RV4

### RV-4 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span</td>
<td>23’0”</td>
</tr>
<tr>
<td>Wing Loading (lbs/sq ft)</td>
<td>13.64</td>
</tr>
<tr>
<td>Length</td>
<td>20’4”</td>
</tr>
<tr>
<td>Power Loading (lbs)</td>
<td>9.375 (160 hp)</td>
</tr>
<tr>
<td>Height</td>
<td>5’5”</td>
</tr>
<tr>
<td>Engine (hp)</td>
<td>150-180</td>
</tr>
<tr>
<td>Wing Area (sq. ft)</td>
<td>110</td>
</tr>
<tr>
<td>Propeller</td>
<td>Fixed or C/S</td>
</tr>
<tr>
<td>Empty Weight (lbs)</td>
<td>933</td>
</tr>
<tr>
<td>Fuel Capacity (US gallons)</td>
<td>32</td>
</tr>
<tr>
<td>Gross Weight (lbs)</td>
<td>1500</td>
</tr>
<tr>
<td>Baggage</td>
<td>100</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

## SECTION

1. GENERAL
2. LIMITATIONS
3. EMERGENCY PROCEDURES (Stall & Spin recovery)
4. NORMAL PROCEDURES
5. PERFORMANCE
6. WEIGHT & BALANCE
7. SYSTEMS and OPERATION of SYSTEMS
8. GROUND HANDLING, SERVICE & MAINTENANCE
9. EQUIPMENT LISTING (Supplier listing)

## APPENDICIES

1. Electrical Diagrams
2. Performance curves
3. Weight & Balance
4. Maintenance
### SECTION 1
### GENERAL

#### 1.1 General

This Pilot’s operating handbook is designed as an appropriate information manual and to provide information relevant to achieve maximum utilization of the Aircraft. It is not designed to be a substitute for adequate and competent flying instruction and should not be used for operational purposes unless kept up to date.

Assurance that the Aircraft is airworthy is the responsibility of the owner. The Pilot in command is responsible for ensuring the Aircraft is safe for flight and for operating within the limits detailed in this handbook and as displayed on placards and instrument markings in the Aircraft and in accordance with current FAA regulations.

#### 1.2 ENGINE

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Manufacturer</td>
<td>Lycoming</td>
</tr>
<tr>
<td>Model Number</td>
<td>E 2 D</td>
</tr>
<tr>
<td>Rated Horsepower</td>
<td>150</td>
</tr>
<tr>
<td>Rated Speed (rpm)</td>
<td>2700 (Note Propeller limitation)</td>
</tr>
<tr>
<td>Displacement (Cubic inch)</td>
<td>320</td>
</tr>
<tr>
<td>Compression Ratio</td>
<td>7.00:1</td>
</tr>
<tr>
<td>Type</td>
<td>Four cylinders, Direct drive</td>
</tr>
<tr>
<td></td>
<td>Horizontally Opposed, Air Cooled</td>
</tr>
</tbody>
</table>

#### 1.3 PROPELLER

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Catto</td>
</tr>
<tr>
<td>Model</td>
<td>6672</td>
</tr>
<tr>
<td>Number of blades</td>
<td>3</td>
</tr>
<tr>
<td>Diameter</td>
<td>66 INS</td>
</tr>
<tr>
<td>Type</td>
<td>Fixed pitch</td>
</tr>
<tr>
<td>Limitation</td>
<td>3200 rpm</td>
</tr>
</tbody>
</table>

#### 1.4 FUEL

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>32 Gal (US)</td>
</tr>
<tr>
<td>Useable Fuel</td>
<td>30 Gal (US)</td>
</tr>
<tr>
<td>Fuel Grade, Aviation</td>
<td>100LL</td>
</tr>
</tbody>
</table>
1.5 OIL

Oil Capacity 8 Qts.

Specification Ref Lycoming Manual
Viscosity to Ambient Temp for starting:

<table>
<thead>
<tr>
<th>Condition</th>
<th>SINGLE</th>
<th>MULTI - GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 60 F</td>
<td>SAE 50</td>
<td>SAE 40 or 50</td>
</tr>
<tr>
<td>30 F to 90F</td>
<td>SAE 40</td>
<td>SAE 40</td>
</tr>
<tr>
<td>0 F to 70 F</td>
<td>SAE 30</td>
<td>SAE 40 or 20W-30</td>
</tr>
<tr>
<td>Below 10 F</td>
<td>SAE 20</td>
<td>SAE 20W-30</td>
</tr>
</tbody>
</table>

1.6 WEIGHTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum take off/landing weight</td>
<td>1550 lbs</td>
</tr>
<tr>
<td>Max Baggage Weight</td>
<td>100 lbs (subject to Weight &amp; Balance)</td>
</tr>
<tr>
<td>Standard empty weight (Includes full oil)</td>
<td>933 lbs</td>
</tr>
<tr>
<td>Maximum Useful load (Subject to Weight &amp; Balance)</td>
<td>617 lbs</td>
</tr>
</tbody>
</table>

1.7 SPECIFIC LOADINGS

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing loading</td>
<td>14.09 lbs per sq ft</td>
</tr>
<tr>
<td>Power loading</td>
<td>10 lbs per hp</td>
</tr>
</tbody>
</table>
SECTION 2
LIMITATIONS

2.01 Airspeed Limitations

<table>
<thead>
<tr>
<th>INDICATED AIR SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never exceed</td>
</tr>
<tr>
<td>Normal operations, smooth air</td>
</tr>
<tr>
<td>Do not perform full or abrupt Control movements above.</td>
</tr>
<tr>
<td>Flap extension speed:</td>
</tr>
<tr>
<td>20 deg flap</td>
</tr>
<tr>
<td>40 deg (full) flap</td>
</tr>
</tbody>
</table>

NOTE: Because of high ratio of top speed to stall speed and Maneuvering speed the Aircraft is more susceptible to pilot induced overstresses than most other contemporary aerobatic airplanes. THE PILOT CAN THEREFORE EASILY IMPOSE DESTRUCTIVE LOADS ON THE AIRFRAME ABOVE THE RELATIVELY LOW MANEUVERING SPEED. NOTE LIMITATIONS, EXERT CAUTION AND FLY ACCORDINGLY.

2.02 Airspeed indicator Markings

<table>
<thead>
<tr>
<th>MARKING</th>
<th>INDICATED AIR SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red line (Never exceed)</td>
<td>212 mph</td>
</tr>
<tr>
<td>Black Line (Maneuvering speed max)</td>
<td>134 mph</td>
</tr>
<tr>
<td>Yellow (Caution - smooth air or light turbulence)</td>
<td>180/210 mph</td>
</tr>
<tr>
<td>Top Green Arc (max structural cruise)</td>
<td>180 mph</td>
</tr>
<tr>
<td>Bottom Green Arc (Flapless stall)</td>
<td>54 mph</td>
</tr>
<tr>
<td>Top White Arc (max speed full flap)</td>
<td>100 mph</td>
</tr>
<tr>
<td>Bottom White Arc (Stall full flap)</td>
<td>50 mph</td>
</tr>
</tbody>
</table>

2.03 Power plant limitations

Based on installed engine Lycoming O320 E2D

<table>
<thead>
<tr>
<th>INDICATED AIR SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Horse Power</td>
</tr>
<tr>
<td>Max Engine Speed</td>
</tr>
<tr>
<td>Maximum Oil Temperature</td>
</tr>
<tr>
<td>Desired Oil Temperature</td>
</tr>
<tr>
<td>Min. Oil Pressure</td>
</tr>
<tr>
<td>Max Oil Pressure</td>
</tr>
<tr>
<td>Max Oil Sump Capacity</td>
</tr>
<tr>
<td>Min Oil Sump Capacity</td>
</tr>
</tbody>
</table>
Fuel Pressure
- Min (red line): 0.5 psi
- Desired: 3 psi
- Max (red line): 8 psi

Fuel Grade (minimum octane): 80 Red

Propeller
- Max RPM: 3200 rpm

Operating Approved Cylinder Head Temperature (CHT)
- High performance cruise: 435 Deg. F
- Economy cruise: 400 Deg. F
- Min for maximum life: 150 Deg. F

Max cooling target on decent 50 Deg F/min to avoid shock cooling, preferably 25 Deg F/min.

2.04 Engine instrument markings

Tachometer
- Normal operating range: Green Arc
- Red Line (Max Continuous Power): 2700 rpm

Oil Temperature
- Green Arc Normal range: 75 to 245 Deg. F
- Red line Max: 245 Deg. F

Oil Pressure
- Green Arc Normal range: 60 to 90 psi
- Yellow Arc Caution (Idle): 25 to 60 psi
- Red line (Minimum): 25 psi
- Red line (Max): 90 psi

Fuel Pressure
- Green Arc Normal range: 0.5 to 8 psi
- Red line (Minimum): 0.5 psi
- Red line (Max): 8 psi

Cylinder Head Temperature
- Red line: 450 Deg. F
- Green Ark Normal range: 300 to 450 Deg. F
2.05 Weight Limitations

Gross Weight (Subject to Weight & Balance) 1550 lbs
Aerobatic Gross weight. With aft CG 27.5% 1375 lbs
Of cord or (15.9” aft of leading edge)

Maximum baggage (Subject to Weight & Balance) 100 lbs

2.06 Center of Gravity Limits

Design CG range is:
Forward limit 15% Wing chord 8.7" from L.E. = 68.7" aft of datum
Rearward limit 30% Wing chord 17.4" from L.E. = 77.4" aft of datum

Note: datum 60" forward of L.E. (leading edge of wing)

2.07 Maneuvering Limits

Refer to Maneuvering speed and weight and balance limitations when contemplating aerobatics. This is highest speed at which full and abrupt control can be applied without exceeding design strength. This is not highest permissible aerobatic entry speed, for any speed above maneuvering speed control inputs must be limited to less than full.

Due to wide speed range entry speeds for some maneuvers can vary over a wide range. For vertical maneuvers (i.e. Loops, Immelmann turns and horizontal eights) entry speed has an inverse relationship to G forces required to complete the maneuver. An entry speed at lower speeds will require a higher G pull up than for entry near top end of speed range. **Note that due to relatively light control stick forces and high aerodynamic cleanliness excessive speed build up can occur very quickly, and particularly in a dive. Due to light control forces and aerodynamic cleanliness the RV 4 is a Pilot limited aircraft - it is the pilot’s responsibility not to overstress the aircraft.** Following are guidelines only as starting point for aerobatic testing.

<table>
<thead>
<tr>
<th>Maneuver Type</th>
<th>Speed Range</th>
<th>Kts Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loops, Horizontal Eights</td>
<td>140-190 mph</td>
<td>120-165 Kts</td>
</tr>
<tr>
<td>Immelmann turns</td>
<td>150-190 mph</td>
<td>130-165 Kts</td>
</tr>
<tr>
<td>Aileron Rolls, Barrel rolls</td>
<td>120-190 mph</td>
<td>105-165 Kts</td>
</tr>
<tr>
<td>Snap Rolls</td>
<td>80-110 mph</td>
<td>70-95 Kts</td>
</tr>
<tr>
<td>Vertical rolls</td>
<td>180-190 mph</td>
<td>155-165 Kts</td>
</tr>
<tr>
<td>Split -S</td>
<td>100-110 mph</td>
<td>87-95 Kts</td>
</tr>
</tbody>
</table>
2.08 Flight Load Factors

The structure has been designed to withstand aerobatic load of 6 G positive and 3 G negative (plus 50% safety factor on design limit of negative 6 G) at aerobatic gross weight of 1375 lbs. This is the maximum load the airframe structure is designed to withstand indefinitely. The calculated breaking strength is 9G at which it will withstand load for 3 seconds (assuming no airframe deterioration, fatigue, material flaws or construction errors). Approaching this 9G load could permanently weaken the structure even if failure does not occur.

2.09 Placards

<table>
<thead>
<tr>
<th>Location</th>
<th>Placard</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument Panel</td>
<td>SOLO – Front Seat Only</td>
<td></td>
</tr>
<tr>
<td>Pilot Compartment, LHS</td>
<td>AEROBATIC LIMITATIONS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refer to the Operating limitation for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>aerobatic maneuvers permitted in this aircraft</td>
<td></td>
</tr>
<tr>
<td>Passenger Compartment, LHS</td>
<td>This Aircraft is amateur built and</td>
<td>This aircraft is built to a higher standards</td>
</tr>
<tr>
<td></td>
<td>does not comply with federal safety</td>
<td></td>
</tr>
<tr>
<td></td>
<td>regulations for standard aircraft</td>
<td></td>
</tr>
<tr>
<td>Passenger Compartment, RHS</td>
<td>Maximum Capacity of this compartment 240 lbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check Weight and Balance</td>
<td></td>
</tr>
<tr>
<td>Baggage Compartment, RHS</td>
<td>Maximum Capacity of this compartment 100 lbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check Weight and Balance</td>
<td></td>
</tr>
<tr>
<td>Instrument Panel RHS</td>
<td>Do not solely rely on fuel level instrument</td>
<td></td>
</tr>
<tr>
<td></td>
<td>to determine the fuel levels in the aircraft</td>
<td></td>
</tr>
</tbody>
</table>

2.10 Types of Approved Operation

The FAA approves this aircraft for Day / Night V.F.R. operation
SECTION 3  
EMERGENCY PROCEDURES  
(Stall and Spin recovery)

3.01 General

Recommended procedures for dealing with various types of emergency and critical situations are detailed in this section. They are suggested as the best course of action based on the aircraft structure, equipment and systems configuration. They are however not a substitute for sound judgment and common sense and are NOT intended to replace pilot training. Pilots should familiarize themselves with the procedures and be prepared to take appropriate action should an emergency arise.

3.02 Emergency Procedures Checklist

Power loss on takeoff

**Sufficient Runway Ahead**
IF AIRBORNE DON’T STALL
Throttle............................CLOSE
Stop Straight Ahead

**Insufficient Runway Ahead**
IF AIRBORNE DON’T STALL
Throttle............................CLOSE
Brakes............................as required
Mixture............................IDLE CUT OFF
Fuel................................SELECT OFF
Fuel Pump............................OFF
Magnetos............................OFF
Masters..............................OFF
Flaps .....................AS REQUIRED
Maneuver to land. DON’T STALL

Power loss in flight
Trim....................Best Glide 71kts
Carb Heat.....................ON
Fuel Pump............................ON
Primer.............CHECK LOCKED
Mixture............................RICH
Fuel Selector...To FULLEST TANK
Magnetos.........................ON
Engine Gauges..................CHECK

If Power not restored
Mags L then R & BOTH
Throttle & Mixture:
TRY DIFFERENT SETTINGS

Committed to Power off landing
Fuel........................................OFF
Mixture..............IDLE CUT OFF
Fuel Pump............................OFF
Throttle................CLOSED
Magnetos............................OFF
Canopy Catch...........RELEAS
Harnesses.......................TIGHT
Radio................MAYDAY CALL
Masters............................OFF

Engine Rough
Carb Heat.........................ON
Primer..........................LOCKED
If rough after 1 Min.
Carb Heat.......................OFF
Mixture... ADJUST SMOOTH
Fuel Pump ....................ON
Fuel..............................Change Tanks
Mags..............L then R & BOTH
Run on Best setting
Nearest suitable landing
Prepare power off landing

Oil Pressure loss
Land ASAP and investigate
Prepare Power off Landing

Fuel Pressure Loss
Fuel Pump............................ON
Fuel.............Change tanks if fuelled

High Oil Temperature
Land ASAP and investigate
Prepare Power off Landing
Engine fire during Start
Starter.............CRANK ENGINE
Mixture..................IDLE CUT OFF
Throttle..................OPEN
Fuel pump................OFF
Fuel Selector..............OFF
Advise ATC if continues
Masters..............................OFF
Abandon if fire continues

Engine Fire in Flight
Fuel Selector..................OFF
Throttle..................CLOSED
Mixture..................IDLE CUT OFF
Fuel PUMP......................OFF
Cabin Heat........................OFF
Magnetos........................OFF
Prepare emergency Land

Electrical Fire (Smoke in Cabin)
Masters........................OFF
Cabin Heat........................OFF
USE EXTINGUISHER WITH CAUTION
Open Air vents to clear Cabin
Electrical switches..............OFF
Masters........................ON
Isolate faulty circuit
Reinstate Essential services
Land ASAP

Cabin Fire
Air Vents..............CLOSE
USE EXTINGUISHER WITH CAUTION
Open Air vents to clear Cabin
Land ASAP

Alternator Failure
Verify failure from instruments
Reduce electrical load

Check Circuit breakers
Masters OFF 1 Second then ON
(Resets voltage regulator)
IF no output
Alternator switch...............OFF
Reduce electrical load
Land ASAP

Radio Failure
Radio..................Check ON
Radio Master.............Check ON
Volume....................Turned UP
SQUELCH..................Turned UP
Headset................Plugged IN
Circuit Breaker.........Check
Frequency...............Selected
IF FAILURE CONFIRMED
Transponder..............SET 7600
Transmit (Rx may have failed)
Land ASAP
Consider Emergency Radio if Available

Brake Failure on Ground
Throttle...............CLOSE
STEER TO GRASS AREA INTO WIND
Mixture ...........IDLE CUT OFF
Magnetos...............OFF
Advise ATC
Shut Down Checks

Brake failure after touchdown
Overshoot Action
Radios ................GIVE DETAILS
Land on SAFE GRASS LONGEST
RUNWAY INTO WIND
Shut Down Checks
Await assistance
Ditching in water - Life jackets to be worn for Sea Crossing

### Ditching Procedure

- **Always Check DIRECTION OF SWELL and WIND**
- Turn towards LAND/SHIPPING
- Trim .......................BEST GLIDE 71 Kts
- Plan landing.................ALONG SWELL
- OR
  - No Swell.................INTO WIND
  - Check Failure...ATTEMPT CORRECTION
  - Radio.........................MAYDAY
  - Engine............Shut Down Procedure

| Harnesses..........................TIGHT |
| Cabin Latch...UNLOCK. NOT OPEN    |
| Final Approach. Master OFF         |
| NO FLAP SELECTED (Pitches DOWN)    |
| HOLD OFF “SPASH” TAIL DOWN         |

### Leaving Aircraft

| Seat Belts...............Release   |
| Canopy.....................Open    |
| Exit onto Wing                |
| Inflate Life Jacket           |

### 3.03 Notes on Emergency procedures

#### 3.03.01 Engine power loss during takes off

Action depends on circumstances. If sufficient runway remains then land straight ahead. If insufficient runway remains, maintain a safe airspeed and make only shallow turns to avoid obstructions. Use of flap depends on circumstances; they would normally be fully extended for landing. With sufficient altitude and safe speed established engine restart procedure can be initiated. Fuel pump on with mixture rich, carburetor heat should be on and the primer checked to ensure it is locked. Engine failure due to fuel exhaustion may require up to 10 seconds after switching tanks.

#### 3.03.02 Engine power loss in flight

Complete power loss is usually due to fuel interruption, if this is so power will be restored when fuel flow is itself restored. The first action is to trim for best glide 71 KIAS and establish if there is time to attempt restart or immediately prepare for an emergency “Power Off” landing.

Restart procedure is to switch to the other tank (provided it is fuelled), turn on the fuel pump and move mixture to rich and the carburetor heat on. Check engine gauges for an indication of cause and if no fuel pressure is indicated change tank selection. Primer should be locked. When power is restored move carburetor heat to cold and turn fuel pump off.

If engine still fails to restart and time permits turn the ignition to “L” then “R” then backs to both. Try moving the throttle and/or mixture to different settings. This may restore power if mixture is too rich or too lean or if there is a partial fuel blockage. Try the other tank; water in the fuel may take time to clear the system. Allowing the engine to windmill may restore power. If failure is due to water then fuel pressure will be normal. Empty fuel lines may take ten seconds to refill.

Power Off landing is covered in section 3.02.03
3.03.03  Power Off Landing

The initial action is **ALWAYS TRIM FOR BEST GLIDE 71 Kts IAS** if power restoration measures are ineffective and time allows check for airports/strips available and notify of problem/intent if possible.

Identify a suitable field, planning an into wind landing. Try to be 1000 ft at the end of the downwind leg to make a normal landing. Aim initially for the center of the field (drag with a wind milling propeller will be higher than you are used to) and only lower final stages of flap when you judge you can reach the field. Plan for slowest short field landing but do not stall.

When committed to landing close throttle, turn off masters and ignition switches. Turn fuel selector to off and move mixture to idle cut off. Seat belts should be tight and touchdown at the slowest speed possible.

3.03.04  Engine Fire during Start

These are usually due to over priming. The first attempt to extinguish the fire is to draw the excess fuel back into the induction system. If the engine has started continue to operate to pull the fire into the engine. If the engine is not operating move mixture to idle cut off, open the throttle and crank the engine to draw fire into the engine.

If in either case the fire continues for more than a few seconds it should be extinguished by external means. Fuel selector should be off and mixture at idle cut off.

3.03.05  Fire in Flight

Engine fire in flight is extremely rare. If it is present switch fuel selector off and close throttle. Mixture should be at idle cut off and booster pump off. Close heater and subject to radio requirements turn masters off. Proceed with Power off Landing.

Cabin fire is identified through smell and smoke - be sure it is not from outside! It is essential the source be identified through instrument readings, nature of smoke or system failure. If an electrical fire is indicated masters should be turned off, cabin heat turned off and vents open. Fire extinguisher should be used with caution. Proceed with Power off landing procedure.

3.03.06  Oil Pressure Loss

This may be partial or complete, or it may be a gauge malfunction. Note the oil pressure gauge is electrical.

A partial loss of oil pressure is usually a regulation problem. A landing should be made as soon as possible.

A complete loss of pressure may signify oil exhaustion (or faulty gauge). Proceed to nearest airport/airfield and be prepared for a forced landing. The engine may stop suddenly. Maintain altitude and do not change power settings unnecessarily, as this may hasten power loss.
An off airfield landing while power is available should be considered especially in the presence of additional indicators e.g., rise in engine CHT or oil temperature, oil and/or smoke apparent.

3.03.07 Fuel Pressure loss

If fuel pressure falls, turn on the electric pump and check selector is on a full tank. If the problem remains land as soon as possible and check system.

3.03.08 High Oil Temperature

High oil temperature may be due to a low oil level, obstruction in oil cooler (internal or external), damaged baffle seals, a defective gauge (on this aircraft it is an electrical gauge), or other causes. A steady rise is a particular sign of trouble.

Always land as soon as possible at an appropriate airport/airfield and investigate and be prepared for an engine failure. Watch the oil pressure and CHT (Cylinder Head Temperature) gauge to identify impending failure.

3.03.09 Alternator Failure

This is identified from progressive voltage drop (low voltage warning light and voltmeter). Initially check operation by actuating a high load item (e.g. landing light

Reduce electrical load as much as possible and check circuit breakers.

Attempt to reset by turning off the alternator switch for one second and then back on again. If the cause was a momentary over voltage (16.5V+) this will return the system to normal working.

If the indications are that there is zero alternator output turn Alternator switch off, use only minimum electrical load and land as soon a practicable. Note that the flaps are electrically driven so prepare for a flapless approach.

3.03.10 Engine Roughness

This is usually due to carburetor icing indicated by a drop in RPM and may be accompanied by slight loss of airspeed and/or altitude. If too much ice accumulates restoration of full power may not be possible, therefore prompt action is required.

Turn carburetor heat on. RPM will decrease slightly and roughness increases. Wait for a decrease in engine roughens or increase in RPM, indicating ice removal. If no change in approximately one minute return carburetor heat to off.

Partial carburetor heat may be worse than no heat as it may melt part of the ice, which will refreeze in the intake system. Therefore always use full heat and when ice is removed return to full cold position.
If engine is still rough adjust mixture for maximum smoothness. Engine will run rough if too rich or lean. Switch fuel pump on and try other tank to check fuel contamination. Check engine gauges for normality and react accordingly. Move magneto switches to “L” then “R” and both. If operation is satisfactory on either magneto proceed at reduced power, with mixture rich, to nearest airport/airfield.

3.04 Stall and Spin Recovery

The following has been taken from information provided by Vans Aircraft Inc, which it is based on their testing of RV4 aircraft. Characteristics of different aircraft are different; the information should be taken as a guide only and not as specific to this aircraft.

3.04.01 Stalls (Notes from testing section of Vans assembly manual for aircraft)

Indicated stalling speed of 38 mph can possibly be 50 mph or more. However the readings are relative and you can believe the gauge will indicate the same speed consistently, if the stall is approached at the same rate every time.

Except for accelerated stalls and secondary stalls, approach each slowly while keeping the nose from turning with the rudder. Allow the speed to bleed off until you feel a slight buffet. Note the airspeed and recover with a smooth forward movement of the stick as power is added. Maybe simply relieving backpressure on the stick when the stall occurs will be sufficient for your airplane. Stalls entered from steep bank or climb will require more aggressive recovery control application. Remember the RV4 has light elevator forces, and over control can easily occur, and secondary stalls encountered.

3.04.02 Spins & Spin Recovery

Vans aircraft does not consider spins to be a recreational aerobatic maneuver and does not recommend that they be casually undertaken in the aircraft.

Intentional spin entry should be initiated from a power off stall with full rudder in one direction and full elevator following the initial break. Typical spin behavior for an RV is that the control pressures are released immediately following spin entry, recovery will be automatic and almost immediate-no more than ½ spin revolution. If spin rotation is held for approximately one full revolution, recovery can be accomplished quickly through application of anti-spin control (opposite rudder, stick centered). If pro-spin controls are held until two full revolution have been completed, the spin will be fully developed. Recovery techniques will vary.

The most effective technique is as follows:
1. Power off
2. Elevator centered.(or stick free)
3. Full opposite rudder.
4. Recover from dive as soon as rotation stops.

Recovery time (time to stop rotation) will vary depending on C.G. position and other factors.
Step#2 is best accomplished “hands-on stick” rather than stick free because while in spin rotation, the outside aileron will sometimes float up, thus driving the stick out of center.

Good spin recovery is evident in the first two rotations. Simply releasing the controls during the first rotation stopped the spin, and opposite rudder and forward stick caused a quick recovery during the second rotation. After two turns, the rotation rate will increase and stabilized between 3 and 4 turns with a high rate of rotation of about 180 degrees/second. Once past approximately 2 spin rotations the spin has stabilized and if the controls are freed, the RV4 will continue spinning until anti-rotation control inputs are applied. The recovery procedure consists of the following

1. Power to idle
2. Apply full opposite rudder,(opposite the direction of rotation)
3. Center the ailerons and elevator (because of up elevator float,( Forward stick pressure is needed to center the elevators.)
4. Hold the above control positions until rotation stops, then use elevator to recover to level flight. 1 ¼ to 1 ¾ rotations are usually required for rotation to stop.
SECTION 4
NORMAL PROCEDURES

4.01 General

Pilots should familiarize themselves with the procedures in this section to become proficient with the normal safe operation of the aircraft.

4.02 Airspeeds for safe operation

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>V (mph)</th>
<th>Kts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vy</td>
<td>Best rate of climb speed</td>
<td>78</td>
<td>68</td>
</tr>
<tr>
<td>Vx</td>
<td>Best angle of climb speed</td>
<td>82</td>
<td>71</td>
</tr>
<tr>
<td>Va</td>
<td>Turbulent air operating speed</td>
<td>132</td>
<td>115</td>
</tr>
<tr>
<td>Vso</td>
<td>Stall full flap</td>
<td>56</td>
<td>49</td>
</tr>
<tr>
<td>Vs</td>
<td>Stall flapless</td>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td>Vfe</td>
<td>Maximum full flap speed</td>
<td>100</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Landing Final approach speed (full 40 deg flap)</td>
<td>70</td>
<td>60</td>
</tr>
</tbody>
</table>

Demonstrated crosswind velocity
Take off rotate speed

Demonstrated unstuck speed
(To be established)

4.03 Engine Operating Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>RPM</th>
<th>HP</th>
<th>Fuel Cons.</th>
<th>Max Oil Cons.</th>
<th>Max.CHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gal/Hr</td>
<td>Qts/Hr</td>
<td></td>
</tr>
<tr>
<td>Normal Rated</td>
<td>2700</td>
<td>150</td>
<td>13.4</td>
<td>0.68</td>
<td>500</td>
</tr>
<tr>
<td>Performance Cruise (75%)</td>
<td>2450</td>
<td>120</td>
<td>8.4</td>
<td>0.38</td>
<td>500</td>
</tr>
<tr>
<td>Economy Cruise (65%)</td>
<td>2350</td>
<td>104</td>
<td>7.3</td>
<td>0.33</td>
<td>500</td>
</tr>
</tbody>
</table>

4.04 Normal procedures check list

Engine is equipped with electronic ignition, please read the P-Mag operation Notes before starting the engine.
P-Mag Operating Notes

Starting - To start the engine, simply turn on the 12 volt power to the ignition (The master power switch) Turn on the 2 switch breakers right of the start switch. Then start the engine with the start switch. Start mode is automatically sensed by the P-Mag and provides multiple strikes to each cylinder.

Stopping the engine – CAUTION P-Mag models are similar to magnetos in that the ignition kill switch (or mixture control) is the only way to stop the ignition once the engine is started.

Powering Down – With all P-Mag models, use your main power switch breakers to power down the ignitions. The ignition OFF switch (p-lead) only tells the P-Mag to stop generating spark. It does NOT cut power to the ignition. If you leave the aircraft with the P-Mags power on, they will draw down your battery over time.

P-Mag Alternator Check – You can check the internal alternator operation on the P-Mag during run-up (900+rpm) by switching to the P-Mag ignition and cutting 12 volt power (Switch Breaker). If built in alternator is working, the engine will continue to run. If it is not working, the engine will quit.
PREFLIGHT CHECK

EXTERNAL CHECKS

All switches.......................OFF
Exterior ..........check for damage
Flap pushrod ends…. wear/security
Rear Empennage fairing. Secure round elevator
Control surfaces ck. interference
Hinges interference/hinges ...ok
Tanks.... caps secure & quantity
Tank drains................. Drain
Fuel vents................. Clear
Tires....................... Check ok
Pitot tube....................... Clear
Canopy ....................... Clean
Prop & Spinner ...............ok
Oil........................ check level
Dipstick .....................secure
Cowl..........................Secure
Air inlets .....................Clear
Static port..................... Clear
Master ................. ON
Flap.......................Extend
Nav lights...............CHECK
Strobe...............CHECK
Fuel gauges/Quantity...CHECK
Master .................OFF

INTERNAL CHECKS

Canopy latched
Controls Full & Free
Master on
Flap set
Trims cycle & check
Fuel select to fullest tank
Pump on check pressure
Pump off
Carb heat set
Mixture rich
Throttle set (1/4” travel open)
Prime (3 strokes max)

STARTING

Start (10 Sec Max Crank time)
1200 rpm set
Alternator on
Check: Oil pressure (max 90 min 60 psi)
Fuel pressure (max 8 min 0.5)
Volt meter
Magnetos
Strobe on
AI rising
Radio Master on & set radios

TAXYING

Brakes check
Instruments check

POWER CHECK

Brakes on
Change tanks
1800 rpm set
Check: Carb heat
Mag drop (Drop less than 175 rpm
Not greater 50 rpm between mags)
Volts
Oil temp
CHT (all above 150 Deg.F)
Idle @ 500/700

PRE TAKE OFF

Trim set
Mixture rich
Magnetos both on
Carb air cold
Fuel pump on
Primer locked
Fuel status
Flaps as required
Altimeter set
Engine instruments check
Canopy closed and locked
Harnesses secure
Collision lights on
Controls full and free
POST FLIGHT CHECK

AFTER LANDING CHECKS
1. Unnecessary electrics off
2. Flaps up if appropriate
3. Carb air cold

SHUTDOWN CHECKS
1. Park brake on
2. 1200 RPM set
3. Magnetos check
4. Radios (MASTER) off
5. Electrics off
6. Mixture cut off
7. Magneto Switch off
8. Master switches off
9. Fuels off

LANDING CHECKS
B. Brakes
M. Mixture rich
C. Carb air Hot
F. Fuel tank & Pump
H. Harnesses/Articles
C. Carb air Cold
E. Engine T's & P's

HASSELL CHECK
H. Height sufficient
A. Airframe/flaps
S. Security/harnesses
E. Engine T & P, Mixture
L. Location
L. Lookout

FIELD APPROACH
F. Fuel tank
R. Radio Freq. /vol
E. Engine T's & P's
   Carb air, Mixture
D. D.I set
A. Altimeter set

AFTER TAKE OFF CHECKS
G. (Gear up)
F. Flaps up
H. Heading/speed check

CLIMB CHECKS
I. Icing/IDENT
P. Power
A. Altimeter

TOP OF CLIMB
F. Fuel pump off/Mix set
A. Altimeter set
I. Indent Nav. aids
L. Landing light off
   AND
P. Power
A. Altimeter
T. Transmit

TURN CHECKS
S. Stopwatch
T. Turn/track
A. Altimeter set
R. R/T report
R. Radio/nav set
   OR
T. Time
T. Turn
T. Talk

FEMDO ROUTE CHECK
F. Fuel
E. Engine
M. Mixture
D. D/I set
O. Orientation.

DESCEND CHECKS
S. Sector safety
A. Altitude
S. Speed
SECTION 5
PERFORMANCE

5.01 GENERAL

Aircraft performance will be specific to a particular airplane. Whilst experience has show that Vans published test data is close to that of other similar aircraft, differences in build standards and equipment fitted inevitably mean individual evaluation is required.

In this section (Prov) against a performance characteristic means it has been obtained from published data and the characteristic for this aircraft has yet to be established. In some cases data is not currently available.

5.02 Airspeed Calibration

Air speed systems, particularly in home build aircraft are usually inaccurate. The system as fitted has proven to be reasonably accurate.

5.03 Stall Speeds

<table>
<thead>
<tr>
<th>Stall Speed Description</th>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stall speed with full 40 deg flap</td>
<td>56</td>
<td>49</td>
</tr>
<tr>
<td>Stall speed flapless</td>
<td>60</td>
<td>52</td>
</tr>
</tbody>
</table>

5.04 Climb Performance

<table>
<thead>
<tr>
<th>Climb Description</th>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Climb angle 1230 lbs Gross</td>
<td>78</td>
<td>68</td>
</tr>
<tr>
<td>Best Climb angle 1500 lbs Gross</td>
<td>82</td>
<td>71</td>
</tr>
<tr>
<td>Best rate of climb 1230 lbs Gross</td>
<td>110</td>
<td>96</td>
</tr>
<tr>
<td>Best rate of climb 1500 lbs Gross</td>
<td>120</td>
<td>105</td>
</tr>
</tbody>
</table>

5.05 Gliding Range

PERFORMANCE GRAPHS TO BE ESTABLISHED

<table>
<thead>
<tr>
<th>Gliding Range Description</th>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Glide angle???? Lbs Gross</td>
<td>82</td>
<td>71</td>
</tr>
</tbody>
</table>
5.06 Take off & Landing Performance

PERFORMANCE GRAPHS TO BE ESTABLISHED

Vans quoted figures:
Take off distance 300/535 ft
Landing distance 300/500 ft

5.08 Engine Performance

PERFORMANCE GRAPHS TO BE ESTABLISHED

Top speed 201 mph 174 Kts
Cruise 75% @ 8000 ft msl 189 mph 164 Kts
Cruise 55% @ 8000 ft msl 170 mph 148 Kts

<table>
<thead>
<tr>
<th>RV-4 Solo Weight (1160 lbs)</th>
<th>RV-4 Gross Weight (1500 lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine (hp)</td>
<td>Engine (hp)</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Top Speed</td>
<td>Top Speed</td>
</tr>
<tr>
<td>201</td>
<td>200</td>
</tr>
<tr>
<td>205</td>
<td>204</td>
</tr>
<tr>
<td>213</td>
<td>212</td>
</tr>
<tr>
<td>Cruise (75% @ 8000’)</td>
<td>Cruise (75% @ 8000’)</td>
</tr>
<tr>
<td>189</td>
<td>188</td>
</tr>
<tr>
<td>193</td>
<td>192</td>
</tr>
<tr>
<td>201</td>
<td>200</td>
</tr>
<tr>
<td>Cruise (55% @ 8000’)</td>
<td>Cruise (55% @ 8000’)</td>
</tr>
<tr>
<td>171</td>
<td>170</td>
</tr>
<tr>
<td>174</td>
<td>173</td>
</tr>
<tr>
<td>182</td>
<td>180</td>
</tr>
<tr>
<td>Stall Speed</td>
<td>Stall Speed</td>
</tr>
<tr>
<td>48</td>
<td>54</td>
</tr>
<tr>
<td>48</td>
<td>54</td>
</tr>
<tr>
<td>48</td>
<td>54</td>
</tr>
<tr>
<td>Takeoff Distance (ft)</td>
<td>Takeoff Distance (ft)</td>
</tr>
<tr>
<td>325</td>
<td>475</td>
</tr>
<tr>
<td>300</td>
<td>450</td>
</tr>
<tr>
<td>260</td>
<td>400</td>
</tr>
<tr>
<td>Landing Distance (ft)</td>
<td>Landing Distance (ft)</td>
</tr>
<tr>
<td>300</td>
<td>425</td>
</tr>
<tr>
<td>300</td>
<td>425</td>
</tr>
<tr>
<td>300</td>
<td>425</td>
</tr>
<tr>
<td>Rate of Climb (fpm)</td>
<td>Rate of Climb (fpm)</td>
</tr>
<tr>
<td>1850</td>
<td>1500</td>
</tr>
<tr>
<td>2050</td>
<td>1650</td>
</tr>
<tr>
<td>2450</td>
<td>1950</td>
</tr>
<tr>
<td>Ceiling (ft)</td>
<td>Ceiling (ft)</td>
</tr>
<tr>
<td>21,700</td>
<td>18,00</td>
</tr>
<tr>
<td>24,000</td>
<td>19,500</td>
</tr>
<tr>
<td>28,600</td>
<td>23,000</td>
</tr>
<tr>
<td>Speed Ratio</td>
<td>Range (75% @ 8000’)</td>
</tr>
<tr>
<td>4.2:1</td>
<td>640</td>
</tr>
<tr>
<td>4.27:1</td>
<td>640</td>
</tr>
<tr>
<td>4.43:1</td>
<td>590</td>
</tr>
<tr>
<td></td>
<td>Range (55% @ 8000’)</td>
</tr>
<tr>
<td></td>
<td>790</td>
</tr>
<tr>
<td></td>
<td>790</td>
</tr>
<tr>
<td></td>
<td>725</td>
</tr>
</tbody>
</table>
SECTION 6
WEIGHT & BALANCE

6.1 General

So as to achieve the designed performance and flying characteristics the aircraft must be flown with the weight and center of gravity (CG) within the approved operating range/envelope. **It is the pilot’s responsibility to ensure the aircraft is loaded within its operating envelope before taking off.**

An overloaded aircraft will not take off, climb or cruise as well as one properly loaded. Stall speed may be reduced.

If the CG is too far aft the aircraft may rotate prematurely during takeoff or tend to pitch up in the climb. Longitudinal stability will be reduced leading to inadvertent stall and even spins; spin recovery is difficult or impossible as CG moves aft of approved limits.

With a CG forward of limits it may be difficult to rotate for take off or land.

6.2 Weight and Balance Design Limits

Datum 60 ins forward of wing leading edge (LE)

**Design CG Range:** - 15% to 29% of wing chord
8.7 ins to 17.4 ins from LE
68.7 ins to 77.4 ins aft of datum

6.3 Empty Weight Data (actual for aircraft)

ARM aft of datum

<table>
<thead>
<tr>
<th>Item</th>
<th>Distance aft of datum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tail wheel</td>
<td>237.5 ins</td>
</tr>
<tr>
<td>Main wheel right</td>
<td>60 ins</td>
</tr>
<tr>
<td>Main wheel left</td>
<td>60.3 ins</td>
</tr>
<tr>
<td>Fuel</td>
<td>70.00 ins</td>
</tr>
<tr>
<td>Pilot</td>
<td>82.5 ins</td>
</tr>
<tr>
<td>Passenger</td>
<td>107.0 ins</td>
</tr>
<tr>
<td>Baggage</td>
<td>130.0 ins</td>
</tr>
</tbody>
</table>

SEE APPENDIX 7 FOR DETAILED WEIGHT AND BALANCE SCHEDULE
SECTION 7
SYSTEMS and OPERATION of SYSTEMS

7.01 Airframe

The airframe is aluminum alloy construction except for steel components comprising: - engine mount, landing gear struts, main landing gear mounts, elevator bellcranks and other miscellaneous items. Fiberglass moulds are used for the tips of wings and tail surface as well as for cowls, wheel fairing and empennage fairings.

The aircraft is conventional configured with a non laminar flow aerofoil; the effect of surface irregularities is relatively minor (compared to a laminar flow aerofoil).

7.02 Engine and Propeller

The aircraft is powered buy a Lycoming 0-320 E2D four cylinder, direct drive, horizontally opposed engine rated at 150 HP at 2700 rpm. The engine is fitted with a 40-amp 14-volt alternator, shielded ignition, fuel pump and automotive type oiled carburetor air filter mounted in a ram air box underneath the engine that incorporates the carburetor hot air control system.

The exhaust system is all-stainless with a 4 pipe configuration and no mufflers. One heat shroud provides carburetor heat and another cabin heat as required being ducted to the center section of the firewall.

The Catto 66” dia. fixed pitch three-blade propeller is made of a maple core cover with Fiberglas.

7.03 Landing gear

In conventional configuration the landing gear legs are of spring steel (6150), to which a wooden perform stiffener has been fitted to the rear of main legs to improve damping.

The tail wheel is a full swiveling Van’s # FSTW-ASSY

The main gear wheels, fitted with Cleveland 199-102 wheels and disc brakes

The braking system consists of toe brakes attached to the rudder pedals operating individual Cleveland brake cylinders to each of the main landing wheels, these share a common reservoir installed on the top center front face of the fire wall.

Both brake pedals should have a similar feel and a firm resistance after ½" of pedal travel.

7.04 Flying controls

Flight control integrity is essential for safe flight. At installation or after maintenance it should be confirmed that ALL controls are connected, secured and safetied and that they all operate within the specified ranges smoothly and in the correct direction. Full travel should be confirmed
prior to each flight. NO play should be permitted in the control hinges; sloppiness may induce flutter. Similarly trim tabs must be free of play.

Dual controls are provided. A bolt at the base of the passenger (rear) control stick allows it to be removed without effecting the operation of the remaining controls. Elevator and Ailerons are operated through a system of adjustable pushrods. The rudder is operated through a cable system to the rudder pedals. An electrical trim system, operating through a “top hat switch” on the pilots control handle enables operation of elevator and Aileron trims both of which have a feedback position indicator located on the lower center section of the instrument panel.

Flaps are operated electrically through a switch installed in the control stick

The design specified control travel limits are:-

<table>
<thead>
<tr>
<th>Surface</th>
<th>Design Deg.</th>
<th>Min Limits Deg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aileron</td>
<td>32 up, 17 down</td>
<td>25 up, 15 down</td>
</tr>
<tr>
<td>Elevator</td>
<td>30 up, 25 down</td>
<td>25 up, 20 down</td>
</tr>
<tr>
<td>Rudder</td>
<td>35 right, 35 left</td>
<td>30 right, 30 left</td>
</tr>
<tr>
<td>Flaps</td>
<td>40 down</td>
<td>40 down</td>
</tr>
</tbody>
</table>

7.05 Engine Controls

Engine controls consist of a throttle control and mixture control mounted on the left sidewall beneath the canopy rail.

The throttle is used to adjust engine RPM, forward being maximum and rearward for idle. The throttle friction control has a central lever, which operates a clutch within the system, which must be set to enable the throttle lever to operate the throttle cable.

The mixture control is used to adjust the air to fuel ratio. Placing the control in the full lean rearward position shuts down the engine.

The carburetor heat control is a Black cable control knob located beneath throttle quadrant on bulkhead. Forward is cold, Rearward is hot.

Note: Engine controls are configured for a "Forward to Go" position - i.e. Full throttle, Mixture Rich, Carburetor air Cold

7.06 Fuel System

Fuel is stored in two 16 US gal. Tanks secured to the leading edge structure with screws and platenuts. Fuel drains are fitted to the lowest point of each tank (and of the fuel system) and should be opened prior to the first flight of the day to check for sediment and water.

The fuel selector valve is located in the center column forward of the pilots control stick. A central button must be lifted to enable the handle to move into or out of the off position.
An auxiliary electric fuel pump is fitted in case of failure of the engine driven pump and is also used during take off and landing, and when changing fuel tanks in flight. The switch is located in electrical panel the lower left side of the instrument panel. Fuel quantity gauge and fuel pressure gage are located on the right side of the instrument panel.

7.07 Electrical System

The electrical system includes a 14 volt 40 amp alternator, a 12 volt battery and a master relay. The alternator is wired to be off unless the master switch is on. Electrical breaker switches are positioned in a sub panel on the left side lower instrument panel; with circuit breakers on the bulkheads below the instrument panel. A dimmer rheostat on the left bulkhead controls radio and instrument lighting where fitted.

Electrical accessories include starter, electric fuel pump and gauges as listed in the equipment in section 9.

7.08 Instrument Panel

The instrument panel is fitted with instrumentation and controls as variously listed in this manual in section 9. Should a revised layout be required it should be noted that it is removable being retained by platenuts and screws.

7.09 Static air pressure system

The system supplies static pressure to the airspeed indicator, altimeter, vertical speed indicator and altitude encoder (which provides altitude information to the Transponder). The static pressure points are on the rear sides of the fuselage and are positioned to self-drain. As part of the standard walk round checks the static vents should be inspected and confirmed as clean and open.

7.10 Heating and Ventilation

Cabin heat is provided via a heated muff attached to the exhaust system and fed with high-pressure air from the left engine inlet-cooling duct. Flow, which enters through the center of the bulkhead and is controlled with a lever forward of the pilot control stick. Fresh air from ducts on the high-pressure zone under the left wing is fed into adjustable ducts at the base of the control sticks. A on-off knob is located on the left side passenger foot floor area to control fresh air.

7.11 Cockpit and Baggage features

The seat back and bottoms are non adjustable. A full safety harness is provided which should be carefully fitted and adjusted prior to take off. In single person operations the passenger straps should be securely stowed. Straps should be checked regularly for damage.

A large baggage area with a maximum capacity of 100 lbs is behind the rear seat, though weight and balance limitations will in practice be a constraint on that capacity.
7.12 Canopy

The RV4 canopy is a side hinged (RHS) bubble canopy covering both seats.

Operation of the canopy is via a single lever (one inside, one outside) that must be in the full rearward position for both opening and closing the canopy.

The single lever controls locking pins (Left hand side) at the forward and aft ends of the canopy. Damage to the airframe will result if the lever is not rotated downward when the canopy is being open or closed.
SECTION 8
GROUND HANDLING, SERVICE & MAINTENANCE

8.01 General

This section provides information on handling, service and maintenance of the aircraft.

The owner should stay in close contact with Vans Aircraft inc. so as to obtain the latest information pertinent to the aircraft including improvements or new equipment that may be of interest to the owner. It would also be useful to retain contact with other builders and users to exchange relevant information.

The owner should also obtain up to date service bulletins and Airworthiness Directives (ADs) related to installed equipment and particularly the Engine and Propeller and other proprietary items (Wheels, brakes, radio and navigation equipment etc.)

The Experimental Aircraft Association may also issue information and directives, which could be advisory or mandatory. It is essential the owner keep up to date on all such relevant information relating to the aircraft, and its installed systems equipment.

8.02 Ground Handling

Ground towing/ non-taxi movement is best accomplished by use of the tail wheel steering bar. This fits into exposed socket cap bolts forming part of the nose wheel assembly.

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 ensure effectiveness. Do not operate the engine at high rpm, taxi with care - a RV4 can take off at throttle settings no higher than those needed for engine run up and magneto checks.

When parking aircraft ensure it is sufficiently protected from adverse weather and that it presents no danger to others (aircraft). Park the aircraft into wind if possible and moor securely.

8.03 Maintenance and Service

All work should be entered in the appropriate logbook indicating:

- Date work was done
- Description of work
- Number of hours recorded on the aircraft at that time.
- Name and signature of individual responsible for the work.

There is no specified maintenance/service schedule for the aircraft. The following 25-hour check has been developed by the builder from a variety of relevant sources and based on his engineering judgment.

25 Hour check:
8.04 Inspection Panels

In addition to engine cowling the RV4 includes a number of removable inspection panels.
Remove engine cowl for general inspection including the following:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil hoses &amp; filter</td>
<td>Check for leaks and signs of loosening</td>
</tr>
<tr>
<td>Oil cooler</td>
<td>General check of installation</td>
</tr>
<tr>
<td>Oil</td>
<td>Check level and review top up frequency</td>
</tr>
<tr>
<td>Carb. Air inlet</td>
<td>Check filter visually</td>
</tr>
<tr>
<td>Carburetor</td>
<td>Check carburetor heat functionality</td>
</tr>
<tr>
<td>Magneto</td>
<td>General Exterior checks including control cables.</td>
</tr>
<tr>
<td>Plug leads</td>
<td>Inspect for condition</td>
</tr>
<tr>
<td>Fuel hoses</td>
<td>Check for leaks and signs of loosening</td>
</tr>
<tr>
<td>Fuel pump</td>
<td>Check body joins for leaks</td>
</tr>
<tr>
<td>Primer system</td>
<td>Check for integrity</td>
</tr>
<tr>
<td>Exhaust system:</td>
<td>Check for blowing manifold gaskets</td>
</tr>
<tr>
<td></td>
<td>Check heat muffs (Carburetor and Cabin heat) &amp; ducting</td>
</tr>
<tr>
<td></td>
<td>Check joints for wear/damage</td>
</tr>
<tr>
<td></td>
<td>Check mounting points</td>
</tr>
<tr>
<td></td>
<td>Check general integrity of system</td>
</tr>
<tr>
<td>Engine mount</td>
<td>Check for damage</td>
</tr>
<tr>
<td></td>
<td>Check mounting cotters (engine &amp; bulkhead)</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Check level- note change since last filled/topped up.</td>
</tr>
<tr>
<td>Compartment wiring</td>
<td>Check all wires for damage and security.</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Check all baffles for damage/wear/security</td>
</tr>
<tr>
<td></td>
<td>Check flexible sealing strips</td>
</tr>
<tr>
<td></td>
<td>Check blast tubes to Magneto/ and Alterntor</td>
</tr>
<tr>
<td>Propeller</td>
<td>Check for nicks, scratches or corrosion</td>
</tr>
<tr>
<td>Spinner</td>
<td>Check spinner &amp; back plate for cracks</td>
</tr>
<tr>
<td>General</td>
<td>General review/inspection of Engine Compartment and propeller, spinner and its installation</td>
</tr>
<tr>
<td>Cowl</td>
<td>Inspect for damage</td>
</tr>
</tbody>
</table>
Replace cowl and safety all locking pins etc

Remove all wheel fairing:

Tires  
- Check pressures 24 psi to 27 psi (cold)
- Inspect tires for wear and slip on hub.

Brake system  
- Inspect brake shoes, replace if appropriate.
- Inspect hydraulic lines, joints and bleed points.

Wheels  
- Check bearings for play.
- Check split pins and bolts for integrity.

General  
- Check for wear/damage.

Fairing  
- Inspect for damage.

Replace wheel fairing.

General airframe and control surfaces review including, but not limited to:

Control surfaces  
- Individual inspection of each surface for free movement, satisfactory mounting/hinge condition and actuating system integrity, particular attention should be given to flap actuating rods as the rod end is not wire locked. Remove stabilizer root trim for inspection to include trim wiring condition.

Fiberglass components  
- General inspection of fixing integrity

Fuel tanks  
- Inspect for leaks and fixing integrity.

GENERALLY THE AIRCRAFT SHOULD BE MAINTAINED IN ACCORDANCE WITH

AC-43-13i

NOTE: - A detailed 50 hours and Annual maintenance schedule is given in appendix 4. This is based on the above AC43 schedule and Textron Lycoming Operator’s Manual.
SECTION 9
EQUIPMENT LISTING

9.01 Engine, accessories & Instruments

The following engine instruments are fitted:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachometer</td>
<td>Van’s Aircraft Th-0007</td>
<td>Th000507-035</td>
</tr>
<tr>
<td>CHT</td>
<td>Van’s Aircraft</td>
<td></td>
</tr>
<tr>
<td>Fuel gauge</td>
<td>E I FL-2C</td>
<td>050252</td>
</tr>
<tr>
<td>Oil pressure</td>
<td>Van’s Aircraft VOP100</td>
<td>None</td>
</tr>
<tr>
<td>Oil temperature</td>
<td>Van’s Aircraft VOT250</td>
<td>None</td>
</tr>
<tr>
<td>Fuel pressure</td>
<td>Van’s Aircraft VFP15</td>
<td>None</td>
</tr>
</tbody>
</table>

9.02 Propeller

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propeller</td>
<td>Catto 6672 (3 blade 66” dia w/ 72” pitch)</td>
<td>05-04-0579</td>
</tr>
<tr>
<td>Spacer</td>
<td>Saber 2 ¼”</td>
<td>(matched to Prop.)</td>
</tr>
</tbody>
</table>

9.03 Radio equipment

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Com</td>
<td>King KY97a</td>
<td></td>
</tr>
<tr>
<td>Transponder</td>
<td>King KT76</td>
<td></td>
</tr>
<tr>
<td>Altitude encoder</td>
<td>ARK 350</td>
<td></td>
</tr>
<tr>
<td>Intercom</td>
<td>Flightcom FL 403</td>
<td></td>
</tr>
<tr>
<td>GPS</td>
<td>Apollo 360</td>
<td></td>
</tr>
</tbody>
</table>

9.04 Flight instruments

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altimeter</td>
<td>Falcon alt20inf-3n</td>
<td>ALT01050043</td>
</tr>
<tr>
<td>Vertical Speed Ind.</td>
<td>United 7030</td>
<td>293361</td>
</tr>
<tr>
<td>Attitude Gyro</td>
<td>R.C. Allen Instruments RCA 22-7</td>
<td></td>
</tr>
<tr>
<td>Magnetic Compass</td>
<td>Unknown make</td>
<td></td>
</tr>
<tr>
<td>Air Speed Ind.</td>
<td>United Part No 8025</td>
<td>174392</td>
</tr>
</tbody>
</table>
9.05 Electrical equipment

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltmeter</td>
<td>Van’s Aircraft EVV16</td>
<td>None</td>
</tr>
<tr>
<td>Battery</td>
<td>Odyssey ES PC680</td>
<td></td>
</tr>
<tr>
<td>Alternator</td>
<td>Cam 040 AD</td>
<td></td>
</tr>
</tbody>
</table>

9.06 Other Equipment

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan belt</td>
<td>Napa Premium Belt</td>
<td>Part number 7350</td>
</tr>
<tr>
<td>Main Tires</td>
<td>Aero trader 5.00-5</td>
<td></td>
</tr>
</tbody>
</table>

9.07 Supplier list

Van’s Aircraft, Inc. (1-503-678-6545)
14401 NE Keil Rd.
Aurora, OR 97002

Fairings-Etc (1-623/536-0951)
Bob Snedaker
P.O. Box 5488
Goodyear, AZ 85338

Catto Propellers (1-209-754-3553)
15301 Jesus Maria Rd.
Mokelumne Hill, CA 95245

Honeywell (King Radios) (1-913-782-0400)
One Technology Center
23500 W. 105th Street, M/D #19
Olathe, KS 66061-1950

Gamin AT, Inc. (Apollo GPS 360) (1-800-525-672)
2345 Turner Rd. SE
Salem, OR 97302

E-MAG Ignitions
2014 Greg Street
Azle, Texas 76020
## APPENDICES

<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electrical Diagrams</td>
</tr>
<tr>
<td>2</td>
<td>Performance curves</td>
</tr>
<tr>
<td>3</td>
<td>Weight &amp; Balance</td>
</tr>
<tr>
<td>4</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
APPENDIX 1

ELECTRICAL DIAGRAMS
APPENDIX 2

PERFORMANCE CURVE
Best Climb Angle.
@ 78 mph

1230 lb. Gross

Best Climb Angle
@ 82 mph

1500 lb. Gross

BEST GLIDE ANGLE

GLIDE CURVE
APPENDIX 3

WEIGHT & BALANCE
WEIGHT & BALANCE DATA

Make: Van’s Aircraft
Model: RV4    Serial # 4354    Registration #  N359DM

Datum= 60 inches forward of wing leading edge. (L.E.)
Design C.G. Range = 15% to 29% of wing chord, or 8.7” to 16.8 inches from L.E., or 68.7 to
77.4 inches aft of Datum.
Wing L.E. = 60” aft of datum.
Main wheel, right = 60” aft of datum.
Main wheel, left = 60.3” aft of datum.
Tail Wheel = 237.5” aft of datum.

Aircraft weighed empty in level flight attitude.

\[
\begin{array}{ccc}
\text{Weight (lbs)} & \text{Arm (ins)} & \text{Moment (lbs. in)} \\
\text{Right Wheel} & 441 & 60 & 26460 \\
\text{Left Wheel} & 436 & 60.3 & 26290.8 \\
\text{Tail Wheel} & 56 & 237.5 & 13300 \\
\text{Total:} & 933 & & 66050.8 \\
\end{array}
\]

\[CG=66050.8 / 933= \text{Empty moment of aircraft 70.8” aft of datum}\]
Weight and Balance Work Sheet

Datum = 60 inches forward of wing leading edge. (L.E.)
Design C.G. Range = 15% to 29% of wing chord, or 8.7” to 17.4 inches from L.E., or 68.7 to 77.4 inches aft of Datum.
Wing L.E. = 60” aft of datum.
Oil = 40” aft of datum.
Fuel = 70” aft of datum.
Pilot = 82.5” aft of datum.
Passenger = 107” aft of datum.
Baggage = 130” aft of datum.

**Gross Weight CG**

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Arm</th>
<th>Moment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft</td>
<td>933</td>
<td>6605.8</td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>192</td>
<td>70</td>
<td>13440</td>
</tr>
<tr>
<td>Oil (8 qts.)</td>
<td>15</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>Pilot</td>
<td>195</td>
<td>82.5</td>
<td>16087.5</td>
</tr>
<tr>
<td>Passenger</td>
<td>160</td>
<td>107</td>
<td>17120</td>
</tr>
<tr>
<td>Baggage</td>
<td>5</td>
<td>130</td>
<td>650</td>
</tr>
<tr>
<td>Total</td>
<td>1500</td>
<td></td>
<td>113948.3</td>
</tr>
</tbody>
</table>

CG = 113948.3/1500 = 75.96” aft of datum

**Most Aft C.G. (Gross Weight Min. Fuel)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Arm</th>
<th>Moment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft</td>
<td>933</td>
<td>6605.8</td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>30</td>
<td>70</td>
<td>2100</td>
</tr>
<tr>
<td>Oil (8 qts.)</td>
<td>15</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>Pilot</td>
<td>195</td>
<td>82.5</td>
<td>16087.5</td>
</tr>
<tr>
<td>Passenger</td>
<td>160</td>
<td>107</td>
<td>17120</td>
</tr>
<tr>
<td>Baggage</td>
<td>5</td>
<td>130</td>
<td>650</td>
</tr>
<tr>
<td>Total</td>
<td>1338</td>
<td></td>
<td>102608.3</td>
</tr>
</tbody>
</table>

CG = 102608.3/1338 = 76.68” aft of datum

**Most Forward C.G. (Two Occupants.)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Arm</th>
<th>Moment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft</td>
<td>933</td>
<td>6605.8</td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>192</td>
<td>70</td>
<td>13440</td>
</tr>
<tr>
<td>Oil (8 qts.)</td>
<td>15</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>Pilot</td>
<td>170</td>
<td>82.5</td>
<td>14025</td>
</tr>
<tr>
<td>Passenger</td>
<td>170</td>
<td>107</td>
<td>18190</td>
</tr>
<tr>
<td>Baggage</td>
<td>0</td>
<td>130</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1480</td>
<td></td>
<td>112305.8</td>
</tr>
</tbody>
</table>

CG = 112305.8/1480 = 75.8 aft of datum

**Most Forward C.G. (Std. Pilot Wt.)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Arm</th>
<th>Moment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft</td>
<td>933</td>
<td>6605.8</td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>30</td>
<td>70</td>
<td>2100</td>
</tr>
<tr>
<td>Oil (8 qts.)</td>
<td>15</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>Pilot</td>
<td>170</td>
<td>82.5</td>
<td>14025</td>
</tr>
<tr>
<td>Passenger</td>
<td>0</td>
<td>107</td>
<td>0</td>
</tr>
<tr>
<td>Baggage</td>
<td>0</td>
<td>130</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1148</td>
<td></td>
<td>82775.8</td>
</tr>
</tbody>
</table>

CG = 82775.8/1148 = 72.1” aft of datum

**RV4 Weight and Limits – easy Reference**

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Gross Weight</td>
<td>1500 lbs</td>
</tr>
<tr>
<td>Aerobatic Gross Weight</td>
<td>1375 lbs</td>
</tr>
<tr>
<td>Forward CG Limit</td>
<td>15% of cord or 8.7” aft of leading edge</td>
</tr>
<tr>
<td>Aft CG limit</td>
<td>30% of cord or 17.4” aft of leading edge</td>
</tr>
<tr>
<td>Aerobatic Aft CG limit</td>
<td>27.5% of cord or 15.9” aft of leading edge</td>
</tr>
</tbody>
</table>
APPENDIX 4

MAINTENANCE
Maintenance and Inspection Schedule

The following maintenance schedule is based on AC43-13 LIGHT AIRCRAFT MAINTENANCE SCHEDULE (FIXED WING) and Textron Lycoming Operators Manual to Revision April 1998

Maintenance Cycle:

50 Hours check   At 50 Hours or 6 Months whichever sooner
150 Hour check   Comprising 50 & 150 hour check items at 150 Flying hours
Annual check     50,150 hr. & annual check items not exceeding 12 months

Permitted variation:

<table>
<thead>
<tr>
<th>Check Type</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 &amp; 150 Hour check</td>
<td>10%</td>
</tr>
<tr>
<td>6 months</td>
<td>1 Month</td>
</tr>
<tr>
<td>Annual</td>
<td>None</td>
</tr>
</tbody>
</table>

1.00 FINAL CHECKS (include with all checks)

1.01 Carry out an engine ground run: -

Check power plant, liquid, air and gas systems for leaks during and following ground run.

Check instruments, systems and services. Radio for electromagnetic interference.

Following ground run, ensure all cowlings, access panels are secure.

1.02 Certification: -

Ensure Engine, Airframe and Propeller logbooks have been correctly filled in, certified and are up to date. (All flights and work carried out must be entered and signed up as required)

1.03 Type certification and Schedule Review: -

Ensure all mandatory placards are installed and legible.

Check all mandatory requirements (modifications, inspections and other directives) have been complied with.

Review maintenance schedule to ensure all maintenance needs are being met to continue safe operation. Account to be taken of maintenance history, operating environment and utilization.
2.0 50 Hour or if earlier Six Months Maintenance Schedule

2.01 Structural/Zonal

Inspect external surface of fuselage, empennage, cowlings, flaps and control surfaces.

Check and inspect canopy fit, operation and condition including satisfactory operation of latching and locking mechanism.

Check protective treatments, drain holes free from obstruction, access panels secure

2.02 Landing Gear

Remove wheel fairing and inspect for damage.

Inspect landing gear legs and fixed fairings for damage and integrity

Check brake system for leaks.

Inspect brake pads and discs for condition and wear

Check brake fluid reservoir (Fill as required)

Check tire condition and tire pressures (Main 24 psi not greater than 27 psi)

Replace wheel fairing.

2.03 Flying Controls

Check flying controls for full and free movement and in the correct sense.

Check correct operation of trim mechanisms and those indicators agree with surface movement.

2.04 Liquid, Air and Gas Systems

Inspect Pitot/static system vents. Pitot head, Drains clear. Pitot head correctly aligned

2.05 Equipment and Environmental

Check first aid kit complete and within expiry date

Check seat belts/harnesses for satisfactory condition, locking and release.

Check seat belt/harness mounting points and brackets

Check fire extinguisher for leakage/discharge.
2.06  **Airplane Lubrication**

Lubricate aircraft as appropriate (all rod end and hinges).

2.07  **Power plant Installation**

Engine cowls, clean and inspect for damage (cracks, distortion loose or missing fasteners).

Operational check of engine controls for full and free movement – throttle, mixture, carburetor heat system including air door and box.

Inspect spark plug cable leads/ ignition harness and ceramics for damage, corrosion and deposits. If fouling spark plugs apparent, rotate bottom plugs into top position.

Check ignition harness for security of mounting clamps and ensure connections are tight at spark plug and magneto connections.

Check cylinders for evidence of excessive heat (burnt paint on cylinder). This condition is indicative of internal damage to the cylinder and cause MUST be determined.

Inspect rocker box covers for evidence of oil leaks. If leaking is found replace gasket, torque cover screws 50 inch-pounds.

Cooling system – Check cowling and baffles for damage and secure anchorage.

Inspect air intake seals, ducting and clamps.

Inspect vent lines for evidence of fuel or oil seepage

Inspect all wiring connections to the engine and accessories.

**IN ADDITION TO THE ABOVE LYCOMING RECOMMEND AT 100 HOURS: -**

Check all wiring connected to the engine or accessories. Any shielded cables that are damaged should be replaced. Replace clamps or loose wires and check terminals for security and cleanliness.

Remove spark plugs; test, clean and regap. Replace if necessary.

Magnetos – Check breaker points for pitting and gap. Check for excessive oil in the breaker compartment, if found wipe dry. Breaker point felt to be lubricated. Check magneto to engine timing.

Engine Accessories – Check for secure mounting and tight connections
Cylinders – Check visually for cracked or broken fins.

Engine Mounts – Check mounting bolts and bushings for security and excessive wear. Replace excessively worn bushings.

2.08 Air Induction

Inspect air filter, intake and induction system.

Remove and clean air filter.

2.09 Exhaust system

Check attaching flanges at exhaust ports on cylinder.

Examine exhaust manifolds for general condition.

2.10 Engine Lubrication

Drain oil sump.

Remove oil suction and pressure screens and check for presence of metal particles, which are indicative of internal engine damage.

Change full flow oil filter, split used filter and inspect.

Clean oil screens

Inspect oil lines and fittings for leaks, security or damage

Refill engine with oil (see manual section 1.5)

2.11 Fuel System

Check primer lines for leaks and security

Drain samples from drain points and check for water, foreign matter and correct color.

Drain carburetor and clean inlet line fuel strainer.

Check tank vents unobstructed.

Inspect fuel system/lines and tank for leaks.

Remove and clean fuel filter bowl and screen.
2.12 Propeller
Inspect spinner and back plate, and spinner attachment screws.
Inspect propeller blade for damage.

2.13 Electrical System
Check and inspect battery installation, vents and drains.
Check operation of all electrical circuits.
Inspect Alternator/generator drive belt tension and condition.
Check all controls and switches labeled correctly

2.14 Radio
Inspect aerials, insulators, instruments and displays.
Check placards and markings legible
Carry out VHF ground function check
Inspect cables and terminals.

2.15 Instrument Systems
Inspect instruments for damage, and legibility of markings and associated placards.
Check instrument readings are consistent with ambient conditions; operation, as far as possible on engine ground run. Perform manual override and disengagement checks.
Check last compass swing date (and any other instrument calibration dates) and assess if renewal required.

3.0 150 Hour (as 50 Hour and in addition the following)

3.01 Structural/Zonal
Remove all inspection panels, rear cabin bulkhead, internal flap mechanism inspection panels and floor panels over control stick mechanism. Remove fairing over empennage.
Inspect internal structure of fuselage, wing and empennage revealed by removal of above items.
Inspect internal corrosion protection, drain holes and paths.

3.02 Landing Gear

Inspect structural members and attachment fittings.

Inspect and check all brake hydraulic lines, flexible hoses, connections, master cylinders and parking brake system for correct operation.

Inspect wheels for alignment.

Support the weight off the wheels and check wheel bearings for play. Check landing gear mounting bolts.

Inspect wheels for cracks, corrosion and broken bolts.

If required lubricate wheel bearings.

3.03 Flying Controls

Inspect all control surface hinges, hinge bolts, brackets, push-pull rods, bellcranks, stops, control horns and balance weights. Check associated turnbuckles/locking systems.

Check control neutrals and travel.

Inspect rudder control cable, fairleads and cable guides.

Inspect rudder pedals and pedal mechanism.

Check flap operation, mechanism, and actuating system.

Check and inspect aileron and rudder trim for correct operation and security.

3.04 Liquid, Air and Gas Systems

Inspect tanks, filler caps, valves, pipelines, and hoses.

3.05 Equipment and Environment

Operational check and inspect Cabin air system

Check cabin heating system controls, hoses and ducts

Check and inspect cabin heat exchanger for signs of exhaust gas leakage.
Check Fire extinguisher by pressure

3.06  Power plant Installation

Inspect accessory housings, cylinder assemblies, bulkhead/firewall and sealing; cooling baffles/seals, cowlings, and items in engine bay for mutual interference.

Inspect throttle, carburetor heat, and mixture and cabin heat controls for security, travel and operating conditions

Inspect breather tube for obstructions and security

Inspect crankcase for cracks, leaks and security of seam bolts.

Inspect engine mounts bushing for deterioration/cracks and loose mounting. (Replace as required)

Check and record in engine log book cylinder compression and leakage,

Clean engine as required.

3.07  Ignition System

Inspect Magneto harness leads

Carry out high-tension leakage and continuity test.

Inspect magneto points for condition and correct clearance.

Inspect Magneto for oil leakage

Inspect breaker felts for proper cam lubrication.

Check Magneto to Engine timing

Inspect condition of spark plugs (clean and adjust gap as required, adjust in accordance with Lycoming Service instructions). If fouling of plugs is apparent rotate bottom to upper plugs.

3.08  Exhaust System

Inspect exhaust stacks, connections and gaskets. (Replace gaskets as required).

Inspect mufflers, cabin heat exchanger and tubes.
3.09  **Engine Lubrication**

Clean and inspect oil radiator cooling fins

Inspect Sump, Oil hoses pipes and vent.

Inspect oil sender connections and pipe for leaks and security.

3.10  **Fuel System**

Inspect condition of flexible fuel lines

Check operation of fuel selector valve.

Inspect fuel gauges for damage and operation.

Inspect security of all fuel lines

Inspect fuel boost pump

3.11  **Propeller**

Remove spinner, inspect complete propeller and spinner assembly for security and damage or wear.

Inspect propeller mounting bolts and safety (check torque if safety is broken).

3.12  **Electrical System**

Inspect – components, wiring, terminals and connectors.

Operational check of all warning circuits

Check correct type and rating of fuses and circuit breakers.

Check lamps and lights

Check starter brushes and alternator belts tension/drive.

Inspect condition of alternator and starter (and mounting integrity)

Ensure voltage regulator operating correctly

3.13  **Instrument System**
Inspect instruments: panel; mounts; pipes; hoses; electrical wiring.

Check pitot/static system for leaks

4.00 ANNUAL (as 150 and 50 Hour and in addition the following)

4.01 Flying Controls

Inspection and operation of Electric flap actuating system

4.02 Electrical System

Consider battery capacity check

4.03 Radio

VHF communication – test the function of the system

The following checks (as legal requirements for FAA certified aircraft) should be considered. As a minimum a flight check should be completed to confirm satisfactory operation: -

ATC Transponder - carry out check with Field Test Set. Check – frequency tolerance and side-lobe suppression. Check – Mode “C”

5.00 Other Maintenance/Inspection Requirements
90 days  Remove and clean fuel filter bowl and screen.

400 Hours  Remove rocker box covers. Check for freedom of valve rockers when valves are closed. Look for evidence of abnormal wear or broken parts in the area of the valve tips, valve keeper, springs and spring seat. Any damage requires removal (including piston and connecting rod assembly) and inspection for further damage.

500 Hours  Inspect distributor block for cracks, burnt areas or corrosion and height of contact springs.

500 Hours  Remove and flush oil radiator

1000 Hours  CONSIDER overhaul or replace magnetos

1000 Hours  CONSIDER propeller overhaul or replacement

1000 Hours  CONSIDER replace flexible fuel lines (earlier if required)

1000 Hours  CONSIDER replacement of flexible oil lines (earlier if required)

1000 Hours  CONSIDER overhaul or replace fuel pump

2000 Hours  CONSIDER engine overhaul or replacement

Minimum 10 years (earlier if required) reweigh and check weight and balance schedule.