

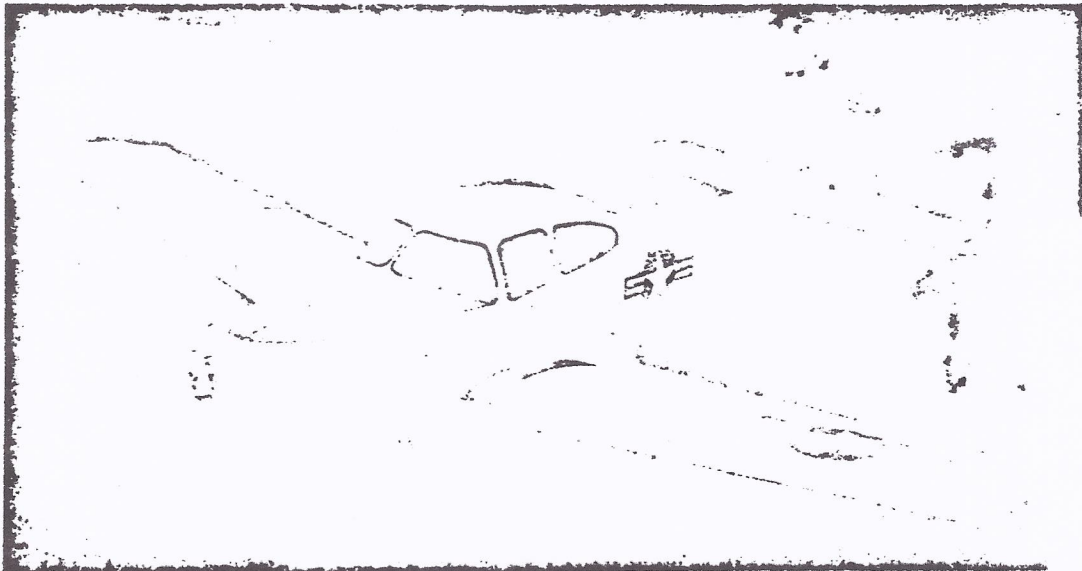
TECHNICAL ORDER  
1L-17A-1  
FORMERLY AN 01-100LAA-1)

# FLIGHT HANDBOOK

N842JW NAV-4-1639

USAF SERIES

L-17A, L-17B, AND L-17C  
AIRCRAFT



This Publication replaces AN 01-100LAA-1 dated 1 October 1948

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE  
AIR FORCE AND THE CHIEF OF THE BUREAU OF AERONAUTICS

## Weight & Balance Worksheet

### Navion N842JW Cont.I0550B

Max Gross Weight.....3150  
 Utility Max Gross Wt.....2350  
 Empty Weight .....2131  
 Useful Load.....1019  
 Max Baggage.....167

	* Weight	x	Arm"	= * Moment
Aircraft.....	2131.60		95.96"	204545.46

Front Seats... \_\_\_\_\_ ..... 96.0 ..... \_\_\_\_\_

Rear Seats..... \_\_\_\_\_ ..... 132.0 ..... \_\_\_\_\_

Fuel Main..... \_\_\_\_\_ ..... 103.0 ..... \_\_\_\_\_

Fuel Aux..... \_\_\_\_\_ ..... 130.0 ..... \_\_\_\_\_

Fuel Tip Tanks \_\_\_\_\_ ..... 100.5 ..... \_\_\_\_\_

Baggage..... \_\_\_\_\_ ..... 159.0 ..... \_\_\_\_\_

TOTALS..... \_\_\_\_\_ ..... \_\_\_\_\_

TOTAL MOMENT / TOTAL WT. = C.G. IN INCHES

C.G. = \_\_\_\_\_ MAX AFT CG 103.4

Main Tank Full...39.5 GAL.....237lbs

Aux Full..... 20.0 GAL.....120lbs

Tip Tanks Full...40.0 GAL.....240lbs

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1/03/2006

**WEIGHT AND BALANCE DATA AND/OR SUPPLEMENTAL EQUIPMENT LIST**

**AIRCRAFT**

MAKE RYAN NAVION A

MODEL L-17B

S/N NAV4-1639

REG. N842JW


			WEIGHT	ARM	MOMENT
	LAST WT DATE:	/ /	2119.60	95.62	202680.60
	REMOVED				
1	EA	GARMIN GNC-250XL GPS/COM	-3.25	76.00	-247.00
1	EA	GARMIN GA-56 ANTENNA	-0.50	58.00	-29.00
1	EA	CESSNA IN-514R CDI	-1.00	78.00	-78.00
1	EA	CESSNA R-402A MKR REC	-0.70	72.00	-50.40
1	EA	KING KA-25 AUDIO AMP	-1.30	72.00	-93.60
1	EA	SIGTRONICS SPA-400 ICS	-0.40	78.00	-31.20
1	EA	ACK A-30 ENCODER	-0.50	72.00	-36.00
1	EA	RCALLEN RCA11A-7 DG	-2.75	76.00	-209.00
1	EA	ELECT. GYRO 1394T100-3 TC	-1.10	78.00	-85.80
	INSTALLED				
1	EA	GARMIN GMA-340 AUDIO/MKR/ICS	1.70	78.00	132.60
1	EA	GARMIN GNS-480 WAAS GPS/COM/IL	5.80	76.00	440.80
1	EA	GARMIN MD200-306 CDI	1.25	78.00	97.50
1	EA	GARMIN A-33 GPS ANTENNA	0.40	58.00	23.20
1	EA	SIGMATEK 4000C-1 DG	0.26	76.00	19.76
1	EA	TRANS CAL SSD120-RS ENCODER	0.70	72.00	50.40
1	EA	S-TEC 01260-0-0-14 TC/COMPUTR	2.20	78.00	171.60
1	EA	S-TEC 01261-8-14 PITCH COMPTR	2.10	206.00	432.60
1	EA	S-TEC 0107-P4 SERVO/BRKT	3.50	182.00	637.00
1	EA	S-TEC 0105-R1 SERVO/BRKT	3.50	120.00	420.00
1	EA	S-TEC 0111 TRANSDUCER	0.30	224.00	67.20
1	EA	S-TEC GPSS ST-901	0.30	74.00	22.20
	WIRING		1.50	140.00	210.00

NEW EMPTY WT: 2131.61 lbs

NEW C.G. 95.96 inches

NEW MOMENT: 204545.46

NEW USEFUL LOAD: 1018.39 lbs

SIGNATURE: 

Gross Weight and C. G. Limitations

Normal Category

The following chart shows the maximum permissible loading of the airplane for given C.G. locations.

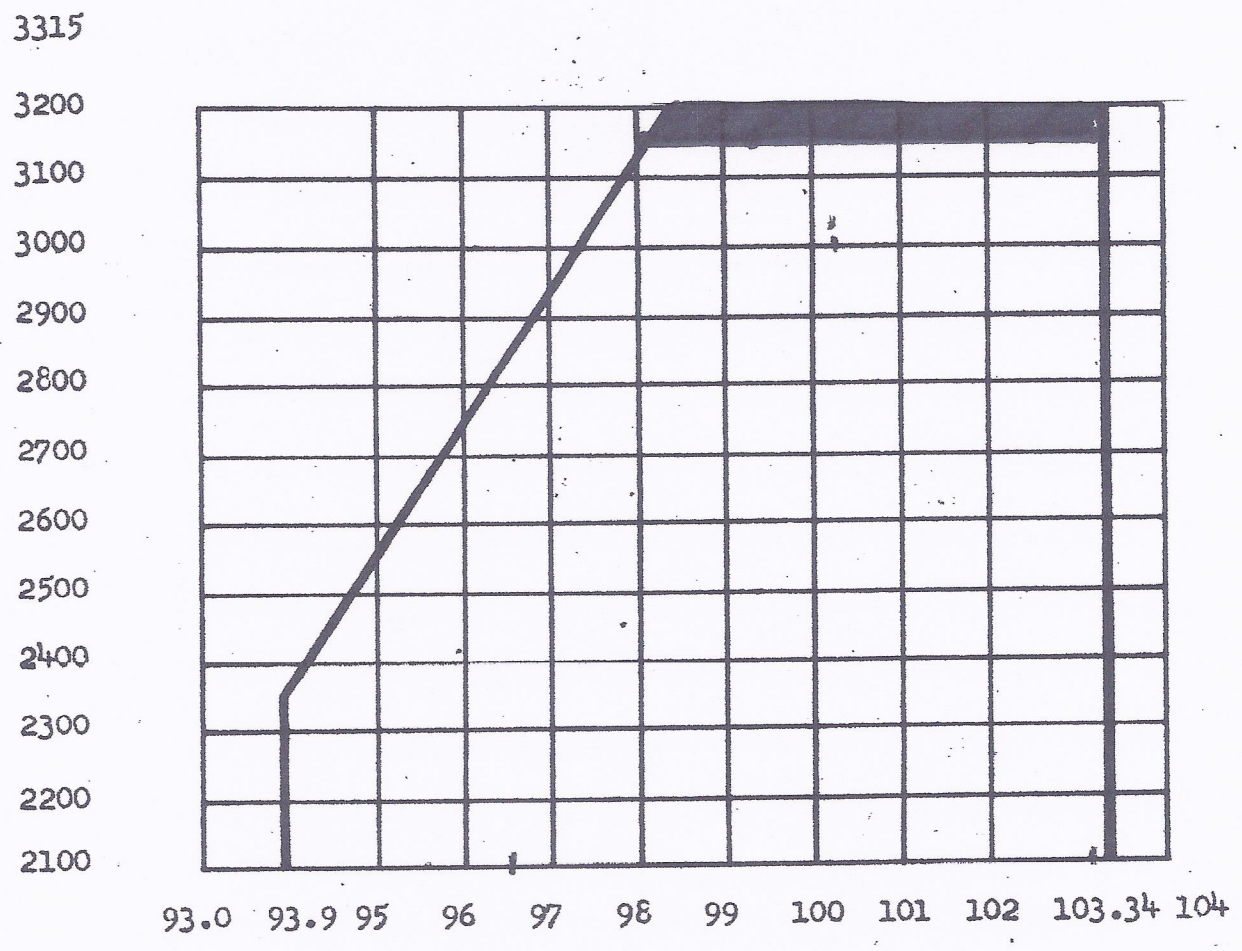


Chart shows gear down condition;  
Gear up condition approximately  
1/4 inch aft of values shown by line.

1. Maximum Take-off Weight at Sea Level = 3150 lbs.
2. Maximum Gross Weight with No Tip Fuel = 2950 lbs.

EQUIPMENT LIST  
(Items installed at time of weighing)

Make: North American

Model: Navion F

Serial Number: NAV-4-1639

N842JW

ITEM	WT. LBS	H-ARM INCHES
<b>PROPELLER AND PROPELLER ACCESSORIES</b>		
16.(a) Propeller- McCauley, constant speed, hub model D3A32C409, Blade Model 82NC-2	62	9
(b) Woodward Governor K210452	4	18
(c) Spinner assembly, McCauley	4	9
<b>ENGINE ACCESSORIES</b>		
101. (h) Starter, Electric, Prestolite MCL6501	18.6	46.5
104. (c) Oil cooler, Harrison Radiator Div. AP10AU08-2	5	45
106. (b) Engine Driven Hydraulic Pump New York Airbrake Model 67A025	2	48
Brackett Air Filter Assembly part # BA-7210	4	26
Brackett Air Filter part # BA-7112	1	22
Vacuum Pump G455	3	48
110. Auxiliary Fuel Tank Installation		
(f.) Underseat Installation SYMONS	10	130
(g.) Brittain 20 gal tip tanks	35	105
113. Dukes Electric Fuel Pump	2.5	66
Navion Muffler Heater Combination	7	42
125. Main Gear Enclosures, Both Wheels (Ryan Dwg. 145-33301)	5	114
<b>ENGINE</b>		
142. Continental IO-550-B	431.7	31.3

EQUIPMENT LIST cont'd

	WT, LBS	H-ARM INCHES
<b>LANDING GEAR</b>		
201. Main Landing Gear Wheel and Brake Assembly with 6.50-8, Type III, 4 ply, tire and tube Cleveland P/N 199-52	54	114
202. Nose Wheel Assembly- With 6.00-6, Type III, 4 ply, tire and tube (a) Firestone Model 6C-5	14	46
206. (b) Main gear farings	4	114
<b>FLAPS</b>		
409. Intermediate Position Flap Valve, RYAN Dwg. 145-58012	Neglect WT	
<b>ELECTRIC AND RADIO EQUIPMENT</b>		
301. (f) Alternator- Prestolite 70 Amp. ALX-9405	11.4	18
302. Battery (Concord RG35AXC) and Battery Case	33	151
303. Landing Light-GE 4509 and Bracket RYAN Dwg. 145-54007	3	114
304. Voltage regulator (Zeftronics R15VON)	0.8	53
Radio. Garmin GNS 480 WAAS	5.8	75
Radio Cessna Nav Com	2.8	75
Transponder	2.3	75
Autopilot S-Tec 30	1.8	75
Audio Panel Garmin GMA-340	1.7	75
<b>INTERIOR EQUIPMENT</b>		
401. Operation limitations- Current issue	NEG	
402. Safety belt- rear seat RYAN Dwg. 145-53051	2	132
403. Baggage Tie Down Straps-RYAN Dwg. 145-53071	NEG	
406. Gyro-Instrument Panel (Sensitive Altimeter, Clock, Turn and bank indicator, Suction Gauge, and lines)	13	75
Electronics International UBG-16	1.5	75
Electronics International R-1 Tach	0.7	75
Electronics International FP-5	0.7	75
Cabin Vent & Heating Mixing Valve Installation	3	51

Page 3

NOTE 5. (b) Symons Engineering Dwg. SY-108 "Installation Instructions for Navion Stabilizer Change."

The following C.G. range applies:

Normal-     (+98.0) to (+103.4) at 3,150 lb.  
              (+93.9) to (+103.4) at 2,350 lb. or less

NOTE 6. Fuselage structural reinforcing in accordance with Navion Dwg. 143-31001-700 installed

Aircraft Empty Wt	2131.6 Lbs.
Aircraft Arm	95.96
Aircraft Moment	204545.46

Russell C. Druett  
1458 W. Jacinto View Road  
Banning, CA 92220

AFM Supplement To  
Navion Model A;B;D-H AFM  
STE # SA7088NM

Supplement # 1

Operating Limitations

Power Plant and Limitations

1. Continental, Model IO550B
2. Take-Off / Maximum Continuous Operation-2700 RPM
3. Manifold Pressure (In Hg) Maximum continuous operations  
27.0
4. Fuel - Aviation Gasoline - Minimum grade 100LL Blue  
or 100 Green  
(Placards for minimum fuel octane rating required  
for all fuel tanks)

Propeller

The following is for McCauley three bladed propeller

1. Part # D3A32C409C
2. Prop. Diameter Max. 80.0 inches  
Min. 78 1/2 inches
3. Pitch Settings at 30.0 inch station  
Low 13.7 degrees  
High 28.8 degrees

Governor

1. Woodward, Part # K 210452

Instrument Dial Markings

Tachometer - 1800 - 2700 RPM	Green Arc - Normal Operating Range
2700 RPM	Red Line - Do Not Exceed
Manifold Pressure 27.0	Red Line

FAA Approved MAY 6, 1994



Russell C. Druett  
145B W. Jacinto View Road  
Banning, CA 92220

AFM Supplement To  
Navion Model A; B; D-H AFM  
STC # SA7088NM

Supplement # 1

Cylinder Head Temperature

100 degrees C (212 Degrees F.) -  
237.8 degrees C (460 degrees F.)

Green Arc - Normal  
Operating Range

~~237.8 degrees C (460 degrees F.)~~

~~Red Line - Do Not  
Exceed~~

Oil Temperature

23.9 degrees C. - 107.2 degrees C

Green Arc - Normal  
Operating Range

23.9 degrees C.

Red Line - Minimum

~~115.5 degrees C.~~

~~Red Line - Maximum~~

Oil Pressure 30 - 60 psi

Green Arc - Normal  
Operating Range

10 psi

Red Line - Minimum

60 psi

Red Line - Maximum

Fuel Pressure 4 - ~~17.5~~ psi

Green Arc - Normal  
Operating Range

1.5 psi

Red Line - Minimum

~~17.5~~ psi

Red Line - Maximum

Oil Grade (SAE)

Above 40 degrees

50

Below 40 degrees

30 or 10 W 30

Oil Capacity

12 qts. maximum

NAVION  
NAVION A, B, D, E, F  
(Circle appropriate Model)

FAA APPROVED

DATE December 22, 1959

FAA Identification N842JW

BY W. A. Kelly  
VF

BRITAIN AIRCRAFT ENTERPRISES  
AIRPLANE FLIGHT MANUAL SUPPLEMENT  
FOR  
20-GALLON WING TIP FUEL TANK INSTALLATION

This aircraft is equipped with Mark II Wing Tip Tanks, (Part #2009), 20 gallons each, and must be operated in compliance with the limitations prescribed herein.

A. LIMITATIONS SECTION

Same as prescribed in appropriate CAA (FAA) Approved Airplane Flight Manual except:

1. NO CATEGORY OTHER THAN NORMAL IS APPROVED.
2. STALLS  
A minimum of 150 feet of altitude is required to recover from power-off stalls.
3. INCREASE IN GROSS WEIGHT ALLOWANCES ALLOWED ONLY IF LANDING GEAR MEETS REQUIREMENTS OF INSTALLATION MANUAL TT2-1. INCREASED GROSS WEIGHT MUST BE IN ACCORDANCE WITH TABLE I, INSTALLATION MANUAL TT2-1, AND WHERE APPLICABLE, ANY INCREASE IN GROSS WEIGHT MUST BE CARRIED AS WING TIP TANK FUEL LOAD.
4. NAVION  
Same as prescribed in CAA (FAA) Approved Airplane Flight Manual dated June 3, 1947.

NAVION A

Same as prescribed in appropriate CAA (FAA) Approved Airplane Flight Manual except:

GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most forward loading 93.9" (15%MAC) at 2350 lbs or less.

Most forward loading 93.1" (21%MAC) at 2850 lbs.

Most rearward loading 104.0" (29.6%MAC) at 2850 lbs or less

NORMAL CATEGORY WITH FUEL IN TIP TANKS SAME AS ABOVE EXCEPT:

With 205 H.P. Engine - Most rearward loading 102.0" (26.9%MAC) at 2850 lbs or less.

With 225 H.P. ENGINE - Most rearward loading 102.0" (26.9%MAC) at 3000 lbs or less.

BRITAIN AIRCRAFT ENTERPRISES  
AIRPLANE FLIGHT MANUAL SUPPLEMENT  
FCR  
20-GALLON WING TIP FUEL TANK INSTALLATION

NAVION B

Same as prescribed in appropriate CAA (FAA) Approved Airplane Flight Manual except:

GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most forward loading 93.9" (15% MAC) at 2350 lbs or less

Most forward loading 98.1" (21% MAC) at 2860 lbs.

Most rearward loading 103.5 (29% MAC) at 2860 lbs or less

NORMAL CATEGORY WITH FUEL IN TIP TANKS SAME EXCEPT:

Most rearward loading 102.0" (27% MAC) at 3100 lbs or less

NAVIONS D, E, & F

Same as prescribed in appropriate CAA (FAA) Approved Flight Manual except:

GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most rearward loading 103.5" at 2860 lbs or less

NORMAL CATEGORY WITH FUEL IN TIP TANKS:

Most rearward loading 102.0" at 3100 lbs or less

B. PROCEDURE SECTION

Same as prescribed in respective (CAA) FAA Airplane Flight Manual except:

1. AUXILIARY TIP TANK FUEL TO BE USED IN LEVEL FLIGHT ONLY IN ACCORDANCE WITH THE FOLLOWING:
  - a. TO PRECLUDE THE POSSIBILITY OF OVERFLOWING THE MAIN TANK BY EXCESS FUEL RETURNED FROM CARBURETOR, WING TIP TANKS SHOULD BE USED ONLY WHILE MAIN GAGE REGISTERS BELOW 30 GALLONS.
2. WITH STANDARD INSTALLATION, THAT IS, NO CROSSFEED, RIGHT AND LEFT TIP TANKS SHOULD BE SELECTED ALTERNATELY AT INTERVALS TO PREVENT EXCESSIVE FUEL ASYMMETRY.
3. IF UNSYMMETRICAL FUEL LOADING OCCURS IN FLIGHT, LANDING SHOULD BE MADE WITH FLAPS UP.

C. PERFORMANCE INFORMATION SECTION

Revision of this section of the Airplane Flight Manual is not necessary inasmuch as the airplane meets the take-off and balked landing climb performance requirements of CAR 3.85 (a) and (c) of Amendment 3-4.

# IMPORTANT

**In order to gain the maximum benefit from this handbook, it is imperative that you read these pages carefully.**

This handbook contains all the information necessary for safe and efficient operation of the L-17A modified, L-17B and L-17C series airplanes. These instructions do not teach basic flight principles, but are designed to provide you with a general knowledge of the airplane, its flight characteristics, and specific normal and emergency operating procedures. Your flying experience is recognized, and elementary instructions have been avoided.

The only source of technically accurate and constantly current information is contained in your Flight Handbook. This information is based upon the technical knowledge of the aircraft manufacturer and the Air Force as well as the experience of the using commands. You would never recognize these new books as your old familiar, undesirable -1 technical order. To help solve your specific problems, these new books have been made attractive, accurate, current, and easy to use. Not all of the books have been prepared to the new requirements, but you can easily tell the old from the new. The new type handbook has a full page cover illustration whereas the old book has a small "spot" illustration.

Each flight crew member (*except those attached to an administrative base*) is entitled to have a personal copy of the Flight Handbook while he is stationed at a given base. (*Air Force Regulation 5-13*), issued in 1953, specifically makes that provision.

The technical order distribution system will work if you do your part; order your required quantity of handbooks before they are needed instead of waiting until the need arises. If you order them early, the Air Force will print enough to cover your requirements; if you delay, you will probably be kept waiting a long time when you do order because sufficient copies may not have been originally printed to cover your request.

The technical order system is easy to cope with; (*Technical order 00-5-2*) explains, in just a few pages, the easy means by which you can set the automatic machinery into motion. Actually, all you have to do is reflect your requirement quantities on the *Publications Requirement Table (T.O. 00-3-1)* and all the revisions, reissues, and supplements will be automatically forwarded to you in the same quantities. Your base supply officer is charged with the responsibility of ordering and securing quantities of the technical orders in accordance with your requirements—check with him. Of course, each base must develop a system of feeding these books and related data to their flight crew members so that no one will be using an obsolete book.

One more thing—it takes a certain amount of time to revise the Flight Handbook. Since the time lag is excessive for safety of flight information a new program has been put into effect to get such information to you in a hurry. This is done by means of safety of flight supplements which use the same number as your Flight Handbook except for the addition of a suffix letter. Supplements covering loss of life will get to you in 48 hours; those concerning serious damage to equipment will be delivered in 6 days. And what do you have to do to get these supplements? Absolutely nothing—if you have ordered your Flight Handbook on the Publications Requirements Table, you will automatically receive all supplements pertaining to your aircraft.

Your comments and questions regarding any phase of the Flight Handbook program are invited and should be directed to the Wright Air Development Center, Attention: WCOSF-3.

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This handbook is divided into 5 sections and an appendix as follows:

**SECTION I, DESCRIPTION.**

The function of this section is to describe the airplane, its equipment, systems, and controls which are essential to flight. All emergency equipment which is not part of the auxiliary equipment and all miscellaneous equipment is also covered in this section.

**SECTION II, NORMAL OPERATING INSTRUCTIONS.**

This section contains the steps of procedure to be accomplished from the time the airplane is approached by flight crew until it is left parked on the ramp after accomplishing one complete non-combat mission in good weather.

**SECTION III, EMERGENCY OPERATING INSTRUCTIONS.**

This section clearly and concisely describes the procedure to be followed in meeting any emergency that could be reasonably expected to be encountered.

**SECTION IV, OPERATIONAL EQUIPMENT.**

This section includes the description, normal operation and emergency operation of all equipment not directly contributing to flight but which enables the airplane to perform certain specialized functions.

**SECTION V, EXTREME WEATHER OPERATION.**

This section contains operational notes and procedures to be followed under extreme weather conditions.

**APPENDIX I, FLIGHT OPERATING CHARTS.**

This section contains the necessary charts and instrument markings for making take-off, climb and landing speed calculations.

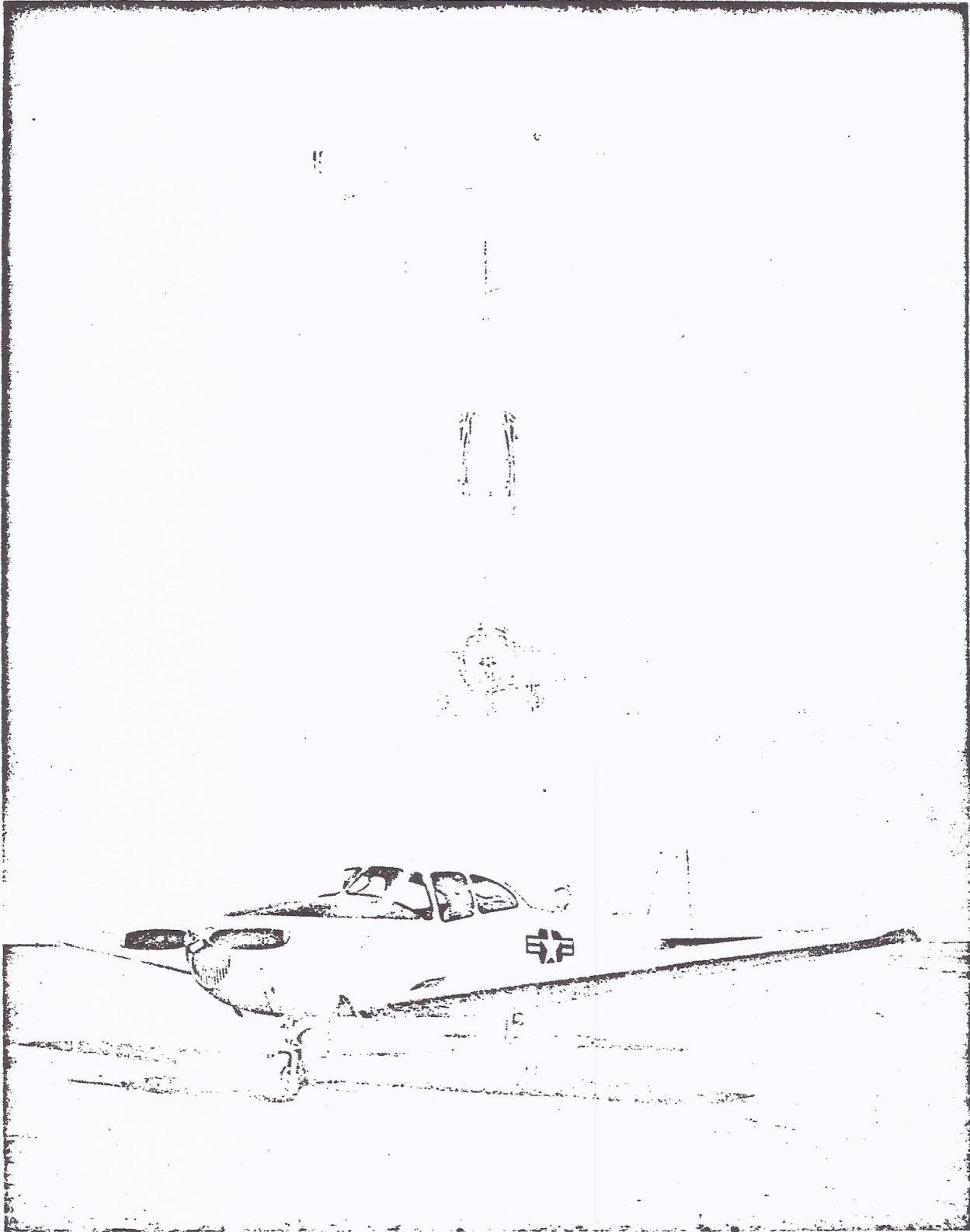


Figure 1-1 Airplane

## SECTION I DESCRIPTION

### 1-1. AIRPLANE.

1-2. **GENERAL.** The Ryan Aeronautical Co. L-17 is a four-passenger, single-engine, all-metal, low-wing airplane. It has hydraulically retractable tricycle landing gear, flaps and conventional controls. The power plant is a Continental 0-470-7 engine, equipped with an injection type carburetor and a Hartzell controllable pitch propeller. The airplane is designed to accomplish liaison functions including reconnaissance, personnel and light cargo carrying, column control, camouflage checking and courier service. There are three models of this airplane, which in this book are designated as L-17A, L-17B and L-17C. The manual is basically written about the L-17A airplane. Material concerning the L-17B and L-17C airplanes only, is designated as such in the text. L-17C airplanes are L-17A airplanes that have been modified to provide a 21-gallon auxiliary fuel tank; a 35 amp generator in lieu of a 25 amp generator; an Aircraft Radio Corporation, Type 12, radio set instead of the Ranger Radio Receiver and Transmitter; a venturi vacuum system; vacuum-driven turn-and-bank indicator instrument, artificial horizon, and directional gyro; auxiliary tank fuel gage; an external power receptacle aft of the wing trailing edge on the left side of the fuselage; an additional neutral position in the flap control; a flap position indicator stripe; Hayes-Goodrich expander tube type brakes in place of Firestone brakes; an electrically actuated starter system instead of the manual engaging system; and the power plant is rated at 205 bhp at 2600 rpm (take-off) instead of 185 bhp at 2300 rpm. The L-17B airplane incorporates all of the above changes, plus the incorporation of both fuel quantity indicating systems into one gage, with two calibration scales and a selector switch. To determine the model of any specific airplane, check the serial number against the following chart.

L-17A Airplanes. All airplanes USAF Serial Nos. 47-1297 through 47-1379, not hereunder designated as L-17C airplanes.

L-17B Airplanes. USAF 48-921 through USAF 48-1078.

L-17C Airplanes. This information to be furnished when available.

### 1-3. AIRPLANE SIZE.

Wing Span—33 feet, 4-9/16 inches.  
Fuselage Length—27 feet, 3 inches.  
Height (to top of fin)—8 feet, 6-5/16 inches.

### 1-4. GROSS WEIGHT.

1-5. The normal gross weight of the airplane varies from approximately 2350 pounds to 2750 pounds.

### 1-6. SPECIAL FEATURES.

1-7. Steerable nose wheel, hydraulically actuated landing gear and wing flaps, and variable-pitch propeller are features uncommon to this type airplane.

### 1-8. FLIGHT CONTROLS.

1-9. Conventional, dual, side-by-side controls are provided. When desired, the control wheel and rudder pedals on the right side are removable on the ground. A surface control lock is stowed beneath the forward edge of the pilot's seat. (See Figure 1-4.) When installed, the lock engages a lug on the left longeron (Figure 1-2, Reference 38) and is attached to the left control wheel.

### 1-10. RUDDER-AILERON COORDINATING SYSTEM.

1-11. While the flight control system is entirely conventional, a rudder-aileron coordinating system is included to impart added lateral stability to the airplane during certain maneuvers. Connection between the two controls is such that when force is applied to rudder pedals, a limited movement of ailerons is automatically accomplished. Normal coordinated movement of flight controls is still required. Effect of the system will be noticed only in balance of control forces and improved aileron control "feel" particularly at low airspeeds.

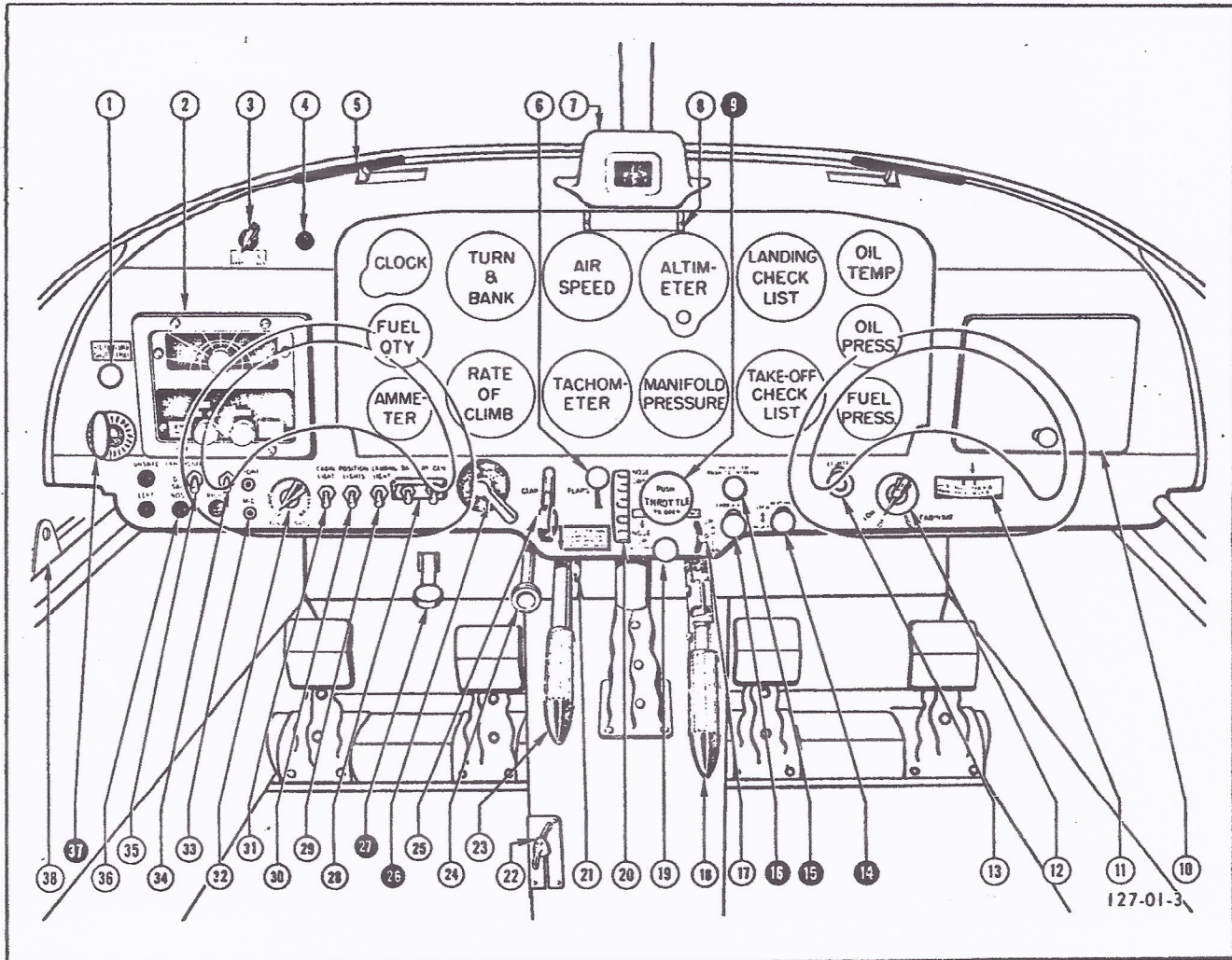
### 1-12. TRIM TABS.

1-13. Trim tabs, installed in the trailing edge of each elevator, are controlled in flight by an elevator trim wheel at center of control panel. (See Figure 1-2, Reference 20.) Condition of elevator trim is shown by an indicator located to the right of the trim wheel. (See Figure 1-2, Reference 17.) Fixed trim tabs, adjustable on ground only, are installed on the rudder and right aileron.

### 1-14. WING FLAPS.

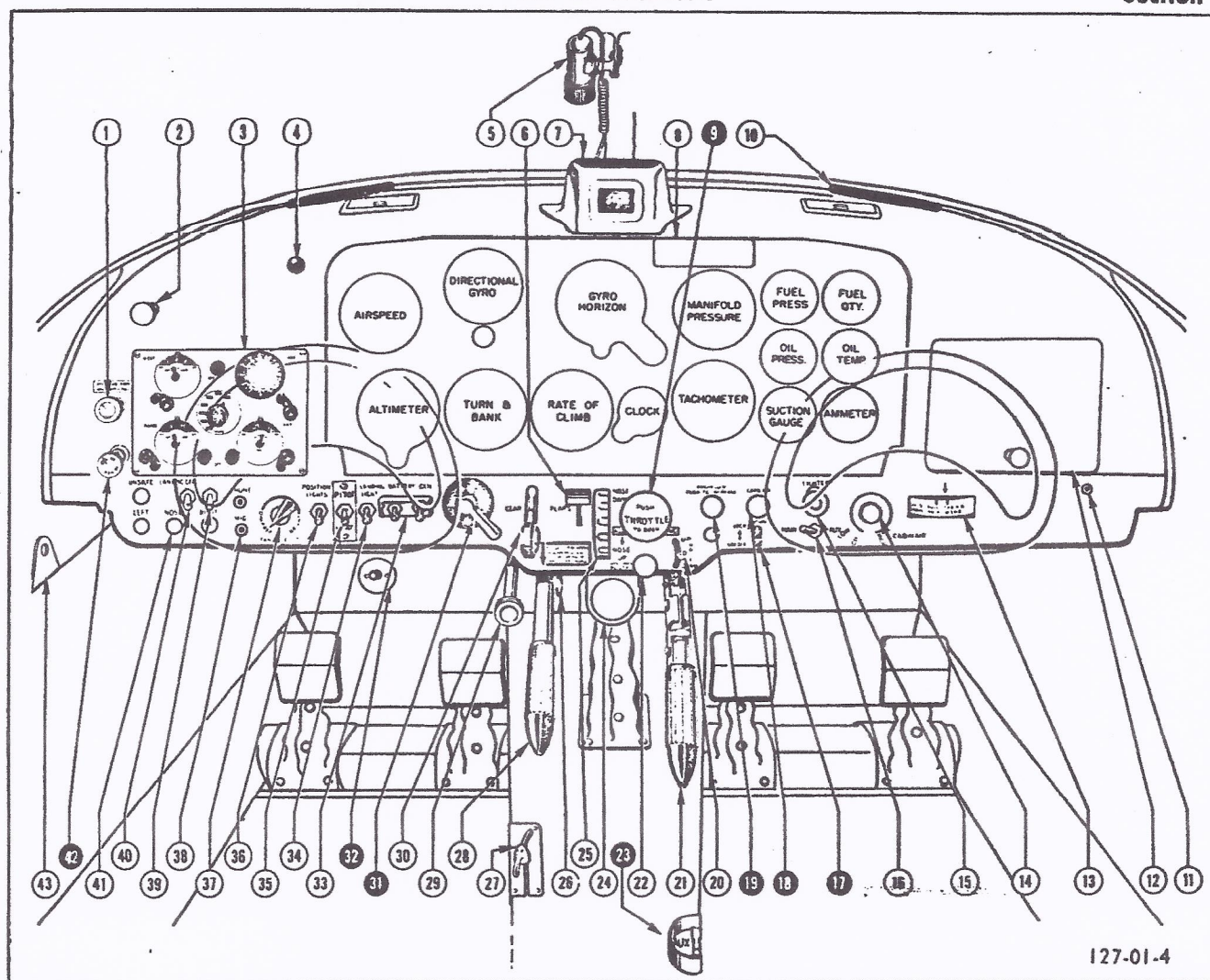
1-15. Hydraulically actuated flaps are controlled by a lever located at the center of the control panel. (See Figure 1-2, Reference 6.) The flaps have two positions, "UP" and full "DOWN." Flap position can be visually checked from the cabin. The hydraulic power control (paragraph 1-50) must be on before movement of flap control effects movement of the flaps. Should normal operation fail, flaps can be raised or lowered by leaving hydraulic power control on, placing flap control in desired position, and supplying hydraulic pressure with the hand-pump. On L-17B





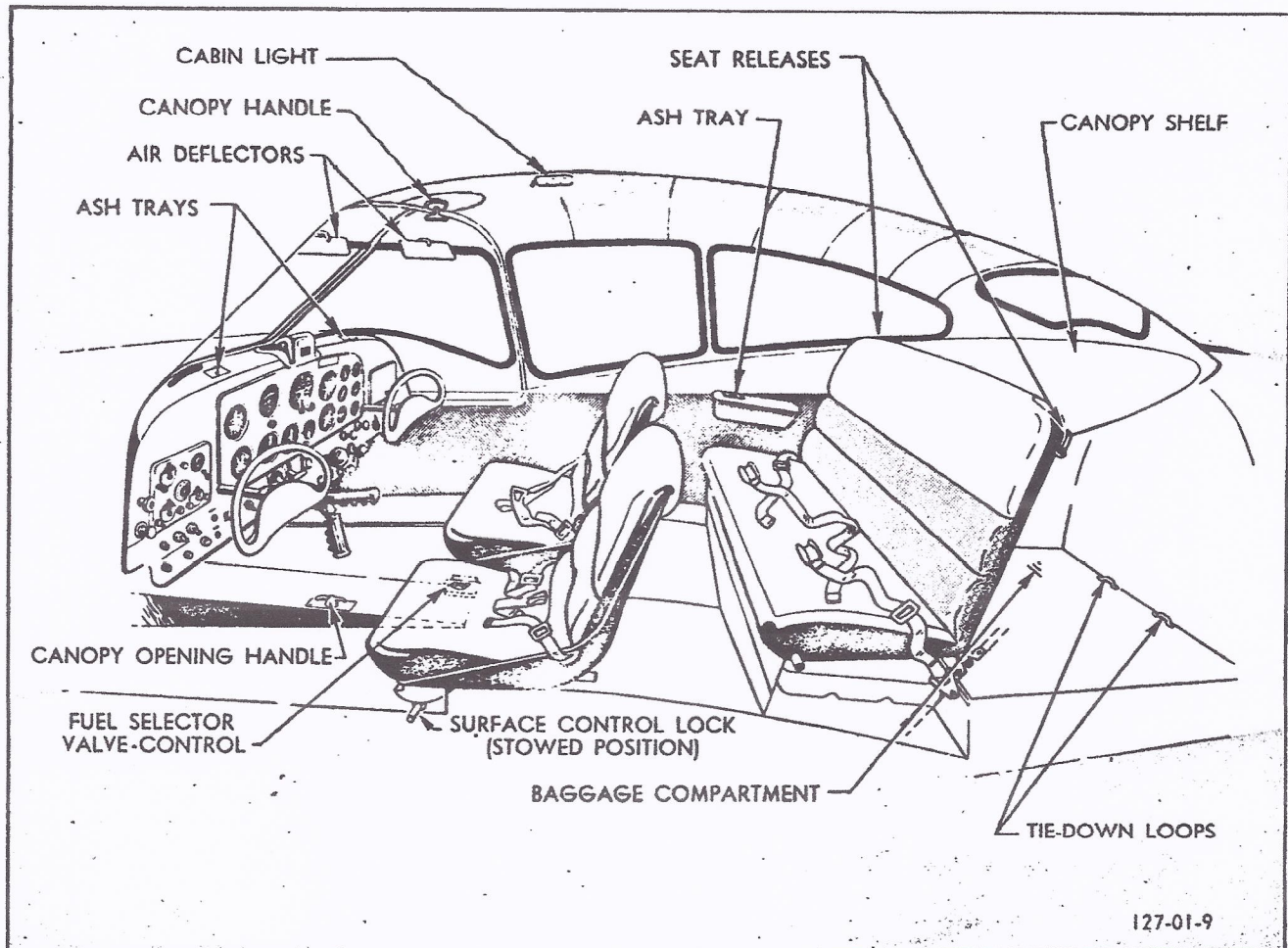
- |  |  |
|--|--|
| 1. HYDRAULIC FLUID EMERG. SHUT-OFF CONTROL | 20. ELEVATOR TRIM CONTROL                        |
| 2. RADIO RECEIVER                          | 21. LANDING GEAR CONTROL LOCKING LEVER           |
| 3. TRANSMITTER FREQUENCY SELECTOR          | 22. CANOPY ASSIST HANDLE                         |
| 4. HYDRAULIC POWER LIGHT                   | 23. HYDRAULIC HAND PUMP                          |
| 5. VENTILATING AIR OUTLET                  | 24. EMERG. LANDING GEAR RELEASE                  |
| 6. FLAP CONTROL                            | 25. LANDING GEAR CONTROL                         |
| 7. MAGNETIC COMPASS                        | 26. IGNITION SWITCH                              |
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| 11. CABIN AIR DISTRIBUTING CONTROL         | 30. POSITION LIGHT SWITCH                        |
| 12. CABIN HEATER CONTROL                   | 31. CABIN LIGHT SWITCH                           |
| 13. CIGARETTE LIGHTER                      | 32. PANEL LIGHT SWITCH                           |
| 14. MIXTURE CONTROL                        | 33. RADIO JACKS                                  |
| 15. PROPELLER CONTROL                      | 34. ELECTRICAL FUEL PUMP SWITCH (MODIFIED L-17A) |
| 16. CARBURETOR HEAT CONTROL                | 35. INDICATOR LIGHTS DIMMER SWITCH               |
| 17. ELEVATOR TRIM INDICATOR                | 36. GEAR POSITION INDICATOR LIGHTS               |
| 18. BRAKE CONTROL                          | 37. PRIMER                                       |
| 19. HYDRAULIC POWER CONTROL                | 38. CONTROLS LOCK ENGAGING LUG                   |

Figure 1-2. Cabin — Forward View — L-17A Airplanes



- |  |   |
|--|---|
| 1. HYDRAULIC FLUID EMERG. SHUT-OFF CONTROL | 23. FUEL SYSTEM THREE-WAY VALVE                     |
| 2. OIL COOLER SHUTTER CONTROL              | 24. AUXILIARY TANK FUEL GAGE (L-17C AIRPLANES ONLY) |
| 3. RADIO CONTROL PANEL                     | 25. ELEVATOR TRIM CONTROL                           |
| 4. HYDRAULIC POWER LIGHT                   | 26. LANDING GEAR CONTROL LOCKING LEVER              |
| 5. COCKPIT UTILITY LIGHT                   | 27. CANOPY ASSIST HANDLE                            |
| 6. FLAP CONTROL                            | 28. HYDRAULIC HAND PUMP                             |
| 7. MAGNETIC COMPASS                        | 29. EMERG. LANDING GEAR RELEASE                     |
| 8. COMPASS CORRECTION CARD                 | 30. LANDING GEAR CONTROL                            |
| 9. THROTTLE                                | 31. IGNITION SWITCH                                 |
| 10. VENTILATING AIR OUTLET                 | 32. STARTER BUTTON                                  |
| 11. RADIO EARPHONE JACK                    | 33. BATTERY AND GENERATOR SWITCHES                  |
| 12. GLOVE COMPARTMENT                      | 34. LANDING LIGHT SWITCH                            |
| 13. CABIN AIR DISTRIBUTING CONTROL         | 35. PITOT HEAT SWITCH                               |
| 14. CABIN HEATER CONTROL                   | 36. POSITION LIGHT SWITCH                           |
| 15. CIGARETTE LIGHTER                      | 37. PANEL LIGHT SWITCH                              |
| 16. FUEL QTY. GAGE SELECTOR SWITCH         | 38. RADIO JACKS                                     |
| 17. MIXTURE CONTROL                        | 39. ELECTRIC FUEL PUMP SWITCH                       |
| 18. CARBURETOR HEAT CONTROL                | 40. INDICATOR LIGHTS DIMMER SWITCH                  |
| 19. PROPELLER CONTROL                      | 41. GEAR POSITION INDICATOR LIGHTS                  |
| 20. ELEVATOR TRIM INDICATOR                | 42. PRIMER  |
| 21. BRAKE CONTROL                          | 43. CONTROLS LOCK ENGAGING LUG                      |
| 22. HYDRAULIC POWER CONTROL                |   |

Figure 1-3 Cabin - Forward View - L-17B and L-17C Airplanes



127-01-9

Figure 1-4. Cabin Interior

and L-17C airplanes, the flap control valve has been remodeled to allow the flaps to be stopped at any desired position, by returning the valve control to neutral. A stripe painted on the upper surface of the left flap indicates when the flaps are at the desired take-off position ( $\frac{1}{2}$  flap). The flaps are at the desired take-off angle when this indicating stripe lines up with the wing trailing edge, as seen from the pilot's position.

#### 1-16. POWER PLANT CONTROLS.

#### 1-17. THROTTLE.

1-18. A conventional, push-to-open throttle, located at the center of the control panel (Figure 1-2, Reference 9), is accessible from either front seat. Clockwise rotation of an adjusting nut on the control shaft increases throttle friction. A microswitch in the throttle control system actuates a landing gear warning horn when throttle is retarded and gear is not down and locked.

#### 1-19. PROPELLER CONTROL.

1-20. The propeller control is located to the right of the throttle. (See Figure 1-2, Reference 15.) When the control is pushed in against the panel, the propeller is set at full increase rpm; when the control is pulled out to the extreme aft position, the propeller is at full decrease rpm. Setting the control at any point between these two positions selects the desired intermediate engine speed. A friction adjusting nut is provided on the control shaft.

#### 1-21. MIXTURE CONTROL.

1-22. Fuel-air mixture is determined by manual setting of a push knob located below and right of the propeller control on the panel. (See Figure 1-2, Reference 14.) The control is released for adjustment by turning the knob clockwise. When control is pushed to its most forward position, mixture is full rich. Pulling control out causes a progressive leaning of mixture; full out is idle cut-off.

**WARNING**

To avoid reaching idle cut-off position inadvertently during flight, mixture control should never be extended more than one inch.

**1-23. CARBURETOR AIR.**

1-24. A carburetor heat control, located below and right of the throttle (Figure 1-2, Reference 16), provides selection of either hot or cold induction air (filtered ram air.) When control is in full forward position, cold air is selected. Pulling control to full aft position selects hot air. Normally heat is not required because the airplane is equipped with a pressure-type carburetor not subject to icing; however, when low outside air temperatures are encountered, heat may be used as necessary to maintain mixture temperature in range required for smooth engine operation. Under extreme conditions, if carburetor air filter should be obstructed by ice (indicated by an unaccountable drop in rpm and manifold pressure), selection of carburetor heat provides an alternate source of air.

**CAUTION**

Carburetor heat control should be set only in full on or full off positions. An intermediate position should not be used.

**1-25. PRIMER.**

1-26. The primer pump plunger handle is located at the extreme left side of the control panel. (See Figure 1-2, Reference 37.)

**1-27. STARTER.**

1-28. On L-17B and L-17C airplanes a foot-operated starter button, mounted forward and above pilot's rudder pedals (Figure 1-3, Reference 27), actuates a direct-cranking electric solenoid engaging starter. On L-17A airplanes the starter is engaged by a foot-operated pedal.

**1-29. IGNITION.**

1-30. A conventional ignition switch is located on the left side of the control panel. (See Figure 1-2, Reference 26.)

**1-31. OIL COOLER SHUTTER.**

1-32. A push-pull knob located above the radio panel provides control over the amount of air flowing through the oil cooler. The oil cooler shutter is full open when the knob is in. Move knob to left, to disengage lock, before moving knob either in or out.

**1-33. FUEL SYSTEM.**

1-34. L-17A FUEL SYSTEM. Two fuel tanks, holding approximately 20 gallons each, are installed in the wing, one in each wing panel. (See Figure 1-5.) An accumulator sump tank, mounted between the two tanks and inter-connected with each has a capacity of approximately 1/2 gallon. Fuel from both main tanks is gravity fed into the accumulator sump tank, which ensures an adequate supply of fuel to the engine during all flight maneuvers. From the accumulator tank, fuel is passed through a filter and a shut-off control valve to the two engine-driven pumps; which supply fuel to the carburetor. The output of either pump is sufficient (in case of failure of one) for normal engine operation.

1-35. L-17A MODIFIED AND L-17B FUEL SYSTEMS. On the modified L-17A airplane and the L-17B airplane, the fuel system of the L-17A airplane has been modified as follows (Figure 1-6). The two engine-driven variable displacement pumps have been replaced by a single nonpulsating engine-driven pump and an electric-driven pump. Fuel is normally supplied to the carburetor by the engine-driven pump. The electric pump (Figure 1-3, Reference 39) is used as an auxiliary pump for take-off and landings; or in the event of failure or malfunctioning of the engine-driven pump. Either pump has sufficient output to support normal engine operation. The L-17B modification also incorporates an auxiliary fuel tank and sump tank which are installed beneath the rear seat. The shut-off control valve has been removed, and a three-way valve (Figure 1-3, Reference 23) has been installed. The fuel gage has been replaced by an indicating gage which incorporates two calibration scales and a selector switch (Figure 1-3, Reference 16).

1-36. L-17C Fuel System. The fuel system of the L-17C airplanes is similar in all respects to that of the L-17B airplanes, with the exception of the fuel quantity indicating system. The single double-scale gage of the L-17B airplanes is replaced by two gages on the L-17C airplanes.

1-37. FUEL SPECIFICATION AND GRADE. The fuel used in this aircraft must conform to Specification MIL-F-5572, Grade 80 (recommended) U. S. Army Specification 2-103, Grade 80 (alternate).

**1-38. FUEL SYSTEM CONTROLS.**

1-39. FUEL SHUT-OFF CONTROL VALVE. On L-17A airplanes an emergency fuel shut-off control valve, located forward of the accumulator tank, is operated by a fuel selector valve-control on the center aisle adjacent to the right seat. (See Figure 1-4.) The valve is normally left open but can be positioned to shut off the fuel supply at the firewall in an emergency.

1-40. THREE-WAY FUEL CONTROL VALVE. On L-17C and L-17B airplanes a three-way fuel control

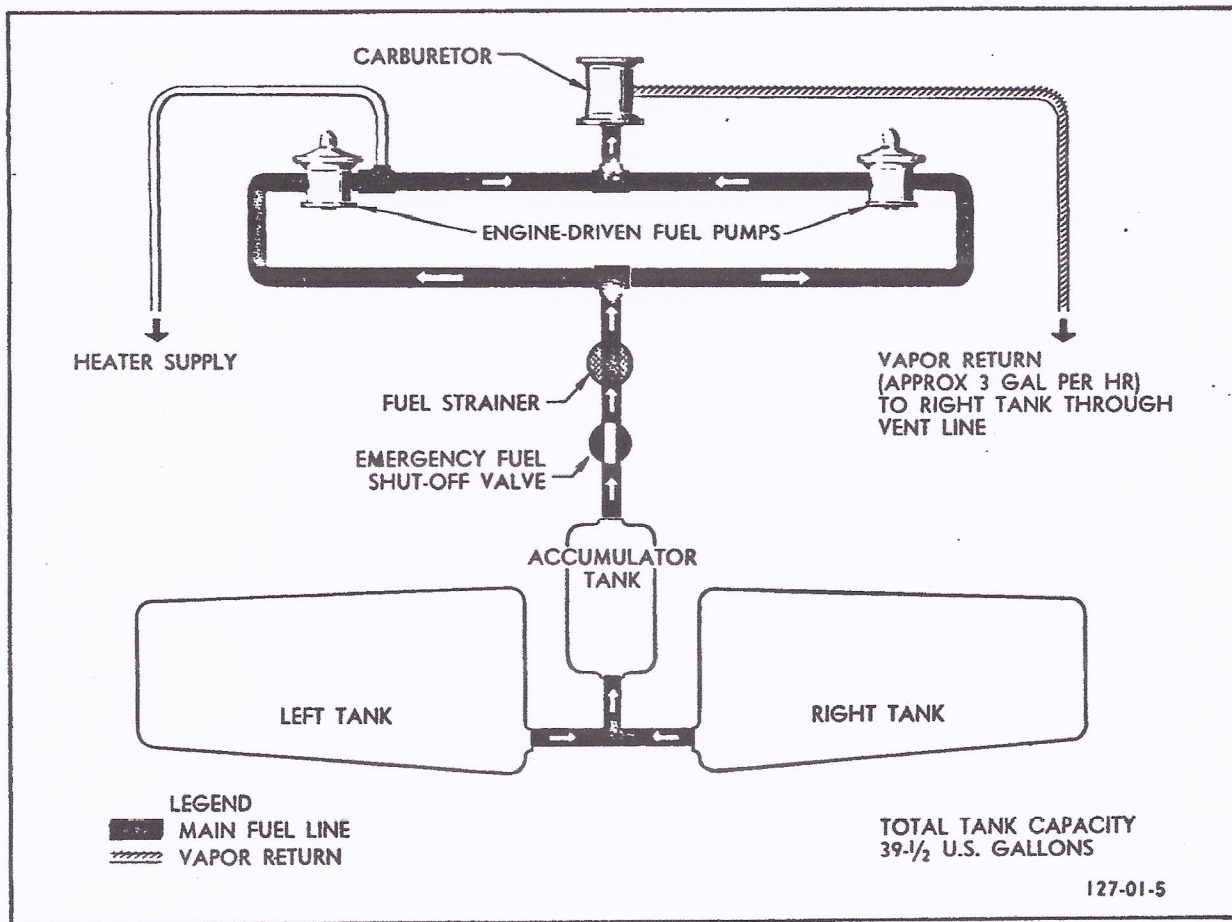


Figure 1-5. Fuel System, L-17A Airplane

valve is located on the floor of the main fuselage compartment, immediately forward and to the right of the pilot's seat. This valve is used to permit fuel flow from either the wing or auxiliary tanks to the fuel pumps, or may be used to stop all fuel flow.

**CAUTION**

Do not operate the airplane from the auxiliary fuel tank until the airplane has flown at least one (1) hour or used a minimum of ten (10) gallons of fuel. Use of auxiliary tank fuel, when the main tanks are full, will result in vapor return fuel flowing overboard through the vent lines, as this fluid normally flows into the main tanks.

1-41. ELECTRIC FUEL PUMP SWITCH. (See Figure 1-3, Reference 39.) This switch is used to turn the electric fuel pump "ON" or "OFF" as necessary.

1-42. FUEL GAGE SELECTOR SWITCH. (See Figure 1-3, Reference 16.) On L-17B airplanes this switch is used to control the fuel indicator gage system. Use of this switch allows determination of the fuel remaining in either the wing tanks or the auxiliary tank. A lapse of one minute should be allowed between use of the fuel gage selector switch and reading the fuel quantity on the gage.

1-43. FUEL QUANTITY GAGES. Three fuel quantity gage variations will be found on these airplanes.

1-44. L-17A FUEL QUANTITY GAGE. A fuel quantity gage (Figure 1-2) indicates the total fuel in both main fuel tanks up to 30 gallons. As the total capacity of the main fuel tanks is 39½ gallons, the gage will show a drop in fuel quantity only after approximately 9½ gallons of fuel have been consumed.

1-45. L-17B FUEL QUANTITY GAGE. On L-17B airplanes the fuel gage (Figure 1-3) may be used to indicate the amount of fuel in either the wing tanks or the auxiliary tank. To change the gage indication use the switch (Figure 1-3, Reference 16) located on

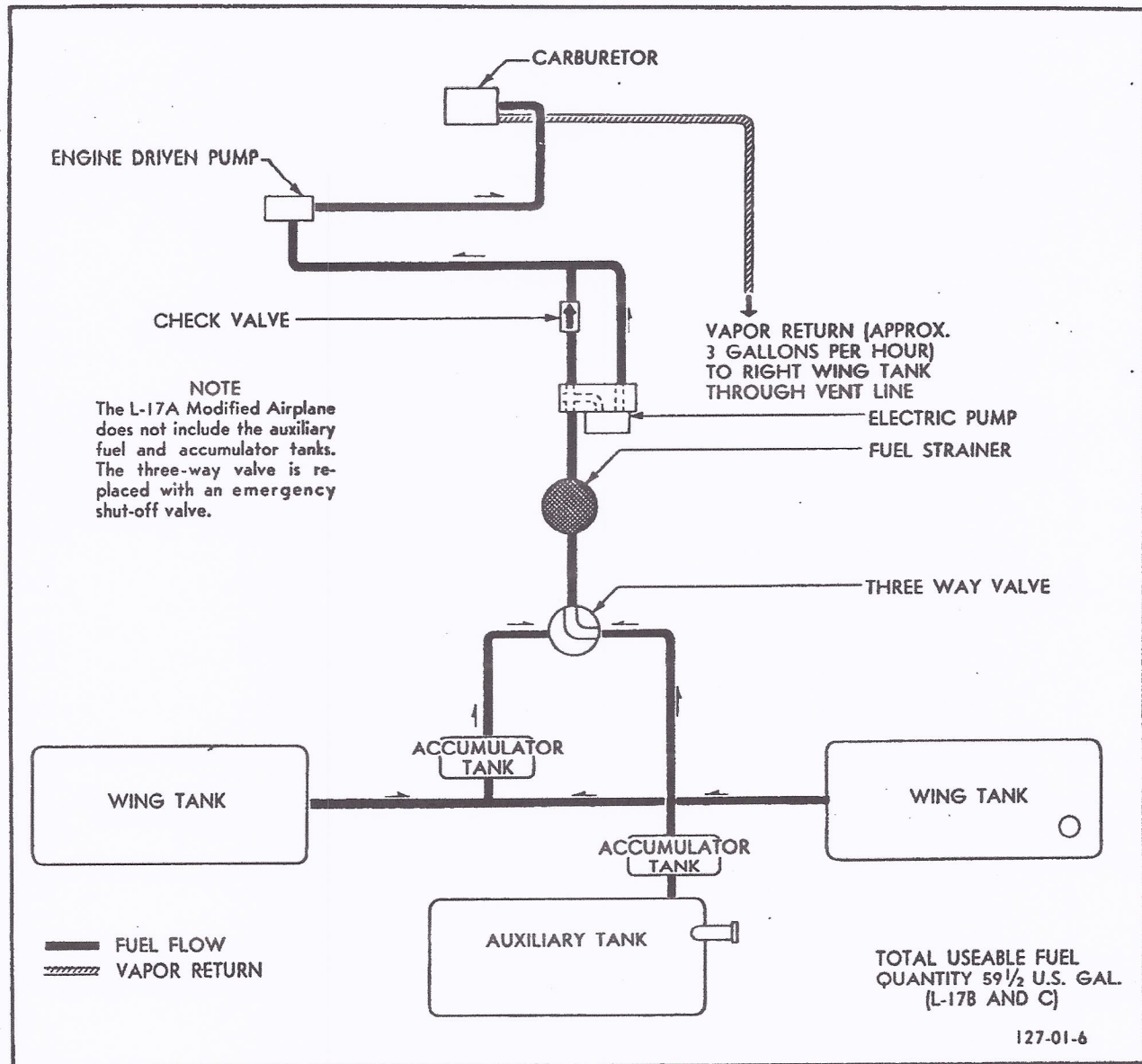


Figure 1-6. Fuel System L-17A Modified, L-17B and L-17C Airplanes.

the instrument panel. This gage is accurate for either the wing tanks or the auxiliary tank.

**NOTE**

After activating the fuel quantity gage selector switch, allow a one-minute stabilization period to elapse before reading the gage.

1-46. L-17 FUEL QUANTITY GAGES. L-17C airplanes are equipped with two fuel quantity gages; one for the auxiliary fuel tank and one for the wing tanks.

(See Figure 1-3.) The wing tank gage is similar to the gage in the L-17A airplanes. The auxiliary fuel tank gage is accurate for the full capacity of the tank, 21 gallons.

**1-47. HYDRAULIC SYSTEM.**

1-48. Power for operation of landing gear and flaps is provided by the hydraulic system. (See Figure 1-7.) Pressure, supplied to the system by an engine-driven pump, is manually controlled from the cabin by a push-pull hydraulic power control. When the control is pushed in to the off position, a relief valve in the system is opened to by-pass pump output back to a reservoir, thereby relieving the complete hydraulic

## Paragraphs 1-49 to 1-65

system of operating under constant pressure. When the control is pulled out to the on position, the relief valve is closed and pressure is directed to a master selector valve for gear and flap operation. Hydraulic fluid for operation of wheel brakes is supplied to a master brake cylinder directly from the reservoir.

**1-49. HYDRAULIC SYSTEM CONTROLS.**

**1-50. HYDRAULIC POWER CONTROL.** The hydraulic power control is located below the throttle. (See Figure 1-2, Reference 19.) This control must be on (pulled out from panel) before either gear or flaps can be operated by movement of their respective controls. To preclude the possibility of the nose gear collapsing, the hydraulic power control should be on during all ground operations. When flaps and gear have reached the desired position after take-off, the hydraulic power control should be pushed to off. When the power control is pulled on, an amber light at the upper left side of the control panel (Figure 1-2, Reference 4) illuminates, reminding pilot to push the control off after desired operation is completed.

**1-51. HYDRAULIC HAND-PUMP.** A hydraulic hand pump, mounted centrally below the control panel (Figure 1-2, Reference 23) supplies pressure through the master selector valve for ground check and emergency operation of gear and flaps. When hand-pump is used, the hydraulic power control must be on, as it is for normal operation; otherwise, pressure produced will be relieved back to the reservoir.

**1-52. HYDRAULIC FLUID EMERGENCY SHUT-OFF CONTROL.** A hydraulic fluid emergency shut-off control is located at the left side of the control panel. (See Figure 1-2, Reference 1.) Pulling the control out will immediately cut off the supply of hydraulic fluid to the system in case of engine fire.

**1-53. LANDING GEAR.****1-54. LANDING GEAR CONTROL HANDLE.**

**1-55.** The hydraulically operated, tricycle landing gear is controlled by a handle mounted at the center of the control panel. (See Figure 1-2, Reference 25.) The hydraulic power control must be on before movement of the gear control handle is effective. To prevent inadvertent gear retraction, the control is held at "DOWN" by a lock which is released by a lever located below and right of the control handle. (See Figure 1-2, Reference 21.) In order to raise the gear, the locking lever must be pushed to the left and held while the gear control is pulled out, raised to "UP", and pushed in. When the control is moved to "DOWN", the lock engages automatically.

**1-56. EMERGENCY LANDING GEAR RELEASE.**

**1-57.** An emergency landing gear release is located below the control handle. (See Figure 1-2, Reference

24.) If gear fails to lower normally, pushing the emergency release (gear control handle at "DOWN", hydraulic power control "ON") will free the gear from the up-locks and force it to the down and locked position.

**1-58. GEAR POSITION INDICATORS.**

**1-59.** Gear position indicator lights are at the extreme left side of the control panel. (See Figure 1-2, Reference 36.) Three green lights (one for each gear) and a single red light (connected to all three gears) give a constant visual indication of gear position. Each green light illuminates when its respective gear is down and locked. The red light illuminates when the gear is in any position other than down and locked or up and locked. Brilliance of the green lights is controlled by a toggle switch located above them. (The switch also controls brightness of the hydraulic power light.) Additional indication of unsafe gear condition is provided by a warning horn which sounds when throttle is retarded to idling position, and gear is not down and locked for landing.

**1-60. NOSE WHEEL STEERING.**

**1-61.** A steering mechanism on the nose wheel is directly connected to the rudder pedals. Through this mechanism, turning the airplane to right or left is accomplished by pressure on the related rudder pedal. Full pedal depression turns the nose wheel approximately 20 degrees left or right of center. When pedal pressure is released, the wheel is aligned by castering.

**1-62. WHEEL BRAKES.**

**1-63.** Hydraulic brakes on the two main wheels are controlled by a hand lever mounted below the control panel (Figure 1-2, Reference 18) within reach from either front seat. The brakes operate simultaneously, equal force being applied to the two as the control is pulled aft. They are locked for parking by pulling the same control to its extreme aft position and depressing the thumb trigger on the upper surface of the lever. They are released by pulling aft on the lever until the trigger disengages.

**1-64. ELECTRICAL SYSTEM.**

**1-65.** The 12-volt, direct current electrical system is supplied with power by an engine-driven generator of 15-volt 25 ampere capacity (35 ampere capacity on L-17B and L-17C airplanes). A combined voltage regulator and reverse-current relay is provided with the generator. A 12 volt, 34 ampere-hour storage battery serves as a stand-by and supplies power to electrically operated units when the generator is not operating. An ammeter is installed on the instrument panel. (See Figures 1-2 and 1-3.) On L-17B and L-17C airplanes, an external power receptacle is installed on the left side of the fuselage aft of the wing trailing edge. (See Figure 1-8.)

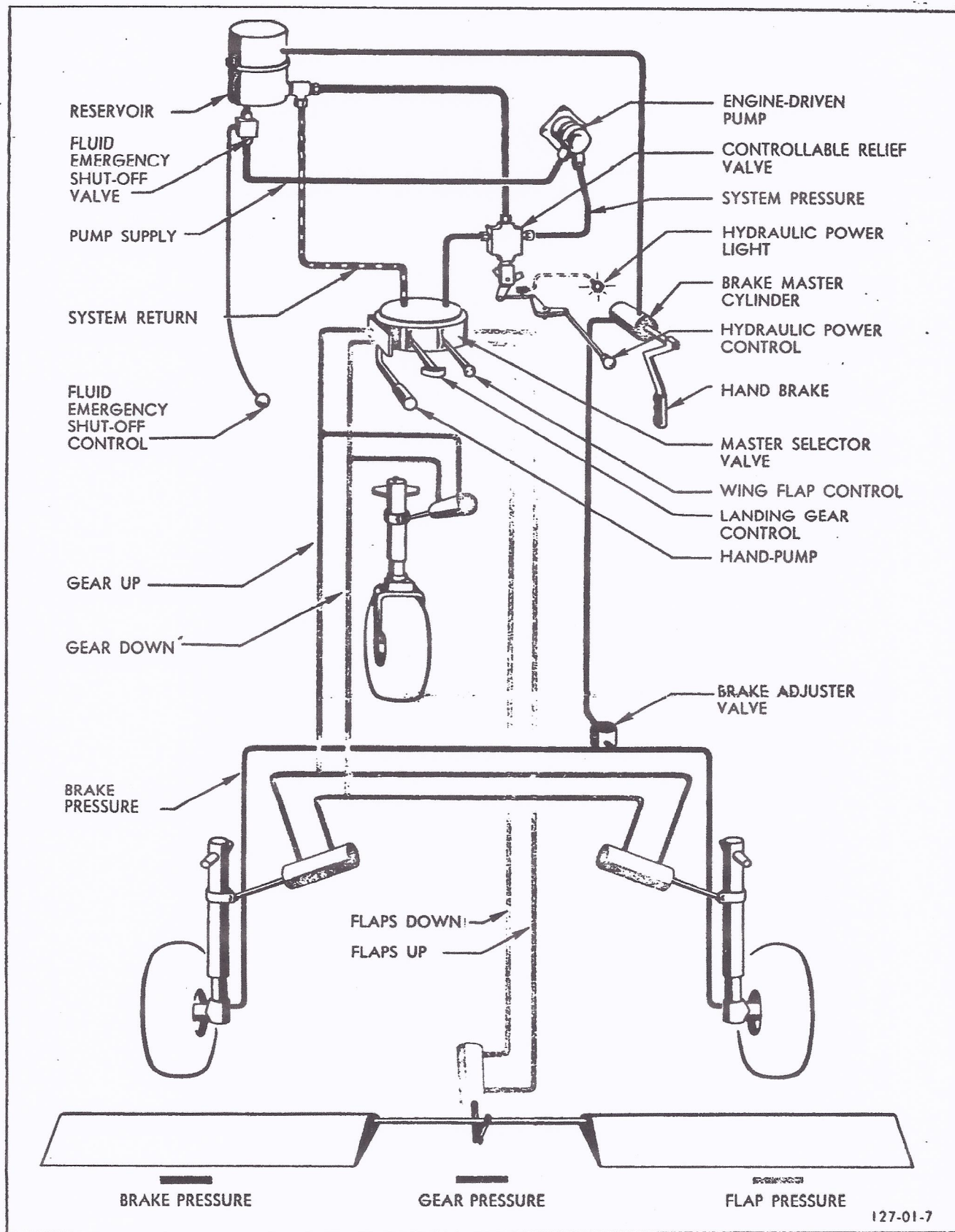


Figure 1-7. Hydraulic System.



## Section I

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### Paragraphs 1-66 to 1-81

#### 1-66. ELECTRICALLY OPERATED EQUIPMENT.

1-67. The system supplies power for operation of the following equipment: starter, lights, instruments, fuel quantity transmitter, fuel pump, cigarette lighter, radio, cockpit heater, and flares when installed.

#### 1-68. ELECTRICAL SYSTEM CONTROLS.

1-69. BATTERY AND GENERATOR. Battery and generator switches are located at left side of control panel. (See Figure 1-2, Reference 28.) A bar, installed across the two switches, is provided to turn them off simultaneously, but they may also be operated individually.

1-70. CIRCUIT BREAKERS. All electrical circuits (except the starter) are protected by push-to-reset circuit breakers and fuses located on a panel hinged to the lower edge of the left side of the control panel (in line with ignition switch). (See Figure 1-7.) The cigarette lighter is equipped with a special replaceable fuse located on the back of the lighter assembly.

#### 1-71. MISCELLANEOUS CONTROLS & EQUIPMENT.

##### 1-72. CANOPY.

1-73. An external canopy handle (located at forward edge of sliding portion of cabin enclosure) contains a key hole for locking the canopy from outside. Rotating handle clockwise releases a latch and permits canopy to be opened. As long as handle is held in the unlock position, the canopy may be moved freely along the enclosure sill. Releasing the handle permits canopy to lock in one of two open positions where pins snap into detents in the sill. A similar handle (Figure 1-3) inside the cabin permits identical operation from within. A canopy assist handle, located on cabin floor forward and right of pilot's seat (Figure 1-2, Reference 22), is provided for opening canopy in flight.

Pulling this handle, after first unlocking canopy, slides canopy back to the first detent stop. From that position, canopy may be manually moved to full open. On L-17A modified, L-17B, and L-17C airplanes, pulling the canopy assist handle will move the canopy to the full open position.

##### 1-74. SEATS.

1-75. A lock handle on the inboard side of each front seat releases the seats for fore and aft adjustment. Either a seat or backtype parachute may be used in front seats when cushions are removed. Two hooks, securing back cushion to backrest, are released when cushion is lifted. Unscrewing two wing nuts, at front of seat frame, permits seat cushions to be lifted out.

##### 1-76. BAGGAGE COMPARTMENT.

1-77. The baggage compartment behind the rear seat (Figure 1-4) is accessible on ground or in flight. Trip levers on aft side of backrest releases backrest, permitting it to fold forward. Tie-down rings and straps are provided in the compartment for holding baggage in place.

#### CAUTION

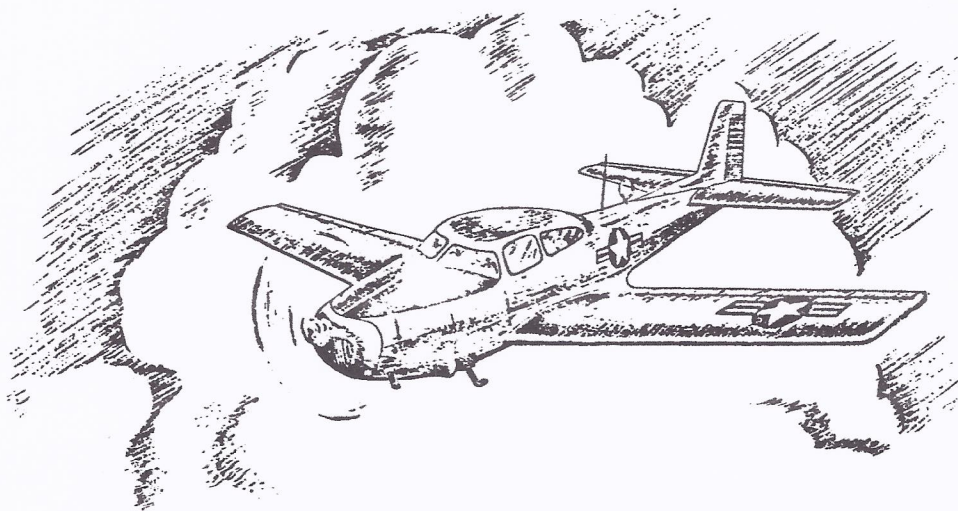
Baggage must be securely tied down at all times.

##### 1-78. FLARES.

1-79. Provision is made for the installation of three parachute flares at the upper left forward end of the fuselage tail cone.

##### 1-80. OPERATIONAL EQUIPMENT.

1-81. Information on communication equipment, heating and ventilating system, and lighting equipment is supplied in Section IV.



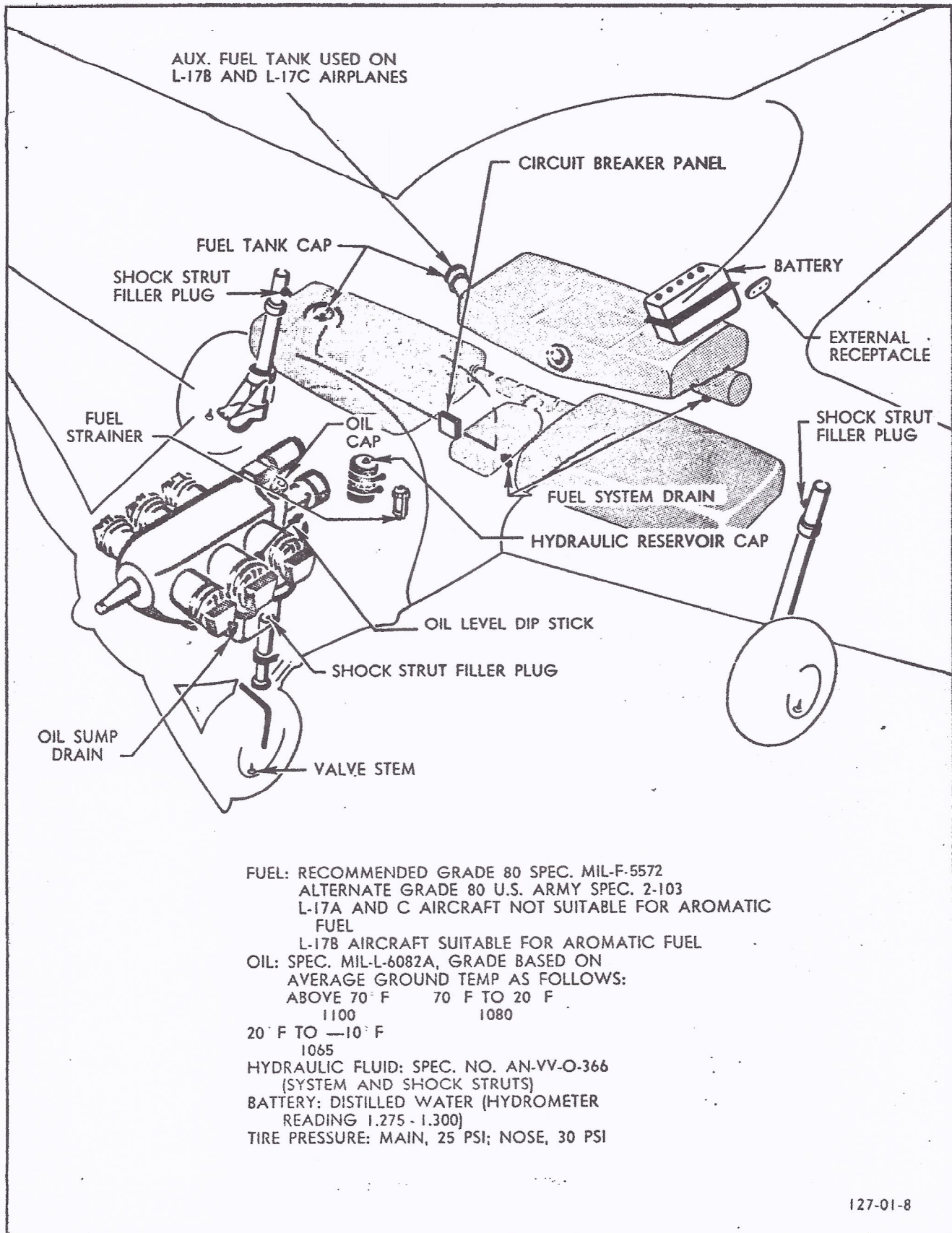


Figure 1-8. Servicing.



## SECTION II

### NORMAL OPERATING INSTRUCTIONS

#### 2-1. BEFORE ENTERING AIRPLANE.

#### 2-2. RESTRICTIONS.

a. Maximum permissible indicated airspeed varies linearly with gross weight from 190 mph at 2650 pounds to 161 mph at 3200 pounds.

b. Maximum permissible indicated airspeed for gear and flap lowering—100 mph.

c. Spins are prohibited.

d. When gross weight exceeds 2350 pounds, all acrobatics are prohibited. The most severe maneuver to be executed is a steep turn at maximum of 60 degrees bank.

e. The recommended maximum gross weight for these airplanes is 2750 pounds. At this weight the airplanes will make good a limit load factor of 3.80.

f. The maximum allowable gross weight for take-off is 3200 pounds. At this weight the airplanes will make good a limit load factor of 2.1.

g. When gross weight is below 2350 pounds, all acrobatics are prohibited except the following: Steep turns (up to 60° only), chandelles, lazy 8's, and stalls (except whip stalls).

h. Do not open canopy beyond *first* stop while in flight except in an emergency.

i. Do not enter or leave airplane while engine is running.

j. Design useful load with 59.5 gallons of fuel limits crew to three; pilot, co-pilot, and one passenger.

THESE LIMITATIONS AND RESTRICTIONS ARE SUBJECT TO CHANGE, AND LATEST SERVICE DIRECTIVES AND ORDERS MUST BE CONSULTED.

## Paragraphs 2-3 to 2-13

**2-3. TAKE-OFF AND GROSS WEIGHT.**

2-4. Check take-off and anticipated landing gross weight.

**2-5. EXTERIOR CHECK.**

- a. Check Form 1.
- b. Ignition—Check "OFF".
- c. Fuel, oil, and hydraulic fluid—make sure airplane has been properly serviced.
- d. Cowling and filler caps—make sure caps are on and cowling securely fastened.
- e. Carburetor air filter—inspect for clean lines and obstructions.
- f. Propeller—examine for security of installation, nicks, cracks, and oil leakage. Pull through three revolutions.
- g. Pitot tube—remove cover and make sure tube opening is clear.
- h. Landing gear—check oleo strut extension.
- i. Tires—examine for general condition and inflation.
- j. Nose gear steering linkage—check for tightness.
- k. Over-all exterior—inspect for obvious damage. Remove accumulations of dirt, dust, frost, snow, or ice.

**2-6. ENTRANCE TO AIRPLANE.**

2-7. Enter airplane from leading edge of left wing, using step and handhold provided. Unlock and slide back canopy.

**WARNING**

Do not enter or leave airplane while engine is running.

2-8. **MINIMUM CREW REQUIREMENT.** The minimum crew requirement for this aircraft is one pilot in the left seat.

**2-9. ON ENTERING AIRPLANE.****NOTE**

A pilot's check list is provided in the cabin.

**2-10. STANDARD CHECK FOR ALL FLIGHTS.**

- a. Cabin and baggage compartment—examine for loose objects.
- b. Brakes set.
- c. Seat adjusted.
- d. Flight controls unlocked. Check for free and proper movement, observing control surfaces for correct response.

**NOTE**

It may be noticed, while checking aileron movement, that control wheel returns to neutral when released. This condition is normal and is caused by spring connection between aileron and rudder systems. Rudder action is more easily checked while taxiing, because linkage for ground steering prevents free movement of pedals when airplane is not in motion.

- e. Oil cooler shutter control—"OPEN".
- f. Clock and altimeter set.
- g. Generator switch—check "ON".
- h. Battery switch "OFF" ("ON" for L-17A aircraft. "ON" for L-17B and C if external power is not used—this constitutes an emergency procedure).
- i. Landing gear handle "DOWN".
- j. Flap control—"UP".
- k. Hydraulic power control—On.
- l. Propeller control—full increase rpm.
- m. Carburetor heat control—"OFF".
- n. Mixture control—full rich (L-17A); idle cut-off (L-17A modified, L-17B and C).
- o. Fuel quantity checked. Emergency fuel shut-off on, and lock engaged. On L-17B and L-17C airplanes turn fuel three-way valve to "MAIN".
- p. Communications equipment—check operation.
- q. Heater switches—check off.
- r. Before any night flight—check all lighting equipment.
- s. Flashlight—check.

**2-11. FUEL SYSTEM MANAGEMENT.**

2-12. On L-17A airplanes no selection is necessary with the exception of the emergency fuel shut-off valve, which is normally left in the on position. On L-17B and L-17C airplanes use the three-way valve to determine whether fuel from the main wing tanks "MAIN" or auxiliary tank "AUX" is supplied to the fuel system.

**2-13. STARTING ENGINE, L-17A AIRPLANES.****CAUTION**

When wind conditions are strong and gusty, always head airplane into wind before engine starting or warm-up. A quartering tail wind is particularly hazardous, because it may lift one wing and gear enough to damage the propeller.

- a. Ignition switch—"OFF".
- b. Have ground personnel turn propeller to check for hydraulic lock.
- c. Propeller control full increase rpm.

**NOTE**

When operating at temperatures of 32°F or below, it is advisable to start and stop engine with propeller in decrease rpm (control full out).

- d. Throttle advance approximately ¼ inch.
- e. Mixture control full rich.
- f. Prime with 3 or 4 even strokes to fill the lines.
- g. Press starter pedal; then turn ignition switch to "BOTH".

**NOTE**

Always release starter control as soon as engine catches. If engine dies after initial start, do not re-engage starter until propeller stops rotating.

- h. Prime with slow even strokes while turning engine over until engine is running smoothly; set throttle to obtain 1200 rpm for engine warm-up.
- i. Check oil pressure; if not 10 psi in 30 seconds, stop engine and investigate.
- j. Continue warm-up at 1200 rpm until desired oil temperature is attained.
- k. Instruments—check for desired range.

**2-14. STARTING ENGINE, L-17A MODIFIED, L-17B AND L-17C AIRPLANES.**

- a. Ignition switches off.
- b. Have ground personnel turn propeller to check for hydraulic lock.
- c. Propeller control full increase rpm.

**NOTE**

When operating at temperatures of 32°F or below, it is advisable to start and stop engine with propeller in decrease rpm (control full out).

- d. Throttle advanced approximately ¼ inch.
- e. Mixture control at idle cut-off.
- f. Electric fuel pump "ON".
- g. Prime with three or four even strokes to fill lines.
- h. Press starter button; then turn ignition switch to "BOTH".

**NOTE**

Always release starter control as soon as engine catches. If engine dies after initial start, do not re-engage starter until propeller stops rotating.

- i. Prime with slow even strokes while engine is turning over until engine is running smoothly; set throttle to obtain 1200 rpm for engine warm-up.

j. Mixture control at full rich.

- k. Check oil pressure. If not 10 psi in 30 seconds, stop engine and investigate.

l. Battery switch on (L-17B and C).

m. External power disconnected (L-17B and C).

**2-15. STARTING—FLOODED ENGINE, L-17A AIRPLANES.**

If engine is flooded during attempt to start, turn ignition switch "OFF", pull mixture control to "IDLE CUT-OFF", and push throttle "FULL OPEN". Crank engine with starter until clear. Make subsequent start as follows:

a. Throttle ¼ inch open.

b. Mixture control full rich.

c. Press starter; then turn ignition switch to "BOTH".

d. Prime as required.

**2-16. STARTING — FLOODED ENGINE, L-17A MODIFIED, L-17B AND L-17C AIRPLANES.** If engine is flooded during an attempt to start, turn the ignition and electric fuel pump switches "OFF", pull mixture control to "IDLE CUT-OFF", and push throttle "FULL OPEN". Crank engine with starter until clear. Make subsequent start as follows:

a. Throttle ¼ inch open.

b. Mixture control "IDLE CUT-OFF".

c. Press starter; then turn ignition switch to "BOTH".

d. Electric fuel pump "ON".

e. After engine starts, move mixture control to full rich.

f. Prime as required.

**2-17. STARTING—HOT WEATHER.**

2-18. Starting difficulties sometimes experienced with a hot engine on a hot day are caused by vaporization of fuel standing in engine lines and pumps. Should this trouble be encountered, proceed as follows:

a. Throttle ½ inch open.

b. Operate primer until resistance at plunger handle shows primer is pumping fuel and not fuel vapor.

**NOTE**

On L-17A MODIFIED, L-17B and L-17C Aircraft turn the electric pump "ON" to fill fuel lines, if primer does not show resistance.

c. Then prime two full strokes before engaging starter.

## Paragraphs 2-19 to 2-25

2-19. WARM-UP. Before making any engine performance checks or before taxiing, warm up engine at 1200 rpm until desired oil temperature is reached. If necessary use oil cooler shutter to increase oil temperature.

2-20. GROUND TESTS. While engine is warming up make the following tests:

a. Carburetor heat system—Check operation by pulling control full out and noting drop in rpm with heat on. Push control off.

b. Fuel system—On the L-17B and C only, switch fuel selector from "MAIN" to "AUX" to check for proper feed and selector operation.

c. Hydraulic system—Hydraulic power control on. Check system by operating flaps, then turn hydraulic power control off.

d. Generator—Check ammeter to make sure generator cuts in for charging at 1600 rpm.

## 2-21. PREFLIGHT CHECK (BEFORE EACH FLIGHT).

a. Idle speed—With propeller at full "INCREASE" rpm and throttle fully closed observe engine rpm of  $600 \pm 50$ .

b. Ignition switch test—At 700 rpm turn ignition switch "OFF" momentarily and note that engine stops firing completely. Perform this check as rapidly as possible to prevent severe backfire when ignition switch is turned on again.

c. Acceleration and deceleration check—Advance throttle firmly from idle to 2000 rpm. Engine should accelerate and decelerate rapidly and smoothly with no tendency to falter or backfire.

d. Propeller—Set throttle at 1700 rpm with propeller control in full increase rpm. Pull propeller control back full decrease and note rpm drop of approximately 500 rpm, then return to full increase.

e. Power—Advance throttle to full open, approximately 28 in. Hg (20-30 seconds maximum) and check engine rpm (propeller at full increase rpm): 1900-2000 L-17A, 2200-2300 on L-17B and C Airplanes.

f. Ignition Check—At 1700 rpm check "L" and "R" ignition system (maximum drop is 75 rpm). Return ignition switch to "BOTH" between checks to allow speed to stabilize. If drop exceeds 75 rpm return ignition switch to "BOTH" and run engine up to take-off power for a few seconds, then recheck ignition system at 1700 rpm. Return ignition switch to "BOTH" position.

## 2-22. TAXIING INSTRUCTIONS.

2-23. Observe following instructions for taxiing:

- Wing flap lever "UP".
- Landing gear lever "DOWN".
- Hydraulic power on during all taxiing opera-

tions. During extended ground operation other than normal taxiing, take-offs and landings, the power control should be off to prevent overheating of the hydraulic fluid.

d. Release brakes. Depress either right or left rudder pedal to turn in desired direction. With full rudder deflection, airplane pivots on a point about halfway inboard of wing tip.

e. Nose wheel is inherently stable and will maintain a straight course (except as affected by torque) when rudder pedals are in neutral position.

## 2-24. BEFORE TAKE-OFF.

2-25. After taxiing to take-off position, set brakes and make following complete check:

a. Fuel selector—MAIN TANK (L-17B and C only).

b. Elevator trim tab 0 or  $\frac{1}{4}$  "NOSE DOWN".

c. Hydraulic power control—Check on for take-off. Check power light on.

d. On L-17B and L-17C airplanes return flaps to the one-half (take-off) position indicated by the stripe painted on the left flap.

e. Mixture control—full rich if airport is below 5000 feet.

## NOTE

If take-off is being made from a field above 5000 feet, mixture should be leaned for maximum power. Run up engine to full throttle. Pull mixture control slowly until rpm reaches maximum and then decrease slightly. Leave control in this position for take-off.

f. Oil cooler shutter door control—"OPEN" (L-17B and C).

g. Canopy—Closed.

h. Instruments—Check for desired readings. (See Figure A-2.)

## NOTE

Under certain operating conditions (when outside air temperatures are low or heavier oil is used) oil pressure may exceed specified desired operating range without damage to engine.

Before take-off, oil temperature must show rise of at least 10°F within 5 minutes to a minimum of 70°F or above. (Rise from 70°F to 80°F if temperature at start was 70°F.) Use oil cooler shutter, as necessary, to maintain oil temperature in desired operating range.

i. Release brakes.

**2-26. TAKE-OFF.****2-27. NORMAL TAKE-OFF.****NOTE**

See Figure A-3 for take-off distances.

- a. Start take-off run advancing throttle to full open—approximately 28 in. Hg (at sea level) and 2300 rpm (2600 rpm for L-17B airplanes).
- b. Use rudder pedals for directional control.
- c. Raise nose wheel off at approximately 55 to 60 mph.

**NOTE**

If nose wheel is allowed to skip along ground, light "kicks" on rudder pedals will be felt as nose wheel attempts to straighten itself.

- d. Airplane will take off at approximately 70 mph.
- e. Landing gear handle "UP" when definitely airborne. Check gear position indicators.

**NOTE**

As nose gear retracts, friction brake in nose wheel well may cause slight odor of burning rubber. This condition is normal.

- f. Wing flap control—"UP" on L-17B and C airplanes then push hydraulic power control "OFF".
- g. Maintain airspeed of at least 80 mph during initial climb.

**NOTE**

Refer to paragraph 3-8 for procedure in case of engine failure during take-off.

- h. Fuel selector—"AUX TANK" (L-17B and C only).
- i. Electrical fuel pump switch—"OFF" (L-17B and C only).

**2-28. CROSS-WIND TAKE-OFF.**

2-29. For a cross-wind condition, use normal take-off technique, but hold airplane on ground until an airspeed of 70 mph is attained, and then pull off more sharply.

**2-30. MINIMUM RUN TAKE-OFF.****NOTE**

Provision for use of partial flap for take-off is not a design feature of L-17A airplanes.

- a. Set elevator tab for slightly more than normal nose-down trim.
- b. On L-17B and L-17C airplanes set flaps at one-half (take-off) position indicated by the stripe painted on the left flap.
- c. In position for take-off, set brakes and run up engine to full throttle.

- d. Hold control wheel well forward and release brakes. Take off at approximately 70 mph.
- e. During initial climb, hold airspeed of 70 mph for best obstacle clearance.

**WARNING**

This procedure should be used only under emergency conditions and when air is smooth. Under no circumstances should airspeed be permitted to drop below 70 mph.

**2-31. CLIMB.**

2-32. For detail climb performance data see Figure A-3.

- a. Climb at full throttle and 2300 rpm.
- b. Best climbing speed for sufficient engine cooling and highest rate of climb is approximately 95 mph.

**2-33. DURING FLIGHT.****2-34. ENGINE OPERATION.**

- a. Set throttle and propeller controls to desired power settings. (See Figure A-4 for cruise data).
- b. Lean mixture to obtain maximum rpm consistent with smooth engine operation for selected power setting. (Refer to paragraph 2-35 for leaning procedure.)
- c. Use oil cooler shutter, as necessary, to maintain oil temperature in desired range.
- d. Under low power conditions, a momentary engine overspeed to a maximum of 2600 rpm may occur without damage to engine.

2-35. MIXTURE ADJUSTMENT. To lean mixture, proceed as follows:

**CAUTION**

Lean mixture slowly and do not pull control beyond one inch during flight. If advancing or retarding throttle after leaning results in rough engine operation, readjust mixture control.

- a. Set up rpm and manifold pressure slightly higher than desired.
- b. Lean mixture to point of engine roughness; then enrich slightly.
- c. After leaning, rpm and manifold pressure should be selected. If necessary, readjust to obtain desired rpm and manifold pressure.

**NOTE**

Repeat leaning procedure if either power settings or altitude is changed.



## Paragraphs 2-36 to 2-53

**2-36. FLIGHT CHARACTERISTICS.**

2-37. All control forces are normal and well balanced, requiring only gentle pressures to execute any maneuver. Stability around all axis is excellent, and the airplane handles well even in rough air. An unusual amount of aileron control is available down to a minimum operating speed; and the rudder aileron coordinating system imparts added lateral stability, a feature particularly noticeable in the lower speed range where light airplanes often lack aileron control "feel." The coordinating system supplies this control "feel" which is not normally provided by the low pressures acting on control surfaces of light airplanes at low speeds. The system does not eliminate normal coordination of controls but makes such coordinating easier.

**2-38. STALLS.**

2-39. Stall characteristics of this airplane are conventional. Power-off stalls are quite smooth; stalls with power are somewhat more sensitive. Aileron control remains very effective in either case.

**2-40. STALLS—POWER OFF.**

2-41. With power off, there is very little warning before the stall breaks, and the airplane pitches straight forward with no tendency to roll or yaw. When gear and flaps are up, a slight tail buffet occurs immediately following the break. Normal recovery is effected by applying forward elevator and additional power.

**2-42. STALLS—POWER ON.**

2-43. When approaching a power-on stall with gear and flaps up, the tail begins to buffet approximately 4 mph before the stall breaks. Recovery can be made

with little loss in altitude by lowering nose when airplane begins to pitch. Power-on stalls with gear and flaps down require a nose high altitude and hard right rudder to prevent yaw. Wings must be kept fairly level before stall breaks to prevent airplane from rolling. When airplane pitches, nose will drop quickly and a normal recovery can be made.

**2-44. SPINS.**

2-45. Spins are prohibited. If a spin is entered inadvertently, use conventional spin recovery technique. When airplane is loaded so that the center of gravity is located ahead of 25% MAC, the airplane does not spin but enters a diving spiral which is accompanied by tail buffeting and rapid increase in speed. If such a spiral is entered accidentally, effect recovery by neutralizing controls.

**2-46. PERMISSIBLE ACROBATICS.****2-47. GROSS WEIGHT ABOVE 2350 POUNDS.**

2-48. When airplane gross weight exceeds 2350 pounds, all acrobatics are prohibited.

**2-49. GROSS WEIGHT BELOW 2350 POUNDS.**

2-50. When airplane gross weight is below 2350 pounds, all acrobatics are prohibited except the following: Steep turns (up to 60° only), chandelles, lazy 8's, and stalls (except whip stalls).

**2-51. DIVING.**

2-52. Do not exceed maximum permissible indicated airspeed, 190 mph, or maximum engine speed, 2300 rpm (2600 rpm for L-17B's and L-17C's) during dive. Pull propeller control to full decrease rpm position (full out) and retard throttle as necessary to avoid exceeding maximum rpm.

**2-53. STALLING SPEEDS (IAS).**

## GROSS WEIGHT—2750 LB.

	GEAR AND FLAPS UP		GEAR AND FLAPS DOWN	
	Power On	Power Off	Power On	Power Off
Straight Flight	61 mph	69 mph	51 mph	54 mph
30° Bank	66 mph	75 mph	54 mph	58 mph
60° Bank	87 mph	101 mph	70 mph	78 mph

## GROSS WEIGHT—2350 LB.

	GEAR AND FLAPS UP		GEAR AND FLAPS DOWN	
	Power On	Power Off	Power On	Power Off
Straight Flight	56 mph	63 mph	48 mph	50 mph
30° Bank	61 mph	69 mph	50 mph	54 mph
60° Bank	80 mph	94 mph	64 mph	73 mph

**2-54. APPROACH.**

2-55. When approaching field for landing:

- a. Mixture control—full rich if field is below 5000 feet.

**NOTE**

If landing is being made at field above 5000 feet, mixture control should be placed in position to secure maximum power. Advance throttle to full open. Pull mixture control slowly until rpm reaches maximum and then decrease slightly. Push control in slowly until rpm increases and then decrease slightly. Mixture control should be left in this position for landing.

- b. Propeller control—full increase rpm.  
c. Carburetor heat control off or on as required.  
d. Check gear—warning horn.  
e. Hydraulic power control on.  
f. Electric fuel "ON", on L-17A modified, L-17B and L-17C airplanes.  
g. Fuel selector valve—"MAIN TANK" (L-17B and L-17C airplanes only).  
h. Landing gear handle "DOWN"—below 100 mph.  
i. Check gear position indicators.

**2-56. LANDING.****2-57. NORMAL LANDING.**

- a. Flap control "DOWN" when desired below 100 mph.  
b. Normal glide—75 mph (flaps "DOWN").  
c. When desired, side slips can be safely executed during approach with gear and flaps down. Keep airspeed above 75 mph. Recovery is normal.  
d. Touch ground with main gear first (nose wheel up) at approximately 55 mph. As speed diminishes, lower nose wheel to ground.

**NOTE**

When winds are strong or gusty, land airplane faster with tail only slightly down.

- e. Slowly apply brakes if necessary. Do not turn airplane too abruptly at high speeds.  
f. Before taxiing—flaps "UP".

**NOTE**

Leave the hydraulic power control on until the airplane is parked.

**2-58. GO-AROUND.**

- a. Throttle full open.  
b. With gear and flaps down, best angle of climb is at 65 mph.

- c. Landing gear handle "UP" (hydraulic power control must be on).

- d. When sufficient flying speed is attained, move flap control to "UP" (hydraulic power control off after flaps have been raised).

**NOTE**

Raise flaps as quickly as possible in order to secure maximum climb performance. This is particularly important if go-around occurs at a high-altitude field on a hot day when airplane is heavily loaded.

- e. With gear and flaps up, best speed of climb is at 80 mph.

**2-59. CROSS-WIND LANDING.**

2-60. Tricycle landing gear minimizes difficulties associated with cross-wind landings. On approach, use normal procedure required to maintain a straight flight path and to touch down with minimum drift. Land faster and lower nose wheel to ground as quickly as possible.

**2-61. MINIMUM RUN LANDING.**

2-62. When brakes are used to stop airplane following a full flap, power off approach, a very short landing roll is possible. An alternate technique for minimum run landing over an obstacle is to use a full flap, partial power approach. Use enough power to keep airplane at a gliding speed slightly below normal, and as soon as obstacle is cleared, close throttle and start flare as for normal landing.

**2-63. STOPPING ENGINE.**

2-64. Stop engine as follows:

- a. Set brakes.  
b. On the last flight of the day accomplish the following checks:

1. Idle speed and mixture—with throttle fully closed observe engine rpm of  $600 \pm 50$ . When engine speed is stabilized pull the mixture control slowly back toward "IDLE CUT-OFF" and carefully observe the tachometer for any change during the leaning process; then return control to "FULL RICH" position before engine cuts out. RPM increase of over 10 rpm during leaning process is indicative of an excessively rich idle mixture; less than 5 rpm indicates an excessively lean mixture.

2. Ignition switch—at 700 rpm, turn ignition "OFF" momentarily, and note that engine stops firing completely. Perform this check as rapidly as possible to prevent severe backfire when ignition switch is turned on again.

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### Paragraphs 2-65 to 2-66

3. Power—advance throttle to full open, approximately 28 in. Hg (20-30 seconds maximum) and check engine rpm (propeller at full increase rpm): 1900-2000 L-17A, 2200-2300 on L-17B and L-17C airplanes.

4. Ignition check—at 1700 rpm check "L" and "R" ignition system (maximum drop is 75 rpm). Return ignition switch to "BOTH" between check to allow speed to stabilize. If drop exceeds 75 rpm return ignition switch to "BOTH" and run engine to take-off power for a few seconds, then recheck ignition system at 1700 rpm. Return ignition switch to "BOTH" position.

5. Cruising fuel air mixture check—set throttle at 1700 rpm and mixture control "RICH." After engine speed and instruments have stabilized pull mixture control back slowly through the manual lean range. An increase of over 25 rpm indicates an excessively rich mixture.

c. Cool engine before shut-down by idling at 900 rpm for 3 minutes.

d. Electric fuel pump "OFF" on L-17A modified, L-17B and L-17C airplanes.

e. Run up engine to 1300 rpm; then pull mixture control to idle cut-off. Advance throttle to full open as engine dies.

f. When propeller stops spinning, ignition and battery switches "OFF."

g. Hydraulic power control—"OFF."

h. Radio and heater switches "OFF."

### 2-65. BEFORE LEAVING AIRPLANE.

2-66. Check the following:

a. All switches off except generator switch.

b. Surface controls locked.

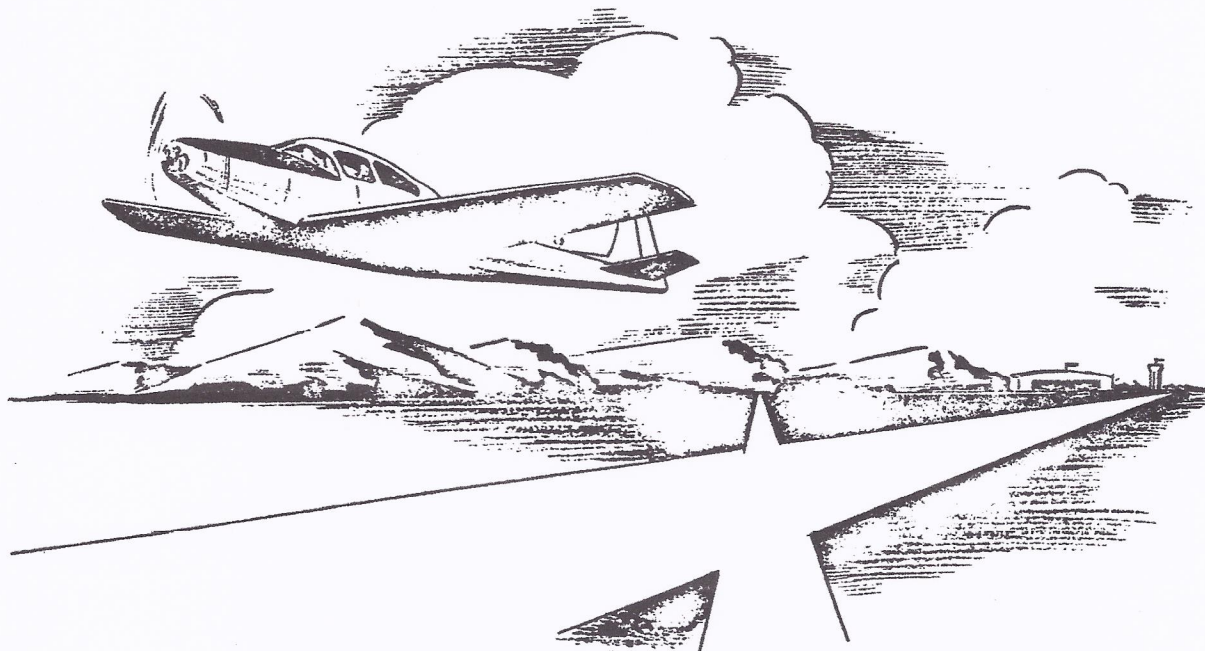
c. Chock wheels.

d. Release brakes.

e. Close and lock canopy.

f. Install pitot tube cover.

g. Moor airplane if necessary.



## SECTION III

### EMERGENCY OPERATING INSTRUCTIONS

**3-1. FIRE.****3-2. ENGINE FIRE DURING STARTING.**

- a. Keep engine running, as fire may be drawn through engine and extinguished.
- b. If fire fails to go out, pull mixture control to idle-cut-off.
- c. Pull emergency fuel shut-off.
- d. On L-17A modified, L-17B and L-17C airplanes, turn fuel selector switch—"OFF."
- e. Turn electric fuel pump "OFF."
- f. Pull hydraulic fluid emergency shut-off.
- g. Ignition, battery, and generator switches "OFF."
- h. Leave airplane as quickly as possible.

**3-3. ENGINE FIRE DURING FLIGHT.**

- a. Mixture control to idle cut-off.
- b. Pull emergency fuel shut-off.
- c. On L-17A modified, L-17B's and L-17C's turn fuel selector to "OFF" and electric-driven fuel pump "OFF."
- d. Pull hydraulic fluid emergency shut-off.
- e. Ignition battery and generator switches "OFF."

**3-4. ELECTRICAL FIRE.**

- a. If source of fire can be determined, turn off switches controlling faulty circuits.
- b. When impossible to isolate origin of fire, turn battery and generator switches "OFF."

**3-5. WING FIRE.**

- a. Turn off switches controlling electrical installations in wing.
- b. When possible, attempt to extinguish fire by sideslipping airplane away from flame.

**3-6. ENGINE FAILURE.****3-7. ENGINE FAILURE DURING TAKE-OFF.**

3-8. If engine fails during take-off run:

- a. Close throttle and apply brakes.
- b. If it is impossible to stop with brakes, pull mixture control to idle cut-off, emergency fuel shut-off to off, turn ignition "OFF", and retract gear. (On L-17A modified, L-17B's and L-17C's, turn electric fuel pump "OFF" and fuel selector valve to "OFF" before retracting gear.)

3-9. If engine fails immediately after take-off, act quickly as follows:

a. Maintain airspeed above 80 mph by depressing nose of airplane at once.

b. If terrain ahead is suitable for wheels-down landing, leave gear down. If surface appears very rough, raise gear handle to "UP" (hydraulic power control must be on). Sufficient hydraulic pressure to start gear up may soon be available. Even if only unlocked and starting to retract, gear will collapse on landing.

c. Pull fuel emergency shut-off or turn fuel selector "OFF" and cut all switches.

d. If possible, lower flaps with hand pump (hydraulic power control on).

e. Land straight ahead, changing direction only enough to miss obstacles.

**3-10. ENGINE FAILURE DURING FLIGHT.**

a. Immediately depress nose of airplane to maintain flying speed.

b. Mixture control full rich.

c. On L-17A modified, L-17B's and L-17C's turn electric fuel pump "ON."

d. Propeller control full increase rpm.

e. If weather conditions or engine roughness prior to engine failure indicate possible icing of carburetor air filter or low mixture temperature, pull carburetor heat control full on.

f. If failure was caused by low fuel pressure, keep airplane nosed down to lower suction head on fuel pumps. It may be possible to secure partial power by operation of primer.

g. If propeller is not turning, attempt restart by engaging starter.

**NOTE**

Refer to paragraph 3-16 for procedure to follow if attempts to restart are unsuccessful and forced landing is necessary.

**3-11. PROPELLER DIAPHRAGM FAILURE IN FLIGHT.**

3-12. In the event of a propeller diaphragm rupture during flight, pull propeller control "OUT" to full decrease RPM position to prevent leakage of engine oil from propeller control element.

**3-13. BAIL-OUT.**

3-14. If an emergency exit must be made during flight, the following procedure is recommended.

a. Reduce speed as much as possible and trim airplane to fly "hands off."

## Paragraphs 3-15 to 3-27

- b. Unfasten safety belt.
- c. Open canopy.
- d. Step out on wing and roll off.

**3-15. FORCED LANDING.**

3-16. Prepare for emergency landing as follows:

- a. Pull fuel emergency shut-off or turn fuel selector valve to "OFF."
- b. All switches "OFF."
- c. Make sure safety belt is securely fastened.
- d. Open canopy.
- e. Hydraulic power control on.
- f. Plan approach as for normal landing.
- g. If landing area selected appears relatively smooth and there is sufficient time and altitude to properly plan an approach, lower gear. If condition of landing area is questionable, keep gear up.
- h. Flaps "DOWN." If propeller is windmilling, engine-driven hydraulic pump may supply sufficient pressure to operate flaps.
- i. If necessary to prevent overshooting, the airplane can be effectively sideslipped. Be sure to maintain air-speed above 85 mph (flaps up) or 70 mph (flaps down), and recover with ample altitude to establish a normal glide.
- j. After landing, get out of airplane as quickly as possible and stay out.

**3-17. DITCHING.**

3-18. If it should be necessary to ditch airplane, proceed as follows:

- a. Make sure safety belt is tight and securely fastened.
- b. Open canopy. Make sure canopy locks in full open position.
- c. Leave landing gear "UP."
- d. Hydraulic power control on.
- e. Flaps "DOWN."
- f. Use power if available.
- g. Reduce speed to just above stall.
- h. Maintain level altitude.
- i. If wind is blowing, head into wind, attempt to touch down just after a wave crest has passed. If wind velocity is under 5 mph, disregard wind, and head airplane parallel to any swells that may be running. Try to touch down just below the crest on falling side of swell.

**3-19. FUEL SYSTEM EMERGENCY OPERATION.****3-20. LOW FUEL PRESSURE.**

- a. If possible, fly in a nose down position to reduce suction head on fuel pumps.

b. On L-17A modified, L-17B's and L-17C airplanes, turn electric fuel pump "ON."

c. It may be possible to secure partial power by operation of primer.

**3-21. EMERGENCY FUEL SHUT-OFF.**

3-22. In case of engine fire, force landing, etc., cut off fuel supply at fire wall by pulling emergency shut-off control. On L-17A modified, L-17B and L-17C airplanes fuel supply is turned off at the fuel selector valve.

**3-23. LANDING GEAR EMERGENCY OPERATION**

3-24. Should gear fail to lower normally, proceed as follows:

- a. Check condition of gear position indicator lamps, replace if necessary.
- b. Hydraulic power control on.
- c. Normal gear control handle "DOWN."
- d. Push emergency landing gear release and hold until all three green landing gear position lights are "ON."
- e. Supply hydraulic pressure by operating hand pump.
- f. If gear does not lock down, yaw aircraft to lock main gear then bring aircraft to near stall while working rudder pedals to lock nose gear.
- g. If gear does not lower by the above procedure, turn hydraulic power off and repeat items c., d., and f.

**NOTE**

Since it is desirable to have hydraulic power on when landing after the above procedure has been completed, the hydraulic power control should be turned on. If the landing gear will not stay down and locked, turn hydraulic power off and repeat emergency procedure and land with hydraulic power off. If flaps are required for landing they should be operated before the hydraulic power control is turned off.

3-25. If gear fails to retract normally:

- a. Leave hydraulic power control on.
- b. Leave gear control handle "UP."
- c. Operate hand pump.

**3-26. WING FLAP EMERGENCY OPERATION.**

3-27. If flaps fail to operate normally:

- a. Leave hydraulic power control on.
- b. Move flap control to desired position.
- c. Operate hand pump.

**3-28. CANOPY EMERGENCY OPERATION.**

3-29. To open canopy in an emergency during flight:

a. Turn overhead handle and hold in unlocked position.

b. On L-17A airplanes it is necessary to slide the canopy aft of the first detent by using overhead handle.

c. On L-17A modified, L-17B and L-17C airplanes, pull canopy assist handle to extreme open position.

**3-30. ELECTRICAL SYSTEM EMERGENCY OPERATION.**

3-31. Check circuit breaker panel in case of failure of any electrically operated equipment. Reset circuit breakers or replace fuses as necessary.

**3-32. GENERATOR FAILURE.**

a. Generator switch "OFF."

b. To preserve battery, shut off all unnecessary electrical equipment.

**3-33. VOLTAGE REGULATOR FAILURE.**

3-34. Failure of voltage regulator may result in excessively high voltage. Proceed as follows:

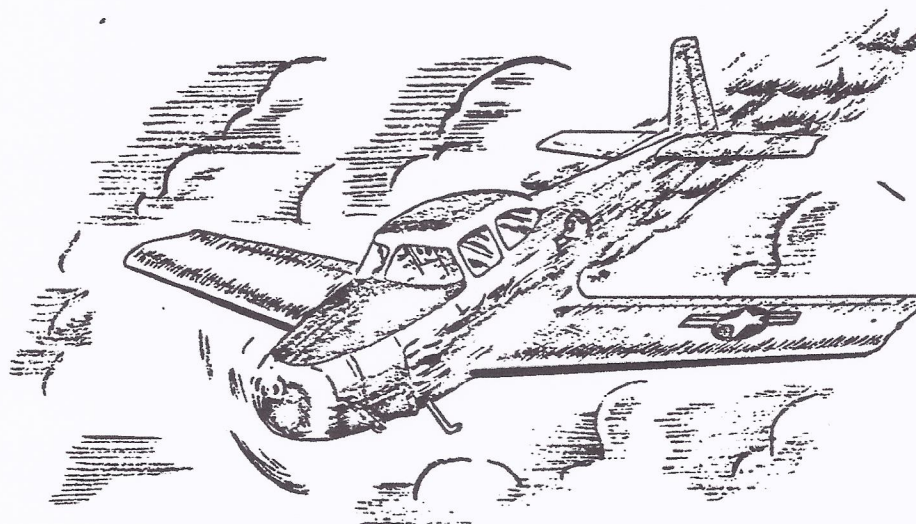
a. Generator switch "OFF."

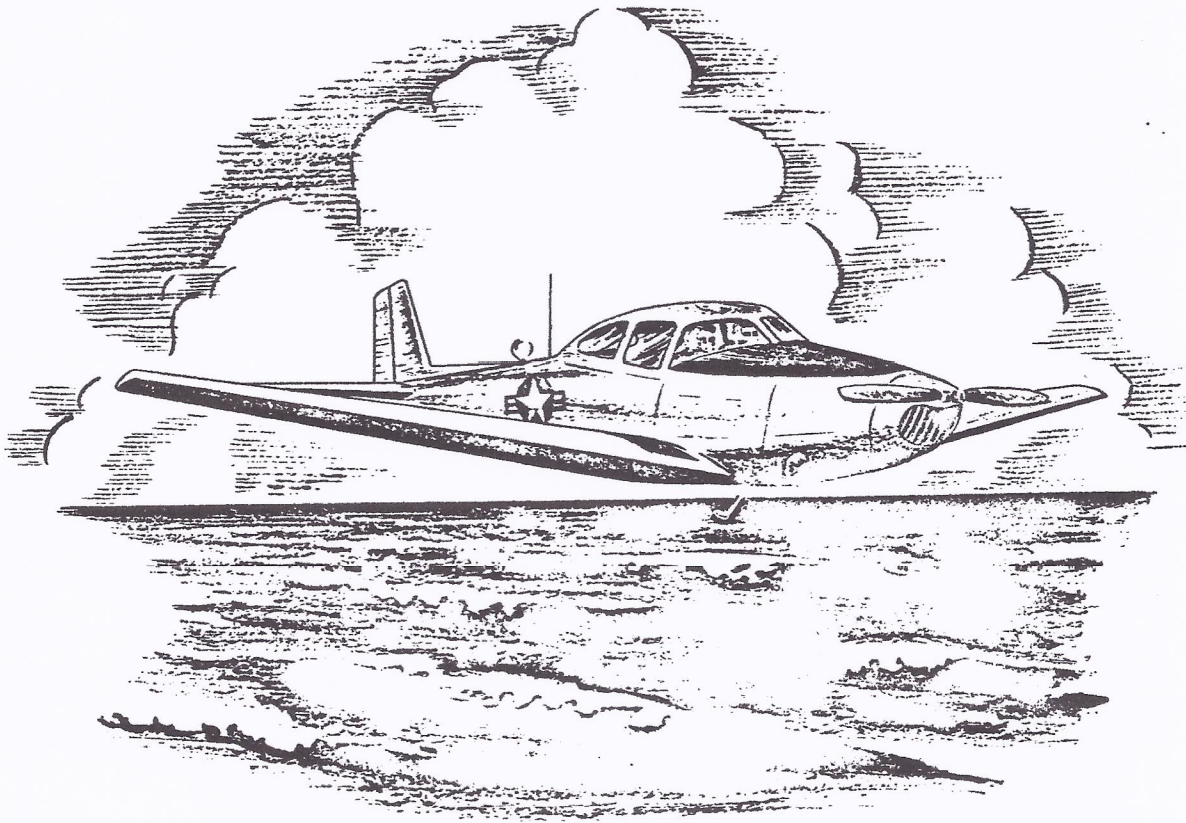
b. Shut off all unnecessary electrical equipment to preserve battery.

c. Periodically recharge battery by turning generator switch "ON" for approximately 5 minutes.

**CAUTION**

Charging the batteries for long periods under these conditions will permanently damage the battery.





## SECTION IV

### OPERATIONAL EQUIPMENT

#### 4-1. COMMUNICATIONS.

#### 4-2. L-17A RADIO EQUIPMENT.

4-3. The radio equipment (Ranger, Model 209C transmitter and 120C receiver) provides two-way radio communication with tower and radio range stations. A control panel on the receiver, at the left side of the instrument panel (Figure 1-2, Reference 2), contains the following: receiver frequency band selector, antenna selector, tuning and volume controls. The receiver frequency band selector has three positions: "RANGE" for reception in frequency range of 200 to 400 kilocycles; "VOICE" for reception of range plus voice; and "COMM" for reception in frequency range of 2.5 to 7.0 megacycles. A transmitter frequency selector, located above the receiver (Figure 1-2, Reference 3), provides selection of one of two preset frequencies, 3105 or 4495 kilocycles. Jacks for junction of microphone and headset cords are located just beneath the receiver. (See Figure 1-2, Reference 33.) A hand-held microphone is stowed in a clip at the left side of the cabin and a headset is held by a hook immediately below.

#### 4-4. OPERATION OF RADIO.

- a. Generator switch "ON."
- b. Antenna selector at "ANT."
- c. Rotate volume control clockwise from "OFF" to turn radio on.
- d. Allow set to warm up for a few seconds.
- e. With band selector, select "RANGE," "VOICE," or "COMM" as desired.
- f. With turning knob, select desired frequency on dial.
- g. Adjust volume control for desired output.
- h. To transmit, turn transmitter frequency selector to desired transmitting frequency, then press microphone button and speak directly into microphone.
- i. The radio is turned off by turning volume control counterclockwise to "OFF."

#### 4-5. L-17B AND L-17C RADIO EQUIPMENT.

4-6. The airplane is equipped with Aircraft Radio Corporation (ARC) Type 12 equipment. The equipment consists of three receivers and two crystal controlled VHF transmitters. The receivers may be operated individually or simultaneously as conditions require. The VHF transmitters are controlled from a single switch marked "TRANS" in the center of the

control unit. The "RANGE" receiver covers 190-550 kilocycles (kc). The "BROADCAST" receiver covers 520-1500 kc. The "VHF" receiver covers 108-135 megacycles (mc). Each receiver has its own combination power-sensitivity control. The dynamotor on the VHF receiver must be turned on before attempting to transmit.

#### CAUTION

In order to conserve the battery when the engine is not running, turn on the required equipment for as little time as possible.

4-7. All of the above units are installed on shockproof mounts in a special rack on the left side of the airplane baggage compartment aft of the rear seat. The equipment is readily accessible for the purpose of adjustment or service in the airplane with the canopy in the full "open" position. The control panel for both the transmitters and receivers is conveniently located on the left side of the airplane instrument panel just forward of the pilot's control wheel. (See Figure 4-1). The following controls are located on the control panel: antenna selector switch (Ant-Loop), tuning control "ON" and "OFF" switch, and volume control for the Broadcast and Range Receivers; VHF receiver audio selector switch (Lo-Hi), tuning unit, "ON" and "OFF" switch, and volume control; directional loop azimuth control and VHF transmitter channel and interphone selector switch. Phone and microphone jacks are provided for the pilot, with a separate microphone jack for the copilot.

4-8. Antenna for operation of the above equipment are a range and broadcast antenna running from the top of the vertical stabilizer to a point on the fuselage just aft of the canopy; a vertical VHF antenna and controllable directional loop mounted on top of fuselage between canopy and dorsal fin.

#### 4-9. OPERATION OF RADIO.

#### 4-10. TO RECEIVE.

- a. Battery switch "ON."
- b. Set "ANT-LOOP" switches on "RANGE" and broadcast receivers to "ANT."
- c. Turn on desired receiver by means of the combination power-sensitivity control nearest that receiver.
- d. Tune in the desired station. Note that all calibra-



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**Paragraphs 4-11 to 4-17**

tions are in megacycles (mc). For example: .35mc is equivalent to 350 kilocycles (kc).

e. Back off on sensitivity control to desired signal level. Except in the case of the VHF receiver, whose sensitivity control should be left at full clockwise. The "HI-LO" switch for this receiver should be set to "LO."

f. To communicate under conditions of severe static, turn off all receivers except the VHF.

g. Army channel B (BAKER) is 126.18 mc for both transmitting and receiving.

**4-11. TO USE LOOP ON RANGE OR BROADCAST RECEIVER.**

a. For optimum results, the "ANT-LOOP" switch must be on "LOOP" for only one receiver at a time.

b. After tuning in the desired station in the "ANT" position of the "ANT-LOOP" switch, turn this switch to "LOOP." Rotate the loop and adjust the sensitivity control for the sharpest minimum signal. This device will produce two such minima, 180° apart, which ambiguity must be resolved by the pilot.

**4-12. TO TRANSMIT.**

a. Make certain the VHF receiver is turned "ON."

b. Set "TRANS" switch to the desired frequency.

c. Hold microphone close to lips. Press button and talk distinctly. Release to listen.

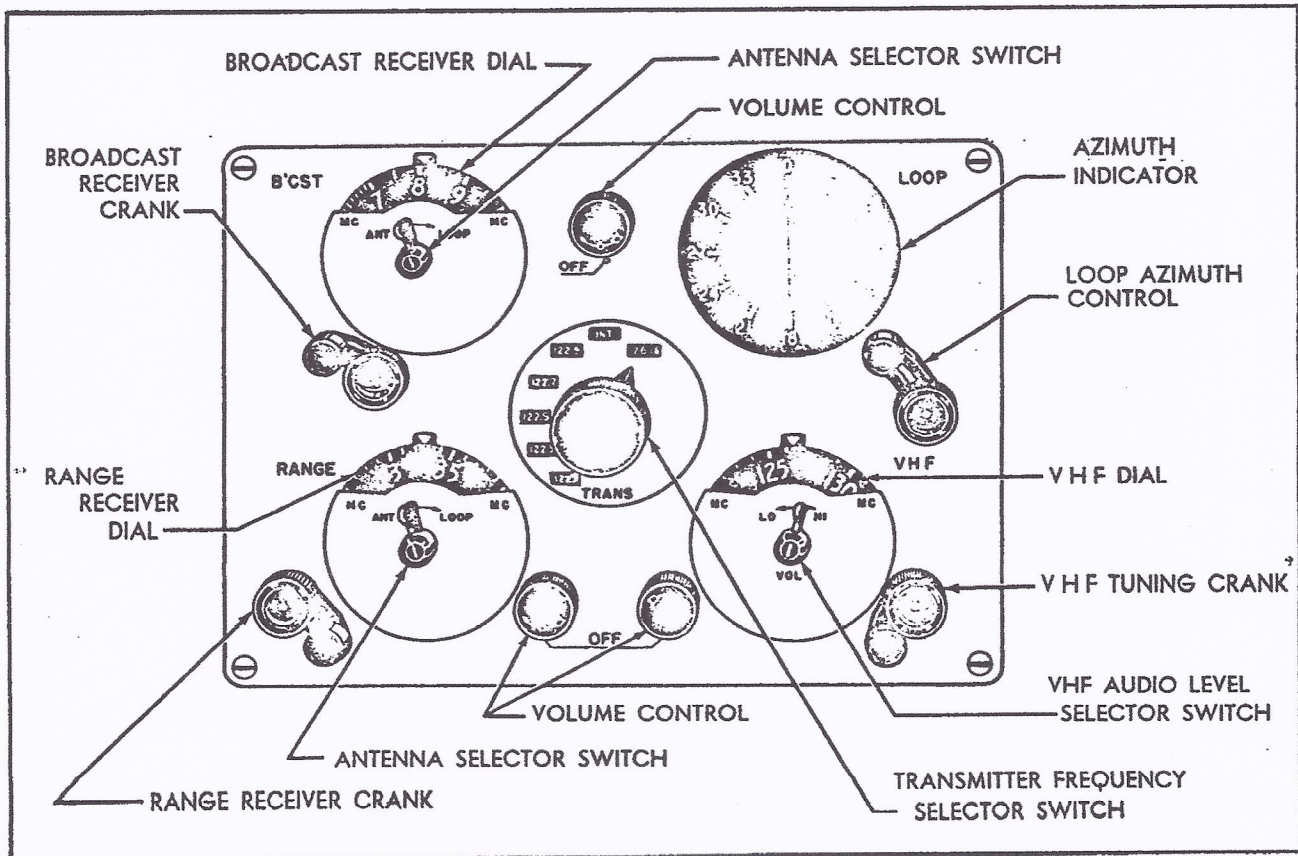
**4-13. CABIN AIR-VENTILATING AND HEATING.**

4-14. To provide cabin ventilation, ram air, obtained just aft of the nose cowl, is routed through ducts to outlets on cabin floor between the rudder pedals and below each windshield panel. When heat is desired, the ventilating air is heated by a combustion-type heater installed in the air duct at the right rear side of the engine. A blower, installed on the heater to supply combustion air, permits ground operation when the engine is running. The blower is automatically turned off when gear is retracted. The system may also be used for windshield defogging.

4-15. On L-17B's, additional cabin vent is provided by two exit air scoops, one on each wing-to-fuselage fairing. Air is exhausted from the cabin through adjustable sliding doors forward of the rear seat.

**4-16. CABIN AIR CONTROLS**

4-17. AIR DISTRIBUTING CONTROLS. An air distributing control (Figure 1-2, Reference 11), located below the glove compartment, permits selec-



**Figure 4-1. Radio Control Panel (ARC)**

tion of volume of air (either hot or cold) and directs airflow to windshield or cabin, or to both simultaneously. When the control is at "OFF," allowing no airflow, the heater is automatically shut off, regardless of the position of the heater control.

4-18. **HEATER CONTROL.** The heater control (Figure 1-2, Reference 12) is located just inboard of the air distributing control. Rotating the control from "OFF" to "LOW", "HIGH", or any intermediate position, starts the heater and selects the desired temperature. Should the heater overheat, the fuel supply is automatically shut off. After the heater cools to a safe temperature, fuel is again admitted and the heater restarts automatically. When the distributing control is "OFF", the heater is inoperative.

4-19. **PITOT HEAT CONTROL.** On L-17B and L-17C airplanes, a pitot heater switch (See Figure 1-3, Reference 35) is located between the position light switch and the landing light switch. This circuit breaker type switch controls the electrically heated pitot-static tube which safeguards against icing of the tube and subsequent failure of the air-speed system.

4-20. **AIR DEFLECTORS.** (See Figure 1-4.) Adjustable air deflectors are installed above the windshield to direct the flow of ventilating air into the cabin.

#### 4-21. LIGHTING EQUIPMENT.

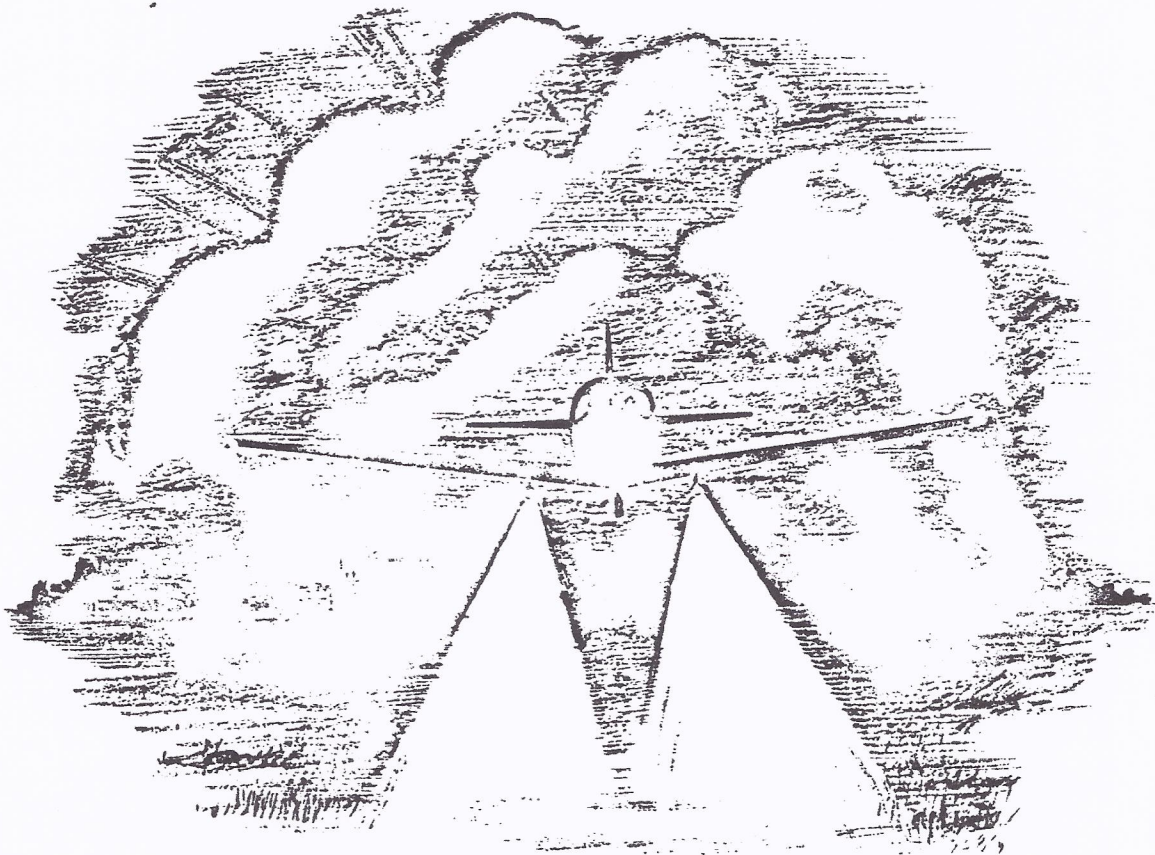
4-22. **POSITION LIGHTS.** Standard position lights on wing tips and rudder are controlled by a single switch on the control panel. (See Figure 1-2, Reference 30.)

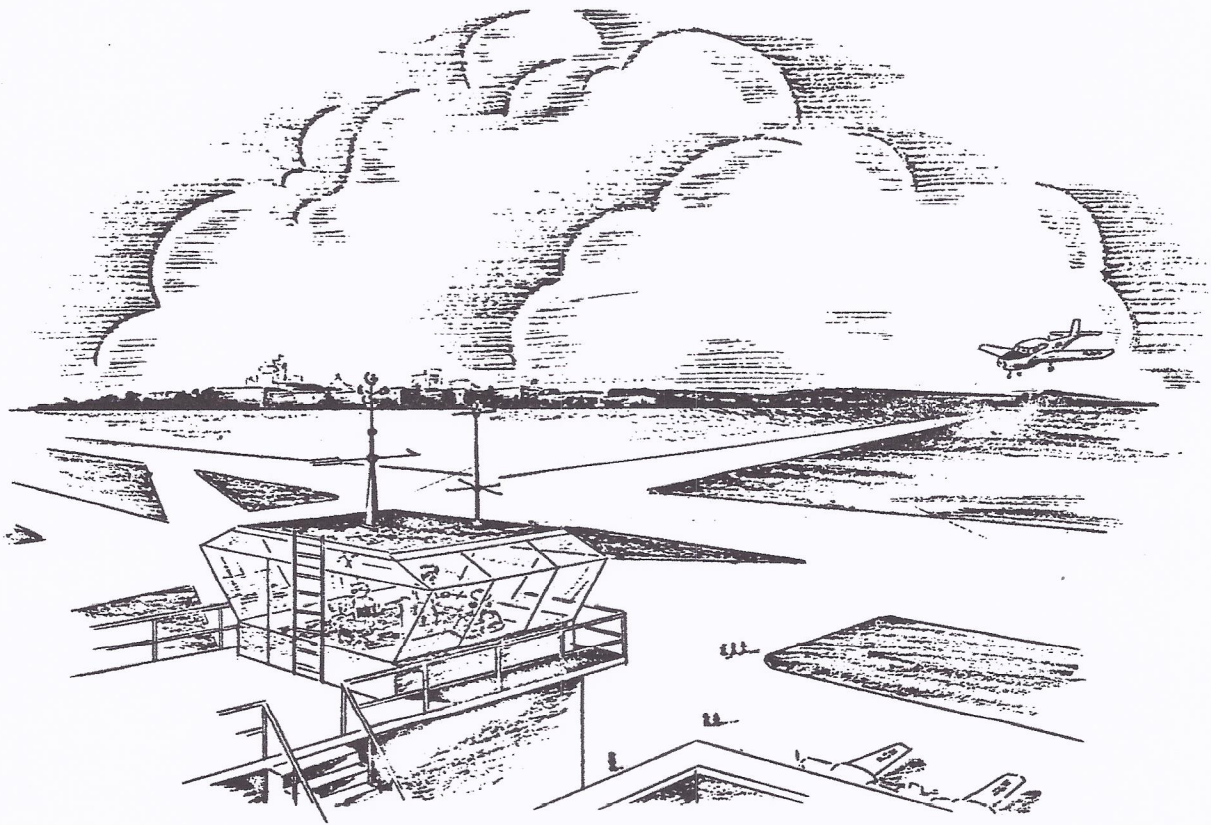
4-23. **LANDING LIGHTS.** The landing lights, one on each main gear, are controlled by a switch adjacent to the position light switch. (See Figure 1-2, Reference 29.)

4-24. **CABIN LIGHT.** A cabin light, mounted overhead at the center of the canopy, is controlled by a switch at the left of the position light switch. (See Figure 1-2, Reference 31.)

4-25. **CABIN LIGHT, L-17B AIRPLANES.** A cabin light, mounted overhead at the center of the canopy, is controlled by a switch located on the light mount. (See Figure 1-4.)

4-26. **SPARE LAMPS.** Spare lamps for the gear position indicators and the instrument panel lights are stowed in clips behind the control panel beneath the gear position indicators. Spares for the cabin light are stowed in a clip attached to the circuit breaker panel.





## SECTION V

### EXTREME WEATHER OPERATION

#### NOTE

This airplane has no special equipment for extreme weather operation.

#### 5-1. COLD WEATHER.

#### 5-2. OPERATIONAL NOTES.

5-3. LUBRICATION. Use oil Specification No. AN-0-8, grade based on average ground temperature as follows:

70°F to 20°F  
1080

20°F to -10°F  
1065

5-4. PROPELLER. When operating at temperatures of 32°F or below, it is advisable to start and stop engine with propeller in high pitch (control full out). If propeller is left in low pitch under such conditions, oil in propeller actuating cylinder may congeal before next engine start, making it difficult for propeller to change pitch. After starting in high pitch, wait until oil pressure reaches 40-50 psi and oil temperature indicates a definite rise before moving control to low pitch position.

5-5. BATTERY. When operating in cold climate, keep battery fully charged at all times.

5-6. On L-17B and L-17C airplanes an external power receptacle is provided on the left hand side of fuselage adjacent to wing trailing edge.

5-7. BRAKES. Do not set brakes for parking. Snow or slush on warm brakes will melt and subsequently freeze.

#### 5-8. OPERATING PROCEDURES.

##### NOTE

Make complete checks as outlined in Section II, with the following additions and exceptions.

#### 5-9. BEFORE ENTERING AIRPLANE.

- a. Remove protective covers.
- b. Remove snow and ice from surfaces, control hinges, propeller, pitot tube, and fuel and oil vents.
- c. Drain moisture from fuel strainer and accumulator tank drain cock.
- d. Clean shock struts of dirt and ice; check for proper inflation.
- e. Make sure battery is fully charged.

f. Pull propeller through five or six revolutions. Ease with which this can be accomplished will aid in determining amount of engine compartment heat that may be required prior to starting.

g. When necessary, heat engine compartment until engine may be easily pulled through by hand.

##### NOTE

In cold weather it is advisable to preheat oil prior to any starting attempts.

#### 5-10. STARTING ENGINE.

a. On L-17B and L-17C airplanes attach the auxiliary power supply to the exterior power receptacle on the left hand side of fuselage above wing fairing. (See Figure 1-8.)

b. Set all controls as for normal start except propeller control which should be in high pitch position.

c. On L-17A modified, L-17B and L-17C airplanes pull mixture control out to idle cut-off and turn the electric-driven fuel pump "ON".

d. Prime approximately 5-10 strokes before engaging starter.

e. Press starter control; then turn ignition switch to "BOTH."

f. On L-17A modified, L-17B and L-17C airplanes, move mixture control to full rich as soon as engine starts.

g. Prime as required throughout start and for first few minutes of operation.

h. Immediately after start, pull carburetor heat control full on and leave on for warm-up period.

i. Close oil cooler shutter, by pulling control knob full out.

j. If there is no oil pressure after 30 seconds running, or if pressure drops after a few minutes ground operation, stop engine and investigate.

k. After engine is running, cabin heater may be started for cabin heating and windshield defrosting as required.

#### 5-11. WARM-UP.

a. Maintain engine rpm between 1000-1200 rpm until instrument indications are in desired ranges.

## Paragraphs 5-12 to 5-22

**NOTE**

Before take-off, oil temperature must show rise of at least 10°F within 5 minutes to a minimum of 70°F to 80°F if temperature at start was 70°F.

b. When oil pressure reaches 40-50 psi and oil temperature indicates definite rise, move propeller control to low pitch position.

**5-12. BEFORE TAKE-OFF.**

a. Check controls carefully for freedom of movement.

b. Hold brakes and run up engine until spark plugs have burned clean and engine is operating smoothly. Then check magnetos.

c. Carburetor heat control off.

**5-13. DURING FLIGHT.**

a. Use cabin heat as required.

b. Use carburetor heat as required for smooth engine operation. While the carburetor is a pressure-type and not subject to icing, when low temperatures are encountered, heat is required to maintain temperature in desired range. Under extreme conditions, selection of carburetor heat provides an alternate source of air should the carburetor air filter be obstructed by ice (indicated by an unaccountable drop in rpm and manifold pressure.)

**CAUTION**

Carburetor heat control should be set only in full on or full off position. Do not use any intermediate position.

c. Use oil cooler shutter, as necessary, to maintain oil temperature in desired operating range.

**5-14. APPROACH AND LANDING.**

a. Avoid engine overcooling during let down.

b. Carburetor heat control on.

c. After landing, apply brakes intermittently and carefully.

**5-15. STOPPING ENGINE.**

a. Move propeller control to full decrease rpm posi-

tion before stopping engine.

b. Do not set parking brakes.

**NOTE**

Snow or slush on warm brakes will melt and subsequently freeze.

**5-16. BEFORE LEAVING AIRPLANE.**

a. Install protective covers.

b. Clean dirt and ice from shock struts.

c. Inspect fuel and oil vents and remove ice.

d. Drain fuel drains of condensate within 30 minutes after stopping engine.

e. If engine is expected to be idle for several days, battery should be removed and oil drained.

**5-17. HOT WEATHER.****5-18. LUBRICATION**

5-19. Use oil Specification No. AN-0-8, Grade 1100, when average ground temperature is above 70°F.

**5-20. PROTECTION.**

a. Take all possible precautions to prevent entrance of sand and dust into engine and other moving parts.

b. Avoid leaving airplane in sun's rays. When airplane must be parked in sun, leave canopy open to allow circulation of air.

c. Do not cover canopy unless required for sand protection, as covers increase temperature around canopy and may cause permanent deformation of transparent panels.

**5-21. HOT WEATHER STARTING.**

5-22. Starting difficulties sometimes experienced with a hot engine on a hot day are caused by vaporization of fuel in engine lines and pumps. Should this occur, proceed as follows:

a. Crack throttle open 1/2 inch.

b. Operate primer until resistance at plunger handle shows primer is pumping fuel and not fuel vapor. Then prime two full strokes before engaging starter.

c. On L-17A modified, L-17B and L-17C airplanes, place mixture control in IDLE CUT-OFF, turn electric-driven fuel pump "ON", and prime.

## APPENDIX I FLIGHT OPERATING CHARTS

AIRSPEED INSTALLATION CORRECTION TABLE

IAS (mph)	TIAS (mph)			
	FLAPS UP		FLAPS DOWN	
	Power On	Power Off	Power On	Power Off
50	51.5	56	47.5	54.5
60	62	66	58	64.5
70	72	75.5	68.5	74.5
80	81.5	85	78.5	83.5
90	91	94.5	88	93
100	100.5	104	97.5	102
110	110.5	113.5		
120	120.5	123.5		
130	130.5	133.5		
140	141	144		
150	151.5	154.5		
160	162	164.5		

Figure A-1. Airspeed Installation Correction Table.

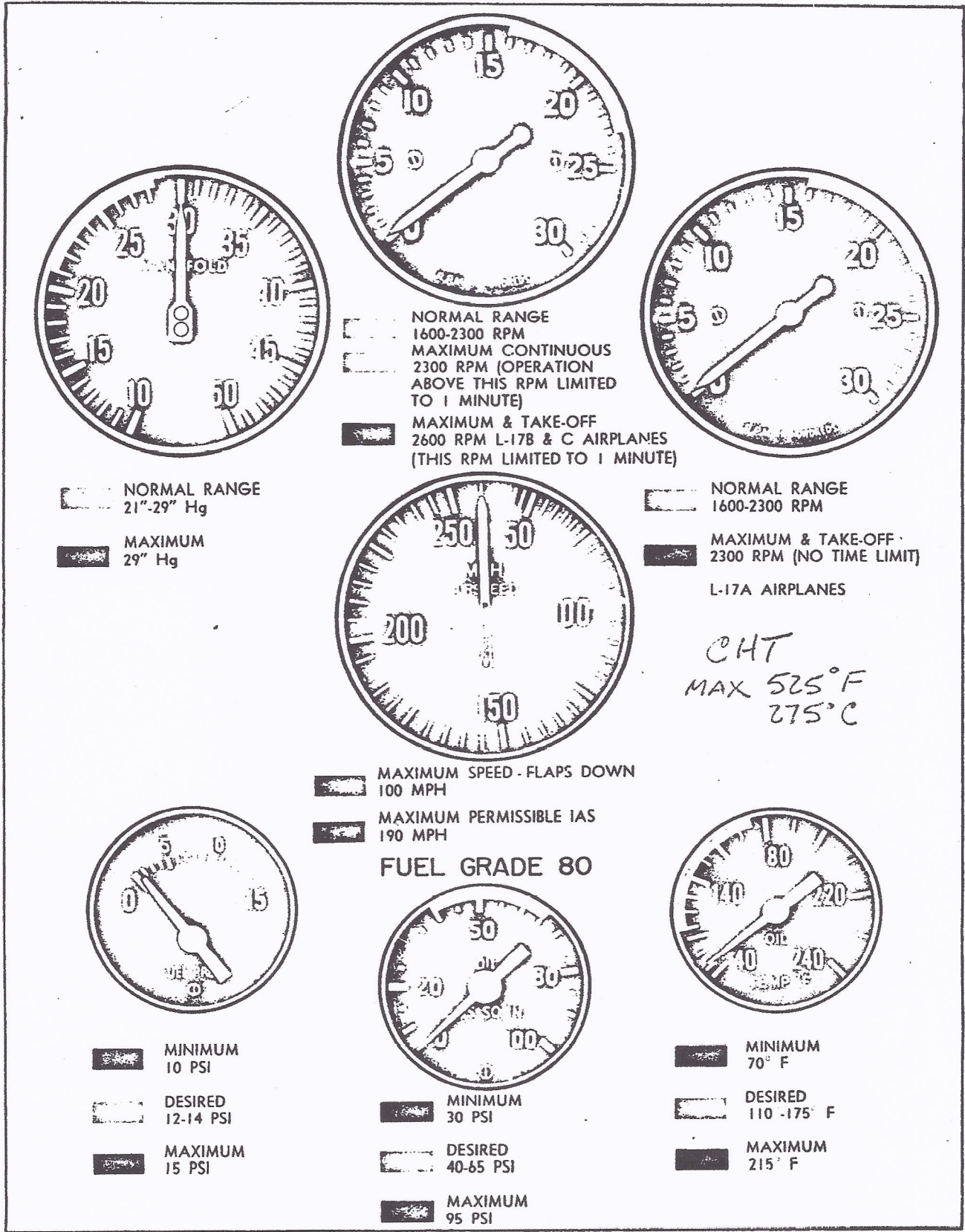


Figure A-2. Instrument Dial Markings.

AIRCRAFT MODEL		ENGINE MODEL		TAKE-OFF, CLIMB & LANDING CHART											
L-17A		CONTINENTAL O-470-7		TAKE-OFF DISTANCE FEET											
GROSS WEIGHT LB.	HEAD WIND M.P.H.	HARD SURFACE RUNWAY				SOFT-TURF RUNWAY				SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FEET		AT SEA LEVEL		AT 3000 FEET		AT SEA LEVEL		AT 3000 FEET			
		GROUND RUN	TO CLEAR 50' OBJ. RUN	GROUND RUN	TO CLEAR 50' OBJ. RUN	GROUND RUN	TO CLEAR 50' OBJ. RUN	GROUND RUN	TO CLEAR 50' OBJ. RUN	GROUND RUN	TO CLEAR 50' OBJ. RUN	GROUND RUN	TO CLEAR 50' OBJ. RUN		
2750	0	1050	1800	1400	2200	1900	2900	1900	2900	1900	2900	1900	2900		
	17	650	1200	900	1750	1400	2150	1400	2150	1400	2150	1400	2150		
	34	350	700	500	950	750	1300	750	1300	750	1300	750	1300		
	51	100	350	200	550	300	700	300	700	300	700	300	700		
2350	0	650	1250	900	1500	1200	1950	1200	1950	1200	1950	1200	1950		
	17	400	800	550	1200	750	1500	750	1500	750	1500	750	1500		
	34	200	450	250	750	400	950	400	950	400	950	400	950		
	51	50	200	100	350	150	450	150	450	150	450	150	450		

GROSS WEIGHT LB.	CLIMB DATA																							
	AT SEA LEVEL			AT 3000 FEET			AT 6000 FEET			AT 9000 FEET			AT 12,000 FEET											
	BEST I.A.S. MPH	RATE OF CLIMB KTS	FUEL USED F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB KTS	FUEL USED F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB KTS	FUEL USED F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB KTS	FUEL USED F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB KTS	FUEL USED F.P.M.									
2750	95	80	730	3	95	80	570	5	5	95	80	410	11	7	95	80	260	20	6	95	80	90	38	12
2350	95	80	900	3	95	80	700	3.5	4	95	80	610	8	6	95	80	430	14	7	95	80	250	23	9

GROSS WEIGHT LB.	LANDING DISTANCE FEET															
	BEST IAS APPROACH				HARD DRY SURFACE				FIRM DRY SOD				WET OR SLIPPERY			
	POWER OFF MPH	POWER ON MPH	AT SEA LEVEL	AT 3000 FEET	POWER OFF MPH	POWER ON MPH	AT SEA LEVEL	AT 3000 FEET	POWER OFF MPH	POWER ON MPH	AT SEA LEVEL	AT 3000 FEET	POWER OFF MPH	POWER ON MPH	AT SEA LEVEL	AT 3000 FEET
2750	75	65	600	1550	650	750	1750	1550	650	750	1750	1550	650	750	1750	1550
2350	75	65	550	1400	600	1650	1550	650	750	1750	1550	650	750	1750	1550	

NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 75°F + 10%; 100°F + 20%; 125°F + 30%; 150°F + 40%  
 DATA AS OF 7/1/47  
 BASED ON: FLIGHT TEST

POWER PLANT SETTINGS: 2300 RPM & F.T.  
 DATA AS OF 7/1/47  
 BASED ON: FLIGHT TEST

FUEL USED (U.S. GAL.) INCLUDES WARM-UP & TAKE-OFF ALLOWANCE

REMARKS:  
 NOTE: TO DETERMINE FUEL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12

LEGEND:  
 I.A.S. : INDICATED AIRSPEED  
 M.P.H. : MILES PER HOUR  
 KTS. : KNOTS  
 F.P.M. : FEET PER MINUTE  
 F.T. : FULL THROTTLE

OPTIMUM LANDING IS BOX OF CHART VALUES

Figure A-3. Take-Off, Climb and Landing Chart—L-17A Airplanes.



AIRCRAFT MODELS		ENGINE MODEL																	
L-17B and L-17C		CONTINENTAL 0-470-7																	
TAKE-OFF, CLIMB & LANDING CHART		TAKE-OFF DISTANCE FEET																	
GROSS WEIGHT LB.	HEAD WIND	HARD SURFACE RUNWAY				SOD-TURF RUNWAY				SOFT SURFACE RUNWAY									
		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
2750	0	800	1650	1000	1950	1300	2450												
	15	450	1100	600	1250	750	1600												
	30	200	700	250	800	350	950												
2350	0	600	1100	750	1350	950	1750												
	15	350	700	400	800	550	1250												
	30	150	400	200	500	250	650												
	45	50	300	50	350	100	450												

CLIMB DATA		AT 6000 FEET				AT 9000 FEET				AT 12,000 FEET			
GROSS WEIGHT LB.	AT SEA LEVEL	BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB	
		MPH	KTS	F.P.M.	PER CENT	MPH	KTS	F.P.M.	PER CENT	MPH	KTS	F.P.M.	PER CENT
2750	95	80	730	3	95	80	570	5	5	95	80	410	11
2350	95	80	980	3	95	80	790	3.5	4	95	80	610	8

LANDING DISTANCE FEET		HARD DRY SURFACE				FIRM DRY SOD				WET OR SLIPPERY			
GROSS WEIGHT LB.	BEST IAS APPROACH	AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
		POWER OFF	POWER ON	MPH	KTS	MPH	KTS	MPH	KTS	MPH	KTS	MPH	KTS
2750	75	65	75	65	1550	650	1750						
2350	75	65	75	65	1400	600	1550						

FLIGHT TEST		FLIGHT TEST	
DATA AS OF	POWER PLANT SETTINGS	DATA AS OF	POWER PLANT SETTINGS
9/3/47	2300 RPM & F.T.	7/1/47	2300 RPM & F.T.

NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 120' & 100' & 200'; 100' & 200'; 120' & 100'; 150' & 400'

BASED ON: 9/3/47

BASED ON: 7/1/47

BASED ON: 7/1/47

BASED ON: 7/1/47

OPTIMUM TAKE-OFF WITH 2600 RPM, F.T. HALF FLAP IS USE OF CHART VALUES

FUEL USED (U.S. GAL.) INCLUDES WARM-UP & TAKE-OFF ALLOWANCE

LEGEND

I.A.S. : INDICATED AIRSPEED  
 M.P.H. : MILES PER HOUR  
 KTS. : KNOTS  
 F.P.M. : FEET PER MINUTE  
 F.T. : FULL THROTTLE

OPTIMUM LANDING IS 80% OF CHART VALUES

Figure A-4. Take-Off, Climb and Landing Chart—L-17B and L-17C Airplanes.

AIRCRAFT MODEL(S) L-17A, L-17B, AND L-17C		EXTERNAL LOAD ITEMS NONE		FLIGHT OPERATION INSTRUCTION CHART		NUMBER OF ENGINES OPERATING: 1					
ENGINE(S): CONTINENTAL O-470-7		CHART WEIGHT LIMITS: 2750 OR LESS POUNDS		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE READ BEST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.		NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS 11, 111, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER MI. (G.P.M.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND); TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.M.) MILITARY U.S. GAL. (OR G.P.M.) BY 10 THEN DIVIDE BY 12.					
COLUMN I		COLUMN II		COLUMN III		COLUMN IV		COLUMN V			
RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES			
STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL		
310	265	420	365	780	675	810	700	810	700		
265	230	360	310	640	555	660	570	660	570		
220	190	300	260	500	430	515	445	515	445		
175	150	240	205	355	305	370	320	370	320		
130	115	180	155	210	180	220	190	220	190		
85	75	120	100	140	120	150	130	150	130		
40	35	60	50	70	60	75	65	75	65		
MAXIMUM CONTINUOUS		PRESS		PRESS		PRESS		PRESS			
M.P. INCHES	MIX-TURE	ALT. FEET	T.A.S. GPH	M.P. INCHES	MIX-TURE	ALT. FEET	T.A.S. GPH	M.P. INCHES	MIX-TURE		
2300 F.T. RICH	12	143	124	2180 F.T. RICH	12	147	128	1750 F.T. RICH	12	143	124
2300 F.T. RICH	13.5	147	127	2050 F.T. RICH	12	143	124	1800 F.T. RICH	12	143	124
2300 F.T. RICH	15.5	151	131	2050 F.T. RICH	11.5	137	119	1750 F.T. RICH	11.5	137	119
2300 F.T. RICH	16.5	152	132								
2300 F.T. RICH	17.5	154	133								

**SPECIAL NOTES**

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB PLUS ALLOWANCE FOR WIND AND RESERVE AS REQUIRED.

(2) THERE IS NO "LEAN" POSITION ON MIXTURE CONTROL. LEAN TO POINT OF ENGINE ROUGHNESS, THEN ENRICH SLIGHTLY. (REFER TO SECTION 11, "DURING FLIGHT.")

CAUTION: FOR MAXIMUM ENGINE LIFE, DO NOT EXCEED MANIFOLD PRESSURE FOR LISTED RPM.

**EXAMPLE**

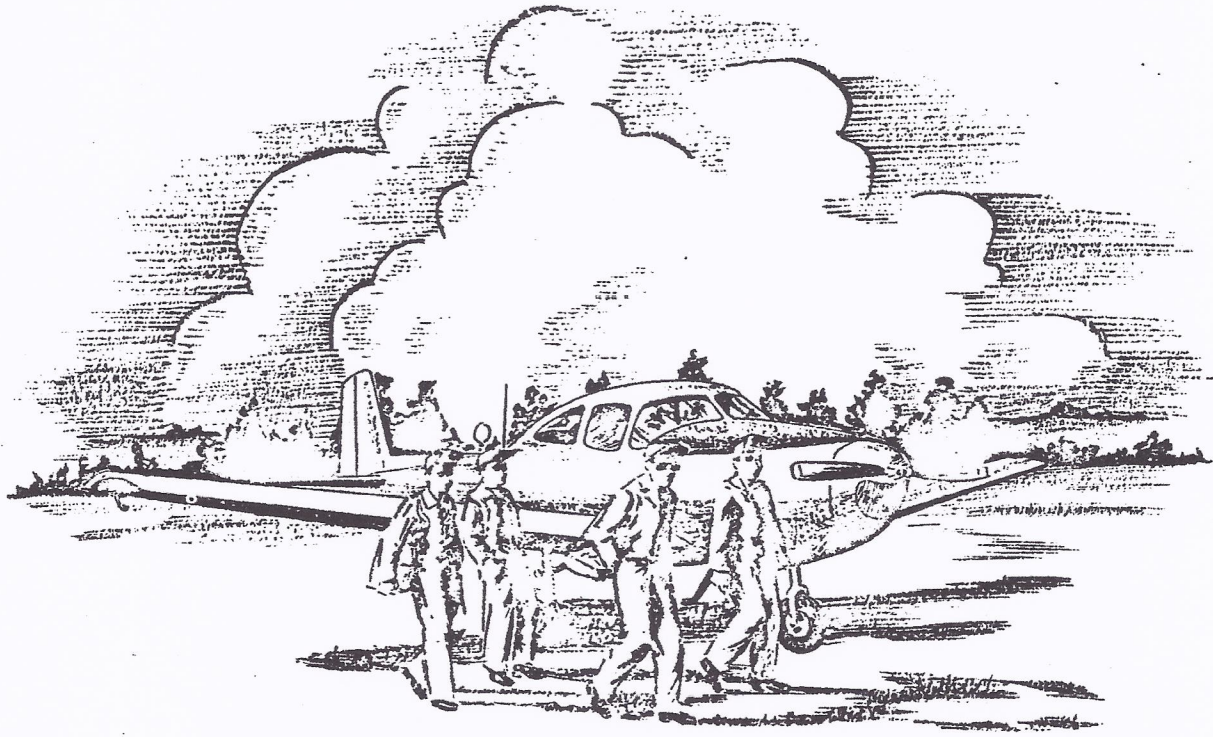
AT 2700 LB. GROSS WEIGHT WITH 35 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 9.5 GAL.) TO FLY 500 STAT. AIRMILES AT 6000 FT. ALTITUDE MAINTAIN 1800 RPM AND 19.7 IN. MANIFOLD PRESSURE WITH MIXTURE SET: LEAN

**LEGEND**

ALT : PRESSURE ALTITUDE F.R. : FULL RICH  
M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH  
SPM : U.S. GAL. PER HOUR A.L. : AUTO-LEAN  
TAS : TRUE AIRSPEED C.L. : CRUISING LEAN  
RPM : RPM KTS. : KNOTS M.L. : MANUAL LEAN  
S.L. : SEA LEVEL F.T. : FULL THROTTLE

DATA AS OF 4/25/49 BASED ON: FLIGHT TEST

Figure A-5. Flight Operation Instruction Chart.



## INTRODUCTION

Manual is issued as a pilot's guide for the operation of the Navion Range Master. A concerted effort has been made to present the material in a clear and convenient manner, to the pilot to use the Manual as a ready reference check list.

Navion Range Master is a low-wing, five dual-controlled aircraft powered by a air-cooled engine. Clean aerodynamic designed structural sturdiness are evident in metal, semi-monocoque construction. Res are of aluminum alloy construction designed to ultimate load factors meet F.A.A. requirements. Each of the more than 300 internal structural components are usually sprayed with zinc chromate compound assembly, to prevent rust and oxidation (one) of the various metals incorporated in Navion. Navion Aircraft feels this precaution a necessity because of the aircraft's world wide operation and the fact any aircraft there are certain places where is little or no access for maintenance.

ble tricycle landing gear, steerable wheel, wing flaps, large cabin door, and compartment on the pilot's side, and upholstered interior combine features of efficiency with private flying requirements. Luxury and convenience. Safety and control in all flight maneuvers are provided by the inherent stability and balance of

control forces characteristic of the airplane. Years of engineering experience and advanced manufacturing technique have produced these qualities in the Navion.

Your co-operation in reporting any problems concerning operation and maintenance of the Navion Range Master is solicited. Reports such as these are an important factor in rendering prompt and efficient service, and also in improving the design and operation of our aircraft.

Kemp Bourne, Vice President  
NAVION AIRCRAFT CORPORATION

Additional copies of this Manual may be purchased by writing to the Sales Division, Navion Aircraft Corporation, P.O. Box 110, Seguin, Texas 78155.

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DESIGN FEATURES

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Max. Gross Wgt. - 3315  
Navion H

Engine	Continental - 10-520-B	
HP & RPM	285 HP @ 2700	
Gross T.O. Wgt. (lbs)	3315	
Empty Wgt. Dry (average w/standard eqpt.)	2000 ± 50	
Useful Load (lbs)	1300	
Wing Span (ft.)	34' 9"	
Wing Area (Sq.Ft.)	184.33	
Length (ft.)	27' 10"	
Height (ft.)	8' 6"	
Prop Dia. (Max.in.)	85"	
Power Loading (lbs. per Sq.Ft.)	11.63	
Wing Loading (lbs. per Sq.Ft.)	18	
Baggage Capacity (lbs.)	190	
Fuel Capacity Main Tanks (U.S. Gal.)	39.5	
	(lbs.)	237
Fuel Capacity Tip Tanks (34 US gal. ea.)	68	
Total Fuel Capacity (US gal.)	408	
	(lbs.)	107.5
Top Speed (MPH)	645	
Cruising Speed (73% power @ 7500 ft.MPH)	203	
Best Economy Cruise (50% power @ 7500 ft.MPH)	180	
Fuel Consumption (Gal/hr. @ 73% power)	12000 ft.MPH	165
Fuel Consumption (Gal/hr. @ 50% power)	7500 ft.)	14.8
Fuel Consumption (Gal/hr. @ 50% power)	12000 ft.)	10.6
Cruise Range (Miles @ 73% power 7500 ft.)	*1200	
Cruise Range (Miles @ 50% power 12000 ft.)	*1500	
*Plus 30 min. reserve		

Stalling Speed (Flap & Gear Down MPH)	55
Best Rate of Climb Speed (MPH)	105
Best Rate of Climb (Ft. per Min.)	1200
Take Off Run (Ft.)	975
Landing Roll (Ft. Flaps Down)	950
Service Ceiling (Ft)	20500
Absolute Ceiling (Ft)	20500
Wheel Base (Ft)	5' 8 1/2"
Wheel Tread (Ft)	8' 7 1/2"
Tire Pressure (lbs. Nose)	30
Tire Pressure (lbs. Main)	40 - 50
Minimum Fuel Octane	100/300

**NAVION N842JW**

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**EXTERIOR CHECK**

Fuel - Drain main tank  
 Brake Lines / Tire  
 Hydraulic level  
 Oil level /Cap  
 Prop - Air Filter  
 Nose Tire  
 Cap/Quantity - Main tank  
 Fuel - Drain Aux tank and  
 Tip tanks  
 Brake Lines / Tire  
 Pitot Tube  
 Cap/Quantity - Aux tank  
 Control Surfaces/Hinges

**STARTING**

Seat Belts - **Fasten**  
 Brake - **Set**  
 Sweep - **Switches/CB's**  
 Gas - **Main**  
 Mixture - **Rich**  
 Cowl Flaps - **Open**  
 Prop - **Full**  
 Throttle- Open 1/4"  
 HYD PWR - **ON**  
 Flaps - **UP**  
 Gear - **Down**  
 Master - **3 Green**  
 Fuel Pump on 5-9 sec off  
 Start

**AFTER START**

GEN - **ON**  
 Oil - **20 - 65psi**  
 HYD PRESS - **UP**  
 Radio Master **ON**  
 ATIS  
 Altimeter

**TAXI**

Brakes - **Check**  
 Flaps - **Cycle**  
 Controls- **Check**  
 Trim - **Set**  
 Compass/Turn & Bank  
 Vacuum System - **Check**

**RUN UP**

Oil -Check **20 - 60psi**  
 Voltmeter - Check **~14volts**  
 Temp. **75 - 240**  
 Fuel Pres. stable  
 Mixture - **Rich**  
 1700rpm - **100 drop max**  
 Prop - Cycle **1500-1700rpm**  
 Alt. Air Source - **Check**

**BEFOR TAKEOFF**

Pitot Heat **AS REQ'D**  
 Vac System **CHECK**

GAS	<b>MAIN</b>
MIXTURE	<b>RICH</b>
COWL FLAPS	<b>OPEN</b>
PROP	<b>FULL</b>
TRIM	<b>SET</b>
FLAPS	<b>AS REQ'D</b>
DG	<b>SET</b>
AUTOPILOT	<b>ON</b>

Vx 85	Vy 105
Vso 50	Vs1 64
Vm 132	
Vno 169	Vne 190





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**CRUISE**

Hydr. - Off (yellow light out)  
 Cowl Flaps - close <400  
 Lean - EGT<1400  
 VOLTS - Check

22"x 22 = 14.0gph  
 23"x 23 = 16.2gph  
 25"x 25 = 18.5gph

**FUEL PROCEDURE**

Burn main tank -Until Less Than  
 10 GAL in Main  
 (39.5 MAX CAP)

Tip tank procedure- burn fuel  
 from each tank to purge air  
 then turn on crossfeed with  
 either tip tank selected.  
 Alternative is to switch tip  
 tanks every 15 to 30 min.

Open AUX Transfer Valve  
 (20GAL MAX CAP)

If Engine Sputters:

SWITCH TO MAIN TANK  
 OPEN TRANSFER VALVE  
 FUEL PUMP - ON

**APPROACH**

Hydr.	On
Gas	Main
Mixture	Rich
Prop	As Req'd

**BEFORE LANDING**

Gas	Main
U(GEAR)	Hydraulic Power ON GEAR DOWN
Mixture	RICH
Prop	Full
Seatbelts	ON
Flaps	Down

**AFTER LANDING**

Flaps	Up
Cowl Flaps	Open
Mixture	Lean
Pitot Heat	Off

**SHUT DOWN**

1000rpm - 3 min.	
Autopilot	OFF
Radio Master	OFF
Alternator	OFF
Mixture	Full Lean
MAGS	OFF
Master	OFF
Parking Brake	OFF

Sav Approach 118.4 ATIS 123.75  
 AGS Approach 126.8 ATIS 132.75  
 CAE Approach 133.4 ATIS 120.15  
 Flight Watch 122.0 -  
 Air to Air & Private Fields 122.75, 122.85  
 FSS 122.2, 122.65, 122.45, 122.1R, 122.6 (MACON)  
 JAX CENTER 132.5  
 ATL CENTER 135.55  
**EMERGENCY 121.5 Skawk 7700**