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SECTION 2  
LIMITATIONS

2.1 GENERAL

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

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

2.3 AIRSPEED LIMITATIONS

SPEED	CAS
Never Exceed Speed ( $V_{NE}$ ) - Do not exceed this speed in any operation.	171 MPH (148 KTS)
Maximum Structural Cruising Speed ( $V_{NO}$ ) - Do not exceed this speed except in smooth air and then only with caution.	140 MPH (121 KTS)
Design Maneuvering Speed ( $V_A$ ) - Do not make full or abrupt control movements above this speed.	124 MPH (108 KTS)
Maximum Flaps Extended Speed ( $V_{FE}$ ) - Do not exceed this speed with the flaps extended.	115 MPH (100 KTS)

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**2.5 AIRSPEED INDICATOR MARKINGS**

MARKING	CAS
Red Radial Line (Never Exceed)	171 MPH (148 KTS)
Yellow Arc (Caution Range - Smooth Air Only)	140 MPH to 171 MPH (121 KTS to 148 KTS)
Green Arc (Normal Operating Range)	68 MPH to 140 MPH (59 KTS to 121 KTS)
White Arc (Flap Down)	61 MPH to 115 MPH (53 KTS to 100 KTS)

**2.7 POWER PLANT LIMITATIONS**

(a) Number of Engines	1
(b) Engine Manufacturer	Lycoming
(c) Engine Model No.	O-360-A4M with carburetor setting 10-3878
(d) Engine Operating Limits	
(1) Maximum Horsepower	180
(2) Maximum Rotation Speed (RPM)	2700
(3) Maximum Oil Temperature	245°F
(e) Oil Pressure	
Minimum (red line)	25 PSI
Maximum (red line)	90 PSI
(f) Fuel Pressure	
Minimum (red line)	.5 PSI
Maximum (red line)	8 PSI
(g) Fuel Grade (minimum octane)	100/130 - Green
(h) Number of Propellers	1
(i) Propeller Manufacturer	Sensenich
(j) Propeller Model	76EM8S5-0-60
(k) Propeller Diameter	
Minimum	76 IN.
Maximum	76 IN.
(l) Propeller Tolerance (static RPM at maximum permissible throttle setting)	Not above 2425 RPM Not below 2325 RPM

No additional tolerance permitted.

2.9 POWER PLANT INSTRUMENT MARKINGS

(a) Tachometer		
Green Arc (Normal Operating Range)		500 to 2700 RPM
Red Line (Maximum Continuous 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
Red Line (Minimum)		25 PSI
Red Line (Maximum)		90 PSI
(d) Fuel Pressure		
Green Arc (Normal Operating Range)		.5 PSI to 8 PSI
Red Line (Minimum)		.5 PSI
Red Line (Maximum)		8 PSI

2.11 WEIGHT LIMITS

(a) Maximum Weight	NORMAL	UTILITY
(b) Maximum Baggage	2550 LBS	1950 LBS
	200 LBS	0 LBS

NOTE

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

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**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
1950 (and less)	82.0	86.5

**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°.

Steep Turns	Entry Speed 124 MPH
Lazy Eights	124 MPH
Chandelles	124 MPH

**2.17 FLIGHT LOAD FACTORS**

(a) Positive Load Factor (Maximum)	<b>NORMAL</b> 3.8 G	<b>UTILITY</b> 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.                               |             |

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## 2.23 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 OPERATIONS, REFER TO THE PILOT'S OPERATING HANDBOOK.

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

In full view of the pilot, the following takeoff and landing check lists will be installed:

### TAKEOFF CHECK LIST

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

### LANDING CHECK LIST

Fuel on proper tank		Flaps - set (115 mph)
Mixture rich	Seat back erect	Fasten belts/harness
Electric fuel pump on		Air Conditioner - off

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

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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:

**"ROUGH AIR OR MANEUVERING SPEED - 124 MPH."**

**"UTILITY CATEGORY OPERATION - NO AFT PASSENGERS  
ALLOWED."**

**"DEMONSTRATED CROSS WIND COMPONENT - 20 MPH."**

On the instrument panel in full view of the pilot when the oil cooler winterization kit is installed:

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

In full view of the pilot:

**"UTILITY CATEGORY ONLY."**

**ACROBATIC MANEUVERS ARE LIMITED TO THE FOLLOWING:**

	<b>ENTRY SPEED</b>
<b>STEEP TURNS</b>	<b>124 MPH</b>
<b>LAZY EIGHTS</b>	<b>124 MPH</b>
<b>CHANDELLES</b>	<b>124 MPH</b>

On the instrument panel in full view of the pilot:

**"WARNING - TURN OFF STROBE LIGHTS WHEN TAXIING  
IN VICINITY OF OTHER AIRCRAFT, OR DURING FLIGHT  
THROUGH CLOUD, FOG OR HAZE."**

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