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Supplement D07: pages replacement instructions

SECTION 1 – GENERAL

Make sure you first applied instructions reported on the basic AFM, Section 1 General

According to A/C configuration apply following pages replacement:

Supplement GENERAL page		AFM Section 1 page
APV1-6	**REPLACES**	1-6 of basic AFM, Section 1
APV1-13	**REPLACES**	1-13 of basic AFM, Section 1
APV1-16 thru 31	**REPLACES**	1-16 thru 31 of basic AFM, Section 1

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5. ENGINE

Manufacturer ……Lycoming Engines

Model ……...IO-360-M1A

Type Certificate ……...EASA TCDS no. IM.E.032

Engine type	Fuel injected (IO), direct drive, four cylinder horizontally opposed, air cooled with down exhaust outlets.
Maximum power	134.0 kW (180hp) @ 2700 rpm

Maximum continuous power ……...129.2 kW (173.3hp) @ 2600 rpm

6. PROPELLER

Manufacturer ……MT Propeller

Model ……MTV-15-B/193-52

Type Certificate ……EASA TCDS no. P.098

Blades/hub ……wood/composite 2-blades – aluminum hub

Diameter ……1930 mm (76 in) (no reduction is permitted)

Type …… Variable pitch

GOVERNOR

Manufacturer …… MT Propeller

Model …… P-860-23:

Type …….. Hydraulic

Autopilot acronyms

AC	Advisory Circular	*GNSS*	Global Navigation Satellite System
A/C	Aircraft	*GP*	Glide Path
ADC	Air Data Computer	*GPS*	Global Position System
ADF	Automatic Direction Finder	*GS*	Glide Slope
ADI	Attitude Directional Indicator	*GSA*	Garmin Servo Actuator
AFCS	Automatic Flight Control Systyem	*GSM*	Garmin Servo Mount
AHRS	Attitude Heading Reference System	*HDG*	Heading
ALT	Altitude	*HSDB*	High Speed Data Bus
ALTS	Altitude Selector	*IAU*	Integrated Avionic Unit
AMPS	Ampere	*LOC*	Localizer
A/P	Autopilot	*LRU*	Line Repleaceable Unit
APR	Approach	*LVL*	Level
ARP	Aerospace Recommended Practice	*MAG*	Magnetometer
ASI	Air Speed Indicator	*MET*	Manual Electric Trim
BC	Back Course	*MFD*	Multi-Function Display
CAS	Caution Advisory System	*NAV*	Navigation
CDI	Course Deviation Indicator	*OAT*	Outside Air Temperature
CS	Certification Specifications	*PFD*	Primary Flight Display
CWS	Control Wheel steering	*PFI*	Primary Flight Information
DC	Direct Current	*PFT*	Pre Flight Test
DME	Distance Measuring Equipment	*PWM*	Pulse Width Modulation
EIS	Engine Indication System	*SAE*	SAE International
ESP	Electronic Stability and Protection	*TDM*	Time Division Multiplexing
FD	Flight Director	*USP*	Under Speed Protection
FLC	Flight Level Change	*VHF*	Very-High Frequency
GA	Go Around	*VNV*	Vertical Navigation
GDU	Garmin Display Unit	*VS*	Vertical Speed
GIA	Garmin Integrated Avionics	*XPDR*	Transponder

12. AUTOPILOT DESCRIPTION

P2010 aircraft is equipped, as an optional equipment, with an integrated 2-axis autopilot suite manufactured by Garmin and identified as GFC 700. This autopilot suite was designed as an option for the G1000 integrated flight deck. The autopilot is controlled via dedicated keys grouped in a control panel located on the MFD. The installed MFD display is different with respect to standard P2010 configuration since it is GDU 1044.

The autopilot suite installed on P2010 is based on the following configuration:

- 1 Roll servo
- 1 Pitch servo
- 1 Pitch Trim servo

Neither yaw axis nor rudder trim tab control is provided.

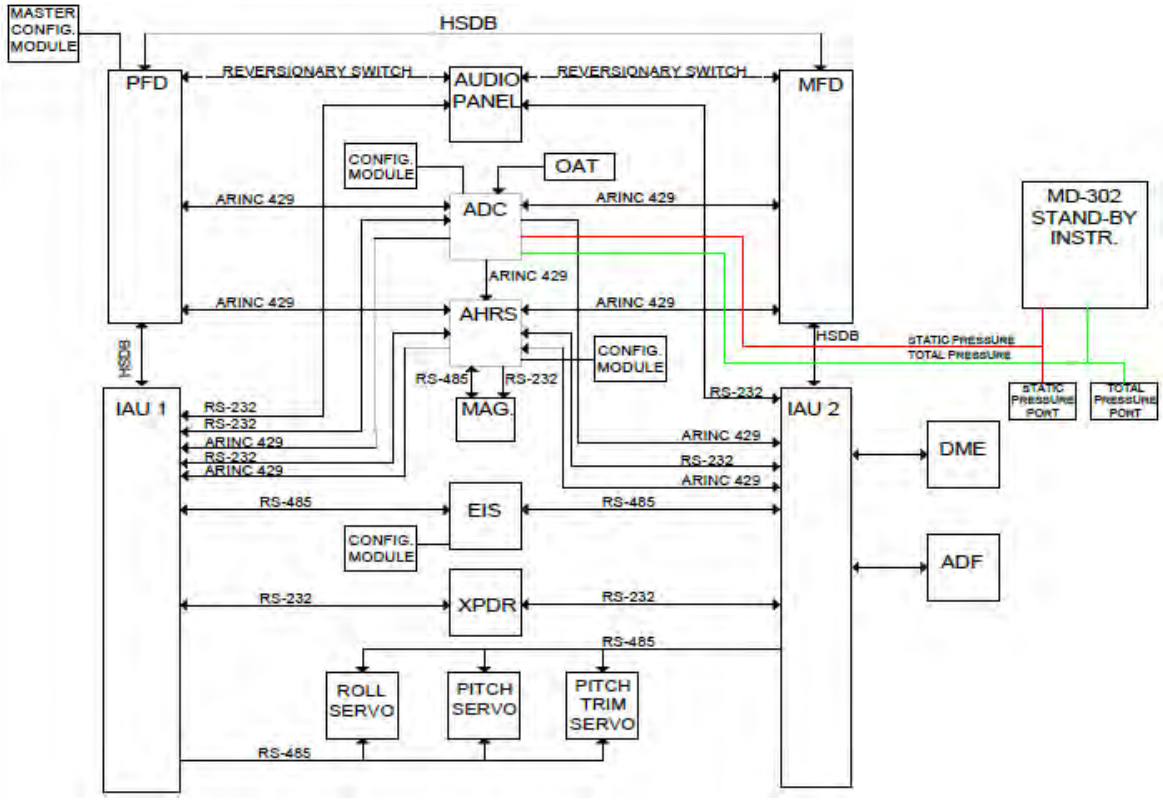
The autopilot is connected to electric system through the below listed circuit breakers connected to the avionics bus:

1) A/P (5A)
2) PITCH TRIM (3A)

The installed servos are capstan type and are composed of two main components:

- A servo motor
- A servo capstan including the servo clutch

The following block diagram describes the avionic system installed on P2010 and its interconnections with the autopilot servos:



The multifunction display (MFD) provides the pilot with a dedicated set of keys for autopilot control (see red frame in the below picture).

The roll servo is located under the pilot seat and is fixed to a/c structure using a dedicated mount. Pitch and pitch trim servos are located in the tail cone and are installed on a dedicated mount which hosts both the servos.

GFC 700 is an integrated autopilot since it uses several information provided by other units embodied in the G1000 avionics suite in order to compute the maneuvers to be performed by the aeroplane and actuate them. The below table lists the functions which are required in order to have the GFC 700 operational and the G1000 LRUs responsible for providing it:

LRU **Function**	**PFD/MFD (GDU 104X)**	**ADC (GDC 74X)**	**AHRS (GRS 77)**	**MAG. (GMU 44)**	**IAU1/2 (GIA 63W)**	**ACTUATOR (GSA 8X)**	**CAPSTAN (GSM 8X)**
AFCS mode select buttons	✓						
Display of the AFCS mode annuncia- tions and flight director command bars.	✓ (PFD NORMAL) (MFD REVERSIONARY)						
Attitude/Heading information			✓	✓			
Air data information		✓					
Navigational database Parameters	✓						
GPS/WAAS, VOR, and ILS navigational data					✓		
Mode logic, flight director computations, and servo management					✓		
Autopilot computations and monitoring						✓	
Aircraft control surface Actuation							✓
Trim functionality						✓	

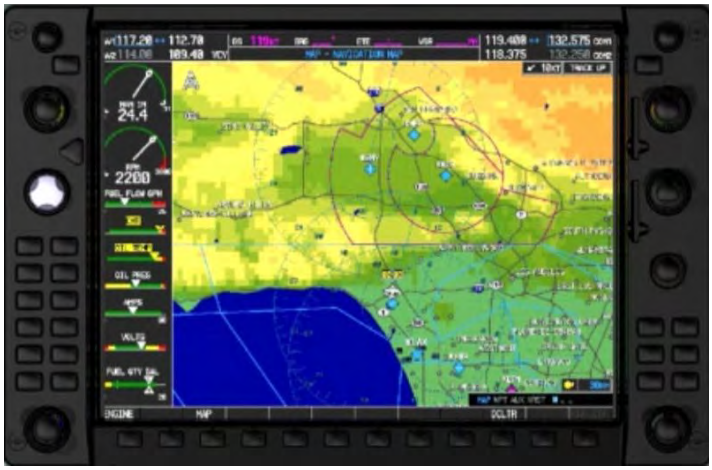
In control of the roll axis, the autopilot senses turn rate, as well as closure rate to the selected course, along with the non-rate quantities of heading error, course error and course deviation indication.

In control of the pitch axis, the autopilot senses vertical speed, acceleration, and closure rate to the selected glideslope, along with the non-rate quantities of altitude and glideslope deviation indication.

The "autotrim" function senses when the aircraft needs to be trimmed about the pitch axis, and responds by driving the trim servo in the proper direction to provide trim.

12.1 GDU 1044 (MFD)

GDU 1044 MFD unit can display as default engine parameters and moving map information, along with other information that can be selected by the pilot (see the first figure below); when reversionary mode is active it will display flight parameters (in the form of PFD with the left strip engine information, as can be seen in the second figure below). It is the user interface for P2010 avionics suite. GDU 1044 unit replaces the GDU 1040 unit on instrument panel RH side (MFD).



GDU 1044 (MFD)

Reversionary mode:

- In the event of a single display failure the system is able to automatically switch the critical information including flight and engine parameters on the remaining display presenting them in a compact view. In the event of a failure of the automatic switch logic, the pilot can easily force the reversionary mode by pressing the red button on the bottom of the audio panel thus getting both flight and engine parameters information, necessary for continued safe flight, on the remaining display.

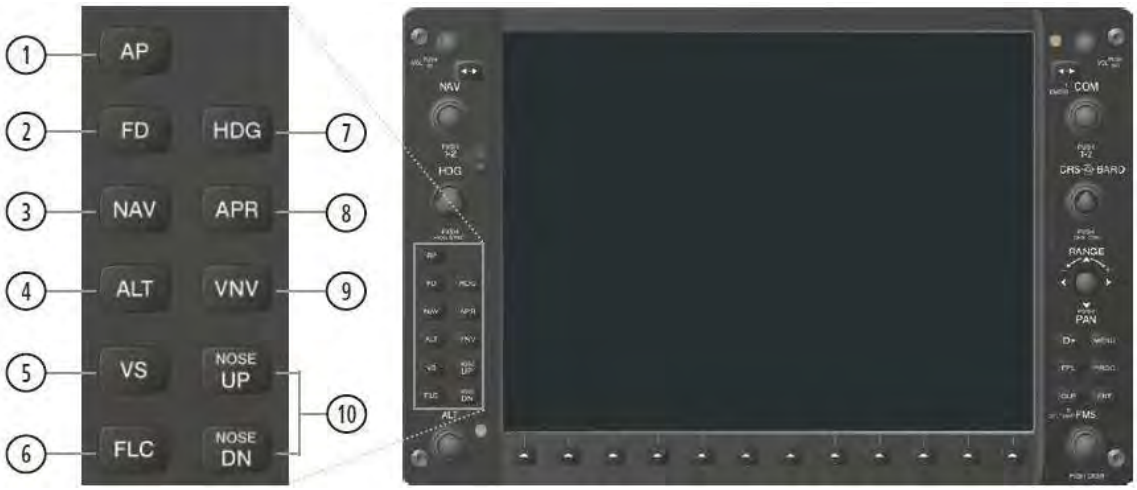
GDU 1044 (MFD) in reversionary mode

Autopilot control panel

The GDU1044 includes a set of additional softkeys dedicated to the control of Autopilot system.

The following dedicated AFCS keys are located on the bezel of the MFD (refer picture below):

1) **AP Key:** Engages/ disengages the autopilot
2) **FD Key: Activates/deactivates the flight director only**
3) **NAV Key:** Selects/deselects Navigation Mode
4) **ALT Key:** Selects/deselects Altitude Hold Mode
5) **VS Key:** Selects/deselects Vertical Speed Mode
6) **FLC Key:** Selects/deselects Flight Level Change Mode
7) **HDG Key:** Selects/deselects Heading Select Mode
8) **APR Key:** Selects/deselects Approach Mode
9) **VNV Key:** Selects/deselects Vertical Path Tracking Mode for Vertical Navigation flight control
10) **NOSE UP/ NOSE DN Keys:** Control the mode reference in Pitch Hold, Vertical Speed and Flight Level Change modes



Autopilot control panel

12.2 PILOT CONTROL WHEEL AND THROTTLE BUTTONS

On the left side of pilot's and copilot's control wheels there are two PTT switches (the one on pilot control wheel is shown below as **(1)**) that, when pushed, allow radio transmission. These switches are momentaneous ones thus acting in such a way that when they are released the active COM device returns to the non- transmitting state. These switches are already installed in the basic aircraft which is not equipped with the autopilot. The following additional dedicated AFCS controls are located on the pilot control wheel, separately from the MFD, and on the throttle handle:

AP DISC Switch: Disengages the autopilot and interrupts pitch trim operation This switch may be used to mute the aural autopilot disconnect alert.

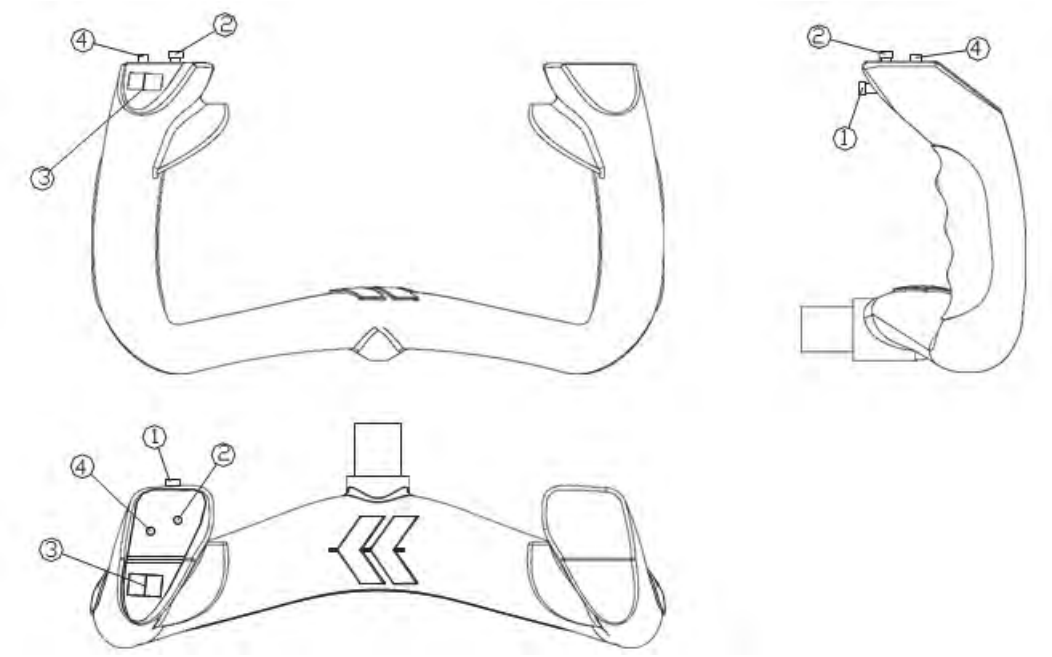
AP Trim Switch: Used to command manual electric trim. This composite switch is split into left and right sides. The left switch is the ARM contact and the right switch controls the DN (forward) and UP (rearward) contacts. The AP TRIM ARM switch can be used to disengage the autopilot and to acknowledge an autopilot disconnect alert and mute the associated aural tone. Manual trim commands are generated only when both sides of the switch are operated simultaneously. If either side of the switch is active separately for more than three seconds, MET function is disabled and 'PTRM' is displayed as the AFCS Status Annunciation on the PFD. The function remains disabled until both sides of the switch are inactivated.

CWS Button: While pressed, the Control Wheel Steering allows manual control of the aircraft while the autopilot is engaged and synchronizes the flight director's Command Bars with the current aircraft pitch (if not in Glideslope Mode) and roll (if in Roll Hold Mode). Upon release of the CWS Button, the flight director may establish new reference points, depending on the current pitch and roll modes. CWS operation details are discussed in the flight director modes section.

TO/GA Switch: The GA Switch is located on the throttle handle.

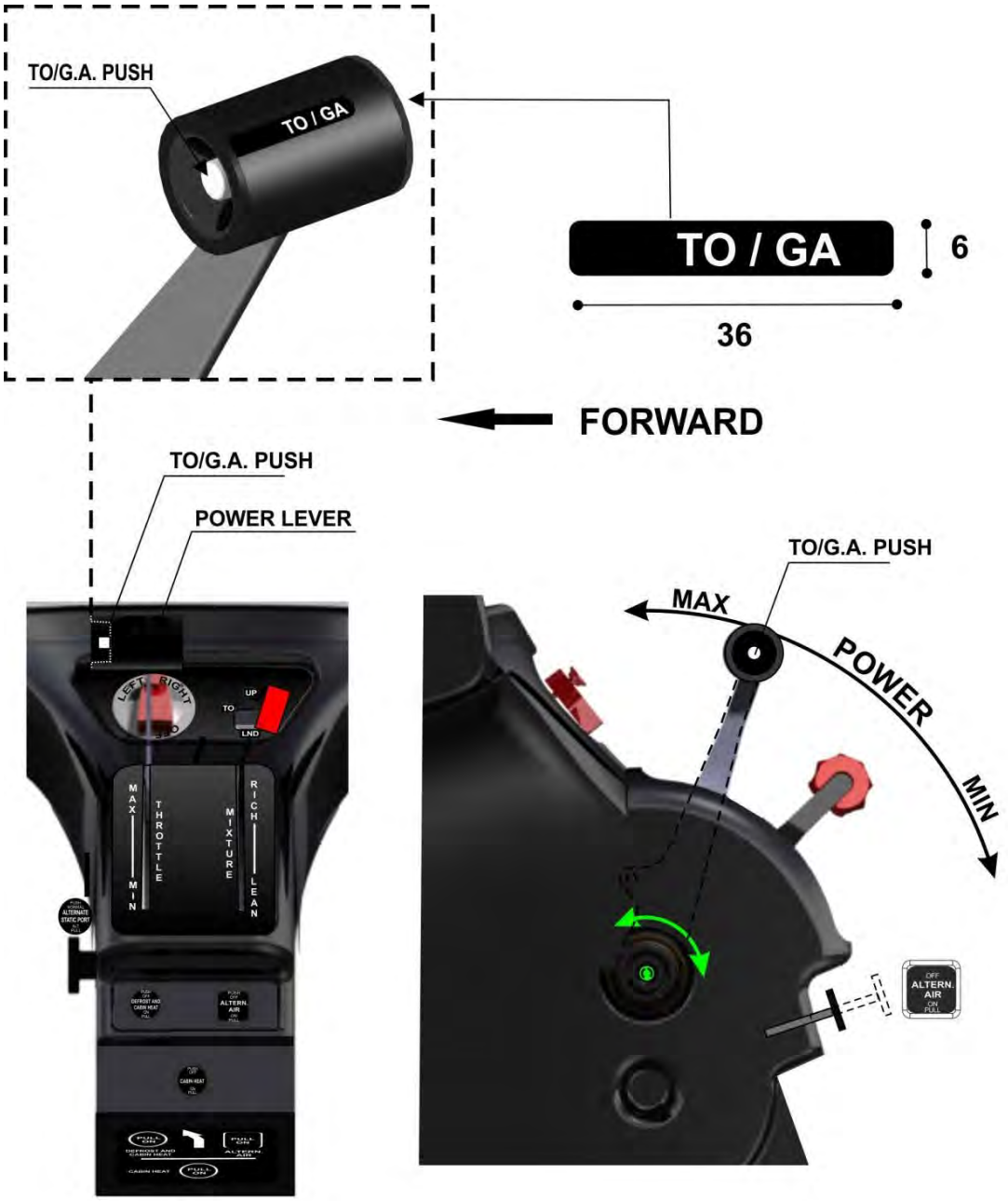
Go Around and Takeoff modes are coupled pitch and roll modes and are annunciated as both the vertical and lateral modes when active. In these modes, the flight director commands a constant set pitch attitude and keeps the wings level. The GA Switch is used to select both modes. The mode entered by the flight director depends on whether the aircraft is on the ground

The above mentioned AFCS controls are depicted in the below figures.



Where:

1) PTT switch
2) AP DISC Switch
3) AP Trim Switch
4) CWS Button


TO/G.A. PUSH
TO / GA
TO / GA
6
36
FORWARD
TO/G.A. PUSH
POWER LEVER
TO/G.A. PUSH
MAX
POWER
MIN
LEFT
RIGHT
UP
TO
LND
MAX
THROTTLE
MIN
MIXTURE
RICH
LEAN
ALTERNATE STATIC PORT
PUSH OFF DEFROST AND CABIN HEAT PULL ON
PUSH OFF ALTERN. AIR PULL ON
OFF CABIN HEAT PULL ON
PULL ON DEFROST AND CABIN HEAT
PULL ON ALTERN. AIR
CABIN HEAT PULL ON
OFF ALTERN. AIR ON PULL

13. AUTOPILOT FUNCTIONS AND FEATURES

GFC 700 autopilot suite is deeply integrated with Garmin G1000 avionics suite which integrates both the a/p controls and the sensors providing the required data to the servos.

The GFC 700 AFCS is equipped with the following main operating functions:

- **Flight Director (FD)** — Flight director commands are displayed on the PFD. The flight director provides:
  - ✓ Command Bars showing pitch/roll guidance
  - ✓ Pitch/roll mode selection and processing
  - ✓ Autopilot communication

- **Autopilot (AP)** — Autopilot operation occurs within the pitch, roll, and pitch trim servo and provides servo monitoring and automatic flight control in response to flight director steering commands, AHRS attitude and rate information, and airspeed.

- **Manual Electric Trim (MET)** — The pitch trim servo provides manual electric trim capability when the autopilot is not engaged.

- **ESP** (Electronic Stability & Protection) keeps the aircraft within well defined operational limits thus preventing the pilot to operate the aircraft outside a specific envelope when it is being hand flown. This feature only operates when autopilot is not engaged and its operation is mutually exclusive with autopilot operation.

- **USP** (Underspeed Protection) is a flight director function that reacts to underspeed conditions in a way that allows the autopilot to remain engaged but prevents the airplane from stalling.

13.1 ESP

Garmin GFC 700 is equipped with an envelope protection feature referred as ESP (Electronic Stability & Protection). Electronic Stability and Protection continuously monitors the aircraft. The system works by applying a correcting force to the controls in order to nudge pilot to avoid extreme attitudes that may bring the aircraft, if not corrected, to exceed normal flying envelope.

This software feature aims to provide protection against aircraft operation outside a desired flight envelope. ESP will maintain the desired operating envelope, defined at autopilot development time, by automatically engaging one or more sevos when the aircraft is near the operating limit and nudging pilot to come back to nominal operating envelope. While ESP utilizes the same sensors, processors, and actuators as the GFC 700 autopilot, it is basically a separate function. ESP can be overpowered by the pilot and can be temporarily disabled using the AP disconnect or CWS switches. It functions independently of the aircraft's autopilot system (although it uses the same control servos), so it basically operates "in background" whenever the pilot is hand-flying the airplane.

The ESP feature will only function with GPS available, A/P MASTER SWITCH ON (but autopilot not engaged) and aircraft above 200ft AGL.

ESP enabling:

As a standard, ESP will automatically set to enable at power-up.

The system is configured in order to allow the pilot to disable ESP (or re-enable it if previously disabled after power up) via the AUX – SYSTEM SETTINGS page on MFD.

If ESP has been disabled via MFD, it will automatically be set to ON upon any battery/power reset.

ESP function uses the same servos that provide autopilot functionality while autopilot is not engaged, as such, if power is cut from these servos both autopilot and ESP functions will be unavailable.

Based on the above if "AUTOPILOT MASTER" is set to OFF, power to servos is cut irrespectively of their mode of operation (autopilot or ESP).

The pilot can interrupt ESP by pressing and holding either the Control Wheel Steering (CWS) or Autopilot Disconnect (AP DISC TRIM INTRPT) switch. Upon releasing the CWS or AP DISC TRIM INTRPT switch, ESP force will again be applied, provided aircraft attitude and/or airspeed are within their respective engagement limits.

ESP can be enabled or disabled on the AUX-SYSTEM SETUP 2 Page on the MFD.

To enable or disable ESP:

1) Turn the large FMS Knob to select the AUX Page Group.
2) Turn the small FMS Knob to select the System Setup Page.
3) If necessary, select the SETUP 2 Softkey to display the AUX-SYSTEM SETUP 2 Page.If the AUX-SYSTEM SETUP 2 is already displayed, proceed to step 4.
4) Press the FMS Knob to activate the cursor.
5) Turn the large FMS Knob to place cursor in the STABILITY & PROTECTION field.
6) Turn the small FMS Knob to select 'ENABLE' or 'DISABLE'.
7) Press the FMS Knob to remove the cursor.

ESP engagement and operation:

ESP is automatically enabled on system power up.

NOTE *ESP unavailability and/or failure is indicated to the pilot on PFD by the advisory "ESP not available" on alert window.*

NOTE *ESP will turn OFF upon loss of both GPS. The ADVSY "ESP OFF" will appear on the alert window in case of loss of both GPS*

13.1.1 PITCH MODE

Pitch attitude boundaries are set based on P2010 aircraft performances. Since pitch ESP augments the natural aircraft longitudinal stability, no special simbology is required.

Value that have been set-up for the P2010 are as follows:

Nose above the horizon:

Engagement low threshold: + 15°
Engagement upper threshold: + 18°
Lower disengage threshold: + 12°

Nose below the horizon:

Engagement low threshold: -15°
Engagement upper threshold: -20°
Lower disengage threshold: -13°

ESP utilizes electronic torque and speed commands to augment the aircraft's stability: it uses an Electronic Torque Limit (ETL) and an Electronic Speed Limit (ESL) to limit the maximum authority of the ESP function. ESP is inactive when the pitch attitude is within the positive and negative engagement limits defined in the certification gain file

When the aircraft reaches the engagement limit, ESP ramps up the servo torque command to adjust the aircraft back toward zero pitch attitude. ESP uses a rate command to drive the attitude back to the nominal range and does not try to control to a specific attitude. As the pitch attitude returns to the nominal range, the torque and pitch rate are reduced until the aircraft reaches the disengagement limit at which time ESP turns off. The disengagement threshold is sized so that the transition from ESP being active to being inactive is transparent to the pilot (no transient when ESP turns off).

If, when ESP engages, the aircraft continues to pitch away from the nominal attitude range the torque command will increase with increasing pitch deviation. Above the upper disengagement limit specified in the certification gain file ESP will be disabled.

13.1.2 ROLL MODE

Roll mode is similar to pitch mode and also utilizes configurable gain file parameters to define engagement and disengagement limits as well as the speed and torque curves.
The engagement and disengagement attitude limits are displayed with double hash marks on the roll indicator when ESP is available and /or active. The lack of double hash marks above 200 ft AGL (when autopilot is not connected) is a clear indication that ESP is not available.

Values for the symmetric roll attitude limits are as follows:

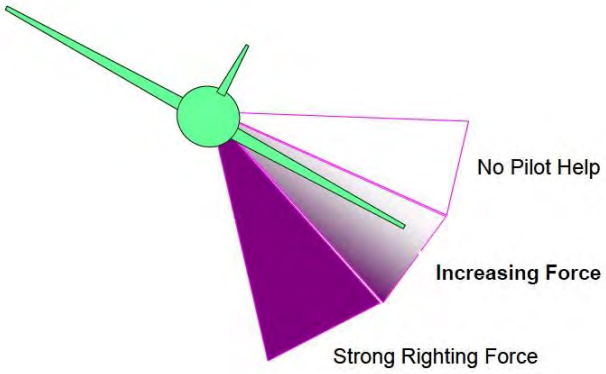
Engagement low threshold: +/- 45°
Engagement upper threshold: +/- 75°
Lower disengage threshold: +/- 30°

Electronic stability and protection action starts at the predetermined bank angle. Since crossing this bank angle results in a change in aircraft stability (and therefore handling characteristics) indications of this boundary are provided to the pilot.

When ESP is inactive (roll attitude within nominal limits) only the engagement limits are displayed in order to reduce clutter on the roll indicator. As the bank.

angle is increased, a region of an increasing force as a function of bank angle is entered. The envelope protection system adds bank stability in this region. As the bank angle is increased further, a constant force is applied to right the airplane.

See the below figure for an example of the ESP engagement limits.



VMO

Exceeding VMO will result in ESP applying force to raise the nose; when the high speed condition is remedied, ESP force is no longer applied.

Engage Limit: 165 KIAS

Upper Limit: 168 KIAS

Lower disengage Limit: 160 KIAS

13.2 USP

Underspeed Protection (USP) is a flight director function that reacts to underspeed conditions, designed to discourage aircraft operation below minimum established airspeeds.

Pilot will be warned of impending low speed conditions, and if no action will be taken FD will directly react in a way that allows the A/P to remain engaged but prevents the airplane from stalling.

WARNING

USP function has been developed in order to warn pilot of impending low speed conditions, and if no action will be taken FD will directly react in a way that allows the Autopilot to remain engaged but prevents the airplane from stalling.

Pilot action is still expected at first warning of low airspeed conditions in order to prevent a low speed conditions, so to maintain normal flight.

CAUTION

When autopilot is engaged USP will provide the pilot with aural/visual cues to make him aware of an impending stall and will drive the servos in order to prevent stall.

When autopilot is not engaged and only Flight director is active, USP will provide the pilot with aural/visual cues to make him aware of an impending stall but servos will not be driven.

How Underspeed Protection functions depends on which vertical flight director mode is selected.

For the purpose of this discussion, the vertical flight director modes can be divided into two categories:

- It is important to maintain altitude for as long as possible (altitude- critical modes).
- Maintaining altitude is less crucial (non-altitude critical modes).

CAUTION

If USP engages while Autopilot is in PIT or VS mode, and power is abruptly set to full throttle, pilot may expect a slight nose up tendency that will be quickly counteracted by autopilot. This is a normal behaviour, the slight nose up tendency in this case will be due to abrupt power advance, but will be immediately damped by Autopilot (with PIT or VS turning green on the annunciation panel).

CAUTION

USP engagement is a consequence of autopilot failing to properly monitoring A/P and aircraft behaviour. This is mainly caused by a pilot request that cannot be fulfilled due to lack of power coupled with unattainable pitch input.

Pilot need to continuously monitor autopilot performance, while checking that mode selections are compatible with aircraft performance.

CAUTION

If Autopilot is engaged in FLC mode, FLC mode will downgrade to PIT mode when in USP for more than 10 seconds.

CAUTION

If USP engages while in ALT mode, upon USP disengagement FD will command bars to regain pre-selected altitude (altitude selected before USP engagement). Pilot must monitor A/P to check if previous pre-selected altitude is still attainable with energy available. It is recommended in this case to preselect a new altitude in order to speed-up energy management and recover from slow speed conditions.

NOTE

When USP becomes active, expect a small FD adjustment due to reaction to very low speed condition.

13.2.1 ALTITUDE CRITICAL MODES (ALT, GS, GP, TO, GA, FLC)

When the airspeed trend vector (dedicated algorithm) reaches 65 +/- 2 KIAS a single aural "AIRSPEED" will sound, alerting the pilot to the impending underspeed condition, which requires pilot action.
If the aircraft decelerates to stall warning and a speed of 65 KIAS is reached, the lateral and vertical flight director modes will change from active to armed and the autopilot will provide input causing the aircraft to pitch down and the wings to level.

The aural "AIRSPEED" alert will sound every five seconds.

If aircraft is unintentionally decelerated to 65 KIAS, a MINSPD annunciation posts above the airspeed tape on PFD in alternating amber and black text. A red "UNDERSPEED PROTECT ACTIVE" annunciation will appear to the right of the vertical speed indicator. USP will drive the pitch down until the indicated airspeed increases above 70 KIAS or stall warning turns off, plus two knots (whichever comes first).

When USP disengages, autopilot will cause the aircraft to pitch up until recapturing the vertical reference (vertical and lateral flight director modes will change from white armed to green active).

13.2.2 NON ALTITUDE CRITICAL MODES (VS, VNAV, IAS)

When the **airspeed trend vector** (dedicated algorithm) reaches 65 +/- 2 KIAS a single aural "AIRSPEED" will sound, alerting the pilot to the impending under- speed condition, which requires pilot action.

If the aircraft is allowed to decelerate to an IAS below the minimum commandable autopilot airspeed (65 Kts for P2010), a red "UNDERSPEED PROTECT ACTIVE" annunciation appear to the right of the vertical speed indicator

Vertical flight director mode will change from active to armed, Flight Director and autopilot will command the aircraft to pitch down until reaching a pitch attitude at which IAS equals at least the minimum commandable autopilot airspeed, avoiding the development of a stall condition.

When airspeed increases (as a result of adding power/thrust) to an IAS above 70 KIAS, USP will then disengage and the autopilot will command the aircraft to pitch up until recapturing the vertical reference (vertical vertical flight director mode will switch from white armed to green active).

Supplement D07: pages replacement instructions

SECTION 2 – LIMITATIONS

Make sure you first applied instructions reported on the basic AFM, Section 2 Limitations

According to A/C configuration apply following pages replacement:

Supplement D07 LIMITATIONS page		AFM Section 2 page
APV 2-7	**REPLACES**	2-7 of basic AFM, Section 2
APV 2-9 thru 10	**REPLACES**	2-9 thru 10 of basic AFM, Section 2
APV 2-15	**REPLACES**	2-15 of basic AFM, Section 2
APV 2-17 thru 20	**REPLACES**	2-17 thru 20of basic AFM, Section 2

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4. POWERPLANT LIMITATIONS

Following table reports the operating limitations the installed engine:

ENGINE MANUFACTURER: Lycoming Engines
ENGINE MODEL: IO-360-M1A
MAXIMUM POWER:

	Max Power *(hp)*	**Max rpm. Prop. rpm**
Max. T.O.	180	2700
Max. Cont.	173.3	2600

Temperatures:

Max CHT ……..…… 500° F (260° C)

Max Oil ……. 245° F (118° C)

Oil Pressure:

Minimum Idling ……..... 25 psi (1.7 Bar)

Minimum Normal ……. 55 psi (3.8 Bar)
Maximum Normal ……..… 95 psi (6.5 Bar)

Starting, Warm-up, taxi and take-off (Max) …..115 psi (7.9 Bar)

Fuel pressure:

- *At Inlet to fuel injector:*

Minimum ..... 14 psi (0.96 Bar)

Maximum ..... 35 psi (2.41 Bar)

7. PAINT

To ensure that the temperature of the composite structure does not exceed limits, the outer surface of the aeroplane must be painted with white paint, except for areas of registration marks, placards, and ornament.

Refer to Aircraft Maintenance Manual (AMM), ATA Chapter 4 and 51, for specific paint requirements.

8. PROPELLER

MANUFACTURER: …….. MT Propeller

MODEL: ……..……. MTV 15B/193-52

TYPE: ……..…… wood/composite 2-blade, variable pitch

DIAMETER: ……... 1930 mm (76 in) (no reduction is permitted)

9. MAXIMUM OPERATING ALTITUDE

Maximum operating altitude is 12000 ft (3658 m) MSL.

At altitudes above 10000 ft (3048 m) up to and including 12000 ft (3658 m), flight crew is recommended to use supplemental oxygen.

10. AMBIENT TEMPERATURE

Ambient temperature: from -25°C to +50°C.

Flight in expected and/or known icing conditions is forbidden

11. POWERPLANT INSTRUMENT MARKINGS

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

INSTRUMENT		RED ARC Minimum limit	WHITE ARC Advisory	GREEN ARC Safe operation	YELLOW ARC Caution	RED ARC Maximum limit
PROPELLER	RPM	/	/	950-2600	0-950 2600-2700	2700 (line)
OIL TEMP.	°F	/	/	140-245	0 - 140	245 - 255
CHT	°F	/	435 (line)	150-475	0 – 150 475-500	500-510
EGT	°F	/	1000-1500	/	1375 (line)	1500-1550
OIL PRESS	psi	0-25	/	55-95	25 - 55 95-115	115 - 125
FUEL PRESS	psi	0-14	/	14-35	/	35 - 40
FUEL QTY	litres	0	/	0-115	/	/
	gal	0		0-30,4		
FUEL FLOW	l/hr	/	0-75	/	/	/
	gal/hr		0-20			

12. OTHER INSTRUMENT MARKINGS

INSTRUMENT	RED ARC Minimum limit	GREEN ARC Safe operation	YELLOW ARC	RED ARC Maximum limit
Voltmeter	20-21 Volt	24–30 Volt	21–24 Volt	30-31

19 LIMITATIONS PLACARDS

Hereinafter limitation placards, related to the operating limitations, are placed in plain view on the pilot.

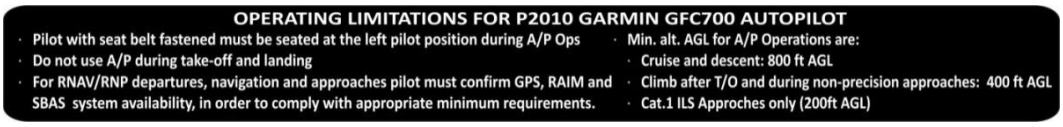
19.1 SPEED LIMITATIONS

On the left side instrument panel, above on the left, it is placed the following placard reporting the speed limitations:

19.2 OPERATING LIMITATIONS

On the central side of the instrument panel, the following placard is placed reminding the observance of aircraft operating limitations according to installed equipment configuration, see KOEL paragraph 18.

When the Autopilot is installed, next placard is added on the instrument panel to the right of the preceding one:



19.3 NO SMOKING PLACARD

On the right hand side of the instrument panel the following placard is placed reminding the observance for “no smoking”:

20 AUTOPILOT LIMITATIONS

NOTE

The "Garmin G1000 Pilot's Guide for the Tecnam P2010" (Part No. 190-01830-00 Revision A dated September 25, 2014 or a more up-dated version) must be carried in the aircraft and made available to the pilot at all time.

Following operating limitations shall apply when the aircraft is equipped with Garmin GFC700 Autopilot:

- The Autopilot is certified for Category I – ILS Approaches [with a decision height not lower than 200 ft AGL (61 m)]
- During Autopilot operation, a pilot with seat belt fastened must be seated at the left pilot position
- Maximum speed for Autopilot operation is 150 KIAS
- Do not use autopilot for airspeed below 70 KIAS
- Minimum approach speed is 70 KIAS
- The autopilot must be OFF during takeoff and landing
- Minimum altitude AGL for Autopilot operation is:
  - b. Cruise and Descent: 800 ft (244 m) AGL
  - c. Climb after Take-off: 400 ft (122 m) AGL
  - d. ILS CAT I precision approach: 200 ft (61 m) AGL
- Use of the autopilot or manual electric trim system is prohibited before the satisfactory completion of the Pre-flight procedure.
- Autopilot USP function requires flaps indicators lights in the cockpit to be efficient for correct operation. If one flap indicator light gets in-operative during flight, USP function is not assured.

21 PBN (RNAV & RNP) OPERATIONAL ELIGIBILITY

21.1 GENERAL GNSS NAVIGATION EQUIPMENT APPROVALS

The GPS/GNSS receivers in the G1000 System are certified to TSO C129a Class A1 and ETSO C129a Class A1 or TSO C145a and ETSO 2C145a.

The Garmin GNSS navigation system as installed in this airplane complies with the requirements of AC 20-138A, JAA TGL-10 and AMCs 20-4A, 20-27A and 20-28.

It's approved for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, precision and non-precision approach operations.

The G1000 System meets the requirements for GPS/GNSS as a Primary Means of Navigation for Oceanic/Remote Operations (RNP-10) per AC 20-138C, FAA Notice N8110.60, FAA Order 8400-12C and FAA Order 8700-1. Both GPS/GNSS receivers are required to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor.

In accordance to ICAO doc 9613 (Fouth Edition – 2013), the G1000 System has been shown to be eligible for:

- B-RNAV (RNAV-5) per AMC 20-4A.
- RNAV1 / P-RNAV (RNP-1) Enroute and Terminal navigation per JAA TGL-10 Rev.1.
- RNP APCH LNAV/VNAV per EASA AMC 20-27. This does not include APV BARO-VNAV operation which is not cleared.
- LPV with SBAS per EASA AMC 20-28.

provided that the G1000 is receiving usable navigation information from at least one GPS receiver.

21.2 G1000 GNSS (GPS/SBAS) NAVIGATION SYSTEM LIMITATIONS

The pilot must confirm at system initialization that the Navigation database is current. 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.

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.

Discrepancies that invalidate a procedure must be reported to Garmin International. The affected procedure is prohibited from being flown using data from the Navigation database until a new Navigation database is installed in the airplane and verified that the discrepancy has been corrected.

Contact information to report Navigation database discrepancies can be found at www.Garmin.com>Support>Contact Garmin Support>Aviation. Pilots and operators can view navigation data base alerts at www.Garmin.com > In the Air> NavData Alerts.

For flight planning purposes, in areas where SBAS coverage is not available, the pilot must check RAIM availability.

Within Europe, RAIM availability can be determined using the G1000 WFDE Prediction program or Europe's AUGER GPS RAIM Prediction Tool at http://augur.ecacnav.com/augur/app/home.

This requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight.

The route planning andWFDE prediction program may be downloaded from the GARMIN G1000 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'.

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 rerouted on a track where RAIM requirements can be met.

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

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs) and Obstacle Departure Procedures (ODPs), Standard Terminal Arrival (STAR), and enroute RNAV ”Q” and RNAV ”T” routes should be loaded into the

flight plan from he database in their entirety, rather than loading route waypoints from the data

base 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. ”GPS”, ”or GPS”, and ”RNAV (GPS)” instrument approaches using the G1000 System are prohibited unless the pilot verifies and uses the current Navigation database. GPS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is loaded from the Navigation database.

Not all published Instrument Approach Procedures (IAP) are in the Navigation database.

Pilots planning on flying an RNAV instrument approach must ensure that the Navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the Navigation database into the FMS flight plan by its name.

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 G1000 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 G1000 VOR/LOC/GS receivers to fly the final approach segment, VOR/LOC/GS navigation data must be selected and presented on the CDI.

SID/STAR

The use of SIDs and STARs stored in GPS data base is only authorized, if the pilot has checked that GPS procedure corresponds to the one given in the official documentation (coordinates of various points and paths between points).

Supplement D07: pages replacement instructions

SECTION 3 – EMERGENCY PROCEDURES

Make sure you first applied instructions reported on the basic AFM, Section 3 Emergency Procedures

According to A/C configuration apply following pages replacement:

Supplement D07 EMERGENCY PROCEDURES page		AFM Section 3 page
APV 3-4	**REPLACES**	3-4 of basic AFM, Section 3
APV 3-14	**REPLACES**	3-14 of basic AFM, Section 3
APV 3-18 thru 19	**REPLACES**	3-18 thru 19 of basic AFM, Section 3
APV 3A-31 thru 35	**REPLACES**	Added at the end of Section 3 of basic AFM

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1.1. REFERENCE AIRSPEEDS FOR EMERGENCY PROCEDURES

Best glide speed (V_{GLIDE})	**84 KIAS**
No-flaps Approach Speed	**80 KIAS**

6.3 PROPELLER OVERSPEED

In case of propeller overspeed in flight, apply following procedure:

1.	Throttle Lever …….	REDUCE power
2.	Propeller Lever …….	Decrease RPM
3.	Mixture Lever …….	As required
4.	RPM indicator ……	CHECK

If it is not possible to decrease propeller rpm, **land as soon as possible** applying

Forced landing procedure. *(See Para 11)*

Maximum propeller rpm exceedance may cause engine components damage.

Monitor engine RPM; overspeed shall be prevented by retarding propeller lever.

6.4 IRREGULAR RPM

1. Fuel pump: ……..……ON
2. Fuel quantity and pressure indicators: ……CHECK
3. If necessary: …….. SWITCH TANK

If engine continues to run irregularly

- **Land as soon as possible**.

6.10. DEFECTIVE ENGINE CONTROLS

Defective Mixture Control Cable

1. Maintain altitude to the nearest arfield
2. During descent, check engine behaviour to a higher power setting. A lean mixture can lead to engine roughness and loss of power. Landing approach must be planned accordingly.

Go-around may then be impossible.

Defective Throttle Control Cable

If power is sufficient to continue flight:

1. Approach nearest airfield, control engine power with Propeller lever
2. Perform landing with shut-down engine applying *Forced landing procedure. (See Para 11)*

If power is not sufficient to continue flight:

1. Carry out *Forced landing procedure. (See Para 11)*

Defective Propeller Lever Control Cable

If power is sufficient to continue flight:

1. Approach nearest airfield, control engine power with throttle
2. Perform normal landing.

Go-around may then be impossible.

If power is not sufficient to continue flight:

1. Carry out Forced landing procedure. (See Para 11)

7. INFLIGHT ENGINE RESTART

7.1. PROPELLER WINDMILLING

In case of engine shutdown, propeller will keep windmilling and will not stop, preventing the use of ignition key. Engine inflight restart must be performed without using ignition key with propeller windmilling in order to avoid possible engine damages.

Typical indication of a potential engine shutdown, with windmilling propeller, will be RPM running sub-idle below 600-500 RPM, to be confirmed by other engine instrument (OIL Pressure, CHT, EGT running down abnormally).

Inflight engine restart may be performed during 1g flight anywhere within the normal operating envelope of the airplane.

1.	Master switch ……	*Check ON*
2.	Fuel pump …….	*ON*
3.	Fuel quantity indicator ……..	*CHECK*
4.	Fuel Selector …….	*SWITCH TANK*
5.	Throttle Lever ……..	*Minimum 1cm. above IDLE*
6.	Propeller Lever……..	*Full forward*
7.	Mixture ……	*FULL rich*
8.	Throttle lever ……	*SET as required*

In case of unsuccessful engine restart:

- **Land as soon as possible** applying *Forced landing procedure. (See Para 11)*

In case of successful engine restart:

- **Land as soon as possible**

After engine restart, if practical, moderate propeller rpm to allow the temperatures for stabilizing in the green arcs.

12. AUTOPILOT EMERGENCY PROCEDURES

NOTE

In the event of autopilot malfunction, or when the system is not performing as expected or commanded, take immediately the aircraft control disconnecting the autopilot which must be set inoperative until the failure has been identified and corrected.

12.1 AUTOPILOT HARDOVER OR FAILURE TO HOLD THE SELECTED HEADING

In case of A/P hardover or failure to hold selected heading, apply following procedure:

Accomplish items 1 and 2 simultaneously:

1.	Airplane control wheel	*GRASP FIRMLY and OVERPOWER if necessary to regain aircraft control*
2.	AP DISC/TRIM INTR switch	*PRESS*
3.	AP MASTER SWITCH	*OFF*
4.	AP Circuit Breaker	*PULL*

Following an A/P or MET system malfunction, do not engage the autopilot until the cause of the malfunction has been corrected.

NOTE

When Autopilot is disconnected, it may be necessary operate the pitch trim through either the Manual Electric Trim Switch or the Trim Wheel.

12.2 ALTITUDE LOST DURING A PITCH AXIS AUTOPILOT MALFUNCTION AND RECOVERY

Following table addresses the altitude lost during a pitch axis malfunction and recovery for each reported flight phase:

Flight phase	Altitude loss
Climb	90 ft
Cruise	200 ft
Descent	170 ft
Maneuvering	210 ft
Approach	70 ft

12.3 ELECTRIC TRIM MALFUNCTION

In case of Electric Trim malfunction (either in AP Autotrim mode or when manually operated through the Manual Electric Trim Switch), apply following procedure:

1. AP DISC/TRIM INTR switch — *PRESS and HOLD*
2. TRIM MASTER SWITCH — *OFF*
3. TRIM Circuit Breaker — *PULL*
4. AP DISC/TRIM INTR switch — *RELEASE*

When Autopilot is disconnected because of a pitch trim malfunction, hold the control wheel firmly.

NOTE

When electric trim is disconnected, it is necessary operate the pitch trim through the Trim Wheel.

NOTE

When electric trim is disconnected, Autopilot system can be operated both in pitch and roll modes; nevertheless, when a pitch mode (ALT HOLD, VS, GS) is engaged, the Autopilot will provide an annunciation whenever it is necessary to manually trim the aircraft about the pitch axis using the Trim Wheel. Make reference to "Garmin G1000 Integrated Avionic System Pilot's Guide"for Tecnam P2010 (Part No. 190-01830-00 Revision A dated September 25, 2014 or a more updated version).

12.4 AMPLIFIED EMERGENCY PROCEDURES

The following observations provide additional information for more complete understanding of the recommended course(s) of action in emergency situations.

1. An autopilot or autotrim malfunction occurs when there is an uncommanded deviation in the airplane flight path or when there is abnormal control wheel or trim wheel motion. In some cases, (especially for autopilot trim), there may be little to no airplane motion, but the PITCH TRIM annunciator (LH side of PDF) may come on.

2. The primary concern in reacting to an autopilot or autopilot trim system malfunction, or to an automatic disconnect of the autopilot, is to keep control of the airplane. Immediately grasp the control wheel and push and hold the A/P DISC/TRIM INT switch throughout the recovery. Manipulate the controls as required to safely keep the airplane within all of its operating limitations. Elevator trim should be used manually as needed to relieve control forces.

   Switch the AP MASTER SWITCH to OFF and, when time is available after aircraft recovery, open (pull) the AUTOPILOT circuit breaker on the lower right hand corner of the circuit breaker panel to completely disable the autopilot system.

3. A MET (Manual Electric Trim) system malfunction (without pilot actuation of the manual electric trim switches) may be recognized by the PITCH TRIM annunciator coming on or by unusual trim wheel motions with the autopilot not engaged. As with an autopilot malfunction, the first concern following a manual electric trim system malfunction is to keep the airplane in control. Grasp the control wheel firmly and push and hold down the A/P DISC/TRIM INT switch. Switch the trim cut-out switch to OFF.

12.5 ABNORMAL PROCEDURES

This table is a quick access table that provide additional information regarding residual A/P capabilities in case loss of autopilot servos and/or pitch trim servo.

NOTE

With A/P engaged, in case of loss of both A/P servos and pitch trim servo, the disconnect tone will play continuously, until acknowledged through A/P button on MFD or trim switch on control wheel.

LOSS OF A/P SERVO	LOSS OF PITCH TRIM SERVO	A/P STATUS	NOTES	A/P FUNCTIONALITY	ESP STATUS		USP STATUS	
					ON	OFF	ON	OFF
	X	DISENGAGED	MEPT Unavailable PTRM red on PFD NO VERT MODES on PFD PTRM C&M red cross on MFD SYS page	A/P can be engaged, but only lateral modes will be correctly flown (lack of pitch trim). FD is operative in all modes	X		X (can't hold 65 kts without pitch trim available)	
X			A/P disconnect PTCH red annunciation on PFD NO VERT MODES on PFD ESP Fail on alert window PTCH C&M red cross on MFD SYS page ROLL C&M red cross on MFD SYS page	A/P can be engaged, but only lateral modes will be correctly flown (lack of pitch trim). FD is operative in all modes		X		X (only MINSPD warning)
X	X		A/P disconnect & MEPT Unavailable AFCS red annunciation on PFD (1") ESP Fail on alert window PTCH C&M red cross on MFD SYS page ROLL C&M red cross on MFD SYS page PTRM C&M red cross on MFD SYS page	A/P can't be engaged FD is operative in all modes		X		X (only MINSPD Warning)
	X	ENGAGED	MEPT Unavailable PTRM red annunciation on PFD NO VERT MODES on PFD PTRM C&M red cross on MFD SYS page	A/P can't be engaged FD is operative in all modes	X		X (can't hold 65 kts without pitch trim available)	
X			A/P disconnect PTCH red annunciation on PFD NO VERT MODES on PFD ESP Fail on window alert PTCH C&M red cross on MFD SYS page ROLL C&M red cross on MFD SYS page	A/P can't be engaged FD is operative in all modes		X		X (only MINSPD Warning)
X	X		***A/P continuous disconnect tone can be silenced through the AP button on MFD and by the trim switch on control wheel.*** A/P disconnect &MEPT Unavailable AFCS red annunciation on PFD (1") NO VERT MODES on PFD ESP Fail on alert window PTCH C&M red cross on MFD SYS page ROLL C&M red cross on MFD SYS page PTRM C&M red cross on MFD SYS page	A/P can't be engaged FD is operative in all modes		X		X (only MINSPD warning)

This table is a quick access table that provide additional information regarding residual A/P capabilities in case of loss of PFD or MFD.

PFD	MFD	NOTES
ON → OFF	ON	A/P reverts to PIT & ROLL (from any mode selected) No aurals from A/P (both A/P DISC & USP)
ON	ON → OFF	A/P stays in the selected mode A/P control keyboard unavailable A/P can be disconnected with A/P DISC button on control wheel FD command bars cannot be eliminated ESP Off on alert window on PFD
ON → OFF	ON → OFF	A/P automatically disconnects after ~ 4 to 5 seconds A/P disconnection tone plays endlessly until A/P DISC

Supplement D07: pages replacement instructions

SECTION 4 – NORMAL PROCEDURES

Make sure you first applied instructions reported on the basic AFM, Section 4 Normal Procedures

According to A/C configuration apply following pages replacement:

Supplement D07 NORMAL PROCEDURES page		AFM Section 4 page
APV 4-7	**REPLACES**	4-7 of basic AFM, Section 4
APV 4-15	**REPLACES**	4-15 of basic AFM, Section 4
APV 4-19 thru 26	**REPLACES**	4-19 thru 26 of basic AFM, Section 4
APV 4-27 thru 38	**REPLACES**	Added at the end of Section 4 of basic AFM

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3. AIRSPEEDS FOR NORMAL OPERATIONS

The following airspeeds are those which are significant for normal operations.

	FLAPS	**1160kg (2557lbs)**
Rotation Speed (V_R)	T/O	**60 KIAS**
Best Angle-of-Climb Speed (V_X)	0°	**75 KIAS**
Best Rate-of-Climb speed (V_Y)	0°	**82 KIAS**
Flaps (V_{FE})	T/O & LAND	**91 KIAS**
No flaps approach	0°	**80 KIAS**
Approach speed	T/O	**75 KIAS**
Final Approach Speed	FULL	**70 KIAS**
Manoeuvring speed (V_A)	0°	**120 KIAS**
Vglide	0°	**84 KIAS**
Never Exceed Speed (V_{NE})	0°	**166 KIAS**

5. CHECKLISTS

5.1. BEFORE STARTING ENGINE (AFTER PREFLIGHT INSPECTION)

1. Seat position and safety belts: *adjust*
2. Flight controls: operate full stroke checking for movement smoothness, free of play and friction.
3. Parking brake: *engage*
4. Throttle friction: *adjust*
5. Throttle*: IDLE*
6. Propeller Lever: *HIGH RPM*
7. Mixture control Lever: *LEAN*
8. Circuit Breakers: *check all IN*
9. Master switch: *ON, wait PFD turn on, Check ALT OUT caution ON, Check LOW FP and LOW OP warning ON*
10. Only before the first flight of the day:

    Standby Instrument: Check no red crosses displayed.

    a. Press and hold the control knob (approx. 2 sec)

    b. Rotate the knob selecting "INFO>" page then press it

    c. Select "BATTERY INFO" page then press the knob

    d. Check "CHARGE (%)" to be more than 80%, then exit menu
11. Avionic Master switch: *ON, wait MFD turn on, check instruments, check Voltage on Main and Essential Buses.*
12. Fuel quantity: *compare the fuel quantity indicators information with fuel quantity visually checked into the tanks (see Pre-flight inspection – External inspection), then update the Garmin fuel content in the totalizer accordingly*

NOTE

The totalizer function available on Garmin Engine page allows input only up to 230lts (maximum usable fuel). Initial Fuel indication on totalizer must be corrected manually (as it does not use the aircraft fuel quantity indicators as input). Once correctly initialized, fuel consumption on totalizer is very precise as it take instantaneous fuel flow for computation

13. Electric fuel pump: *ON (check for audible pump noise and increase of fuel pressure)*
14. Warning "LOW FUEL PRESSURE"*: extinguished*
15. Electric fuel pump: *OFF*
16. Flap control: *cycle fully extended and then set to T/O*
17. Pitch Trim: *cycle fully up and down, then set to NEUTRAL*
18. Rudder trim: *cycle full right and left, then set to NEUTRAL*

Pitch trim position other than in neutral position would affect take off performance and take off rotation execution at the correct VR.

19. Nav & Strobe lights: *ON*

NOTE

In absence of RH seat occupant: fasten seat belts around the seat in order to prevent any interference with the aeroplane flight control operation and with rapid egress in an emergency

20. Doors: *Closed and locked*

5.5. BEFORE TAKEOFF

1. Parking brake: *brake pedal press, ON*
2. Engine instruments: *Check within limits*
3. ALT OUT caution: *OFF (check)*
4. Electric Fuel pump: *ON*
5. Fuel selector valve: *select the fullest tank*
6. Fuel pressure: *check*
7. Mixture: *FULL RICH*

NOTE *For 5000ft density altitude and above, or high ambient temperatures, a FULL RICHmixture may cause rough running of the engine or a loss of performance. The mixture may be adjusted to obtain smooth engine operations*

8. *Throttle: set 1500 RPM*
    a. *Alternate Air check:*
    - Alternate Air: *PULL (Check drop 50-100 RPM)*
    b. *Mixture check:*
    - Mixture: *reduce*
    - EGT: *check increase*
    - FF: *check decrease*
    - Mixture: *FULL RICH*
9. Throttle: *2100 RPM*
10. *Propeller Lever:*
    - *Pull back until a drop of max. 500 RPM is reached then high RPM*
    - *Cycle 3 times*
11. Magneto Check: *L – BOTH – R – BOTH*
    - Max RPM drop: *175 RPM*
    - Max. difference: *50 RPM*
12. Throttle: *Idle*
13. Flaps: check *T/O*
14. Pitch and Rudder trim: *check neutral*
15. Flight controls: *check free*
16. Seat belts: *check fastened*
17. Doors: *check closed and locked*
18. Parking brake: *Release*
19. Landing light: *ON as required*
20. XPDR: *ON*

5.6. TAKEOFF

NOTE

For 5000ft density altitude and above, or high ambient temperatures, a FULL RICH mixt may cause rough running of the engine or a loss of performance. The mixture may be justed to obtain smooth engine operations.

Lean to maximum RPM at Full Throttle prior to take-off where airports are at 5000ft den altitude or higher.

During climb, a rough method of correctly leaning is to slowly reduce mixture lever until increase of appr.ly 50-100 RPM is noticed at constant IAS or EGT reaches 1375°F mark

1. Pitot HEAT: *ON if required*
2. Fuel pump: *ON*
3. Brakes: *apply*
4. Throttle: FULL *and check approximately 2680 ± 20 RPM*

Engine proper performance at full throttle shall be checked early in the ground roll in order to abandon take-off if necessary.

A rough engine, sluggish RPM increase or failure to reach take-off RPM are reasons for abandoning the take-off. If the engine oil is cold, an oil pressure in the yellow sector is permissible

5. Engine instruments: *check parameters within the limits*
6. Brakes: Release
7. Rotation speed VR: 60 KIAS
8. Airspeed: 67 KIAS

Above a safe height:

1. Propeller lever: *2600 RPM*
2. Landing lights: *OFF*

5.7. CLIMB

NOTE

Due to position of fuel sensors, during climb fuel gauges in cockpit will indicate a fuel quantity slightly lower than the real amount. Regaining level flight will immediately restore correct indications.

For 5000ft density altitude and above, or high ambient temperatures, a FULL RICH mixture may cause rough running of the engine or a loss of performance.

The mixture may be adjusted to obtain smooth engine operations.

NOTE

Lean to maximum RPM at Full Throttle prior to take-off where airports are at 5000ft density altitude or higher.

During climb, a rough method of correctly leaning is to slowly reduce mixture lever until an increase of appr.ly 50-100 RPM is noticed at constant IAS or EGT reaches 1375°F mark.

1. Flaps: *UP (minimum speed 73 KIAS)*

NOTE

Expect to adjust pitch trim (pitch up) when retracting flaps after take-off

2. Establish climb Vy: *82 KIAS*
3. Electrical fuel pump: *OFF*
4. Fuel pressure: *check within limits*
5. Throttle: *FULL*
6. MIXTURE: *RICH, above 5000ft keep EGT constant*
7. Engine instruments: *in the GREEN*

NOTE

If the fuel pressure warning light illuminates, or the fuel pressure indication is below green arc, the electrical fuel pump must be switched ON.

5.8. CRUISE

1. Power: *set performance as required, refer to table in section 5 of AFM*
2. Propeller lever: 1800-2400 RPM
3. Fuel tank selector: *as required to maintain symmetric balance*
4. Mixture: *set in accordance with following para 5.9*

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

NOTE *Monitor and manually compensate asymmetrical fuel consumption by switching fuel selector valve. Switch ON the electric fuel pump prior to swap the fuel feeding from one tank to another.*

5.9. MIXTURE ADJUSTMENT RECOMMENDATION

CAUTION *The maximum permissible cylinder head temperature (500 °F) must never be exceeded. The mixture control lever should always be moved slowly.*

Before selecting a higher power setting the mixture control lever should, on each occasion, be moved slowly to fully RICH before throttle adjustment.

Care should always be taken that the cylinders do not cool down too quickly. The cooling rate should not exceed 50 °F per minute.

NOTE *For maximum service life cylinder head temperature should be kept below 475 °F (high performance cruise) and below 435 °F (for economy cruise).*

Best Cruise Economy Mixture

The best economy mixture setting may only be used up to a power setting of 75 %. In order to obtain the lowest specific fuel consumption at a particular power setting, proceed as follows:

- *Slowly pull the mixture control lever back towards LEAN until the engine starts to run roughly.*
- *Then push the mixture control lever forward just far enough to restore smooth running. At the same time the exhaust gas temperature (EGT) should reach a maximum.*

Best Cruise Power Mixture

The mixture can be set for maximum performance at all power settings:

- *The mixture should first be set as for best economy.*
- *The mixture should then be enriched until the exhaust gas temperature is approximately 100°F lower.*

This mixture setting produces the maximum performance for a given manifold pressure and is mainly used for high power settings (approximately 75 %).

5.10. DESCENT

NOTE

Due to position of fuel sensors, during descent fuel gauges in cockpit will indicate a fuel quantity slightly higher than the real amount. Regaining level flight will immediately restore correct indications

1. Mixture control: *slowly full rich*
2. Propeller lever: *as required*
3. Throttle: *reduce as required*

Shock cooling shortens engine life.

NOTE

When reducing power, the change in cylinder head temperature should not exceed 50°F per minute. In order to ensure best practice and avoid potential illumination of ALT FAIL (due to low propeller speed), the following best practice should be observed:

- *Reducing power to maintain a minimum descent speed of 84 KIAS (best glide) and / or a blade angle to maintain 850 RPM;*
- *Opening the ALTER AIR command to full open (to avoid ice accretion).*

The maximum permissible cylinder head temperature (500 °F) must never be exceeded. The mixture control lever should always be moved slowly.

Before selecting a higher power setting the mixture control lever should, on each occasion, be moved slowly to fully RICH.

Care should always be taken that the cylinders do not cool down too quickly. The cooling rate should not exceed 50 °F per minute.

5.11. BEFORE LANDING

1. Electric fuel pump: *ON*
2. Fuel valve: *select the fullest tank*
3. Landing Light: *ON*

On downwind, leg abeam touch down point:

4. Flaps: *set T/O (below 90KIAS)*

NOTE *Expect to adjust pitch trim (pitch down) when extending flaps to T/O or LAND*

5. Approach speed: set On final leg, before landing:
6. Mixture control lever: RICH
7. Propeller Lever: HIGH RPM
8. Flaps: LAND
9. Final Approach Speed: set
10. ptimal touchdown speed: *60 KIAS*

CAUTION *In conditions such as (e.g.) strong wind, danger of windshear or turbulence a higher approach speed shall be selected..*

5.12. BALKED LANDING/MISSED APPROACH

1. Throttle: *FULL*
2. Speed: *keep over 80 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *T/O*

Above a safe height:

4. Propeller lever: 2600 RPM
5. Landing lights: OFF

5.13. GO-AROUND

1. Throttle: *FULL*
2. Speed: *keep over 80 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *T/O*

5.14. AFTER LANDING

1. Throttle: *Idle*
2. Brakes: *apply*
3. Pitot heat: *OFF (if ON)*
4. Flaps: *UP*
5. Electric Fuel Pump*: OFF*
6. XPDR: *OFF*
7. Landing light: *OFF*

5.15. ENGINE SHUT DOWN

1. Parking brake: *set*
2. Keep engine running at 1200 propeller rpm for about one minute in order to reduce latent heat.
3. Avionic equipment: *OFF*
4. Throttle*: idle*
5. Magnetos*: Check OFF – BOTH*
6. Mixture*: closed*
7. Ignition key: *OFF, key extracted*
8. Strobe light: *OFF*
9. Avionic Master: *OFF*
10. Master & Generator switches: *OFF*
11. Fuel selector valve: *OFF*

For safety, verify propeller is fully stopped before any other action.

Instruct passenger to fully open RH door and depart, avoiding contact with wheels and sharp wing control surfaces edges.

5.16. POSTFLIGHT CHECKS

1. Flight controls: *lock by means of seat belts*
2. Wheel chocks and wing mooring lines: *Set*
3. Parking brake: *Release*
4. Doors: *Close and lock*
5. Protection plugs: *set over pitot tube, stall warning, static ports*

5.17. FLIGHT IN RAIN

Performance deteriorates in rain; this applies particularly to take-off distance and maximum Horizontal speed. The effect on flight characteristics is minimal.

5.18. REFUELLING

Before refuelling, the airplane must be connected to electrical ground.

5.19. FLIGHT AT HIGH ALTITUDE

At high altitudes the provision of oxygen for the occupant is necessary. Legal requirements for the provision of oxygen should be adhered to (see para 2.9).

6 AUTOPILOT NORMAL PROCEDURES

NOTE

For detailed description of A/P selections, behaviour and display outlook, refer to the "Garmin G1000 Pilot's Guide for the Tecnam P2010" (Part No. 190-01830-00 Revision A dated September 25, 2014 or a more updated version); it must be always carried in the aircraft and made available to the pilot at all time

NOTE

If A/P Master switch and /or Trim disconnect switch are inadvertently switched OFF, it will be necessary to reset both switches to allow A/P and pitch trim functionality. In this case pilot will make sure A/P is disengaged before reset. The single reset of only one of the switches will not permit to reset the single functionality.

PREFLIGHT:

AIRCRAFT PRE-FLIGHT CHECKS:

1) MASTER SWITCH (BAT): ON.
2) AVIONICS MASTER SWITCH: ON.
3) AUTOPILOT MASTER SWITCH: ON.
4) POWER APPLICATION and SELFCTEST - The autopilot tests itself when power is first made available. The test is a sequence of internal checks before starting normal system operation. The test sequence is shown on PFD left upper corner by the red AFCS label followed by the white PFT label, ending with double AP disengagement tone (which indicates a successful completion).

Autopilot system availability is shown under system page on MFD.

If the red AFCS stays ON, the A/P has failed the preflight test. Put the A/P MASTER SWITCH OFF to make sure that the A/P will not operate.

5) MANUAL ELECTRIC TRIM (MET) SYSTEM - TEST

Pitch Trim: cycle fully up and down, then set to NEUTRAL

NOTE

Both pitch trim halves must be actuated to move pitch trim.

Any movement of the elevator trim wheel during the check of either the LH or RH Switch only means that the Manual Electric Trim System has failed.

6) ELEVATOR TRIM WHEEL - SET pointer to takeoff position.
7) AVIONICS MASTER SWITCH: OFF
8) MASTER SWITCH (BAT):OFF

7 AUTOPILOT MODES

When the A/P is engaged, the pilot must continuously monitor and be ready to disengage the A/P. Do the Emergency Recovery procedure if A/P operation is erratic or does not correctly control the airplane.

NOTE

The "Garmin G1000 Pilot's Guide for the Tecnam P2010" (Part No. 190-01830-00 Revision A dated September 25, 2014 or a more updated version) must be carried in the aircraft and made available to the pilot at all time.

NOTE

Autopilot tracking performance will not be as good as usual in turbulence.

NOTE

Autopilot engagement / disengagement is not equivalent to servo engagement/disengagement. Use the CWS Button to disengage the pitch and roll while the autopilot remains active

HDG

NOTE

Pressing the HDG knob synchronizes the Selected Heading to the current heading

In this case expect a small heading overshoot that will be subsequently corrected

VS MODE

Selection of a vertical speed beyond the capability of the aircraft can create a condition of reduced airspeed, and possibly lead to USP activation.
During A/P operation, pilot must set the A/P Vs rate and engine power to make sure that airspeed remains within autopilot envelope and does not exceed any other airplane operating limitation.

VS is an open mode, which will engage irrespective of Selected Altitude. Pilot monitoring is always required to make sure that a correct Selected Altitude is shown on PFD

SELECTED ALTITUDE CAPTURE MODE (ALTS)

NOTE

Pressing the CWS Button while in Selected Altitude Capture Mode does not cancel the mode.

ALTITUDE HOLD MODE (ALT)

NOTE *Turning the ALT knob while in Altitude Hold Mode changes the Selected Altitude, but not the FD Altitude Refrence, and does not cancel the mode*

FLC MODE

The Selected Altitude MUST be set before selecting Flight Level Change Mode.FLC IAS selection is directly linked to actual IAS, pilot will need to monitor airspeed after selection of FLC mode.

VERTICAL NAVIGATION MODES (VPTH, ALTV)

NOTE *VNV is disabled when parallel or dead reckoning mode is active*

NOTE *The selected altitude takes precedence over any other vertical constraints.*

NOTE *If another pitch mode key is pressed while Vertical Path Tracking Mode is selected, VPTH mode reverts to armed.*
If the selected altitude is not at least 75 ft below the VNV Target Altitude, the FD captures the Selected Altitude once Vertical Path Tracking Mode become active (ALTS is armed rather than ALTV).

NOTE *Altitude preselect must show an altitude below the flight plan's Target Altitude.*
If the selected altitude is not at least 75 ft below the VNV Target Altitude, the FD captures the Selected Altitude once Vertical Path Tracking Mode become active (ALTS is armed rather than ALTV).

NOTE *If VPTH is armed more than 5 minutes prior to descent path capture, acknowledgement is required for the FD to transition from Altitude Hold to VPTH*
To proceed with descent path capture if the white "VPTH" flashes,do the following:

- *Press VNV Kay*
- *Turn ALT knob to adjust the Selected Altitude.*

If the selected altitude is not at least 75 ft below the VNV Target Altitude, the FD captures the Selected Altitude once Vertical Path Tracking Mode become active (ALTS is armed rather than ALTV).

NOTE *Armed VNV Target Altitude and Selected Altitude capture modes are mutually exclusive. Selected Altitude Capture Mode is armed also (not annunciated) whenever VNV Target Altitude Capture Mode is armed*

APPROACH MODES

NOTE *The selected navigation receiver must have a valid VOR or LOC signal or active GPS course for the flight director to enter Approach Mode*

8 AUTOPILOT ABNORMAL PROCEDURES

Loss of a single GPS:

In case of loss of a single GPS, RNAV guidance will still be available as the system will automatically revert to the other available GPS without losing any autopilot / FD guidance.

The ALERT window will switch to ADVSY and start to flash; when selected a "AHRS1 GPS – AHRS1 using backup GPS source" CAS message will appear inside the alert window.

Loss of both GPS:

In case of loss of both GPS, RNAV guidance will not be available anymore.

The ALERT window will switch to ADVSY and start to flash; when selected a "GPS NAV LOST – Loss of GPS navigation. Insufficient satellites" CAS message will appear inside the alert window. In this case also ESP will be lost and the "ESP OFF" CAS message will also appear inside the alert window.

Further to that, a yellow "LOI" (loss of integrity) CAS message will be displayed on the HIS and all other GPS related information (e.g. wind) will turn to yellow.

If GPS nave mode is being selected, the HSI on the PFD will not display the deviation bar. If GPS is selected as navigation source a *"AHRS1 GPS – AHRS1 operating exclusively in no-GPS mode"* CAS message will appear inside the alert window.

NOTE *Dead Reckoning Mode only functions in Enroute (ENR) or Oceanic (OCN) phase of flight. In all other phases, an invalid GPS solution produces a "NO GPS POSITION" annunciation on the map and the G1000 stops using GPS*

It is important to note that estimated navigation data supplied by the G1000 in DR Mode may become increasingly unreliable and must not be used as a sole means of navigation. If while in DR Mode airspeed and/or heading data is also lost or not available, the DR function may not be capable of accurately tracking estimated position and, consequently, the system may display a path that is different than the actual movement of the aircraft. Estimated position information displayed by the G1000 through DR while there is no heading and/or airspeed data available shall not be used for navigation.

DR Mode is inherently less accurate than the standard GPS/SBAS Mode due to the lack of satellite measurements needed to determine a position.

NOTE

Changes in wind speed and/or wind direction compound the relative inaccuracy of DR Mode. Because of this degraded accuracy, other navigation equipment must be relied upon for position awareness until GPS derived position data is restored.

DR Mode is indicated on the G1000 by the appearance of the letters 'DR' superimposed in yellow over the 'own aircraft' symbol.

In addition, 'DR' is prominently displayed in yellow on the HSI slightly above and to the right of the aircraft symbol on the CDI. Also, the CDI deviation bar is removed from the display. Lastly, but at the same time, a 'GPS NAV LOST' alert message appears on the PFD.

Normal navigation using GPS/SBAS source data resumes automatically once a valid GPS solution is restored. As a result of operating in DR Mode, all GPS derived data is computed based upon an estimated position and is displayed as yellow text on the display to denote degraded navigation source information.

Also, while the G1000 is in DR Mode, some terrain functions are not available. Additionally, the accuracy of all nearest information (airports, airspaces, and waypoints) is questionable. Finally, airspace alerts continue to function, but with degraded accuracy.

RAIM AVAILABILITY:

Because of tighter protection limit on approaches, there may be times when RAIM is not available. The G1000 automatically monitors RAIM and warns with an alert message when it is not available. If RAIM is not predicted to be available for the final approach course, the approach does not become active, as indicated by the message "Approach is not active".

If RAIM is not available when crossing the FAF, the missed approach procedure must be flown.

9 ADDITIONAL GUIDANCE FOR RNAV GPS

Experience of RNAV systems, and Flight FMS in general, has identified the pitfalls of waypoint entry error at the receiver as well as inaccuracies and errors in the database itself.

Research and experience have both shown that human error, often the result of a lack of familiarity with the airborne equipment, represents the major hazard in operations using RNAV systems. Therefore, it is imperative that pilots understand their system thoroughly and are able to determine whether it is safe to proceed.

This requires robust procedures, which check for possible errors in the computer database, monitor continued performance of the RNAV systems and enable pilots to identify and avoid not only their own mistakes but also errors in the information presented to them.

Flight planning on RNAV routes should include the following recommendation.

- During the pre-flight planning phase, given a GPS constellation of 23 satellites or less (22 or less for GPS stand-alone equipment that incorporate pressure altitude aiding), the availability of GPS integrity (RAIM) should be confirmed for the intended flight (route and time). This should be obtained from a prediction program either ground-based, or provided as an equipment function, or from an alternative method acceptable to the Authority;
- Where a navigation data base is installed, the data base validity (current AIRAC cycle) should be checked before flight;
- Traditional navigation equipment (e.g. VOR, DME and ADF) should be selected to available aids so as to allow immediate cross-checking or reversion in the event of loss of GPS navigation capability.

1) *Pre-flight Planning*

During the pre-flight planning phase, the availability of the navigation infrastructure, required for the intended operation, including any non-RNAV contingencies, must be confirmed for the period of intended operation. Availability of the onboard navigation equipment necessary for the route to be flown must be confirmed. The onboard navigation database must be appropriate for the region of intended operation and must include the navigation aids, waypoints, and coded terminal airspace procedures for the departure, arrival and alternate airfields.

Where the responsible airspace authority has specified in the AIP that dual PRNAV systems are required for specific terminal P-RNAV procedure, the availability of dual P-RNAV systems must be confirmed. This typically will apply where procedures are effective below the applicable minimum obstacle clearance altitude or where radar coverage is inadequate for the purposes of supporting P-RNAV. This will also take into account the particular hazards of a terminal area and the feasibility of contingency procedures following loss of P-RNAV capability.

RAIM availability must be confirmed with account taken of the latest information

2) *Departure*

At system initialisation, the flight crew must confirm that the navigation database is current and verify that the aircraft position has been entered correctly. The active flight plan should be checked by comparing the charts, SID or other applicable documents, with the map display. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a procedure, a check will need to be made to confirm that updating will use a specific navigation aid(s), or to confirm exclusion of a specific navigation aid. A procedure shall not be used if doubt exists as to the validity of the procedure in the navigation database

The creation of new waypoints by manual entry into the RNAV system by the flight crew is not permitted as it would invalidate the affected P-RNAV procedure.

Route modifications in the terminal area may take the form of radar headings or 'direct to' clearances and the flight crew must be capable of reacting in a timely fashion. This may include the insertion in the flight plan of waypoints loaded from the database.

During the procedure and where feasible, flight progress should be monitored for navigational reasonableness, by cross-checks, with conventional navigation aids using the primary display

3) *Arrival*

Prior to the arrival phase, the flight crew should verify that the correct terminal procedure has been loaded. The active flight plan should be checked by comparing the charts with the map display. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a procedure, a check will need to be made to confirm that updating will exclude a particular navigation aid. A procedure shall not be used if doubt exists as to the validity of the procedure in the navigation database.

Note: as a minimum, the arrival checks could be a simple inspection of a suitable map display that achieves the objectives of this paragraph.

The creation of new waypoints by manual entry into the RNAV system by the flight crew would invalidate the P-RNAV procedure and is not permitted.

Where the contingency to revert to a conventional arrival procedure is required, the flight crew must make the necessary preparation.

During the procedure and where feasible, flight progress should be monitored for navigational reasonableness by cross-checks with conventional navigation aids using the primary display

Route modifications in the terminal area may take the form of radar headings or 'direct to' clearances and the flight crew must be capable of reacting in a timely fashion.

Although a particular method is not mandated, any published altitude and speed constraints must be observed.

In the event that either the GPS or the EGNOS signal is not available at the destination, by the nature of the system, and its susceptibility to interference, there exists the possibility that it will also be unavailable over a wide area. Therefore it is probable that the signal will also be unavailable at a nearby diversion aerodrome.

Notwithstanding any normal operational requirements for the identification of an alternate aerodrome, where a RNAV approach is to be flown in conditions where a visual approach will not be possible; pilots should always ensure that either:

1) A different type of approach system is available at the destination, not dependent on GPS data and for which the weather is forecast to be suitable to enable a landing to be made from that approach, or;
2) There is at least one alternate destination within range, where a different type of approach system is available, which is not dependent on GPS data and for which the weather is forecast to be suitable to enable a landing to be made from that approach.

9.1 APPROACH APPLICATIONS

NOTE

When GPS is not approved for the selected final approach course, the message "NOT APPROVED FOR GPS" is displayed. GPS provides guidance for the approach, but the HIS must be switched to a NAV receiver to fly the final course of the approach

NOTE

f certain GPS parameters (SBAS, RAIM, etc.) are not available, some published approach procedures for the desired airport may not be displayed in the list of available approaches.

An Approach Procedure (APPR) can be loaded at any airport that has one available, and provides guidance for non-precision and precision approaches to airports with published instrument approach procedures.

NOTE

Only one approach can be loaded at a time in a flight plan. If an approach is loaded when another approach is already in the active flight plan, the new approach replaces the previous approach. The route is defined by selection of an approach and the transition waypoints.

Whenever an approach is selected, the choice to either "load" or "activate" is given. "Loading" adds the approach to the end of the flight plan without immediately using it for navigation guidance. This allows continued navigation via the intermediate waypoints in the original flight plan, but keeps the procedure available on the Active Flight Plan Page for quick activation when needed. "Activating" also adds the procedure to the end of the flight plan but immediately begins to provide guidance to the first waypoint in the approach.

When selecting an approach, a "GPS" designation to the right of the procedure name indicates the procedure can be flown using the GPS receiver. Some procedures do not have this designation, meaning the GPS receiver can be used for supplemental navigation guidance only.

NOTE

If the GPS receiver cannot be used for primary guidance, the appropriate navigation receiver must be used for the selected approach (e.g., VOR or ILS). The final course segment of ILS approaches, for example, must be flown by tuning the NAV receiver to the proper frequency and selecting that NAV receiver on the CDI

The G1000 SBAS GPS allows for flying LNAV, LP, LP+V and LPV approach service levels according to the published chart. The '+V' designation adds advisory vertical guidance for assistance in maintaining a constant vertical glidepath similar to an ILS glideslope on approach. This guidance is displayed on the system PFD in the same location as the ILS glideslope using a magenta diamond. A sample of how the active approach service level is annunciated on the HSI is shown in the following table:

HSI Annunciation	Description	Example on HSI
LNAV	RNAV GPS approach using published LNAV minima	 ***Approach Service Level*** *- LNAV, LP, LP+V, LPV*
LP (available only if SBAS available)	RNAV GPS approach using published LP minima (downgrades to LNAV if SBAS unavailable)	
LP+ V (available only if SBAS available)	RNAV GPS approach using published LP minima Advisory vertical guidance is provided (downgrades to LNAV if SBAS unavailable)	
LPV (available only if SBAS available)	RNAV GPS approach using published LPV minima	

Before reaching the IAF, the flight crew should verify that the correct procedure has been loaded into the receiver's route or flight plan. A comparison with the approach chart should be made including the following:

- The waypoint sequence.
- Reasonableness of the tracks and distances of the approach legs, accura cy of the inbound course and mileage of the FAS.
- Verify from the charts, map display or CDU, which waypoints are fly- by and which are fly-over.
- Check any map display to ensure the track lines actually 'fly-over' or 'fly-by' the respective waypoints in the procedure.

By the time the aircraft reaches the IAF the pilot should have completed the above and been cleared for the approach. Also, the approach must have been activated in the receiver at least by this time.

Approach Applications which are classified as RNP Approach (APCH) in accordance with ICAO Doc 9613 Performance Based Navigation (PBN) Manual (and ICAO state Letter SP65/4-10/53) give access to minima (on an instrument approach procedure) designated as:

LNAV (Lateral Navigation)

This is a Non-Precision or 2D Approach with Lateral only navigation guidance provided by GNSS and an Aircraft Based Augmentation System (ABAS). Receiver Autonomous Integrity Monitoring (RAIM) is a form of ABAS. Lateral guidance is linear with accuracy to within +/- 0.3 NM parallel to either side of the final approach track.

LP (Localiser Performance)

This is a Non-Precision or 2D Approach with Lateral only navigation guidance provided by GNSS and SBAS. The EGNOS is a form of SBAS in Europe. The lateral guidance is angular with increasing sensitivity as the aircraft continues along the final approach track; much like a localiser indication.

LPV (Localiser Performance with Vertical Guidance)

This is an Approach Procedure with Vertical Guidance. The Lateral and Vertical guidance is provided by GPS and SBAS. Lateral and vertical guidance are angular with increasing sensitivity as the aircraft progresses down the final approach track; much like an ILS indication. LPV approach and annunciation on HSI is available only is SBAS available.

Before selecting a LPV approach, make sure SBAS is indicated ACTIVE in the GPS status box on AUX-GPS STATUS page on MFD.

If DISABLED highlight the appropriate SBAS SELECTION Box under SBAS softkey under AUX-GPS Status Page on MFD

Should SBAS signal be lost, augmentation is lost. It may be possible to continue with LNAV only but this is reliant on the availability of RAIM.

NOTE: The instrument approach procedures associated with RNP APCH are entitled RNAV (GNSS) to reflect that GNSS is the primary navigation system. With the inherent onboard performance monitoring and alerting provided by GNSS, the navigation specification qualifies as RNP, however these procedures pre-date PBN, so the chart name has remained as RNAV.

Missed approach procedures

Before commencing an RNAV (GNSS) missed approach, a MAP should be possible without reference to GPS derived navigation so that, in the event of a loss of GPS accuracy or loss of integrity during the approach, a safe return to above Minimum Sector Altitude can be made.

This may be possible by dead reckoning (DR) navigation but where this is not possible and the MAP requires reference to terrestrial navigation aids, these must be available, tuned and correctly identified before passing the IAF and remain available throughout the approach.

Reasons for a missed approach are many and if GPS information remains available for the MAP, the pilot must be able to sequence the system correctly past the MAP, in order to follow the published MAP correctly.

Pilots should be fully competent in the necessary selection routines required by their own equipment, in order to transition to the MAP and preserve accurate navigation throughout.

When GPS navigation is NOT available for the MAP, it may be necessary to reset the display function of the HSI/CDI to disengage GPS information and regain VOR/LOC display. Pilots must be fully conversant with navigation display selections in order safely to follow the MAP.

Abnormal procedures for approaches

As the aircraft approaches the FAF (LNAV Only, without SBAS), the receiver automatically perform a final RAIM prediction for the approach. The receiver will not enter the approach mode if this RAIM prediction is negative. In this case, the approach should be discontinued.

However, this RAIM check assumes availability of the full constellation and will not take account of scheduled interruptions or failures. This can lead to a successful RAIM prediction at this point when the RAIM function itself is not available.

If RAIM is lost after passing the FAF the equipment should continue to provide navigation, where possible for five minutes, before giving a RAIM loss indication and this should be enough to complete the approach.

Should RAIM detect an out of tolerance situation, a warning will be given and a missed approach should be initiated immediately

The approach should always be discontinued:

(a) If the receiver fails to engage the correct approach mode or;
(b) In case of Loss Of Integrity (LOI) monitoring or;
(c) Whenever the HSI/CDI indication (or GP indication where applicable) exceeds half scale displacement or;
(d) If a RAIM (or equivalent) warning is activated or;
(e) If RAIM (or equivalent) function is not available and annunciated before passing the FAF.

Supplement D07: pages replacement instructions

SECTION 5 – PERFORMANCE

Make sure you first applied instructions reported on the basic AFM, Section 5 Performance

According to A/C configuration,
Supplement D02- Performances pages replace basic AFM Section 5 as whole

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SECTION 5 – PERFORMANCE

INDEX

1. INTRODUCTION

This section provides all necessary data for an accurate and comprehensive planning of flight activity from takeoff to landing.

Data reported in graphs and/or in tables were determined using:

- ✓ "Flight Test Data" under conditions prescribed by EASA CS-23 regulation
- ✓ aircraft and engine in good condition
- ✓ average piloting techniques

Each graph or table was determined according to ICAO Standard Atmosphere (ISA - s.l.); evaluations of the impact on performances were carried out by theoretical means for:

- ✓ Airspeed
- ✓ External temperature
- ✓ Altitude
- ✓ Weight
- ✓ Runway type and condition

2. USE OF PERFORMANCE CHARTS

Performances data are presented in tabular or graphical form to illustrate the effect of different variables such as altitude, temperature and weight. Given information is sufficient to plan the mission with required precision and safety.

Additional information is provided for each table or graph.

3. AIRSPEED INDICATOR SYSTEM CALIBRATION

Normal Static Source

Graph shows calibrated airspeed V_{IAS} as a function of indicated airspeed V_{CAS}.

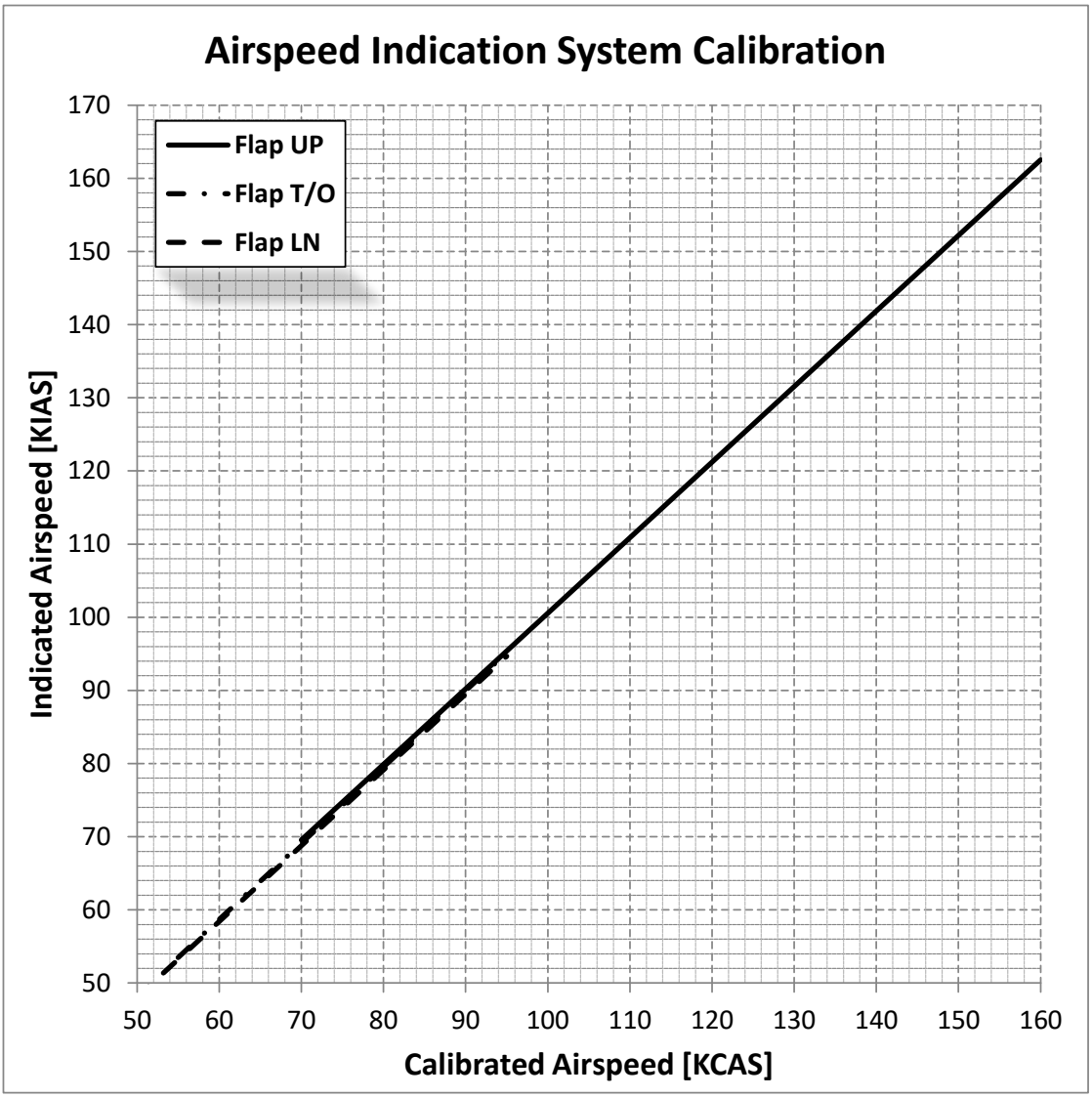


Fig. 5-1. Calibrated vs Indicated Airspeed

Example:

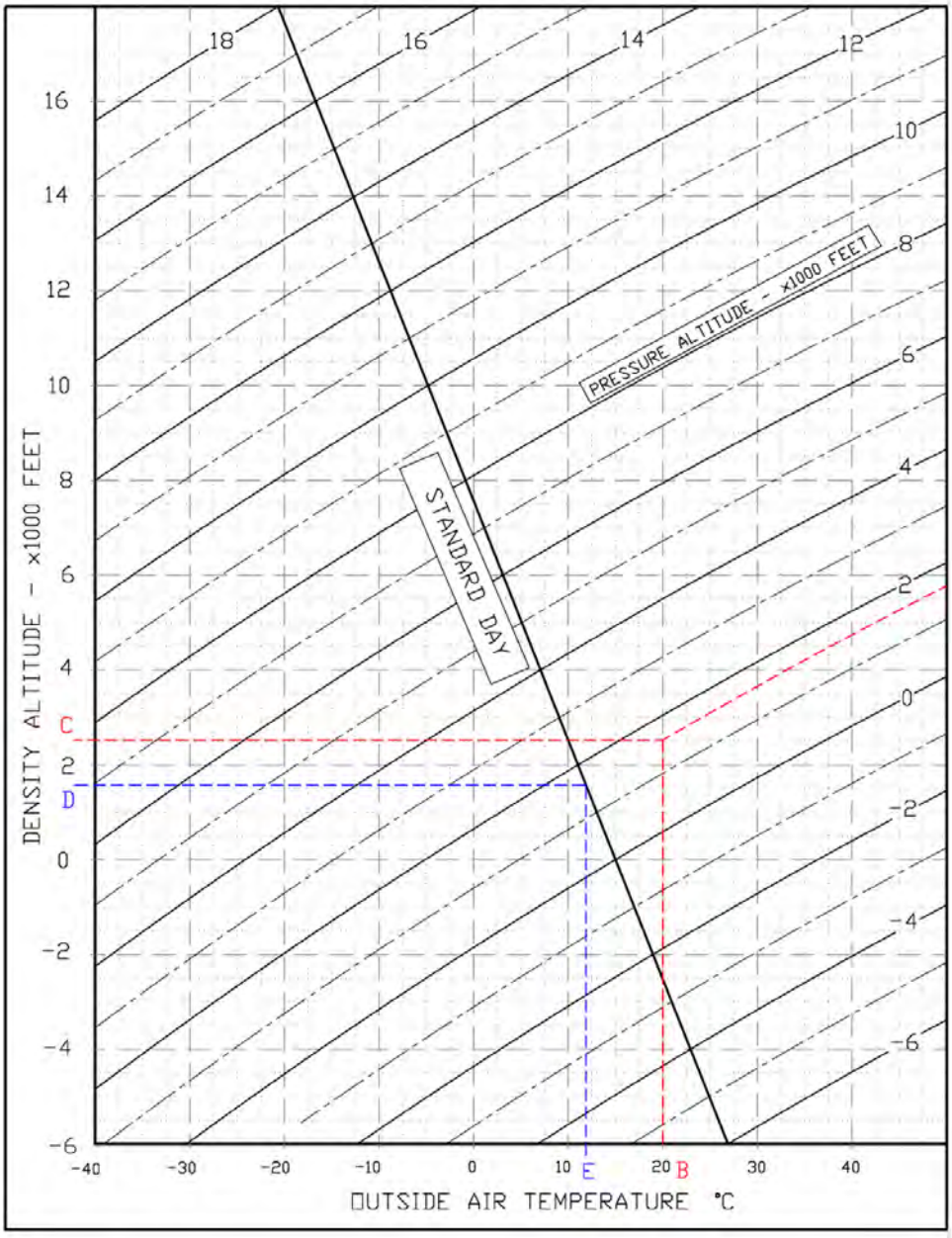
Given	***Find***
KIAS *75.0* *Flap: UP*	KCAS *74.7*

NOTE *Indicated airspeed assumes 0 as an instrument error*

Alternate Static Source

		Alternate Static Air Open		Vents Open		Vents and Hot Air Open	
		IAS [kn]	H_P [ft]	IAS [kn]	H_P [ft]	IAS [kn]	H_P [ft]
Pressure Altitude [ft]	**IAS** [kn]	**FLAP UP**					
1000	70	75	1020	72	1010	72	1020
	90	95	1020	92	1030	93	1020
	110	115	1030	113	1020	112	1020
	135	140	1040	139	1030	137	1030
		FLAP T/O					
	60	63	1020	63	1020	62	1010
	70	75	1020	73	1020	72	1020
	90	94	1020	92	1020	92	1020
		FLAP LND					
	60	62	1020	61	1020	61	1020
	70	72	1020	72	1020	71	1020
	90	92	1020	91	1020	91	1020
		FLAP UP					
5000	70	72	5020	72	5020	71	5020
	90	94	5030	93	5020	92	5020
	110	114	5030	113	5020	112	5020
	133	137	5040	136	5030	135	5020
		FLAP T/O					
	60	62	5010	62	5020	61	5010
	70	74	5020	73	5020	72	5020
	90	93	5030	93	5020	93	5020
		FLAP LND					
	60	63	5030	62	5020	61	5000
	70	72	5020	72	5010	71	5010
	90	92	5020	92	5020	91	5010
		FLAP UP					
8000	70	72	8020	72	8020	71	8020
	90	93	8030	92	8020	92	8020
	110	113	8030	112	8020	112	8020
	128	131	8040	130	8030	130	8020
		FLAP T/O					
	60	62	8010	62	8020	61	8010
	70	73	8020	72	8020	72	8020
	90	92	8030	92	8020	92	8020
		FLAP LND					
	60	61	8020	61	8020	61	8000
	70	72	8010	71	8010	71	8010
	90	92	8010	91	8010	91	8010

4. ICAO STANDARD ATMOSPHERE



Examples:

Scope	Given		Find
Density Altitude:	A: Pressure altitude = *1600ft* B: Temperature = *20°C*	→	C: Density Altitude = *2550ft*
ISA Temperature:	D: Pressure altitude = *1600ft*	→	E: ISA Air Temperature = *12°C*

5. STALL SPEED

Weight: 1160 kg (2557 lb)
Throttle Lever: IDLE
CG: Most Forward (19%)
No ground effect

WEIGHT [kg] ([lb])	BANK ANGLE [deg]	STALL SPEED					
		FLAPS 0°		FLAPS T/O		FLAPS FULL	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
1160 (2557) (FWD C.G.)	0	59	60	53	55	50	52
	15	60	61	54	56	51	53
	30	64	65	58	59	54	56
	45	71	71	64	65	61	62
	60	85	85	77	78	73	74

NOTE *Altitude loss during conventional stall recovery, as demonstrated during flight tests is approximately 350 ft with banking below 15°.*

6. CROSSWIND

Maximum demonstrated crosswind is 12 kts

⇒ *Example:*

Given	***Find***
Wind direction (*with respect to aircraft longitudinal axis*) = 30°	Headwind = 17.5 kts
Wind speed = 20 kts	Crosswind = 10 kts

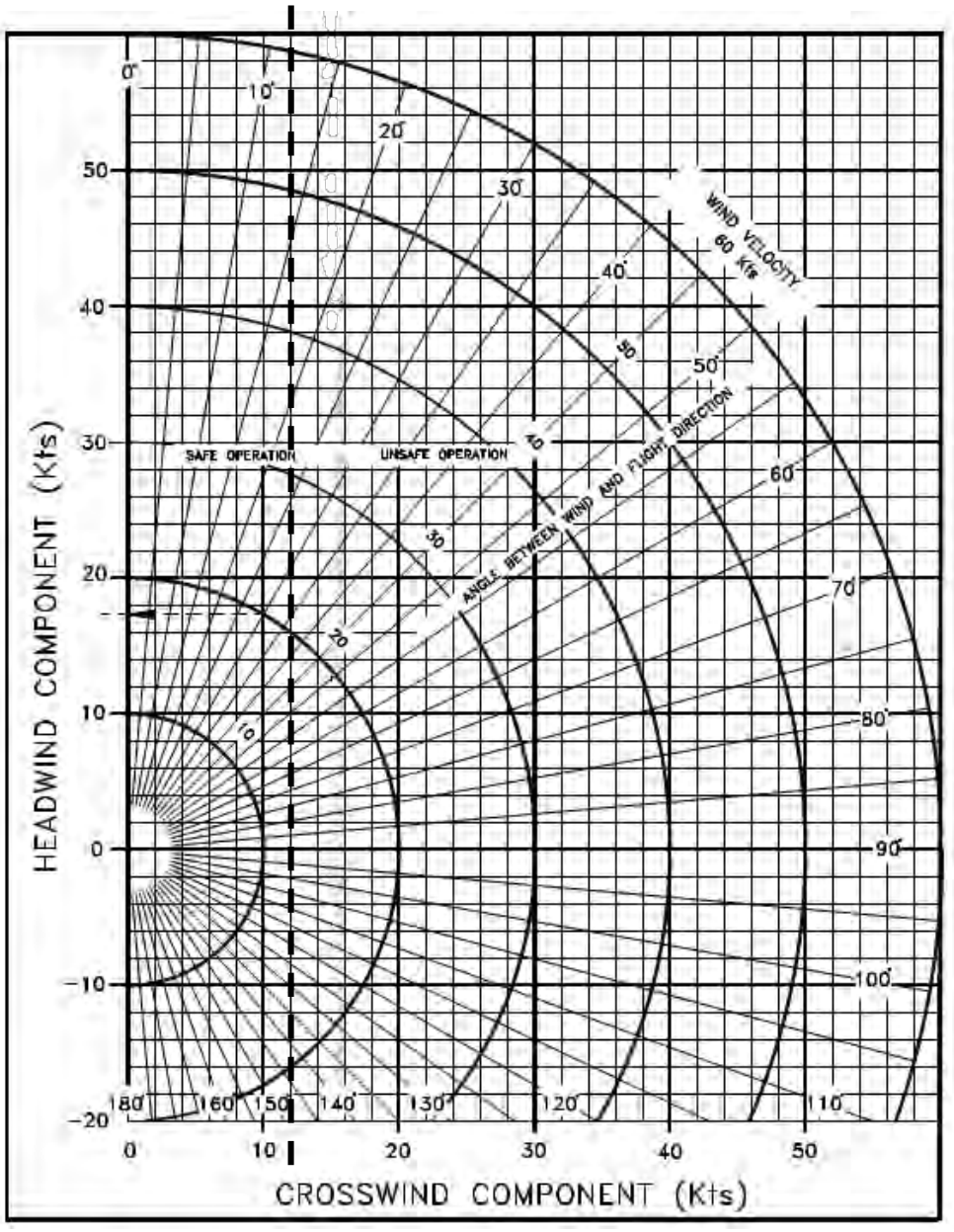


FIG. 5-3. CROSSWIND CHART

7. TAKE-OFF PERFORMANCES

NOTE *To account for likely in service performance variations apply a factored to distances of 1.10*

Weight = 1160 kg (2557 lb)

Flaps: T/O
Speed at Lift-Off = 60 KIAS
Speed Over 50ft Obstacle = 65 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	234 (768)	295 (968)	364 (1194)	442 (1450)	**336 (1102)**
	At 50 ft AGL	421 (1381)	526 (1726)	644 (2113)	776 (2546)	**595 (1952)**
1000	Ground Roll	256 (840)	322 (1056)	397 (1302)	482 (1581)	**360 (1181)**
	At 50 ft AGL	458 (1503)	572 (1877)	701 (2300)	844 (2769)	**637 (2090)**
2000	Ground Roll	279 (915)	352 (1155)	434 (1424)	526 (1726)	**387 (1270)**
	At 50 ft AGL	499 (1637)	622 (2041)	762 (2500)	918 (3012)	**682 (2238)**
3000	Ground Roll	305 (1001)	384 (1260)	474 (1555)	575 (1886)	**415 (1362)**
	At 50 ft AGL	543 (1781)	678 (2224)	830 (2723)	1000 (3281)	**731 (2398)**
4000	Ground Roll	333 (1093)	420 (1378)	518 (1699)	628 (2060)	**446 (1463)**
	At 50 ft AGL	591 (1939)	738 (2421)	904 (2966)	1089 (3573)	**783 (2569)**
5000	Ground Roll	364 (1194)	459 (1506)	566 (1857)	687 (2254)	**480 (1575)**
	At 50 ft AGL	645 (2116)	805 (2641)	986 (3235)	1188 (3898)	**840 (2756)**
6000	Ground Roll	399 (1309)	502 (1647)	620 (2034)	752 (2467)	**516 (1693)**
	At 50 ft AGL	703 (2306)	878 (2881)	1075 (3527)	1296 (4252)	**901 (2956)**

Weight = 1060 kg (2337 lb)

Flaps: T/O
Speed at Lift-Off = 60 KIAS
Speed Over 50ft Obstacle = 65 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	189 (620)	238 (781)	293 (961)	356 (1168)	**270 (886)**
	At 50 ft AGL	342 (1122)	427 (1401)	523 (1716)	630 (2067)	**483 (1585)**
1000	Ground Roll	206 (676)	259 (850)	320 (1050)	388 (1273)	**290 (951)**
	At 50 ft AGL	372 (1220)	464 (1522)	569 (1867)	685 (2247)	**517 (1696)**
2000	Ground Roll	225 (738)	283 (928)	349 (1145)	424 (1391)	**311 (1020)**
	At 50 ft AGL	405 (1329)	505 (1657)	619 (2031)	745 (2444)	**554 (1818)**
3000	Ground Roll	246 (807)	309 (1014)	382 (1253)	463 (1519)	**334 (1096)**
	At 50 ft AGL	441 (1447)	550 (1804)	674 (2211)	812 (2664)	**593 (1946)**
4000	Ground Roll	268 (879)	338 (1109)	417 (1368)	506 (1660)	**359 (1178)**
	At 50 ft AGL	480 (1575)	599 (1965)	734 (2408)	884 (2900)	**636 (2087)**
5000	Ground Roll	294 (965)	370 (1214)	456 (1496)	553 (1814)	**386 (1266)**
	At 50 ft AGL	523 (1716)	653 (2142)	800 (2625)	964 (3163)	**682 (2238)**
6000	Ground Roll	321 (1053)	404 (1325)	499 (1637)	605 (1985)	**416 (1365)**
	At 50 ft AGL	571 (1873)	713 (2339)	873 (2864)	1052 (3451)	**732 (2402)**

Weight = 960 kg (2116 lb)

Flaps: T/O
Speed at Lift-Off = 60 KIAS
Speed Over 50ft Obstacle = 65 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft])				
		Temperature [°C]				
		-25	0	25	50	ISA
S.L.	Ground Roll	149 (489)	187 (614)	231 (758)	281 (922)	**213 (699)**
	At 50 ft AGL	272 (892)	340 (1115)	416 (1365)	501 (1644)	**384 (1260)**
1000	Ground Roll	162 (531)	204 (669)	252 (827)	306 (1004)	**229 (751)**
	At 50 ft AGL	296 (971)	369 (1211)	452 (1483)	545 (1788)	**411 (1348)**
2000	Ground Roll	177 (581)	223 732)	275 (902)	334 (1096)	**245 (804)**
	At 50 ft AGL	322 (1056)	402 (1319)	492 (1614)	593 (1946)	**440 (1444)**
3000	Ground Roll	194 (636)	244 (801)	301 (988)	365 (1198)	**264 (866)**
	At 50 ft AGL	350 (1148)	438 (1437)	536 (1759)	645 (2116)	**472 (1549)**
4000	Ground Roll	212 (696)	266 (873)	329 (1079)	399 (1309)	**283 (928)**
	At 50 ft AGL	382 (1253)	477 (1565)	584 (1916)	703 (2306)	**506 (1660)**
5000	Ground Roll	231 (758)	291 (955)	360 (1181)	436 (1430)	**305 (1001)**
	At 50 ft AGL	416 (1365)	520 (1706)	636 (2087)	766 (2513)	**542 (1778)**
6000	Ground Roll	253 (830)	319 (1047)	393 (1289)	477 (1565)	**328 (1076)**
	At 50 ft AGL	454 (1489)	567 (1860)	694 (2277)	836 (2743)	**582 (1909)**

8. TAKE-OFF RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Lever: Full Forward
Propeller: 2600 RPM
Flaps: Take-Off

Weight [kg] ([lb])	Pressure Altitude [ft]	Climb Speed V_y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				
			-25	0	25	50	ISA
1160 (2557)	S.L.	72	974	808	659	525	717
	2000	71	848	684	538	406	617
	4000	70	721	560	417	287	518
	6000	69	596	437	296	169	419
	8000	68	470	315	176	51	320
	10000	67	345	193	56	-67	221
	12000	67	221	71	-63	-184	122
	14000	66	96	-51	-182	-300	23
1060 (2337)	S.L.	70	1118	943	787	647	848
	2000	69	985	813	660	522	744
	4000	69	853	684	533	397	640
	6000	68	721	555	406	273	536
	8000	68	589	426	280	149	431
	10000	67	458	298	155	26	327
	12000	66	327	170	29	-97	223
	14000	66	197	43	-95	-220	119
960 (2116)	S.L.	69	1288	1103	937	787	1001
	2000	69	1147	964	801	654	890
	4000	68	1006	827	666	522	780
	6000	68	866	689	532	390	669
	8000	67	726	553	398	258	558
	10000	66	586	416	264	127	448
	12000	66	447	280	131	-3	337
	14000	65	309	145	-2	-134	226

9. EN-ROUTE RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Lever: Full Forward
Propeller: 2600 RPM
Flaps: UP

Weight [kg] ([lb])	Pressure Altitude [ft]	Climb Speed V_Y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				
			-25	0	25	50	ISA
1160 (2557)	S.L.	82	1131	944	776	625	841
	2000	81	989	804	639	491	729
	4000	80	846	665	503	357	618
	6000	79	705	526	367	224	506
	8000	78	563	388	232	91	394
	10000	77	423	251	97	-41	282
	12000	76	282	113	-37	-173	171
	14000	76	142	-23	-171	-305	59
1060 (2337)	S.L.	82	1284	1085	907	747	976
	2000	81	1133	937	762	605	857
	4000	80	982	789	618	463	739
	6000	79	831	642	474	322	621
	8000	78	682	496	330	181	502
	10000	77	532	350	187	40	384
	12000	76	383	204	45	-99	265
	14000	75	235	59	-97	-239	147
960 (2116)	S.L.	81	1465	1251	1060	888	1134
	2000	80	1302	1092	905	735	1007
	4000	79	1140	934	749	583	880
	6000	78	979	776	595	432	753
	8000	77	818	619	441	281	625
	10000	76	658	462	287	130	498
	12000	75	498	306	134	-20	371
	14000	74	339	150	-18	-170	244

10. CRUISE PERFORMANCE

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 0 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-15°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (15°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (45°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	29.9	113	138	19.2 (72.7)	107	139	18.4 (69.7)	102	141	17.7 (67)
2600	29.9	109	136	18.7 (70.8)	103	138	17.9 (67.8)	98	139	17.2 (65.1)
	28	101	132	17.6 (66.6)	96	134	16.9 (64)	91	135	16.3 (61.7)
	26	90	126	16.1 (60.9)	85	127	15.4 (58.3)	81	128	14.9 (56.4)
	24	79	120	14.7 (55.6)	75	121	14.1 (53.4)	71	121	13.6 (51.5)
	22	69	113	13.3 (50.3)	65	113	12.8 (48.5)	62	113	12.4 (46.9)
	20	59	105	11.9 (45)	56	104	11.5 (43.5)	53	103	11.1 (42)
2450	29.9	103	133	17.9 (67.8)	98	135	17.1 (64.7)	93	136	16.5 (62.5)
	28	95	129	16.8 (63.6)	90	130	16.1 (60.9)	85	131	15.5 (58.7)
	26	85	123	15.4 (58.3)	80	124	14.8 (56)	76	125	14.3 (54.1)
	24	75	117	14.1 (53.4)	71	117	13.5 (51.1)	67	118	13.1 (49.6)
	22	65	110	12.8 (48.5)	62	110	12.3 (46.6)	59	110	11.9 (45)
	20	55	102	11.5 (43.5)	52	101	11.1 (42)	50	100	10.7 (40.5)
2350	29.9	100	131	17.4 (65.9)	94	133	16.7 (63.2)	90	134	16.1 (60.9)
	28	91	127	16.2 (61.3)	86	128	15.6 (59.1)	82	129	15 (56.8)
	26	81	121	15 (56.8)	77	122	14.4 (54.5)	73	123	13.9 (52.6)
	24	72	115	13.7 (51.9)	68	115	13.1 (49.6)	65	115	12.7 (48.1)
	22	62	108	12.4 (46.9)	59	108	12 (45.4)	56	107	11.6 (43.9)
	20	53	99	11.1 (42)	50	98	10.7 (40.5)	48	96	10.4 (39.4)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 3000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-21°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (9°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (39°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	26.8	104	137	17.9 (67.8)	98	138	17.2 (65.1)	93	139	16.5 (62.5)
2600	26.8	100	135	17.4 (65.9)	94	136	16.7 (63.2)	90	137	16.1 (60.9)
2600	26	96	133	16.9 (64)	90	134	16.2 (61.3)	86	135	15.6 (59.1)
2600	24	85	126	15.4 (58.3)	80	127	14.8 (56)	76	128	14.3 (54.1)
2600	22	76	128	14.3 (54.1)	70	120	13.5 (51.1)	67	120	13 (49.2)
2600	20	63	111	12.6 (47.7)	60	111	12.1 (45.8)	57	110	11.7 (44.3)
2600	18	53	101	11.1 (42)	50	99	10.7 (40.5)	47	97	10.4 (39.4)
2450	26.8	94	132	16.6 (62.8)	89	132	15.9 (60.2)	84	133	15.3 (57.9)
2450	26	90	129	16.1 (60.9)	85	129	15.4 (58.3)	81	130	14.8 (56)
2450	24	80	123	14.7 (55.6)	75	123	14.2 (53.8)	72	124	13.7 (51.9)
2450	22	70	116	13.5 (51.1)	66	116	12.9 (48.8)	63	117	12.5 (47.3)
2450	20	60	108	12.1 (45.8)	57	108	11.6 (43.9)	54	107	11.3 (42.8)
2450	18	50	97	10.7 (40.5)	47	97	10.4 (39.4)	45	95	10.1 (38.2)
2350	26.8	90	130	16.1 (60.9)	85	131	15.5 (58.7)	81	131	14.9 (56.4)
2350	26	86	127	15.6 (59.1)	81	128	15 (56.8)	77	129	14.4 (54.5)
2350	24	77	121	14.3 (54.1)	72	122	13.8 (52.2)	69	122	13.3 (50.3)
2350	22	67	114	13.1 (49.6)	64	114	12.6 (47.7)	60	114	12.2 (46.2)
2350	20	57	105	11.7 (44.3)	54	105	11.3 (42.8)	51	103	11 (41.6)
2350	18.5	50	98	10.7 (40.5)	47	95	10.4 (39.4)	45	92	10.1 (38.2)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 6000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-27°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (3°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (33°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	23.9	94	135	16.6 (62.8)	89	136	15.9 (60.2)	84	137	15.3 (57.9)
2600	23.9	90	133	16.1 (60.9)	85	134	15.5 (58.7)	81	134	14.9 (56.4)
2600	23	85	130	15.5 (58.7)	80	130	14.8 (56)	76	131	14.3 (54.1)
2600	22	80	126	14.8 (56)	75	127	14.2 (53.8)	72	127	13.6 (51.5)
2600	20	68	117	13.2 (50)	64	117	12.7 (48.1)	61	117	12.3 (46.6)
2600	19	63	113	12.5 (47.3)	59	112	12 (45.4)	56	111	11.6 (43.9)
2600	18	57	108	11.7 (44.3)	54	106	11.3 (42.8)	51	104	10.9 (41.3)
2450	23.9	85	129	15.4 (58.3)	80	130	14.8 (56)	76	131	14.2 (53.8)
2450	23	80	126	14.8 (56)	75	127	14.2 (53.8)	72	127	13.7 (51.9)
2450	22	75	123	14.1 (53.4)	71	123	13.6 (51.5)	67	123	13.1 (49.6)
2450	20	64	114	12.7 (48.1)	61	114	12.2 (46.2)	58	113	11.8 (44.7)
2450	19	59	110	12 (45.4)	56	109	11.6 (43.9)	53	107	11.2 (42.4)
2450	18	54	104	11.3 (42.8)	51	102	10.9 (41.3)	49	99	10.6 (40.1)
2350	23.9	81	127	15 (56.8)	77	128	14.4 (54.5)	73	128	13.8 (52.2)
2350	23	77	124	14.3 (54.1)	73	124	13.8 (52.2)	69	124	13.3 (50.3)
2350	22	72	121	13.7 (51.9)	68	121	13.2 (50)	65	120	12.7 (48.1)
2350	20	62	112	12.3 (46.6)	58	111	11.9 (45)	55	110	11.5 (43.5)
2350	19	57	107	11.7 (44.3)	54	106	11.2 (42.4)	51	103	10.9 (41.3)
2350	18.5	54	104	11.3 (42.8)	51	102	10.9 (41.3)	49	99	10.6 (40.1)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 9000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-33°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (-3°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (27°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	21.3	85	133	15.4 (58.3)	80	133	14.7 (55.6)	76	133	14.2 (53.8)
2600	21.3	81	130	15 (56.8)	77	131	14.3 (54.1)	73	131	13.8 (52.2)
2600	20	73	124	13.8 (52.2)	69	124	13.3 (50.3)	65	123	12.8 (48.5)
2600	19	67	119	13.1 (49.6)	64	119	12.6 (47.7)	60	118	12.1 (45.8)
2600	18	62	114	12.3 (46.6)	58	113	11.9 (45)	55	111	11.5 (43.5)
2450	21.3	77	127	14.3 (54.1)	72	127	13.7 (51.9)	69	127	13.2 (50)
2450	20	69	121	13.3 (50.3)	65	121	12.8 (48.5)	62	119	12.3 (46.6)
2450	19	64	116	12.6 (47.7)	60	115	12.1 (45.8)	57	114	11.7 (44.3)
2450	18	59	111	11.9 (45)	55	109	11.4 (43.2)	52	106	11.1 (42)
2350	19	66	121	12.9 (48.8)	62	120	12.4 (46.9)	59	117	11.9 (45)
2350	18	60	115	12.2 (46.2)	57	113	11.7 (44.3)	54	110	11.3 (42.8)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 12000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-39°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (-9°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (21°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	19	75	128	14.1 (53.4)	70	128	13.5 (51.1)	67	128	13 (49.2)
2600	19	72	126	13.7 (51.9)	68	126	13.2 (50)	64	125	12.7 (48.1)
2600	18	66	121	13 (49.2)	63	120	12.4 (46.9)	59	118	12 (45.4)
2450	19	68	123	13.2 (50)	64	122	12.7 (48.1)	61	121	12.2 (46.2)
2450	18	63	118	12.5 (47.3)	59	116	12 (45.4)	56	113	11.6 (43.9)
2350	19	66	121	12.9 (48.8)	62	120	12.4 (46.9)	59	117	11.9 (45)
2350	18	60	115	12.2 (46.2)	57	113	11.7 (44.3)	54	110	11.3 (42.8)

11. LANDING PERFORMANCES

NOTE *To account for likely in service performance variations apply a factored to distances of 1.67*

Weight = 1160 kg (2557 lb)

Flaps: LAND
Short Final Approach Speed = 66 KIAS
Throttle Lever: Idle
Runway: Paved

Corrections

Headwind: -4 m for each kn
Tailwind: +13 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: -3% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft])				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	204 (669)	225 (738)	245 (804)	266 (873)	**237 (778)**
	At 50 ft AGL	488 (1601)	509 (1670)	529 (1736)	550 (1804)	**521 (1709)**
1000	Ground Roll	212 (696)	233 (764)	254 (833)	276 (906)	**244 (801)**
	At 50 ft AGL	496 (1627)	517 (1696)	538 (1765)	560 (1837)	**528 (1732)**
2000	Ground Roll	220 (722)	242 (794)	264 (866)	286 (938)	**251 (823)**
	At 50 ft AGL	504 (1654)	526 (1726)	548 (1798)	570 (1870)	**535 (1755)**
3000	Ground Roll	228 (748)	251 (823)	274 (899)	297 (974)	**259 (850)**
	At 50 ft AGL	512 (1680)	535 (1755)	558 (1831)	581 (1906)	**543 (1781)**
4000	Ground Roll	236 (774)	260 (853)	284 (932)	308 (1010)	**267 (876)**
	At 50 ft AGL	520 (1706)	544 (1785)	568 (1864)	592 (1942)	**551 (1808)**
5000	Ground Roll	245 (804)	270 (886)	295 (968)	320 (1050)	**275 (902)**
	At 50 ft AGL	529 (1736)	554 (1818)	579 (1900)	604 (1982)	**559 (1834)**
6000	Ground Roll	255 (837)	280 (919)	306 (1004)	332 (1089)	**284 (932)**
	At 50 ft AGL	539 (1768)	564 (1850)	590 (1936)	616 (2021)	**568 (1864)**

12. BALKED LANDING PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to rate of climb and to angle of climb of 0.90*

Throttle and Propeller Lever: Full Forward
Flaps: LAND
Speed: 67 KIAS

Weight [kg] ([lb])	Pressure Altitude [ft]	Steady Gradient of Climb [%]				
		Temperature [°C]				
		-25	0	25	50	ISA
1160 (2557)	S.L.	10.9	8.6	6.6	4.7	7.4
	1000	10.0	7.8	5.7	3.9	6.7
	2000	9.2	6.9	4.9	3.1	6.0
	3000	8.3	6.1	4.1	2.3	5.3
	4000	7.4	5.2	3.2	1.4	4.6
	5000	6.6	4.4	2.4	0.6	3.9
	6000	5.7	3.5	1.6	-0.2	3.3
	7000	4.8	2.7	0.7	-1.0	2.6
1060 (2337)	S.L.	12.9	10.4	8.1	6.1	9.0
	1000	11.9	9.4	7.2	5.2	8.3
	2000	11.0	8.5	6.3	4.3	7.5
	3000	10.0	7.6	5.4	3.4	6.8
	4000	9.1	6.7	4.5	2.5	6.0
	5000	8.1	5.7	3.6	1.7	5.3
	6000	7.2	4.8	2.7	0.8	4.5
	7000	6.2	3.9	1.8	-0.1	3.8
960 (2116)	S.L.	15.2	12.4	10	7.7	10.9
	1000	14.1	11.4	9.0	6.7	10.1
	2000	13.1	10.4	7.9	5.8	9.3
	3000	12.0	9.3	6.9	4.8	8.4
	4000	11.0	8.3	5.9	3.8	7.6
	5000	10.0	7.3	4.9	2.8	6.8
	6000	8.9	6.3	3.9	1.8	6.0
	7000	7.9	5.3	2.9	0.9	5.2

13. NOISE DATA

Noise level, determined in accordance with ICAO/Annex 16 6th Ed., July 2011, Vol. I°, Chapter 10 and 14 CFR 36.1581(c), is **80.58** dB(A).

NOTE

No determination has been made by the Federal Aviation Administration that the noise levels of this aircraft are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

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Supplement D07: pages replacement instructions

SECTION 6 – WEIGHT AND BALANCE

Refer to the basic AFM, Section 6 Weight and Balance

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Supplement D07: pages replacement instructions

SECTION 7 – AIRFRAME AND SYSTEMS DESCRIPTION

Make sure you first applied instructions reported on the basic AFM, Section 7 Airframe and Systems Description

According to A/C configuration apply following pages replacement:

Supplement D07 AIRFRAME AND SYSTEMS DESCRIPTION page		AFM Section 7 page
APV 7-8 thru 11	**REPLACES**	7-8 thru 11 of basic AFM, Section 7
APV 7-16	**REPLACES**	7-16 of basic AFM, Section 7
APV 7-20 thru 21	**REPLACES**	7-20 thru 21 of basic AFM, Section 7
APV 7-27	**REPLACES**	7-27 of basic AFM, Section 7
APV 7-33	**REPLACES**	7-33 of basic AFM, Section 7
APV 7-36	**REPLACES**	7-36 of basic AFM, Section 7

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3 FLIGHT CONTROLS

Aircraft flight controls are operated through conventional stick and rudder pedals. Longitudinal control acts through a system of push-rods and is equipped with a trim tab. a cable control circuit is confined within the cabin and it is connected to a pair of push-pull rod systems positioned in each main wing which control ailerons differentially. Aileron trimming is carried out on ground through a small tab positioned on left aileron.

Flaps are extended via an electric servo actuator controlled by a switch on the instrument panel. Flaps act in continuous mode; the indicator displays three markings related to 0°, takeoff (T/O) and landing (FULL) positions. A breaker positioned on the right side of the instrument panel protects the electric circuit.

The control of the stabilator trim is operated by means of both a control wheel, located between the two front seats that acts directly on the control cables, and an electrical actuator controlled by a switch located on the control wheel; stabilator trim position is displayed on a dedicated analogue indicator located on the LH area of the instrument panel.

Rudder Trimming device for lateral control is provided by means of an electrical actuator controlled by a rocker switch located near the pitch trim wheel; the surface is connected to a potentiometer linked to a rudder trim indicator included in the Garmin G1000 EIS (Engine Indication System).

4 INSTRUMENT PANEL

The instrument panel is divided in three areas:

- The left area holds Garmin G1000 PFD, a chronometer and the pitch trim indicator;
- The Central area holds the standby unit for PFI parameters, MD 302 suite, and the ELT button;
- The right area holds Garmin G1000 MFD with dedicated AP control buttons and breaker panel;
- The lower-LH portion of the instrument panel holds:
  - Ignition key;
  - Master and Generator switches;
  - Emergency fuel pump;
  - Avionic Master switch;
  - AP Master switch
  - Trim Disconnect switch
- The lower-Central portion of the instrument panel holds:
  - Fuel selector valve.
  - Flap Control
- The lower-RH portion of the instrument panel holds:
  - Pocket

Fig. 7-8. INSTRUMENT PANEL

4.1 ENGINE CONTROL LEVER

Engine handling is via three levers: Throttle, RPM lever, Mixture control lever.

They're situated on the center control; the use of "front/forward" and "rear/backward" is defined in relation to the direction of flight (longitudinal).

Mixture control lever

This lever (right hand lever with red handle) controls the fuel-air mixture, which is supplied to the engine.

With the lever full forward, extra fuel is being supplied to the engine which at higher performance setting contributes to engine cooling.

In cruise, the mixture should be made leaner in order to reach the appropriate fuel-air mixture. The leaning procedure is given in Chapter 4.

Lever forward (RICH) >> Mixture rich (in fuel)

Lever to rear (LEAN) >>Mixture lean (in fuel)

To shut off the engine the mixture control lever is pulled to the rear stop: air without fuel is drawn into the cylinders that shuts down.

Throttle

This lever (left hand with large knob) is used to control manifold pressure (MAP).

High manifold pressure means a large quantity of fuel-air mixture is being supplied to engine, while low manifold pressure means a lesser quantity of fuel-air mixture is being supplied.

Propeller lever

By means of this lever (central lever with blue handle) the propeller governor controls the propeller pitch, and consequently engine RPM. A selected RPM is held constant by the governor independent of the airspeed and the throttle setting.

Lever forward (HIGH RPM) = fine pitch

Lever rearward (LOW RPM) = coarse pitch

Following a defect in governor or oil system, the blades go to the finest possible pitch (maximum RPM), thus allowing continuation of the flight.

Following failure of the governor or a serious drop in oil pressure, the RPM should be adjusted using the throttle. Every effort should be made not to exceed 2700 RPM.

The throttle and RPM lever should be moved slowly, in order to avoid over-speed and excessively rapid RPM changes.

4.2 ALTERNATE AIR

Alternate Air knob is located on the central pedestal; when the knob is fully pulled outward from the instrument panel, injectors receive maximum hot air. During normal operation, the knob is set in OFF position.

4.3 DEFROST AND CABIN HEAT

Two knobs, located on the lower side of the central pedestal, allow Defrost and Cabin Heat function. The one marked as "Defrost and Cabin Heat" allows hot air to perform windshield defrost and partially cabin heat.

The cabin heat control knob, when fully outward, allows cabin to receive maximum hot air. When both cabin heat and defrost and cabin heat are pulled, air is partitioned.

Fig. 7-9. CENTRAL PEDESTAL

7. POWERPLANT

7.1 ENGINE

Manufacturer ……. Lycoming Textron

Model ……..... IO-360-M1A

Type Certificate ……..... EASA TCDS no. IM.E.032

Engine type …… Fuel injected (IO), direct drive, four cylinder horizontally opposed, air cooled with down exhaust outlets.

Maximum power…… 134.0 kW (180hp) @ 2700 rpm

Maximum continuous power ……... 129.2 kW (173.3hp) @ 2600 rpm

Oil Consumption				
Operation	RPM	HP	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
Normal Rated	2700	180	.80	500°F (260°C)
Performance Cruise (75%)	2450	135	.45	500°F (260°C)
Economy Cruise (60R Rated)	2350	117	.39	500°F (260°C)

7.2 PROPELLER

Manufacturer …….. MT Propeller

Model ……. MTV-15-B/193-52

Type Certificate …….. EASA TCDS no. P.098

Blades/hub …….. wood/composite 2-blades – aluminium hub

Diameter ……. 1930 mm (6,33 ft) no reduction allowed

Type …… Variable pitch

Governor

Manufacturer …….. MT Propeller

Model ……. P-860-23:

Type……. Hydraulic

9. ELECTRICAL SYSTEM

Primary DC power is provided by an external alternator with a 28 VDC output, rated of 70 Amps @ 2700 rpm. During normal operations, it recharges the battery.

Secondary DC power is provided by a lead type battery (GILL G-247) which provides the energy necessary for feeding the essential electrical loads in the event of an alternator failure.

The switch between the energy sources is automatic and no action is required in order to activate the alternate energy source.

For ground maintenance and/or starting, an external power socket is provided.

The alternator and battery are connected to the battery bus in order to provide energy for the electric equipment.

Each electrically fed instrument is connected to a dedicated circuit breaker which protects the cable from the battery bus to the associated electric equipment.

If the Ignition is in the position L, R, or BOTH, an accidental movement of the propeller may start the engine with possible danger for bystanders.

In the following figure is presented the electrical system architecture.

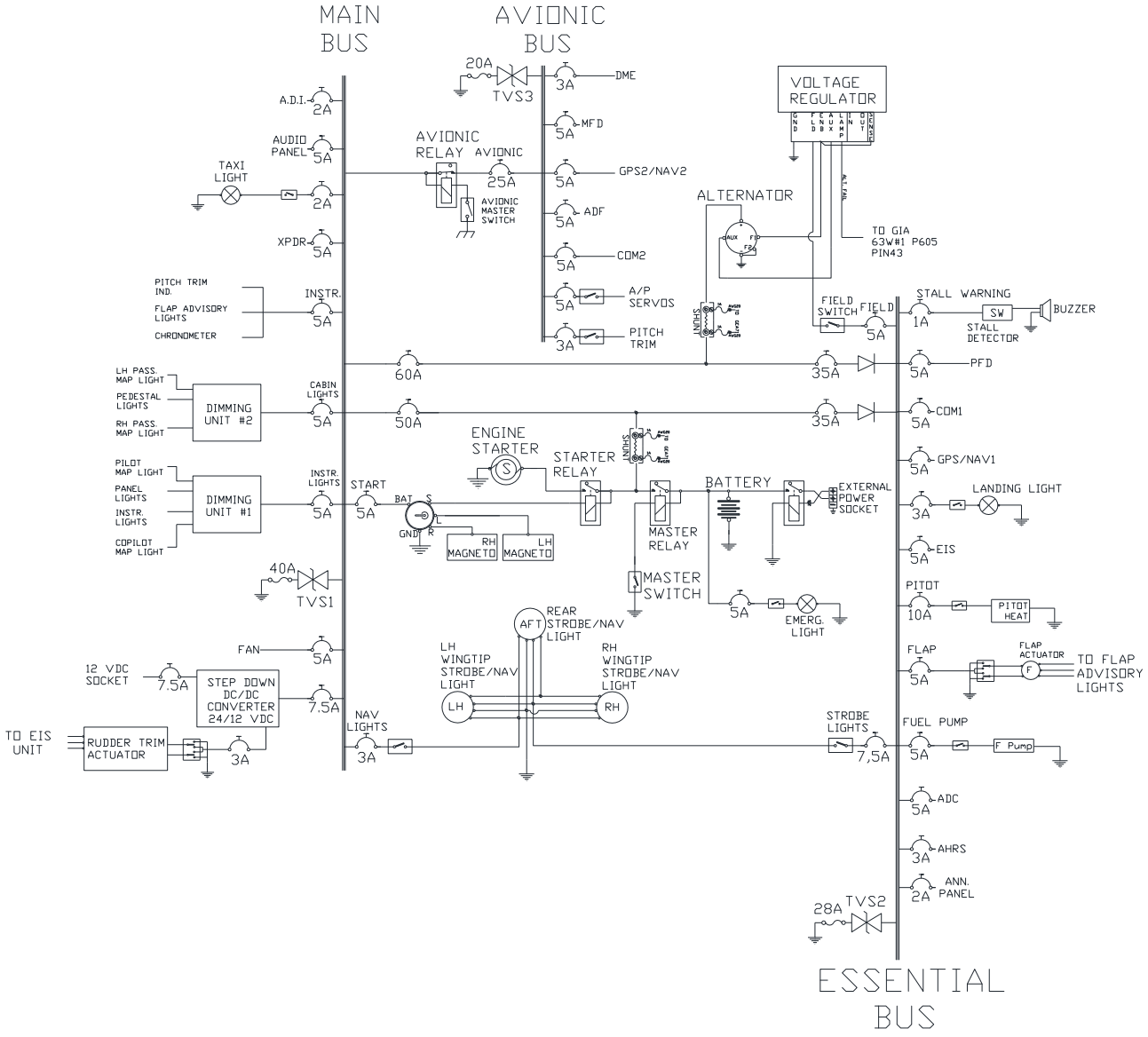


FIG.7-15. ELECTRICAL SYSTEM ARCHITECTURE

12.3 STALL WARNING SYSTEM

The aircraft is equipped with a stall warning system consisting of a sensor located on the right wing leading edge connected to a warning horn located near the instrument panel.

11.2 INTERNAL LIGHTS

On the cabin ceiling are located four map lights, two in the front area (pilot) and two in the rear area (passengers).

In the central area of the cabin ceiling is located a spot light used to illuminate the pedestal during night flight operations. All ceiling lights are dimmable by a dedicated dimmer.

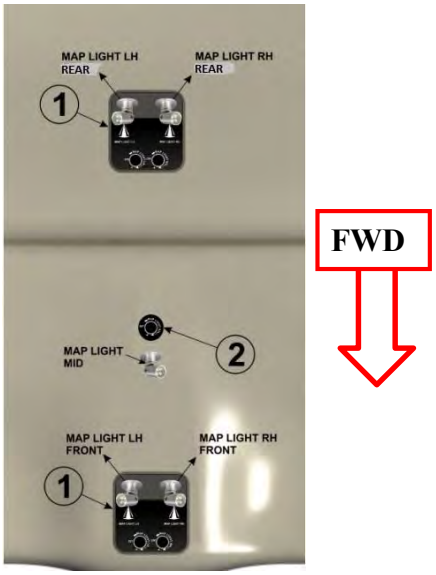
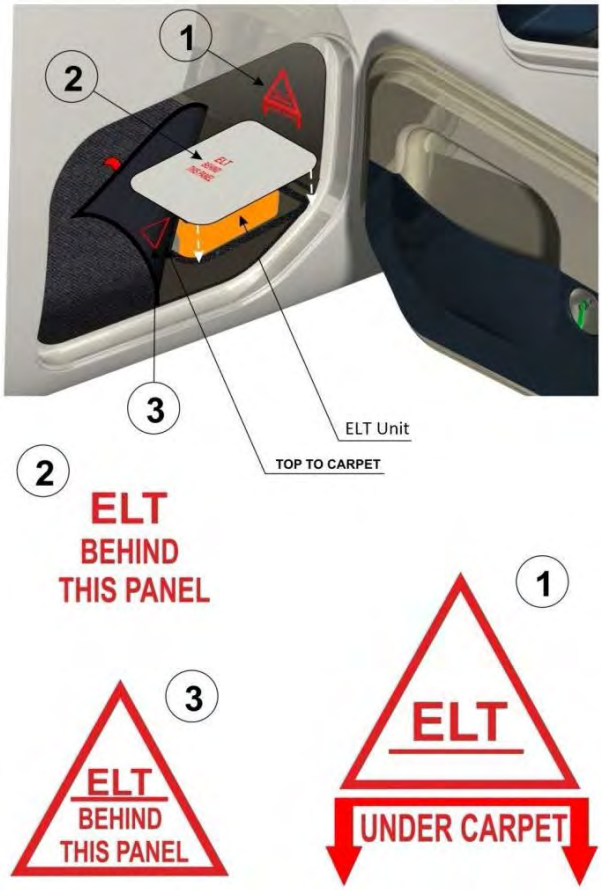


FIG.7-18. CABIN CEILING LIGHTS LAYOUT

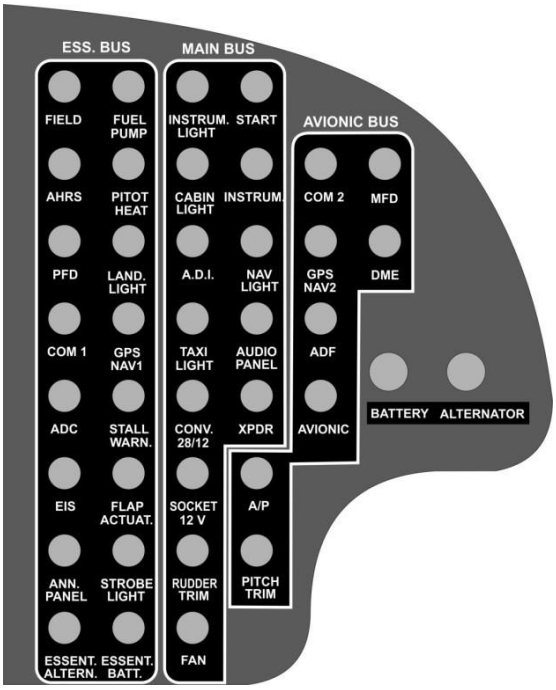
The instrument panel can be illuminated by 8 incandescence light strips, all dimmable.

FIG.7-19. INSTRUMENT PANEL LIGHTS LAYOUT

ELT unit position placard:



Breaker Panel placards:



Pedestal placards:

Supplement D07: pages replacement instructions

SECTION 8 – GROUND HANDLING & SERVICE

Make sure you first applied instructions reported on the basic AFM, Section 8 Ground Handling & Service

According to A/C configuration refer to the basic AFM, Section 8 – Ground Handling & Service

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Supplement n° D08

AFMS FOR ALTERNATIVE AVIONICS CONFIGURATION AND VARIABLE PITCH PROPELLER EQUIPPED AIRPLANES

Record of Revisions

Rev	Revised page	Description of Revision	Tecnam Approval			EASA Approval or Under DOA Privileges
			DO	OoA	HDO	
0	All	Editorial Change	F.Auricchio	C. Caruso	M. Oliva	Approved under the authority of DOA ref. EASA.21J.335 (MOD2010/131.180403)

List of Effective Pages

	Page	Revision
Cover Pages	D08-1 thru 22	*Rev. 0*
Section 1	GV 1-6	*Rev. 0*
Section 2	GV 2-7, GV 2-9 thru 10, GV 2-13	*Rev. 0*
Section 3	GV 3-4 thru 7, GV 3-10, GV 3-14, GV 3-16 thru 19, GV 3-25	*Rev. 0*
Section 4	GV 4-4 thru 5, GV 4-7, GV 4-9, GV 4-15 thru 26	*Rev. 0*
Section 5	GV 5-1 thru 19	*Rev. 0*
Section 7	GV 7-8 thru 11, GV 7-16, GV 7-20 thru 24, GV 7-27, GV 7-36	*Rev. 0*

INDEX

INTRODUCTION

The information contained herein supplements or supersedes the basic Aircraft Flight Manual: detailed instructions are provided to allow the owner for replacing the AFM pages containing information amended as per Garmin G500 and variable pitch propeller in subject.

It is the owner's responsibility to replace the mentioned pages in accordance with the instructions herein addressed section by section.

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Supplement D08: pages replacement instructions

SECTION 1 – GENERAL

Make sure you first applied instructions reported on the basic AFM, Section 1 General

According A/C configuration apply following pages replacement:

Supplement D08 LIMITATIONS page		AFM Section 1 page
GV 1-6	**REPLACES**	Page 1-6 of basic AFM, Section 1

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5. ENGINE

Manufacturer ……	Lycoming Engines
Model ……...	IO-360-M1A
Type Certificate ……...	EASA TCDS no. IM.E.032
Engine type ……..	Fuel injected (IO), direct drive, four cylinder horizontally opposed, air cooled with down exhaust outlets.
Maximum power …….	134.0 kW (180 hp) @ 2700 rpm
Maximum continuous power ……...	129.2 kW (173.3 hp) @ 2600 rpm

6. PROPELLER

Manufacturer ……..	MT Propeller
Model …….	MTV-15-B/193-52
Type Certificate ……..	EASA TCDS no. P.098
Blades/hub ……..	wood/composite 2-blades – aluminum hub
Diameter …….	1930 mm (76 in) (no reduction is permitted)
Type ……	Variable pitch

Governor

Manufacturer ……..	MT Propeller
Model …….	P-860-23:
Type ……..	Hydraulic

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Supplement D08: pages replacement instructions

SECTION 2 – LIMITATIONS

Make sure you first applied instructions reported on the basic AFM, Section 2 Limitations

According A/C configuration apply following pages replacement:

Supplement D08 LIMITATIONS page		AFM Section 2 page
GV 2-7	**REPLACES**	Page 2-7 of basic AFM, Section 2
GV 2-9 thru 10	**REPLACE**	Pages 2-9 thru 10 of basic AFM, Section 2
GV 2-13	**REPLACES**	Page 2-13 of basic AFM, Section 2

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4. POWERPLANT LIMITATIONS

Following table reports the operating limitations the installed engine:

ENGINE MANUFACTURER: Lycoming Engines
ENGINE MODEL: IO-360-M1A
MAXIMUM POWER:

	Max Power *(hp)*	**Max rpm. Prop. rpm**
Max. T.O.	180	2700
Max. Cont.	173.3	2600

Temperatures:

Max CHT …….. 500° F (260° C)
Max Oil ……. 245° F (118° C)

Oil Pressure:

Minimum Idling …… 25 psi (1.7 Bar)
Minimum Normal ……..55 psi (3.8 Bar)
Maximum Normal ……95 psi (6.5 Bar)
Starting, Warm-up, taxi and take-off (Max) …....115 psi (7.9 Bar)

Fuel pressure:

- *At Inlet to fuel injector:*

Minimum ..... 14 psi (0.96 Bar)
Maximum ..... 35 psi (2.41 Bar)

7. PAINT

To ensure that the temperature of the composite structure does not exceed limits, the outer surface of the aeroplane must be painted with white paint, except for areas of registration marks, placards, and ornament.

Refer to Aircraft Maintenance Manual (AMM), ATA Chapter 4 and 51, for specific paint requirements.

8. PROPELLER

MANUFACTURER: ……..	MT Propeller
MODEL: ……..……	MTV 15B/193-52
TYPE: ……..……	wood/composite 2-blade, variable pitch
DIAMETER: ……...	1930 mm (76in) (no reduction is permitted)

9. MAXIMUM OPERATING ALTITUDE

Maximum operating altitude is 12000 ft (3658 m) MSL.

CAUTION

*At altitudes above 10000 ft (3048 m) up to and including 12000 ft (*3658 *m), flight crew is recommended to use supplemental oxygen.*

10. AMBIENT TEMPERATURE

Ambient temperature: from -25°C to +50°C.

WARNING

Flight in expected and/or known icing conditions is forbidden.

11. POWERPLANT INSTRUMENT MARKINGS

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

INSTRUMENT		RED ARC Minimum limit	WHITE ARC Advisory	GREEN ARC Safe operation	YELLOW ARC Caution	RED ARC Maximum limit
PROPELLER	RPM	/	/	950-2600	0-950 2600-2700	2700 (line)
OIL TEMP.	°F	/	/	140-245	0 - 140	245 - 255
CHT	°F	/	435 (line)	150-475	0 – 150 475-500	500-510
EGT	°F	/	1000-1500	/	1375 (line)	1500-1550
OIL PRESS	psi	0-25	/	55-95	25 - 55 95-115	115 - 125
FUEL PRESS	psi	0-14	/	14-35	/	35 - 40
FUEL QTY	litres	0	/	0-115	/	/
	gal	0		0-30,4		
FUEL FLOW	l/hr	/	0-75	/	/	/
	gal/hr		0-20			

12. OTHER INSTRUMENT MARKINGS

INSTRUMENT	RED ARC Minimum limit	GREEN ARC Safe operation	YELLOW ARC Caution	RED ARC Maximum limit
Voltmeter	20-21 Volt	24–30 Volt	21–24 Volt	30-31

18. KINDS OF OPERATION EQUIPMENT LIST (KOEL)

This paragraph reports the KOEL table, concerning the equipment list required on board under CS-23 regulations to allow flight operations in VFR Day/Night and IFR Day/Night. Flight in VFR Day/Night and IFR is permitted only if the prescribed equipment is installed and operational. Additional equipment, or a different equipment list, for the intended operation may be required by national operational requirements and also depends on the airspace classification and route to be flown.
The owner is responsible for fulfilling these requirements.

Equipment	VFR Day	VFR Night	IFR Day	IFR Night	Note
External Power					
Circuit Breakers	●	●	●	●	As Required
Battery	●	●	●	●	
Safety Equipment & Furnishing					
First Aid kit	●	●	●	●	
Fire extinguisher	●	●	●	●	
ELT	●	●	●	●	
Torch (with spare batt.)		●		●	
Ice Protection					
Pitot heating system		●	●	●	
Landing Gear					
Wheel pants					Removable
Lights					
Landing/taxi lights	●	●	●	●	
Strobe lights	●	●	●	●	
NAV lights	●	●	●	●	
Cabin lights		●		●	
Instrument lights		●		●	
Emergency light		●		●	
Dimming Devices		●		●	
Day/Night switch		●		●	
COM/Navigation/Engine parameters					
Magnetic compass	●	●	●	●	
GARMIN G500 Suite	●	●	●	●	
GDU 620 (PFD/MFD)	●	●	●	●	
MD 302 suite	●	●	●	●	
GTN 650	●	●	●	●	
GNC 255A	●	●	●	●	
GMA 340	●	●	●	●	
DME Indicator-KDI 572	●	●	●	●	
ADF system - KR 87	●	●	●	●	
JP Instruments EDM 930	●	●	●	●	
Remote Alarm Display	●	●	●	●	
Pitot system	●	●	●	●	
Clock	●	●	●	●	
Flight Controls					
Pitch trim indicator	●	●	●	●	
Flap System	●	●	●	●	
Flaps position lights	●	●	●	●	
Rudder trim indicator	●	●	●	●	
Rudder trim system	●	●	●	●	only for VFR operations, rudder trim system may be inoperative provided the trim tab is fixed in the streamlined position and the system is electrically disabled
Stall warning system	●	●	●	●	
	VFR Day	**VFR Night**	**IFR Day**	**IFR Night**	

Supplement D08: pages replacement instructions

SECTION 3 – EMERGENCY PROCEDURES

Make sure you first applied instructions reported on the basic AFM, Section 3 Emergency Procedures

According A/C configuration apply following pages replacement:

Supplement D08 EMERGENCY PROCEDURES page		AFM Section 3 page
GV 3-5 thru 7	**REPLACE**	Pages 3-5 thru 7 of basic AFM, Section 3
GV 3-10	**REPLACES**	Page 3-10 of basic AFM, Section 3
GV 3-14	**REPLACES**	Page 3-14 of basic AFM, Section 3
GV 3-16 thru 19	**REPLACE**	Pages 3-16 thru 19 of basic AFM, Section 3
GV 3-25	**REPLACES**	Page 3-25 of basic AFM, Section 3

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1.1. REFERENCE AIRSPEEDS FOR EMERGENCY PROCEDURES

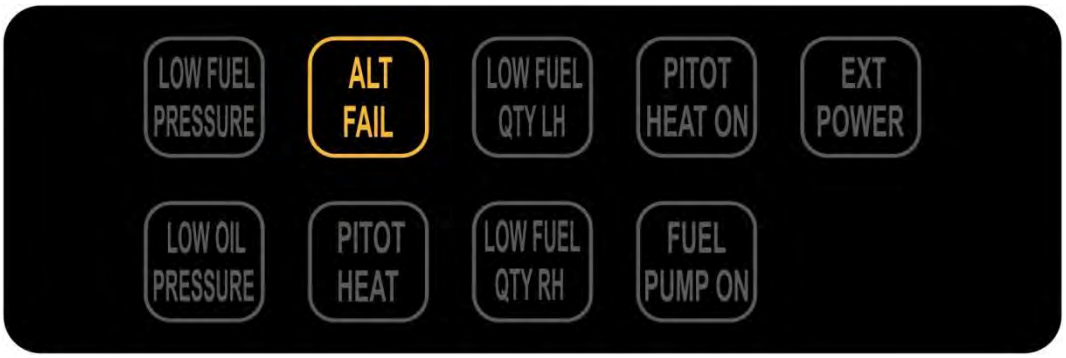
Best glide speed (V_{GLIDE})	**84 KIAS**
No-flaps Approach Speed	**80 KIAS**

2. FAILURES INDICATED ON THE ANNUNCIATION PANEL

The annunciator panel, located on the centre of the instrument panel, contains 9 lights for warnings, cautions and advisories. The colours are as follows:

GREEN: to indicate that pertinent device is turned ON
AMBER: to indicate no-hazard situations which have to be considered and which require a proper crew action
RED: to indicate emergency conditions
WHITE: to indicate advisory messages

2.1 ALTERNATOR FAILURE



If **ALT FAIL** caution is **ON**:

1. Circuit breaker(s)…….. *Check*
2. Generator SWITCH……..… *OFF*
3. Generator SWITCH…….. *ON*

If **ALT FAIL** CAUTION REMAINS on:

4. Generator SWITCH……..… *OFF*

NOTE *A fully charged battery shall supply electrical power for at least 30 minutes.*

2.2 PITOT HEATING SYSTEM FAILURE

When the Pitot Heating system is activated, the green **PITOT HEAT ON** advisory light turns on and the amber **PITOT HEAT** caution light turns **OFF**, indicating that the Pitot Heating system is functioning properly.

If the amber **PITOT HEAT** caution light is **ON** when the green **PITOT HEAT ON** light is on, then the Pitot Heating system is not functioning properly.

In this case apply following procedure:

1. Pitot heat switch …… *OFF*
2. Pitot heat circuit breaker ……..…… *CHECK IN*
3. Pitot heat switch …… *ON*
4. **PITOT HEAT** caution light …….. *CHECK*

NOTE *if the amber light stays ON, avoid visible moisture and OATs below 10° C.*

3. G500 System Failures

3.1 Loss of information displayed

When a LRU or a LRU function fails, a large red 'X' is typically displayed on the display field associated with the failed data.

NOTE

In most of cases, the red "X" annunciation is accompanied by a message advisory alert issuing a flashing ADVISORY Softkey annunciation which, once selected, acknowledges the presence of the message advisory alert and displays the alert text message in the Alerts Window.

3.2 Loss of airspeed information

	**AIRSPEED FAIL** **(RED X ON DISPLAY FIELD)**
	Display system is not receiving airspeed input from Air Data Computer.

INSTRUCTION: revert to standby instrument

3.7 DISPLAY FAILURE

In case of display failure refer to backup instrument (MD302) for primary flight information, and to GTN650 for navigation information.

3.8 LOW FUEL QUANTITY LEFT

If fuel quantity LH is under 24 litres

1. Fuel tank selector …… *Switch to RH fuel tank*

3.9 LOW FUEL QUANTITY RIGHT

If fuel quantity RH is under 24 litres

1. Fuel tank selector …… *Switch to LH fuel tank*

3.10 LOW FUEL QUANTITY LEFT AND RIGHT

If fuel quantity LH and RH is under 24 litres

1. **Land as soon as practical**: land at the nearest approved landing area where suitable repairs can be made.

6.3 PROPELLER OVERSPEED

In case of propeller overspeed in flight, apply following procedure:

1.	Throttle Lever …….	REDUCE power
2.	Propeller Lever …….	Decrease RPM
3.	Mixture Lever …….	As required
4.	RPM indicator ……	CHECK

If it is not possible to decrease propeller rpm, **land as soon as possible** applying *Forced landing* procedure. *(See Para 11)*

CAUTION

Maximum propeller rpm exceedance may cause engine components damage.
Monitor engine RPM; overspeed shall be prevented by retarding propeller lever.

6.4 IRREGULAR RPM

1. Fuel pump: ……ON
2. Fuel quantity and pressure indicators: …..…CHECK
3. If necessary: …….. SWITCH TANK

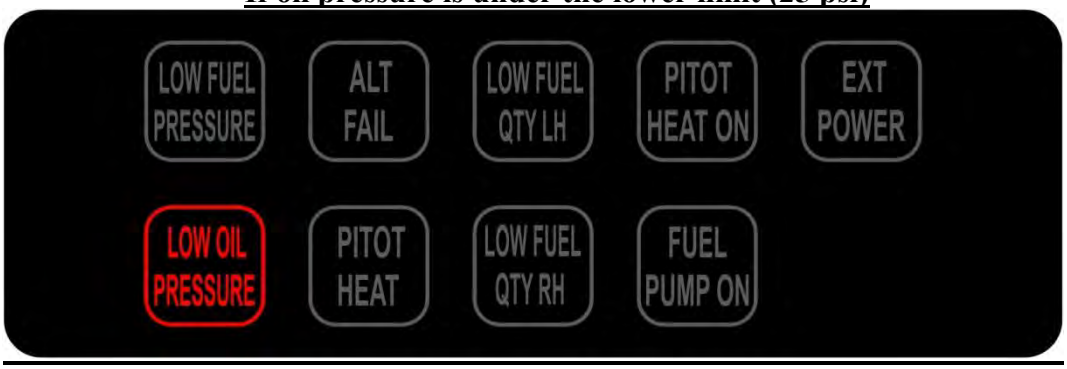
If engine continues to run irregularly

- **Land as soon as possible**.

6.7 OIL PRESSURE LIMITS EXCEEDANCE

LOW OIL PRESSURE

If oil pressure is under the lower limit (25 psi)



1. Throttle Lever …… *REDUCE to minimum practical*
2. Mixture Lever ..…….. *as required*
3. OIL TEMP …… *CHECK within limits*
4. OIL PRESS …… *CHECK*

If oil pressure does not increase and temperature remains within limits

Monitor oil and cylinder head temperatures.
Land as soon as practicable.

If oil pressure does not increase and temperature exceeds limits

Reduce engine power to minimum required.
Land as soon as possible applying Forced landing procedure. *(See Para 11)*
Be prepared for engine failure and emergency landing.

If oil pressure tends to zero (combined with vibration, loss of oil, unusual metallic smoke and noise)

Apply Forced landing procedure. *(See Para 11)*

HIGH OIL PRESSURE

If oil pressure exceeds upper limit (115 psi)

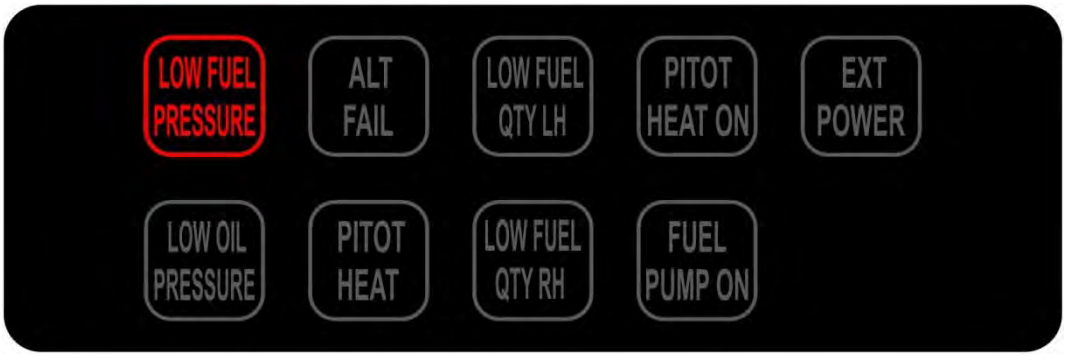
1. Throttle Lever …… *first REDUCE engine power by 10%*
2. Mixture Lever ……... *as required*
3. OIL PRESS ……... *CHECK*

If oil pressure does not increase

4. **Land as soon as possible** applying *Forced landing procedure (See Para 11)*

NOTE *An excessive oil pressure value can be counteracted by decreasing propeller rpm.*

6.8 LOW FUEL PRESSURE



If fuel pressure decreases below the lower limit (14 psi)

1. Electric fuel pump……...ON
2. Fuel selector valve……..Select opposite fuel tank if NOT empty
3. Fuel quantity ……..*CHECK*

If fuel pressure doesn't build up:

1. **Land as soon as practical.** Prepare for potential engine failure and prepare to apply *Forced landing procedure*. *(See Para 11)*

6.9 HIGH FUEL PRESSURE

If fuel pressure increases above the upper limit (35 psi)

1. **Land as soon as possible.** Prepare for potential engine shut down and apply *Forced landing procedure*. *(See Para 11)*

Possible injector failure or obstruction.

6.10 DEFECTIVE ENGINE CONTROLS

Defective Mixture Control Cable

1. Maintain altitude to the nearest arfield
2. During descent, check engine behaviour to a higher power setting. A lean mixture can lead to engine roughness and loss of power.
   Landing approach must be planned accordingly.

WARNING

Go-around may then be impossible.

Defective Throttle Control Cable

If power is sufficient to continue flight:

1. Approach nearest airfield, control engine power with Propeller lever
2. Perform landing with shut-down engine applying *Forced landing procedure. (See Para 11)*

If power is not sufficient to continue flight:

1. Carry out *Forced landing procedure. (See Para 11)*

Defective Propeller Lever Control Cable

If power is sufficient to continue flight:

1. Approach nearest airfield, control engine power with throttle
2. Perform normal landing.

WARNING

Go-around may then be impossible.

If power is not sufficient to continue flight:

1. Carry out *Forced landing procedure. (See Para 11)*

7. INFLIGHT ENGINE RESTART

7.1 PROPELLER WINDMILLING

In case of engine shutdown, propeller will keep windmilling and will not stop, preventing the use of ignition key. Engine inflight restart must be performed without using ignition key with propeller windmilling in order to avoid possible engine damages.
Typical indication of a potential engine shutdown, with windmilling propeller, will be RPM running sub-idle below 600-500 RPM, to be confirmed by other engine instrument (OIL Pressure, CHT, EGT running down abnormally).
Inflight engine restart may be performed during 1g flight anywhere within the normal operating envelope of the airplane.

WARNING

1. Master switch …… *Check ON*
2. Fuel pump …… *ON*
3. Fuel quantity indicator …….. *CHECK*
4. Fuel Selector ……. *SWITCH TANK*
5. Throttle Lever …….. *Minimum 1cm. above IDLE*
6. Propeller Lever…….. *Full forward*
7. Mixture …… *FULL rich*
8. Throttle lever …… *SET as required*

In case of unsuccessful engine restart:

- **Land as soon as possible** applying *Forced landing procedure. (See Para 11)*

In case of successful engine restart:

- **Land as soon as possible**

CAUTION

After engine restart, if practical, moderate propeller rpm to allow the temperatures for stabilizing in the green arcs.

10. OTHER EMERGENCIES

10.1 LOSS OF ESSENTIAL BUS

In case of loss of essential bus, the following will be lost (related breakers are listed):

PFD/MFD	FLAP ACTUATOR
COM1	PITOT HEAT
GPS/NAV1	STROBE LIGHT
EIS	LANDING LIGHT
FUEL PUMP	AHRS
FIELD	ADC
STALL WARNING	ANN. PANEL
XPDR	

Electrical power from Alternator is lost, battery will automatically provide energy (duration at least 30 min.).

Pilot will need to make reference to standby instrument for primary flight information and parameters.

Pilot will be able to use the audio panel and COM2/NAV2.

Engine parameters and related warnings/cautions are lost.

Flaps extension and retraction will be lost, apply Flaps control failure procedure (See Para 10.6).

Strobe and landing lights will be lost, NAV and taxi lights are still available; taxi light will be the only visual aid for landing in night conditions.

10.2 LOSS OF MAIN BUS

In case of loss of main bus, the main bus voltage will drop to zero.

The following will be lost (related breakers are listed):

AUDIO PANEL	NAV LIGHT	INSTRUMENT (clock, pitch trim indic.)
A.D.I. (available running on internal battery power)	TAXI LIGHT	COM2
INSTR. LIGHT	28/12 VDC CONVERTER	NAV2
CABIN LIGHT	RUDDER TRIM ACTUATOR	ADF
START	12VDC SOCKET	DME

Fail safe operation of audio panel allows pilot to transmit and use COM1 using headphones only; speakers will not be available.

For night flights, all instrument lights will be lost, but emergency light will still be available.

Supplement D08: pages replacement instructions

SECTION 4 – NORMAL PROCEDURES

Make sure you first applied instructions reported on the basic AFM, Section 4 Normal Procedures

According A/C configuration apply following pages replacement:

Supplement D08 NORMAL PROCEDURES page		AFM Section 4 page
GV 4-4 thru 5	**REPLACE**	Pages 4-4 thru 5 of basic AFM, Section 4
GV 4-7	**REPLACES**	Page 4-7 of basic AFM, Section 4
GV 4-9	**REPLACES**	Page 4-9 of basic AFM, Section 4
GV 4-15 thru 26	**REPLACE**	Pages 4-15 thru 26 of basic AFM, Section 4

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2. IFR FLIGHT: G500 GROUND TRAINING PRE-REQUISITES

The aircraft is equipped with a Garmin G500 avionic suite that integrates radio aids navigation with GPS navigation, providing an outstanding capability to support IFR flight, from basic instrument flight training to complex IFR scenario.

NOTE

Depending on national regulations, in some countries flying IFR with a single engine aircraft without autopilot installation and/or single pilot may or may not be allowed, any customer must pay careful attention to check limitations that may apply.

The use of G500 software requires full system knowledge (Garmin applicable manual with specific peculiar limitations), careful preparation, ground and pre-flight training before flight.

Furthermore, as a minimum during training, it's strongly recommended using the avionic suite in IFR with incremental steps after initial basic IFR instruction:

1. Initial use of a single radio-aids (No GPS);
2. Use of two radio-aids (No GPS);
3. Use of GPS for point to point navigation (No approaches);
4. Use of VNAV feature;
5. Full use of avionic suite.

The flight training syllabus for IFR instruction will need to address this incremental approach in order to give pilots awareness of full avionic potential, and to highlight the complexity of single pilot usage of G500 Garmin suite enroute or inside high density airspace structure.

CAUTION

During IFR flight, the workload that may develop using full avionic suite could get high in single pilot; pilot planning is important and essential in order to correctly address all avionic functions and aids.

Considering the complexity of the G500 suite, sound judgment will be required (weather, airspace complexity, pilot skills) to assess the best option for IFR steer guidance.

NOTE

The necessity to correct or modify flight plans in the Garmin G500 under these conditions may distract pilots from basic handling causing deviations from assigned parameters, so careful attention must be exercised to avoid deviations on flying parameters.

It's highly recommended to continue cross-checking flight parameters when entering flight data into the G500, especially when trying to create / insert arrival and departure procedures and / or VNAV profiles as the quantity of actions needed is high and may distract pilots from basic and precise handling.

The following prescriptions, other than those already present in the G500 manual, shall be observed:

- Use of GPS for precision approach navigation mode is not allowed;
- Use of GPS is prohibited as primary means for navigation. GPS is approved as supplemental means for navigation;
- Use of GPS is prohibited for IFR in terminal area or in non-precision approach operations.

If Receiver Autonomous Integrity Monitoring (RAIM) function becomes unavailable in enroute phase of flight, position must be verified every 15 minutes using other IFR approved navigation system.

Turbulence and / or Crosswind:

Presence of moderate to heavy turbulence and / or strong crosswind conditions (above 20 kts crosswind) will require high drift angle to correct for wind (above 15° drift) and highly reduce spare capabilities to do other concurrent tasks inside the cockpit other than precise flying.

3. AIRSPEEDS FOR NORMAL OPERATIONS

The following airspeeds are those which are significant for normal operations.

	FLAPS	**1160kg (2557lbs)**
Rotation Speed (V_R)	T/O	**60 KIAS**
Best Angle-of-Climb Speed (V_X)	T/O	**65 KIAS**
Best Angle-of-Climb Speed (V_X)	0°	**75 KIAS**
Best Rate-of-Climb speed (V_Y)	0°	**82 KIAS**
Flaps (V_{FE})	T/O & LAND	**91 KIAS**
No flaps approach	0°	**80 KIAS**
Approach speed	T/O	**75 KIAS**
Final Approach Speed	FULL	**70 KIAS**
Manoeuvring speed (V_A)	0°	**120 KIAS**
V glide	0°	**84 KIAS**
Never Exceed Speed (V_{NE})	0°	**166 KIAS**

4. PRE-FLIGHT INSPECTION

Before each flight, it is necessary to carry out a complete aircraft check including a cabin inspection followed by an external inspection, as below detailed.

4.1 CABIN INSPECTION

1. Aircraft documents (ARC, Certificate of Airworthiness, Noise certificate, Radio COM certificate, AFM): *check current and on board*
2. Weight and balance: *calculate (ref. to Section 6) and check within limits*
3. Breaker: *all IN*
4. Safety belts: *connected to hard points, check condition*
5. Ignition key: *OFF, key extracted*
6. Master switch: *ON*
7. Voltmeter: *check within the limits*
8. Lights: *all ON, check for operation*
9. Annunciator panel: *check all lights*
10. Acoustic stall warning: *check for operation*
11. Master switch: *OFF*
12. Baggage: *check first aid kit, ELT, fire extinguisher, luggage secured with restraint net.*

5. CHECKLISTS

5.1 BEFORE STARTING ENGINE (AFTER PREFLIGHT INSPECTION)

1. Seat position and safety belts: *adjust*
2. Flight controls: operate full stroke checking for movement smoothness, free of play and friction.
3. Parking brake: *engage*
4. Throttle friction: *adjust*
5. Throttle*: IDLE*
6. Propeller Lever: *HIGH RPM*
7. Mixture control Lever: *LEAN*
8. Circuit Breakers: *check all IN*
9. Master switch: *ON, wait EDM930 turn on, Check ALT OUT caution ON, Check LOW FP and LOW OP warning ON*
10. Only before the first flight of the day:

    Standby Instrument: Check no red crosses displayed.

    a. Press and hold the control knob (approx. 2 sec)
    b. Rotate the knob selecting "INFO>" page then press it
    c. Select "BATTERY INFO" page then press the knob
    d. Check "CHARGE (%)" to be more than 80%, then exit menu
11. Avionic Master switch: *ON*
12. Fuel quantity: *compare the fuel quantity indicators information with fuel quantity visually checked into the tanks (see Pre-flight inspection – External inspection), then update the EDM930 fuel content in the totalizer accordingly)*

NOTE

The totalizer function available on EDM930 Engine page allows input only up to 230lts (maximum usable fuel). Initial Fuel indication on totalizer must be corrected manually (as it does not use the aircraft fuel quantity indicators as input). Once correctly initialized, fuel consumption on totalizer is very precise as it take instantaneous fuel flow for computation.

13. Electric fuel pump: *ON (check for audible pump noise and increase of fuel pressure)*
14. Warning "LOW FUEL PRESSURE"*: extinguished*
15. Electric fuel pump: *OFF*
16. Flap control: *cycle fully extended and then set to T/O*
17. Pitch Trim: *cycle fully up and down, then set to NEUTRAL*
18. Rudder trim: *cycle full right and left, then set to NEUTRAL*

WARNING

Pitch trim position other than in neutral position would affect take off performance and take off rotation execution at the correct V_R.

19. Nav & Strobe lights: *ON*

NOTE

In absence of RH seat occupant: fasten seat belts around the seat in order to prevent any interference with the aeroplane flight control operation and with rapid egress in an emergency.

20. Doors: *Closed and locked*

5.2 ENGINE STARTING

(a) Cold engine

1. Engine throttle: *1cm above idle*
2. Fuel selector valve: *select the tank with less fuel*
3. Electric fuel pump: *ON*
4. Mixture: *full open for 3 – 5" (positive fuel flow indication) then CUT-OFF*
5. Propeller area: *check that area is clear of persons / objects*

WARNING

Check to insure no person or object is present in the area close to the propeller. Forward lower sector visibility is not possible from inside the cockpit.

CAUTION

Do not overheat the starter motor. Do not operate it for more than 10 seconds. After operating the starter motor, let it cool off for 20 seconds. After 6 attempts to start the engine, let the starter cool off for half an hour.

6. Ignition key: *BOTH*
7. Ignition key: *START*

When engine start turning and first indication of a starting condition exist:

8. Mixture: *rapidly move to FULL RICH*
9. Throttle: *set 1000 – 1200 RPM*
10. Check oil pressure rises within 10 sec.
11. Check "OIL PRESSURE LOW": *extinguished*
12. Electric fuel pump: *OFF*
13. Check fuel pressure: *within limits*
14. Generator switch: *ON*
15. Voltmeter: *increase and check within green arc*
16. ALT FAIL caution: *extinguished*

NOTE

Avoid idling operations on the ground for optimum engine operation, maintain 1000-1200 RPM, do not exceed 2200 RPM on the ground.

17. Engine instruments: *Check within limits*
18. Check for annunciator panel with no cautions

(b) Warm engine

1. Engine throttle: idle
2. Fuel selector valve: *select the tank with less fuel*
3. Electric fuel pump: *ON*
4. Propeller area: *check for area clear of persons / objects*

WARNING

Check to insure no person or object is present in the area close to the propeller. Forward lower sector visibility is not possible from inside the cockpit.

CAUTION

Do not overheat the starter motor. Do not operate it for more than 10 seconds. After operating the starter motor, let it cool off for 20 seconds. After 6 attempts to start the engine, let the starter cool off for half an hour.

5. Ignition key: *BOTH*
6. Ignition key: *START*

When engine start turning and first indication of a starting condition exist:

7. Mixture: *rapidly move to FULL RICH*
8. Throttle: *set 1000 – 1200 RPM*
9. Check oil pressure rises within 10 sec.
10. Check “OIL PRESSURE LOW”: extinguished
11. Electric fuel pump: *OFF*
12. Check fuel pressure *within limits*
13. Generator switch: *ON*
14. Voltmeter: *increase and check within green arc*
15. ALT FAIL caution: *extinguished*

NOTE

Avoid idling operations on the ground for optimum engine operation, maintain 1000-1200 RPM, do not exceed 2200 RPM on the ground.

16. Engine instruments: *check within green arc*
17. Check for annunciator panel with no cautions

5.3 BEFORE TAXIING

1. Flight instruments and avionics: *set, TEST functions*
2. Altimeter: *set*
3. Pitot Heat: *ON, test for ammeter indication, then OFF*
4. Taxi light: *ON*
5. Parking brake: *OFF*

CAUTION

When taxiing at close range to other aircraft, or during night flight in clouds, fog or haze, the strobe lights should be switched OFF. The NAV lights must always be switched ON during night procedures.

5.4 TAXIING

1. Parking brake: *Release*
2. Brakes: *check*
3. Flight instruments: *check altimeter.*

NOTE

Avoid prolonged idling during taxi.

Alternator lights may appear when reducing engine RPM below 950 RPM (yellow arc). The light will stay ON until RPM is increased above.

CAUTION

During taxi, it is recommended to maintain propeller speed at 1000RPM or above in order to preserve a full loaded battery, minimise annunciator nuisance and assure maximum battery performance during flight. Furthermore this is particularly true during cold weather to prevent lead fouling of spark plugs.

Following extended operation on the ground, or at high ambient temperatures, the following indications of fuel vapor lock may appear:
- Arbitrary changes in idle RPM and fuel flow;
- Slow reaction of the engine to operation of throttle;
- Engine will not run with throttle in IDLE position.

CAUTION

Solution:
1. For about 1 to 2 minutes, or until the engine settles, run at a speed of 1800 to 2000 RPM. Oil and cylinder head temperatures must stay within limits.
2. Pull throttle back to IDLE to confirm smooth running.
3. Set throttle to 1200 RPM and mixture for taxiing, i.e., use mixture control lever to set the maximum RPM attainable.
4. Immediately before the take-off run set the mixture for take-off, apply full throttle and hold this position for 10 seconds.

NOTE

Vapor lock can be avoided if the engine is run at speeds of 1800 RPM or more.

5.5 BEFORE TAKEOFF

1. Parking brake: *brake pedal press, ON*
2. Engine instruments: *Check within limits*
3. ALT OUT caution: *OFF (check)*
4. Electric Fuel pump: *ON*
5. Fuel selector valve: *select the fullest tank*
6. Fuel pressure: *check*
7. Mixture: *FULL RICH*

NOTE *For 5000ft density altitude and above, or high ambient temperatures, a FULL RICH mixture may cause rough running of the engine or a loss of performance. The mixture may be adjusted to obtain smooth engine operations.*

8. Throttle: *set 1500 RPM*
    a. Alternate Air check:
    - Alternate Air: *PULL (Check drop 50-100 RPM)*

    b. Mixture check:
    - Mixture: *reduce*
    - EGT: *check increase*
    - FF: *check decrease*
    - Mixture: *FULL RICH*
9. Throttle: *2100 RPM*
10. *Propeller Lever:*
    - *Pull back until a drop of max. 500 RPM is reached then high RPM*
    - *Cycle 3 times*
11. Magneto Check: *L – BOTH – R – BOTH*
    - Max RPM drop: *175 RPM*
    - Max. difference: *50 RPM*
12. Throttle: *Idle*
13. Flaps: check *T/O*
14. Pitch and Rudder trim: *check neutral*
15. Flight controls: *check free*
16. Seat belts: *check fastened*
17. Doors: *check closed and locked*
18. Parking brake: *Release*
19. Landing light: *ON as required*
20. XPDR: *ON*

5.6 TAKEOFF

For 5000ft density altitude and above, or high ambient temperatures, a FULL RICH mixture may cause rough running of the engine or a loss of performance. The mixture may be adjusted to obtain smooth engine operations.

NOTE

Lean to maximum RPM at Full Throttle prior to take-off where airports are at 5000ft density altitude or higher.

During climb, a rough method of correctly leaning is to slowly reduce mixture lever until an increase of appr.ly 50-100 RPM is noticed at constant IAS or EGT reaches 1375°F mark.

1. Pitot HEAT: *ON if required*
2. Fuel pump: *ON*
3. Brakes: *apply*
4. Throttle: FULL *and check approximately 2680 ± 20 RPM*

WARNING

Engine proper performance at full throttle shall be checked early in the ground roll in order to abandon tak-off if necessary.

A rough engine, sluggish RPM increase or failure to reach take-off RPM are reasons for abandoning the take-off. If the engine oil is cold, an oil pressure in the yellow sector is permissible.

5. Engine instruments: *check parameters within the limits*
6. Brakes: *Release*
7. Rotation speed V_R: *60 KIAS*
8. Airspeed: 67 *KIAS*

Above a safe height:

9. Propeller lever: *2600 RPM*
10. Landing lights: *OFF*

5.7 CLIMB

NOTE

Due to position of fuel sensors, during climb fuel gauges in cockpit will indicate a fuel quantity slightly lower than the real amount. Regaining level flight will immediately restore correct indications.

NOTE

For 5000ft density altitude and above, or high ambient temperatures, a FULL RICH mixture may cause rough running of the engine or a loss of performance.
The mixture may be adjusted to obtain smooth engine operations.
Lean to maximum RPM at Full Throttle prior to take-off where airports are at 5000ft density altitude or higher.
During climb, a rough method of correctly leaning is to slowly reduce mixture lever until an increase of appr.ly 50-100 RPM is noticed at constant IAS or EGT reaches 1375°F mark.

1. Flaps: *UP (minimum speed 73 KIAS)*

NOTE

Expect to adjust pitch trim (pitch up) when retracting flaps after take-off

2. Establish climb Vy: *82 KIAS*
3. Electrical fuel pump: *OFF*
4. Fuel pressure: *check within limits*
5. Throttle: *FULL*
6. MIXTURE: *RICH, above 5000ft keep EGT constant*
7. Engine instruments: *in the GREEN*

NOTE

If the fuel pressure warning light illuminates, or the fuel pressure indication is below green arc, the electrical fuel pump must be switched ON.

5.8 CRUISE

1. Power: *set performance as required, refer to table in section 5 of AFM*
2. Propeller lever: 1800-2400 RPM
3. Fuel tank selector: *as required to maintain symmetric balance*
4. Mixture: *set in accordance with following para 5.9*

NOTE

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

NOTE

Monitor and manually compensate asymmetrical fuel consumption by switching fuel selector valve. Switch ON the electric fuel pump prior to swap the fuel feeding from one tank to another.

5.9 MIXTURE ADJUSTMENT RECOMMENDATION

CAUTION

The maximum permissible cylinder head temperature (500 °F) must never be exceeded.
The mixture control lever should always be moved slowly.
Before selecting a higher power setting the mixture control lever should, on each occasion, be moved slowly to fully RICH before throttle adjustment.
Care should always be taken that the cylinders do not cool down too quickly.
The cooling rate should not exceed 50 °F per minute.

NOTE

For maximum service life cylinder head temperature should be kept below 475 °F (high performance cruise) and below 435 °F (for economy cruise).

Best Cruise Economy Mixture

The best economy mixture setting may only be used up to a power setting of 75 %. In order to obtain the lowest specific fuel consumption at a particular power setting, proceed as follows:

- *Slowly pull the mixture control lever back towards LEAN until the engine starts to run roughly.*
- *Then push the mixture control lever forward just far enough to restore smooth running. At the same time the exhaust gas temperature (EGT) should reach a maximum.*

Best Cruise Power Mixture

The mixture can be set for maximum performance at all power settings:

- *The mixture should first be set as for best economy.*
- *The mixture should then be enriched until the exhaust gas temperature is approximately 100°F lower.*

This mixture setting produces the maximum performance for a given manifold pressure and is mainly used for high power settings (approximately 75 %).

5.10 DESCENT

NOTE

Due to position of fuel sensors, during descent fuel gauges in cockpit will indicate a fuel quantity slightly higher than the real amount. Regaining level flight will immediately restore correct indications.

1. Mixture control: *slowly full rich*
2. Propeller lever: *as required*
3. Throttle: *reduce as required*

Shock cooling shortens engine life.

NOTE

When reducing power, the change in cylinder head temperature should not exceed 50°F per minute. In order to ensure best practice and avoid potential illumination of ALT FAIL (due to low propeller speed), the following best practice should be observed:

- *Reducing power to maintain a minimum descent speed of 84 KIAS (best glide) and / or a blade angle to maintain 850 RPM;*
- *Opening the ALTER AIR command to full open (to avoid ice accretion).*

The maximum permissible cylinder head temperature (500 °F) must never be exceeded.

The mixture control lever should always be moved slowly.

Before selecting a higher power setting the mixture control lever should, on each occasion, be moved slowly to fully RICH.

CAUTION *Care should always be taken that the cylinders do not cool down too quickly. The cooling rate should not exceed 50 °F per minute.*

5.11 BEFORE LANDING

1. Electric fuel pump: *ON*
2. Fuel valve: *select the fullest tank*
3. Landing Light: *ON*

On downwind, leg abeam touch down point:

4. Flaps: *set T/O (below 90KIAS)*

NOTE *Expect to adjust pitch trim (pitch down) when extending flaps to T/O or LAND*

5. Approach speed: *set*

On final leg, before landing:

6. Mixture control lever: *RICH*
7. Propeller Lever: HIGH RPM
8. Flaps: *LAND*
9. Final Approach Speed: *set*
10. Optimal touchdown speed: *60 KIAS*

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

CAUTION

5.12 BALKED LANDING/MISSED APPROACH

1. Throttle: *FULL*
2. Speed: *keep over 80 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *T/O*

Above a safe height:

4. Propeller lever: 2600 RPM
5. Landing lights: *OFF*

5.13 GO-AROUND

1. Throttle: *FULL*
2. Speed: *keep over 80 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *T/O*

5.14 AFTER LANDING

1. Throttle: *Idle*
2. Brakes: *apply*
3. Pitot heat: *OFF (if ON)*
4. Flaps: *UP*
5. Electric Fuel Pump*: OFF*
6. XPDR: *OFF*
7. Landing light: *OFF*
8. Taxi Light: *ON*

5.15 ENGINE SHUT DOWN

1. Parking brake: *set*
2. Keep engine running at 1200 propeller rpm for about one minute in order to reduce latent heat.
3. Avionic equipment: *OFF*
4. Throttle*: idle*
5. Magnetos*: Check OFF – BOTH*
6. Mixture*: closed*
7. Ignition key: *OFF, key extracted*
8. Strobe light: *OFF*
9. Avionic Master: *OFF*
10. Master & Generator switches: *OFF*
11. Fuel selector valve: *OFF*

WARNING

For safety, verify propeller is fully stopped before any other action.

CAUTION

Instruct passenger to fully open RH door and depart, avoiding contact with wheels and sharp wing control surfaces edges.

5.16 POSTFLIGHT CHECKS

1. Flight controls: *lock by means of seat belts*
2. Wheel chocks and wing mooring lines: *Set*
3. Parking brake: *Release*
4. Doors: *Close and lock*
5. Protection plugs: *set over pitot tube, stall warning, static ports*

5.17 FLIGHT IN RAIN

Performance deteriorates in rain; this applies particularly to take-off distance and maximum Horizontal speed. The effect on flight characteristics is minimal.

5.18 REFUELLING

Before refuelling, the airplane must be connected to electrical ground.

5.19 FLIGHT AT HIGH ALTITUDE

At high altitudes the provision of oxygen for the occupant is necessary. Legal requirements for the provision of oxygen should be adhered to (see para 2.9).

Supplement D08: pages replacement instructions

SECTION 5 – PERFORMANCES

Supplement D08 - Performances pages replace basic AFM Section 5 as whole

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SECTION 5 – PERFORMANCE

INDEX

1. INTRODUCTION

This section provides all necessary data for an accurate and comprehensive planning of flight activity from takeoff to landing.

Data reported in graphs and/or in tables were determined using:

- ✓ "Flight Test Data" under conditions prescribed by EASA CS-23 regulation
- ✓ aircraft and engine in good condition
- ✓ average piloting techniques

Each graph or table was determined according to ICAO Standard Atmosphere (ISA - s.l.); evaluations of the impact on performances were carried out by theoretical means for:

- ✓ Airspeed
- ✓ External temperature
- ✓ Altitude
- ✓ Weight
- ✓ Runway type and condition

2. USE OF PERFORMANCE CHARTS

Performances data are presented in tabular or graphical form to illustrate the effect of different variables such as altitude, temperature and weight. Given information is sufficient to plan the mission with required precision and safety.

Additional information is provided for each table or graph.

3. AIRSPEED INDICATOR SYSTEM CALIBRATION

Normal Static Source

Graph shows calibrated airspeed V_{IAS} as a function of indicated airspeed V_{CAS}.

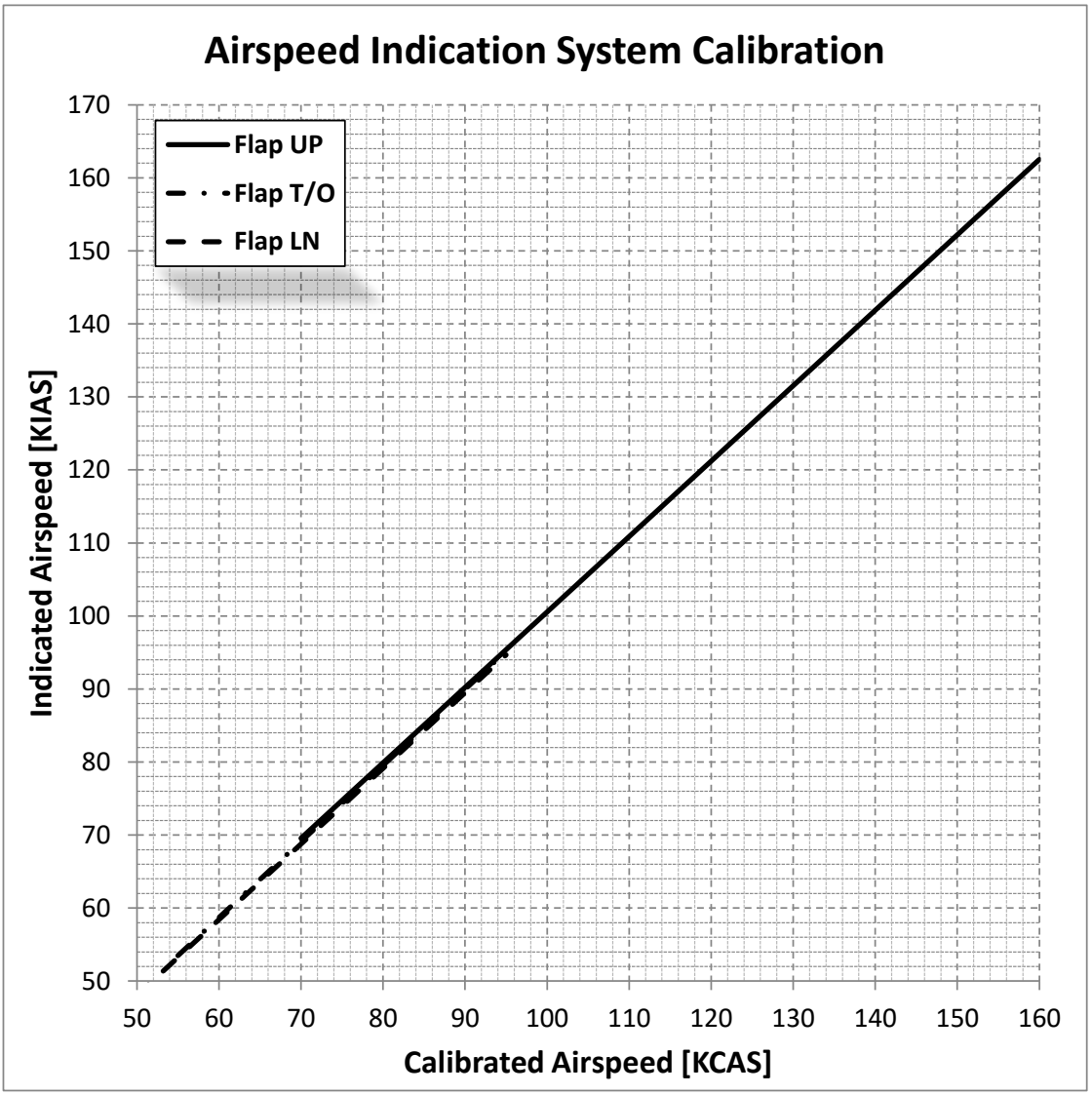

Fig. 5-1. Calibrated vs Indicated Airspeed

Example:

Given	***Find***
KIAS *75.0* *Flap: UP*	KCAS *74.7*

NOTE *Indicated airspeed assumes 0 as an instrument error*

Alternate Static Source

		Alternate Static Air Open		Vents Open		Vents and Hot Air Open	
		IAS [kn]	H_P [ft]	IAS [kn]	H_P [ft]	IAS [kn]	H_P [ft]
Pressure Altitude [ft]	**IAS** [kn]	**FLAP UP**					
1000	70	75	1020	72	1010	72	1020
	90	95	1020	92	1030	93	1020
	110	115	1030	113	1020	112	1020
	135	140	1040	139	1030	137	1030
		FLAP T/O					
	60	63	1020	63	1020	62	1010
	70	75	1020	73	1020	72	1020
	90	94	1020	92	1020	92	1020
		FLAP LND					
	60	62	1020	61	1020	61	1020
	70	72	1020	72	1020	71	1020
	90	92	1020	91	1020	91	1020
		FLAP UP					
5000	70	72	5020	72	5020	71	5020
	90	94	5030	93	5020	92	5020
	110	114	5030	113	5020	112	5020
	133	137	5040	136	5030	135	5020
		FLAP T/O					
	60	62	5010	62	5020	61	5010
	70	74	5020	73	5020	72	5020
	90	93	5030	93	5020	93	5020
		FLAP LND					
	60	63	5030	62	5020	61	5000
	70	72	5020	72	5010	71	5010
	90	92	5020	92	5020	91	5010
		FLAP UP					
8000	70	72	8020	72	8020	71	8020
	90	93	8030	92	8020	92	8020
	110	113	8030	112	8020	112	8020
	128	131	8040	130	8030	130	8020
		FLAP T/O					
	60	62	8010	62	8020	61	8010
	70	73	8020	72	8020	72	8020
	90	92	8030	92	8020	92	8020
		FLAP LND					
	60	61	8020	61	8020	61	8000
	70	72	8010	71	8010	71	8010
	90	92	8010	91	8010	91	8010

4. ICAO STANDARD ATMOSPHERE

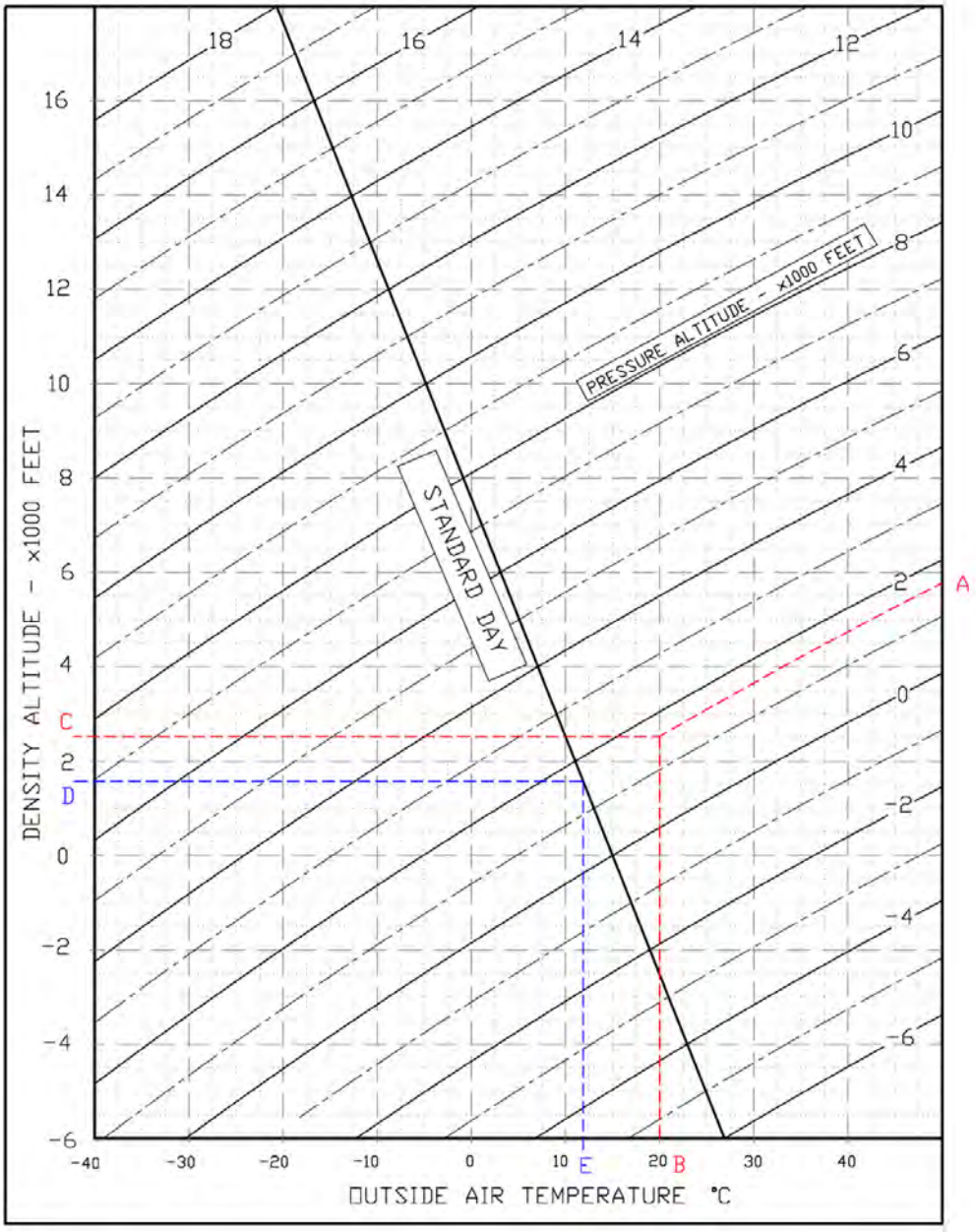

FIG. 5-2. ICAO CHART

Examples:

Scope	***Given***		***Find***
Density Altitude:	**A: Pressure altitude = *1600ft* B: Temperature = *20°C***	→	**C: Density Altitude = *2550ft***
ISA Temperature:	**D: Pressure altitude = *1600ft***	→	**E: ISA Air Temperature = *12°C***

5. STALL SPEED

Weight: 1160 kg (2557 lb)
Throttle Lever: IDLE
CG: Most Forward (19%)
No ground effect

WEIGHT [kg] ([lb])	BANK ANGLE [deg]	STALL SPEED					
		FLAPS 0°		FLAPS T/O		FLAPS FULL	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
1160 (2557) (FWD C.G.)	0	59	60	53	55	50	52
	15	60	61	54	56	51	53
	30	64	65	58	59	54	56
	45	71	71	64	65	61	62
	60	85	85	77	78	73	74

NOTE

Altitude loss during conventional stall recovery, as demonstrated during flight tests is approximately 350 ft with banking below 15°.

6. CROSSWIND

Maximum demonstrated crosswind is 12 kts

⇒ *Example:*

Given	***Find***
Wind direction (*with respect to aircraft longitudinal axis*) = 30°	Headwind = 17.5 kts
Wind speed = 20 kts	Crosswind = 10 kts

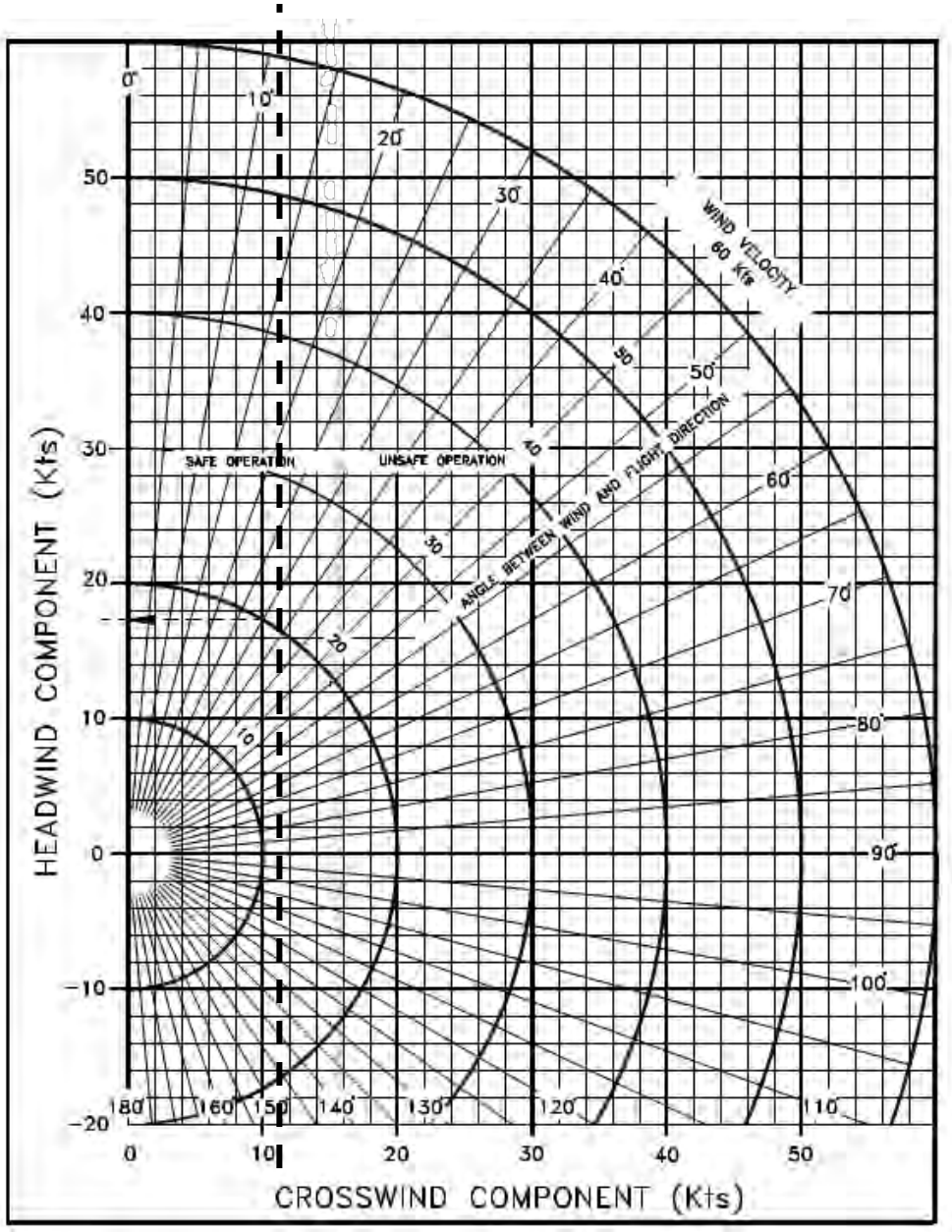

FIG. 5-3. CROSSWIND CHART

7. TAKE-OFF PERFORMANCES

NOTE *To account for likely in service performance variations apply a factored to distances of 1.10*

Weight = 1160 kg (2557 lb)

Flaps: T/O
Speed at Lift-Off = 60 KIAS
Speed Over 50ft Obstacle = 65 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	234 (768)	295 (968)	364 (1194)	442 (1450)	**336 (1102)**
	At 50 ft AGL	421 (1381)	526 (1726)	644 (2113)	776 (2546)	**595 (1952)**
1000	Ground Roll	256 (840)	322 (1056)	397 (1302)	482 (1581)	**360 (1181)**
	At 50 ft AGL	458 (1503)	572 (1877)	701 (2300)	844 (2769)	**637 (2090)**
2000	Ground Roll	279 (915)	352 (1155)	434 (1424)	526 (1726)	**387 (1270)**
	At 50 ft AGL	499 (1637)	622 (2041)	762 (2500)	918 (3012)	**682 (2238)**
3000	Ground Roll	305 (1001)	384 (1260)	474 (1555)	575 (1886)	**415 (1362)**
	At 50 ft AGL	543 (1781)	678 (2224)	830 (2723)	1000 (3281)	**731 (2398)**
4000	Ground Roll	333 (1093)	420 (1378)	518 (1699)	628 (2060)	**446 (1463)**
	At 50 ft AGL	591 (1939)	738 (2421)	904 (2966)	1089 (3573)	**783 (2569)**
5000	Ground Roll	364 (1194)	459 (1506)	566 (1857)	687 (2254)	**480 (1575)**
	At 50 ft AGL	645 (2116)	805 (2641)	986 (3235)	1188 (3898)	**840 (2756)**
6000	Ground Roll	399 (1309)	502 (1647)	620 (2034)	752 (2467)	**516 (1693)**
	At 50 ft AGL	703 (2306)	878 (2881)	1075 (3527)	1296 (4252)	**901 (2956)**

Weight = 1060 kg (2337 lb)

Flaps: T/O
Speed at Lift-Off = 60 KIAS
Speed Over 50ft Obstacle = 65 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	189 (620)	238 (781)	293 (961)	356 (1168)	**270 (886)**
	At 50 ft AGL	342 (1122)	427 (1401)	523 (1716)	630 (2067)	**483 (1585)**
1000	Ground Roll	206 (676)	259 (850)	320 (1050)	388 (1273)	**290 (951)**
	At 50 ft AGL	372 (1220)	464 (1522)	569 (1867)	685 (2247)	**517 (1696)**
2000	Ground Roll	225 (738)	283 (928)	349 (1145)	424 (1391)	**311 (1020)**
	At 50 ft AGL	405 (1329)	505 (1657)	619 (2031)	745 (2444)	**554 (1818)**
3000	Ground Roll	246 (807)	309 (1014)	382 (1253)	463 (1519)	**334 (1096)**
	At 50 ft AGL	441 (1447)	550 (1804)	674 (2211)	812 (2664)	**593 (1946)**
4000	Ground Roll	268 (879)	338 (1109)	417 (1368)	506 (1660)	**359 (1178)**
	At 50 ft AGL	480 (1575)	599 (1965)	734 (2408)	884 (2900)	**636 (2087)**
5000	Ground Roll	294 (965)	370 (1214)	456 (1496)	553 (1814)	**386 (1266)**
	At 50 ft AGL	523 (1716)	653 (2142)	800 (2625)	964 (3163)	**682 (2238)**
6000	Ground Roll	321 (1053)	404 (1325)	499 (1637)	605 (1985)	**416 (1365)**
	At 50 ft AGL	571 (1873)	713 (2339)	873 (2864)	1052 (3451)	**732 (2402)**

Weight = 960 kg (2116 lb)

Flaps: T/O
Speed at Lift-Off = 60 KIAS
Speed Over 50ft Obstacle = 65 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	149 (489)	187 (614)	231 (758)	281 (922)	**213 (699)**
	At 50 ft AGL	272 (892)	340 (1115)	416 (1365)	501 (1644)	**384 (1260)**
1000	Ground Roll	162 (531)	204 (669)	252 (827)	306 (1004)	**229 (751)**
	At 50 ft AGL	296 (971)	369 (1211)	452 (1483)	545 (1788)	**411 (1348)**
2000	Ground Roll	177 (581)	223 732)	275 (902)	334 (1096)	**245 (804)**
	At 50 ft AGL	322 (1056)	402 (1319)	492 (1614)	593 (1946)	**440 (1444)**
3000	Ground Roll	194 (636)	244 (801)	301 (988)	365 (1198)	**264 (866)**
	At 50 ft AGL	350 (1148)	438 (1437)	536 (1759)	645 (2116)	**472 (1549)**
4000	Ground Roll	212 (696)	266 (873)	329 (1079)	399 (1309)	**283 (928)**
	At 50 ft AGL	382 (1253)	477 (1565)	584 (1916)	703 (2306)	**506 (1660)**
5000	Ground Roll	231 (758)	291 (955)	360 (1181)	436 (1430)	**305 (1001)**
	At 50 ft AGL	416 (1365)	520 (1706)	636 (2087)	766 (2513)	**542 (1778)**
6000	Ground Roll	253 (830)	319 (1047)	393 (1289)	477 (1565)	**328 (1076)**
	At 50 ft AGL	454 (1489)	567 (1860)	694 (2277)	836 (2743)	**582 (1909)**

8. TAKE-OFF RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Lever: Full Forward
Propeller: 2600 RPM
Flaps: Take-Off

Weight [kg] ([lb])	Pressure Altitude [ft]	Climb Speed V_y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				
			-25	0	25	50	ISA
1160 (2557)	S.L.	72	974	808	659	525	717
	2000	71	848	684	538	406	617
	4000	70	721	560	417	287	518
	6000	69	596	437	296	169	419
	8000	68	470	315	176	51	320
	10000	67	345	193	56	-67	221
	12000	67	221	71	-63	-184	122
	14000	66	96	-51	-182	-300	23
1060 (2337)	S.L.	70	1118	943	787	647	848
	2000	69	985	813	660	522	744
	4000	69	853	684	533	397	640
	6000	68	721	555	406	273	536
	8000	68	589	426	280	149	431
	10000	67	458	298	155	26	327
	12000	66	327	170	29	-97	223
	14000	66	197	43	-95	-220	119
960 (2116)	S.L.	69	1288	1103	937	787	1001
	2000	69	1147	964	801	654	890
	4000	68	1006	827	666	522	780
	6000	68	866	689	532	390	669
	8000	67	726	553	398	258	558
	10000	66	586	416	264	127	448
	12000	66	447	280	131	-3	337
	14000	65	309	145	-2	-134	226

9. EN-ROUTE RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Lever: Full Forward
Propeller: 2600 RPM
Flaps: UP

Weight [kg] ([lb])	Pressure Altitude [ft]	Climb Speed V_Y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				
			-25	0	25	50	ISA
1160 (2557)	S.L.	82	1131	944	776	625	841
	2000	81	989	804	639	491	729
	4000	80	846	665	503	357	618
	6000	79	705	526	367	224	506
	8000	78	563	388	232	91	394
	10000	77	423	251	97	-41	282
	12000	76	282	113	-37	-173	171
	14000	76	142	-23	-171	-305	59
1060 (2337)	S.L.	82	1284	1085	907	747	976
	2000	81	1133	937	762	605	857
	4000	80	982	789	618	463	739
	6000	79	831	642	474	322	621
	8000	78	682	496	330	181	502
	10000	77	532	350	187	40	384
	12000	76	383	204	45	-99	265
	14000	75	235	59	-97	-239	147
960 (2116)	S.L.	81	1465	1251	1060	888	1134
	2000	80	1302	1092	905	735	1007
	4000	79	1140	934	749	583	880
	6000	78	979	776	595	432	753
	8000	77	818	619	441	281	625
	10000	76	658	462	287	130	498
	12000	75	498	306	134	-20	371
	14000	74	339	150	-18	-170	244

10. CRUISE PERFORMANCE

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 0 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-15°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (15°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (45°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	29.9	113	138	19.2 (72.7)	107	139	18.4 (69.7)	102	141	17.7 (67)
2600	29.9	109	136	18.7 (70.8)	103	138	17.9 (67.8)	98	139	17.2 (65.1)
	28	101	132	17.6 (66.6)	96	134	16.9 (64)	91	135	16.3 (61.7)
	26	90	126	16.1 (60.9)	85	127	15.4 (58.3)	81	128	14.9 (56.4)
	24	79	120	14.7 (55.6)	75	121	14.1 (53.4)	71	121	13.6 (51.5)
	22	69	113	13.3 (50.3)	65	113	12.8 (48.5)	62	113	12.4 (46.9)
	20	59	105	11.9 (45)	56	104	11.5 (43.5)	53	103	11.1 (42)
2450	29.9	103	133	17.9 (67.8)	98	135	17.1 (64.7)	93	136	16.5 (62.5)
	28	95	129	16.8 (63.6)	90	130	16.1 (60.9)	85	131	15.5 (58.7)
	26	85	123	15.4 (58.3)	80	124	14.8 (56)	76	125	14.3 (54.1)
	24	75	117	14.1 (53.4)	71	117	13.5 (51.1)	67	118	13.1 (49.6)
	22	65	110	12.8 (48.5)	62	110	12.3 (46.6)	59	110	11.9 (45)
	20	55	102	11.5 (43.5)	52	101	11.1 (42)	50	100	10.7 (40.5)
2350	29.9	100	131	17.4 (65.9)	94	133	16.7 (63.2)	90	134	16.1 (60.9)
	28	91	127	16.2 (61.3)	86	128	15.6 (59.1)	82	129	15 (56.8)
	26	81	121	15 (56.8)	77	122	14.4 (54.5)	73	123	13.9 (52.6)
	24	72	115	13.7 (51.9)	68	115	13.1 (49.6)	65	115	12.7 (48.1)
	22	62	108	12.4 (46.9)	59	108	12 (45.4)	56	107	11.6 (43.9)
	20	53	99	11.1 (42)	50	98	10.7 (40.5)	48	96	10.4 (39.4)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 3000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-21°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (9°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (39°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	26.8	104	137	17.9 (67.8)	98	138	17.2 (65.1)	93	139	16.5 (62.5)
2600	26.8	100	135	17.4 (65.9)	94	136	16.7 (63.2)	90	137	16.1 (60.9)
2600	26	96	133	16.9 (64)	90	134	16.2 (61.3)	86	135	15.6 (59.1)
2600	24	85	126	15.4 (58.3)	80	127	14.8 (56)	76	128	14.3 (54.1)
2600	22	76	128	14.3 (54.1)	70	120	13.5 (51.1)	67	120	13 (49.2)
2600	20	63	111	12.6 (47.7)	60	111	12.1 (45.8)	57	110	11.7 (44.3)
2600	18	53	101	11.1 (42)	50	99	10.7 (40.5)	47	97	10.4 (39.4)
2450	26.8	94	132	16.6 (62.8)	89	132	15.9 (60.2)	84	133	15.3 (57.9)
2450	26	90	129	16.1 (60.9)	85	129	15.4 (58.3)	81	130	14.8 (56)
2450	24	80	123	14.7 (55.6)	75	123	14.2 (53.8)	72	124	13.7 (51.9)
2450	22	70	116	13.5 (51.1)	66	116	12.9 (48.8)	63	117	12.5 (47.3)
2450	20	60	108	12.1 (45.8)	57	108	11.6 (43.9)	54	107	11.3 (42.8)
2450	18	50	97	10.7 (40.5)	47	97	10.4 (39.4)	45	95	10.1 (38.2)
2350	26.8	90	130	16.1 (60.9)	85	131	15.5 (58.7)	81	131	14.9 (56.4)
2350	26	86	127	15.6 (59.1)	81	128	15 (56.8)	77	129	14.4 (54.5)
2350	24	77	121	14.3 (54.1)	72	122	13.8 (52.2)	69	122	13.3 (50.3)
2350	22	67	114	13.1 (49.6)	64	114	12.6 (47.7)	60	114	12.2 (46.2)
2350	20	57	105	11.7 (44.3)	54	105	11.3 (42.8)	51	103	11 (41.6)
2350	18.5	50	98	10.7 (40.5)	47	95	10.4 (39.4)	45	92	10.1 (38.2)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 6000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-27°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (3°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (33°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	23.9	94	135	16.6 (62.8)	89	136	15.9 (60.2)	84	137	15.3 (57.9)
2600	23.9	90	133	16.1 (60.9)	85	134	15.5 (58.7)	81	134	14.9 (56.4)
2600	23	85	130	15.5 (58.7)	80	130	14.8 (56)	76	131	14.3 (54.1)
2600	22	80	126	14.8 (56)	75	127	14.2 (53.8)	72	127	13.6 (51.5)
2600	20	68	117	13.2 (50)	64	117	12.7 (48.1)	61	117	12.3 (46.6)
2600	19	63	113	12.5 (47.3)	59	112	12 (45.4)	56	111	11.6 (43.9)
2600	18	57	108	11.7 (44.3)	54	106	11.3 (42.8)	51	104	10.9 (41.3)
2450	23.9	85	129	15.4 (58.3)	80	130	14.8 (56)	76	131	14.2 (53.8)
2450	23	80	126	14.8 (56)	75	127	14.2 (53.8)	72	127	13.7 (51.9)
2450	22	75	123	14.1 (53.4)	71	123	13.6 (51.5)	67	123	13.1 (49.6)
2450	20	64	114	12.7 (48.1)	61	114	12.2 (46.2)	58	113	11.8 (44.7)
2450	19	59	110	12 (45.4)	56	109	11.6 (43.9)	53	107	11.2 (42.4)
2450	18	54	104	11.3 (42.8)	51	102	10.9 (41.3)	49	99	10.6 (40.1)
2350	23.9	81	127	15 (56.8)	77	128	14.4 (54.5)	73	128	13.8 (52.2)
2350	23	77	124	14.3 (54.1)	73	124	13.8 (52.2)	69	124	13.3 (50.3)
2350	22	72	121	13.7 (51.9)	68	121	13.2 (50)	65	120	12.7 (48.1)
2350	20	62	112	12.3 (46.6)	58	111	11.9 (45)	55	110	11.5 (43.5)
2350	19	57	107	11.7 (44.3)	54	106	11.2 (42.4)	51	103	10.9 (41.3)
2350	18.5	54	104	11.3 (42.8)	51	102	10.9 (41.3)	49	99	10.6 (40.1)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 9000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-33°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (-3°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (27°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	21.3	85	133	15.4 (58.3)	80	133	14.7 (55.6)	76	133	14.2 (53.8)
2600	21.3	81	130	15 (56.8)	77	131	14.3 (54.1)	73	131	13.8 (52.2)
2600	20	73	124	13.8 (52.2)	69	124	13.3 (50.3)	65	123	12.8 (48.5)
2600	19	67	119	13.1 (49.6)	64	119	12.6 (47.7)	60	118	12.1 (45.8)
2600	18	62	114	12.3 (46.6)	58	113	11.9 (45)	55	111	11.5 (43.5)
2450	21.3	77	127	14.3 (54.1)	72	127	13.7 (51.9)	69	127	13.2 (50)
2450	20	69	121	13.3 (50.3)	65	121	12.8 (48.5)	62	119	12.3 (46.6)
2450	19	64	116	12.6 (47.7)	60	115	12.1 (45.8)	57	114	11.7 (44.3)
2450	18	59	111	11.9 (45)	55	109	11.4 (43.2)	52	106	11.1 (42)
2350	19	66	121	12.9 (48.8)	62	120	12.4 (46.9)	59	117	11.9 (45)
2350	18	60	115	12.2 (46.2)	57	113	11.7 (44.3)	54	110	11.3 (42.8)

Weight: 1160 kg
Mixture: FULL RICH
Pressure Altitude: 12000 ft

Corrections
Best Power: -10% to Full Rich F.C.
Best Economy: -20% to Full Rich F.C.

RPM	MAP [inHg]	ISA – 30°C (-39°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA (-9°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])	ISA + 30°C (21°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([L/h])
2700	19	75	128	14.1 (53.4)	70	128	13.5 (51.1)	67	128	13 (49.2)
2600	19	72	126	13.7 (51.9)	68	126	13.2 (50)	64	125	12.7 (48.1)
2600	18	66	121	13 (49.2)	63	120	12.4 (46.9)	59	118	12 (45.4)
2450	19	68	123	13.2 (50)	64	122	12.7 (48.1)	61	121	12.2 (46.2)
2450	18	63	118	12.5 (47.3)	59	116	12 (45.4)	56	113	11.6 (43.9)
2350	19	66	121	12.9 (48.8)	62	120	12.4 (46.9)	59	117	11.9 (45)
2350	18	60	115	12.2 (46.2)	57	113	11.7 (44.3)	54	110	11.3 (42.8)

11. LANDING PERFORMANCES

NOTE *To account for likely in service performance variations apply a factored to distances of 1.67*

Weight = 1160 kg (2557 lb)

Flaps: LAND
Short Final Approach Speed = 66 KIAS
Throttle Lever: Idle
Runway: Paved

Corrections

Headwind: -4 m for each kn
Tailwind: +13 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: -3% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft])				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	204 (669)	225 (738)	245 (804)	266 (873)	**237 (778)**
	At 50 ft AGL	488 (1601)	509 (1670)	529 (1736)	550 (1804)	**521 (1709)**
1000	Ground Roll	212 (696)	233 (764)	254 (833)	276 (906)	**244 (801)**
	At 50 ft AGL	496 (1627)	517 (1696)	538 (1765)	560 (1837)	**528 (1732)**
2000	Ground Roll	220 (722)	242 (794)	264 (866)	286 (938)	**251 (823)**
	At 50 ft AGL	504 (1654)	526 (1726)	548 (1798)	570 (1870)	**535 (1755)**
3000	Ground Roll	228 (748)	251 (823)	274 (899)	297 (974)	**259 (850)**
	At 50 ft AGL	512 (1680)	535 (1755)	558 (1831)	581 (1906)	**543 (1781)**
4000	Ground Roll	236 (774)	260 (853)	284 (932)	308 (1010)	**267 (876)**
	At 50 ft AGL	520 (1706)	544 (1785)	568 (1864)	592 (1942)	**551 (1808)**
5000	Ground Roll	245 (804)	270 (886)	295 (968)	320 (1050)	**275 (902)**
	At 50 ft AGL	529 (1736)	554 (1818)	579 (1900)	604 (1982)	**559 (1834)**
6000	Ground Roll	255 (837)	280 (919)	306 (1004)	332 (1089)	**284 (932)**
	At 50 ft AGL	539 (1768)	564 (1850)	590 (1936)	616 (2021)	**568 (1864)**

12. BALKED LANDING PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to rate of climb and to angle of climb of 0.90*

Throttle and Propeller Lever: Full Forward
Flaps: LAND
Speed: 67 KIAS

Weight [kg] ([lb])	Pressure Altitude [ft]	Steady Gradient of Climb [%]				
		Temperature [°C]				
		-25	0	25	50	ISA
1160 (2557)	S.L.	10.9	8.6	6.6	4.7	7.4
	1000	10.0	7.8	5.7	3.9	6.7
	2000	9.2	6.9	4.9	3.1	6.0
	3000	8.3	6.1	4.1	2.3	5.3
	4000	7.4	5.2	3.2	1.4	4.6
	5000	6.6	4.4	2.4	0.6	3.9
	6000	5.7	3.5	1.6	-0.2	3.3
	7000	4.8	2.7	0.7	-1.0	2.6
1060 (2337)	S.L.	12.9	10.4	8.1	6.1	9.0
	1000	11.9	9.4	7.2	5.2	8.3
	2000	11.0	8.5	6.3	4.3	7.5
	3000	10.0	7.6	5.4	3.4	6.8
	4000	9.1	6.7	4.5	2.5	6.0
	5000	8.1	5.7	3.6	1.7	5.3
	6000	7.2	4.8	2.7	0.8	4.5
	7000	6.2	3.9	1.8	-0.1	3.8
960 (2116)	S.L.	15.2	12.4	10	7.7	10.9
	1000	14.1	11.4	9.0	6.7	10.1
	2000	13.1	10.4	7.9	5.8	9.3
	3000	12.0	9.3	6.9	4.8	8.4
	4000	11.0	8.3	5.9	3.8	7.6
	5000	10.0	7.3	4.9	2.8	6.8
	6000	8.9	6.3	3.9	1.8	6.0
	7000	7.9	5.3	2.9	0.9	5.2

13. NOISE DATA

Noise level, determined in accordance with ICAO/Annex 16 6th Ed., July 2011, Vol. I°, Chapter 10 and 14 CFR 36.1581(c), is **80.58** dB(A).

NOTE: No determination has been made by the Federal Aviation Administration that the noise levels of this aircraft are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

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Supplement D08: pages replacement instructions

SECTION 6 – WEIGHT AND BALANCE

Refer to the basic AFM, Section 6 Weight and Balance

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Supplement D08: pages replacement instructions

SECTION 7 – AIRFRAME AND SYSTEMS DESCRIPTION

Make sure you first applied instructions reported on the basic AFM, Section 7 Airframe and Systems Description

According A/C configuration apply following pages replacement:

Supplement D08 AIRFRAME AND SYSTEMS page		AFM Section 7 page
GV 7-8 thru 11	**REPLACE**	Pages 7-8 thru 11 of basic AFM, Section 7
GV 7-16	**REPLACES**	Page 7-16 of basic AFM, Section 7
GV 7-20 thru 24	**REPLACE**	Pages 7-20 thru 24 of basic AFM, Section 7
GV 7-27	**REPLACES**	Page 7-27 of basic AFM, Section 7
GV 7-36	**REPLACES**	Page 7-36 of basic AFM, Section 7

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3. FLIGHT CONTROLS

Aircraft flight controls are operated through conventional stick and rudder pedals. Longitudinal control acts through a system of push-rods and is equipped with a trim tab. a cable control circuit is confined within the cabin and it is connected to a pair of push-pull rod systems positioned in each main wing which control ailerons differentially. Aileron trimming is carried out on ground through a small tab positioned on left aileron.

Flaps are extended via an electric servo actuator controlled by a switch on the instrument panel. Flaps act in continuous mode; the indicator displays three markings related to 0°, takeoff (T/O) and landing (FULL) positions. A breaker positioned on the right side of the instrument panel protects the electric circuit.

The control of the stabilator trim is operated by means of a control wheel, located between the two front seats that acts directly on the control cables.

Stabilator trim position is displayed on a dedicated analogue indicator located on the LH area of the instrument panel.

Rudder Trimming device for lateral control is provided by means of an electrical actuator controlled by a rocker switch located near the pitch trim wheel; the surface is connected to a potentiometer linked to a rudder trim analogue indicator located on the LH area of the instrument panel.

4. INSTRUMENT PANEL

The instrument panel installed on P2010, when equipped with G500 suite, is presented below:

- N° 1 Garmin GDU 620 (PFD/MFD), (5);
- N° 1 Garmin GTN 650 (Com/Nav/Gps), (9);
- N° 1 Garmin GNC 255A (Com/Nav), (10);
- N° 1 Garmin GMA 340 (Audio Panel), (8);
- N° 1 Bendix/King KN 572 (DME unit), (14);
- N° 1 Bendix/King KR87 (ADF unit), (11);
- N° 1 JP Instruments EDM 930 (EIS unit), (13);
- N° 1 JP Instruments EDM 930 Remote Alarm Display, (12);
- N° 1 Mid-Continent MD-302 (Stand-by Instrument), (6);
- N° 1 Annunciator panel, (7);
- N° 1 Pitch trim indicator, (3);
- N° 1 Rudder trim indicator, (4);
- N° 1 Chronometer (2);

Fig. 7-8. INSTRUMENT PANEL

4.1 ENGINE CONTROL LEVER

Engine handling is via three levers: Throttle, RPM lever, Mixture control lever.

They're situated on the center control; the use of "front/forward" and "rear/backward" is defined in relation to the direction of flight (longitudinal).

Mixture control lever

This lever (right hand lever with red handle) controls the fuel-air mixture, which is supplied to the engine.

With the lever full forward, extra fuel is being supplied to the engine which at higher performance setting contributes to engine cooling.

In cruise, the mixture should be made leaner in order to reach the appropriate fuel-air mixture. The leaning procedure is given in Chapter 4.

Lever forward (RICH) >> Mixture rich (in fuel)

Lever to rear (LEAN) >>Mixture lean (in fuel)

To shut off the engine the mixture control lever is pulled to the rear stop: air without fuel is drawn into the cylinders that shuts down.

Throttle

This lever (left hand with large knob) is used to control manifold pressure (MAP).

High manifold pressure means a large quantity of fuel-air mixture is being supplied to engine, while low manifold pressure means a lesser quantity of fuel-air mixture is being supplied.

Propeller lever

By means of this lever (central lever with blue handle) the propeller governor controls the propeller pitch, and consequently engine RPM. A selected RPM is held constant by the governor independent of the airspeed and the throttle setting.

Lever forward (HIGH RPM) = fine pitch

Lever rearward (LOW RPM) = coarse pitch

Following a defect in governor or oil system, the blades go to the finest possible pitch (maximum RPM), thus allowing continuation of the flight.

CAUTION

Following failure of the governor or a serious drop in oil pressure, the RPM should be adjusted using the throttle. Every effort should be made not to exceed 2700 RPM.

CAUTION

The throttle and RPM lever should be moved slowly, in order to avoid over-speed and excessively rapid RPM changes.

4.2 ALTERNATE AIR

Alternate Air knob is located on the central pedestal; when the knob is fully pulled outward from the instrument panel, injectors receive maximum hot air. During normal operation, the knob is set in OFF position.

4.3 DEFROST AND CABIN HEAT

Two knobs, located on the lower side of the central pedestal, allow Defrost and Cabin Heat function. The one marked as "Defrost and Cabin Heat" allows hot air to perform windshield defrost and partially cabin heat.

The cabin heat control knob, when fully outward, allows cabin to receive maximum hot air. When both cabin heat and defrost and cabin heat are pulled, air is partitioned.

Fig. 7-9. CENTRAL PEDESTAL

7 POWERPLANT

7.1 ENGINE

Manufacturer …… Lycoming Textron

Model ……... IO-360-M1A

Type Certificate ……... EASA TCDS no. IM.E.032

Engine type …….. Fuel injected (IO), direct drive, four cylinder horizontally opposed, air cooled with down exhaust outlets.

Maximum power ……. 134.0 kW (180hp) @ 2700 rpm

Maximum continuous power ……... 129.2 kW (173.3hp) @ 2600 rpm

Oil Consumption				
Operation	RPM	HP	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
Normal Rated	2700	180	.80	500°F (260°C)
Performance Cruise (75%)	2450	135	.45	500°F (260°C)
Economy Cruise (60R Rated)	2350	117	.39	500°F (260°C)

7.2 PROPELLER

Manufacturer …….. MT Propeller

Model ……. MTV-15-B/193-52

Type Certificate …….. EASA TCDS no. P.098

Blades/hub …….. wood/composite 2-blades – aluminium hub

Diameter ……. 1930 mm (6,33 ft) no reduction allowed

Type …… Variable pitch

Governor

Manufacturer …….. MT Propeller

Model ……. P-860-23:

Type Hydraulic

9 ELECTRICAL SYSTEM

Primary DC power is provided by an external alternator with a 28 VDC output, rated of 70 Amps @ 2700 rpm. During normal operations, it recharges the battery.

Secondary DC power is provided by a lead type battery (GILL G-247) which provides the energy necessary for feeding the essential electrical loads in the event of an alternator failure.

The switch between the energy sources is automatic and no action is required in order to activate the alternate energy source.

For ground maintenance and/or starting, an external power socket is provided.

The alternator and battery are connected to the battery bus in order to provide energy for the electric equipment.

Each electrically fed instrument is connected to a dedicated circuit breaker which protects the cable from the battery bus to the associated electric equipment.

WARNING

If the Ignition is in the position L, R, or BOTH, an accidental movement of the propeller may start the engine with possible danger for bystanders.

In the following figure is presented the electrical system architecture.

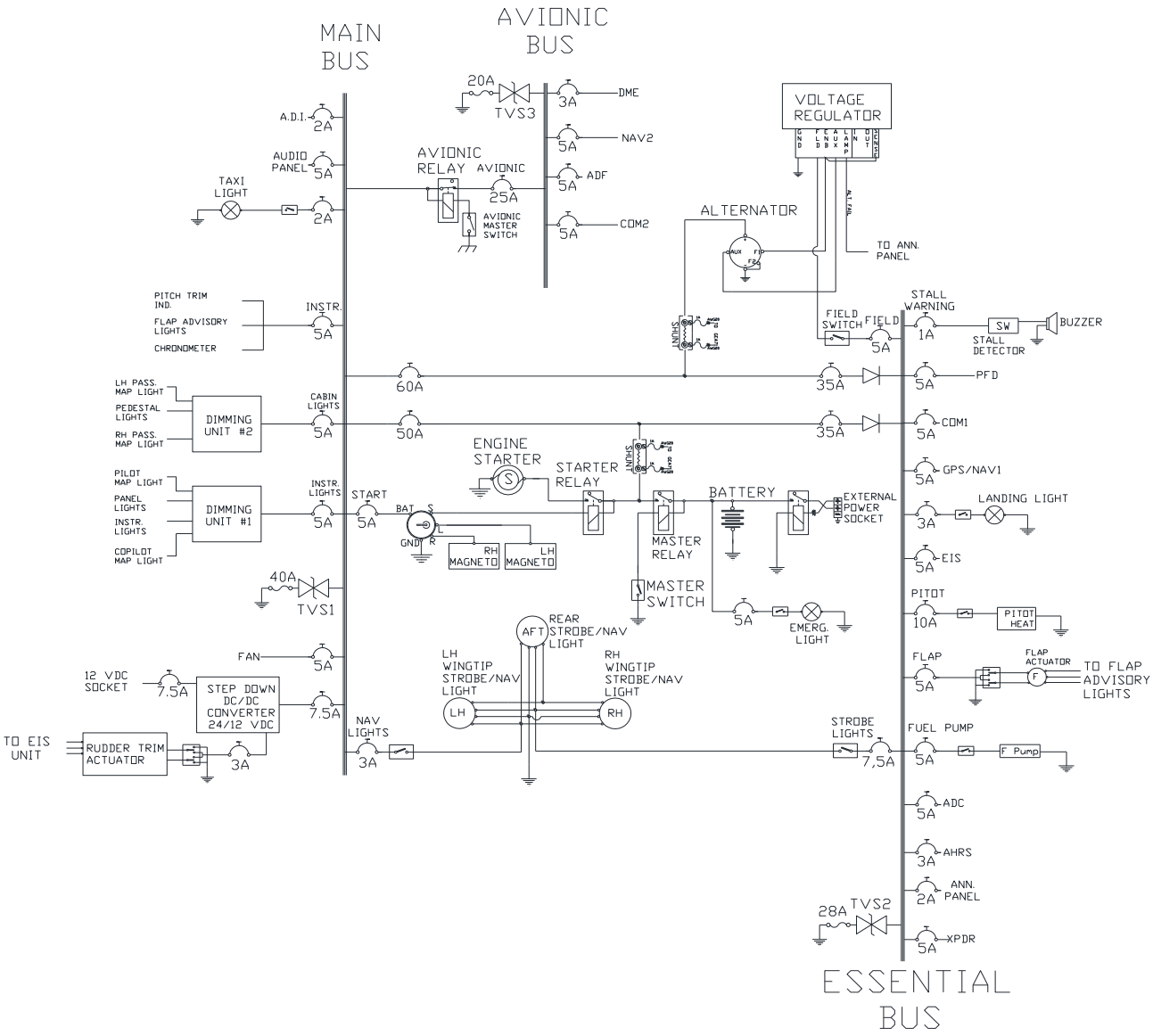


FIG.7-15. ELECTRICAL SYSTEM ARCHITECTURE

9.1 STALL WARNING SYSTEM

The aircraft is equipped with a stall warning system consisting of a sensor located on the right wing leading edge connected to a warning horn located near the instrument panel.

9.2 AVIONICS

P2010 avionic system, in this equipment configuration, is mainly based on avionics package Garmin G500.

The G500 suite installed on P2010 is based on a single display layout. It provides the pilot with all primary flight information and is able to act as a navigation indicator for external navigation sources such as VHF NAV and GPS. G500 also presents moving map information to the pilot.

Engine parameters are presented on an external instrument, EDM-930, equipped with an additional Remote Alarm Display which is intended to provide RPM and MAP information in the event of primary display failure.

An external annunciator panel is located in the top center area of the instrument panel.

In order to provide the pilot with main flight information in the event of PFD failure, or in the event of an AHRS and ADC units combined failure, an integrated digital stand-by instrument, Mid-Continent MD-302, featuring airspeed, altitude, attitude and slip information is installed.

An ELT device is installed and its control switch is located in the upper left area of the cockpit.

The Com/Nav functions are embodied into two devices, GNC 255 and GTN 650. The second one provides also GPS signal.

A dedicated DME and an dedicated ADF receivers are installed, and also a Trasponder unit.

Two dedicated analogue indicators are provided for pitch and rudder trim positions.

The installed equipment is such that the aircraft is able to fly under day/night VFR and day/night IFR rules and to perform ILS CAT I approaches with ILS.

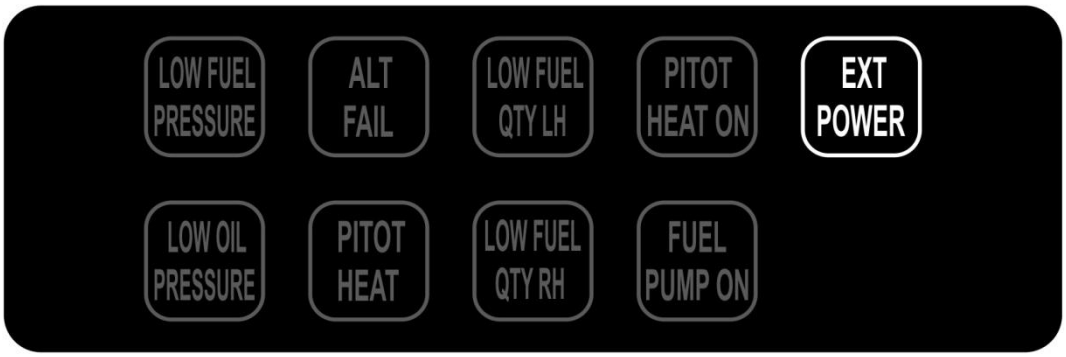
CAUTION

Standby MD302 has a better availability and integrity than Garmin G500 (at least for the critical parameters) against the HIRF/IEL threats. In case of inconsistency between Garmin PFD and MD-302SAM flight informations, it may be expected MD-302SAM to be more reliable, but cross-check with other flight parameters will be necessary to address the faulty source of information.

9.3 External Power Supply

On the right side of the tail cone, an external power is present. Using this device it is possible to feed the electric system directly on the main bus bar, by an external power source. It should be used at the engine start-up in cold weather condition.

A white advisory "EXT. POWER" label will appear on annunciator panel upon connection of external power in order to advise pilot; the label will disappear upon disconnection of ground external power.



CAUTION

Exercise caution while applying external power.
Exercise extreme caution while disconnecting external power with engine running due to airflow coming from the propeller.
Approach the power supply receptacle from rear of the wing.
Make a positive check, upon disconnection, that:
- *the power chord is free from any aircraft structure*
- *the receptacle is firmly closed.*

Follow this procedure to start the engine using the external power source.

1. Ignition key, Master switch, Generator switch: OFF
2. Open the receptacle door and insert the external power source's plug into the socket
3. Engine start-up procedure (see Sect. 4 in this manual)
4. Disconnect the external power source's plug and close firmly the receptacle door.

10. PITOT-STATIC PRESSURE SYSTEMS

The P2010 air speed/altitude indicating systems are connected with a Pitot-Static system based on a total pressure/Pitot probe (simple Pitot tube, heated for icing protection) mounted on left wing strut and two static pressure ports connected in parallel and located in correspondence of engine firewall on left and right side of fuselage. Flexible hoses connects total pressure and static ports to primary analogue instruments, anemometer and altimeter.

Garmin G500 suite and standby MD 302 unit are connected to both static and total pressure lines providing both air speed and altitude information.

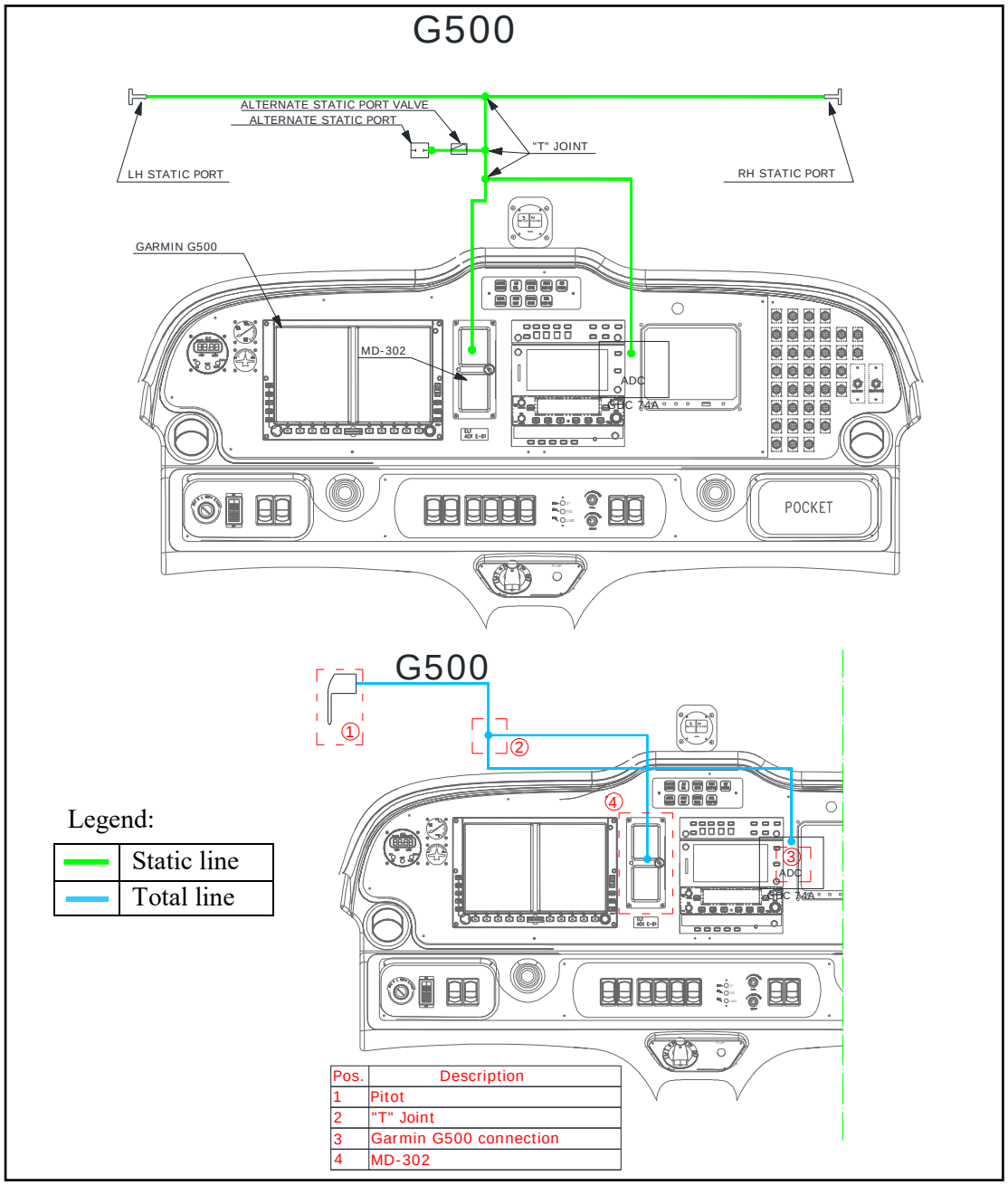


FIG.7-16. PITOT-STATIC SYSTEM

11.2 INTERNAL LIGHTS

On the cabin ceiling are located four map lights, two in the front area (pilot) and two in the rear area (passengers).

In the central area of the cabin ceiling is located a spot light used to illuminate the pedestal during night flight operations. All ceiling lights are dimmable by a dedicated dimmer.

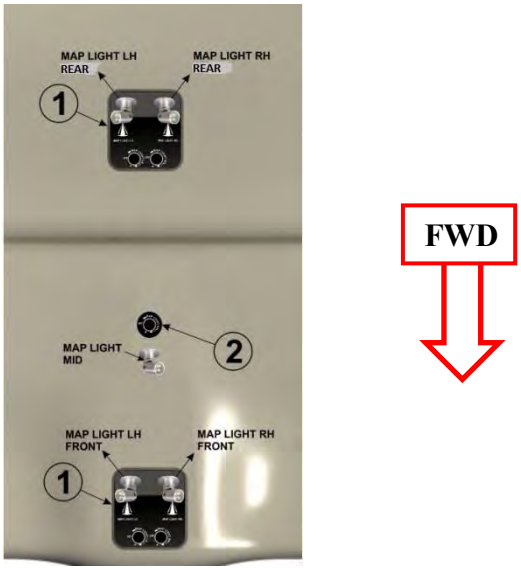


FIG.7-18. CABIN CEILING LIGHTS LAYOUT

The instrument panel can be illuminated by 8 incandescence light strips, all dimmable.

FIG.7-19. INSTRUMENT PANEL LIGHTS LAYOUT

Pedestal placards:

Supplement D08: pages replacement instructions

SECTION 8 – GROUND HANDLING & SERVICE

Make sure you first applied instructions reported on the basic AFM, Section 8 Ground Handling & Service

Refer to the basic AFM, Section 8 – Ground Handling & Service

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Supplement n° D10

AFMS FOR
Lycoming IO-390 Engine and G1000 Nxi Avionic Suite

Record of Revisions

Rev	Revised page	Description of Revision	Tecnam Approval			EASA Approval or Under DOA Privileges
			DO	OoA	HDO	
0	-	First Issue	A.Sabino	C. Caruso	M. Oliva	EASA Approval N° 10065113
1	D10-1, 5, 6	Cover pages amended	A.Sabino	C. Caruso	M. Oliva	Approved under the authority of DOA, ref. EASA.21J.335 (MOD2010/131.180403)
	E3-4	Added Reference Airspeeds for Emg Procedures.				
	E4-19	Governor purging cycling added.				
	E4-24	Reference to missed approach speed inserted in place of its value.				

List of Effective Pages

	Page	Revision
Cover Pages	D10-2 thru 4, 7 thru 10	*Rev. 0*
	D10-1, 5, 6	*Rev. 1*
Section 1	E1-6	*Rev. 0*
Section 2	E2-1, 5 thru 10, 17 thru 20	*Rev. 0*
Section 3	E3-14, E3-18, E3-19	*Rev. 0*
	E3-4	*Rev. 1*
Section 4	E4-1, 7, 13, 15, 20, 22 thru 24, 27 thru 34	*Rev. 0*
	E4-19, 24	*Rev. 1*
Section 5	E5-1 thru 20	*Rev. 0*
Section 7	E7-8 thru 11, 16, 21, 27, 33, 35, 37	*Rev. 0*

INTRODUCTION

The information contained herein supplements or supersedes the basic Aircraft Flight Manual: detailed instructions are provided to allow the owner for replacing the AFM pages containing information amended as per Garmin G1000 Nxi and new powerplant system composed by Lycoming IO-390 engine and MTV-12 propeller.

It is the owner's responsibility to replace the mentioned pages in accordance with the instructions herein addressed section by section.

Supplement D10: pages replacement instructions

SECTION 1 – GENERAL

Make sure you first applied instructions reported on the basic AFM, Section 1 General

According A/C configuration apply following pages replacement:

Supplement D10 LIMITATIONS page		AFM Section 1 page
E1-6	**REPLACES**	Page 1-6 of basic AFM, Section 1

5. ENGINE

Manufacturer ……	Lycoming Engines
Model ……...	IO-390-C3B6
Type Certificate ……...	EASA TCDS no. IM.E.097
Engine type ……..	Fuel injected (IO), direct drive, four cylinder horizontally opposed, air cooled.
Maximum power ……..	160.3 kW (215 hp) @ 2700 rpm

6. PROPELLER

Manufacturer ……..	MT-Propeller Entwicklung GmbH
Model …….	MTV-12-B/183-59
Type Certificate ……..	EASA TCDS no. P.013
Blades/hub ……..	wood/composite 3-blades – aluminum hub
Diameter …….	1830 mm (72 in)
Type ……	Variable pitch propeller at constant speed

Governor

Manufacturer ……..	MT Propeller
Model …….	P-860-23:
Type ……	Hydraulic

Supplement D10: pages replacement instructions

SECTION 2 – LIMITATIONS

Make sure you first applied instructions reported on the basic AFM, Section 2 Limitations

According A/C configuration apply following pages replacement:

Supplement D10 LIMITATIONS page		AFM Section 2 page
E2-1	**REPLACES**	Page 2-1 of basic AFM, Section 2
E2-5 thru 10	**REPLACE**	Page 2-7 thru 10 of basic AFM, Section 2
E2-17 thru 20	**TO BE ADDED**	At the end of Section 2 of basic AFM

SECTION 2 – LIMITATIONS

INDEX

2. AIRSPEED LIMITATIONS

The following table addresses the airspeed limitations and their operational significance:

AIRSPEED		KIAS	KCAS	REMARKS
V_{NE}	Never exceed speed	169	164	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	132	130	Do not exceed this speed except in smooth air, and only with caution.
V_A	Design Manoeuvring speed	120	119	Do not make full or abrupt control movement above this speed, because under certain conditions the aircraft may be overstressed by full control movement.
V_O	Operating Manoeuvring speed			
V_{FE}	Maximum flaps extended speed	91	92	Do not exceed this speed for indicated flaps setting.

3. AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their colour code are explained in the following table.

MARKING	KIAS	EXPLANATION
White arc	**47 – 91**	Positive Flap Operating Range (lower limit is V_{SO}, at specified maximum weight and upper limit is the maximum speed permissible with landing flaps extension).
Green arc	**57– 132**	Normal Operating Range (lower limit is V_{S1} at specified maximum weight and most forward c.g. with flaps retracted and upper limit is maximum structural speed V_{NO}).
Yellow arc	**132 – 169**	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**169**	Maximum speed for all operations.

4. POWERPLANT LIMITATIONS

Following table reports the operating limitations the installed engine:

ENGINE MANUFACTURER: Lycoming Engines
ENGINE MODEL: IO-390-C3B6
MAXIMUM POWER:

	Maximum Power ***(hp)***	**Max RPM** ***(Propeller RPM)***
Maximum T.O.	215	2700

Temperatures:

Max CHT …….. 465° F (240° C)
Max Oil ……. 235° F (113° C)

Oil Pressure:

Minimum Idling …… 25 psi (1.7 Bar)
Minimum Normal ……..55 psi (3.8 Bar)
Maximum Normal ……95 psi (6.5 Bar)
Starting, Warm-up, taxi and take-off (Max) ….....115 psi (7.9 Bar)

Fuel pressure:

- *At Inlet to fuel injector:*

Minimum ..... 14 psi (0.96 Bar)
Maximum ..... 35 psi (2.41 Bar)

5. FUEL

2 TANKS:	120 litres each one (31.7 US gallons)
MAXIMUM CAPACITY:	240 litres (63.4 US gallons)
MAXIMUM USABLE FUEL:	231 litres (61 US gallons)
APPROVED FUEL:	AVGAS 100 LL

For additional information, refer to Lycoming Service Instruction No. 1070, latest issue.

6. LUBRICANT

Recommended Grade Oil:

Average Ambient Temperature	MIL-L-6082B or SAEJ1966 Spec. Mineral Grades	MIL-L-22851 or SAEJ1899 Spec. Ashless Dispersant Grades
All Temperatures	----	SAE15W50 or SAE20W-50
Above 80°F	SAE60	SAE60
Above 60°F	SAE50	SAE40 or SAE50
30°F to 90°F	SAE40	SAE40
0°F to 70°F	SAE30	SAE40, SAE30, SAE20W40
Below 10°F	SAE20	SAE30 or SAE20W30

For additional info, refer to Engine Installation and Operation Manual IO-390-C Series, latest issue.

7. PAINT

To ensure that the temperature of the composite structure does not exceed limits, the outer surface of the aeroplane must be painted with white paint, except for areas of registration marks, placards, and ornament.

Refer to Aircraft Maintenance Manual (AMM), ATA Chapter 4 and 51, for specific paint requirements.

8. PROPELLER

MANUFACTURER: ……..	MT-Propeller Entwicklung GmbH
MODEL: …….	MTV 12B/183-59
TYPE: ……	wood/composite 3-blade, variable pitch
DIAMETER: ……...	1830 mm (72 in)

9. MAXIMUM OPERATING ALTITUDE

Maximum operating altitude is 12000 ft (3658 m) MSL.

CAUTION

Flight crew is required to use supplemental oxygen according to applicable Air Operation Rules.

10. AMBIENT TEMPERATURE

Ambient temperature: from -25°C (-13 °F) to +50°C (122 °F).

WARNING

Flight in expected and/or known icing conditions is forbidden.

11. POWERPLANT INSTRUMENT MARKINGS

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

INSTRUMENT		RED ARC Minimum limit	WHITE ARC Advisory	GREEN ARC Safe operation	YELLOW ARC Caution	RED ARC Maximum limit
PROPELLER	RPM	/	/	950 - 2700	0 - 950	2700 - 2800
MAP	inHg	/	30-35	10 - 30		
OIL TEMP.	°F	/	/	140 - 235	0 - 140	235 - 245
CHT	°F	/	/	150 - 465	/	465 - 475
EGT	°F	/	1000 - 1500	/	/	1500 - 1550
OIL PRESS	psi	0 - 25	/	55-95	25 - 55 95 - 115	115 - 125
FUEL PRESS	psi	0 - 14	/	14-35	/	35 - 40
FUEL QTY	litres	0	/	0 - 115	/	/
	gal	0		0 – 30.4		
FUEL FLOW	l/hr	/	0 - 100	/	/	/
	gal/hr		0 - 27			

12. OTHER INSTRUMENT MARKINGS

INSTRUMENT	RED ARC Minimum limit	GREEN ARC Safe operation	YELLOW ARC Caution	RED ARC Maximum limit
Voltmeter	20 - 21 Volt	24 - 30 Volt	21 - 24 Volt	30 – 31 Volt

20 PBN (RNAV & RNP) OPERATIONAL ELIGIBILITY

20.1 General GNSS Navigation Equipment Approvals

The GPS/GNSS receivers in the G1000 NXi System are certified to TSO C129a Class A1 and ETSO C129a Class A1 or TSO C145a and ETSO 2C145a.

The Garmin GNSS navigation system as installed in this airplane complies with the requirements of AC 20-138A, JAA TGL-10 and AMCs 20-4A, 20-27A and 20-28.

It's approved for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, precision and non-precision approach operations.

The G1000 NXi System meets the requirements for GPS/GNSS as a Primary Means of Navigation for Oceanic/Remote Operations (RNP-10) per AC 20-138C, FAA Notice N8110.60, FAA Order 8400-12C and FAA Order 8700-1. Both GPS/GNSS receivers are required to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor.

In accordance to ICAO doc 9613 (Fourth Edition – 2013), the G1000 NXi System has been shown to be eligible for:

- B-RNAV (RNAV-5) per AMC 20-4A.
- RNAV1 / P-RNAV (RNP-1) Enroute and Terminal navigation per JAA TGL-10 Rev.1.
- RNP APCH LNAV/VNAV per EASA AMC 20-27. This does not include APV BARO-VNAV operation which is not cleared.
- LPV with SBAS per EASA AMC 20-28.

provided that the G1000 NXi is receiving usable navigation information from at least one GPS receiver.

20.2 G1000 NXi GNSS (GPS/SBAS) Navigation System Limitations

The pilot must confirm at system initialization that the Navigation database is current. 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.

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.

Discrepancies that invalidate a procedure must be reported to Garmin International. The affected procedure is prohibited from being flown using data from the Navigation database until a new Navigation database is installed in the airplane and verified that the discrepancy has been corrected.

Contact information to report Navigation database discrepancies can be found at www.Garmin.com>Support>Contact Garmin Support>Aviation. Pilots and operators can view navigation data base alerts at www.Garmin.com > In the Air> NavData Alerts.

For flight planning purposes, in areas where SBAS coverage is not available, the pilot must check RAIM availability.

Within Europe, RAIM availability can be determined using the G1000 NXi WFDE Prediction program or Europe's AUGER GPS RAIM Prediction Tool at http://augur.ecac-nav.com/augur/app/home.

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 G1000 NXi 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'.

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 rerouted on a track where RAIM requirements can be met.

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

Whenever possible, RNP and RNAV routes including Standard Instrument Depar- tures (SIDs) and Obstacle Departure Procedures (ODPs), Standard Terminal Arrival (STAR), and enroute RNAV "Q" and RNAV "T" routes should be loaded into the flight plan from he database in their entirety, rather than loading route waypoints from the data base 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. "GPS", "or GPS", and "RNAV (GPS)" instrument approaches using the G1000 NXi System are prohibited unless the pilot verifies and uses the current Navigation database. GPS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is loaded from the Navigation database.

Not all published Instrument Approach Procedures (IAP) are in the Navigation database.

Pilots planning on flying an RNAV instrument approach must ensure that the Navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the Navigation database into the FMS flight plan by its name.

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 G1000 NXi 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 G1000 NXi VOR/LOC/GS receivers to fly the final approach segment, VOR/LOC/GS navigation data must be selected and presented on the CDI.

SID/STAR

The use of SIDs and STARs stored in GPS data base is only authorized, if the pilot has checked that GPS procedure corresponds to the one given in the official documentation (coordinates of various points and paths between points).

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Supplement D10: pages replacement instructions

SECTION 3 – EMERGENCY PROCEDURES

Make sure you first applied instructions reported on the basic AFM, Section 3 Emergency Procedures

According A/C configuration apply following pages replacement:

Supplement D10 LIMITATIONS page		AFM Section 3 page
E3-4	**REPLACES**	Page 3-4 of basic AFM, Section 3
E3-14	**REPLACES**	Page 3-14 of basic AFM, Section 3
E3-18	**REPLACES**	Page 3-18 of basic AFM, Section 3
E3-19	**REPLACES**	Page 3-19 of basic AFM, Section 3

1.1. REFERENCE AIRSPEEDS FOR EMERGENCY PROCEDURES

Best Glide Speed (V_{GLIDE})	**84 KIAS**
No-Flaps Approach Speed	**78 KIAS**

6.3 PROPELLER OVERSPEED

In case of propeller overspeed in flight, apply following procedure:

1. Throttle Lever …… REDUCE power
2. Propeller Lever ……. … Decrease RPM
3. Mixture Lever ……. ….. As required
4. RPM indicator …….. CHECK

If it is not possible to decrease propeller RPM,

- **land as soon as possible applying Forced landing procedure.**

CAUTION

Maximum propeller rpm exceedance may cause engine components damage.
Monitor engine RPM; overspeed shall be prevented by retarding propeller lever.

6.4 IRREGULAR RPM

1. Oil Pressure: ……..... CHECK
2. Fuel Pressure: ……. …….. CHECK

If Oil and Fuel Pressure stay within limits and a governor failure is suspected,

- **Land as soon as practical, monitoring RPM and Propeller Lever position**.

6.10 DEFECTIVE ENGINE CONTROLS

Defective Mixture Control Cable

1. Maintain altitude to the nearest airfield
2. During descent, check engine behaviour to a higher power setting. A lean mixture can lead to engine roughness and loss of power.
   Landing approach must be planned accordingly.

WARNING

Go-around may then be impossible.

Defective Throttle Control Cable

If power is sufficient to continue flight:

1. Approach nearest airfield, control engine power with Propeller lever
2. Perform landing with shut-down engine applying *Forced landing procedure*.

If power is not sufficient to continue flight:

1. Carry out *Forced landing procedure*.

Defective Propeller Lever Control Cable

If power is sufficient to continue flight:

1. Approach nearest airfield, control engine power with throttle
2. Perform normal landing.

WARNING

Go-around may then be impossible.

If power is not sufficient to continue flight:

1. Carry out *Forced landing procedure*.

7 INFLIGHT ENGINE RESTART

7.1 PROPELLER WINDMILLING

WARNING

In case of engine shutdown, propeller will keep windmilling and will not stop, preventing the use of ignition key. Engine inflight restart must be performed without using ignition key with propeller windmilling in order to avoid possible engine damages.
Typical indication of a potential engine shutdown, with windmilling propeller, will be low RPM values incompatible with power lever demand, to be confirmed by other engine instrument (OIL Pressure, CHT, EGT running down abnormally).
Flight test results suggest a windmilling propeller speed as low as 1000 RPM at low speeds in case of an engine flameout.
Inflight engine restart may be performed during 1g flight anywhere within the normal operating envelope of the airplane.

1.	Master switch ……	*Check ON*
2.	Fuel pump ……	*ON*
3.	Fuel quantity indicator ……..	*CHECK*
4.	Fuel Selector …….	*SWITCH TANK*
5.	Throttle Lever ……..	*Minimum 1cm. above IDLE*
6.	Propeller Lever……..	*Full forward*
7.	Mixture ……	*FULL rich*
8.	Throttle lever ……	*SET as required*

In case of unsuccessful engine restart:

- **Land as soon as possible** applying *Forced landing procedure.*

In case of successful engine restart:

- **Land as soon as possible**

CAUTION

After engine restart, if practical, moderate propeller rpm to allow the temperatures for stabilizing in the green arcs.

Supplement D10: pages replacement instructions

SECTION 4 – NORMAL PROCEDURES

Make sure you first applied instructions reported on the basic AFM, Section 4 Normal Procedures

According A/C configuration apply following pages replacement:

Supplement D10 NORMAL PROCEDURES page		AFM Section 4 page
E4-1	**REPLACES**	Pages 4-1 of basic AFM, Section 4
E4-7	**REPLACES**	Page 4-7 of basic AFM, Section 4
E4-13	**REPLACES**	Page 4-13 of basic AFM, Section 4
E4-15	**REPLACES**	Page 4-15 of basic AFM, Section 4
E4-19	**REPLACES**	Page 4-19 of basic AFM, Section 4
E4-20	**REPLACES**	Page 4-20 of basic AFM, Section 4
E4-22 thru 24	**REPLACE**	Page 4-22 thru 24 of basic AFM, Section 4
E4-27 thru 34	**TO BE ADDED**	At the end of Section 4 of basic AFM

SECTION 4 – NORMAL PROCEDURES

INDEX

3. AIRSPEEDS FOR NORMAL OPERATIONS

The following airspeeds are those which are significant for normal operations.

	FLAPS	**1160kg (2557lbs)**
Rotation Speed (V_R)	T/O	**58 KIAS**
Best Angle-of-Climb Speed (V_X)	0°	**77 KIAS**
Best Rate-of-Climb speed (V_Y)	0°	**86 KIAS**
Flaps (V_{FE})	T/O & FULL	**91 KIAS**
No flaps approach	0°	**78 KIAS**
Approach speed	T/O	**73 KIAS**
Final Approach Speed	FULL	**68 KIAS**
Optimal touch down speed	FULL	**58 KIAS**
Missed approach speed	FULL	**81 KIAS**
Manoeuvring speed (V_A)	0°	**120 KIAS**
Vglide	0°	**84 KIAS**
Never Exceed Speed (V_{NE})	0°	**169 KIAS**

S	Propeller and spinner condition	*CHECK for nicks, cracks, dents and other defects, propeller should rotate freely. Check fixing and lack of play between blades and hub.*

T Check the engine cowling surface conditions and perform the following checks:

a) Nacelle inlets and exhausts openings must be free of obstructions. Visually inspect that ram air intake is unobstructed. If inlet and outlet plugs are installed, they must be removed.
b) Check radiator. There should be no indication of leakages and obstructions.
c) Check for foreign objects
d) Check exhaust general conditions.
e) At cold engine, Check engine oil level and replenish as required. Prior to long flights oil should be added so that the oil level reaches the "max" mark.
f) Drain off Gascolator for water and sediment (drain until no water comes off). Then make sure drain valve is closed.
g) Check drainage hoses free of obstructions.

U	Engine cowling fittings	*CHECK all fixed or locked.*
V	Landing/taxi light and LH static port	*CHECK, Visual inspection for integrity. Right side tank vent: check for obstructions.*
Z	Tow bar and chocks	*REMOVE, stow on board pitot, static ports and stall warning protective plugs.*

NOTE *Avoid blowing inside Pitot tube and inside airspeed indicator system's static ports as this may damage instruments.*

5. CHECKLISTS

5.1. BEFORE STARTING ENGINE (AFTER PREFLIGHT INSPECTION)

1. Seat position and safety belts: *adjust*
2. Flight controls: *operate full stroke checking for movement smoothness, free of play and friction.*
3. Parking brake: *engage*
4. Throttle friction: *adjust*
5. Throttle*: IDLE*
6. Propeller Lever: *MAX RPM*
7. Mixture control Lever: *LEAN*
8. Circuit Breakers: *check all IN*
9. Master switch: *ON, wait PFD turn on, Check ALT OUT caution ON, Check LOW FP and LOW OP warning ON*
10. Only before the first flight of the day:

    Standby Instrument: *Check no red crosses displayed.*

    a. Press and hold the control knob (approx. 2 sec)

    b. Rotate the knob selecting "INFO>" page then press it

    c. Select "BATTERY INFO" page then press the knob

    d. Check "CHARGE (%)" to be more than 80%, then exit menu
11. Avionic Master switch: *ON, wait MFD turn on, check instruments, check Voltage on Main and Essential Buses.*
12. Fuel quantity: *compare the fuel quantity indicators information with fuel quantity visually checked into the tanks (see Pre-flight inspection – External inspection), then update the Garmin fuel content in the totalizer accordingly*

NOTE

The totalizer function available on Garmin Engine page allows input only up to 230lts (maximum usable fuel). Initial Fuel indication on totalizer must be corrected manually (as it does not use the aircraft fuel quantity indicators as input). Once correctly initialized, fuel consumption on totalizer is very precise as it take instantaneous fuel flow for computation

13. Electric fuel pump: *ON (check for audible pump noise and increase of fuel pressure)*
14. Warning "LOW FUEL PRESSURE"*: extinguished*
15. Electric fuel pump: *OFF*
16. Flap control: *cycle fully extended and then set to T/O*
17. Pitch Trim: *cycle fully up and down, then set to NEUTRAL*
18. Rudder trim: *cycle full right and left, then set to NEUTRAL*

Pitch trim position other than in neutral position would affect take off performance and take off rotation execution at the correct V_R.

19. Nav & Strobe lights: *ON*

NOTE

In absence of RH seat occupant: fasten seat belts around the seat in order to prevent any interference with the aeroplane flight control operation and with rapid egress in an emergency

20. Doors: *Closed and locked*

5.5. BEFORE TAKEOFF

1. Parking brake: *brake pedal press, ON*
2. Engine instruments: *Check within limits*
3. ALT OUT caution: *OFF (check)*
4. Electric Fuel pump: *ON*
5. Fuel selector valve: *select the fullest tank*
6. Fuel pressure: *check*
7. Mixture: *FULL RICH*

NOTE *For 5000ft density altitude and above, or high ambient temperatures, a FULL RICH mixture may cause rough running of the engine or a loss of performance. The mixture may be adjusted to obtain smooth engine operations*

8. *Throttle: set 1500 RPM*
   a. *Alternate Air check:*
      - Alternate Air: *PULL (Check drop 50-100 RPM)*
   b. *Mixture check:*
      - Mixture: *reduce*
      - EGT: *check increase*
      - FF: *check decrease*
      - Mixture: *FULL RICH*
9. Throttle: *2100 RPM*
10. *Propeller Lever:*
    - *Pull back until a drop of max. 500 RPM is reached then high RPM*
    - *Cycle 3 times*
11. Magneto Check: *L – BOTH – R – BOTH*
    - Max RPM drop: *175 RPM*
    - Max. difference: *50 RPM*
12. Throttle: *Idle*
13. Flaps: check *T/O*
14. Pitch and Rudder trim: *check neutral*
15. Flight controls: *check free*
16. Seat belts: *check fastened*
17. Doors: *check closed and locked*
18. Parking brake: *Release*
19. Landing light: *ON as required*
20. XPDR: *ON*

5.6. TAKEOFF

NOTE

For 5000 ft density altitude and above, or high ambient temperatures, a FULL RICH mixture may cause rough running of the engine or a loss of performance. The mixture may be adjusted to obtain smooth engine operation.

Lean to maximum RPM at Full Throttle prior to take-off where airports are at 5000 ft density altitude or higher.

1. Pitot HEAT: *ON if required*
2. Fuel pump: *ON*
3. Brakes: *apply*
4. Throttle: *FULL and check approximately 2680 ± 20 RPM*

Engine proper performance at full throttle shall be checked early in the ground roll in order to abandon take-off if necessary.

A rough engine, sluggish RPM increase or failure to reach take-off RPM are reasons for abandoning the take-off. If the engine oil is cold, an oil pressure in the yellow sector is permissible.

5. Engine instruments: *check parameters within the limits*
6. Brakes: Release

Once V_R is reached:

7. Rotate and allow airspeed to reach V_X

Above a safe height:

8. Landing lights: OFF

5.8. CRUISE

1. Power: *set performance as required, refer to table in section 5 of AFM*
2. Propeller lever: *1800-2400 RPM*
3. Fuel tank selector: *as required to maintain symmetric balance*
4. Mixture: *set in accordance with following para 5.9*

NOTE

To optimize engine life, monitor CHT as advised in the last issues of engine manufacturer's publications.

NOTE

Monitor and manually compensate asymmetrical fuel consumption by switching fuel selector valve. Switch ON the electric fuel pump prior to swap the fuel feeding from one tank to another.

5.9. MIXTURE ADJUSTMENT RECOMMENDATION

CAUTION

The maximum permissible cylinder head temperature must never be exceeded. The mixture control lever should always be moved slowly.

Before selecting a higher power setting the mixture control lever should, on each occasion, be moved slowly to fully RICH before throttle adjustment.

Care should always be taken that the cylinders do not cool down too quickly. The cooling rate should not exceed 50 °F per minute.

NOTE

If not otherwise specified in the last issues of engine manufacturer's publications, CHT should be kept below 435 °F (high performance cruise) and below 400 °F (economy cruise) for maximum service life.

Best Cruise Economy Mixture

The best economy mixture setting may only be used up to a power setting of 75 %. In order to obtain the lowest specific fuel consumption at a particular power setting, proceed as follows:

- *Slowly pull the mixture control lever back towards LEAN until the engine starts to run roughly.*
- *Then push the mixture control lever forward just far enough to restore smooth running. At the same time the exhaust gas temperature (EGT) should reach a maximum.*

Best Cruise Power Mixture

The mixture can be set for maximum performance at all power settings:

- *The mixture should first be set as for best economy.*
- *The mixture should then be enriched until the exhaust gas temperature is approximately 100°F lower.*

This mixture setting produces the maximum performance for a given manifold pressure and is mainly used for high power settings (approximately 75 %).

5.10. DESCENT

1. Mixture control: *slowly full rich*
2. Propeller lever: *as required*
3. Throttle: *reduce as required*

NOTE

Shock cooling shortens engine life.

When reducing power, the change in cylinder head temperature should not exceed 50°F per minute. In order to ensure best practice and avoid potential illumination of ALT FAIL (due to low propeller speed), the following best practice should be observed:

- *Reducing power to maintain at least the best glide speed;*
- *Opening the ALTERNATE AIR command to full open (to avoid ice accretion).*

The maximum permissible cylinder head temperature must never be exceeded. The mixture control lever should always be moved slowly.

Before selecting a higher power setting the mixture control lever should, on each occasion, be moved slowly to fully RICH.

Care should always be taken that the cylinders do not cool down too quickly. The cooling rate should not exceed 50 °F per minute.

5.11. BEFORE LANDING

1. Electric fuel pump: *ON*
2. Fuel valve: *select the fullest tank*
3. Landing Light: *ON*

On downwind, leg abeam touch down point:

4. Flaps: *set T/O (below V_{FE})*

NOTE *Expect to adjust pitch trim (pitch down) when extending flaps to T/O or LAND*

5. Approach speed: set On final leg, before landing:
6. Mixture control lever: RICH
7. Propeller Lever: HIGH RPM
8. Flaps: LAND
9. Final Approach Speed: set

CAUTION *In conditions such as (e.g.) strong wind, danger of windshear or turbulence a higher approach speed shall be selected..*

5.12. BALKED LANDING/MISSED APPROACH

1. Throttle: *FULL*
2. Speed: *keep over 81 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *T/O*

Above a safe height:

4. Landing lights: OFF

5.13. GO-AROUND

1. Throttle: *FULL*
2. Speed: *keep over 81 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *T/O*

5.14. AFTER LANDING

1. Throttle: *Idle*
2. Brakes: *apply*
3. Pitot heat: *OFF (if ON)*
4. Flaps: *UP*
5. Electric Fuel Pump*: OFF*
6. XPDR: *OFF*
7. Landing light: *OFF*

6 ADDITIONAL GUIDANCE FOR RNAV

Experience of RNAV systems, and Flight FMS in general, has identified the pitfalls of waypoint entry error at the receiver as well as inaccuracies and errors in the database itself.

Research and experience have both shown that human error, often the result of a lack of familiarity with the airborne equipment, represents the major hazard in operations using RNAV systems. Therefore, it is imperative that pilots understand their system thoroughly and are able to determine whether it is safe to proceed.

This requires robust procedures, which check for possible errors in the computer database, monitor continued performance of the RNAV systems and enable pilots to identify and avoid not only their own mistakes but also errors in the information presented to them.

Flight planning on RNAV routes should include the following recommendation.

- During the pre-flight planning phase, given a GPS constellation of 23 satellites or less (22 or less for GPS stand-alone equipment that incorporate pressure altitude aiding), the availability of GPS integrity (RAIM) should be confirmed for the intended flight (route and time). This should be obtained from a prediction program either ground-based, or provided as an equipment function, or from an alternative method acceptable to the Authority;
- Where a navigation data base is installed, the data base validity (current AIRAC cycle) should be checked before flight;
- Traditional navigation equipment (e.g. VOR, DME and ADF) should be selected to available aids so as to allow immediate cross-checking or reversion in the event of loss of GPS navigation capability.

1) *Pre-flight Planning*

During the pre-flight planning phase, the availability of the navigation infrastructure, required for the intended operation, including any non-RNAV contingencies, must be confirmed for the period of intended operation. Availability of the onboard navigation equipment necessary for the route to be flown must be confirmed. The onboard navigation database must be appropriate for the region of intended operation and must include the navigation aids, waypoints, and coded terminal airspace procedures for the departure, arrival and alternate airfields.

Where the responsible airspace authority has specified in the AIP that dual PRNAV systems are required for specific terminal P-RNAV procedure, the availability of dual P-RNAV systems must be confirmed. This typically will apply where procedures are effective below the applicable minimum obstacle clearance altitude or where radar coverage is inadequate for the purposes of supporting P-RNAV. This will also take into account the particular hazards of a terminal area and the feasibility of contingency procedures following loss of P-RNAV capability.

RAIM availability must be confirmed with account taken of the latest information.

2) *Departure*

At system initialisation, the flight crew must confirm that the navigation database is current and verify that the aircraft position has been entered correctly. The active flight plan should be checked by comparing the charts, SID or other applicable documents, with the map display. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a procedure, a check will need to be made to confirm that updating will use a specific navigation aid(s), or to confirm exclusion of a specific navigation aid. A procedure shall not be used if doubt exists as to the validity of the procedure in the navigation database

The creation of new waypoints by manual entry into the RNAV system by the flight crew is not permitted as it would invalidate the affected P-RNAV procedure.

Route modifications in the terminal area may take the form of radar headings or 'direct to' clearances and the flight crew must be capable of reacting in a timely fashion. This may include the insertion in the flight plan of waypoints loaded from the database.

During the procedure and where feasible, flight progress should be monitored for navigational reasonableness, by cross-checks, with conventional navigation aids using the primary display.

3) *Arrival*

Prior to the arrival phase, the flight crew should verify that the correct terminal procedure has been loaded. The active flight plan should be checked by comparing the charts with the map display. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a procedure, a check will need to be made to confirm that updating will exclude a particular navigation aid. A procedure shall not be used if doubt exists as to the validity of the procedure in the navigation database.

Note: as a minimum, the arrival checks could be a simple inspection of a suitable map display that achieves the objectives of this paragraph.

The creation of new waypoints by manual entry into the RNAV system by the flight crew would invalidate the P-RNAV procedure and is not permitted.

Where the contingency to revert to a conventional arrival procedure is required, the flight crew must make the necessary preparation.

During the procedure and where feasible, flight progress should be monitored for navigational reasonableness by cross-checks with conventional navigation aids using the primary display.

Route modifications in the terminal area may take the form of radar headings or 'direct to' clearances and the flight crew must be capable of reacting in a timely fashion.

Although a particular method is not mandated, any published altitude and speed constraints must be observed.

In the event that either the GPS or the EGNOS signal is not available at the destination, by the nature of the system, and its susceptibility to interference, there exists the possibility that it will also be unavailable over a wide area. Therefore it is probable that the signal will also be unavailable at a nearby diversion aerodrome.

Notwithstanding any normal operational requirements for the identification of an alternate aerodrome, where a RNAV approach is to be flown in conditions where a visual approach will not be possible; pilots should always ensure that either:

1) A different type of approach system is available at the destination, not dependent on GPS data and for which the weather is forecast to be suitable to enable a landing to be made from that approach, or;
2) There is at least one alternate destination within range, where a different type of approach system is available, which is not dependent on GPS data and for which the weather is forecast to be suitable to enable a landing to be made from that approach.

9.1 APPROACH APPLICATIONS

NOTE *When GPS is not approved for the selected final approach course, the message "NOT APPROVED FOR GPS" is displayed. GPS provides guidance for the approach, but the HIS must be switched to a NAV receiver to fly the final course of the approach*

NOTE *f certain GPS parameters (SBAS, RAIM, etc.) are not available, some published approach procedures for the desired airport may not be displayed in the list of available approaches.*

An Approach Procedure (APPR) can be loaded at any airport that has one available, and provides guidance for non-precision and precision approaches to airports with published instrument approach procedures.

NOTE *Only one approach can be loaded at a time in a flight plan. If an approach is loaded when another approach is already in the active flight plan, the new approach replaces the previous approach. The route is defined by selection of an approach and the transition waypoints.*

Whenever an approach is selected, the choice to either "load" or "activate" is given. "Loading" adds the approach to the end of the flight plan without immediately using it for navigation guidance. This allows continued navigation via the intermediate waypoints in the original flight plan, but keeps the procedure available on the Active Flight Plan Page for quick activation when needed. "Activating" also adds the procedure to the end of the flight plan but immediately begins to provide guidance to the first waypoint in the approach.

When selecting an approach, a "GPS" designation to the right of the procedure name indicates the procedure can be flown using the GPS receiver. Some procedures do not have this designation, meaning the GPS receiver can be used for supplemental navigation guidance only.

NOTE

If the GPS receiver cannot be used for primary guidance, the appropriate navigation receiver must be used for the selected approach (e.g., VOR or ILS). The final course segment of ILS approaches, for example, must be flown by tuning the NAV receiver to the proper frequency and selecting that NAV receiver on the CDI

The G1000Nxi SBAS GPS allows for flying LNAV, LP, LP+V and LPV approach service levels according to the published chart. The '+V' designation adds advisory vertical guidance for assistance in maintaining a constant vertical glidepath similar to an ILS glideslope on approach. This guidance is displayed on the system PFD in the same location as the ILS glideslope using a magenta diamond. A sample of how the active approach service level is annunciated on the HSI is shown in the following table:

HSI Annunciation	Description	Example on HSI
LNAV	RNAV GPS approach using published LNAV minima	 ***Approach Service Level*** *- LNAV, LP, LP+V, LPV*
LP (available only if SBAS available)	RNAV GPS approach using published LP minima (downgrades to LNAV if SBAS unavailable)	
LP+ V (available only if SBAS available)	RNAV GPS approach using published LP minima Advisory vertical guidance is provided (downgrades to LNAV if SBAS unavailable)	
LPV (available only if SBAS available)	RNAV GPS approach using published LPV minima	

Before reaching the IAF, the flight crew should verify that the correct procedure has been loaded into the receiver's route or flight plan. A comparison with the approach chart should be made including the following:

- The waypoint sequence.
- Reasonableness of the tracks and distances of the approach legs, accura cy of the inbound course and mileage of the FAS.
- Verify from the charts, map display or CDU, which waypoints are fly- by and which are fly-over.
- Check any map display to ensure the track lines actually 'fly-over' or 'fly-by' the respective waypoints in the procedure.

By the time the aircraft reaches the IAF the pilot should have completed the above and been cleared for the approach. Also, the approach must have been activated in the receiver at least by this time.

Approach Applications which are classified as RNP Approach (APCH) in accordance with ICAO Doc 9613 Performance Based Navigation (PBN) Manual (and ICAO state Letter SP65/4-10/53) give access to minima (on an instrument approach procedure) designated as:

LNAV (Lateral Navigation)

This is a Non-Precision or 2D Approach with Lateral only navigation guidance provided by GNSS and an Aircraft Based Augmentation System (ABAS). Receiver Autonomous Integrity Monitoring (RAIM) is a form of ABAS. Lateral guidance is linear with accuracy to within +/- 0.3 NM parallel to either side of the final approach track.

LP (Localiser Performance)

This is a Non-Precision or 2D Approach with Lateral only navigation guidance provided by GNSS and SBAS. The EGNOS is a form of SBAS in Europe. The lateral guidance is angular with increasing sensitivity as the aircraft continues along the final approach track; much like a localiser indication.

LPV (Localiser Performance with Vertical Guidance)

This is an Approach Procedure with Vertical Guidance. The Lateral and Vertical guidance is provided by GPS and SBAS. Lateral and vertical guidance are angular with increasing sensitivity as the aircraft progresses down the final approach track; much like an ILS indication. LPV approach and annunciation on HSI is available only is SBAS available.

Before selecting a LPV approach, make sure SBAS is indicated ACTIVE in the GPS status box on AUX-GPS STATUS page on MFD.

If DISABLED highlight the appropriate SBAS SELECTION Box under SBAS softkey under AUX-GPS Status Page on MFD

Should SBAS signal be lost, augmentation is lost. It may be possible to continue with LNAV only but this is reliant on the availability of RAIM.

NOTE: The instrument approach procedures associated with RNP APCH are entitled RNAV (GNSS) to reflect that GNSS is the primary navigation system. With the inherent onboard performance monitoring and alerting provided by GNSS, the navigation specification qualifies as RNP, however these procedures pre-date PBN, so the chart name has remained as RNAV.

Missed approach procedures

Before commencing an RNAV (GNSS) missed approach, a MAP should be possible without reference to GPS derived navigation so that, in the event of a loss of GPS accuracy or loss of integrity during the approach, a safe return to above Minimum Sector Altitude can be made.

This may be possible by dead reckoning (DR) navigation but where this is not possible and the MAP requires reference to terrestrial navigation aids, these must be available, tuned and correctly identified before passing the IAF and remain available throughout the approach.

Reasons for a missed approach are many and if GPS information remains available for the MAP, the pilot must be able to sequence the system correctly past the MAP, in order to follow the published MAP correctly.

Pilots should be fully competent in the necessary selection routines required by their own equipment, in order to transition to the MAP and preserve accurate navigation throughout.

When GPS navigation is NOT available for the MAP, it may be necessary to reset the display function of the HSI/CDI to disengage GPS information and regain VOR/LOC display. Pilots must be fully conversant with navigation display selections in order safely to follow the MAP.

Abnormal procedures for approaches

As the aircraft approaches the FAF (LNAV Only, without SBAS), the receiver automatically perform a final RAIM prediction for the approach. The receiver will not enter the approach mode if this RAIM prediction is negative. In this case, the approach should be discontinued.

However, this RAIM check assumes availability of the full constellation and will not take account of scheduled interruptions or failures. This can lead to a successful RAIM prediction at this point when the RAIM function itself is not available.

If RAIM is lost after passing the FAF the equipment should continue to provide navigation, where possible for five minutes, before giving a RAIM loss indication and this should be enough to complete the approach.

Should RAIM detect an out of tolerance situation, a warning will be given and a missed approach should be initiated immediately

The approach should always be discontinued:

(a) If the receiver fails to engage the correct approach mode or;
(b) In case of Loss Of Integrity (LOI) monitoring or;
(c) Whenever the HSI/CDI indication (or GP indication where applicable) exceeds half scale displacement or;
(d) If a RAIM (or equivalent) warning is activated or;
(e) If RAIM (or equivalent) function is not available and annunciated before passing the FAF.

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Supplement D10: pages replacement instructions

SECTION 5 – PERFORMANCES

Supplement D10 - Performances pages replace basic AFM Section 5 as whole

SECTION 5 – PERFORMANCE

INDEX

1. INTRODUCTION

This section provides all necessary data for an accurate and comprehensive planning of flight activity from takeoff to landing.

Data reported in graphs and/or in tables were determined using:

- ✓ "Flight Test Data" under conditions prescribed by EASA CS-23 regulation
- ✓ aircraft and engine in good condition
- ✓ average piloting techniques

Each graph or table was determined according to ICAO Standard Atmosphere (ISA - s.l.); evaluations of the impact on performances were carried out by theoretical means for:

- ✓ Airspeed
- ✓ External temperature
- ✓ Altitude
- ✓ Weight
- ✓ Runway type and condition

2. USE OF PERFORMANCE CHARTS

Performances data are presented in tabular or graphical form to illustrate the effect of different variables such as altitude, temperature and weight. Given information is sufficient to plan the mission with required precision and safety.

Additional information is provided for each table or graph.

3. AIRSPEED INDICATOR SYSTEM CALIBRATION

Normal Static Source

Graph shows calibrated airspeed V_{IAS} as a function of indicated airspeed V_{CAS}.

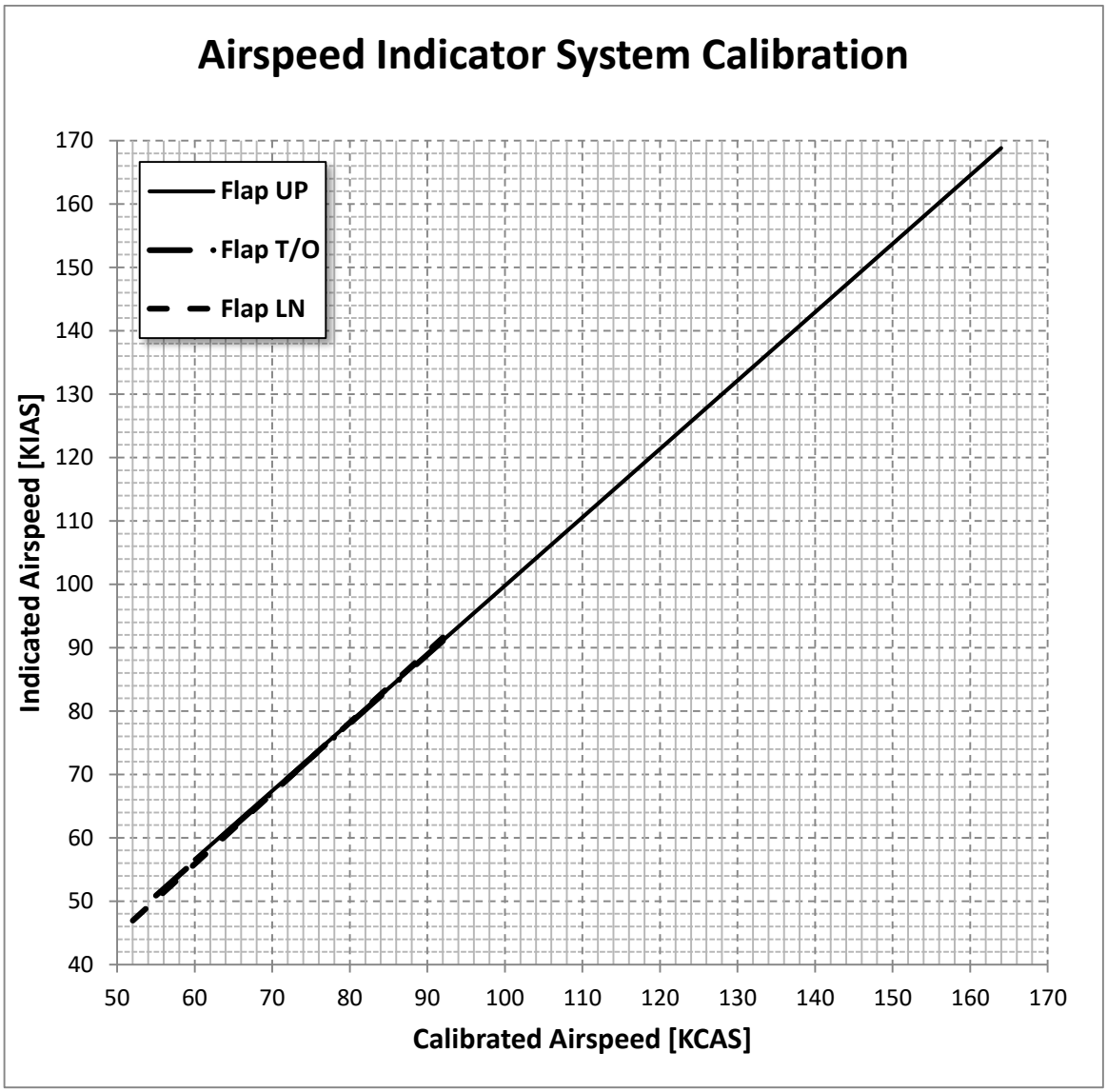

FIG. 5-1. CALIBRATED VS INDICATED AIRSPEED

Example:

Given	***Find***
KIAS *75.0* *Flap: UP*	KCAS *77.1*

NOTE *Indicated airspeed assumes 0 as an instrument error*

Alternate Static Source

		Alternate Static Air Open		Vents Open		Vents and Hot Air Open	
		IAS [kn]	H_P [ft]	IAS [kn]	H_P [ft]	IAS [kn]	H_P [ft]
Pressure Altitude [ft]	**IAS** [kn]	**FLAP UP**					
1000	70	75	1020	72	1010	72	1020
	90	95	1020	92	1030	93	1020
	110	115	1030	113	1020	112	1020
	135	140	1040	139	1030	137	1030
		FLAP T/O					
	60	63	1020	63	1020	62	1010
	70	75	1020	73	1020	72	1020
	90	94	1020	92	1020	92	1020
		FLAP LND					
	60	62	1020	61	1020	61	1020
	70	72	1020	72	1020	71	1020
	90	92	1020	91	1020	91	1020
		FLAP UP					
5000	70	72	5020	72	5020	71	5020
	90	94	5030	93	5020	92	5020
	110	114	5030	113	5020	112	5020
	133	137	5040	136	5030	135	5020
		FLAP T/O					
	60	62	5010	62	5020	61	5010
	70	74	5020	73	5020	72	5020
	90	93	5030	93	5020	93	5020
		FLAP LND					
	60	63	5030	62	5020	61	5000
	70	72	5020	72	5010	71	5010
	90	92	5020	92	5020	91	5010
		FLAP UP					
8000	70	72	8020	72	8020	71	8020
	90	93	8030	92	8020	92	8020
	110	113	8030	112	8020	112	8020
	128	131	8040	130	8030	130	8020
		FLAP T/O					
	60	62	8010	62	8020	61	8010
	70	73	8020	72	8020	72	8020
	90	92	8030	92	8020	92	8020
		FLAP LND					
	60	61	8020	61	8020	61	8000
	70	72	8010	71	8010	71	8010
	90	92	8010	91	8010	91	8010

4. ICAO STANDARD ATMOSPHERE

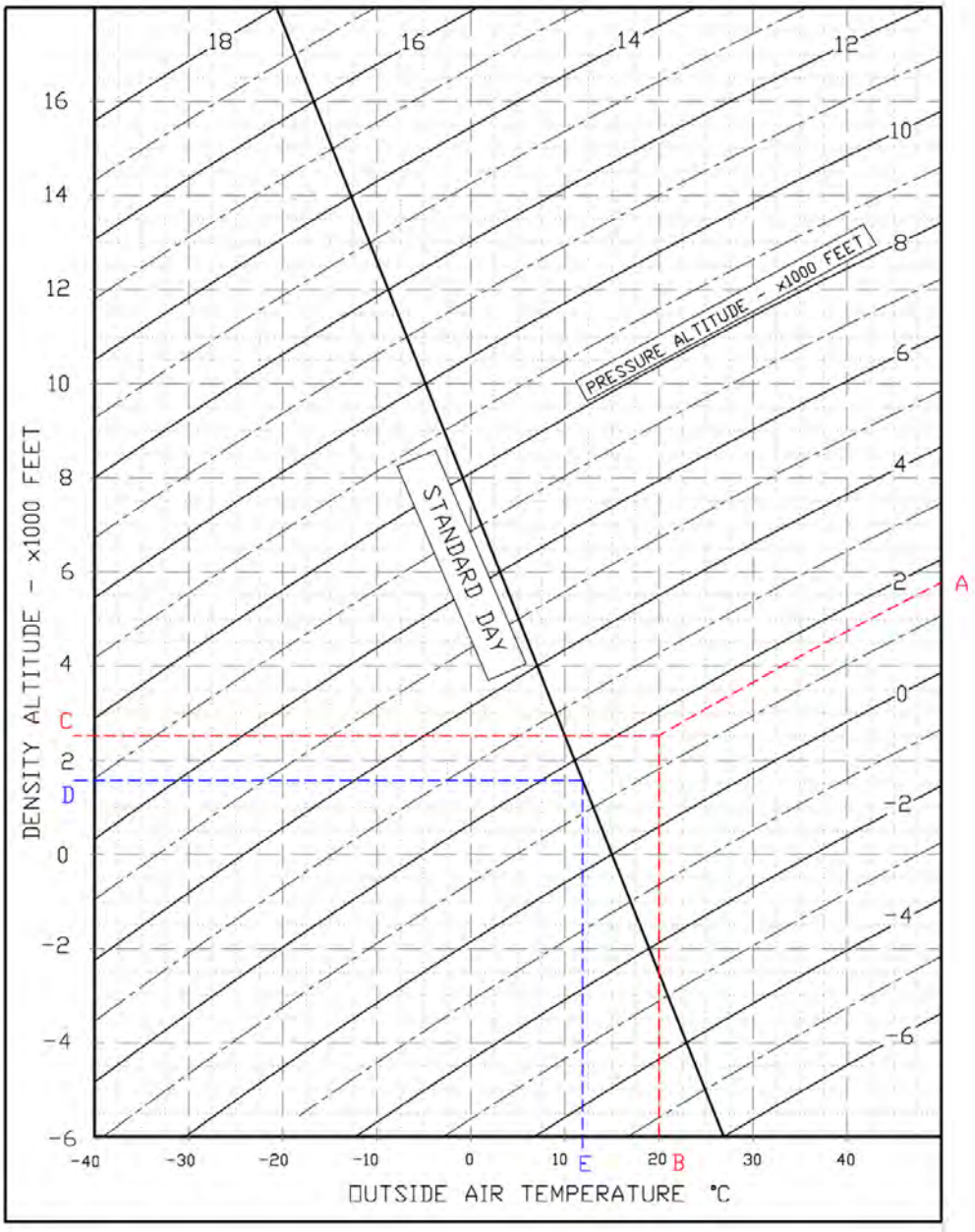

FIG. 5-2. ICAO CHART

Examples:

Scope	***Given***		***Find***
Density Altitude:	**A: Pressure altitude = *1600ft* B: Temperature = *20°C***	→	**C: Density Altitude = *2550ft***
ISA Temperature:	**D: Pressure altitude = *1600ft***	→	**E: ISA Air Temperature = *12°C***

5. STALL SPEED

Weight: 1160 kg (2557 lb)
Throttle Lever: IDLE
CG: Most Forward (19%)
No ground effect

WEIGHT [kg] ([lb])	BANK ANGLE [deg]	STALL SPEED					
		FLAPS 0°		FLAPS T/O		FLAPS FULL	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
1160 (2557) (FWD C.G.)	0	57	60	51	55	47	52
	15	58	61	52	56	49	53
	30	62	65	56	59	52	56
	45	69	71	62	65	59	62
	60	84	85	76	78	72	74

NOTE *Altitude loss during conventional stall recovery, as demonstrated during flight tests is approximately 350 ft with banking below 15°.*

6. CROSSWIND

Maximum demonstrated crosswind is 12 kts

⇒ *Example:*

Given	***Find***
Wind direction (*with respect to aircraft longitudinal axis*) = 30°	Headwind = 17.5 kts
Wind speed = 20 kts	Crosswind = 10 kts

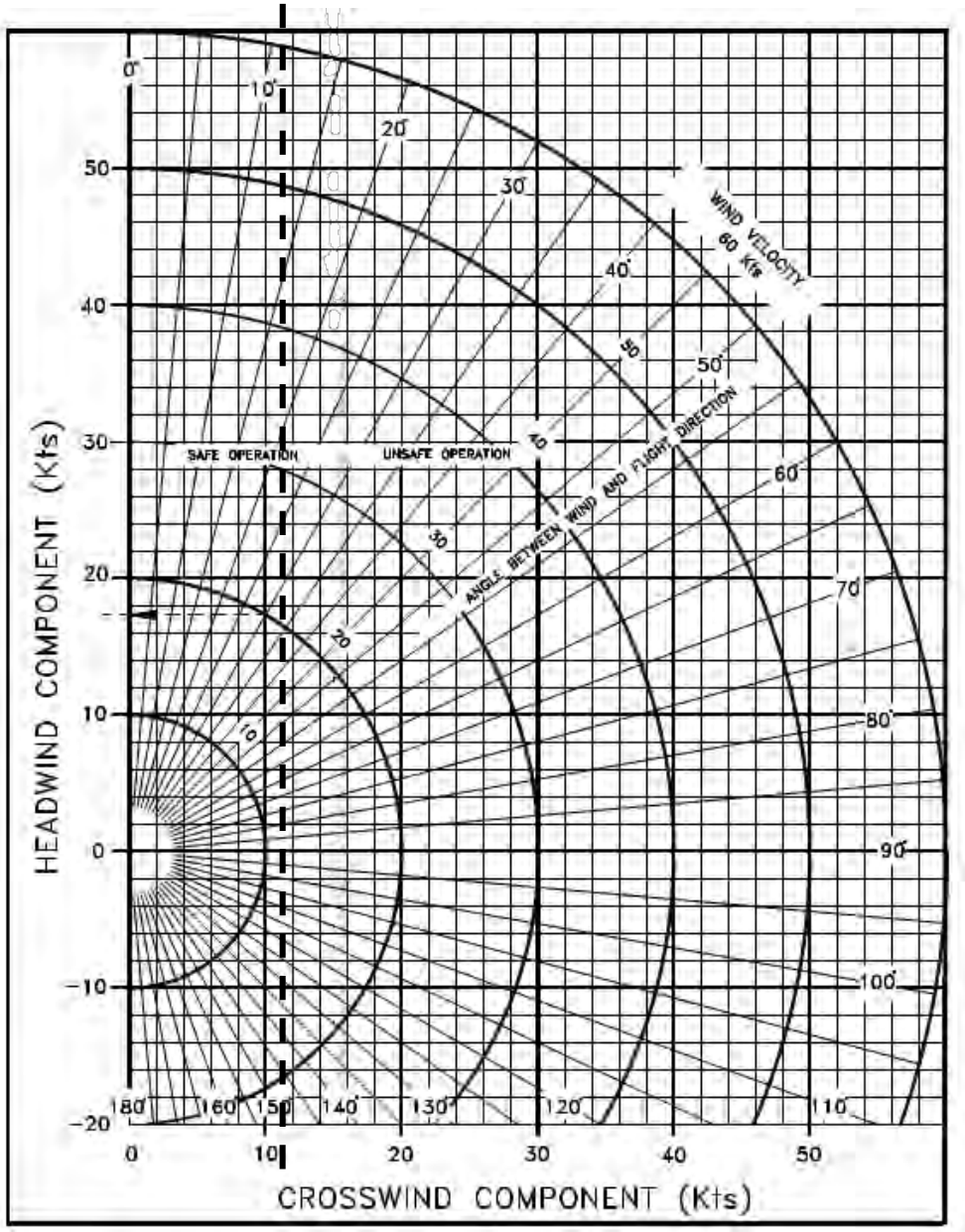

FIG. 5-3. CROSSWIND CHART

7. TAKE-OFF PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to distances of 1.10*

Weight = 1160 kg (2557 lb)

Flaps: T/O
Speed at Lift-Off = 58 KIAS
Speed Over 50ft Obstacle = 63 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft])				
		Temperature [°C]				
		-25	0	25	50	ISA
S.L.	Ground Roll	244 (801)	292 (958)	345 (1132)	402 (1319)	**323 (1060)**
	At 50 ft AGL	355 (1165)	426 (1398)	503 (1650)	586 (1923)	**472 (1549)**
1000	Ground Roll	261 (856)	313 (1027)	370 (1214)	431 (1414)	**342 (1122)**
	At 50 ft AGL	380 (1247)	456 (1496)	539 (1768)	628 (2060)	**499 (1637)**
2000	Ground Roll	280 (919)	336 (1102)	396 (1299)	462 (1516)	**362 (1188)**
	At 50 ft AGL	408 (1339)	489 (1604)	578 (1896)	673 (2208)	**527 (1729)**
3000	Ground Roll	300 (984)	360 (1181)	425 (1394)	495 (1624)	**383 (1257)**
	At 50 ft AGL	437 (1434)	525 (1722)	620 (2034)	722 (2369)	**558 (1831)**
4000	Ground Roll	322 (1056)	386 (1266)	456 (1496)	531 (1742)	**405 (1329)**
	At 50 ft AGL	469 (1539)	563 (1847)	665 (2182)	775 (2543)	**591 (1939)**
5000	Ground Roll	345 (1132)	414 (1358)	489 (1604)	570 (1870)	**429 (1407)**
	At 50 ft AGL	503 (1650)	604 (1982)	714 (2343)	832 (2730)	**626 (2054)**
6000	Ground Roll	371 (1217)	445 (1460)	526 (1726)	613 (2011)	**455 (1493)**
	At 50 ft AGL	541 (1775)	649 (2129)	766 (2513)	893 (2930)	**663 (2175)**

Weight = 1060 kg (2337 lb)

Flaps: T/O
Speed at Lift-Off = 58 KIAS
Speed Over 50ft Obstacle = 63 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	193 (633)	231 (758)	273 (896)	318 (1043)	**256 (840)**
	At 50 ft AGL	281 (922)	337 (1106)	398 (1306)	464 (1522)	**373 (1224)**
1000	Ground Roll	206 (676)	248 (814)	292 (958)	341 (1119)	**271 (889)**
	At 50 ft AGL	301 (988)	361 (1184)	426 (1398)	497 (1631)	**394 (1293)**
2000	Ground Roll	221 (725)	265 (869)	314 (1030)	365 (1198)	**286 (938)**
	At 50 ft AGL	322 (1056)	387 (1270)	457 (1499)	533 (1749)	**417 (1368)**
3000	Ground Roll	237 (778)	285 (935)	336 (1102)	392 (1286)	**303 (994)**
	At 50 ft AGL	346 (1135)	415 (1362)	490 (1608)	571 (1873)	**442 (1450)**
4000	Ground Roll	254 (833)	305 (1001)	361 (1184)	420 (1378)	**321 (1053)**
	At 50 ft AGL	371 (1217)	445 (1460)	526 (1726)	613 (2011)	**467 (1532)**
5000	Ground Roll	273 (896)	328 (1076)	387 (1270)	451 (1480)	**340 (1115)**
	At 50 ft AGL	398 (1306)	478 (1568)	564 (1850)	658 (2159)	**495 (1624)**
6000	Ground Roll	293 (961)	352 (1155)	416 (1365)	485 (1591)	**360 (1181)**
	At 50 ft AGL	428 (1404)	513 (1683)	606 (1988)	706 (2316)	**524 (1719)**

Weight = 960 kg (2116 lb)

Flaps: T/O
Speed at Lift-Off = 58 KIAS
Speed Over 50ft Obstacle = 63 KIAS
Throttle and Propeller Lever: Full Forward
Runway: Paved

Corrections
Headwind: -10 m for each kn
Tailwind: +20 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: +10% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft]) Temperature [°C] -25	0	25	50	ISA
S.L.	Ground Roll	149 (489)	179 (587)	211 (692)	246 (807)	**198 (650)**
	At 50 ft AGL	217 (712)	260 (853)	308 (1010)	358 (1175)	**288 (945)**
1000	Ground Roll	160 (525)	191 (627)	226 (741)	263 (863)	**209 (686)**
	At 50 ft AGL	233 (764)	279 (915)	330 (1083)	384 (1260)	**305 (1001)**
2000	Ground Roll	171 (561)	205 (673)	242 (794)	282 (925)	**221 (725)**
	At 50 ft AGL	249 (817)	299 (981)	353 (1158)	412 (1352)	**322 (1056)**
3000	Ground Roll	183 (600)	220 (722)	260 (853)	303 (994)	**234 (768)**
	At 50 ft AGL	267 (876)	321 (1053)	379 (1243)	441 (1447)	**341 (1119)**
4000	Ground Roll	197 (646)	236 (774)	279 (915)	325 (1066)	**248 (814)**
	At 50 ft AGL	287 (942)	344 (1129)	406 (1332)	474 (1555)	**361 (1184)**
5000	Ground Roll	211 (692)	253 (830)	299 (981)	349 (1145)	**262 (860)**
	At 50 ft AGL	308 (1010)	369 (1211)	436 (1430)	508 (1667)	**383 (1257)**
6000	Ground Roll	227 (745)	272 (892)	321 (1053)	374 (1227)	**278 (912)**
	At 50 ft AGL	331 (1086)	397 (1302)	469 (1539)	546 (1791)	**405 (1329)**

8. TAKE-OFF RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Lever: Full Forward
Propeller: 2700 RPM
Flaps: Take-Off

Weight [kg] ([lb])	Pressure Altitude [ft]	Climb Speed V_y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				
			-25	0	25	50	ISA
1160 (2557)	S.L.	69	1264	1074	905	752	970
	2000	69	1119	933	766	616	857
	4000	69	976	792	629	481	744
	6000	70	832	652	492	347	631
	8000	70	690	513	355	212	519
	10000	70	547	374	218	79	406
	12000	70	405	235	83	-55	293
1060 (2337)	S.L.	68	1461	1251	1064	896	1137
	2000	69	1302	1096	912	746	1012
	4000	69	1143	941	760	597	887
	6000	69	985	786	608	448	763
	8000	70	827	632	457	300	638
	10000	70	670	478	307	152	513
	12000	70	513	325	157	5	389
960 (2116)	S.L.	68	1693	1459	1250	1062	1331
	2000	68	1515	1285	1080	896	1192
	4000	69	1338	1112	911	729	1053
	6000	69	1162	940	742	563	914
	8000	69	986	768	574	398	775
	10000	70	811	597	406	234	636
	12000	70	636	426	239	70	497

9. EN-ROUTE RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Lever: Full Forward
Propeller: 2700 RPM
Flaps: UP

Weight [kg] ([lb])	Pressure Altitude [ft]	Climb Speed V_Y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				
			-25	0	25	50	ISA
1160 (2557)	S.L.	86	1431	1220	1032	863	1105
	2000	86	1271	1064	879	712	980
	4000	85	1111	908	726	562	854
	6000	84	952	752	574	413	729
	8000	84	794	597	422	264	604
	10000	83	636	443	270	115	478
	12000	83	478	289	120	-33	353
1060 (2337)	S.L.	84	1617	1390	1187	1004	1265
	2000	84	1444	1221	1021	842	1130
	4000	84	1272	1052	856	680	995
	6000	84	1100	885	692	518	860
	8000	83	929	717	528	358	725
	10000	83	759	551	365	197	589
	12000	83	589	385	202	38	454
960 (2116)	S.L.	84	1837	1590	1368	1169	1454
	2000	83	1649	1405	1188	992	1307
	4000	83	1461	1222	1008	816	1159
	6000	83	1274	1039	829	640	1012
	8000	83	1088	857	650	464	864
	10000	82	902	675	472	290	717
	12000	82	717	494	295	116	570

10. CRUISE PERFORMANCE

Weight: 1160 kg
Mixture: BEST ECONOMY
Pressure Altitude: 0 ft

RPM	MAP [inHg]	ISA – 30°C (-15°C)			ISA (15°C)			ISA + 30°C (45°C)		
		PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])
2700	29.3	106	142	18.3 (69.4)	100	144	16.8 (63.7)	95	145	15.6 (59.0)
	28.0	99	139	17.5 (66.2)	94	140	16.1 (60.8)	90	141	14.9 (56.4)
	26.0	90	133	16.1 (61.1)	85	134	14.9 (56.2)	81	135	13.8 (52.3)
	24.0	81	127	14.9 (56.4)	76	128	13.7 (52.0)	73	129	12.8 (48.4)
	22.0	71	121	13.6 (51.5)	68	121	12.6 (47.7)	64	121	11.8 (44.5)
	20.0	62	114	12.4 (46.8)	59	113	11.5 (43.4)	56	113	10.7 (40.7)
2450	29.3	95	136	16.9 (63.8)	90	137	15.5 (58.6)	85	138	14.4 (54.5)
	28.0	89	133	16.0 (60.7)	84	134	14.8 (55.9)	80	135	13.7 (52.0)
	26.0	80	127	14.9 (56.2)	76	128	13.7 (51.9)	72	129	12.8 (48.3)
	24.0	72	121	13.7 (51.7)	68	122	12.6 (47.8)	65	122	11.8 (44.7)
	22.0	63	114	12.5 (47.2)	60	114	11.6 (43.8)	57	114	10.8 (41.0)
	20.0	55	106	11.3 (42.9)	52	106	10.5 (39.9)	49	104	9.9 (37.5)
2350	29.3	91	134	16.3 (61.6)	86	135	15.0 (56.7)	82	136	13.9 (52.7)
	28.0	85	130	15.5 (58.7)	80	131	14.3 (54.1)	77	132	13.3 (50.3)
	26.0	77	125	14.3 (54.3)	73	125	13.2 (50.1)	69	126	12.4 (46.8)
	24.0	68	119	13.2 (49.9)	65	119	12.2 (46.2)	61	119	11.4 (43.2)
	22.0	60	112	12.0 (45.6)	57	111	11.2 (42.3)	54	110	10.5 (39.7)
	20.0	52	103	10.9 (41.4)	49	102	10.2 (38.6)	47	100	9.6 (36.3)

Weight: 1160 kg
Mixture: BEST ECONOMY
Pressure Altitude: 3000 ft

RPM	MAP [inHg]	ISA – 30°C (-21°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	ISA (9°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	ISA + 30°C (39°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])
2700	26.8	96	140	16.5 (62.4)	91	142	15.1 (57.3)	86	143	14.0 (53.1)
	25.0	87	135	15.3 (58.0)	83	136	14.1 (53.4)	79	137	13.1 (49.6)
	24.0	83	132	14.8 (55.9)	79	133	13.6 (51.5)	75	134	12.7 (47.9)
	22.0	73	125	13.5 (50.9)	69	126	12.4 (47.1)	66	125	11.6 (43.9)
	20.0	65	118	12.3 (46.7)	61	118	11.4 (43.2)	58	117	10.7 (40.5)
	18.0	56	110	11.1 (42.2)	53	108	10.4 (39.2)	50	106	9.7 (36.8)
2450	26.8	87	135	15.3 (57.9)	82	136	14.1 (53.2)	78	136	13.1 (49.5)
	25.0	79	129	14.2 (53.7)	74	130	13.1 (49.5)	71	130	12.2 (46.1)
	24.0	75	126	13.6 (51.6)	71	127	12.6 (47.7)	67	127	11.7 (44.5)
	22.0	65	119	12.4 (47.0)	62	119	11.5 (43.5)	59	118	10.8 (40.7)
	20.0	57	111	11.4 (43.0)	54	110	10.6 (40.0)	52	108	9.9 (37.5)
	18.0	49	102	10.3 (38.9)	47	99	9.6 (36.3)	44	94	9.0 (34.2)
2350	26.8	83	132	14.8 (56.0)	79	133	13.6 (51.6)	75	134	12.7 (48.0)
	25.0	75	127	13.7 (51.9)	71	127	12.7 (47.9)	68	127	11.8 (44.7)
	24.0	71	124	13.2 (49.9)	67	124	12.2 (46.2)	64	124	11.4 (43.1)
	22.0	62	116	12.0 (45.4)	59	116	11.1 (42.1)	56	114	10.4 (39.4)
	20.0	55	108	11.0 (41.6)	52	107	10.2 (38.7)	49	104	9.6 (36.3)
	18.0	47	98	9.9 (37.6)	44	94	9.3 (35.1)	42	86	8.8 (33.1)

Weight: 1160 kg
Mixture: BEST ECONOMY
Pressure Altitude: 6000 ft

RPM	MAP [inHg]	ISA – 30°C (-27°C)			ISA (3°C)			ISA + 30°C (33°C)		
		PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])
2700	23.9	85	137	14.6 (55.1)	81	138	13.4 (50.7)	76	138	12.4 (47.1)
	23.0	80	134	13.9 (52.8)	76	134	12.8 (48.6)	72	134	12.0 (45.2)
	22.0	75	130	13.3 (50.3)	71	130	12.3 (46.4)	67	130	11.4 (43.3)
	21.0	71	127	12.8 (48.4)	67	127	11.8 (44.7)	64	126	11.0 (41.7)
	20.0	67	123	12.3 (46.5)	64	123	11.4 (43.0)	60	122	10.6 (40.2)
	18.0	58	114	11.1 (42.1)	55	113	10.3 (39.1)	52	110	9.7 (36.7)
2450	23.9	77	131	13.5 (51.2)	73	132	12.5 (47.2)	69	131	11.6 (44.0)
	23.0	72	127	12.9 (49.0)	68	128	11.9 (45.2)	65	127	11.1 (42.2)
	22.0	68	123	12.3 (46.6)	64	123	11.4 (43.1)	61	122	10.6 (40.3)
	21.0	64	120	11.9 (44.9)	60	119	11.0 (41.6)	57	118	10.3 (38.9)
	20.0	60	116	11.4 (43.1)	57	115	10.6 (39.9)	54	113	9.9 (37.4)
	18.0	52	106	10.3 (39.0)	49	104	9.6 (36.3)	46	98	9.0 (34.2)
2350	23.9	74	129	13.1 (49.6)	70	129	12.1 (45.8)	66	128	11.3 (42.7)
	23.0	69	125	12.5 (47.5)	65	125	11.6 (43.9)	62	124	10.8 (41.0)
	22.0	65	121	11.9 (45.2)	61	120	11.1 (41.9)	58	119	10.3 (39.2)
	21.0	61	117	11.5 (43.5)	58	116	10.7 (40.3)	55	114	10.0 (37.8)
	20.0	57	113	11.0 (41.7)	54	112	10.2 (38.7)	51	109	9.6 (36.3)
	18.0	49	103	10.0 (37.8)	46	99	9.3 (35.2)	44	91	8.8 (33.2)

Weight: 1160 kg
Mixture: BEST ECONOMY
Pressure Altitude: 9000 ft

RPM	MAP [inHg]	ISA – 30°C (-33°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	ISA (-3°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	ISA + 30°C (27°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])
2700	21.3	75	132	12.8 (48.5)	70	132	11.8 (44.7)	67	132	11.0 (41.6)
	20.0	70	128	12.2 (46.2)	66	128	11.3 (42.7)	62	127	10.5 (39.8)
	19.0	65	124	11.6 (44.1)	61	123	10.8 (40.8)	58	121	10.1 (38.1)
	18.0	60	119	11.1 (42.0)	57	117	10.3 (38.9)	54	115	9.6 (36.4)
2450	21.3	67	126	11.9 (45.2)	64	125	11.0 (41.7)	60	124	10.3 (39.0)
	20.0	63	121	11.4 (43.0)	59	120	10.5 (39.8)	56	118	9.9 (37.3)
	19.0	58	117	10.8 (41.0)	55	115	10.1 (38.1)	52	111	9.4 (35.7)
	18.0	54	111	10.3 (39.0)	51	108	9.6 (36.3)	48	103	9.0 (34.1)
2350	21.3	65	123	11.6 (43.8)	61	122	10.7 (40.6)	58	120	10.0 (37.9)
	20.0	60	118	11.0 (41.8)	57	117	10.2 (38.7)	54	114	9.6 (36.3)
	19.0	56	114	10.5 (39.8)	53	111	9.8 (37.0)	50	106	9.2 (34.7)
	18.0	52	108	10.0 (37.9)	49	104	9.3 (35.3)	46	95	8.8 (33.2)

Weight: 1160 kg
Mixture: BEST ECONOMY
Pressure Altitude: 12000 ft

RPM	MAP [inHg]	ISA – 30°C (-39°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	ISA (-9°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])	ISA + 30°C (21°C) PWR [%MCP]	TAS [kn]	F.C. [gal/h] ([l/h])
2700	19.0	68	129	11.6 (43.8)	64	128	10.7 (40.4)	60	126	10.0 (37.8)
	18.0	63	124	11.0 (41.7)	59	122	10.2 (38.6)	56	119	9.5 (36.1)
2450	19.0	61	122	10.8 (41.0)	57	120	10.0 (37.9)	54	116	9.4 (35.5)
	18.0	57	116	10.3 (39.0)	53	113	9.6 (36.2)	50	107	9.0 (34.0)
2350	19.0	58	119	10.5 (39.8)	55	116	9.8 (36.9)	52	111	9.1 (34.6)
	18.0	54	113	10.0 (38.0)	51	109	9.3 (35.3)	48	99	8.8 (33.1)

11. LANDING PERFORMANCES

NOTE *To account for likely in service performance variations apply a factored to distances of 1.67*

Weight = 1160 kg (2557 lb)

Flaps: LAND
Short Final Approach Speed = 64 KIAS
Throttle Lever: Idle
Runway: Paved

Corrections

Headwind: -4 m for each kn
Tailwind: +13 m for each kn
Grass Runway: +10% to Ground Roll
Runway slope: -3% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m] (Distance [ft])				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	204 (669)	225 (738)	245 (804)	266 (873)	**237 (778)**
	At 50 ft AGL	488 (1601)	509 (1670)	529 (1736)	550 (1804)	**521 (1709)**
1000	Ground Roll	212 (696)	233 (764)	254 (833)	276 (906)	**244 (801)**
	At 50 ft AGL	496 (1627)	517 (1696)	538 (1765)	560 (1837)	**528 (1732)**
2000	Ground Roll	220 (722)	242 (794)	264 (866)	286 (938)	**251 (823)**
	At 50 ft AGL	504 (1654)	526 (1726)	548 (1798)	570 (1870)	**535 (1755)**
3000	Ground Roll	228 (748)	251 (823)	274 (899)	297 (974)	**259 (850)**
	At 50 ft AGL	512 (1680)	535 (1755)	558 (1831)	581 (1906)	**543 (1781)**
4000	Ground Roll	236 (774)	260 (853)	284 (932)	308 (1010)	**267 (876)**
	At 50 ft AGL	520 (1706)	544 (1785)	568 (1864)	592 (1942)	**551 (1808)**
5000	Ground Roll	245 (804)	270 (886)	295 (968)	320 (1050)	**275 (902)**
	At 50 ft AGL	529 (1736)	554 (1818)	579 (1900)	604 (1982)	**559 (1834)**
6000	Ground Roll	255 (837)	280 (919)	306 (1004)	332 (1089)	**284 (932)**
	At 50 ft AGL	539 (1768)	564 (1850)	590 (1936)	616 (2021)	**568 (1864)**

12. BALKED LANDING PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to rate of climb and to angle of climb of 0.90*

Throttle and Propeller Lever: Full Forward
Flaps: LAND
Speed: 65 KIAS

Weight [kg] ([lb])	Pressure Altitude [ft]	Steady Gradient of Climb [%]				
		Temperature [°C]				
		-25	0	25	50	ISA
1160 (2557)	S.L.	14.2	11.3	8.7	6.3	**9.7**
	1000	13.1	10.2	7.6	5.2	**8.8**
	2000	12	9.1	6.5	4.2	**7.9**
	3000	10.9	8	5.4	3.1	**7**
	4000	9.8	6.9	4.4	2.1	**6.2**
	5000	8.6	5.8	3.3	1	**5.3**
	6000	7.5	4.7	2.2	0	**4.4**
	7000	6.4	3.6	1.2	-1.1	**3.5**
1060 (2337)	S.L.	16.4	13.2	10.4	7.9	**11.5**
	1000	15.2	12.1	9.3	6.8	**10.6**
	2000	14	10.9	8.1	5.6	**9.6**
	3000	12.8	9.7	7	4.5	**8.7**
	4000	11.6	8.6	5.8	3.4	**7.8**
	5000	10.4	7.4	4.7	2.3	**6.8**
	6000	9.2	6.2	3.6	1.2	**5.9**
	7000	8	5.1	2.4	0.1	**5**
960 (2116)	S.L.	18.9	15.5	12.5	9.7	**13.7**
	1000	17.6	14.2	11.2	8.5	**12.6**
	2000	16.3	13	10	7.3	**11.6**
	3000	15	11.7	8.8	6.1	**10.6**
	4000	13.8	10.5	7.5	4.9	**9.6**
	5000	12.5	9.2	6.3	3.7	**8.6**
	6000	11.2	8	5.1	2.5	**7.6**
	7000	9.9	6.7	3.9	1.3	**6.6**

13. NOISE DATA

Noise level, determined in accordance with ICAO/Annex 16 6th Ed., July 2011, Vol. I°, Chapter 10 and 14 CFR 36.1581(c), is **77.22** dB(A).

NOTE: No determination has been made by the Federal Aviation Administration that the noise levels of this aircraft are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

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Supplement D10: pages replacement instructions

SECTION 6 – WEIGHT AND BALANCE

Refer to the basic AFM, Section 6 Weight and Balance

Supplement D10: pages replacement instructions

SECTION 7 – AIRFRAME AND SYSTEMS DESCRIPTION

Make sure you first applied instructions reported on the basic AFM, Section 7 Airframe and Systems Description

According A/C configuration apply following pages replacement:

Supplement D10 AIRFRAME AND SYSTEMS page		AFM Section 7 page
E7-8 thru 11	**REPLACE**	Pages 7-8 thru 11 of basic AFM, Section 7
E7-16	**REPLACES**	Page 7-16 of basic AFM, Section 7
E7-21	**REPLACES**	Pages 7-21 of basic AFM, Section 7
E7-27	**REPLACES**	Page 7-27 of basic AFM, Section 7
E7-33	**REPLACES**	Page 7-33 of basic AFM, Section 7
E7-35	**REPLACES**	Page 7-35 of basic AFM, Section 7
E7-37	**REPLACES**	Page 7-37 of basic AFM, Section 7

3. FLIGHT CONTROLS

Aircraft flight controls are operated through conventional stick and rudder pedals. Longitudinal control acts through a system of push-rods and is equipped with a trim tab. A cable control circuit is confined within the cabin and it is connected to a pair of push-pull rod systems positioned in each main wing which control ailerons differentially. Aileron trimming is carried out on ground through a small tab positioned on left aileron.

Flaps are extended via an electric servo actuator controlled by a switch on the instrument panel. Flaps act in continuous mode; the indicator, included in the Garming G1000 NXi EIS (Engine Indication System), displays three markings related to 0°, takeoff (T/O) and landing (LND) positions. A breaker positioned on the right side of the instrument panel protects the electric circuit.

The control of the stabilator trim is operated by means of a control wheel, located between the two front seats that acts directly on the control cables.

Stabilator trim position is reported in the Garmin G1000 NXi.

Rudder Trimming device for lateral control is provided by means of an electrical actuator controlled by a rocker switch located near the pitch trim wheel; the surface is connected to a potentiometer linked to a rudder trim indicator included in the Garmin G1000 NXi EIS.

4. INSTRUMENT PANEL

The instrument panel is divided in three areas:

- The left area holds Garmin G1000 NXi PFD;
- The Central area holds the standby unit for PFI parameters, MD 302 suite, and the ELT button.
- The right area holds Garmin G1000 NXi MFD and breaker panel;
- The lower-LH portion of the instrument panel holds:
  - Ignition key;
  - Master and Generator switches;
  - Emergency fuel pump;
  - Avionic Master switch;
- The lower-Central portion of the instrument panel holds:
  - Trim disconnect;
  - Pitot Heat;
  - Strobe Light;
  - Navigation Light;
  - Taxi Light;
  - Landing Light;
  - Instrument and Pnale Dimmers;
  - Day/Night switch;
  - Emergency Light;
  - Fuel selector valve
  - Flap Control;
  - Engine Control Levers.
- The lower-RH portion of the instrument panel holds:
  - Pocket

Fig. 7-8. INSTRUMENT PANEL

4.1. ENGINE CONTROL LEVER

Engine handling is via three levers: Throttle, RPM lever, Mixture control lever.

They're situated on the centre control; the use of "front/forward" and "rear/backward" is defined in relation to the direction of flight (longitudinal).

Mixture control lever

This lever (right hand lever with red handle) controls the fuel-air mixture, which is supplied to the engine.

With the lever full forward, extra fuel is being supplied to the engine which at higher performance setting contributes to engine cooling.

In cruise, the mixture should be made leaner in order to reach the appropriate fuel-air mixture. The leaning procedure is given in Chapter 4.

Lever forward (RICH) >> Mixture rich (in fuel)

Lever to rear (LEAN) >>Mixture lean (in fuel)

To shut off the engine the mixture control lever is pulled to the rear stop: air without fuel is drawn into the cylinders that shuts down.

Throttle

This lever (left hand with large knob) is used to control manifold pressure (MAP).

High manifold pressure means a large quantity of fuel-air mixture is being supplied to engine, while low manifold pressure means a lesser quantity of fuel-air mixture is being supplied.

Propeller lever

By means of this lever (central lever with blue handle) the propeller governor controls the propeller pitch, and consequently engine RPM. A selected RPM is held constant by the governor independent of the airspeed and the throttle setting.

Lever forward (HIGH RPM) = fine pitch

Lever rearward (LOW RPM) = coarse pitch

Following a defect in governor or oil system, the blades go to the finest possible pitch (maximum RPM), thus allowing continuation of the flight.

Following failure of the governor or a serious drop in oil pressure, the RPM should be adjusted using the throttle. Every effort should be made not to exceed 2700 RPM.

The throttle and RPM lever should be moved slowly, in order to avoid over-speed and excessively rapid RPM changes.

4.2. ALTERNATE AIR

Alternate Air knob is located on the central pedestal; when the knob is fully pulled outward from the instrument panel, injectors receive maximum hot air. During normal operation, the knob is set in OFF position.

4.3. DEFROST AND CABIN HEAT

Two knobs, located on the lower side of the central pedestal, allow Defrost and Cabin Heat function. The one marked as "Defrost and Cabin Heat" allows hot air to perform windshield defrost and partially cabin heat.

The cabin heat control knob, when fully outward, allows cabin to receive maximum hot air. When both cabin heat and defrost and cabin heat are pulled, air is partitioned.

Fig. 7-9. CENTRAL PEDESTAL

7. POWERPLANT

7.1. ENGINE

Manufacturer …… Lycoming Textron

Model ……... IO-390-C3B6

Type Certificate ……... EASA TCDS no. IM.E.097

Engine type …….. Fuel injected (IO), direct drive, four cylinder horizontally opposed, air cooled.

Maximum power …….. 160.3 kW (215hp) @ 2700 rpm

Oil Consumption				
Operation	RPM	HP	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
Normal Rated	2700	215	.80	465°F (240°C)
Performance Cruise (75%)	2450	161	.45	465°F (240°C)
Economy Cruise (60R Rated)	2350	140	.39	465°F (240°C)

7.2. PROPELLER

Manufacturer …….. MT Propeller

Model ……. MTV-12B/183-59

Type Certificate …….. EASA TCDS no. P.013

Blades/hub …….. wood/composite 3-blades – aluminium hub

Diameter ……. 1830 mm (72 in)

Type …… Variable pitch

Governor

Manufacturer …….. MT Propeller

Model ……. P-860-23:

Type Hydraulic

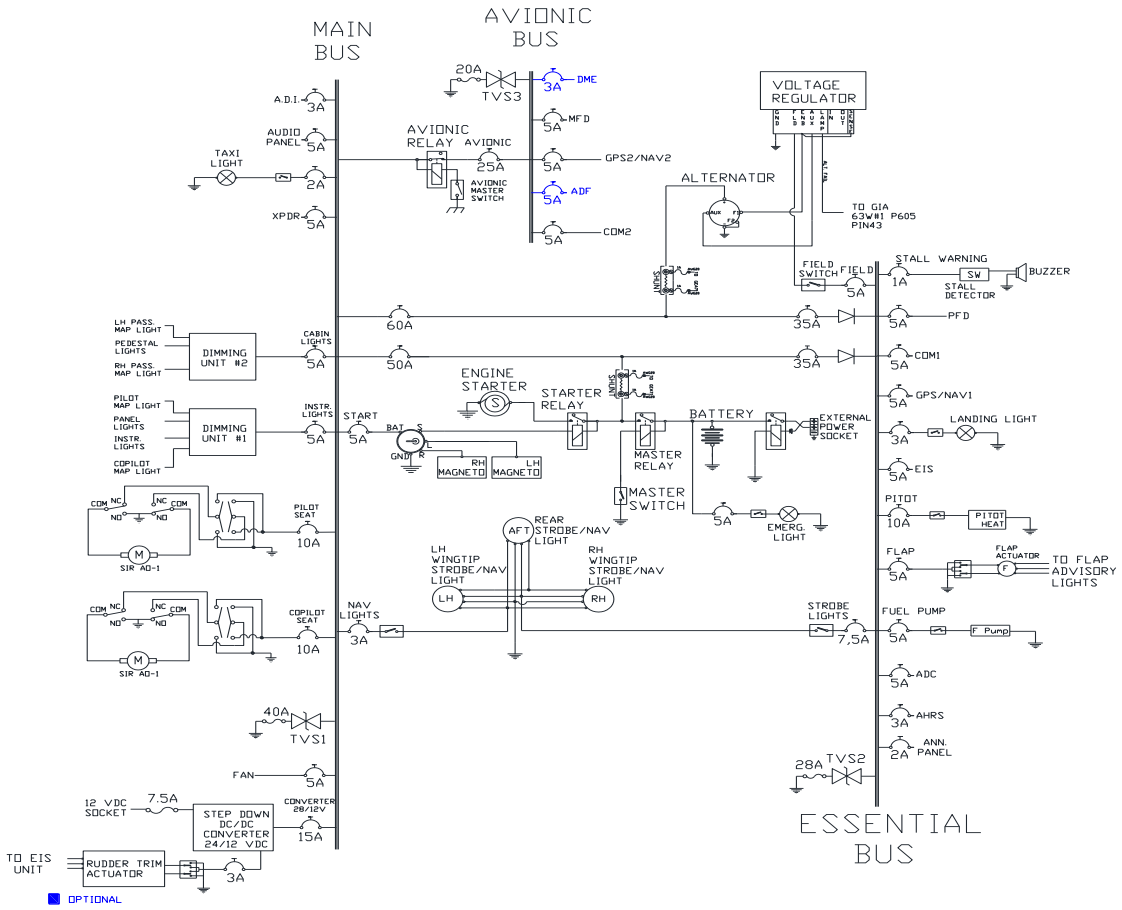


FIG.7-15. ELECTRICAL SYSTEM ARCHITECTURE

9.1. STALL WARNING SYSTEM

The aircraft is equipped with a stall warning system consisting of a sensor located on the right wing leading edge connected to a warning horn located near the instrument panel.

11.2 INTERNAL LIGHTS

On the cabin ceiling are located four map lights, two in the front area (pilot) and two in the rear area (passengers).

In the central area of the cabin ceiling is located a spot light used to illuminate the pedestal during night flight operations. All ceiling lights are dimmable by a dedicated dimmer.

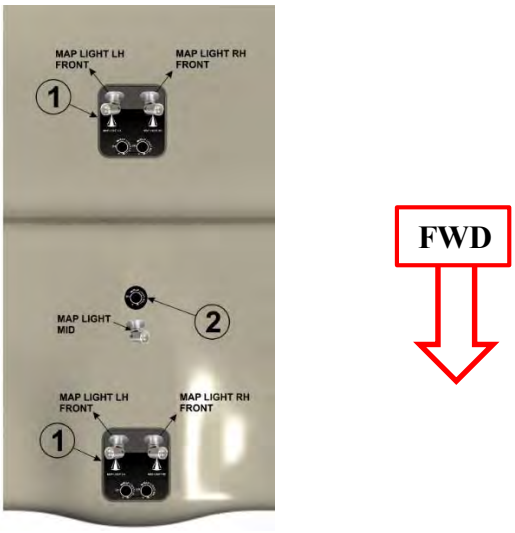
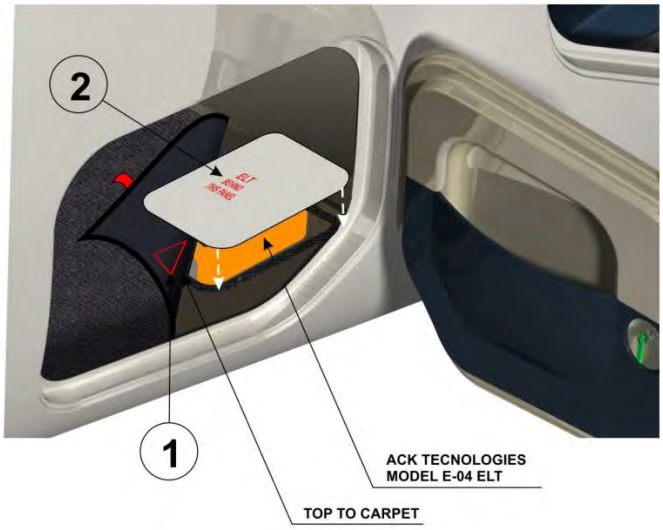
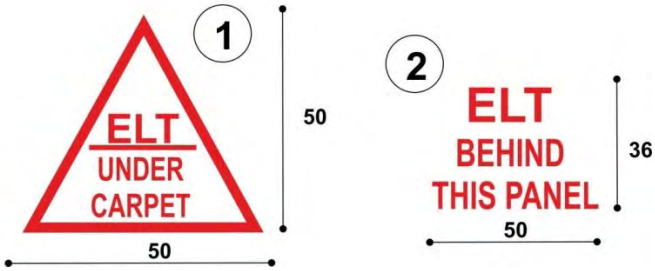


FIG.7-18. CABIN CEILING LIGHTS LAYOUT

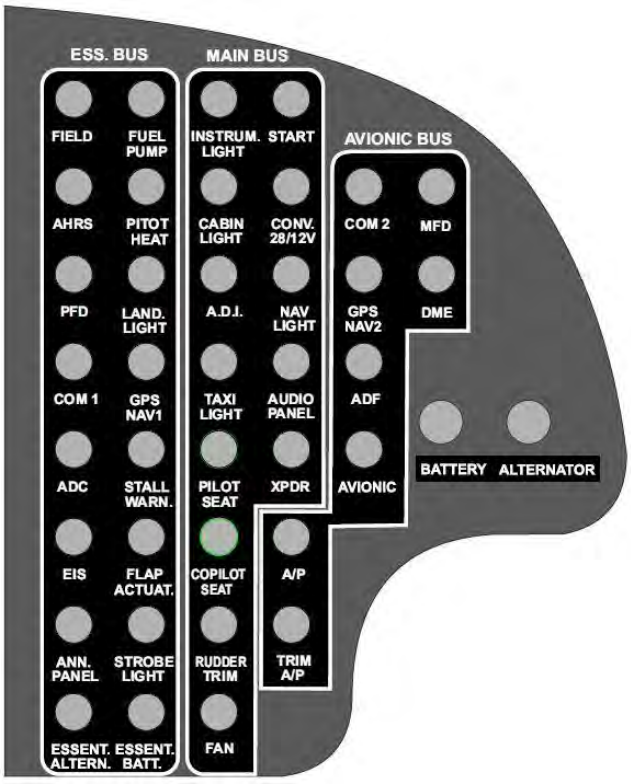
The instrument panel can be illuminated by 8 light strips, all dimmable. For reference, see Par. "*Instrument Panel*".

ELT unit position placard:

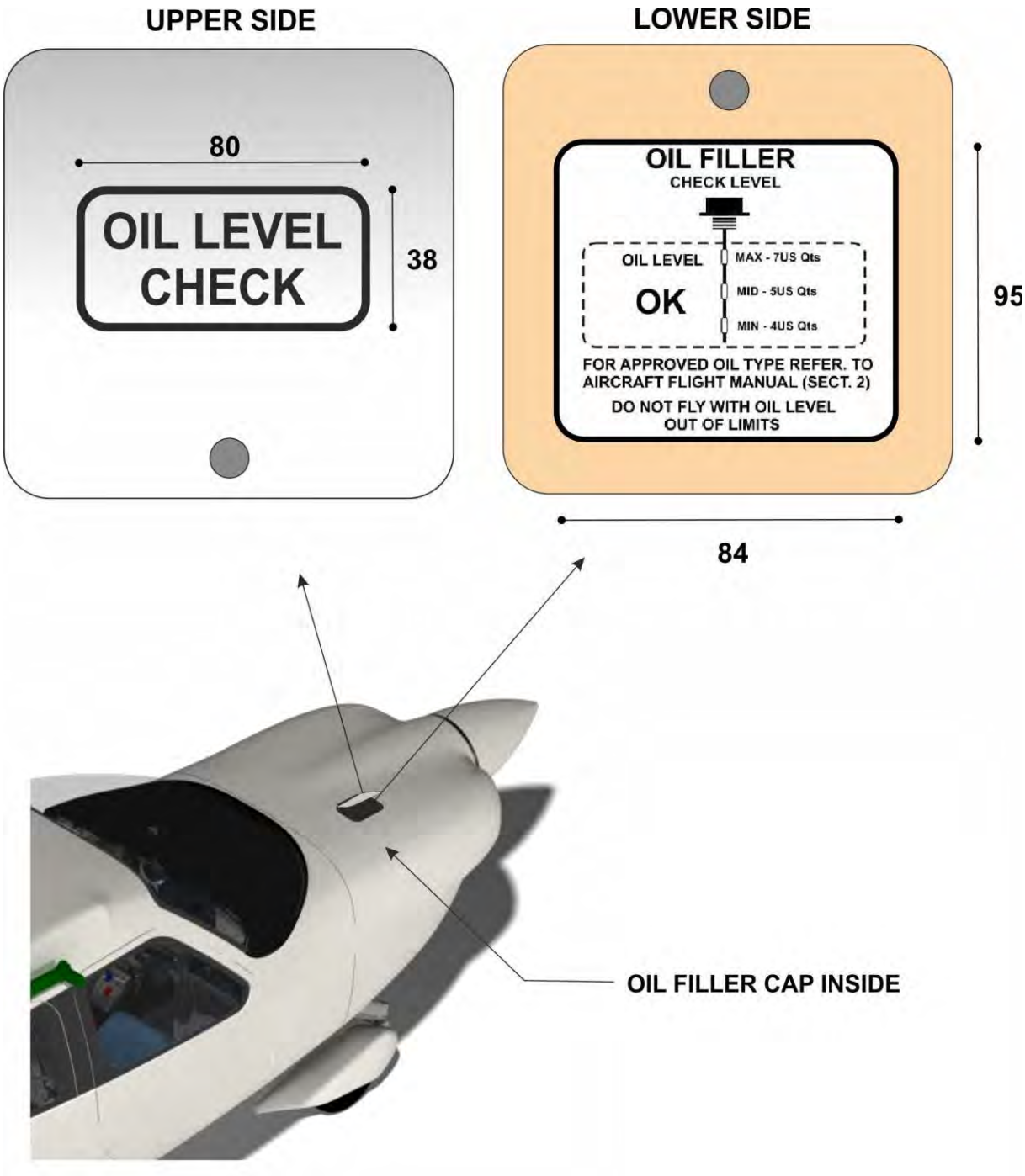




Breaker Panel placards:



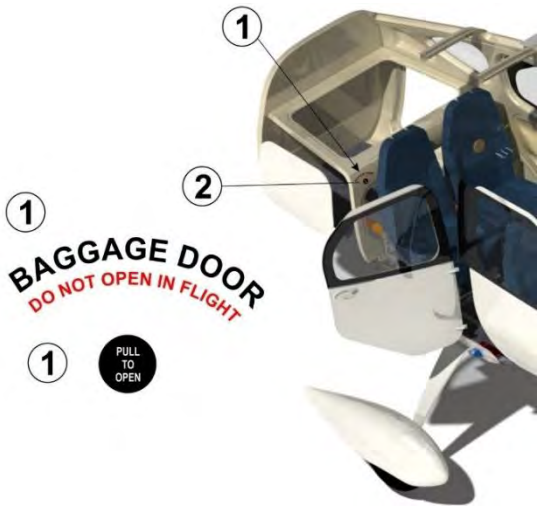
Oil check placards:



Fuel selector valve and Flap control knob:

Emergency exit placards

Baggage Door opening knob:



Supplement D10: pages replacement instructions

SECTION 8 – GROUND HANDLING & SERVICE

Make sure you first applied instructions reported on the basic AFM, Section 8 Ground Handling & Service

Refer to the basic AFM, Section 8 – Ground Handling & Service

SUPPLEMENT NO. D11

AFMS FOR BRAZILIAN AIRPLANES

Record of Revisions

Rev	Revised page	Description of Revision	Tecnam Approval			EASA Approval or Under DOA Privileges
			DO	OoA	HDO	
0	All	Editorial revision	A. Sabino	C. Caruso	M. Oliva	DOA Approval *

(*) This Supplement was originally issued under ANAC Approval.

List of Effective Pages

Page	Revision
D11-1	Rev 0
D11-2	Rev 0
D11-3	Rev 0
D11-4	Rev 0

INTRODUCTION

This supplement applies for Brazilian registered aircraft.

Information contained herein complements the basic information in the EASA Approved Aircraft Flight Manual when the aircraft is registered in Brazil.

For limitations, procedures, and performance information not contained in this Supplement, refer to the basic Aircraft Flight Manual.

LIMITATIONS

APPROVED FUEL: AVGAS 100 LL (ASTM D910)

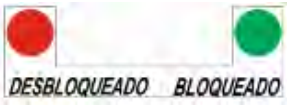
NOTE*: Use of automotive gasoline (MOGAS) is not allowed for operation in Brazil.*

WAAS AND SBAS FUNCTIONALITIES:

Currently, SBAS (Satellite-Based Augmentation System) is not available in Brazil. While SBAS is not functional, operations that require it, such as GNSS vertical navigation modes, are not available and should not be performed in Brazilian airspace.

PLACARDS IN PORTUGUESE

Description	Placard	Place
External Power Receptacle Placard	TOMADA DE ALIMENTAÇÃO EXTERNA 24 Volts - DC	Tail Cone
No Step Placard	NÃO PISE	MLG Fairings
Fuel Limitation Placard	AVGAS 100 LL (ASTM D910) ou ver o manual de vôo (Seção 2) Capacidade - 120 LT (31,7 US Gallon)	Wing
Door Placard	SAÍDA DE EMERGÊNCIA PARA ACESSO DE EMERGÊNCIA ABRA A PORTA COM A MAÇANETA 23 80	Fuselage
Baggage door	COMPARTIMENTO DE BAGAGEM 5 80	Fuselage
Baggage Compartment Maximum Load Placard	CARGA MÁXIMA DE BAGAGEM 40kg/88lb MÁX. PRES. ESPEC. 0.72 kg/dm² - 14.9 lbs/sqft PRENDER AS BAGAGENS COM REDE DE CARGA ANTES DO VÔO 85 136	Baggage Compartment
No Smoking Placard	NÃO FUME	Instrument Panel
Internal door placards	BLOQUEADO DESBLOQUEADO	Doors internal side

Description	Placard	Place
Door Handle locking placard		**Doors internal side**
Emergency Exit Internal Placard		**Doors internal Side**
Open Baggage Placard		**Baggage compartment Panel**