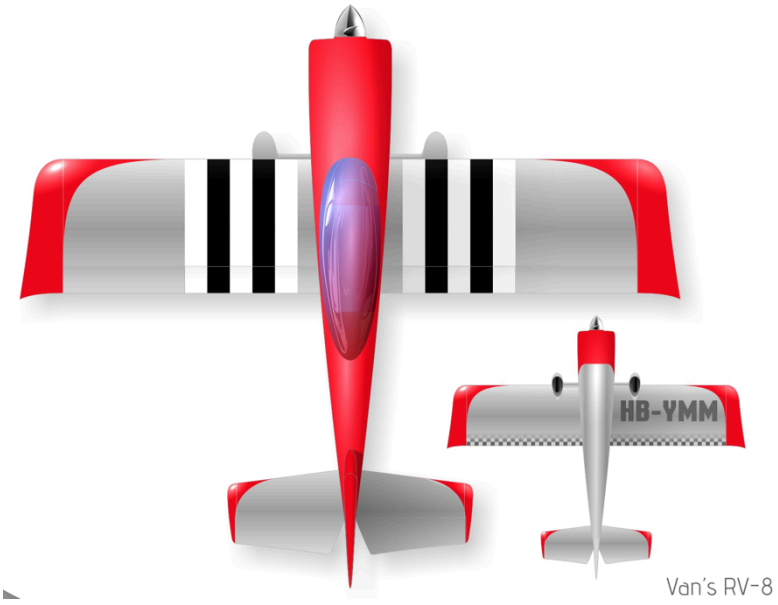
AFM - Aircraft Flight Manual

HB-YMM
Van's Aircraft RV-8
Serial 82007

This Aircraft Flight Manual is written by the builder to combine all necessary information required for safe flight test operation.

The current version reflects the initial draft to obtain a permit to fly to start flight test activities.

Data and important operational aspects will be collected by the test team to complete this AFM.



SECTION 0

0 INTRODUCTION
CONTENTS

0.1 AIRCRAFT

Kit Manufacturer:	**Van's Aircraft Inc.**
Type:	**RV-8**
Builder:	**Michael Coggins**
Serial No:	**82007**
Registration:	**HB-YMM**

0.2 AFM AGREEMENT

The owner (currently the builder) is responsible for the appropriate correctness of the content of the manual.
Date of Issue: 2 February 2021
The Builder: Michael Coggins

Approval of Section 2 and agreement of Section 1, 6, 7, and 8 by EAS on behalf of FOCA.
Date:
Name:
Stamp and Signature:

Partial approval of Section 5 and agreement of Sections 3 and 4 by EAS on behalf of FOCA.
Date:
Name:
Stamp and Signature:

Final approval by EAS Certification:
Date:
Name:
Stamp and Signature:
The aircraft must be operated in compliance with information and limitations contained herein.

0.3 WARNINGS, CAUTIONS AND NOTES

The following definitions apply to the warnings, cautions, and notes as used in this manual:

WARNIN G

ANY OPERATING PROCEDURE, PRACTICE, OR CONDITION WHICH, IF NOT STRICTLY COMPLIED WITH, MAY RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

CAUTION

ANY OPERATING PROCEDURE, PRACTICE, OR CONDITION WHICH, IF NOT STRICTLY COMPLIED WITH, MAY RESULT IN DAMAGE TO THE AIRCRAFT OR EQUIPMENT.

NOTE

ANY OPERATING PROCEDURE, PRACTICE, OR CONDITION THAT REQUIRES EMPHASIS.

0.4 RECORD OF REVISIONS

Revisions of this manual, except actual weighting data, will be recorded in the following table. In case of agreed sections, endorsement by EAS/FOCA is required. The new or amended text in the revised page is indicated by a black vertical line in the left-hand margin. Revision No. and the date is shown within the footer.

Rev. No	Affected Section	Affected Pages	Date	Approval	Date	Date Inserted	Signature
1	**2, 5**	**2-24, 5-54 – 5-59**	**2021-02-02**				

SECTION 1

1 GENERAL
CONTENTS

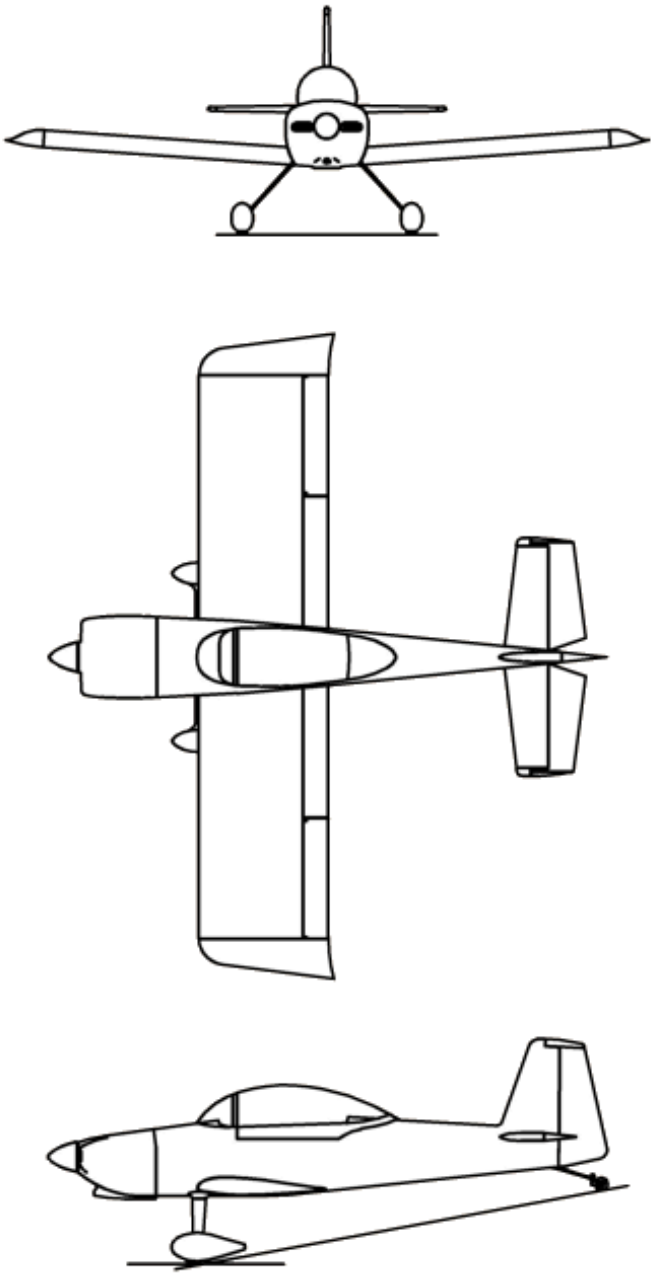
1.1 INTRODUCTION

This AFM includes the material required furnished by Van's Aircraft Inc. and additional information provided by the builder. It constitutes the FOCA Approved Airplane Flight Manual (AFM) for the specific homebuilt aircraft Type RV-8, SN 82007, HB-YMM. This AFM must be read, and thoroughly understood by the operator in order to achieve maximum utilization as an operating guide for the pilot.

This AFM provides the information necessary for the operation of the aircraft under VISUAL FLIGHT RULES (VFR).

Pages that have been intentionally left blank will be so indicated by the statement "THIS PAGE INTENTIONALLY BLANK".

1.2 THREE-VIEW DIAGRAM



Wingspan:	7.35 m (24'1")
Length:	6.45 m (21' 2")
Height (Tail):	1.70 m (5'7")
Main Wheel Track:	1.93 m (6'4")
Wing Area:	10.7 m² (115 ft²)
Wing Load:	75.7 kg/m² (15.5 lbs/ft²)
Main Wheel Tires:	380X150-5, Tire Pressure 3.1 bar (45 psi)

1.3 ENGINE

Number	1
Manufacturer	Teledyne Mattituck Services Lycoming
Model Number	TMX IO-360-M1B
Engine Type	Four-cylinder, direct drive, horizontally opposed, air-cooled, four-stroke engine
Power Output	180 SHP at 2700 RPM 160 SHP at 2400 RPM

1.4 PROPELLER

Number	1
Manufacturer	Hartzell
Model Number	HC-C2YR-1BFP/F7497-2
Type	2-bladed, variable pitch, constant speed

1.5 FUEL SPECIFICATIONS

Leaded or unleaded Avgas with 91 or higher octane
Unleaded Mogas with 91 AKI/95 RON or higher octane

Fuel without lead is preferred. If leaded fuel is used, a lead scavanger agent like Decalin is recommended. If not using Avgas, Ethanol-free mogas like BP Ultimate Unleaded 98 is preferred to reduce changes of vapor lock on hot days. All fuel system components are compatible with gasoline mixed with up to 10% ethanol.

1.6 OIL SYSTEM

The following table shows recommended oil grades according to the latest revision of Lycoming Service Instruction No. 1014:

AVERAGE AMBIENT AIR	**MIL-L-6082B/SAEJ1966 Mineral Grades**	**MIL-L-22851/SAEJ1899 ASHLESS DISPERSANT GRADES**
All Temperatures	-	SAE 15W-50 or 20W-50
Above 80°F (>26°C)	SAE 60	SAE 60
Above 60°F (>15°C)	SAE 50	SAE 40 or SAE 50
30° to 90°F (-1° to 32°C)	SAE 40	SAE 40
0° to 70°F (-18° to 21°C)	SAE 30	SAE 40, 30 or 20W-40
Below 10°F (<-12°C)	SAE 20	SAE 30 or 20W-30

Table 1-1 Oil Grades

1.7 MAXIMUM CERTIFIED WEIGHTS

Maximum Takeoff Weight (MTOW)	816 kg (1800 lbs)
Maximum Landing Weight	816 kg (1800 lbs)
Maximum Aerobatic Weight	725 kg (1600 lbs)
Maximum Weight in Forward Baggage Compartment	22.7 kg (50 lbs)
Maximum Weight in Rear Baggage Compartment	34.0 kg (75 lbs)

1.8 SYMBOLS, ABBREVATIONS AND TERMINOLOGY

1.8.1 GENERAL AIRSPEED TERMINOLOGY

KIAS	**Knots Indicated Airspeed** is the speed shown on the airspeed indicator assuming no instrument error, expressed in knots.
KCAS	**Knots Calibrated Airspeed** is indicated airspeed corrected for position and instrument error, expressed in knots. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
KTAS	**Knots True Airspeed** is the airspeed relative to undisturbed air, expressed in knots, which KCAS corrected for altitude, temperature and compressibility.
GS	**Ground Speed** is the speed of the aircraft relative to the ground.
V_A	**Maneuvering Speed** is the maximum speed at which abrupt full control deflection will not overstress the aircraft.
V_{FE}	**Maximum Flaps Extension Speed** is the highest speed permissible with wing flaps in a prescribed extended position.
V_{NO}	**Maximum Structural Cruising Speed** is the speed that should not be exceeded except in smooth air, and then only with caution.
V_{NE}	**Never Exceed Speed** is the speed limit that may not be exceeded at any time.
V_S	**Stalling Speed** is the minimum steady flight speed at which the aircraft is controllable in a specific configuration.
V_{SO}	**Stalling Speed in the landing configuration** at most forward center of gravity.
V_X	**Best Angle of Climb Speed** is the speed which results in the greatest altitude gain in a given horizontal distance.
V_Y	**Best Rate of Climb Speed** is the speed which results in the greatest altitude gain in a given time.

1.8.2 METEOROLOGICAL TERMINOLOGY

ISA	**International Standard Atmosphere** is a nominal atmosphere where air is a dry perfect gas with a temperature of 15°C (59°F) at sea level. The pressure at sea level is 1013.35 mbar (29.92 inHg). The temperature gradient from sea level to 36089 ft is -1.98°C per 1000 ft.
OAT	**Outside Air Temperature** is the free static air temperature. It is obtained from meteorological sources or in-flight instruments adjusted for instrument error and compressibility effects.
PA	**Pressure Altitude** is the altitude read from an altimeter when the altimeter's barometric scale has been set to 1013.25 mbar, assuming zero position and instrument error.

1.8.3 ENGINE POWER AND INSTRUMENTS TERMINOLOGY

BHP	**Brake Horsepower** is the power developed by the engine.
RPM	**Revolution Per Minute** is engine speed.
MP	**Manifold Pressure** is the absolute pressure measured in the engine's induction system, expressed in inches of mercury (inHg).

1.8.4 PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient	**Climb Gradient** is the ratio of change in height during a climb, to the horizontal distance covered in the same time interval.
Demonstrated Crosswind	**Demonstrated Crosswind** is the velocity of crosswind component for which adequate handling qualities during takeoff and landing has been demonstrated during flight test. The values shown are not considering to be limiting.
Usable Fuel	**Usable Fuel** is the fuel that can be safely used in flight.
Unusable Fuel	**Unusable Fuel** is the fuel that cannot be safely used in flight.
g	**g** is the acceleration due to gravity.

1.8.5 WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	**Reference Datum** is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	**Station** is a location along fuselage given in terms of distance from the reference datum.
Arm	**Arm** is the horizontal distance from the reference datum to the center of gravity of an item.
Moment	**Moment** is the product of weight on an item multiplied by its arm. (Moment divided by the constant 1000 is used in this manual to simplify balance calculations by reducing the number of digits.)
Center of Gravity (CG)	**Center of Gravity** is the point at which the aircraft, or item, would balance if suspended.
CG Arm	**Center of Gravity Arm** is the arm obtained by adding the aircraft individual moments and dividing the sum by the total weight.
CG Limits	**Center of Gravity Limits** are the extreme center of gravity locations within which the aircraft must be operated at a given weight.
Empty Weight	**Empty Weight** is the weight of aircraft including unusable fuel and full engine oil and hydraulic fluid.
Useful Load	**Useful Load** is the difference between takeoff weight and empty weight.
Payload	**Payload** is the weight of occupants, cargo and baggage.
Gross Weight	**Gross Weight** is the loaded weight of the aircraft.
Maximum Takeoff Weight (MTOW)	**Maximum Takeoff Weight** is the maximum weight approved to start the takeoff run.

SECTION 2

2 LIMITATIONS
CONTENTS

2.1 GENERAL

The Van's Aircraft RV-8, SN 82007, HB-YMM, is cleared by the Swiss Federal Office for Civil Aviation (FOCA) to operate in the Annex II Experimental Homebuilt Category. The design of the aircraft allows operation according FAR Part 23 Aerobatic Category. Only limitations which have been approved by the FOCA are included in this section. It is not authorized to exceed these limitations.

2.2 AIRSPEED LIMITATIONS

SPEED		KIAS (KTAS)	REMARKS
Never Exceeded Speed	V_{NE}	(200)	Do not exceed this airspeed in any operation.
Maximum Structural Cruising Speed	V_{NO}	168	Do not exceed this airspeed in turbulent conditions.
Maneuvering Speed	V_A	123	Maximum permissible speed at which a single full control input can be applied (full elevator control can impose loads exceeding limits).
Maximum Flap Extended Speed	$V_{FE\ T/O}$ $V_{FE\ LDG}$	95 87	Do not exceed this speed with flaps extended.

Table 2-1 Airspeed Limitations

2.3 AIRSPEED INDICATOR MARKINGS

Instrument Marking	KIAS Value or Range	REMARKS
Red Line (V_{NE})	Analog ASI: fixed at 200 EFIS ASI: Variable to limit 200 KTAS	Maximum speed for all operations. For analog ASI V_{NE} reduction refer to EFIS indication or placards.
Yellow Arc	168 – 200 (200 KTAS)	Caution Range. To be flown only in calm or light turbulent conditions.
Green Arc	56 - 168	Normal Operating Range. Lower limit is maximum weight stalling speed with flaps retracted. Upper limit is maximum operating speed in turbulent air.
White Arc	51 - 87	Full Flap Operating Range. Lower limit is maximum weight stalling speed in landing configuration at idle power. Upper limit is maximum speed permissible with flaps extended in LDG position.

Table 2-2 Airspeed Indicator Markings

2.4 POWER PLANT LIMITATIONS

The limitations quoted in this section are based on engine limitations from Lycoming IO-360 Operator's Manual and Hartzell Propeller Owner's Manual No. 115N. Exceeding these limitations will reduce engine and propeller life and could cause power plant failure.

OPERATING CONDITIONS	PROP [RPM]	CHT [°F]	EGT [°F]	OIL TEMP [°F]	OIL PRESS [PSI]	FUEL PRESS [PSI]
Starting / Warm-up	1000 to 1200 (1) (2) (8)	-	-	(9)	115 (Max)	20 to 80
Idle	(1)	150 to 500	(3)	140 to 245	25 (Min)	20 to 80
Takeoff	2500 to 2700 +81	150 to 500	(3) (4)	140 to 245	55 to 95	20 to 80
High Performance Cruise (75%)	2200 to 2700 +81	150 to 435	Peak -150 (3) (5) (6)	140 to 245	55 to 95	20 to 80
Economy Power Cruise (<75%)	1800 to 2700 +81	150 to 400	Peak (6)	140 to 245	55 to 95	20 to 80
Transient	2835 (3min) 2970 (20sec)	-	-	-	-	20 to 80

Table 2-3 Power Plant Limitations

(1) Avoid prolonged idling and do not exceed 2200 RPM on the ground.

(2) Drop-off during ignition check must not exceed 175 RPM and must not exceed 50 RPM between ignitions.

(3) Maintain mixture control in "Full Rich" position for rated take-off, climb, and maximum cruise power (>75%).

(4) Adjust mixture control to obtain smooth operation for high elevated airport take-off.

(5) Never lean beyond 150°F on rich side of peak EGT for high performance cruise.

(6) Always return the mixture to full rich before increasing power settings.

(7) Desired Oil Temperature is 180°F, lower nose and/or reduce power to adjust accordingly.

(8) Do not allow RPM to drop more than 500 RPM during propeller operation check.

(9) During extreme cold weather, it is recommended to preheat the engine and oil before starting.

(10) For maximum service life of the engine maintain CHT between 150°F and 400°F during continuous operation.

(11) Do not operate a single ignition for too long a period; a few seconds is usually sufficient to check drop-off and to minimize plug fouling.

(12) Full range throttle movements must be performed over a minimum time duration of 3 seconds in both directions.

(13) Minimum propeller diameter is 72 inches.

Refer to Paragraph 2.6 and 2.8 for further limitations about fuel and oil system.

2.5 ENGINE MARKINGS

ENGINE PARAMETER	GREEN RADIAL	AMBER RADIAL	RED RADIAL	REMARKS
Manifold Pressure [inHg]	0 to 36	36 to 38	38 to 40	-
Propeller [RPM]	0 to 2700	-	2700 to 3000	-
Oil Pressure [PSI]	55 to 95	25 to 55	0 to 25 95 to 140	Start, Warm-up, Taxi and Takeoff max 115
Oil Temperature [°F]	140 to 245	0 to 140	245 to 300	Blue mark at 180 to indicate desired oil temperature
CHT [°F]	150 to 400	0 to 150 400 to 500	500 to 550	-
EGT [°F]	1200 to 1500	0 to 1200 1500 to 1550	1550 to 1900	-
Fuel Pressure [PSI]	14 to 45	45 to 50	0 to 14	-
Fuel Flow [l/h]	0 to 61	61 to 68	68 to 76	-
Fuel QTY LH [l]	15 to 82	0 to 15	-	-
Fuel QTY RH [l]	15 to 82	0 to15	-	-
Battery Volts [V]	12.0 to 14.6	11.0 to 12.0 14.6 to 15.0	10.0 to 11.0 15.0 to 15.5	-
Battery Amps [A]	-3 to 48	-3 to -7 48 to 55	-7 to -10 55 to 65	-

Table 2-4 Engine Markings

2.6 STARTER CRANKING LIMITATIONS

The following cranking limitations apply to the SkyTec 149-NL Starter:
Six times maximum 10 seconds cranking with minimum 20 seconds cool down between cycles and then 30 minutes cooling.

2.7 FUEL CAPACITIES

Fuel System:

Total fuel capacity	2 x 81.75 ℓ (21.6 USG) = 163.50 ℓ (43.2 USG)
Total usable fuel capacity	2 x 81.40 ℓ (21.5 USG) = 162.75 ℓ (43.0 USG)

2.8 OIL SYSTEM LIMITATIONS

The following table shows recommended oil grades according latest revision of Service Instruction No. 1014:

AVERAGE AMBIENT AIR	MIL-L-6082B GRADES	MIL-L-22851 ASHLESS DISPERSANT GRADES
All Temperatures	-	SAE 15W-50 or 20W-50
Above 80°F (>26°C)	SAE 60	SAE 60
Above 60°F (>15°C)	SAE 50	SAE 40 or SAE 50
30° to 90°F (-1° to 32°C)	SAE 40	SAE 40
0° to 70°F (-18° to 21°C)	SAE 30	SAE 40, 30 or 20W-40
Below 10°F (<-12°C)	SAE 20	SAE 30 or 20W-30

Table 2-5 Oil System Limitations

CAUTION

MIXING DIFFERENT OIL GRADES AND BRANDS IS NOT RECOMMENDED. THE CURRENT USED OIL GRADE AND BRAND IS NOTED ON A PLACARD INSTALLED AT THE INNER SIDE OF THE OIL REFILL ACCESS DOOR.

The following oil sump capacity applies for the Teledyne Mattituck TMX IO-360 engine:

Total Oil Capacity	8 U.S. Quarts
Minimum Safe Quantity in Sump	4 U.S. Quarts

2.9 WEIGHT LIMITS

The maximum permissible weights for operation of the aircraft are:

Maximum Takeoff Weight (MTOW)	816 kg (1800 lbs)
Maximum Landing Weight	816 kg (1800 lbs)
Maximum Aerobatic Weight	725 kg (1600 lbs)
Maximum Weight in Forward Baggage Compartment	22.7 kg (50 lbs)
Maximum Weight in Rear Baggage Compartment	34 kg (75 lbs)

2.10 CENTER OF GRAVITY LIMITS

Refer to section 6 Weight & Balance for more details.

Utility mass - 1800 lbs		816.47	kg
Aerobatic mass - 1600 lbs		725.75	kg
Utility CG - 78.7"-86.82"	1998.98	2205.23	mm
Aerobatic CG - 78.7"-85.3"	1998.98	2166.62	mm

2.11 MANUEVER LIMITS

The following aerobatic maneuvers are permitted alone or in combination. A recommended entry speed is quoted with each maneuver. Intentional spinning is permitted not exceeding two (2) turns. CG Range for Aerobatics and Spinning: 78.7 inches to 85.3 inches aft of datum. Flick maneuvers and maneuvers not mentioned below are not permitted.

No aerobatic maneuvers are permitted when the g indicator on the EFIS has failed.

MANEUVER	**ENTRY SPEED KIAS (See Note)**
INVERTED FLIGHT	105 – 165
LAZY EIGHT	120 – 165
DERRY TURN	120 – 165
WING OVER	120 – 165
SLOW ROLL	120 – 165
AILERON ROLL	105 – 165
BARREL ROLL	130 - 160
CLIMBING HALF ROLL	155 – 165
HESITATION ROLL	150 - 160
VERTICAL ROLL	155 – 165
STALL TURN	130 – 165
LOOP POSITIVE	150 - 160
IMMELMANN	130 - 160
ROLLING CIRCLE	105 – 123
ERECT SPIN	60
KNIFE EDGE	105 – 165
STEEP TURN	130 - 140
CUBAN EIGHT	160
SPLIT-S	60 - 80
CLOVERLEAF	130 - 140

SNAP/FLICK ROLL	Not Recommended
TAIL SLIDE	Not Recommended

Table 2-6 Maneuver Limits

CAUTION

DO NOT APPLY FULL CONTROL SURFACE DEFLECTION ABOVE V_A 123 KIAS TO AVOID OVERSTRESSING OF THE AIRFRAME.

RESPECT ENGINE LIMITS.

2.12 TIME LIMITS

The following time limits apply to ensure sufficient fuel and oil delivery to the engine:

TBD values have to be defined in flight test to address appropriate handling qualities in terms of safe margins to flight load – and airspeed limitations, as well proper function of the engine oil supply system.

FLIGHT CONDITION	TIME LIMIT
INVERTED FLIGHT	Maximum TBD seconds
VERTICAL FLIGHT – NOSE UP	Maximum TBD seconds
VERTICAL FLIGHT – NOSE DOWN	Maximum TBD seconds (TBD seconds at idle power)
KNIFE EDGE (straight flight – wings vertical)	Maximum TBD seconds

Table 2-7 Time Limits

2.13 FLIGHT LOAD FACTOR LIMITS

(a) The maximum g limits above 725 kg (1600 lbs) are: Utility, +4.4g to –1.76g
(b) The maximum g limits below 725 kg (1600 lbs) are: Aerobatic, +6g to -3g
(c) The maximum g limits with flaps extended are: +2g to 0g
(d) The accelerator markings on the EFIS are:

INSTRUMENT MARKING	UNITS [g]	REMARKS
White Range	+4.4 to -1.70	Permissible range up to MTOW 816 kg (1800 lbs)
Amber Range	+4.4 to +6.0 -1.70 to -3.0	Permissible range up to maximum aerobatic weight 725 kg (1600 lbs)
Red Range	+6.0 to +10.0 -3.0 to -6.0	Never enter/cross this range

Table 2-8 Flight Load Factor Limits Instrument Markings

2.14 FLIGHT CONTROL SURFACES DEFLECTION LIMITS

CONTROL SURFANCE DEFLECTION [°]	
Ailerons	Up: 25 to 32 Down: 15 to 17
Elevators	Up: 25 to 30 Down: 20 to 25
Rudder	Left: 30 to 35 Right: 30 to 35
Flaps	≤ $V_{FE\ T/O}$: max 20 ≤ $V_{FE\ LDG}$: max 40
Trim Tab	Up: max 25 Down: max 35

Table 2-9 Flight Control Surface Deflection Limits

2.15 FLIGHT CREW LIMITS

The minimum crew is one pilot.
The aircraft may only be flown solo from the front seat.

2.16 KINDS OF OPERATING LIMITS

The aircraft is cleared for the following kinds of operation:

- Day and Night VFR
- Aerobatic according limitations mentioned in preceeding sections.

2.17 KINDS OF OPERATION EQUIPMENT LIST (KOEL)

The aircraft is approved for operation under day and night VFR conditions and aerobatic flight when the required equipment is installed and operating properly.

The following systems and equipment list does not include specific flight and radio/navigation equipment required by any particular country's operating regulations.

The pilot in command is responsible for determining the airworthiness of the aircraft and assuring compliance with current operating regulations for each intended flight.

Equipment	VFR Day	VFR Night	Aero-batic	Remarks
COM	(x)	(x)	(x)	When flying in airspace that requires it
XPDR	(x)	(x)	(x)	When flying in airspace that requires it
GPS (GRT)				-
Compass	(x)	(x)	(x)	When flying in airspace that requires it
ASI	(x)	(x)	(x)	When flying in airspace that requires it
Altimeter	(x)	(x)	(x)	When flying in airspace that requires it
Battery	x	x	x	LiFePo4 battery must be in good working order
Alternator				-
EFIS Backup Battery	x	x	x	LiFePo4 IBBS must be in good working order
EFIS PFD Screen Page				-
Attitude indicator				-
Airspeed indicator				-
Altimeter				-
Vertical speed indicator				-
AOA indexer				-
HITS				-
G-Meter			x	Aerobatic flight requires functioning G-meter
EFIS Engine Screen Page				-
Manifold pressure				-
RPM indicator				-
Oil temp. indicator	x	x	x	Safety of flight
Oil pressure indicator	x	x	x	Safety of flight
CHT				-
EGT				-
OAT				-
Fuel pressure indicator	x	x	x	Safety of flight
Fuel flow indicator				-
Fuel level indicators				-
Battery voltage indicator	x	x	x	Safety of flight

Alt. amps indicator	x	x	x	Safety of flight
Aileron trim indicator	x	x	x	Safety of flight
Pitch trim indicator	x	x	x	Safety of flight
Other EMS indications				-
Autopilot				
AP pitch servo				-
AP roll servo				-
AP disconnect button	x	x	x	Safety of flight
AP power switch	x	x	x	Safety of flight
Trim				
Pitch trim servo	x	x	x	Safety of flight
Roll trim servo	x	x	x	Safety of flight
Trim power switch	x	x	x	Safety of flight
Fuel system				
Fuel selector	x	x	x	Safety of flight
Fuel pump	x	x	x	Safety of flight
External lights				
Navigation lights		x		
Strobe lights		x		
Taxi/Landing lights		x		
Flaps	x	x	x	Safety of flight
Dual USB charger				-

2.18 ENVIRONMENTAL LIMITATIONS

2.18.1 ALTITUDE

Maximum operating altitude: 19'000 ft

Altitude where 500ft/min can be still achieved after a continuous Vy climb at MTOW +5% and safe engine operation within limitation is possible.

WARNING

PILOT EXPOSURE WITHOUT OXYGEN SUPPLY BETWEEN 10000 FT – 13500 FT SHALL BE LIMITED TO 30 MINUTES AND LIMITED TO 10 MINUTES BETWEEN13500 FT – 15000 FT.

DO NOT OPERATE ABOVE 15000 FT WITHOUT USE OF AN APPROPRIATE OXYGEN SUPPLY SYSTEM.

2.18.2 TEMPERATURE

The aircraft shall be operated within outside air temperatures between -35°C and +50°C.

Ensure avionic bay temperature is above -30°C before powering up electrical systems and avionics.

CAUTION

ADOPT FLIGHT OPERATION TO STAY WITHIN ENGINE LIMITATIONS.

2.18.3 RUNWAY SURFACE LIMITS

The aircraft is proven to operate from hard surfaced runways (concrete, asphalt or similar), as well from soft surfaced runways (hard grass fields, hard desert sand or similar).

CAUTION

THE PILOT HAS TO ASSESS SOFT SURFACED RUNWAYS INDIVIDUAL FOR SUITABILITY TO ASSURE SAFE OPERATION.

OPERATION ON POOR CONDITIONED, DAMP OR WET SOFT SURFACED RUNWAYS COULD LEAD TO SIGNIFICANT REDUCTION IN FIELD PERFORMANCE OR EVEN MAY LEAD TO LANDING GEAR COLLAPSE.

2.19 AVIONIC SYSTEMS LIMITATIONS

AUTOPILOT Minimum Engagement/Disengagement Heights:
Takeoff 500 ft AGL
Enroute 500 ft AGL
Approach 50 ft AGL

2.20 CANOPY LIMITATIONS

Do not open canopy inflight apart from specified emergency procedures mentioned in Section 3. Avoid high power settings on ground with open canopy. Do not use canopy structure to support embarking/disembarking of rear seat occupant.

2.21 PLACARDS

EXTERIOR

On the LH canopy skirt side:

On left canopy skirt side, clearly visible to passengers entering the aircraft:

EIGENBAULUFTFAHRZEUG

On wheel pants inner side:

TIRE PRESSURE 3.1 bar
(45 psi)

On flaps near embarking/disembarking area:

NO
STEP

INTERIOR

On cockpit panel:

FIRE EXTINGUISHER
BELOW INSTRUMENT
PANEL

On instrument panel – radio call sign:

HB-YMM

On parking brake:

PARK BRAKE
TURN/PULL TO OPERATE

On instrument panel – Flight Load limits:

On RH gear box:

CABIN HEAT
PULL TO
HEAT

On instrument panel – Types of Operation:

TYPES OF OPERATION

Switch labels on panel:

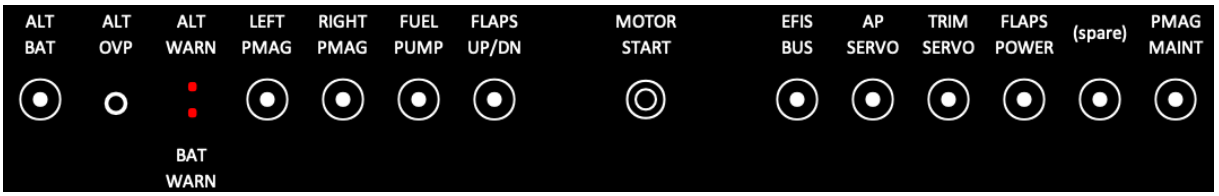


Table 2-10 Labels on panel

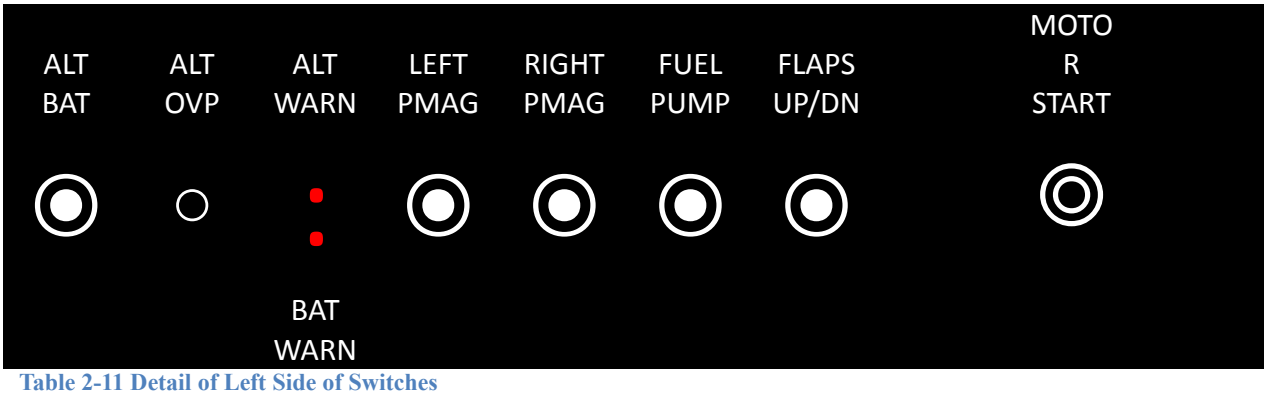


Table 2-11 Detail of Left Side of Switches

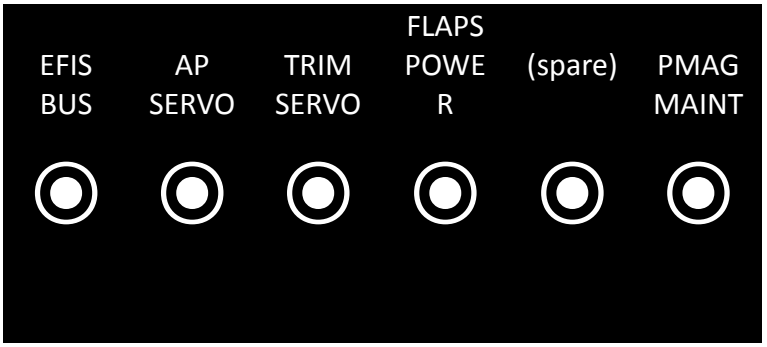


Table 2-12 Detail of Right Side of Switches

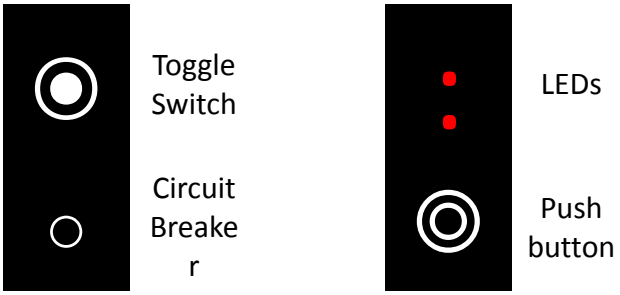


Table 2-13 Switch Symbol Key

Switches on RH side panel:

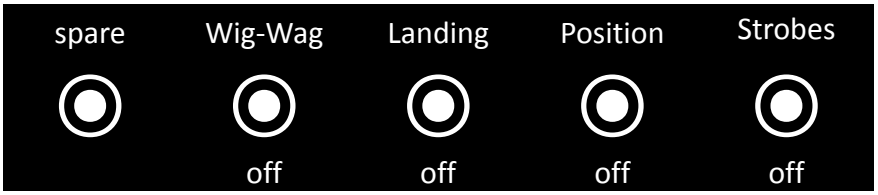


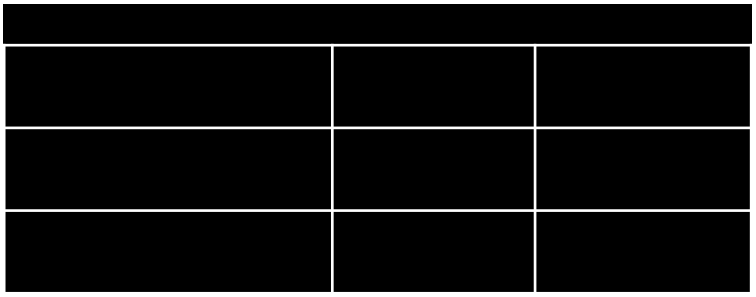
Table 2-14 Light Switches

On LH lower side panel near fuel valve:

Inside cockpit, visible to pilot:

Warning
This is a high-performance aircraft in which care is required particularly during aerobatic maneuvers to avoid exceeding structural limits and/or maximum permitted airspeeds.

Visible to pilot on side panel:



On mid cockpit cross bar:

On RH side panels – 2x:

Front Stick Grip switches:

Control	Label/Function
Switch Up	Flaps Up
Switch Down	Flaps Down
Upper Button	Autopilot Disconnect
Trigger	Radio PTT

Coolie Hat Left	Trim Left
Coolie Hat Right	Trim Right
Coolie Hat Up	Trim Nose Down
Coolie Hat Down	Trim Nose Up

Below rear seat RH arm rest, visible to passenger:

HOMEBUILT
THIS AIRCRAFT IS PROVEN TO FLY WITHIN THE EXPERIMENTAL / HOMEBUILT CATEGORY. IT COMPLIES ONLY PARTALLY TO INTERNATIONAL CERTIFICATION SPECIFICATIONS.

EIGENBAULUFTFAHRZEUG
Für dieses Luftfahrzeug besteht eine Fluggenehmigung der Sonderkategorie, Unterkategorie Eigenbau. Das Luftfahrzeug entspricht nur beschränkt den internationalen Normen.

On rear baggage compartment aft panel:

REAR BAGGAGE
COMPARTMENT
MAX LOAD 34 KG (75 LBS)

On forward baggage compartment door (inside):

FWD BAGGAGE
COMPARTMENT
MAX LOAD 22.7 KG (50 LBS)

On brake fluid reservoir (inside forward baggage compartment):

Automotive Brake
Fluid
DOT 4 or 5.1 only

On engine oil door (inside):

After engine break-in is complete:

SECTION 3

3 EMERGENCY PROCEDURES

CONTENTS

3.1 GENERAL

The recommended actions to be taken in case of failure or in emergency situations are contained in this section. Some situations require rapid action, leaving little time to consult the emergency procedures. Prior knowledge of these procedures and a good understanding of the aircraft system is a prerequisite for safe aircraft handling.

KNOW YOUR AIRCRAFT AND BE THOROUGHLY FAMILIAR WITH IMPORTANT EMERGENCY PROCEDURES.

Emergency procedures alone cannot protect against all situations. Good airmanship must be used in conjunction with the emergency procedures to manage the emergency.

3.2 AIRSPEEDS FOR EMERGENCY OPERATIONS

Airspeeds for emergency operations are listed below. Unless otherwise noted, all airspeeds are based on a maximum takeoff weight of 816 kg (1800 lbs.) at sea level under ISA standard day conditions.

Best Glide	90 KIAS
Maximum Maneuvering Speed (V_A)	123 KIAS
Never Exceeded Speed (V_{NE})	200 KTAS

WARNIN G

TO PREVENT FLUTTER, DECREASE ANALOG ASI INDICATED SEA LEVEL V_{NE} ACCORDING EFIS. ALTITUDE CORRECTED V_{NE} TABLE CAN BE FOUND IN SECTION 2 AND IS PLACARDED ON INSTRUMENT PANEL.

Landing Approach Speed for emergency operation (1.3 * Vs):

Flaps UP	73 KIAS
Flaps T/O	70 KIAS
Flaps LDG	67 KIAS

3.3 ENGINE FIRE ON THE GROUND

Mixture	**IDLE CUT OFF**
Fuel selector	**OFF**
Master battery	**OFF**
Park brake	**AS REQUIRED**

Continue with EMERGENCY EGRESS ON THE GROUND

3.4 EMERGENCY EGRESS ON THE GROUND

Park brake	**AS REQUIRED**
Seat belt	**UNFASTEN**
Canopy	**OPEN**
Aircraft	**EVACUATE**

3.5 ENGINE FAILURE ON TAKEOFF

1. **Throttle** **CLOSE**
2. **Brake** **APPLY**
3. **Elevator control** **PULL**

   If insufficient runway:
4. **Fuel selector** **OFF**
5. **Master battery** **OFF**

When aircraft stopped continue with para EMERGENCY EGRESS ON THE GROUND

3.6 ENGINE FAILURE AFTER TAKEOFF

1. **Airspeed** **70 KIAS**
2. **Mixture** **FULL RICH**
3. **Fuel selector** **CHANGE TANK**
4. **LH + RH Magnetos** **OFF, then ON (reboot)**
5. **Master battery** **OFF**
6. **Aircraft** **LAND with MINIMUM ENERGY**

When aircraft stopped continue with EMERGENCY EGRESS ON THE GROUND

3.7 ENGINE FIRE IN THE AIR OR MECHANICAL FAILURE

1. **Airspeed** **70 KIAS**
2. **Throttle** **CLOSED**
3. **Mixture** **IDLE CUT OFF**
4. **Fuel selector** **OFF**
5. **LH + RH Magnetos** **OFF**

Continue with FORCED LANDING

3.8 SMOKE OR FIRE IN THE COCKPIT

1. **Throttle** — **REDUCE to minimum REQUIRED**
2. **Airspeed** — **REDUCE below 100 KIAS**
3. **Cabin heat** — **CLOSE**
4. **Master battery** — **OFF**
5. **Cockpit vents** — **AS REQUIRED**
6. **Fire extinguisher** — **USE AS REQUIRED**
7. **Canopy** — **OPEN MAX 5cm (2 in)**
8. **Aircraft** — **LAND ASAP**

If smoke or fire gets out of control, consider continuing with BAIL OUT

3.9 PARTIAL OR TOTAL POWER LOSS (AIR START)

1. **Fuel pump** — **ON**
2. **Fuel selector** — **CHANGE TANK**
3. **Mixture** — **RICH**
4. **LH + RH Magnetos** — **OFF, then ON (reboot)**

   If no response and air filter blockage can be suspected:
5. **Alternate air** — **OPEN**

   If propeller stopped due to low airflow:
6. **Throttle** — **HALF OPEN**
7. **Propeller** — **AIM for 2500 RPM**
8. **Mixture** — **IDLE CUT OFF**
9. **Engine starter** — **ARM**
10. **Starter** — **PUSH as REQUIRED**
11. **Mixture** — **MOVE SLOWLY to FULL RICH**

When engine restarted:

12. **Engine starter** — **OFF**
13. **Aircraft** — **LAND ASAP and STAY in CONE of GLIDE**

    If unable to restart engine, proceed with FORCED LANDING

3.10 FORCED LANDING

1. **Airspeed** — **BEST GLIDE 90 KIAS**
2. **Landing site** — **SELECTED**
3. **Throttle** — **CLOSED**
4. **Propeller** — **LOW RPM**
5. **Mixture** — **IDLE CUT OFF**
6. **Fuel selector** — **OFF**
7. **LH + RH Magnetos** — **OFF**
8. **FLAPS** — **AS REQUIRED**

With final flaps setting and before touch down:

9. **Master battery** — **OFF**
10. **Aircraft** — **TOUCH DOWN with MINIMUM ENERGY**

If aircraft stopped inverted and canopy blocked:

11. **Canopy** — **BREAK with MULTIPURPOSE TOOL**

12. Aircraft	**EVACUATE**

3.11 OIL SYSTEM

3.11.1 OIL PRESSURE

A **low oil pressure** reading may be caused by malfunction of the indicating system, oil pump failure, or loss of oil. Monitor the oil temperature for a marked increase in temperature. If no oil temperature change is detected, the failure is most likely in oil pressure indicating system.

1. Throttle	**REDUCE**
2. Mixture	**RICH**
3. Aircraft maintain	**PROCEED to nearest AIRFIELD and GLIDE CONE, LAND ASAP**

If rough engine operation establishes and condition permits:

4. Mixture	**IDLE CUT OFF**

Continue with para 3.10 FORCED LANDING

High oil pressure

1. Throttle	**REDUCE**
2. Mixture	**RICH**
3. Engine parameters	**MONITOR**

If engine parameters can be maintained within normal operating range

4. Aircraft	**LAND AS SOON AS PRACTICAL**

3.11.2 OIL TEMPERATURE

High oil temperature

1. Throttle	**REDUCE**
2. Mixture	**RICH**
3. Oil cooler restrictor	**PUSH**
4. Airspeed	**INCREASE**
5. Aircraft	**LAND AS SOON AS PRACTICAL**

Low oil temperature

1. Throttle settings	**AS REQUIRED avoid high power**
2. Mixture	**AS REQUIRED**

3.12 TRIM RUNAWAY

Indication: Non-commanded trim operation, rapidly increasing out of trim forces.

1. AP quick disconnect	**PRESS AND HOLD**
2. Trim/AP power switches	**OFF**

Reduce airspeed if control forces are high.

The autopilot will disconnect when Trim/AP quick disconnect is pressed

3. **Aircraft** **LAND AS SOON AS PRACTICAL**

3.13 FLAPS

Condition: Flaps system failed.

1. **Aircraft** **Land with flaps at the failed position**

3.14 BAIL OUT

In the event of an emergency situation forcing the pilot to bail out:

WARNING

Minimum safe altitude for bail out – tbd ft.

1. **Mixture** **IDLE CUT OFF**
2. **Airspeed** **100 KIAS**
3. **Aircraft** **STEER AWAY FROM POPULATED AREAS**
4. **Canopy** **OPEN/EJECT using PIP PINS**
5. **Seat Belts** **RELEASE**
6. **Form a crouched position** **JUMP BEHIND TRAILING EDGE OF WING**

When clear of aircraft:

7. **Parachute release cord** **PULL**

NOTE

If aircraft is in a spin, bail out towards the outside of the turn.

3.15 FUEL SYSTEM FAILURES

3.15.1 FUEL PRESSURE LOW

1.	**Fuel Pump**	**ON**
2.	**Fuel bypass**	**Forward (closed)**
3.	**Fuel selector**	**CHANGE TANK**
4.	**Mixture**	**RICH**
5.	**Throttle**	**REDUCE to MIN REQUIRED**

3.15.2 FUEL ASYMMETRY

1.	**Fuel selector**	**SELECT FULLER TANK**

3.16 ELECTRICAL FAILURES

3.16.1 ALTERNATOR FAILURE

1. **Master Alternator** **CYCLE**

If still no alternator output:

2. **Master alternator** **OFF**
3. **Electrical consumers** **REDUCE to minimum REQUIRED**
4. **Battery** **MONITOR CURRENT DRAW and VOLTAGE**

Avoid excessive battery depletion to retain COM capability for landing

5. **Aircraft** **LAND BEFORE BATTERY DEPLETION**

3.16.2 HIGH VOLTAGE

1. **Master Alternator** **CYCLE**

   If still high voltage:
2. **Master alternator** **OFF**

   Continue with ALTERNATOR FAILURE

3.16.3 HIGH CURRENT (AMPS)

1. **Electrical consumers** **REDUCE to minimum REQUIRED**

   If still high current:
2. **Master alternator** **CYCLE**

   If still high current:
3. **Master alternator** **OFF**

   If still high current, problem with current sensor.
4. **Aircraft** **LAND BEFORE BATTERY DEPLETION**

3.16.4 EFIS FAILURE

1. **Aircraft USE REMAINING BACKUP INSTRUMENTS TO COMPLETE FLIGHT AT PILOTS DISCRETION**

3.16.5 COM FAILURE

1.	**Headset Connection**	**CHECK, use AUXILIARY if applicable**
2.	**Radio/Intercom**	**CHECK VOLUME SETTINGS, CYCLE**
3.	**Navigation**	**USE GPS**
4.	**Transponder**	**SQUAWK 7600**
5.	**Aircraft**	**USE ICAO "NO RADIO" PROCEDURES**

3.16.6 XPDR FAILURE

1.	**XPDR code**	**CYCLE**
	If still no XPDR read out:	
2.	**XPDR power**	**CYCLE**
3.	If still no XPDR read out:	
4.	**ATC**	**INFORM**
5.	**Aircraft**	**DESCEND below 7000 ft**

CAUTION

WITHOUT OPERATIONAL XPDR THERE IS NO TCAS RECOGNITION BY OTHER AIRCRAFT. INCREASED CLOUD SEPARATION AND LOOKOUT CAN PARTIALLY COMPENSATE XPDR SYSTEM FAILURE.

3.17 EFIS ALERTS

The EFIS annunciates important notifications onscreen, in a dedicated message window and via audio. This paragraph indicates the configured alert behavior. For further information, refer to the GRT Avionics Sport SX/Sport EX/Horizon EX Installation Manual. Not all messages apply to the installation of HB-YMM.

TT22/ECHO NOT COMMUNICATING	The TT22 Adapter is not receiving responses from the TT22 or echoUAT / The EX is not receiving responses from the TT22 or echoUAT.
TT22 ADAPTER NEEDS SOFTWARE	The TT22 Adapter is waiting for a software update.
Trig Transponder WARNING	The Trig Transponder is indicating a warning.
MAGNETIC HEADING LOST	The AHRS is not receiving a magnetic heading reference from the magnetometer. Ground track will be displayed if available.
ROLL TRIM REQUIRED	The GRT roll servo isn't keeping up with commands. The roll servo cannot overcome out-of-trim forces, torque is too low, or the shear pin has sheared. Autopilot may deviate from lateral target.
PITCH TRIM REQUIRED	The GRT pitch servo isn't keeping up with commands. The pitch servo cannot overcome out-of-trim forces, torque is too low, or the shear pin has sheared. Autopilot may deviate from vertical target.
FLIGHT TIME LIMIT	The flight time limit has been reached. (user setting)
INTERVAL ALARM	The timer interval has been reached.
FUEL FLOW TOO HIGH	The upper limit on fuel flow has been reached.
OIL PRESSURE TOO HIGH	The upper limit on oil pressure has been reached.
OIL PRESSURE TOO LOW	The lower limit on oil pressure has been reached.
CRUISE: OIL PRESSURE TOO LOW	The lower limit on oil pressure during cruise has been reached.
OIL TEMP TOO HIGH	The upper limit on oil temperature has been reached.
OIL TEMP TOO LOW	The lower limit on oil temperature has been reached.
RPM TOO HIGH	The upper limit on engine RPM has been reached.
RPM TOO LOW	The lower limit on engine RPM has been reached.
N1 TOO HIGH	The upper limit on N1 has been reached.
N1 TOO LOW	The lower limit on N1 has been reached.
LOW FUEL	The fuel totalizer has reached the lower limit.
AUX# (name) TOO HIGH	The upper limit on EIS auxiliary input # (name) has been reached.
AUX# (name) TOO LOW	The lower limit on EIS auxiliary input # (name) has been reached.
Analog # (name) TOO HIGH	The upper limit on EFIS analog input # (name) has been reached.

Analog # (name) TOO LOW	The lower limit on EFIS analog input # (name) has been reached.
COOLANT TEMPERATURE TOO HIGH	The upper limit on coolant temperature has been reached.
COOLANT TEMPERATURE TOO LOW	The lower limit on coolant temperature has been reached.
EIS VOLTAGE TOO HIGH	The upper limit on EIS voltage has been reached.
EIS VOLTAGE TOO LOW	The lower limit on EIS voltage has been reached.
EFIS VOLTAGE TOO HIGH	The upper limit on EFIS voltage has been reached.
EFIS VOLTAGE BUS # TOO HIGH	The upper limit on EFIS power bus # voltage has been reached.
EFIS VOLTAGE BUS # TOO LOW	The lower limit on EFIS power bus # voltage has been reached.
CARB TEMP WARNING	The limits on carb temperature have been reached.
EGT # TOO HIGH	The upper limit on EGT # has been reached.
EGT # TOO LOW	The lower limit on EGT # has been reached.
EGT SPAN TOO LARGE	The limit on the maximum difference between highest and lowest EGT has been reached.
EGT # HIGH FROM LEAN	EGT # has risen too far from the lean point.
EGT # LOW FROM LEAN	EGT # has dropped too far from the lean point.
CHT # COOLING TOO FAST	CHT # has reached the limit for cooling rate.
CHT # TOO HIGH	The upper limit on CHT # has been reached.
CHT # TOO LOW	The lower limit on CHT # has been reached.
TIT # TOO HIGH	The upper limit on TIT # has been reached.
TIT # TOO LOW	The lower limit on TIT # has been reached.
OBSTACLE ALERT	An obstacle could be within 250 feet in under 1 minute.
TERRAIN ALERT	Terrain could be within 500 feet in under 2 minutes.
AHRS-# REALIGNMENT	The AHRS aligned in flight, which normally only occurs during power-up. AHRS data may be unreliable until realignment on the ground. Dual AHRS mode may be inhibited.
CHECK ALTITUDE	Altitude has deviated from selected altitude.
NO (name) DATA FROM (source)	No acceptable data for input (name) has arrived from (source) in the last N seconds. The source could be a serial port or a module.
UNABLE TO CLIMB - ADD THROTTLE	Selected airspeed too high for climb with available engine power.
INPUT VOLTAGE TOO LOW	AHRS data is not available due to low input voltage.
GPS CONFIGURATION FAILED	GPS module is not responding to commands or serial output is not configured.
COGUARDIAN UNIT FAILURE	The CO Guardian self-test failed.
LIFE GUARDIAN SYSTEM-N FAILURE	The Life Guardian system #N failed a self-test.
LIFE GUARDIAN SENSOR-N FAILURE	The Life Guardian sensor #N failed a self-test.
CARBON MONOXIDE (CO) LEVEL UNSAFE (# PPM)	The level of carbon monoxide in the cabin is unhealthy (over 50ppm).

CABIN PRESSURE UNSAFE (# FT)	The CO Guardian is reporting a cabin pressure alarm.
TIME TO CHECK BIO DATA	This is a periodic reminder to use the Life Guardian.
WX-500 STUCK IN RESET	The WX-500 Stormscope is stuck in reset mode. Check wiring.
WX-500 STORMSCOPE FATAL/RECOVERABLE FAULT	The WX-500 Stormscope is reporting a fault. See the STATUS page for details.
WX500 HEADING INVALID	The WX-500 Stormscope does not have valid heading data. Heading data is required for heading stabilization.
VERTICAL POWER VP-X FAULT	The Vertical Power VP-X is reporting a fault. Push SHOW to view the VP-X status page.
VP-X: MULTIPLE FAULTS	
VP-X: CURRENT > 60A	The VP-X is operating over its maximum current limits.
VP-X: CURRENT > 48A	The VP-X is operating near its maximum current limits.
VP-X: WARM RESET	Unexpected reset of the VP-X unit.
VP-X: DATA INTEGRITY	An internal self-check failed and configuration data may have been reset.
VP-X: NO EXTERNAL DATA	The unit isn't received data (from the EFIS).
(name) - Overvoltage / Short circuit / Overcurrent / Current fault / Fault	The VP-X is indicating a fault for one of the circuits/devices.
(name) - Runaway / Switch active / Disabled / Fault	A fault for the flaps circuit in the VP-X.
(name) - Runaway / Switch active / Disabled / Fault	A fault for one of the trim circuits in the VP-X.

SECTION 4

4 NORMAL OPERATING PROCEDURES

CONTENTS

4.1 GENERAL

This section provides the normal operating procedures. All of the procedures required by regulation as well as those procedures which have been determined as necessary for the operation of this airplane are provided.

Pilots must familiarize themselves with these procedures to become proficient in the normal operation of the airplane.

It is recommended that these procedures be followed for the normal operation of the aircraft. When the aircraft has been in extended storage, has had recent major maintenance or has been operated from prepared unpaved surfaces, the full preflight inspection procedure given in this section is recommended.

4.2 AIRSPEEDS FOR NORMAL OPERATIONS

Airspeeds for normal operations are listed below. Unless otherwise noted, all airspeeds are based on a maximum takeoff weight of 816 kg (1800 lbs) at sea level under ISA standard day conditions.

Takeoff (V_R) (1.1 * Vs):	55 KIAS
Best Angle (V_X)	70 KIAS
Best Rate (V_Y):	97 KIAS
Best Glide	90 KIAS
Maximum Maneuvering Speed (V_A)	123 KIAS
Maximum Normal Operating Speed (V_{NO})	168 KIAS
Never Exceeded Speed (V_{NE})	200 KTAS

WARNING

TO PREVENT FLUTTER DECREASE ANALOG ASI INDICATED SEA LEVEL V_{NE} ACCORDING EFIS. ALTITUDE CORRECTED V_{NE} TABLE CAN BE FOUND IN SECTION 2 AND IS PLACARDED ON THE INSTRUMENT PANEL.

Maximum Flaps Extended (V_{FE}):

Flaps T/O	95 KIAS
Flaps LDG	87 KIAS

Landing Approach Speed (1.3 * Vs):

Flaps UP	75 KIAS
Flaps T/O	72 KIAS
Flaps LDG	69 KIAS

Maximum Demonstrated Crosswind for Takeoff and Landing (not a limitation):

Flaps UP	14 KIAS
Flaps T/O	12 KIAS
Flaps LDG	10 KIAS

4.3 PREFLIGHT INSPECTION

4.3.1 COCKPIT

1.	**PARK BRAKE**	**SET as REQUIRED**
2.	**THROTTLE**	**CLOSE**
3.	**MIXTURE**	**IDLE CUT OFF**
4.	**LH + RH MAGNETOS**	**OFF**
5.	**STARTER**	**OFF**

4.3.2 LEFT WING

1.	**Flap**	**CHECK CONDITION and ATTACHMENT**
2.	**Aileron**	**CHECK CONDITION and ATTACHMENT**
3.	**Fuel drain**	**SAMPLE and SECURE**
4.	**Nav/Strobe light**	**CHECK CONDITION**
5.	**Fuel quantity and filler cap**	**CHECK CONTENT and SECURE**
6.	**Fuel tank vent**	**CLEAR of OBSTRUCTIONS**
7.	**Landing/Taxi light**	**CHECK CONDITION**
8.	**Leading edge**	**CHECK CONDITION**
9.	**Pitot/AOA probe**	**COVER REMOVED and CHECKT**
10.	**Main tank**	**CHECK CONDITION**
11.	**Fuel quantity and filler cap**	**CHECK CONTENT and SECURE**
12.	**Fuel drain**	**SAMPLE and SECURE**

4.3.3 FOREWARD FUSELAGE / POWERPLANT

1.	**Fuel tank vent**	**CLEAR of OBSTRUCTIONS**
2.	**Left main landing gear**	**CHECK CONDITION**
3.	**Windshield**	**CHECK CLEAN**
4.	**Two NACA inlets**	**CLEAR of OBSTRUCTIONS**
5.	**Cowling LH**	**CHECK and SECURE**
6.	**Engine air inlet**	**CLEAR of OBSTRUCTIONS**
7.	**Propeller**	**CHECK GENERAL CONDITION**
8.	**Spinner**	**CHECK**
9.	**Cowling RH**	**CHECK and SECURE**
10.	**Engine oil**	**CHECK CONTENT and SECURE**
11.	**Fuel tank vent**	**CLEAR of OBSTRUCTIONS**
12.	**Right main landing gear**	**CHECK CONDITION**

4.3.4 RIGHT WING

1.	**Fuel drain**	**SAMPLE and SECURE**
2.	**Fuel quantity and filler cap**	**CHECK CONTENT and SECURE**
3.	**Main tank**	**CHECK CONDITION**
4.	**Leading edge**	**CHECK CONDITION**
5.	**Landing/Taxi light**	**CHECK CONDITION**
6.	**Nav/Strobe light**	**CHECK CONDITION**
7.	**Aileron**	**CHECK CONDITION and ATTACHMENT**
8.	**Flap**	**CHECK CONDITION and ATTACHMENT**

4.3.5 AFT FUSELAGE / EMPENAGE

1.	**Canopy RH**	**CHECK CLEAN**
2.	**Static port**	**CHECK CLEAR of OBSTRUCTIONS**
3.	**Vertical stabilizer**	**CHECK VISUALLY**
4.	**Horizontal stabilizer RH**	**CHECK VISUALLY**
5.	**Elevator RH**	**CHECK CONDITION and ATTACHMENT**
6.	**Elevator trim tab**	**CHECK CONDITION and ATTACHMENT**
7.	**Rudder**	**CHECK CONDITION and ATTACHMENT**
8.	**Nav/Strobe light**	**CHECK CONDITION**
9.	**Tailwheel assembly**	**CHECK CONDITION**
10.	**Elevator LH**	**CHECK CONDITION and ATTACHMENT**
11.	**Horizontal stabilizer LH**	**CHECK VISUALLY**
12.	**Static port**	**CHECK CLEAR of OBSTRUCTIONS**
13.	**Canopy LH**	**CHECK CLEAN**

4.4 BEFORE ENGINE START

1.	**Park brake**	**SET (push pedals, turn/pull/turn handle)**
2.	**Electrical systems**	**ALL OFF**
3.	**EFIS Battery**	**ON**
4.	**Master battery**	**ON**
5.	**Master alternator**	**ON**
6.	**COM power**	**ON, if required for ATIS and start-up**
7.	**Canopy**	**CLOSED/AS REQUIRED**
8.	**Seat Belts**	**FASTENED**
9.	**Altimeters**	**SET QNH/FIELD ELEVATION**
10.	**Battery power**	**CHECK minimum 12 V**
11.	**Fuel quantity**	**CHECK ENDURANCE (sufficient for flight)**
12.	**Fuel selector**	**FULLER TANK SELECTED**
13.	**Throttle**	**CLOSE**
14.	**Propeller**	**HIGH RPM**
15.	**Mixture**	**RICH**
16.	**Cabin heat**	**SET as REQUIRED**

4.5 ENGINE START

1.	**NAV light**	**ON**
2.	**Beacon light**	**ON**
3.	**Fuel pump**	**ON, FUEL PRESSURE GREEN**
4.	**Throttle**	**FULL OPEN**
5.	**Mixture**	**FULL RICH until steady fuel flow**
6.	**Throttle**	**CLOSE**
7.	**Mixture**	**IDLE CUT OFF**
8.	**Throttle**	**OPEN ¼ of travel**
9.	**Propeller area**	**CLEAR**
10.	**LH + RH Magnetos**	**ON**
11.	**Starter**	**PUSH as REQUIRED (max 10 seconds)**

12. Mixture	**MOVE SLOWLY to FULL RICH**
13. Throttle	**ADJUST to 1000-1200 RPM**
14. Oil pressure	**CHECK GREEN RANGE within 30 seconds**

CAUTION

IF MINIMUM OIL PRESSURE IS NOT INDICATED WITHIN 30 SECONDS, STOP ENGINE AND DETERMINE TROUBLE.

15. Alternator	**CHECK VOLTS and AMPS**
16. Avionics	**ON**

4.6 TAXI

1. Taxi/Landing lights	**ON**
2. Flight controls	**FREE and CORRECT**
3. Park brake	**OFF (turn/push/turn)**
4. Elevator	**PULL**
5. Throttle	**OPEN AS REQUIRED**
6. Direction and speed control	**USE RUDDER and BRAKES AS REQUIRED**
7. Flight instruments	**STABLE**
8. Throttle	**ADJUST to 1000-1200 RPM**
9. Taxi/Landing lights	**AS REQUIRED**

4.7 RUN UP

NOTE

WARM-UP TO APPROXIMATELY 1000-1200 RPM. AVOID PROLONGED IDLING AND DO NOT EXCEED 2200 RPM ON THE GROUND.

ENGINE IS WARM ENOUGH FOR TAKE-OFF WHEN THROTTLE CAN BE OPENED WITHOUT THE ENGINE FALTERING. CONSIDER OPERATION OF OIL COOLER IN COLD ENVIRONMENT.

1. Park Brake	**SET**
2. Oil pressure	**CHECK GREEN RANGE**
3. Oil temperature	**CHECK GREEN RANGE**
4. Mixture	**FULL RICH**
5. Propeller	**HIGH RPM**
6. Throttle	**OPEN to 2000 RPM**
7. LH Magneto	**OFF check RPM drop then ON**
8. RH Magneto	**OFF check RPM drop then ON**

NOTE

MAGNETOS CHECK DROP-OFF MUST NOT EXCEED **175 RPM** AND MUST NOT EXCEED **50 RPM** BETWEEN MAGNETOS. SMOOTH OPERATION REQUIRED. IF RPM DROP-OFF EXCEEDS VALUES

ABOVE, SLOWLY LEAN THE MIXTURE UNTIL THE RPM PEAKS. THEN RETARD THE THROTTLE TO THE PREVIOUS ESTABLISHED RPM SETTING AND REPEAT THE CHECK. IF THE VALUES ABOVE ARE NOT EXCEEDED ANYMORE AND THE ENGINE RUNS SMOOTHLY, THE IGNITION SYSTEM IS OPERATING PROPERLY. RETURN MIXTURE TO FULL RICH.

9.	**Propeller**	**2 CYCLES WITH MAX 500 RPM DROP**
10.	**Throttle**	**IDLE then 1000-1200 RPM**

4.8 BEFORE DEPARTURE

1.	**Fuel Pump**	**ON check fuel pressure GREEN**
2.	**Fuel Quantity**	**CHECK ENDURANCE (sufficient for flight)**
3.	**Fuel Selector**	**FULLER TANK**
4.	**Mixture**	**RICH, as appropriate for density altitude**
5.	**Propeller**	**HIGH RPM**
6.	**Engine instruments**	**GREEN RANGES no FLAG**
7.	**Flaps**	**T/O**
8.	**Trims**	**GREEN MARK**
9.	**Flight controls**	**FREE and CORRECT**
10.	**Flight instruments**	
	a. Airspeed indicators	**ZERO**
	b. Altimeters	**SET and COMPARED**
	c. Attitude indicator	**CHECKED and COMPARED**
	d. HSI and compass	**CHECKED and COMPARED**
11.	**Avionics**	
	a. COM	**SET as REQUIRED**
	b. NAV	**SET as REQUIRED**
	c. XPDR	**SET 7000/AS REQUIRED**
12.	**Departure briefing:**	
	a. Runway/Wind	**NOTED**
	b. Departure speeds	**V_R 55 KIAS, V_X 70 KIAS, V_Y 97 KIAS**
	c. Outbound routing	**BRIEFED**
	d. Vital altitudes	**BRIEFED**
	e. Obstacles	**NOTED**

EMERGENCIES

	f. Malfunctions on ground	**ABORT TAKEOFF** **-THROTTLE IDLE** **-APPLY BRAKE** **-ELEVATOR PULL**

CAUTION

BALANCE BRAKE APPLICATION AND ELEVATOR CONTROL TO AVOID PROPELLER GROUND STRIKE OR LOSS OF DIRECTIONAL CONTROL.

	g. Engine failure after takeoff	**BRIEFED according Section 3.6**

4.9 LINE UP

1.	**Approach sector**	**CLEAR**
2.	**Canopy**	**CLOSED**
3.	**Strobe lights**	**ON**
4.	**Runway**	**IDENTIFIED**
5.	**Time**	**NOTIFIED**

4.10 TAKEOFF

1.	**Elevator**	**PULL**
2.	**Brakes**	**APPLY**
3.	**Throttle**	**OPEN slowly to maximum**

CAUTION

FULL RANGE THROTTLE MOVEMENTS (IDLE TO FULL POWER OR FULL POWER TO IDLE) MUST BE PERFORMED OVER A MINIMUM TIME PERIOD OF 3 SECONDS.

4.	**Propeller**	**MAXIMUM 2700 RPM**
5.	**Brakes**	**RELEASE as REQUIRED to keep RWY center**
6.	**Elevator**	**PUSH to lift tail**
7.	**Rudder**	**APPLY as REQUIRED to keep RWY center**
8.	**Engine instruments**	**NO CAUTION or WARNING**
9.	**Rotate at V_R**	**55 KIAS**
	After lift-off:	
10.	**Initial climb at V_X**	**70 KIAS**
	When clear of obstacles:	
11.	**Flaps**	**UP**
12.	**Climb at V_Y**	**97 KIAS**

4.11 CLIMB

1.	**Autopilot**	**AS REQUIRED**
2.	**Throttle**	**ADJUST manifold pressure to 25 inHg**
3.	**Propeller**	**ADJUST to 2500 RPM**
4.	**Engine instruments**	**ALL in GREEN RANGE**
5.	**Flaps**	**CHECK UP**
6.	**Fuel pump**	**OFF check fuel pressure GREEN**
7.	**Climb speed**	**AS REQUIRED**
	During Climb:	
8.	**Throttle**	**OPEN to manifold pressure ≤ 25 inHg**
	When passing 5000ft AMSL:	
9.	**Mixture**	**ADJUST to obtain smooth operation**
	When passing Transition Altitude:	
10.	**Altimeters**	**SET STANDARD (QNE 1013)**

4.12 CRUISE

1.	**Throttle**	**SET desired CRUISE POWER**
2.	**Propeller**	**SET desired CRUISE RPM**
3.	**Mixture**	**SET as REQUIRED**
4.	**Engine Instruments**	**MONITOR**
5.	**Fuel quantity**	**CHECK ENDURANCE**
6.	**Fuel selector**	**SELECT FULLER TANK to balance**

NOTE

MAINTAIN MIXTURE CONTROL IN "FULL RICH" POSITION FOR RATED TAKE-OFF, CLIMB AND MAXIMUM CRUISE POWER (ABOVE APPROXIMATELY 75%). ALWAYS RETURN THE MIXTURE CONTROL TO FULL RICH BEFORE INCREASING POWER SETTINGS. FOR LEANING TO EXHAUST GAS TEMPERATURE:

A) **MAXIMUM POWER CRUISE** (APPROXIMATELY 75% POWER): NEVER LEAN BEYOND 150°F ON RICH SIDE OF PEAK EGT. MONITOR CHT TO STAY BELOW 435°F.

B) **BEST ECONOMY CRUISE** (APPROXIMATELY 75% POWER AND BELOW): OPERATE AT PEAK EGT. MONITOR CHT TO STAY BELOW 400°F.

4.13 DESCENT

1.	**ATIS**	**RECEIVED**
2.	**Approach briefing:**	
	a. Runway/Wind	**NOTED**
	b. Approach routing	**BRIEFED**
	c. Vital altitudes	**BRIEFED**
	d. Approach configuration (flaps)	**BRIEFED**
	e. Approach speeds	**INITIAL 80 KIAS, FINAL 70 KIAS (MINIMUM 1.3 Vs)**
	f. Obstacles/restrictions	**NOTED**
3.	**Throttle**	**REDUCE to desired descent power**
4.	**Mixture**	**ADJUST to obtain smooth operation**
	When passing Transition Level:	
5.	**Altimeters**	**SET QNH**

4.14 APPROACH

1.	**Runway/wind**	**IDENTIFIED**
2.	**Fuel Pump**	**ON check fuel pressure GREEN**
3.	**Fuel Quantity**	**CHECK ENDURANCE**
4.	**Fuel Selector**	**FULLER TANK**
5.	**Mixture**	**RICH**

6.	**Flaps**	**AS REQUIRED**

4.15 FINAL

1.	**Runway**	**CLEAR**
2.	**Wind**	**CHECKED**
3.	**Touch-down/go-around points**	**IDENTIFIED**
4.	**Propeller**	**HIGH RPM**
5.	**Flaps**	**SET AS BRIEFED**
6.	**Autopilot**	**DISENGAGED**

NOTE

For minimum Autopilot heights, refer to Section 2 – Avionic Systems Limitation.

For crosswind information, refer to para 4.21.

4.16 GO AROUND

1.	**Throttle**	**OPEN to maximum**

CAUTION

FULL RANGE THROTTLE MOVEMENTS (IDLE TO FULL POWER OR FULL POWER TO IDLE) MUST BE PERFORMED OVER A MINIMUM TIME PERIOD OF 3 SECONDS.

2.	**Elevator control**	**PITCH to 5° attitude nose up**
3.	**Initial climb at Vx**	**70 KIAS**
	When clear of obstacles:	
4.	**Flaps**	**UP**
5.	**Climb at Vy**	**97 KIAS**

Continue with para 4.11 – CLIMB.

4.17 LANDING

NORMAL (long and fair runway)

1.	**Throttle**	**IDLE**
2.	**Elevator control**	**FLARE TO TOUCH DOWN WITH MAIN WHEELS FIRST, SLOWLY LOWER TAIL WHEEL, WITH ALL WHEELS ON GROUND KEEP ELEVATOR MAXIMUM DEFLECTED PITCH UP**

WARNIN G

ADJUST THROTTLE AND ELEVATOR CONTROL TO AVOID HIGH SINK RATES AT TOUCH DOWN RESULTING IN AIRCRAFT BOUNCING AND/OR POTENTIAL LANDING GEAR COLLAPSE. IN ANY DOUBT OR INSTABLE CONDITIONS EXECUTE GO-AROUND.

3. **Braking** **AS REQUIRED to safe taxi speed**

CAUTION

TO AVOID PROPELLER, ENGINE AND AIRFRAME DAMAGE BY PROPELLER GROUND STRIKE, BALANCE BRAKE APPLICATION AND ELEVATOR CONTROL IN RELATION TO GROUND SPEED. NEVER ALLOW NEGATIVE PITCH ATTITUDES DURING THIS MANEUVER. IMMEDIATELY RELEASE BRAKE PRESSURE ONCE APPROACHING ZERO PITCH ATTITUDES.

4. **Rudder control** **AS REQUIRED to maintain center line**
5. **Aileron control** **DEFLECT AGAINST WIND or AS REQUIRED**

SHORT/SOFT FIELD

1. **Throttle** **IDLE**
2. **Elevator control** **FLARE TO TOUCH DOWN WITH THREE WHEELS, ON GROUND KEEP ELEVATOR MAXIMUM DEFLECTED PITCH UP**

WARNIN G

ADJUST THROTTLE AND ELEVATOR CONTROL TO AVOID HIGH SINK RATES AT TOUCH DOWN RESULTING IN AIRCRAFT BOUNCING AND/OR POTENTIAL LANDING GEAR COLLAPSE. IN ANY DOUBT OR INSTABLE CONDITIONS EXECUTE GO-AROUND.

3. **Braking** **FIRM to safe taxi speed**
4. **Rudder control** **AS REQUIRED to maintain center line**
5. **Aileron control** **DEFLECT AGAINST WIND or AS REQUIRED**

4.18 AFTER LANDING

1. **Flaps** **LDG**
2. **Trims** **GREEN MARK**
3. **Fuel pump** **OFF**
4. **Strobe lights** **OFF**
5. **Transponder** **STBY or check GND**

4.19 SHUTDOWN

1. **Throttle** **ADJUST to 1000-1200 RPM**

2.	**Park brake**	**SET (push pedals, turn/pull/turn handle)**
3.	**Taxi/Landing lights**	**OFF**
4.	**Avionics**	**OFF**
5.	**Engine instruments**	**CHT BELOW 300 °F, EGT BELOW 1100 °F**
6.	**Mixture**	**CUT OFF (full lean position)**
7.	**LH + RH Magnetos**	**OFF**
8.	**External lights**	**OFF**
9.	**Master alternator**	**OFF**
10.	**Master battery**	**OFF**

4.20 PARKING

1.	**Flight controls**	**INSTALL GUST LOCK**
2.	**Wheel chocks**	**AS REQUIRED**
3.	**Tie downs**	**AS REQUIRED**
4.	**External covers**	**INSTALLED**

4.21 CROSSWIND OPERATIONS

Use the wing-low technique for crosswind operations to avoid touch down with remaining crab angle. Aim to touch down with the upwind main wheel and tail wheel first before lowering the downwind main wheel. Use rudder as required to properly align fuselage with runway center line.

For recommended flaps settings related to demonstrated crosswind refer to para 4.2.

4.22 AEROBATIC FLIGHT

Prior to aerobatic flights conduct the following checks:

1.	**Aircraft mass**	**BELOW 725 KG (1600 LBS)**
2.	**G-Meter**	**SELECTED on EFIS**
3.	**Engine instruments**	**ALL in NORMAL OPERATING RANGE**
4.	**Fuel selector**	**FULLEST TANK SELECTED**
5.	**Mixture**	**RICH**
6.	**Propeller**	**BELOW 2500 RPM**
7.	**Parachute**	**FASTENED**
8.	**Seat belts**	**FASTENED**
9.	**Lose items**	**NONE**
10.	**Airspace**	**CLEAR**

For good practice perform "HASELL" prior aerobatic, test or training flights:

H	**HEIGHT**	Height sufficient for intended maneuvers?
A	**AIRFRAME**	Airframe secured and ready for intended maneuvers?
S	**SECURITY**	Fit and properly strapped in?
E	**ENGINE**	Operating limitations known?
L	**LOCATION**	Appropriate for intended maneuvers?

L	**LOOKOUT**	Airspace clear for intended maneuvers?

SECTION 5

5 PERFORMANCE

CONTENTS

5.1 GENERAL

This section provides approved data for airspeed calibration, stall speeds, take-off, landing, and climb performance.

The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques. The performance information presented do not take into account variations in pilot experience or a poorly maintained airplane. The performance given can be attained if the procedures quoted in this manual are applied, and the airplane has been well maintained.

5.2 AIRSPEED CALIBRATION

Airspeed Indicator Calibration - Clean Configuration	
Indicated Airspeed [KIAS]	Calibrated Airspeed [KCAS]
60	63
70	69
80	76
90	87
100	97
110	106
120	116
130	126
140	137
150	145
160	159

Airspeed Indicator Calibration - Takeoff Configuration	
Indicated Airspeed [KIAS]	Calibrated Airspeed [KCAS]
60	58
67	65
77	75
87	85

Airspeed Indicator Calibration - Landing Configuration	
Indicated Airspeed [KIAS]	Calibrated Airspeed [KCAS]
60	57
67	63
77	73
87	83

5.3 STALL SPEED

Stall speeds in KIAS at MTOW.

Power on stalls	clean config. 0° bank	clean config. 30° bank turn	take off flaps 0° bank	full flaps 0° bank
Stall speed KIAS	**54**	**56**	**50**	**50**

Power off stalls	clean config.		full flaps	
Stall speed KIAS	Vs1	**61**	Vs0	**53**

5.4 TAKEOFF PERFORMANCE

Rotation Speed KIAS	55
Climb Speed KIAS	65
Runway Surface	Hard
Weight at MTOW kg	816
Propeller speed RPM	2500

Flaps 15°, apply full power and release brakes
For every knot of headwind, reduce distances by 1%
For every 2 knots of tailwind, increase distances by 10%
For dry grass surface, add 15% to ground run
For soft grass surface, add 50% to ground run

	0°c		10°c		20°c		30°c		40°c	
Pressure Altitude (ft)	Ground Run (m)	Distance over 15m obstacle (m)	Ground Run (m)	Distance over 15m obstacle (m)	Ground Run (m)	Distance over 15m obstacle (m)	Ground Run (m)	Distance over 15m obstacle (m)	Ground Run (m)	Distance over 15m obstacle (m)
0	280	360	303	387	324	412	344	435	362	456
2000	337	440	367	480	396	519	423	556	449	591
4000	405	536	444	591	482	646	518	700	553	753
6000	486	650	536	724	585	798	632	872	677	945
8000	588	792	651	890	713	988	773	1087	833	1186

5.5 LANDING PERFORMANCE

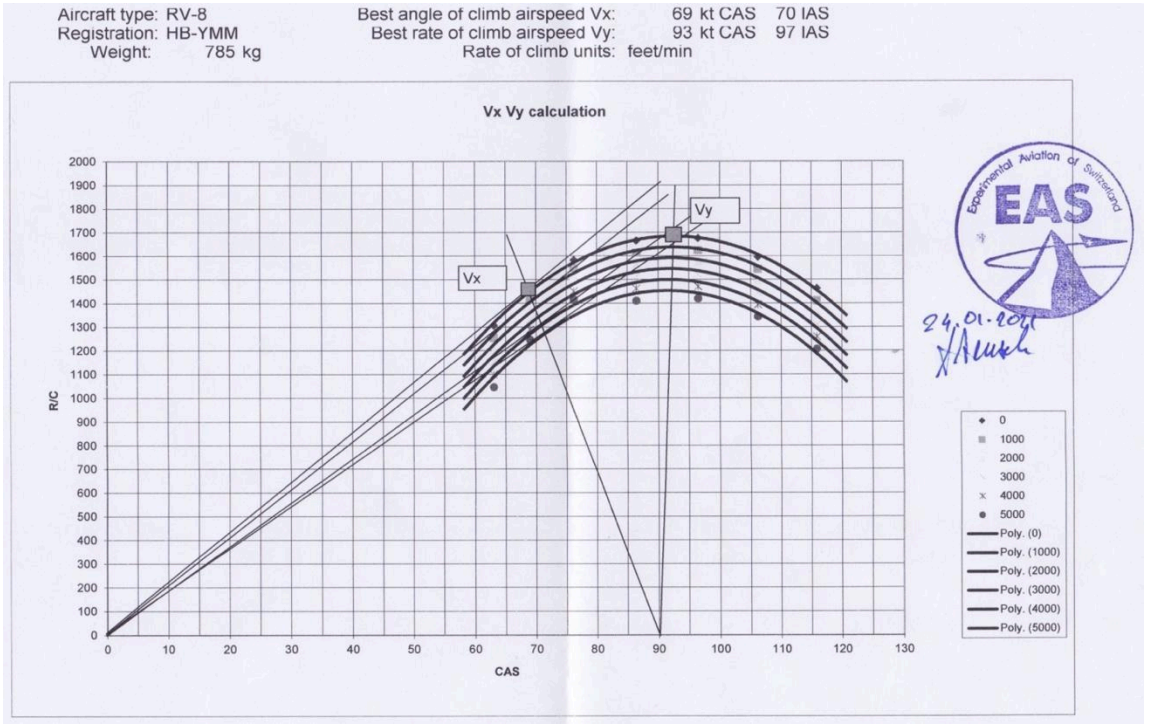
Touchdown Speed IAS	58 kt
Approach Speed IAS	69 kt
Weight	816 kg

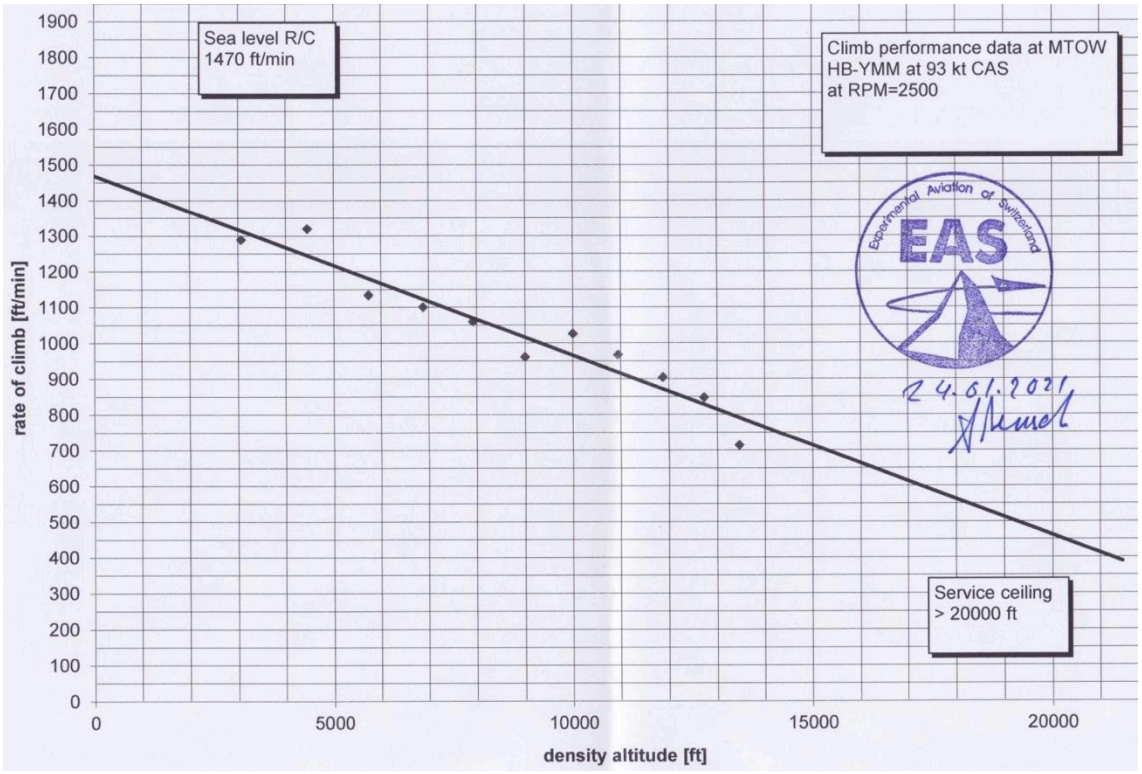
Hard runway surface
For every knot of headwind, reduce distances by 1%
For every 2 knots of tailwind, increase distances by 10%

	0°c		10°c		20°c		30°c		40°c	
Pressure Altitude (ft)	Ground Run (m)	Distance over 15m Obstacle (m)	Ground Run (m)	Distance over 15m Obstacle (m)	Ground Run (m)	Distance over 15m Obstacle (m)	Ground Run (m)	Distance over 15m Obstacle (m)	Ground Run (m)	Distance over 15m Obstacle (m)
0	396	614	429	656	458	696	486	732	511	766
2000	477	750	520	814	560	876	598	936	634	993
4000	574	912	629	1003	682	1091	732	1178	781	1264
6000	689	1107	759	1228	827	1348	893	1468	957	1588
8000	833	1350	922	1509	1008	1670	1093	1831	1176	1993

5.6 CLIMB PERFORMANCE

Vx KIAS	70
Vy KIAS	97





5.7 CLIMB TEMPERATURES

Time minutes	Pressure Altitude	OAT ^{0}C	RPM	Cylinder head temperature °F				Oil temp
				1	2	3	4	˚F
0	2'983	3	2504	236	234	230	226	129
1	4'272	2	2506	279	277	271	265	128
2	5'592	-1	2508	302	299	293	283	130
3	6'726	-2	2508	315	310	304	294	133
4	7'826	-5	2508	336	328	325	310	138
5	8'886	-7	2508	246	336	334	316	140
6	9'847	-8	2508	247	336	334	316	142
7	10'873	-11	2510	356	344	345	326	144
8	11'840	-13	2510	368	354	357	338	145
9	12'744	-15	2510	374	357	366	342	146
10	13'592	-17	2510	381	357	369	343	148
11	14'306	-19	2508	382	356	370	343	148

SECTION 6

6 WEIGHT & BALANCE / EQUIPMENT LIST

CONTENTS

6.1 GENERAL

The following chapter provides the operator sufficient information to safely operate the aircraft within its designed CG envelope.

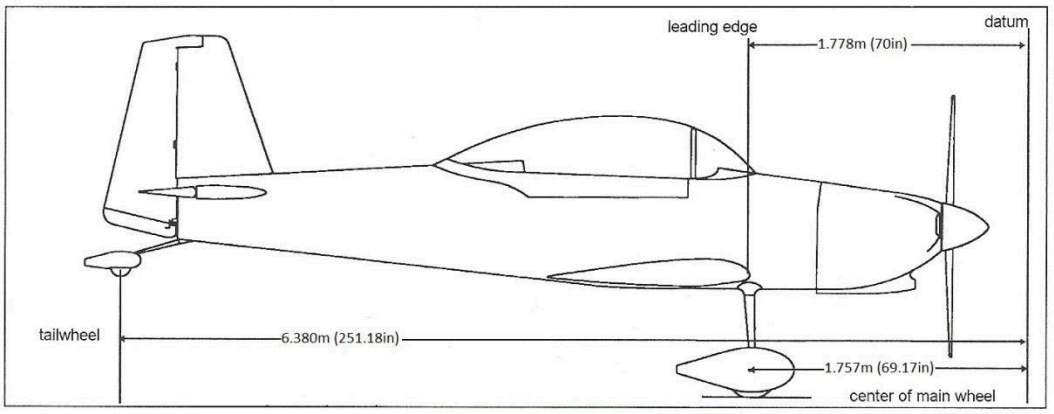
Instructions of initial weighting procedures and records of current aircraft configuration are provided.

The operator should update Weight and Balance Record and Equipment List (if applicable) when a modification is incorporated on the aircraft.

It is the responsibility of the pilot in command to ensure that the airplane is loaded properly.

6.2 AIRCRAFT WEIGHING PROCEDURE

1. Preparation:
    a) Inflate tires to recommended operating pressure.
    b) Drain all usable fuel from the fuel tanks.
    c) Ensure the oil sump is filled to 8 US quarts.
    d) Remove all items from forward and aft baggage area and cockpit pockets.
    e) Raise flaps to fully retracted position.
    f) Place all control surfaces in the neutral position.
2. Leveling
    a) Place scales under each wheel (minimum capacity 600 lbs)
    b) Place shims under main wheels as necessary to level aircraft laterally.
    c) Raise tail wheel with support until a level on the canopy rail indicates level.
    d) Close and lock the canopy.
3. Weighing:
    a) With the aircraft level, record weight shown on each scale.
    b) Swap scales and record second measurement.
    c) Take the average from the two measurements.
4. Measuring:
    a) Drop a plumb bob from the wing leading edge behind each main gear and mark the floor. Measure 70 inches forward of this line and mark the floor for the location of the datum.
    b) Measure the horizontal distance from the datum (parallel to the aircraft center line) to each main wheel center.
    c) Measure the horizontal distance (along the aircraft center line) from the datum to the center of the tail wheel axle.
5. Using weights from item 3 and measurements from item 4, the aircraft weight and CG can be determined.



6.3 WEIGHT AND BALANCE RECORD

Changes to equipment or structure which affect the aircraft weight and balance are to be recorded in the following table. After insertion of the data, calculate the new basic aircraft empty weight and moment. The most recent figure is to be used for the preflight weight and balance calculation.

BASIC EMPTY WEIGHT of the aircraft includes all operating equipment that has a fixed location and is actually installed. It includes the weight of the airframe, powerplant, required equipment, fitted operational or special equipment, hydraulic fluid, oil, residual and unusable fuel. The data is stored in the spreadsheet titled:

`AircraftWeightAndBalanceRecord – HB-YMM – 20200102.xls`

Aircraft Model: Van's Aircraft RV-8 HB-YMM				Serial Number: 82007						Page Number: 1/1	
Date	Item No.		Description of Article or Modification	Weight Change						Running Basic Empty Weight	
				Added (+)			Removed (-)				
	In	Out		Wt. (kg)	Arm (cm)	Moment /1000	Wt. (kg)	Arm (cm)	Moment /1000	Wt. (kg)	Moment /1000
2020-01-02	-	-	Initial Empty Weight							500.7	979.404

Table 6-1 Aircraft Weight and Balance Record

The table in this document will be updated as required by any changes in the fixed operating equipment or structure of the aircraft.

6.4 BAGGAGE COMPARTMENTS

There are two baggage compartments available to distribute baggage in order to stay within the weight and balance envelope. For weight limitations refer to Section 2.

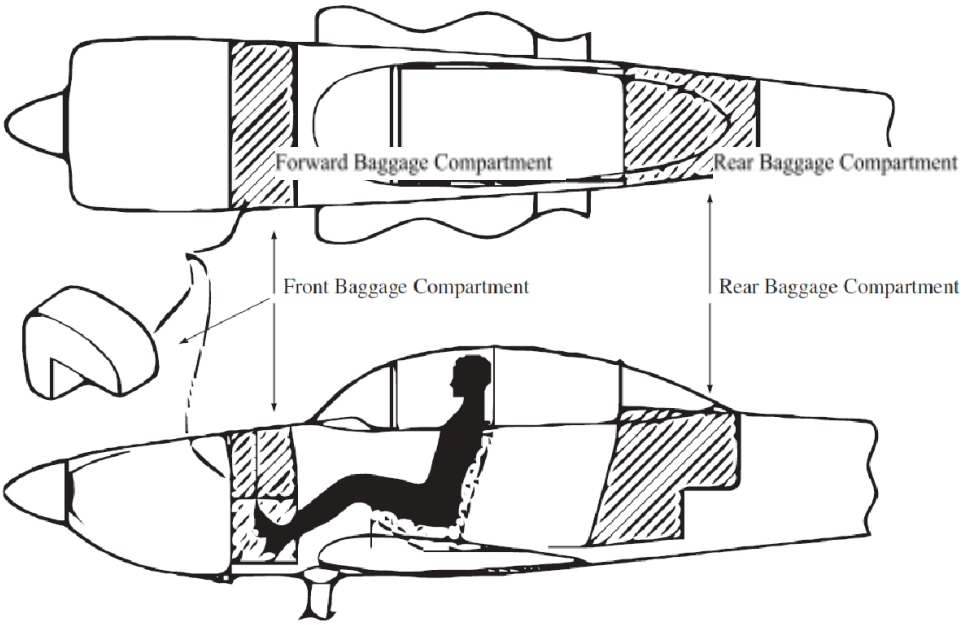


Figure 6-4: Baggage Compartments

6.5 LOADING FORM

This weight and balance loading form need to be completed to obtain actual data for a specific flight. Crosscheck calculated data with weight limits in Section 2 and enter data in the CG Envelope (Para 6.6). Below is an example using the W&B spreadsheet:

`HB-YMM Weight and Balance Calculator.xls`

WEIGHT & BALANCE

EMPTY CG

	WEIGHT (kg)	ARM (mm)	MOMENT
RIGHT WHEEL	237.25	1753	415899
LEFT WHEEL	236.75	1753	415023
Tail WHEEL	22.00	6378	140316
Wheel Pants	4.00	1753	7012
Mufflers	0.74	1560	1154
AIRFRAME TOTAL	**500.74**		979404
EMPTY CG	**1956**		

LOADED CG (example)

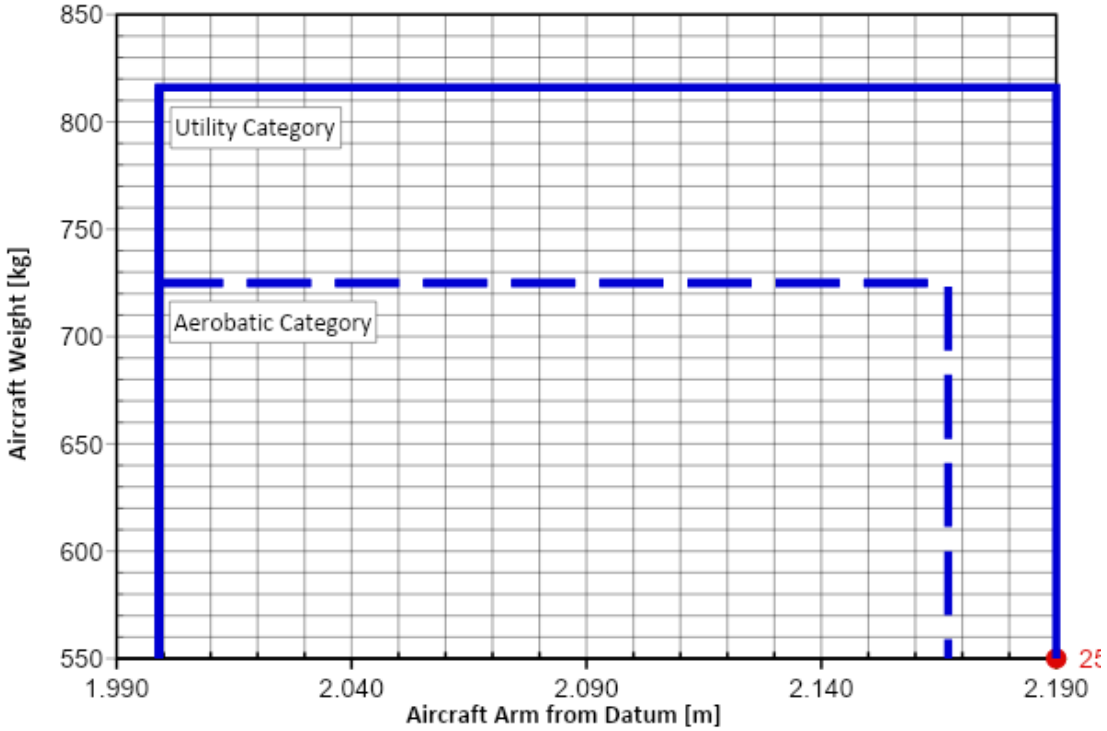
	WEIGHT (kg)	ARM (mm)	MOMENT
FWD BAGGAGE	10	1486	14860
FUEL	123	2032	249936
PILOT	80	2331	186480
PASSENGER	0	3026	0
AFT BAGGAGE FLOOR	10	3505	35050
AFT BAGGAGE SHELF	0	3884	0
TOTAL	**723.7397**		1465730
CG	**2025.22**		

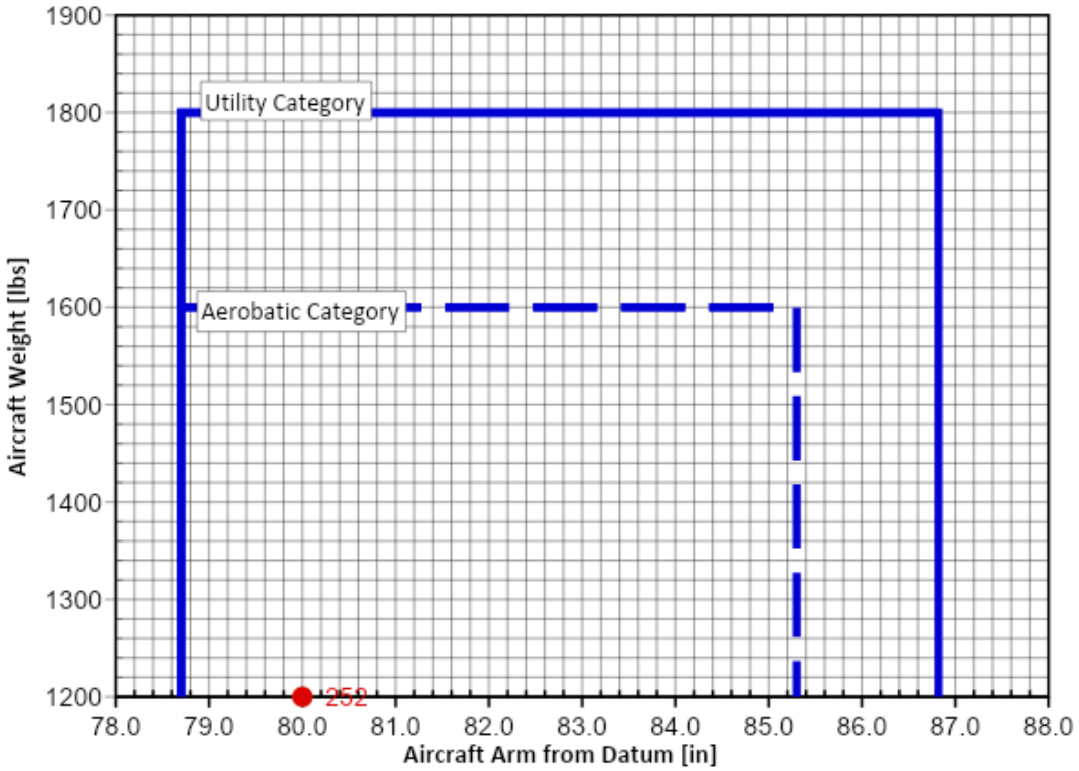
Key: **Aero OK** | **Utility OK** | **Not OK!**

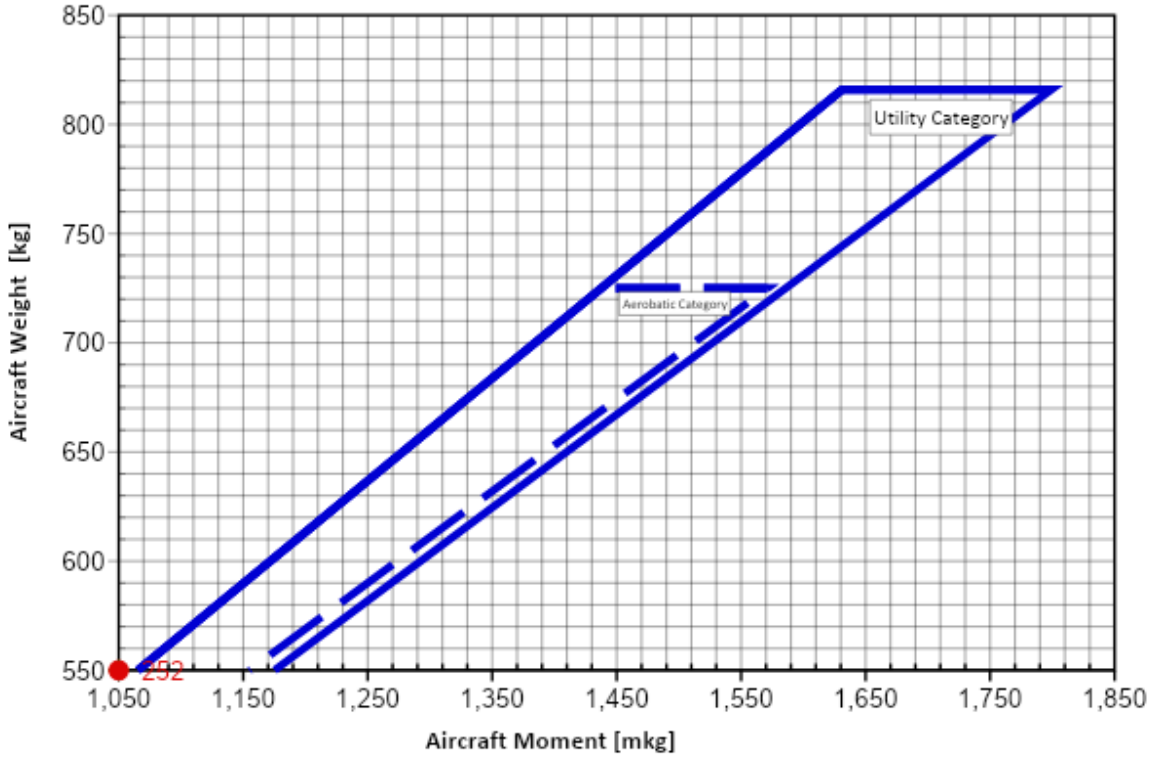
Utility max mass - 1800 lbs		816.47	kg
Aerobatic max mass - 1600 lbs		725.75	kg
Utility CG Range 78.7"-86.82"	1998.98	2205.23	mm
Aerobatic CG Range 78.7"-85.3"	1998.98	2166.62	mm

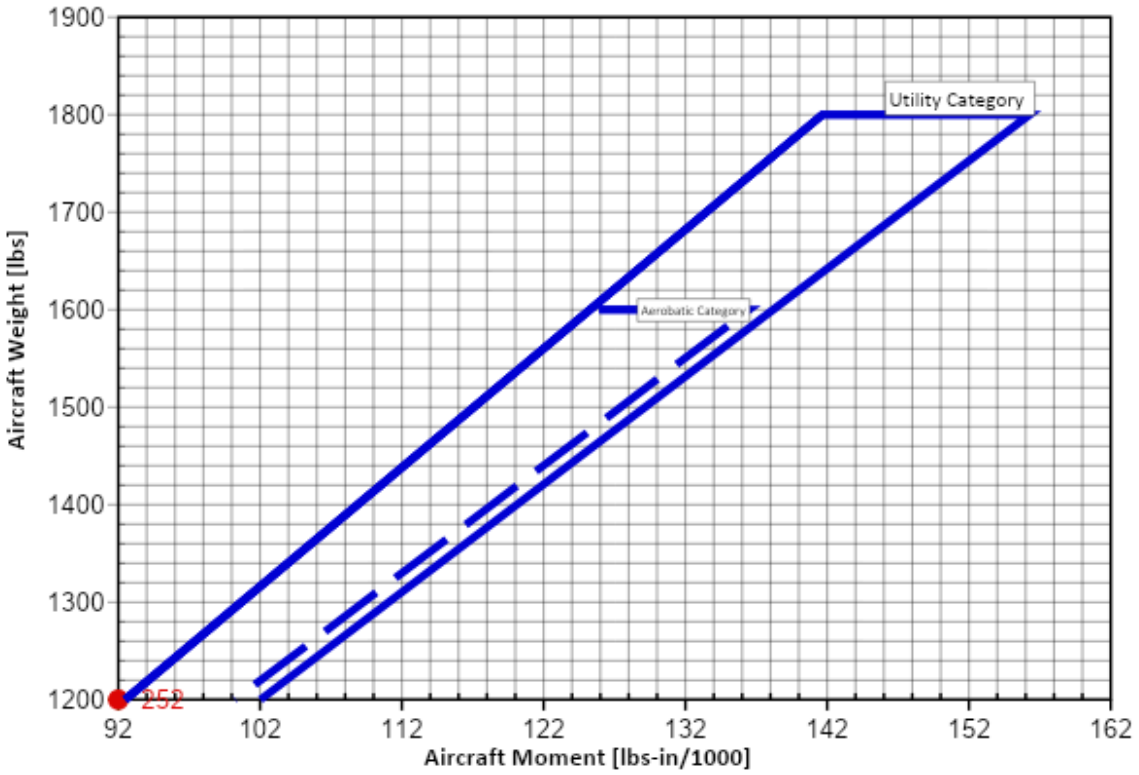
Table 6-2 Weight and Balance Spreadsheet Example

6.6 CG ENVELOPE






Aircraft Weight [kg]
850
800
750
700
650
600
550
1,050
1,150
1,250
1,350
1,450
1,550
1,650
1,750
1,850
Aircraft Moment [mkg]
Utility Category
Aerobatic Category
252


Aircraft Weight [lbs]
1900
1800
1700
1600
1500
1400
1300
1200
92
102
112
122
132
142
152
162
Aircraft Moment [lbs-in/1000]
Utility Category
Aerobatic Category
252

6.7 EQUIPMENT LIST

The following list shows the installed equipment on the aircraft. Changes will be tracked with the maintenance log until the table below is updated by an AFM revision. Master for this is the **`EAS_12_29c_Equipment_List_HB-YMM-20200101.xlsx`** spreadsheet.

Item #	Description	Manufacturer	Type	Serial Number
A	**Powerplant & Accessories**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Engine 180 hp	Teledyne Mattituck Services	TMX IO-360	V537958521
	Exhaust System	Vetterman	EA EXH 8 IO-360M1B	-
	Air Filter	K&N	E-33-2060	-
	Starter	Sky-Tec	149-NL	FN-2910226
	Alternator	Plane Power	AL12-EI60/B	216-102110
	Alternator belt	Gates	11a0925 or 7365	-
	Propeller 74" diameter	Hartzell	HC-C2YR-1BF P/F7497	CH45668B
	Governor	MT-Propeller	P-860-4	10G292-G
	Oil Filter	Champion	CH48108-1 (or equivalent)	-
	Spinner Installation	Van's Aircraft	C/S-13	-
	Muffler stainless steel	Danielsson-Konstruktion	RV-8	-
	Oil Cooler	Niagra Thermal Products LLC	20002A	H10-8093-35
	Ignition - Left	E-mag Electronic Ignition	P-114	1738
	Ignition - Right	E-mag Electronic Ignition	P-114	1740
	Oil Quick Drain Valve	Fumoto	T202N	-
	Spark Plugs	NGK	BR8EIX Iridium	-
	Throttle Quadrant	DJM Manufacturing	CT83F	-
	Manifold Pressure Sensor	GRT Avionics	MAP-02	-
	Fuel Pressure Sensor	VDO	362 001	-
	Oil Pressure Sensor 150 psi NPT 1/8-27	VDO	360 430	-
	Oil Temperature Sensor	GRT Avionics	FT-LC-02	-
	EGT Sensor	GRT Avionics	EGT-HCSLL-01	-
	CHT Sensor	GRT Avionics	CHT-BAY-01	-
	OAT Sensor	GRT Avionics	OAT-02	-

B	**Landing Gear and Accessories**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Main gear	Grove	RV-8 1219-1 & -2	-
	Main wheel	Cleveland/Parker	40-78B	-
	Main wheel fairings	Van's Aircraft	PRFLT	-
	Brakes hydraulic	Cleveland/Parker	30-9	-
	Tailgear	Doug Bell	-	-
	Tailwheel	Van's Aircraft	U TAIL WHEEL 6"	-
	Brake Master Cylinders (2)	Matco Manufacturing	MCMC-4F(S)	-
	Parking Brake	Matco Manufacturing	PVPV-1	-
	Main wheel tire 380X150-5 6PLY	MICHELIN AIR	070-554-0	-
	Main wheel tube	Michelin Airstop Tubes	097-908-0	-
	Hydraulic Tank	Van's Aircraft	VA-107	-
C	**Electrical Systems (_12_V)**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Battery	EarthX	ETX680C	-
	Battery relay	B&C Specialty Products Inc.	S701-1	-
	Starter relay	B&C Specialty Products Inc.	S702-1	-
	Backup Battery for EIS and EFIS	TCW Technologies	IBBS-12v-3ah	20186318 G
	Flap electric servo	Motion Systems Corporation	85615-157-1	-
	Aileron trim servo	Ray Allen	T2-10A-TS	-
	Elevator trim servo	Ray Allen	T2-12A-TS	-
	Circuit Breaker for Alternator Overvoltage 5A	Klixon	7274-2-5	-
	Fuseblocks 12 positions each Bussmann 2x	B&C Specialty Products Inc.	FH-12	-
	Position lights	Flyleds	SKU 16050	-
	Strobe lights	Flyleds	SKU 16050	-
	Landing light	Flyleds	SKU 18710	-
	Wig-Wag controller	Perihelion Design	Wig-Wag (C) Module	-
	Current Sensor	GRT Avionics	CS-01	-
	USB port (front and rear)	Blue Sea	1045	-
	Powerlet 12v Adapter (front)	Powerlet	PSO-001	-

D	**Instruments**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Air speed indicator	UMA	16-210-240	-
	Altimeter	UMA	5-411-20	-
	Vertical speed indicator	UMA	8-210-30	-
	Vertical card compass	Precision Aviation	PAI-700-14	-
	Vertical card compass	Falcon Gauge	MCVC-2L	MCVCL01050006
E	**Cabin Accomodation**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Pilot seat (front)	Flightline Interiors	RV-8	-
	Passenger seat (rear)	Flightline Interiors	RV-8	-
	Seat belt - 5 point safety harness (front)	Crow Enterprizes	R50012F	-
	Seat belt - 5 point safety harness (rear)	Crow Enterprizes	R50012R	-
	Cabin heat assembly	Plane Innovations LLC	TG-10SS	-
	Fresh air vents (front and rear)	Steinair Inc.	AV-1.25C	-
	USB port (front and rear)	Blue Sea	1045	-
	Powerlet 12v Adapter (front)	Powerlet		-
F	**Placards, Warnings and Manuals**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Aircraft Flight Manual			
G	**Auxiliary Equipment**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Escape Tool	Victorinox	Rescue Tool	
	Fire extinguisher	Contrafeu	FireEX 800ml -20°C	
	Towbar			
	Tie down kit			
	Control lock	Anti Splat Aero LLC	05-12483	-
	Pitot cover, fuel vent locks			
	First aid kit			

H	**Avionics & Autopilot**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	PFD/EFIS Primary Flight Display	Grand Rapids Avionics	Sport EX	214
	Engine monitor	Grand Rapids Avionics	EIS-4000 - 44V91F	16206
	Pitch Servo	GRT Avionics	AP-SERVO-PITCH-B	
	Roll Servo	GRT Avionics	AP-SERVO-ROLL-B	
	Transponder	Trig Avionics	TT21 and TC20	02537 and 02226
	Radio	Trig Avionics	TY91 and TC90	06894 and 06923
	External Magnetometer	GRT Avionics	EX7-OPT-MAG	XXX
	Electronic Ignition Commander	EI Commander	EIC	-
J	**Fuel System**			
	Description	**Manufacturer**	**Type**	**Serial Number**
	Main tank 24 gallons - Left	Van's Aircraft	RV-8	-
	Main tank 24 gallons - Right	Van's Aircraft	RV-8	-
	Fuel Injection	Airflow Performance	FM-200	21031833
	Flow Divider	Airflow Performance	AP-1382	-
	Fuel selector	Andair	FS2020	FS2020
	Fuel flow sensor	Electronics International	FT-60	98919
	Main fuel pump	Lycoming	62B26931	XXX
	Aux fuel pump	Andair	PX375-TC	30823
	Fuel Filter - 100 Micron, ORB-10 Red	Aeromotive	12304	-
	Fuel Filter - 100 Micron stainless steel element	Aeromotive	12604	-
K	**Special Option**			
	Description	**Manufacturer**	**Type**	**Serial Number**

SECTION 7

7 AIRPLANE AND SYSTEM DESCRIPTION

CONTENTS

7.1 AIRFRAME

7.1.1 GENERAL

The design represents a conventional single-engine, low-wing, tailwheel, full metal, sport aircraft to carry two occupants.

The airframe is mainly built with aluminum alloy in semi-monocoque construction. The majority of surface skin rivet connections use flush head rivets. Fiberglass composite is used for surface endings, engine cowlings, fairings and wheel pants. Welded steel tubes and plates are used for several structure reinforcements, as well as the engine mount.

For corrosion protection all metal parts are coated with primer or other corrosion protection like ACF-50.

The external finish is a combination of painted aluminum and composite parts.

7.1.2 FUSELAGE

The fuselage is designed to fit two occupants. In the classical low wing single engine layout, the fuselage carries the engine, empennage, most of the electrical system and the landing gear assembly.

The wing main spar and rear spar bridge crosses below the cabin floor and is an integral part of the fuselage structure.

A sliding canopy and windshield provide maximum outside view to the occupants and is made of acrylic glass.

CAUTION

ONLY USE APPROPRIATE CLEANING FLUIDS MENTIONED IN SECTION 8 ON ACRYLIC GLASS. MOST SOLVENTS AND AGGRESSIVE CLEANER WILL CAUSE PERMANENT DAMAGE TO THE CANOPY.

7.1.3 EMPENNAGE

The empennage consists of a horizontal and vertical stabilizer.

For lateral control two balanced elevators with a single trim tab on the left-hand elevator are hinged to the horizontal stabilizer.

For directional control a balanced rudder is installed to the vertical stabilizer. No pilot adjustable rudder trim tab is available.

7.1.4 WINGS

The rectangular wing design incorporates the integral main fuel tanks.

Flaps and ailerons are hinged behind the rear spar to support slow flight operation and longitudinal control. Maintenance panels at the lower skin surface allow access to systems installed within the wings.

The wings are bolted at the main- and rear-spar bridge to the fuselage.

7.1.5 COCKPIT

The cockpit is equipped with all necessary controls, avionics, and switches to ergonomically and safely operate the aircraft within its designed maneuver envelope. For placards definition and location refer to Section 2.

1. Throttle Control Lever
2. Propeller Control Lever
3. Mixture Control Lever
4. Fuel Servo Bypass Handle
5. Parking Brake Handle (not visible in photo)
6. Flaps Control Switch
7. Ventilation Valve
8. Trim Interrupt Switch
9. Autopilot Interrupt Switch
10. Mode-S Transponder
11. 8.33khz VHF radio
12. Airspeed Indicator (Backup)
13. GRT Sport EFIS
14. GRT EIS 4000 Engine Monitor
15. Electronic Ignition Monitor
16. Altimeter (Backup)
17. Magnet Compass (Backup)
18. Vertical Speed Indicator (Backup)
19. Electrical Power Switches
20. Fuel System Switches
21. External Light Switches
22. Engine Ignitions Switches
23. Dual USB Charging Port
24. Powerlet Charging Port
25. Cabin Heat Control Lever
26. Pilot Flight Control Stick

Table 7-1 Photo of cockpit switches and controls

7.2 ENGINE

7.2.1 GENERAL

The Teledyne Mattituck Services Lycoming TMX IO-360-M1B engine belongs to the O-360 family of four-cylinder, direct-drive, horizontally opposed, air-cooled, piston aircraft engines.

The selected engine is built for the experimental aircraft category.

A horizontal air induction system allows a slim engine cowling design without the need of an external air induction scoop.

For enhanced understanding of the installed engine handling, operation, and maintenance refer to the Lycoming Operator's Manual Part No. 60297-36.

7.2.2 POWER CONTROL

The engine power is controlled through the following levers:

- Throttle (front cockpit)
- Propeller (front cockpit)
- Mixture (front cockpit)

Secondary engine controls are:

- Fuel Servo Bypass (front cockpit)

All engine controls are mechanical linkages with Bowden cables from the front cockpit to the associated engine control unit.

7.2.3 IGNITION SYSTEM

The ignition system consists of independent dual E-MAG "P-114" electronic ignitions (LH + RH) attached the engine's accessories gear box. To disable the electronic ignitions (OFF), an airframe ground wire is switched to the P-Lead on each magneto. A wire from the electronic ignition is used to obtain accurate engine/propeller RPM indication. Both electronic ignitions are cooled by air through one-inch tubes fitted to the engine rear baffle skins. The electronic ignitions require a minimum of 9v in order to start and are self-powering after they reach 900 RPM.

7.2.4 STARTING SYSTEM

To start the engine the pilots activates the starter solenoid which allows full load towards the lightweight electrical starter motor. The starter motor is attached to the forward engine case and will connect via electromagnetically driven gearwheel to the starter disc which is fitted between engine and propeller shaft.

For full engine starting procedure and starter cranking limitation refer to Section 4 and 2.

7.2.5 ENGINE OIL SYSTEM

The oil cooler assembly is attached to the left-hand rear engine baffle construction and uses air coming via the cowling air inlets.

The maximum capacity is 8 quarts. It is recommended to operate the engine between 6 and 7 quarts. Four (4) quarts is the minimum for safe engine operation. To refill engine oil a service door on the right-hand portion of the top engine cowling allows access to the engine oil refill cap. Use a cone or funnel to avoid oil spillage during refill.

CAUTION

AVOID MIXING DIFFERENT OIL GRADES AND BRANDS. THE CURRENT USED OIL GRADE AND BRAND IS NOTED ON A PLACARD INSTALLED AT THE INNER SIDE OF THE OIL REFILL ACCESS DOOR.

7.2.6 AIR INDUCTION SYSTEM

Air necessary for engine combustion is taken from the bottom of the left cowling air intake. A serviceable air filter separates air from particles before being channeled through a composite snorkel into the engine injector assembly.

7.2.7 ENGINE INFORMATION SYSTEM

Engine monitoring and information is available on the GRT Sport EFIS and the GRT EIS-4000.

The following engine specific parameters are provided:

- Manifold pressure
- Propeller RPM
- Oil pressure
- Oil temperature
- Fuel pressure
- Fuel flow
- CHT (each cylinder)
- EGT (each cylinder)
- Hobbs meter
- Alternator charging current
- Battery voltage

7.3 PROPELLER

7.3.1 GENERAL

The aircraft is fitted with a Hartzell two bladed aluminum alloy constant speed, variable pitch propeller.

The installed engine/propeller combination is on the RV-8 airframe proven by the manufacturer and has no restriction range. Maximum RPM (red line) is 2700 RPM. For transient operations refer to Section 2. To obtain proper propeller operation conduct preflight and ground run checks mentioned in Section 3.

Further information about the propeller is found in the latest Owner's Manual No. 115N.

7.3.2 PROPELLER CONTROL

Propeller speed is controlled with engine oil pressure. The propeller lever at the front cockpit throttle quadrant is connected via Bowden cable to the propeller governor installed at the engine accessories gear box. A spring within the propeller hub assembly forces the propeller into its fine pitch hard stop (12.6° ±0.2°measured at reference radius 30 in). When lower RPM is requested by retarding the propeller control lever, the propeller governor increases the oil pressure to overcome the spring force. The mechanical coarse pitch angle is 35.0° ±2.0°.

A bob weight bases constant speed linkage within the propeller hub schedules constant RPM at sufficient engine power independent from aircraft speed.

7.3.3 PROPELLER SPEED INDICATION

To obtain accurate engine/propeller RPM indication, the electronic ignition "tach" wire is connected to the EIS-4000 engine monitor. Engine/propeller RPM will be indicated on any engine page format on the EIS and the EFIS. Further information for indication is mentioned in ENGINE MONITORING SYSTEM (EMS) OPERATION.

7.4 AIRCRAFT FUEL SYSTEM

7.4.1 GENERAL

The aircraft fuel system consists of the standard two integral wing tanks. Fuel pumps, fuel filters, venting systems, filler caps, a fuel selector, a fuel flow and pressure sensor and appropriately sized soft aluminum tubing connects all components with AN-fittings to the engine driven main fuel pump.

Both fuel tanks are fitted with a filler cap. The respective label around the filler caps indicate usable fuel quantity and approved fuel grade.

7.4.2 FUEL SUPPLY

The following figure shows the aircraft fuel supply system:

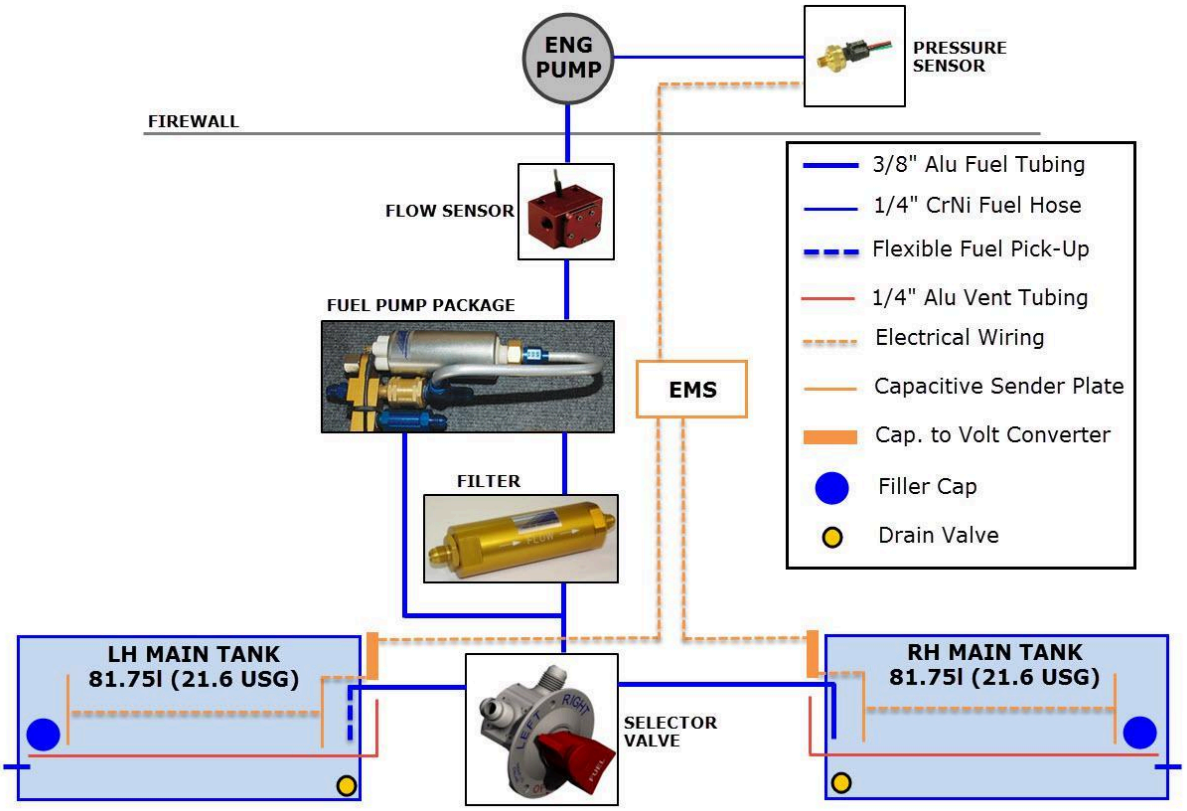


Figure 7-4-2-1: Fuel Supply System Diagram

7.4.3 FUEL SYSTEM OPERATION AND INDICATION

Pilot's interface to the fuel system is mainly by controlling the fuel selector to balance fuel between the left and right main fuel tank. For maintenance purpose or specific emergency procedures the fuel selector can be closed by lifting the safety latch and turning the selector handle to the OFF position.

The fuel switch panel consists of one toggle switch located on the instrument panel. The switch is to control the electric fuel pump.

Indication about main fuel tank level (vertical bar and digital quantity read out in liters), as well as main fuel flow and pressure are contained on the EFIS engine page.

7.5 ELECTRICAL SYSTEM

7.5.1 GENERAL

The electrical system consists of the following main components:

- One **12 V**, **12.4 Ah battery** installed on the firewall.
- One **14 V**, **60 A alternator** driven by the engine via belt and pulley
- Multiple switches to control all electronic devices

7.5.2 DC GENERATION AND DISTRIBUTION

Detailed diagrams of the electrical system are shown below. The source file for the diagrams are stored at http://www.rv8.ch/files/RV-8-HB-YMM-Wiring.drawio and updated when required.

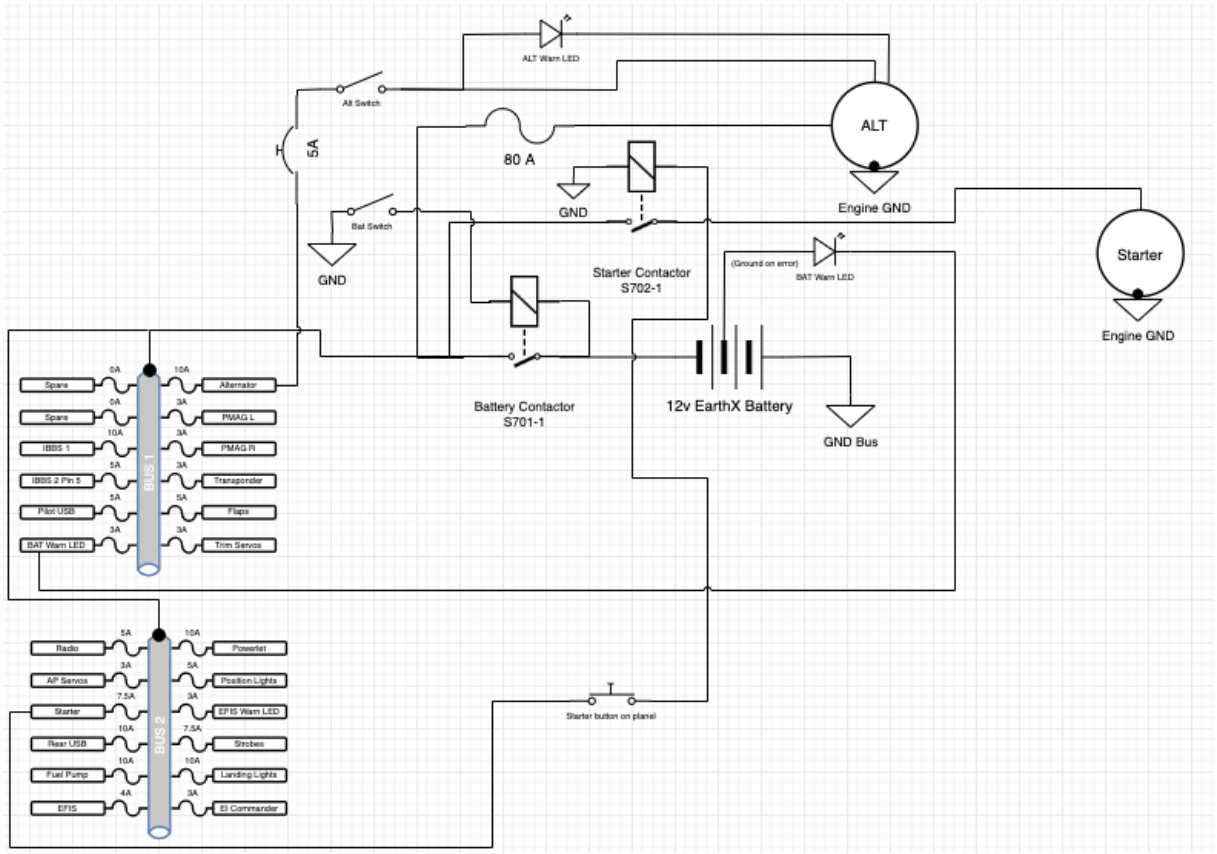


Figure 7-1 Main Electrical Diagram

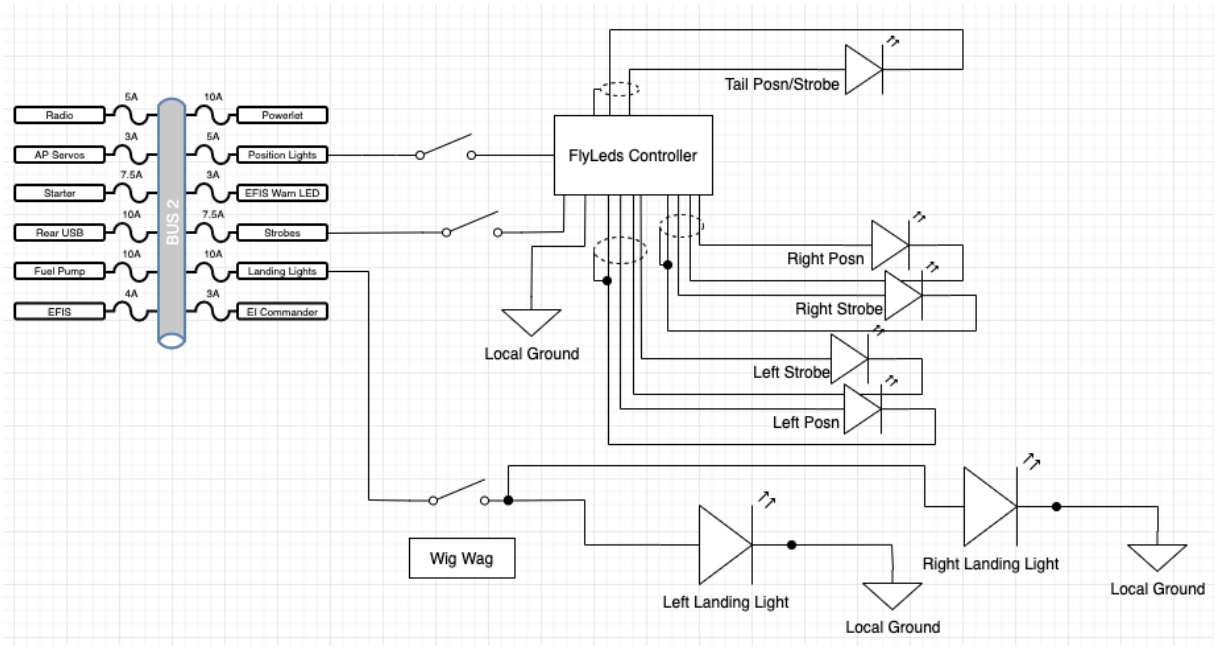


Figure 7-2 Lights Electrical Diagram

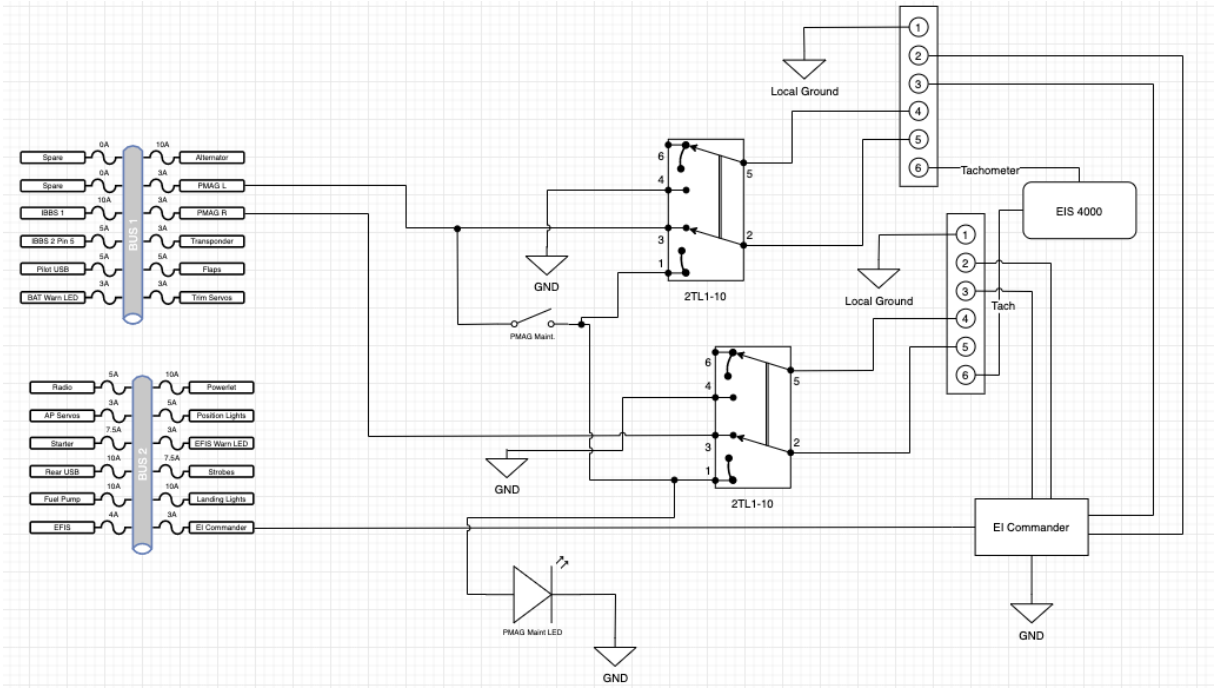


Figure 7-3 PMAG Ignition Electrical Diagram

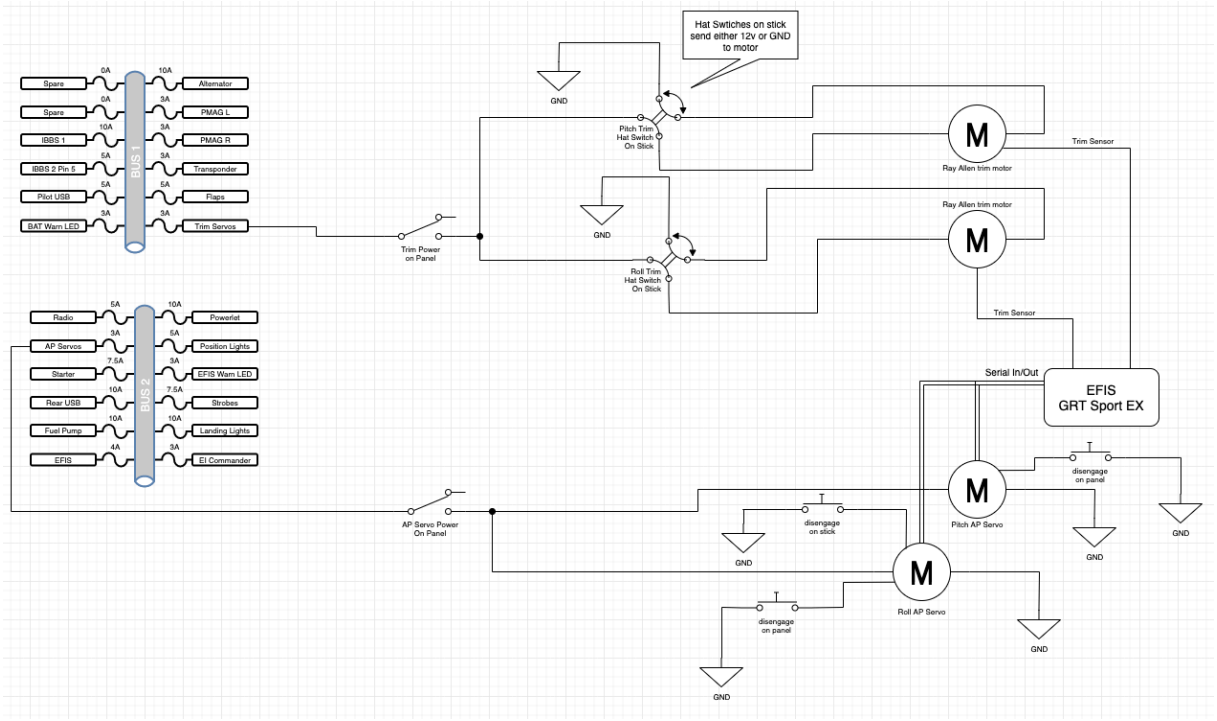


Figure 7-4 Trim and AP Servos Electrical Diagram

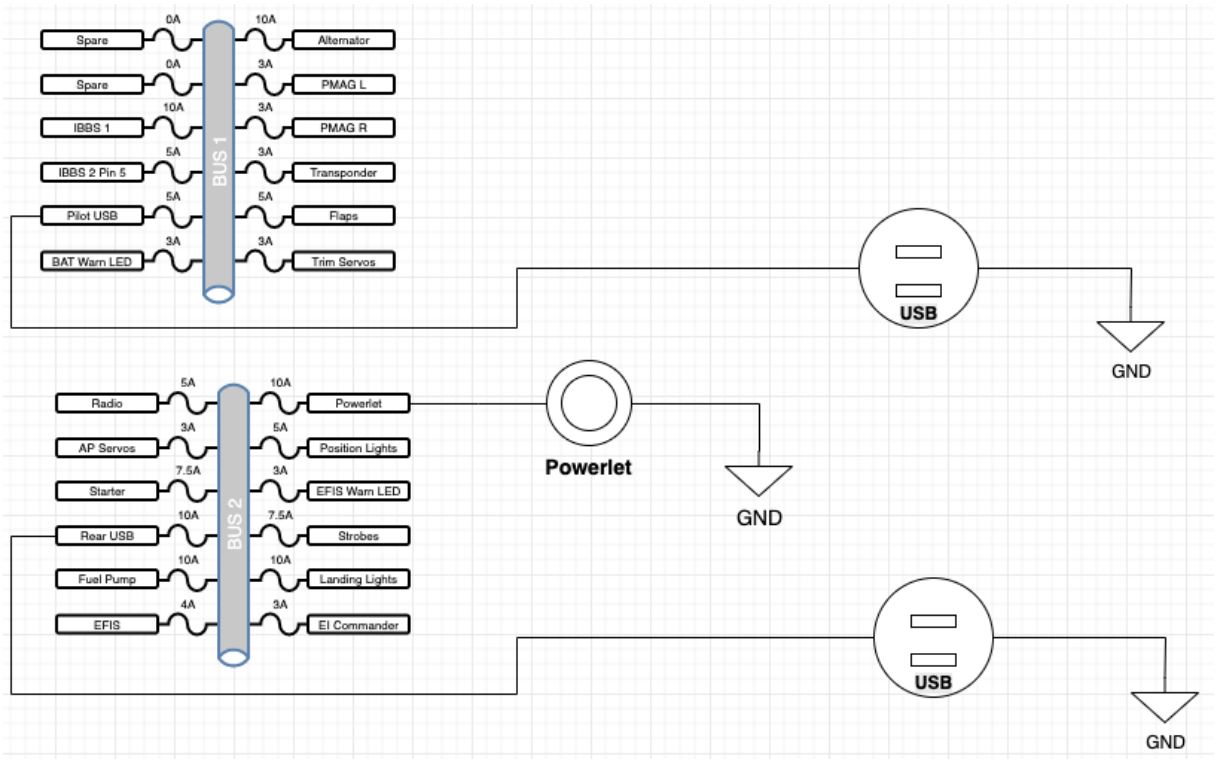


Figure 7-5 Power Outlets Electrical Diagram

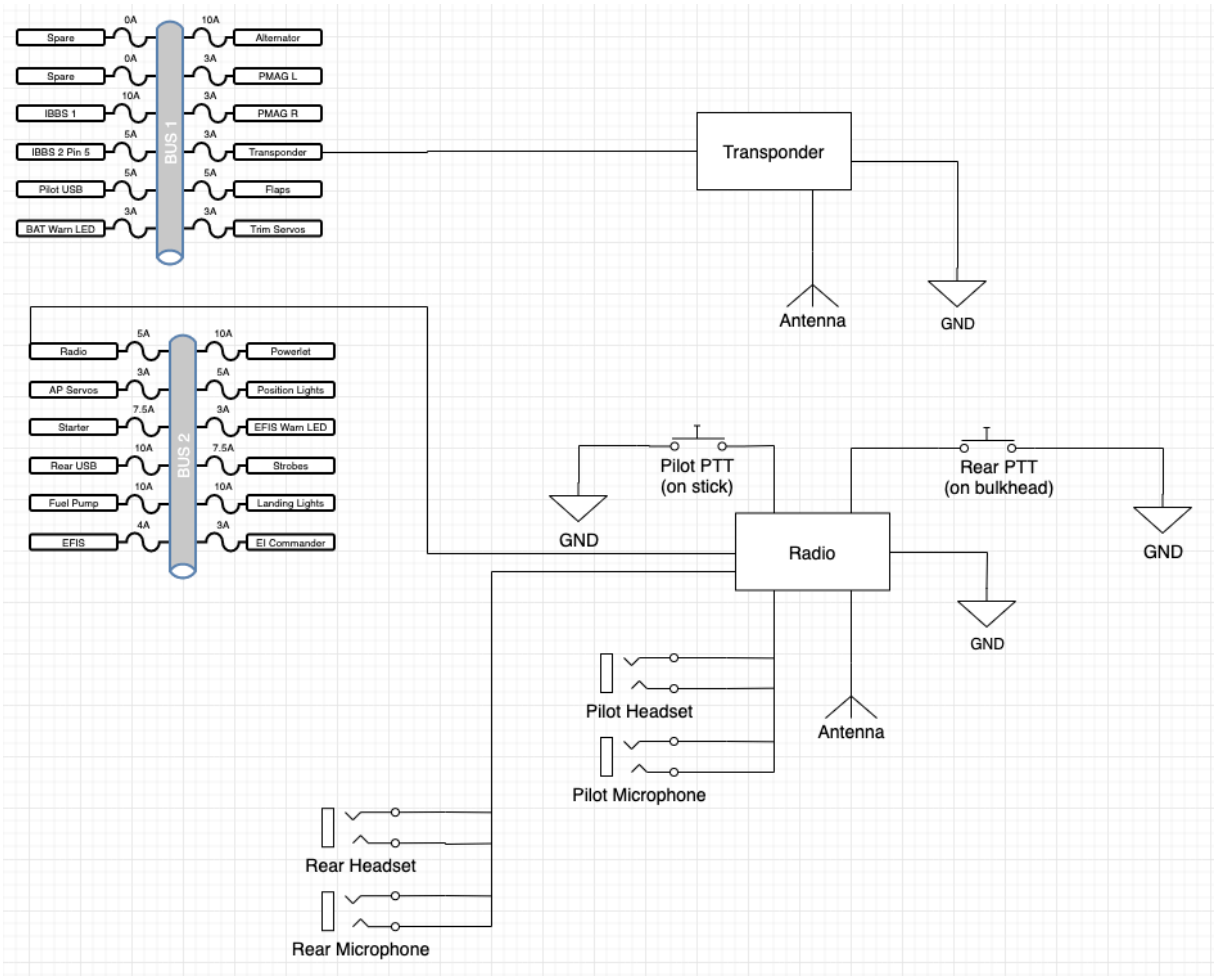


Figure 7-6 Radio and Transponder Electrical Diagram

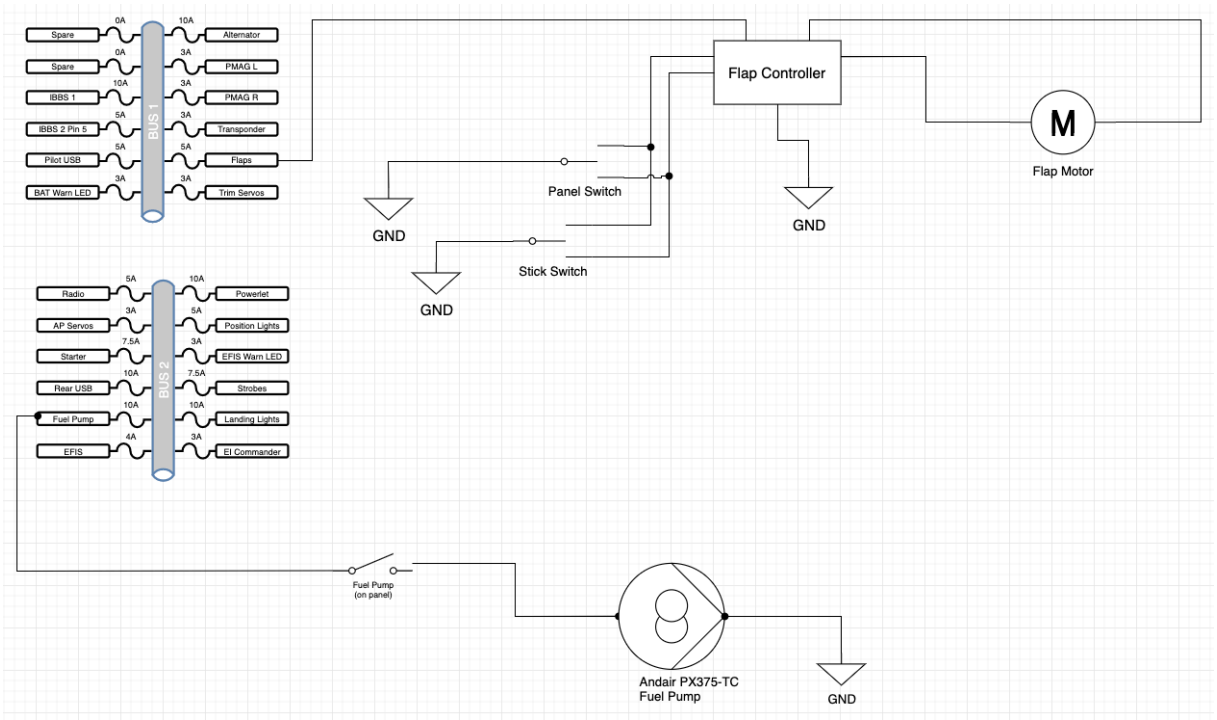


Figure 7-7 Flaps and Fuel Pump Electrical Diagram

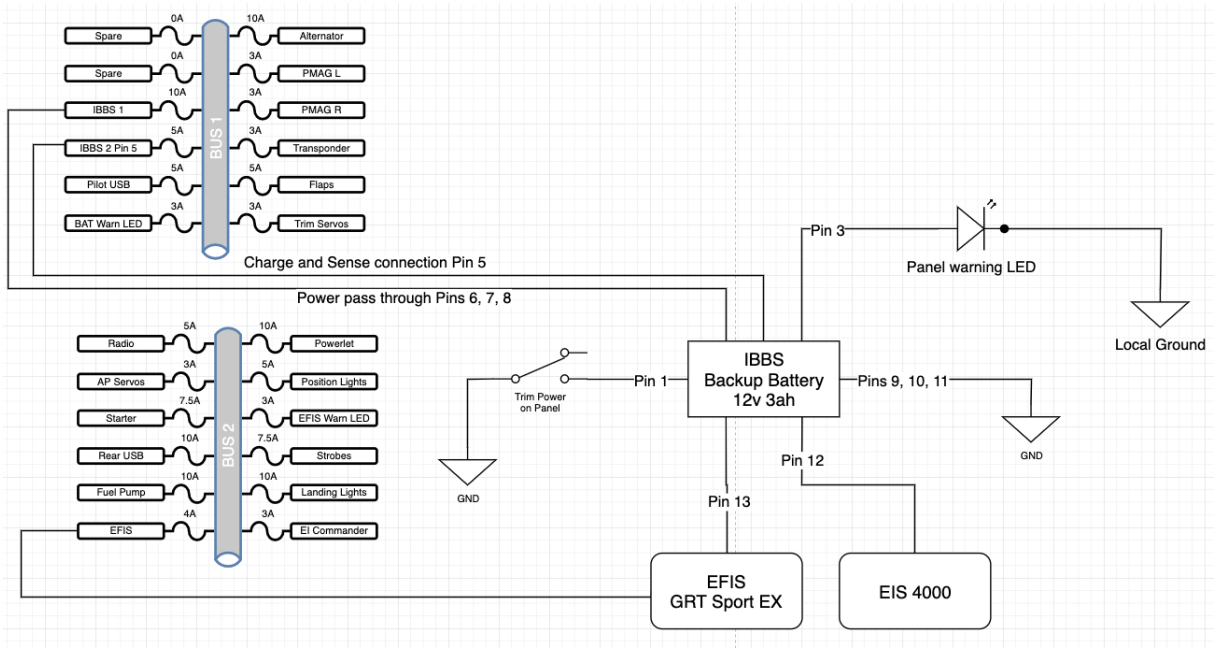


Figure 7-8 EFIS, EIS, and IBBS Electrical Diagram

7.6 LANDING GEAR SYSTEM

7.6.1 GENERAL

The RV-8 landing gear system consists of a traditional taildragger configuration. The main gear legs are made of airfoil shaped solid aluminum alloy with an internal high-pressure brake fluid line. Wheel pants covering the tubed main wheels to reduce parasite drag and avoiding damage and contamination to the lower wing and flap surface.

The tailwheel is made of solid rubber and is full castering but normally locked to follow the rudder position. For tight turns with full rudder or differential braking as well when towing the aircraft backwards the tailwheel will unlock from the castering condition.

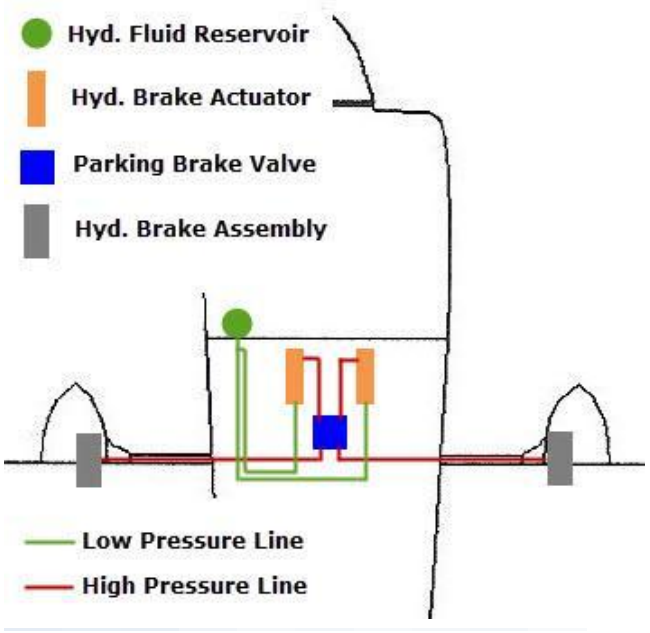
7.6.2 WHEEL BRAKE SYSTEM

The wheel braking system consists of toe brakes attached to the rudder pedals operating Cleveland brake master cylinders. The left and right wheel braking system share a common fluid reservoir installed in the front baggage compartment which are lined by transparent nylon tubes indicating the presence of hydraulic fluid within the low-pressure part. The high-pressure part of the braking system consists of flexible stainless-steel hoses and soft aluminum tubing routed between the pedals and wheels.

WARNIN G

REPEATED MAXIMUM BRAKE ENERGY EVENTS FROM REJECTED TAKE-OFF OR FLAPLESS LANDINGS CAN LEAD TO A WHEELBRAKE SYSTEM FAILURE CAUSING LOSS OF WHEEL BRAKES AND REDUCED DIRECTIONAL CONTROL ON GROUND.

A parking brake valve is installed below the front baggage compartment floor and is operated via a parking brake handle located on the parking brake valve. To activate the parking brake system first pressure has to be applied with the wheel brake system and secondary the parking brake valve has to be closed by moving the parking brake handle down to the vertical position. To release the parking brake pressure from the wheel brake system the parking brake handle has to be returned to the horizontal position.


Hyd. Fluid Reservoir
Hyd. Brake Actuator
Parking Brake Valve
Hyd. Brake Assembly
Low Pressure Line
High Pressure Line

7.7 FLIGHT CONTROLS

7.7.1 GENERAL

A limited dual flight control system is fitted to control pitch and roll from the front and rear seat. The front stick is equipped with a coolie hat trim switch to control the electric pitch and roll trim and as well to provide quick autopilot disconnect.

When necessary, the rear seat stick can be removed without affecting the flight control system. Limited maintenance action is required to remove the rear seat stick.

7.7.2 ELEVATOR

The elevator is operated through a system of adjustable push-pull rods and a bell crank located in the tail cone of the fuselage. The autopilot pitch servo is interconnected to the bell crank. For reduced pitch control forces and to prevent flutter at high speed the elevator is balanced by aerodynamic force and counterweights.

7.7.3 AILERONS

The ailerons are also operated through a system of adjustable push-pull rods and a bell crank located in each wing. The autopilot roll servo is interconnected to the bell crank in the right wing. For adequate roll control forces and to prevent flutter at high speed the ailerons are balanced by counterweights in terms of a steel tube attached inside the leading edge of the ailerons.

7.7.4 RUDDER

The rudder is operated through the adjustable rudder pedals which are connected by steel cables along the fuselage to the rudder. To adjust the rudder pedals simply pull the little rod handle in the middle of the pedal slider mechanisms and move the pedals to the desired position. Make sure that the locking pin is reengaged into a position hole to avoid unintended pedals movement. Similar to the elevator control the rudder is balanced aerodynamically and by a counterbalance weight. The rudder is also connected to the tailwheel to provide tailwheel steering. A combined tail navigation and strobe light is fitted to the rear end of the lower rudder fairing.

CAUTION

AT THE MOST FORWARD POSITION OF THE ADJUSTABLE RUDDER PEDALS WITH FULL DEFLECTION TO EITHER SIDE LIMITED BRAKE TRAVEL BY THE FIREWALL REDUCES AVAILABLE BRAKE APPLICATION ON THE DEFLECTED SIDE.

7.7.5 TRIMMING SYSTEM

The aircraft is equipped with an electrical pitch and roll trim system. Primary pitch and roll trim operation are achieved by the coolie hat trim switch installed on top of the control sticks.

In case of a trim runaway situation both trim axes can be stopped by removing power to the trim servos using the switch on the instrument panel.

WARNIN G

A TRIM RUNAWAY SITUATION CAN RAPIDLY INCREASE THE CONTROL FORCES ESPECIALLY AT HIGH AIRSPEEDS. QUICK REACTION BY THE PILOT MAY BE REQUIRED TO AVOID AIRCRAFT LIMITATION EXCEEDANCE.

For yaw trimming a non-adjustable trim rod will be tested on the lower left side of the rudders trailing edge to achieve balanced flight at 8500ft with 75% power and flaps up. For all other conditions the pilot has to use the rudder to avoid sideslip.

7.7.6 ELEVATOR TRIM

The elevator trim system consists of an electrical trim motor and trim tab connected with a push-pull rod located at the inner side of the left elevator. Pitch trim position is indicated on the engine page of the GRT EFIS depending on the current selected display layout configuration. A green mark on the pitch trim indicator points the required position for takeoff.

7.7.7 AILERON TRIM

The aileron trim system consists of an electrical trim motor linked with a spring bungee to the aileron control system below the cabin floor between the two seats. Roll trim position is indicated on the engine page of the GRT EFIS depending on the current selected display layout configuration. A green mark on the roll trim indicator points the neutral position for takeoff.

7.8 WING FLAP SYSTEM

7.8.1 GENERAL

The flaps are hinged to the lower surface of the inner wing structure and are driven by a single electric motor located below the rear seat left arm rest. A welded tube assembly behind the rear seat and a push-pull rod connection to each flap links the left and right flap together with the flaps motor.

WARNIN G

AVOID STANDING ON ANY PART OF THE WING FLAP SYSTEM DURING EMBARKING OR DISEMBARKING THE AIRCRAFT. DOING SO CAN DAMAGE THE FLAPS OR OVERSTRESS THE CONNECTION ROD WHICH COULD FAIL LATER INFLIGHT CAUSING LARGE ASYMMETRIC ROLL STEERING.

NOTE

LEAVE OR LOWER THE FLAPS INTO LDG POSITION ON GROUND BEFORE DISEMBARKING THE AIRCRAFT TO PREVENT UNINTENDED STEPPING.

7.8.2 FLAP OPERATION

The flaps are operated by a spring-loaded momentary action toggle switch covered with a flap lookalike extension on the instrument panel, and parallel toggle switch on the stick grip. A single up command will completely retract the flaps to the UP position. Lowering flaps requires holding the toggle switch down. The position of the flaps can be easily seen from the cockpit.

7.9 LIGHTING SYSTEM

7.9.1 GENERAL

Lighting is provided to allow readability of instruments and increase aircraft recognition. Full exterior lightings are installed. Landing and Taxi lighting will be tested.

7.9.2 INTERNAL LIGHTING

Internal lighting is limited to independent brightness control of the following devices:

- GRT EFIS Sport
- GRT EIS 4000
- Trig TT-21 transponder
- Trig TY-91 radio

7.9.3 EXTERIOR LIGHTING

The exterior lighting consists of the following pilot controllable systems:

- Navigation light (wingtip and tail)
- Strobe light (wingtip and tail)
- Taxi/LDG light (both wing outer leading edge)
- Wig-Wag of both Taxi/LDG lights

To control the external lights a group of four switches is installed in the right-side console.

All external lights are low power consumption LED type lights. The Taxi/LDG lights incorporate a wing-wag function.

7.10 CANOPY

7.10.1 GENERAL

An acrylic glass canopy bonded to a sliding metal tube frame covers both seats and provides nearly unrestricted view around the aircraft.

7.10.2 DESCRIPTION AND OPERATION

The open/close handle is located on the forward left-hand side of the canopy side skirts.

During ground operation the canopy may be kept open to provide additional ventilation and cooling to the occupants. A canopy intermediate lock mechanism installed within the left-hand sliding roller assembly allows partial opening of the canopy during ground operation.

Opening of the canopy inflight is not approved for normal operation. High aerodynamic lifting forces relative to airspeed may rip of the canopy and damage/destroy the tail of the aircraft. Only specific emergency procedures mentioned in Section 3 require a partial inflight opening for smoke evacuation or full opening for bail out procedure.

Be aware that the windshield is not bird-strike proven. Reports have shown collapsing windshields after bird-strike impact with medium and large sized birds.

The canopy is one of the most fragile and expensive airframe parts and would require a lot of effort to be replace. Accordingly, the canopy should never be used to support hand stabilization during embarking and disembarking. Occupants should receive a thorough briefing and support by the pilot in command or appropriate supporting staff to ensure safe embarking and disembarking without damage to the canopy or airframe.

7.11 SEATS

7.11.1 GENERAL

The fabric covered cockpit seats are shape optimized to allow comfortable and ergonomic seating capabilities to support long endurance flights.

To facilitate embarking and disembarking in may become necessary to step on the seat floor upholstery.

CAUTION

SMALL AIRCRAFT SPACE CONSTRAINTS REQUIRE SPECIAL ATTENTION DURING EMBARKING AND DISEMBARKING TO AVOID AIRFRAME (WING/CANOPY) OR PANEL MOUNTED AVIONIC DAMAGE.

7.11.2 STRAPPING-IN PROCEDURE

Secured strapping-in is achieved via the five-position single buckle seal belt harness. A tight fit is enabled by correctly tighten all belts is required to gain maximum control over the aircraft during maneuvering flight. Ensure proper condition and closure of the single buckle and clearance to any interfering objects like headset cables to avoid uncontrolled seat belt opening.

Depending on size of the front seat occupant, it might become necessary to loosen the shoulder harness to gain unrestricted control to the park brake handle and fuel selector valve.

To unfasten, rotate the harness locking mechanism. Appropriate positioning of open seat belt harness is required to avoid seat or airframe damage by standing on any seat belt gear.

For solo flight flown from the front seat make sure that the rear seat harness is properly secured to avoid possible interference with flight controls or airframe and canopy damage caused by uncontrolled movement of the seat belt buckles and latches.

7.12 EMERGENCY AND PERSONAL SURVIVAL EQUIPMENT

7.12.1 GENERAL

The equipment described in the following sub-paragraphs is:

- Emergency locator transmitter
- Fire extinguisher
- Multipurpose rescue tool

7.12.2 EMERGENCY LOCATOR TRANSMITTER

An Emergency Locator Transmitter (ELT) provides for location of the aircraft under some emergency conditions. A fixed ELT is not fitted in HB-YMM. It is recommended that the pilot carry a modern Personal Locator Beacon when flying in areas that might require rescue.

7.12.3 FIRE EXTINGUISHER

A fire extinguisher of the type: Contrafeu FireEX 800ml -20°C, is installed to the left side of the pilot's seat in the cockpit.

The Contrafeu FireEx is an easy to handle multipurpose spume fire extinguisher without using pressurized gases or aerosols.

To release the fire extinguisher, pull out the red "Pull" pin and lower fire extinguisher.

7.12.4 MULTIPURPOSE RESCUE TOOL

A Victorinox multipurpose rescue tool is stowed in a high visibility cover mounted to the right-hand side wall accessible to both aircraft occupants.

The primary intended purpose is to break the canopy for emergency evacuation in case of a blocked canopy opening past crash landing. However, the rescue tool supports also other functions like cutting seat belts, etc. For full operation description refer to the Victorinox Rescue Tool User's Guide.

7.13 HEATING/COOLING SYSTEM

7.13.1 GENERAL

Heating and cooling of the cabin is achieved by controlling the amount of heated air (outside air bypassed the engine muffler) or ventilating with outside ram air. Cooling is limited to the outside air temperature and requires propeller and aircraft movement to become effective.

7.13.2 HEATING CONTROL

A heat exchanger attached to the cylinder 3 exhaust system warms up ram air taken at the right-hand rear engine baffle skin. A single lever cabin heat controller located at the right-hand gear box allows opening and closing of the firewall regulating valve for heat control.

WARNIN G

IN CASE OF SUSPECTED LEAKAGE OF THE EXHAUST SYSTEM SURROUNDED BY THE HEAT EXCHANGER, CABIN HEAT MUST BE SELECTED MAX COLD AND FRESH AIR VENTILATION MAX TO AVOID CARBON MONOXIDE POISONING.

7.13.3 COOLING CONTROL

Cabin cooling is achieved through ventilation vents installed on both cockpits. A NACA inlet located at the forward left-hand fuselage side skin provides fresh air to the instrument panel mounted ventilation outlet. The rear seat collects the air from the lower right-hand wing skin

surface and routes it to the rear seat ventilation valve installed on the flight control cover assembly.

7.14 MISCELLANEOUS EQUIPMENT

7.14.1 CHARGING PORTS

A dual USB charging port located at the right-hand side panel of the front and rear seats convert aircraft DC when master power is selected ON to a 5V DC output. This output power is applied to a dual USB-A connector in accordance with the USB Implementers Forum. The maximum current drawn is 2.1 Amps. The system is internally protected against short circuit, over-current, low input voltage (<10V) and over-temperature. A Powerlet standard 12v power port is installed in the right gear tower for the pilot.

7.14.2 BAGGAGE COMPARTMENTS

A forward and aft baggage compartment allows distribution of carry-on baggage.
The forward baggage compartment is accessed from the forward right fuselage outside and is opened by a key lock. The rear baggage compartment is accessed from inside by tilting the rear seat back rest forward.

For weight limitation and balance calculation refer to Section 2 and 6.

7.15 GRT Avionics Sport EX EFIS

7.15.1 GENERAL

The GRT Avionics Sport EX EFIS is a complete Electronic Flight Information System and includes an internal attitude/heading reference system (AHRS) which replaces the traditional gyros for attitude and direction, and an air data computer for measuring airspeed, altitude, vertical speed, and angle-of-attack. It also includes an external magnetometer for accurate magnetic heading information. The EFIS is connected to two independent power sources.

For detailed information about the GRT Avionics Sport EX EFIS, please consult the GRT Avionics Sport/Horizon EX Pilot's guide that matches the code version that is installed in the EFIS, available at http://www.grtavionics.com/

7.15.2 SYSTEM DESCRIPTION

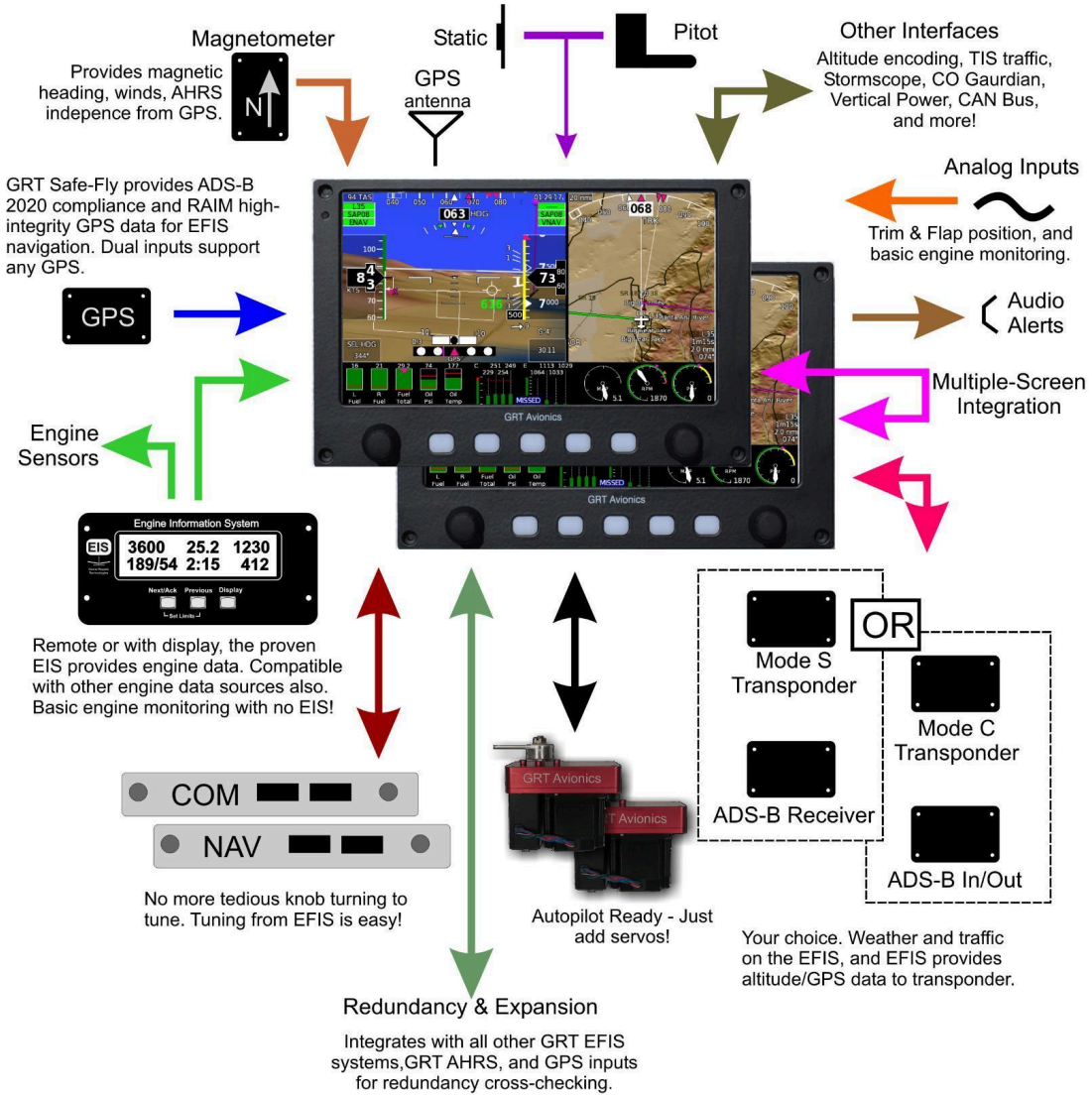
The EFIS as installed on HB-YMM is interfaced via a panel mounted display unit. The 8-inch display mounted in the middle of the instrument panel displays primary flight data, engine data, and georeferenced map data. The 4-inch display located below the EFIS shows engine information in a very simplified text format.

Connections used by the EFIS in HB-YMM at this time are:

- Magnetometer installed in last bay of left wing

- GPS Antenna installed on glareshield
- Pitot and static ports
- AoA pressure input from right wing port
- Trim position inputs from Ray Allen trim servos
- Audio output to Trig TY-91 radio
- EIS 4000 engine information system
- Pitch and Roll Autopilot Servos
- 12v power from aircraft power bus
- 12v power from TCW Technologies IBBS backup battery

Below is a diagram from the GRT Avionics Sport/Horizon EX Pilot's guide:

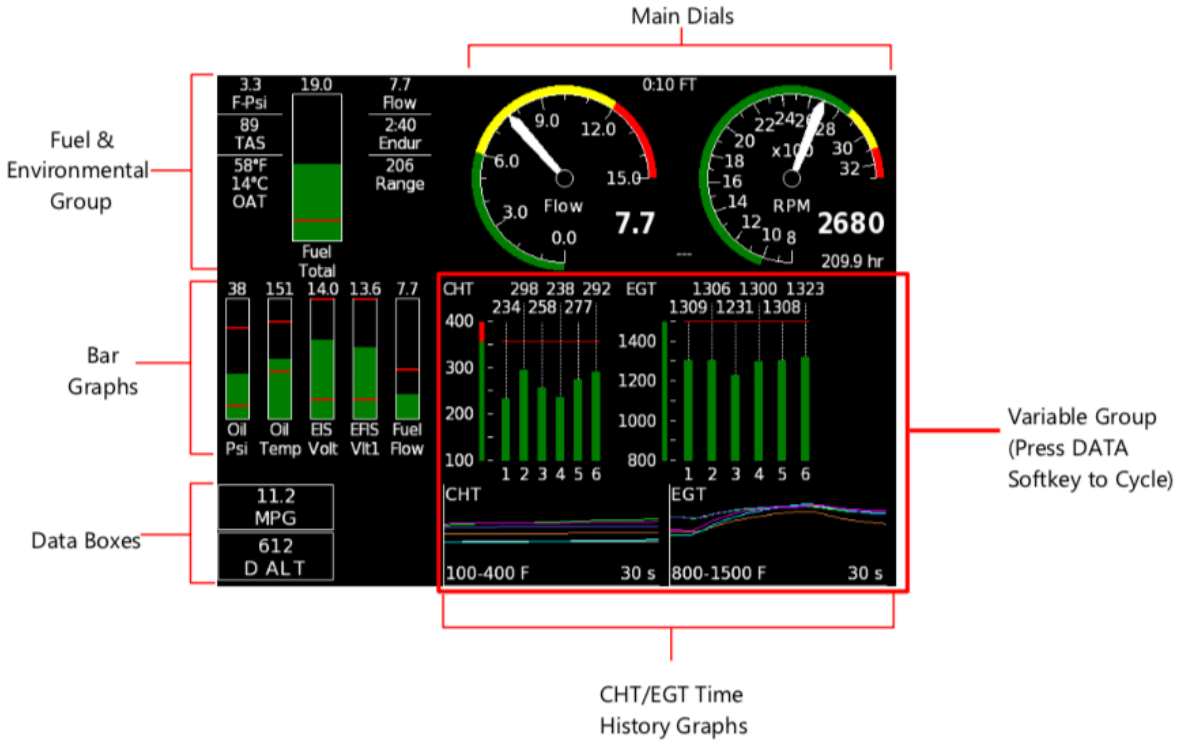


7.15.3 PRIMARY FLIGHT DISPLAY (PFD) OPERATION

The PFD displays heading, altitude, vertical speed, attitude, airspeed, yaw, and other important flight information.

7.15.4 ENGINE MONITORING SYSTEM (EMS) OPERATION

The engine monitoring information displayed on the EFIS includes all values collected from the engine by the EIS 4000 engine information system, including EGT, CHT, Oil Pressure, Oil Temperature, Fuel Pressure, Fuel Flow, RPM, Manifold Pressure, Alternator Current, Bus Voltage, Fuel Tank Level, Hours, and power output.



The engine information display format can be customized by the pilot. Details of how to do this are documented in the Pilot's guide.

Audible and visible alarms are configured for critical engine parameters like CHT, Oil Temp, Oil Pressure, Fuel Pressure, Fuel Level, and Voltage.

7.15.5 MAP OPERATION

The EFIS moving map display provides a view of the aircraft position on a GPS-oriented map including aeronautical information, topographical features including terrain, traffic if equipped, and flight path information.

7.15.6 AUTOPILOT OPERATION

The EFIS includes connectivity to a pair of autopilot servos providing Roll and Pitch functions, including flight director. The AP servos are powered via a toggle switch on the instrument panel.

7.15.7 WARNINGS / CAUTIONS / MESSAGES / ALERTS

The EFIS provides different kinds of alerting messages. A table with alerts is found in Section 3 of this manual.

7.15.8 FIRMWARE AND DATABASE UPDATE

For firmware and database updates, the display unit has an external USB port located on the right side of the display on the instrument panel. The USB port can also be used to extract flight logging information.

For further information about the system refer to the GRT Avionics Sport/Horizon EX Pilot's guide.

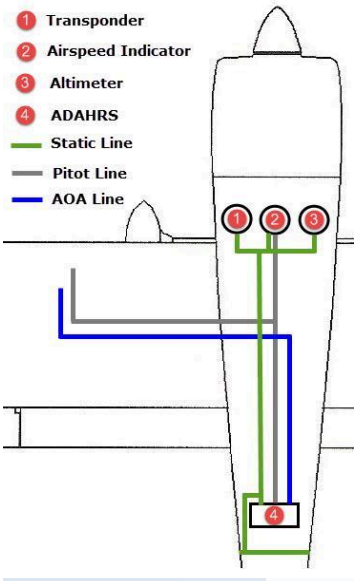
7.16 ADDITIONAL FLIGHT INSTRUMENTS

7.16.1 GENERAL

Additional analog flight instruments are installed to support flight continuation in case of failure affecting EFIS flight instrument information.

Photo 7-2 Analog instruments during Pitot check

The following figure shows the Pitot/Static/AOA line arrangements to provide the related air pressure to the different devices:



7.16.2 AIRSPEED INDICATOR

A 2 ¼ gauge airspeed indicator is installed on the left side of the EFIS. The speed range markings relate to aircraft and are mentioned in Section 2. Be aware that indicated VNE red line of 200 kts only adhere to sea level ISA conditions and must be reduced with altitude to never exceed 200 KTAS.

In case of small deviations between the EFIS airspeed and the analog airspeed gauge, it has been observed during pitot static system ground testing that the EFIS information is in more accurate.

7.16.3 ALTIMETER

A single needle, barometric pressure adjustable 2 ¼ gauge altimeter is installed on the top left side of the EFIS.

The analogue backup altimeter covers an altitude range of 0 to 20000 ft and is independent from the aircraft electronic system. The barometric pressure scale is labeled in mbar.

7.16.4 MAGNETIC COMPASS

A magnetic compass located at the top right side of the instrument panel provides a back-up course indication in addition to the EFIS system.

The compass will be compensated biannually. A deviation table at the right of the instrument panel shows the correction values from the most recent calibration. For correct reading ensure that the engine is running and the avionics system is ON.

7.17 RADIO and TRANSPONDER

7.17.1 GENERAL

The aircraft includes a Trig TY91 8.33kHz VHF COM radio and a Trig TT21 Mode S transponder.

7.17.2 Trig TY91 8.33kHz VHF COM Radio

The Trig TY91 is a compact 8.33kHz VHF COM radio with built in 2-place intercom.

The unit is powered by the aircraft 12v bus and can be switched on and off with the left knob. It has 2nd frequency monitoring capability.

For further information refer to the TY91 and TY92 Radio Operating Manual.

7.17.3 TRIG TT21 Mode S TRANSPONDER

The Trig TT21 transponder is a compact (ETSO) certified mode S unit with integrated barometric altitude encoder. Hexadecimal address and aircraft registration are stored for identification and shall be not changed by the operator.

The transponder is powered by the aircraft 12v bus and can be switched on and off with the left knob.

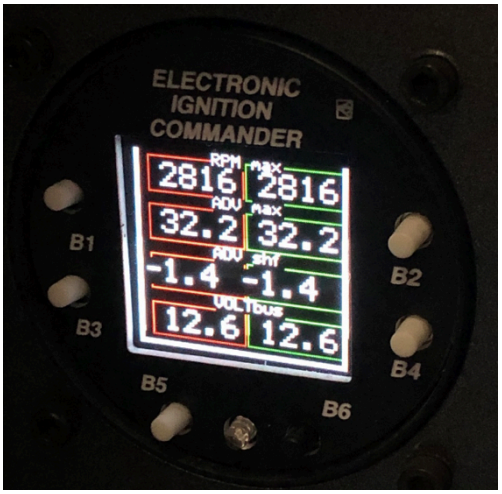
For further information, please consult the TT21 and TT22 Mode S transponder Operating Manual.

7.18 ANTENNA LOCATIONS

The following antennas are installed:

- GRT GPS: On glare shield.
- COM: On bottom center right hand side of fuselage.
- XPDR: On bottom center left hand side of fuselage.

7.19 ELECTRONIC IGNITION COMMANDER



The Electronic Ignition Commander (EICommander) is an electronic device designed to monitor and manage E-MAG Ignition's P114 electronic ignitions. The main value of the EICommander is to display the ignition timing and any errors that might be coming from either or both electronic ignitions. It can also be used to adjust the timing of the ignitions.

For further information, please consult the Electronic Ignition Commander Installation and Operating Guide.

SECTION 8

8 HANDLING, SERVICING AND MAINTENANCE

CONTENTS

8.1 INTRODUCTION

This section contains the aircraft builder's recommended procedures for ground handling, care and servicing of the RV-8.

This section also contains the inspection and maintenance requirements. There must be compliance with the requirements in order to maintain airworthiness, performance and reliability of the aircraft.

8.1.1 IDENTIFICATION PLATES

Two identification plates are attached to the aircraft. One identification plate is located in the empennage, in front of the left horizontal stabilizer, and displays the aircraft registration.

The other identification plate is located in the forward baggage compartment on the top right rear face of the firewall. This plate displays the manufacturer's model name, serial number, builder's name, aircraft registration, manufacturing date and engine model name.

8.2 AIRCRAFT INSPECTION PERIODS

As required by regulations all civil aircraft must undergo a complete inspection annually (every twelve calendar months). In addition to the required annual inspection, there will be periodic inspections required in accordance to the Aircraft Maintenance Program Doc No. AMP_82007.

The authority may require other inspections by the issuance of airworthiness directives applicable to the aircraft, engine, propeller and components. It is the responsibility of the operator to ensure compliance with all applicable airworthiness directives and, when the inspections are repetitive, to take appropriate steps to prevent inadvertent noncompliance.

8.2.1 SCHEDULED INSPECTION PERIODS

Scheduled inspection and maintenance intervals are 50 hrs, 100 hrs, and annual. Specific components require attention at other intervals or are lifetime limited. For full details of aircraft scheduled inspections refer to the Aircraft Maintenance Program Doc No. AMP_82007.

8.3 8.3 AIRCRAFT ALTERATIONS OR REPAIRS

Alterations or repairs to the aircraft must be accomplished by appropriate personnel and are required to follow the agreed process between EAS and FOCA.

8.4 GROUND HANDLING

8.4.1 PARKING AND TYING DOWN

In normal weather conditions the aircraft can be parked on any firm level ground, with park brake applied, or wheel chocks in place, or both. Blanks and covers should be fitted at any time the aircraft is not being readied for flight. The aircraft should be moored if it is to be parked in the open for long periods and weather conditions are unfavorable. In extreme conditions the aircraft should be parked in a hangar, as structural damage can occur in high winds, even when moored correctly.

The aircraft should be tied down using standard aircraft mooring techniques.

8.4.2 TOWING

The aircraft should be towed from the tailwheel using a portable tow bar.

Photo 8-1 Tow bar on tailwheel

8.4.3 JACKING

Jacking the aircraft should be done with a wing jack and some wing jack adapters in the tiedown points. Ensure that the aircraft is properly chocked so that it does not roll forward or back. It is recommended to ensure that the aircraft is in flying attitude, with the tail on a

small table or other platform, and properly chocked. Take care to ensure that the jack force is about at the CG of the aircraft so that it does not nose over onto the engine and propeller.

If the aircraft falls off a wing jack the repairs required will be costly.

	
Wag Aero Wing Jack	Anti Splat Aero Jack Points

Table 8-1 Useful tools for jacking small aircraft

8.5 SERVICING

In addition to the Aircraft Inspection periods detailed in para 8.2, the relevant checks as prescribed in Section 4, para 4.3, must be performed before flight.

8.5.1 FUELING

The left and right wing fuel tanks are gravity filled through filler openings on the upper surface. Allowance should be made for expansion to minimize venting of fuel if ambient temperature is expected to rise markedly. Approved fuels conforming to Lycoming Operators Manual are listed in Section 2.

Fueling Precautions

WARNIN G

CHECK FUEL SUPPLY VEHICLE OR STATION FOR CORRECT FUEL GRADE AND TYPE. USE AN APPROVED WATER DETECTION KIT TO CHECK FOR WATER CONTAMINATION.

DURING FUELING AND DEFUELING, AIRCRAFT GROUNDING MUST BE COMPLETED.

REFUEL AND DRAIN IN WELL-VENTILATED AREAS ONLY – NEVER INSIDE A HANGAR.

DO NOT OPERATE AIRCRAFT ELECTRICAL OR RADIO EQUIPMENT DURING FUELING.

MAKE SURE THAT FIRE FIGHTING EQUIPMENT IS AVAILABLE. HAVE A PLAN IN CASE OF FIRE.

HIGH FREQUENCY PULSE TRANSMISSIONS IN THE VICINITY OF THE AIRCRAFT POSSIBLY PRESENT A FIRE HAZARD.

NO PERSONS SHALL BE ON BOARD OF THE AIRCRAFT DURING FUELING OPERATIONS.

DO NOT APPLY CHOCKS OR PARKING BRAKES DURING REFUELING IN ORDER TO BE ABLE TO QUICKLY MOVE A BURNING AIRCRAFT TO A SAFER AREA.

CAUTION

DRAIN WATER FROM THE TANKS BEFORE FIRST FLIGHT OF THE DAY.

Fueling Procedure

a) Make sure that the fuel supplied is checked for type, grade, and cleanliness.

b) Make sure the aircraft and fuel vehicle/station are grounded (attach grounding cable to one of the exhaust system).

c) Make sure all power is OFF and, if connected, disconnect external power.

d) Make sure that the fueling nozzle is clean. Open the filler cap (use protective towel to avoid paint scratches) and fill the tank. Let the fuel settle when topping off.

e) Remove the fuel nozzle, install and secure the filler cap and clean and remove the skin protection towel.

f) Repeat steps (d) and (e) for the other tanks for balanced fuel uplift.

g) Remove the grounding cable from the exhaust system.

8.5.2 OIL SYSTEM REPLENISHMENT

Oils specified for use in the IO-360-M1B engine oil system are listed in the Lycoming Operators Manual or in Section 2 of this AFM.

For minimum overboard oil spillage during maneuvering and aerobatics it is recommended to maintain the oil quantity around 6 quarts.

CAUTION

ENSURE THAT OIL IS OF THE CORRECT TYPE. DO NOT MIX BRANDS, SPECIFICATIONS OR TYPES OF OILS. IF OILS ARE ACCIDENTALLY MIXED, DRAIN AND FLUSH THE COMPLETE SYSTEM AND REFILL WITH APPROVED OIL.

TO PREVENT OIL DRIPPING FROM THE DIPSTICK AND CONTAMINATING EQUIPMENT, HOLD A PIECE OF ABSORBENT LINT-FREE MATERIAL UNDER THE DIPSTICK DURING REMOVAL.

Oil Replenishment Procedure:

a) Open the engine oil access door.

b) Release and remove by unscrewing the engine oil filler cap/dipstick assembly from the filler neck.

c) Use a funnel to replenish oil of the type mentioned on the placard installed on the inner side of the engine oil access door.

d) Reinstall the filler cap/dipstick assembly.

f) Close the engine oil access door.

8.5.3 BRAKE SYSTEM REPLENISHMENT

Brake hydraulic system servicing consists primarily of maintaining the hydraulic fluid in the brake reservoir. The reservoir is mounted inside the front baggage area. Brake fluid is contained in the aluminum cylinder and vented through the refill plug screwed on top of the reservoir. Use a dipstick to check the content of the reservoir. The brake fluid is to conform to specifications DOT 5.1 and shall be kept above ⅓ of total reservoir volume.

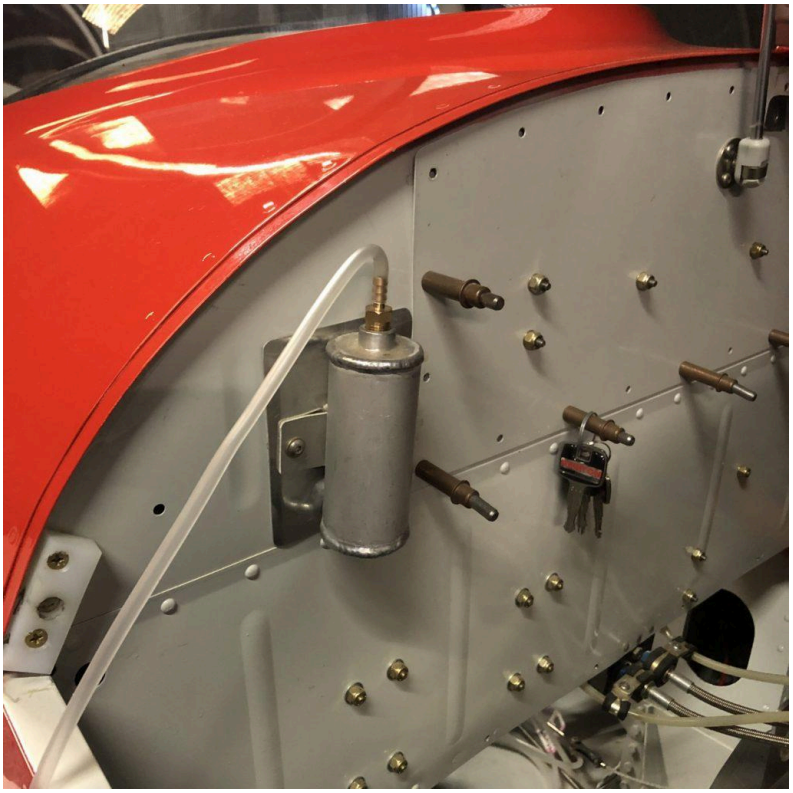


Photo 8-2 Brake fluid reservoir

DOT 4 and DOT 5.1 brake fluid are automotive glycol-based brake fluids. They have the advantages of ubiquity, high temperature boiling points (over 190° C), and very high flash points. The disadvantages are that they can damage paint, and require changing all rubber O-rings in the brake system to EPDM (ethylene propylene) O-rings, which has been done on HB-YMM. It is recommended to replace the brake fluid annually due to possible water absorption.

8.5.4 TIRE SERVICING

For maximum service, keep tires inflated to proper pressure. When checking the tire pressure, examine the tires for wear, cuts, bruises and slippage.

For normal operation inflate the tires to 3.1 bar (45 psi).

8.6 CLEANING AND CARE

8.6.1 EXTERIOR CLEANING

Regular washing of the aircraft helps to prevent corrosion. Exposed flight control bearings should be protected prior to washing. To prevent water from entering the pitot/static system, the pitot tube openings and the static port should be blanked off.

When washing, use lots of water and avoid rubbing dust or sand particles on the surface because this will cause scratches. Do not use a power washer.

8.6.2 INTERIOR CLEANING

The cockpit area should be frequently vacuum-cleaned using an air-type cleaner.

Panels and Seats

Instrument panels and side panels may be cleaned with a lint-free cloth dampened with petroleum solvent (white spirit) but it must not be used for cleaning the avionic display screens and instruments (see Display Screen Cleaning below).

Seat harnesses that have been soiled by service may be cleaned by gently scrubbing with a soft brush, water and an appropriate soap.

Display Screen Cleaning

WARNIN G

FOLLOW THE MANUFACTURERS' HEALTH AND SAFETY INSTRUCTIONS WHEN YOU USE THE CLEANING AGENTS.

CAUTION

TO AVOID DAMAGE TO LCD SCREENS AND ANTI-GLARE COATINGS, USE ONLY WATER AND A MICROFIBER CLOTH TO CLEAN. NEVER USE ANY OTHER CHEMICAL.

CAUTION

TO AVOID DAMAGE TO INTERNAL ELECTRONICS, DO NOT POUR OR SPRAY ANY LIQUIDS ON THE DISPLAY SCREENS.

TO AVOID SCRATCHING THE DISPLAY SCREENS:

- REMOVE WRISTWATCH, RINGS AND OTHER JEWELRY FROM HANDS AND WRISTS BEFORE CLEANING THE DISPLAY SCREENS.
- USE ONLY MICROFIBER CLOTH FOR CLEANING THE DISPLAY SCREENS.
- DO NOT PRESS ON THE DISPLAY SCREENS WITH FINGERS OR USE HARD OBJECTS TO RUB THE DISPLAY SCREENS.

8.6.3 CANOPY CLEANING

Recommended Cleaning Agents

- Clean Water
- New or newly cleaned Microfiber cloths
- Plexus or equivalent canopy cleaning products

Windshield and Canopy Cleaning Procedure

CAUTION

REMOVE WRISTWATCH, RINGS AND OTHER JEWELRY FROM HANDS AND WRISTS BEFORE CLEANING THE CANOPY OR WINDSHIELD.

DO NOT USE SOLVENTS, FUELS, DETERGENTS, ALCOHOL, ACETONE OR THINNERS TO CLEAN CANOPY OR WINDSHIELD.

TRANSPARENT PLASTICS LACK THE SURFACE HARDNESS OF GLASS. EXERCISE CAUTION WHEN CLEANING WINDSHIELD AND CANOPY TO AVOID SCRATCHING OR SCORING TRANSPARENCIES.

a) Flush the canopy and windshield with lots of clean water to remove loose dust, etc.

b) Wash the canopy and windshield using lots of water and a bare hand or new/newly cleaned microfiber cloth.

c) Rinse with clean water and dry with a new/newly cleaned microfiber cloth.

d) Use Plexus canopy cleaner or equivalent to remove any grease, smears, etc., still adhering to canopy or windshield.

NOTE

RUBBING THE PLEXIGLASS WITH A DRY CLOTH WILL CAUSE SCRATCHES AND THE BUILDUP OF AN ELECTROSTATIC CHARGE WHICH ATTRACTS DUST. WHERE AN ELECTROSTATIC CHARGE IS PRESENT, GENTLY PAT THE AREA WITH A DAMP CHAMOIS LEATHER TO REMOVE THE CHARGE AND ANY ACCUMULATED DUST.

8.6.4 LUBRICATION

Proper lubrication is essential for trouble-free operation of mechanical components. Lubricants and dispensing equipment must be kept clean. Use only one lubricant in a grease gun or oil can.

After lubrication, clean off all excessive grease or oil to prevent dust and dirt buildup.

The frequency of application may be increased for a particular type of operation or if excessive wear is experienced.

8.7 PROLONGED OUT-OF-SERVICE CARE

Special care is especially required to the engine. The engine is considered to be active if at least one hour of cruising operation with oil temperatures between 165°F and 200°F at intervals not exceeding 30 days is achieved.

In case of expected interruption of flight operation for periods longer than 30 days it is highly recommended to follow instructions from Lycoming Service Letter No. L180B, concerning: Engine Preservations for Active and Stored Aircraft.

SECTION 9

9 SUPPLEMENTS

CONTENTS

9.1 GENERAL

This section provides information in form of supplements for the operation of the aircraft when equipped with operational equipment or systems which are not installed on the initial cleared aircraft configuration. All of the supplements went through the EAS defined change process for minor or major alteration and are if required FOCA approved. The supplements are a permanent part of this manual.

The information contained in each supplement applies only when the specific equipment or system is installed.

9.2 LIST OF SUPPLEMENTS

SERIAL NO.: **82007** REGISTRATION NO.: **HB-YMM**

NO.	DESCRIPTION	DOCUMENT NO.	DATE
	NIL	NIL	NIL

Table 9-1 List of Supplements

---- End of document ----