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SECTION 2

LIMITATIONS

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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 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 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. | 160 | 153 |
| Maximum Structural Cruising Speed (VNO) - Do not exceed this speed except in smooth air and then only with caution. | 126 | 122 |
| Maximum Flaps Extended Speed (VFE) - Do not exceed this speed with the flaps extended. | 103 | 100 |

| SPEED | KIAS | KCAS |
|---|------|------|
| Design Maneuvering Speed (V_A) - Do not make full or abrupt control movements above this speed. | | |
| At 2440 LBS. G.W. | 111 | 108 |
| At 1531 LBS. G.W. | 88 | 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.

2.5 AIRSPEED INDICATOR MARKINGS

| MARKING | KIAS |
|--|------------|
| Red Radial Line (Never Exceed) | 160 |
| Yellow Arc (Caution Range - Smooth Air Only) | 126 to 160 |
| Green Arc (Normal Operating Range) | 50 to 126 |
| White Arc (Flap Down) | 44 to 103 |

2.7 POWER PLANT LIMITATIONS

| | |
|----------------------------------|-----------------------------|
| (a) Number of Engines | 1 |
| (b) Engine Manufacturer | Lycoming |
| (c) Engine Model No. | O-320-D2A or O-320-D3G |
| (d) Engine Operating Limits | |
| (1) Maximum Horsepower | 160 |
| (2) Maximum Rotation Speed (RPM) | 2700 |
| (3) Maximum Oil Temperature | 245°F |
| (e) Oil Pressure | |
| Minimum (red line) | 25 PSI |
| Maximum (red line) | 100 PSI |
| (f) Fuel Pressure | |
| Minimum (red line) | .5 PSI |
| Maximum (red line) | 8 PSI |
| (g) Fuel (AVGAS ONLY) | |
| (minimum grade) | 100 or 100LL Aviation Grade |

- | | |
|---|--|
| (h) Number of Propellers | 1 |
| (i) Propeller Manufacturer | Sensenich |
| (j) Propeller Model | 74DM6-0-60 or 74DM6-0-58 |
| (k) Propeller Diameter | |
| Minimum | 72 IN. |
| Maximum | 74 IN. |
| (l) 74DM6-0-60 Propeller Tolerance (static rpm at maximum permissible throttle setting, Sea Level, ISA) | Not above 2430 RPM Not below 2330 RPM |

NOTE

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

- | | |
|---|--|
| (m) 74DM6-0-58 Propeller Tolerance (static RPM at maximum permissible throttle setting, Sea Level, ISA) | Not above 2465 RPM Not below 2365 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 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 |

2.9 POWER PLANT INSTRUMENT MARKINGS (Continued)

| | |
|------------------------------------|---------------|
| (c) Oil Pressure | |
| Green Arc (Normal Operating Range) | 60 to 90 PSI |
| Yellow Arc (Caution Range) (Idle) | 25 to 60 PSI |
| Yellow Arc (Ground Warm-Up) | 90 to 100 PSI |
| Red Line (Minimum) | 25 PSI |
| Red Line (Maximum) | 100 PSI |
| (d) Fuel Pressure | |
| Green Arc (Normal Operating Range) | .5 to 8 PSI |
| Red Line (Minimum) | .5 PSI |
| Red Line (Maximum) | 8 PSI |

2.11 WEIGHT LIMITS

| | | |
|-------------------------|----------|----------|
| | Normal | Utility |
| (a) Maximum Weight | 2440 LBS | 2020 LBS |
| (b) Maximum Ramp Weight | 2447 LBS | 2027 LBS |
| (c) Maximum Baggage | 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 |
|------------------|--------------------------------------|---------------------------------------|
| 2440 | 88.3 | 93.0 |
| 1950 (and less) | 83.0 | 93.0 |

(b) Utility Category

| Weight Pounds | Forward Limit Inches Aft of Datum | Rearward Limit Inches Aft of Datum |
|------------------|--------------------------------------|---------------------------------------|
| 1950 (and less) | 83.0 | 93.0 |
| 2020 | 83.8 | 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 | 111 KIAS |
| Lazy Eights | 111 KIAS |
| Chandelles | 111 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 KINDS OF OPERATION EQUIPMENT LIST

This airplane may be operated in day or night VFR, day or night IFR when the appropriate equipment is installed and operable.

The following equipment list identifies the systems and equipment upon which type certification for each kind of operation was predicated and must be installed and operable for the particular kind of operation indicated. However, certain operations may be authorized with certain listed equipment and/or systems inoperative under certain conditions and under provisions defined by a current Minimum Equipment List (MEL) approved by the FAA which is dated concurrently with or after this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual and authorized under an operating regulation which provides for use of an MEL.

(a) Day VFR

- (1) Airspeed indicator
- (2) Altimeter
- (3) Magnetic compass
- (4) Tachometer
- (5) Oil pressure indicator
- (6) Oil temperature indicator
- (7) Fuel pressure indicator
- (8) Fuel quantity indicator - each tank
- (9) Volt-ammeter
- (10) Elevator/rudder trim indicator
- (11) Alternator
- (12) Safety restraint - each occupant

(b) Night VFR

- (1) All equipment required for Day VFR
- (2) Position lights
- (3) Instrument lights
- (4) Anti-collision (strobe) lights

(c) Day IFR

- (1) All equipment required for Day VFR
- (2) Vacuum pump
- (3) Gyro suction indicator

(d) Night IFR

- (1) All equipment required for Day and Night VFR
- (2) All equipment required for Day IFR

NOTE

The above system and equipment list does not include specific flight instruments and communication/navigation equipment required by the FAR Part 91 and 135 operating requirements.

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 72.9 dB(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 CHECKLIST

| | |
|-----------------------|----------------------|
| 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 CHECKLIST

| | |
|-----------------------|-------------------------|
| Fuel on proper tank | Flaps - set (White Arc) |
| 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 checklists 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 PERFOR-
MANCE.**

Adjacent to upper door latch:

ENGAGE LATCH BEFORE FLIGHT

On inside of the baggage compartment door:

**BAGGAGE MAXIMUM 200 LBS
UTILITY CATEGORY OPERATION — NO BAG-
GAGE OR AFT PASSENGERS ALLOWED, NORMAL
CATEGORY OPERATION - SEE PILOT'S OPER-
ATING HANDBOOK WEIGHT AND BALANCE
SECTION FOR BAGGAGE AND AFT PASSENGER
LIMITATIONS.**

In full view of the pilot:

$V_A = 111$ KIAS AT 2440# (SEE A.F.M.)

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

DEMO. X-WIND 17 KTS.

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 OPERATION ONLY

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

| | ENTRY SPEED |
|------------------|-------------|
| SPINS PROHIBITED | |
| STEEP TURNS | 111 KIAS |
| LAZY EIGHTS | 111 KIAS |
| CHANDELLES | 111 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.

Adjacent to fuel filler caps:

FUEL - 100 OR 100LL AVIATION GRADE

Adjacent to fuel filler caps (serial numbers 28-8316037 and up):

