

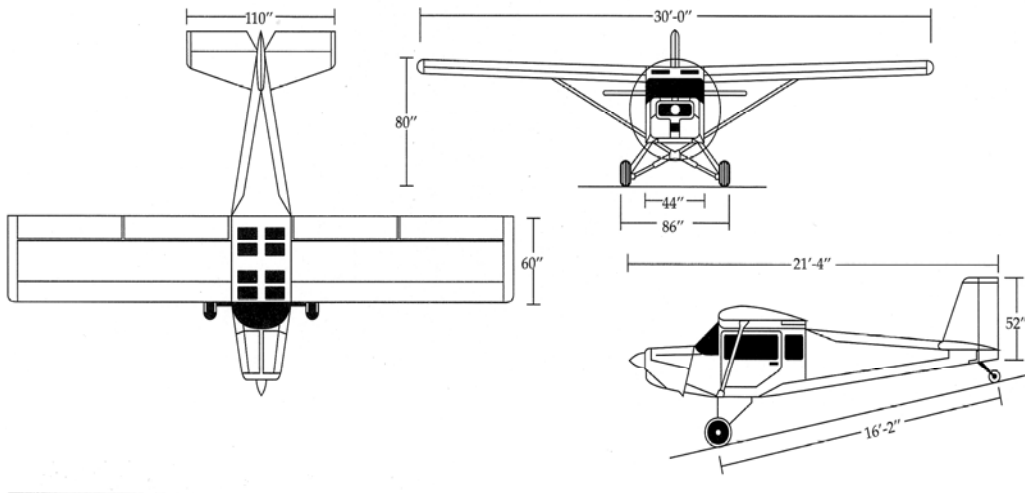
# PILOTS OPERATING MANUAL

## 0-235 MURPHY REBEL

This manual is intended as a guide only. Amateur built aircraft vary a great deal in their construction standard, equipment and handling. If you intend to fly any aircraft with which you are unfamiliar *you must undertake a thorough checkout with a suitably qualified pilot.*

This manual refers specifically to the Murphy Rebel cabin monoplane, with tailwheel undercarriage and powered by the Lycoming 0-235 L2C 118 h.p. 4 cycle aeroengine. All information is given assuming a factory standard Rebel with no modifications.

KIT No.



## SECTION 1

### → LIMITATIONS

This aircraft must be operated only for V.F.R. day flights.  
This aircraft is not approved for aerobatics or spins.

#### ★ ENGINE

AVCO LYCOMING 0-235 L2C.

Max. continuous r.p.m. and take off : 2800

Max. oil temp.: 245° F (118° C) desired 180° F (82° C).

Propeller - Sensenich 2 blade metal propeller, 72 diam. 56 pitch. These are fixed pitch propellers and care must be taken not to red line the engine in a dive.

#### ★ FUEL

Aviation grade 100LL.

Usable fuel 35 Imp Gals. / 159.25 Lts.

#### ★ INSTRUMENT LIMIT MARKINGS

##### *Oil Temp.*

Caution range .... 50 to 100° F

Normal operating range .... 100 to 240° F

##### *Oil pressure*

Idle .... 25 p.s.i.

Caution .... 10 to 30 p.s.i.

Normal operating .... 60 to 90 p.s.i.

max. start and warm up .... 100 p.s.i.

##### *Tachometer*

Normal operating range .... 2000 to 2800 r.p.m.

Max. .... 2800 r.p.m.

##### *Cylinder head temp.*

Normal .... 200 to 460° F

Max. .... 500° F

#### ★ AIRSPEED LIMITATIONS

Arc colour	KTS	M.P.H.	Operating range
White arc	40-70	44-80	Full flap operating range
Green arc	50-110	60-125	Normal operating range
Yellow arc	110-131	125-151	Operate with caution, only in smooth air
Red line	131	151	<b>NEVER EXCEED</b>

Speed	KTS	M.P.H.	Remarks
Never exceed $V_{ne}$	131	151	Do not exceed
Max. structural cruising $V_{no}$ or $V_c$	110	125	Do not exceed except in smooth air.
Manoeuvring $V_a$	95	110	no full or abrupt control movements above this speed.
Max. flap ext. $V_f/V_{fe}$	70	80	No flaps above this speed.

✚ POSITIVE MANOEUVRING LOAD FACTORS AT 1650lb. .... 3.8

✚ CENTRE OF GRAVITY

Datum line = leading edge of wing

Basic distances : Pilot/passenger .... 15"

Baggage .... 45"

Fuel .... 23"

Theoretical forward center of gravity limit for the modified 4415 airfoil is 7.7" A.O.D., however testing has revealed that 10.85 (20% MAC) is more practical.

Forward limit = 10.85" A.O.D.

Aft limit = 18.10" A.O.D.

*To determine empty weight centre of gravity:*

1/ Place aircraft in level flight attitude, with a suitable scale under each wheel.

2/ Record weight on each wheel.

3/ Measure the distance from main wheel centre to tail wheel centre, 90° to main axle.

$$\frac{\text{Tail weight} \times \text{Distance(moment) to tail wheel}}{\text{Total weight}} = \text{Empty weight C of G}$$

*Sample loading:*

	<u>Wt. x Location</u>	=	<u>inch - lbs</u>
Pilot & Pass.	380 lbs. @ 15"	=	5700
Baggage	100 lbs. @ 45"	=	4500
Empty Weight	823 lbs. @ 9.86	=	8115
Fuel (35 imp. gal.)	<u>264 lbs. @ 23"</u>	=	<u>6072</u>
	= 1567		= 24387

$$\text{Loaded C of G} = \frac{24387}{1567} = 15.56" \text{ A.O.D.}$$

✚ WEIGHTS

➔ Assuming standard conditions:

15°C, dry, hard, flat runway, press/alt 10ft.

TAKE OFF ROLL.....400ft.

LANDING ROLL.....400ft.

50ft. OBSTACLE.....600ft.

Max. Take off weight .... 1650lbs.

Empty weight .... 950lbs.

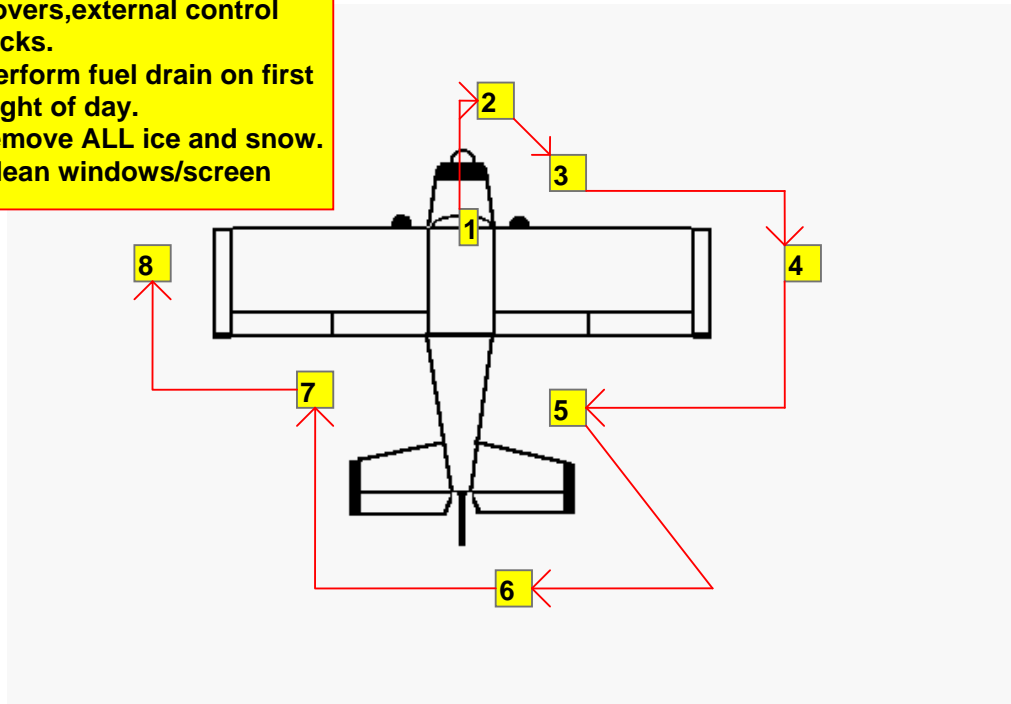
Useful load .... 700lbs.

■ SECTION II

## ➔ NORMAL PROCEDURES

### ↻ PREFLIGHT INSPECTION

Remove Tie downs, pitot-covers, external control locks.  
Perform fuel drain on first flight of day.  
remove ALL ice and snow.  
Clean windows/screen



#### 1 COCKPIT

- a) Control locks (if fitted) removed.
- b) Magneto switch OFF keys out.
- c) Master switch ON.
- d) Check strobes, landing light, fuel gauges, nav. lights, and electric trim at neutral (green).
- e) Master Switch **OFF**.
- f) Operate flapperons through range. Leave at first setting.
- g) Fuel taps both ON.
- h) First aid kit and fire extinguisher in place.
- i) Req. documents on board.

#### 2 ENGINE + NOSE

- a) Static vent clear.
- b) Cowling secure, intake clear, landing light.
- c) Propeller leading edge & spinner condition.
- d) Oil contents not less than 4 quarts.
- e) Fuel strain.

#### 3 UNDERCARRIAGE

- a) Condition of tyre, inflation, creep and tread.
- b) Hydraulic lines - no leaks.

- c) Condition of disc brakes.
- d) Tailwheel - condition, spring undamaged, secure.

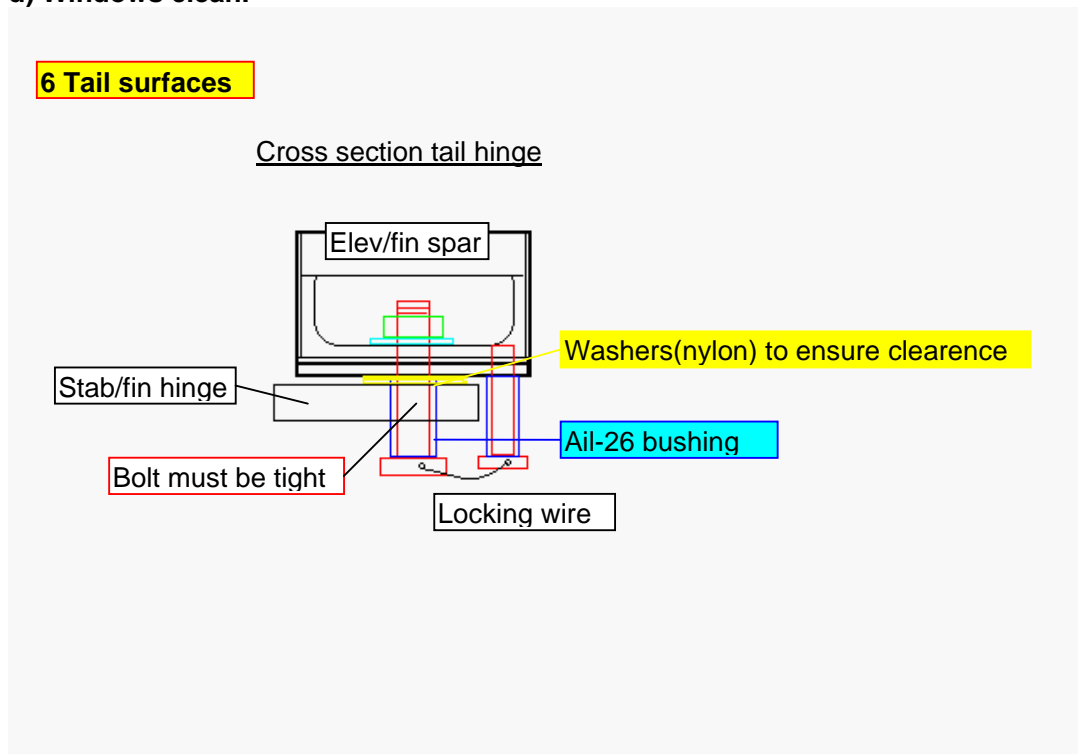
#### 4 WINGS

- a) Strut secure.
- b) Flaperon → condition (fabric/damage), hinges and linkages secure.  
→ Full and free.
- c) Wing skin condition - top, bottom and leading edge.
- d) Wing tip fairing & nav. light secure.
- e) Fuel tank contents (visual check), cap secure.
- f) Pitot head clear.

#### 5 FUSELAGE

- a) Skin condition.
- b) Aerials secure.
- c) Door latch & hinge operative.
- d) Windows clean.

#### 6 Tail surfaces



- a) Skin condition.
- b) Elevator linkages secure/full and free/ hinges secure.
- c) Rudder full and free/ hinges secure/ cable linkage secure.
- d) Trim tab secure/linkages secure.

#### ✦ BEFORE START

- a) Seat ..... Adjust & lock
- b) Hatches & harness.. Secure & adjusted
- c) Fuel taps ..... Both **ON**

- d) Flaps ..... UP
- e) Mag. switch..... Insert key
- f) Circuit breakers..... In & secure
- g) Instruments..... Undamaged, in limits & legible
- h) Radio..... OFF
- i) Cabin heat & air..... OFF/CLOSED
- j) Mixture..... Full & free - set RICH
- k) Throttle..... Full & free - set ̂ " open
- l) Carb heat..... Full and free - set cold
- m) Primer..... 4 primes when cold/as required
- n) Master switch..... ON
- o) Trim..... Check O.K. & at take off(green)
- p) Beacon..... ON
- q) BRAKES..... ON
- r) Controls..... Up elevator
- s) LOOKOUT - Call "Clear prop"
- t) **START ENGINE - KEEP REVS. BELOW 1000**

 **AFTER START**

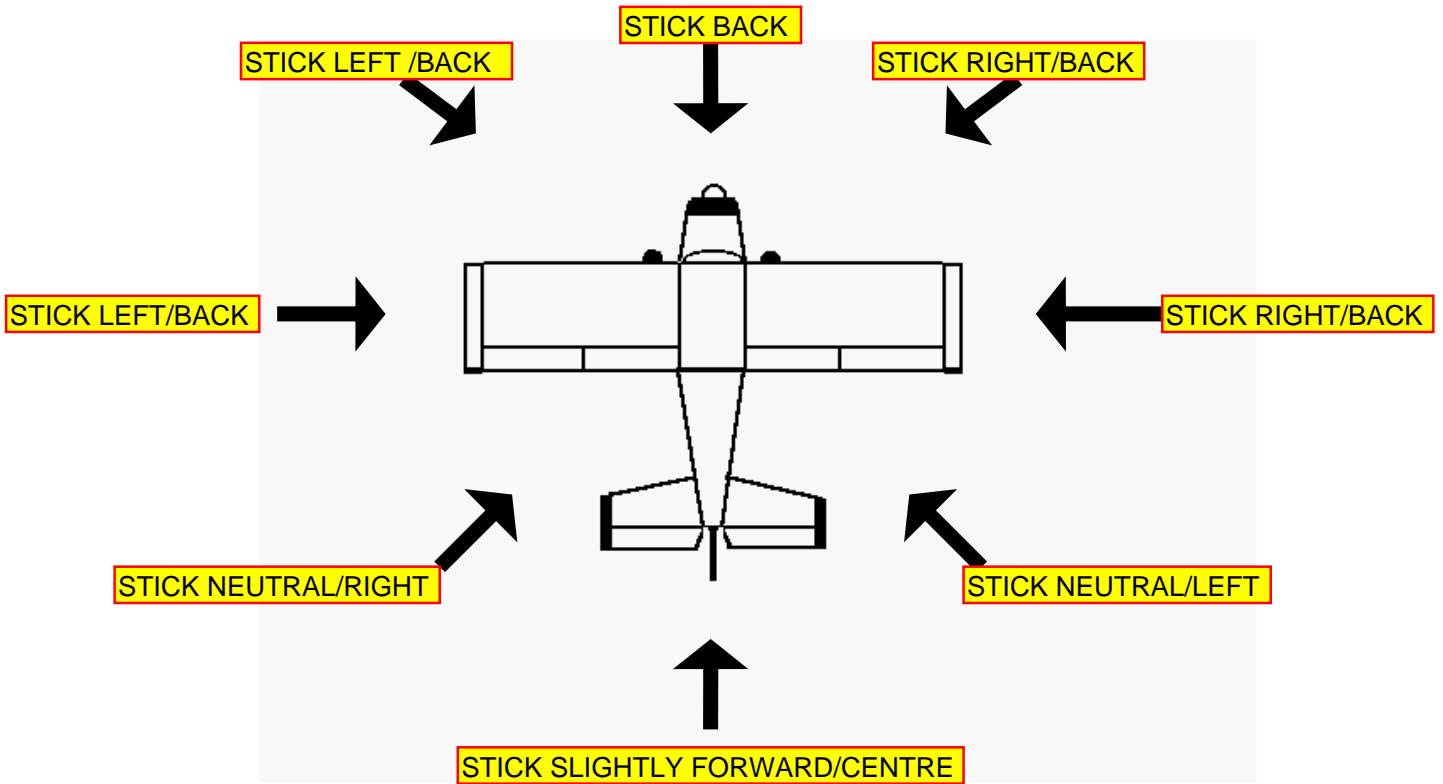
- a) R.P.M..... Set 1000
- b) Starter warning light.... OUT
- c) Oil pressure..... 60 p.s.i. in 30 secs. or shut down
- d) Ammeter..... Charging
- e) Suction..... 3" to 5"
- f) Instruments..... Set D.I.
- g) Clock..... Set time
- h) Radios..... ON
- i) Altimeter..... Set
- j) G.P.S. .... Set

 **TAXI**

- a) Radio call - move forward
- b) Brakes..... CHECK
- c) Steering..... CHECK
- d) Compass/D.I. .... Increasing/decreasing

**STICK POSITION DURING TAXI - REFER TO DIAGRAM**





## 🔗 POWER CHECKS

- a) Position..... Into wind & clear all round
- b) Brakes ..... ON
- c) Oil T's & P's..... Within limits
- d) R.P.M..... 1800
- e) Carb heat..... Hot-max. drop 75rpm.Set COLD
- f) Magnetos check:
  - LEFT - RIGHT - BOTH*
  - Max. drop..... 125 rpm
  - Max. diff. between mags... 50 rpm
- g) Suction..... Within limits
- h) Oil T's & P's..... Within limits
- i) Ammeter..... No discharge
- j) R.P.M..... Idle 500 - 700. Reset 1000

## 🔗 PRE-TAKE OFF AND VITAL ACTIONS

- a) Trim..... Set for take off
- b) Throttle..... Friction nut set
- c) Mixture..... RICH
- d) Fuel..... ON & sufficient

- e) Flap..... Set-10° on grass
- f) Instruments
- g) Hatches..... Closed and locked
- h) Harness's..... Secure
- i) CONTROLS..... FULL AND FREE
- j) Lookout..... Clear to proceed

**✂ TAKE OFF**

Apply throttle gently. Move stick forward immediately. Aircraft will swing left as tail lifts. Just before rotation, the Rebel lowers its nose slightly to take up flying attitude. **DO NOT BE TEMPTED TO PULL BACK AT THIS STAGE.** Backpressure at 40 kts. Cross wind - up aileron on wing into wind - run on one wheel till speed gained.

- a) Approach and runway clear.
- b) D.I. corresponds with runway heading
- c) R.P.M. .... 2300 min.
- e) Oil T's & P's..... Within limits
- f) Airspeed..... Increasing

————— After take off —————

Flaps..... UP at 300ft.

ROTATE ..... 45 kts.  
 CLIMB:  
 BEST ANGLE (10° FLAP).. 50 kts.  
 BEST RATE (to 4000ft)..... 60 kts.  
 CRUISE (2300 rpm)..... 100 kts.  
 APR. & LAND *initial final thresh*  
 normal            60        55        45 kts.  
 flapless          65        60        55 kts.  
 glide              60        60        55 kts.  
 MAX. CROSS WIND @ 90°... 15kts.  
 STALL no flaps,no power....38kts.  
 STALL 30° flap,no power.....34kts.

**✂ LANDING CHECKS**

- a) Mixture..... RICH
- b) Fuel..... ON
- c) Flaps..... As required - **LOWER ONLY AFTER FINAL TURN / FINALS**
- d) Hatches & harness's.. Secure
- e) Brakes..... OFF or COVERED

Crosswind technique - Wing low, use aileron to keep wing down, USE BRAKES TO KEEP STRAIGHT.

**GO-AROUND**

- a) CARB HEAT COLD
- b) FULL POWER SLOWLY
- c) FLAPS 10°
- d) TRIM NEUTRAL (GREEN)

**✂ AFTER LANDING**

- a) Carb heat..... Cold
- b) Flaps..... Up
- c) Trim..... Neutral (green)
- d) Non essential electrics..... Off



 **SHUT DOWN**

- a) Brakes..... On
- b) R.P.M. .... 1500 for 20 secs.
- c) Radios & electrics..... Off
- d) Mixture..... Lean for 10 secs ~~Idle~~ idle cut off
- e) Magnetos..... Off
- f) Master Switch.....Off
- g) Control locks..... In place

**EMERGENCY**

**FIRE**

**ENGINE FIRE ON START :**

1800 rpm for 1 min.....SHUT DOWN

***IF FIRE CONTINUES:***

- a) Throttle.....CLOSE
- b) Mixture.....IDLE CUT OFF
- c) Fuel.....OFF
- d) Magnetos.....OFF
- e) Master switch.....OFF

***EVACUATE AIRCRAFT***

**ENGINE FIRE IN FLIGHT :**

- a) Fuel.....OFF
- b) Cabin air/heat.....CLOSE

***WHEN ENGINE STOPS :***

- c) Throttle.....CLOSE
- d) Magnetos.....OFF
- e) Mixture.....IDLE CUT OFF
- f) Airspeed.....INCREASE -  
to find incombustable mixture

**ELECTRICAL FIRE IN FLIGHT :**

- a) Master switch.....OFF
- b) Cabin air/heat.....CLOSE
- c) Fire extinguisher.....ACTIVATE
- d) VENTILATE CABIN

**ENGINE FAILURE**

**AFTER TAKE OFF :**

- a) Lower nose. Airspeed 60 kts.
- b) Select landing area ahead.

**DO NOT TURN BACK**

- c) Flaps.....AS REQUIRED
- d) Mixture.....IDLE CUT OFF
- e) Fuel.....OFF
- f) Magnetos.....OFF
- g) Master switch.....OFF
- h) Doors.....UNLATCH

**AT ALTITUDE :**

- a) Airspeed.....60 kts.
- b) Choose landing area
- d) If enough high → investigate failure  
Mixture - RICH, fuel - ON / sufficient.  
Magnetos - ON both, carb heat - HOT  
Primer - LOCKED.

***IF ENGINE FAILS TO START :***

- a) MAYDAY CALL, squawk 7700
- b) Mixture.....IDLE CUT OFF
- c) Fuel.....OFF
- d) Magnetos.....OFF
- e) Master switch.....OFF
- f) Hatches RELEASE Harness SECURE

## NOTES

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