

**SECTION 2  
LIMITATIONS**

**2.1 GENERAL**

This section provides the "FAA Approved" operating limitations, instrument markings, color coding and basic placards necessary for operation of the airplane and its systems.

This airplane must be operated as a normal or utility category airplane in compliance with the operating limitations stated in the form of placards and markings and those given in this section and this complete handbook.

Limitations associated with those optional systems and equipment which require handbook supplements can be found in Section 9 (Supplements).

**2.3 AIRSPEED LIMITATIONS**

SPEED	KIAS	KCAS
Never Exceed Speed (VNE) - Do not exceed this speed in any operation.	154	148
Maximum Structural Cruising Speed (VNO) - Do not exceed this speed except in smooth air and then only with caution.	125	121

SPEED	IAS	KCAS
Design Maneuvering Speed (VA) - Do not make full or abrupt control movements above this speed.		
At 2550 lbs. G.W.	113	111
At 1634 lbs. G.W.	89	89

**CAUTION**

Maneuvering speed decreases at lighter weight as the effects of aerodynamic forces become more pronounced. Linear interpolation may be used for intermediate gross weights. Maneuvering speed should not be exceeded while operating in rough air.

Maximum Flaps Extended Speed (VFE) - Do not exceed this speed with the flaps extended.	102	100
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**2.5 AIRSPEED INDICATOR MARKINGS**

MARKING	IAS
Red Radial Line (Never Exceed)	154 KTS
Yellow Arc (Caution Range - Smooth Air Only)	125 KTS to 154 KTS
Green Arc (Normal Operating Range)	55 KTS to 125 KTS
White Arc (Flap Down)	49 KTS to 102 KTS

**2.7 POWER PLANT LIMITATIONS**

(a) Number of Engines	1
(b) Engine Manufacturer	Lycoming
(c) Engine Model No.	O-360-A4M or O-360-A4A with carburetor setting 10-3878
(d) Engine Operating Limits	
(1) Takeoff Power - 5 Minute limit (BHP)	180
(2) Takeoff Engine Speed - 5 Minute Limit (RPM)	2700
(3) Maximum Continuous Power (BHP)	178
(4) Maximum Continuous Engine Speed (RPM)	2650
(5) Maximum Oil Temperature	245°F
(6) Oil Pressure	
Minimum (red line)	25 PSI
Maximum (red line)	90 or 100 PSI
(7) Fuel Pressure	
Minimum (red line)	0.5 PSI
Maximum (red line)	8 PSI
(8) Fuel (AVGAS ONLY) (minimum grade)	100 or 100LL Aviation Grade
(9) Number of Propellers	1
(10) Propeller Manufacturer	Sensenich
(11) Propeller Model	76EM8S5-0-62
(12) Propeller Diameter	
Minimum	76 IN.
Maximum	76 IN.
(13) Propeller Tolerance (static RPM at maximum permissible throttle setting, sea level, ISA)	Not above 2340 RPM Not below 2240 RPM

**NOTE**

Refer to the airplane maintenance manual for test procedure to determine approved static rpm under non-standard conditions.

## 2.9 POWER PLANT INSTRUMENT MARKINGS

(a) Tachometer		
Green Arc (Normal Operating Range)		500 to 2650 RPM
Yellow Arc (5 Minute Limit)		2650 to 2700 RPM
Red Line (Takeoff Power)		2700 RPM
(b) Oil Temperature		
Green Arc (Normal Operating Range)		75° to 245°F
Red Line (Maximum)		245°F
(c) Oil Pressure		
Green Arc (Normal Operating Range)		60 PSI to 90 PSI
Yellow Arc (Caution Range) (Idle)		25 PSI to 60 PSI
Yellow Arc (Ground Warm-Up)	None or 90 PSI to 100 PSI	
Red Line (Minimum)		25 PSI
Red Line (Maximum)		90 or 100 PSI
(d) Fuel Pressure		
Green Arc (Normal Operating Range)		0.5 PSI to 8 PSI
Red Line (Minimum)		0.5 PSI
Red Line (Maximum)		8 PSI

## 2.11 WEIGHT LIMITS

	Normal	Utility
(a) Maximum Ramp (lbs.)	2558	2138
(b) Maximum Weight (lbs.)	2550	2130
(c) Maximum Baggage (lbs.)	200	0

## NOTE

Refer to Section 5 (Performance) for maximum weight as limited by performance.

2.13 CENTER OF GRAVITY LIMITS

(a) Normal Category

Weight Pounds	Forward Limit Inches Aft of Datum	Rearward Limit Inches Aft of Datum
2550	88.6	93.0
2050 (and less)	82.0	93.0

(b) Utility Category

Weight Pounds	Forward Limit Inches Aft of Datum	Rearward Limit Inches Aft of Datum
2130	83.0	93.0
2050 (and less)	82.0	93.0

NOTES

Straight line variation between points given.

The datum used is 78.4 inches ahead of the wing leading edge at the inboard intersection of the straight and tapered section.

It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. See Section 6 (Weight and Balance) for proper loading instructions.

**2.15 MANEUVER LIMITS**

- (a) Normal Category - All acrobatic maneuvers including spins prohibited.
- (b) Utility Category - Approved maneuvers for bank angles exceeding 60°.

	Entry Speed
Steep Turns	113 KIAS
Lazy Eights	113 KIAS
Chandelles	113 KIAS

**2.17 FLIGHT LOAD FACTORS**

- |                                    | Normal                         | Utility |
|------------------------------------|--------------------------------|---------|
| (a) Positive Load Factor (Maximum) | 3.8 G                          | 4.4 G   |
| (b) Negative Load Factor (Maximum) | No inverted maneuvers approved |         |

**2.19 TYPES OF OPERATION**

The airplane is approved for the following operations when equipped in accordance with FAR 91 or FAR 135.

- (a) Day V.F.R.
- (b) Night V.F.R.
- (c) Day I.F.R.
- (d) Night I.F.R.
- (e) Non Icing

**2.21 FUEL LIMITATIONS**

- |                                                                                                                  |              |
|------------------------------------------------------------------------------------------------------------------|--------------|
| (a) Total Capacity                                                                                               | 50 U.S. GAL. |
| (b) Unusable Fuel                                                                                                | 2 U.S. GAL.  |
| The unusable fuel for this airplane has been determined as 1.0 gallon in each wing in critical flight attitudes. |              |
| (c) Usable Fuel                                                                                                  | 48 U.S. GAL. |
| The usable fuel in this airplane has been determined as 24.0 gallons in each wing.                               |              |

### **2.23 NOISE LEVEL**

The noise level of this aircraft is 73.9 d B(A).

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

The above statement notwithstanding the noise level stated above has been verified by and approved by the Federal Aviation Administration in noise level test flights conducted in accordance with FAR 36, Noise Standards - Aircraft Type and Airworthiness Certification. This aircraft model is in compliance with all FAR 36 noise standards applicable to this type.

## **2.25 PLACARDS**

In full view of the pilot:

**"THIS AIRPLANE MUST BE OPERATED AS A NORMAL OR UTILITY CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS.**

**ALL MARKINGS AND PLACARDS ON THIS AIRPLANE APPLY TO ITS OPERATION AS A UTILITY CATEGORY AIRPLANE. FOR NORMAL AND UTILITY CATEGORY OPERATION REFER TO THE PILOT'S OPERATING HANDBOOK.**

**NO ACROBATIC MANEUVERS ARE APPROVED FOR NORMAL CATEGORY OPERATIONS. SPINS ARE PROHIBITED FOR NORMAL AND UTILITY CATEGORY."**

In full view of the pilot:

### **TAKEOFF CHECK LIST**

Fuel on proper tank	Seat backs erect
Electric fuel pump on	Fasten belts/harness
Engine gauges checked	Trim tab - set
Flaps - set	Controls- free
Carb. heat off	Door - latched
Mixture set	Air Conditioner off
Primer locked	

### **LANDING CHECK LIST**

Fuel on proper tank	Flaps - set
Mixture rich	Fasten belts/harness
Electric fuel pump on	Air Conditioner off
Seat backs erect	

The "AIR COND OFF" item in the above takeoff and landing check lists is mandatory for air conditioned aircraft only.

In full view of the pilot, in the area of the air conditioner control panel when the air conditioner is installed:

**"WARNING — AIR CONDITIONER MUST BE OFF TO INSURE NORMAL TAKEOFF CLIMB PERFORMANCE."**

Adjacent to upper door latch:

**"ENGAGE LATCH BEFORE FLIGHT."**

On inside of the baggage compartment door.

**"BAGGAGE MAXIMUM 200 LBS."**

**"UTILITY CATEGORY OPERATION - NO BAGGAGE OR AFT PASSENGERS ALLOWED. NORMAL CATEGORY OPERATION - SEE PILOT'S OPERATING HANDBOOK WEIGHT AND BALANCE SECTION FOR BAGGAGE AND AFT PASSENGER LIMITATIONS."**

In full view of the pilot:

**" $V_A = 113$  KIAS AT 2550# (SEE P.O.H.)"**

**"DEMO. X-WIND 17 KTS."**

In full view of the pilot:

**"OIL COOLER WINTERIZATION PLATE TO BE REMOVED WHEN AMBIENT TEMPERATURE EXCEEDS 50°F."**

In full view of the pilot:

"UTILITY CATEGORY OPERATION ONLY."

- (1) NO AFT PASSENGERS ALLOWED.
- (2) ACROBATIC MANEUVERS ARE LIMITED TO THE FOLLOWING:

	ENTRY SPEED
SPINS PROHIBITED	---
STEEP TURNS	113 KIAS
LAZY EIGHTS	113 KIAS
CHANDELLES	113 KIAS

In full view of the pilot:

"WARNING — TURN OFF STROBE LIGHTS WHEN IN CLOSE PROXIMITY TO GROUND OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE."

On tachometer face:

"AFTER 5 MIN: REDUCE POWER TO 2650 RPM."

Adjacent to the fuel filler caps:

FUEL - 100 or 100LL AVIATION GRADE.

or

FUEL - 100-130 AVIATION GRADE MIN.

USABLE CAPACITY 24 GAL.

USABLE CAPACITY TO BOTTOM OF FILLER

NECK INDICATOR 17 GAL.

Adjacent to the filler caps (serial numbers 28-8390036 and up):

