AFM

AIRPLANE FLIGHT MANUAL



HB-YMT

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AIRPLANE

Designer / design organization :.....Van's Aircraft

Type : RV-7A

Builder :.....Daenzer / Lichtensteiger

Serial No : 72072

Registration : .....HB-YMT

AIRPLANE FLIGHT MANUAL

The builder / owner is responsible for the appropriate correctness of the content of this manual

Date of Issue:

The Builder : (Name and Signature)

Approval of Section 2 and Agreement of Sections 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, 4 by EAS on behalf of FOCA :

Date :

Name :

Stamp and Signature :

This aeroplane is to be operated in compliance with information and limitations contained herein.

0.I Record of revisions

Any revision of the present manual, except actual weighing data, must be recorded in the following table and in case of agreed Sections endorsed by the EAS.

The new or amended text in the revised pages will be indicated by a black vertical line in the left hand margin, and the Revision No. and the date will be shown on the bottom left hand side of the page.

Rev. No	Affected Section	Affected Pages	Date	Approval	Date	Date Inserted	Signature
1	2.3	2-3	24.08.10		24.08.10		
	2.4	2-3	24.08.10		24.08.10		
	2.5	2-5	24.08.10		24.08.10		
	2.16	2-7	24.08.10		24.08.10		
	3.8	3-5	24.08.10		24.08.10		
	4.6	4-7, 4-8	23.09.10		23.09.10		
2	7.9	7-8	28.01.11		28.01.11		
	2.5	2.5	07.02.11		07.02.11		
	5	5-1 to 5-8	10.02.11		10.02.11		
	6.5	6-5	10.02.11		10.02.11		
	7.14	7-18	10.02.11		10.02.11		
	3.7.5	3-5	10.02.11		10.02.11		
3	5.2.3	5-3	05.06.11		05.06.11		
	5.2.4	5-4	05.06.11		05.06.11		
	5.2.5	5-5	05.06.11		05.06.11		
	5.3.7	5-8	05.06.11		05.06.11		
4	6.5	6-5	09.04.12		09.04.12		
5	2.16	2-7	27.05.15		27.05.15		
6	All	All	01.11.17		01.11.17		

7	**3.3** **3.4** **4.5** **5.3.6** **6.3** **6.4** **6.5** **7.4** **7.5** **7.9** **7.11** **7.14** **8.2**	**...**	**17.06.20**		**17.06.20**		
8	**6.5** **7.4** **7.11** **7.14**		**14.03.24**		**14.03.24**		

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0.2 Table of Contents

General (a non-EAS agreed section) ..... Section 1

Limitations (an EAS approved section) .....Section 2

Emergency procedures (an EAS agreed section) .....Section 3

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Performance (a partly EAS approved section) .....Section 5

Weight and balance / equipment list
(a non- EAS agreed section) .....Section 6

Aircraft and systems description
(a non-EAS agreed section) .....Section 7

Aircraft handling, servicing and maintenance
(a non-EAS agreed section) .....Section 8

Supplements .....Section 9

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1 GENERAL

1.1 Introduction

1.2 Certification basis

1.3 Warnings, cautions and Notes

1.4 Descriptive Data

1.5 Three-view drawing

1. 1 Introduction

The aeroplane Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of this homebuilt airplane.

This manual includes the material required to be furnished to the pilot of homebuilt airplanes. It may also contain supplemental data supplied by the equipement manufacturers.

1.2 Certification basis

This type of aircraft is not certified in accordance with published Standard Airworthiness Requirements.

It is authorized for flight in accordance with FOCA regulation MZ-275.001 in the special homebuilt category.

1.3 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes used in the flight manual.

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

CAUTION: means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

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

1.4 Descriptive data

Side by side 2 place, closed low wing single engine with nose gear aluminium airplane.

Tip-up canopy.

180hp fuel injected experimental Lycoming 4 cylinder turning a 2 blade Hartzell constant speed propeller.

Wingspan: 7.62m

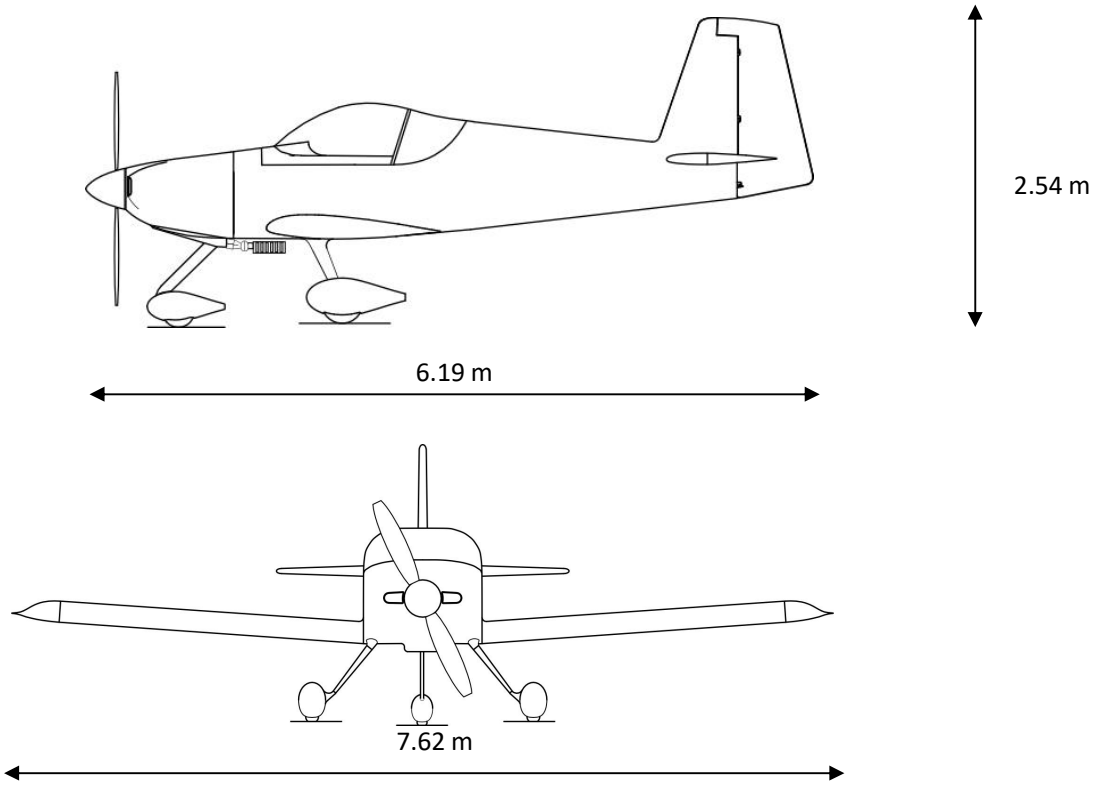
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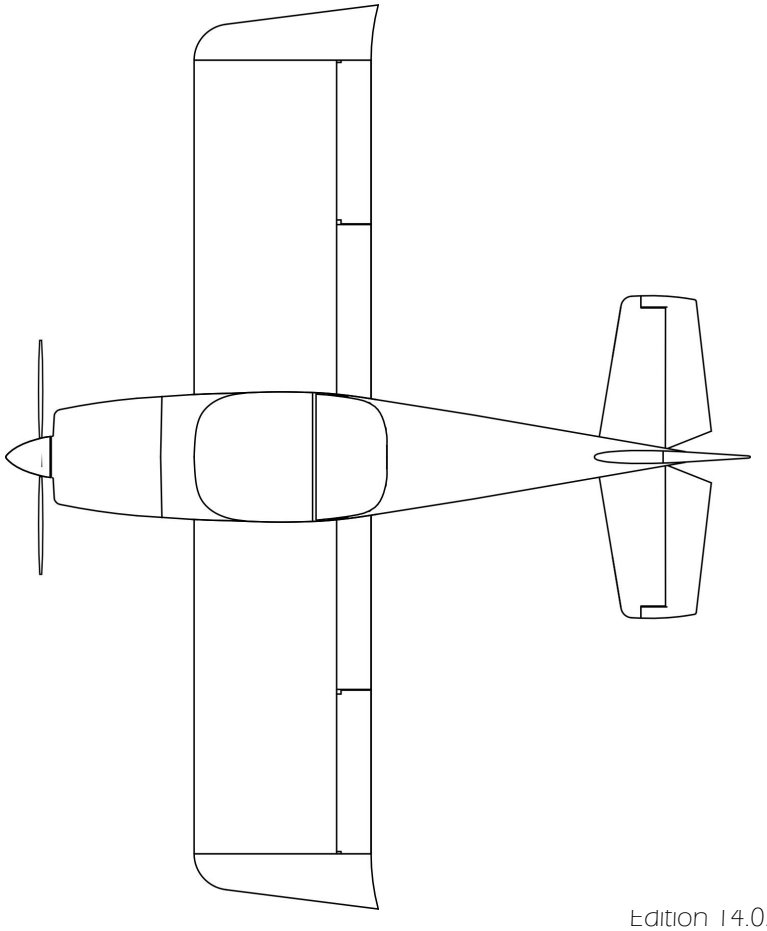
Height: 2.54m

Wing area: 121 sqft

Wing Loading: 72.26 kg/m²

1.5 Three-view drawing





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2 LIMITATIONS

2.1 Introduction

2.2 Airspeed

2.3 Airspeed indicator markings

2.4 Powerplant

2.5 Powerplant instrument markings

2.6 Miscellaneous instrument markings

2.7 Weight

2.8 Centre of gravity

2.9 Approved manoeuvres

2.10 Manoeuvring load factors

2.11 Flight crew

2.12 Kinds of operation

2.13 Fuel

2.14 Maximum passenger seating

2.15 Other limitations

2.16 Limitation placards

2.1 Introduction

Section 2 includes operating limitations, instrument markings, and basic placards necessary for safe operation of the aeroplane, its engine, standard systems and standard equipment.

The limitations included in this section (and in Section 9) have been approved by EAS, on behalf of FOCA.

2.2 Airspeed

Airspeed limitations and their operational significance are shown below.

	Speed	IAS-KTS	Remarks
V_{NE}	Never exceed speed	200 (TAS)	Do not exceed this speed in any operation
V_{NO}	Maximum structural cruising speed	167	Do not exceed this speed except in smooth air, and then only with caution
V_A	Maneuvering speed	123	Do not make full or abrupt control movement above this speed, because under certain conditions the aircraft may be overstressed by full control movement
V_{FE}	Maximum Flap Extended speed	95 (1&2) 87 (FULL)	Do not exceed thes speed with the given flap setting

2.3 Airspeed indicator markings

Airspeed indicator markings and their colour-code significance are shown below.

Marking	IAS-KTS *value or range*	Significance
White arc	50 - 87	Positive Flap Operating Range
Green arc	55 - 167	Normal Operating Range
Yellow arc	167 - 200	Manoeuvres must be conducted with caution and only in smooth air
Red line	200	Maximum speed for all operations
Blue Line	123	Maneuvering speed

2.4 Powerplant

Engine Manufacturer: .... Mattituck

Engine Type: .... TMX IO-360

Maximum Power..... Take-off: ..... 167 h.p. @ 2500 RPM

..... Continuous: ..... 167 h.p. @ 2500 RPM

Maximum Engine RPM at MSL .... 2500 RPM

Maximum Cylinder Head Temperature: ..... 500° F

Maximum Oil Temperature: .... 245° F

Oil Pressure ..... Minimum: ..... 25 psi

..... Maximum: ..... 115 psi

Fuel pressure ..... Minimum: ..... 5 psi

..... Maximum: ..... 45 psi

Fuel Grade (Specification): .... Avgas 100 LL / Mogas 98 UL

Oil Grade (Specification): .... SAE 15W50 or SAE 20W50

Propeller Manufacturer: ....Hartzell

Propeller Model: C2YR-1BFP/F7497-2

Propeller Diameter: .... 72 in

Propeller Blade Angle (at 30 in station)...Low:.....13.6°

.....High:.....35°

2.5 Powerplant instrument markings

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

Indication	Red arc/bar lower prohibited range	Yellow arc caution range	Green arc/bar Normal operating range	Yellow arc/bar caution range	Red arc/bar upper prohibited range
Manifold Pressure			13 - 30 inHG		
Engine RPM			500 – 2500 RPM		2500 RPM
Oil Pressure	< 25 psi	25 – 55 psi	56 – 95 psi	96 – 115 psi	> 115 psi
Oil Temp	< 104 °F	104 – 140 °F	140 – 210 °F	210 – 245 °F	> 245 °F
Cyl Head Temp		150 – 250 °F	250 – 400 °F	400 – 500 °F	> 500 °F
EGT			1000 – 1500 °F		
Fuel Press	< 5 psi	5 – 9 psi	9 – 35 psi	35 – 45 psi	> 45 psi
Fuel Flow			1 – 18 U.S.gal/h		> 18 U.S.gal/h

2.6 Miscellaneous instrument markings

Indication	Red arc/bar lower prohibited range	Yellow arc caution range	Green arc/bar Normal operating range	Yellow arc/bar caution range	Red arc/bar upper prohibited range
Voltage	< 12 VDC	12 – 13 VDC	13 – 15 VDC	15 – 16 VDC	> 16 VDC

2.7 Weight

Maximum Take-off weight:..... .....816.7 kg

Maximum Aerobatic Weight:..... .....725.7 kg

Maximum Weight in Baggage Compartment:..... 45 kg

2.8 Centre of gravity

Reference datum: ....70 in ahead of wing leading edge

Centre of gravity range:

Forward CG Limit: .... 15% of chord or 78.7″ aft of datum
Aft CG Limit: ....29% of chord or 86.82″ aft of datum
Aerobatic Aft CG Limit:..... .....25% of chord or 84.5″ aft of datum

2.9 Approved maneuvers

The airplane is approved for the following aerobatic maneuvers, provided the additional Aerobatic gross weight and CG conditions are met:

Maneuver	Recommended Entry speed (IAS)
Loops, Cuban 8's	140 kts
Immelmann Turns	140 kts
Aileron Rolls, Barrel Rolls	120 kts
Vertical Rolls	160 kts
Hammerheads	140 kts
Retournement	90 kts

No Intentional Spins!
No Inverted Flight!

2.10 Maneuvering load factors

Operating mass 1600 lbs (725 kg) and below:	+6g to -3g
reducing linearly to - mass 1800 lbs (817 kg):	+5g to -2.5g
Operating mass 1800 lbs (817 kg)	+5g to -2.5g

2.11 Flight Crew

N/A

2.12 Kinds of operation

Day VFR

2.13 Fuel

Tank capacity:

Total fuel: ....157 l / 42 USG

Usable fuel .... 153 l / 40.8 USG

Unusable fuel: .... 2 l per tank / 0.6 USG per tank

Approved fuel grades:..... ..... Avgas 100LL / Mogas 98 UL

2.14 Maximum seating

2 seats

2.15 Other limitations

NIL

2.16 Placards

1. The word "EXPERIMENTAL", in 30 mm high block letters visible clearly when entering the cockpit.

2. A permanently installed, fireproof Identification plate that is engraved with the callsign of the aircraft HB-YMT, mounted below the horizontal stabilizer on the left side of the fuselage.

3. Beside the fuel caps on each tank the following placard:
FUEL CAPACITY 21USG (79 l)
Avgas 100LL OR Mogas 98UL

4. On the panel a placard reading: "Aerobatic category airplane, Maneuvers and operation according AFM, No intentional spins, No inverted flight, VFR day only"

5. On the panel a placard reading: "VA Maneuvering speed 123 KIAS"

6. On the panel a placard reading "VFE Flap Extended speed 95 KIAS (1&2) 87 KIAS (FULL)"

7. On the back wall of the baggage compartment a placard: Baggage 100lbs / 45kg max

8. On the outside near the canopy lock mechanism:
Canopy Release
1. Pinch Tabs ><
2. Rotate Tab In / Handle Out
Emergency: Destroy Canopy, Secondary latch can NOT be opened from outside!

9. Near the secondary latch inside the canopy.
"Turn" on the handle and "- open" & "| closed" nearby.

10. On the inside right-hand canopy frame: "This aircraft has been issued a Permit to Fly in the category "Special", sub-category "Homebuilt". It complies only partially with internationally agreed standards.

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3 EMERGENCY PROCEDURES

3.1 Introduction

3.2 Engine failure

3.3 Air start

3.4 Smoke and fire

3.5 Glide

3.6 Landing emergency

3.7 Recovery from unintentional spin

3.8 Other emergencies

3.1 Introduction

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by aeroplanes or engine malfunction are extremely rare if proper preflight inspections and maintenance are practised.

However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

3.2 Engine failure

1. Airspeed..... 85 KIAS FLAPS UP
..... 70 KIAS FLAPS DN
2. Throttle ..... FULL
3. Mixture.....RICH
4. Boost Pump ..... ON
5. Fuel Selector.....OTHER TANK
6. Mags .....CYCLE
7. Alternate Air ..... PULL
8. if prop stopped
Starter ..... ENGAGE
9. If still not successful: Forced Landing:

Look for an adequate landing site, considering wind and the RV glide ratio with a fine pitch prop setting. Use flaps only once "field is made".

10. Throttle.....CLOSE
11. Mixture..... CUTOFF
12. Prop control .....FORWARD

Prop control forward will result in a fine pitch setting with high drag. However this is the only predictable setting, as low rpm/coarse pitch depends on oil pressure which might not be available any longer. If it is absolutely necessary to "stretch the glide", gliding distance might be extended by pulling the prop control lever back.

13. Boost Pump.....OFF
14. Fuel Selector .....OFF
15. Mags.....OFF
16. MAYDAY..... DECLARE
17. Transponder 7700
As late as possible
18. VP200..... SYSTEM SHUTDOWN

3.3 Air start

No reference data available. Deemed possible as the engine should be self-sufficient as long as it turns > 800 RPM (Pmags). If engine stopped, use starter.

3.4 Smoke and fire

ENGINE/FUEL SMOKE AND FIRE

1. Mixture ..... CUTOFF
2. Boost Pump ..... OFF
3. Fuel Selector ..... OFF
4. Cabin Heat ..... CLOSE
5. Vents ..... CLOSE

Forced Landing:

Look for an adequate landing site, considering wind and the RV glide ratio with a fine pitch prop setting. Use flaps only once "field is made".

6. Throttle ..... CLOSE
7. Prop control ..... FORWARD

Prop control forward will result in a fine pitch setting with high drag. However this is the only predictable setting, as low rpm/coarse pitch depends on oil pressure which might not be available any longer. If it is absolutely necessary to "stretch the glide", gliding distance might be extended by pulling the prop control lever back.

8. Mags ..... OFF
9. MAYDAY ..... DECLARE
10. Transponder 7700

As late as possible

11. VP200 ..... SYSTEM SHUTDOWN

ELECTRICAL SMOKE AND FIRE

1. VP200 ..... SYSTEM SHUTDOWN

The EFIS and Engine Monitor will continue to run through their internal battery.

2. Vents ..... OPEN
3. Cabin Heat ..... OPEN
4. Land ..... ASAP
5. IGN L & R ..... MAN ON
6. Trims ..... CHECK FROZEN TRIMS
7. Flaps ..... CHECK FROZEN FLAPS
8. Com ..... USE HANDHELD RADIO
9. MAYDAY ..... DECLARE

after landing

10. Throttle ..... CLOSE
11. Mixture ..... CUTOFF
12. Fuel Selector ..... OFF
13. Mags ..... OFF

3.5 Glide

Best gliding speed/config: Flaps Up, 85KIAS

Prop control forward will result in a fine pitch setting with high drag. However this is the only predictable setting, as low rpm/coarse pitch depends on oil pressure which might not be available any longer. If it is absolutely necessary to "stretch the glide", gliding distance might be extended by pulling the prop control lever back.

If flaps were already partially extended, considering retracting them.

The RV-7A has a glide ratio of only approximately 7.5:1

3.6 Landing emergencies

FORCED LANDING

1. Airspeed..... 85 KIAS FLAPS UP
..... 70 KIAS FLAPS DN
2. Throttle .....CLOSE
3. Mixture..... CUTOFF
4. Prop control.....FORWARD
Prop control forward will result in a fine pitch setting with high drag. However this is the only predictable setting, as low rpm/coarse pitch depends on oil pressure which might not be available any longer. If it is absolutely necessary to "stretch the glide", gliding distance might be extended by pulling the prop control lever back.
5. Boost Pump .....OFF
6. Fuel Selector.....OFF
7. Mags .....OFF
8. MAYDAY ..... DECLARE
9. Transponder..... 7700
As late as possible
10. VP200..... SYSTEM SHUTDOWN

ZERO FLAPS LANDING

Landing with zero flaps is easily accomplished, provided engine power is available. Use 70KIAS as approach target speed, aim for a flatter approach using more power and expect a much higher deck angle.

3.7 Recovery from unintentional spin

1. Power ..... IDLE
2. Ailerons ..... NEUTRAL
3. Rudder ..... OPPOSITE SPIN DIRECTION
4. Elevator ..... FORWARD
5. When spin stops, Rudder ..... NEUTRAL
6. Attitude ..... RECOVER

The airplane is capable of spinning, however recovery after max 2 turns is highly recommended.

3.8 Other emergencies

CARBON MONOXIDE ALERT

1. Cabin Heat ..... CLOSE
2. Vents ..... OPEN
3. Land ..... ASAP

When safely on ground:

4. Canopy ..... OPEN IMMEDIATELY

AIR FILTER ICING

1. Alternate Air ..... PULL
2. Mixture ..... ADJUST
3. Starter ..... AS REQUIRED

Note: When the alternate air flap is opened, it can only be partially reset from the cockpit. For a full reset, remove the top cowl and latch manually.

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4 NORMAL PROCEDURES

4.1 Introduction

4.2 Rigging and derigging

4.3 Daily inspection

4.4 Preflight inspection

4.5 Normal procedures and check list

4.6 Aerobatics

4.1 Introduction

Section 4 provides checklist and amplified procedures for the conduct of normal operation Normal procedures associated with optional systems can be found in Section 9.

4.2 Rigging and Derigging

N/A

4.3 Daily Inspection

N/A

4.4 Preflight inspection

Before operating the aircraft, execute a thorough outside check/inspection. Make sure that all pitot and inlet covers, control locks, the towbar and all chocks are removed.

Perform a visual check of all the important control surface hinges and bolts.

Check the oil level of the engine and drain the fuel tanks of any water they might contain. Also confirm fuel quantity visually.

Check all three tires for condition and pressure.

Pitot and both static ports as well as fuel vent lines must be clear.

Also make sure that all required documents are onboard.

4.5 Normal procedures and checklist

USE OF EXTERNAL POWER

Connect the ground power unit to the plug on the engine mount. Limit electrical load to 20A to avoid discharging of the battery.

PRE-FLIGHT CHECK

1. Outside Check ..... COMPLETED
2. VP200..... MASTER ON
3. Baggage ..... SECURED
4. Passenger ..... INSTRUCTED
5. ELT ..... ARMED
6. Alternate Air ..... CLOSED
7. Fuel Quantity..... CHECK
8. Fuel Selector..... L OR R TANK
9. VP200 Mode ..... BEFORE STARTING ENGINE

BEFORE STARTING ENGINE

1. Seat Belts ..... FASTENED
2. Canopy..... SECURED
3. Strobe Lt..... ON
4. Nav Lt ..... AS REQD
5. Mixture..... RICH
6. Prop control ..... FORWARD
7. Throttle ..... 1"/2.5cm OPEN
8. Mags ..... BOTH
9. Boost Pump ..... ON FOR 1-5s / 15-20 psi
10. Prop Area ..... CLEAR
11. Starter ..... ENGAGE

AFTER ENGINE START / BEFORE TAXI

1. Oil Pressure ..... CHECKED
2. Throttle ..... 1000 RPM
3. Mixture..... LEAN
4. Alternator/Voltage ..... CHECKED
5. Cabin Heat/Vents..... SET
6. Flaps ..... UP
7. Trims..... TEST/T.O.POS.
8. Altimeters (2) ..... SET QNH
9. EFIS/FMS/COM/NAV ..... SET
10. Transponder ..... SET

TAXI

1. Landing Lt ..... ON
2. Brakes.....CHECK
3. Flight Instruments.....CHECK

CHECK BEFORE TAKEOFF

1. Landing Lt .....OFF
2. Canopy.....CLOSED
3. Canopy Warning.....OFF
4. Flaps .....CHECKED T.O.POS.
5. Trims.....CHECKED T.O.POS.
6. Flight Controls..... CHECK FULL TRAVEL
7. Engine Instruments ..... CHECKED
8. Fuel Quantity..... CHECKED
9. Fuel Selector.....FULLER TANK
10. Mixture ..... RICH
11. Throttle..... 1800 RPM
12. Magnetos .....L / R / BOTH
Drop has to be less than 150 RPM on either side.
13. Prop control..... CYCLE / FORWARD
14. Mixture .....CHECK / RICH
15. Throttle.....IDLE
16. Throttle..... 1000 RPM
17. Pmags IGN L & R .periodical self PWR check (OFF/AUTO)
Turn both backup IGN switches to OFF at the same time, engine must keep running. Then switch both back to "AUTO" Once per month is sufficient.
18. VP200 .....T.O. checks
19. Departure Briefing..... COMPLETED

1. Surface Wind
2. Speeds (55 Rotate, 70 Initial, 85+ Climb)
3. Routing, Altitude, Restrictions
4. Emergency Procedures, Best Glide 85

Vx 70 kts for initial climb, then Vy 85 kts for best rate.

TAKEOFF

1. Landing Lt ..... ON
2. Approach Sector..... CLEAR
3. Runway.....IDENTIFIED
4. Heading..... CHECKED

VP200 automatically switches to "Cruise" mode 3 minutes after takeoff

CLIMB

1. Climb Power.....SET

CRUISE

1. Cruise Power.....SET
2. Mixture.....ADJUST
At least 100°F rich of first cylinder to peak EGT
Below 75% Power, economy setting target 50°F lean of last cylinder to peak.
3. Fuel Quantity.....CHECK
4. Fuel Selector.....L / R TANK
5. Altimeters (2) ..... QNH or 1013

DESCENT

1. Mixture..... RICH(ER)

BEFORE LANDING

1. Landing Data .....RECEIVED
2. Altimeters (2) .....SET QNH
3. EFIS/FMS/COM/NAV.....SET
4. Seat Belts .....FASTENED
5. Autopilot .....DISCONNECT
6. Brakes..... PRESS
7. Prop control ..... FORWARD
8. Approach Briefing ..... COMPLETED

1. Surface Wind, RWY in use
2. Speeds (V_{FE1+2} 95KIAS, V_{FEF} 87KIAS, V_{REF} 70KIAS)
3. Routing, Altitude, Restrictions
4. Missed Approach, Alternate, Best Glide 85

GO AROUND

1. Throttle ..... FULL
2. Mixture.....RICH (except high alt)
3. Flaps ..... UP

AFTER LANDING

N/A

ENGINE SHUTDOWN

1. Flight Data..... RECORDED
2. VP200 Mode ..... SELECT POST FLIGHT
3. Flaps ..... FULL
4. Landing Lt ..... OFF
5. Nav Lt ..... OFF
6. MapPC ..... CONFIRM OFF
7. Mixture..... IDLE/CUTOFF
8. Mags ..... OFF

POST FLIGHT

1. Strobe Lt..... OFF
2. VP200..... SYSTEM SHUTDOWN

4.6 Aerobatics

WEIGHT / CG

The Aerobatic gross weight of 725.7kg/1600lbs and cg range have to be observed in order to fly aerobatic maneuvers. Within these limits, the airframe has the design strength of +6g/-3g (plus 50% safety margin).

INVERTED FLIGHT

However, this particular aircraft does not feature required systems for inverted flight, so any maneuvers at less than 0g must be avoided.

SPEED BUILDUP

Due to the aerodynamic cleanliness of the RV, any nose down maneuver (especially when unloaded) will result in quick speed build-up and this should be the primary concern.

MANEUVERING SPEED Va

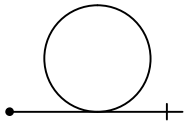
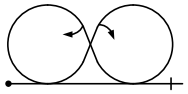
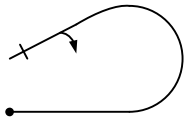
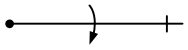
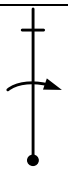
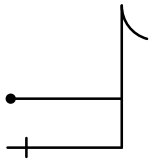
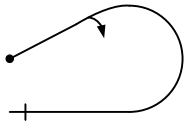
Remember that the relatively low maneuvering speed (123KIAS) is defined as the highest speed at which full and abrupt controls can be applied without exceeding the design strength of the airplane. Note that some of the recommended entry speeds are above the maneuvering speed.

VERTICAL MANEUVERS G-PULL-UP

For vertical maneuvers like loops, Immelmann turns and horizontal eights, the entry speeds have an inverse relationship to the G's required to complete the maneuver. An entry speed near the low end of the speed range will require a higher G pull-up and vice versa.

SPINS

No intentional spinning.

Maneuver Segment	Entry speed min (IAS)	Entry speed max (IAS)	Typical speed	Symbol	Remarks
Loops	122 kts	165 kts	140 kts		
Cuban 8's	122 kts	165 kts	140 kts		No inverted flight
Immelmann Turns	130 kts	165 kts	140 kts		No inverted flight
Aileron Rolls, Barrel Rolls	105 kts	165 kts	120 kts		No inverted flight.
Vertical Rolls	156 kts	165 kts	160 kts		Max ½ roll
Hammer-heads	122 kts	165 kts	140 kts		No inverted flight. If with power, only left-hand
Retourne-ment	85 kts	95 kts	90 kts		Check speed on downline!

5 PERFORMANCE

(partly approved)

5.1 Introduction

5.2 Approved data

5.2.1 Airspeed indicator system calibration

5.2.2 Stall speeds

5.2.3 Take-off performance

5.2.4 Landing distances

5.2.5 Climb performance

5.3 Additional information

5.3.1 Cruise

5.3.2 Endurance

5.3.3 Balked landing climb

5.3.4 Take-off measurements

5.3.5 Effect on flight performance and characteristics

5.3.6 Demonstrated crosswind performance

5.3.7 Noise data

5.1 Introduction

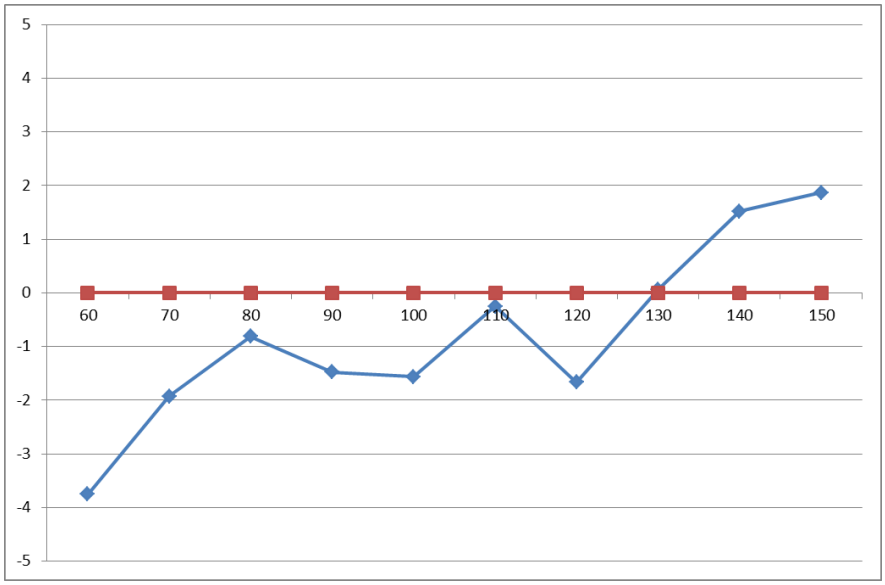
Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and non-approved additional information.

The data in the charts has been computed from actual flight tests with the aeroplane and engine in good condition and using average piloting techniques.

5.2 Approved data

5.2.1 Airspeed indicator system calibration

The blue line represents CAS in relation to the IAS (bordeaux line)



5.2.2 Stall speed

All speeds at MTOM and IAS.

Flaps Up	Power Off	59 KIAS
Flaps Down	Power Off	53 KIAS
Flaps Up	Power On	54 KIAS
Flaps Down	Power On	49 KIAS

5.2.3 Take-off performance

V1.2 takeoff1.xls

AIRCRAFT: RV-7A **REGISTRATION: HB-YMT**

TAKEOFF PERFORMANCE

ROTATION SPEED IAS: 64 kt WEIGHT: 817 kg

CLIMB SPEED IAS: 76 kt Apply full power then release brakes

Hard runway surface

Pressure Altitude	0°C		10°C		20°C		30°C		40°C	
	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle
feets	m	m	m	m	m	m	m	m	m	m
0	204	317	222	341	239	363	255	384	269	403
2000	245	387	269	423	292	457	313	491	334	523
4000	295	471	326	521	355	570	384	618	411	665
6000	354	571	393	638	431	704	468	770	503	836
8000	428	697	478	784	526	872	573	960	619	1049

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

19/04/2011

5.2.4 Landing distances

AIRCRAFT: RV-7A **REGISTRATION: HB-YMT**

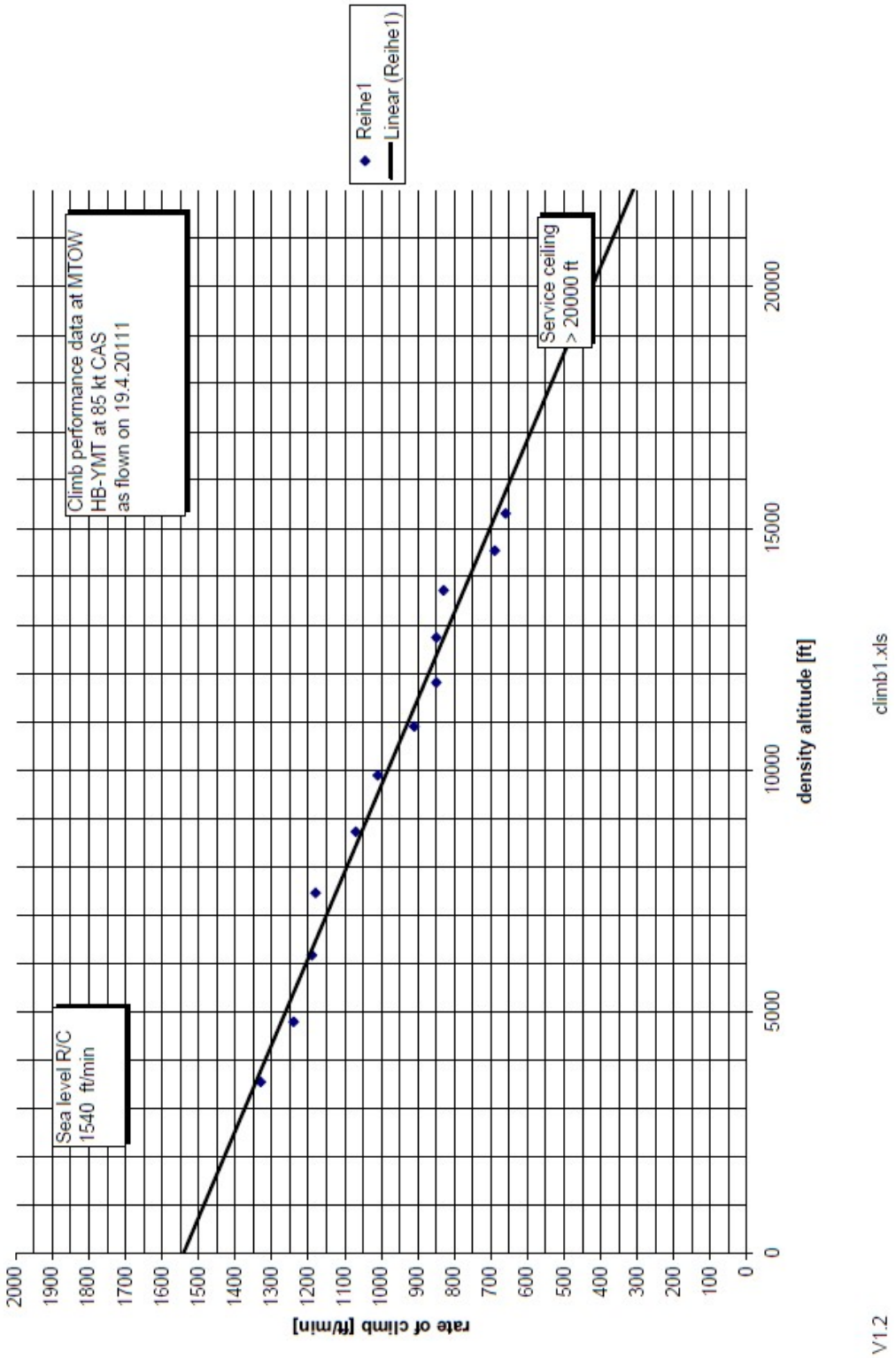
LANDING PERFORMANCE

TOUCHDOWN SPEED: 58 kt WEIGHT: 817 kg
APPROACH SPEED: 68 kt
Hard runway surface

Pressure Altitude	0°C		10°C		20°C		30°C		40°C	
	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle	Ground Run	Distance over 15 m obstacle
feets	m	m	m	m	m	m	m	m	m	m
0	206	406	224	435	241	461	256	485	271	507
2000	247	497	272	539	294	580	316	619	336	657
4000	297	604	328	664	358	722	386	780	414	837
6000	357	733	396	813	434	893	471	972	507	1051
8000	432	894	481	1000	530	1106	577	1212	623	1319

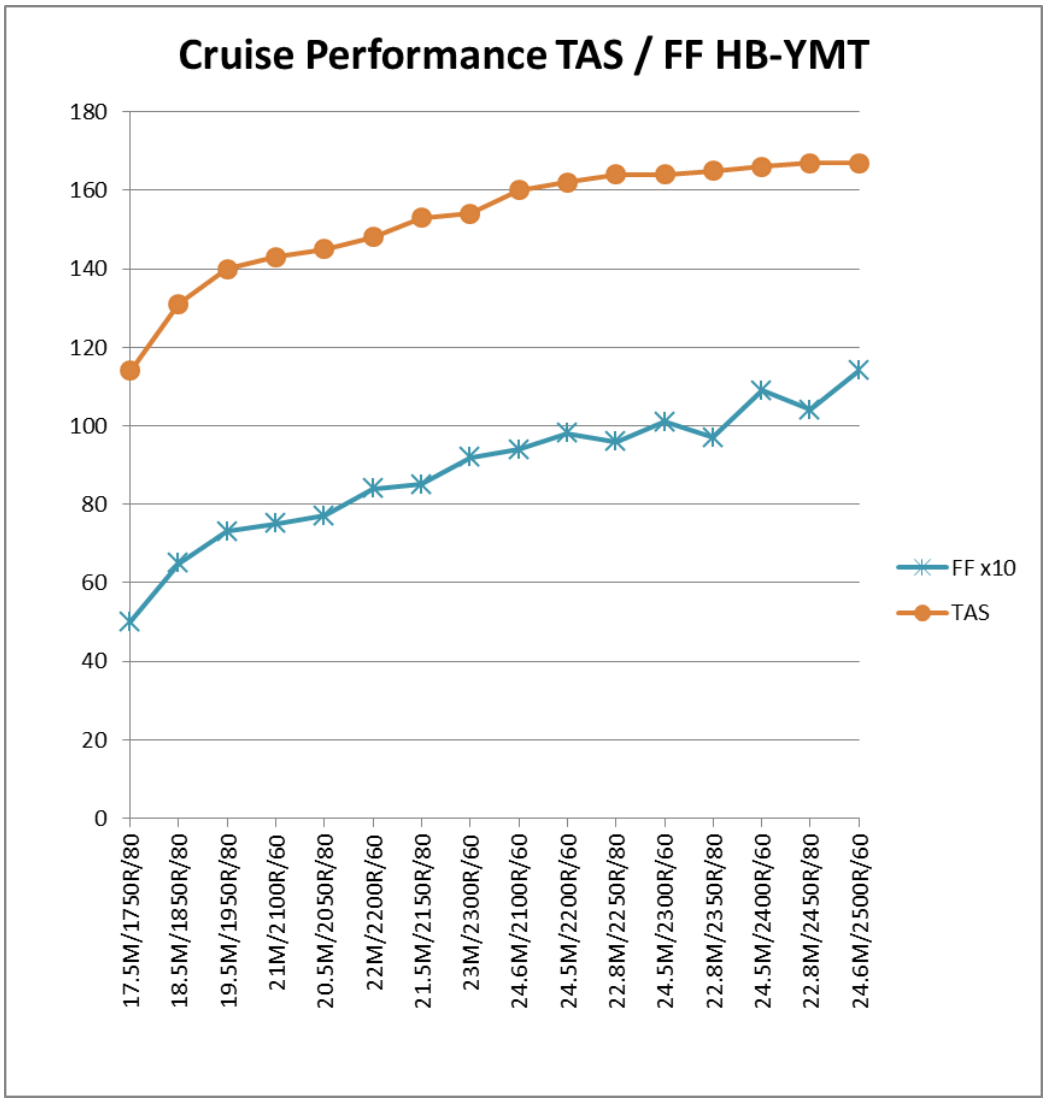
For every knot of headwind, reduce distances by 1%
For every 2 knots of tailwind, increase distances by 10%

5.2.5 Climb performance



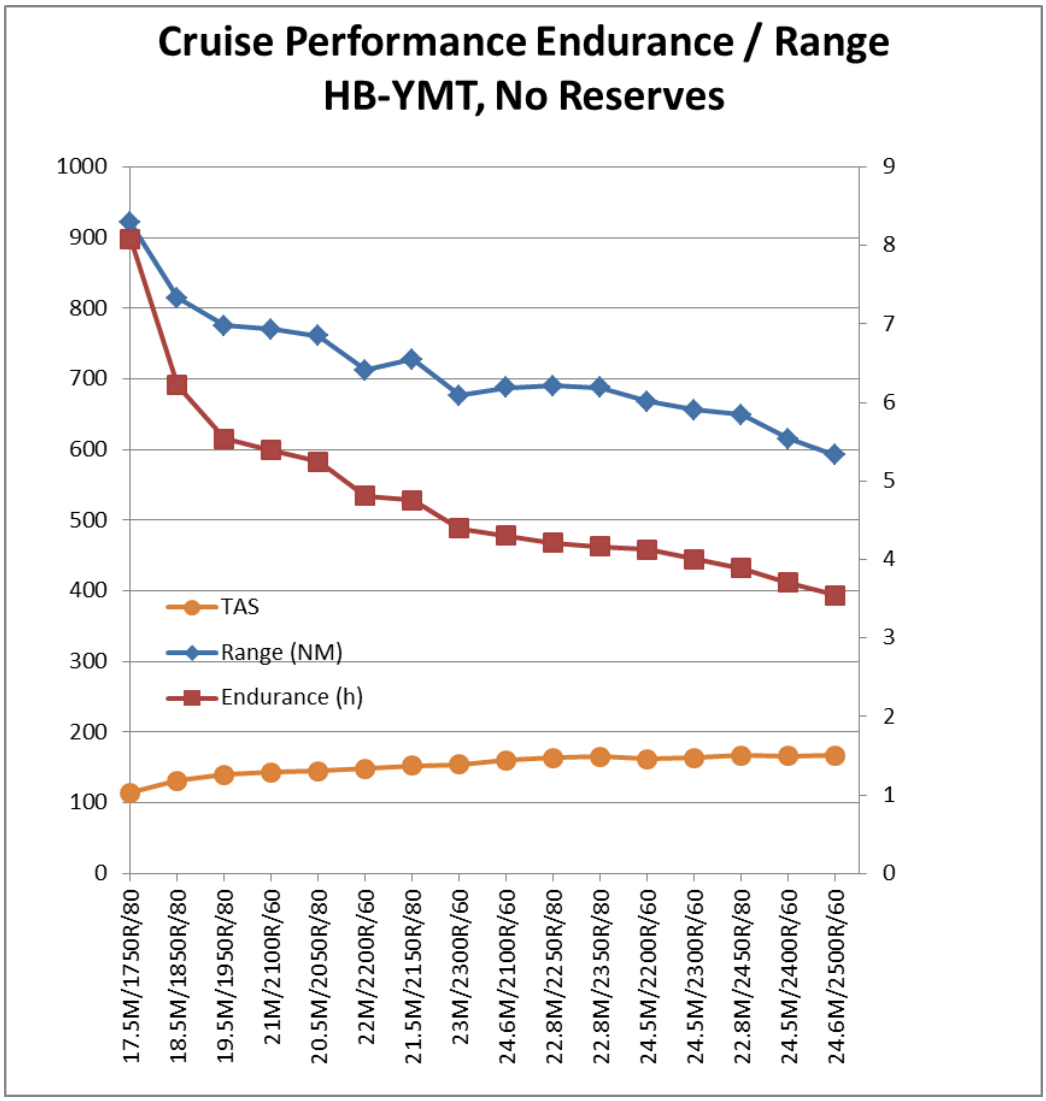
5.3 Additional information

5.3.1 Cruise



True Airspeed and Fuel Flow at various Power Settings and Pressure Altitudes (FL).

5.3.2 Endurance



Power Settings (Man Press / RPM / FL)

5.3.3 Balked landing climb.

Equal to regular climb performance

5.3.4 Grass Runway Performance

N/A.

5.3.5 Effect from Rain or insects

N/A

5.3.6 Demonstrated crosswind performance.

30kts Crosswind Component

5.3.7 Noise data.

Noise measurement Van's Aircraft RV-7AB-YMT

according to ICAO Annex 16, Volume 1, Chapter 10

and Swiss requirement for noise emission 1.4.96 (VEL 748.215.3)

Test Results: Cat D. 70.9 dB(A)

6 WEIGHT AND BALANCE

6.1 Introduction

6.2 Weighing procedure

6.3 Weight and balance record

6.4 Permitted payload range or calculation samples

6.5 Equipment list

6.6 Specialty Requirement of the RV-7A

6.1 Introduction

This section contains the payload range within which the aeroplane may be safely operated and the procedures for weighing the aircraft, the calculation method for establishing the permitted payload range and a comprehensive list of all the installed equipment during the weighing of the aircraft.

6.2 Weighing procedure

Longeron and cabin crossbar level, weighing all 3 gears.

Reference Datum is 70" ahead of wing leading edge.

6.3 Weight and balance record

Date	In	Out	Description of modification	Weight Change						Running Basic Empty Weight	
				Added (+)			Removed (-)				
				Wt-Kg	Arm m.	Mom.	Wt-Kg	Arm m.	Mom.	Weight	Mom.
24.4.10			As weighed (24.04.2010)	529	2.04	1079				529	1079
15.6.20			As weighed (11.06.2020)	530	2.02	1071				530	1071

6.4 Permitted payload range or/and Calculation samples

Reference datum ....70 in ahead of wing leading edge

Centre of gravity range..... .....
Forward CG Limit: .... 15% of chord or 78.7"/199.8 cm aft of datum.
Aft CG Limit: ....29% of chord or 86.82" / 220.5 cm aft of datum.
Aerobatic Aft CG Limit: ....25% of chord or 84.5" / 214.6 cm aft of datum.

Maximum Take-off weight:..... ..... 1800 lbs / 816.7 kg
Maximum Aerobatic Weight:..... 1600 lbs / 725.7 kg
Maximum Weight in Baggage Compartment:..... 100 lbs / 45 kg

6.4.1 Loading calculation (Sample)

	Item	Weight (Kg)	Arm (m)	Moment (mKg)
1	Basic empty weight	530	2.02	1070.6
2	Pilot	80	2.47	197.6
3	Co-pilot / passenger	80	2.47	197.6
4	Fuel, Wing tanks (1 l = 0,72 Kg)	100	2.03	203
5	Baggage	20	3.22	64.4
6	Total	810	2,14	1733.2

6.4.2 Most forward CG (Sample)

	Item	Weight (Kg)	Arm (m)	Moment (mKg)
1	Basic empty weight	530	2.02	1070.6
2	Pilot	60	2.47	148.2
3	Co-pilot / passenger	0	2.47	0
4	Fuel, Wing tanks (1 l = 0,72 Kg)	114	2.03	231.4
5	Baggage	0	3.22	0
6	Total	704	2.06	1450.2

6.4.3 Most rearward CG (Sample)

	Item	Weight (Kg)	Arm (m)	Moment (mKg)
1	Basic empty weight	530	2.02	1070.6
2	Pilot	100	2.47	247
3	Co-pilot / passenger	100	2.47	247
4	Fuel, Wing tanks (1 l = 0,72 Kg)	40	2.03	81.2
5	Baggage	40	3.22	128.8
6	Total	805	2.20	1774.6

6.5 Equipment list

The following list shows all installed equipment (Main parts like wings or flight controls which are parts of the basic design and cannot be changed by other make must not be listed)

This list must be checked at weighing for correctness.

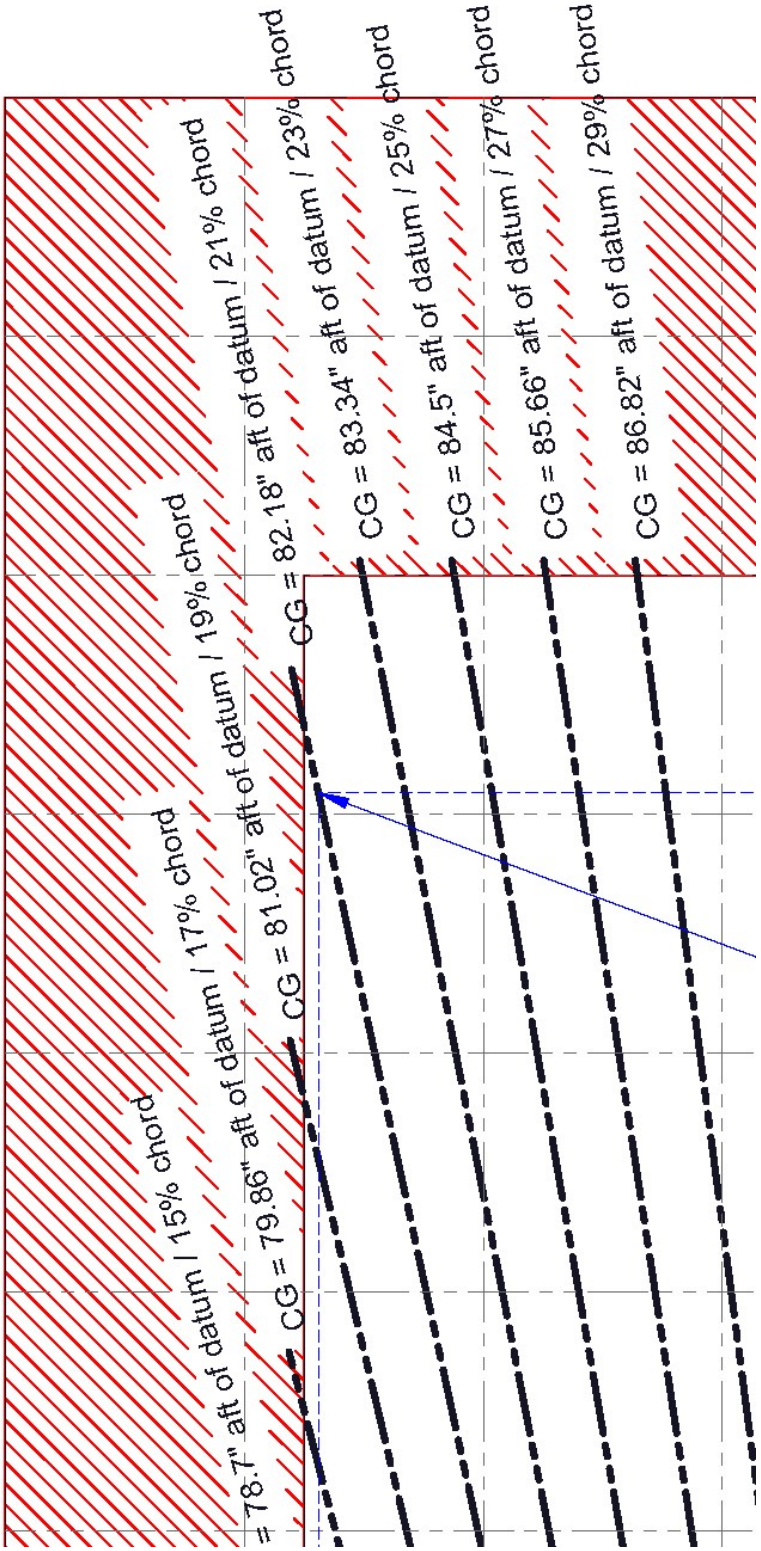
Item #	Description	Manufacturer	Type
A	**Powerplant & Accessories**		
	Engine 180hp, parallel valve, 8.5:1, roller tappets	Mattituck / Lycoming	TMX IO-360
	Air Filter	K&N	30-2060
	Starter	SkyTec	149-NL
	Alternator 14V/60A	Lester or Dixie or AC Delco	14684 A8159 334-1747
	C/S Propeller 72" diameter	Hartzell	HC-C2YR-1BFP / F7497-2
	Governor	Aero Technologies	PCU5000X
	Oil Cooler	Niagara Thermal Products	20002A
	Oil Filter	Champion	CH48108-1
	Ignition Left	Emagair	P-Mag 114
	Ignition Right	Emagair	P-Mag 114
B	**Landing Gear and Accessories**		
	Nosewheel	Grove Aircraft	59-2M-RV
	Mainwheel	Cleveland	5x5.00 Wheel
	Parking Brake Valve	Matco	PVPV-1
C	**Electrical Systems (12V)**		
	Battery	Odyssey or equivalent	PC-680 or equivalent

D	***Instruments***		
	Backup Airspeed	UMA	2.25" ASI
	Backup Altimeter	UMA	2.25" Altimeter
	Magnetic Compass	Airpath	2.25" Compass
	PFD	Advanced Flight Systems	AF3400EF
	Engine monitor	Advanced Flight Systems	AF3400EM
	Angle of Attack	Advanced Flight Systems	AOA Sport
	Electrical System	Vertical Power	VP-200
	MapPC System	Custom	Custom
E	**Cabin Accomodation**		
	Pilot seat	Van's Aircraft / Classic Aero Design	Van's Cushions, CAD Cover
	Interior	Classic Aero Design	Interior
	Center console	Custom	Custom
F	**Placards, Warnings and Manuals**		
	Airplane Flight Manual	B.Daenzer / A.Lichtensteiger	
G	***Auxiliary Equipment***		
	CO Monitor	Co Guardian	352
H	***Avionics & Autopilot***		
	Audio Panel	Garmin	GMA-340
	Warning Audio Mixing Board	Flight Data Systems	AP-60
	Com1 / Nav	Trig	TX56
	Com2	Trig	TY96
	GPS	Garmin	GPS18-5
	Transponder Mode-S	Garmin	GTX-328
	ELT 406 MHz	Kannad	AF-406 Compact
	Traffic Information	FLARM	PowerFLARM Fusion

	Autopilot	Trutrak Flight Systems	Digiflight IIVSGV (AFS Ed. & Autotrim)
	EFIS Control Panel	Custom	Flight Control Unit
J	**Fuel System**		
	Fuel Selector	Andair	
	Fuel Filter	Airflow Performance	Filter
	Fuel Pump	Airflow Performance	Boost Pump
K	**Special Option**		

6.6 Specialty Requirement of the RV-7A

The RV-7A Nosewheel has its own CG/load envelope:



7 AEROPLANE AND SYSTEM DESCRIPTION

7.1 Introduction

7.2 Airframe

7.3 Flight controls (including Flap and Trim)

7.4 Instrument panel

7.5 Landing gear system

7.6 Seats and safety harness

7.7 Baggage compartment

7.8 Doors, windows and exits

7.9 Powerplant

7.10 Fuel system

7.11 Electrical system

7.12 Pitot and static pressure systems

7.13 Miscellaneous equipment

7.14 Avionics

7.1 Introduction

This section provides description and operation of the aeroplane and its systems.

Refer to Section 9, Supplements, for details of optional systems and equipment.

7.2 Airframe

The RV-7A is an aluminum, semi-monocoque design using mostly flush solid rivets. Pop-rivets are only sparsely used and for non-structural areas.

The manufacturing tools, methods and materials employed are classic and therefore well understood, tested and tried. The wing is of a simple constant chord design with a NACA 23013.5 profile. This profile is widely used. Among others on the DC-3, Cessna Citation, all tapered wing Beechcraft and many Cessna twins.

The respectable empennage gives good control and stability.

The aircraft is equipped with 2 integral fuel tanks, one on each wing comprising the inboard front section of the wing. Each tank is equipped with an analog floating type fuel level sensor.

Further equipment includes:

- Tip-up canopy design for maximum visibility.
- Free-castering nosewheel for better ground operation.
- Electrically actuated flaps
- Electrically actuated aileron and elevator trim
- LED NAV lights
- STROBE lights
- HID landing lights
- Hydraulic brakes including a parking brake valve
- Double control sticks

7.3 Flight controls

Dual controls are fitted with both control sticks permanently attached. Elevator and ailerons are operated through a system of adjustable push rods. The rudder is operated by a cable system to the rudder pedals.

An autopilot roll servo is attached to the aileron belcrank by a firm pushrod in the right wing near the main spar. An autopilot pitch servo is attached to the elevator belcrank by a firm pushrod on the bottom of the rear fuselage. Both servos can be overpowered & contain a shear screw design, guaranteeing control continuity.

Control Travel Limits	Maximum Up/Down	Minimum Up/Down
Elevator	30°/25°	25°/20°
Aileron	32°/17°	25°/15°
Rudder	35°/35°	30°/30°
Flaps	Down 40°	

One inboard flap on each wing is attached to a single flap actuation mechanism, rendering an asymmetric flap condition impossible. The mechanism is operated by an electric motor attached to a drive train by the means of a clutch. The electric motor is wired to the VP200 Control Unit, reversing direction by switching polarity. A momentary up/down switch on the bottom of the instrument panel, also wired to the VP200 Control Unit, commands either extension or retraction of the flaps.
A linear position sensor wired to the VP200 Control Unit, enables a graphical representation of actual flap position on the VP200 Display Unit as well as the provision of a "step" positioning logic. The logic has 4 positions, UP, 1, 2, Full Position 1 approximately mirrors 10°, position 2 20° and full 40° of flaps.

The aircraft has both pitch and aileron trim, however no rudder trim is available. Also, there is no way for the autopilot to affect trim. The aileron trim consists of an electrical servo operating a spring-bias system connected to the base of the control sticks. Primary purpose of the aileron trim is to counter fuel imbalance and an empty or occupied passenger seat. The pitch trim consists of an electrical servo operating a trim tab on the left elevator. Both trims are controlled with buttons on the control stick and the aircraft is perfectly controllable, even in a runaway trim condition.

7.4 Instrument panel



Main Row
1 Starter Pushbutton
2 Advanced Flight Systems AF3400EF
3 MapPC Display Unit
4 Vertical Power VP200 Display Unit
5 Garmin GMA 340 Audio Panel
6 Trig TX56 Com1 & Nav
7 Garmin GTX-328 Transponder
8 Trig TY96 Com2
9 Advanced Flight Systems AF3400EM
10 ELT Remote Control Panel

Top Row
11 Advanced Flight Systems AOA system
12 Advanced Flight Control Unit
13 Fuel Boost Backup Switch
14 IGN L & R Backup Switches
15 PTT Copilot Pushbutton Switch
16 Dimmer / Interior Lighting Control

Bottom Row
17 Headset Plugs
18 UMA 2.25" Backup Airspeed Indicator
19 UMA 2.25" Single Pointer Backup Altimeter
20 MapPC Input Keyboard
21 Vertical Power VP200 Switch Panel
22 Flap Control Switch
23 Trutrak AFS-Pilot Autopilot
24 CO Guardian CO Detector
25 Backup Magnetic Compass
26 Cabin Vents
27 Cabin Heat Control

Center Console
28 Alternate Air Control (inivisible on the foto, just above park brake)
29 Parking Brake Control
30 MapPC Touchpad
31 Mixture Control
32 Fuel Selector Valve
33 Throttle
34 Prop Control
35 Throttle Quadrant Friction Control

7.5 Landing gear system

The nose gear employs a custom size tire and tube available through Van's.
Recommended pressure is at least 25 psi / 1.8 bar and ideally 45 psi / 3.1 bar.

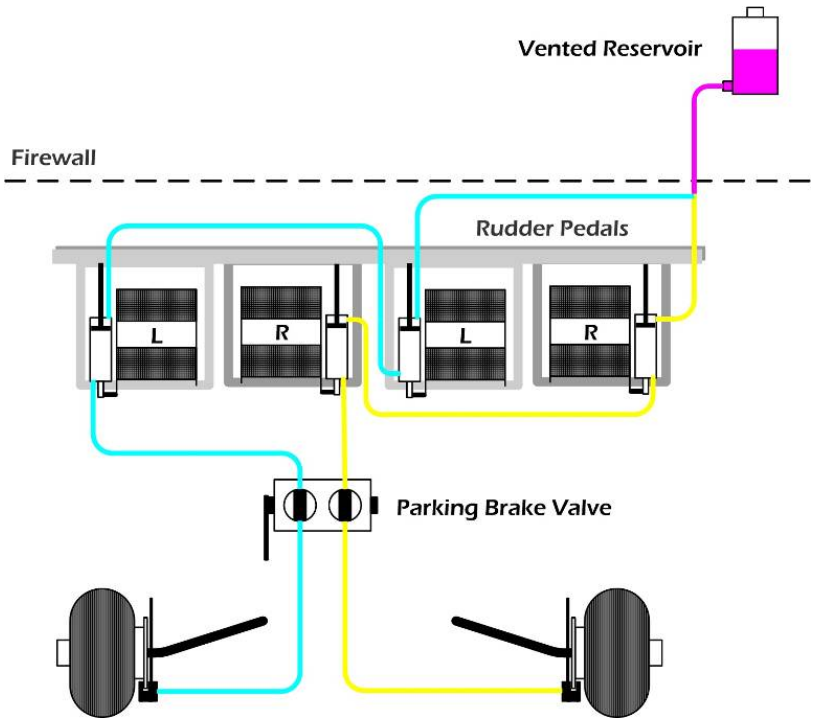
The wheel itself is a "Grove 59-2A-RV" 500x5 aftermarket part with improved performance employing an axle spacer resulting in lower friction.

The "breakout force", meaning the pull required sideways to rotate the fork when pulled at the location of the axle bolt should be 22lbs/10kg. If required, adjust by tightening the large fork nut and safety with a cotter pin. Too little force increases the risk of shimmy.

The nose-gear is free castering, differential braking is required for ground steering.

The nose gear also has special M&B requirements, consult chapter 6 Mass & Balance for this.

Main gear employs a standard light aircraft Cleveland 500x5 wheel and brake assembly. 5:00X5-6 Tire/Tube with a target pressure of at least 25 psi / 1.8 bar and ideally 40 psi / 2.8 bar.



7.6 Seats and safety harness

Both seats have standard adjustable 5-point aviation harnesses.
Eye height may be adjusted by adding / removing foam cushions below the main seat cushion.
Rudder pedals are fixed, so distance can be adjusted by attaching the seat back to one of three hinges on the cabin floor.

7.7 Baggage compartment

Baggage may be loaded in the back of the seats.
Maximum 100lbs/45kg are permitted.

7.8 Doors, windows and exits

The canopy has a primary lock mechanism on the left fuselage sidewall, which can be both operated from the inside as well as the outside. This mechanism also triggers an alert on the VP200 Display if not latched properly.

There is a secondary latch, which can only be operated from inside. It is a simple rotation latch at the top center locking against the rollover bar.

7.9 Powerplant

The engine is a Mattituck TMX-IO360 experimental Lycoming clone with the Red/Gold enhancements and roller-lifters. It's an air cooled, four-cylinder horizontally-opposed (boxer) design. ECI experimental fuel injection (a copy/adaptation of the proven continental fuel injection) and ECI cold air induction (oil sump and air plenum are physically separated) give it extra smoothness and power. Ignition are two Emagair P-Mag 114series electronic ignitions generating sparks with automotive spark plugs (NGK BR8ES). Starter is a lightweight SkyTec NL. The engine also drives a 60A automotive alternator.

Compression Ratio is 8.5:1 Rated Horsepower is 180h.p. at 2700 RPM. The engine has a TBO of 2400hrs. In order to reach noise class D, prop RPM has been restricted to 2500 RPM, at which the engine puts out approximately 167h.p.

The exhaust system is a combination of a Vetterman stainless steel 4-into-4 with a 4-into-1 collector outside of the cowl. At the back is a custom Liese muffler to reduce noise footprint.

Engine control is achieved through:

- Throttle Lever operating the Throttle Body Valve
- Prop Control Lever operating the governor
- Mixture Lever operating the lever at the ECI fuel pump.
- Alternate Air Cable, actuating the alternate air opening inside the cowl.
  Note: The alternate air flap can only be partially reset from the cockpit. To completely reset the flap, remove the top cowl and latch manually.

Propeller is a Hartzell "blended airfoil" 2 blade hydraulic constant speed.
The engine/propeller are approved for a max of 2700 RPM, however due to noise considerations, the max RPM is derated to 2500 by means of a mechanical restriction on the prop lever.

Full engine instrumentation is available through the Advanced Flight Systems EFIS/Engine Monitor.

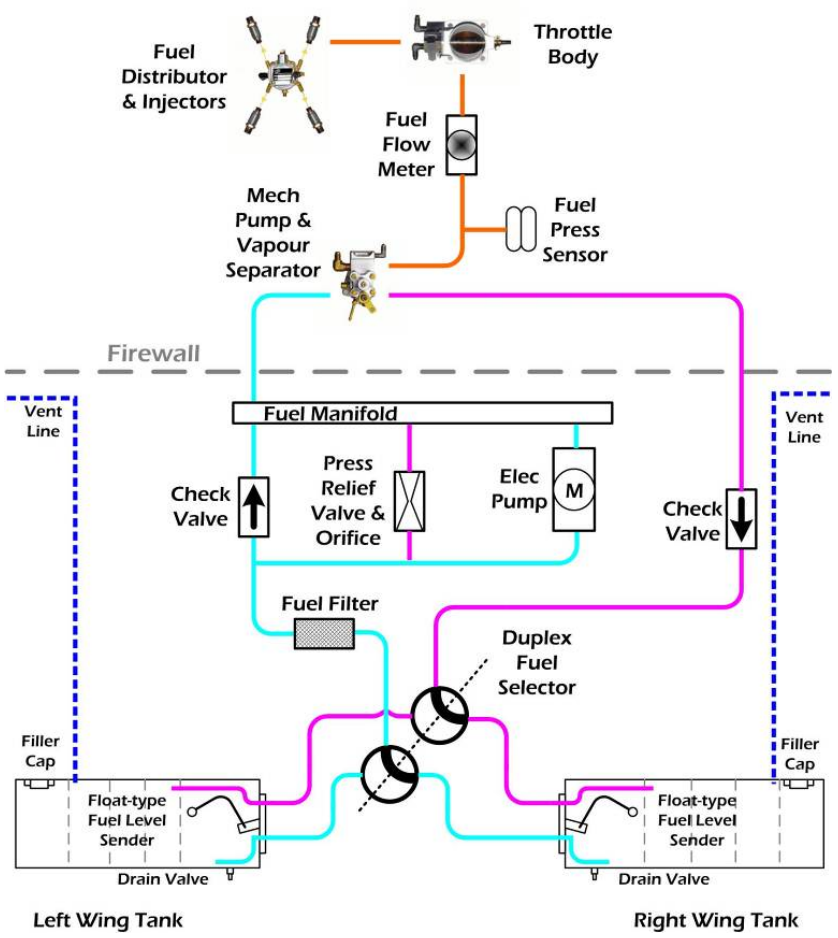
All engine data of interest is available:

- RPM
- Manifold Pressure
- Cylinder Head Temperature for each cylinder

- **Exhaust Gas Temperature for each cylinder**
- **Oil Temperature**
- **Oil Pressure**
- **Fuel Pressure**
- **Fuel Flow**

To allow for normal oil temperatures in wintertime, an oil cooler airflow shutter is installed. Its position is semi-permanent. No cockpit controls are available, however, its setting can be changed to one of the predetermined positions through a handle/latch accessible through the oil filler door in the cowling.

7.10 Fuel system



There are 2 integral wing tanks, with a capacity of 21USG/79l each giving a total system capacity of 42USG/157l.

They have fixed-low-lying pickups, meaning fuel can only be fed at zero to

positive load factors.

Each tank has a mechanical "float type" fuel sender installed. Although they are carefully calibrated, a visual check of fuel quantity / dipstick is recommended before flight.

Each tank is vented via a line that enters the fuselage and terminates near the firewall on the belly. The vent lines are protected by a screen from insects etc... They should be verified unobstructed during the walk-around inspection.

Each tank has one drain valve at the bottom, mainly to remove any water that could have entered the tank. They also work well as a grounding point during refuelling.

Due to the construction of various chambers in the tanks, fuel will take a while to balance from the chamber with the nozzle to the rest of the tank. When intending to "top it off", it has to be done in several steps and with a bit of patience.

The Fuel Selector is a Andair duplex fuel selector. It simultaneously selects / shuts off both the feed and return lines from each tank.

There are 3 positions, "LEFT", "RIGHT" and "OFF". To select off, the safety latch has to be lifted while turning the handle simultaneously.

The Fuel Pump is the standard Van's Fuel Injection pump kit, produced by "Airflow Performance".

First the fuel is filtered through a serviceable fuel filter, then it enters the fuel pump package.

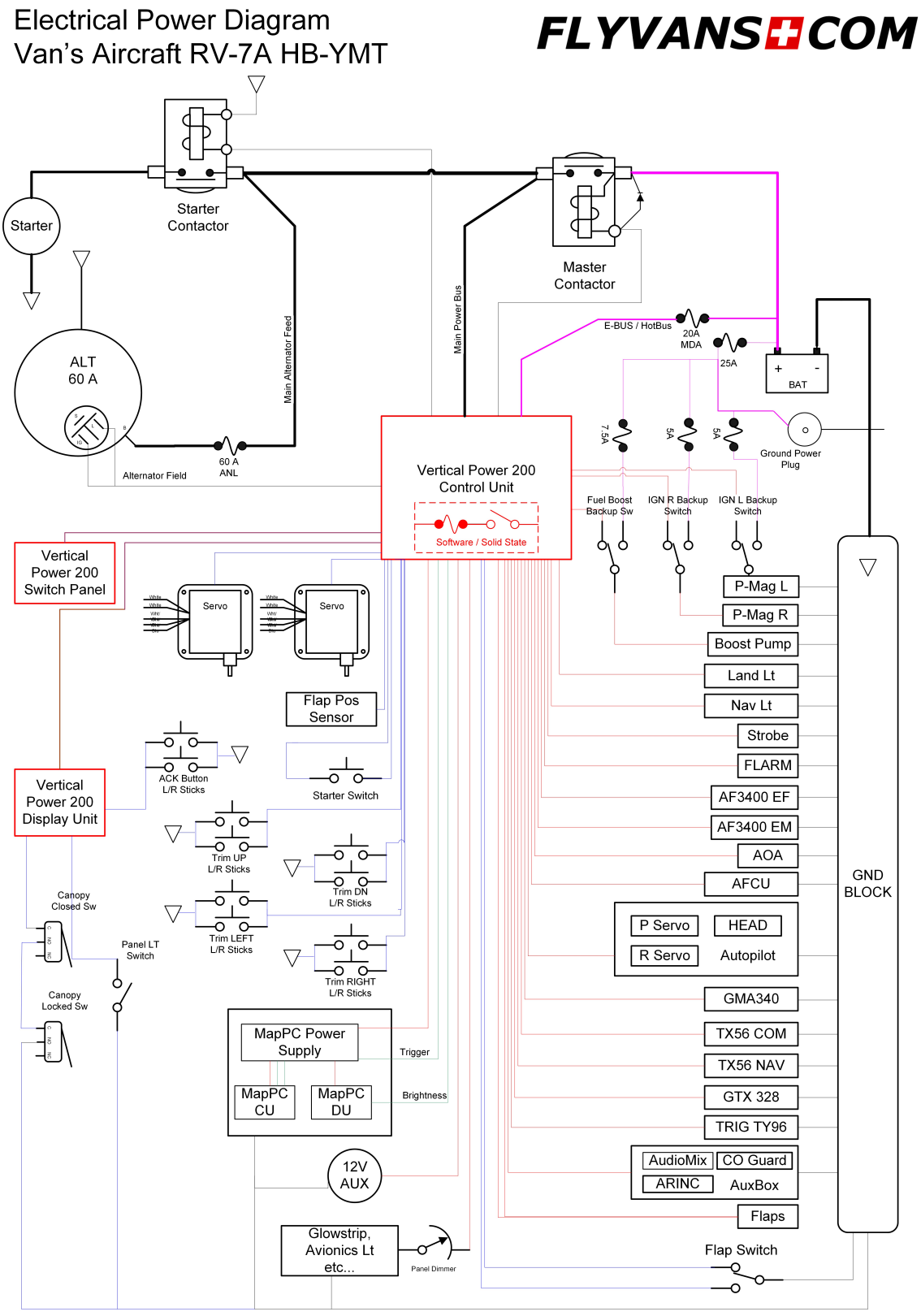
The package offers three flow paths. One is low-resistance unpowered through a check valve and only based on suction by the engine. A second flows through the electrical boost pump to the engine. And the third is a pressure relief circuit within the package in the event that the pump is running but no fuel is flowing downstream. Also, there is a tiny orifice in the check valve, whose function is to relief pressure when the whole system is unpowered/airplane parked.

Due to the characteristic of the fuel system, the electric boost pump is only needed for engine start. Thereafter it only serves as a backup in case of mechanical pump failure. If the boost pump is turned on during normal operation, the engine will run over-rich. Barely noticeable at high power settings but rich enough to kill/flood it at low power.

The fuel system features a fuel return line to each tank, providing a constant flow and with it Mogas compatibility.

Unusable fuel has been designated 2l/tank. Tests however have shown that the actual value is quite a bit lower, but the 2l is ample to cover for piping loss and various flight attitudes.

7.11 Electrical system



B. Daenzer / 25.02.2024

The VP200 solid state electrical system installed on this aircraft brings the advances of modern electronics to the electrical system. Instead of using traditional components such as mechanical switches, circuit breakers or fuses, the VP200 integrates everything, yet is designed for high reliability.

The advantages are numerous. Starting from ease of installation and ending with advanced switching of devices and integration into the typical flight phases. Also, the VP200 allows realtime monitoring of the state and condition that the electrical system operates in.

Reading the Vertical Power VP200 Operating Manual is highly recommended. This AFM only contains a subset of the information, considering the minimum knowledge required for the safe operation of the aircraft...

There are 3 main components of the system:



Control Unit
The invisible "heart" of the system containing all the solid state relays and most of the connections to devices, motors, sensors and switches.



Display Unit
The Vertical Power Display Unit is the main user interface to the system. The display shows engine data that it receives from the engine monitor over a serial link, aircraft configuration (flaps, trims) as well as everything related to the electrical system. Softkeys provide quick access to the most important functions in each mode.

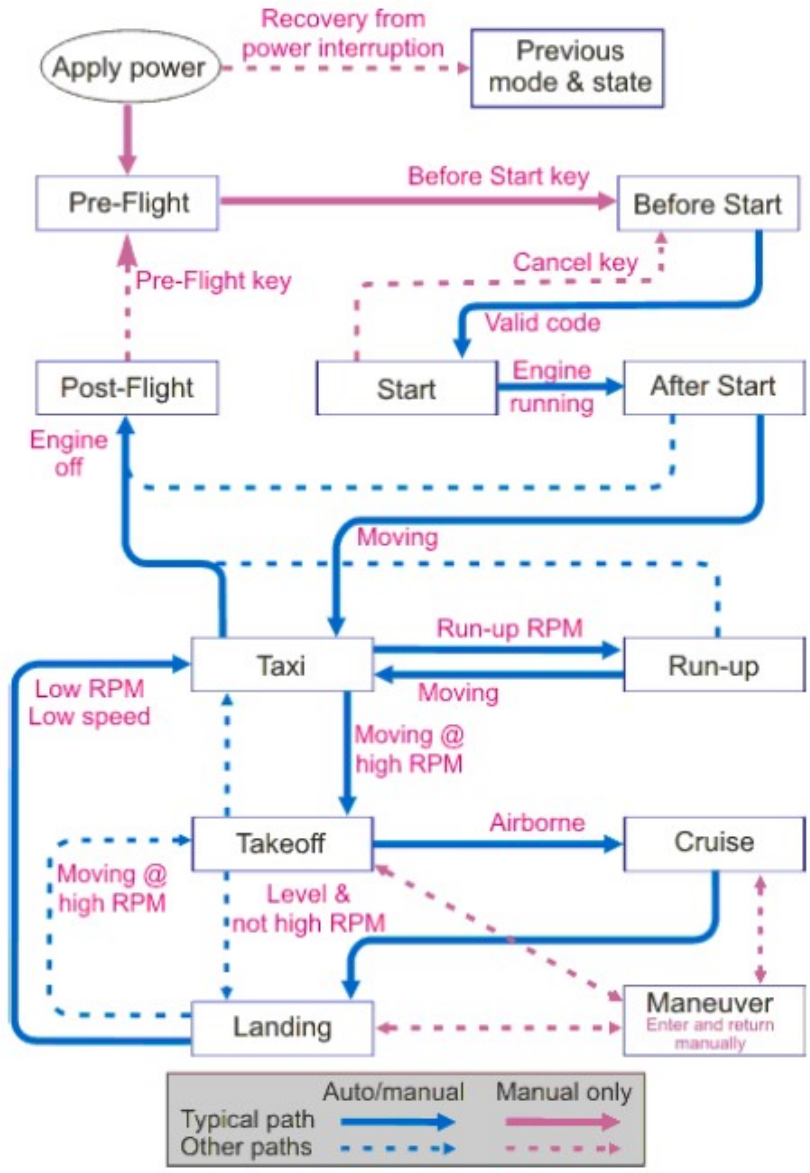


Switch Panel
A pilot accessible panel with a green master switch, red emergency button, three two-position switches with LEDs, a light sensor, and knob for controlling engine ignition (a MAG switch). Note that the magnetos are wired directly to the MAG switch on the SP and are NOT controlled by the VP-200 system.

This aircraft uses the so called "Configuration 1".

One Control Unit, a single battery and a single alternator make up the backbone of the system. The Battery is a PC680 from Odyssey Batteries, System Voltage 10.5-13 VDC. It is capable of sustaining a 5A load for over 2.5hrs. The Alternator is a 60A automotive unit.

The system is designed to present modes for a typical flight, based on which it can automatically control devices, present checklists and change softkey behaviour.



The modes can be switched either manually or automatically based on these conditions:

Before Start to Start:
When the correct keycode has been entered

Start to After-Start:
When engine RPM and oil pressure values are in normal range.

After-Start to Taxi:
When the aircraft is in forward motion.

Taxi to Run-Up:
When engine RPM is within +-100RPM of the Run-Up bug and aircraft stationary.

Run-Up to Takeoff:
When engine is at high RPM and aircraft greater than approx 30kts ground speed.

Takeoff to Cruise:
Based on time after takeoff, configurable, set to 3mins.

Cruise to Landing:
Based on engine RPM and groundspeed, both configurable.

Landing to Taxi:
After rollout based on ground speed.

Taxi to Post-Flight:
At engine shutdown and no movement of the aircraft.

Device / Description	Modes
12V AUX Cigarette Lighter Adapter	Always powered
AFCU Advanced Flight Control Unit	After-Start until entering Post-Flight
AoA Advanced Flight Systems AOA Sport	After-Start until entering Post-Flight
Audio Pnl Garmin GMA-340 Audio Panel	After-Start until entering Post-Flight
Autopilot Trutrak Digiflight II VSGV	After-Start until entering Post-Flight
Aux Box Combines the ARINC429 interface module, CO Guardian and AP-60 Audio Mixer. Faulting of the Aux Box Device will therefore result in loss of external audio warnings, loss of link from EFIS to Autopilot and loss of carbon monoxide alerts.	After-Start until entering Post-Flight
Boost Fuel Boost Pump	Manually switched
Cabin Bus Panel Lt Circuit	Manually switched
Com1 & Nav Trig TX56 Com & Nav	After-Start until entering Post-Flight
Com2 Trig TY96	After-Start until entering Post-Flight
EFIS1 Left Advanced Flight Systems EFIS	Always powered
EFIS2 Right Advanced Flight Systems EFIS	Always powered
Field Alternator Field	Managed by VP200.
Flarm Anti Collision System	Before-Start until entering Post-Flight
Ign L P-Mag electronic ignition external power	Start through Post-Flight

Device / Description	Modes
Ign R P-Mag electronic ignition external power	Start through Post-Flight
Land Lt HID Landing Light	Manually switched, VP200 SP
MPC brt MapPC DU Brightness	After-Start through Post-Flight
MPC cmd Triggers startup and shutdown of the MPC.	After-Start until entering Post-Flight
MPC pwr Stabilizes power to the MapPC to 12V within closer tolerances.	Start through Post-Flight
Nav Lt LED Navigation Light	Manually switched, VP200 SP
Strobe Lt Flashing Strobe Light	Manually switched, VP200 SP
Xpdr Garmin GTX-328 Mode-S Transponder	After start until entering Post-Flight

By default, a device is in the automatic mode and switched as described in the above table.

However, at any time, this logic can be overruled by manual input. This device is then no longer in automatic mode, indicated by a >> leading the device name.

By pressing the rotary button on the display unit, then hovering over the appropriate device, the softkeys change their functions to manually turn off, turn on or revert to automatic switching of the device. Pressing the rotary button again exits that menu.

The control unit always memorizes the state of a device. So if for an example the system is shut down manually, then turned on again, the same devices are immediately powered/have the same state as at the time of shutdown (within 1-4 seconds) while the display unit takes longer to boot up. (20s or so).

The system permanently monitors the pins for short circuits and over current conditions. If a device faults, it is automatically switched off, marked red, an alert triggered and the device automatically selected, showing details.

The fault status can be manually reset.

Load Analysis:

Alternator	Automotive	60A
Battery	Odyssey	PC-680 / 17Ah

Description	Peak Load	Normal Load
AFCU	0.1	0.1
AOA	0.1	0.1
Audio Panel	0.5	0.5
Autopilot	1.7	1.7
Aux Box	0.1	0.1
Boost Pump	4	4
Cabin Bus	0.2	0.2
Com1/Nav	4.2	1.0
Com2	1.3	0.5
EFIS1	1.3	1.3
EFIS2	1.4	1.4
Field	0.1	0.1
Flarm	0.1	0.1
IGN L	0.1	0.1
IGN R	0.1	0.1
Land Lt	7	3.5
Nav Lt	2.1	2.1
Strobe Lt	8	6
Xpdr	1	1
Aux 12V	(Max 10A)	0
Flaps	2	0
MapPC	3	2.7
Starter Ctc	3.6	0
Pitch and Roll Trim	0.2	0
VP200	1.2	1.2
Total	43.4 / (with Aux 53.4)	27.8 (with Aux 37.8)

Total System	
Alternator	60 A
Battery	17 Ah

Remark: The aux 12V plug is safetied by a 10A fuse and is intended to hook up additional units. In reality, consumption will be zero or near zero.

Conclusion: The capacity of the alternator is sufficient to support the complete system.

There are 3 backup circuits with switches in the case that the complete VP200 would be malfunctioning. One for the Boost Pump, one for each P-Mag external power, both directly attached to the battery and fused by automotive style blade fuses.

7.12 Pitot and static pressure systems

The single unheated Pitot tube below the left wing measures dynamic pressure and feeds it to the following instruments:

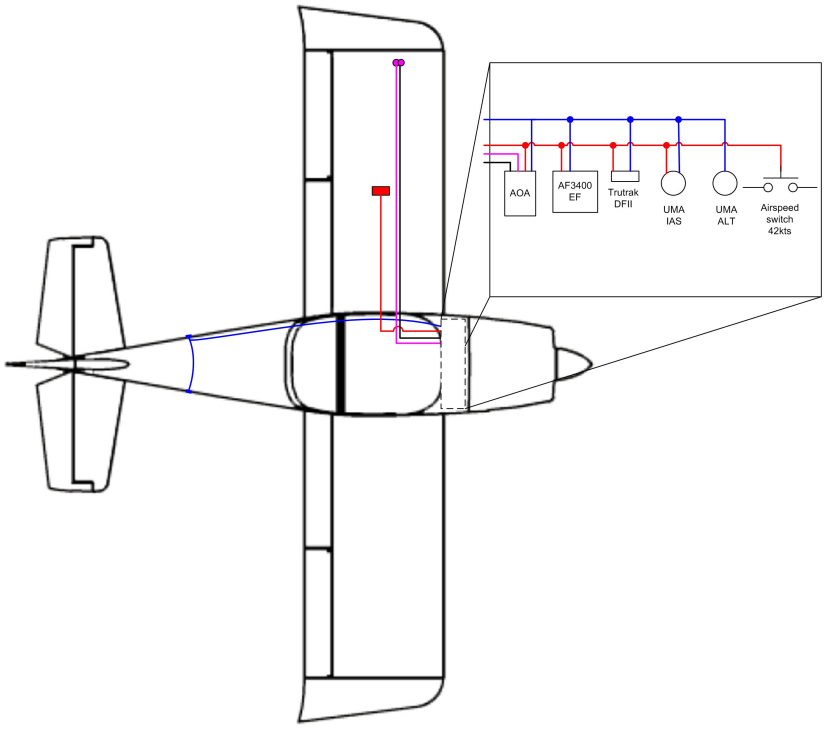
- **Backup Airspeed Indicator**
- **Air Data Computer part of the EFIS**
- **Angle of Attack CPU**
- **Trutrak Flight Systems Digiflight II VSGV Autopilot**

The single static system measures outside static pressure on the left and right side of the rear fuselage. It feeds into the following instruments:

- **Backup Airspeed Indicator**
- **Backup Altimeter**
- **Air Data Computer part of the EFIS**
- **Angle of Attack CPU**
- **Trutrak Flight Systems Digiflight II VSGV Autopilot**

Pitot Static System
Van's Aircraft RV-7A HB-YMT

FLYVANS.COM



B. Daenzer / 26.06.2010

7.13 Miscellaneous equipment

ELT

A Kannad AF-406 Compact ELT is fitted in the tail, which can be controlled through a remote control panel.

CO Guardian CO Detector

A carbon monoxide detector detects unusual concentrations of carbon monoxide which cannot be smelled by humans. However, presence of CO is very dangerous as it could incapacitate the pilot without previous warning. Most likely source would be a leak in the exhaust system / cabin heating system.

7.14 Avionics

Advanced Flight Systems AF3400 EF and EM electronic flight information system (EFIS)

All essential flight data is displayed through this system. Refer to the Operating Manual from www.advanced-flight-systems.com
The left unit physically contains the air data and solid state gyro part, while the right side unit contains all the engine sensor interfaces. All the data however is interchanged and can be displayed on each screen. The units have their own internal backup battery and could continue to work (at reduced brightness) for up to an hour after an electrical bus failure.

MapPC Embedded PC solution.

This unit is a custom development. Primary function is to provide navigation and flight management functions. Due to the possibilities of the platform however, further functions like entertainment, connectivity etc... are also possible. The unit is considered non-essential for flight.

Advanced Flight Control Unit (AFCU)

Another custom development, this is essentially a remote control interface to the EFIS. Providing more discrete rotary buttons for each function to make up for the shortcomings of one single rotary per EFIS screen. The unit is considered non-essential for flight.

Advanced Flight Systems AOA Sport

This system displays the current flight AOA in a row of LED's. The AOA is calculated based on pitot, static and on top wing/bottom wing differential pressures. It inherently serves as a stall warning device, also featuring audio warnings.

PowerFLARM Fusion Anti Collision System

A PowerFLARM fusion unit is fitted, mainly to warn against other light aircraft and gliders, which are equipped with FLARM in central Europe. Flarm also contains a passive ADS-B reception functionality. The unit is hidden behind the instrument panel but interfaces with a serial interface into the MapPC. Traffic is then displayed on the map, along with warning messages and sounds (if so configured). www.flarm.com for further system description.
The flarm source can also be used via Wifi with tablets:
SSID: HBYMT-flarm WPA2-PSK: flyvanscom

Garmin GMA-340 Audio Panel

Refer to the Garmin GMA-340 pilots guide, available on www.garmin.com
The main function is to select audio sources, which radio to transmit and adjust volumes.

Trig TX56 Com1 / Nav

The TX56 provides many features in a single unit. As a Com1 transmitting via a belly mounted com antenna, it provides 8.33KHz capable voice communication. Dual Watch is available via the MON button.
It also serves as a VOR/ILS/GP receiver, with the output being displayed on the EFIS.
A transmit interlock lowers the squelch while Com2 is transmitting.
For more details refer to the Trig TX56 operations manual available at www.trig-avionics.com

Trig TY96

Com2 radio, 8.33 capable, connected to a second exterior belly antenna. Dual Watch is available via the MON button.
A transmit interlock lowers the squelch while Com1 is transmitting.
Refer to the TY96 operations manual available at www.trig-avionics.com

Garmin GTX-328 Mode-S Transponder

The transponder serves as the aircraft portion of the ATCRBS (Air Traffic Control Radar Beacon System). Refer to the Garmin GTX-328 pilots guide at www.garmin.com for further information.

Trutrak Flight Systems "AFS Pilot" Autopilot

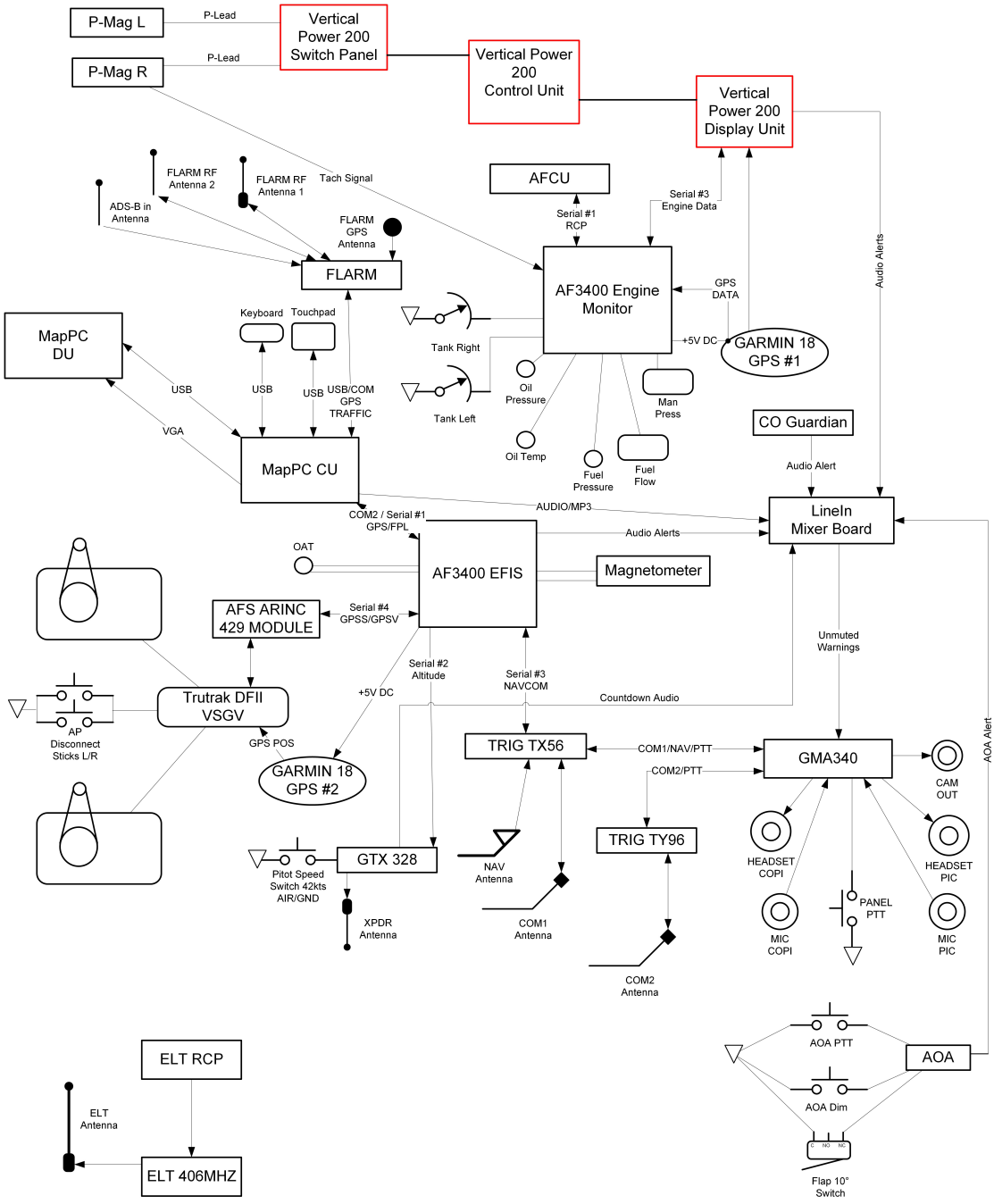
The autopilot is a close sibling to the Digiflight II VSGV, also from Trutrak. The main interfaces for the pilot are the CWS/AP disconnect pushbutton on the control stick and the EFIS button on the autopilot. Pressing the EFIS button slaves the autopilot to the commands from the EFIS. Pressing the CWS/disconnect button shortly while the AP is engaged will disconnect

the autopilot. Pressing the CWS button for more than 2 seconds will turn on the AP if not already and slave it to the current aircraft track and vertical rate. The Autopilot is also equipped with an autotrim module, assuring a trimmed out aircraft upon AP disconnection.

Overview of Avionics interconnections:

Serial / Data / Audio Connection Diagram
Van's Aircraft RV-7A HB-YMT

FLYVANS.COM



B. Daenzer / 12.03.2024

8 AEROPLANE HANDLING, SERVICING AND MAINTENANCE

8.1 Introduction

8.2 Aeroplane inspection periods

8.3 Aeroplane alterations or repairs

8.4 Ground handling/Road transport

8.5 Cleaning and care

8.1 Introduction

This section contains recommended procedures for proper ground handling and servicing of the aeroplane. It also identifies certain inspection and maintenance requirements which must be followed if the aeroplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2 Aeroplane inspection period

Regular inspection intervals:

- **50 hour inspection:**
- **100 hour inspection:**
- **Annual condition inspection**

Refer to the maintenance documentation regarding the contents.

Some equipment parts have individual servicing recommendations by the supplier, which are listed for information. Depending on the ever-changing regulatory situation, operation "on condition" beyond the recommended intervals may be considered/permitted:

- **Oil Filter ..... 50 hrs**
- **Spark Plugs ..... 150 hrs approx**
- **Engine ..... 2400hrs TBO > EAS OCM**
- **Fuel injection system: ..... 2000hrs TBO**
- **P-Mags ..... Engine TBO (2400hrs)**
- **Propeller ..... 2400 hrs (or 6 years) > EAS OCM**
- **Governor ..... 2400 hrs (or 7 years)**
- **Starter ..... Engine TBO (2400hrs)**
- **ELT Battery ..... Replace every 6 yrs**
- **CO Guardian ..... Service every 5 yrs**
- **Magnetic compass ..... Compensate every 2 yrs**

8.3 Aeroplane alterations or repairs

It is essential that the EAS be contacted prior to any alterations on the aeroplane to ensure that airworthiness of the plane is not violated.

Major repairs which may impair the airwortiness of the aeroplane when improperly done must be proposed to the EAS for comment and / or approval.

8.4 Ground handling

When taxiing the aircraft ensure that the taxi path and propeller back blast areas are clear. In the first few feet of taxi apply the brakes to check for effectiveness. Do not operate the engine at high RPM, taxi with care - the RV-7A can take off at throttle settings no higher than those needed for engine run up and magneto checks.

Ground Handling with Towbar

A towbar can be temporarily attached on the nose wheel fork. There are two openings in the fairing to permit the towbar to clamp on two dedicated bolts. Make sure the ignition switch is turned OFF. While the aircraft can be pushed/pulled easily on the propeller, be careful about inadvertent turning/snapping of the propeller or damaging the propeller by hitting the towbar. Be careful when pushing the aircraft back, as the castering nosewheel fork has a limited range of motion.

Ground Handling without Towbar

The aircraft can be pushed back on the wing leading edge, horizontal stabilizer or the propeller. Pulling on the propeller and/or pushing on the footsteps from behind works best for forward motion. Be careful when pushing the aircraft back, as the castering nosewheel fork has a limited range of motion.

Parking

For short durations, the parking brake should be sufficient to secure the aircraft.
For longer durations, chocks should be placed at least on the nose wheel. Also, consider installing the lightweight canopy cover, pitot tube protection and air inlet covers .

Mooring

There are provisions for 3 removable tie-down rings. One below each wing and one below the tail bulkhead. The tie-down rings can be stored in the baggage compartment sidewalls.

Jacking

There are 3 main possibilities for jacking:

- Lifting the nosegear at the fork nut
- Lifting each wing by pushing up on a special insert that attaches to the tie-down ring hardpoints.
- Lifting at the gear leg close to the wheel/brake by using a special jack kit.

8.5 Cleaning and care

Clean all frontal surfaces (wing leading edges, propeller, cowling etc...) with water and a sponge, then dry it with a buckskin after every flight.

Clean the canopy with water and paper towels.

Polish the airplane when the clear coat starts to wear out.

9 SUPPLEMENTS

9.1 Introduction

9.2 List of inserted supplements

9.3 Supplements inserted

9.1 Introduction

This section contains the appropriate supplements necessary to safely and efficiently operate the aeroplane when equipped with various optional systems and equipment not provided with the standard aeroplane.

9.2 List of inserted supplements

Currently N/A

9.3 Supplements inserted

Each supplement should normally cover only a single system, device or piece of equipment such as an autopilot, ski or navigation system.

The supplement may be issued by the aeroplane manufacturer or by any other manufacturer of the applicable item.

The supplement must be approved by the EAS and must contain all deviations and changes relative to the basic Flight Manual.
Each supplement should be a self-contained, miniature Flight Manual with at least the following:

Section 1 General

The purpose of the supplement and the system or equipment to which it specifically applies should be stated.

Section 2 Limitations

Any change to the limitations, markings or placards of the basic Flight Manual should be stated. If there is no change, a statement to that effect should be made.

Section 3 Emergency procedures

Any addition or change to the basic emergency procedures of the Flight Manual should be stated. If there is no change, a statement to that effect should be made.

Section 4 Normal procedures

Any addition or change to the basic normal procedures of the Flight Manual should be stated. If there is no change, a statement to that effect should be made.

Section 5 Performance

Any effect of the subject installation upon aeroplane performance as shown in the basic Flight Manual should be indicated. If there is no change, a statement to that effect should be made.

Section 6 Weight and balance

Any effect of the subject installation upon weight and balance of the aeroplane should be indicated. If there is no change, a statement to that effect should be made.)