SECTION 2
LIMITATIONS

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INTRODUCTION

Section 2 includes operating limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, its engine, standard systems and standard equipment. The limitations included in this section and in Section 9 have been approved by the Federal Aviation Administration. Observance of these operating limitations is required by Federal Aviation Regulations.

NOTE

Refer to Section 9 of this Pilot's Operating Handbook for amended operating limitations, operating procedures, performance data and other necessary information for airplanes equipped with specific options.

NOTE

The airspeeds listed in the Airspeed Limitations chart (figure 2-1) and the Airspeed Indicator Markings chart (figure 2-2) are based on Airspeed Calibration data shown in Section 5 with the normal static source, with the exception of the lower limits of the green and white arcs on the airspeed indicator. If the alternate static source is being used, ample margins should be observed to allow for the airspeed calibration variations between the normal and alternate static sources as shown in Section 5.

Your Cessna is certificated under FAA Type Certificate No. 3A21 as Cessna Model No. P210N.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in figure 2-1.

	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	195	200	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	165	167	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed:			
	4000 Pounds	129	130	Do not make full or abrupt control movements above this speed.
	3350 Pounds	118	119	
	2700 Pounds	105	106	
V_{FE}	Maximum Flap Extended Speed:			
	To 10° Flaps	159	160	Do not exceed these speeds with the given flap settings.
	10° - 20° Flaps	131	130	
	20° - 30° Flaps	116	115	
V_{LO}	Maximum Landing Gear Operating Speed	163	165	Do not extend or retract landing gear above this speed.
V_{LE}	Maximum Landing Gear Extended Speed	195	200	Do not exceed this speed with landing gear extended.
V_{WO}	Maximum Window Open Speed	195	200	Do not exceed this speed with window open.

Figure 2-1. Airspeed Limitations

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in figure 2-2.

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	58 - 115	Full Flap Operating Range. Lower limit is maximum weight V_{S_0} in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	73 - 167	Normal Operating Range. Lower limit is maximum weight V_S at most forward C.G. with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc	167 - 200	Operations must be conducted with caution and only in smooth air.
Red Line	200	Maximum speed for all operations.

Figure 2-2. Airspeed Indicator Markings

POWER PLANT LIMITATIONS

Engine Manufacturer: Teledyne Continental.
Engine Model Number: TSIO-520-AF.
Maximum Power, 5 Minutes - Takeoff: 310 BHP rating.
Continuous: 285 BHP.
Engine Operating Limits for Takeoff and Continuous Operations:
Maximum Engine Speed, 5 Minutes - Takeoff: 2700 RPM.
Continuous: 2600 RPM.
Maximum Manifold Pressure,
5 Minutes - Takeoff: 35.5 inches Hg. (from sea level to 17,000 feet).
Continuous: 34.5 inches Hg from sea level to 18,000 feet.
33.5 inches Hg at 19,000 feet.
31.5 inches Hg at 21,000 feet.
29.5 inches Hg at 23,000 feet.
Maximum Cylinder Head Temperature: 460°F (238°C).
Maximum Oil Temperature: 240°F (116°C).
Oil Pressure, Minimum: 10 psi.
Maximum: 100 psi.
Fuel Pressure, Minimum: 3.0 psi.
Maximum: 19.5 psi (186 PPH).
Fuel Grade: See Fuel Limitations.
Oil Grade (Specification):
MIL-L-6082 Aviation Grade Straight Mineral Oil or Ashless Dispersant Oil conforming to Continental Motors Specification MHS-24 and all revisions thereto.

Propeller Manufacturer: McCauley Accessory Division.
Propeller Model Number: D3A34C402/90DFA-10.
Propeller Diameter, Maximum: 80 inches.
Minimum: 78.5 inches.
Propeller Blade Angle at 30 Inch Station, Low: 12.4°.
High: 28.5°.
Propeller Operating Limits: Avoid continuous operation between 1850 and 2150 RPM above 23 inches manifold pressure.

POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color code significance are shown in figure 2-3 except for the takeoff minimum fuel flow setting of 180 lbs/hr which is indicated by a white triangle on the fuel flow indicator.

INSTRUMENT	RED LINE MINIMUM LIMIT	GREEN ARC NORMAL OPERATING	YELLOW ARC CAUTION RANGE	WHITE ARC NORMAL CLIMB RANGE	RED LINE MAXIMUM LIMIT
Tachometer	- - -	2200 - 2500 RPM	2600 - 2700 RPM	- - -	2700 RPM
Manifold Pressure	- - -	15 - 30 in. Hg	34.5 - 35.5 in. Hg	- - -	35.5 in. Hg
Oil Temperature	- - -	100° - 240°F	- - -	- - -	240°F
Cylinder Head Temperature	- - -	200° - 460°F	- - -	- - -	460°F
Turbine Inlet Temperature	- - -	1300°-1650°F	- - -	- - -	1650°F
Fuel Flow (Pressure)	(3.0 psi)	36 - 125 PPH	- - -	125-168 PPH	186 PPH (19.5 psi)
Oil Pressure	10 psi	30 - 60 psi	- - -	- - -	100 psi
Fuel Quantity	E (1.5 Gal Unusable Each Tank)	- - -	- - -	- - -	- - -
Suction	- - -	4.6 - 5.4 in. Hg.	- - -	- - -	- - -

Figure 2-3. Power Plant Instrument Markings

WEIGHT LIMITS

Maximum Ramp Weight: 4016 lbs.
Maximum Takeoff Weight: 4000 lbs.
Maximum Landing Weight: 3800 lbs.
Maximum Weight in Baggage Compartment:
Baggage Area "A" - Station 124 to 152: 200 lbs.
Baggage Area "B" - Station 152 to 166: 80 lbs.

NOTE

The maximum allowable combined weight capacity for baggage areas A and B is 200 pounds.

CENTER OF GRAVITY LIMITS

Center of Gravity Range with Landing Gear Extended:
Forward: 37.0 inches aft of datum at 3000 lbs. or less, with straight line variation to 42.5 inches aft of datum at 3800 lbs. and with straight line variation to 43.9 inches aft of datum at 4000 lbs.
Aft: 52 inches aft of datum at all weights.
Reference Datum: Lower portion of front face of firewall.

MANEUVER LIMITS

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60°.

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors:
*Flaps Up: +3.8g, -1.52g
*Flaps Down: +2.0g

*The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR and may be equipped for night VFR and/or IFR operations. FAR Part 91 establishes the minimum

required instrumentation and equipment for these operations. The reference to types of flight operations on the operating limitations placard reflects equipment installed at the time of Airworthiness Certificate issuance.

Flight into known icing conditions is prohibited; however, the airplane may be equipped with a known icing equipment package which allows flight penetration of icing conditions as defined by the FAA.

FUEL LIMITATIONS

2 Standard Tanks: 45 U.S. gallons each.
Total Fuel: 90 U.S. gallons.
Usable Fuel (all flight conditions): 87 U.S. gallons.
Unusable Fuel: 3 U.S. gallons.

Takeoff and land with the fuel selector valve handle in the BOTH ON position.

With 1/4 tank or less, prolonged uncoordinated flight is prohibited when operating on either left or right tank.

When switching from dry tank, turn auxiliary fuel pump on momentarily.

Use of left or right tank only is reserved for level flight.

Approved Fuel Grades (and Colors):
100LL Grade Aviation Fuel (Blue).
100 (Formerly 100/130) Grade Aviation Fuel (Green).

MAXIMUM OPERATING ALTITUDE LIMIT

Certificated Maximum Operating Altitude: 23,000 Feet.

CABIN PRESSURIZATION LIMITS

Normal Cabin Operating Differential Pressure: 0 to 3.35 psi.
Maximum Cabin Operating Differential Pressure: 3.35 psi.
Landing with cabin pressurized is prohibited.

OTHER LIMITATIONS

FLAP LIMITATIONS

Approved Takeoff Range: 0° to 20°.
Approved Landing Range: 0° to 30°.

EGT (TIT) LIMITATIONS

Maximum allowable turbine inlet temperature (TIT) is 1650°F.
Use of EGT (TIT) prohibited above 80% power.
Operations on lean side of peak EGT (TIT) prohibited.

PLACARDS

The following information must be displayed in the form of composite or individual placards.

1. In full view of the pilot: (The "DAY-NIGHT-VFR-IFR" entry, shown on the example below, will vary as the airplane is equipped.)

> The markings and placards installed in this airplane contain operating limitations which must be complied with when operating this airplane in the Normal Category. Other operating limitations which must be complied with when operating this airplane in this category are contained in the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.
>
> No acrobatic maneuvers, including spins, approved.
>
> Landing with cabin pressurized is prohibited.
>
> Flight into known icing conditions prohibited.
>
> This airplane is certified for the following flight operations as of date of original airworthiness certificate:
>
> DAY—NIGHT—VFR—IFR

2. Near landing gear lever:

MAX SPEED IAS	
GEAR OPER	165 KTS
GEAR DOWN	200 KTS

3. Near the airspeed indicator:

> MANEUVER SPEED - 130 KIAS

4. On control lock:

CAUTION! CONTROL LOCK REMOVE BEFORE STARTING ENGINE

5. On fuel selector valve (at appropriate locations):

ALL FLIGHT ATTITUDES		
	BOTH ON	87.0 GAL.
	FUEL	SELECTOR
LEFT ON 43.5 GAL. LEVEL FLT ONLY		RIGHT ON 43.5 GAL. LEVEL FLT ONLY

6. Near fuel selector valve:

TAKEOFF AND LANDING ON BOTH WHEN SWITCHING FROM DRY TANK TURN AUX FUEL PUMP ON MOMENTARILY.

7. Aft of fuel tank caps:

SERVICE THIS AIRPLANE WITH 100LL/100 MIN AVIATION GRADE GASOLINE. TOTAL CAPACITY 45.0 GAL.

8. Forward of fuel tank caps:

CAPACITY 33.5 GALLONS TO BOTTOM OF FILLER NECK EXTENSION

9. On baggage compartment door:

MAX BAGGAGE 200 LBS. TOTAL
RAISED AREA AFT OF BAGGAGE
DOOR 80 LBS MAX. REFER TO WEIGHT
AND BALANCE DATA FOR BAGGAGE/
CARGO LOADING.

10. On hand pump cover:

MANUAL GEAR EXTENSION

1. SELECT GEAR DOWN
2. PULL HANDLE FORWARD
3. PUMP VERTICALLY

CAUTION
DO NOT PUMP WITH
GEAR UP SELECTED

11. Near the manifold pressure/fuel flow indicator:

MINIMUM FUEL FLOWS

T.O.: 2700 RPM
35.5 IN. MP., 180 LBS/HR

MAX. CONTINUOUS POWER: 2600 RPM

ALT-FT/1000	SL-18	19	20	21	22	23
MP. IN. HG	34.5	33.5	32.5	31.5	30.5	29.5
FUEL FLOW-LBS/HR	168	162	156	150	144	138

AVOID CONTINUOUS OPERATION BETWEEN
1850 AND 2150 RPM ABOVE 23 IN. M.P.

12. On flap control indicator:

0°- 10°	160 KIAS	(partial flap range with dark blue color code; also, mechanical detent at 10°.)
10°- 20°	130 KIAS	(light blue color code; also, mechanical detent at 20°.)
20°- FULL	115 KIAS	(white color code.)

13. On inside nose wheel doors:

WARNING

BEFORE WORKING IN WHEEL WELL AREA PULL HYDRAULIC PUMP CIRCUIT BREAKER OFF

14. Near pilot's outside door handle:

CLOSE
OPEN

15. Near emergency button to unlock pilot's cabin door from the outside:

EMERGENCY
PUSH TO UNLOCK

16. Near secondary lock for pilot's inside door handle:

DOOR HANDLE SAFETY LOCK
PUSH FLUSH TO LOCK
PULL TO UNLOCK

17. Near inside cabin door handle:

TO CLOSE DOOR

1. OPEN VENT WINDOW
2. PULL DOOR WITHIN 4-5 INCHES CLOSED - THEN CLOSE BRISKLY USING ASSIST STRAP.
3. ROTATE HANDLE FWD TO LOCK

TO OPEN DOOR

1. UNLOCK SAFETY LOCK (PULL OUT)
2. ROTATE HANDLE TO "OPEN" POSITION
3. PUSH DOOR OUTWARD

18. Near pilot's inside door handle:

CLOSE
OPEN ←→ LOCK

19. Near emergency exit handle:

OPEN ←→ CLOSE ←→ LATCH
PUSH FLUSH
TO LOCK
CLOSE AND LOCK FOR FLIGHT

20. Near emergency exit handle:

EMERGENCY EXIT - TO OPEN

1. LIFT HANDLE (DO NOT PULL INWARD)
2. ROTATE COUNTERCLOCKWISE TO "OPEN" POSITION
3. PUSH DOOR OUTWARD

21. On oil filler cap:

OIL 10 QTS

22. A calibration card must be provided to indicate the accuracy of the magnetic compass in 30° increments.

23. In full view of the pilot:

MAJOR FUEL FLOW FLUCTUATIONS/POWER SURGES 1. AUX FUEL PUMP - ON, ADJUST MIXTURE. 2. FUEL SELECTOR - BOTH. 3. WHEN FUEL FLOW STEADY, RESUME NORMAL OPERATIONS. SEE P.O.H. SECTION 3 FOR EXPANDED INSTRUCTIONS.

24. Forward of each fuel tank filler cap in line with fwd arrow:

FUEL CAP FWD ▲ ARROW ALIGNMENT CAP MUST NOT ROTATE DURING CLOSING