.1	113	60	5.1	114	60	5.1	116	60	5.1	117	60	5.1	118
	45	4.0	96	45	4.0	97	45	4.0	98	45	4.0	98	45	4.0	99
6000 1829	92	8.3	139	92	8.3	141	92	8.3	142	92	8.3	144	89	8.0	143
	75	6.6	128	75	6.6	129	75	6.6	130	75	6.6	132	75	6.6	133
	60	5.1	115	60	5.1	116	60	5.1	117	60	5.1	118	60	5.1	119
	45	4.0	98	45	4.0	98	45	4.0	99	45	4.0	99	45	4.0	100
8000 2438	92	8.3	142	92	8.3	143	92	8.3	145	92	8.3	146	89	8.0	146
	75	6.6	130	75	6.6	131	75	6.6	133	75	6.6	134	75	6.6	135
	60	5.1	117	60	5.1	118	60	5.1	119	60	5.1	120	60	5.1	121
	45	4.0	99	45	4.0	99	45	4.0	100	45	4.0	100	45	4.0	100
10000 3048	92	8.3	144	92	8.3	146	92	8.3	148	92	8.3	149	90	8.1	149
	75	6.6	132	75	6.6	134	75	6.6	135	75	6.6	136	75	6.6	138
	60	5.1	119	60	5.1	120	60	5.1	121	60	5.1	122	60	5.1	123
	45	4.0	99	45	4.0	100	45	4.0	100	45	4.0	101	45	4.0	101
12000 3658	92	8.3	147	92	8.3	149	92	8.3	150	92	8.3	152	90	8.1	152
	75	6.6	135	75	6.6	136	75	6.6	137	75	6.6	139	75	6.6	140
	60	5.1	121	60	5.1	122	60	5.1	123	60	5.1	124	60	5.1	125
	45	4.0	100	45	4.0	100	45	4.0	101	45	4.0	101	45	4.0	100
14000 4267	92	8.4	150	92	8.4	151	92	8.4	153	85	7.6	149	80	7.1	147
	75	6.6	137	75	6.6	138	75	6.6	140	75	6.6	141	75	6.6	142
	60	5.1	123	60	5.1	124	60	5.1	125	60	5.1	126	60	5.1	127
	45	4.0	101	45	4.0	101	50	4.4	111	50	4.4	111	50	4.4	112
16000 4877	92	8.4	153	92	8.4	154	90	8.2	155	84	7.5	151	79	7.0	149
	75	6.6	139	75	6.6	141	75	6.6	142	75	6.6	144	75	6.6	145
	60	5.1	124	60	5.1	126	60	5.1	127	60	5.1	127	60	5.1	128
	50	4.4	111	50	4.4	111	50	4.4	112	50	4.4	112	50	4.4	112

5.3.12 LANDING DISTANCES

Conditions:

- Power lever .... IDLE
- Flaps .... LDG, T/O 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 20 kt (10.3 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 30%.
- Grass runway, dry, longer than 5 cm (2 in):	Increase the ground roll at least by 45 %.
- Grass runway, wet or soft runway:	Increase the ground roll by 15%.
- Downhill slope:	Increase the ground roll by 10% for each 1% (1 m per 100 m or 1 ft per 100 ft) 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.

NOTE

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

Landing Distance - Flaps LDG - 1310 kg / 2888 lb								
Weight: 1310 kg / 2888 lb V_{REF}: 77 KIAS					Flaps: LDG 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	305	315	325	335	355	375	318
	15 m / 50 ft	620	650	670	680	720	760	650
1000	Ground Roll	315	325	335	350	370	395	327
305	15 m / 50 ft	640	660	680	700	740	790	660
2000	Ground Roll	325	335	350	370	390	415	336
610	15 m / 50 ft	650	670	690	730	770	810	670
3000	Ground Roll	335	350	365	385	410	435	345
914	15 m / 50 ft	670	690	710	750	800	840	681
4000	Ground Roll	350	360	380	405	430	455	356
1219	15 m / 50 ft	680	700	740	780	830	870	692
5000	Ground Roll	360	375	400	425	450		366
1524	15 m / 50 ft	700	720	770	810	860		704
6000	Ground Roll	375	395	420	445	475		378
1829	15 m / 50 ft	710	750	790	840	890		717
7000	Ground Roll	400	430	460	485	515		404
2134	15 m / 50 ft	750	790	840	890	940		746
8000	Ground Roll	455	485	520	550	585		452
2438	15 m / 50 ft	810	870	920	970	1020		806
9000	Ground Roll	520	555	585	625	660		508
2743	15 m / 50 ft	890	950	1000	1060	1120		875
10000	Ground Roll	580	620	655	695			565
3048	15 m / 50 ft	970	1030	1090	1140			936
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Landing Distance - Flaps LDG - 1280 kg / 2822 lb								
Weight: 1280 kg / 2822 lb V_{REF}: 77 KIAS					Flaps: LDG 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	295	305	320	330	345	365	310
	15 m / 50 ft	610	630	650	670	710	750	639
1000	Ground Roll	305	320	330	340	365	385	320
305	15 m / 50 ft	630	650	670	690	730	770	647
2000	Ground Roll	320	330	340	360	380	405	329
610	15 m / 50 ft	640	660	680	720	750	800	657
3000	Ground Roll	330	340	355	375	400	425	338
914	15 m / 50 ft	650	670	700	740	780	830	667
4000	Ground Roll	340	355	375	395	420	445	348
1219	15 m / 50 ft	670	690	720	770	810	860	679
5000	Ground Roll	355	370	390	415	440		359
1524	15 m / 50 ft	680	710	750	800	840		690
6000	Ground Roll	365	385	415	440	465		370
1829	15 m / 50 ft	700	740	780	830	870		702
7000	Ground Roll	395	420	450	475	505		396
2134	15 m / 50 ft	730	780	820	870	920		732
8000	Ground Roll	450	480	510	540	570		445
2438	15 m / 50 ft	800	850	900	950	1010		792
9000	Ground Roll	510	545	580	615	650		501
2743	15 m / 50 ft	880	930	990	1040	1100		861
10000	Ground Roll	575	610	650	685			557
3048	15 m / 50 ft	960	1010	1070	1130			925
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Landing Distance - Flaps LDG - 1200 kg / 2645 lb								
Weight: 1200 kg / 2645 lb V_{REF}: 76 KIAS					Flaps: LDG 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	280	290	300	310	325	345	293
	15 m / 50 ft	600	620	640	660	690	730	626
1000	Ground Roll	290	300	310	320	340	360	301
305	15 m / 50 ft	610	630	650	680	720	760	633
2000	Ground Roll	300	310	320	340	360	380	310
610	15 m / 50 ft	620	640	660	700	740	780	639
3000	Ground Roll	310	320	335	355	375	400	319
914	15 m / 50 ft	630	650	680	720	760	800	649
4000	Ground Roll	320	335	350	375	395	420	329
1219	15 m / 50 ft	650	670	700	740	790	830	657
5000	Ground Roll	335	345	370	395	415		338
1524	15 m / 50 ft	660	690	730	770	810		668
6000	Ground Roll	345	365	390	415	435		348
1829	15 m / 50 ft	680	710	750	800	840		679
7000	Ground Roll	370	400	425	450	475		373
2134	15 m / 50 ft	710	750	790	840	890		707
8000	Ground Roll	425	455	485	515	545		423
2438	15 m / 50 ft	780	820	870	920	980		768
9000	Ground Roll	490	525	555	590	620		482
2743	15 m / 50 ft	860	910	960	1020	1070		839
10000	Ground Roll	560	590	630	665			540
3048	15 m / 50 ft	930	990	1050	1100			905
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Landing Distance - Flaps LDG - 1100 kg / 2425 lb								
Weight: 1100 kg / 2425 lb v_{REF}: 72 KIAS				Flaps: LDG 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	255	265	275	285	300	320	270
	15 m / 50 ft	590	610	630	640	680	720	612
1000	Ground Roll	265	275	285	295	315	335	278
305	15 m / 50 ft	590	610	630	660	690	730	615
2000	Ground Roll	275	285	295	310	330	350	286
610	15 m / 50 ft	600	620	640	670	710	750	617
3000	Ground Roll	285	295	310	330	345	370	294
914	15 m / 50 ft	610	630	650	690	730	770	623
4000	Ground Roll	295	305	325	345	365	385	302
1219	15 m / 50 ft	620	640	670	710	750	800	630
5000	Ground Roll	305	320	340	360	385		311
1524	15 m / 50 ft	630	650	690	730	780		637
6000	Ground Roll	320	335	355	380	405		321
1829	15 m / 50 ft	640	680	720	760	800		644
7000	Ground Roll	345	365	390	415	440		345
2134	15 m / 50 ft	670	710	750	800	840		671
8000	Ground Roll	400	425	450	480	510		394
2438	15 m / 50 ft	740	790	840	880	930		736
9000	Ground Roll	465	495	525	560	590		457
2743	15 m / 50 ft	830	880	930	980	1030		810
10000	Ground Roll	535	565	600	635			518
3048	15 m / 50 ft	910	960	1010	1070			880

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

5.3.13 LANDING DISTANCE - ABNORMAL FLAP POSITION

Landing Distance - Abnormal Flap Position - 1310 kg / 2888 lb								
Weight: 1310 kg / 2888 lb V_{REF}: 78 KIAS (Flaps T/O) 83 KIAS Flaps UP)					Flaps: T/O or UP 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	355	365	380	390	415	440	372
	15 m / 50 ft	790	810	840	870	920	970	822
1000 305	Ground Roll	365	380	395	420	445	475	382
	15 m / 50 ft	800	820	860	910	960	1020	827
2000 610	Ground Roll	380	400	425	450	480	510	401
	15 m / 50 ft	810	850	900	950	1010	1060	849
3000 914	Ground Roll	400	430	455	485	515	545	425
	15 m / 50 ft	840	890	940	1000	1060	1120	881
4000 1219	Ground Roll	430	460	490	520	550	580	450
	15 m / 50 ft	880	940	990	1060	1120	1180	917
5000 1524	Ground Roll	460	490	525	555	590		476
	15 m / 50 ft	930	990	1050	1110	1170		954
6000 1829	Ground Roll	495	525	560	595	630		503
	15 m / 50 ft	980	1040	1100	1170	1240		992
7000 2134	Ground Roll	545	580	615	655	695		547
	15 m / 50 ft	1040	1110	1180	1240	1310		1046
8000 2438	Ground Roll	620	660	705	745	790		615
	15 m / 50 ft	1150	1220	1290	1370	1440		1141
9000 2743	Ground Roll	710	755	800	850	900		696
	15 m / 50 ft	1270	1350	1420	1500	1590		1243
10000 3048	Ground Roll	800	850	900	955			776
	15 m / 50 ft	1380	1460	1550	1630			1340
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Landing Distance - Abnormal Flap Position - 1280 kg / 2822 lb

Weight: 1280 kg / 2822 lb
Flaps: T/O or UP
v_{REF}: 78 KIAS (Flaps T/O), 83 KIAS (Flaps UP)
Power: IDLE
Runway: dry, paved, level

Press. Alt. [ft] / [m]	Distance [m]	Outside Air Temperature - [°C] / [°F] 0 / 32	10 / 50	20 / 68	30 / 86	40 / 104	50 / 122	ISA
SL	Ground Roll	350	360	370	385	410	430	364
	15 m / 50 ft	770	790	820	850	900	950	803
1000	Ground Roll	360	375	390	415	440	465	374
305	15 m / 50 ft	780	800	840	890	940	990	808
2000	Ground Roll	370	390	415	445	470	500	393
610	15 m / 50 ft	790	830	880	930	980	1040	829
3000	Ground Roll	395	420	445	475	505	535	416
914	15 m / 50 ft	820	870	930	980	1040	1090	863
4000	Ground Roll	420	450	480	510	540	570	441
1219	15 m / 50 ft	860	920	970	1030	1090	1150	895
5000	Ground Roll	450	480	515	545	580		467
1524	15 m / 50 ft	910	970	1020	1080	1150		931
6000	Ground Roll	485	515	550	585	620		492
1829	15 m / 50 ft	960	1020	1080	1140	1210		972
7000	Ground Roll	535	570	605	645	680		537
2134	15 m / 50 ft	1020	1080	1150	1220	1290		1022
8000	Ground Roll	610	650	690	735	780		606
2438	15 m / 50 ft	1130	1200	1270	1340	1410		1117
9000	Ground Roll	700	745	790	835	885		685
2743	15 m / 50 ft	1250	1320	1400	1480	1550		1223
10000	Ground Roll	790	840	890	940			766
3048	15 m / 50 ft	1360	1440	1520	1610			1319

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

Landing Distance - Abnormal Flap Position 1200 kg / 2645 lb								
Weight: 1200 kg / 2645 lb V_{REF}: 78KIAS (Flaps T/O) 82 KIAS (Flaps UP)					Flaps: T/O or UP 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	330	340	350	365	385	410	345
	15 m / 50 ft	760	780	810	840	880	930	790
1000	Ground Roll	340	350	370	390	415	440	354
305	15 m / 50 ft	760	790	820	870	920	970	790
2000	Ground Roll	350	370	395	420	445	470	371
610	15 m / 50 ft	770	810	860	910	960	1020	811
3000	Ground Roll	375	400	420	450	475	505	394
914	15 m / 50 ft	800	850	900	950	1010	1060	837
4000	Ground Roll	400	425	455	480	510	540	416
1219	15 m / 50 ft	840	890	940	1000	1060	1110	870
5000	Ground Roll	425	455	485	515	545		441
1524	15 m / 50 ft	880	930	990	1050	1110		901
6000	Ground Roll	460	490	520	550	585		466
1829	15 m / 50 ft	920	980	1040	1100	1170		937
7000	Ground Roll	505	540	575	610	645		508
2134	15 m / 50 ft	980	1040	1110	1170	1240		988
8000	Ground Roll	580	620	660	700	740		577
2438	15 m / 50 ft	1090	1160	1230	1300	1370		1083
9000	Ground Roll	670	715	760	805	850		660
2743	15 m / 50 ft	1210	1280	1360	1430	1510		1187
10000	Ground Roll	765	815	860	910			740
3048	15 m / 50 ft	1330	1400	1490	1560			1289
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

Landing Distance - Abnormal Flap Position 1100 kg / 2425 lb								
Weight: 1100 kg / 2425 lb v_{REF}: 74 KIAS (Flaps T/O) 78 KIAS (Flaps UP)					Flaps: T/O or UP 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	305	315	325	335	355	380	319
	15 m / 50 ft	750	770	790	820	870	920	777
1000	Ground Roll	315	325	340	360	385	405	328
305	15 m / 50 ft	750	770	800	850	900	950	780
2000	Ground Roll	325	345	365	390	410	435	343
610	15 m / 50 ft	760	780	830	880	930	980	783
3000	Ground Roll	345	370	390	415	440	465	364
914	15 m / 50 ft	760	810	860	920	970	1020	804
4000	Ground Roll	370	395	420	445	470	500	386
1219	15 m / 50 ft	800	850	900	950	1010	1060	829
5000	Ground Roll	395	420	450	475	505		408
1524	15 m / 50 ft	840	890	940	1000	1050		857
6000	Ground Roll	425	450	480	510	540		431
1829	15 m / 50 ft	870	930	990	1040	1100		887
7000	Ground Roll	470	500	535	565	600		471
2134	15 m / 50 ft	930	990	1050	1110	1170		936
8000	Ground Roll	545	580	620	655	695		542
2438	15 m / 50 ft	1040	1100	1170	1240	1300		1031
9000	Ground Roll	640	680	720	765	805		627
2743	15 m / 50 ft	1170	1230	1310	1380	1450		1141
10000	Ground Roll	735	780	825	870			712
3048	15 m / 50 ft	1280	1360	1430	1510			1242
For the distance in [ft] divide by 0.3048 or multiply by 3.28.								

5.3.14 GO-AROUND CLIMB PERFORMANCE

Conditions:

- Power lever .... MAX
- Flaps .... LDG
- Airspeed .... v_{REF}

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:

3.0° for Maximum Take-Off Mass / Maximum Landing Mass (1280 kg / 2822 lb)

3.6° for Maximum Landing Mass (1216 kg / 2645 lb)

If MÄM 40-662 is carried out:

2.9° for Maximum Take-Off Mass (1310 kg / 2888 lb)

Go-Around Climb Performance											
Flaps: LDG								Power: MAX			
v_{REF}:		77 KIAS at 1280 kg (2822 lb) and 1310 kg (2888 lb) 76 KIAS at 1200 kg (2645 lb) 72 KIAS at 1100 kg (2425 lb)									
Weight [kg] / [lb]	Press. Alt. [ft]	Press. Alt. [m]	Rate of Climb - [ft/min]								
			Outside Air Temperature - [°C] / [°F]								
			-20	-10	0	10	20	30	40	50	ISA
			-4	14	32	50	68	86	104	122	
1310 / 2888	SL		410	405	395	390	385	375	360	335	388
	2000	610	395	390	380	375	370	360	340	310	376
	4000	1219	380	375	365	360	350	340	315	285	364
	6000	1829	365	360	350	345	335	315	285		351
	8000	2438	350	345	335	320	310	280	250		336
	10000	3048	330	320	310	295	275	240			315
1280 / 2822	SL		425	415	410	400	395	385	370	345	400
	2000	610	410	400	395	385	380	370	350	320	387
	4000	1219	395	385	380	370	365	350	325	295	375
	6000	1829	380	370	360	355	345	325	295		361
	8000	2438	360	355	345	330	320	290	260		346
	10000	3048	345	330	320	305	285	250			326
1200 / 2645	SL		505	500	495	490	480	475	460	425	488
	2000	610	495	490	480	475	465	460	435	400	475
	4000	1219	480	475	465	455	450	435	410	375	462
	6000	1829	465	455	450	440	435	410	380		448
	8000	2438	450	440	430	425	410	380	345		434
	10000	3048	430	420	410	395	375	335			418

Go-Around Climb Performance											
Flaps: LDG									Power: MAX		
V_{REF}:			77 KIAS at 1280 kg (2822 lb) and 1310 kg (2888 lb) 76 KIAS at 1200 kg (2645 lb) 72 KIAS at 1100 kg (2425 lb)								
Weight [kg] / [lb]	Press. Alt. [ft]	Press. Alt. [m]	Rate of Climb - [ft/min]								
			Outside Air Temperature - [°C] / [°F]								
			-20	-10	0	10	20	30	40	50	ISA
			-4	14	32	50	68	86	104	122	
1100 / 2425	SL		615	615	610	605	605	595	575	535	607
	2000	610	610	605	605	595	585	580	550	510	596
	4000	1219	605	595	585	580	570	555	520	480	582
	6000	1829	585	575	570	560	550	525	490		568
	8000	2438	570	560	550	540	530	495	455		553
	10000	3048	550	540	530	520	495	450			537

5.3.15 GLIDE

The following table shows the glide ratio and the resulting maximum horizontal distance in nautical miles per 1000 ft (305 m) of altitude loss in a glide traveled in still air.

	Glide ratio	Maximum horizontal distance per 1000 ft (305 m) altitude loss
Windmilling propeller	1 : 9.7	1.59 NM (2.94 km)

Conditions:

- Flaps . . . . UP
- Airspeed . . . . 88 KIAS

CAUTION

The propeller will keep windmilling under all expected conditions. Do not attempt to stop the propeller intentionally.

NOTE

In case of stationary propeller the given numbers are conservative.

NOTE

For operation without wheel fairings the glide ratio is reduced to 9.4; i.e., for every 1000 ft (305m) of altitude loss the maximum horizontal distance traveled in still air is 1.54 NM (2.85 km). During this the propeller will continue to windmill.

5.3.16 APPROVED NOISE DATA

Maximum Flight Mass 1280 kg (2825 lb):

ICAO Annex 16 Chapter X .... 74.5 dB(A)
CS-36 Subpart C .... 74.5 dB(A)

If the Exhaust Pipe with Muffler MÄM 40-434 or OÄM 40-310 is installed:

ICAO Annex 16, Chapter X .... 71.5 dB(A)
CS-36 Subpart C .... 71.5 dB(A)

Maximum Flight Mass 1310 kg (2888 lb):

ICAO Annex 16 Chapter X .... 71.4 dB(A)
CS-36 Subpart C .... 71.4 dB(A)

CHAPTER 6
MASS AND BALANCE / EQUIPMENT LIST

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. Over and above this there is a comprehensive list of the equipment approved for this airplane (Equipment List), as also a list of that equipment installed when the airplane was weighed (Equipment Inventory).

Before the airplane is delivered the empty mass and the corresponding CG position are determined, and entered in Section 6.3 - MASS AND BALANCE REPORT.

NOTE

Following equipment changes the new empty mass and the corresponding CG position must be determined by calculation or by weighing.

Following repairs or repainting the new empty mass and the corresponding CG position must be determined by weighing.

Empty mass, empty mass CG position, and the empty mass moment must be certified in the Mass and Balance Report by an authorized person.

NOTE

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

6.2 DATUM PLANE

The Datum Plane (DP) is a plane which is normal to the airplane's longitudinal axis and in front of the airplane as seen from the direction of flight. The airplane's longitudinal axis is parallel with the upper surface of a 600:31 wedge which is placed on top of the rear fuselage in front of the vertical stabilizer. When the upper surface of the wedge is aligned horizontally, the Datum Plane is vertical. The Datum Plane is located 2.194 meter (86.38 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 brake fluid, lubricant (1.0 liter / 1.06 qts), coolant, gearbox oil, engine oil (7.0 liter / 7.4 qts), plus unusable fuel (2.0 US gal / approx. 7.6 liter).

MASS AND BALANCE REPORT

(Continuous report on structural or equipment changes)

DA 40 NG				Serial No.: 40.N482			Registration:			Page No.:		
				Changes in Mass								
				Addition (+)			Subtraction (-)			Current Empty Mass		
	Entry No.		Description of Part or Modification	Mass	Moment Arm	Moment	Mass	Moment Arm	Moment	Mass	Moment Arm	Moment
Date	IN	OUT		[kg]	[m]	[kgm]	[kg]	[m]	[kgm]	[kg]	[m]	[kgm]
06. Feb. 20			upon delivery							933,4	2,443	2280,2

6.4 FLIGHT MASS AND CENTER OF GRAVITY

The following information enables you to operate your DA 40 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 40 NG' in Table 6.4.3 - CALCULATION OF LOADING CONDITION.

2. Read the fuel quantity indicators to determine the fuel quantity. If an indicator shows 14 US gal, up to 19.5 US gal can be in the Long Range Tank. In this case, the exact quantity must be determined with the alternate means for fuel quantity indication.

3. 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.

4. Add up the masses and moments in the respective columns. The total moments may be rounded to whole numbers. The CG position is calculated by dividing the total moment by the total mass (using row 9 for the condition with empty fuel tanks, and row 11 for the pre take-off condition). The resulting CG position must be inside the limits.

   As an illustration the total mass and the CG position are entered on Diagram 6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE. This checks graphically that the current configuration of the airplane is within the permissible range.

5. Graphical method:

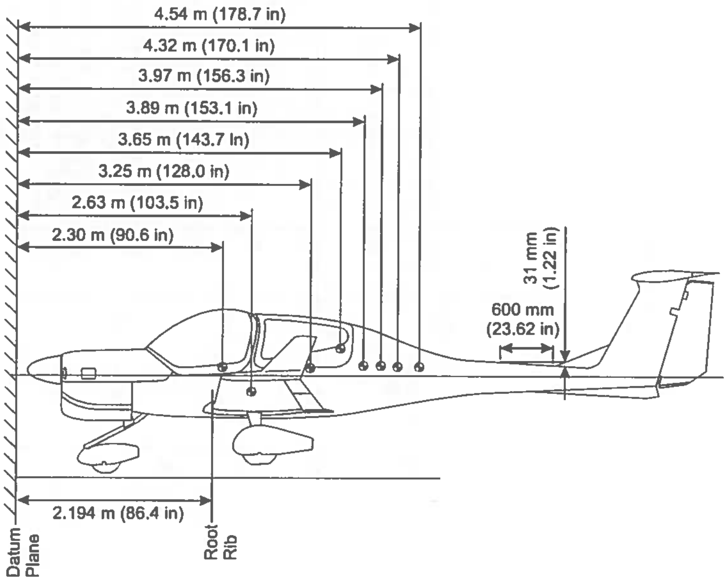
   Diagram 6.4.2 - LOADING DIAGRAM is used to determine the moments. The masses and moments for the individual items of loading are added. Then Diagram 6.4.5 - PERMISSIBLE MOMENT RANGE is used to check whether the total moment associated with the total mass is in the admissible range.

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

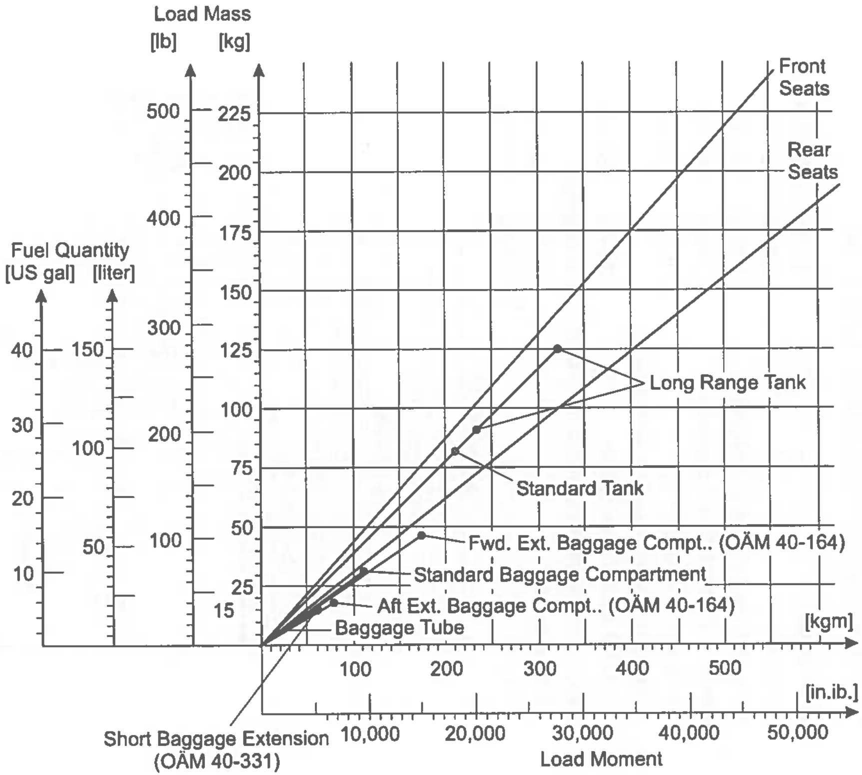
6.4.1 MOMENT ARMS

The most important lever arms aft of the Datum Plane:

- Front seats :	2.30 m	90.6 in
- Rear seats :	3.25 m	128.0 in
- Wing tank (Standard & Long Range) :	2.63 m	103.5 in
- Baggage in standard compartment :	3.65 m	143.7 in
- Baggage in baggage tube :	4.32 m	170.1 in
- Baggage in short baggage extension (if OÄM 40-331 is installed):	3.97 m	156.3 in
- Baggage in baggage extension (if OÄM 40-164 is installed):		
- Forward part :	3.89 m	153.1 in
- Aft part :	4.54 m	178.7 in



6.4.2 LOADING DIAGRAM



6.4.3 CALCULATION OF LOADING CONDITION

a) Standard Tank Configuration

CALCULATION OF LOADING CONDITION	DA 40 NG (Example)		Your DA 40 NG	
	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*
1. Empty mass (from Mass and Balance Report)	900 *1,984*	2,180.8 *189,253*		
2. Front seats Lever arm: 2.30 m *(90.6 in)*	150 *331*	345.0 *29,989*		
3. Rear seats Lever arm: 3.25 m *(128.0 in)*	0 *0*	0 *0*		
4. Standard baggage comp. Lever arm: 3.65 m *(143.7 in)*	20 *44*	73.0 *6,323*		
5. Baggage tube Lever arm: 4.32 m *(170.1 in)*	0 *0*	0 *0*		
6. Short baggage extension (OÄM 40-331 carried out) Lever arm: 3.97 m *(156.3 in)*	0 *0*	0 *0*		
7. Forward extended baggage compartment (OÄM 40-164 carried out) Lever arm: 3.89 m *(153.1 in)*	0 *0*	0 *0*		
8. Aft extended baggage compartment (OÄM 40-164 carried out) Lever arm: 4.54 m *(178.7 in)*	0 *0*	0 *0*		

CALCULATION OF LOADING CONDITION	DA 40 NG (Example)		Your DA 40 NG	
	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*
9. Total mass and total moment with empty fuel tanks (Total of 1.-8.)	1,070 *2,359*	2,598.8 *225,565*		
10. On-board usable fuel (0.84 kg/liter) *(7.01 lb/US gal)* Lever arm: 2.63 m *(103.5 in)*	89 *196*	234.1 *20,286*		
11. Total mass and total moment with full fuel tanks (Total 9. plus 10.)	1,159 *2,555*	2,832.9 *245,851*		

12. The total moments from rows 9 and 11 2,598.8 and 2,832.9 kgm) *(225,565 and 245,851 in.lb)* must be divided by the related total mass (1,070 and 1,159 kg respectively) (2,359 and 2,555 lb) and then located in Diagram 6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE.

As in our example CG positions (2.429 m and 2.444 m respectively) *(95.62 and 96.22 in)* and masses fall into the permitted area, this loading condition is allowable.

b) Long Range Tank Configuration

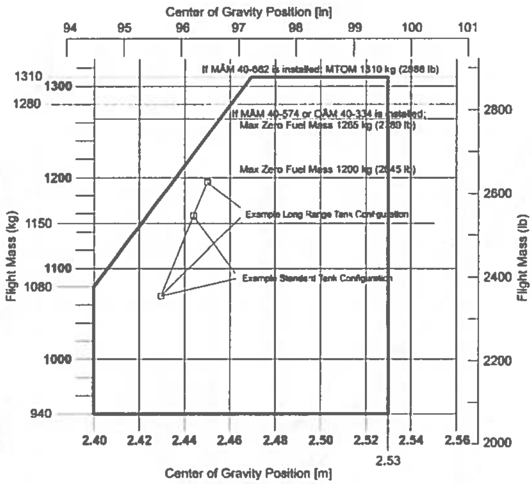
CALCULATION OF LOADING CONDITION	DA 40 NG (Example)		Your DA 40 NG	
	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*
1. Empty mass (from Mass and Balance Report)	900 *1,984*	2,180.8 *189,253*		
2. Front seats Lever arm: 2.30 m *(90.6 in)*	150 *331*	345.0 *29,989*		
3. Rear seats Lever arm: 3.25 m *(128.0 in)*	0 *0*	0 *0*		
4. Standard baggage comp. Lever arm: 3.65 m *(143.7 in)*	20 *44*	73.0 *6,323*		
5. Baggage tube Lever arm: 4.32 m *(170.1 in)*	0 *0*	0 *0*		
6. Short baggage extension (OÄM 40-331 carried out) Lever arm: 3.97 m *(156.3 in)*	0 *0*	0 *0*		
7. Forward extended baggage compartment (OÄM 40-164 carried out) Lever arm: 3.89 m *(153.1 in)*	0 *0*	0 *0*		
8. Aft extended baggage compartment (OÄM 40-164 carried out) Lever arm: 4.54 m *(178.7 in)*	0 *0*	0 *0*		

CALCULATION OF LOADING CONDITION	DA 40 NG (Example)		Your DA 40 NG	
	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*	Mass [kg] *[lb]*	Moment [kgm] *[in.lb]*
9. Total mass and total moment with empty fuel tanks (Total of 1.-8.)	1,070 *2,359*	2,598.8 *225,565*		
10. On-board usable fuel (0.84 kg/liter) *(7.01 lb/US gal)* Lever arm: 2.63 m *(103.5 in)*	124 *273*	326.1 *28,256*		
11. Total mass and total moment with full fuel tanks (Total 9. plus 10.)	1,194 *2,632*	2,924.9 *253,821*		

12. The total moments from rows 9 and 11 (2,598.8 and 2,924.9 kgm) *(225,565 and 253,821 in.lb)* must be divided by the related total mass (1,070 and 1,194 kg respectively) *(2,359 and 2,632 lb)* and then located in Diagram 6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE.

As in our example CG positions (2.429 m and 2.450 m respectively) *(95.62 and 96.44 in)* and masses fall into the permitted area, this loading condition is allowable.

6.4.4 PERMISSIBLE CENTER OF GRAVITY RANGE



The CG's shown in the diagram are from the examples in Tables 6.4.3 - CALCULATION OF LOADING CONDITION a) and b), rows 9 and 11.

The flight CG position must be within the following limits:

Most forward CG:

2.40 m (94.5 in) aft of DP from 940 kg to 1080 kg (2072 lb to 2381 lb)
2.46 m (96.9 in) aft of DP at 1280 kg (2822 lb)

If MÄM 40-662 is installed:

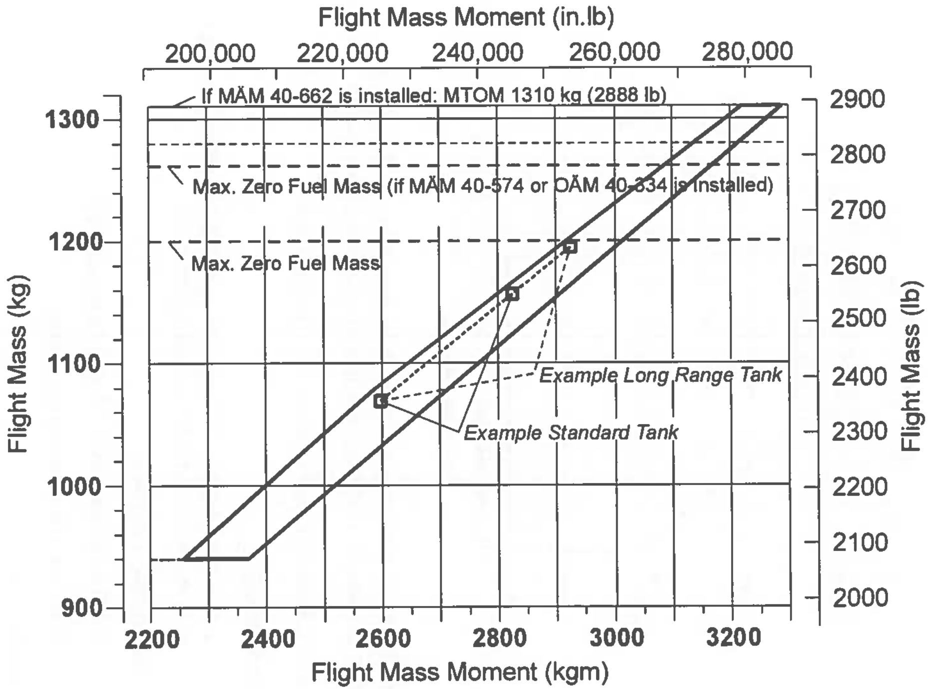
2.469 m (97.2 in) aft of DP at 1310 kg (2888 lb)

linear variation between these values

Most rearward CG:

2.53 m (99.6 in) aft of DP from 940 kg (2072 lb) to1310 kg (2888 lb)

6.4.5 PERMISSIBLE MOMENT RANGE



6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following items are added to the Equipment List:

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

All equipment approved for installation in the DA 40 NG is shown in the *Equipment List* below.

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*.

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.

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		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		☑				
Avionics cooling fan	Cyclone 21-3	CRB-122253	Lone Star Aviation		☐				
PFD cooling fan	SAFE 128	305 468-00	Sandia Aerospace		☑				
MFD cooling fan	SAFE 128	305 468-00	Sandia Aerospace		☑				
AUTOPILOT SYSTEM									
Pitch servo	GSA 81	011-00878-00	Garmin		☐				
Pitch servo	GSA 81	011-00878-20	Garmin	1A1025425	☑				
Pitch servo mount	GSM 85	011-00894-07	Garmin		☐				
Pitch servo mount	GSM 86	011-01904-03	Garmin	28K009700	☑				
Pitch clutch cartridge		011-02147-15	Garmin		☑				
Roll servo	GSA 81	011-00878-00	Garmin		☐				
Roll servo	GSA 81	011-00878-20	Garmin	1A1024745	☑				
Roll servo mount	GSM 85	011-00894-07	Garmin		☐				
Roll servo mount	GSM 86	011-01904-03	Garmin	28K009716	☑				
Roll clutch cartridge		011-02147-08	Garmin		☑				
Pitch trim servo	GSA 81	011-00878-00	Garmin		☐				
Pitch trim servo	GSA 81	011-00878-20	Garmin	1A1024312	☑				
Pitch trim servo mount	GSM 85	011-00894-04	Garmin		☐				
Pitch trim servo mount	GSM 86	011-01904-03	Garmin	28K010005	☑				
Pitch trim clutch cartridge		011-02147-15	Garmin		☑				
Control stick		DA4-2213-12-90	Diamond Aircraft		☑				
CWS switch		031-00514-0000	Bendix/King		☐				

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
AP-Disc switch		031-00428-0000	Bendix/King		☑				
Trim switch assy		200-09187-0000	Bendix/King		☑				
ELECTRICAL POWER									
Main battery	RG24-15		Concorde		☑				
Emergency battery		D60-2560-91-00	Diamond Aircraft		☑				
ECU backup battery (2 pcs.)	LC-R127R2P		Panasonic		☑				
External power connector		DA4-2443-10-00	Diamond Aircraft		☑				
Additional alternator		ES-10024B-2	Kelly Aerospace		☐				
Alternator pulley		D44-2416-00-34X03	Diamond Aircraft		☐				
Alternator pulley		D44-2416-00-70_1	Diamond Aircraft		☐				
Gear box fan assy		D44-2416-20-00	Diamond Aircraft		☐				
Prop. flange pulley support		D44-2416-00-52_1	Diamond Aircraft		☐				
Additional alternator V-belt		ISO 4184 XPZ L862	Diamond Aircraft		☐				
Additional alternator V-belt		ISO 4184 XPZ L987	Diamond Aircraft		☐				
Additional alternator regulator		VR2000-28-1	Electrosystems Inc.		☐				
CABIN COOLING SYSTEM									
Cabin cooling central unit		D44-2151-00-00	Diamond Aircraft		☐				
Cabin cooling central unit		D44-2153-00-00	Diamond Aircraft		☐				

Airplane Serial No.:	40.N482	Registration:		Date:	03. Feb..20	Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
EQUIPMENT									
Safety belt, pilot	5-01-() Series	5-01-1C0710	Schroth		☐	2.110	0.960	92.520	2.350
Safety belt, co-pilot	5-01-() Series	5-01-1C5710	Schroth		☐	2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-1B5710	Schroth		☐	2.250	1.020	126.800	3.220
Safety belt, RH pax	5-01-() Series	5-01-1B0710	Schroth		☐	2.250	1.020	126.800	3.220
Safety belt, pilot	5-01-() Series	5-01-2G0710	Schroth		☐	2.110	0.960	92.520	2.350
Safety belt, co-pilot	5-01-() Series	5-01-2G5710	Schroth		☐	2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-2H5710	Schroth		☐	2.250	1.020	126.800	3.220
Safety belt, RH pax	5-01-() Series	5-01-2H0710	Schroth		☐	2.250	1.020	126.800	3.220
Safety belt, pilot	5-01-() Series	5-01-2G0701	Schroth		☐	2.110	0.960	92.520	2.350
Safety belt, co-pilot	5-01-() Series	5-01-2G5701	Schroth		☐	2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-2H5701	Schroth		☐	2.250	1.020	126.800	3.220
Safety belt, RH pax	5-01-() Series	5-01-2H0701	Schroth		☐	2.250	1.020	126.800	3.220
Safety belt, pilot	5-01-() Series	5-01-1C0701	Schroth	34/19	☑	2.110	0.960	92.520	2.350
Safety belt, co-pilot	5-01-() Series	5-01-1C5701	Schroth	34/19	☑	2.110	0.960	92.520	2.350
Safety belt, LH pax	5-01-() Series	5-01-1B5701	Schroth	27/19	☑	2.250	1.020	126.800	3.220
Safety belt, RH pax	5-01-() Series	5-01-1B0701	Schroth	17/19	☑	2.250	1.020	126.800	3.220
ELT unit	ME406	453-6603	Artex		☐	2.064	0.936	179.700	4.565
ELT remote switch		345-6196-04	Artex		☐				
ELT antenna		110-773	Artex		☐	0.251	0.114	152.800	3.880
Buzzer		452-6505	Artex		☐				
Winter baffle		DA4-2157-00-00			☐				
Nose gear tie-down		DA4-1001-00-00			☐				

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following item is added to the Equipment List:

Airplane Serial No.: 40.N482		Registration:		Date: 6.2.20	
Description	**Type**	**Part No.:**	**Manufacturer**	**S/N**	**in-stalled**
SAFETY EQUIPMENT					
Emergency Egress Hammer		D67-2560-80-50	Diamond		✓

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Airplane Serial No.: 40. N482		Registration:		Date: 6.2.20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
INDICATING / REC. SYSTEM									
Primary flight display (PFD)	GDU 1050	011-03470-00	Garmin	494005797	✓				
Multi function display (MFD)	GDU 1054	011-03470-60	Garmin	494605068	✓				

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6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The Section 'Landing Gear' is added to the Equipment List:

Airplane Serial No.: 40.N482		Registration:		Date: 6.2.20	
Description	**Type**	**Part No.:**	**Manufacturer**	**S/N**	**installed**
LANDING GEAR					
LANDING GEAR STANDARD FAIRINGS					
MLG wheel fairing LH		D41-3213-91-00	Diamond Aircraft		
MLG wheel fairing RH		D41-3213-92-00	Diamond Aircraft		
NLG wheel pant shell LH		D41-3223-91-00_1	Diamond Aircraft		
NLG wheel pant shell RH		D41-3223-92-00_1	Diamond Aircraft		
LANDING GEAR SPEEDKIT					
MLG speed cover LH		DA4-3219-27-00_1	Diamond Aircraft		✓
MLG speed cover RH		DA4-3219-28-00_1	Diamond Aircraft		✓
MLG sheet cover LH		DA4-3219-25-00	Diamond Aircraft		
MLG sheet cover RH		DA4-3219-26-00	Diamond Aircraft		
MLG cover speed LH		DA4-3219-21-00	Diamond Aircraft		✓
MLG cover speed RH assembly		D4D-3219-12-00	Diamond Aircraft		✓
MLG strut cover LH (heavy landing)		D44-3219-23-00	Diamond Aircraft		✓
MLG strut cover RH (heavy landing)		D44-3219-24-00	Diamond Aircraft		✓
NLG wheel pant shell LH		D41-3223-91-00_1	Diamond Aircraft		
NLG wheel pant shell RH		D41-3223-92-00_1	Diamond Aircraft		
NLG strut cover (heavy landing)		D44-3229-29-00	Diamond Aircraft		
NLG mounting sheet assy		DA4-3229-30-00	Diamond Aircraft		✓

Diamond Aircraft Production Organisation

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
SAFETY EQUIPMENT									
Fire extinguisher		HAL 1	AIR Total		☐				
Fire extinguisher, portable [1]		A 620 T	Amerex		☑				
First aid kit					☑				
Emergency axe		G45912	Fiskars		☐				
FLIGHT CONTROLS									
Flaps actuator assy		43055	Krutz		☑				
Flap control unit		DAI-9031-10-01	Krutz		☐				
Stall warning horn assy	"A"	DA4-2739-10-00	Diamond Aircraft		☐				
Stall warning horn assy	"B"	DA4-2739-10-00X01	Diamond Aircraft		☐				
Stall warning horn assy	"C"	DA4-2739-10-00X02	Diamond Aircraft		☐				
Stall warning horn assy	"D"	DA4-2739-10-00X03	Diamond Aircraft		☐				
Stall warning horn assy	"E"	DA4-2739-10-00X04	Diamond Aircraft		☑				
Stall warning horn assy	"F"	DA4-2739-10-00X05	Diamond Aircraft		☐				
FUEL									
Fuel transfer pump		5100-00-9	Dukes Inc.		☑				
Fuel transfer pump		18002-B	Weldon		☐				
INDICATING / REC. SYSTEM									
Primary flight display (PFD)	GDU 1040	011-00972-03	Garmin		☐	6.400	2.900	70.080	1.780
Primary flight display (PFD)	GDU 1040	011-00972-10	Garmin	TR-MÂM-40-868	☐	6.400	2.900	70.080	1.780

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
Primary flight display (PFD)	GDU 1040	011-00972-02	Garmin		☐	6.400	2.900	70.080	1.780
Multi function display (MFD)	GDU 1044	011-01078-01	Garmin		☐	6.400	2.900	70.080	1.780
Multi function display (MFD)	GDU 1044	011-01078-10	Garmin	TR-MÄM-40-868	☐	6.400	2.900	70.080	1.780
Multi function display (MFD)	GDU 1040	011-00972-02	Garmin		☐	6.400	2.900	70.080	1.780
Multi function display (MFD)	GDU 1040	011-00972-03	Garmin		☐	6.400	2.900	70.080	1.780
Multi function display (MFD)	GDU 1040	011-00972-10	Garmin		☐	6.400	2.900	70.080	1.780
Flight timer		85094-12	Hobbs		☐				
Digital chronometer with OAT	M803-28V		Davtron		☐				
Annunciator panel		WW-IDC004	White Wire		☐				
Chronometer		09CH	Adriatica		☐				
HYDRAULIC									
Master cylinder		10-54A	Cleveland		☑				
Parking valve		60-5D	Cleveland		☑				
Brake assembly		30-239B	Cleveland		☑				
Brake assembly		30-239A	Cleveland		☐				
Brake assembly		30-32E	Cleveland		☐				
Speedkit NLG		D44-3229-29-00_1	Diamond Aircraft		☑				
LIGHTS									
Map / Reading light assy crew		W1461.0.010	Rivoret		☐				
Cabin Light		W1461.0.010	Rivoret		☐				
Strobe / Pos. light assy LH	A600-PR-D-28	01-0790006-05	Whelen		☐	0.800	0.363	103.800	2.638
Strobe / Pos. light assy LH	9034004	01-0790340-04	Whelen		☐				
Strobe / Pos. light assy LH	OR6002R	01-0771733-12	Whelen		☑				

Airplane Serial No.: 40 N482		Registration:		Date: 6.2.20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
COMMUNICATION / NAVIGATION									
Digital air data system	GDC 72	011-03734-00	Garmin	45S002233	✓				
Transponder	GTX 335 R	011-03301-00	Garmin	36F022004	✓				
Attitude / Heading reference system	GRS 79	011-03732-00	Garmin	45T003083	✓				

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following is added to the existing table:

Airplane Serial No.: 40.N482		Registration:		Date: 6.2.20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	Installed	lb	kg	in	m
COMMUNICATION/NAVIGATION									
Transponder	GTX 335R	011-03301-00	Garmin	3EF022004	✓	2.0	0.91	153.100	3.890
Transponder	GTX 345R	011-03303-00	Garmin			2.3	1.0	153.100	3.890

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
Strobe / Pos. light assy RH	A600-PG-D-28	01-0790006-07	Whelen		☐	0.600	0.363	103.800	2.638
Strobe / Pos. light assy RH	9034003	01-0790340-03	Whelen		☐				
Strobe / Pos. light assy RH	OR6002G	01-0771733-11	Whelen		☑				
Strobe light power supply LH/RH	A490ATS-CF-14/28	01-0770062-05	Whelen		☐				
Halogen Taxi light	7034601	01-0770346-01	Whelen		☐	0.280	0.130	79.920	2.030
Halogen Landing light	7034601	01-0770346-01	Whelen		☐	0.280	0.130	79.920	2.030
Ballast	GEN5 D1, 24V	37778	Newark		☐				
Ballast	GEN5 D1, 24V	37776	Newark		☐				
Taxi light	HID Lamp D1S	39663	Newark		☐				
Landing light	HID Lamp D1S	39663	Newark		☐				
LED Taxi light	71125	01-0771125-23	Whelen		☑	0.300	0.140	79.920	2.030
LED Landing light	71125	01-0771125-20	Whelen		☑	0.300	0.140	79.920	2.030
Glareshield lamp assy		DA4-3311-10-02	Diamond Aircraft		☐				
Glareshield lamp assy		DA4-3311-10-01	Diamond Aircraft		☐				
Glareshield light inverter		APVL328-4-1-L-5QF	Quantaflex		☑				
Glareshield light inverter		APVL328-8-3-L-18QF	Quantaflex		☐				
Placards Inverter		APVL328-4-1-L-15QF	Quantaflex		☑				
Map / reading light		RL6980-1	Birk Aerosystems		☑				
Instr./ Radio lights dimmer		WW-LCM002	White Wire		☑				
COMMUNICATION / NAVIGATION									
COMM #1 antenna	DMC63-1/A		DM		☐	0.400	0.180	177.100	4.500
COMM #1 antenna	CI 291		Comant		☑	0.500	0.227	177.100	4.500
COMM #2 antenna	DMC63-2		DM		☐	0.400	0.180	155.100	3.940

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
COMM #2 antenna	CI 292-2		Comant		☑	0.500	0.227	155.100	3.940
Audio panel / Marker / ICS	GMA 1347	011-00809-00	Garmin	TR-MÄM40-1007	☐				
Headset, pilot	Echelon 100		Telex		☐				
Headset, pilot	HMEC25-KAP-2	025-230-715	Sennheiser		☐				
Headset, co-pilot	Echelon 100		Telex		☐				
Headset, co-pilot	HMEC25-KAP-2	025-230-715	Sennheiser		☐				
Headset, LH pax	Echelon 100		Telex		☐				
Headset, LH pax	HMEC25-KAP-2	025-230-715	Sennheiser		☐				
Headset, RH pax	Echelon 100		Telex		☐				
Headset, RH pax	HMEC25-KAP-2	025-230-715	Sennheiser		☐				
Speaker	FRS8 / 4 Ohms		Visaton		☑				
Handmic	100 TRA	62800-001	Telex		☑				
Pitot / Static probe, heated	AN5814-2	PST-305	Aeroinstruments	AS07194214	☑				
Alternate static valve		DA4-3111-51-00	Diamond Aircraft		☑				
Backup altimeter		5934PD-3	United Instruments	518042	☑	0.496	0.225	70.080	1.780
Backup airspeed indicator	8025	8025 Code B.908	United Instruments	219674	☑	0.680	0.308	70.080	1.780
Backup artificial horizon	4300	4300-206	Mid Continent Instr.	L19-11004	☑	2.500	1134	70.080	1.780
Magnetic compass		PG2C-28V	SIRS Navigation		☑				
Magnetic compass		NV2C-2400-28V	SIRS Navigation		☐				
OAT probe	GTP 59	011-00978-00	Garmin	47946274	☑				
Digital air data system	GDC74A	011-00882-00	Garmin		☐	1.690	0.770	70.080	1.780
Digital air data system	GDC 74A	011-00882-10	Garmin	TR-MÄM-40-868	☐	1.690	0.770	70.080	1.780
Integrated avionics #1	GIA 63	37207	Garmin		☐	5.290	2.400	154.900	3.935
Integrated avionics #1	GIA 63W	011-01105-01	Garmin		☐	5.290	2.400	154.900	3.935
Integrated avionics #1	GIA 63W	011-01105-20	Garmin	TR-MÄM40-1007	☐	5.290	2.400	154.900	3.935

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following is added to the existing table:

Airplane Serial No.: 40.N482		Registration:		Date: 6.2.20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	Installed	lb	kg	in	m
COMMUNICATION/NAVIGATION									
Audio panel/Maker/ICS	GMA 1360	011-03568-00	Garmin	4QT005804	✓	1.860	0.840	70.080	1.780
Integrated avionics #1	GIA 64W	011-03711-00	Garmin	45X007423	✓	5.400	2.450	154.900	3.935
Data link processor	GDL 69A SXM	010-01294-11	Garmin			1.720	0.780	155.000	3.937

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Airplane Serial No.: 40.N482		Registration:		Date: 6.2.20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	Installed	lb	kg	in	m
COMMUNICATION/NAVIGATION									
Integrated avionics #2	GIA 64W	011-03711-00	Garmin	45K008304		5.400	2.450	154.900	3.935

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Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
Integrated avionics #2	GIA 63	37207	Garmin		☐	5.290	2.400	154.900	3.935
Integrated avionics #2	GIA 63W	011-01105-01	Garmin		☐	5.290	2.400	154.900	3.935
Integrated avionics #2	GIA 63W	011-01105-20	Garmin	TR-MÄM40-1007	☐	5.290	2.400	154.900	3.935
Transponder	GTX 33	011-00779-00	Garmin		☐	5.290	2.400	154.900	3.935
Transponder	GTX 33	011-00779-10	Garmin	TR-MÄM-40-868	☐	3.100	1.410	153.100	3.890
Attitude / Heading reference system GRS 77	GRS 77	011-00868-10	Garmin	TR-MÄM-40-868	☐	2.800	1.270	154.900	3.935
Attitude / Heading reference system GRS 77	GRS 77	011-00868-00	Garmin		☐	2.800	1.270	154.900	3.935
Magnetometer	GMU 44	011-00870-00	Garmin		☐	0.350	0.160	103.800	2.638
Magnetometer	GMU 44	011-00870-10	Garmin	1CM030744	☑	0.350	0.160	103.800	2.638
VOR / LOC / GS antenna	CI 157P		Comant		☑				
Dual VOR / dual GS duplexer	CI 1125		Comant		☑				
Transponder antenna	KA 60	071-01591-0001	Bendix/King		☐				
Transponder antenna	KA 61	071-00221-0010	Bendix/King		☐				
Marker antenna	CI 102		Comant		☑				
GPS #1 antenna	GA 56	011-00134-00	Garmin		☐	0.470	0.210	104.100	2.645
GPS #1 antenna	GA 36	013-00244-00	Garmin		☑	0.470	0.210	104.100	2.645
GPS #2 antenna	GA 56	011-00134-00	Garmin		☐	0.470	0.210	104.100	2.645
GPS #2 antenna	GA 36	013-00244-00	Garmin		☑	0.470	0.210	104.100	2.645
DME	KN 63	066-1070-01	Bendix/King	43897	☑	2.800	1.270	141.100	3.580
DME antenna	KA 60	071-01591-0001	Bendix/King		☐				
DME antenna	KA 61	071-00221-0010	Bendix/King		☐				
Stormscope	WX-500	805-11500-001	L-3	104707	☑				
Stormscope antenna	NY-163	805-10930-001	L-3	103660	☑				
ADF receiver	RA 3502-(01)	0505.757-912	Becker		☐				

Airplane Serial No.:	40.N482	Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
ADF / RMI converter	AC 3504-(01)	0856.010-912	Becker		☐				
ADF antenna	AN 3500	0832.601-912	Becker		☐				
TAS processor	TAS 600	70-2420-x TAS 600	Avidyne/Ryan		☐				
TAS processor	TAS 605	70-2420-x TAS 605	Avidyne/Ryan	M191550677	☑				
TAS processor	TAS 610	70-2420-x TAS 610	Avidyne/Ryan		☐				
Transponder coupler		70-2420	Avidyne/Ryan	M193058484	☑				
TAS antenna, top		S72-1750-31L	Sensor Systems	13695	☑				
TAS antenna, bottom		S72-1750-32L	Sensor Systems	13821	☑				
COM/NAV	SL 30	430-6040-303	Garmin		☐				
Intercom	PM1000II	11922	PS Engineering		☐				
Transponder	GTX 328	011-01684-00	Garmin		☐				
Altitude digitizer	SAE5-35	305154-00	Sandia Aerospace		☐				
P/S probe heater fail sensor		DA4-3031-01-00	Diamond Aircraft		☐				
Altimeter inHg/mbar, primary		5934PD-3	United Instruments		☐				
Altimeter inHg/mbar, secondary		5934PD-3	United Instruments		☐				
Airspeed indicator		8025 Code B.908	United Instruments		☐				
Vertical speed indicator		7000	United Instruments		☐				
Magnetic compass		C2400L4P	Airpath		☐				
Directional gyro, free	AIM2051BLD	505-0031-931	L-3 Communications		☐				
Attitude indicator	AIM1100-28L(0F)	504-0111-936	L-3 Communications		☐				
Attitude indicator	AIM1100-28LK(0F)	504-0111-938	L-3 Communications		☐				
Attitude indicator	AIM1100-28LK(2F)	504-0111-941	L-3 Communications		☐				
Turn coordinator	1394T100-3Z		Mid Continent		☐				
Turn coordinator	1394T100-12RB		Mid Continent		☐				
GPS antenna	GA56	011-00134-00	Garmin		☐				

Airplane Serial No.: 40 N482		Registration:		Date: 6.2.20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	Installed	lb	kg	in	m
ENGINE									
ENGINE INDICATING									
Engine/Airframe unit	GEA 71B	011-03682-00	Garmin	4P7003286	✓	1.800	0.820	70.080	1.780

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Airplane Serial No.:	40.N482	Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	**Type**	**Part No.**	**Manufacturer**	**S/N**	**installed**	**lb**	**kg**	**in**	**m**
ENGINE									
Engine	E4-A	E4A-00-000-000	Austro Engine	E4-A-00707	☑				
Engine control unit	EECU-E4-01	E4A-92-100-000 Iss. 02()	Austro Engine	3199	☑				
ECU software		Refer to DAI Service Bulletin MSB-40NG-002	Austro Engine	VC33_1_06_~~24~~ 23 x	☑				
ENGINE STARTING									
Glow plug control unit		E4A-94-200-000	Austro Engine		☑				
Starter		E4A-93-000-000	Austro Engine		☑				
ELECTRICAL POWER									
Alternator		E4A-91-000-000	Austro Engine		☐				
Alternator		E4A-91-400-000	Austro Engine	02407	☑				
Alternator regulator		E4A-91-100-000	Austro Engine		☐				
Alternator regulator		E4A-91-200-000	Austro Engine		☑				
ENGINE FUEL PUMPS									
Fuel pumps (2x)		0-580-054-001	Bosch		☑				
ENGINE INDICATING									
Engine / Airframe unit	GEA 71	011-00831-00	Garmin	TR-MÃM40-1007	☐				
Main engine display		A1A-10-100-000-010	Austro Engine		☐				
Secondary engine display		A1A-10-200-000-010	Austro Engine		☐				

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Diamond Aircraft Production Organisation

Airplane Serial No.: 40.N482		Registration:		Date: 03. Feb. 20		Mass		Lever Arm	
Description	Type	Part No.	Manufacturer	S/N	installed	lb	kg	in	m
ENGINE EXHAUST									
Exhaust pipe		D44-7806-10-01	Diamond Aircraft		☐				
Exhaust pipe with muffler		D44-7806-20-00	Diamond Aircraft		☐				
Exhaust pipe with muffler		D44-7806-20-00_1	Diamond Aircraft		☐				
Exhaust pipe with muffler		D44-7806-20-00_2	Diamond Aircraft		☑				
PROPELLER									
Propeller	MTV-6-R/190-69		mt-propeller	191128	☑				
Governor		P-853-16	mt-propeller	19G704-I/G	☑				
FUEL TANK SYSTEM									
Fuel probe assy., LH inboard		D4D-2817-13-00x01	Diamond Aircraft		☑				
Fuel probe assy., RH inboard		D4D-2817-13-00x01	Diamond Aircraft		☑				
Alternate means for fuel qty.		D4D-2807-90-00	Diamond Aircraft		☐				
Long range tank		D4D-2807-11-00	Diamond Aircraft		☑				
Long range tank		D4D-2807-12-00	Diamond Aircraft		☑				
Standard tank		D4D-2817-11-00	Diamond Aircraft		☐				
Standard tank		D4D-2817-12-00	Diamond Aircraft		☐				
AIRPLANE FLIGHT MANUAL		Doc. No. 6.01.15-E	Diamond Aircraft		☑				

6.5 EQUIPMENT LIST AND EQUIPMENT INVENTORY

The following item is added to the existing table:

Airplane Serial No.: 40.N482		Registration:		Date: 6.2.20	
Description	**Type**	**Part No.**	**Manufacturer**	**S/N**	**inst'd**
FUEL TANK SYSTEM					
Alternate means for fuel qty. II		D4D-2807-90-00_01	Diamond Aircraft		✓

Diamond Aircraft Production Organisation Kleinrath Quality Assurance

40.N482 03. Feb. 20

1. Amerex A620T is UL approved and can be used in aircraft registered in Canada and the USA. For aircraft registered in other countries, contact the local airworthiness authority.

Place: LOAN Date: 03. Feb. 20 Signature: ____________

First Issue Equipment List:

The following temporary revisions with relevance to the equipment list are include	
TR-MÄM-40-580, TR-MÄM-40-816, TR-MÄM-40-868, TR-MÄM-40-1007, TR-OÄM-40-401, TR-OÄM-40-1003	
Changes:	**CI 105-16 Antenne installed S/N 42370, 42092**

CHAPTER 7
DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

Page

7.1 INTRODUCTION

Chapter 7 contains a description of the airplane and its systems, together with operating instructions.

For details about optional equipment see Chapter 9.

7.2 AIRFRAME

Fuselage

The GFRP fuselage is of semi monocoque molded construction. The fire protection on the firewall is of a special fire-resistant matting, which is covered on the engine side by stainless steel cladding. The two main bulkheads are GFRP/CFRP items.

Wings

The wings have a front and rear spar; each wing has a top shell and a bottom shell - a 'fail-safe' concept. 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 semi monocoque construction. Both the stabilizers have twin spars and a skin with no sandwich. 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.

Ailerons

Construction:	GFRP/CFRP composite sandwich.
Hinges:	There are 4 hinges, which are hinge pins mounted in an aluminum bracket. They are secured in position by a roll pin. The absence of this roll pin can lead to the loss of the hinge pin and a consequent loss of flight safety.
Operation:	A rod-end bearing is screwed into a steel push rod and locked by means of a jam nut which has locking varnish applied to it. Damage to this varnish can indicate a twisting and thus a change to the adjustment. The connection between the rod-end bearing and the control horn is a bolt, the nut of which is likewise sealed with locking varnish. The aluminum control horn is attached to the aileron with 3 screws.

Flaps

Construction: GFRP/CFRP composite sandwich.

Hinges: There are 6 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. Another aluminum fitting is located at the fuselage and is attached to a torsion tube. The torsion tube is located in the fuselage, creating a connection between the left and right flaps.

Operation: A rod-end bearing is screwed into a steel push rod and locked by means of a jam nut which has locking varnish applied to it. Damage to this varnish can indicate a twisting and thus a change to the adjustment. The connection between the rod-end bearing and the control horn is a bolt, the nut of which is likewise sealed with locking varnish.

The flap control horn is attached to the flap with 3 screws.

The flaps are driven by an electric motor and have 3 settings:

- Cruise (UP), totally retracted
- Take-off (T/O), 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 take-off position (T/O);

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 traveling.

Elevator

Construction:	GFRP sandwich.
Hinges:	5 hinges.
Operation:	Steel push-rods; Two of the bellcrank bearings are accessible to visual inspection next to the lower hinge of the rudder. The elevator horn and its bearing, as well as the connection to the push-rod, can be visually inspected at the upper end of the rudder.

Rudder

Construction:	GFRP sandwich.	
Hinges:	Upper hinge:	One bolt.
	Lower hinge:	Bearing bracket including rudder stops, held by 4 screws to the rear web of the vertical stabilizer. The mating part on the rudder is a bracket which is attached to the rudder by 2 bolts. The bolts and nuts are accessible to visual inspection.
Operation:	Steel cables, the eyes of which are connected to the bolts on the bracket.	

Elevator Trim

The trim control is a black wheel in the center console to the rear of the power lever. To guard against over-rotating, the trim wheel incorporates a friction device. A mark on the wheel shows the take-off (T/O) position.

Turn wheel to the front = nose down

Turn wheel to the rear = nose up

Pedal Adjustment

NOTE

The pedals may only be adjusted on the ground!

The pedals are unlocked by pulling the black handle which is located behind the rear attachment.

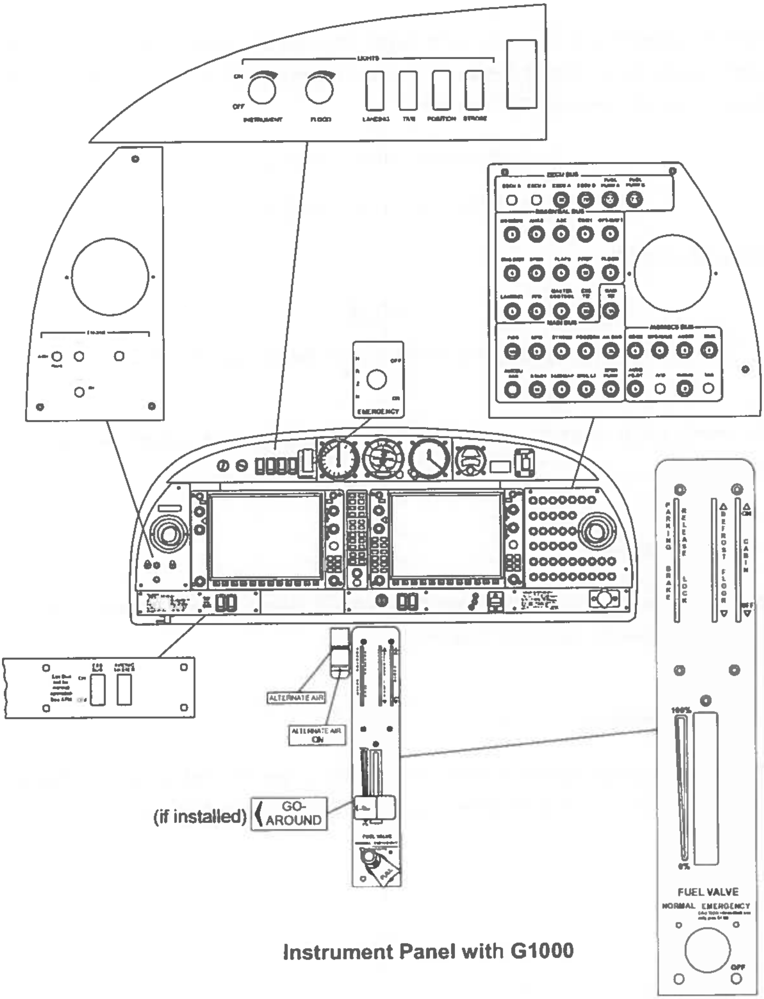
Forward Adjustment:

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

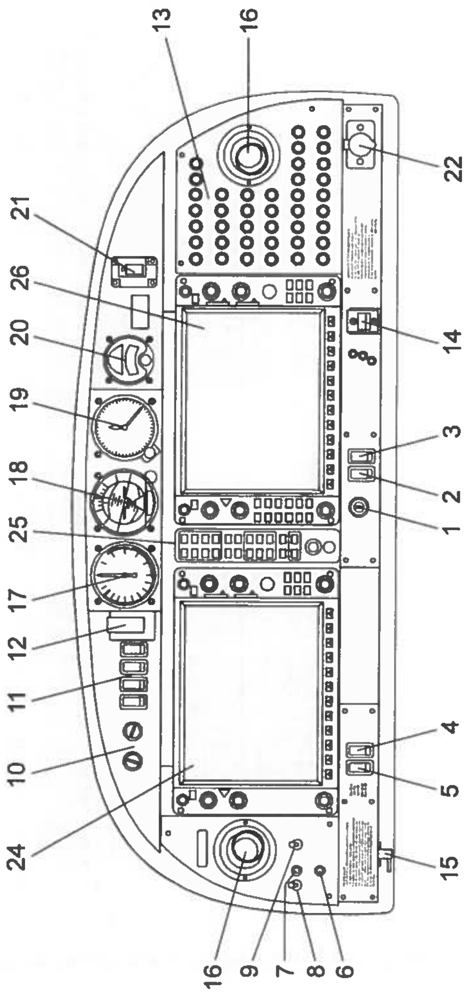
Rearward Adjustment:

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

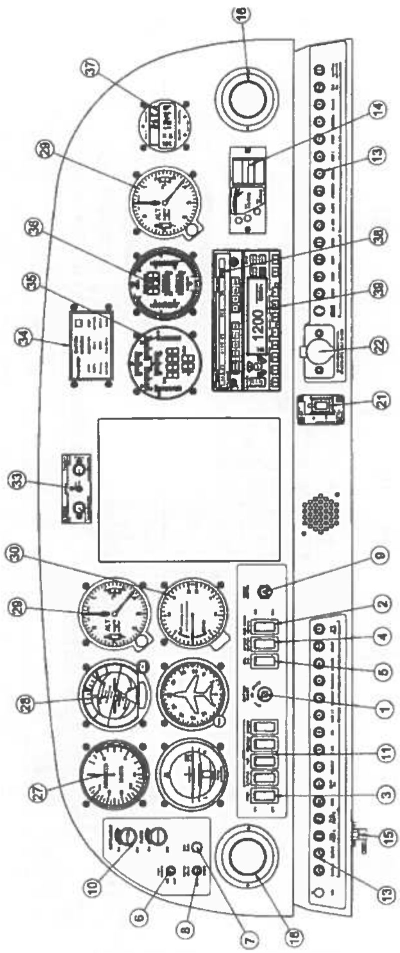
7.4 INSTRUMENT PANEL



Instrument Panel with G1000



Instrument Panel with G1000



Instrument Panel with SED, MED and White Wire Annunciator Panel

Major Instruments and Controls			
1	Electric Master key switch	21	ELT control unit
2	Fuel Transfer switch	22	Accessory power socket
3	Pitot Heat switch		
4	Avionics Master switch	24	Primary Flight Display (PFD)
5	Essential Bus switch	25	Audio amplifier / Intercom / Marker beacon receiver
6	Fuel pumps switch	26	Multi Function Display (MFD)
7	ECU Test button	27	Airspeed Indicator
8	ECU Voter switch	28	Attitude Gyro (artificial horizon)
9	Engine Master switch**	29	Altimeter
10	Rotary buttons for instrument lighting and flood light	30	Vertical Speed Indicator (VSI)
11	Light switches	31	Directional Gyro
12	Emergency switch**	32	Turn & Bank indicator
13	Circuit breakers*	33	Intercom
14	Flap selector switch	34	Annunciator panel
15	Alternate static valve	35	Main Engine Display (MED)
16	Ventilation nozzles	36	Secondary Engine Display (SED)
17	Backup airspeed indicator	37	Chronometer with OAT Indicator
18	Backup artificial horizon	38	COM/NAV
19	Backup altimeter	39	Transponder
20	Emergency compass		

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

**) The Emergency switch and optionally the Engine Master switch are guarded. Lift the guard prior to actuate the toggle. After switching, lower the Engine Master switch guard with the toggle in the desired position. Do not lower the Emergency switch guard with the toggle in ON position.

NOTE

The figures on previous pages show the typical DA 40 NG installation position for the equipment. The actual installation may vary due to the approved equipment version.

Cockpit Ventilation

Ventilation in the front is provided by the movable ventilation over 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 bottom surface of the left wing. To increase cabin temperatures when operating at low outside air temperatures, a ventilation inlet baffle may be installed at the inlet. With the baffle installed, the rear cabin ventilation nozzles on the left and right hand side and in the central console above the passengers' heads will be inoperative.

The ventilation inlet baffle consists of a metal plate with rubber edging and is attached to the bottom LH wing by a camloc.

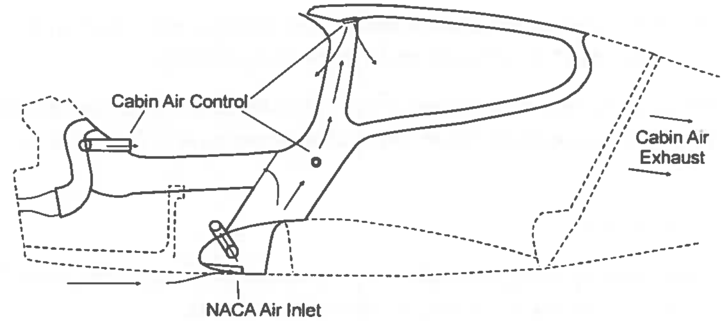
Heating

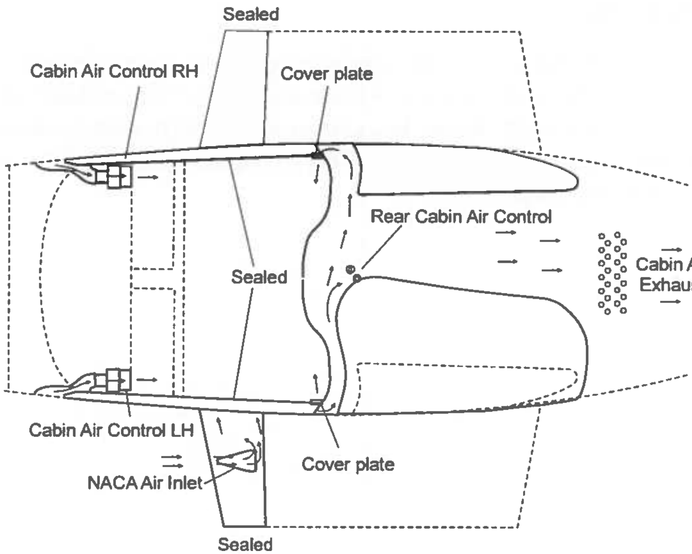
Heating is operated using two levers located on the small center console under the instrument panel.

Right lever:	up	=	heating ON
	down	=	heating OFF

Central lever (air distribution lever):

	up	=	airflow to canopy (DEFROST)
	down	=	airflow to floor (FLOOR)


Cabin Air Control
Cabin Air Exhaust
NACA Air Inlet


Sealed
Cabin Air Control RH
Cover plate
Rear Cabin Air Control
Sealed
Cabin Air Exhaust
Cabin Air Control LH
NACA Air Inlet
Cover plate
Sealed

7.5 LANDING GEAR

The landing gear consists of a main landing gear of spring steel struts, and a free-castering nose wheel which is spring-loaded by an elastomer package.

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

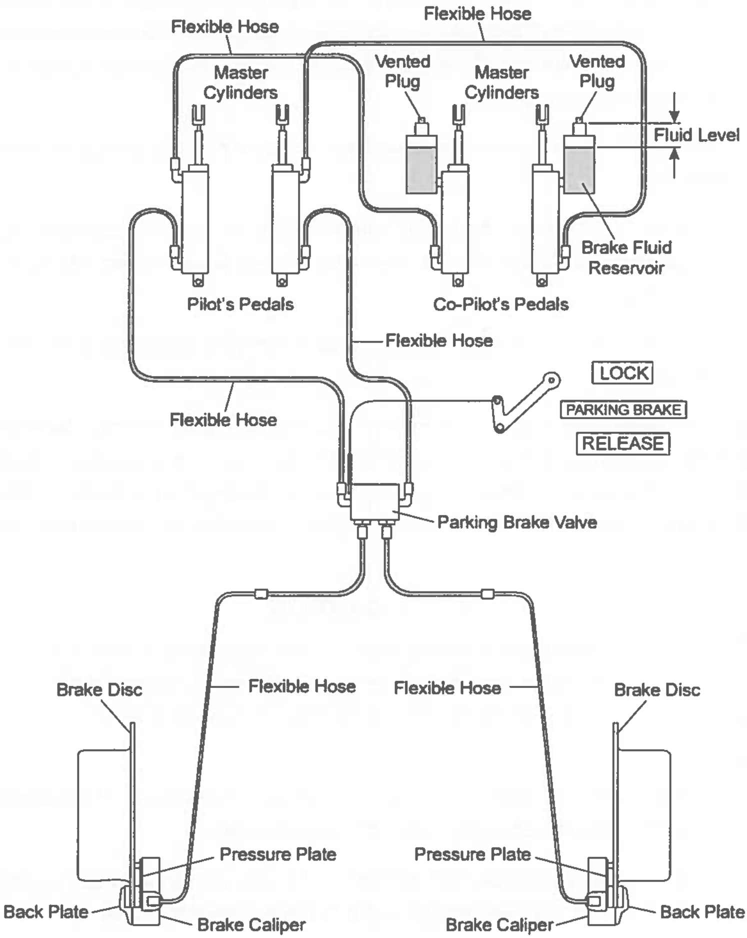
Wheel Brakes

Hydraulically operating 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.

Hydraulic System Schematic



7.6 SEATS AND SAFETY HARNESSES

To increase passive safety, the seats are constructed using a carbon fiber/Kevlar hybrid material and GFRP. The seats are removable to allow the maintenance and inspection of the underlying controls. Covers on the control sticks prevent loose objects from falling into the area of the controls.

The seats have removable furnishings and are equipped with energy-absorbing foam elements.

The seats are fitted with three-point safety harnesses. The harnesses are fastened by inserting the belt clip into 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 knob of the locking bolt.

If front seats with adjustable backrests are installed (OÄM 40-252), the angle of the backrests can be adjusted for best comfort. The backrest lever is situated on the outboard side of the backrest. 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.

CAUTION

Before the backrest lever is lifted in order to unlock the backrest, lean back towards the backrest to counteract the spring load; otherwise the backrest may snap forward.

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

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

7.6 SEATS AND SAFETY HARNESSES

The following paragraphs are amended to read:

If front seats with adjustable backrests are installed (OÄM 40-252 or OÄM 40-375), the angle of the backrest and the lumbar support can be adjusted for best comfort. The backrest control lever is situated on the outboard side of the backrest if OÄM 40-252 is installed. The backrest release button, in case of OÄM 40-375 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 snap forward.

CAUTION

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

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

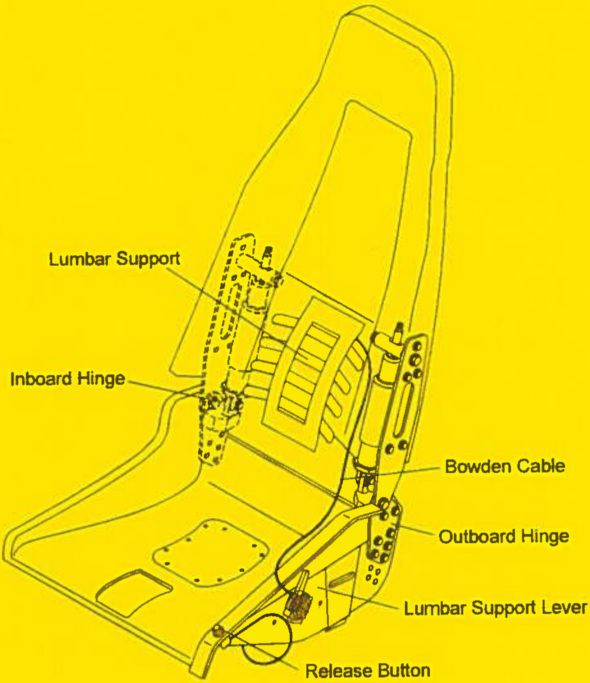
If OÄM 40-252 is installed and in case of a defective adjustment mechanism the outboard friction adjustment screw can be tightened with a 10 mm hexagon nut in clockwise direction in order to fix the backrest in the upright position.

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

If OÄM 40-375 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.

The Figure is added:

If seats with adjustable backrest are installed (OÄM 40-375):

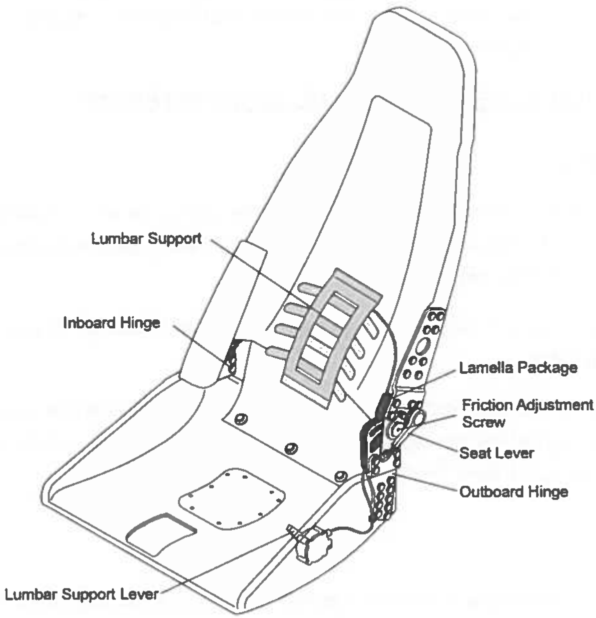


in the upright position.

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

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

If seats with adjustable backrests are installed (OÄM 40-252):



7.7 BAGGAGE COMPARTMENT

The baggage compartment is behind the seat backs of the rear seats. Without a baggage net, no baggage may be loaded.

As options, a baggage tube or a baggage extension (OÄM 40-164) or a short baggage extension (OÄM 40-331) may be installed.

NOTE

If OÄM 40-331 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 and locking it with the handle on the left hand side of the canopy frame. On locking, steel bolts catch 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 key-locked by a locking mechanism on the left side near the canopy lever by turning the key clockwise. The closed and locked 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 latched, but not key-locked.

Do not key-lock the front canopy before flight 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 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 held. The rear door is protected against unintentional opening by an additional lever.

The door can be locked by a locking mechanism on the left side near the door opening lever by turning the key clockwise. The closed and locked door can be opened from inside by pulling the lever inside the opening handle. For a better handling an additional handle is mounted.

WARNING

Before starting the engine the door must be closed and latched, but not key-locked.

Do not key-lock the door before flight in order to assure emergency evacuation from outside.

Emergency Axe

If OÄM 40-326 is incorporated an emergency axe is installed on the floor panel under the co-pilot's seat (see Figure below).

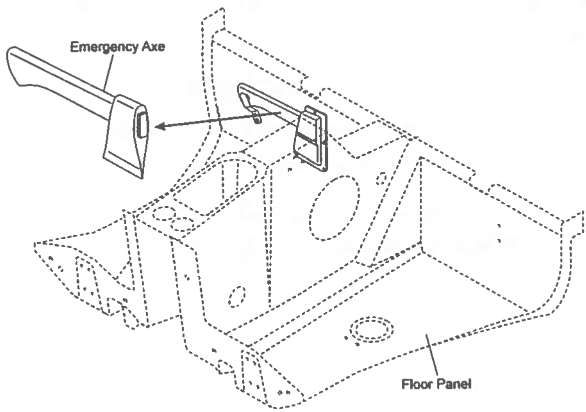
If the canopy can not be opened in case of an emergency use the emergency axe to break through the canopy.

WARNING

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

WARNING

Beware of sharp edges and fragments of the broken canopy.



7.8 CANOPY, REAR DOOR, AND CABIN INTERIOR

The following Paragraph is added:

Emergency Egress Hammer

If OÄM 40-401 is incorporated an Emergency Egress Hammer is installed on the floor panel under the co-pilot's seat.

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

WARNING

Make sure not to harm other persons by using the Emergency Egress Hammer.

WARNING

Beware of sharp edges and fragments of the broken canopy.

7.9 POWER PLANT

7.9.1 ENGINE, GENERAL

The installed Austro Engine E4-A engine has 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 (using the gearbox 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:	114.0 kW (152.8 DIN-HP) at 2100 RPM at sea level and ISA

The indications for monitoring important engine parameters during operation are integrated within the Garmin G1000 display (if installed) or on the MED and SED (if installed). The engine can only be operated with the ENGINE MASTER switch ON. The engine has an EECU (Electrical Engine Control Unit) which receives its electrical power from the generator when the engine is running. When the engine is not running, the ECU receives its electrical power from the battery.

7.9.2 OPERATING CONTROLS

POWER lever

The engine performance is controlled by the power lever, situated on the large center console. 'Front' and 'rear' are defined in relation to the direction of flight.

This lever is used to set the desired engine power LOAD (%)

Lever forward (MAX) = Full power

Lever to rear (IDLE) = Idle

The ECU controls manifold pressure, injected fuel quantity and propeller speed according to the desired engine power preselected with the power lever.

The propeller governor is attached to the top rear side of the gearbox and uses gearbox oil for propeller pitch regulation. Following a loss of oil pressure the propeller blades go to the low pitch stop (maximum RPM), thus allowing continuation of the flight according to 3.3.6 - DEFECTIVE RPM REGULATING SYSTEM.

ELECTRIC MASTER

The key can be switched into three positions:

OFF Disconnecting battery power.

ON Connecting battery power to the power distribution system.

START Starting the engine.

ENGINE MASTER

The engine can only be cranked with the ENGINE MASTER switched to ON. To shut down the engine the ENGINE MASTER is switched to OFF.

ECU VOTER

For normal operation the switch is set to AUTO. The engine is controlled by either ECU A or ECU B. In case of a failure of the active electrical engine control unit (ECU) there is 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

POWER lever at IDLE:

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 blockage of the air filter, there is the possibility of drawing air from the engine compartment. The ALTERNATE AIR operating lever is located under the instrument panel on the left side of the center console. To open the alternate air source the lever is pulled to the rear. The alternate air source is closed, with the lever being 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 open):

ALTERNATE AIR
ON

7.9.3 PROPELLER

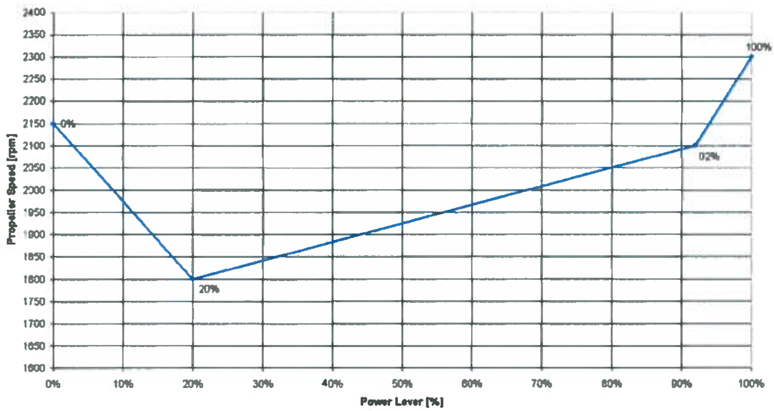
An mt-Propeller MTV-6-R/190-69 hydraulically regulated 3-bladed constant speed propeller is installed. The propeller has wood-composite blades with fiber-reinforced plastic coating and metal leading edge protection; in the region of the propeller hub the leading edge is coated with adhesive PU tape. These blades combine the lowest weight whilst minimizing vibration.

Propeller Control

The propeller pitch is controlled by the P-853-16 mt-propeller governor. 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 which leads to an increase in pitch and a lower propeller RPM. When oil leaves the propeller hub pitch is reduced and RPM will increase.

In flight 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



Ground Operation:

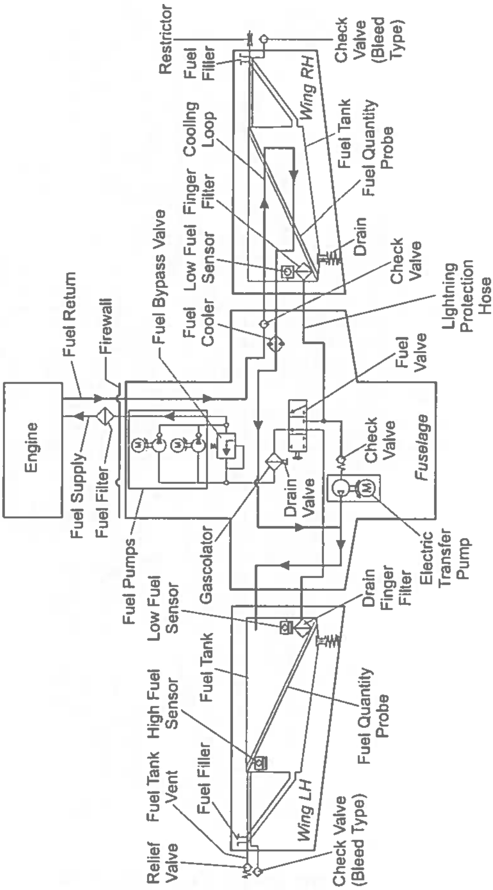
CAUTION

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.

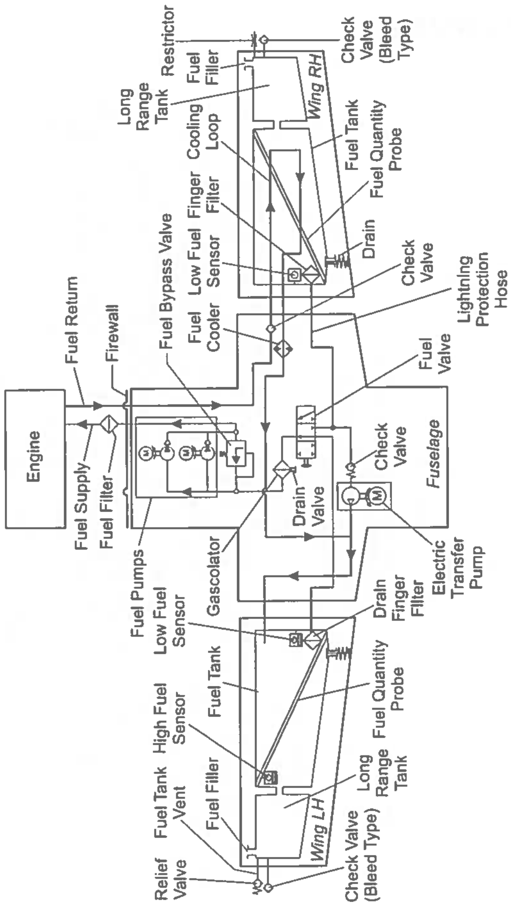
WARNING

Never rotate the propeller by hand.

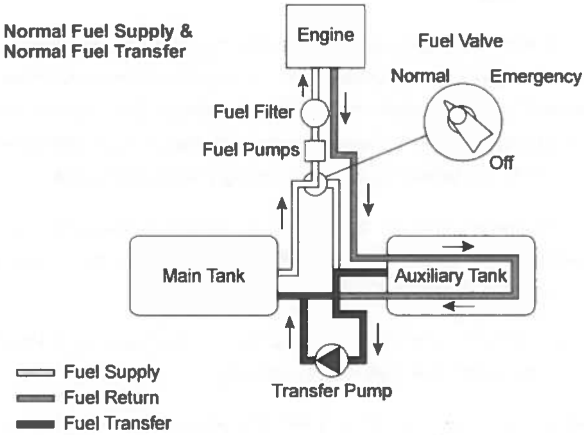
7.9.4 FUEL SYSTEM

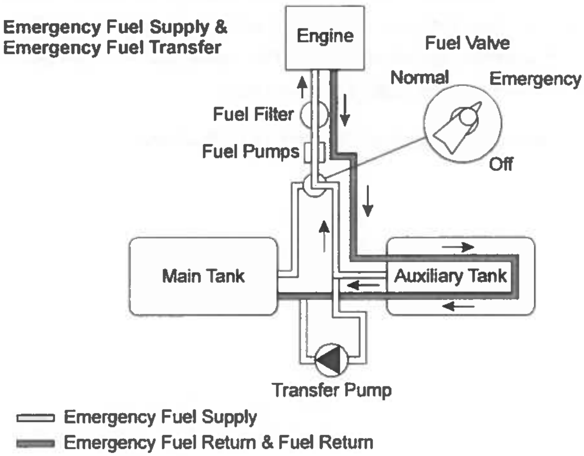


Standard Tank Schematic



Long Range Tank Schematic


Normal Fuel Supply &
Normal Fuel Transfer
Engine
Fuel Valve
Normal
Emergency
Off
Fuel Filter
Fuel Pumps
Main Tank
Auxiliary Tank
Transfer Pump
Fuel Supply
Fuel Return
Fuel Transfer


Emergency Fuel Supply &
Emergency Fuel Transfer
Engine
Fuel Valve
Normal
Emergency
Off
Fuel Filter
Fuel Pumps
Main Tank
Auxiliary Tank
Transfer Pump
Emergency Fuel Supply
Emergency Fuel Return & Fuel Return

Fuel is stored in the fuel tanks which are located in the wings. Normally fuel is taken from the MAIN tank (left wing).

The fuel is injected with high pressure directly into the combustion chambers. 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 power setting the rail pressure is controlled by the ECU through an electric valve.

Fuel that is not injected into the combustion chambers is routed through the AUX fuel tank (right wing) and fed back into the MAIN fuel tank (left wing). This way hot fuel from the rail is cooled and cold fuel in both tanks is heated.

With the help of an electrical transfer pump fuel can be transferred from the AUX tank (right wing) to the MAIN tank (left wing) manually.

The transfer pump is switched off automatically when the auxiliary tank is empty or the main tank is full.

If fuel transfer with the transfer pump becomes impossible for any reason, fuel can also be taken directly from the AUX tank (right wing) by switching the fuel valve to the EMERGENCY position. As the return line goes back into the MAIN tank (left wing), fuel will then be transferred from right to left fuel tank.

As an option additional long range tanks may be installed.

CAUTION

Switching the fuel valve to the EMERGENCY position will start the transferring of fuel with the help of the electrically driven and engine driven fuel pumps from the auxiliary tank through the fuel return line to the main tank at a rate of approximately 45 US gal/h (170 liter/h) with FUEL PUMPS switch in OFF position. The fuel valve must be switched back to the NORMAL position before the auxiliary tank indication reads zero. If the fuel valve is not switched back to the NORMAL position, the engine will stop running as soon as the auxiliary tank is empty.

Fuel Pumps

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

Each fuel pump is electrically connected to an ECU BUS and protected by a 7.5 A circuit breaker.

NOTE

By switching between ECU A and B the two independent electrical fuel pumps are switched over as well. In case of an emergency both pumps can be activated simultaneously by pushing the FUEL PUMPS switch to the ON position.

Fuel Valve

The fuel valve is located at the center console. The selectable positions are NORMAL, EMERGENCY and OFF. The desired position is reached by turning the valve handle while pulling up the safety latch on the valve handle. This is to ensure that a selection is not made unintentionally.

Standard Fuel Tanks

Main Tank (Left Wing):

The main tank consists of an aluminum chamber and a filler tube which are connected by a flexible hose. There are two tank vents. One includes a check valve with a capillary and one includes a pressure relief valve, which operates at 150 mbar (2 PSI) and allows fuel and air to flow to the outside at higher internal pressure. The relief pressure valve protects the tank against high pressure if the tank will be overfilled in case of a 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 terminations are situated on the underside of the wing, approximately 2 meter (7 ft) from the wing tip.

Auxiliary Tank (Right Wing):

The auxiliary tank consists of an aluminum chamber and a filler tube which are connected by a flexible hose. There are two tank vents. One includes a check valve with a capillary and one includes a capillary. The check valve with capillary allows air to enter the tank during descent but prevents flow of fuel to the outside. The capillary equalizes the air pressure during climb. The second capillary is installed for additional safety. The hose terminations are situated on the underside of the wing, approximately 2 meter (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, an outlet valve (drain valve) is installed at the lowest point of the fuel tank.

A gascolator is located at the bottom side of the fuselage which is the lowest point of the entire fuel system. A drain valve (pull to drain) is mounted to the gascolator, to allow the remove of water and sediment which has collected in the fuel system.

A capacity probe measures the fuel quantity in each tank. The indication is non-linear, therefore proportional calculations to determine the remaining fuel quantity or direct calculations of fuel consumption are not possible. Information about the fuel consumption can be found in Chapter 5 - PERFORMANCE.

Long Range Tank (if installed)

The tank chamber has a capacity of approx. 5 US gal (19 liter). The ventilation system of the main and the auxiliary tank remains unchanged.

When the fuel quantity indicator reads zero, only the unusable fuel remains in the tank. The useable capacity of each tank is 19.5 US gal, the maximum quantity that can be indicated is 14 US gal. Up to an actual quantity of 14 US gal the indication is correct. At an actual quantity above 14 US gal the indication remains at 14 US gal.

NOTE

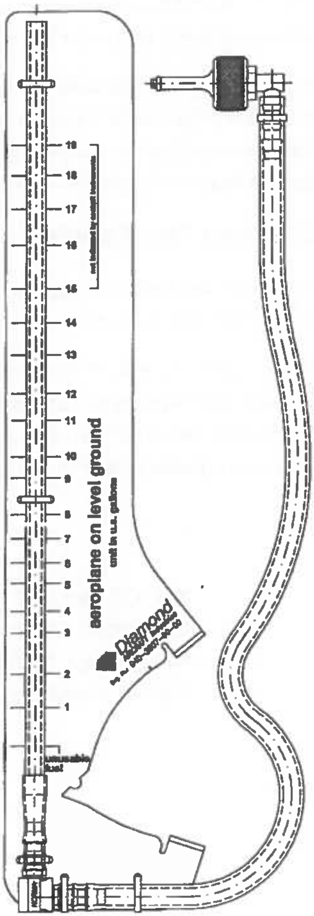
When the fuel quantity indicator reads 14 US gal, the correct fuel quantity must be determined with the alternate mean for fuel quantity indication. If this measurement is not carried out, the fuel quantity available for flight planning is 14 US gal.

<u>Alternate Means For Fuel Quantity Indication</u>

The alternate means for fuel quantity indication allows the fuel quantity in the tank to be determined during the pre-flight inspection. It functions according to the principle of communicating containers. The fuel quantity measuring device has a recess which fits the airfoil of the wing. With this recess the device is held against the stall strip at the leading edge of the wing. The exact position is marked by a bore in the stall strip. Then the metal connector is pressed against the drain of the tank. The amount of fuel in the tank can now be read off from the vertical ascending pipe.

For an exact indication the airplane must stand on a horizontal ground.

The designated place for the fuel quantity measuring device is the bag on the rear side of the pilot seat.



7.9 POWER PLANT

7.9.4 FUEL SYSTEM

Alternate Means for Fuel Quantity Indication

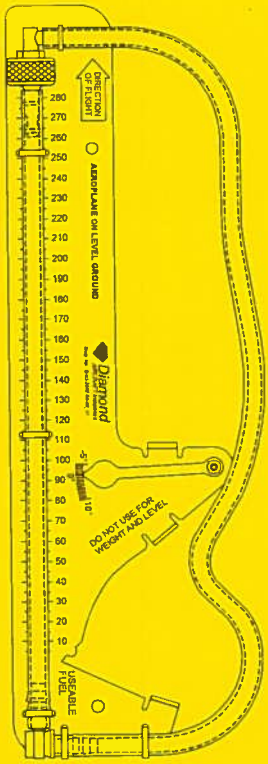
The following is added after the first Paragraph:

Fuel Indicator II:

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 top of the fuselage tube just in front of the vertical tail. The lower edge of the fuel indicator II must be supported by the fuselage for its entire length. Read the pitch angle on the fuel indicator II and read the exact fuel quantity on the tables provided.

The Figure is added:



Fuel Quantity Indicator II

The tables are added:

Standard Tank Configuration

Fuel Quantity Indicator II Pitch Angle Reading					Usable Fuel Quantity	
1°	2°	3°	4°	5°	US gal	Liter
up to 5	up to 5	up to 5	up to 5	up to 5	0	0
25	21	16	12	6	1	3.8
47	37	28	20	10	2	7.6
72	58	45	32	30	3	11.3
83	75	55	48	40	4	15.1
90	87	78	71	55	5	18.9
105	97	90	80	73	6	22.7
112	107	98	92	83	7	26.5
123	115	108	103	95	8	30.3
135	128	120	112	105	9	34.1
145	137	130	124	112	10	37.8
160	152	145	137	130	11	41.6
175	168	157	150	143	12	45.4
192	188	180	172	165	13	49.2
225	215	208	202	192	14	53.0

Long Range Tank (if installed) Configuration

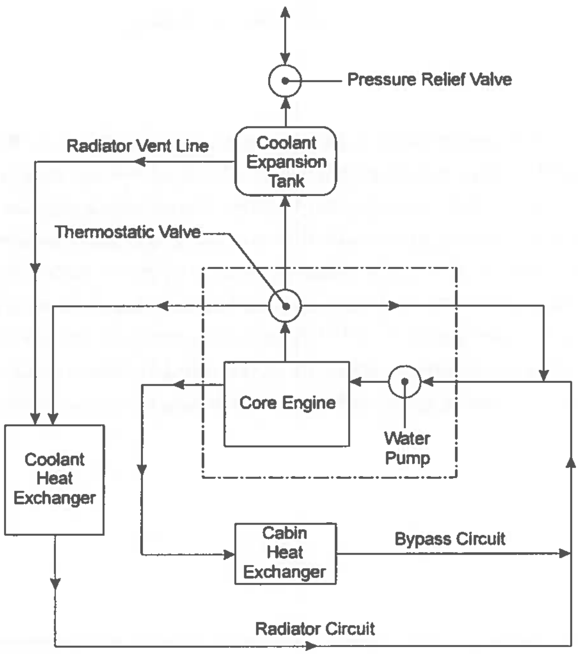
Fuel Quantity Indicator II Pitch Angle Reading					Usable Fuel Quantity	
1°	2°	3°	4°	5°	US gal	Liter
up to 5	up to 5	up to 5	up to 5	up to 0	0	0
35	25	16	8	1	1	3.8
45	36	30	20	15	2	7.6
65	48	40	35	28	3	11.3
75	68	55	47	39	4	15.1
92	80	72	66	55	5	18.9
110	90	78	70	65	6	22.7
118	108	95	87	77	7	26.5
130	123	110	100	90	8	30.3
140	132	115	102	95	9	34.1
148	136	129	122	113	10	37.8
162	149	138	130	118	11	41.6
174	158	150	138	131	12	45.4
180	171	162	156	146	13	49.2
185	180	175	166	156	14	53.0
200	195	184	176	168	15	56.8
217	205	196	189	181	16	60.6
232	220	215	204	196	17	64.4
248	238	230	221	214	18	68.1

7.9.5 COOLING SYSTEM

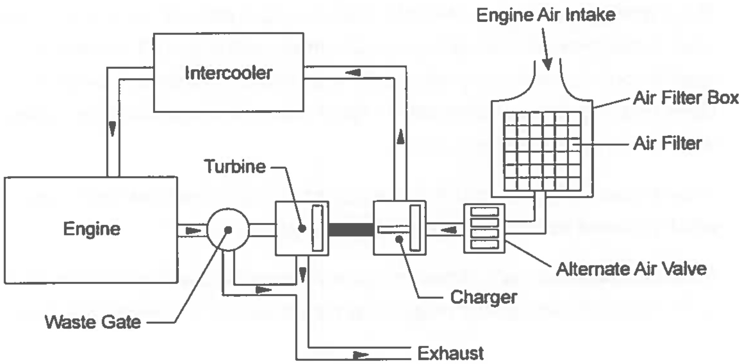
The engine is liquid cooled. The liquid cooling system consists of a radiator circuit (coolant heat exchanger) and a bypass circuit (cabin heat exchanger). The radiator circuit is only open during hot coolant temperatures. This assures that a cold engine will warm up quickly. Upon reaching approximately 80°C (126°F) coolant temperature the radiator circuit is activated by a thermostatic valve.

Integrated in the bypass circuit is a coolant to air heat exchanger (cabin heat exchanger) which provides warm air for the cabin heat system.

An coolant expansion tank allows coolant expansion and pressure adjustment. The coolant system is protected against overpressure by means of a pressure relief valve.



7.9.6 TURBO CHARGER SYSTEM



The intake air is compressed in the compressor which is driven by the turbine, and is subsequently cooled down in the intercooler. Cooling the air increases engine efficiency and power through the higher density of cold air. 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 an exhaust pipe and exits at the bottom cowling opening. Excess exhaust gases bypass the turbine. The bypass is controlled by the ECU through the waste gate valve. A manifold pressure sensor behind the compressor allows the ECU to calculate the correct position of the waste gate valve. This prevents excessive manifold pressures at low density altitudes.

7.9.7 OIL SYSTEMS

The engine has two separate oil systems.

Lubrication System (Engine and Turbo Charger)

The engine lubrication is a wet sump lubrication system. Oil is cooled by a separate cooler on the underside of the engine.

A dip-stick is provided to check the oil quantity through an inspection door on the LH side of the upper cowling. If required, oil can also be filled in there (for specified oil types refer to 2.4 - POWER-PLANT LIMITATIONS).

Gearbox and Propeller Governor System

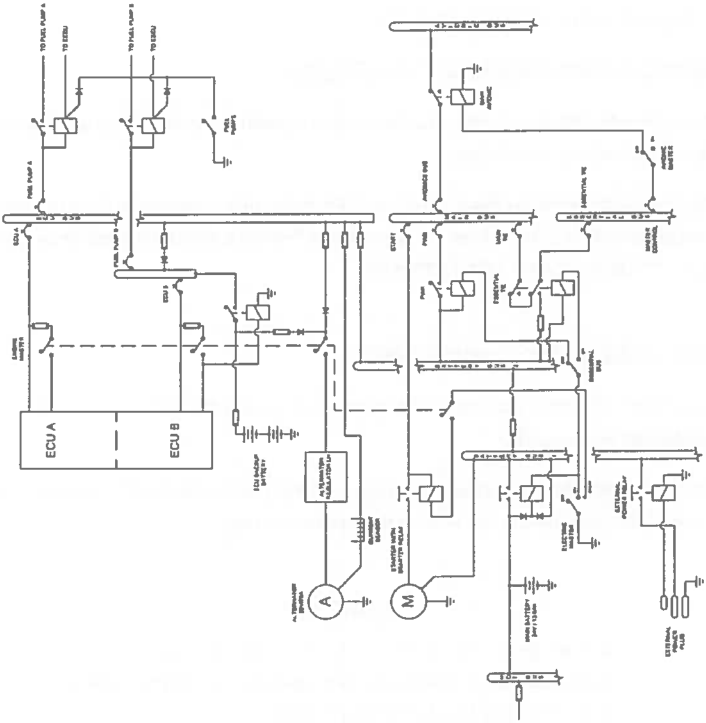
The second oil circuit lubricates the gear and serves the governor system and the regulation of the propeller.

Gear oil quantity can be checked via an inspection glass which can be reached through an inspection door on the LH side of the upper cowling.

CAUTION

If the gear oil quantity is too low, an unscheduled maintenance is necessary (for specified oil types refer to 2.4 - POWER-PLANT LIMITATIONS).

7.10 ELECTRICAL SYSTEM



Electrical System Schematic

7.10.1 GENERAL

The DA 40 NG has a 28 Volt DC system, which can be sub-divided into:

- Power generation
- Storage
- Distribution
- Consumers

Power Generation

Power generation is provided by a 70 Ampère alternator (generator) which is mounted on the bottom left side of the engine. The alternator is driven by a flat-belt.

The power output line of the alternator is connected to the ENG ECU bus via a 100 A fuse, which is installed in the instrument panel. The power output line also runs through the current sensor, which provides an indication of the power being supplied to the electrical system by the alternator including the current for battery charging.

In the event of a main battery failure the field of the alternator is energized by two 12 V, 7.2 Ah sealed-lead-acid batteries (ECU backup batteries) which are installed behind the first ring frame. The ENGINE MASTER switch connects the ECU backup battery to the alternator voltage regulator via a 10 A fuse.

Alternator Control:

The alternator control unit includes a comprehensive set of diagnostic functions that will warn the operator using a warning message (ALTN FAIL on the G1000 system (if installed) or ALTERNATOR on the White Wire annunciator panel (if installed)) 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 behind the baggage compartment frame. The main battery is connected to the battery bus via the battery-relay which is installed in the relay junction box behind the baggage compartment frame.

The battery relay is controlled with the ELECTRIC MASTER key switch which is located in the center of the instrument panel.

In addition, two 12 V, 7.2 Ah sealed-lead-acid batteries (ECU backup-batteries) are installed behind the first ring frame as a further source of electrical power for the Engine Control Unit (ECU B only).

Under normal operating conditions the ECU backup batteries are charged by the ECU bus. In the event of an alternator failure and a depleted main battery the ECU backup batteries automatically supply electrical power to ECU B via a 32 A fuse. This prevents the engine from stopping in the unlikely event of an alternator failure and a totally discharged main battery.

In addition, a non-rechargeable dry battery is installed in the IFR model as a further source of power for the attitude gyro (artificial horizon) and the flood light. When the EMERGENCY switch is set to ON, these two systems are supplied with power for 1 hour, 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 pack must be replaced.

Distribution

Electrical power is distributed via the hot battery bus, the battery bus 1, the battery bus 2, the ECU-bus, the main bus, the essential bus and the avionic bus.

Hot Battery Bus:

The hot battery bus is directly connected to the main-battery installed in the relay junction box and cannot be disconnected from the main battery. The hot battery bus provides power to the accessory power plug and ELT which are protected by their own fuses.

Battery Bus 1:

The battery bus 1 is connected to the main-battery via the battery-relay which can be controlled by the ELECTRIC MASTER key switch. The battery bus 1 provides power to the battery bus 2 and heavy duty power to the starter.

The battery bus 1 is also connected to the power input line of the external power plug.

Battery Bus 2:

The battery bus 2 is connected to the battery bus 1 via a 100 A fuse and provides power to the ECU bus via a 80 A fuse. It also provides power to the main bus via the power relay which can be controlled by the ELECTRIC MASTER key switch and the ESSENTIAL BUS switch. The ELECTRIC MASTER key switch must be set to ON and the ESSENTIAL BUS switch must be set to OFF to connect the battery bus to the main bus.

ECU Bus:

The ECU bus is connected to the battery bus 2 via a 80 A fuse and provides power for the ECU A and ECU B and their fuel pumps. It is also connected to the power output line of the alternator via a 100 A fuse. It also provides power for charging the ECU backup-battery. The ENGINE MASTER switch must be set to ON to activate the ECU A and ECU B to the ECU bus.

Main Bus:

The main bus is connected to the battery bus via the power-relay. It provides power to the consumers directly connected to the main bus and the avionic bus via the avionic master-relay. The AVIONIC MASTER switch must be set to ON to connect the main bus to the avionic bus. Under normal operating conditions the main bus is also connected to the essential bus via the essential tie-relay. In the event of an alternator failure the pilot must switch ON the ESSENTIAL BUS switch (refer to Section 3.4 - FAILURES IN THE ELECTRICAL SYSTEM). This separates the main bus from the battery bus and the essential bus and the equipment connected to the main bus no longer has power.

Essential Bus:

Under normal operating conditions the essential bus is connected to the main bus via the essential tie-relay. The essential bus provides power to the consumers connected to the essential bus. The AVIONIC MASTER switch must be set to ON to connect the essential bus to the avionic bus. In the event of an alternator failure the pilot must switch ON the ESSENTIAL BUS switch (refer to Section 3.4 - FAILURES OF THE ELECTRICAL SYSTEM). This separates the essential bus from the main bus. The essential bus is then connected to the battery bus 2 which provides battery power for a limited time to the equipment essential for safe flight and landing.

<u>Consumers</u>

The individual consumers (e.g. radio, electrical fuel transfer pump, 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 shows the voltage of the essential bus. Under normal operating conditions the alternator voltage is shown, otherwise it is the voltage of the main battery.

Ammeter

The ammeter displays the intensity of current which is supplied to the electrical system by the alternator, including the current for battery charging.

Landing and Taxi Lights

Landing and taxi lights are built into the left wing, and are each operated by means of a switch (LANDING, TAXI) on the row of switches on the instrument panel.

Position and Strobe Lights

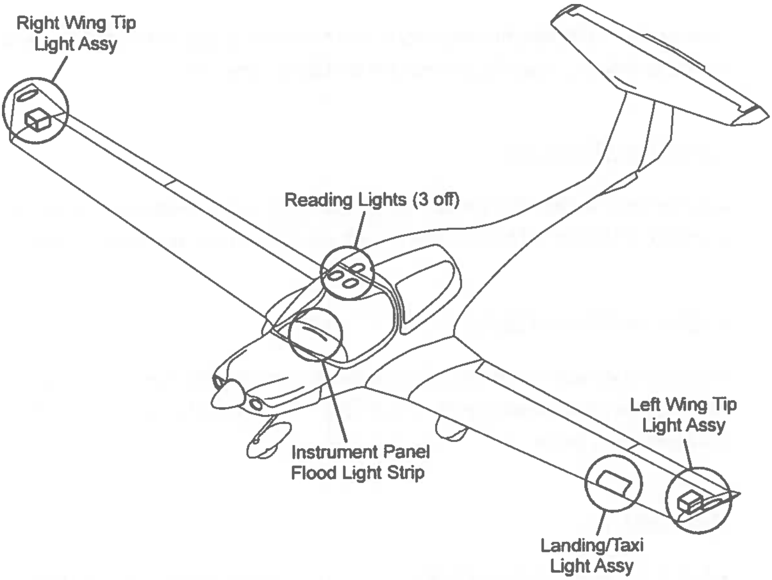
Combined position and strobe lights (anti collision lights) are installed on both wing tips. Each system is operated by a switch (POSITION, STROBE) on the row of switches on the instrument panel.

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. With a rotary button (FLOOD) in the left-hand section of the instrument panel the flood light is switched on and its brightness is adjusted.

Instrument Lighting

With a rotary button (INSTRUMENT) in the left-hand section of the instrument panel the internal lighting of the instruments is switched on and its brightness is adjusted.



Pitot Heating

The Pitot probe, which provides measurement for the Pitot-static system, is electrically heated. The heating is activated with a switch (PITOT) 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. PITOT FAIL on the G1000 (if installed) or PITOT on the White Wire annunciator panel (if installed) will be displayed, if the thermal fuse or the thermal switch is activated and the PITOT HT is set to ON. The PITOT HT OFF indication on the G1000 (if installed) is on if the Pitot heating is switched off.

7.10.2 ENGINE CONTROL UNIT / ECU

Engine Control and Regulation

The Electrical ECU is used to control the engine actuator (e.g. fuel injector) 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 (G1000, if installed), OT (MED, if installed)
- Oil pressure (lubrication system engine) / OIL PRES (G1000, if installed), OP (MED, if installed)
- Coolant temperature / COOLANT TEMP (G1000, if installed), CT (MED, if installed)
- Gearbox temperature / GEARBOX (G1000, if installed), GT (MED, if installed)
- 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

7.10 ELECTRICAL SYSTEM

7.10.2 ENGINE CONTROL UNIT / ECU

The last two Paragraphs are amended to read:

The Electronic ECU consists of two ECUs. 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 EECU is forced to control the engine with ECU A respectively ECU B.

A fault in one of the ECUs is indicated by a caution message (ECU A/B FAIL on the PFD (if G1000 is installed) or ECU A/B on the White Wire annunciator panel (if installed)). 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.

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 the PFD of the G1000 (if installed) or White Wire annunciator panel (if installed):

- Glow sparks active
- Status ECU A
- Status ECU B
- Low fuel pressure warning (on the G1000, if installed)

The Electrical ECU consists of two similar ECUs. A VOTER switch is integrated in the Electrical ECU and proposes an ECU to control the engine regarding the ECU operating hours or in case of a failure the ECU with better engine control capability.

A fault in one of the ECUs is indicated by a caution message (ECU A/B FAIL on the PFD (if G1000 is installed) or ECU A/B on the White Wire annunciator panel (if installed)). After the indication of the ECU A/B FAIL or ECU A/B caution message, the engine must be serviced.

7.11 PITOT-STATIC SYSTEM

Total pressure is measured at the leading edge of a Pitot probe under the left wing. Static pressure is measured 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 static system.

7.12 STALL WARNING SYSTEM

If airspeed drops, suction on the orifice at the leading edge of the left wing will increase until the stall warning horn, located in the instrument panel, will sound. The horn becomes progressively louder the closer one gets to stalling speed. Suction at an orifice on the left wing leading edge activates the horn via a hose. The orifice for the stall warning in the left wing is marked by a red ring.

CHAPTER 8
AIRPLANE HANDLING, CARE AND MAINTENANCE

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. 6.02.15) 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 and 1000 hours. Independent of the flight hours an annual inspection must be performed every year. 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. 6.02.15; Section 05-50).

8.3 AIRPLANE ALTERATIONS OR REPAIRS

Alterations or repairs of the airplane may be carried out only according to the Airplane Maintenance Manual, Doc. No. 6.02.15, and only by authorized personnel.

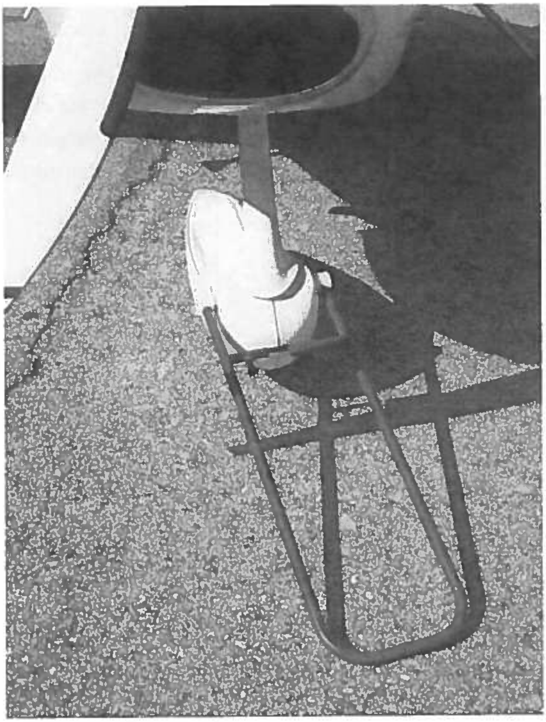
8.4 GROUND HANDLING / ROAD TRANSPORT

8.4.1 GROUND HANDLING WITHOUT TOW BAR

During forward traversing the nose wheel will follow the movement of the airplane. Change in direction is achieved by pulling on the propeller near the spinner. To traverse in the rear direction, the tail section of the airplane should be pushed down until the nose wheel is clear of the ground. This method can also be used to turn the airplane around its main landing gear.

8.4.2 GROUND HANDLING WITH TOW BAR

For pushing or pulling the airplane on the ground, it is recommended to use the tow bar which is available from the manufacturer. The tow bar is bent apart and engaged in the appropriate holes in the nose wheel fairing as shown on the picture below. The arresting knob must be fully engaged.



WARNING

The tow bar must be removed before starting the engine.

CAUTION

The tow bar may only be used for moving the airplane on the ground by hand. After moving the airplane, the tow bar must be removed.

NOTE

When moving the airplane rearward, the tow bar must be held firmly to prevent abrupt sideward deflection of the nose wheel.

8.4.3 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.

For outdoor parking at temperatures below -38°C (-36.4°F) make sure that the distilled water / coolant mixture ratio is 40 % to 60 %.

If the battery heating system (OÄM 40-363) is installed, it is recommended to use the system when the airplane is parked at outside air temperature below 0°C (32°F).

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.

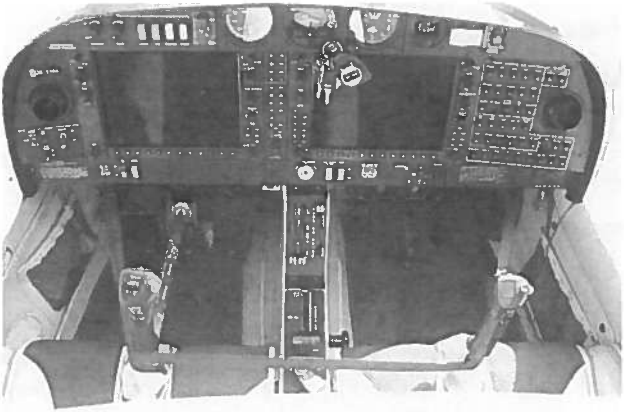
The control surfaces gust lock is installed as follows:

1. Move the rudder pedals fully rearward.
2. Engage the control surfaces gust lock 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.

NOTE

It is recommended to cover the canopy when the airplane is parked outdoors, in direct sunlight, at outside air temperatures above +25 °C (77 °F), in order to prevent excessive heat generation within the instrument panel which can cause damage to the equipment. Such a canopy cover is available from Diamond Aircraft Industries, P/N: S_30172.



Affected Chapters:
8.4 GROUND HANDLING / ROAD TRANSPORT

8.4.3 PARKING

The Figures are amended to read:

8.4.4 MOORING

The tail fin of the airplane has 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.

8.4.5 JACKING

The airplane can be jacked at the two jackpoints located on the lower side of the fuselage's LH and RH root ribs as well as at the tail fin.

8.4.6 ALIGNMENT

For alignment push down on the tail section at the fuselage/vertical tail junction until the nose wheel is clear of the ground. With the nose wheel free, the airplane can be turned around the main landing gear. After turning the airplane into the correct position, release the tail section slowly until the nose wheel is back on the ground.

8.4.7 ROAD TRANSPORT

For transporting the airplane on the road it is recommended that an open trailer be used. All airplane components must be stored on a cushioned surface and secured to avoid any movement during transportation.

NOTE

Disassembling and Assembling of the airplane is a maintenance action and requires qualified personel.

1. *Fuselage:*

The fuselage should stand on the main and nose landing gear. It must be ensured that the fuselage will not move in any direction. Furthermore, it must be ensured that the propeller has sufficient clearance so that it cannot be damaged due to fuselage movement during transportation.

2. *Wings:*

For transportation, both wings must be removed from the fuselage. To avoid any damage, the wings must be stored in an upright position on the leading edge with the root rib area positioned on an upholstered profiled surface with a width of at least 400 mm (1.3 ft). The outside wing area (approximately 3 m (10 ft) from the root rib area) must be placed on an upholstered profiled surface with a minimum width of 300 mm (1 ft).

The wings must be secured to avoid any sliding movement to the rear.

3. *Horizontal Stabilizer:*

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

8.5 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.

8.5.1 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.

8.5.2 CANOPY AND REAR DOOR

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

8.5.3 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.

8.5.4 ENGINE

Engine cleaning is part of the scheduled inspections.

8.5.5 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.

CAUTION

The PFD and MFD displays use a lens coated with a special anti-reflective coating that is very sensitive to skin oils, waxes, and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

8.6 GROUND DE-ICING

Approved de-icing fluids are:

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

1. Remove any snow from the airplane using a soft brush.
2. Spray de-icing fluid onto ice-covered surfaces using a suitable spray bottle.
3. Use a soft piece of cloth to wipe the airplane dry.

CHAPTER 9
SUPPLEMENTS

Page

9.1 INTRODUCTION

Chapter 9 contains information concerning additional (optional) equipment of the DA 40 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.

NOTE

The listed Supplements cannot be installed in any arbitrary combination.

9.2 LIST OF SUPPLEMENTS

The following item is added to the existing table:

Airplane S/N: 40.N482	Registration:		Date: 6.2.20		
Sup. No.	**Title**	**Rev. No.**	**Date**	**applicable**	
				YES	**NO**
A01	Garmin G1000 Avionics System	2	08 Apr 2015	☐	☒

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9.2 LIST OF SUPPLEMENTS

The following items are amended to read:

Airplane S/N: 40.N482 Registration: Date: 6.2.20

Sup. No.	Title	Rev. No.	Date	applicable YES	applicable NO
A02	Garmin G1000 NXi Avionics System	0	10-May-2017	☐	☒

9.2 LIST OF SUPPLEMENTS

The following is added to the existing table:

Airplane S/N: 40.N482		Registration:		Date: 6.2.20	
Sup. No.	**Title**	**Rev. No.**	**Date**	**Applicable**	
				Yes	**No**
A02	Garmin G1000 NXi Avionics System	1	30-Nov-2018	☒	☐
A03	Intercom PM 1000 II	0	05-Sep-2017	☐	☒

9.2 LIST OF SUPPLEMENTS

The following is added to the existing table:

Airplane S/N: 40.N482	Registration:			Date: 6.2.20	
Sup. No.	Title	Rev. No.	Date	Applicable	
				Yes	No
S11	Garmin GTX 335R/345R with ADS-B	0	15-Apr-2019	☒	☐

9.2 LIST OF SUPPLEMENTS

Airplane S/N: 40.N482 Registration: Date: 6.2.20

Sup. No.	Title	Rev. No.	Date	applicable YES	applicable NO
A01	Garmin G1000 Avionics System	1	01 Jul 2014	☐	☒
A02	Intercom PM 1000 II	0	15 Mar 2011	☐	☒
A05	Conventional Cockpit DA 40 NG Club (SED, MED, White Wire Annunciator Panel)	0	15 Mar 2011	☐	☒
A13	Autopilot System KAP 140 Bendix/King	1	15 Mar 2011	☐	☒
A29	Garmin Transponder GTX 328	0	15 Mar 2011	☐	☒
A30	Garmin COM/NAV SL 30	0	15 Mar 2011	☐	☒
A33	Integrated Avionics System Garmin 1000, SBAS and P-RNAV Operation	2	01 Jul 2014	☐	☒
E07	Winter Baffle Fresh Air Inlet	1	01 Jul 2014	☐	☒
S04	ELT ME 406	0	01 Apr 2010	☐	☒
S06	G1000 Synthetic Vision Technology	1	15 Mar 2011	☒	☐
S07	Recirculating Cabin - Air Cooling	5	01 Jul 2014	☐	☒
O01	Use of the DA 40 NG as Tow-Plane	1	01 Jul 2014	☐	☒

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Airplane S/N: 40.N482	Registration:		Date: 6.2.20		
Sup. No.	**Title**	**Rev. No.**	**Date**	**applicable**	
				YES	**NO**
O02	Landing Gear with Large Tyres and 1280 kg Maximum Landing Mass	2	01 Jul 2014	☐	☒
O03	Cold Weather Operation	1	01 Jul 2014	☐	☒
O04	Diesel Operation	0	06 Dec 2013	☐	☒
				☐	☐
				☐	☐
				☐	☐

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SUPPLEMENT A02
TO THE AIRPLANE FLIGHT MANUAL

DA 40 NG
GARMIN G1000 NXi AVIONICS SYSTEM

Doc. No.	**: 6.01.15-E**
Date of Issue of the Supplement	**: 08-Feb-2019**
Design Change Advisories	**: MÄM 40-868**
	: MÄM 40-1007

This supplement to the DA 40 NG Airplane Flight Manual is approved in accordance with the Canadian Aviation Regulations.

Signature :

Authority : For, Chief Flight Test
Transport Canada Civil Aviation

Date of Approval :

DIAMOND AIRCRAFT INDUSTRIES INC.
1560 Crumlin Sideroad
London, ON, Canada
N5V 1S2

0.1 RECORD OF REVISIONS

Rev. No.	Reason	Chap-ter	Page(s)	Date of Revision	Approval Note	Date of Approval	Date Inserted	Signature
1	Administrative changes and NXi Phase II implementation (MÄM 40-1007) All pages have been revised due to pagination. Content changes are marked by rev. bars, and are on pages noted here.	0, 1, 2, 4A, 7	9-A02-1, 9-A02-2, 9-A02-3, 9-A02-4, 9-A02-5, 9-A02-6, 9-A02-7, 9-A02-8, 9-A02-9, 9-A02-10, 9-A02-12, 9-A02-13, 9-A02-14, 9-A02-16, 9-A02-17, 9-A02-20, 9-A02-22, 9-A02-29, 9-A02-35, 9-A02-55, 9-A02-68, 9-A02-75, 9-A02-76	08-Feb-2019				

0.2 LIST OF EFFECTIVE PAGES

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0.3 TABLE OF CONTENTS

1. GENERAL

1.1 INTRODUCTION

This airplane flight manual supplement (AFMS) supplies the information necessary for the efficient operation of the airplane when the Garmin G1000 NXi avionics system is installed. The information contained within this supplement is to be used in conjunction with the complete airplane flight manual (AFM).

This supplement is a permanent part of this AFM, and must remain in this AFM at all times when the Garmin G1000 NXi avionics system is installed.

1.5 DEFINITIONS AND ABBREVIATIONS

(j) 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 SOURCE DOCUMENTATION

This section lists documents, manuals and other literature that were used as sources for the supplement, and indicates the respective publisher. However, only the information given in the AFM and AFMS are valid.

1.8.3 AVIONICS SYSTEM

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

Phone: +1-913-397-8200

Fax: +1-913-397-8282

Website: www.garmin.com

Documents: G1000 NXi Cockpit Reference Guide:
For aircraft with MÄM 40-868 only, P/N 190-02258-( ), appropriate revision
For aircraft with MÄM 40-1007, P/N 190-02453-( ), appropriate revision
G1000 NXi Pilot's Guide:
For aircraft with MÄM 40-868 only, P/N 190-02257-( ), appropriate revision
For aircraft with MÄM 40-1007, P/N 190-02452-( ), appropriate revision

1.9 G1000 AVIONICS SYSTEM

1. The G1000 NXi 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, and autopilot operation. The MFD may also be used 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 NXi 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. 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-C145d Class 3 approved Garmin GIA 64W if MÄM 40-1007 is installed), TSO-C146d Class 3 approved Garmin GDU 105X Display Units, two Garmin GA 36 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 NXi operational capabilities does not constitute an operational approval. For the operational approval of the airplane, contact the appropriate governing authority.

The Garmin 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 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.

5. Phase II of the NXi installation is accomplished in accordance with MÄM 40-1007. This upgrades the GIA 63W to GIA 64W, GMA 1347 to GMA 1360, GEA 71 to GEA 71B and installs a Flight Stream 510 Bluetooth and Wi-Fi transceiver.

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 APCHLNAV	FAA AC 90-105	EASA AMC 20-27	S1	Yes
RNP APCHLNAV/VNAV	FAA AC 90-105	EASA AMC 20-27 with CM-AS-002	S2	Yes
LP	FAA AC 90-107	-	N/A	Yes[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

[1] When GDU software version 13.00 or later is installed.

2. OPERATING LIMITATIONS

2.15 LIMITATION PLACARDS

If autopilot GFC 700 is installed:

LIMITATIONS FOR GFC 700 AUTOPILOT SYSTEM: **DO NOT USE AP IF "ALTERNATE STATIC" IS OPEN.** **CONDUCT AP AND TRIM CHECK PRIOR TO EACH FLIGHT (SEE AFM).** **AUTOPILOT OFF DURING TAKE-OFF AND LANDING.** **MAXIMUM SPEED FOR AUTOPILOT OPERATION IS 165 KIAS.** **MINIMUM SPEED FOR AUTOPILOT OPERATION IS 70 KIAS.** **MINIMUM ALTITUDE FOR AUTOPILOT OPERATION:** **CRUISE, CLIMB, DESCENT AND MANEUVERING: 800 FEET AGL** **APPROACH: 200 FEET AGL**

2.16 OTHER LIMITATIONS

2.16.8 GARMIN G1000 AVIONICS SYSTEM

MÄM 40-868 installed:

The Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02258-( ), appropriate revision must be immediately available to the flight crew.

MÄM 40-868 and MÄM 40-1007 installed:

The Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02453-( ), appropriate revision must be immediately available to the flight crew.

NOTE

Refer to DAI MSB 40NG-003 for information regarding the appropriate revisions of the Garmin G1000 NXi Cockpit Reference Guide.

The Garmin G1000 NXi must utilize the Garmin software images shown in the following table.

Software Part Number (MÄM 40-868 only)	Software Part Number (MÄM 40-868 and MÄM 40-1007)	Software Version	Software Name
System	**System**	Refer to the latest revision of DAI MSB 40NG-003 for information regarding the proper approved software version(s) for the given aircraft configuration.	
006-B2948-XX	006-B2948-XX		
Manifest	**Manifest**		
006-B0081-( )	006-B2371-( )		COM System
006-B0082-( )	006-B2253-( )		NAV System
006-B0193-( )	006-B2139-( )		GEA System
006-B0203-( )	006-B2210-( )		GMA System
006-B0224-( )	006-B0224-( )		GMU System
006-B0339-( )	006-B1827-( )		GPS/WAAS System
006-B0398-( )	006-B0398-( )		GSA 8X System
006-B0544-( )	006-B2548-( )		GIA System
006-B1177-( )	006-B1177-( )		GDU System
006-B1902-( )	006-B1902-( )		GDL 69e System
006-B1607-( )	006-B1607-( )		GTX 3X5 System
006-B1797-( )	006-B1797-( )		GTX 3X5 ADS-B System
006-B1838-( )	006-B1838-( )		GRS 79 System
006-B1838-( )	006-B1838-( )		GDC 72 System
006-C0048-( )	006-C0048-( )		GMU FPGA
006-C0124-( )	006-C0124-( )		NAV FPGA
006-C0153-( )	006-C0153-( )		GTX 3X5 FPGA
006-D5080-( )	006-D5080-( )		GRS 79 Region List
006-D5080-( )	006-D5080-( )		GDC 72 Region List
006-D1306-( )	006-D1306-( )		GFC Cert Gain

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 NXi GPS receiver is prohibited unless the pilot verifies the currency of the database, or verifies each selected waypoint for accuracy by reference to current approved data.

4. Instrument approach navigation predicated upon the G1000 NXi 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 NXi GPS receiver is not authorized.

C. Use of the G1000 NXi VOR/ILS receiver to fly approaches not approved for GPS, requires 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 a normal position to land.

5. If not previously defined, the following default settings must be made in the SYSTEM SETUP menu of the G1000 NXi 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 the 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 the 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 remaining, range, and endurance functions of the FMS are supplemental information only, and must be verified by the flight crew.

8. The availability of SafeTaxi®, ChartView, or FliteCharts® in electronic form on the G1000 NXi is for information purposes only; it is still mandatory to carry another source of charts on board the airplane.

2.16.9 AUTOPILOT LIMITATIONS (IF AUTOPILOT GFC 700 IS INSTALLED)

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 must be disconnected (using the DISC button) during take-off and landing.

3. Following an autopilot or electric trim malfunction, re-engaging 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. ILS approaches using the GFC700/flight director are limited to Category I approaches.

5. Autopilot maximum airspeed : 165 KIAS

   Autopilot minimum airspeed : 70 KIAS

6. The autopilot must be disengaged:

   A. below 200 ft AGL during approach

   B. below 800 ft AGL for all other phases of flight

7. Overriding the autopilot to change pitch or roll attitude is prohibited. (Disengage or press CWS while maneuvering).

8. The GFC 700 AFCS pre-flight test must be successfully completed prior to use of the autopilot, flight director, or manual electric trim. Use of the autopilot or manual electric trim system is prohibited if the preflight test is not satisfactorily completed.

9. A pilot with the seat belt fastened must occupy the left pilot's seat during all operations.

2.16.10 G1000 NXi GPS NAVIGATION SYSTEM LIMITATIONS

(a) 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 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 the Garmin GA36 antenna, 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.ecacnav.com/augur/app/home. 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.

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) conform to WGS-84 or equivalent.

For flight planning purposes, it is not acceptable to plan an RNAV (GPS) LPV, or an LNAV/VNAV approach on the destination and alternate airport. The alternate airport must be planned using a LNAV approach or available ground-based aid.

(b) Preflight Phase

SBAS functionality must be enabled on the G1000 NXi GPS Status page (refer to the G1000 NXi 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.

The 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 database alerts at www.Garmin.com > In the Air > NavData Alerts.

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.

<u>(c) In Flight Phase</u>

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

NOTE

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs), Obstacle Departure Procedures (ODPs), Standard Terminal Arrival (STAR), 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.

(d) 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 IAP, 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.

Advisory vertical guidance deviation information is only an aid to help pilots comply with altitude restrictions. When using advisory vertical guidance, the pilot must use the primary barometric altimeter to ensure compliance with all altitude restrictions, particularly during instrument approach operations.

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

3.1 INTRODUCTION

3.1.3 SELECTING THE EMERGENCY FREQUENCY

In an in-flight emergency, depressing and holding the Com transfer button ↔ on the G1000 NXi 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.

3.9 OTHER EMERGENCIES

3.9.4 AUTOPILOT OR ELECTRIC TRIM MALFUNCTION/FAILURE (IF INSTALLED)

NOTE

If the autopilot GFC 700 is not installed, the following checklist is not valid, and the airplane must be trimmed manually.

NOTE

An autopilot or electric trim malfunction may be recognized by an unexpected deviation from the desired flight path, abnormal flight control or trim wheel movement, or flight director commands which cause unexpected or contradictory information on the other cockpit displays. It may be accompanied by the aural autopilot disconnect tone, a red AFCS, red PTCH, red ROLL, red 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 aircraft 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.

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

3.10 AIRPLANE RELATED G1000 NXi WARNINGS

3.10.1 WARNINGS/GENERAL

CHARACTERISTICS	Means that the non-observation of the corresponding procedure leads to an immediate or important degradation in flight safety. Red color coded warning text. Warning chime tone of 1.5 second duration which repeats without delay until acknowledged by the crew.

3.10.2 ENG TEMP

ENG TEMP	Engine coolant temperature is in the upper red range (too high/above 105 °C).

Proceed according to AFM Section 3.2.1 - ENGINE TEMPERATURE.

3.10.3 OIL TEMP

OIL TEMP	Engine oil temperature is in the upper red range (too high/above 140 °C).

Proceed according to AFM Section 3.2.2 - OIL TEMPERATURE.

3.10.4 OIL PRES

OIL PRES	Engine oil pressure is in the lower red range (too low/below 0.9 bar).

Proceed according to AFM Section 3.2.3 - OIL PRESSURE.

3.10.5 GBOX TEMP

GBOX TEMP	Engine gearbox temperature is in the upper red range (too high/above 120 °C).

Proceed according to AFM Section 3.2.4 - GEARBOX TEMPERATURE.

3.10.6 L/R FUEL TEMP

L/R FUEL TEMP	Fuel temperature is in the upper red range (too high/above 60 °C).

Proceed according to AFM Section 3.2.5 - L/R FUEL TEMPERATURE.

3.10.7 FUEL PRESS

FUEL PRESS	Engine fuel pressure is low.

Proceed according to AFM Section 3.2.6 - FUEL PRESSURE.

3.10.8 ALTN AMPS

ALTN AMPS	Engine alternator output is in the upper red range (too high/above 70 A).

Proceed according to AFM Section 3.2.7 - ALTERNATOR AMPS.

3.10.9 ALTN FAIL

ALTN FAIL	Engine alternator has failed.

Proceed according to AFM Section 3.2.8 - ALTERNATOR FAIL.

3.10.10 STARTER

STARTER	Engine starter is engaged.

Proceed according to AFM Section 3.4.3 - STARTER MALFUNCTION.

3.10.11 DOOR OPEN

DOOR OPEN	Canopy and/or rear door are/is not closed and locked.

Proceed according to AFM Section 3.9.3 - UNLOCKED DOORS.

3.11 G1000 NXi SYSTEM WARNINGS

3.11.1 RED X/YELLOW X

RED X/YELLOW X	The G1000 NXi uses a red "X" for indications of failures which require immediate pilot action (e.g. primary flight instruments) and a yellow "X" for all other failure indications. The legacy G1000 used a red "X" for all failure indications.

3.11.2 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.

3.11.3 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.

3.11.4 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.

3.11.5 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.

3.11.6 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.

3.12 G1000 NXi FAILURES

3.12.1 NAVIGATION INFORMATION FAILURE

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

3.12.2 PFD OR MFD DISPLAY FAILURE

1. DISPLAY BACKUP button on audio panel . . push

(a) Automatic Entry of Display Revisionary Mode

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

2. 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.

3. DISPLAY BACKUP button on audio panel . . PUSH (button will be IN)
4. If the system returns to normal mode, leave the DISPLAY BACKUP button IN and continue.
5. If the system remains in reversionary mode, or abnormal display behavior such as flashing occurs, then return the DISPLAY BACKUP button to the OUT position.

END OF CHECKLIST

3.12.3 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

3.12.4 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

3.12.5 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 performance data, refer to AFM Section 5.3.2 - FUEL FLOW TABLE 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

3.12.6 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. Monitor other indications to determine the health of the engine. 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

4A. NORMAL OPERATING PROCEDURES

4A.1 INTRODUCTION

NOTE

Readability of the G1000 NXi PFD, and MFD displays may be degraded when wearing polarizing sunglasses.

NOTE

MÄM 40-868 installation: normal operating procedures for the GFC 700 are described in the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02258-( ) or later, and the Garmin G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02257-( ) or later.

NOTE

MÄM 40-868, and MÄM 40-1007 installation: normal operating procedures for the GFC 700 are described in the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02453-( ) or later, and the Garmin G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02452-( ) or later.

4A.5 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.5.21 GFC 700 OPERATION (IF AUTOPILOT GFC 700 IS INSTALLED)

WARNING

It is the responsibility of the pilot in command to monitor the autopilot when it is engaged. The pilot should be prepared to immediately disconnect the autopilot, and to take prompt corrective action in the event of unexpected or unusual autopilot behavior. Do not attempt to manually fly the airplane with the autopilot engaged. The autopilot servos will oppose pilot input, and will trim opposite the direction of pilot input (pitch axis only). This could lead to a significant out-of-trim condition. Disconnect the autopilot if manual control is desired. The pilot in command must use proper autopilot modes, and proper engine power settings to ensure that airplane speed is maintained between 70 KIAS and 165 KIAS. It will be necessary to change engine power to maintain the desired rate of descent when operating at 165 KIAS. Observe the minimum autopilot operating speed of 70 KIAS. Operation in pitch (PIT), or vertical speed (VS) modes below this speed can result in an airplane stall. If indications of an airplane stall are present, including stall warning horn, loss of control effectiveness, or airframe buffet, disconnect the autopilot and manually return the airplane to stabilized flight prior to re-engaging the autopilot.

(a) GFC 700 Operation During Climb (if Autopilot GFC 700 is Installed)

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.

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 VS mode is limited to 1500 ft/min climb, and 3000 ft/min descent. 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

Flight level change (FLC)

1. Altitude preselect . . . . set to desired altitude
2. Mode controller . . . . select FLC on mode controller
3. Airspeed reference. . . . . adjust using NOSE UP and NOSE DN buttons
4. White ALT (altitude preselect armed) . . . . . . note on PFD
5. Green ALT . . . . verify upon 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 70 KIAS and 165 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

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 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

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

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

(b) GFC 700 Operation During Cruise (if Autopilot GFC 700 is Installed)

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.

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 VS 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

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 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 70 KIAS and 165 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

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

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

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

(c) GFC 700 Operation During Descent (if Autopilot GFC 700 is Installed)

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.

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 VS 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

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 70 KIAS and 165 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

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 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

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

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

(d) GFC 700 Operation During Approach (if Autopilot GFC 700 is Installed)

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
7. Airspeed .... maintain 80 KIAS or greater (recommended)

NOTE

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

END OF CHECKLIST

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

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

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

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

(e) GFC 700 Operation During Go-Around (if Autopilot GFC 700 is Installed)

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 7° 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 modes on mode 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 ADVISORY ALERTS ON THE G1000 NXi

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

4A.6.1 ADVISORY/GENERAL

CHARACTERISTICS	White color coded text.

4A.6.2 GLOW ON

GLOW ON	Engine glow plug active.

4A.6.3 FUEL XFER

FUEL XFER	Fuel transfer from auxiliary to main tank is in progress.

4A.6.4 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 GIAs is inoperative.

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

4B. ABNORMAL OPERATING PROCEDURES

4B.9 ENGINE INSTRUMENT INDICATIONS OUTSIDE OF GREEN RANGE ON THE G1000 NXi

4B.9.1 RPM

Proceed according to AFM Section - 4B.2.1 - RPM.

4B.9.2 COOLANT TEMPERATURE

Proceed according to AFM Section - 4B.2.2 - COOLANT TEMPERATURE.

4B.9.3 OIL TEMPERATURE

Proceed according to AFM Section - 4B.2.3 - OIL TEMPERATURE.

4B.9.4 OIL PRESSURE

Proceed according to AFM Section - 4B.2.4 - OIL PRESSURE.

4B.9.5 GEARBOX TEMPERATURE

Proceed according to AFM Section - 4B.2.5 - GEARBOX TEMPERATURE.

4B.9.6 FUEL TEMPERATURE

Proceed according to AFM Section - 4B.2.6 - FUEL TEMPERATURE.

4B.9.7 VOLTAGE

Proceed according to AFM Section - 4B.2.7 - VOLTAGE.

4B.9.8 CURRENT

Proceed according to AFM Section - 4B.2.8 - CURRENT.

4B.10 CAUTION-ALERTS ON THE G1000

The G1000 NXi provides the following CAUTION-alerts on the PFD in the ALERT area.

4B.10.1 CAUTIONS/GENERAL

CHARACTERISTICS	Yellow color coded text. Single warning chime tone of 1.5 seconds duration.

4B.10.2 ECU A FAIL

ECU A FAIL	Engine ECU A has failed, or is being tested during the FADEC test procedure before take-off check.

Proceed according to AFM Section 4B.3.1 - ECU A FAILURE.

4B.10.3 ECU B FAIL

ECU B FAIL	Engine ECU B has failed, or is being tested during the FADEC test procedure before take-off check.

Proceed according to AFM Section 4B.3.2 - ECU B FAILURE.

4B.10.4 FUEL LOW

FUEL LOW	Left fuel quantity is low.

Proceed according to AFM Section 4B.3.3 - FUEL QUANTITY LOW.

4B.10.5 LOW VOLTAGE CAUTION (VOLTS LOW)

VOLTS LOW	Bus voltage is less than 25 volts.

Proceed according to AFM Section 4B.2.7 - VOLTAGE.

4B.10.6 COOL LVL

COOL LVL	Engine coolant level is low.

Proceed according to AFM Section 4B.3.4 - COOLANT LEVEL.

4B.10.7 PITOT FAIL/HT OFF

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

1. PITOT HEAT . . . . check ON/as required

NOTE

The Pitot heating caution message is displayed when the Pitot heating is switched OFF, or when there is a failure of the Pitot heating system. Prolonged operation of the Pitot heating on the ground can also cause the Pitot heating caution message to be displayed. In this case, it indicates the activation of the thermal switch, which prevents overheating of the Pitot heating system on the ground. This is a normal function of the system. After a cooling period, the heating system will be switched on again automatically.

Proceed according to AFM Section 4B.3.5 - PITOT HEATING FAILURE.

END OF CHECKLIST

4B.10.8 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 NXi 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 NXi 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

4B.11 FAILURES IN THE GFC 700 AUTOPILOT SYSTEM (IF INSTALLED)

4B.11.1 AUTOPILOT DISCONNECT (YELLOW AP FLASHING ON PFD)

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

NOTE

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

END OF CHECKLIST

4B.11.2 AUTOPILOT OVERSPEED RECOVERY (YELLOW MAXSPD ON PFD)

1. Power lever . . . . REDUCE

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 (165 KIAS). Overspeed recovery is not active in altitude hold (ALT) or glideslope (GS) modes.

END OF CHECKLIST

4B.11.3 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 aircraft 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 or APR 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.11.4 AUTOPILOT OUT OF TRIM (YELLOW ←AIL, AIL→, ↑ELE, OR ↓ELE 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
2. Airplane attitude. . . . . maintain/regain airplane control use standby attitude indicator if if necessary
3. Pitch Trim. . . . . RETRIM if necessary, using the trim wheel

CONTINUED

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, or AIL→ Indication:

1. Rudder Trim . . . . VERIFY slip/skid indicator is centered

NOTE

Observe the maximum fuel imbalance limitation.

If annunciation remains:

2. Airplane control stick . . . . grasp firmly and regain airplane control

CAUTION

Be prepared for sustained control forces in the direction of the annunciation arrow. For example, an arrow pointing to the right indicates that sustained right wing down control stick 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.11.5 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.

(a) Loss of Selected Vertical Mode (FLC, VS, ALT, GS, VPTH, GP):

1. Autopilot mode controls . . . . Select another vertical mode

If on an instrument approach

2. Autopilot. . . . . DISCONNECT and continue manually, or execute missed approach

END OF CHECKLIST

(b) 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.11.6 EFFECTS OF G1000 NXi LOSSES UPON AUTOPILOT OPERATION

G1000 NXi System Loss	Effect upon Autopilot Operation
AHRS	The autopilot disconnects, and autopilot flight director is 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.

5. PERFORMANCE

No change.

6. MASS AND BALANCE

No change.

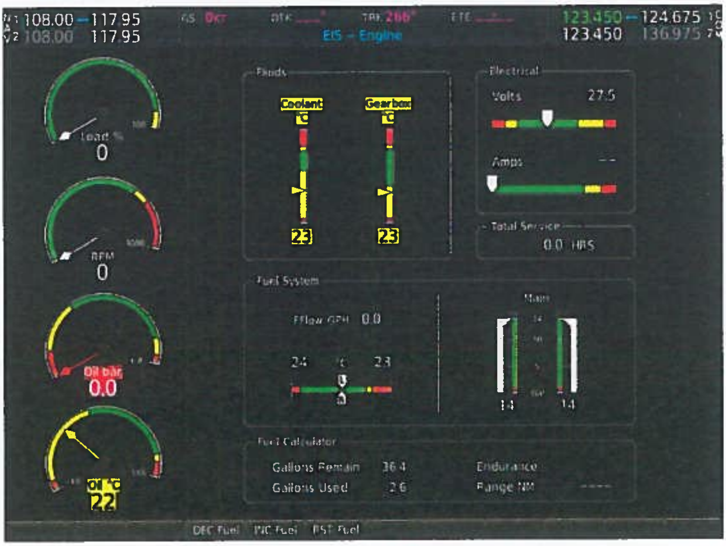
7. DESCRIPTIONS OF THE AIRPLANE AND ITS SYSTEMS

7.9 POWER PLANT

7.9.8 ENGINE INSTRUMENTS

The engine instruments are displayed on the Garmin G1000 NXi MFD. Also refer to 7.13.3 - MULTI-FUNCTION DISPLAY (MFD) of this supplement.

Default page, engine.



Displayed after pushing the ENGINE button.

NOTE

The figures shown are a general demonstration of a typical G1000 NXi MFD, to show the different display modes. The pictured engine instrument markings may not stringently agree with the current engine limitations of the DA 40 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
VOLT	Volts	V
AMPS	Ampère	A
COOLANT TEMP	Coolant temperature	°C
GEARBOX	Gearbox temperature	°C
OIL TEMP	Engine oil temperature	°C
OIL PRES	Oil pressure	bar
FUEL QTY	Fuel pressure	US gal
FFLOW	Fuel flow	US gal/hr
FUEL TEMP	Fuel temperature	°C

7.10 ELECTRICAL SYSTEM

7.10.3 WARNING, CAUTION, AND ADVISORY MESSAGES

(a) Crew Alerting System (CAS)

The G1000 NXi 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.

(b) 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	Yellow	May require future corrective action	Single warning chime tone
Annunciation Advisory	White		None
Message Advisory	White		None
Safe Operation Annunciation	Green	Lowest	None

(c) Warning, Caution, and Advisory Alerts

A list of all alerts is given in AFM Section 2.6 - WARNING, CAUTION, AND STATUS LIGHTS.

7.13 GARMIN G1000 NXi INTEGRATED AVIONICS SYSTEM

7.13.1 GENERAL

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 NXi is mounted on the end of each control stick. There are connection facilities for up to 4 headsets between the front seats.

| MÄM 40-868 is installed:

Refer to the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02258-( ) and Garmin G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02257-( ) for complete descriptions of the G1000 NXi system and operating procedures.

| MÄM 40-868 and MAM 40-1007 is installed:

| Refer to the Garmin G1000 NXi Cockpit Reference Guide, P/N 190-02453-( ) and Garmin
| G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02452-( ) 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.

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

* 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 AFM Chapter 3 - EMERGENCY PROCEDURES, 4B - ABNORMAL OPERATING PROCEDURES, and Section 7.10.3 - WARNING, CAUTION, AND ADVISORY MESSAGES of this supplement.

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

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

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

7.13.3 MULTI-FUNCTION DISPLAY (MFD)

The multi-function display (MFD) typically displays engine data, maps, terrain, traffic and topography displays, and flight planning and progress information. The display unit is identical to the PFD, and contains the same controls as previously listed. Additionally, the MFD incorporates the controls for the autopilot system, if installed.

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 the caution range, and turn red, and flash for the warning range.

Also refer to 7.9.8 - ENGINE INSTRUMENTS.

7.13.4 AUDIO PANEL

The audio panel contains traditional transmitter and receiver selectors, an integral intercom, and a 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 in 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.

7.14 AVIONICS

7.14.1 AUTOPILOT SYSTEM (IF AUTOPILOT GFC 700 IS INSTALLED)

(a) General

The GFC 700 Automatic Flight Control System (AFCS) is a two axis autopilot and flight director system which provides the pilot with the following features: Altitude Preselect and Altitude Hold (ALT), Flight Level Change with Airspeed Hold (FLC), Vertical Speed Hold (VS), Navigation Tracking for VOR (NAV) and GPS (GPS), Heading Hold (HDG), and Approach mode and Go-Around (GA) pitch/roll guidance. The system consists of autopilot controls on the multi-function display (MFD), servos with autopilot processing logic, Flight Director processing logic in the GIAs, a control stick-mounted elevator trim switch, a control stick mounted trim interrupt and autopilot disconnect switch, a control stick mounted CWS (Control Wheel Steering) switch, a power lever mounted GA (go-around) switch, and PFD/MFD-mounted altitude preselect, heading, and course knobs.

The GFC 700 autopilot contains an electric pitch trim system, which is used by the autopilot for automatic pitch trim during autopilot operation, and by the pilot for manual electric pitch trim when the autopilot is not engaged. The manual electric pitch trim is operated by a split switch on the pilot´s control stick.

The GFC 700 autopilot and manual electric trim (MET) will not operate until the system has satisfactorily completed a preflight test. The preflight test begins automatically with initial power application to the autopilot (AVIONIC MASTER switch is set to the ON position).

The following conditions will cause the autopilot to automatically disconnect:

* Electrical power failure
* Internal autopilot system failure
* AHRS malfunction
* Loss of air data computer information

The GFC 700 may be manually disconnected by any of the following means:

* Depressing the red AP DISC button on the pilot's or copilot's control stick
* Moving the left (outboard) side of the manual electric trim switch on the pilot's control stick
* Pushing the AP button on the autopilot mode controller when the autopilot is engaged
* Depressing the GA button on the left side of the POWER lever
* Pulling the AUTOPILOT circuit breaker
* Turning off the AVIONICS MASTER switch
* Turning off the ELECTRIC MASTER key 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 NXi 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. The autopilot 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.

WARNING

Following an autopilot or electric trim malfunction, do not re-engage the autopilot or manual electric trim, or reset the AUTOPILOT circuit breaker until the cause of the malfunction has been determined and corrected.

The GFC 700 Automatic Flight Control system (AFCS) installed in the Diamond DA 40 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
VNV	Vertical navigation mode on/off

This GDU is installed as the MFD.

* Servos with autopilot processing logic in the pitch, roll, 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. 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.

MÄM 40-868 installed:
Refer to the Garmin G1000 NXi Cockpit Reference Guide for the Diamond DA 40 NG, P/N 190-02258-( ), and Garmin G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02257-( ), for complete descriptions of the G1000 NXi system, and operating procedures.

MÄM 40-868 and MÄM 40-1007 is installed:

Refer to the Garmin G1000 NXi Cockpit Reference Guide for the Diamond DA 40 NG, P/N 190-02453-( ), and Garmin G1000 NXi Pilot's Guide for the Diamond DA 40 NG, P/N 190-02452-( ), 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, and pitch trim servos.

7.14.2 AUTOMATIC FLIGHT CONTROL SYSTEM ANNUNCIATIONS AND ALERTS (IF AUTOPILOT GFC 700 IS INSTALLED)

(a) 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 priorized by criticality.

Warning alerts on the automatic flight control system (AFCS)

Warning Alerts	Meaning/Cause
PFT	PREFLIGHT TEST - Preflight system test failed; aural alert sounds at failure.
AFCS	SYSTEM FAILURE - AP and MET are unavailable; FD may still be available
PTCH	PITCH FAILURE - Pitch axis control failure; AP inoperative
ROLL	ROLL FAILURE - Roll axis control failure; AP inoperative
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 force in indicated direction.
AIL→	AILERON MISTRIM RIGHT - Roll servo providing force in indicated direction.

Advisory alerts on the automatic flight control system (AFCS)

Advisory Alerts	Meaning/Cause
PFT	PREFLIGHT TEST - Performing preflight system test; aural alert sounds at completion. Do not press the AP DISC switch during a 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.

8. AIRPLANE HANDLING, CARE, AND MAINTENANCE

No change.

SUPPLEMENT S06

TO THE AIRPLANE FLIGHT MANUAL

DA 40 NG

G1000 Synthetic Vision Technology

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0.2 RECORD OF REVISIONS

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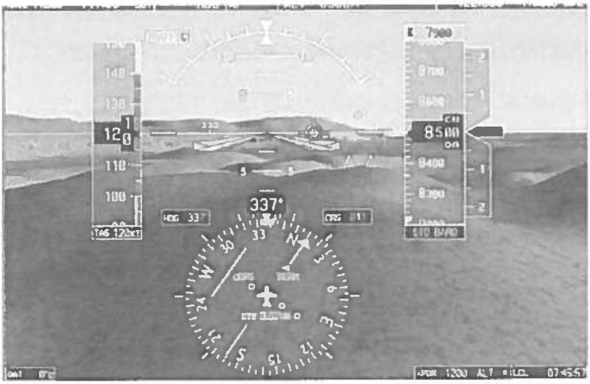
1. GENERAL

1.9 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

2.16.8 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 190-00953-00, Rev. A or later must be immediately available to the flight crew.

3. EMERGENCY PROCEDURES

No change.

4A NORMAL OPERATING PROCEDURES

4A.5 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.5.21 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:

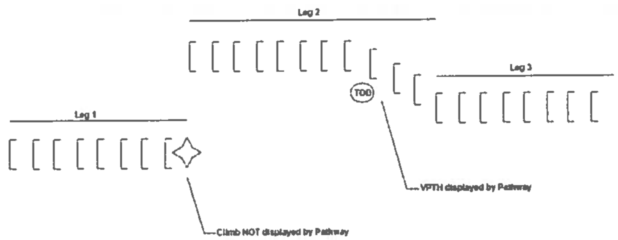
When enroute, the pathway will be displayed along the lateral path defined by the flight plan, at the altitude selected on the G1000 altitude selector.

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.



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:

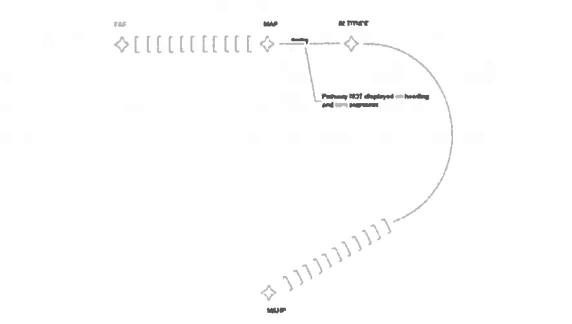
When the missed approach is selected on the G1000 FMS, the pathway to the Missed Approach Holding Point will be displayed just as described for the departure segment.

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.



Missed Approach Pathway Display

4B ABNORMAL OPERATING PROCEDURES

4B.11 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.

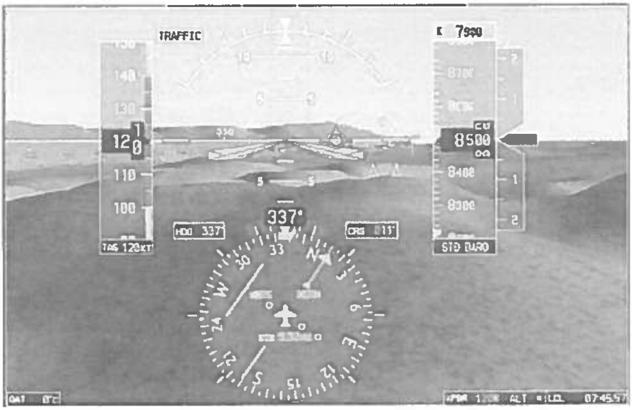
7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

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 S11
TO THE AIRPLANE FLIGHT MANUAL

DA 40 NG
GARMIN GTX 335R/345R WITH ADS-B

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This supplement to the DA 40 NG Airplane Flight Manual is approved in accordance with the Canadian Aviation Regulations.

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0.1 RECORD OF REVISIONS

Rev. No.	Reason	Chap-ter	Page(s)	Date of Revision	Approval Note	Date of Approval	Date Inserted	Signature

0.2 LIST OF EFFECTIVE PAGES

Chapter	Page	Date
0	9-S11-1	15-April-2019
	9-S11-2	15-April-2019
	9-S11-3	15-April-2019
	9-S11-4	15-April-2019
	9-S11-5	15-April-2019
	9-S11-6	15-April-2019
1	9-S11-7	15-April-2019
	9-S11-8	15-April-2019
	9-S11-9	15-April-2019
2, 3	9-S11-10	15-April-2019
4A	9-S11-11	15-April-2019
4B	9-S11-12	15-April-2019
5, 6	9-S11-13	15-April-2019
7	9-S11-14	15-April-2019
8	9-S11-15	15-April-2019
	9-S11-16	15-April-2019

0.3 TABLE OF CONTENTS

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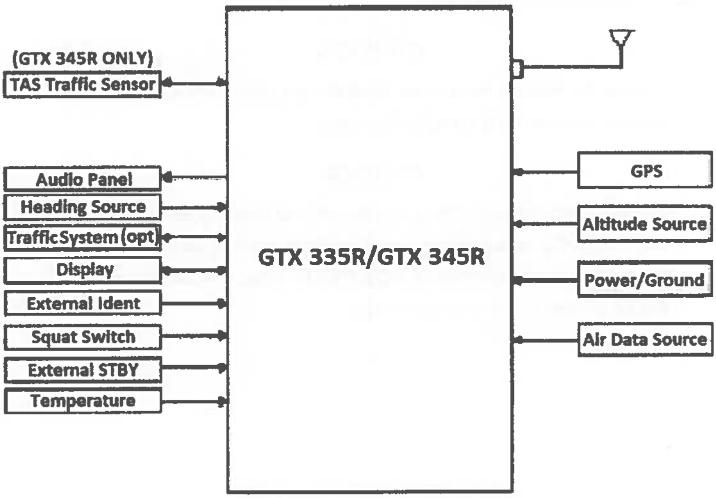
1. GENERAL

This AFM supplement supplies the information necessary for the efficient operation of the DA 40 NG airplane when the optional Garmin GTX 335R/345R transponder is installed.

NOTE

The GTX 335R transponder has ADS-B Out capability only. The GTX 345R transponder has both ADS-B In and Out capability.

All Garmin GTX transponders are a radio transmitter/receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. Each unit is equipped with IDENT capability and will reply to ATCRBS Mode A, Mode C, and Mode S All-Call interrogation. Interfaces to the GTX 335R/345R are shown in the following block diagram.



GTX 335R/345R Interfaces

The GTX 335R/345R performs the following ADS-B Out functions:

* Transmission of ADS-B out data on 1090 MHz extended squitter (1090 ES) (1090 MHz)
* Integration of data from internal and external sources to transmit the following data:
  - 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 code, IDENT, and emergency status
* Pressure Altitude Broadcast Inhibit

CAUTION

In order to provide the proper ADS-B data, the GPS source, and altitude source must be fully functional.

CAUTION

The GTX 335R/345R only complies with the integrity requirements for ADS-B Out when all required functions are operational. When the system is not operational, ADS-B Out transmit failure messages will be present on the G1000 display.

For the GTX 345R ADS-B In functions, refer to the Garmin Cockpit Reference Guide 190-02453-00, and the Garmin Pilot's Guide 190-02452-00 or later revisions.

CAUTION

Do not use datalink weather information for maneuvering in, near, or around areas of hazardous weather. Information provided by datalink weather products may not accurately depict current weather conditions.

Do not use the indicated datalink weather product age to determine the age of the weather information shown by the datalink weather product. Due to time delays inherent in gathering and processing weather data for datalink transmission, the weather information shown by the datalink weather product may be significantly older than the indicated weather product age.

Do not rely solely relay upon datalink services to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information.

1.1 CAPABILITIES

The Garmin GTX 335R/345R with ADS-B Out functionality as installed in this aircraft has been shown to meet the equipment requirements of the following:

* 14 CFR 91.227
* CS-ACNS.D.ADSB

A detailed description of the system operation can be found in the Garmin Cockpit Reference Guide, 190-02453-00, and the Pilot's Guide, 190-02452-00, or later revisions.

1.2 APPLICABLE SOFTWARE

This AFMS is applicable to the G1000 NXi software, and GTX 3X5 system software version V2.05 or later approved versions.

2. OPERATING LIMITATIONS

No change.

3. EMERGENCY PROCEDURES

No change.

4A. NORMAL OPERATING PROCEDURES

NOTE

The Cockpit Reference Guide will provide additional operating information specific to the displays or other traffic systems.

ADS-B Out functionality resides within the GTX transponders. All GTX functions are controlled through the G1000 display units thereby providing a single point of entry for Mode 3/A code, flight ID, IDENT functionality and activating or deactivating emergency status for both transponder and ADS-B Out functions. Details on performing these procedures are located in the G1000 Pilot's Guide.

4A.1 UNIT POWER ON

The ADS-B function is enabled on power cycle, and when the transponder is in ALT mode.

4A.2 BEFORE TAKEOFF

GTX mode . . . . ALT

CAUTION

Pressure Altitude Broadcast Inhibit (PABI) shall only be enabled when requested by Air Traffic Control while operating within airspace requiring an ADS-B Out compliant transmitter. PABI is enabled by selecting the GTX to ON mode.

4B. ABNORMAL OPERATING PROCEDURES

4B.1 ABNORMAL INDICATIONS

The loss of an interfaced input to the 335R/345R may cause the transponder to stop transmitting ADS-B Out data. Depending on the nature of the fault or failure, the GTX may no longer be transmitting all of the required data in the ADS-B Out messages.

If the GTX 335R/345R detects any internal faults or failures with the ADS-B Out functionality, the G1000 display will annunciate this event via the **XPDR1 ADS-B FAIL** message. When this message appears in the display, one of the following failures or faults have occurred:

* Loss of adequate GPS position data
* Internal failure of the ADS-B function

When the **XPDR1 ADS-B FAIL** annunciation is received, verify proper operation of all interfaced equipment (refer to Section 1) as the failure of one of these devices could be the cause of the abnormal indication.

4B.2 LOSS OF GPS NAVIGATION DATA

When the GPS/SBAS receiver is inoperative, or GPS position information is not available or invalid, the GTX will no longer be transmitting ADS-B Out data.

XPDR1 ADS-B FAIL or **XPDR1 ADS-B NO POS** annunciator illuminated:

GPS . . . . VERIFY VALID POSITION

5. PERFORMANCE

No change.

6. MASS AND BALANCE

No change.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

The Garmin G1000 Cockpit Reference Guide 190-02453-00, and the Pilot's Guide190-02452-00, or later, contain additional information regarding GTX system description, control, and function.

8. AIRPLANE HANDLING, CARE, AND MAINTENANCE

No change.