Pilot's Handbook
of
Flight Operating Instructions

NAVY MODEL
J2F-6 Airplane

THIS PUBLICATION SUPERSEDES NAVAER 01-220QA-1
DATED 1 DECEMBER 1944

PUBLISHED BY AUTHORITY OF
THE CHIEF OF THE BUREAU OF AERONAUTICS

This publication shall not be carried in aircraft on combat missions or when there is a reasonable chance of its falling into the hands of the enemy

15 July 1945

POLICY GOVERNING DISTRIBUTION AND USE OF THIS PUBLICATION

Instructions Applicable to Navy Personnel:

1. Navy Regulations, Article 76, contains the following statements relating to the handling of restricted matter:

"Par. (9) (*a*). Restricted matter may be disclosed to persons of the Military or Navy Establishments in accordance with special instructions issued by the originator or other competent authority, or in the absence of special instructions, as determined by the local administrative head charged with custody of the subject matter."

"(*b*) Restricted matter may be disclosed to persons of discretion in the Government Service when it appears to be in the public interest."

"(*c*) Restricted matter may be disclosed, under special circumstances, to persons not in the Government service when it appears to be in the public interest."

2. The Bureau of Aeronautics Aviation circular Letter No. 90-44 contains the following paragraph relative to the use of aeronautical technical publications:

"Par. 8. *Distribution to All Interested Personnel.* In connection with the distribution of aeronautical publications within any activity, it should be borne in mind by the offices responsible for such distribution that technical publications, whether confidential or restricted, are issued for use not only by officer personnel, but also by responsible civilian and enlisted personnel working with or servicing equipment to which the information applies."

3. Disclosure of technical information in this publication may not be made to representatives of foreign governments or nationals except in instances where those foreign governments have been cleared to receive information concerning all equipments, or other technical data covered by this publication.

Instructions Applicable to Army Personnel:

1. This publication is intended for technical aid and education of military and civilian personnel engaged in promotion the war effort. Its maximum distribution and use is therefore encouraged. However, since the publication is "confidential" within the meaning of AR380-5, the following security regulations will be observed:

a. Members of Armed Forces and civilian employees of War Department will be given access to this publication whenever required to assist in the performance of their official duties (including expansion of their knowledge of AAF equipment, procedures, etc.).

b. Personnel of War Department contractors and subcontractors may be given possession of this publication, on a loan basis, or knowledge of its contents, only when required to assist in the performance of War Department contracts. Releases will be made in accordance with the requirements of T. O. No. 00-5-2.

c. Representatives of other governments will be given possession of this publication, or knowledge of its contents, only in accordance with AAF Letter No. 45-6.

2. This publication is restricted because the information contained in it is restricted. It does not follow that the physical article to which it relates is also restricted. Classification of the materiel or component must be ascertained independently of the classification of this document.

3. Neither this publication nor information contained herein will be communicated to press or public except through Public Relations channels.

FOR OFFICIAL USE ONLY.—Not to be communicated to anyone outside of his Majesty's service. Not to be published. The information given in this document is not to be communicated, either directly or indirectly to the press or to any person not holding an official position in his Majesty's service.

LIST OF REVISED PAGES ISSUED

NOTE.—A heavy black vertical line, in the outer margin of revised pages (the left margin for left-hand columns, and the right margin for right-hand columns), indicates the extent of the revision. This line is omitted where more than 50 percent of the page is revised.

BuAer

ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:

AAF ACTIVITIES.—In accordance with T. O. No. 00-5-2, base Air Inspectors, Technical will submit requisitions (AAF Form 104B) to:

Commanding General
Fairfield Air Technical Service Command
Patterson Field
Fairfield, Ohio
Attn: Publications Distribution Branch

NAVY ACTIVITIES.—Submit requests to Chief, BuAer, Navy Department, Washington, D. C., Attention: Publications Branch on order form NAVAER-140. For complete listing of available material and details of distribution see Naval Aeronautical Publication Index, NavAer 00-500.

BRITISH ACTIVITIES.—Submit requirements on Admiralty Form S. 134D to the Naval Store Officer, Royal Navy Store Depot, 191A, Eskew Road, Shepherds Bush, London, W. 12, England.

FOREWORD

This handbook is prepared for the purpose of familiarizing the flying personnel with the take-off, flying and landing characteristics of the J2F-6 utility airplane; the function of its particular systems and installations; and the operation of its various automatic and manual controls.

For service and maintenance instructions refer to the Model J2F-6 Erection and Maintenance Manual, NavAer 01-220QA-2.

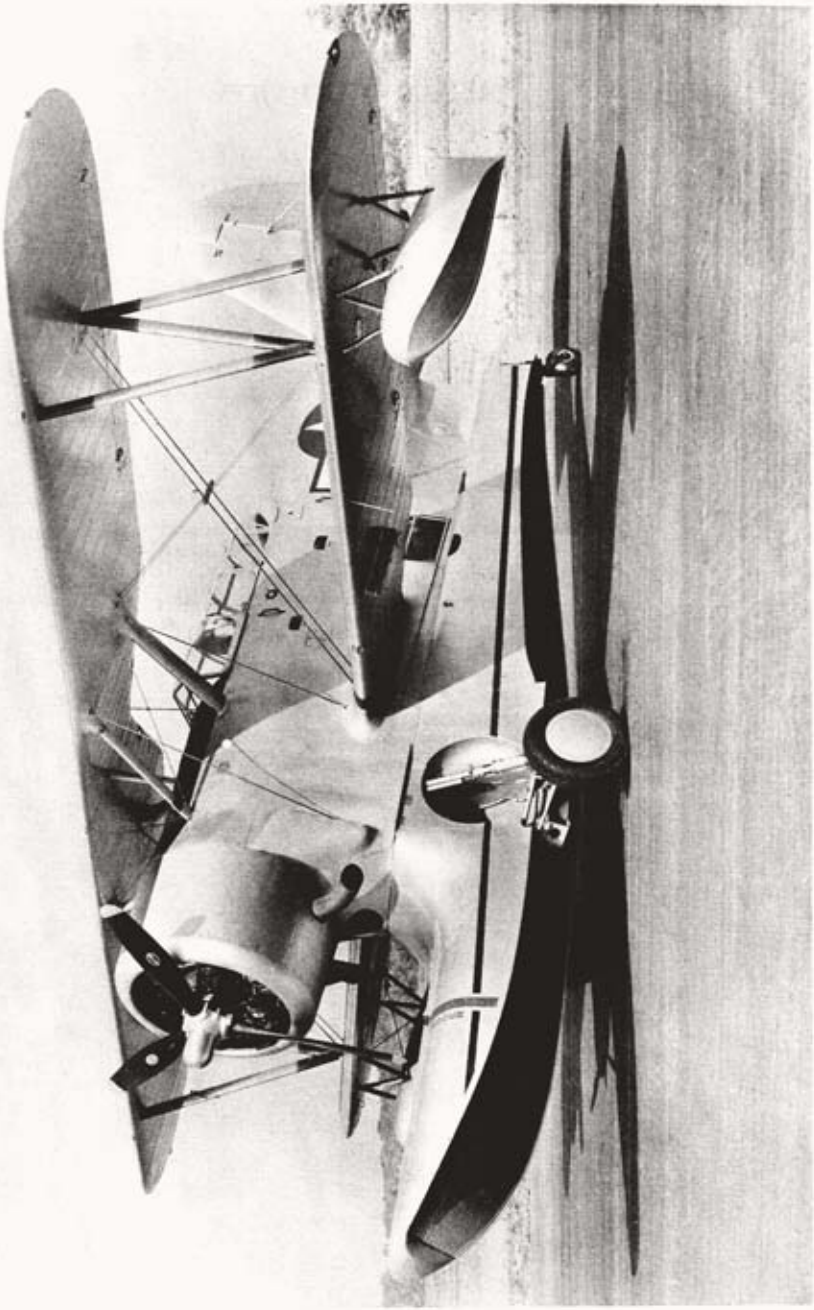


Figure 1.—Exterior view—J2F-6 airplane.

TABLE OF CONTENTS

ILLUSTRATIONS AND CHARTS

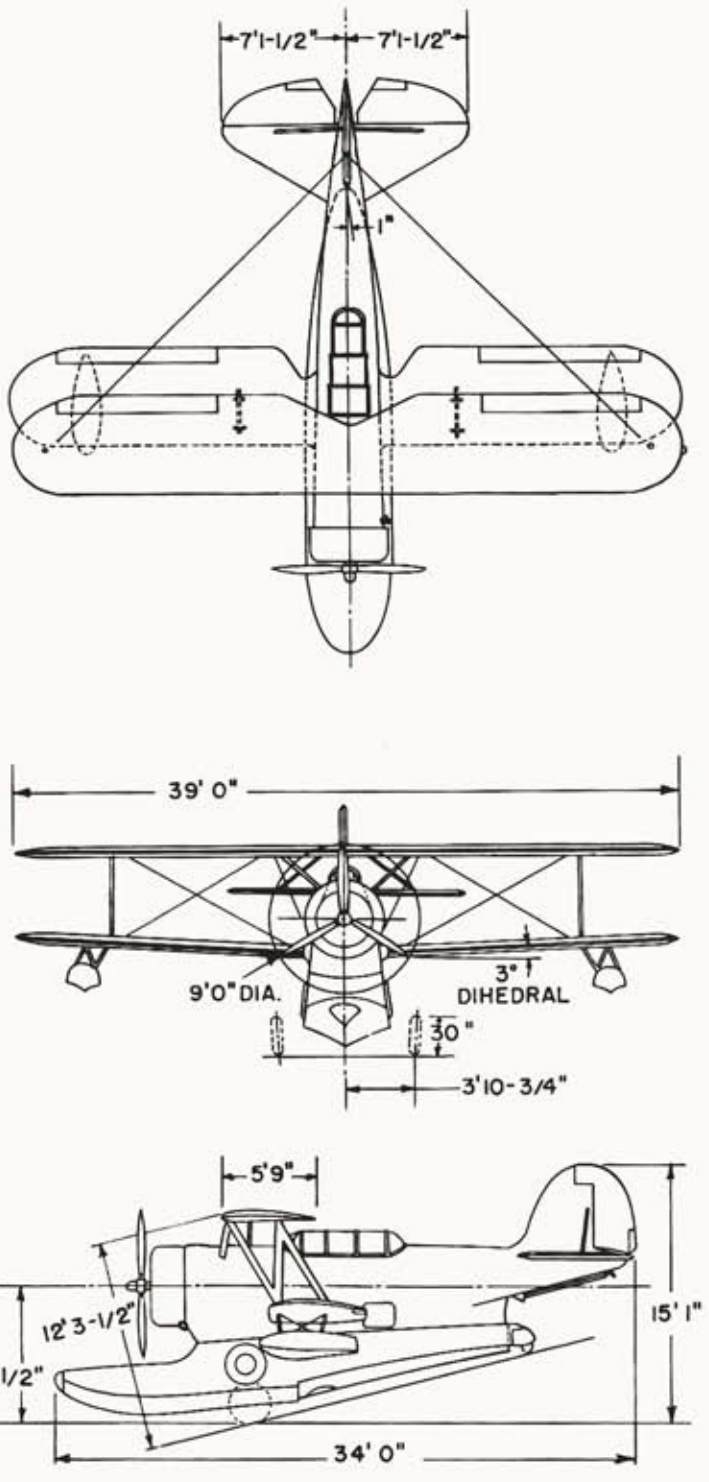


Figure 2.—General arrangement.

SECTION 1
COCKPIT ARRANGEMENT AND CONTROLS

The arrangement of the controls and instruments in the pilot's and gunner's cockpits is shown in accompanying illustrations. In general, the name and direction of operation is indicated by a name plate adjacent to each control knob or handle.

1. FLYING CONTROLS.

a. AILERON, ELEVATOR AND RUDDER.—Standard stick and foot pedals in both cockpits.

b. TRIM TAB CONTROLS.—*Aileron tab*—Permanently fastened to the inboard end of the trailing edge of right upper aileron and is adjustable by hand bending only when airplane is on the ground. *Elevator tab*—Hand crank to the left of the pilots' seat. Indicator on unit shows position of the tab.*Rudder tab*—Handwheel on pilot's left hand shelf. Position of tab is indicated on wheel face.

c. RUDDER PEDAL ADJUSTMENT.—Toe levers on pilot's pedals. Adjustable to three positions in flight.

d. LANDING GEAR AND TAIL WHEEL RETRACTING CONTROLS.—Handcrank on right side of pilot's cockpit. Clockwise rotation raises the landing gear and tail wheel. Ratchet release controlled by small lever just aft of the hand crank.

e. WARNING INDICATORS.—Two arrow pointers on the pilot's right hand shelf, just forward of the landing gear handcrank, indicate the position of the main wheels when operating the landing gear mechanism

f. TAIL WHEEL CASTER LOCK CONTROL.—Lever with knob on pilot's left hand shelf. Locked position of knob is aft. Locked for take-off and landing, and unlocked for taxiing.

g. WATER RUDDER CONTROL.—Control knob on pilot's auxiliary instrument panel. Pull out to engage and push in to disengage the water rudders.

2. POWER PLANT CONTROLS.

a. CARBURETOR AIR CONTROL.—Push-pull knob on bulkhead to right of pilot's auxiliary instrument panel.

NOTE

Carburetor air shall be left on DIRECT at all times unless icing conditions or severe rains are encountered, when control shall be placed in full ALTERNATE position. The ALTERNATE position shall also be used for water landings. Never use an intermediate position of the control.

b. FUEL TANK SELECTOR.—Standard dial and handle, below pilot's left hand shelf. Three positions: MAIN, AUXILIARY, and OFF.

c. AUXILIARY TANK DUMP VALVE.—Below pilot's left hand shelf adjacent to tank selector valve control.

d. IGNITION SWITCH.—On the left hand side of the pilot's main instrument panel.

e. ELECTRIC AUXILIARY FUEL PUMP.—Rheostat control located on pilot's auxiliary instrument panel.

f. OIL COOLER TEMPERATURE CONTROL AND BY-PASS VALVE.—Atached to oil cooler—automatic in operation.

g. PROPELLER CONTROL.—Control knob located on aft portion of engine control quadrant on left hand shelf of pilot's cockpit. Downward motion of the knob increases RPM (decreases pitch).

h. PRIMER SWITCH.—Switch is located on the right hand side of the pilot's instrument panel, adjacent to starter switch.

i. STARTER CONTROL. — Starter control toggle switch on right hand side of pilot's main instrument panel, adjacent to the primer switch.

j. SUPERCHARGER.—Control knob located in the control quadrant on the left hand shelf of pilot's cockpit. Forward position—"LOW" ratio; aft position—"HIGH" ratio.

k. THROTTLE AND MIXTURE CONTROLS.—On control quadrant on left hand shelf of pilot's cockpit. Throttle lever only in rear cockpit.

l. STARTING HAND CRANK.—In clips in anchor compartment aft of the fire wall.

3. AUXILIARY CONTROLS.

a. ARRESTING HOOK CONTROL.—Control handle in a slide on the left hand side of pilot's cockpit under enclosure rail. Push handle forward to raise hook; pull handle aft to lower hook. Handle locks in either the hook up or hook down position by rotating downward.

b. BRAKE PEDAL CONTROL.—Front cockpit only. Rods of brake master cylinders are adjustable for length.

c. COCKPIT LIGHTS.—Four spotlights, one on each side of each cockpit. Two fluorescent spotlights in pilot's cockpit only.

d. COCKPIT ENCLOSURE OPERATING CONTROL.—Large handle in slide tube on right hand side of pilot's cockpit. Handle may be latched in any one of three positions: closed, one-third open, and full open. Latch on right hand side of rear cockpit sliding cover locks the enclosure in either open or closed position. Small knob on rear hinged section locks the hinged section in any one of three positions. Both sliding cockpit enclosures may be locked or unlocked from the outside while in the closed position by access through small doors on the right side of the fuselage.

WARNING

Side windows of lower camera compartment shall be kept closed at al times during flight to prevent concentration of carbon monoxide.

e. ELECTRICAL DISTRIBUTION PANELS.—Front cockpit—on right hand shelf. Rear cockpit—below left hand cockpit shelf. Lower compartment—on right hand side.

WARNING

Note that the front cockpit switch marked "Battery" is the main control for the electric power supply of the airplane. When this switch is turned off all electrical units, including the radio, will be inoperative.
DUE CARE MUST ALWAYS BE TAKEN TO TURN THIS SWITCH OFF BEFORE LEAVING AIRPLANE FOR ANY LENGTH OF TIME.

f. SEAT ADJUSTMENT.—The pilot's seat is vertically adjustable. Control lever is on right side of seat.

4. USEFUL LOAD CONTROLS.

a. CAMERA LIGHT SWITCH.—Toggle switch on photographer's electrical panel in lower compartment. Two positions: Manual—Operates pilot's camera light. Intervalometer—pilot's camera light flashes when shutter opens.

b. OXYGEN EQUIPMENT.

(1) GENERAL.—Three separate oxygen systems are provided for the crew. Each system uses an NAF-1135-23 oxygen cylinder, an AN6004-1 diluter-demand regulator (Pioneer Instrument Company) an AN6029-1 flow indicator (Pioneer Instrument Company) and an oxygen mask with the necessary fittings.

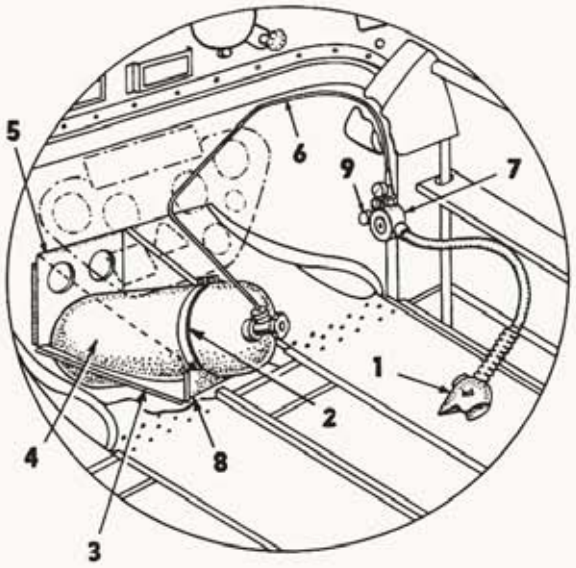


Figure 2A—Pilot's Oxygen System

FIGURE 2A—PILOT'S OXYGEN SYSTEM

1. Mask
2. Strap
3. Trough
4. Bottle
5. Support
6. Tube Assembly
7. Regulator
8. Support
9. Indicator

(a) PILOT'S COCKPIT. *(See Figure 2A.)*—The oxygen cylinder is located between the rudder pedals with the shut-off valve facing aft. The cylinder is readily replaced by loosening one clamp securing the cylinder to its mounting bracket. A diluter-demand regulator with flow indicator is mounted on a bracket on the starboard side of the airplane at Station No. 5.

NOTE

Airplanes Serial Nos. 36935 to 37009 originally had the pilot's oxygen cylinder under the pilot's seat. Bureau of Aeronautics Model J2F-6 Service Change No. 9 relocates the pilot's oxygen cylinder to its present location.

(b) OBSERVER'S COCKPIT. *(See Figure 2B.)*—The oxygen cylinder is located aft of the photographer's back rest under the observer's floor with the shut-off valve toward the starboard side of the airplane. The cylinder may be replaced by loosening the two straps around it, accessible from the photographer's compartment. The diluter-demand regulator with flow indicator is mounted on a bracket on the starboard side of the fuselage adjacent to the drift sight door.

NOTE

The shut-off valve for the observer's oxygen supply is not accessible from the observer's seat in flight. If a flight is anticipated where oxygen will be used the shut-off valve for the observer's oxygen supply should be opened before take-off if the photographer's compartment is not occupied during the flight.

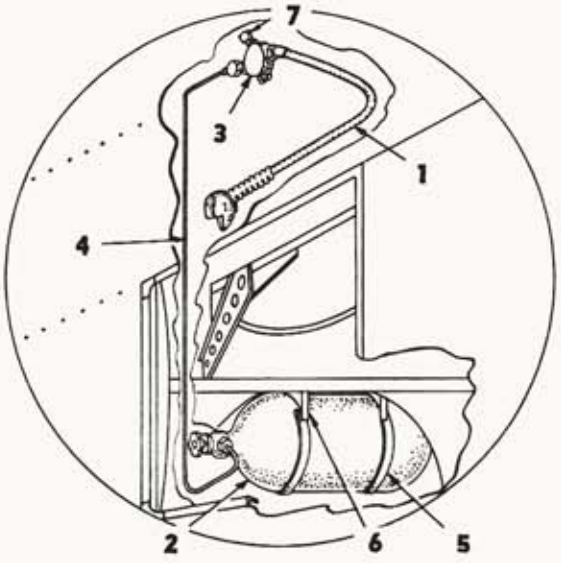


Figure 2B—Observer's Oxygen System

FIGURE 2B—OBSERVER'S OXYGEN SYSTEM

1. Mask
2. Bottle
3. Regulator
4. Tube Assembly
5. Strap
6. Support

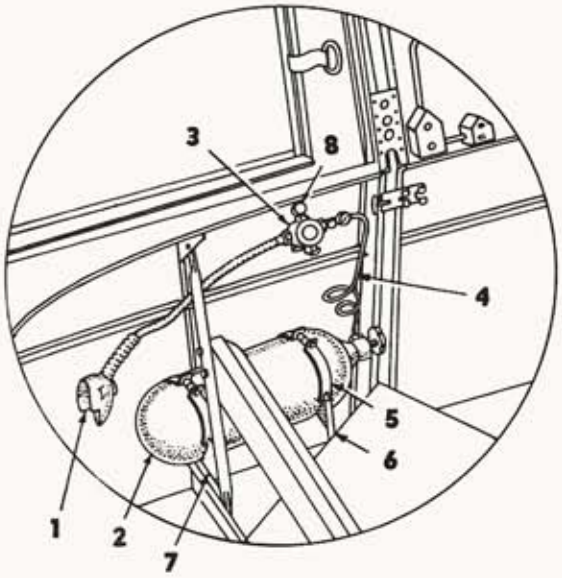


Figure 2C—Photographer's Oxygen System

FIGURE 2C—PHOTOGRAPHER'S OXYGEN SYSTEM

1. Mask
2. Bottle
3. Regulator
4. Tube Assembly
5. Strap
6. Support
7. Indicator
8. Indicator

(c) PHOTOGRAPHER'S COMPARTMENT. *(See Figure 2C.)*—The oxygen cylinder is located on the port side of the photographer's seat, with the shut-off valve facing forward and is readily replaced by loosening two straps which secure it to its brackets. A diluter-demand regulator with flow indicator is mounted on a bracket located on the port side of the hull just above the oxygen cylinder.

(2) USE OF OXYGEN.—During normal operations the diluter lever should be turned to the "ON" position and the emergency valve (small red knob on the regulator) turned "OFF". This allows air from the outside to enter the breathing system at altitudes from sea level to approximately 30,000 feet after which 100 per cent oxygen is automatically delivered to the oxygen mask, thus obtaining maximum economy and endurance from the oxygen supply. The emergency valve (small red knob on the regulator) should be opened slowly to the minimum required in the event of failure of the diluter-demand regulator or symptoms of oxygen deficiency such as drowsiness, dizziness, diminution of vision or nausea should occur. Oxygen should be used on all flights above 10,000 feet or night flights above 5,000 feet. The diluter-demand regulator is equipped with a flow indicator which blinks when there is a flow of oxygen through the regulator. If the flow indicator stops blinking with the regulator in normal operation immediately turn on the emergency valve to the minimum oxygen required. Exception to this may

occur on the ground as there is very little flow of oxygen through the regulator with normal operation.

(3) The following items should be checked prior to flights where oxygen may be used to assure proper functioning of the oxygen systems.

(a) Check regulator valve which should be in the "OFF" position.

(b) Open cylinder shut-off valve. After a period of 10 seconds the pressure gage should read 1800 ± 50 p.s.i. for a fully charged cylinder.

(c) Close cylinder valve. If pressure drops more than 100 p.s.i. in five minutes check for leakage.

(d) Check oxygen mask for fit by placing thumb over end of mask tube and inhale lightly. The mask should adhere to the face if it does not leak. If mask leaks adjust or replace it. Never check a mask with the EMERGENCY FLOW "ON". Never use a mask that leaks.

(e) Couple mask securely to breathing tube by means of quick disconnect coupling.

c. RADIO CONTROLS.

(1) Airplanes Serial No. 36935 to 37034, inclusive, 32637 to 32739, inclusvie, and 32741 to 32786, inculsive, are equipped as follows: *(See Figures 3 and 4.)*

(a) GENERAL.—The radio equipment consists of the radio communication system, the interphone system, the radio navigational equipment and the ABK, ABA, IFF equipment.

(b) COMMUNICATION SYSTEM.—The communication system consists mainly of a GP-7 transmitter and an RU-19 receiver both located in the observer's cockpit. The GP-7 transmitter is controlled by a CAY-23219 control box located on the starboard side of the pilot's cockpit. A CAY23219 control box is also located on the starboard side of the photographer's compartment. A CAY23220 control box is located on the starboard side of the observer's cockpit. Each of these control units are provided with outlets for microphone and headset. The RU-19 receiver is controlled by a CW-23087 control box located on the starboard side of the pilot's cockpit, a CW-23012 remote tuner located on the starboard shelf in the pilot's cockpit. An FSSC-16-C-34225 hi-lo switch located on the starboard shelf in the pilot's cockpit changes the frequency of the RU-19 receiver. Three spare coils are located on the shelf under the observer's floor at Station No. 8. Changing coils in the RU-19 receiver must be accomplished from the observer's cockpit as the receiver is inaccessible from the pilot's cockpit. Power supply (D.C.) for the RU-19 receiver is supplied from the battery or generator and the radio receiver may be operated without the engine running. Power supply (A.C.) for the GP-7 transmitter is supplied directly from the engine generator which is an AC-DC type. The transmitter will not operate unless the engine is running at least 1200 RPM and the generator cutout switch is closed.

(c) INTERPHONE SYSTEM.—The interphone system is incorporated in the RU-19 radio receiver and does not form a separate unit by itself. A microphone and headset are located in the pilot's cockpit, the observer's cockpit and the photographer's compartment. Pressing the microphone push button on any one of the microphones with the ICS radio switch in the ICS position connects all head phones to the interphone amplifier output giving clear interphone communication with no interference from the radio receiver. With the ICS radio switch in the radio position the microphone push button brings the radio transmitter into the circuit.

(d) RADIO NAVIGATIONAL EQUIPMENT.—An NAF214084 DU-1 direction finder is located on the shelf in the center of the airplane forward of the observer's cockpit. A ZB-3 homing adapter is located on the starboard side of the observer's cockpit and is controlled by a CZR-23214 ZB-3 control box located on the starboard side of the pilot's cockpit.

(e) ABK, ABA, IFF EQUIPMENT.—The IFF radio equipment is located in the fuselage aft of the observer's seat with provisions for the mounting of a control unit on the port side of the pilot's cockpit. A destructor switch is located in the pilot's cockpit on the starboard side of the airplane. An impact switch is located on bulkhead No. 7 which is an approximate location of the center of gravity of the airplane. The destructor unit which explodes within the receiver is operated manually by the destructor switch or automatically by the impact switch in the event of a crash landing. A detailed description and operational instructions for this equipment will be found in applicable Navy publications.

(f) ANTENNAE.—This airplane is equipped with the following antennae.

1. A "V" antenna for receiving and transmitting runs from the vertical stabilizer to each wing tip.

2. A trailing antenna used for receiving and transmitting is reeled out and in from a reel located on the port side of the observer's cockpit. A CAY-47125 antenna loading coil located on the port side of the observer's cockpit is used with this antenna.

3. A rotating loop antenna is installed under the fixed cabin hatch between the pilot's and observer's cockpits. This antenna is used with the NAF214084 DU-1 direction finder in conjunction with the ZB homing equipment.

4. An NAF48134-1 whip antenna is installed on the lower port wing and is used with the ZB-3 homing equipment.

5. An NAF48134-2 whip antenna is installed on the upper starboard wing and provisions for a whip antenna is made on the upper port wing. These antennae are used in conjunction with ABK, ABA, IFF radio equipment.

(2) Airplanes Serial No. 32740 and 33353 to 33614, inclusive, are equipped with the following radio equipment. *(See Figures 3A and 4A.)*

(a) GENERAL.—The radio equipment consists of the radio communication system, the interphone system, the radio navigational equipment and the IFF equipment. The main radio units are located in the

observer's cockpit with remote controls in the pilot's cockpit with the exception of the radio compass unit and the IFF equipment which are located in the fuselage aft of the observer's seat. A radio master switch and circuit breaker are located on the pilots distribution panel. Power for the radio equipment is supplied from the battery or engine generator. Each unit operates from an individual dynamotor. It is not recommended to operate the radio equipment without the engine running at least 1400 RPM with the generator cutout closed as the drain on the battery would be excessive.

(b) COMMUNICATIONS SYSTEM.—The communication system consists mainly of three transmitters and three receivers as follows:

1. T-19/ARC TRANSMITTER.—This is a high frequency (HF) transmitter with a frequency band of 3.0 to 4.0 megacycles using three types of emissions: continuous wave (CW), modulated continuous wave (MCW) and voice. This transmitter is controlled by a push button marked "2" on control unit C30/ARC-5 located on the starboard side of the pilot's cockpit.

2. T-21/ARC-5 TRANSMITTER.—This is a high frequency (HF) transmitter with a frequency band of 5.3 to 7.0 megacycles using three types of emissions: continuous wave (CW), modulated continuous wave (MCW) and voice. This transmitter is controlled by a push button marked "3" on control unit C30/ARC-5 located on the starboard side of the pilot's cockpit.

3. T-23/ARC-5 TRANSMITTER.—This is a very high frequency (VHF) transmitter with a frequency band of 100 to 156 megacycles using three types of emissions: continuous wave (CW), modulated continuous wave (MCW) and voice. This transmitter is controlled by four push buttons on control unit C30/ARC-5 located on the starboard side of the pilot's cockpit marked "A" to "D".

4. R-26/ARC-5 RECEIVER.—This receiver is designed for the reception of continuous wave (CW), modulated continuous wave (MCW) signals or voice on a frequency band of 3.0 to 6.0 megacycles and is controlled by a remote tuner on control unit C43/ARC-5 which is located on the starboard side of the pilot's cockpit.

5. R-27/ARC-5 RECEIVER.—This receiver is designed for the reception of continuous wave (CW), modulated continuous wave (MCW) signals or voice on a frequency band of 6.0 to 9.1 megacycles and is controlled by a remote tuner on control unit C43/ARC-5 which is located on the starboard side of the pilot's cockpit.

6. R-28/ARC-5 RECEIVER.—This is a very high frequency (VHF) receiver and is resigned for the reception of continuous wave (CW), modulated continuous wave (MCW) signals or voice on a frequency band of 100 to 156 megacycles. The frequency band is selected by four push buttons on control unit C30/ARC-5 marked "A" to "D".

(c) INTERPHONE SYSTEM.—The interphone system consists of an RL-9 interphone amplifying unit located in the observer's cockpit on the starboard side of the airplane, one RL-9 pilot's control and two RL-9 operator's controls, one in the observer's cockpit and one in the photographer's compartment. Pressing the microphone push button when the ICS Radio switch is in the ICS position operates a relay in each control box which connects all head phones to the interphone amplifier output giving clear interphone communications with no interference from the radio receiver. When the ICS Radio switch is in the radio position the microphone push button brings the radio transmitter into the circuit simultaneously connecting the microphone to the input of the transmitter and all head phones remain connected to the receiver output.

(d) RADIO NAVIGATIONAL EQUIPMENT.—The radio navigational equipment consists of a R-4A/ARR-2 receiver, a R-23/ARC-5 receiver and a SCR-269-F radio compass receiver.

1. R-4A/ARR-2 RECIVER.—This receiver is located in the observer's cockpit with a C-35/ARC control box located on the starboard side of the pilot's cockpit. A complete description and operational instructions of this receiver will be found in applicable Navy publications.

2. R-23/ARC-5 RECEIVER.—This receiver is designed for the reception of continuous wave (CW) or voice on a frequency band of 190 to 550 kilocycles and is controlled by a remote tuner in control unit C-26/ARC-5 which is located on the starboard side of the pilot's cockpit. In this installation, however, there is no provision for continuous wave (CW) reception.

3. SCR-269-F RADIO COMPASS. — This equipment consists of a BC-433-F radio compass unit located in the center of the fuselage aft of the observer's seat. An LP-21-F loop antenna is located on the top of the fuselage aft of the observer's cockpit. The BC-434-F control box for this equipment is located in the pilot's cockpit on the starboard side of the airplane. An I-81-F indicator located on the pilot's lower instrument panel indicates the angular position of the loop antenna. A complete description and operational instructions will be found in applicable publications.

(e) The IFF radio equipment is located in the fuselage aft of the observer's seat with provisions for the mounting of a control unit on the left hand side of the pilot's cockpit. A destructor switch is located in the pilot's cockpit on the starboard side of the airplane. An impact switch is located on bulkhead No. 7 which is an approximate location of the center of gravity of the airplane. The destructor unit which explodes within the receiver is operated manually by the destructor switch or automatically by the impact switch in the event of a crash landing. Detailed description and operational instructions for this equipment will be found in applicable publications.

(f) ANTENNAE.—This airplane is equipped with the following antennae.

1. A "V" antenna running from the vertical stabilizer to each wing tip. This antenna is used with the R-26/ARC-5 receiver, the R-27/ARC-5 receiver, the T-19/ARC-5 transmitter and the T-21/ARC-5 transmitter.

2. Two balanced "T" antennae running from the stabilizer to the inboard end of the upper starboard wing. The forward balanced "T" antenna is used with the R-23/ARC-5 navigational receiver. The aft balanced "T" antenna is used with the BC-433-F radio compass unit.

3. Two NAF48134-2 ABK whip antennae, one located on the upper starboard wing and the other located on the upper port wing. These antennae are used with the ABK and IFF radio equipment.

4. One NAF48134-1 ARR-2 whip antenna located on the lower port wing. This antenna is used with the R-4A/ARR-2 navigational receiver.

5. One LP-21-F loop antenna located on top of the fuselage aft of the observer's seat. This antenna is used with the SCR-269-F radio compass.

6. One AT-8/AR (VHF) whip antenna located on top of the fuselage aft of the observer's seat. This antenna is used with the T-23/ARC-5 transmitter and the R-28/ARC-5 receiver.

d. BOMB RELEASE CONTROL.—Standard Mark IV unit on inboard edge of bulkhead to left of pilot's auxiliary instrument panel. Controll shall be in outboard position when not in use.

e. CHART BOARD.—Directly under pilot's main instrument panel.

f. DRIFT SIGHT.—The drift sight when stowed is clipped to a bracket on the left hand side of the rear cockpit below the drift sight door.

g. FLARE CONTROLS.—Two tee handles mounted to the right of the pilot's seat. Pull to release flares.

h. FLOAT LIGHTS.—Four Mark IV float lights secured in container just aft of rear cockpit seat.

i. SMOKE GRENADES.—Two holders located below the right rear cockpit shelf.

j. PYROTECHNIC PISTOL AND AMMUNITION CONTAINER.—Located in the pilot's cockpit, on floor on port side.

NOTE

The installation of each of the foregoing items is further described in the J2F-6 Erection and Maintenance Manual NavAer 01-220QA-2.

Index to Figure 3—Pilot's Cockpit

1. *Compass*
2. *Airspeed indicator*
3. *Turn and bank indicator*
4. *Directional gyro*
5. *Ignition switch*
6. *Altimeter*
7. *Gyro horizon*
8. *Camera light*
9. *Clock*
10. *Primer switch*
11. *Starter switch*
12. *Chart board*
13. *Manifold pressure gage*
14. *Cylinder temperature gage*
15. *Water rudder control*
16. *Fuel gage*
17. *Fuel pump rheostat*
18. *Tachometer*
19. *Engine gage unit*
20. *Free air temperature gage*
21. *Arresting hook control*
22. *Spot light*
23. *Carburetor air control*
24. *Oxygen regulator*
25. *Spot light*
26. *Bomb release*
27. *Pyrotechnic pistol holder*
28. *Mixture control*
29. *Throttle*
30. *Supercharger control*
31. *Auxiliary tank dump valve control*
32. *Fuel tank selector*
33. *Propeller governor control*
34. *Elevator tab control*
35. *Rudder tab control*
36. *Tail wheel lock control*
37. *Landing gear indicator*
38. *Fluorescent spot light (left & right)*
39. *Receiver tuning control*
40. *Microphone*
41. *Landing gear control crank*
42. *Transmitter control unit*
43. *Homing adapter unit*
44. *Main distribution panel*
45. *Receiver control unit (alternate position)*
46. *Flare release handles*
47. *Cockpit enclosure control*
48. *Main switch panel*
49. *Oxygen bottle*
50. *Coil frequency chart*

Note

All radio equipment shown in Figure 3 is installed in J2F-6 Airplanes No. 36935 to 37034, inclusive, 32637 to 32739, inclusive, and 32741 to 32786, inclusive.

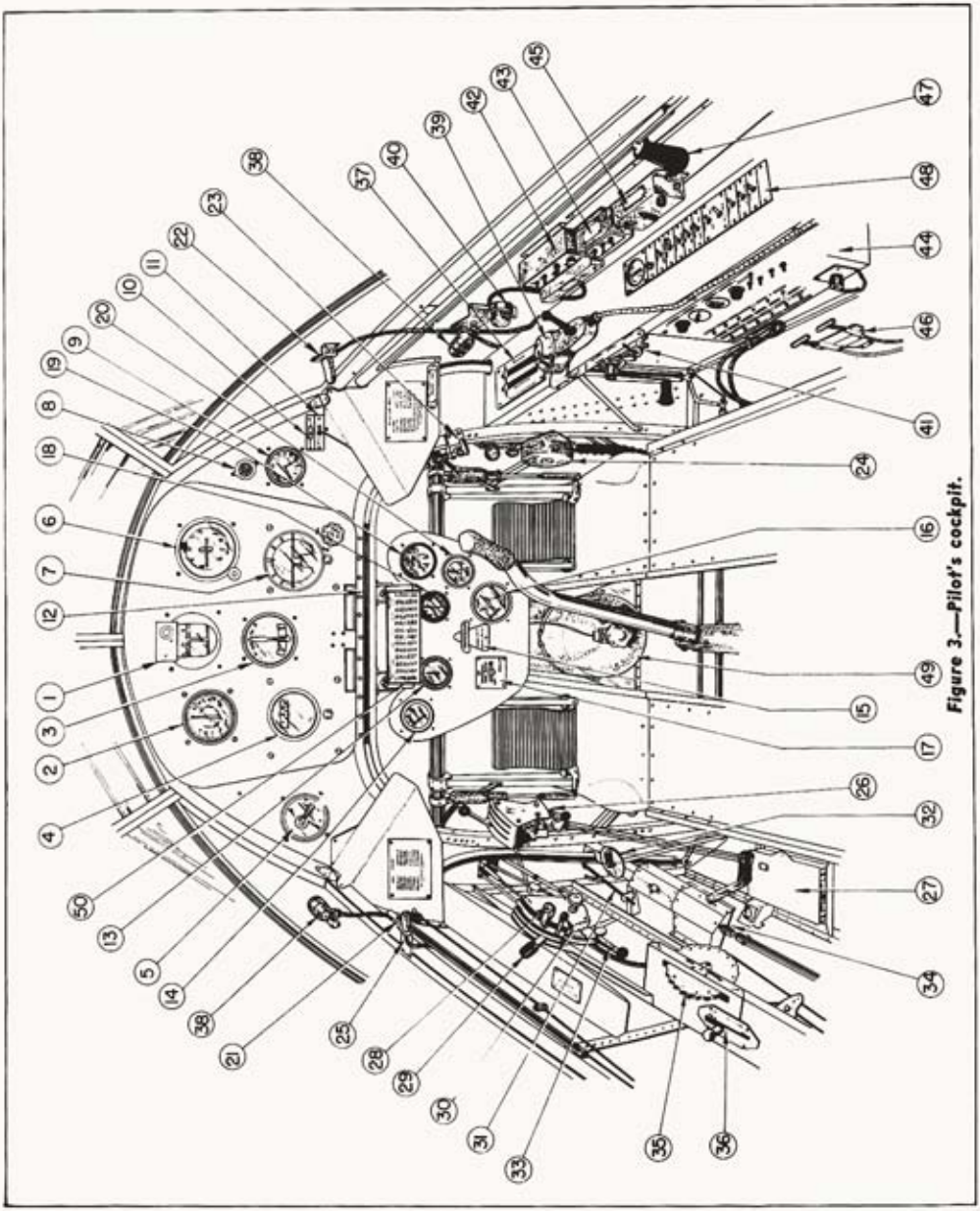


Figure 3.—Pilot's cockpit.

Index to Figure 3A

Pilot's and Photographer's Radio Equipment

1.	*Control Unit*	*C26/ARC-5*
2.	*Control Unit*	*C43/ARC-5*
3.	*Control Unit*	*C35/ARR-2*
4.	*Control Unit*	*C30/ARC-6*
5.	*Destruction Switch Box*	*C44370*
6.	*Pilot's Control Box (I.C.S.)*	*RL-9*
7.	*Microphone and Holder*	*NAF213264*
8.	*Control Box (A.D.F.)*	*BC-434-F*
9.	*ABK Control Unit*	.....
10.	*Junction Box*	*NAF68969-1*
11.	*Beam Filter*	*NAF68304-14*
12.	*Photographer's Control Box (I.C.S.)*	*RL-9*
13.	*Radio Impact Switch*	.....
14.	*Inverter*	.....
15.	*Radio Junction Box (ADF)*	*C44684*
16.	*Radio Junction Box*	*C44691*
17.	*Modulator*	*MD-7/ARC-5*

NOTE

The above radio equipment is installed in J2F-6 Airplanes Serial No. 32740 and 33535 to 33614 inclusive.

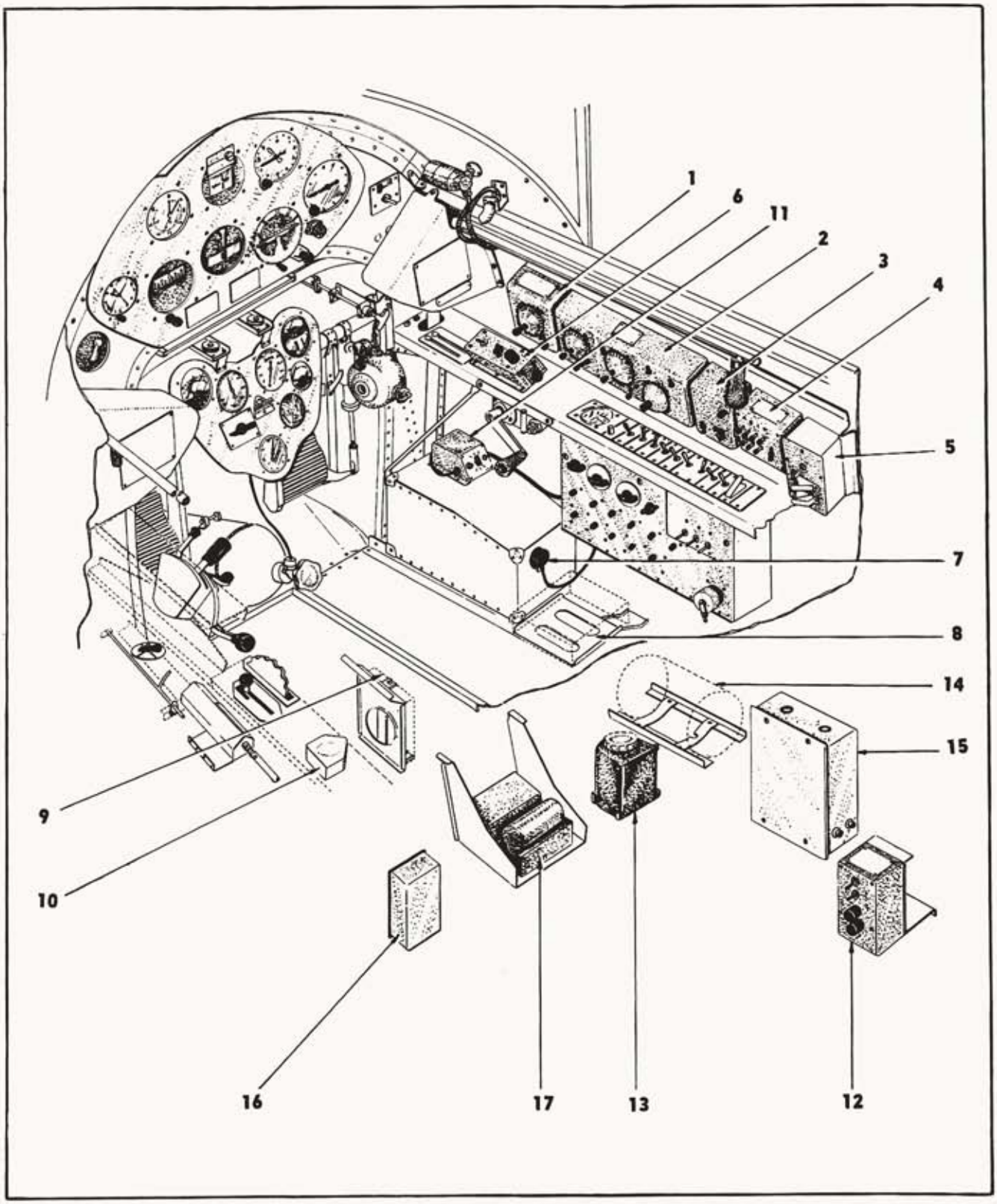


Figure 3A—Pilot's and Photographer's Radio Equipment

Index to Figure 4—Rear Cockpit

1. *DU Direction Finder*
2. *Altimeter*
3. *Camera signal light*
4. *Clock*
5. *GP-7 Transmitter*
6. *Spotlight*
7. *Antenna feed-through insulator*
8. *Throttle*
9. *Inclinometer*
10. *Compass*
11. *Airspeed indicator*
12. *ZB Homing adapter*
13. *Spotlight*
14. *Cockpit canopy controls*
15. *LM-10 Frequency indicator*
16. *Rear distribution panel*
17. *Antenna loading coil*
18. *RU-19 Receiver*
19. *Radio control box*
20. *Radio transmitter key*
21. *Microphone*

Note

All radio equipment shown on Figure 4 is installed in J2F-6 Airplanes No. 36935 to 37034, inclusive, 32637 to 32739, inclusive, and 32741 to 32786, inclusive.

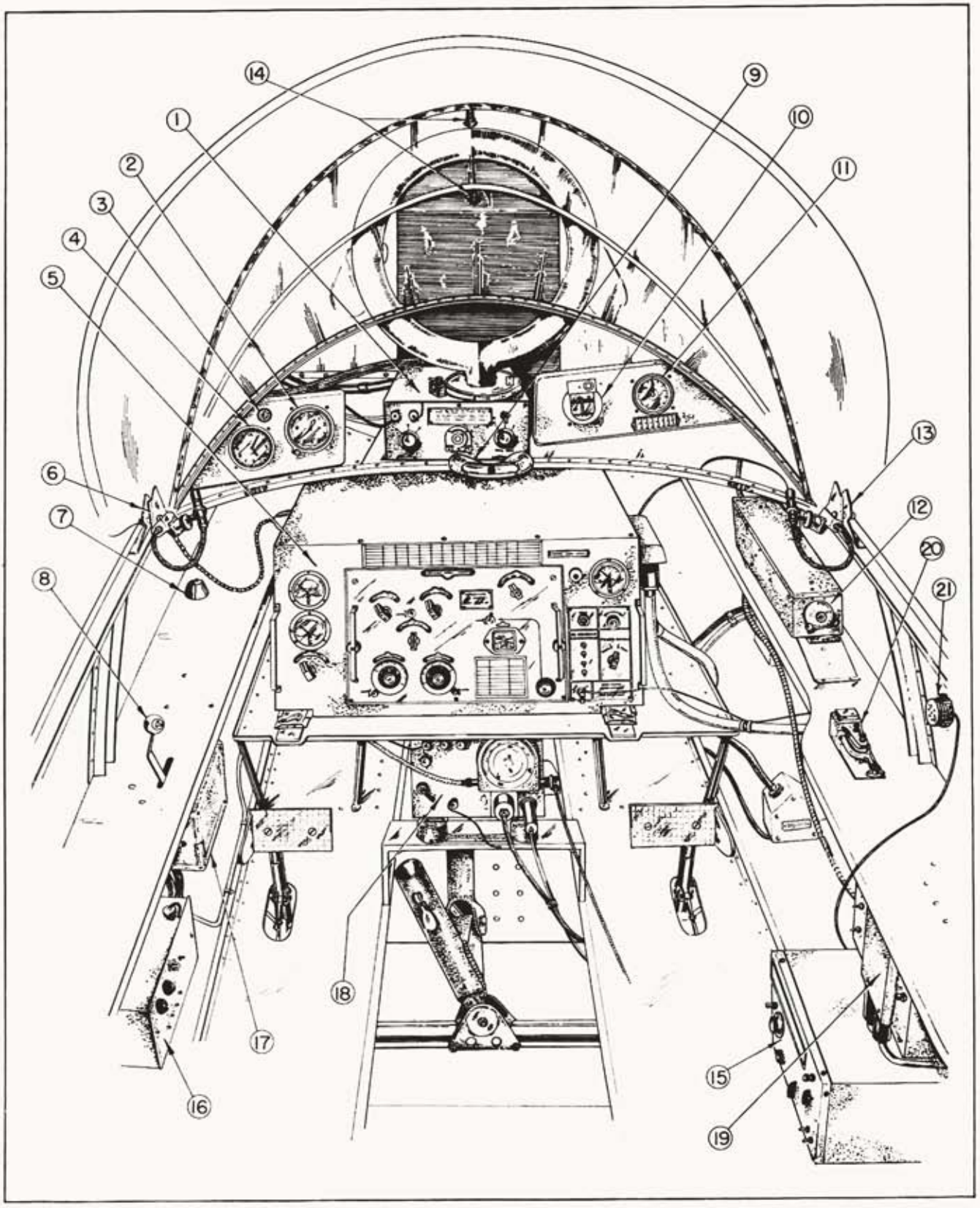


Figure 4.—Rear cockpit.

Index to Figure 4A

Observer's Radio Equipment

7.	*Microphone and Holder*	*NAF213264-2*
18.	*Antenna Relay Base*	*MT-77/ARC-5*
19.	*Antenna Relay Unit*	*RE-2/ARC-5*
20.	*Receiver*	*R-26/ARC-5*
21.	*Receiver*	*R-27/ARC-5*
22.	*Receiver*	*R-4A/ARR-2*
23.	*Receiver Rack*	*MT-65/ARC-5*
24.	*Receiver*	*R-23/AkC-5*
25.	*Receiver Rack*	*MT-7A/ARR-2*
26.	*Transmitter*	*T-21/ARC-5*
27.	*Transmitter*	*T-21/ARC-5*
28.	*Transmitter Rack*	*MT-71/ARC-5*
29.	*Receiver*	*R-28/ARC-5*
30.	*Transmitter*	*T-23/ARC-5*
31.	*Transmitter Rack*	*MT-69/ARC-5*
32.	*Interphone Unit*	*RL-9*
33.	*Radio Key*	*NAF213265-2*
34	*Operator's Control Box (I.C.S.)*	*RL-9*
35.	*Lead-In Insulator*	*CBU-61016*
36.	*Radio Compass Unit*	*BC-433-F*
37.	*ABK Receiver*	.....
38.	*ABA Receiver*	.....
39.	*Dynamotor (24 V.)*	*CW-21441*

NOTE

The above radio equipment is installed in J2F-6 Airplanes Serial No. 32740 and 33535 to 33614 inclusive.

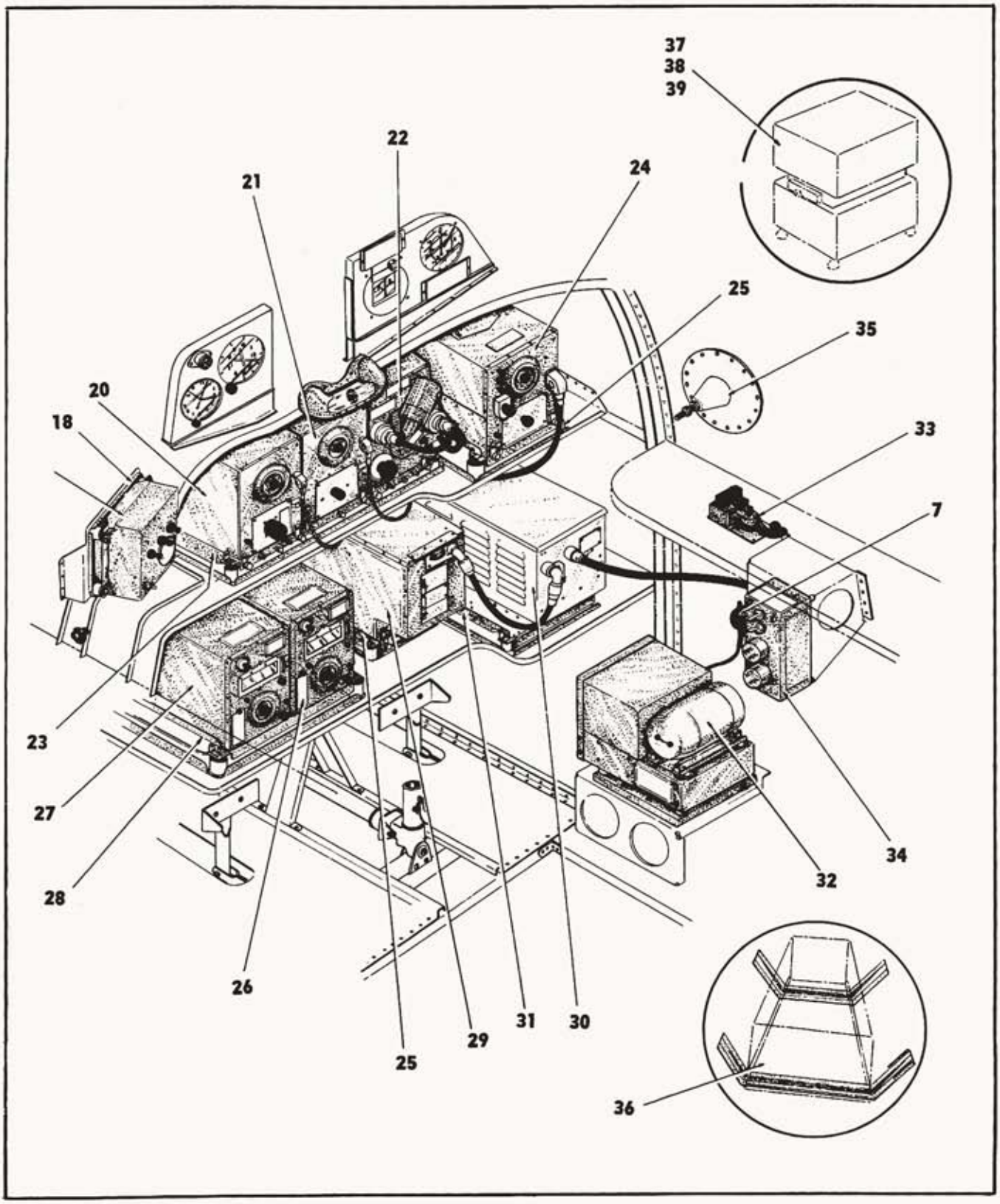
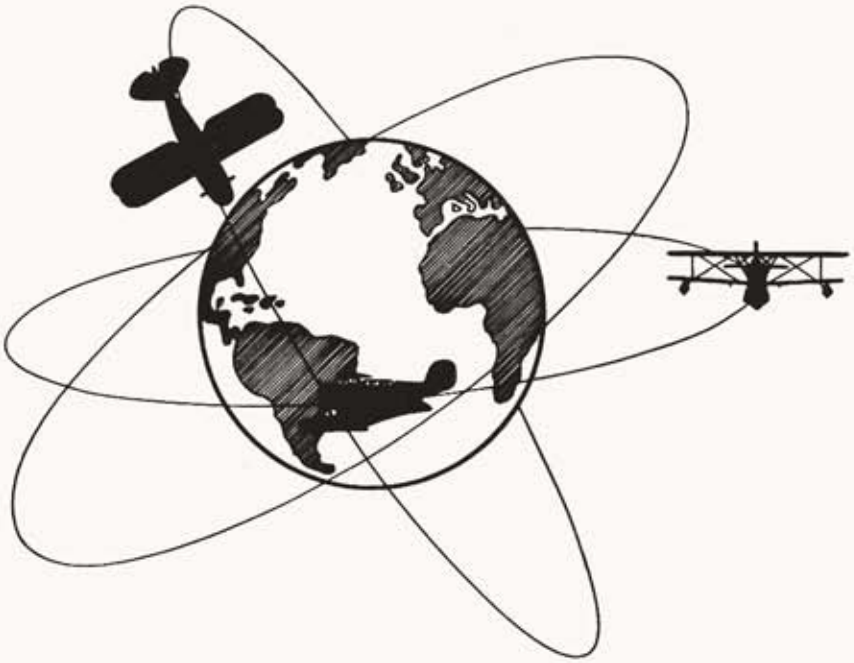


Figure 4A—Observer's Radio Equipment



SECTION 2
PILOT'S OPERATING INSTRUCTIONS

This section contains operating instructions arranged in sequence to cover a complete flight involving the operation of every component part of the airplane controlled from the pilot's compartment.

1. FLYING CONTROLS.

a. ELEVATOR BALANCE AND TRIMMING TAB CONTROL.—The elevator tabs serve as means for "balance," as well as "trimming." There is no stabilizer adjustment. Tabs are adjustable manually from—10° to + 10°, with respect to center line of the elevators, for "trimming." Tabs move automatically in a direction opposed to that of the elevators for "balance." Control is accomplished by means of a screw and trunnion mechanism in the rear of the fuselage, which is connected by torque tubes and universal joints to a hand crank on the left hand side of the pilot's cockpit. The hand crank unit is provided with a screw and follower mechanism. A nameplate adjacent to the crank unit indicates the tab position for nose up or nose down. When taking off with full load the setting should be one turn from neutral towards "nose heavy" position.

b. RUDDER TRIMMING TAB CONTROL.—A standard irreversible screw assembly within the rudder actuates the rudder tab. Control is accomplished by means of a handwheel in the pilot's cockpit, cable operating over a drum thence to a standard flexible drive shaft to the screw actuator in the rudder. Movement is 20° to either side. The rudder trim tab serves to maintain directional trim at all engine speeds and to alleviate "riding" of the pedal controls. When taking off the rudder tab setting should be full 20° right.

c. RUDDER PEDAL ADJUSTMENT.—Rudder pedals are adjustable to "forward," "neutral" and "aft" positions. Adjust as follows: With toes on adjustment levers, push pedals all the way forward, then with toes under pedals, bring them aft one notch at a time until desired position is reached.Check to see that each pedal has ratcheted past the same number of notches.

When visually checking the pedal positions with the tail, remember that the vertical fin is offset to the left 1°20′

2. LANDING GEAR AND WATER RUDDER CONTROLS.

a. RETRACTING MECHANISM.—The main landing gear and the tail wheel are extended and retracted simultaneously by operation of the handcrank located on the pilot's right hand shelf. To extend the gear the crank is turned in a counterclockwise direction; to retract, in a clockwise direction, Approximately 46 turns of the crank are required for either operation. A ratchet on the handcrank unit automatically latches the crank while the wheels are being raised or lowered. This ratchet is released by operating the small lever just aft of the handcrank. After releasing the ratchet, the crank remains in a locked position until pressure is exerted opposite to the desired rotation.

CAUTION

The pilot is cautioned, when lowering wheels, to hold the handcrank and not allow the wheels to drop out.

b. POSITION OF WHEELS.—A mechanical indicator located on the pilot's right hand shelf forward of the handcrank shows the position of the wheels. When the crank is rotated as far as it will go in the desired direction—to raise or to lower the wheels—the wheels should be in the desired position.

c. WHEEL LOCK.—When wheels are cranked to a "full down" position, a spring counter-balance automatically comes into action, preventing all possibility of the wheels retracting during landing or take-off. The counter-balance is so designed and located as to require no adjustment.

d. TAIL WHEEL LOCK.—The tail wheel is provided with a "lock-pin" which locks the caster and wheel in a trailing position. A small lever located on the pilot's left hand shelf operates the lock-pin by cable. The lever is fitted with a name plate showing "locked" and "unlocked" positions of the pin. The primary purpose of the tail-wheel lock is to reduce the possibility of ground looping in landing. The pilot should lock the tail wheel immediately after taxiing into position for take-off. The tail wheel will then be in a locked position during flight and landing. The pilot shall check after take-off, before retracting wheels, to see that the lever is in "locked" position. It must be unlocked by the pilot after landing for ease in taxiing and to prevent damage to the tail wheel locking mechanism. It is recommended that the tail wheel be "unlocked" for the carrier landings. The tail wheel is a 360° swivel type equipped with a spring loaded self-centering device.

e. WATER RUDDER CONTROL.— Each of the two water rudders operates through 30°, one to the right and the other to the left. The water rudders are controlled from the air rudder pedals. For land operation the water rudders are disconnected from the air pedals (pedals in neutral position) by pushing down on the control handle located in the center of the pilot's auxiliary instrument panel. For water operation, the water rudders are engaged by placing the foot pedals in neutral position and pulling the control handle aft.

3. POWER PLANT.

a. ENGINE.—Wright R-1820-54, direct drive, single stage, two-speed supercharged, nine cylinder, radial, air cooled engine.

RATING

	BHP	RPM	Blower	Altitude
Take-off (5 min.)	1050	2200	LOW	S.L.
Normal	900	2100	LOW	S.L.-6000
	800	2100	HIGH	14700

Fuel—Grade 100/130, Spec. AN-F-28.
Oil—Grade 1120, Spec. AN-VV-O-446.
Maximum Diving RPM—2600 (All diving must be done with the supercharger in LOW blower ratio.)

b. PROPELLER.—Hamilton Standard Hydromatic 9'-0" diameter, 3 blade, hub 33D50-119, blades 6383A-13. The basic settings are 14° low pitch and 41° high pitch.

(1) PROPELLER GOVERNOR CONTROL.—The propeller governor control is mounted on the aft end of the main control quadrant. Downward motion of the knob places the control in "INCREASE RPM" position (decrease pitch) and upward in "DECREASE RPM" (increase pitch). The setting of this control determines the RPM but does not directly control the blade angle. Rapid changes of either throttle or propeller governor contol should be avoided because the speed control does not react quickly enough to prevent "overshooting" in such cases. During recovery from dives, the throttle should be opened gradually to prevent overspeeding of the engine.

c. STARTER AND PRIMER.—The starter is an Eclipse electric inertia type, with provisions for manual energizing when required. The primer is solenoid operated and the primer switch is located adjacent to the starter switch on the starboard rigid portion of the pilot's main instrument panel. The electric auxiliary fuel pump must be ON to supply fuel pressure for priming before starting the engine.

d. CARBURETOR AIR CONTROL.—The airplane is equipped with a Stromberg Model PD12H3 carburetor with twin air scoops. The doors in the scoops are both controlled by one push-pull rod mounted on the inboard side of the bulkhead adjacent to the pilot's auxiliary instrument panel.

DIRECT..... IN position
ALTERNATE..... OUT position

NOTE

Do not use an intermediate position for this control. The carburetor air control should be left in DIRECT position at all times, unless icing conditions are suspected or rain is encountered, when the control should be placed in full ALTERNATE position. The full ALTERNATE position shall also be used when making water landings.

e. MIXTURE CONTROL.—The mixture control for the Stromberg PD12H3 carburetor has four positions, in the following order:

IDLE CUT-OFF.....Full Aft (Red Sector)
AUTO LEAN
AUTO RICH
FULL RICH .....Full Forward

(1) Fuel will be discharged from the carburetor with the mixture control in any position except IDLE CUT-OFF whenever the fuel pressure is greater than five p.s.i., whether the engine is running or stopped. To prevent flooding, through inadvertent use of the electric auxiliary fuel pump, the mixture control shall always be left in the IDLE CUT-OFF position when the engine is not running. If for any reason the engine should cut out during ground operation, the mixture control should be moved immediately into IDLE CUT-OFF position in order to prevent loading of the induction system.

(2) For take-off, landing, all ground operation, and all flight operation at more than 70% power, the mixture control shall be set in AUTO RICH.

(3) For cruising operation at 70% power and below, the control should be set in AUTO LEAN. If cylinder head temperatures cannot be held below 205° C. (401° F.), enrich enough to restore proper cooling.

NOTE

When adjusting the mixture control, make sure the control is set properly by feeling for the "notch" in the latchplate on the carburetor which indicates proper positioning of the lever. Control backlash may result in these positions being slightly different from the quandrant markings. Manual leaning beyond auto lean should not be attempted when operating at more than 50% rated power.

f. CYLINDER HEAD TEMPERATURES.—Cylinder head temperatures should not exceed the following:

Take-off	260° C. (500° F.)	(5 min.)
Normal Rated Power to 90%	235° C. (455° F.)	(1 hour)
Normal Rated Power to 70%	218° C. (424° F.)	(continuous)
Crusing Power (70% N.R.P. and below	205° C. (401° F.)	(continuous)

(1) Cylinder head temperatures may be reduced by:

(a) Enriching mixture.

(b) Reducing power.

(c) Increasing airspeed.

(2) Climbing at airspeeds slightly greater than best climbing speed will have very little effect on the rate of climb. BETTER ALL AROUND COOLING WILL RESULT.

g. SUPERCHARGER CONTROL.— The engine is equipped with a two-speed supercharger, controlled by a two-position lever, with lock. The control lever is mounted on the main control quadrant on the left hand shelf in the pilot's cockpit. Forward position for "LOW" Blower and aft position for "HIGH" Blower.

CAUTION

The control lever must be securely locked at the extremity of its travel in either HIGH or LOW position to insure complete and positive clutch engagement.

(1) Change from LOW to HIGH as follows:

(a) Mixture control in AUTO RICH.

(b) Close throttle as necessary to avoid exceeding desired manifold pressure after shift.

(c) Reduce RPM to 1700 (whenever possible).

(d) Shift rapidly.

(e) Readjust RPM, throttle, and mixture control to obtain desired power.

(2) Change from HIGH to LOW as follows:

(a) Mixture control in AUTO RICH.

(b) Shift rapidly.

(c) Readjust RPM, throttle, and mixture control to obtain desired power.

(3) Except in emergency, do not shift more often than at five minute intervals while in flight, in order to provide sufficient time for dissipation of the heat generated during the clutch engagement period. This restriction need not be observed during checking operations on the ground, because of the low clutch loads imposed at low engine RPM.

(4) Operation in either blower ratio should not be continued indefinitely. Prior to take-off and after landing the engine should be operated briefly at 1000 RPM in high blower to prevent accumulation of sludge in the clutches.

(5) ALWAYS take off in LOW blower ratio, regardless of the altitude of the airport from which the take-off is made.

h. CHANGING POWER CONDITIONS.—

(1) To increase power:

(a) Set desired RPM with propeller governor control.

(b) THEN adjust throttle to obtain desired manifold pressure.

(2) To decrease power.

(a) Set desired manifold pressure with the throttle.

(b) THEN set desired RPM with propeller governor control, and readjust throttle if necessary.

i. FUEL SYSTEM.—Fuel is carried in two tanks, as follows:

Main tank	125 gals.
Auxiliary tank	65 gals.

(1) The fuel tank selector on the port side of the pilot's cockpit has three positions: MAIN, AUXILIARY and OFF. Adjacent to the fuel tank selector is

the control handle for the dump valve between the main and auxiliary tanks.

(2) NORMAL OPERATION.—For all normal operations of take-off, flight and landing the FUEL SELECTOR CONTROL SHALL BE SET FOR THE MAIN TANK. When fuel supply in the main tank is low, the contents of the auxiliary tank are dropped into the main tank by placing the dump valve in open position by pulling the handle aft.

(3) EMERGENCY OPERATION.—BEFORE the contents of the auxiliary tank have been dropped into the main tank, operations in flight may be carried on from the auxiliary tank by setting the selector to AUXILIARY and maintaining the dump valve in OFF or forward position. When operating off AUXILIARY tank the auxiliary fuel pump should be in OFF position.

(4) FUEL QUANTITY GAGE.—The fuel quantity gage located on the pilot's auxiliary instrument panel registers, in gallons, the contents of both the auxiliary and the main tank at all times (when battery switch is ON).

(5) VAPOR RETURN.—The vapor return line from the carburetor returns fuel directly to the auxiliary tank. As much as eight gallons of fuel may be returned per hour. In order to make room in the auxiliary tank for the vapor return fuel, the dump valve should be OPEN (in the AFT position) and the fuel selector valve should be in the MAIN position during starting, all ground operation, and the first half hour of flight, otherwise fuel may be lost overboard through the vent.

(6) ELECTRIC AUXILIARY FUEL PUMP.—The electric auxiliary fuel pump is installed instead of a manually operated wobble pump for use when starting, take-off, landing, and for maintaining fuel pressure in case of emergency, such as the failure of the engine driven fuel pump, or lowered fuel pressure at high altitudes. At high altitudes operation off the main tank and engine driven pump alone is unsatisfactory due to possible vapor lock.

(7) GROUNDING JACKS.—Fuel nozzle grounding jacks are located adjacent to each tank filler neck. Fuel filler line from tank truck must be grounded before any filling operation.

j. OIL SYSTEM.—Oil is carried in a single tank of 12 gallons capacity plus 3 gallons foaming space. The tank is located in the upper forward section of the fuselage, just aft of the firewall. It is fitted with an auxiliary firewall and a blast tube from the engine face, for cooling.

(1) Temperature—Oil in
Desired range..... 74° C. (165° F.)-88° C. (190° F)

(2) Pressure
Desired range.....65–75 psi
Idling .....25 psi minimum

(3) COOLER.—Located at the bottom of the firewall is an 11″ diameter oil cooler, with a temperature control valve mounted on the cooler. The valve operates in conjunction with the cooler to maintain the oil temperature within the desired range.

k. STARTING.—

(1) Ignition switch.....OFF
(2) Mixture control.....IDLE CUT-OFF
(3) Rotate engine by hand..Three or four revolutions in normal direction
(4) Fuel selector valve.....MAIN
Dump valve.....OPEN
(5) Propeller governor control.....INCREASE RPM
(6) Carburetor air control..DIRECT
(7) Supercharger control...LOW
(8) Throttle.....Set for 1000 RPM
(9) Battery switch .....ON

NOTE

Battery switch OFF when using external power source.

(10) Auxiliary fuel pump..ON
Fuel pressure 14-16 psi
(11) Starter .....Close energizing switch
(12) Starter .....Engage after energizing for 15 seconds. Prime simultaneously while meshing starter to engine
(13) Ignition switch.....ON–BOTH after starter is engaged and propeller turning
(14) Primer switch.....ON–as required.
(15) Mixture control.....Advance to Auto RICH as engine fires. If engine stops, return to IDLE CUT-OFF immediately.
(16) Primer.....ON–intermittently until engine runs smoothly

CAUTION

Do not pump or abruptly move the throttle until the engine is running smoothly.

(17) Idle - 800 RPM.....If oil pressure is not indicated in 10 seconds or does not reach 40psi in 30 seconds shut down and investigate.

CAUTION

If the engine does not start in 2 attempts, wait at least 5 minutes to permit any spilled fuel to drain out of the intake ducts, and permit the starter to cool before repeating the attempt. If it is suspected that the engine is overprimed, clear the cylinders and induction system of excess fuel as follows:

Mixture control.....IDLE CUT-OFF
(2) Auxiliary fuel pump.....OFF
(3) Ignition switch.....OFF
Battery switch .....OFF
(4) Throttle .....Full open
(5) Rotate engine by hand four or five revolutions.

NOTE

If undue resistance is encountered in turning the propeller over by hand the spark plugs may be removed in order to drain out the fuel in the cylinders.

l. WARM-UP AND GROUND CHECK.—
(1)..Oil Pressure.....65-75 psi desired
(2) Carburetor air control.....DIRECT
(3) Idle.....800 RPM
(4) Warm-up.....When engine fires smoothly and oil pressure has stabilized, run at 1000 RPM until oil inlet temperature reaches 30° C. (88° F.)

CAUTION

Prolonged ground operation at high power should be avoided. Do not attempt to take off with cylinder head temperature above 205° C. (401° F.) or below 120° C. (248° F.)

m. ENGINE CHECK.—

(1) Throttle—open to 30" Hg. with propeller governor control full INCREASE RPM.

(2) Oil pressure—65-75 psi. (If oil pressure drops or fluctuates when throttle is opened, reduce speed and continue warm-up.)

(3) Magnetos—with propeller control set at full INCREASE RPM and throttle set for 30 in. Hg., engine speed should not drop more than 50/75 RPM when switched to one magneto. Avoid operating on one magneto more than 15 seconds, and run on BOTH for short time between checks to clear out engine.

n. SUPERCHARGER CHECK.—

(1) With propeller control set for full INCREASE RPM, set the throttle for 1700 RPM.

(2) Shift blower control quickly from LOW to HIGH and lock.

(3) Open throttle to approximately 30" Hg.

(4) Observe manifold pressure when RPM has become stabilized.

(5) Shift to LOW. A sudden drop in manifold pressure is an indication that the two-speed supercharger drive is operating properly.

o. IDLE MIXTURE CHECK.—

Make idle mixture check with throttle set for 600 RPM and auxiliary fuel pump full "ON". Move the mixture control lever smoothly and steadily into the "IDLE CUT-OFF" position and observe the tachometer for any change in RPM. Return the mixture control lever to the "AUTO RICH" position before the engine cuts out. A rise of more than 10 RPM indicates too rich an idle mixture, and no change or a drop in RPM indicates that the mixture is too lean. A rise of 5 to 10 RPM is recommended in order to permit idling at low speeds without damage of fouling plugs and at the same time to afford good acceleration characteristics.

p. GENERATOR SYSTEM CHECK.—

(a) Disconnect external power source if used.

(b) With engine idling, turn on some light electrical load such as the cockpit or instrument lights.

(c) Slowly increase engine rpm and watch the voltmeter for a dip in voltage. The dip, which should occur at approximately 26.5 volts, indicates that the reverse current cut-out has closed. If the voltage does not dip, it is an indication that the cut-out has failed to close.

(d) If no voltage dip is observed by the time the voltage reaches 27 volts, make a second check by turning the battery switch to "OFF". If the cockpit or instrument lights remain on, it is an indication that the reverse current cut-out closed but that the dip was not observed. Turn the battery switch back to "ON".

(e) Increase the engine rpm and observe the voltmeter. The voltage should increase to 28.0 volts and then remain at that value regardless of any further increase in engine rpm.

(f) If the reverse current cut-out does not close or if the voltmeter reading is too low (does not reach 27.5 volts) or too high (reads more than 28.5 volts,) the condition should be corrected before taking off.

q. TAKE-OFF.—
(1) Fuel selector valve.....MAIN
Fuel dump valve .....Open (Aft)
(2) Propeller control.....Take-off RPM (2200 RPM)
(3) Supercharger control.....LOW
(4) Mixture control.....AUTO RICH
(5) Auxiliary fuel pump.....Full ON fuel presure 14-16 psi
(6) Manifold pressure.....42.5" Hg.
(7) Carburetor air control.....DIRECT
(8) Cockpit enclosures.....Locked OPEN
(9) Tail wheel.....LOCKED

CAUTION

Before starting take-off run, see that cylinder head and oil temperatures are above the low limits, and not near the upper limits. Open throttle gradually and smoothly. Do not exceed 42.5" Hg. manifold pressure. If atmospheric icing conditions are suspected, shift the carburetor air control to ALTERNATE before taking off, in order to clear out any ice which may be present, and return the control to DIRECT just before starting the take-off run. For WATER TAKE-OFF complete check list above and leave water rudder engaged. When take-off is completed disengage the water rudder.

q. RATED POWER CLIMB AND LEVEL FLIGHT. 2100 RPM.—Operate according to the Engine Operating Table, and Operating Limits Chart. Table I shows the throttle and supercharger settings for this condition.

TABLE I

Press. Alt. (No Ram.)	*Man. Press.*	*Blower Ratio*
S.L.—6000	41"—36" (F.T.)	LOW
6000—9300	F.T.	LOW
9300—14700	41.5"—37.5" (F.T.)	HIGH
14700 UP	F.T.	HIGH

s. CRUISING.—The mixture control should be in AUTO LEAN for cruising power operation, as shown in the Operating Limits Chart. If head temperatures rise above 205°C. (401°F.). the mixture should be enriched. The cruising manifold pressure—RPM relationships specified in the Operating Limits chart should not be exceeded. While cruising operations can be carried on at any power below normal rated, such operations should be carried on at 70% of normal rated power, or less if minimum fuel consumption is important, and tactical considerations do not require operation at high power.

t. DIVES.—

(1) Propeller governor control .....1700—1900 RPM
(2) Maximum diving RPM..2600 RPM
(3) Supercharger control ....LOW
(4) Mixture control .....AUTO RICH

u. LANDING.—

(1) Carburetor air control ..DIRECT
(2) Propeller governor control .....1900 RPM
(3) Supercharger control ....LOW
(4) Mixture control .....AUTO RICH
(5) Fuel selector .....MAIN
(6) Landing gear .....DOWN
(7) Auxiliary fuel pump ....Full ON
(8) Cockpit enclosures .....Locked OPEN
(9) Tail wheel .....LOCKED

For WATER LANDING complete check list above except "Landing gear—UP" and "Carburetor air control—ALTERNATE". Engage the water rudders for taxiing.

v. STOPPING.—

(1) Carburetor air control .....DIRECT
(2) Propeller governor control .....INCREASE RPM
(3) Supercharger control .....LOW
(4) Mixture control .....AUTO RICH
(5) Throttle .....Set for 1000 RPM to cool engine (head temperature below 149° C. (300° F.) desirable before stopping.)
(6) Mixture control .....MOVE to IDLE CUT-OFF
(7) Fuel selector .....OFF
(8) Auxiliary fuel pump..OFF
(9) Ignition switch .....OFF *when propeller stops rotating*
(10) Battery switch .....OFF

w. OPERATING LIMITS CHART.—This chart can be used to set operating conditions or to determine engine power at any operating condition within the recommended operating limits of the engine. The section to the left is for LOW blower operation; the section to the right is for HIGH blower operation. Part throttle conditions are to the left from the oblique heavy dashed lines in both the LOW and HIGH blower sections; full throttle conditions are to the right from these lines.

x. HIGH POWER—AUTO RICH (PART THROTTLE).—When high power climb is desired, operate along one of the constant manifold pressure—constant RPM lines (sloping lines labeled with manifold pressure and RPM). For constant rated power climb, use 41" Hg. at sea level, decreasing to 36" Hg. at full throttle (6000 feet). Select level flight condition from a point on one of the designated lines, or, if an intermediate condition is desired, any manifold pressure—RPM combination shown on the *full throttle* portion of the chart can be used for part throttle operation.

y. CRUISING POWER — AUTO LEAN (PART THROTTLE).—For power conditions below the dot-dash line, use of the manifold pressure—RPM relationship shown will result in operation at maximum recommended cruising BMEP.

z. TO DETERMINE HORSEPOWER — ANY POWER CONDITION.—

(1) Knowing RPM and manifold pressure, locate the condition in the FULL THROTTLE portion of the chart for the blower ratio in which the engine is operating.

(2) Draw a line through the point determined, parallel to the constant manifold pressure—constant RPM lines shown. Read horsepower at the intersection of this line with the observed pressure altitude line.

aa. PRESSURE ALTITUDE.—Determine the amount by which the altimeter setting is greater or less than 29.92" Hg. Add to indicate altitude 100 feet for each 0.1" Hg. less than 29.92"; subtract 100 feet for each 0.1" Hg. greater than 29.92"

4. EXTERNAL POWER RECEPTACLE.

a. A provision is made for starting the engine with an external source of power, such as a battery cart. The lead from the cart may be plugged into a receptacle inside an access door located on the starboard side of the airplane above the access door to the main fuel tank. All electrical units, including the radio may be operated by means of external power while the main battery switch of the airplane is in OFF position.

5. NORMAL INSTRUMENT READINGS.

a. The following instrument readings were taken on a cruising flight at 4800 feet altitude.

Propeller	Constant speed
RPM	1870
Manifold pressure	30" Hg.
Supercharger	Low blower
Cylinder head temperature	158° C. (316° F.)
Fuel pressure	14-16 psi
Mixture	Auto lean
Oil pressure	70 psi
Oil temperature	60° C. (140° F.)
Air speed	122 Knots
Rudder tab	9° Right rudder
Fuel consumption	50 gal./hr. (approx.)

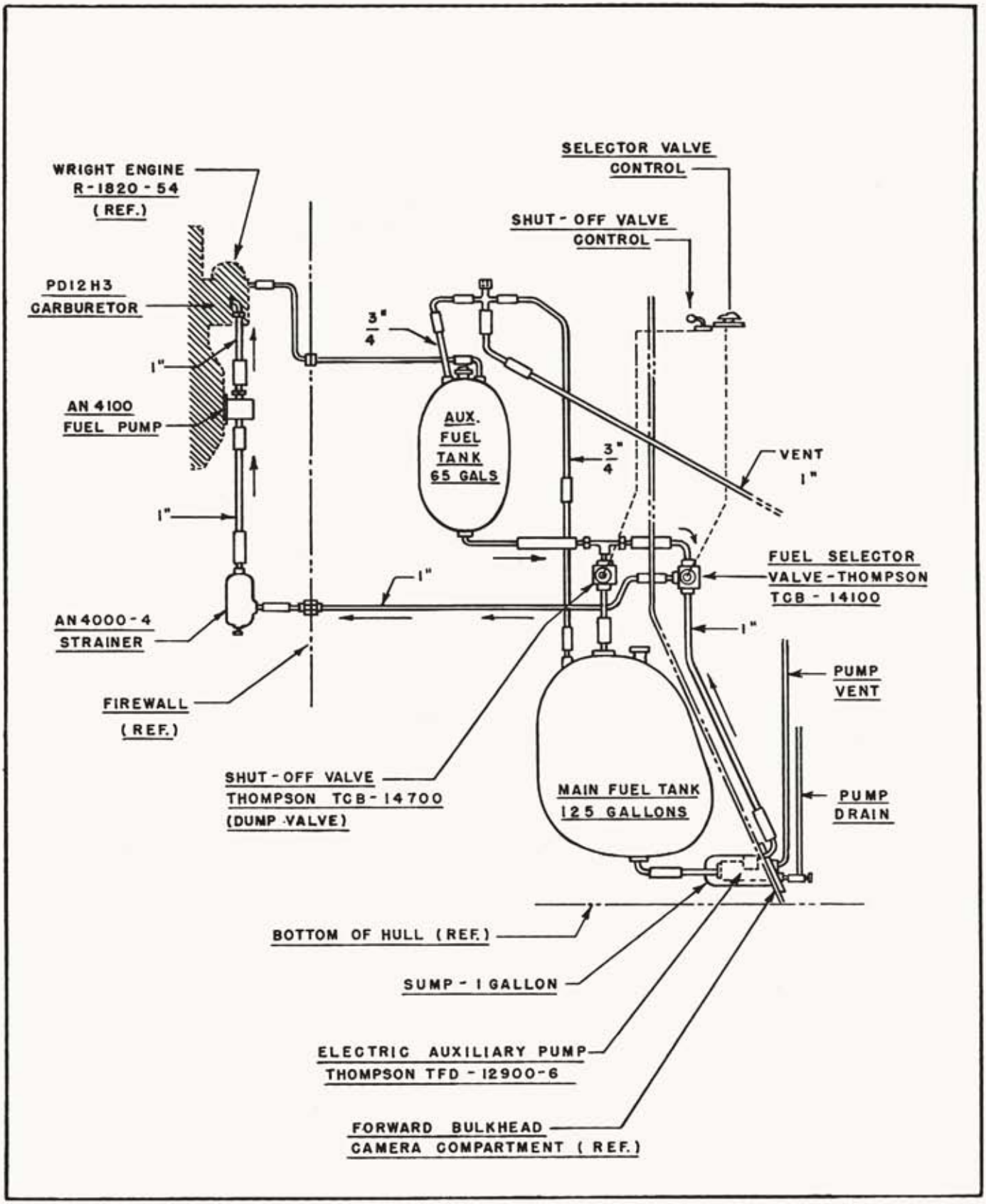


Figure 5.—Fuel system diagram.

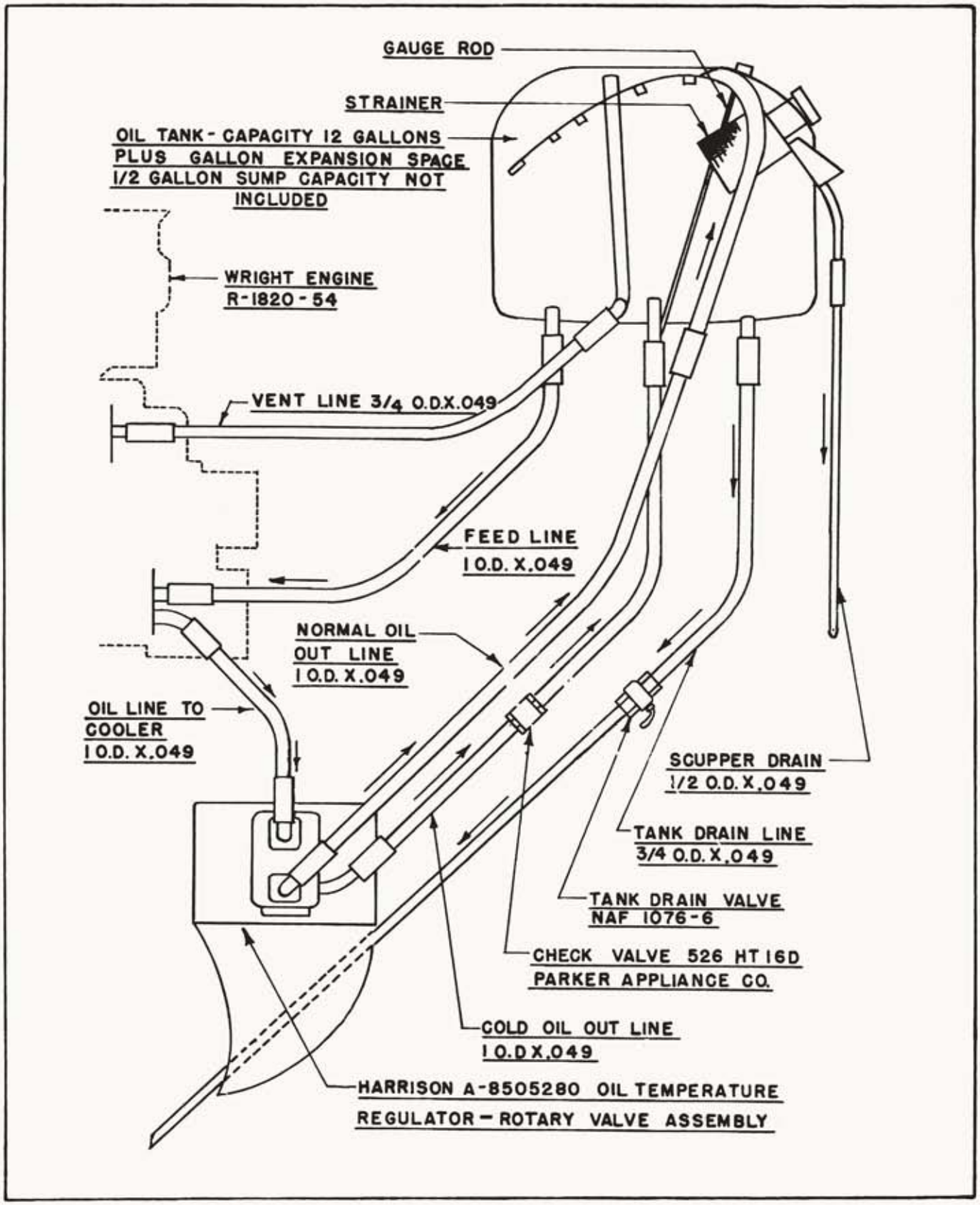


Figure 6.—Oil system diagram.

ENGINE OPERATING CHART

Engine Model: R-1820-54

Operating Condition	*Pressure Altitude (No Ram)*	*Max. Permissible RPM (Gov. Setting)*	*Max. Abs. Man. Pres. In. Hg.*	*Mixture Control*	*Blower Ratio*	*Max. Cyl. Head Temp. ° C*	*Desired Oil in Temp. ° C*	*Oil Press. PSI*	*Fuel Press. PSI*
Starting	.....	1000 (T. O. RPM)	.....	IDLE CUT-OFF	LOW	.....	.....	Show in 30 sec.	*** 14-16
Warm-Up	.....	1000-1200 (T. O. RPM)	17-20	AUTO RICH	LOW-HIGH	205	30	65-75	14-16
Take-Off	S. L.	2200	42.5	AUTO RICH	LOW	260	20 Emer. 30	65-75	14-16
Normal Rated Power	SL-6000 9300-14700	2100	41.0-36.0 41.5-37.5	AUTO RICH	LOW HIGH	{ 235 (1 hr.) { 218 (Cont.)	** 74-88	65-75	14-16
Max. Recommended Cruise*	SL-10600 Above 18300	1870	32.0-25.5 29.0	AUTO LEAN	LOW RICH	205	** 74-88	65-75	14-16
Desired Cruise	SL-7800	1600	32.0-29.0	AUTO LEAN	LOW	205	** 74-88	65-75	14-16
Dives	.....	2600 Max. (1700-1900)	20.0	AUTO RICH	LOW	.....	** 74-88	65-75	14-16
Landing	.....	2200	.....	AUTO RICH	LOW	.....	.....	.....	.....
Stopping	.....	1000-1200 30 sec.	.....	IDLE CUT-OFF	LOW	149	.....	.....	.....

* For other conditions, see Operating Limits Chart.
** 60-102° C. max. permissible—1120 oil.
*** Fuel pressure 14½-16½ PSI with engine pump and auxiliary pump both ON.

Figure 7.—Engine operating chart.

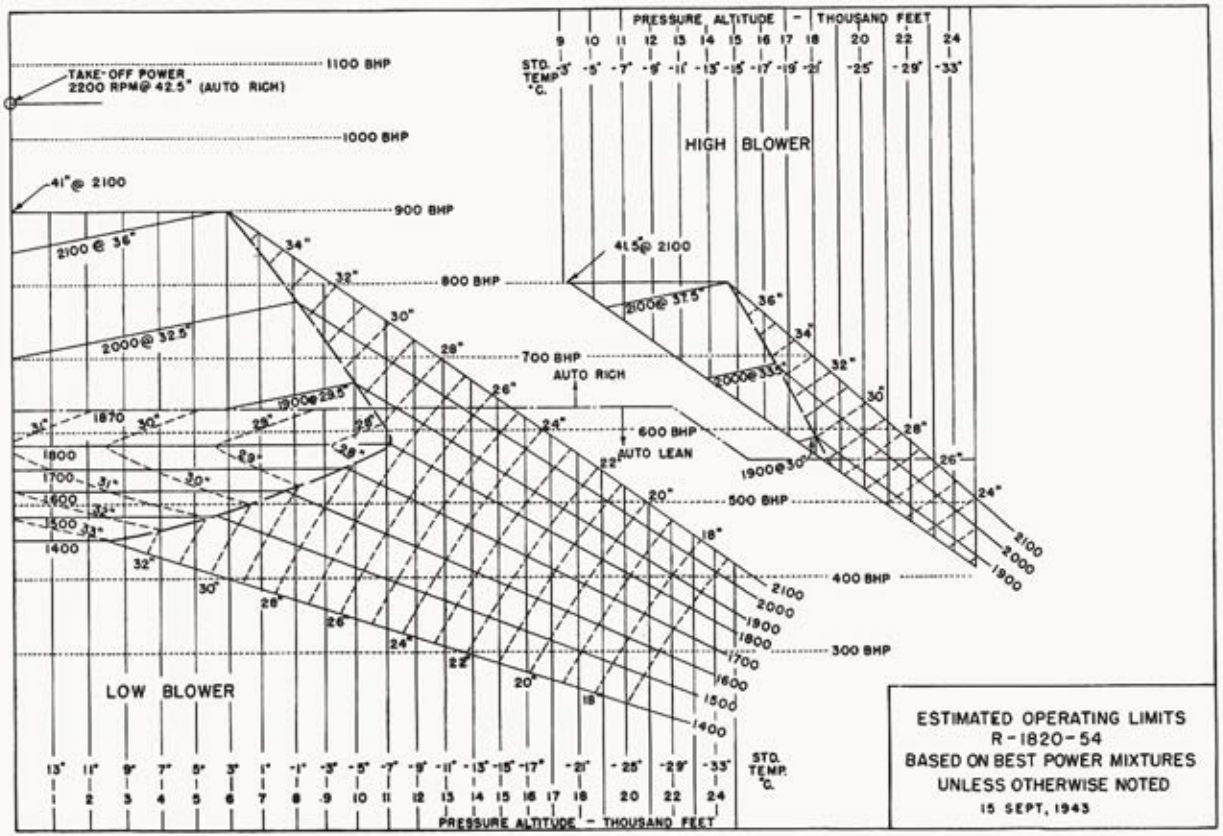
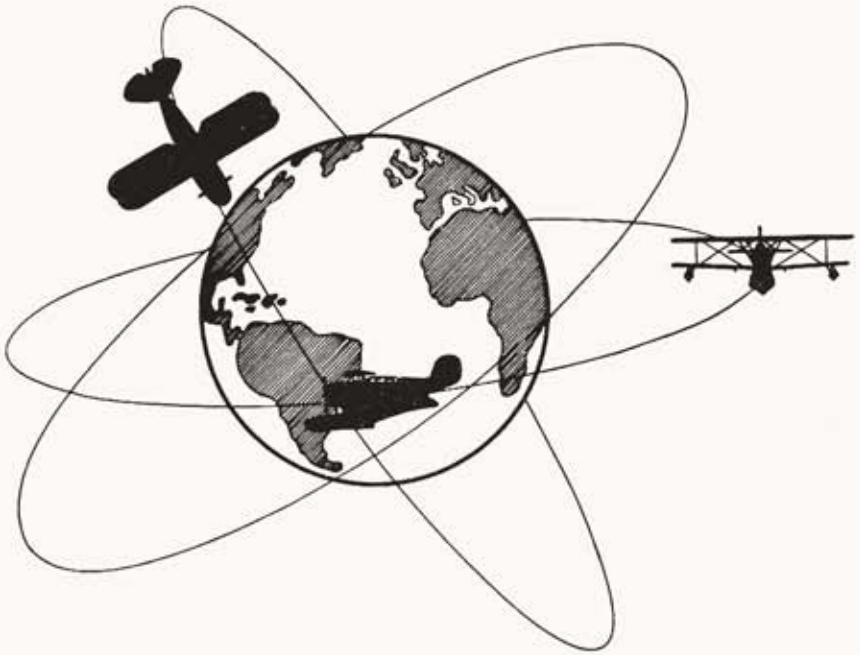
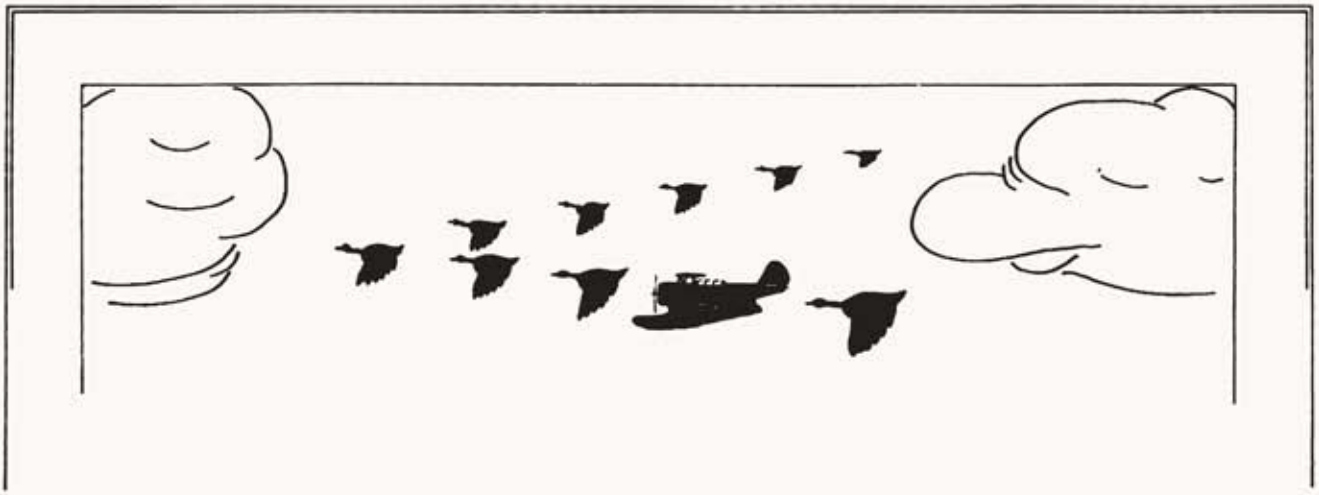


Figure 8.—Operational limits chart.





SECTION 3
FLYING CHARACTERISTICS

1. BALANCE.

a. This airplane is designed to operate as a utility, an aerial mapping, a fleet photographic, an expeditionary or target towing aircraft.

b. The amount of elevator tab travel will be found sufficient to maintain perfect balance in flight and to permit getting the tail down when landing in any of the loading conditions.

c. When airplane is flown with pilot as sole occupant it is recommended that 200 lbs of ballast be secured to the rear seat.

2. MANEUVERS.

This airplane, Class VJ amphibian, is not designed primarily for combat work; however, its excellent maneuverability has been successfully demonstrated. The following maneuvers under respective full load conditions have been accomplished with a minimum of effort on the part of the pilot during acceptance demonstrations of the first airplane.

a. Utility airplane (less ¼ fuel supply)—60° banked turns, side slips, normal stalls and dives as required.

b. Expeditionary airplane (less ¼ fuel supply)—60° banked turns, side slips, normal stalls and dives as required.

3. LOADING CONDITIONS.

NOTE

This paragraph omitted. To obtain gross weights and center of gravity locations for take-off and for anticipated landing loads reference should be made to the Handbook of Weight and Balance Data AN-O1-1B-40 for loading data.

4. CHECK-OFF LISTS.

GROUND TAKE-OFF

Cabin hood	locked open
Fuel valve	MAIN
Carburetor air	DIRECT
Supercharger	LOW blower
Propeller	INCREASE RPM (low pitch)
Mixture control	AUTO RICH
Electric auxiliary fuel pump	ON
Tabs	set as required
Water rudder	disengaged
Tail wheel	LOCKED
Dump valve	full OPEN (AFT position)
Lap belt	fasten
Shoulder harness	tighten and lock

WATER TAKE-OFF

Complete "TAKE-OFF" check list above except "Wheels-up". For best take-off allow airplane to fly itself off the water.

FLIGHT (CRUISING) 70% POWER

Propeller	1870 RPM
Landing gear	UP
Oil pressure	65-75 PSI
Fuel pressure	14-16 PSI
Cylinder head pressure	205° C. (401° F.) max.
Manifold pressure	30" at 5000 ft. altitude
Supercharger	LOW blower
Mixture control	AUTO LEAN
Tabs	set as required
Carburetor air	DIRECT
Oil temperature	74°-88° C. (165°-190° F.)

GROUND LANDING

Cabin hood	locked open
Fuel valve	MAIN
Carburetor air	DIRECT
Supercharger	LOW blower
Propeller	1900 RPM
Mixture control	AUTO RICH
Electric auxiliary fuel pump	ON
Tabs	set as required
Water rudder	disengaged
Landing gear	DOWN
Tail wheel	LOCKED
Lap belt	fasten
Shoulder harness	tighten and lock

WATER LANDING

Complete "LANDING" check-off above "Wheels-up (Landing gear and tail wheel), and "Carburetor air".....ALTERNATE.

4. CHECK-OFF LISTS.

TAKE-OFF

Cabin hood	locked open
Fuel valve	MAIN
Carburetor air	DIRECT
Supercharger..	LOW blower
Propeller	INCREASE RPM (low pitch)
Mixture control	AUTO RICH
Electric auxiliary fuel pump	ON
Tabs	set as required
Water rudder	disengaged
Tail wheel	LOCKED
Dump valve	full OPEN (AFT position)

FLIGHT (CRUISING) 70% POWER

Propeller	1870 RPM
Landing gear	UP
Oil pressure	65-75 PSI
Fuel pressure	16-18 PSI
Cylinder head temperature	205° C. (401° F.) max.
Manifold pressure	30" at 5000 ft altitude
Supercharger	LOW blower
Mixture control	AUTO LEAN
Tabs	set as required
Carburetor air	DIRECT
Oil temperature	74°-88° C. (165°-190° F.)

LANDING

Cabin hood	locked open
Fuel valve	MAIN
Carburetor air	DIRECT
Supercharger..	LOW blower
Propeller	1900 RPM
Mixture control	AUTO RICH
Electric auxiliary fuel pump	ON
Tabs	set as required
Water rudder	disengaged
Landing gear	DOWN
Tail wheel	LOCKED

WATER TAKE OFF

Complete "TAKE-OFF" check list above except "Wheels-up". For best take-off allow airplane to fly itself off the water.

WATER LANDING

Complete "LANDING" check-off above except "Wheels-up (Landing gear and tail wheel), and "Carburetor air.....ALTERNATE.