

N977RV



Van's Aircraft RV-7

Pilot's Operating Handbook

N977RV

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PERFORMANCE – SPECIFICATIONS

SPAN:	25' 0"
LENGTH:	20' 4"
HEIGHT:	5' 10"
SPEED:	
Maximum at Sea Level	189 knots
Cruise, 75% Power at 8,000 ft	180 knots
RANGE (includes 3 gal. for taxi, takeoff & climb):	
75% @ 8000', no reserve	665 nm
55% @ 8000', no reserve	812 nm
75% @ 8000', one hour (10 gal) reserve	430 nm
55% @ 8000', one hour (10 gal) reserve	590 nm
RATE OF CLIMB AT SEA LEVEL	1,600 fpm
SERVICE CEILING	19,500 ft
TAKEOFF DISTANCE:	575 ft
LANDING DISTANCE:	500 ft
STALL SPEED (CAS):	
Flaps Up, Power Off	58 knots
Flaps Down, Power Off	54 knots
MAXIMUM WEIGHT (Normal Category):	1800 lbs
EMPTY WEIGHT	1093 lbs
MAXIMUM USEFUL LOAD:	707 lbs
BAGGAGE ALLOWANCE	100 lbs
WING LOADING (Pounds/ sq ft)	14.8 lbs
POWER LOADING (Pounds/ HP)	10 lbs
FUEL:	
Capacity	42 gal total
Type	100 LL
OIL CAPACITY	8 qts
ENGINE: Superior	XP-IO-360-B1AA2
PROPELLER: Hartzell	HC-C2YR-1BF

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AIRSPEED LIMITATIONS

	SPEED	IAS	REMARKS
V_{NE}	Never Exceed Speed	210 knots	Do not exceed this speed in any operations.
V_{NO}	Maximum Structural Cruising Speed	167 knots	Exceed this speed only in smooth air.
V_A	Maneuvering Speed	125 knots	Do not make full control movements above this speed. Full elevator deflection will result in a 6g load at this speed.
V_{FE}	Maximum Flap Extended Speed	95 – 20 deg 87 – full	Do not exceed this speed with flaps down
V_y	Best Rate of Climb	95 knots	
V_x	Best Angle of Climb	70 knots	
V_s	Stall Speed Clean	58 knots	
V_{so}	Stall Speed Landing Configuration	54 knots	

AIRSPEED INDICATOR MARKINGS

MARKING	IAS VALUE OR RANGE	SIGNIFICANCE
White Arc	54 – 87 knots	Full Flap Operating Range. Lower limit is V _{so} . Upper limit is maximum speed with flaps extended
Green Arc	55 – 167 knots	Normal Operating Range. Lower limit is V _s . Upper limit is maximum structural cruising speed
Yellow Arc	167 – 210 knots	Operations must be conducted with caution and only in smooth air.
Red Line	210 knots	Maximum speed for all operations

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AEROBATIC INFORMATION

Weight Limitation – 1600 Pounds

Loads:

Positive: 6 G

Negative: -3 G

Recommended Entry Speeds:

Loops, Horizontal Eights	122-165 knots
Immelman Turns	130-165 knots
Aileron Rolls, Barrel Rolls	105-165 knots
Snap Rolls	70-95 knots
Vertical Rolls	156-165 knots
Split-S	88-95 knots

SUPERIOR ENGINE XP-IO-360

OPERATING PROCEDURES

General Rules:

- Never exceed the maximum red-line cylinder temperature limit of 500 degrees F. For maximum service life, cylinder head temperature should be maintained below 430 degrees F during high performance cruise operation and below 400 degrees F for economy cruise operation with 300 – 400 degrees F optimal.
- Lower cylinder head temperatures can be obtained by using a shallow climb to obtain greater indicated airspeed, and by enrichening the mixture.
- Oil temperature should be maintained between 120-220 degrees F in cruise flight with 130 – 200 degrees F optimal. Never exceed 240 degrees F.
- Maintain mixture control “Full Rich” for rated takeoff, climb and maximum cruise power (above 75%) except during takeoff from a high elevation airport. In such a case adjust the mixture control only enough to obtain smooth operation – not for economy. Observe instruments for temperature rise.
- Operate the engine at maximum power mixture for performance cruise power and at best economy mixture for economy cruise power.
- During descent it may be necessary to manually lean the mixture to obtain smooth operation.
- Maximum power cruise – never lean below 75 degrees F on the rich side of peak EGT. Monitor cylinder head temperatures.
- Best economy cruise (approximately 75% power or below) – lean to peak EGT to 50 degrees F lean of peak (fuel injected). Slowly lean mixture until a slight loss of power is noted and enrichen until the engine runs smoothly.
- Leaning to fuel flow meter: lean to applicable fuel flow values.

PREFLIGHT INSPECTION

1. CABIN

- a) Documentation – Available In Airplane
- b) Canopy cover – STOW
- c) Aeronautical Charts – CURRENT AND APPROPRIATE TO FLIGHT
- d) Seat Belt Securing Control Stick – RELEASE
- e) Ignition Switch – OFF
- f) Avionics Master and EFIS – OFF
- g) Fuel Quantity – CHECK QUANTITY
- h) Master Switch – OFF

2. EMPENNAGE

- a) Tail Tie-Down – DISCONNECT
- b) Control Surfaces – CHECK freedom of movement and security
- c) Static Sources (both sides of fuselage) – CHECK for blockage
- d) Tail and Strobe – CHECK condition
- e) Tail wheel – CHECK condition, springs, cables

3. RIGHT WING

- a) Flap – CHECK security
- b) Aileron – CHECK freedom of movement and security
- c) Nav and Strobe Lights – CHECK condition
- d) Right Landing Light – CHECK condition
- e) Wing Tie-Down – DISCONNECT
- f) Main Wheel Tire – CHECK for proper inflation, 30 psi min.
- g) Chock – REMOVE
- h) Right Wing Tank – SUMP
- i) Fuel Quantity – CHECK VISUALLY
- j) Fuel Filler Cap – SECURE

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4. NOSE

- a) Engine Oil Level – CHECK, do not operate with less than 5 quarts
- b) Propeller and Spinner – CHECK for nicks and security
- c) Cowl Hinge Pins – CHECK for security
- d) Air Inlet – CHECK for restrictions
- e) Master Switch – ON
- f) Fuel Boost Pump – ON
- g) Gascolators – SUMP
- h) Fuel Boost Pump – OFF
- i) Master switch – OFF
- j) Fuel Tank Vents – CHECK for blockage

5. LEFT WING

- a) Left wing tank – SUMP
- b) Fuel Quantity – CHECK VISUALLY
- c) Fuel filler cap – SECURE
- d) Wing tie down – DISCONNECT
- e) Main Wheel tire – CHECK for proper inflation 30 PSI min
- f) Chock – REMOVE
- g) Pitot tube cover – REMOVE and check for blockage
- h) Left Landing Light – CHECK condition
- i) Nav and Strobe Lights – CHECK condition
- j) Aileron – CHECK freedom of movement and security
- k) Flap – CHECK security

BEFORE STARTING ENGINE

- a) Preflight Inspection – COMPLETE
- b) Seat Belts and Shoulder Harnesses – ADJUST and LOCK
- c) Fuel Selector Valve – DESIRED TANK
- d) Avionics and Electrical – OFF
- e) Brakes – HOLD
- f) Circuit Breakers – CHECK IN
- g) Canopy – DOWN

STARTING ENGINE (cold)

- a) Mixture – RICH (adjust for altitude)
- b) Prop – HIGH RPM
- c) Master Switch – ON
- d) Fuel Boost Pump – ON until fuel pressure in green arc
- e) Fuel Boost Pump – OFF
- f) Throttle – OPEN 1”
- g) Propeller Area – CLEAR
- h) Ignition Switch – START
- i) Avionics & Instruments – ON
- j) Oil Pressure – CHECK 25psi at idle w/in 30 seconds
- k) Nav & Strobe Lights – ON

STARTING ENGINE (warm)

- l) Mixture – LEAN
- m) Throttle – OPEN to 1/2
- n) Prop – HIGH RPM
- o) Master Switch – ON
- p) Flaps – UP
- q) Propeller Area – CLEAR
- r) Ignition Switch – START
- s) Mixture – Enrichen as engine starts
- t) Throttle – PUMP as necessary
- u) Avionics & Instruments – ON
- v) Oil Pressure – CHECK 25 psi at idle
- w) Nav & Strobe Lights – ON

BEFORE TAKEOFF

- a) Brakes – HOLD
- b) Flight Controls – FREE and CORRECT
- c) Flight Instruments – CHECK
 - 1) Altimeter – CORRECT PRESSURE
 - 2) AHRS – ALIGNED
 - 3) Heading – CORRECT
- d) Fuel Selector Valve – DESIRED TANK
- e) Mixture – RICH (below 3000')
- f) Elevator and Aileron Trim – NEUTRAL
- g) Throttle – 1800 RPM
 - 4) Magnetos – CHECK (125 max drop, 50 diff. max)
 - 5) Prop – cycle CHECK operation
 - 6) Engine Instruments – CHECK
 - 7) Throttle – IDLE
- i) Radios – SET
- j) Canopy – Main and Overhead Latches – SECURE
- k) Fuel Boost Pump – ON
- l) Flaps – AS REQUIRED
- m) Passenger – READY and willing

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TAKEOFF

NORMAL TAKEOFF

- a) Wing Flaps – UP
- b) Propeller – HIGH RPM
- c) Throttle – FULL OPEN
- d) Tailwheel – LIFT at 30 knots
- e) Elevator Control – ROTATE (at 55 knots)
- f) Climb Speed – 110 knots

SHORT FIELD TAKEOFF

- a) Wing Flaps – 10 degrees
- b) Propeller – HIGH RPM
- c) Brakes – APPLY
- d) Throttle – FULL OPEN
- e) Mixture – RICH (above 3000' lean to obtain max RPM)
- f) Brakes – RELEASE
- g) Climb Speed – 65 knots (Vy)

ENROUTE CLIMB

- a) Airspeed – 110 to 130 knots
- b) Throttle – 25 inches Hg, or FULL throttle
- c) Propeller – 2500 RPM
- d) Boost Pump – OFF at 1000 feet AGL
- e) Fuel Pressure – CHECK
- f) Mixture – LEAN above 5000 feet
- g) Cylinder temp – 425 maximum (enrich mixture if necessary)

CRUISE

- a) Throttle – 23 inches Hg
- b) Propeller – 2300 RPM
- c) Trim – ADJUST
- d) Mixture – LEAN to 100 degrees F rich of peak

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LANDING

- a) Approach Speed – 90 knots
- b) Wing Flaps – 20 degrees (100 knots max)
- c) Propeller – FULL rpm
- d) Wing Flaps – FULL (87 knots max)
- e) Final (wheel landing) – 75 knots
- f) Final (3 point landing) – 70 knots

AFTER LANDING

- a) Wing Flaps – RETRACT
- b) Boost Pump – OFF

ENGINE SHUTDOWN

- a) Propeller – FULL FORWARD
- b) Throttle – IDLE
- c) CHT – decidedly dropped
- d) Avionics and Instruments – OFF
- e) Mixture – IDLE CUT-OFF
- f) Wait for shut down
- g) Tach – RECORD
- h) Master Switch – OFF

SECURING AIRCRAFT

- a) Wheel Chocks – IN
- b) Wing & Tail Tie-Down – INSTALLED
- c) Pitot Tube Cover – INSTALLED
- d) Rudder Gust lock – INSTALLED
- e) Cockpit – controls LOCKED with seatbelt
- f) Ignition Key – REMOVED
- g) Canopy – LOCKED
- h) Canopy Cover – INSTALLED

WEIGHT AND BALANCE DATA

Make: Larry Driver Model: RV-7
Serial: 71409 Registration: N977RV

Maximum Weights:
 Aerobatic Category 1600 lbs
 Utility Category1700 lbs
 Normal Category 1800 lbs

Datum= 70 inches forward of wing leading edge (L.E.)
Design C.G. Range = 15% to 29% of wing chord
 8.7” to 16.82” from L.E.
 78.7” to 86.82” aft of datum

Wing L.E. = 70 inches aft of datum
Main wheel right = 70.5
Main wheel left = 70.5
Tail wheel = 249.5

Fuel 80” aft of datum
Pilot and Passenger 97.48” aft of datum
Baggage 126.78” aft of datum

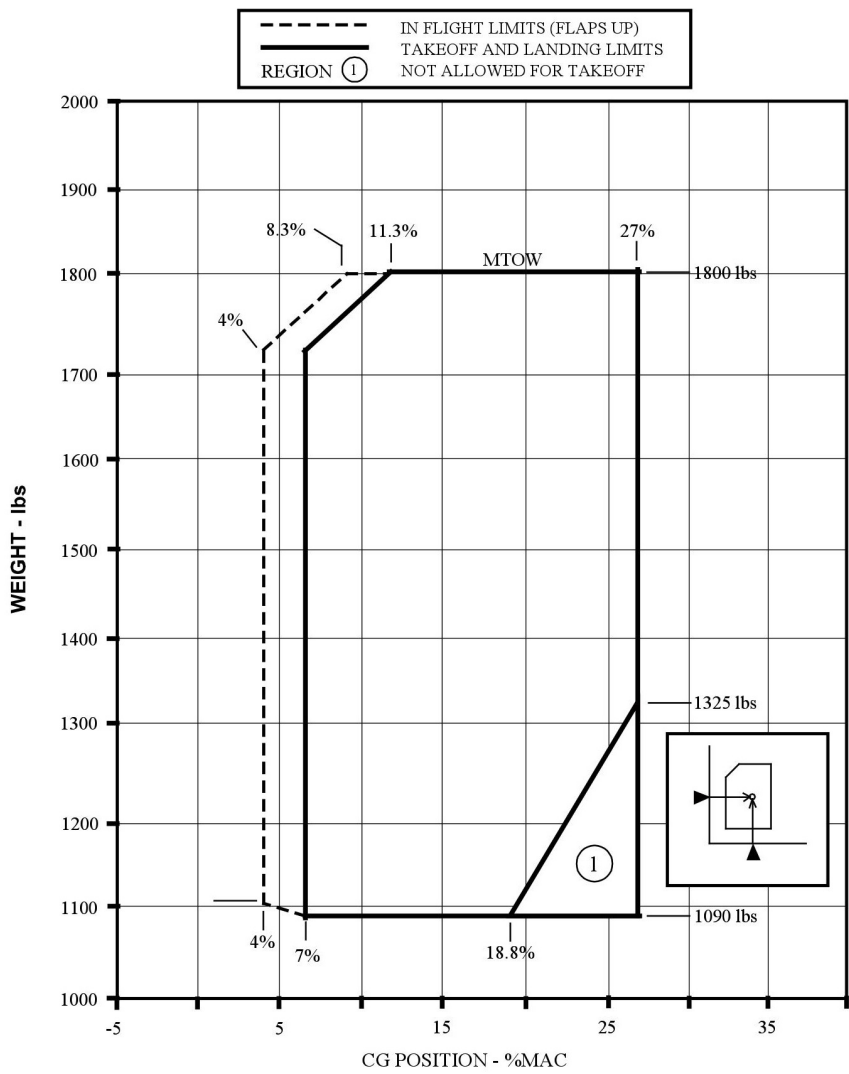
Aircraft weighed empty in level flight attitude.
(Includes 8 qts of oil, no fuel)

Sample:

	Weight	Arm	Moment
Aircraft	<u>1093</u>	<u>80.98</u>	<u>88,512.5</u>
Fuel (6lbs/gal)	<u>252</u>	<u>80</u>	<u>20,160</u>
Pilot	<u>185</u>	<u>97.48</u>	<u>18,033.80</u>
Passenger	<u>170</u>	<u>97.48</u>	<u>16,571.60</u>
Baggage	<u>76</u>	<u>126.78</u>	<u>9,635.28</u>
Total	<u>1776</u>	<u>86.10</u>	<u>152,911</u>

CG = Total Moment / Total Weight
CG = 83.68 inches aft of datum
CG Range = 78.7 to 86.82 inches aft of datum
Empty CG = 79.33 Empty Weight = 1093 lbs

CENTER OF GRAVITY ENVELOPE



EMERGENCY PROCEDURES

AIRSPEEDS FOR EMERGENCY OPERATIONS

Engine Failure After Takeoff:

Wing Flaps Up 78 kts

Wing Flaps Down 70 kts

Maneuvering Speed (V_a) 125 kts

Maximum Glide 78 kts

ELECTRICAL / ALTERNATOR FAILURE

1. Avionics –OFF
2. Master Switch – OFF
3. Alt Field – OFF
4. Master Switch – ON

IF ALTERNATOR IS STILL OFF-LINE:

5. Master Switch – ON
6. Electrical Switches – OFF
7. Alternator Field – OFF
8. Avionics – ON as required
9. Electrical Equipment – ON, as required
10. Flight – TERMINATE as soon as practical, aircraft is on battery reserves only.

EMERGENCY PROCEDURES

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

1. Throttle – IDLE
2. Brakes – APPLY
3. Wing Flaps – RETRACT
4. Mixture – IDLE CUT-OFF
5. Ignition Switch – OFF
6. Master Switch – OFF

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed – 80 knots
2. Mixture – IDLE CUT-OFF
3. Fuel Selector Valve – OFF
4. Ignition Switch – OFF
5. Wing Flaps – AS REQUIRED
6. Master Switch – OFF

ENGINE FAILURE DURING FLIGHT

1. Airspeed – 90 knots
2. Boost Pump – ON
3. Fuel Selector – SWITCH TANKS
4. Mixture – RICH
5. Ignition Switch – BOTH, LEFT, RIGHT
6. Transponder – 7700

EMERGENCY PROCEDURES

FIRES

DURING START ON GROUND

1. Cranking – CONTINUE, to get a start which would suck the flames and accumulated fuel into the engine.

If engine starts:

2. Power – 1700 rpm for a few minutes
3. Engine – SHUTDOWN and inspect for damage

If engine fails to start:

4. Throttle – FULL OPEN
5. Mixture – IDLE CUT-OFF
6. Cranking – CONTINUE
7. Fire Extinguisher – OBTAIN
8. Engine – SECURE

ENGINE FIRE IN FLIGHT

1. Mixture – IDLE CUT-OFF
2. Fuel Selector Valve – OFF
3. Master Switch – OFF
4. Cabin Heat and Air – OFF

ELECTRICAL FIRE IN FLIGHT

1. Master Switch – OFF
2. Avionics – OFF
3. All Other Switches (except ignition) – OFF
4. Vents/ Cabin Air/ Heat – CLOSED
5. Fire Extinguisher – ACTIVATE (if available)

CABIN FIRE

1. Master Switch – OFF
2. Vents/ Cabin Heat – CLOSED
3. Fire Extinguisher – ACTIVATE (if available)

WING FIRE

1. Nav & Strobe Lights – OFF
2. Landing Light – OFF