Van's Aircraft
RV-7
Lycoming O-360-A1A

Pilot's Operating Handbook

N818BG

PERFORMANCE – SPECIFICATIONS

SPAN	25’ 0”
LENGTH	20’ 4”
HEIGHT	5’ 10”

SPEED:

Maximum at Sea Level	200 KIAS
Cruise, 75% Power at 8,000 Ft	174 KIAS

RANGE (includes 3 gal. for taxi, takeoff & climb):

75% @ 8000’ , no reserve	775 SM
55% @ 8000’ no reserve	950 SM
75% @ 8000’, one hour (10 gal) reserve	500 SM
55% @ 8000’, one hour (10 gal) reserve	680 SM
RATE OF CLIMB AT SEA LEVEL	1,600 FPM
SERVICE CEILING	20,500 FT
TAKEOFF PERFORMANCE	575 FT
LANDING PERFORMANCE	500 FT

STALL SPEED (CAS):

Flaps Up, Power Off	57 KIAS
Flaps Down, Power Off	50 KIAS
MAXIMUM WEIGHT (Normal Category)	1800 Lbs
EMPTY WEIGHT	1066 Lbs
MAXIMUM USEFUL LOAD	734 Lbs
BAGGAGE ALLOWANCE	100 Lbs
WING LOADING (Pounds/ Sq. Ft)	14.8 lb/sqft
POWER LOADING (Pounds/ HP)	12.0 lb/hp

FUEL:

Capacity ……42 Gal Total / 40 Gal Usable

Left tank ……21 Gal Total / 20 Gal Usable

Right tank ……..21 Gal Total / 20 Gal Usable

Type: ……100LL Avgas

OIL CAPACITY ……... 8 Qts max

ENGINE…….…… Lycoming O-360-A1A

HORSEPOWER …… 180 HP @ 2700 RPM

PROPELLER ……..…… Hartzell 2-Blade Constant Speed 72” diameter

Performance

Operation above 2600 RPM is limited to takeoff. As soon as practical after takeoff the RPM should be reduced to 2600 RPM or less.

TAS	RPM	MAP	HP	Fuel Flow GPH	% Power
	2700	"	180	---	Takeoff
180	2600	"	135	12.6	100
175	2350	"	101	7.2	75
165	2200	"	87	6.3	65
157	1860	"	74	5.3	55

Fuel flow are based on Peak CHT enriched by 50 degrees.

No Wind Range at 8,000':

- All range calculations include 3 gal. for engine start, taxi, takeoff and climb.
- Engine is leaned for best economy.

One hour (10.0 gal.) reserve:

75% Power …… 570 SM
65% Power…….. 680 SM
55% Power …….. 790 SM

No Reserve:

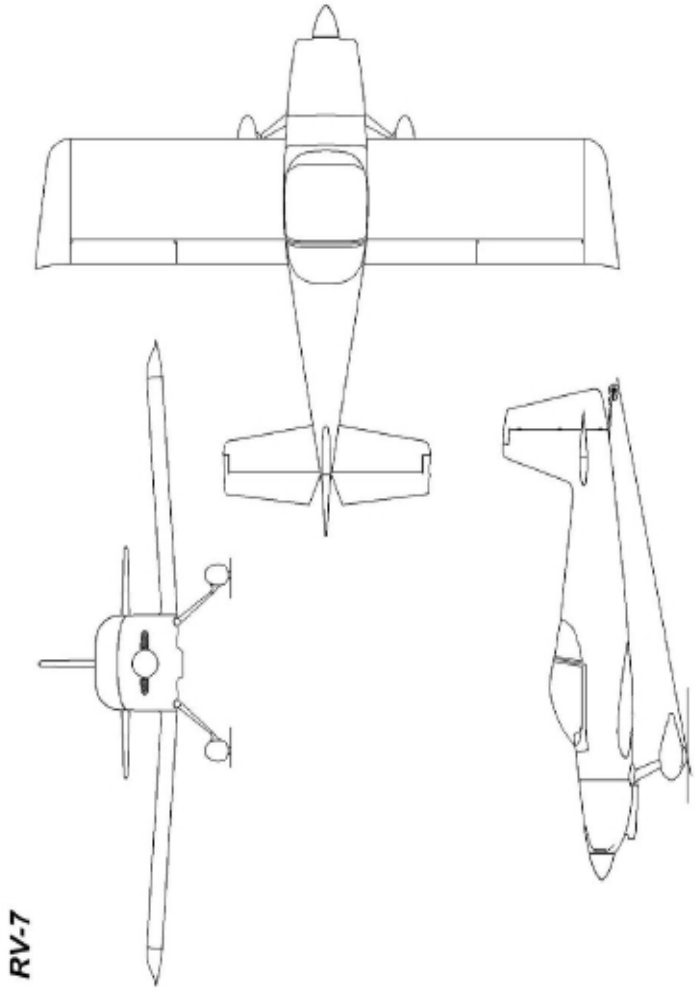
75% Power …….. 745 SM
65% Power …….. 847 SM
55% Power …….. 950 SM

AIRSPEED LIMITATIONS

	SPEED	IAS	REMARKS
V_{NE}	Never Exceed Speed	**200 knots**	Do not exceed this speed in any operations.
V_{NO}	Maximum Structural Cruising Speed	**168 knots**	Exceed this speed only in smooth air.
V_A	Maneuvering Speed	**142 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	**87 knots**	Do not exceed this speed with flaps down
Vy	Best Rate of Climb	**85 knots**	
Vx	Best Angle of Climb	**74 knots**	
Vs	Stall Speed Clean	**56 knots**	
Vso	Stall Speed Landing Configuration	**50 knots**	

AIRSPEED INDICATOR MARKINGS

MARKING	IAS VALUE OR RANGE	SIGNIFICANCE
White Arc	**50 – 87 knots**	Full Flap Operating Range. Lower limit is Vso. Upper limit is maximum speed with flaps extended
Green Arc	**56 – 168 knots**	Normal Operating Range. Lower limit is Vs. Upper limit is maximum structural cruising speed
Yellow Arc	**168–200 knots**	Operations must be conducted with caution and only in SMooth air.
Blue Line	**142 knots**	Maneuvering speed – Max. permissible speed at which full control can be applied.
Red Line	**200 knots**	Maximum speed for all operations


RV-7

WEIGHT AND BALANCE DATA

Make: Scott Ahrens
Model: RV-7
Serial #: 72982
Registration: N818BG

MAXIMUM WEIGHTS AND LIMITS:

Aerobatic Category	Approved for Aerobatics
Utility Category	1600 Lbs
Normal Category	1800 Lbs
Forward CG Limit	15% of chord 8.7" aft of leading edge
Aft CG Limit	29% of chord or 16.82" aft of leading edge
Utility Aft CG Limit	24% of Chord or 12.72" aft of leading edge

Datum: ..... 70 inches forward of wing leading edge (L.E.)

Design C.G. Range: ..... 15% to 28% of wing chord
8.7" to 16.82" from L.E
. 78.70" to 86.82" aft of Datum

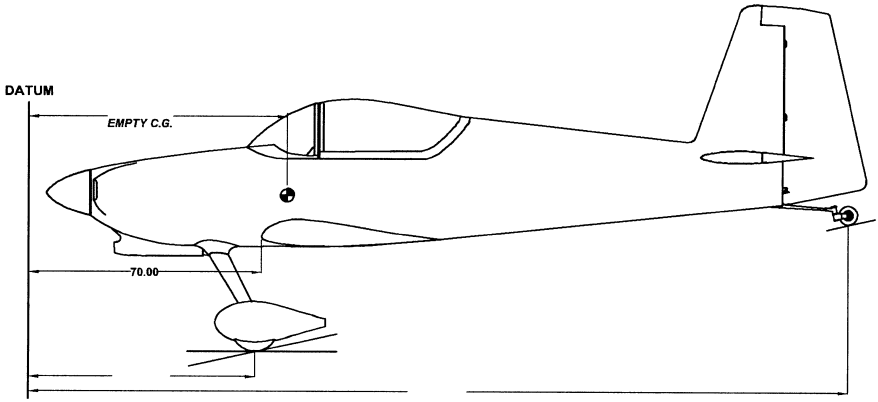
Wing L.E.:	70 inches aft of datum
Main wheel right:	69.13" aft of datum
Main wheel left :	69.31" aft of datum
Tail wheel:	249.19" aft of datum

Fuel:	80.00" 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, unusable fuel)

	Weight	Arm	Moment
Right Wheel	511	69.13	35325.4
Left Wheel	522	69.31	36179.8
Tail Wheel	67	249.19	16695.7
Total	1100		88200.9

Empty CG = 80.18” aft of datum



WEIGHT AND BALANCE DATA

Sample:

	Weight	Arm	Moment
Aircraft	1100	80.18	88200.9
Fuel (6lbs/gal)	_____	80.00	_____
Pilot	_____	97.48	_____
Passenger	_____	97.48	_____
Baggage	_____	126.78	_____
Total	_____		_____

CG = Total Moment / Total Weight

CG = _____ in aft of datum

CG Range = 78.70 to 86.82 in aft of datum

RV-7 N818BG

Pilot Operating Handbook

WEIGHT AND BALANCE DATA

Max. Gross Weight			
Item	**Weight**	**Arm**	**Moment**
Aircraft	1,100		88,200
Fuel (42 gal)	252	80	20,160
Pilot	208	97	20,276
Passenger	200	97	19,496
Baggage	40	127	5,071
Total	**1,800**		**153,203**
CG:	**85.11**		
Zero Fuel CG	**85.95**		

Full Baggage, No Pax			
Item	**Weight**	**Arm**	**Moment**
Aircraft	1,100		88,200
Fuel (42 gal)	252	80	20,160
Pilot	210	97	20,471
Passenger	0	97	0
Baggage	100	127	12,678
Total	**1,662**		**141,509**
CG:	**85.14**		
Zero Fuel CG	**86.06**		

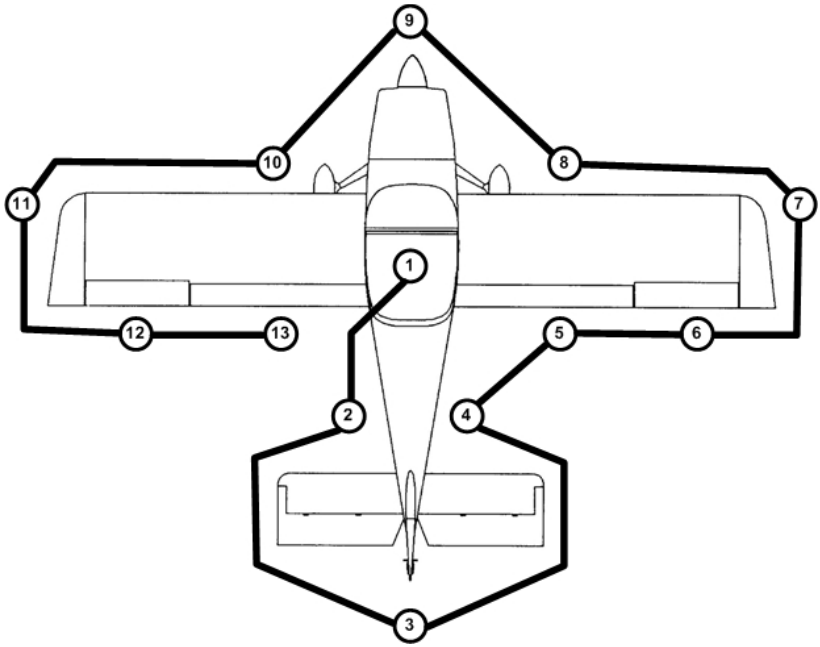
Most Aft CG (Min Fuel)			
Item	**Weight**	**Arm**	**Moment**
Aircraft	1,100		88,200
Fuel (5 gal)	30	80	2,400
Pilot	210	97	20,471
Passenger	170	97	16,572
Baggage	70	127	8,875
Total	**1,580**		**136,517**
CG:	**86.40**		
Zero Fuel CG	**86.53**		

Most Forward CG (Min Pilot Wt.)			
Item	**Weight**	**Arm**	**Moment**
Aircraft	1,100		86,200
Fuel (42 gal)	252	80	20,160
Pilot	100	97	9,748
Passenger	0	97	0
Baggage	0	127	0
Total	**1,452**		**116,108**
CG:	**79.96**		
Zero Fuel CG	**79.96**		

Single Pilot CG (Reg Pilot Wt.)			
Item	**Weight**	**Arm**	**Moment**
Aircraft	1,100		88,200
Fuel (42 gal)	252	80	20,160
Pilot	210	97	20,471
Passenger	0	97	0
Fwd Baggage	0	127	0
Total	**1,562**		**128,831**
CG:	**82.48**		
Zero Fuel CG	**82.95**		

Gross Weight (Heavy Pilot, Reduced Fuel			
Item	**Weight**	**Arm**	**Moment**
Aircraft	1,100		88,200
Fuel (40 gal)	185	80	14,800
Pilot	260	97	25,345
Passenger	255	97	24,857
Fwd Baggage	0	127	0
Total	**1,800**		**153,202**
CG:	**85.11**		
Zero Fuel CG	**85.70**		

PREFLIGHT INSPECTION



1. CABIN

1. Documentation – Available In Airplane
2. Aeronautical Charts – CURRENT AND APPROPRIATE TO FLIGHT
3. Flight Control Locks – RELEASE
4. Magneto Switches – OFF
5. Master Switch – ON
6. Avionics Switch – ON

WARNING

When turning on the master switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the magneto switches were on. Do not stand, nor allow anyone else to stand, within the arc of the propeller since a loose or broken wire or a component malfunction could cause the propeller to rotate.

7. Fuel Quantity – CHECK QUANTITY – VERIFY ENGINE MONITOR RESET
8. Fuel Shutoff Valve – Left Tank
9. Fuel Pump – ON – VERIFY FUEL PRESSURE
10. Fuel Pump – OFF
11. Avionics switch – OFF
12. Flaps – DOWN
13. Navigation, Strobe, and Landing light functionality - Verify
14. Master Switch – OFF

2. STATIC PORT

1. Static Sources – CHECK for blockage

3. EMPENNAGE

1. Tail Tie-Down – DISCONNECT
2. Tail Wheel – CHECK condition and Springs
3. Control Surfaces – CHECK freedom of movement and security

4. STATIC PORT

2. Static Sources – CHECK for blockage

5. FLAPS

1. Flap – CHECK security

6. AILERON

1. Aileron – CHECK freedom of movement and security

7. RIGHT WING TIP

1. Navigation and Strobe Light – CHECK condition
2. Landing Light – CHECK condition

8. RIGHT WING

1. Wing Tie-Down – REMOVE
2. Fuel Quantity – CHECK VISUALLY
3. Fuel Filler Cap – SECURE
4. Main Wheel Tire – CHECK for proper inflation
5. Chock – REMOVE
6. Right Wing Tank – SUMP

7. Fuel Tank Vent – CHECK for blockage

9. NOSE

1. Engine Oil Level – CHECK, do not operate with less than 5 quarts
2. Cowl Skybolts – Check secure
3. Air Inlet – CHECK for restrictions
4. Propeller and Spinner – CHECK for nicks and security
5. Cowl Skybolts – CHECK for security

10. LEFT WING

1. Fuel Tank Vent – CHECK for blockage
2. Left Wing Tank – SUMP
3. Chock – REMOVE
4. Main Wheel Tire – CHECK for proper inflation
5. Fuel Quantity – CHECK VISUALLY
6. Fuel Filler Cap – SECURE
7. Pitot Tube Cover – REMOVE and check for blockage
8. Wing Tie-Down – REMOVE

11. LEFT WING TIP

1. Landing Light – CHECK condition
2. Navigation and Strobe Light – CHECK condition

12. AILERON

1. Aileron – CHECK freedom of movement and security

13. FLAPS

1. Flap – CHECK security

BEFORE STARTING ENGINE

1. Preflight Inspection – COMPLETE
2. Seat Belts and Shoulder Harnesses – ADJUST and LOCK
3. Canopy – OPEN OR CLOSED DEPENDING ON WEATHER
4. Fuel Selector Valve – FULLEST TANK
5. Battery Switch – OFF
6. Avionics Master – OFF
7. Brakes – SET

STARTING ENGINE (COLD)

1. Battery Switch – ON
2. Avionics Master – ON, check PFD for operation
3. Autopilot Switch - ON
4. Strobe – ON
5. Magnetos - ON
6. Carb Heat – COLD
7. Throttle – OPEN 1/4”
8. Mixture – HALF RICH
9. Fuel Pump – ON
10. Primer – Operate 2 – 4 seconds depending on temperature
11. Propeller Area – CLEAR
12. Starter Button – PRESS
13. Throttle – ADJUST to 900 rpm
14. Oil Pressure – CHECK 25 psi at idle
15. Alternator – ON
16. Avionics – ON

STARTING ENGINE (HOT)

1. Battery Switch – ON'
2. Avionics – ON
3. Autopilot Switch - ON
4. Strobes – ON
5. Magnetos – ON
6. Carb Heat - COLD
7. Throttle – OPEN ¼
8. Mixture – HALF RICH
9. Fuel Pump - ON
10. Primer – Operate 1 – 2 seconds

11. Propeller Area – CLEAR
12. Starter Button – PRESS
13. Throttle – ADJUST to 900 RPM
14. Oil Pressure – CHECK 25 PSI at idle
15. Alternator – ON
16. Avionics– ON

BEFORE TAXI

1. Flaps – RETRACT - visually confirm
2. Trim – SET for Takeoff
3. ATIS/AWOS – Confirm

BEFORE TAKEOFF

1. Brakes – SET
2. Flight Controls – FREE and CORRECT
3. Flight Instruments – SET
4. Altimeter and EFIS – CORRECT BARO PRESSURE
5. Fuel Selector Valve – DESIRED TANK
6. Flaps - SET
7. Elevator Trim – NEUTRAL
8. Throttle – 1800 RPM
9. Carb Heat – Check
10. Left Magneto – Check
11. Right Magneto – Check Ship Power
12. Engine Instruments – CHECK
13. Throttle – IDLE
14. Radios – SET
15. Check Flight Timer in EFIS
16. Canopy -------- Overhead Latch – SECURE
17. Canopy -------- Side Latch – SECURE

TAKEOFF

NORMAL TAKEOFF

1. Throttle – FULL FORWARD
2. Elevator Control – LIFT TAIL WHEEL (at 55 IAS)
3. Climb Speed – 120 IAS

SHORT FIELD TAKEOFF

1. Wing Flaps – 10 Deg
2. Brakes – APPLY
3. Throttle – FULL FORWARD
4. Stick – FULL BACK
5. Brakes – RELEASE
6. Climb Speed – 85 IAS (Vy)

ENROUTE CLIMB

1. Airspeed – 110 - 130 IAS
2. Throttle – 25 in Hg, or full throttle
3. Prop – 2500 RPM
4. Fuel Pressure – CHECK

CRUISE

(65% Power)

1. Throttle – 23 in Hg
2. Prop – 2300 RPM
3. Trim – ADJUST
4. Mixture – Adjust as necessary

LANDING

1. Fuel Selector – To fullest tank
2. Slow to 110 IAS
3. Mixture – Full rich
4. Fuel pump – On
5. Landing Lights – as needed
6. Flaps – as needed below 87 IAS

POST FLIGHT

AFTER LANDING

1. Wing Flaps – FULL DOWN
2. Carb Heat – Cold

ENGINE SHUTDOWN

1. Throttle – IDLE (800 to 900 RPM until drop in Cylinder Head Temperature)
2. Avionics – OFF
3. Fuel Pump – OFF
4. Fuel Selector Valve – OFF
5. Mixture – FULL AFT
6. Avionics Master - OFF
7. Magneto Switches – OFF
8. Strobe – OFF
9. Flaps – DOWN
10. Alternator – OFF
11. Master Switch – OFF

SECURING AIRCRAFT

1. Wheel Chocks – INSTALL
2. Wing & Tail Tie-Down – INSTALL AS REQUIRED
3. Pitot Tube Cover – INSTALL AS REQUIRED
4. Cockpit – CLEAN AND SECURE CONTROLS
5. Master and Electrical Switches – OFF
6. Engine Monitor Fuel Quantity – RESET AFTER REFUELING

Battery Information

LED Light	Voltage	Possible Cause	Recommended Action
Slow Flashing (5s on/5s off)	Less than 12.8V	Battery over-discharged (due to faulty charging system)	Charge battery. Once charged, the light will stop flashing.
Slow Flashing (5s on/5s off)	Less than 13.2V	Weak or failing cell	Charge battery. If voltage drops below 13.2V within a few days, discontinue use.
Slow Flashing (5s on/5s off) (> 1 hour time period)	13.2V-14.6V	Weak or failing cell	Discontinue use. If in flight, this is not an immediate issue unless it is in conjunction with a charging system failure.
Slow Flashing (5s on/5s off)	Greater than 15.2V	Over-charging (due to faulty charging system)	If in flight, shutoff charging system immediately. Aircraft over-voltage protection is required if alternator charging system is greater than 20 amps (i.e. over voltage crowbar circuit)
Slow Flashing (5s on/5s off) (< 30 min. time period)	13.2V – 14.6V	Cell to cell charge levels are not balanced	May come on briefly during periods of high current charging until the cells are automatically balanced. Try charging with a plugin charger, like an Optimate Lithium charger.
Solid Light	Any voltage	BMS electronic issue	Discontinue use. If in flight, this is not an immediate issue unless it is in conjunction with a charging system failure.
Solid Light that turns off after 3 minutes	Any voltage	Short Circuit protection was activated	Nothing needs to be done.
Short Flashing (2s on/2s off)	Any voltage	High battery temperature (> 65°C / 150°F)	Let battery cool down prior to cranking or charging.

Engine Information

Model: …….. Lycoming O360-A1A
HP: …… 180
Fuel: …….. 80, 100 LL, or 86 Octane auto fuel
Oil Filter: ….. Champion CH48108-1

OIL: Aeroshell 100W

Average Ambient Air	**MIL-L-6082**	**MIL-L-22851 Ashless Dispersant**
All Temperatures	------	SAE 15W50 or 20W50
Above 80° F	SAE 60	SAE 60
Above 60° F	SAE 50	SAE 40 or SAE 50
30° F to 90° F	SAE 40	SAE 40
0° F to 70° F	SAE 30	SAE 40, 30 or 20W40
Below 10° F	SAE 20	SAE 30 or 20W30

Oil Sump Capacity …….. 8 U.S. Quarts
Minimum Safe Quantity ...5 U.S. Quarts

Operating Conditions:

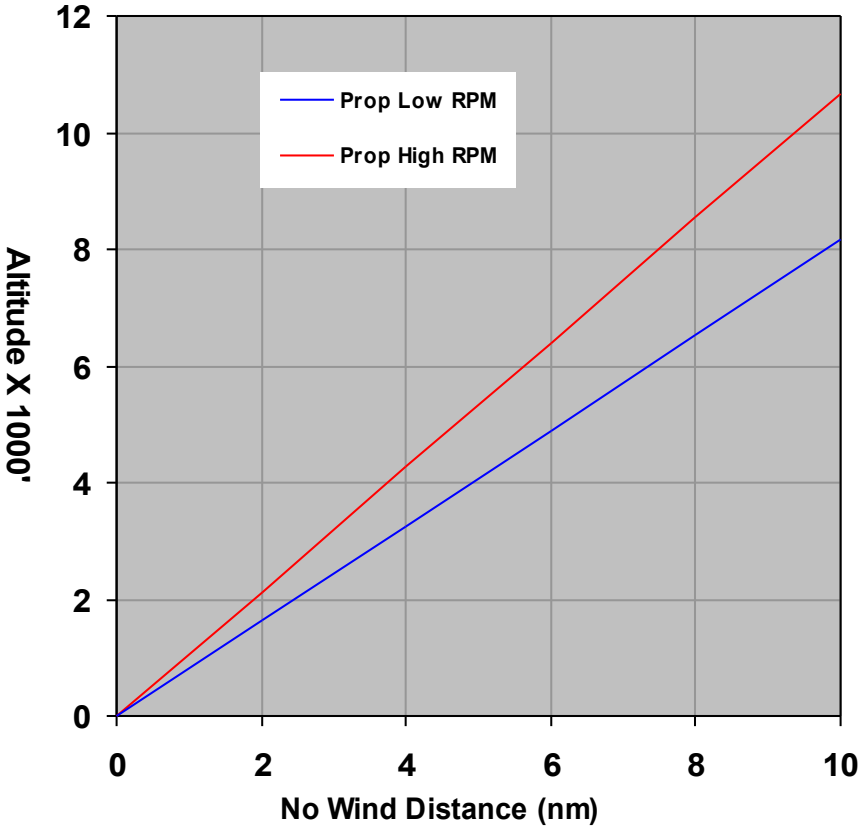
Oil Inlet Temp: 180° F desired
245° F Maximum

Oil Pressure: 90 psi max
60 psi min
25 psi idle

Fuel Pressure: 8 psi max
3 psi desired
.5 psi min

CHT: 500° F Maximum
150 to 435° F for continuous operation

Engine Out Glide Performance
Airspeed 86 mph



EMERGENCY OPERATIONS AIRSPEEDS

Engine Failure After Takeoff:
Wing Flaps Up ……85 IAS
Wing Flaps Down ……... 70 IAS

Maneuvering Speed (Va) ……
142 IAS

Maximum Glide ……
85 IAS

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

1. Throttle –IDLE
2. Brakes – APPLY
3. Wing Flaps – RETRACT
4. Maneto Switches – OFF
5. Battery Switch – OFF

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

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

ENGINE FAILURE DURING FLIGHT

1. Airspeed –80 IAS
2. Carburetor Heat – ON
3. Fuel Pump – ON
4. Mixture – RICH
5. Fuel Selector – SWITCH TANK
6. Magneto Switches – ON
7. Attempt restart
8. Transponder – 7700

EMERGENCY OPERATIONS LANDING

EMERGENCY LANDING

1. Airspeed – 80 IAS
2. Select suitable landing spot and turn to it
3. Harness – SECURE
4. Fuel Pump – OFF
5. Fuel Selector – OFF
6. Transponder – 7700
7. Canopy – Unlatch overhead and side releases
8. Flaps – As needed
9. Master – OFF
10. Touch down at minimum controllable airspeed

DITCHING
(WATER LANDING)

EMERGENCY WATER LANDING

1. Airspeed – 80 IAS
2. Select suitable landing spot close to shore, if possible.
3. APPROACH

– High Winds, Heavy Seas – INTO THE WIND
– Light Winds, Heavy Swells – PARALLEL TO SWELLS

4. Transponder – 7700
5. Canopy – Unlatch overhead and side releases
6. Harness – SECURE (Remind passenger on release)
7. Heavy Objects – SECURE (Remove object from glare shield.)
8. Fuel Pump – OFF
9. Fuel Selector – OFF
10. Flaps – FULL
11. Touch down – 2 knots above stall speed
12. Face – CUSHION at touchdown with folded coat
13. Airplane – EVACUATE
14. Life Vests and Raft - INFLATE

EMERGENCY OPERATIONS
FIRES

DURING START ON GROUND

1. Cranking – CONTINUE, to get a start which would suck the flames and accumulated fuel through the servo and 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:

1. Throttle – FULL OPEN
2. Cranking – CONTINUE
3. Fire Extinguisher – OBTAIN
4. Engine – SECURE

ENGINE FIRE IN FLIGHT

1. Fuel Selector Valve – OFF
2. Master Switch – OFF
3. Cabin Heat and Air – OFF

ELECTRICAL FIRE IN FLIGHT

1. Master Switch – OFF
2. Avionics – OFF
3. All Other Switches (except magneto) – 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 Lights – OFF

ELECTRICAL

ELECTRICAL / ALTERNATOR FAILURE

1. Alternator Switch – OFF
2. Alternator Switch – ON

IF ALTERNATOR IS STILL OFF-LINE:

1. Alternator Switch – OFF
2. Electrical Switches – OFF except Magneto
3. Avionics – OFF
4. Avionics – ON as required
5. Electrical Equipment – ON, as required
6. Flight – TERMINATE as soon as practical.

NOTES