OWNER'S OPERATING MANUAL

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Stinson

108-1

Voyager 150

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UNIVAIR

OWNER'S OPERATING MANUAL

for

STINSON
VOYAGER 150

1947

FOREWORD

In the *Owner's Operating Manual* for the *Stinson Voyager 150* a large amount of engineering and research data has been reduced to an easily understood reference source that will contribute to long life and economical operation of the airplane. The manual is one of two books available to the owner. The other is the *General Service Manual*, which is a conveniently arranged, authoritative guide to construction details and maintenance requirements for the airplane. Careful study of both manuals will provide the information needed to keep the *Stinson Voyager 150* operating economically at top efficiency.

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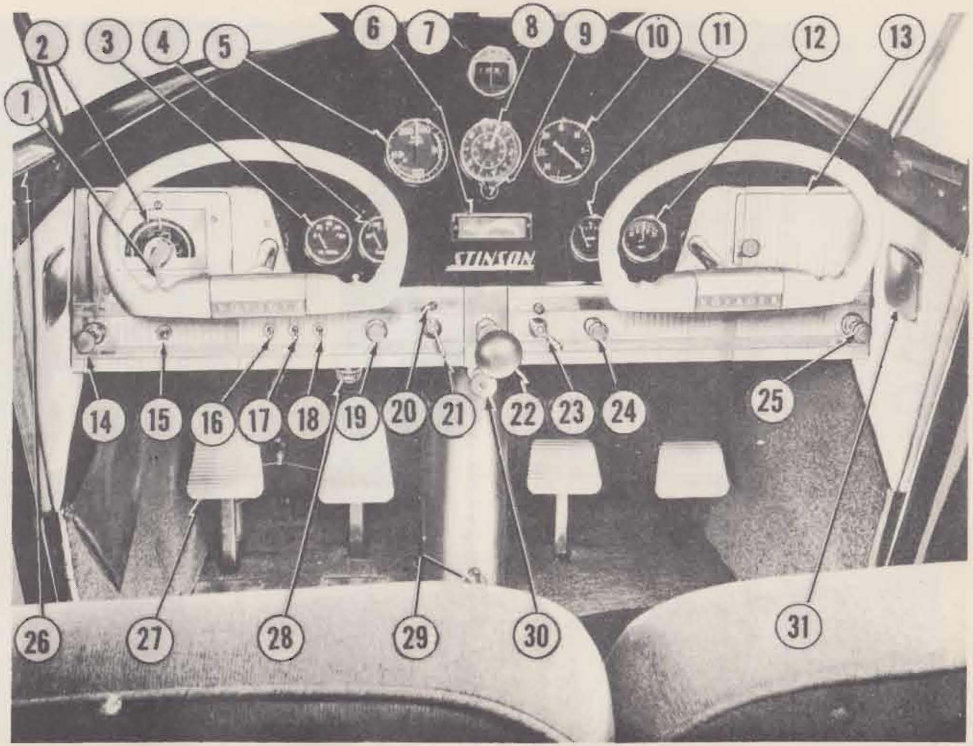


Figure 1—Front of Cabin

SURFACE CONTROLS AND BRAKES

6. The ailerons and elevator are operated by dual control wheels and shafts. The full *up travel* of the elevator is obtained only when the flaps are lowered. When the flaps are raised, a stop on the elevator push-pull tube engages the lower arm of the flap handle control assembly, limiting the elevator *up travel* to approximately nine degrees less than full *up travel.*

7. The flaps are operated by a control lever located between the two front seats. A three-position locking device in the control mechanism allows the flaps to be set in any one of three positions: *raised, take-off,* or *landing.* The flaps are raised fully when the control lever is in the position nearest the floor. Disengage the locking device by pressing the button on the end of the control lever. Do not fly at speeds greater than 88 mph with flaps down.

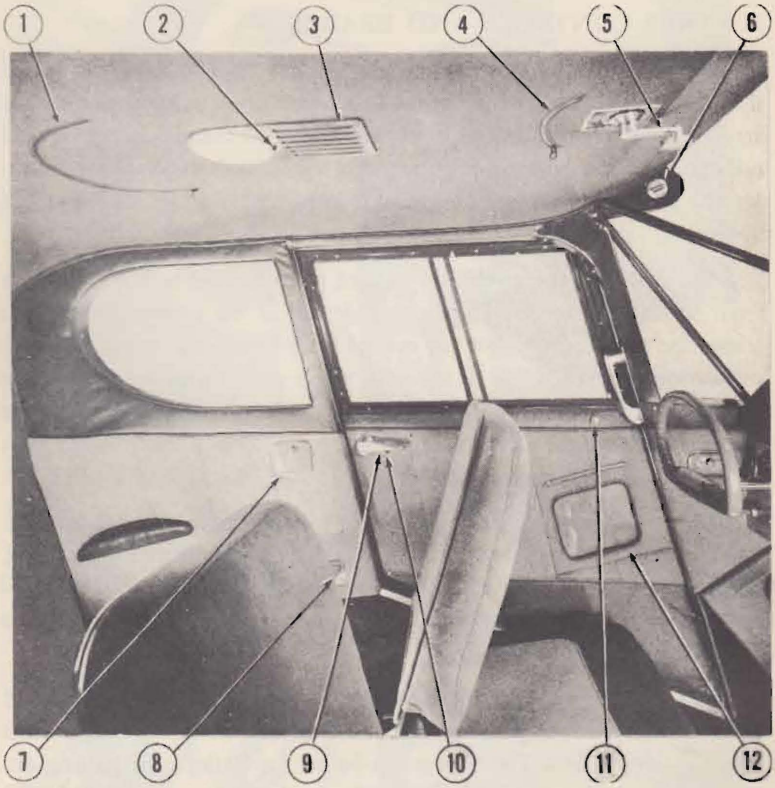
8. The elevator trim tab is operated by a hand crank located overhead. There is a tab position indicator on the placard of the crank assembly. This control is provided to correct the airplane for *nose heavy* or *tail heavy* conditions, usually caused by variations of loading arrangements or power.

9. The rudder and steerable tail wheel are controlled by both sets of pedals. The brake toe-pedals are attached to, and extend above, the left set of rudder pedals. The brakes can be set for parking by pulling out the parking brake control knob while the brakes are depressed. The brakes can be used for turning the airplane while taxiing, but to avoid excessive brake wear, the steerable tail wheel should be used as the principal means of turning when on the ground.

FLIGHT INSTRUMENTS

10. The altimeter, the airspeed indicator, and the compass are mounted on the instrument panel. The dial of the altimeter can be rotated and set to the proper pressure altitude by turning the adjusting knob at the base of the dial.

11. The airspeed indicator is marked with colored lines and letters to show the various speed range limitations of the airplane. The green arc indicates the normal operating range. The white arc, inscribed alongside the green arc, indicates the permissible speed range with the flaps down. A yellow arc indicates the speed range at which the airplane



1. Aileron and Flap Controls Access Zipper
2. Dome Light Switch
3. Radio Loud-Speaker
4. Trim Tab Control Access Zipper
5. Elevator Trim Tab Control
6. Cabin Ventilator
7. Ash Receptacle
8. Baggage Limitation Placard
9. Door Handle
10. Door Lock
11. Window Lock
12. Aircraft Data File

Figure 2—Left Side of Cabin

should be operated with caution to avoid abrupt maneuvers. Red radial lines and letters on the instrument indicate maximum speeds permissible: "N" for maximum speed in the normal category (gross weight between 1925 and 2230 pounds); and "U" for maximum speed in the utility category (gross weight 1925 pounds or less).

12. The compass can be adjusted for deviation by turning the compensating screws on the face of the instrument with a non-magnetic screw driver. The compensating screws are located at the extreme top

of the instrument and are marked "N-S" and "E-W" to indicate the adjustment that can be made by turning the screws. The compass correction card is beneath the compass.

ENGINE CONTROLS AND INDICATORS

13. All of the power plant controls and indicators, except the oil level dip stick, are mounted on the control and instrument panels. The control panel, beneath the main panel, extends the width of the cabin. The oil level dip stick is on the right rear side of the engine crankcase, inside the engine baffles.

14. The throttle control, located in the center of the control panel, is the push-pull type. A knurled locking nut adjusts the friction applied to the push-pull rod and determines the ease with which the throttle control can be adjusted. By turning the nut clockwise, the throttle control can be locked in any position. Engine speed is increased by pushing the throttle control toward the control panel.

15. The fuel selector valve, mounted on the aft side of the firewall, is operated by a torque rod and a combination handle and pointer on the control panel. The position of the valve determines from which tank fuel can flow to the engine. The valve can be set to any one of three positions: *left tank, right tank,* or *off.* When the valve handle is turned to the *off* position, all fuel is shut off from the engine at the valve.

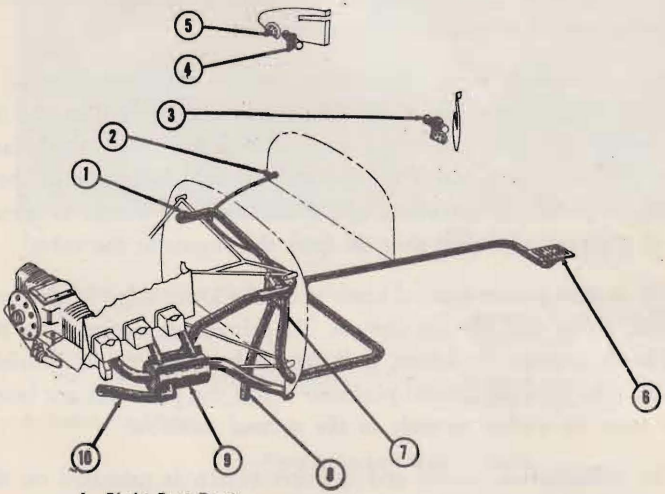
16. The engine primer control knob is on the lower edge of the control panel, below the throttle control. To prime the engine, turn the control knob counter clockwise; pull the knob out as far as possible, then push it back to the normal position. When the primer is not being used, *it must be locked securely in the normal position.*

17. The combination starter and ignition switch is mounted on the control panel to the right of the throttle control. A stop incorporated within this switch prevents the switch from being turned to *start* position unless the button directly above the handle is depressed. The switch is spring loaded and will return to the *both magnetos* position from the *start* position when the switch is released. Both magnetos are *on* with the switch in *start* position.

18. The carburetor heat control knob is mounted on the control panel to the left of the fuel selector valve control. As the control knob is pulled

out, an increasing amount of heated air enters the carburetor. When the control knob is pulled all the way out, only heated air enters the carburetor. A mixture of cold and heated air enters the carburetor when the knob is set at intermediate points. The carburetor heat control can be locked in any position to provide any desired mixture of hot and cold air. The control knob must be *turned* to unlock the push-pull rod before the control can be set at the desired position.

19. The primary purpose of carburetor air heat is to eliminate or prevent carburetor icing. Use carburetor heat during engine warm-up and



1. Right Port Duct
2. Cabin Heat Control
3. Left Ventilator
4. Right Ventilator
5. Ventilator Air Intake
6. Rear Port Duct
7. Heat Control Valve
8. Fresh Air Intake
9. Heater Muff
10. Hot Air Intake

Figure 3—Heating and Ventilating System

during climb whenever there is danger that ice will form in the carburetor. Ice is most likely to form in the carburetor when the outside air temperature is between 20 and 68 degrees Fahrenheit. Use heat also during any prolonged glide or descent. Any time the engine loses speed without apparent cause, the use of carburetor heat may correct the condition. Do not use carburetor heat during take-off or landing.

20. The mixture control knob, mounted on the control panel to the right of the ignition-starter switch, regulates the amount of fuel in the fuel-air mixture going into the engine. With the control pushed in, the mixture is *full rich*. Pulling the knob out leans the mixture progressively until, at full extension of the control, the idle cut-off stops the flow of fuel at the carburetor.

21. When flying at altitudes greater than 3000 feet above sea level, use mixture control to lean carburetor fuel-air mixture to obtain smooth engine performance. Stop engine by use of *idle cut-off* on mixture control.

22. The tachometer, oil pressure gauge, and oil temperature gauge are mounted on the instrument panel. An indicator that registers accumulated hours of engine operation, recording one hour at 2566 rpm, is an integral part of the tachometer.

23. The oil pressure gauge is mounted to the right of the left control wheel. The safe operating pressure range for the engine is marked on this instrument by a green arc with red radial lines at its extremities, 35 psi minimum and 55 psi maximum. Do not operate the engine at full throttle when the oil pressure is outside of these limits.

24. The oil temperature gauge is mounted to the right of the oil pressure gauge. The normal operating temperature range for the engine is marked on this instrument by a green arc. The yellow arc indicates the temperature at which the engine may be operated with caution, and a red radial line indicates the extreme high temperature of 230 degrees Fahrenheit that must never be exceeded. The caution range is from 60 to 80 degrees Fahrenheit.

HEATING AND VENTILATING

25. The cabin heat control knob regulates the temperature of the air entering the cabin through three heater ports. With the control pushed

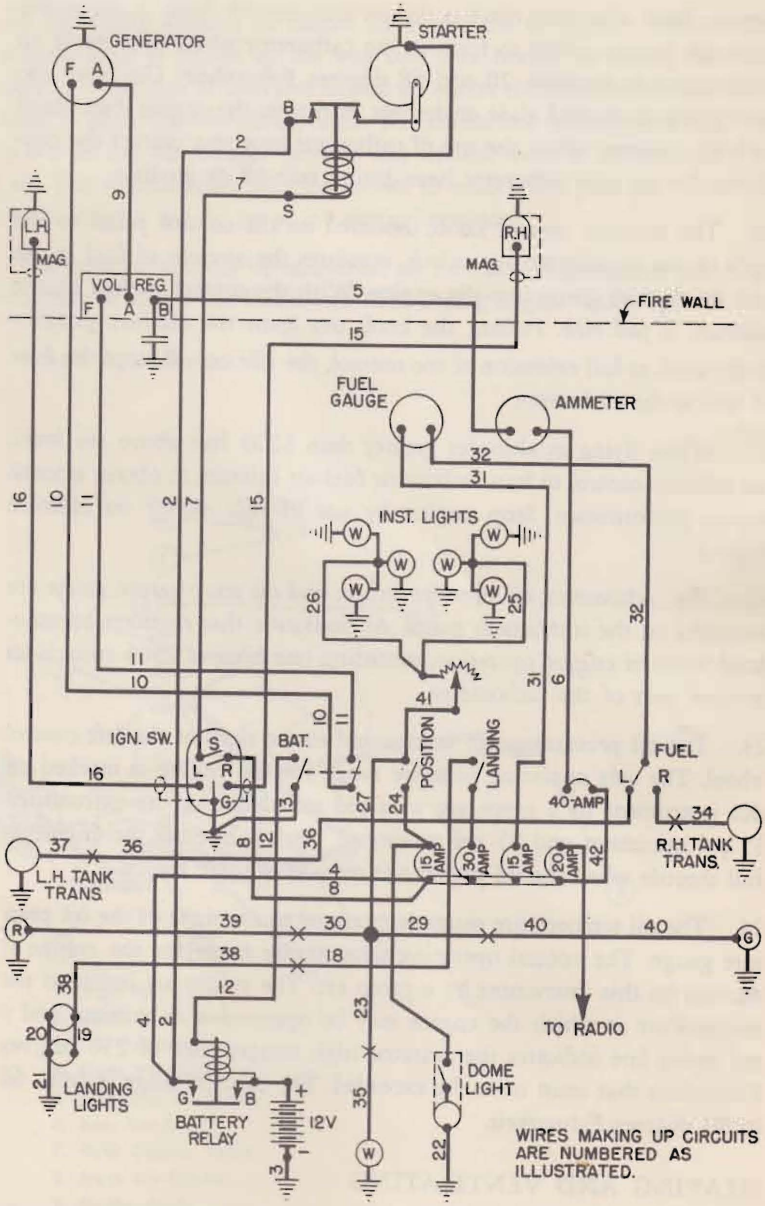


Figure 4—Electrical System Diagram

in, unheated air enters through the ports and when the control is pulled out, heated air is supplied. The temperature of the incoming air is regulated according to the amount the knob is pulled out. Outlets for the front seats are located on the firewall under the instrument panel on each side of the cabin. A grilled outlet, located in the cabin floor just behind the front seats, is provided for the rear of the cabin. These outlets may be individually closed to modify the distribution of air as desired.

26. Additional ventilation is provided by two ports admitting fresh air; one at each upper corner of the windshield. These vents are opened by pulling out the cylindrical tubes. The tube may be rotated to direct a stream of fresh air in any desired direction.

ELECTRICAL SYSTEM

27. A 12-volt battery and engine-driven generator, supply power for the single wire type electrical system (refer to Figure 2). The battery and its case are mounted under the left front seat. The case is vented and provided with a drain to prevent acid damage to the airplane or injury to its occupants. The battery supplies the power to start the engine. The generator supplies energy to the electrical system after the engine is operating at sufficient speed. Electrical power from the generator is fed into the electrical system through a voltage regulator that maintains constant voltage in the system. Power from both the battery and the generator is supplied to a main bus from which current is drawn for the various electrical circuits.

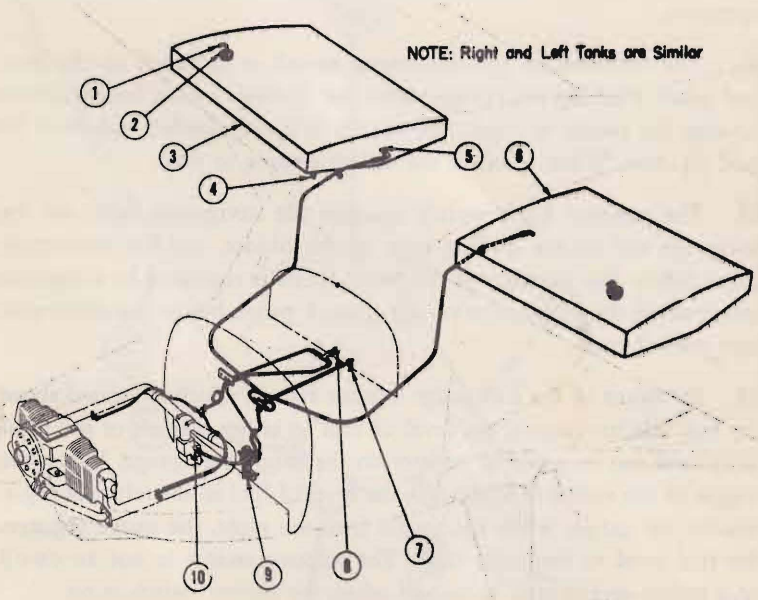
28. The master switch control is a combination battery relay switch and generator field switch and must be *on* before current is supplied to the electrical system. When the master control switch is *on,* the battery relay closes and allows the battery to supply current to the main bus; it also completes the generator field circuit that allows the generator to develop voltage. The airplane may be operated in flight with the master control switch *off,* but the generator will not charge, nor will any electrical equipment operate.

29. The electrical system is divided into the following five main circuits: engine starting, navigation lights, panel lights, dome light, landing lights, fuel tank level gauge, and radio. The main bus, from which power for the various circuits is taken, is mounted on the forward side of the control panel, under the radio. Current for the circuits, except

are a transmitter-receiver unit, a loudspeaker, and a microphone. Two jacks are provided, one for the microphone and the other for headphones. Headphones are not normally required because of the loudspeaker installation.

36. The airplane is equipped with two antennas, an external antenna that extends from the top of the cabin to the vertical stabilizer, and a fixed loop antenna inside the fuselage, aft of the cabin (refer to Figure 5). The loop is perpendicular to the longitudinal axis of the airplane so that homing is accomplished by tuning the null.

37. Transmission may be accomplished at any setting of the radio controls as long as the radio is operating. The transmitter is activated



1. Vent
2. Filler Cap
3. Right Wing Tank
4. Drain Plug
5. Fuel Strainer in Wing Tank
6. Left Wing Tank
7. Selector Valve Handle
8. Primer Pump
9. Fuel Strainer on Firewall
10. Fuel Strainer in Carburetor Inlet

Figure 6—Fuel System

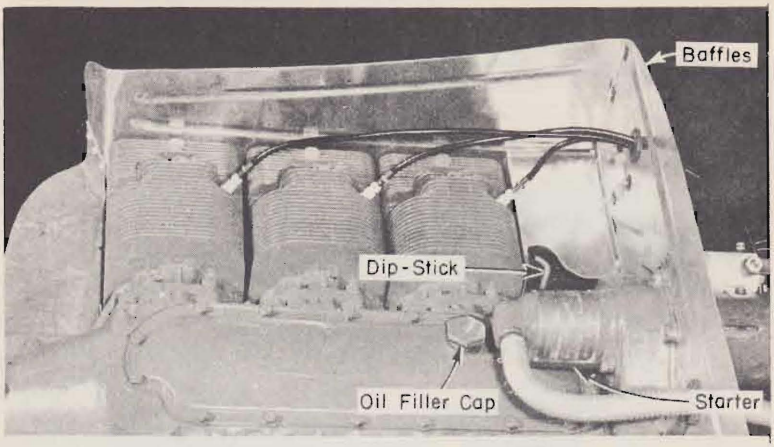
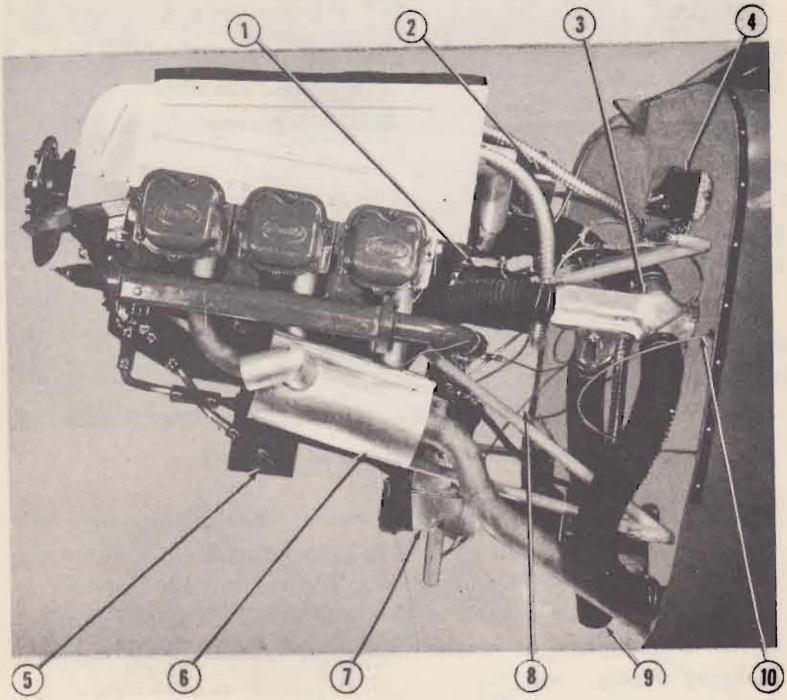


Figure 7—Oil Filler Cap and Dip Stick

by pressing the button on the microphone. The pin-point light just below the radio dial will glow during transmission to indicate the strength of the energy being dispensed. The transmission frequency of the Skyfone radio set is fixed at 3105 kilocycles by a factory installed crystal. The frequency is variable from 2000 to 7000 kilocycles by exchanging crystals.

FUEL SYSTEM

38. The fuel supply is in two 20 gallon tanks, one in each wing panel; refer to Figure 6. Use *80 octane* unleaded aviation fuel. The net usable fuel capacity of each tank is 18 gallons; the remaining being the non-usable residual fuel in the tanks, the weight of which is included in the airplane empty weight. Fuel flows by gravity from the wing tanks to the carburetor and is drawn from either the right or left tank or shut off entirely by means of the fuel selector valve. Fuel for the primer is taken from the main fuel line through the strainer attached to the firewall. There are four strainers in the fuel lines, one at each point where the fuel lines are connected to the fuel tanks, another attached to the firewall, and a fourth where the fuel line is attached to the carburetor. Quick acting drains are provided at the low point of each fuel tank so that tanks may be bled to avoid the accumulation of water. The fuel tank filler necks extend above the upper surface of the wing. The filler caps have tubular vents that *must point forward* when the cap is installed.



1. Generator
2. Starter
3. Cabin Heater Valve
4. Voltage Regulator
5. Oil Cooler
6. Cabin Air Heater Muff
7. Carburetor Air Mixing Box
8. Carburetor Air Heat Control
9. Cabin Fresh Air Intake
10. Parking Brake Control

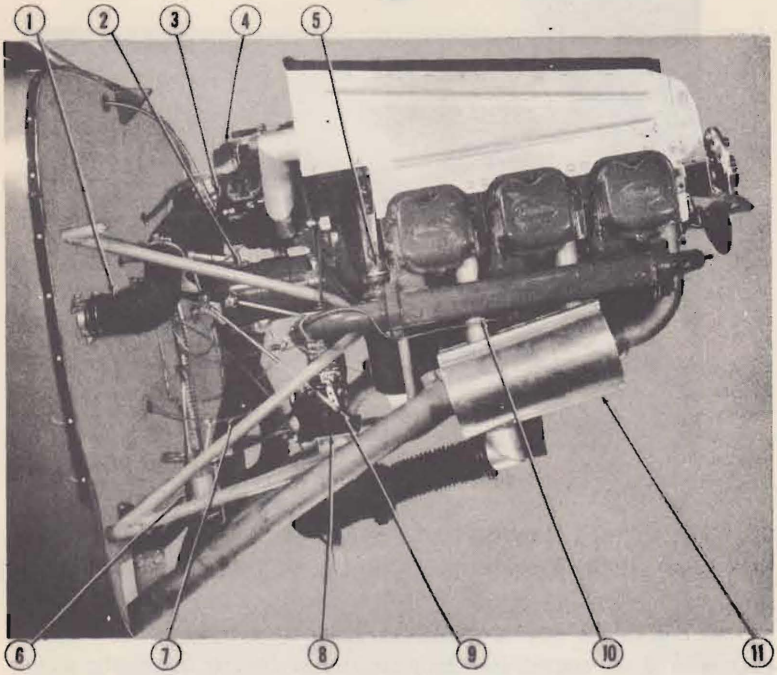
Figure 8—Left Side of Engine

39. The fuel gauge is mounted on the instrument panel. By means of the fuel gauge selector switch, located above the fuel selector valve control, the level of fuel in either the left or the right wing tank can be made to register on the fuel gauge. The fuel remaining in the tank when the gauge reads *E* cannot safely be used in flight.

OIL SYSTEM

40. Eight quarts of oil are carried within the engine crankcase. Use motor oil of the following viscosity:

Summer (Above 40°F.)	SAE 40
Winter (Above 10°F.)	SAE 30
Winter (Below 10°F.)	SAE 20



1. Cabin Heater Duct
2. Generator
3. Right Magneto
4. Starter
5. Engine Shock Mount
6. Fuel Strainer
7. Mixture Control
8. Carburetor
9. Throttle Control
10. Primer Line
11. Carburetor Air Heater Muff

Figure 9—Right Side of Engine

A dip-stick for measuring the quantity of oil in the engine is accessible upon lifting the right engine cowl panel. The stick is on the top right side of the engine crankcase, inside the baffles. Never operate the engine with less than 4 quarts of oil in the crankcase. Oil pressure and temperature gauges are mounted on the instrument panel (see paragraphs 23 and 24).

ENGINE AND ENGINE ACCESSORIES

41. The power plant is an air-cooled, six-cylinder, horizontally opposed 150 horsepower Franklin engine. The rated maximum continuous engine speed is 2600 pounds rpm. The propeller is mounted directly on the crankshaft.

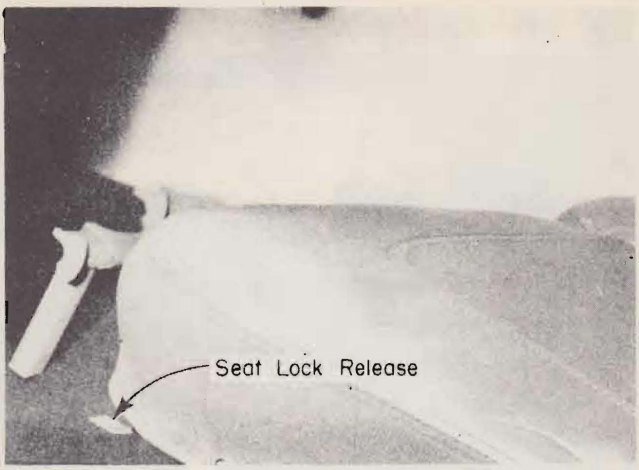


Figure 10—Seat Lock Release

42. The engine accessories include a starter, a generator, two magnetos, a carburetor, a carburetor air filter, an oil cooler, and a carburetor heater muff. Refer to Figures 8 and 9. The starter is mounted on the top aft end of the engine crankcase. The magnetos are below and on each side of the starter, and the generator is directly below the starter and magnetos. The carburetor is attached to the lower aft end of the engine. The oil cooler and carburetor air filter are mounted beneath the forward end of the engine. The carburetor heater muff is attached to the right exhaust manifold and the muff for cabin heat is on the left exhaust manifold.

ACCOMMODATIONS

43. Seats are provided for four persons. The front seats are adjustable and can be moved forward or back by releasing a locking device (see Figure 10). The backs of both front seats fold forward permitting entrance to the rear seats.

44. The rear seats are the hammock type and are not adjustable. Three straps support each of the rear seats, and either or both seats can be removed easily. Each seat is provided with a safety belt. Inasmuch as the lower cushions are not secured, it is recommended that the safety belts be strapped across the rear seat cushions when these seats are not occupied.

1. Rear Heater Port
2. Baggage Drape
3. Map Pocket

Figure 11—Rear of Cabin

45. The entrance doors on each side of the cabin can be locked. Both doors can be locked from inside the airplane by turning down a lever beneath the door handle. The left door is provided with a key lock and can be locked from outside the airplane. The doors have two-piece windows, the forward panel of which slides back. To unlock the window, depress the small knob below the forward panel.

46. Stowage space for small articles is provided by a glove compartment on the instrument panel, and by two pockets in the upholstery. One pocket is on the back of the right front seat and another is on the left side of the cabin just forward of the cabin door. There are ash receivers at the side of each seat.

BAGGAGE

47. Provision is made beneath the rear seat for baggage. The drape from the front edge of the seat is attached to the floor by curtain fasteners. Unsnapping these fasteners will allow access to this space. After the baggage is in place, the drape should be lowered and securely fastened to the floor.

48. Removal of either or both sections of the rear seat will make the rear of the cabin available for larger baggage or light cargo. The forward tube across the cabin may also be removed. To remove either seat section, lift off the lower seat cushion and unlock the canvas hammock straps.

49. Any combination of baggage, passengers, and fuel may be carried that does not exceed any one of the following limitations. The rear seat cannot be occupied during the performance of maneuvers.

(a) Do not exceed 2230 pounds gross weight. See Actual Weight and Balance sheets for airplane weight empty.

(b) Do not exceed most rearward Center of Gravity position permissible. See Operating Limitations Manual for effect of baggage on Center of Gravity position.

(c) Do not exceed 350 pounds on floor in rear of cabin. This is the maximum load for which the floor structure is approved.

50. Securely fasten all loads. The drape extending from the front of the seat to the floor has been proven strong enough to retain 100 pounds of baggage beneath the seat. With the rear seat removed, the safety belts and their lugs on the floor may be used to secure baggage or cargo.

STATION WAGON

51. The Station Wagon loading limitations are the same as for the standard airplane as given in paragraph 49, except for the rear of the

cabin. Baggage is not to be carried beneath the rear seats at any time. A maximum load of 90 pounds per square foot, not to exceed a total of 600 pounds, is permissible on the floor with the rear seats removed.

52. A sling is provided to secure cargo loads against forward motion. The straps on each side are attached to the rear outer seat belt lugs, and the center strap is attached to the rear center seat belt lug. Position sling over the upper forward corner of the cargo and draw all buckles tight. Keep load a minimum of eight inches aft of front seat back.

BAGGAGE COMPARTMENT

53. A separate baggage compartment aft of the cabin is provided in later airplanes. This compartment is designed to carry 100 pounds and has a capacity of 13 cubic feet. Baggage placed in this compartment need not be tied down. This compartment is accessible through a door in the right side of the fuselage, aft of the cabin. This door is provided with a key lock.

CHAPTER II

OPERATING INSTRUCTIONS

PREPARATION

1. In preparing for flight, it is important that the operation of every component of the airplane be checked. Malfunctioning of the primary controls and equipment must be discovered and remedied before flight and it is well to know what units of secondary equipment (radio, lights, brakes, etc.) can be relied upon even though their use may not be anticipated in the flight to be made. The following list is provided as a guide in checking the operation of the airplane and its components.

2. Ascertain that there are no repairs in progress on the airplane that will render it unsafe for flying.

3. Remove pitot tube cover and any other installed weather covers.

4. Inspect the main wheel tires for correct air pressure (21 psi).

5. Bleed each fuel tank sump (see Figure 6) to remove any water that may have accumulated.

6. Check air duct openings in engine cowl nose and bottom cowl for litter and obstructions. Carburetor air filter should be removed to prevent plugging by snow during the winter months.

7. Measure oil level with the dip stick. The dip stick is just aft of the rear cylinder on the right side. Unscrew the dip stick to remove it. The crankcase oil capacity is eight quarts.

8. Bleed fuel strainer on firewall to remove any water that may have accumulated.

9. Check spark plug insulators for cleanliness so that dirt and moisture will not decrease intensity of the spark.

10. Determine that the fuel filler caps on top of the right and left wings are tight and that the vent tubes point forward.

11. Check flight controls (ailerons, elevator, flaps, and rudder) for freedom of operation and for direction of surface movement. It is important to check direction, because through error controls may have been reversed during rerigging.

> Note: The control system is designed so that the elevator *up* travel is restricted when the flaps are raised.

12. Turn elevator trim tab crank to full travel each way and then return to neutral.

13. Test operate brake pedal operation. If pedal action is soft and unresponsive, there is air in the hydraulic lines which should be removed before take-off.

14. Turn master switch *on*.

15. Check quantity of fuel in each tank. Turn fuel gauge selector switch to R for right tank and L for left tank reading. Tap gauge to assure correct reading when gauge reads *full*.

16. Turn fuel selector valve *on* to the tank that has the greater quantity of fuel.

17. Set altimeter to the *pressure-altitude* of field. Be certain that the white indexes on the cover glasses of the airspeed indicator, tachometer, oil pressure gauge, and oil temperature gauge are in line with white indexes on the respective housing if the markings for these instruments are on the glass face.

18. Check operating condition of the radio receiver and transmitter. Pinpoint light beneath radio dial should glow when button on microphone is pressed. Light should become brighter when talking into microphone.

19. Test operate all lights. If instrument panel lights are not bright, turn the rheostat located under the switch panel. Make an independent and quick inspection of the landing lights.

CAUTION

Radiation of landing light heat becomes critical when the airplane is not in flight.

20. Be certain that the weight limits, specified in Operation Limitations Manual, are not exceeded by the load of passengers and/or baggage to be carried. When rear seats are removed, be certain that baggage is securely lashed in place. Use of the rear safety belts or special slings is recommended.

ENGINE STARTING

21 Push throttle control *in* approximately ¼ inch.

22. Push carburetor heat all the way in to *off.*

23. Push mixture control all the way in to *full rich.*

24. Unlock primer control and prime with no more than three strokes, depending on temperature of engine. A warm engine does not need priming.

CAUTION

Be certain that primer control is locked *in* after priming. If this is not done, primer may leak causing over-rich mixture and excessive use of fuel during flight.

25. Push the button just above the ignition switch handle to allow the switch to turn to *start.* The switch is spring loaded and must be held on the *start* position. When the engine fires, release the switch and allow it to return to *both.* Starter is not operative until master swich is *on.*

CAUTION

If no oil pressure is indicated within 30 seconds after engine starts, discontinue the starting procedure and turn ignition switch *off.* The oil system should be investigated and the trouble remedied before operating the engine.

26. If the engine does not start, and if fuel drips from the drain or from the exhaust pipes, the carburetor is flooded or the engine is over-primed; consequently, turn ignition switch *off,* pull mixture control out to *idle cut-off,* open throttle to *full open,* and rotate the propeller several revolutions by hand, backwards to the normal rotation. Then try starting again.

WARM-UP

27. When the engine catches, move the throttle smoothly but rapidly to limit the speed to 900 to 1000 rpm. After oil pressure is a least 20 psi, warm up at 1000 rpm until oil temperature begins to rise.

GROUND TEST

28. Turn the fuel selector valve to the left tank and to the right tank long enough to insure proper engine performance from either tank. One minute on each tank will be sufficient.

29. Open the throttle until 2000 rpm is attained. The engine instruments should read as follows:

Oil Pressure	40 to 45 psi
Oil Temperature	100°F.
Tachometer	2000 rpm
Ammeter	(Charging)

Do not operate the engine above 1600 rpm on the ground longer than necessary to test the instruments, nor operate the engine below 1000 rpm for long idling periods as it will cause fouling of the plugs.

CAUTION

The pressure baffle cooling system used on the airplane requires forward speed to cool the engine. Under no circumstances operate the engine at or near full throttle longer than is necessary for a quick reading of the instruments.

30. With the engine running at 800 rpm, turn the ignition switch *off* momentarily. If the engine does not stop firing, a defective magneto ground connection is indicated. Stop the engine by pulling the mixture control full *out* to the *idle cut-off* position and slowly open the throttle. Keep clear of the propeller until the source of the trouble is located and remedied

31. At 2000 rpm, test the magnetos by switching from *both* to *R* for a moment. If any of the cylinders miss fire, it indicates one or more faulty spark plugs in the upper level of the left bank of cylinders or in the lower level of the right bank. Return the ignition switch to *both*. Turn the ignition swich from *both* to *L* for a moment. If any of the cylinders miss fire, it indicates one or more faulty spark plugs in the lower level of the left bank of cylinders or in the upper level of the right bank. Return the ignition switch to *both*.

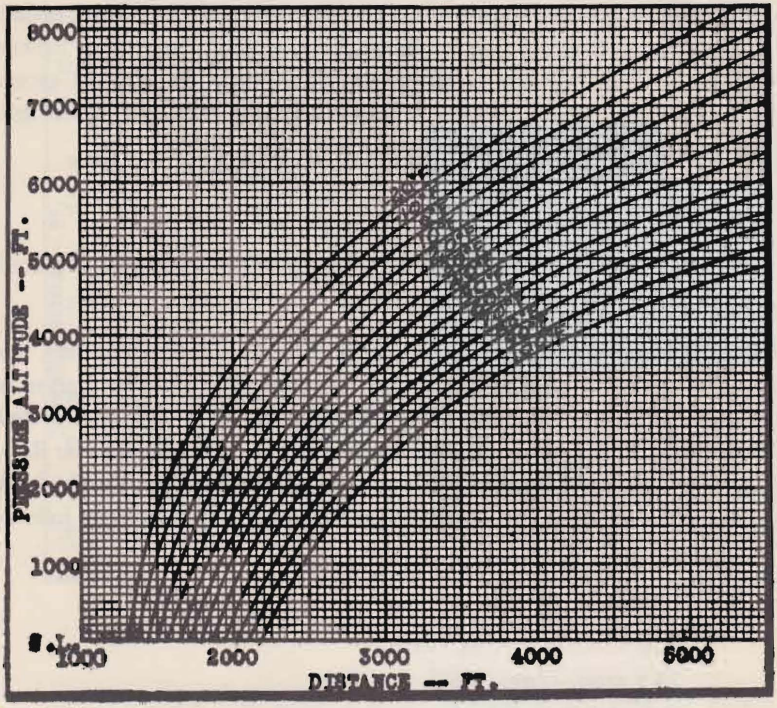


Figure 12—Take-Off Distance

32. A drop in tachometer reading when operating on one magneto should not be more than 200 rpm from that of operation on *both*. Make the test as quickly as possible to prevent damage from detonation.

TAXIING

33. Be certain that the main wheels are not stuck or mired before taxiing.

CAUTION

Never attempt to free airplane by lifting or pushing up on the lift struts.

34. Release the parking brake control by pushing knob in and applying pressure to the brake pedals.

35. Always taxi the airplane slowly, with flaps up. The rudder pedals operate the tail wheel to steer the airplane on the ground. The brakes can be used for turning the airplane when taxiing, but to avoid excessive brake wear, the steerable tail wheel should be used as the principal means of turning when on the ground.

TAKE-OFF

36. The quickest take-off is obtained when the flap control is placed in the first notch.

37. Take-off distances at altitudes from sea level to 7000 feet are shown on Figure 12. Included in the distance given by these curves is that required to climb to 50 feet above the field at a predetermined airspeed of 73.5 mph as required for certification tests by Civil Air Regulations. The data from which these curves were derived was obtained during the CAA Certification Flight Tests conducted under the following conditions:

2230 Pounds Gross Weight
Full Throttle—Wing Flaps up
73.5 mph—Zero Wind
Take-Off From Hard Surface Runway

38. When take-off is accomplished with flaps down, raise flaps gradually after sufficient altitude has been attained to clear all ground hazards.

39. Do not use carburetor heat during take-off but, when outside air temperature is estimated to be between 20°F. and 68°F., carburetor heat can be used during warm-up and climb.

CAUTION

Use of carburetor heat during take-off can result in loss of power.

CLIMB

40. The best rate of climb is obtained with the flaps UP and maintaining an airspeed of about 81 mph.

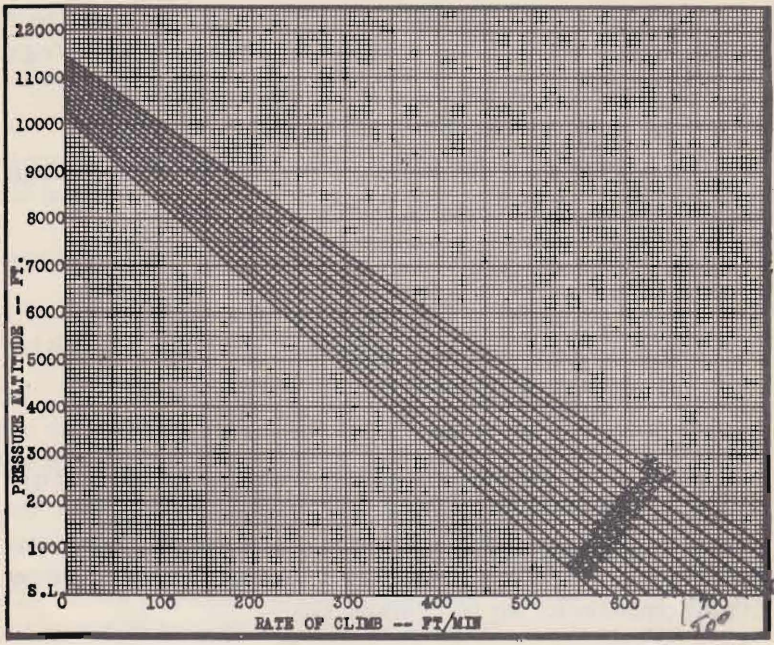


Figure 13—Rate of Climb

41. Climbing characeristics of the airplane at altitudes are shown on Figure 13. The data from which these curves were derived was obtained during the CAA Certified Flight Tests conducted under the following conditions:

2230 Pounds Gross Weight
Wing Flaps UP
Full Throttle
80.5 MPH

STALLS

42. The stalling speed of the airplane is very much affected by the flaps and the gross weight. The following speeds have been determined by flight tests:

	2230 Lbs. Gross Weight	1925 Lbs. Gross Weight
Stalling Speed—Flaps UP	67 mph	58 mph
Stalling Speed—Flaps DOWN	57 mph	54 mph

43. The speed at which the airplane stalls is also affected by the angle of bank as shown in the following table.

Angle of Bank (Deg.)	0	10	20	30	40	50	60
Flaps UP	67	68	69	72	77	84	95
Flaps DOWN	57	58	59	61	65	71	81

CRUISE

44. The cruising airspeed and engine rpm will depend upon the type of propeller installed. Due to production variation, propellers of the same make and design will give different level flight, full throttle, and engine speeds. The following table will aid in determining the proper cruising condition for any one Voyager 150.

Level Flight Full Throttle	Cruising With 83% Power		Cruising With 75% Power	
R.P.M.	R.P.M.	Gal./Hr.	R.P.M.	Gal./Hr.
2775	2575	11.0	2490	10.0
2725	2540	10.0	2460	9.5
2675	2490	10.0	2410	9.0
2625	2460	9.5	2380	8.5

Cruising with 83 percent power is the maximum cruising condition recommended. The design cruising condition is that with 75 percent power. It is suggested that the level flight, full throttle engine rpm be determined by trial.

45. The figures given in the *gallons per hour* column are gallons of fuel for each actual hour of flight time at the given rpm. Generally the engine will consume 11 gallons of fuel per hour as recorded on the tachometer.

46. When flying at altitudes greater than 3000 feet above sea level, adjust mixture control to obtain maximum engine speed after setting throttle.

47. Use carburetor air heater to prevent and eliminate carburetor ice. Icing conditions are most likely when the outside air temperature is between 20°F. and 68°F.

48. The airplane must be operated within the limits given in the CAA Approved Operating Limitations Manual located in the side pocket on the left door.

APPROACH

49. Determine fuel quantity in each tank and turn both the fuel valve and the indicator switch to the fullest tank.

50. Pull carburetor heat control to *on* position and frequently open the throttle to clear the engine and to prevent too rapid cooling during the approach.

51. Push mixture control in to *full-rich* position unless field is above 3000 feet and mixture must be leaned for smooth engine operation.

52. Set the flap control in the second notch to lower flaps all the way for maximum lift and drag during landing. Do not lower flaps at airspeeds above 88 mph.

53. Set elevator trim tab to maintain desired gliding speed.

LANDING

54. Push carburetor heat control full in to the *off* position.

55. Landing distances at altitudes from sea level to 7000 feet are shown on Figure 14. Included in the distance given by these curves is that required to contact the ground from an altitude of 50 feet above the field at an approach speed of 74 mph. The data from which these curves were derived was obtained during the CAA Certification Flight Tests conducted under the following conditions:

2230 Pounds Gross Weight
Wing Flaps full Down
Zero Wind
Landing on a Hard Surface Level Runway

56. The brakes need not be used in every landing, especially since the

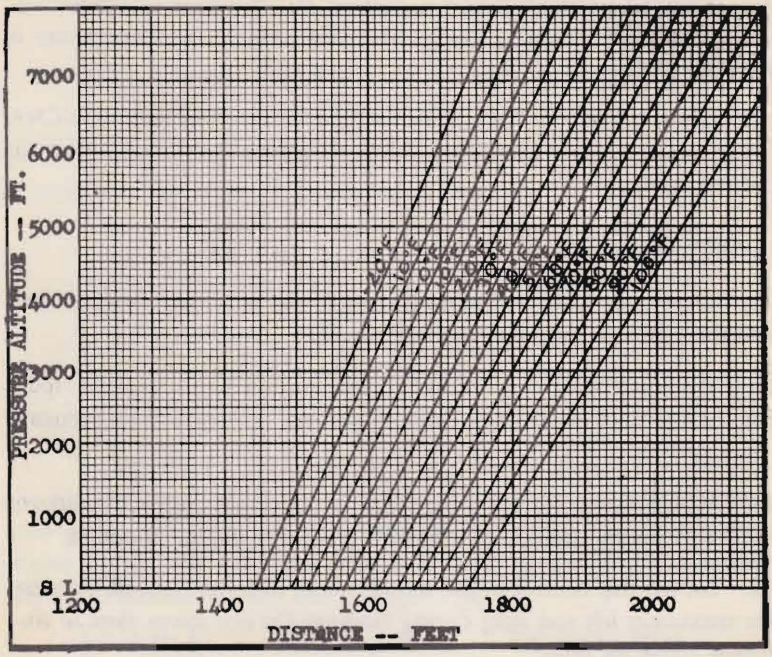


Figure 14—Landing Distance

airplane can land in a short distance. The steerable tail wheel should be used as the principal control for steering after contacting the ground.

EMERGENCY TAKE-OFF IF NO LANDING POSSIBLE (BALKED LANDING)

57. Push throttle smoothly to *full open.*

58. Hold the control wheel forward to prevent climbing until speed is regained.

59. After regaining speed, raise flaps gradually to obtain best climb.

BEFORE STOPPING THE ENGINE

60. With the engine idling at 800 rpm, momentarily turn the ignition switch *off* to be sure of a good magneto ground contact; this will help to avoid accidents later when handling the propeller. Return switch to *both.*

61. Idle engine at 600 rpm for minimum of one minute to allow proper cooling.

STOPPING THE ENGINE

62. To stop the engine pull mixture control all the way out to *idle cut-off* and simultaneously push throttle to full *open.* After engine stops, turn ignition switch *off.* Leave mixture control in *idle cut-off* position as a precaution against accidental starting.

BEFORE LEAVING AIRPLANE

63. Turn all switches *off.*

64. Set the parking brake.

65. Lower the flaps to prevent buffeting when parked outside.

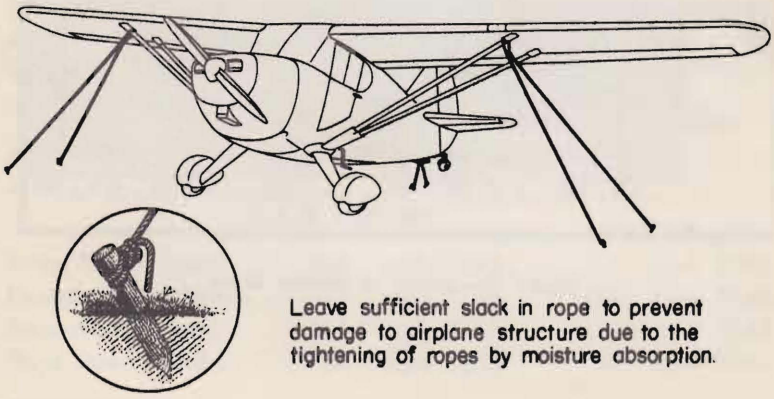


Figure 15—Mooring

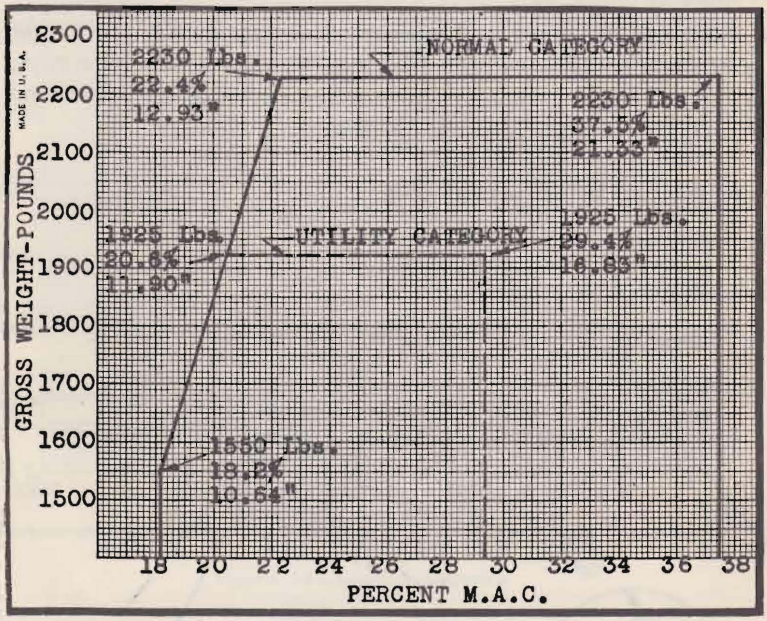


Figure 16—Center of Gravity Limits

CHAPTER III

OPERATING LIMITATIONS

For Complete Operation Limitations See CAA Approved Operating Limitations in Data Case on Left Door.

WEIGHT AND CENTER OF GRAVITY

1. The center of gravity location for any given gross weight must be within the limits shown on Figure 16. To convert figures for percent MAC into inches wing chord, multiply percent MAC by 55.50 and add .52 inches to this product. Wing leading edge is the reference line from which the center of gravity is located.

2. The maximum gross weight for each category is as follows:

Normal Category ..... 2230 Pounds
Utility Category ..... 1925 Pounds

The empty weight of the airplane and its corresponding center of gravity is given on the Actual Weight and Balance sheets located in the Operating Limitations Manual. This manual also contains a list of standard equipment included in the empty weight of the airplane.

AIRSPEED

3. The airspeed limitations for each category are as follows:

	Normal Category	*Utility Category*
Never Exceed Speed	148 mph TIAS	158 mph TIAS
Design Cruising Speed	117 mph TIAS	117 mph TIAS
Maneuvering Speed	113.5 mph TIAS	116.5 mph TIAS
Flaps Down Speed	88 mph TIAS	88 mph TIAS

MANEUVERS

4. No acrobatic maneuvers including spins are approved when operating the airplane in the Normal Category.

5. Only those acrobatic maneuvers listed below are approved when operating the airplane in the Utility Category. No inverted or snap maneuvers are approved.

Chandelle
Lazy Eight
Stall (Except Whip Stall)
Steep Turn
Spin (Intentional Spins Prohibited with Flaps Down)

The rear seat is not to be occupied when the airplane is operated in the Utility Category.

INSTRUMENT MARKINGS

6. The markings on the airspeed indicator are located as follows:

The never exceed speeds of 148 and 158 is the maximum safe airspeed for airplane operating. These are marked with red radial lines, one bearing the letter "U" for Utility Category, and one bearing the letter "N" for Normal Category.

A yellow arc extends from the never exceed speed to 117, the design cruising speed. This is the range in which the airplane should be operated with caution as it is possible to exceed the design load accelerations.

A green arc extends from 117, the design cruising speed, to 67, the stalling speed, flaps UP and 2230 gross weight. This is the normal cruising range.

The flap operating range is marked by a white arc extending from the design flap speed, 88, (maximum speed at which the flaps can be lowered), to the stalling speed, 57, with the flaps down at 2230 gross weight.

7. The empty position on the fuel gauge is marked in red, as the fuel remaining in the tank when the pointer is at this mark cannot safely be used in flight.

8. A red radial line is marked on the oil temperature gauge at 230 which is the maximum permissible oil inlet temperature.

9. A red radial line is marked on the tachometer at 2600 rpm which is the rated engine speed.

INDEX

Italic Numbers Denote Illustrations

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WARRANTY

The Manufacturer warrants each new aircraft or new genuine Stinson product manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any part or parts thereof which shall, within ninety (90) days after delivery of such aircraft or product at Manufacturer's factory, or prior to the time when such aircraft has been operated one hundred (100) hours, whichever event shall first occur, be returned to it with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and the Manufacturer neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its aircraft or other products.

This warranty shall not apply to any aircraft which shall have been repaired or altered outside of the Manufacturer's factory in any way so as, in the Manufacturer's judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence, improper maintenance or accident, nor to any airplane made by Manufacturer which shall have been operated contrary to Manufacturer's Instruction Manual or in violation of any applicable governmental law, rule or regulation.

The term "genuine Stinson products," as used herein, refers to and includes such products (exclusive of aircraft) as are manufactured in accordance with Manufacturer's drawings and specifications primarily for use on or in connection with Stinson aircraft, irrespective of whether such products are manufactured by or for the Manufacturer or whether such products are distributed by Manufacturer or by any division or subsidiary of Consolidated Vultee Aircraft Corporation.

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