

**OPERATIONAL SUPPLEMENT
FLIGHT MANUAL**

USAF SERIES

Original Signed By
T.H. Sullivan



C-54, EC-54, HC-54,

46 Nov 75
T.H. Sullivan
DAPI

AND NAVY

C-54 (R5D)

AIRCRAFT

THIS PUBLICATION SUPPLEMENTS T.O. 1C-54D-1 DATED 30 AUGUST 1963.

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SHORT TITLE: AIMS/IFF EQUIPMENT INSTALLATION

15 FEBRUARY 1972

1. PURPOSE.

To provide flight crews with information and operating instructions for AIMS/IFF (AN/APX-72) equipped aircraft modified in accordance with T.O. 1C-54-597.

2. GENERAL.

The AIMS/IFF equipment replaces the IFF/SIF (AN/APX-25) Radar Equipment.

3. INSTRUCTIONS.

NOTE

A reference to this supplement shall be entered opposite each paragraph in the basic manual affected by this supplement.

Until a change is made to the basic manual, the following shall apply:

- a. Page 1-63, AC AND DC OPERATED EQUIPMENT, IFF/SIF is changed to read:

AIMS/IFF

- b. Pages 1-78 and 1-79, paragraph Altimeters, is supplemented with the following:

Aircraft equipped with AIMS/IFF have altimeter-encoder AAU-21/A and altimeter AAU-27/A (figure 1) installed in the main instrument panel instead of the type C-12 altimeters. The AAU-21/A replaces the pilot's altimeter and the AAU-27/A replaces the copilot's altimeter. Other operating locations in the aircraft retain the type C-12 altimeters.

NOTE

Altimeter AAU-27/A may not be installed as part of T.O. 1C-54-597 modification. If not, the copilot's existing altimeter will be retained. The following warning is not applicable to altimeter-encoder AAU-21/A or altimeter AAU-27/A.

- c. Page 1-79, WARNING, is changed to read:

WARNING

The type C-12 altimeters should be checked closely to assure that the 10,000-foot pointer is set correctly. Due to previous settings, the pressure set knob could have been rotated until the numbers reappeared in the altimeter setting window from the opposite side, thus indicating a 10,000-foot error.

- d. Page 2-11, BEFORE TAXI, delete the WARNING note after item 4.

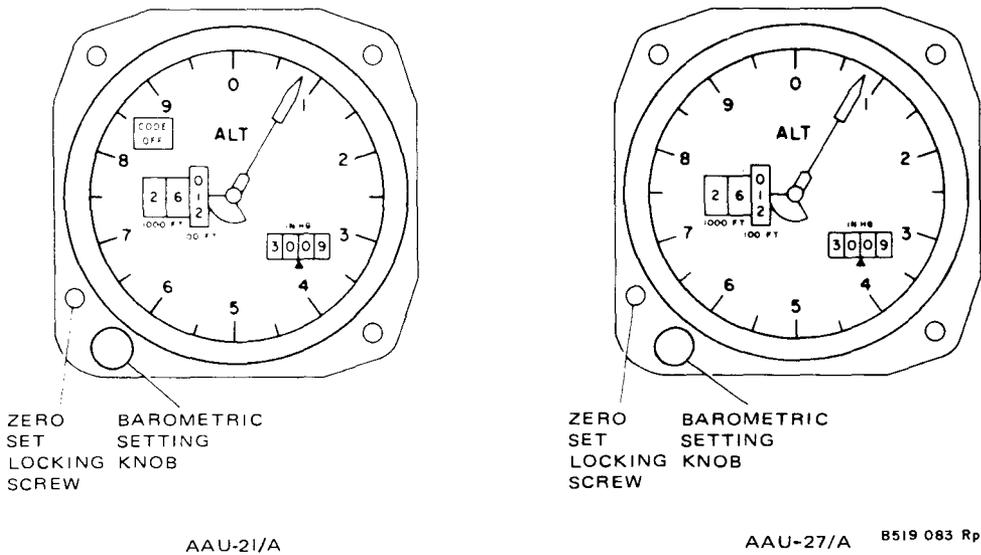


Figure 1. Altimeter-Encoder AAU-21/A and Altimeter AAU-27/A

- ✓ e. Page 2-12, BEFORE TAXI. (Continued), item 5 is changed to read:
5. AIMS/IFF-STANDBY (P,CP,FE)
- ✓ f. Page 2-20, LINE UP (Continued), item 6 is changed to read:
6. AIMS/IFF-Set (Mode and Code as briefed) (P, CP, FE).
- ✓ g. Page 2-24, AFTER TAKEOFF - CLIMB (Continued), add item 8A as follows:
- 8A. AIMS/IFF - NORM (P, CP, FE).
- ✓ h. Page 2-34, AFTER LANDING. (Continued), item 13 is changed to read:
13. AIMS/IFF - As required. (P, CP, FE).

NOTE

Turn AIMS/IFF to STBY or OFF as soon after landing as possible to eliminate signals that may block the controller's scope and interface with the control of airborne aircraft. If it is desired to retain the mode 4 codes between flights, it is necessary to lock the codes into the transponder computer before turning the MASTER control to OFF. Turning the MASTER control to OFF, or removing power from the aircraft without first locking the codes into the transponder computer will zeroize the mode 4 codes. To lock the code, momentarily place the CODE control in the HOLD position after landing, and then proceed with the normal stopping procedure. When power is next applied, the transponder computer will again operate normally. If it is again desired to lock the code in the transponder computer, it is necessary to repeat the HOLD procedure. The transponder computer will zeroize any time that power is applied and the CODE control is turned to ZERO, even if the HOLD function has been activated. Once the code is zeroized, the code is not available until reset.

- ✓ i. Page 2-35/2-36, BEFORE LEAVING AIRCRAFT, add item 1A as follows:
- 1A. AIMS/IFF Classified codes - As required (P)
- ✓ k. Page 3-22, CRASH LANDINGS, add item 5A as follows:
- 5A. AIMS/IFF - EMER (P, CP, FE)
- ✓ l. Page 3-39, PILOT First Actions, item 2 is changed to read:
2. Distress Signal - Initiated
- 2A. AIMS/IFF - EMER

The pilot will direct the radio operator and copilot to notify ground stations of the emergency, aircraft position, intentions, and approximate ditching position. He will direct the copilot to set the AIMS/IFF equipment for emergency operation.

m. Page 3-40, COPILOT First Actions, add item 1A as follows:

1A. AIMS/IFF - EMER

At the direction of the pilot, set the AIMS/IFF equipment for emergency operation.

n. Page 3-44, RADIO OPERATOR First Actions, item 1 is changed to read:

1. Emergency - Declared.

Transmit distress call when directed by the pilot.

p. Page 3-47, Flight Engineer, delete item 2.

q. Page 3-47, Radio Operator, delete item 1.

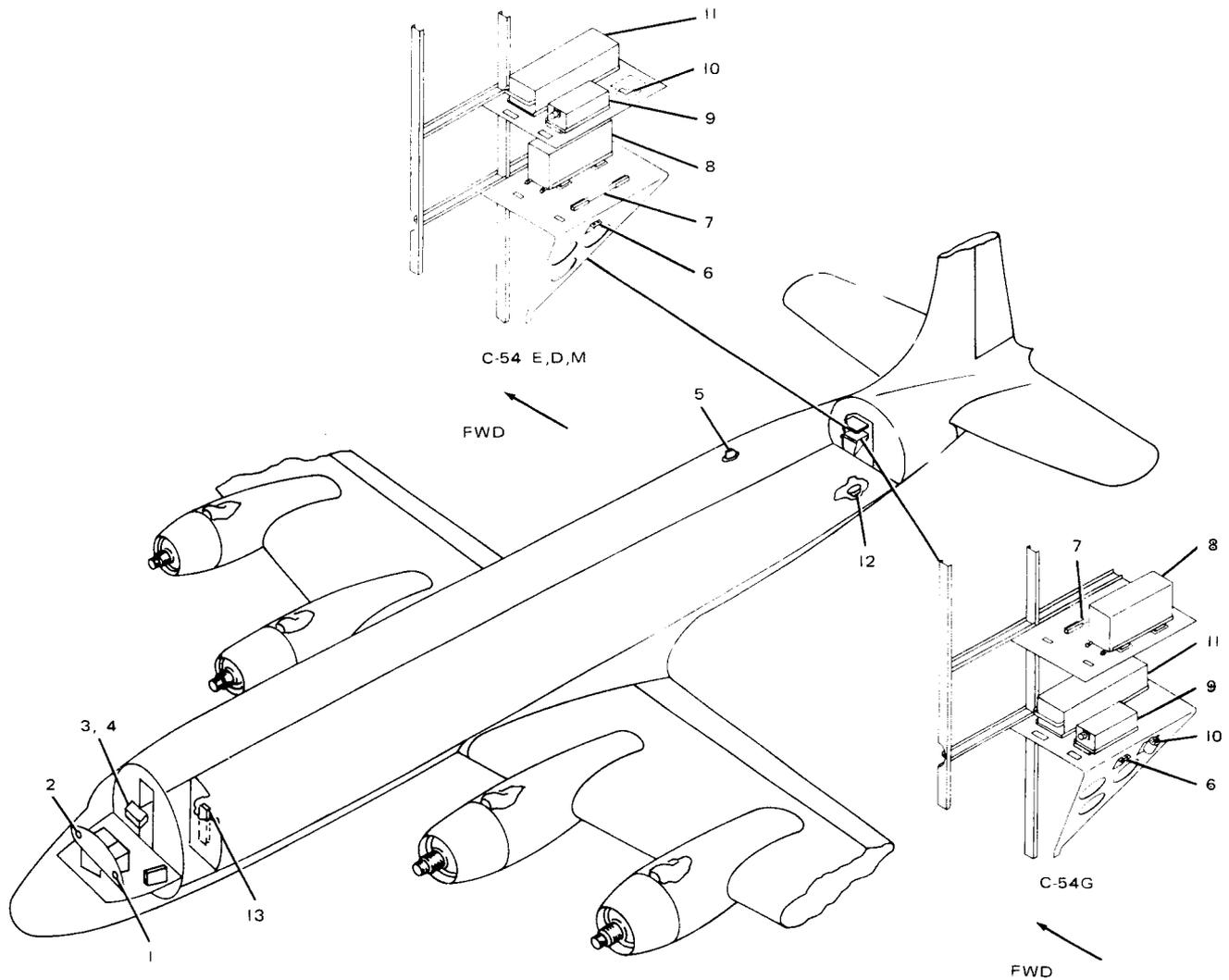
r. Page 4-23, table of COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT - TYPICAL, change first column entry IFF/SIF to AIMS/IFF, change second column entry AN/APX-6 or AN/APX-25 to AN/APX-72, change third column entry IDENTIFICATION to AUTOMATIC RADAR IDENTIFICATION AND ALTITUDE REPORTING, change fourth column entry RADIO OPERATOR to COPILOT, and change seventh column entry RADIO OPERATOR'S STATION to COPILOT'S STATION.

s. Page 4-47/4-48, paragraph AN/APX-25 IFF/SIF, is supplemented as follows:

AIMS/IFF TRANSPONDER SYSTEM (AN/APX-72).

The AIMS/IFF (identification friend or foe) transponder system provides automatic radar identification and altitude information of the aircraft to all suitably equipped challenging ground facilities, aircraft, and surface ships within line-of-sight. Mode 1, 2, 3/A, C or 4 interrogation signals on a frequency of $1,030 \pm 1.5$ megacycles are received by the system and decoded. The received signals are checked for valid code and proper mode, and if the proper interrogating signal has been received, a coded reply is transmitted on $1,090 \pm 3.0$ megacycles. In addition to these normal identification and altitude reply signals, specially coded identification of position (I/P) and emergency signals may be transmitted in response to interrogating signals. The I/P reply signal is used to distinguish between aircraft displaying identical coding and the emergency reply signals indicate an emergency or distress condition of the aircraft in flight. Normal identification operation, as well as transmission of the I/P and emergency reply signals, is accomplished in operating modes 1, 2, and 3/A. Mode 1 provides 32 code combinations, any one of which may be selected in flight. Mode 2 provides 4,096 code combinations, only one of which is normally used in flight, since the code selection dials on the receiver-transmitter are preset before flight. Mode 3/A provides 4,096 possible code combinations any one of which may be selected in flight. Altitude interrogations and replies are accomplished in mode C operation. The code for mode C is determined by the altitude of the aircraft and is encoded in 100-foot increments. Mode 4 operation provides a secure (encrypted) IFF capability through the use of a transponder computer with the AN/APX-72 transponder. The code for mode 4 must be preset into the computer prior to flight.

The AIMS/IFF transponder system includes a test set that provides for go/no-go self-testing of the system in modes 1, 2, 3/A, and C. System self-testing for mode 4 operation is performed automatically by the transponder computer. The major components of the AIMS/IFF system are Transponder Control C-6280(P)/APX, Radio Receiver-Transmitter RT-859/APX-72, Antennas AT-741/A, Antenna Switching Unit SA-1474/A, Altimeter-Encoder AAU-21/A, Altimeter AAU-27/A, Transponder Set Test Set TS-1843/APX, an IFF antenna switch, and Mount MT-3949()A/U with connector for Transponder Computer KIT-1A/TSEC. Refer to figure 2 for the general location of the AIMS/IFF equipment in the aircraft.



- | | |
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| <ul style="list-style-type: none"> 1. ALTIMETER AAU-27/A 2. ALTIMETER-ENCODER AAU-21/A 3. IFF ANTENNA SWITCH 4. TRANSPONDER SET CONTROL C-6280(P)/APX 5. TOP ANTENNA AT-741/A 6. ANTENNA TEST PANEL 7. BY-PASS CABLE ASSEMBLY X68C415-1 | <ul style="list-style-type: none"> 8. TRANSPONDER COMPUTER KIT-1A/TSEC 9. TRANSPONDER SET TEST SET TS-1843()/APX 10. ANTENNA SWITCHING UNIT SA-1474/A 11. RECEIVER-TRANSMITTER RT-859/APX-72 12. BOTTOM ANTENNA AT-741/A 13. MAIN JUNCTION BOX |
|--|---|

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Figure 2. AIMS/IFF Equipment Location

Primary power to operate the AIMS/IFF equipment is supplied from the aircraft phase C ac bus and the 28-vdc bus and is controlled through three circuit breakers on the main junction box. Ac power (115 volts, 400 cycles, 1 phase) is applied through IFF AC 5-ampere circuit breaker to the altimeter-encoder and the receiver-transmitter. The receiver-transmitter provides switched 115-vac power to the antenna switching unit and the transponder computer. The IFF DC 5-ampere circuit breaker provides a 28-vdc power to the test set, the receiver-transmitter, the transponder control, and the IFF CAUTION light. The ALT VIBRATOR 5-ampere circuit breaker provides 28 vdc to the altimeter-encoder and altimeter vibrators.

Transponder Control C-6280(P)/APX.

The transponder control (figure 3) contains all of the controls normally required for operating the AIMS/IFF transponder system except for mode 2 code selections. The MASTER control turns the AIMS/IFF system on and off, places it in warmup (STBY), controls the sensitivity of the receiver (low or normal), and initiates the emergency reply operation. The IDENT-OUT-MIC switch selects I/P operation. The I/P operation is selected when the switch is held in the momentary IDENT position. With the switch set to the MIC position, I/P operation is initiated by keying the UHF command transceiver. The operating modes are selected by the M-1, M-2, M-3/A, and M-C mode enabling switches. These are 3-position toggle switches providing ON and OUT (off) positions plus a momentary position for test signal selection. The TEST light illuminates when the receiver-transmitter responds properly to a mode 1, 2, 3/A, or C self-test. MODE 1 and MODE 3/A thumbwheel switches select and digitally display the reply code numbers. The RAD TEST-OUT-MON switch in the RAD TEST position permits the receiver-transmitter to be interrogated by selected mode signals from

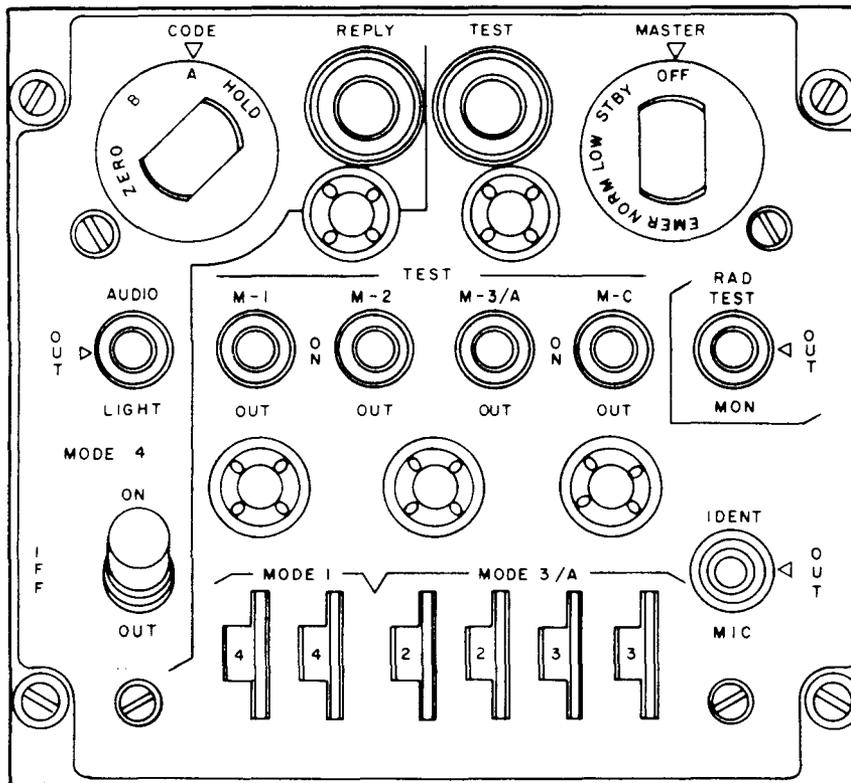


Figure 3. Transponder Control C-6280(P)/APX

external test equipment. In the MON position, the TEST light will illuminate to indicate replies are being transmitted in modes 1, 2, 3/A, or C. The OUT position disables the RAD TEST and MON functions. Mode 4 controls and indicator are grouped together along the left side of the control panel. The MODE 4 switch enables or disables mode 4 operation. The CODE switch provides for the selection of either the A or B mode 4 code. When momentarily placed in the HOLD position, it prevents the transponder computer from zeroizing (canceling) the mode 4 codes when power is removed from the system. In the ZERO position, the mode 4 codes are zeroized. The AUDIO-OUT-LIGHT switch in the AUDIO position selects both audio and reply-light monitoring of mode 4 operation. An audio tone in the pilot's headset indicates valid interrogations are being received and illumination of the REPLY light indicates replies are being transmitted. To hear the audio tone, marker beacon (MARKER) mixing switch on the interphone control panel must be on. The LIGHT position selects REPLY light monitoring only. The OUT position turns the monitoring circuits off. The transponder control is located in the overhead between the pilot and copilot stations.

Radio Receiver-Transmitter RT-859/APX-72.

The radio receiver-transmitter (figure 4) contains the primary receiving and transmitting circuits of the AIMS/IFF transponder system. It receives, decodes, and replies to the characteristic interrogations of operational modes 1, 2, 3/A, C, and 4. Absence of the transponder computer and the altimeter-encoder does not affect the operation of the receiver-transmitter except in modes 4 and C respectively. The mode 2 four-digit reply code select switches on the front panel select and indicate the mode 2 reply codes. Other than these switches, the receiver-transmitter is controlled by the

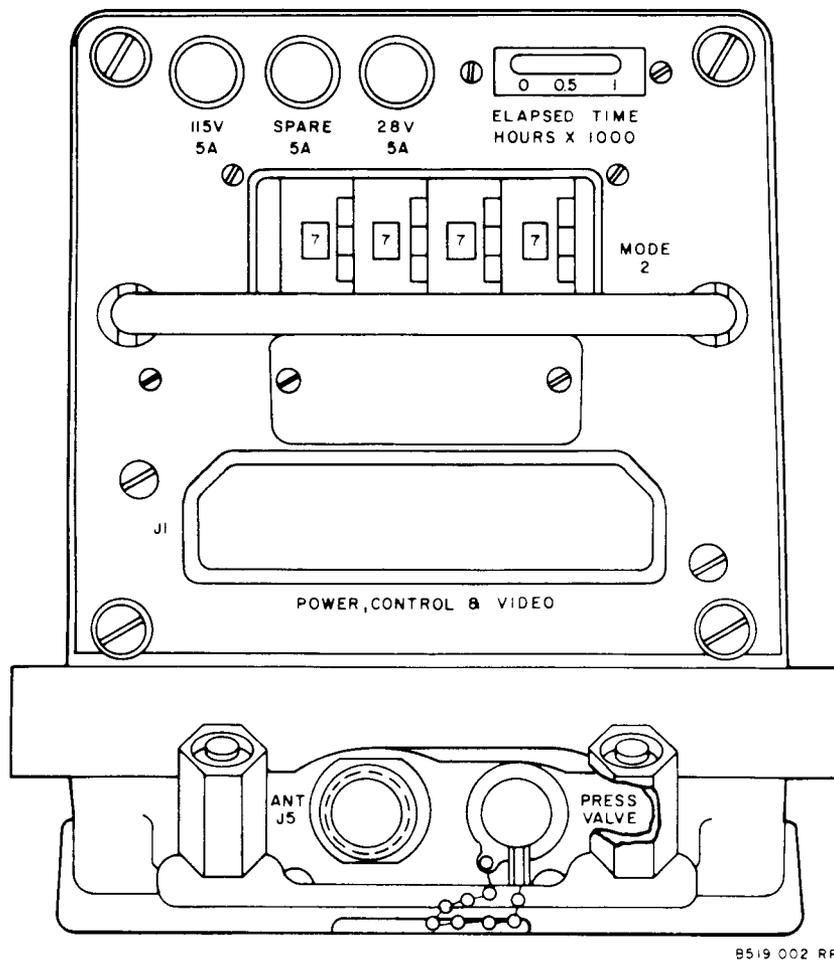


Figure 4. Radio Receiver-Transmitter RT-859/APX-72

positions of the switches and controls on the transponder control. The receiver-transmitter responds only to interrogating signals that correspond to the preset modes and codes. The receiver-transmitter is mounted in the aft end of the aircraft (figure 2).

Antenna AT-741/A.

Two antennas are provided with the AIMS/IFF transponder system. The antennas receive interrogation signals from other stations and radiate the reply signals generated in the receiver-transmitter. The antennas are mounted on the top and bottom of the fuselage. Either or both antennas may be connected to the receiver-transmitter through the antenna switching unit, which is controlled by the IFF antenna switch.

Antenna Switching Unit SA-1474/A.

The antenna switching unit is connected in the radio frequency path between the antennas and the test set, or between the antennas and the receiver-transmitter when the test set is replaced with the bypass cable. The antenna switching unit is controlled by the IFF antenna switch and is mounted in the aft end of the aircraft (figure 2).

IFF Antenna Switch.

The IFF antenna switch panel contains a 3-position toggle switch with switch positions TOP, BOTH, and BOT (bottom). In the TOP position the antenna switching unit connects the receiver-transmitter to the top antenna and to the bottom antenna in the BOT position. When set to BOTH, the antenna switching unit alternately connects the receiver-transmitter to the top and bottom antennas approximately 38 times per second. The IFF antenna switch panel is mounted in the overhead between the pilot and copilot stations.

NOTE

Set the IFF antenna switch to BOTH for normal operation.

Altimeter-Encoder AAU-21/A.

WARNING

If the internal vibrators of the altimeter-encoder or altimeter are inoperative due to either internal failure or dc power failure, the 100-foot pointers may momentarily hang up when passing through 0 (12 o'clock position). If the vibrators have failed, hangup of the 100-foot pointers can be minimized by tapping the case of the altimeters. Pilots should be especially watchful for this failure when the minimum approach altitude lies within the 800- to 1000-foot part of the scale (1800 to 2000 feet, etc).

One altimeter-encoder (figure 1) is installed in the altimeter position on the pilot's instrument panel. The altimeter-encoder combines a conventional barometric type altimeter, possessing a counter-drum-pointer display, with an altitude-reporting encoder in one self-contained unit. The 10,000- and 1000-foot counters and 100-foot drum provide a direct digital output and readout of altitude in increments of 100 feet, from -1000 to 38,000 feet. The digital output is referenced to 29.92 inches of mercury and is not affected by changes of barometric setting. The pointer repeats the indications of the 100-foot drum, and serves both as a vernier for the drum and as a quick indication of the rate and sense of altitude changes. Two methods may be used to read indicated altitude on the

counter-drum-pointer altimeter: (1) read the counter-drum window, without reference to the pointer, as a direct digital readout in thousands and hundreds of feet, or (2) read the thousands of feet on the two counter indicators, without referring to the drum, and then add the 100-foot pointer indication.

The self-contained servo driven encoder provides altitude encoded in 100-foot increments for automatic transmission when the AIMS/IFF transponder is interrogated on mode C. In case of power loss to the encoder servo system, a CODE OFF flag appears automatically in a window in the upper left portion of the display, indicating that altitude information is no longer being transmitted. In this condition, the instrument continues to function as a barometric altimeter.

The barometric pressure is entered by use of a barometric set knob in the lower left front of the instrument case. The altimeter setting appears on counters in the window at the lower right of the display and has a range of settings from 28.1 to 31.0 inches of mercury.

An internal vibrator operates continuously whenever aircraft dc power is turned on. The vibrator minimizes internal mechanical friction, enabling the instrument to provide a smoother display during changing altitude conditions. Should vibrator failure occur, the altimeter will continue to function pneumatically, but a less-smooth movement of the instrument display will be evident with changes in altitude.

Altimeter AAU-27/A.

One altimeter (figure 1) is installed in the copilot's instrument panel. The instrument is identical to the altimeter-encoder except it does not have an altitude encoder nor the CODE OFF display mechanism. The indicated altitude on the altimeter is from -1000 to 50,000 feet. The altitude display, altimeter setting, and vibrator considerations described for the altimeter-encoder also apply to the altimeter.

NOTE

If altimeter AAU-27/A is not installed as part of T.O. 1C-54-597 modification, the copilot's existing altimeter will be retained.

Transponder Set Test Set TS-1843/APX.

The test set provides the capability of testing the AIMS/IFF transponder system on a go/no-go basis in all modes except mode 4. The test set is in the radio-frequency path between the receiver-transmitter and the antenna switching unit. When one of the mode 1, 2, 3/A, or C switches is placed in the TEST position, interrogation pulse pairs for the selected mode are generated. These interrogations are applied to the receiver-transmitter to check for proper receiver frequency, sensitivity, and decoding. The test set analyzes the resulting transmitter replies for proper frequency, power, bracket spacing, and antenna circuit vswr. If all tests are within specified limits, the test set causes the TEST indicator on the transponder control to illuminate, providing a go indication. Failure of a single test prevents the TEST indicator from illuminating, providing a no-go indication. The test set is mounted in the aft end of the aircraft (figure 2). A bypass cable may be used in lieu of the test set with subsequent loss of the go/no-go testing capability for modes 1, 2, 3/A, and C. The bypass cable is mounted on the rack next to the test set.

IFF CAUTION Light.

The IFF CAUTION light illuminates when the IFF caution light circuit detects an inoperative mode 4 capability, provided the transponder computer is installed, aircraft power is on, and the IFF MASTER control is not off. Specific discrepancies monitored by the IFF caution light circuit are: mode 4 codes

zeroized, transponder failure to reply to proper mode 4 interrogation, or the automatic self-test function of the transponder computer reveals a faulty transponder computer. The IFF CAUTION light is located on the fire extinguisher control panel above the pilot's instrument panel.

Operation.

1. Starting procedure.
 - a. Turn on electrical power.
 - b. Set the transponder control MODE 1 and 3/A code select switches to the required operational codes.
 - c. Set receiver-transmitter MODE 2 code select switches to the required operational code.
 - d. Set transponder control mode enable switches M-1, M-2, M-3/A, and M-C to ON (unless operational requirements specify that only certain modes are to be used, then set all other mode switches to OUT).
 - e. Set the transponder control MODE 4 ON-OUT switch to ON and CODE switch to A or B (as required) when equipped with the transponder computer and flying into a known mode 4 interrogating environment.
 - f. Set the transponder control RAD TEST-OUT-MON switch to OUT, AUDIO-OUT-LIGHT switch to LIGHT, and IDENT-OUT-MIC switch to OUT.
 - g. Set the prevailing atmospheric pressure on the barometric displays of the altimeter-encoder and altimeter. The altimeters should indicate local altitude.
 - h. Set the transponder control MASTER switch to STBY for 1 minute (normal ambient temperature) or 5 minutes (extremely low ambient temperatures), then set to NORM.
2. Self-Test Procedure.
 - a. Press to test the REPLY and TEST lights. The lights should illuminate.
 - b. Press to test the IFF CAUTION light. The lamp should illuminate.

NOTE

If the mode 4 codes are zeroized, the IFF CAUTION light will be on before and after this test.

- c. Set transponder control mode enable switches M-1, M-2, M-3/A, and M-C in sequence to TEST. The TEST indicator should illuminate when each switch is in the TEST position indicating a system go condition for the particular mode being tested. Reset the mode enable switches to ON or OUT as required.
- d. The transponder computer automatically performs a self-test of the mode 4 circuits. Observe that the IFF CAUTION light is off. The IFF CAUTION light will illuminate when a mode 4 no-go condition is detected.

3. Normal Operating Procedures.

a. Mode 4 monitoring. Set the transponder control AUDIO-OUT-LIGHT switch to AUDIO to provide aural and visual (REPLY light) monitoring of valid mode 4 interrogations and replies. To hear the audio tone for mode 4 interrogations, set the marker beacon (MARKER) mixing switch on the interphone panel to the on position. Set the AUDIO-OUT-LIGHT switch to LIGHT to enable REPLY light monitoring only, if desired.

b. Monitoring modes 1, 2, 3/A, and C. Set the transponder control RAD TEST-OUT-MON switch to MON for monitoring replies to the selected 1, 2, 3/A, and/or C operating modes.

c. Antenna selection. Set the IFF antenna switch to TOP, BOT (bottom), or BOTH as required.

d. Identification of position (I/P) operation. The receiver-transmitter will transmit specially coded I/P reply signals to mode 1, 2, or 3/A interrogations when the IDENT-OUT-MIC switch on the transponder control is energized. Transmission of the I/P reply signals requires the appropriate mode enable switches to be in the ON position. Use one of the following methods to control the transmission of the I/P reply signals.

(1) Momentarily hold the IDENT-OUT-MIC switch in the IDENT position (spring-loaded return to OUT) and then release it. This action will cause the receiver-transmitter to transmit the I/P reply signals for 15 to 30 seconds in response to mode 1, 2, or 3/A interrogations. Repeat as required.

(2) Place the IDENT-OUT-MIC switch in the MIC position. I/P reply signals can now be transmitted by momentarily keying the UHF command transceiver. When the need for transmitting further I/P reply signals ceases, return the IDENT-OUT-MIC switch to the OUT position.

4. Emergency Operating Procedures. During an aircraft emergency or distress condition, the system may be used to transmit specially coded emergency reply signals to mode 1, 2, or 3/A interrogations. These emergency reply signals will be transmitted as long as the MASTER control on the transponder control remains in the EMER position, regardless of the position of the mode enable switches. For emergency operation, set the MASTER control as follows:

a. Lift the MASTER control knob and rotate to EMER position.

b. When the emergency is over, return the MASTER control to the NORM or LOW position.

5. Inoperative Mode 4 Operation. When illuminated, the IFF CAUTION light signifies that the AIMS/IFF equipment will not respond to mode 4 interrogations, and that operation in a known mode 4 interrogating environment should be avoided. To attempt correction, place the MASTER control to NORM (if in STBY or LOW), check that the mode 4 ON-OUT toggle switch is ON and check that the proper A or B code has been selected for the current code time period. If the IFF CAUTION light remains illuminated, the applicable flight procedures should then be employed that are operationally directed for an inoperative mode 4 condition.

6. Stopping Procedure.

a. Set the transponder control CODE switch to HOLD or ZERO as required.

- b. Set the transponder control MASTER switch to OFF. Set the IDENT-OUT-MIC, M-1, M-2, M-3/A, M-C, MODE 4, AUDIO-OUT-LIGHT, and RAD TEST-OUT-MON switches to OUT.
- c. Turn off electrical power.

Checklist.

Changes to the Pilots'/Flight Engineer's Flight Crew Checklist (T.O. 1C-54D-1CL-1) are reproduced so that appropriate pages may be cut out and inserted in the binder in lieu of the existing page, pending changes to the manual and checklist. Reference to this supplement will be made on the title page of the check list.

THE END

CURRENT FLIGHT MANUAL AND SAFETY AND OPERATIONAL SUPPLEMENT STATUS

This page will be published with each Safety and Operational Supplement, Flight Manual Change, and Flight Manual Revision. It provides a comprehensive listing of the current flight manual, flight crew checklist, and safety and operational supplements. The supplements you receive should follow in sequence and if you are missing one listed on this page, see your publications distribution officer and get your copy. In accordance with T.O. 00-5-1, Safety and Operational Supplements will be filed in reverse numerical sequence in front of basic manual, with Safety Supplements filed in front of Operational Supplements. The appropriate index should be checked periodically to make sure you have the latest publications.

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CHECKLIST	DATE	CHANGED	
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1C-54D-1CL-2	30 Aug 63	6 Jul 67	
1C-54D-1CL-3	30 Aug 63	6 Jul 67	
1C-54D-1CL-4	30 Aug 63	6 Jul 67	
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1C-54D-1S-14	15 Feb 72	AIMS/IFF Equipment Installation	1-63, 1-78, 1-79, 2-11, 2-12, 2-20, 2-24, 2-34, 2-35/2-36, 3-22, 3-39, 3-40, 3-44, 3-47, 4-23, 4-47, 4-48

SUPPLEMENTS INCORPORATED, RESCINDED OR REPLACED

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Original Signed By
T. H. Sullivan

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J. H. Sullivan

NAVY NAVWEPS DIVISION

FLIGHT MANUAL

USAF SERIES
C-54, EC-54
HC-54,

NAVY MODELS
C-54 (R5D)



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Insert changed pages into basic
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SEE BASIC INDEX T.O. 0-1-1-3 FOR CURRENT STATUS
OF OPERATIONAL AND SAFETY SUPPLEMENT

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LIST OF EFFECTIVE PAGES

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Dates of issue for original and changed pages are:

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Change 2 1 Nov 65	Change 7 13 May 69
Change 3 19 Aug 66	Change 8 15 Oct 69
Change 4 6 Jul 67	Change 9 24 Aug 70

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*1-4	9	*1-45 - 1-47	9	1-86 Blank	0
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*1-19	9	*1-63	9	*2-8 - 2-9	9
1-20	2	1-64 - 1-67	0	2-10	8

CURRENT FLIGHT CREW CHECKLISTS

1C-54D-1CL-1 30 Aug 1963, Changed 24 Aug 70	1C-54D-1CL-2 30 Aug 1963, Changed 6 Jul 70	1C-54D-1CL-3 30 Aug 1963, Changed 6 Jul 67
1C-54D-1CL-1-1 24 Aug 70		1C-54D-1CL-4 30 Aug 1963, Changed 6 Jul 67

Upon receipt of the second and subsequent changes to this technical order, personnel responsible for maintaining this publication in current status will ascertain that all previous changes have been received and incorporated. Action should be taken promptly if the publication is incomplete.

* The asterisk indicates pages changed, added, or deleted by the current change.

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USAF

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Index-7	3
Index-8 Blank	0

CURRENT FLIGHT MANUAL AND SAFETY AND OPERATIONAL SUPPLEMENT STATUS

This page will be published with each Safety and Operational Supplement, Flight Manual Change, and Flight Manual Revision. It provides a comprehensive listing of the current flight manual, flight crew checklist, and safety and operational supplements. The supplements you receive should follow in sequence and if you are missing one listed on this page, see your publications distribution officer and get your copy. The appropriate indexes should be checked periodically to make sure you have the latest publications.

FLIGHT MANUAL	DATE	CHANGED
1C-54D-1	30 Aug 63	24 Aug 70

CHECKLIST	DATE	CHANGED
1C-54D-1CL-1	30 Aug 63	24 Aug 70
1C-54D-1CL-1-1	22 Jan 69	24 Aug 70
1C-54D-1CL-2	30 Aug 63	6 Jul 67
1C-54D-1CL-3	30 Aug 63	6 Jul 67
1C-54D-1CL-4	30 Aug 63	6 Jul 67

SAFETY SUPPLEMENTS	DATE	SHORT TITLE	PAGES AFFECTED
1C-54D-1SS-13	23 Jun 67	Circuit Breakers	Sect III

OPERATIONAL SUPPLEMENTS	DATE	SHORT TITLE	PAGES AFFECTED
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SUPPLEMENTS INCORPORATED RESCINDED OR REPLACED.

1C-54D-1SS-13	23 Jun 67	Electrical Fire	Rescinded, No longer required
1C-54D-1S-11	23 Jan 68	AN/APN-1	Rescinded, No longer required
		Change 9	Flyleaf 1/(Flyleaf 2 Blank)



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SECTION IV	<i>Description and Operation of Auxiliary Equipment</i>	<i>4-1</i>
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SECTION VI	<i>Flight Characteristics</i>	<i>6-1</i>
SECTION VII	<i>Systems Operation</i>	<i>7-1</i>
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SECTION IX	<i>All-Weather Operation</i>	<i>9-1</i>
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INDEX	<i>Alphabetical Index</i>	<i>X-1</i>

SCOPE.

This manual contains the necessary information for safe and efficient operation of USAF C-54, EC-54, HC-54 and Navy C-54 aircraft. These instructions provide you with a general knowledge of the aircraft, its characteristics, and specific normal and emergency operating procedures. Your flying experience is recognized, and therefore, basic flight principles are avoided.

SOUND JUDGMENT.

Instructions in this manual are for a crew inexperienced in the operation of this aircraft. This manual provides the best possible operating instructions under most circumstances, but it is not a substitute for sound judgement. Multiple emergencies, adverse weather, terrain, etc., may require modification of the procedures.

PERMISSIBLE OPERATIONS.

The Flight Manual takes a positive approach and normally states only what you can do. Unusual operations or configurations (such as asymmetrical loading) are prohibited unless specifically covered herein. Clearance must be obtained from the Flight Manual Manager before any questionable operation is attempted which is not specifically permitted in this manual.

HOW TO BE ASSURED OF HAVING LATEST DATA.

Refer to T. O. 0-1-1-3 for the listing of all current Flight Manuals, Safety Supplements, Operational Supplements, and Checklists. Its frequency of issue and brevity assures an accurate, up-to-date listing of these publications.

SAFETY AND OPERATIONAL SUPPLEMENTS.

Safety supplements are issued as an expeditious means of reflecting safety information when hazardous or safety conditions exist. These supplements contain operational, precautionary, and restrictive instructions that affect safety and safety modifications. Op-

erational supplements are issued as an expeditious means of reflecting information when mission essential operational procedures are involved. Supplements are issued by teletype (interim) or by printed copy (formal) depending upon the urgency. Interim supplements are formalized and replaced with a new number within 30 days. Formal printed supplements are identified by red letters "SS" for safety supplements and black letters "OS" for operational supplements printed around the borders of the title pages. However, a safety supplement can also be identified by the "SS" preceding the number. Operational supplement numbers are preceded by a single "S".

CHECKLISTS.

The Flight Manual contains only amplified checklists. Abbreviated checklists have been issued as separate technical orders—see the back of the title page for the T. O. number of your latest checklist. Line items in the Flight Manual and checklists are identical in respect to arrangement and item number. When a Safety Supplement affects the abbreviated checklist, write in the applicable change on the affected checklist page. As soon as possible a new checklist page, incorporating the supplement, will be issued. This will keep handwritten entries of Safety Supplement information in your checklist to a minimum.

HOW TO GET PERSONAL COPIES.

Each flight crew member is entitled to personal copies of the Flight Manual, Safety Supplements, and Checklists. The required quantities should be ordered before you need them to assure their prompt receipt. Check

checklist pages are inserted. They are available in three capacities and are obtained through normal Air Force supply under the following stocklist numbers: 7510-766-4268, -4269, and 4270 for 15, 25, and 40 envelope binders respectively. Check with your supply personnel for assistance in securing these items.

WARNINGS, CAUTIONS, AND NOTES.

The following definitions apply to "Warnings", "Cautions", and "Notes" found throughout the manual.

WARNING

Operating procedures, techniques, etc., which will result in personal injury or loss of life if not carefully followed.

CAUTION

Operating procedures, techniques, etc., which will result in damage to equipment if not carefully followed.

Note

An operating procedure, technique, etc., which is considered essential to emphasize.

YOUR RESPONSIBILITY — TO LET US KNOW.

Every effort is made to keep the Flight Manual current. Review conferences with operating personnel and a constant review of accident and flight test reports assure inclusion of the latest data in the manual. However, we cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections, and questions regarding this manual or any phase of the Flight Manual program are welcome. These should be forwarded through your Command Headquarters to Commander, Warner Robins Air Material Area, Service Engineering Division (WRNEO), Robins Air Force Base, Georgia.

AIRCRAFT SERIES DESIGNATION.

This manual contains information for all C-54 series aircraft. Many of the changes in con-

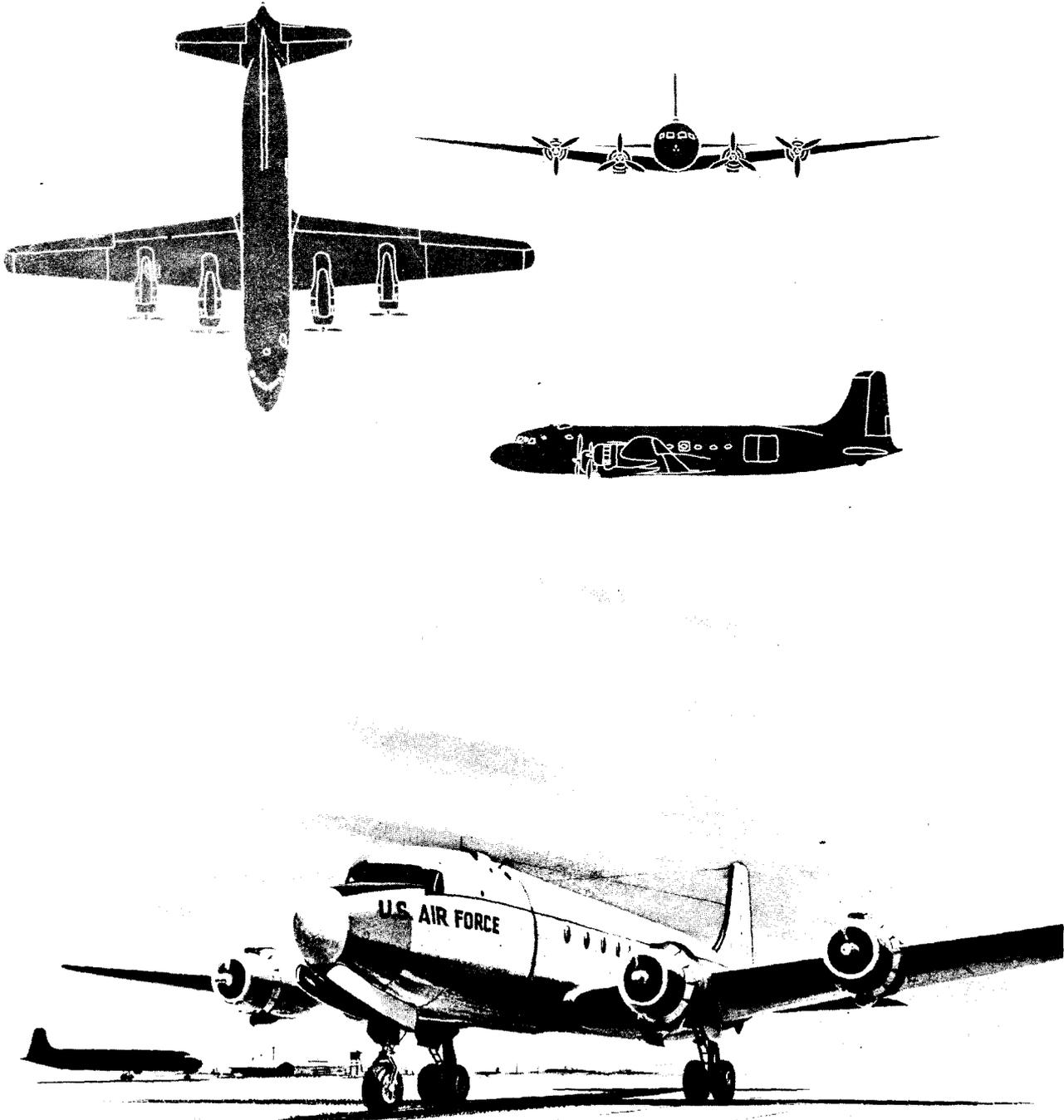
figuration in the different models are apparent to the flight crews by visual inspection and are adequately covered by text and illustrations. Where text or illustrations are not specifically identified for a particular model, it may be assumed that such items are common to all models. When reference is made to individual models, the model is specified. The reference "C-54" will refer to USAF C-54 models, excluding the EC-54, HC-54 and Navy C-54 aircraft. References to EC-54 and HC-54 aircraft will be made by model designation. The reference "Navy C-54" includes all Navy C-54 models, formerly designated as R5D. In some instances it is impossible to identify equipment as being common to any particular model. In such cases as this, the reference "Some Aircraft" indicates that the item may or may not be found on a particular model aircraft. Each aircraft should be checked to determine the equipment installed and the location of equipment.

The following list contains all aircraft covered by this manual, the current model and series designation, the former designation, and the service using the particular model.

Current Designation	Former Designation	Service
C-54D	Same	AF
EC-54D	AC-54D	AF
HC-54D	SC-54D	AF
VC-54D	Same	AF
C-54E	Same	AF
C-54G	Same	AF
VC-54G	Same	AF
C-54M	Same	AF
VC-54N	R5D-1Z	Navy
C-54P	R5D-2	Navy
VC-54P	R5D-2Z	Navy
C-54Q	R5D-3	Navy
VC-54Q	R5D-3Z	Navy
C-54R	R5D-4R	Navy
C-54S	R5D-5	Navy
VC-54S	R5D-5Z	Navy
C-54T	R5D-5R	Navy
EC-54U	R5D-4	Navy (C. G.)
RC-54V	R5D-3	Navy (C. G.)

Note

TC-54D aircraft have been removed from service. Information concerning these aircraft will be removed from individual pages as they are changed for other reasons.



C-54

THE AIRCRAFT

Figure 1-1

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with your Technical Order Distribution Officer—it is his job to fulfill your Technical Order requests. Basically, you must order the required quantities on the Publication Requirements Table (T.O. 0-1-1-3). Technical Orders 00-5-1 and 00-5-2 give detailed information for properly ordering these publications. Make sure a system is established at your base to deliver these publications to the flight crews immediately upon receipt.

FLIGHT MANUAL AND CHECKLIST BINDERS.

Loose leaf binders and sectionalized tabs are available for use with your manual. These are obtained through local purchase procedures and are listed in the Federal Supply Schedule (FSC Group 75, Office Supplies, Part 1). Binders are also available for carrying your abbreviated checklists. These binders contain plastic envelopes into which individual



SECTION I
DESCRIPTION

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THE AIRCRAFT.

The C-54 aircraft, manufactured by Douglas Aircraft Company, Inc., is a four-engined, low-wing monoplane with fully retractable tricycle landing gear. The aircraft is designed as a long-range cargo, troop, or per-

sonnel transport (figure 1-1). The EC-54 and HC-54 have been modified from the basic aircraft by the addition of special equipment necessary for specialized missions (figure 1-3).

AIRCRAFT DIMENSIONS.

The principal dimensions of the aircraft are:

- Span 117 feet 6 inches
- Length. 93 feet 6 inches
- Length with radome
nose 94 feet 6 inches
- Height. 27 feet 10 inches
- Stabilizer span 39 feet 6 inches

Door Dimensions

The dimensions of the entrance doors are:

- Main cabin and cargo doors**
- Both doors open 95 3/4 X 67 inches
 - Passenger door 48 X 33 1/2 inches
 - Crew entrance door 28 3/4 X 57 1/4 inches
 - Forward lower cargo door 29 3/4 X 36 inches
 - Aft lower cargo door 29 3/4 X 36 inches
 - Accessories compartment door 23 X 17 inches

AIRCRAFT GROSS WEIGHT.

The design gross weight of the aircraft is 73,000 pounds. For complete weight information, see Section V.

FLIGHT CREW.

Accommodations are provided for a regular crew of five members: pilot, copilot, flight engineer, radio operator, and navigator. On some aircraft, provision is made for a flight steward, two scanners, assistant flight engineer, and flight inspection technician (panel operator).

MAIN DIFFERENCES TABLES.

The principal differences between the aircraft are shown in the main differences table (figure 1-2).

ENGINE.

The aircraft is powered by four 14-cylinder, twin-row, aircooled Pratt & Whitney R-2000 engines. Each engine incorporates an integral single-stage, two-speed supercharger, a Bendix-Stromberg pressure-injection carburetor, and a direct-cranking starter. Refer to the Appendix for performance data.

THROTTLE LEVERS AND FRICTION LOCK LEVER.

Two banks of four mechanically interconnected throttle levers (1, figure 1-9) with OPEN and CLOSED placarded positions, are installed on the control pedestal. The throttle levers are conventionally operated and are equipped with a mechanical friction lock lever (2, figure 1-9).

MAIN DIFFERENCES TABLE

★ Flight mechanics oxygen regulator installed.

NOTE:
Check aircraft for equipment installation on aircraft models not listed.

ITEM	C-54D, C-54P, C-54Q AND RC-54V	C-54E AND C-54R	C-54G	C-54M	EC-54	HC-54	
FURNISHINGS	TROOP BENCHES OR LITTERS OR CARGO	COMMERCIAL-TYPE PASSENGER SEATS OR CARGO	TROOP BENCHES OR LITTERS OR CARGO	LITTERS OR TROOP BENCHES OR CARGO	TROOP BENCHES	AFT CABIN SEATS	
FUEL SYSTEM	SIX WING AND TWO FUSELAGE TANKS	EIGHT WING TANKS	EIGHT WING TANKS	EIGHT WING TANKS	SIX WING AND TWO FUSELAGE TANKS	SIX WING AND TWO FUSELAGE TANKS	
CABIN VENTILATION SYSTEM GROUND BLOWER	NONE	NONE	NONE	YES	NONE	NONE	
CREW OXYGEN SYSTEM	DILUTER DEMAND	DILUTER DEMAND	★ DILUTER DEMAND	DILUTER DEMAND	DILUTER DEMAND	DILUTER DEMAND	
PASSENGER OXYGEN SYSTEM	CONTINUOUS FLOW	CONTINUOUS FLOW	CONTINUOUS FLOW	CONTINUOUS FLOW	NONE	DILUTER DEMAND	
BUFFET	NONE	AFT MAIN CABIN	NONE	AFT MAIN CABIN	NONE	FWD MAIN CABIN	
NURSE'S CABINET	NONE	NONE	NONE	YES	NONE	NONE	
FACILITIES FLIGHT CHECK RECORDING SYSTEM	NONE	NONE	NONE	NONE	YES	NONE	
DATA RECORDER OPERATOR'S STATION	NONE	NONE	NONE	NONE	YES	NONE	
SCANNER'S STATION (2)	NONE	NONE	NONE	NONE	NONE	YES	
SEARCH AND RESCUE EQUIPMENT	NONE	NONE	NONE	NONE	NONE	YES	
ANTISKID BRAKE SYSTEM	NONE	NONE	NONE	NONE	NONE	YES	
POWER CONTROL PANEL	NONE	NONE	NONE	NONE	YES	NONE	

Figure 1-2

XI-128

GENERAL ARRANGEMENT DIAGRAM—Typical

USAF AND NAVY C-54

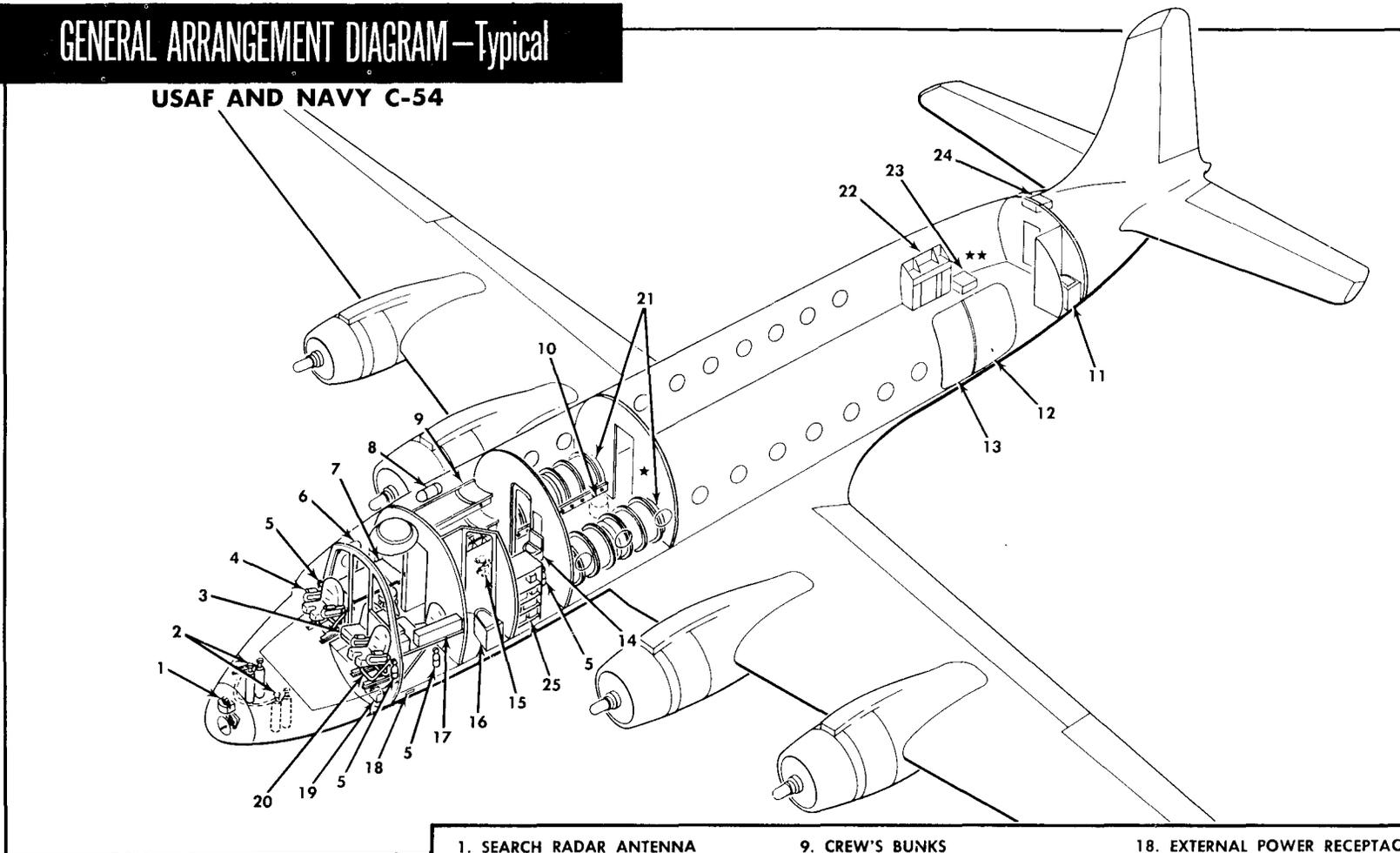


Figure 1-3 (Sheet 1 of 4)

T.O. 1C-54D-1

Section I

Notes:

1. *This bulkhead is installed only on aircraft with fuselage fuel tanks.
2. Depending on model, the main cabin area may be outfitted with troop benches, litters, or commercial type seats. For bulk cargo, all passenger fittings may be removed.
3. **Alternate location for APP.



- | | | |
|---|--------------------------------|--|
| 1. SEARCH RADAR ANTENNA | 9. CREW'S BUNKS | 18. EXTERNAL POWER RECEPTACLE |
| 2. CO ₂ BOTTLES (4 INSTALLED ON NAVY C-54) | 10. HYDRAULIC RESERVOIR | 19. BATTERY INSTALLATION |
| 3. FLIGHT ENGINEER'S JUMP SEAT | 11. AFT LAVATORY | 20. PILOT'S STATION |
| 4. COPILOT'S STATION | 12. CARGO DOOR | 21. FUSELAGE FUEL TANKS (IF INSTALLED) |
| 5. PORTABLE OXYGEN CYLINDERS (4 PLACES) | 13. MAIN CABIN DOOR | 22. BUFFET (IF INSTALLED) |
| 6. CREW ENTRANCE DOOR | 14. WASH BASIN AND ACCESSORIES | 23. LOADING EQUIPMENT STOWAGE BOX |
| 7. NAVIGATOR'S STATION | 15. AUXILIARY POWER PLANT | 24. MAIN CABIN WATER TANK |
| 8. CREW'S WATER TANK | 16. CREW'S LAVATORY | 25. MAIN RADIO RACK |
| | 17. RADIO OPERATOR'S STATION | |

GENERAL ARRANGEMENT DIAGRAM—Typical

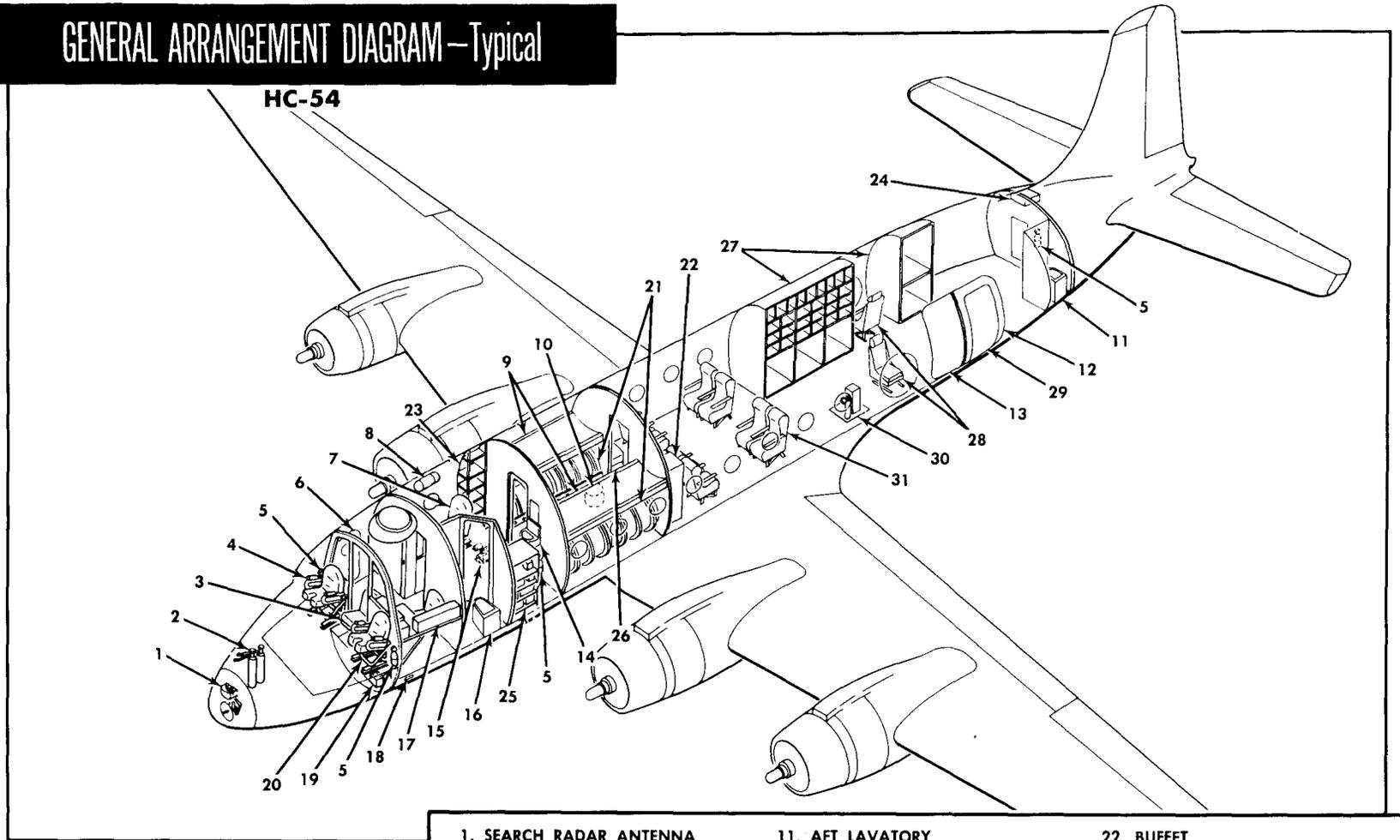
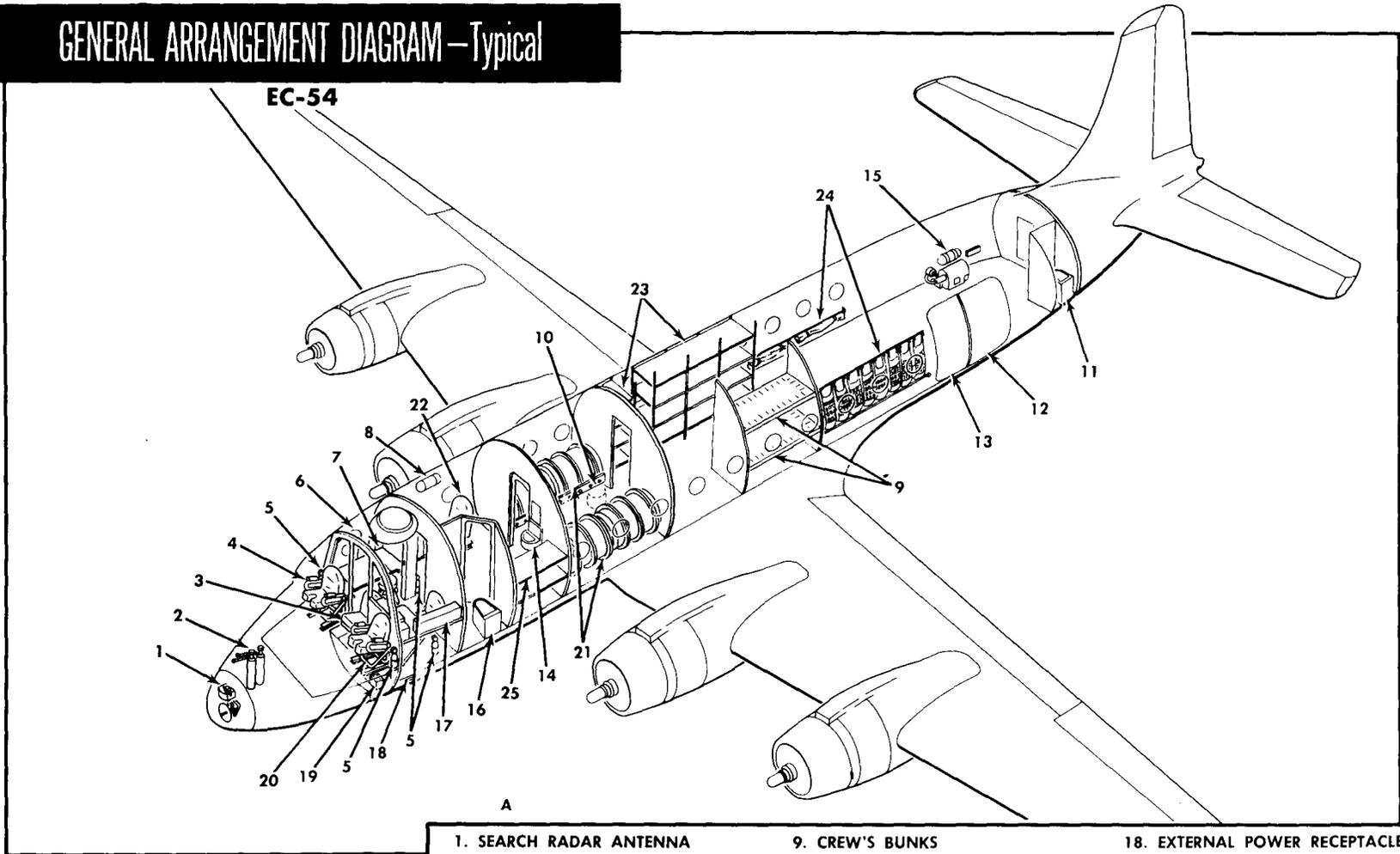


Figure 1-3 (Sheet 2 of 4)



- | | | |
|--|--------------------------------|--|
| 1. SEARCH RADAR ANTENNA | 11. AFT LAVATORY | 22. BUFFET |
| 2. CO ₂ BOTTLES | 12. CARGO DOOR | 23. NO. 2 RADIO RACK |
| 3. FLIGHT ENGINEER'S JUMP SEAT | 13. MAIN CABIN DOOR | 24. MAIN CABIN WATER TANK |
| 4. COPILOT'S STATION | 14. WASH BASIN AND ACCESSORIES | 25. MAIN RADIO RACK |
| 5. PORTABLE OXYGEN CYLINDERS
(4 PLACES) | 15. AUXILIARY POWER PLANT | 26. AUXILIARY OIL TANK |
| 6. CREW ENTRANCE DOOR | 16. CREW'S LAVATORY | 27. EQUIPMENT STOWAGE BINS
(2 PLACES) |
| 7. NAVIGATOR'S STATION | 17. RADIO OPERATOR'S STATION | 28. SCANNER'S STATION (2 PLACES) |
| 8. CREW'S WATER TANK | 18. EXTERNAL POWER RECEPTACLE | 29. AUXILIARY CARGO DOOR |
| 9. CREW'S BUNKS | 19. BATTERY INSTALLATION | 30. FLARE LAUNCHER |
| 10. HYDRAULIC RESERVOIR | 21. FUSELAGE FUEL TANKS | 31. PASSENGER SEATS |

GENERAL ARRANGEMENT DIAGRAM—Typical



- | | | |
|--|--|---|
| 1. SEARCH RADAR ANTENNA | 9. CREW'S BUNKS | 18. EXTERNAL POWER RECEPTACLE |
| 2. CO ₂ BOTTLES | 10. HYDRAULIC RESERVOIR | 19. BATTERY INSTALLATION |
| 3. FLIGHT ENGINEER'S JUMP SEAT | 11. AFT LAVATORY | 20. PILOT'S STATION |
| 4. COPILOT'S STATION | 12. CARGO DOOR | 21. FUSELAGE FUEL TANKS |
| 5. PORTABLE OXYGEN CYLINDERS
(4 PLACES) | 13. MAIN CABIN DOOR | 22. DATA RECORDER OPERATOR'S
STATION |
| 6. CREW ENTRANCE DOOR | 14. WASH BASIN AND ACCESSORIES | 23. EQUIPMENT RACKS |
| 7. NAVIGATOR'S STATION | 15. AUXILIARY POWER PLANT
(SOME AIRCRAFT) | 24. TROOP SEATS |
| 8. CREW'S WATER TANK | 16. CREW'S LAVATORY | 25. RADIO REPAIR TABLE |
| | 17. RADIO OPERATOR'S STATION | |

Figure 1-3 (Sheet 3 of 4)

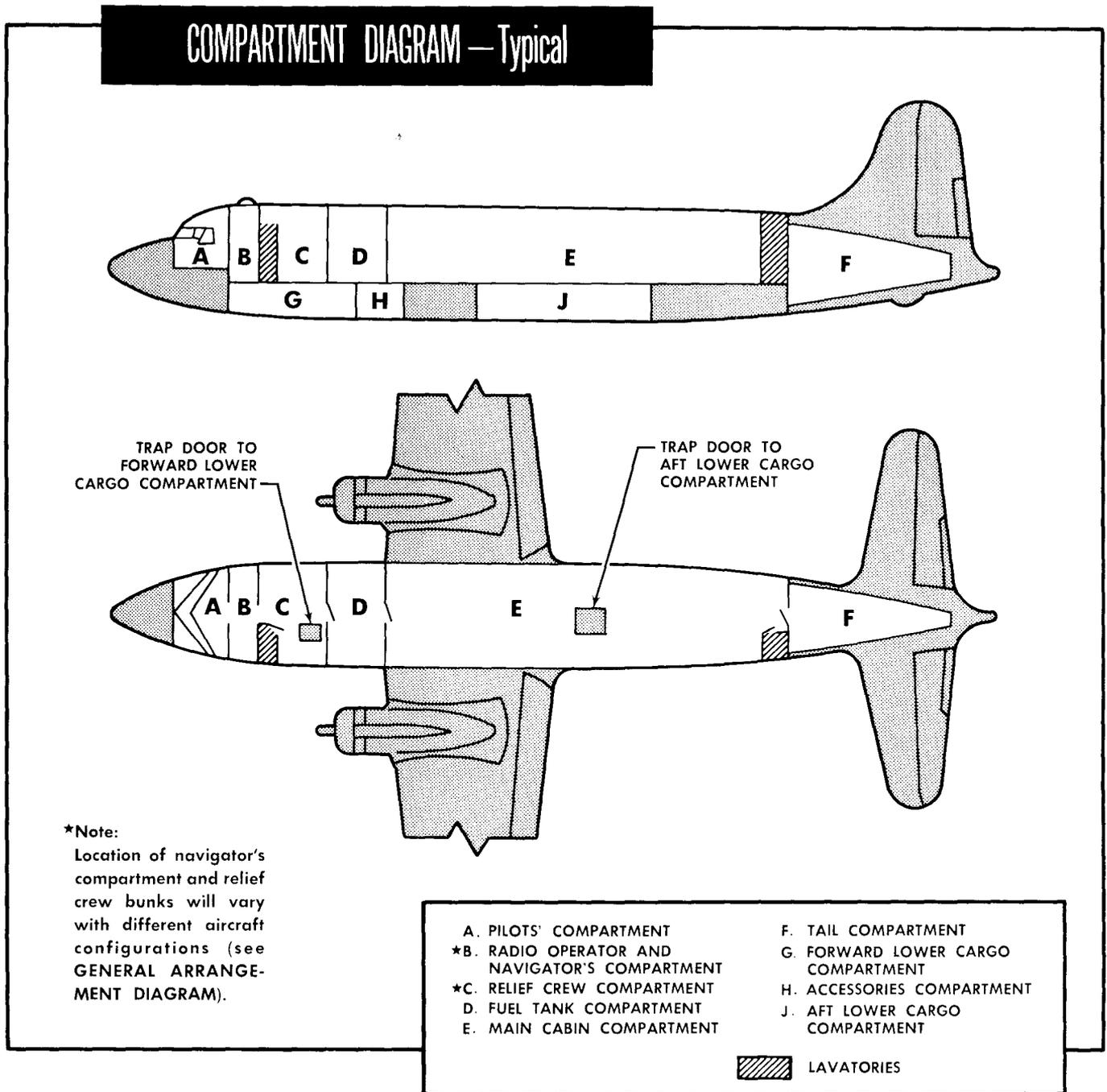
Change 6 1-7

X1-202

T.O. 1C-54D-1

Section I

Figure 1-3 (Sheet 4 of 4) Deleted



N1-101

Figure 1-4

MIXTURE LEVERS.

Four mixture levers, with IDLE CUT OFF, AUTO LEAN, and AUTO RICH positions, and located on the aft face of the control pedestal (12, figure 1-9), are mechanically connected to the carburetor. The IDLE CUT OFF position cuts off all fuel flow to the engine except priming. Normally the AUTO LEAN position automatically provides the leaner fuel/air ratio required for cruise power operation. The AUTO RICH position provides a richer fuel/air ratio required for power settings above the cruise power limits.

BLOWERS (SUPERCHARGERS).

Each engine incorporates an integral single-stage, two-speed blower that is controlled mechanically by a lever on the aft face of the control pedestal. The impeller gear ratio is 7.15 to 1 in low blower and 9.52 to 1 in high blower.

BLOWER (SUPERCHARGER) LEVERS.

Four mechanically operated blower levers, one for each engine (8, figure 1-9), with LOW and HIGH positions, are installed on the aft face of the control pedestal. When a blower lever is moved to the HIGH position, a series of connecting cables, bellcranks, and push-rods, position a ported disc in the engine accessory case which directs engine oil pressure to engage the high blower clutch and disengage the low blower clutch. When a blower lever is moved to the LOW position, engine oil pressure engages the low blower clutch and disengages the high blower clutch.

CARBURETOR AIR SYSTEM.

The carburetor air system (figure 1-5) supplies air to the carburetor from one of two sources: ram air or preheated air. Cold ram air flows through the air scoop opening directly into the carburetor throat. Preheated air flows from inside the engine cowl-

ing, past the exhaust collector ring and into the carburetor throat. The source of air supply is determined by the position of the ram air door and the hot air door.

Carburetor Air Levers.

Four carburetor air levers (2, figure 1-11), with HOT and COLD positions, are located on the control pedestal forward of the propeller levers. The levers mechanically control the movement of their respective preheat doors in the carburetor air duct. In the HOT position, the mechanical ram air door moves up to shut off the ram airflow, and the hot air door is opened to allow preheated air to enter the carburetor. In the COLD position, the ram air door is open, allowing cold ram air to enter the carburetor, and the hot air door is closed. Intermediate positions are used to regulate the carburetor air temperature as required.

Carburetor Air Temperature Indicators.

Two dual indicating carburetor air temperature indicators, (28, figure 1-11) calibrated in degrees centigrade, are installed on the upper instrument panel. A temperature bulb, installed in each carburetor air scoop adapter, is connected through a 28-volt dc circuit to the respective indicator.

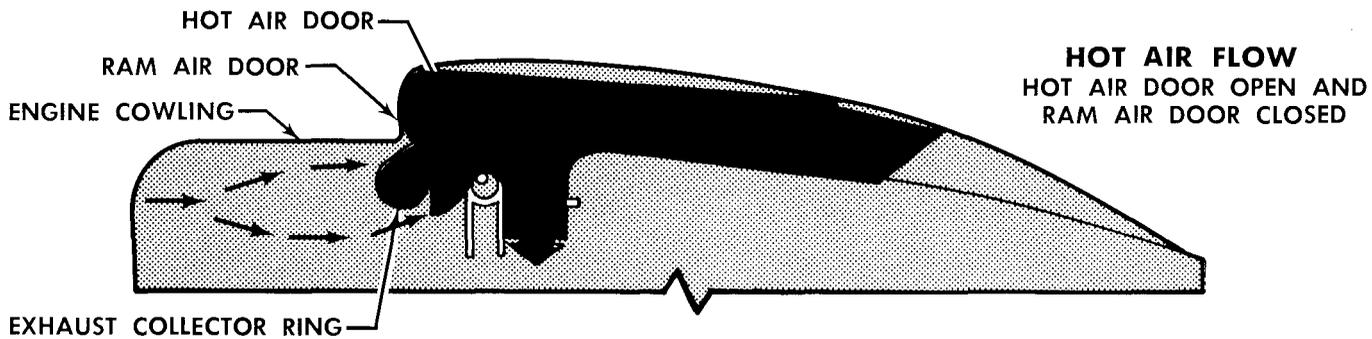
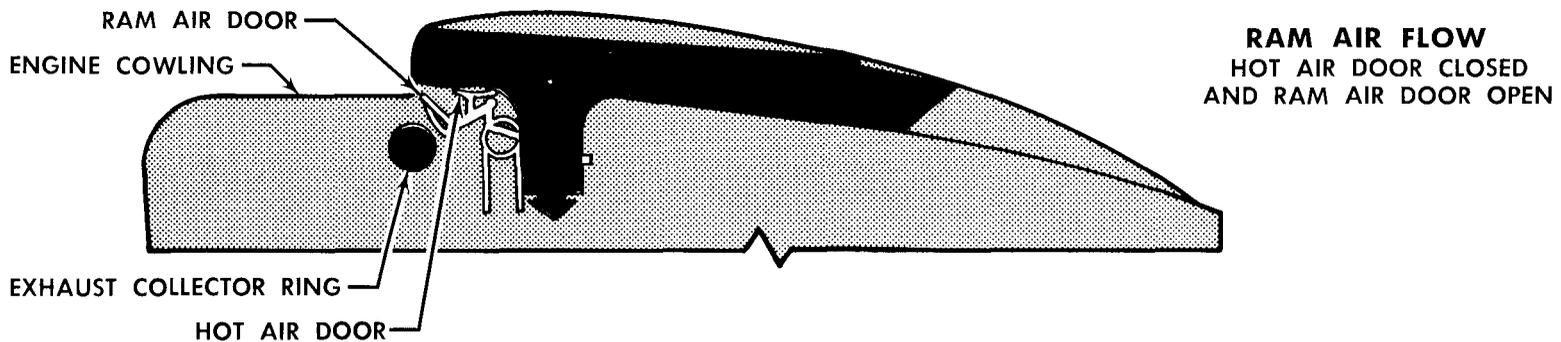
COWL FLAPS.

The engine cowl flaps aid in controlling engine temperature, and are actuated by a hydraulic cylinder which operates the flap segments through push-pull linkages.

Cowl Flap Levers.

Four cowl flap levers, one for each engine (10, figure 1-9), with OPEN, OFF, TRAIL, OFF, and CLOSE positions, are installed on the aft face of the control pedestal. Each lever mechanically actuates a cowl flap selector

CARBURETOR AIR SYSTEM

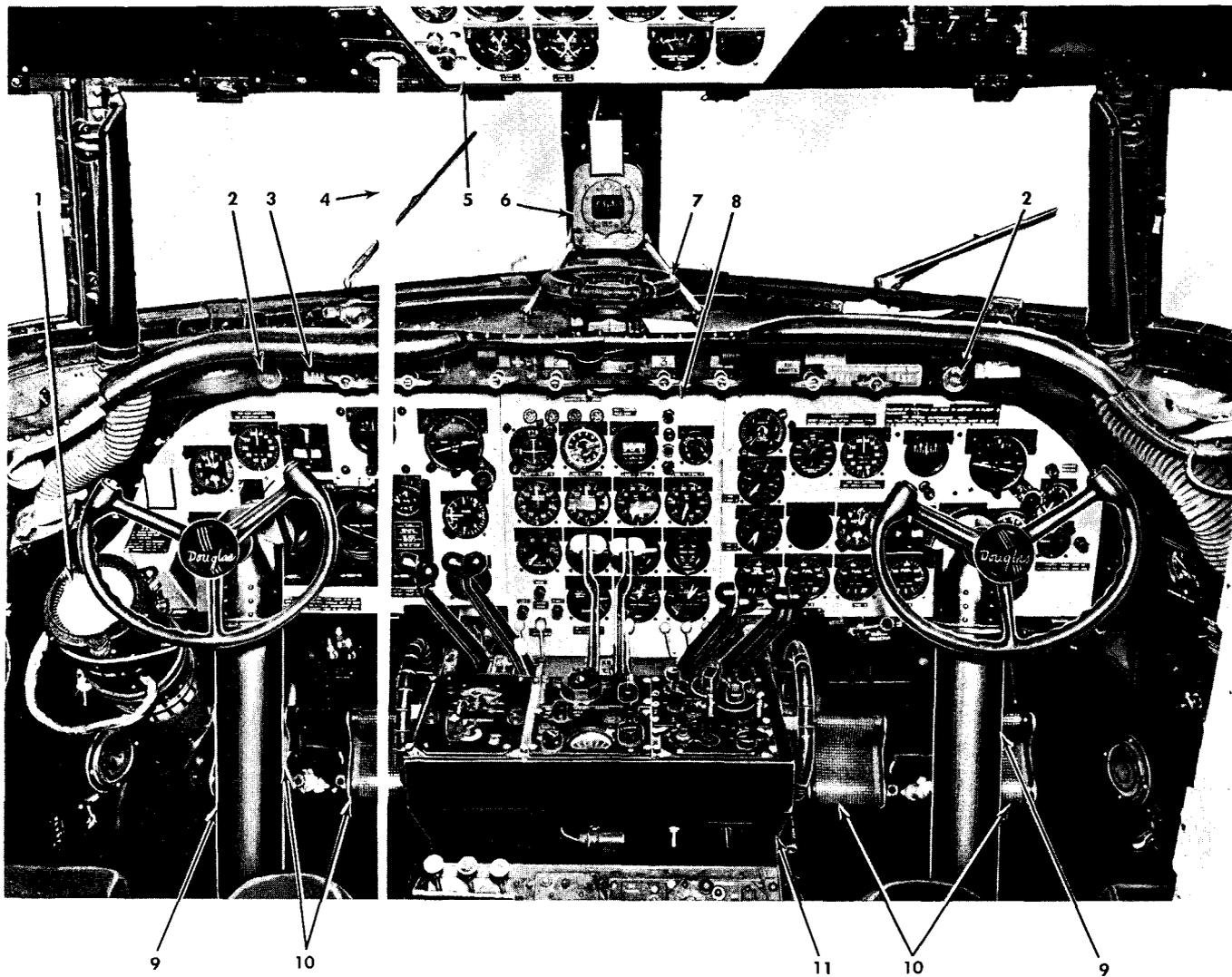


RAM AIR HOT AIR

Figure 1-5

PILOTS' COMPARTMENT - Typical

USAF C-54



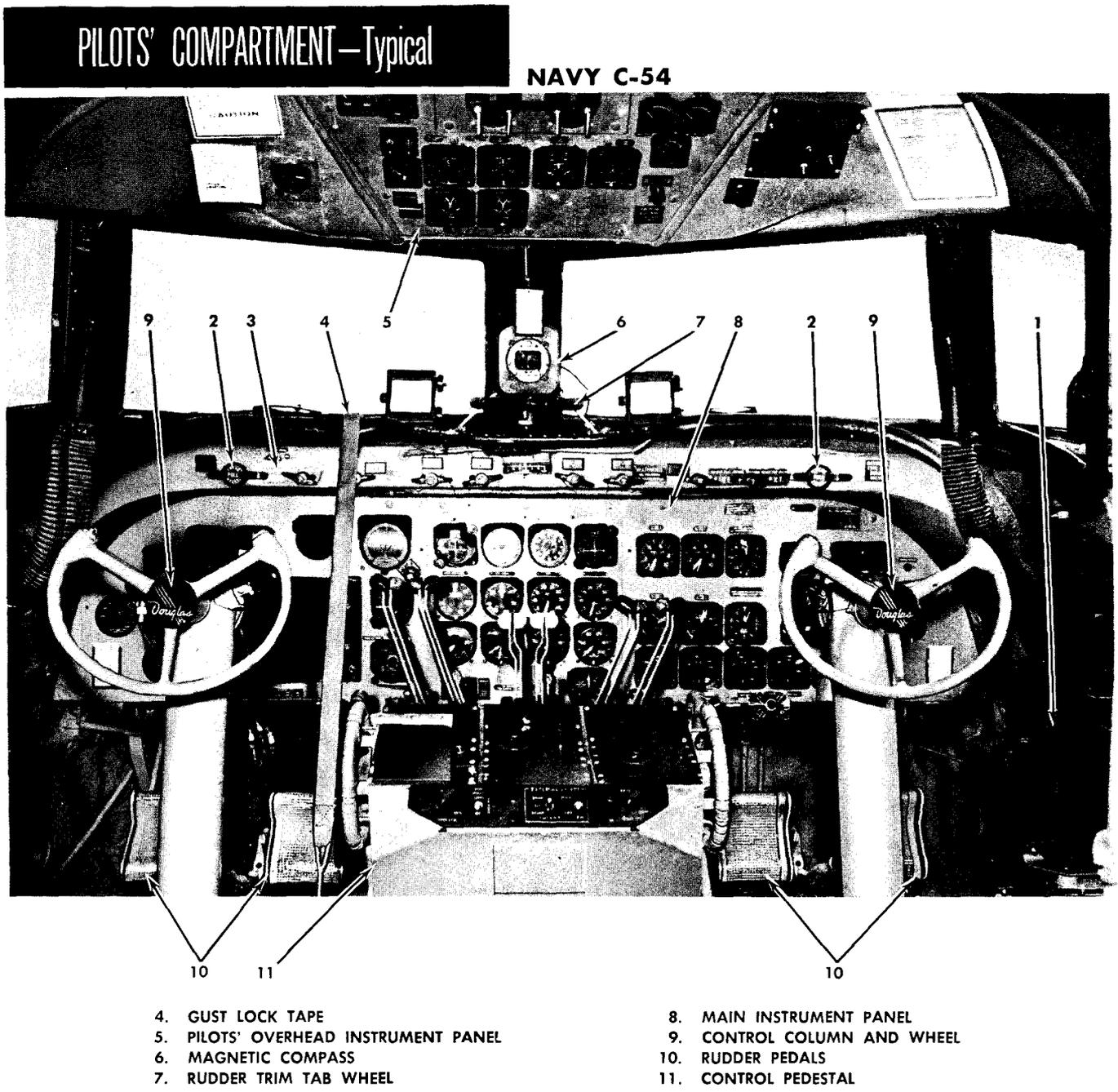
Note:

- 1. EC-54, HC-54, and TC-54 configuration same except for panel and pedestal arrangements.
- 2. Items 4 through 11 on sheet 2.

- 1. SEARCH RADAR SCOPE (IF INSTALLED)
- 2. EMERGENCY AIRBRAKE HANDLES (2)
- 3. FIRE EXTINGUISHER SYSTEM CONTROL PANEL

X1-12

Figure 1-6 (Sheet 1 of 2)



- 4. GUST LOCK TAPE
- 5. PILOTS' OVERHEAD INSTRUMENT PANEL
- 6. MAGNETIC COMPASS
- 7. RUDDER TRIM TAB WHEEL

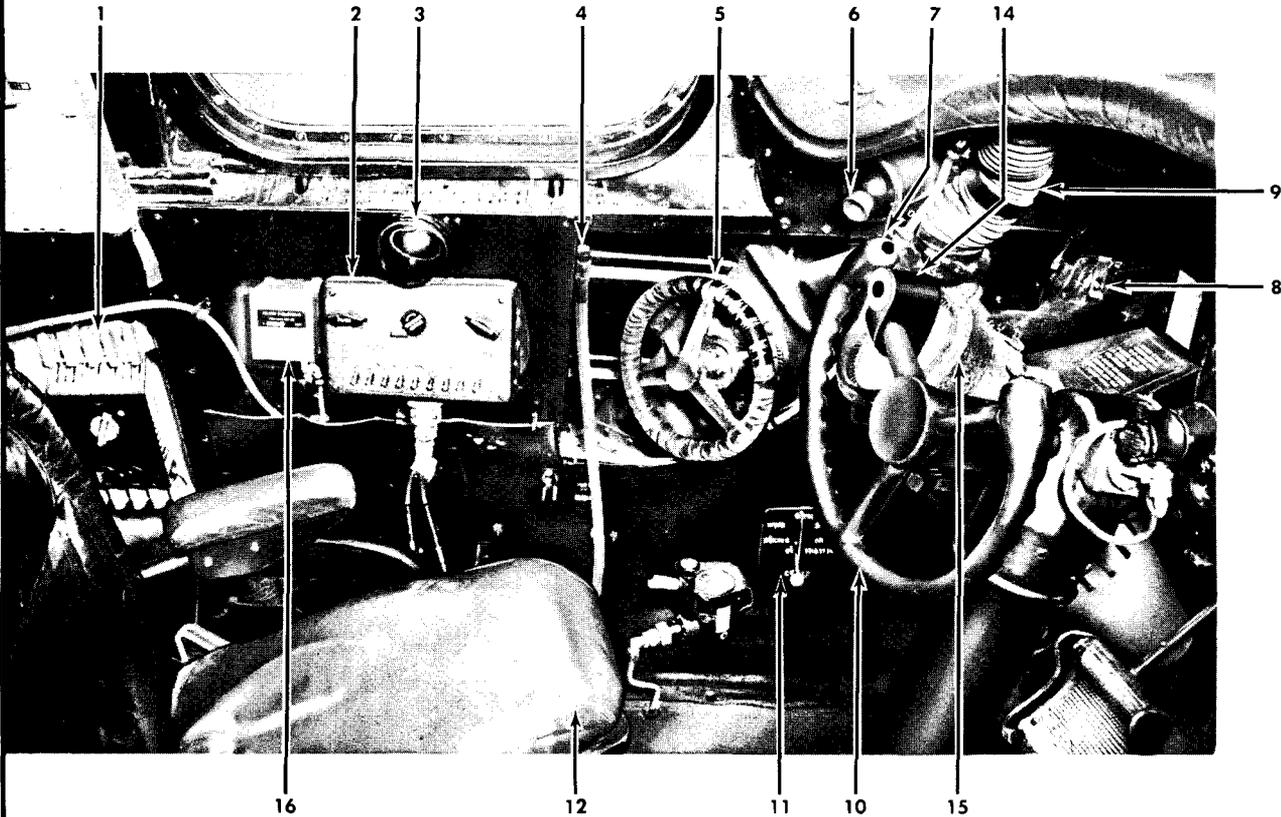
- 8. MAIN INSTRUMENT PANEL
- 9. CONTROL COLUMN AND WHEEL
- 10. RUDDER PEDALS
- 11. CONTROL PEDESTAL

Figure 1-6 (Sheet 2 of 2)

X1-216

PILOT'S STATION — Typical

USAF C-54, EC-54, HC-54 AND TC-54



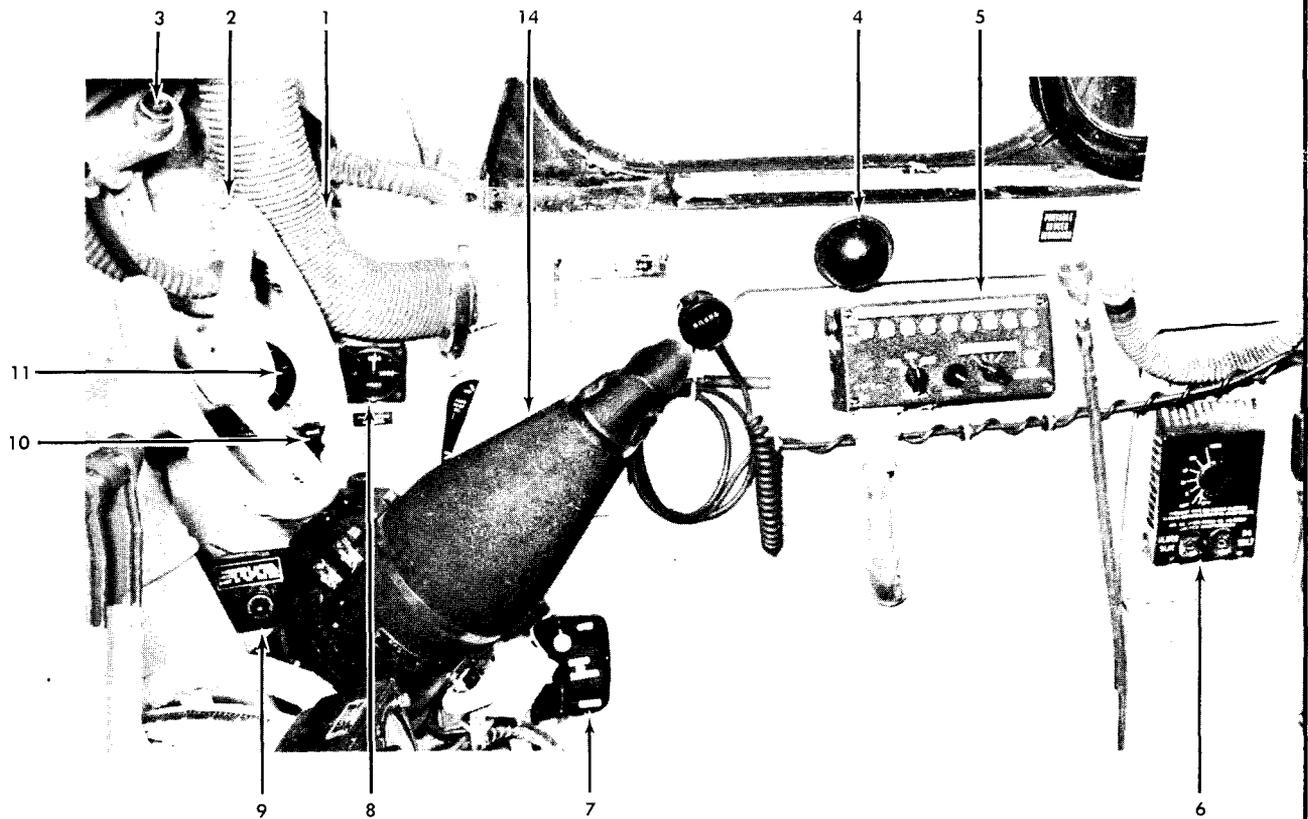
Note:

- 1. Items 1 through 13 typical on all configurations. Items 14 through 16 as noted.
- 2. Items 9 through 16 on sheet 2.

- 1. SUIT HEATER RHEOSTAT
- 2. INTERPHONE CONTROL PANEL
- 3. ASH TRAY
- 4. PORTABLE OXYGEN RECHARGER HOSE
- 5. NOSEWHEEL STEERING WHEEL
- 6. COLD AIR ORIFICE
- 7. MICROPHONE BUTTON
- 8. STATIC SOURCE SELECTOR SWITCH

X1-11

Figure 1-7 (Sheet 1 of 2)

COPILOT'S STATION—Typical**NAVY C-54**

8. EMERGENCY AIRBRAKE PRESSURE GAGE
9. WINDSHIELD WIPER AND WINDSHIELD ALCOHOL CONTROL KNOBS
10. STATIC COURSE SELECTOR SWITCH
11. HYDRAULIC SYSTEM PRESSURE GAGE
12. FILTER (SOME AIRCRAFT)
13. AUTOPILOT OIL SHUTOFF HANDLE (SOME AIRCRAFT)
14. SEARCH RADAR INDICATOR (NAVY C-54 IF INSTALLED)

X1-260

Figure 1-8 (Sheet 2 of 2)

valve to control hydraulic pressure to the cowl flap actuating cylinders. In the OPEN position, hydraulic pressure is directed to one side of the actuating cylinder and the cowl flaps move toward the OPEN position. In the CLOSE position, hydraulic pressure is directed to the other side of the actuating cylinder and the cowl flaps move toward the closed position. In either OFF position, the hydraulic pressure is trapped in the actuating cylinder to hold the cowl flaps in any desired position. In the TRAIL position, both sides of the actuating cylinder are bypassed, allowing the cowl flaps to move in either direction, depending on the balance of the airloads on the cowl flaps. When cowl flap positions other than TRAIL, full OPEN, or full CLOSE are selected, the cowl flap levers should be returned to an OFF position.

Note

The cowl flaps require approximately 3 to 5 seconds to travel from full open to full closed.

Cowl Flap Position Indicators.

Cowl flap position is indicated by a pointer mounted on each top inboard cowl flap. This pointer, which is visible from the cockpit, indicates the cowl flap position on a scale located on the inboard side of the carburetor air scoop fairing. The positions indicated are OPEN and CLOSE.

IGNITION SYSTEM.

The ignition system for each engine consists of dual magnetos with integral distributors, a shielded high-tension wiring harness, and a starting vibrator.

Ignition Switches.

Four ignition switches (20, figure 1-11), one for each engine, with BOTH, R, L, and OFF positions, are mounted on the upper instrument panel. When the ignition switch is in the

BOTH position, both magnetos for that engine furnish current for the ignition system and spark plugs. When the engine ignition switch is positioned to R, the left magneto for that engine is grounded and the front spark plugs will fire. When the engine ignition switch is positioned to L, the right magneto for that engine is grounded and the rear spark plugs will fire. When the ignition switch is positioned to OFF, both magnetos for that engine are grounded and neither the front nor the rear spark plugs will fire.

Master Ignition Switch

The master ignition switch (19, figure 1-11), placarded PULL OFF, has two positions: ON (pushed in) and OFF (pulled out). On some aircraft a bar-type switch is installed that has two positions, ON (up) and OFF (down). The switch is installed immediately above the four ignition switches on the upper instrument panel and is designed to ground out all four ignition switches simultaneously.

Primer Switches.

Four priming switches (14, figure 1-11), spring loaded to the OFF (up) position, are mounted on the electrical control panel. When a primer switch is moved to the ON (down) position, it closes a 28-volt dc circuit to the engine primer solenoid and fuel is injected into the blower throat. Priming pressure is provided by the electrical fuel booster pumps.

STARTER SYSTEM.

The starter system for each engine has an electric direct-cranking starter installed on the accessory drive case. The starter gear automatically meshes with the rear accessory drive gear of the engine when the starter motor is energized. The starter has a torque limiting clutch, which protects the starter from overload in case of backfire or liquid lock and against the shock of jaw engagement. There are no provisions for hand-cranking the engines.

Starter Switches.

Four starter switches (14, figure 1-11), spring-loaded to the OFF (up) position, are mounted on the electrical control panel. When a starter switch is pressed to the ON (down) position, a 28-volt dc circuit is closed to the starter relay and the induction vibrator. This automatically engages the starter gear with the engine accessory drive gear and provides an interrupted current of high voltage from the induction vibrator(s) to the right magneto during cranking. On some aircraft a separate switch labeled BOOST actuates the induction vibrator when pressed down. This switch may be ganged to the starter switch.

ENGINE INSTRUMENTS.**Manifold Pressure Gages and Purge Valves.**

Two direct-reading dual manifold pressure gages (14, figure 1-10) located on the main instrument panel indicate the pressure in inches Hg in each engine intake manifold. With inoperative engines, the gage readings should indicate barometric pressure.

Four push-type manifold pressure purge valves are mounted immediately below the center of the main instrument panel for use in purging or cleaning the indicator supply lines of condensation.

CAUTION

Do not push manifold pressure purge buttons with engine manifold pressure above barometric pressure. If above barometric pressure, the lines will fill rather than purge, and possible fuel spillage behind the main instrument panel will result in a fire hazard.

Cylinder Head Temperature Indicators.

Two dual, direct-reading cylinder head temperature indicators (32, figure 1-11), cali-

brated in degrees centigrade, are located on the upper instrument panel.

The No. 1 cylinder on each engine is provided with a thermocouple which relays the cylinder head temperature to the respective cylinder head temperature indicator.

Tachometers.

Two dual-indicating tachometers located on the main instrument panel (15, figure 1-10) indicate engine rpm. The tachometers are independent of the main aircraft electrical system, power being supplied by four tachometer generators, one mounted on each engine, which furnish current to the respective tachometer.

Synchroscope.

A synchroscope located on the main instrument panel (9, figure 1-10) registers the speed of the other three engines with respect to engine No. 1. Power for operation of the synchroscope is supplied by the tachometer generators on each engine.

Note

If No. 1 tach gen power is lost the synchroscope will be inoperative.

Oil Pressure Gages.

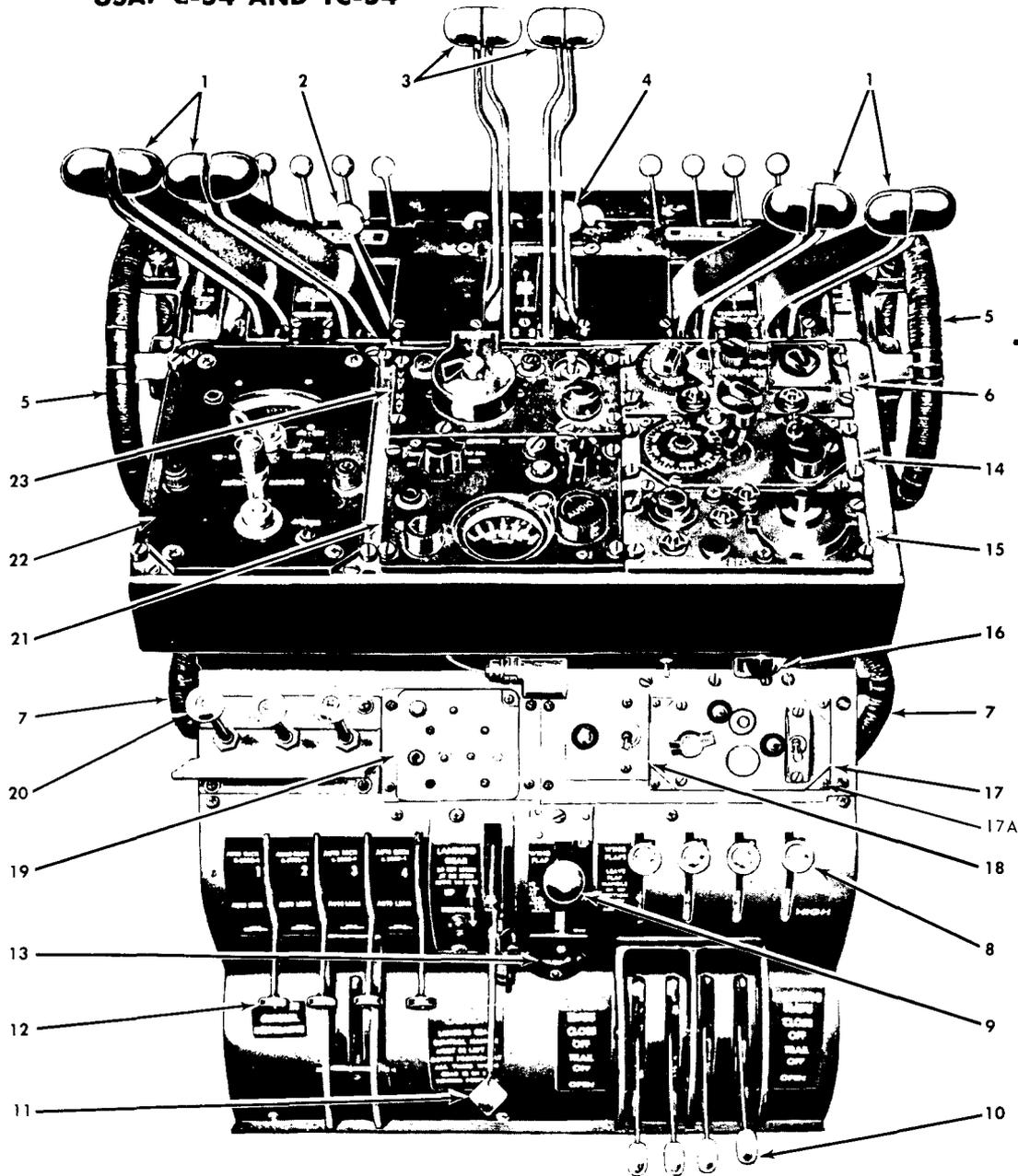
Two 26 volt ac, autosyn operated, dual-indicating oil pressure gages (17, figure 1-10), calibrated in pounds per square inch, are installed on the main instrument panel. Oil pressure is taken from the pressure side of the engine-driven pump and connected to the oil pressure transmitter. On some aircraft the oil pressure gages are operated hydrostatically.

Oil Temperature Indicators.

Two 28 volt dc dual-indicating oil inlet temperature indicators (27, figure 1-11), graduated in degrees centigrade, are installed on the overhead instrument panel. An oil temperature bulb, installed in the oil inlet at the accessory section of each engine, is connected through a 28 volt dc circuit to the respective indicator.

CONTROL PEDESTAL—Typical

USAF C-54 AND TC-54



1. THROTTLES
2. THROTTLE FRICTION LOCK LEVER
3. PROPELLER LEVERS
4. PROPELLER FRICTION LOCK LEVER
5. ELEVATOR TRIM TAB WHEEL
6. UHF COMMAND CONTROL PANEL
7. AILERON TRIM TAB WHEEL
8. BLOWER LEVERS
9. WING FLAP LEVER
10. COWL FLAP LEVERS
11. LANDING GEAR LEVER
12. MIXTURE LEVERS
13. LANDING GEAR LEVER SOLENOID ACCESS HOLE
14. LF RECEIVER CONTROL PANEL

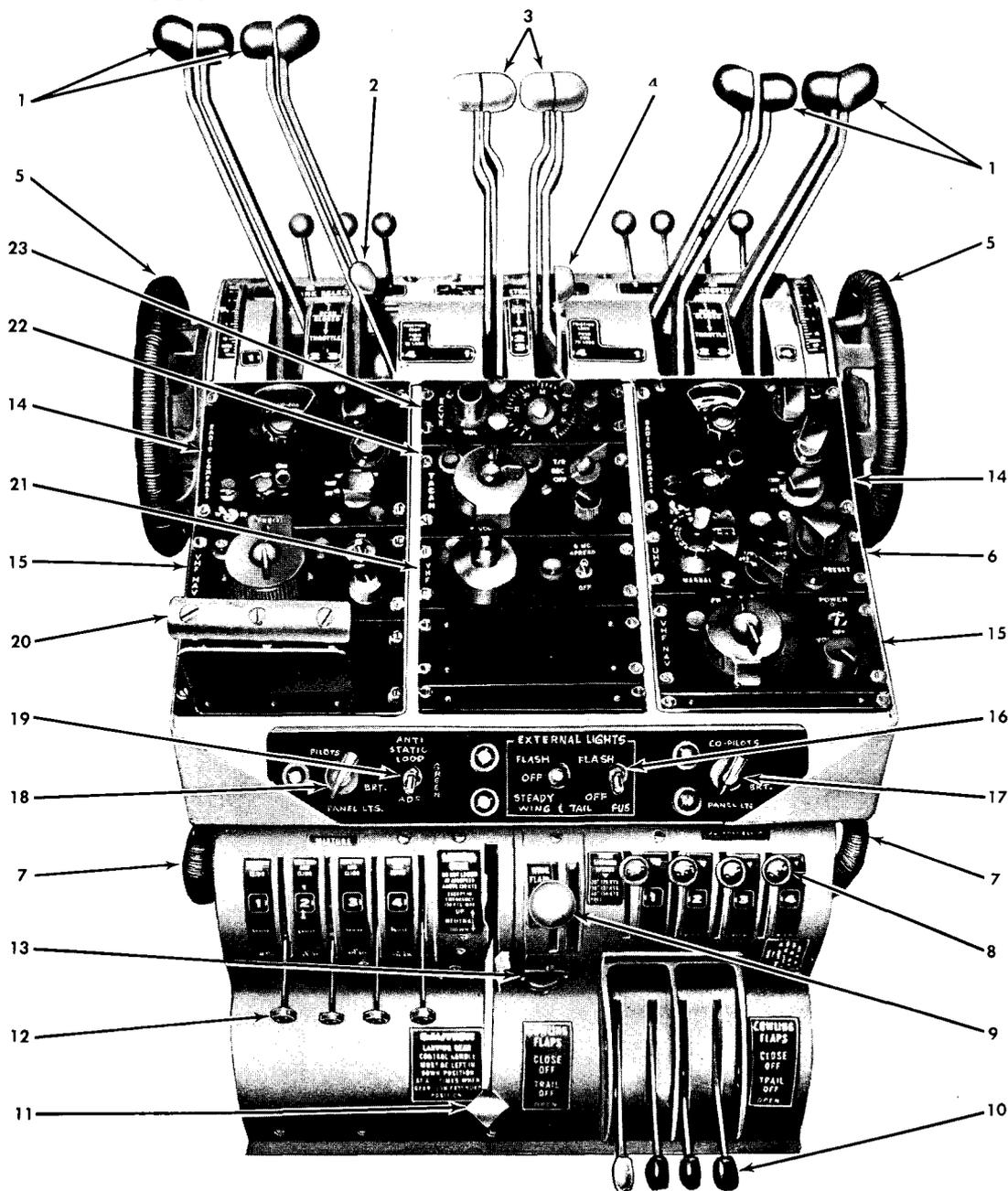
15. TRANSCEIVER CONTROL PANEL
16. PANEL LIGHT RHEOSTAT
17. VHF COMMAND CONTROL PANEL
- 17A. VHF COMMAND CONTROL PANEL 50KC SPACING (807).
18. UHF/VHF MICROPHONE TRANSFER SWITCH
19. RECOGNITION LIGHT PANEL (DISCONNECTED)
20. AUTOPILOT (A3-A) SERVO UNIT HANDLES
21. RADIO COMPASS CONTROL PANEL
22. RADIO COMPASS FREQUENCY SELECTOR CONTROL PANEL
23. VHF NAVIGATION CONTROL PANEL

Figure 1-9 (Sheet 1 of 4)

X1-218

CONTROL PEDESTAL—Typical

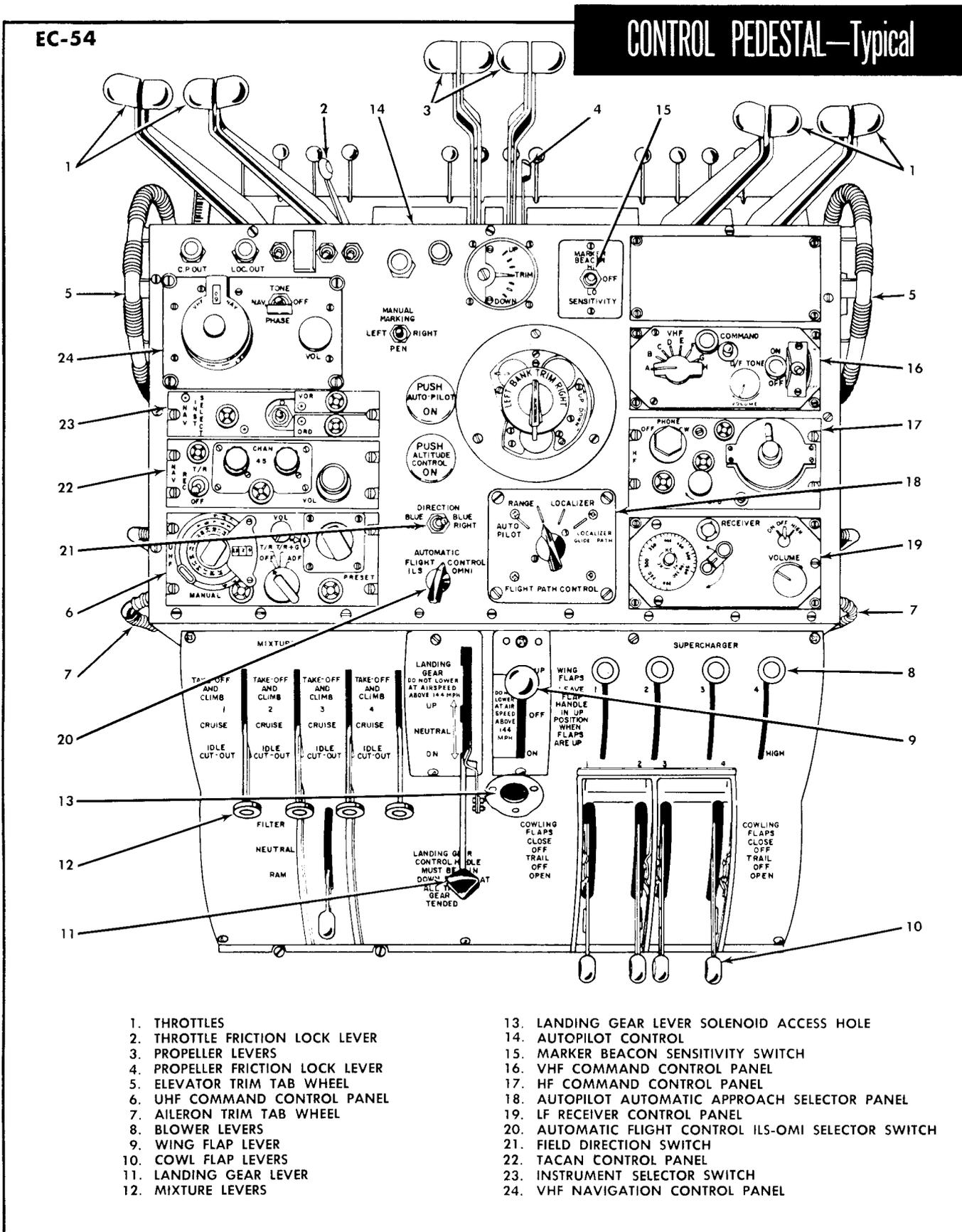
NAVY C-54



Note:
Items 1 through 13 are common
to all configurations. (See sheet 1)

- 14. RADIO COMPASS CONTROL PANEL (2)
- 15. VHF NAVIGATION CONTROL PANEL (2)
- 16. NAVIGATION LIGHT SWITCHES
- 17. COPILOT'S INSTRUMENT PANEL LIGHT RHEOSTAT
- 18. PILOT'S INSTRUMENT PANEL LIGHT RHEOSTAT
- 19. ANTISTATIC LOOP ANTENNA SWITCH
- 20. AUTOPILOT SERVO UNIT HANDLES
- 21. VHF COMMAND CONTROL PANEL
- 22. TACAN CONTROL PANEL
- 23. LF RECEIVER CONTROL PANEL

Figure 1-9 (Sheet 2 of 4)



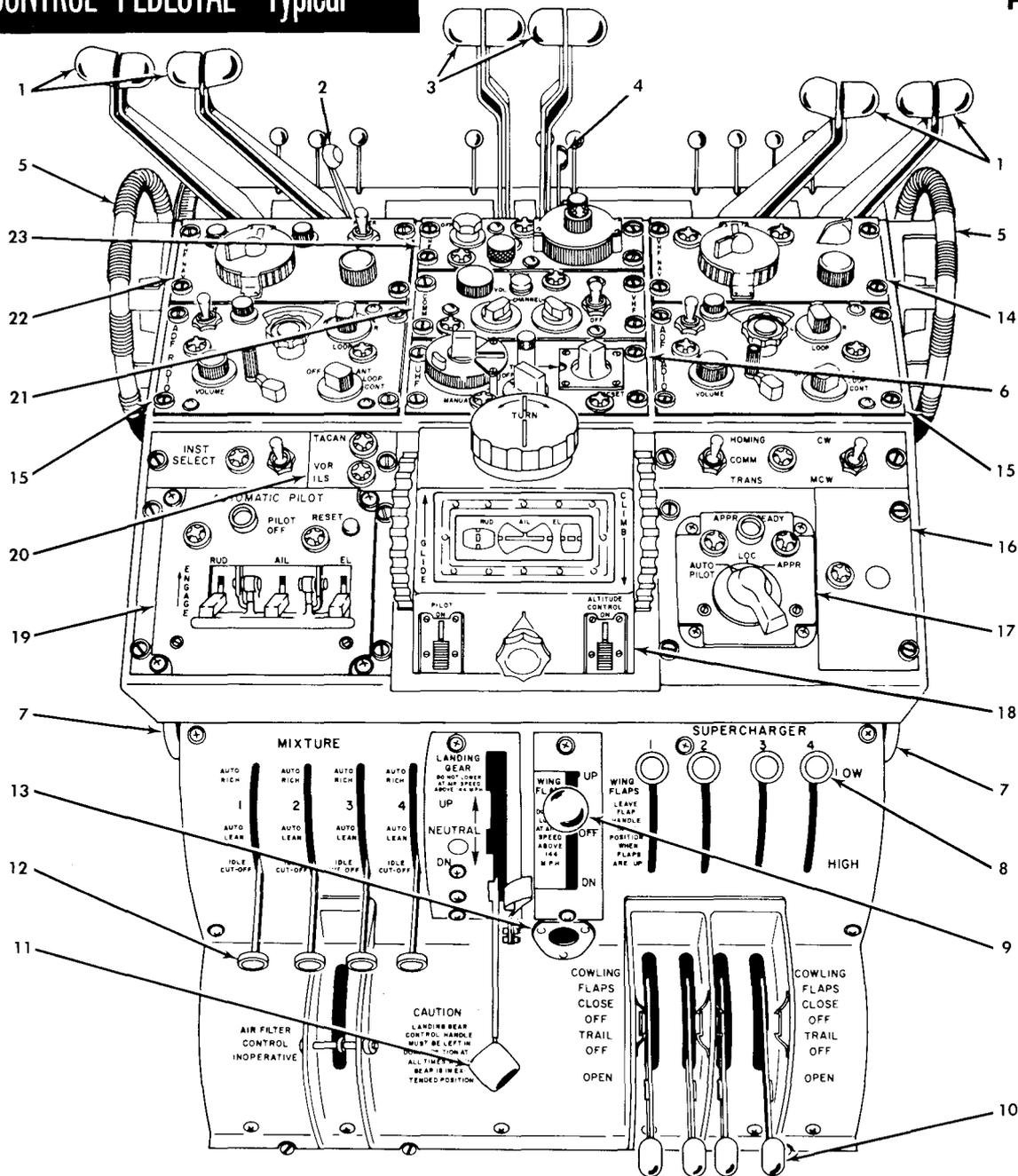
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|---|---|
| <ul style="list-style-type: none"> 1. THROTTLES 2. THROTTLE FRICTION LOCK LEVER 3. PROPELLER LEVERS 4. PROPELLER FRICTION LOCK LEVER 5. ELEVATOR TRIM TAB WHEEL 6. UHF COMMAND CONTROL PANEL 7. AILERON TRIM TAB WHEEL 8. BLOWER LEVERS 9. WING FLAP LEVER 10. COWL FLAP LEVERS 11. LANDING GEAR LEVER 12. MIXTURE LEVERS | <ul style="list-style-type: none"> 13. LANDING GEAR LEVER SOLENOID ACCESS HOLE 14. AUTOPILOT CONTROL 15. MARKER BEACON SENSITIVITY 16. VHF COMMAND CONTROL PANEL 17. HF COMMAND CONTROL PANEL 18. AUTOPILOT AUTOMATIC APPROACH SELECTOR PANEL 19. LF RECEIVER CONTROL PANEL 20. AUTOMATIC FLIGHT CONTROL ILS-OMI SELECTOR SWITCH 21. FIELD DIRECTION SWITCH 22. TACAN CONTROL PANEL 23. INSTRUMENT SELECTOR SWITCH 24. VHF NAVIGATION CONTROL PANEL |
|---|---|

Figure 1-9 (Sheet 3 of 4)

X1-262

CONTROL PEDESTAL—Typical

HC-54



Note:
Items 1 through 13 are common
to all configurations. (See sheet 1)

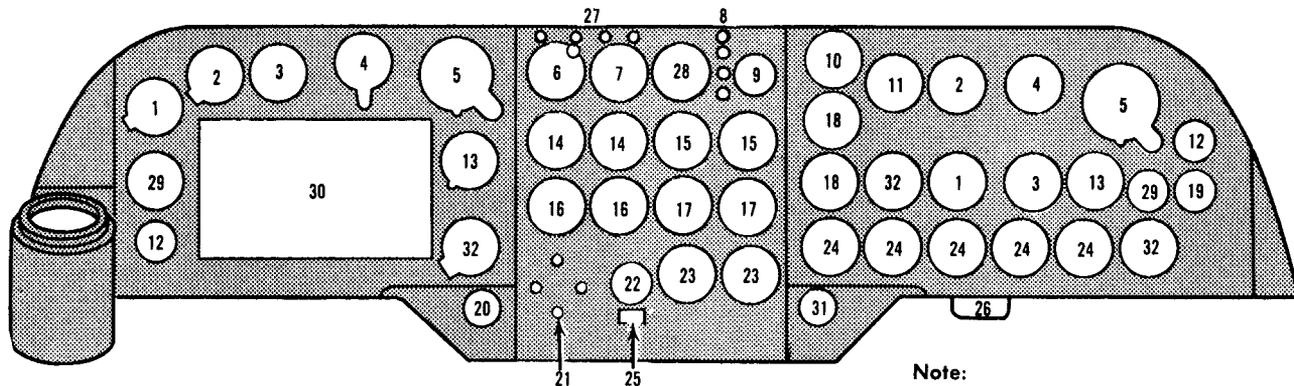
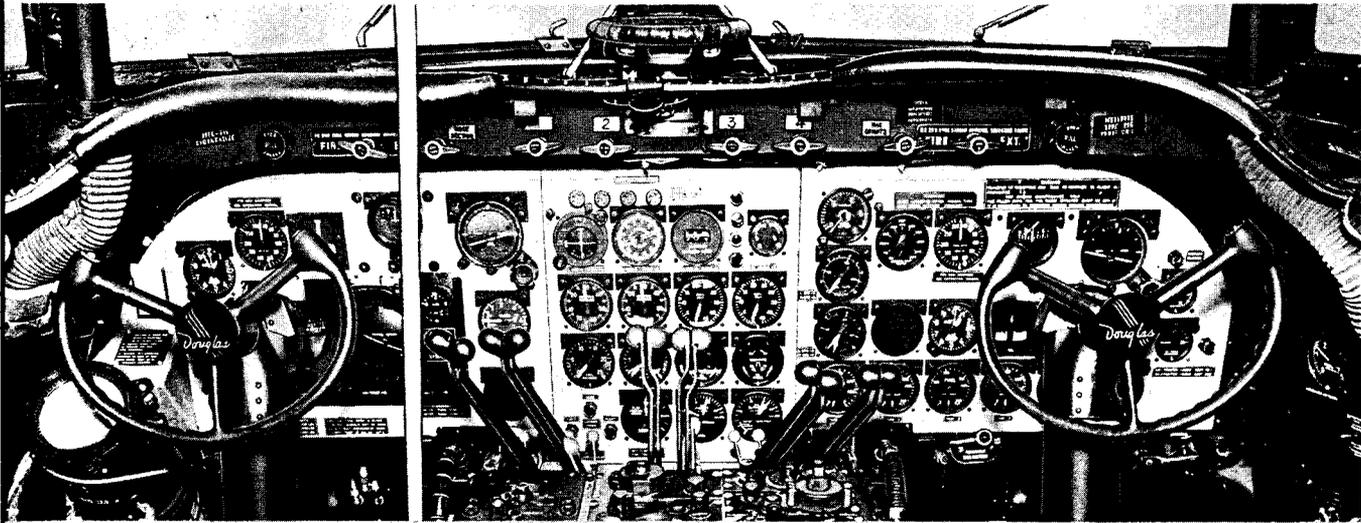
- 14. TACAN CONTROL PANEL
- 15. RADIO COMPASS CONTROL PANEL (2)
- 16. VHF HOMING ADAPTER SWITCH PANEL
- 17. AUTOPILOT AUTOMATIC APPROACH SELECTOR PANEL
- 18. AUTOPILOT CONTROL UNIT
- 19. AUTOPILOT CONTROL SURFACE ENGAGING SWITCH PANEL
- 20. INSTRUMENT SELECTOR SWITCH
- 21. VHF COMMAND CONTROL PANEL
- 22. VHF NAVIGATION CONTROL PANEL
- 23. TRANSCEIVER CONTROL PANEL

Figure 1-9 (Sheet 4 of 4)

X1-261

MAIN INSTRUMENT PANEL - Typical

USAF C-54 AND TC-54



Note:
Items 27 through 32 on sheet 2.

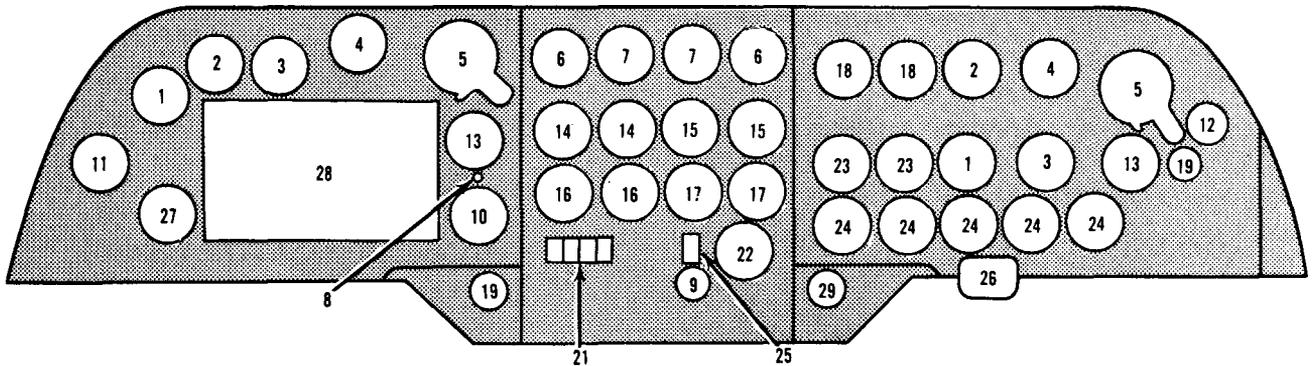
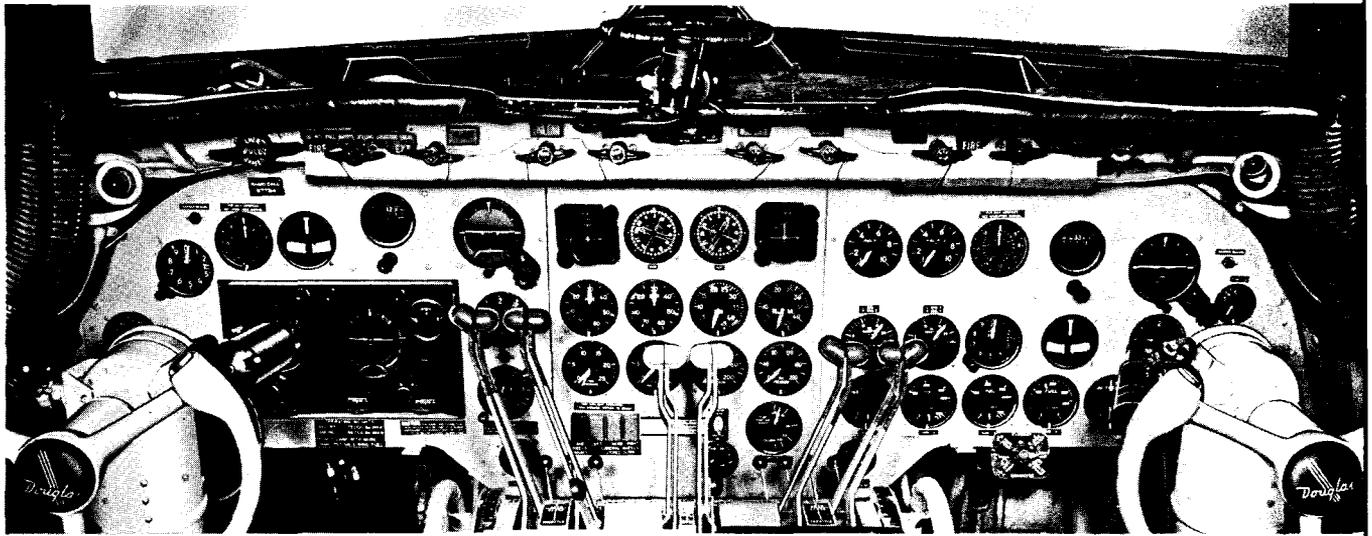
- | | |
|---|--|
| 1. ALTIMETERS (2) | 15. TACHOMETERS (2) |
| 2. AIRSPEED INDICATORS (2) | 16. FUEL PRESSURE GAGES (2) |
| 3. TURN AND SLIP INDICATORS (2) | 17. OIL PRESSURE GAGES (2) |
| 4. HEADING INDICATORS (2) | 18. FUEL FLOW INDICATORS (2) |
| 5. ATTITUDE INDICATORS (2) | 19. DEICER PRESSURE GAGL |
| 6. COURSE INDICATOR | 20. CLOCK (USAF C-54) |
| 7. RADIO MAGNETIC INDICATOR | 21. LANDING GEAR INDICATOR LIGHTS |
| 8. RADIO ALTIMETER INDICATOR LIGHTS | 22. WING FLAP POSITION INDICATOR |
| 9. SYNCHROSCOPE | 23. OIL QUANTITY INDICATORS (2) |
| 10. RADIO ALTIMETER | 24. FUEL QUANTITY INDICATORS
(SIX-TANK SYSTEM - 5, EIGHT-TANK SYSTEM - 6) |
| 11. RADIO ALTIMETER ALTITUDE LIMIT SWITCH | 25. LANDING GEAR INDICATOR LIGHT
DIMMING SWITCH |
| 12. VACUUM PRESSURE GAGES (2) | 26. VACUUM PUMP SELECTOR |
| 13. VERTICAL VELOCITY INDICATORS (2) | |
| 14. MANIFOLD PRESSURE GAGES (2) | |

Figure 1-10 (Sheet 1 of 4)

X1-263

MAIN INSTRUMENT PANEL—Typical

NAVY C-54



Note:

Items 1 through 26 are common to all configurations except as noted. See individual illustrations for differences in locations.

NAVY C-54

- 27. PILOTS' COMPARTMENT (COCKPIT) HEATED AIR TEMPERATURE INDICATOR.
- 28. AUTOPILOT CONTROL PANEL
- 29. AUTOPILOT OIL PRESSURE GAGE

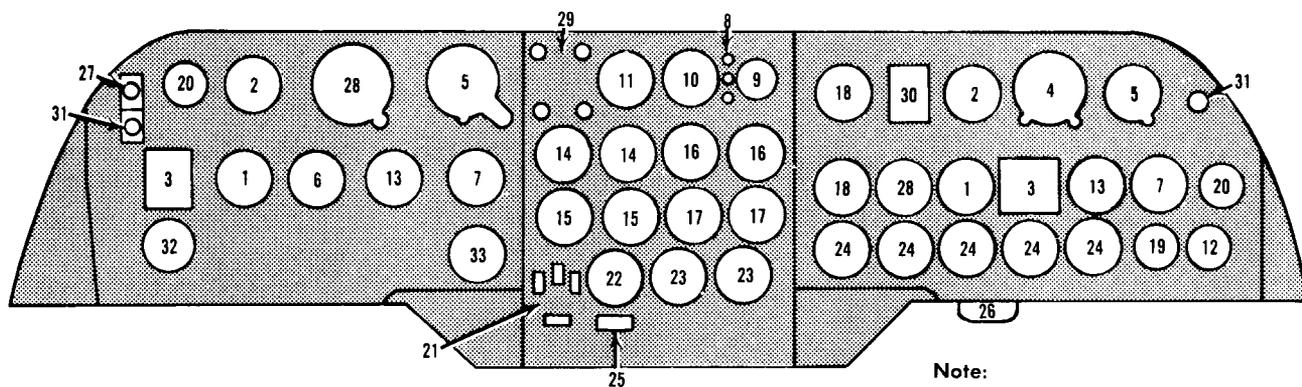
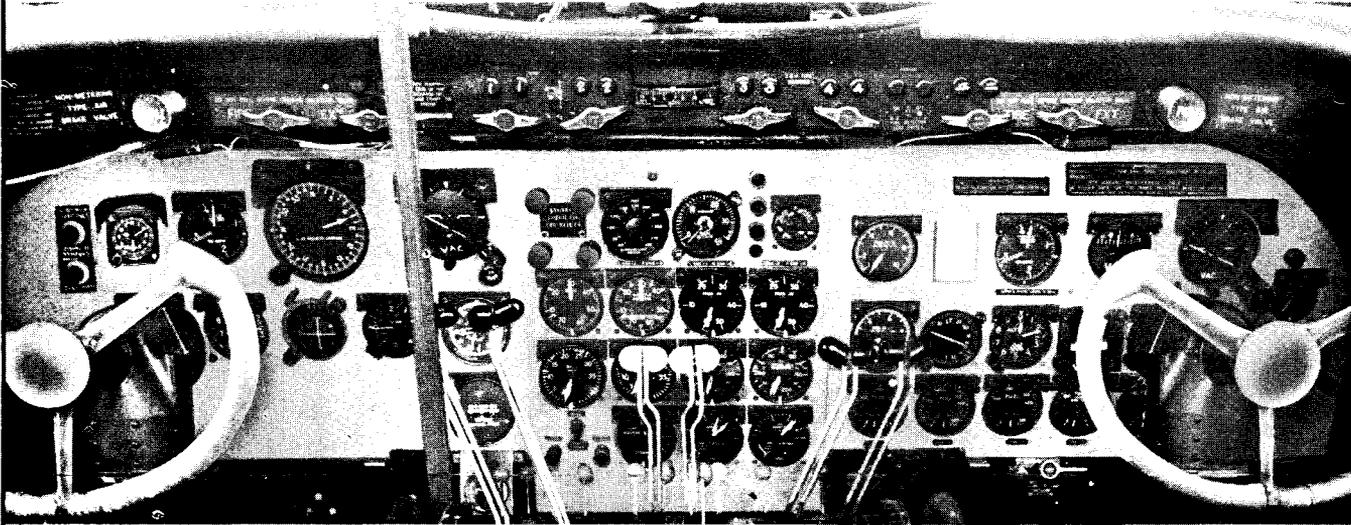
USAF C-54

- 27. MANIFOLD PRESSURE PURGE BUTTONS
- 28. RANGE INDICATOR
- 29. HEADING INDICATORS — FLUXGATE COMPASS (IF INSTALLED)
- 30. AUTOPILOT CONTROL PANEL
- 31. AUTOPILOT OIL PRESSURE GAGE
- 32. SPACE PROVISIONS (3)

Figure 1-10 (Sheet 2 of 4)

MAIN INSTRUMENT PANEL—Typical

HC-54



Note:
Items 27 through 33 on sheet 4.

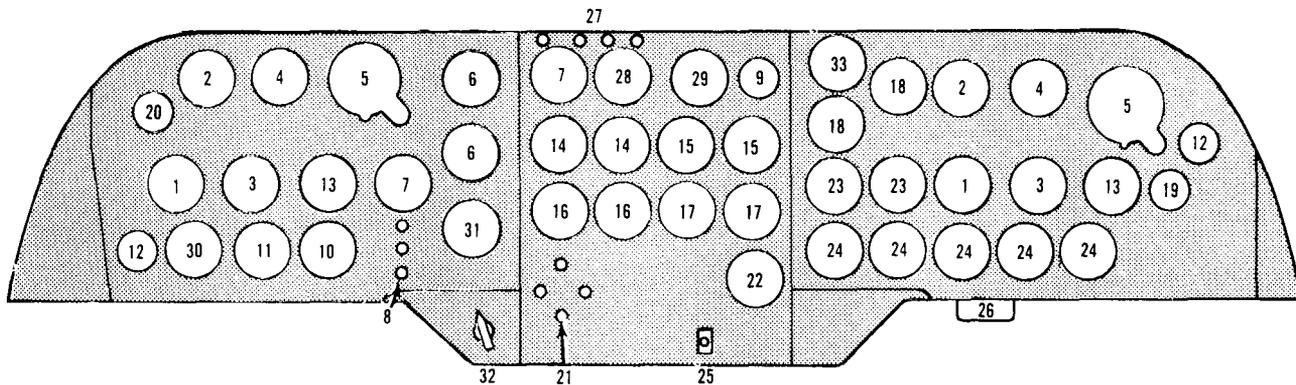
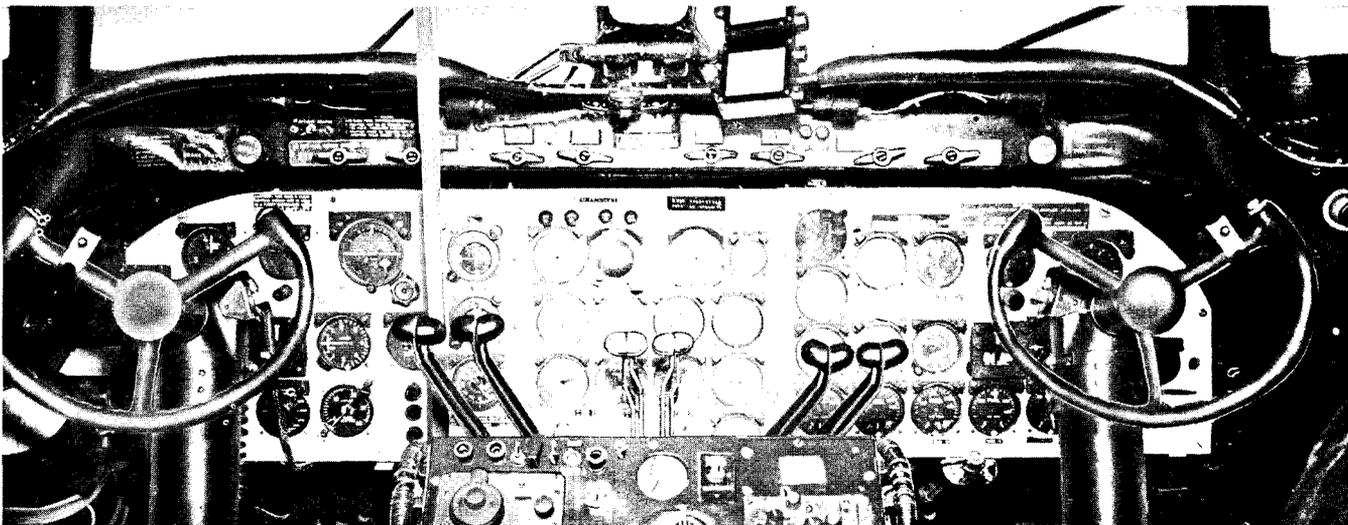
- | | |
|---------------------------------------|--|
| 1. ALTIMETERS (2) | 15. TACHOMETERS (2) |
| 2. AIRSPEED INDICATORS (2) | 16. FUEL PRESSURE GAGES (2) |
| 3. TURN AND SLIP INDICATORS (2) | 17. OIL PRESSURE GAGES (2) |
| 4. HEADING INDICATORS (2 ON EC-54) | 18. FUEL FLOW INDICATORS (2) |
| 5. ATTITUDE INDICATORS (2) | 19. DEICING SYSTEM PRESSURE GAGE |
| 6. COURSE INDICATOR (2 ON EC-54) | 20. CLOCK (2 ON HC-54) |
| 7. RADIO MAGNETIC INDICATORS (2) | 21. LANDING GEAR POSITION INDICATOR AND WARNING LIGHTS |
| 8. RADIO ALTIMETER INDICATOR LIGHTS | 22. WING FLAP POSITION INDICATOR |
| 9. SYNCHROSCOPE | 23. OIL QUANTITY INDICATORS (2) |
| 10. RADIO ALTIMETER | 24. FUEL QUANTITY INDICATORS (5) |
| 11. RADIO ALTIMETER LIMIT SWITCH | 25. LANDING GEAR INDICATOR LIGHTS DIMMING SWITCH |
| 12. VACUUM PRESSURE GAGE (2 ON EC-54) | 26. VACUUM PUMP SELECTOR |
| 13. VERTICAL VELOCITY INDICATORS (2) | |
| 14. MANIFOLD PRESSURE GAGES (2) | |

Figure 1-10 (Sheet 3 of 4)

X1-265

MAIN INSTRUMENT PANEL—Typical

EC-54



Note:

Items 1 through 26 are common to all configurations. See individual illustrations for differences in locations.

HC-54

- 27. BRAKE ANTI-SKID SYSTEM WARNING LIGHT
- 28. N-1 COMPASS REPEATER INDICATORS (2)
- 29. MANIFOLD PRESSURE PURGE BUTTONS
- 30. AIRSPEED CORRECTION CARD
- 31. UHF HOMING ADAPTER INDICATOR LIGHTS
- 32. PILOTS' COMPARTMENT (COCKPIT) HEATER AIR TEMPERATURE INDICATOR
- 33. RANGE INDICATOR

EC-54

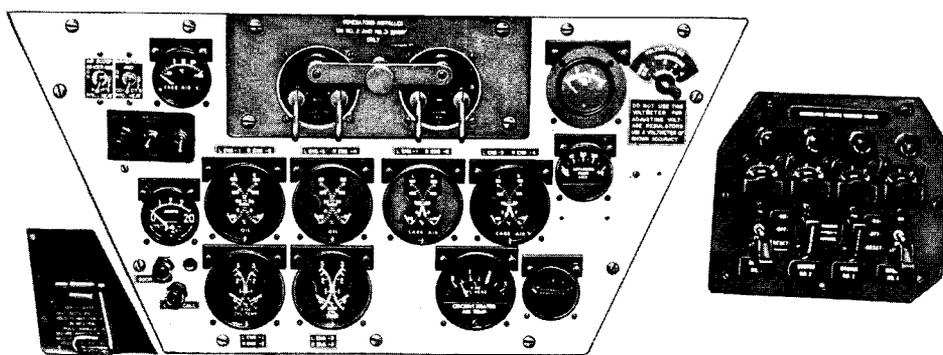
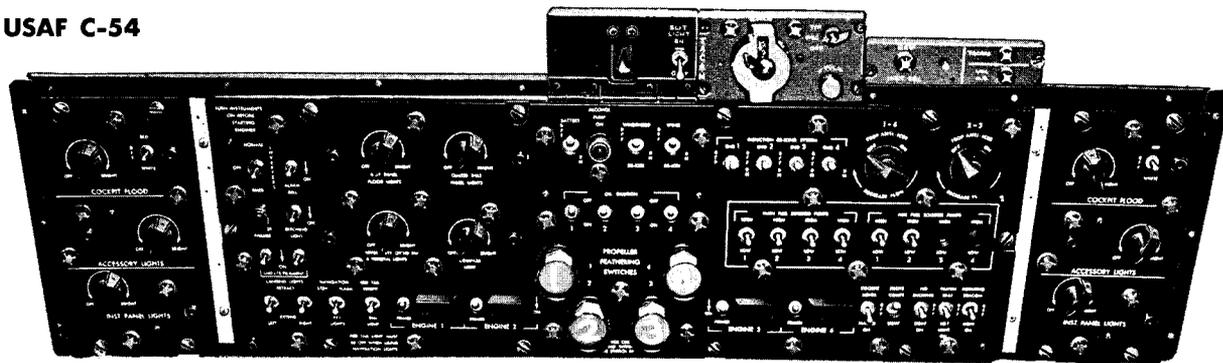
- 27. MANIFOLD PRESSURE PURGE BUTTONS
- 28. AUTOPILOT ATTITUDE INDICATOR
- 29. AUTOPILOT MASTER HEADING INDICATOR
- 30. COCKPIT HEATER AIR TEMPERATURE INDICATOR
- 31. RANGE INDICATOR
- 32. PILOTS' COMPARTMENT (COCKPIT) HEATER BLOWER CONTROL HANDLE
- 33. SPACE PROVISION

Figure 1-10 (Sheet 4 of 4)

X1-266

PILOTS' OVERHEAD PANEL—Typical

USAF C-54



NAVY C-54

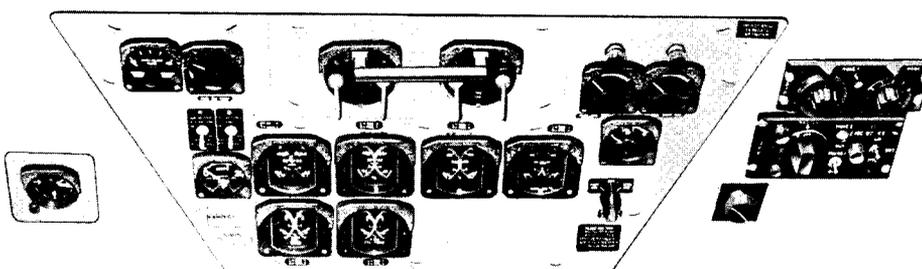
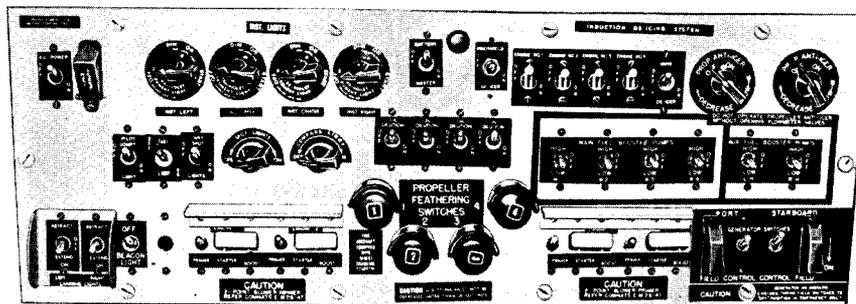
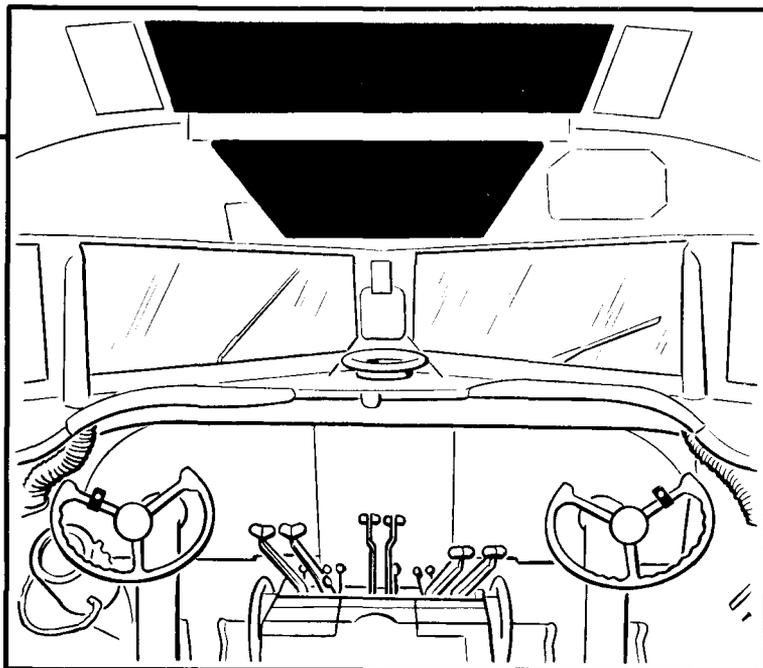
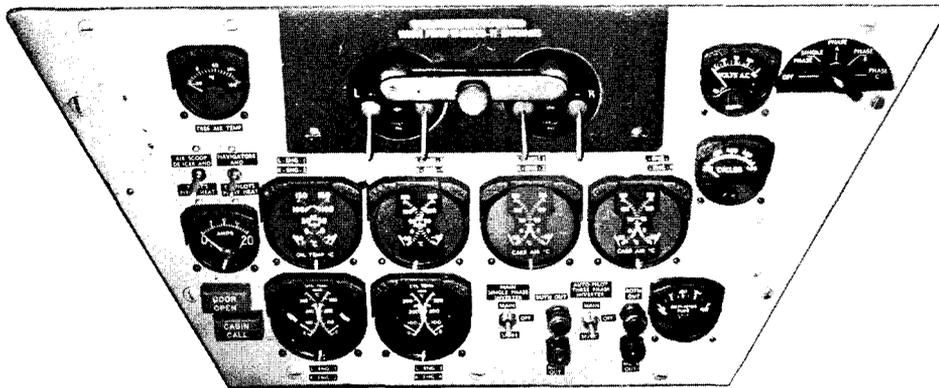
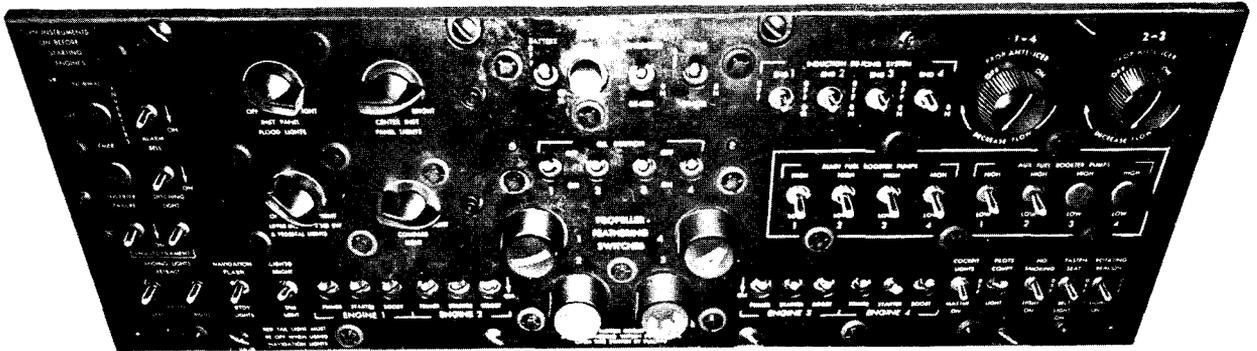


Figure 1-11 (Sheet 1 of 6)

X1-267

PILOTS' OVERHEAD PANEL—Typical

EC-54



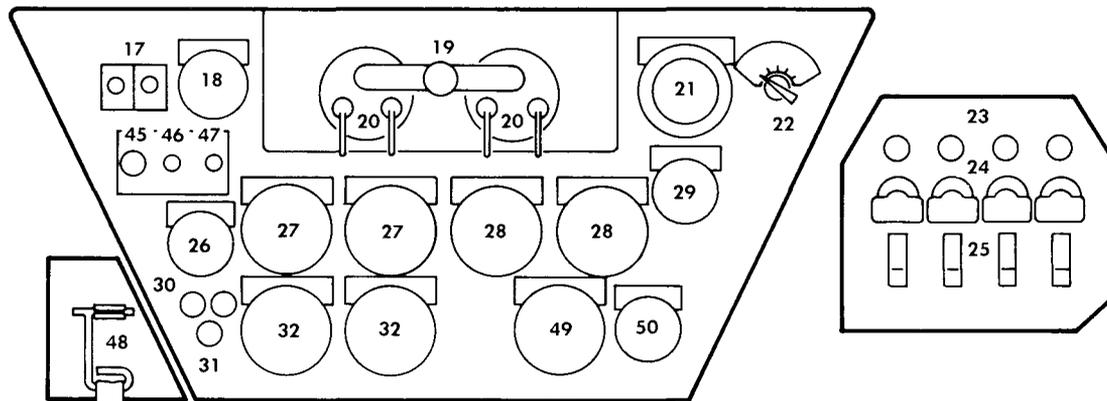
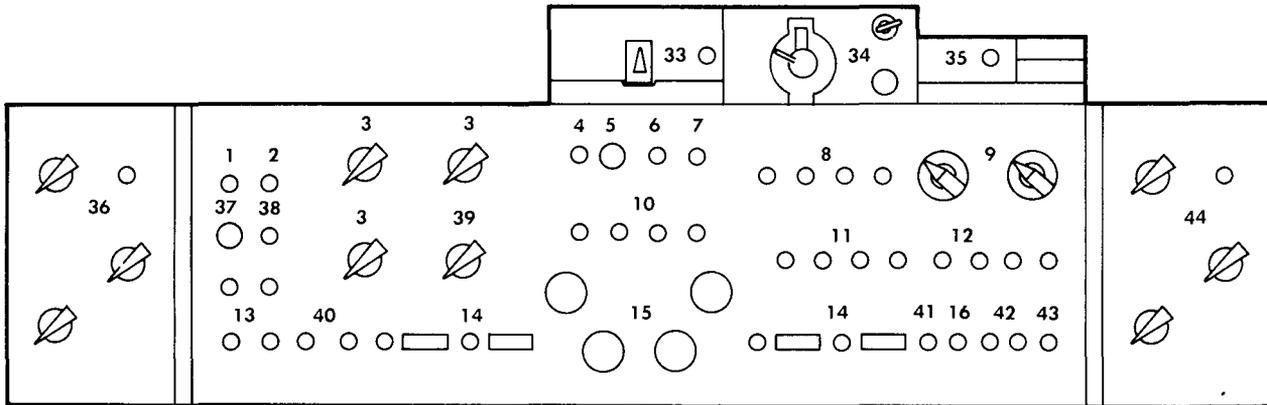
Note:
HC-54 panel not shown. See sheet 5 for
instrument locations for HC-54.

Figure 1-11 (Sheet 2 of 6)

X1-268

PILOTS' OVERHEAD PANEL—Typical

USAF C-54



1. MAIN INVERTER SWITCH
2. ALARM BELL SWITCH
3. INSTRUMENT PANEL LIGHTING RHEOSTATS (3, 4 ON NAVY C-54 AND EC-54)
4. BATTERY SWITCH
5. ANTI-ICING PUMP INDICATOR LIGHT
6. WINDSHIELD DEICER SWITCH
7. WING DEICER SWITCH
8. CARBURETOR ANTI-ICING SWITCHES (4)
9. PROPELLER ANTI-ICING RHEOSTATS (2)
10. OIL DILUTION SWITCHES (4)
11. MAIN FUEL BOOSTER PUMP SWITCHES (4)
12. AUXILIARY FUEL BOOSTER PUMP SWITCHES (2, 4 WITH EIGHT-TANK SYSTEM)
13. LANDING LIGHT SWITCHES (4, 2 ON NAVY C-54)
14. PRIMER AND STARTER SWITCHES (4 EA.)
15. PROPELLER FEATHERING BUTTONS (4)
16. PILOT'S COMPARTMENT LIGHT SWITCH
17. AIRSCOOP DEICER AND PITOT HEATER SWITCHES
18. FREE AIR (OAT) TEMPERATURE INDICATOR
19. MASTER IGNITION SWITCH HANDLE
20. IGNITION SWITCHES (4)
21. DC VOLTMETER

22. DC VOLTMETER SELECTOR SWITCH
23. GENERATOR FAILURE WARNING LIGHT (4, 2 ON NAVY C-54)
24. GENERATOR LOAD METERS (4, NAVY C-54 AMMETERS - 2)
25. GENERATOR SWITCHES (4, NAVY C-54 FIELD CONTROL - 2)
26. PITOT HEATER AMMETER
27. OIL TEMPERATURE INDICATORS (2)
28. CARBURETOR AIR TEMPERATURE INDICATORS (2)
29. ANTI-ICING FLUID QUANTITY GAGE
30. DOOR OPEN WARNING LIGHT(S)
31. CABIN CALL LIGHT
32. CYLINDER HEAD TEMPERATURE INDICATORS (2)

Note:

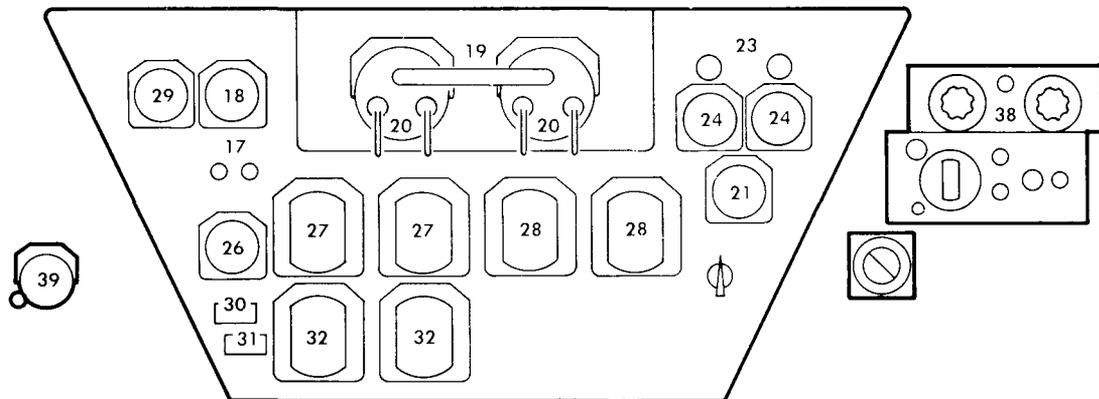
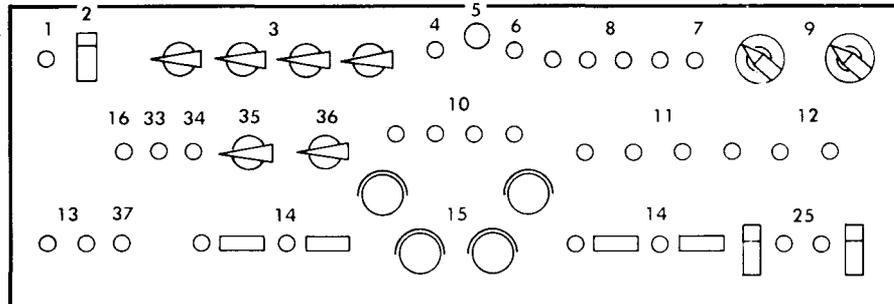
1. Items 1 through 32 are common to all USAF aircraft with eight wing tanks. Check individual aircraft illustrations for differences in location.
2. Items 33 through 50 on sheet 4.

Figure 1-11 (Sheet 3 of 6)

X1-220

PILOTS' OVERHEAD PANEL—Typical

NAVY C-54



USAF C-54

- 33. INSTRUMENT PANEL SLIT LIGHT AND SWITCH
- 34. TACAN CONTROL PANEL
- 35. NAVIGATION INSTRUMENT SELECTOR SWITCH
- 36. PILOT'S COCKPIT AND INSTRUMENT LIGHT CONTROL PANEL
- 37. INVERTER FAILURE LIGHT
- 38. DITCHING LIGHT SWITCH
- 39. COMPASS LIGHT RHEOSTAT
- 40. NAVIGATION LIGHT SWITCHES (2)
- 41. COCKPIT LIGHT MASTER SWITCH
- 42. NO SMOKING AND FASTEN SEAT BELT SIGN SWITCHES (2)
- 43. ANTICOLLISION LIGHT SWITCH
- 44. COPILOT'S COCKPIT AND INSTRUMENT LIGHT CONTROL PANEL
- 45. INSTRUMENT (THREE PHASE) INVERTER SWITCH (SOME AIRCRAFT)

- 46. INSTRUMENT INVERTER FAILURE LIGHT (SOME AIRCRAFT)
- 47. AUTOPILOT (E-4) POWER SWITCH (SOME AIRCRAFT)
- 48. GUST LOCK TAPE
- 49. COCKPIT HEATER AIR TEMPERATURE INDICATOR
- 50. HYDRAULIC FLUID QUANTITY GAGE (SOME AIRCRAFT)

NAVY C-54

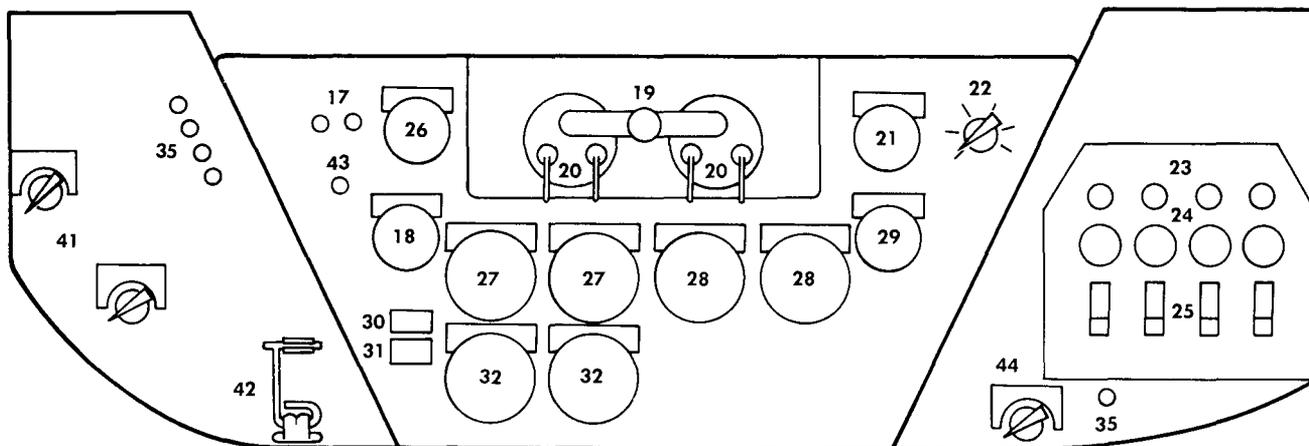
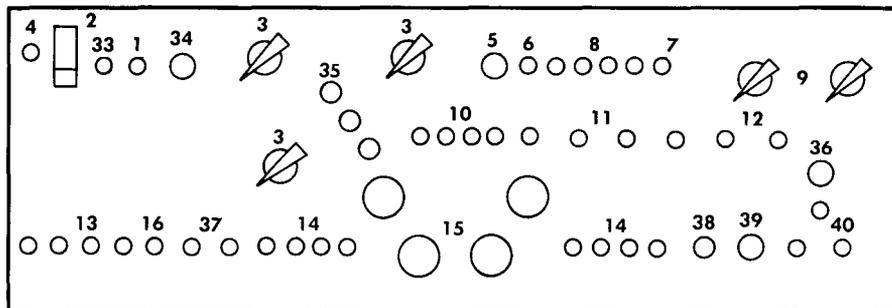
- 33. TAXI LIGHT SWITCH
- 34. INSTRUMENT SPOT LIGHT SWITCH
- 35. INSTRUMENT SPOT LIGHT RHEOSTAT
- 36. COMPASS LIGHT RHEOSTAT
- 37. ANTICOLLISION (BEACON) LIGHT SWITCH
- 38. IFF/SIF CONTROL PANEL
- 39. CLOCK

Figure 1-11 (Sheet 4 of 3)

X1-221

PILOTS' OVERHEAD PANEL—Typical

HC-54



1. MAIN INVERTER SWITCH
2. ALARM BELL SWITCH
3. INSTRUMENT PANEL LIGHTING RHEOSTATS (3)
4. BATTERY SWITCH
5. ANTI-ICING PUMP INDICATOR LIGHT
6. WINDSHIELD DEICER SWITCH
7. WING DEICER SWITCH
8. CARBURETOR ANTI-ICING SWITCHES (4)
9. PROPELLER ANTI-ICING RHEOSTATS (2)
10. OIL DILUTION SWITCHES (4)
11. MAIN FUEL BOOSTER PUMP SWITCHES (4)
12. AUXILIARY FUEL BOOSTER PUMP SWITCHES (2, 4 WITH EIGHT-TANK SYSTEM)
13. LANDING LIGHT SWITCHES (4)
14. PRIMER AND STARTER SWITCHES (4 EA.)
15. PROPELLER FEATHERING BUTTONS (4)
16. PILOTS' COMPARTMENT LIGHT SWITCH
17. AIRSCOOP DEICER AND PITOT HEATER SWITCHES
18. FREE AIR (OAT) TEMPERATURE INDICATOR
19. MASTER IGNITION SWITCH HANDLE
20. IGNITION SWITCHES (4)
21. DC VOLTMETER

22. DC VOLTMETER SELECTOR SWITCH
23. GENERATOR FAILURE WARNING LIGHTS (4)
24. GENERATOR LOADMETERS (4)
25. GENERATOR SWITCHES (4)
26. PITOT HEATER AMMETER
27. OIL TEMPERATURE INDICATORS (2)
28. CARBURETOR AIR TEMPERATURE INDICATORS (2)
29. ANTI-ICING FLUID QUANTITY GAGE
30. DOOR OPEN WARNING LIGHT
31. CABIN CALL LIGHT
32. CYLINDER HEAD TEMPERATURE INDICATORS (2)

Note:

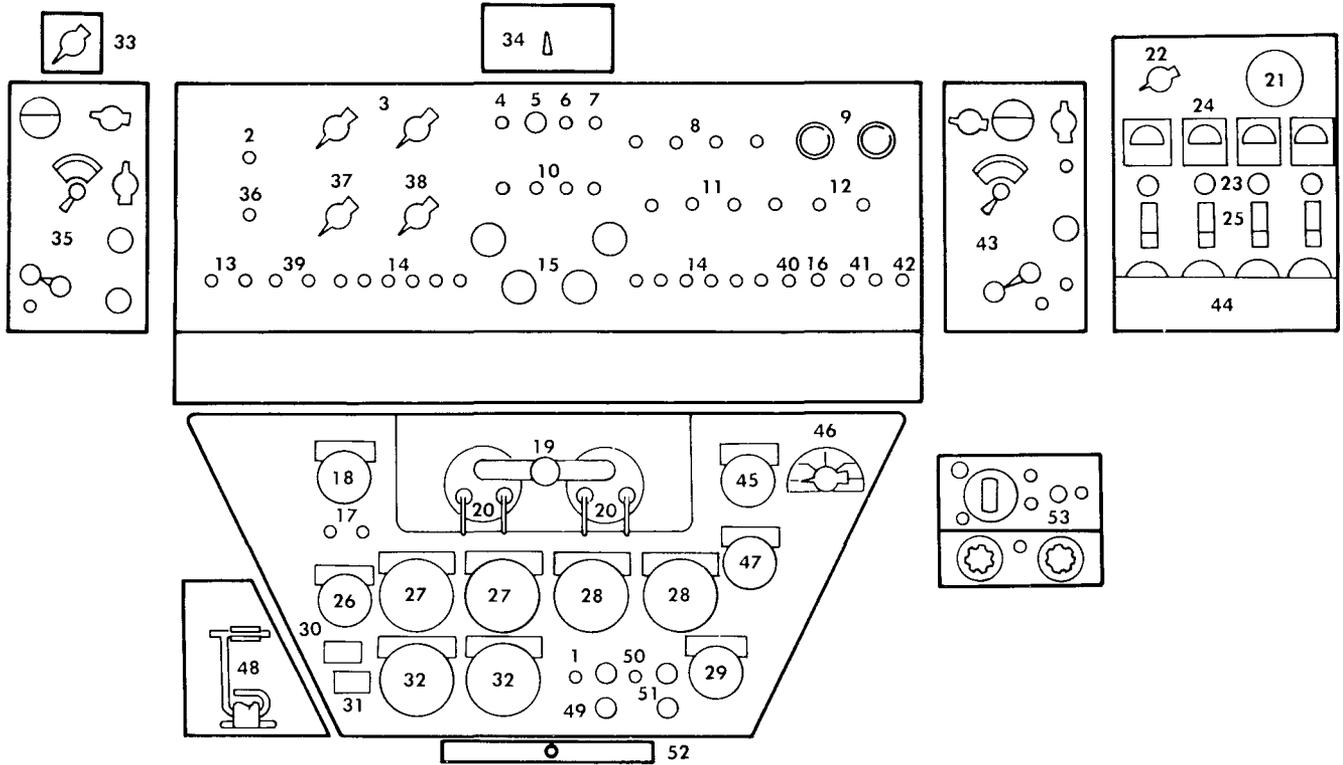
1. Items 1 through 32 are common to all aircraft with six wing tanks. Check individual aircraft illustration for differences in location.
2. Items 33 through 44 are on sheet 6.

Figure 1-11 (Sheet 5 of 6)

X1-269

PILOTS' OVERHEAD PANEL—Typical

EC-54



HC-54 AIRCRAFT

- 33. AUTOPILOT SYSTEM POWER SWITCH
- 34. MAIN INVERTER FAILURE LIGHT
- 35. LIGHTING RHEOSTAT FUSES (8)
- 36. AUTOPILOT INVERTER FAILURE LIGHT AND SWITCH
- 37. NAVIGATION LIGHT SWITCHES
- 38. LANDING GEAR WARNING HORN SHUTOFF SWITCH
- 39. FLARE LAUNCHER RELEASE INDICATOR LIGHT AND SWITCH
- 40. BRAKE ANTISKID SWITCH
- 41. PILOT'S LIGHT CONTROL PANEL
- 42. GUST LOCK PIN
- 43. ANTICOLLISION LIGHT SWITCH
- 44. COPILOT'S INSTRUMENT LIGHT RHEOSTAT

EC-54 AIRCRAFT

- 33. INSTRUMENT PANEL LIGHTS SWITCH

- 34. INSTRUMENT PANEL SLIT LIGHT
- 35. PILOT'S RADIO COMPASS CONTROL PANEL
- 36. DITCHING LIGHT SWITCH
- 37. INSTRUMENT PANEL SPOT LIGHT RHEOSTAT
- 38. COMPASS LIGHT RHEOSTAT
- 39. NAVIGATION LIGHT SWITCHES (2)
- 40. COCKPIT LIGHT SWITCH
- 41. NO SMOKING AND FASTEN SEAT BELT SIGN SWITCHES
- 42. ANTICOLLISION LIGHT SWITCH
- 43. COPILOT'S RADIO COMPASS CONTROL PANEL
- 44. GENERATOR VOLTAGE RHEOSTATS (4)
- 45. AC VOLTMETER
- 46. AC METERING SELECTOR SWITCH
- 47. FREQUENCY METER
- 48. GUST LOCK PIN (STOWED)
- 49. SINGLE PHASE INVERTER FAILURE LIGHTS (2)
- 50. AUTOPILOT THREE PHASE INVERTER SWITCH
- 51. AUTOPILOT THREE PHASE INVERTER FAILURE LIGHTS (2)
- 52. MEMORANDUM STORAGE FILE
- 53. IFF/SIF CONTROL PANEL

Figure 1-11 (Sheet 6 of 6)

X1-270

Fuel Flowmeters.

The dual-indicating fuel flowmeters (18, figure 1-10) mounted on the main instrument panel indicate the fuel flow to each engine in pounds and gallons per hour. Power for the fuel flowmeters is supplied by a 26-volt ac circuit.

Fuel Pressure Gages.

Two 26 volt ac dual-indicating autosyn operated fuel pressure gages (16, figure 1-10) are mounted on the main instrument panel. The two gages indicate the operating pressures of the four engine fuel systems. Fuel pressure is taken from the carburetor. On some aircraft, the fuel pressure gages are operated hydrostatically.

IGNITION ANALYZER (IF INSTALLED).

A portable airborne ignition analyzer (figure 7-1) is installed to permit continuous visual analysis of the complete aircraft power plant ignition system. The ignition analyzer isolates and identifies the malfunctions and failures that may occur during engine operation, and may be used during flight or on the ground. The ignition analyzer is mounted above the radio operator's position on all except Navy C-54 aircraft, and on the navigator's table on Navy C-54 aircraft. The ignition analyzer switch panel and a lead storage compartment are mounted on the stanchion, aft of the copilot's seat. The unit receives power from both 28 volt dc and 115 volt ac busses on all except Navy C-54 aircraft, and from the 115 volt ac bus on Navy C-54 aircraft. Refer to Section VII for operation.

PROPELLERS.

Each engine is equipped with a Hamilton Standard Hydromatic, three-blade, constant speed, full-feathering propeller. Constant engine rpm is maintained by a propeller governor mounted on the engine nose section. The governor is controlled mechanically from the

cockpit. Engine oil is supplied to the governor pump; this boosts the oil pressure and meters the flow of oil to the propeller pitch-change mechanism which controls the propeller blade angle. The propeller feathering system consists of a feathering oil pump and an electric pump motor. When the motor is energized, high-pressure oil from the pump automatically shuts off the metered flow of oil from the propeller governor, and supplies oil at higher than normal pressure to the propeller pitch-change mechanism to feather the selected propeller. For feathering purposes, 1.4 gallons of oil is reserved in each engine nacelle oil tank.

PROPELLER LEVERS AND FRICTION LOCK LEVER.

Four propeller levers (3, figure 1-9), with placarded INC RPM (forward) and DEC RPM (aft) positions, are located on the control pedestal and are equipped with a mechanical friction lock lever (2, figure 1-9). The propeller levers adjust the propeller governor on the nose section of each engine through a mechanical linkage. The governors maintain constant propeller speed, as selected by the control levers, for any setting between 1200 and 2700 rpm.

PROPELLER FEATHERING BUTTONS.

Four guarded push-type propeller feathering buttons (15, figure 1-11), one for each propeller, are mounted on the pilots' overhead panel. When the desired feathering button is depressed to feather the selected propeller, a 28 volt dc circuit is closed to energize the feathering pump motor. A 28 volt dc holding coil holds the feathering switch in until the propeller is feathered, which requires approximately 7 seconds; the button then pops out to the normal position. The feathering operation may be interrupted by manually pulling out the feathering button. This allows propeller rpm to return to the previous control setting. When the propeller feathering button is depressed to unfeather the propeller, it must be held in manually until the propeller blades have moved out of the feathered position and approximately 500 to 800 rpm is indicated on the tachometer.

OIL SYSTEM.

An independent oil system (figure 1-12) for each engine supplies oil to the engine from a nacelle hopper-type oil tank. Each tank has a capacity of 22 gallons, of which 1.4 gallons are reserved for propeller feathering, plus 3.75 gallons foaming and expansion space (for oil grade and specification, see figure 1-30). Oil flows from the tank through a firewall shutoff valve to the engine-driven oil pump located on the engine accessory section. Oil under pressure flows from the pump through the main oil screen and through the engine. A scavenge oil pump returns the oil from the engine through an oil cooler, which has an automatically operated air exit door. This door is actuated by an oil temperature control valve, mounted on the oil cooler, to maintain a constant oil temperature. When oil pressure rises because of congealed oil in the cooling radiator, the oil is bypassed around the cooler muff to the nacelle oil tank through a jacket by-pass valve, until the congealed oil in the radiator is warmed sufficiently to permit normal flow. An oil dilution system is provided to dilute the engine oil when a cold weather start is anticipated.

OIL DILUTION SWITCHES.

Four oil dilution switches (18, figure 1-11), spring loaded to the OFF position, are mounted on the pilots' overheadpanel. These switches, in the ON position, close 28-volt dc circuits to solenoid valves, located on the firewall of each engine, which open and permit gasoline to flow into the oil system, at the firewall shutoff valve, thus diluting the oil for cold weather starting.

AUXILIARY OIL SYSTEM.

An auxiliary oil system (figure 1-12) is provided to supply oil to any nacelle oil tank as required. The auxiliary oil supply is contained in an auxiliary oil tank that has a capacity of 50 US gallons plus a 5-gallon expansion space. The tank is installed in the relief crew compartment under the lower

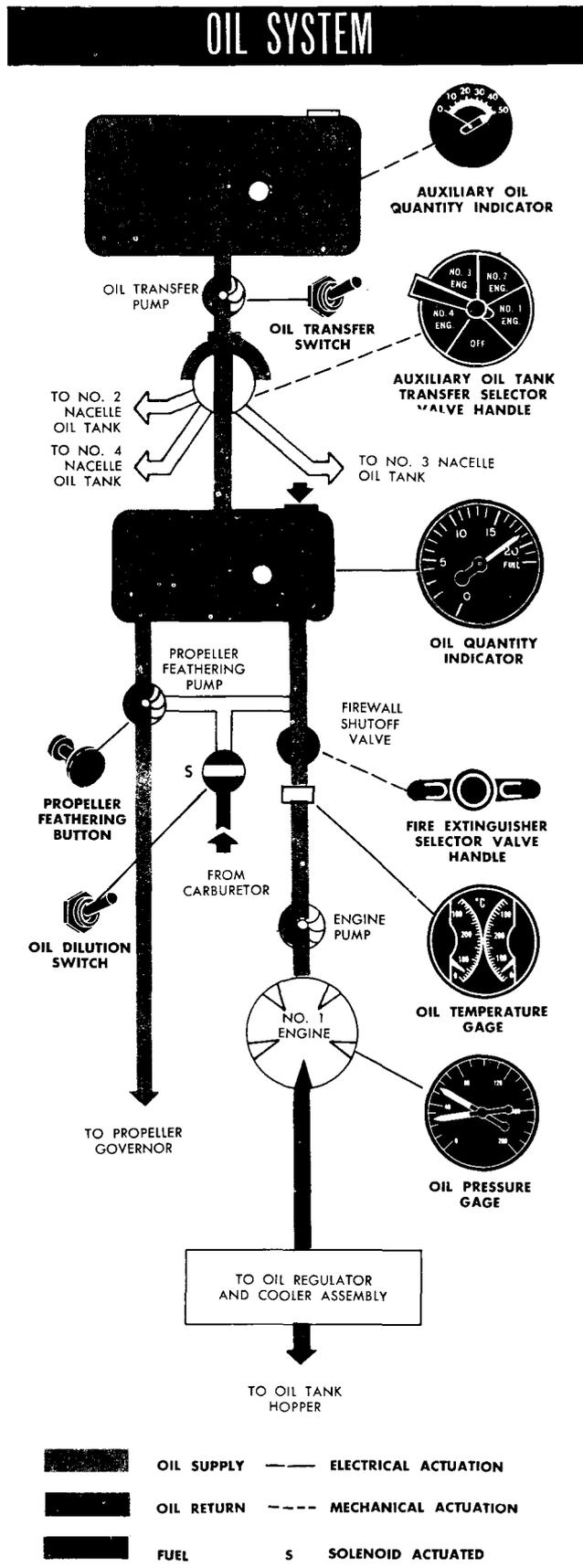


Figure 1-12

X1-8

crew bunk. On the HC-54 aircraft the tank is located at the forward right side of the main cabin compartment (26, figure 1-3, sheet 3). The system uses a pump, an electric motor, a circuit breaker, an actuating switch, and a selector valve to transfer oil when needed.

AUXILIARY OIL TRANSFER HANDLE.

A mechanical auxiliary oil transfer handle (figure 1-13) is located on the bulkhead aft of the fuselage oil tank (aft of navigator's station on HC-54 aircraft), and has the following positions: OFF, NO. 1 ENG., NO. 2 ENG., NO. 3 ENG., and NO. 4 ENG. The handle must be positioned and the oil transfer pump switch must be ON to transfer oil to the respective engine nacelle tank.

AUXILIARY OIL TRANSFER SWITCH.

An auxiliary oil transfer switch (figure 1-13) with ON and OFF positions is located on the

bulkhead, near the floor, aft of the fuselage oil tank (aft of the navigator's station on HC-54 aircraft). This switch, is spring loaded to the OFF position, and when held ON, closes a 28 volt dc circuit to energize the oil transfer pump motor. The auxiliary oil selector valve must be positioned to the engine required prior to placing this switch in the ON position.

Auxiliary Oil Transfer Circuit Breakers.

A 28 volt dc toggle-type, ON-OFF auxiliary oil transfer circuit protector (figure 1-13) is located on the bulkhead, near the floor, aft of the auxiliary oil tank (aft of the navigator's station on HC-54 aircraft).

Auxiliary Oil Tank Quantity Indicator.

A float-type, direct reading, auxiliary oil tank quantity indicator is located on the auxiliary oil tank.

OIL SYSTEM FIREWALL SHUTOFF VALVES.

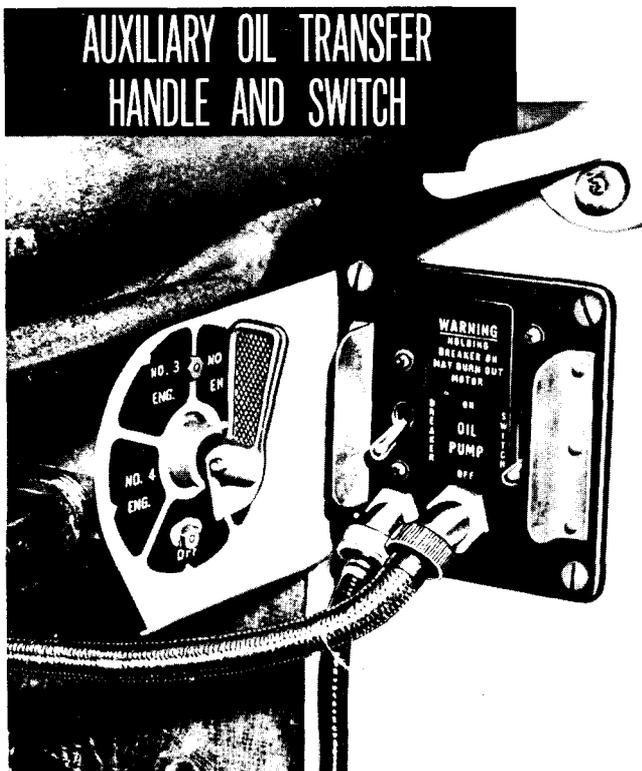
A cable-operated firewall shutoff valve, controlled by a handle located on the fire extinguisher system control panel (7, figure 1-29), is installed at each nacelle firewall to shut off the flow of oil forward of the firewall except to the propeller feathering system.

Oil Quantity Indicators.

Two dual oil quantity indicators, calibrated in gallons, are mounted on the main instrument panel (23, figure 1-10). The indicators are actuated electrically through a 26 volt ac circuit by autosyn transmitters in the respective oil tanks.

FUEL SYSTEM — SIX WING TANK.

The fuel system (figure 1-16) furnishes fuel for the engines, for the primers, for engine oil dilution, and for the combustion heaters. The system includes six integral wing tanks



X1-2

Figure 1-13

checklist pages are inserted. They are available in three capacities and are obtained through normal Air Force supply under the following stocklist numbers: 7510-766-4268, -4269, and 4270 for 15, 25, and 40 envelope binders respectively. Check with your supply personnel for assistance in securing these items.

WARNINGS, CAUTIONS, AND NOTES.

The following definitions apply to "Warnings", "Cautions", and "Notes" found throughout the manual.

WARNING

Operating procedures, techniques, etc., which will result in personal injury or loss of life if not carefully followed.

CAUTION

Operating procedures, techniques, etc., which will result in damage to equipment if not carefully followed.

Note

An operating procedure, technique, etc., which is considered essential to emphasize.

YOUR RESPONSIBILITY — TO LET US KNOW.

Every effort is made to keep the Flight Manual current. Review conferences with operating personnel and a constant review of accident and flight test reports assure inclusion of the latest data in the manual. However, we cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections, and questions regarding this manual or any phase of the Flight Manual program are welcome. These should be forwarded through your Command Headquarters to Commander, Warner Robins Air Material Area, Service Engineering Division (WRNEO), Robins Air Force Base, Georgia.

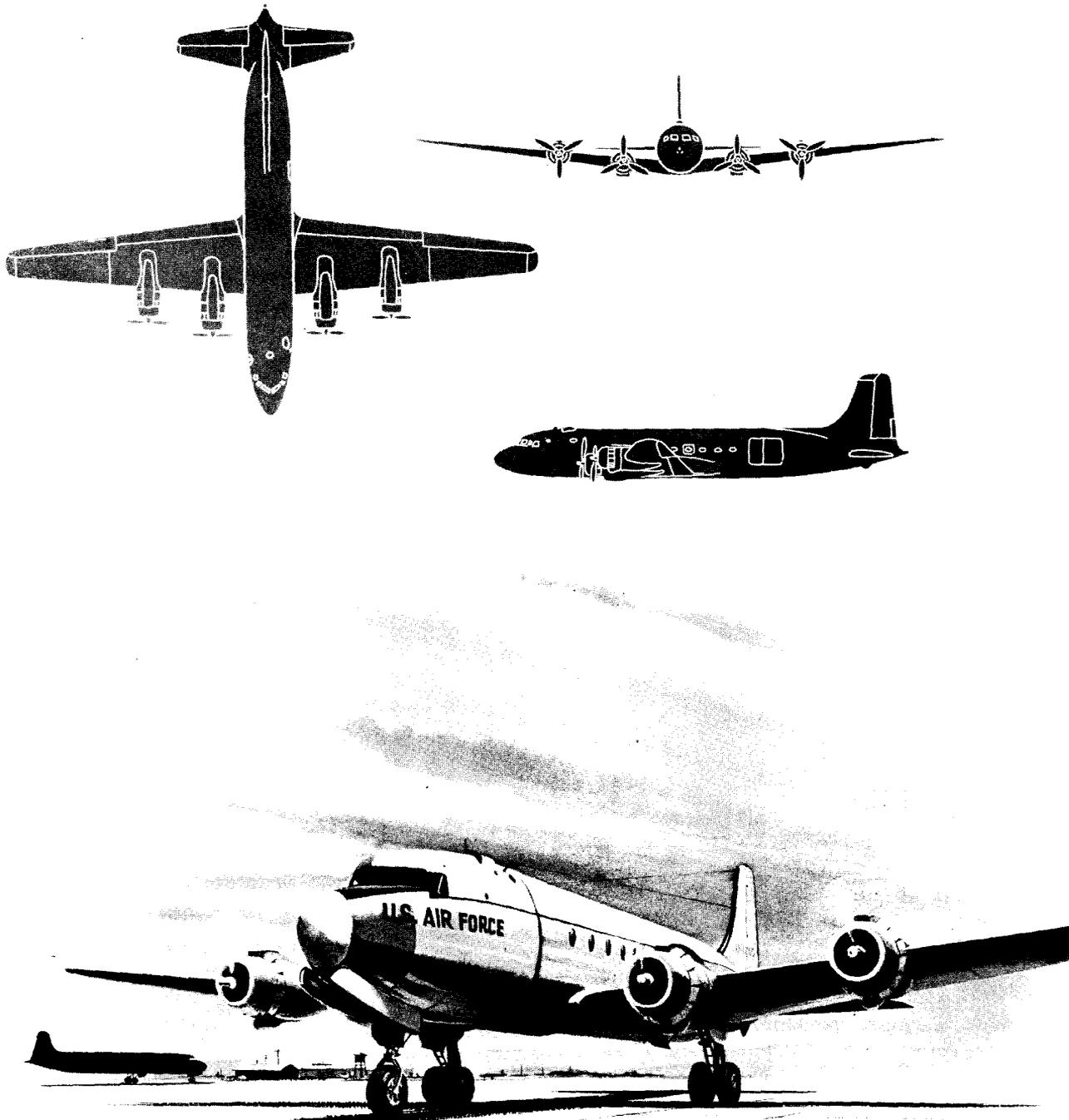
AIRCRAFT SERIES DESIGNATION.

This manual contains information for all C-54 series aircraft. Many of the changes in con-

figuration in the different models are apparent to the flight crews by visual inspection and are adequately covered by test and illustrations. Where text or illustrations are not specifically identified for a particular model, it may be assumed that such items are common to all models. When reference is made to individual models, the model is specified. The reference "C-54" will refer to USAF C-54 models, excluding the EC-54, HC-54, TC-54, and Navy C-54 aircraft. References to EC-54, HC-54 and TC-54 aircraft will be made by model designation. The reference "Navy C-54" includes all Navy C-54 models, formerly designated as R5D. In some instances it is impossible to identify equipment as being common to any particular model. In such cases as this, the reference "Some Aircraft" indicates that the item may or may not be found on a particular model aircraft. Each aircraft should be checked to determine the equipment installed and the location of equipment.

The following list contains all aircraft covered by this manual, the current model and series designation, the former designation, and the service using the particular model.

Current Designation	Former Designation	Service
C-54A	Same	AF
C-54D	Same	AF
EC-54D	AC-54D	AF
HC-54D	SC-54D	AF
TC-54D	Same	AF
VC-54D	Same	AF
C-54E	Same	AF
C-54G	Same	AF
VC-54G	Same	AF
C-54M	Same	AF
VC-54N	R5D-1Z	Navy
C-54P	R5D-2	Navy
VC-54P	R5D-2Z	Navy
C-54Q	R5D-3	Navy
VC-54Q	R5D-3Z	Navy
C-54R	R5D-4R	Navy
C-54S	R5D-5	Navy
VC-54S	R5D-5Z	Navy
C-54T	R5D-5R	Navy
EC-54U	R5D-4	Navy (C. G.)
RC-54V	R5D-3	Navy (C. G.)



C-54

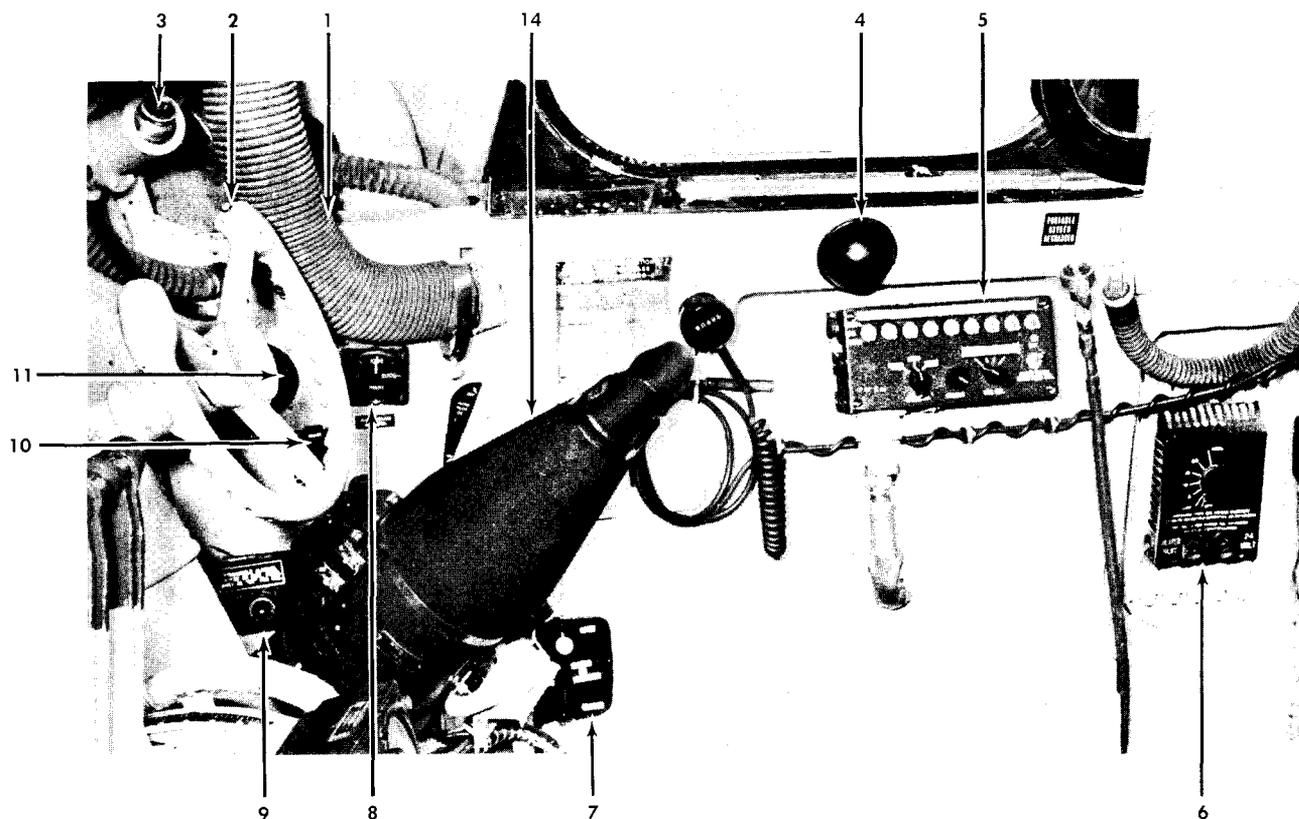
THE AIRCRAFT

Figure 1-1

X1-208

COPLOT'S STATION—Typical

NAVY C-54



8. EMERGENCY AIRBRAKE PRESSURE GAGE
9. WINDSHIELD WIPER AND WINDSHIELD ALCOHOL CONTROL KNOBS
10. STATIC COURSE SELECTOR SWITCH
11. HYDRAULIC SYSTEM PRESSURE GAGE
12. FILTER (SOME AIRCRAFT)
13. AUTOPILOT OIL SHUTOFF HANDLE (SOME AIRCRAFT)
14. SEARCH RADAR INDICATOR (NAVY C-54 IF INSTALLED)

X1-260

Figure 1-8 (Sheet 2 of 2)

valve to control hydraulic pressure to the cowl flap actuating cylinders. In the OPEN position, hydraulic pressure is directed to one side of the actuating cylinder and the cowl flaps move toward the OPEN position. In the CLOSE position, hydraulic pressure is directed to the other side of the actuating cylinder and the cowl flaps move toward the closed position. In either OFF position, the hydraulic pressure is trapped in the actuating cylinder to hold the cowl flaps in any desired position. In the TRAIL position, both sides of the actuating cylinder are bypassed, allowing the cowl flaps to move in either direction, depending on the balance of the airloads on the cowl flaps. When cowl flap positions other than TRAIL, full OPEN, or full CLOSE are selected, the cowl flap levers should be returned to an OFF position.

Note

The cowl flaps require approximately 3 to 5 seconds to travel from full open to full closed.

Cowl Flap Position Indicators.

Cowl flap position is indicated by a pointer mounted on each top inboard cowl flap. This pointer, which is visible from the cockpit, indicates the cowl flap position on a scale located on the inboard side of the carburetor airscoop fairing. The positions indicated are OPEN and CLOSE.

IGNITION SYSTEM.

The ignition system for each engine consists of dual magnetos with integral distributors, a shielded high-tension wiring harness, and a starting vibrator.

Ignition Switches.

Four ignition switches (20, figure 1-11), one for each engine, with BOTH, R, L, and OFF positions, are mounted on the upper instrument panel. When the ignition switch is in the

BOTH position, both magnetos for that engine furnish current for the ignition system and spark plugs. When the engine ignition switch is positioned to R, the left magneto for that engine is grounded and the front spark plugs will fire. When the engine ignition switch is positioned to L, the right magneto for that engine is grounded and the rear spark plugs will fire. When the ignition switch is positioned to OFF, both magnetos for that engine are grounded and neither the front nor the rear spark plugs will fire.

Master Ignition Switch.

The master ignition switch (19, figure 1-11), placarded PULL OFF, has two positions: ON (pushed in) and OFF (pulled out). On some aircraft a bar-type switch is installed that has two positions, ON (up) and OFF (down). The switch is installed immediately above the four ignition switches on the upper instrument panel and is designed to ground out all four ignition switches simultaneously.

Primer Switches.

Four priming switches (14, figure 1-11), spring loaded to the OFF (up) position, are mounted on the electrical control panel. When a primer switch is moved to the ON (down) position, it closes a 28-volt dc circuit to the engine primer solenoid and fuel is injected into the blower throat. Priming pressure is provided by the electrical fuel booster pumps.

STARTER SYSTEM.

The starter system for each engine has an electric direct-cranking starter installed on the accessory drive case. The starter gear automatically meshes with the rear accessory drive gear of the engine when the starter motor is energized. The starter has a torque limiting clutch, which protects the starter from overload in case of backfire or liquid lock and against the shock of jaw engagement. There are no provisions for hand-cranking the engines.

(four main and two auxiliary tanks), two fuselage tanks (if installed), six electrically driven booster pumps for the wing tanks, one or more electrically driven booster pumps for the fuselage tanks (if installed), four engine-driven fuel pumps, four mechanically actuated firewall shutoff valves, fuel flowmeters, and pressure and quantity indicators. Refer to figures 1-15 and 1-30 for fuel quantities and grade. Fuel is supplied from each main tank to its respective engine or can also be supplied into the crossfeed line. Fuel from the auxiliary wing tanks and the fuselage tanks is discharged into the crossfeed line only. Six wing tank selector valves, a fuselage tank selector valve, and four crossfeed selector valves permit selection of fuel for any combination of engines from any combination of tanks. Each wing tank is provided with a filler neck, an overboard vent line, a water sump drain, a fuel level transmitter, and a booster pump. Each fuselage tank is provided with a filler neck, an overboard vent line, a water sump drain, and a fuel level sight gage. One or more booster pumps are installed between the fuselage tanks and the crossfeed line. On some aircraft, submerged electrical booster pumps are installed in the fuselage tanks. A vapor vent return line is connected to each engine carburetor and is routed back to each respective main tank. It is possible for the rate of vapor or fuel return to be as great as 10 gph.

MAIN FUEL TANK SELECTOR LEVERS.

Four main fuel tank selector levers (1, figure 1-14), one for each main tank, have ON and OFF positions, and are installed on the control pedestal. Each lever mechanically controls its respective selector valve.

AUXILIARY FUEL TANK SELECTOR LEVERS.

Two auxiliary fuel tank selector levers (5, figure 1-14) are installed under a floor plate aft of the control pedestal. They mechanically control their respective auxiliary fuel tank selector valves. The left auxiliary tank selector lever has the following positions: OFF,

ON TO LH ENGINES, and ON TO ALL ENGINES. The right auxiliary tank selector lever has the following positions: OFF, ON TO RH ENGINES, and ON TO ALL ENGINES.

FUSELAGE FUEL TANK SELECTOR HANDLE (IF INSTALLED).

A single fuselage fuel tank selector handle (7, figure 1-14) mounted on the floor aft of the left fuselage tank, has OFF, RH, and LH positions. The fuel tank selector valve is mechanically actuated by this handle. The RH position opens the valve to permit fuel flow from the right fuselage tank into the crossfeed line. The LH position opens the valve to permit fuel flow from the left fuselage tank into the crossfeed line. The crossfeed levers must be in the ON position to allow fuel flow from the crossfeed line to the engine. (See fuel system management, Section VII.)

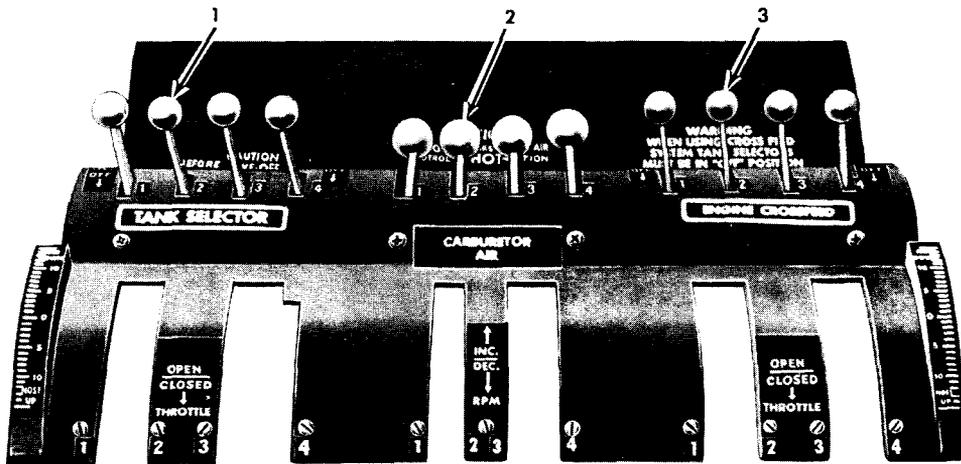
CROSSFEED SELECTOR LEVERS.

Four crossfeed selector levers (5, figure 1-14), with ON and OFF positions, are installed on the control pedestal. They mechanically actuate the fuel crossfeed valves to permit fuel flow through the crossfeed line.

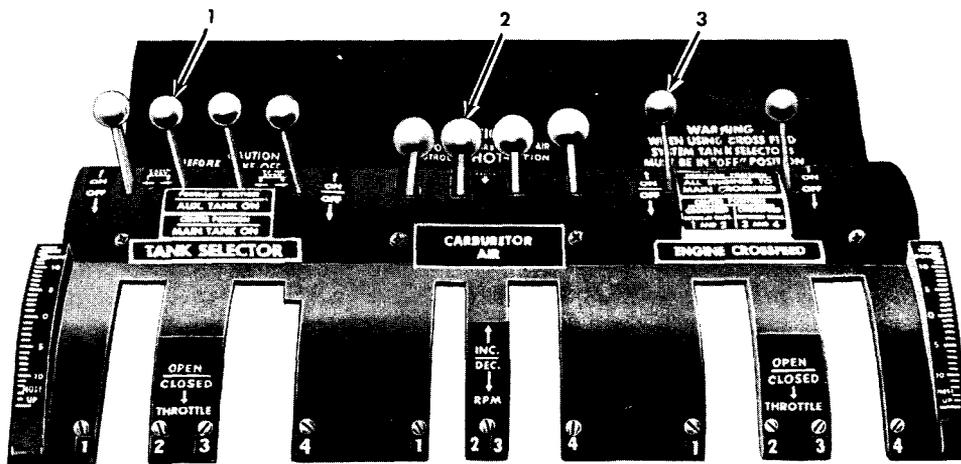
BOOSTER PUMP SWITCHES.

Six booster pump switches (12, figure 1-11) are located on the pilots' overhead panel, and control the booster pumps in the four main fuel tanks and two auxiliary fuel tanks. Two fuselage fuel tank booster pump switches are located on the cabin heater control panel (figure 4-3) and control the booster pumps in the fuselage fuel tanks. On some Navy C-54 aircraft the fuselage tank booster pump switch is located on the pilots' overhead panel. The booster pump switches have LOW, OFF, and HIGH positions. When these switches are in LOW or HIGH position, a 28 volt dc circuit to each respective booster pump motor is closed to operate the pump. The booster pumps maintain approximately 12 psi fuel pressure in low boost operation and approximately 22 psi fuel pressure in high boost operation.

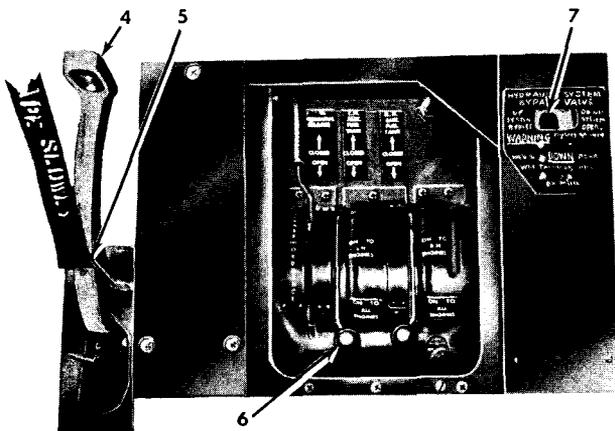
FUEL SYSTEM CONTROLS



FORWARD PEDESTAL — SIX WING TANK FUEL SYSTEM



FORWARD PEDESTAL — EIGHT WING TANK FUEL SYSTEM



PEDESTAL BASE

1. FUEL TANK SELECTOR LEVERS (MAIN FOR SIX-TANK, MAIN AND AUX FOR EIGHT TANK)
2. CARBURETOR AIR LEVERS
3. CROSS FEED SELECTOR LEVERS
4. GUST LOCK HANDLE
5. GUST LOCK PIN
6. AUXILIARY FUEL TANK SELECTOR LEVERS (SIX-TANK)
7. HYDRAULIC SYSTEM BYPASS VALVE HANDLE

Figure 1-14

X1-217

FUEL QUANTITY DATA CHART

SIX WING TANKS		USABLE FUEL—LEVEL FLIGHT ATTITUDE (EACH TANK)		FULLY SERVICED—TAXI ATTITUDE (EACH TANK)	
TANKS	NO.	GALLONS	POUNDS	GALLONS	POUNDS
MAIN (Nos. 1 & 4)	2	490	2940	492	2952
MAIN (Nos. 2 & 3)	2	500	3000	506	3036
AUXILIARY (LH & RH)	2	420	2520	421	2526
FUSELAGE	2	450	2700	453	2718

TOTAL USABLE FUEL WITHOUT FUSELAGE TANKS 2820 GALLONS = 16,920 POUNDS

TOTAL USABLE FUEL WITH FUSELAGE TANKS 3720 GALLONS = 22,320 POUNDS

EIGHT WING TANKS		USABLE FUEL—LEVEL FLIGHT ATTITUDE (EACH TANK)		FULLY SERVICED—TAXI ATTITUDE (EACH TANK)	
TANKS	NO.	GALLONS	POUNDS	GALLONS	POUNDS
MAIN (Nos. 1 & 4)	2	490	2940	492	2952
AUXILIARY (Nos. 1 & 4)	2	420	2520	421	2526
MAIN (Nos. 2 & 3)	2	500	3000	506	3036
AUXILIARY (Nos. 2 & 3)	2	360	2160	363	2178
FUSELAGE (SPECIAL INSTALLATION)	2	450	2700	453	2718

TOTAL USABLE FUEL WITHOUT FUSELAGE TANKS 3540 GALLONS = 21,240 POUNDS

TOTAL USABLE FUEL WITH FUSELAGE TANKS 4440 GALLONS = 26,640 POUNDS

Note: Level flight is assumed to be three degrees nose up

Figure 1-15

X1-210

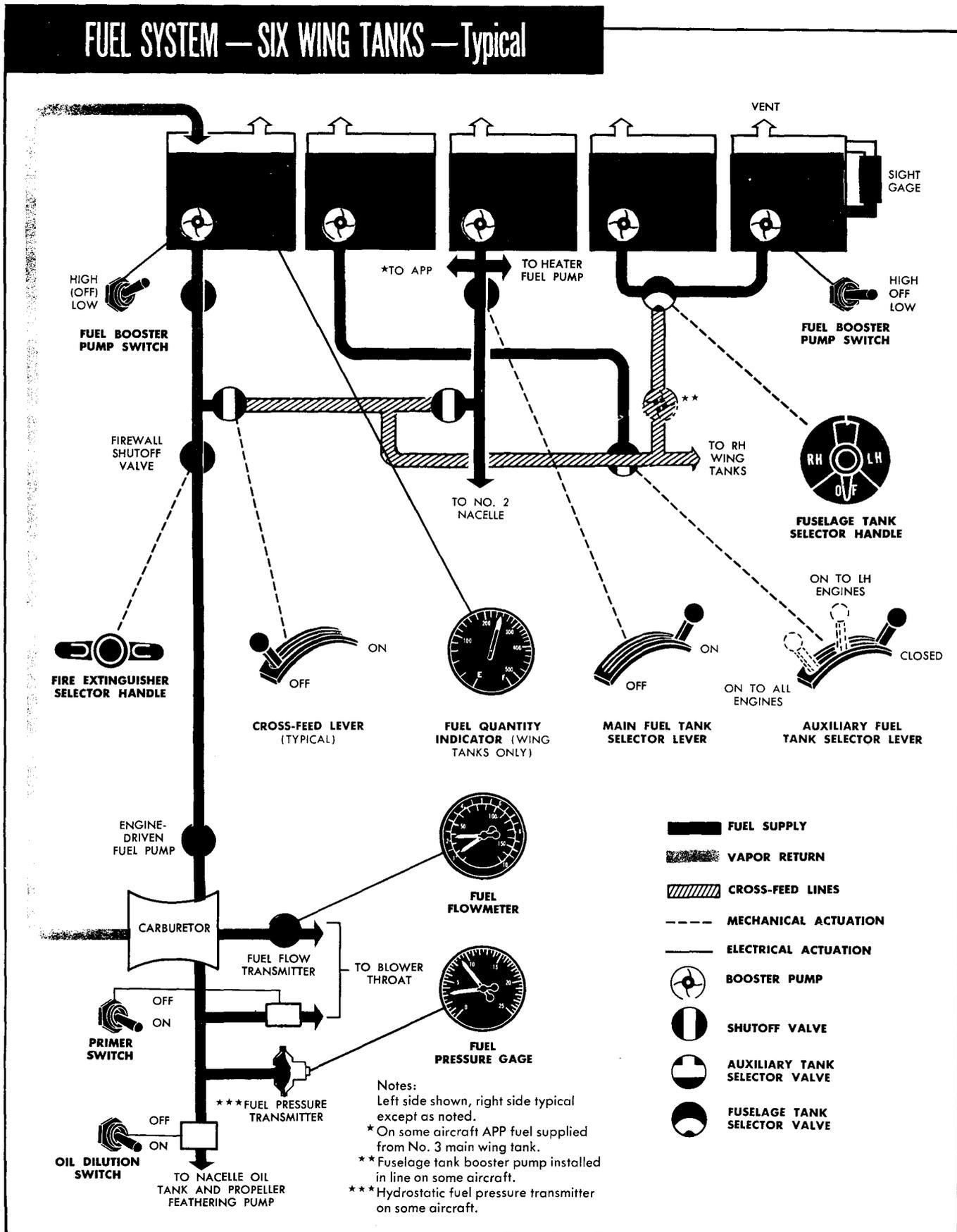


Figure 1-16

X1-127

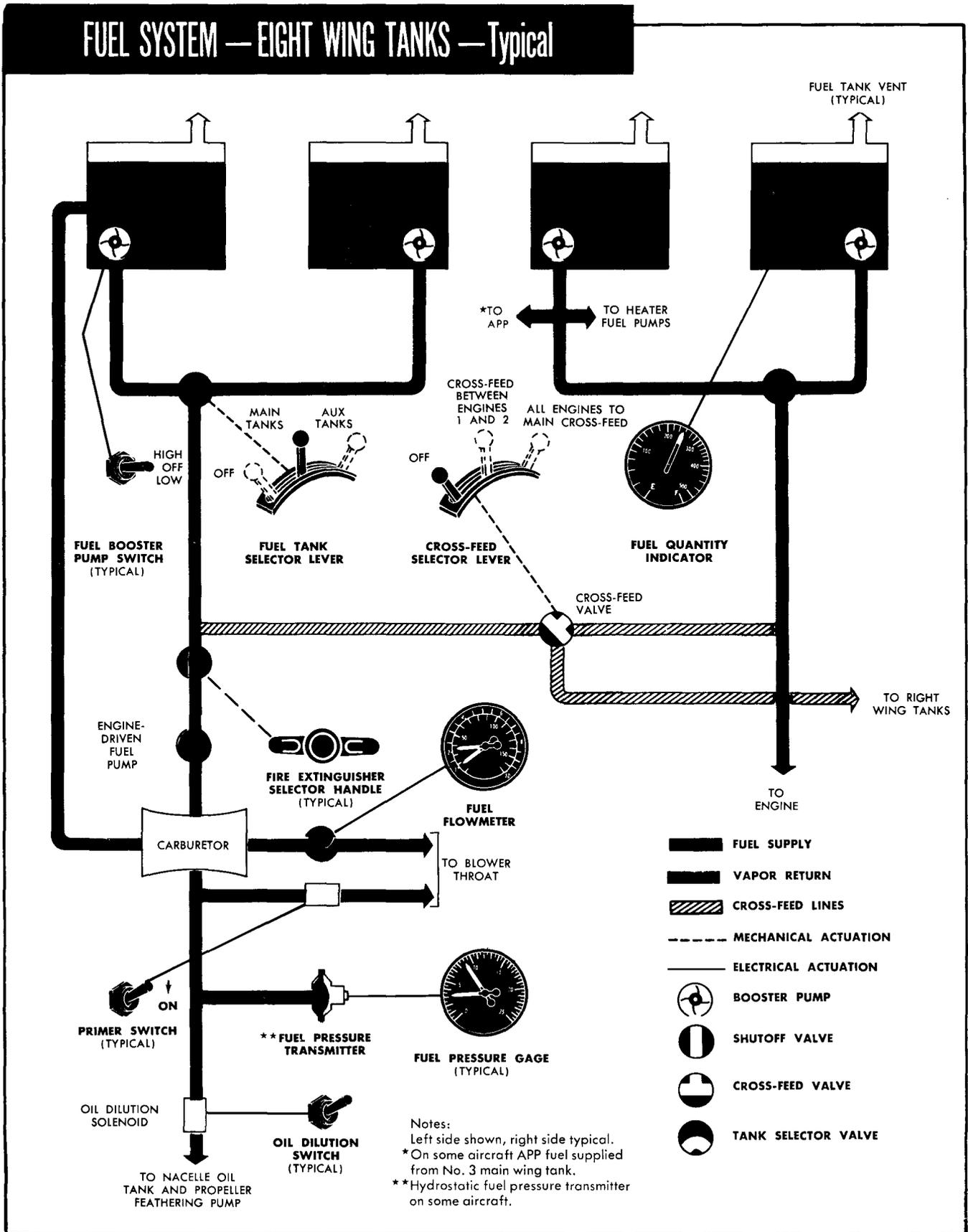


Figure 1-17

X1-128

FUEL SYSTEM FIREWALL SHUTOFF VALVES.

A cable-operated firewall shutoff valve, controlled by a handle (7, figure 1-29), located on the fire extinguisher system control panel, is installed on each nacelle firewall to shut off the flow of fuel forward of the firewall. (See the paragraph on extinguisher selector handles, this section.)

FUEL QUANTITY INDICATORS.

Five 28 volt dc fuel quantity indicators (24, figure 1-10) are located on the main instrument panel, one for each main fuel tank and one dual indicator for the two auxiliary fuel tanks. Fuel quantity in gallons is registered by float-type transmitters in each tank. Green dots on the face of the indicators indicate multiple fuel transmitters in each fuel tank. Each fuselage fuel tank is provided with a direct-reading fuel quantity sight gage which is mounted on the bulkhead at the forward end of the tank.

FUEL SYSTEM — EIGHT WING TANK.

The fuel system (figure 1-17) furnishes fuel for the engines, for the primers, for engine oil dilution, and for the combustion heaters. The system includes six integral wing tanks (four main and two auxiliary tanks), two collapsible (inboard) auxiliary wing tanks, eight electrically driven booster pumps, four engine-driven fuel pumps, four mechanically actuated firewall shutoff valves, fuel flowmeters, and pressure and quantity indicators. Refer to figures 1-15 and 1-30 for fuel quantities and grade. Fuel flow is from each main tank or each auxiliary tank directly to its respective engine or can be supplied into the crossfeed line. Each wing tank is provided with a filler neck, an overboard vent line, a water sump drain, a fuel level liquidometer, and a booster pump. A vapor vent return line is connected to each engine carburetor and is routed back to each respective main tank. It is possible for the rate of vapor or fuel return to be as great as 10 gph. Fuselage fuel tanks can be incorporated by special installation. See the paragraph on heating and ventilating systems, Section IV, for heater fuel supply.

FUEL TANK SELECTOR LEVERS.

Four 3-position fuel tank selector levers (1, figure 1-14) with AUX TANK ON, MAIN TANK ON, and OFF positions, are installed on the control pedestal in front of the pilot's throttle levers. Each lever mechanically controls the fuel flow from its respective main tank or auxiliary tank.

CROSSFEED SELECTOR LEVERS.

Two 3-position crossfeed selector levers (3, figure 1-14) are placarded as follows: ALL ENGINES TO MAIN CROSSFEED, CROSSFEED BETWEEN 1 & 2 (left lever), CROSSFEED BETWEEN 3 & 4 (right lever), and OFF. The selector levers are installed on the control pedestal and mechanically actuate their respective crossfeed selector valves.

FUEL BOOSTER PUMP SWITCHES.

Eight fuel booster pump switches (12, figure 1-11), with HIGH, OFF, and LOW positions, are mounted on the pilots' overhead panel. Each booster pump switch controls its respective booster pump in the four main tanks and the four auxiliary tanks. When these switches are in the LOW or HIGH position, a 28 volt dc circuit to each respective booster pump motor is closed to operate the pump. The booster pumps maintain 12 psi fuel pressure in low boost operation and 22 psi fuel **pressure in high boost operation. Refer to recommended use of fuel booster pumps, Section VII.**

FUEL SYSTEM FIREWALL SHUTOFF VALVES.

A cable-operated firewall shutoff valve, controlled by a handle (7, figure 1-29) located on the fire extinguisher system control panel, is installed on each nacelle firewall to shut off the flow of fuel forward of the firewall. (See the paragraph on fire extinguisher selector valve handles, this section.)

FUEL QUANTITY INDICATORS.

Six 28 volt dc fuel quantity indicators (24, figure 1-10) are located on the main instrument panel, one for each of the four main tanks, and two dual indicators for the four auxiliary tanks. Fuel quantity in gallons is registered by float-type transmitters in each tank. Green dots on the face of the indicators indicate multiple fuel transmitters in each tank. Each fuselage fuel tank is provided with a direct-reading fuel quantity sight gage which is mounted on the bulkhead at the forward end of the tank.

DC POWER SUPPLY.

The dc electric power supply system (figure 1-18) is a 24 to 28 volt direct current single-conductor system. Dc power is supplied by two, three, or four 300 ampere engine-driven generators, two 12 volt 88-ampere-hour storage batteries wired in series, and an auxiliary power plant (if installed). On the ground, power may be supplied from a battery cart or auxiliary power unit when plugged into the external power supply receptacle (18, figure 1-3). Each generator circuit includes a voltage regulator, a reverse current relay, and an overvoltage relay on circuit protector. The emergency alarm bell circuit is operated directly from the aircraft batteries (see Emergency Alarm System, this Section). Power is distributed to the dc electrically operated equipment by bus bars and feeder cables. In the event of failure of the generators, the dc equipment can be supplied by the aircraft batteries. Circuit protection is provided by circuit breakers and fuses (figure 1-21). (See the paragraph on the auxiliary power plant, Section IV.)

Note

Only the equipment essential for safe operation of the aircraft should be operated from the batteries in order to conserve the batteries.

MASTER BATTERY SWITCH.

The master battery switch (4, figure 1-11) is a 28 volt dc relay switch with ON and OFF positions. It is mounted on the top of the pilots' overhead panel. The ON-OFF positions of the switch serve to connect or disconnect the batteries to the main bus system of the aircraft through a 28 volt dc relay. Current from an external power supply actuates the ground power relay and automatically connects the external power receptacle to the main bus regardless of the position of the master battery switch. However, in case the external power supply is a battery cart, the master battery switch must be in the OFF position to prevent the aircraft battery current from discharging into the battery cart.

CAUTION

A minimum battery voltage of approximately 18 volts is required to close the battery relay. The battery relay must be closed before the generators can recharge the batteries.

GENERATOR SWITCHES (USAF C-54, EC-54, HC-54) AIRCRAFT.

Four guarded 3-position generator switches (25, figure 1-11), with ON, OFF, and RESET positions, are located to the right of the pilots' overhead panel. The ON-OFF positions of the switches are conventional in operation; the spring-loaded RESET position is for use in resetting a tripped generator relay.

GENERATOR SWITCHES (NAVY C-54 AIRCRAFT).

Two 2-position generator switches (25, figure 1-11) (four on some aircraft) are located on the pilots' overhead panel. Placing the switch in the ON (down) position closes a 28 volt dc circuit to connect the generator output to the main dc bus. When the switch is placed in the up position, the generator is disconnected from the main dc bus.

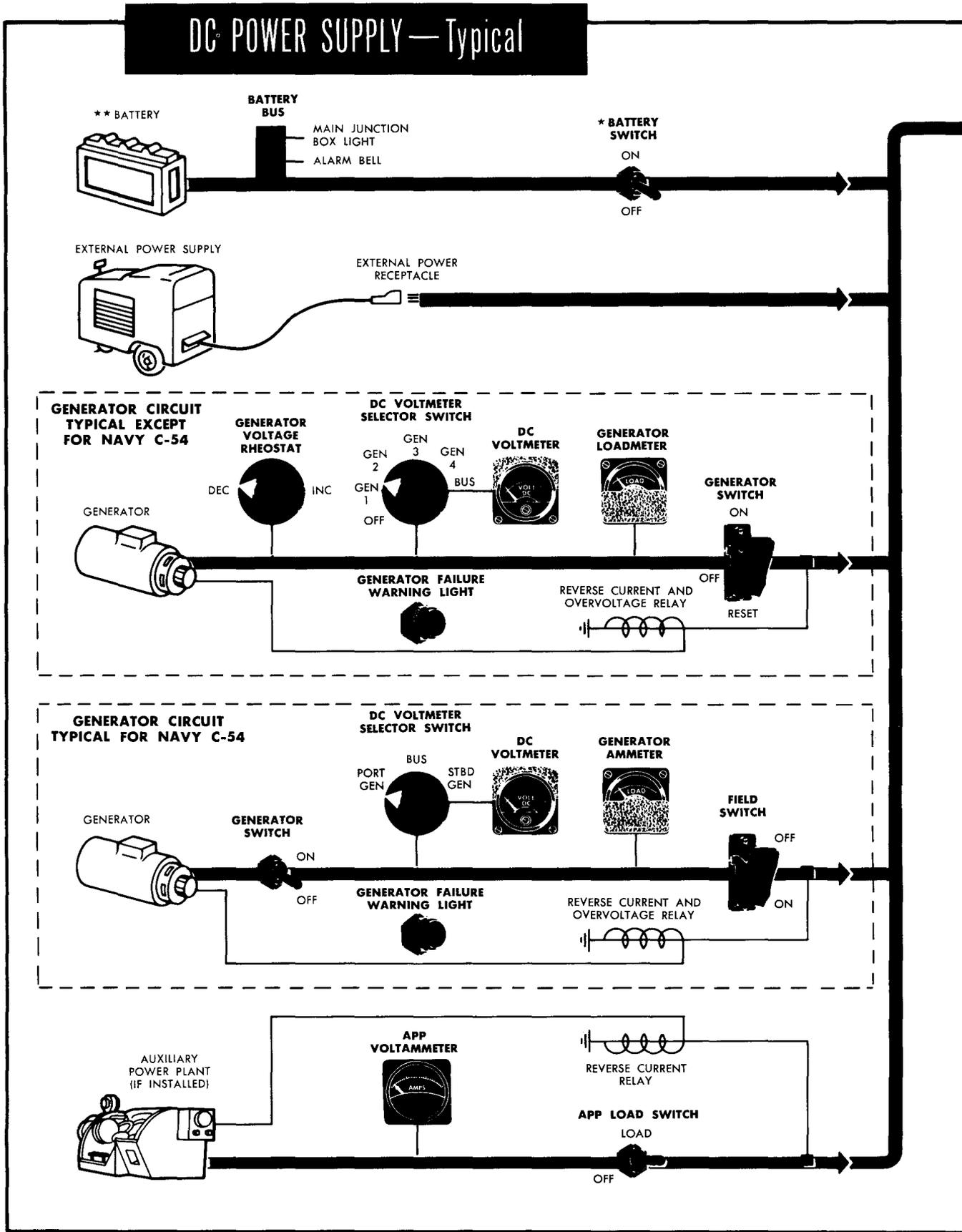


Figure 1-18 (Sheet 1 of 2)

X1-119

GENERATOR FIELD SWITCHES (NAVY C-54 AIRCRAFT).

Two (four on some aircraft) generator field switches (29, figure 1-11) located on the pilots' overhead panel are guarded to the ON position. Placing either switch in the up position serves to disconnect its respective generator from the main dc bus in the event of emergency of failure of the reverse current relay. The switches are placarded as follows:

CAUTION

GENERATORS ON INBOARD ENGINES. THROW FIELD SWITCHES TO "OFF" POSITION IN EMERGENCY ONLY.

DC VOLTMETER AND SELECTOR SWITCH.

A dc voltmeter and a selector switch (21 and 22, figure 1-11) are mounted on the pilots' overhead panel. The switch has the positions MAIN BUS, 1, 2, 3, and 4, and permits checking the voltage output of each engine-driven generator and the main bus. If no other source of electrical power is available to the bus, battery voltage may be read with the selector switch in the MAIN BUS position.

On Navy C-54 aircraft the switch has the positions PORT GEN, MAIN BUS, and STBD GEN, and permits checking the voltage output of each engine-driven generator and the main bus.

LOADMETERS (USAF C-54, EC-54, AND HC-54 AIRCRAFT).

Four generator loadmeters (24, figure 1-11), one for each engine-driven generator, are located on the pilots' overhead panel. The loadmeters indicate the amperage output of each generator in percentage of generator rated capacity i. e. 1.0 = 300 amps, 0.5 = 150 amps.

AMMETERS (NAVY C-54 AIRCRAFT).

Ammeters for generators on engines No. 2 and 3 (24, figure 1-11) are located on the pilots' overhead panel. Each ammeter indicates the amperage output of its respective engine-driven generator.

GENERATOR FAILURE WARNING LIGHTS.

Generator failure warning lights (23, figure 1-11) are located on the pilots' overhead panel. A light will come on when the respective generator reverse current relay opens or when an overvoltage condition (above 32 volts) exists. A generator failure warning light will come on only when the generator reverse current relay is opened and the generator switch is in the ON position. The warning lights are powered from the 28 volt dc bus.

EXTERNAL POWER SUPPLY RECEPTACLE.

A 3-prong, polarized, external power supply receptacle for 28-volt dc power (27, figure 1-3) is installed on the under surface of the fuselage aft of the nosewheel, and allows for the application of external power for starting engines or operating other equipment. An adapter for the receptacle, stowed in the nosewheel well, is provided for external power supplies other than standard U. S. made equipment.

CIRCUIT PROTECTORS.

Circuit breakers, circuit breaker switches, and fuses for the radios, radar, autopilot, navigational equipment, and lighting equipment are located on junction boxes and on circuit breaker panels as shown in figure 1-21. However, some fuses for panel lighting are located on the respective panels.

CAUTION

Under normal conditions, a circuit breaker should be pulled or a circuit breaker switch turned off only when it is necessary to isolate a system for maintenance.

AC POWER SUPPLY (USAF C-54 AND HC-54 AIRCRAFT).

The ac electrical power supply system is operated from the dc system to supply 115-volt 400-cycle ac power. On some aircraft four inverters are installed, two main (single-phase) inverters for the main ac bus and two autopilot (three-phase) inverters for the autopilot and the N-1 compass. A stepdown transformer is used to supply 26 volt ac power. For ac power distribution see figure 1-19.

MAIN (SINGLE-PHASE) INVERTER SWITCH.

The main inverter switch (1, figure 1-11) is located on the pilots' overhead panel. The switch is placarded NORMAL, OFF and EMERGENCY on C-54 aircraft, and MAIN, OFF and SPARE on HC-54 aircraft. In the event the normal inverter fails, the normal inverter failure light will come on and the emergency inverter may be used to supply 115 and 26 volt ac power (see figure 1-19). However, if the emergency inverter is used when the search radar is in operation, the search radar equipment will be automatically disconnected. Normally the emergency inverter supplies ac power to the search radar equipment when the inverter switch is in the NORMAL (MAIN) position, and the radar function switch is in any position other than OFF. The inverter switch receives power from the 28 volt dc bus through circuit breakers in the main junction box (12, figure 1-21).

MAIN (SINGLE-PHASE) INVERTER FAILURE LIGHT.

A red press-to-test, main inverter failure light (37, sheet 3 and 34, sheet 5, figure 1-11) is located on the pilots' overhead panel. The light comes on when either the main or spare inverter voltage to the main ac bus falls below 90 volts. The light receives power from the 28 volt dc bus.

AUTOPILOT (THREE-PHASE) INVERTER SWITCH (SOME AIRCRAFT).

The autopilot inverter switch (45, sheet 3 and 33, sheet 5, figure 1-11) is located on the pilots' overhead panel. The switch has the placarded positions, MAIN, OFF, and SPARE. In the event of failure of the main three-phase inverter, the inverter failure light will come on and the spare inverter may be used. Power to the switch is provided through circuit breakers in the main junction box.

AUTOPILOT (THREE-PHASE) INVERTER FAILURE LIGHT (SOME AIRCRAFT).

A red press-to-test, autopilot inverter failure light (46, sheet 3, 33 sheet 5, figure 1-11) is located on the pilots' overhead panel. The light comes on when the main or spare autopilot inverter is not furnishing power to the ac bus. The light receives power from the 28 volt dc bus.

AC VOLTMETER AND AC FREQUENCY METER (SOME AIRCRAFT).

An ac voltmeter and an ac frequency meter are located on the cabin heater control panel (figure 4-3). The voltmeter indicates ac voltage of the inverters as selected by the ac monitor selector switch. The ac frequency meter indicates the output frequency in cycles per second of the inverters as selected by the ac monitor selector switch. The ac voltmeter and ac frequency meter receive 115-volt ac power through the ac monitor selector switch.

AC POWER SUPPLY—Typical

USAF C-54, HC-54 AND TC-54

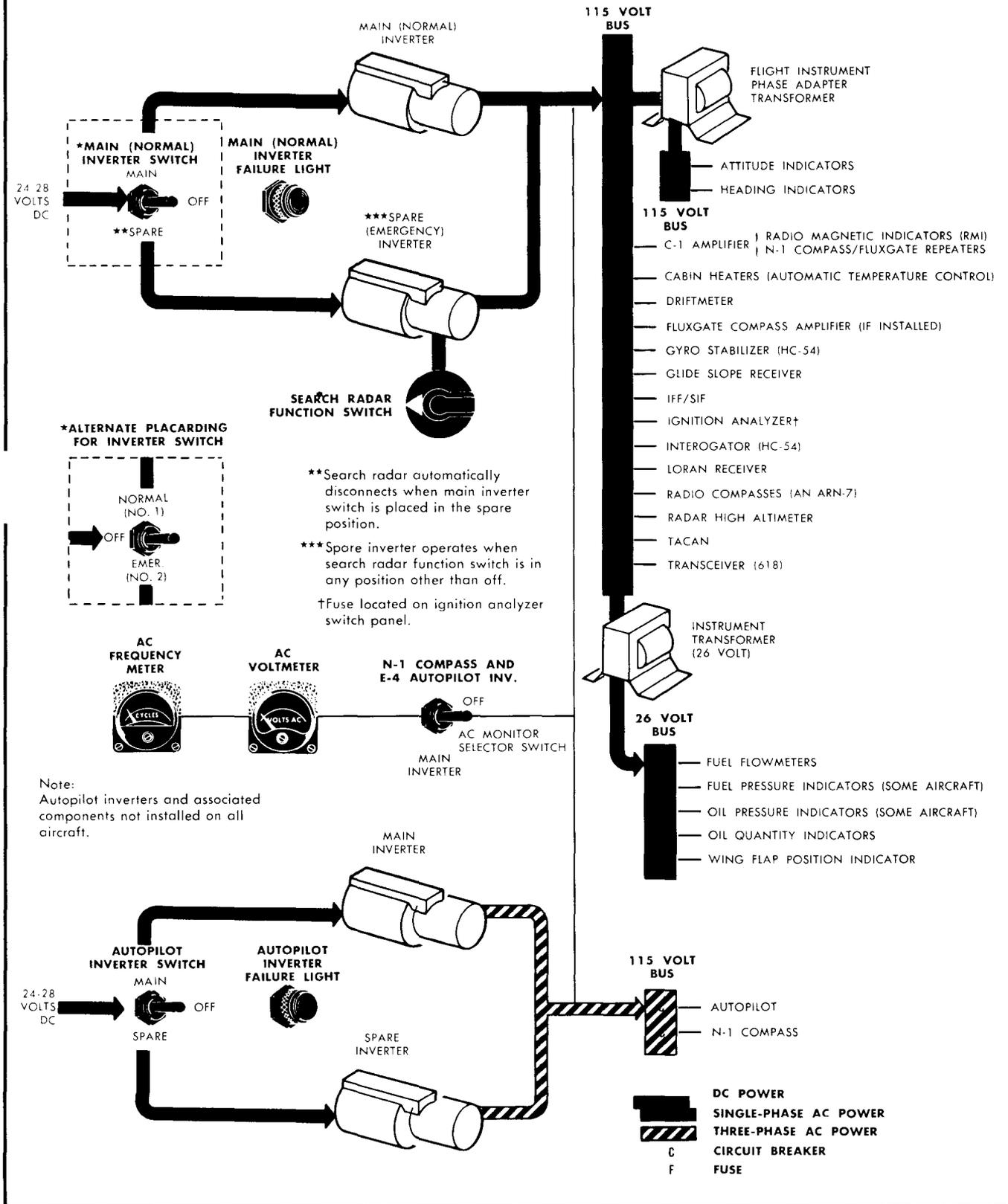


Figure 1-19 (Sheet 1 of 4)

X1-224

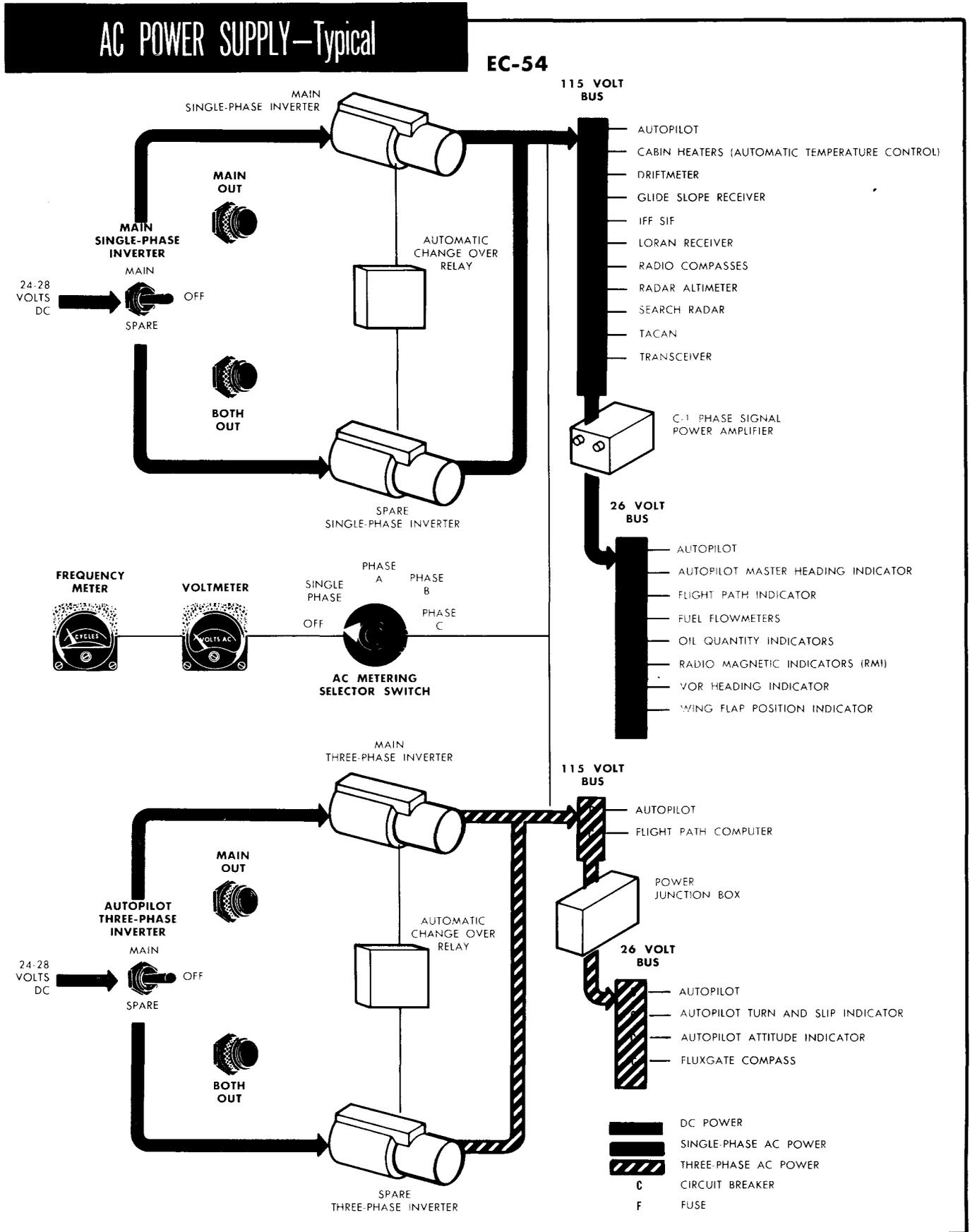


Figure 1-19 (Sheet 2 of 4)^f

X1-225

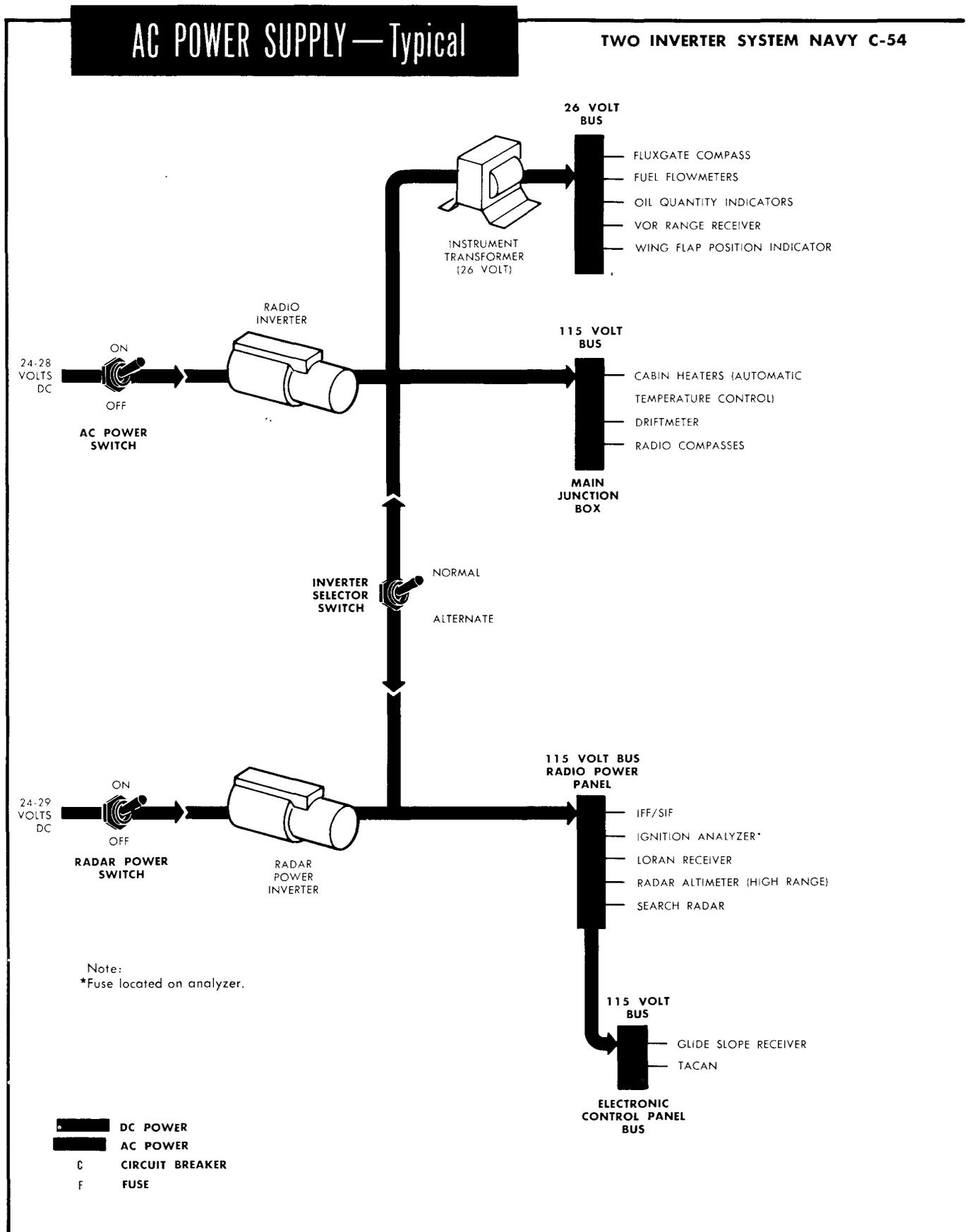


Figure 1-19 (Sheet 3 of 4)

X1-226

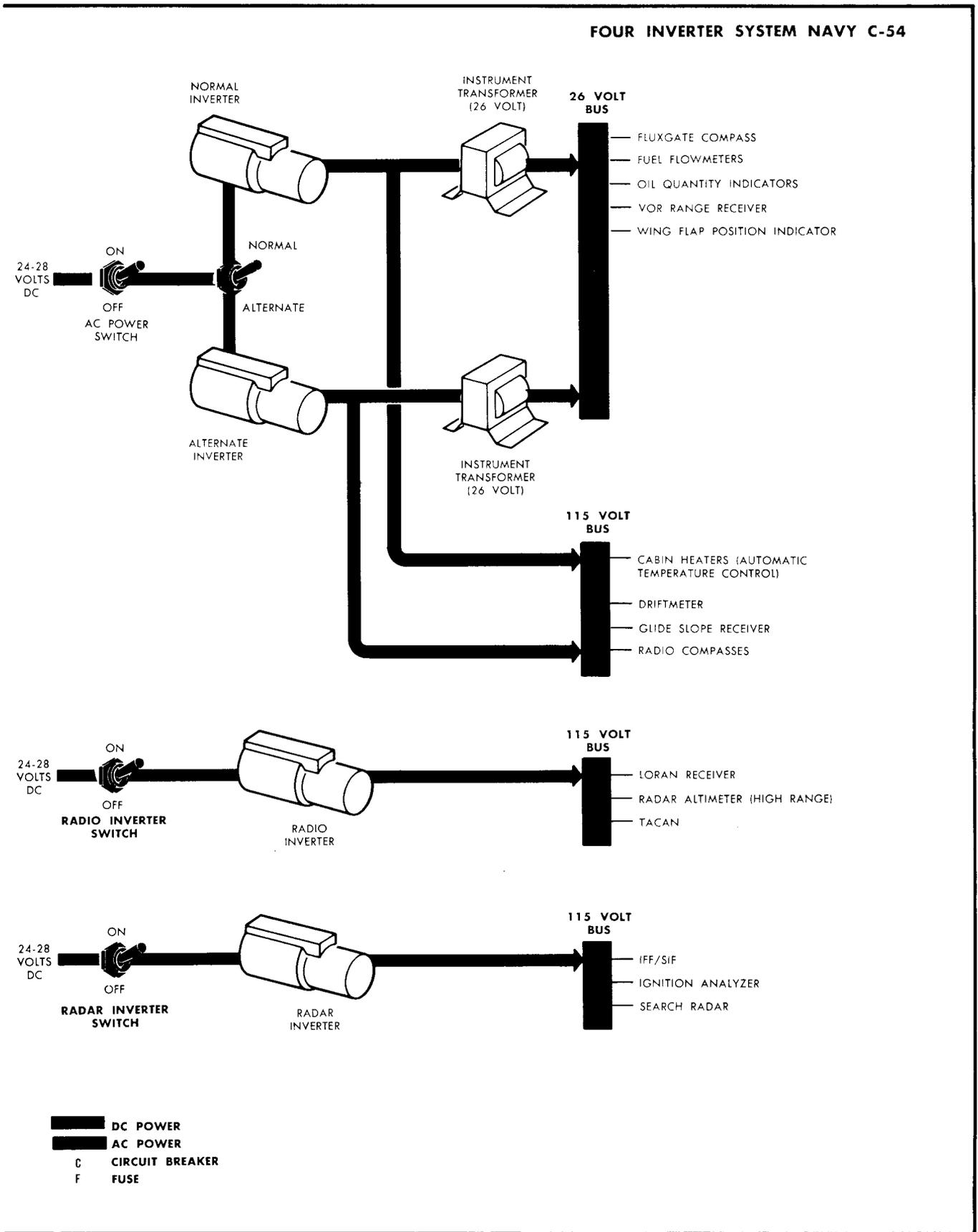


Figure 1-19 (Sheet 4 of 4)

X1-227

Figure 1-20. Deleted

AC MONITOR SELECTOR SWITCH (SOME AIRCRAFT).

An ac monitor selector switch, with N-1 COMPASS AND E-4 AUTOPILOT INV and MAIN INVERTER positions, is located on the cabin heater control panel (figure 4-3). The switch is used to select either inverter system for monitoring by the ac voltmeter and the ac frequency meter. The ac monitor selector switch receives 115-volt ac power through a fuse in the main junction box and directly from the autopilot inverters, depending on the position of the selector switch.

AC POWER SUPPLY (EC-54 AIRCRAFT).

The aircraft is equipped with single and three-phase inverters, located in the lower forward cargo compartment, which supply 115 volt alternating current. Single-phase ac power is supplied by a circuit containing a main and a spare inverter, an inverter switch, an automatic changeover relay, a frequency meter, a voltmeter, and ac metering selector switch, and two inverter warning lights. The frequency meter, voltmeter, and ac metering selector switch are also employed when three-phase ac power is used. Either the main or spare inverter may supply power to the ac bus, but both inverters will not operate simultaneously. The main inverter is normally selected, however, in event of failure of the main inverter, the spare inverter is automatically turned on and connected to the bus. If the spare inverter is being operated and fails, the main inverter will not be automatically turned on. Failure of either or both inverters is indicated by the illumination of warning lights on the upper instrument panel. The inverters operate from the 24-28 volt dc bus. A blower is installed for ground cooling of the inverters. The blower is energized when the single-phase inverter switch is turned on. The blower is automatically turned off when the landing gear is retracted. Three-phase ac power is supplied by a circuit containing a main inverter, a spare inverter, an inverter switch, an automatic changeover relay, a frequency meter, a voltmeter, an ac metering selector switch, and two inverter warning lights. The frequency meter, voltmeter,

and ac metering selector switch are also employed in supplying single-phase ac power. The operation of the three-phase inverters and controls are identical to that of the single-phase system except for blower operation. Three-phase operation has no effect on the blower.

Certain instruments require 26 volt ac power. This is supplied by the single-phase inverter through the type C-1 compass signal power amplifier. (See sheet 2, figure 1-19).

MAIN SINGLE-PHASE INVERTER SWITCH (EC-54 AIRCRAFT).

The main single-phase inverter switch (1, sheet 6, figure 1-11) is located on the pilots' overhead panel. The switch has the placarded positions MAIN, OFF and SPARE, and is used to control the single-phase inverters. When the switch is turned to the desired position, both the inverter and blower are energized. When the main inverter is operating and fails, with the inverter switch in the MAIN position, the spare inverter is automatically turned on and connected to the ac bus. However, if the inverter switch is in the SPARE position and the spare inverter fails, the main inverter will not be turned on automatically. The inverter switch must be manually placed in the MAIN position. Power for the inverters is supplied from the 28 volt dc bus.

AUTOPILOT THREE-PHASE INVERTER SWITCH (EC-54 AIRCRAFT).

The autopilot three-phase inverter switch (50, sheet 6, figure 1-11) is located on the pilots' overhead panel. The switch has the placarded positions and is used to control the three-phase inverters. The switch is marked AUTOPILOT THREE-PHASE INVERTER and operates the same as the single-phase inverter switch; however, the three-phase inverter switch has no control over the blower. When the main inverter is operating and fails, with the inverter switch in the MAIN position, the spare inverter is automatically turned on and connected to the ac bus. However, if the inverter switch is in the SPARE position and

the spare inverter fails, the main inverter will not be turned on automatically. The inverter switch must be manually placed in the MAIN position. Power to the inverters is supplied from the 28 volt dc bus.

AC METERING SELECTOR SWITCH (EC-54 AIRCRAFT).

An ac metering selector switch (46, sheet 6, figure 1-11) is mounted on the upper instrument panel. The switch positions are OFF, SINGLE-PHASE, PHASE A, PHASE B, and PHASE C. Frequency and voltage output of the single-phase and three-phase inverters may be checked by positioning this switch.

AC VOLTMETER AND FREQUENCY METER (EC-54 AIRCRAFT).

An ac voltmeter and a frequency meter (45 and 47, sheet 6, figure 1-11) are mounted on the upper instrument panel. The meters indicate the voltage and frequency of either the single-phase or three-phase inverters, depending on the position of the ac metering selector switch.

MAIN SINGLE-PHASE INVERTER FAILURE LIGHTS (EC-54 AIRCRAFT).

Two red single-phase, inverter failure warning lights (49, sheet 6, figure 1-11) are located on the pilots' overhead panel. One light is placarded MAIN OUT and will come on whenever a failure of the main inverter causes a change-over to the spare inverter. The other light placarded BOTH OUT will come on when the inverter switch is in either MAIN or SPARE position and both inverters are inoperative. The lights are powered from the 28 volt dc bus.

AUTOPILOT THREE-PHASE INVERTER FAILURE LIGHTS (EC-54 AIRCRAFT).

Two red three-phase, inverter failure warning lights (51, sheet 6, figure 1-11) are lo-

cated on the pilots' overhead panel. The placard markings, function and operation is identical to that of the single-phase inverter failure lights.

AC POWER SUPPLY (NAVY C-54 AIRCRAFT).

The ac electrical power supply system is operated from the dc system to supply 115 volt, 400 cycle, ac power and 26 volt ac power. Most aircraft are provided with a two-inverter system (see sheet 3, figure 1-19) consisting of a radio inverter and a radar power inverter. The radar power inverter is installed in all aircraft whether radar is installed or not. In the two-inverter system, the radar power inverter is a standby source of ac power in the event of failure of the radio inverter. The remaining Navy C-54 aircraft are provided with a four-inverter installation (see sheet 4, figure 1-19), consisting of normal and alternate instrument inverters in addition to the radio and radar power inverters.

INVERTER SELECTOR SWITCH (NAVY C-54 AIRCRAFT).

A 2-position inverter selector switch, with the placarded positions NORMAL INVERTER and ALTERNATE INVERTER, is located adjacent to the cabin heater control panel on the main junction box (figure 4-4). Placing the switch in NORMAL INVERTER or ALTERNATE INVERTER position selects the inverter which will furnish power to the ac bus when the ac power switch is in the ON position. In the two-inverter installation, the NORMAL INVERTER position selects the radio inverter and the ALTERNATE INVERTER position selects the radar power inverter.

AC POWER SWITCH (NAVY C-54 AIRCRAFT).

A 2-position ac power switch (1, figure 1-11), with the placarded positions ON and OFF, is located on the pilots' overhead panel. Placing the switch in the ON position closes a 28 volt dc circuit to connect the inverter selected on the inverter selector switch to the ac bus.

Placing the switch in the OFF position opens the circuit and disconnects the inverter from the bus. When an alternate inverter is not installed, the ac power switch energizes the normal inverter regardless of the inverter selector switch position.

RADAR POWER SWITCH (NAVY C-54 AIRCRAFT).

A 2-position radar power switch, located on the main junction box above the cabin heater control panel (figure 4-4), has the placarded positions ON and OFF. Placing the switch in the ON position completes a 28 volt dc circuit to the radar power inverter.

RADIO INVERTER SWITCH (NAVY C-54 AIRCRAFT).

A 2-position radio inverter switch, located adjacent to the cabin heater control panel on the main junction box, has ON and OFF positions. When the switch is in the ON position, a 28 volt dc circuit is completed to energize the radio inverter.

ELECTRICAL POWER SOURCES.

The following lists indicate the power source for installed electrical equipment (see figures 1-18, 1-19 and 1-21).

DC OPERATED EQUIPMENT.

Anti-Icing and Deicing.

- Airscoop deicing elements
- Carburetor and windshield deicing pump motor
- Pitot heaters
- Propeller anti-icing pumps
- Carburetor and windshield deicing valves
- Wing and empennage deicing distributor valve

Communications and Navigation.

- Antenna reel (if installed)
- Interphone system
- Liaison radio
- Low frequency range receiver (if installed)
- Marker beacon
- Radio low altimeter
- Radio compass (AN/ARA-6)
- UHF command radio
- UHF homing adapter
- VHF command radio
- VHF homing adapter (HC-54)

Engine Instruments and Controls .

- Carburetor air temperature indicator
- Engine primer and starting systems
- Fire detection system
- Fuel booster pumps
- Oil dilution system
- Oil temperature indicators
- Propeller feathering pumps

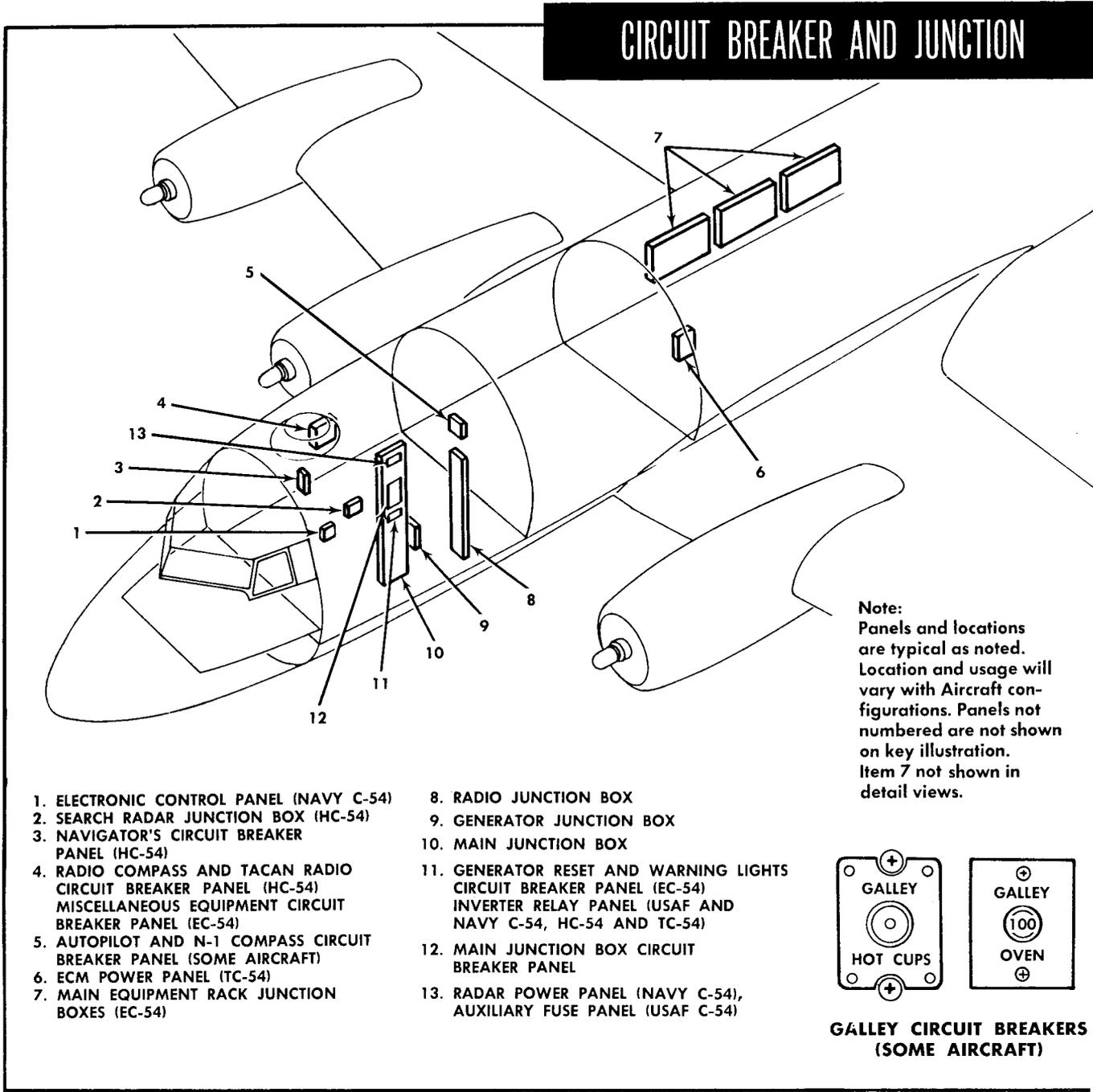
Flight Instruments.

- Copilot's turn and slip indicator (some aircraft)

Exterior Lighting.

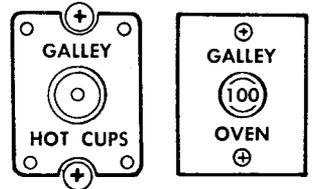
- Landing lights and landing light motors
- Anticollision light
- Navigation lights
- Taxi lights (Navy C-54)

CIRCUIT BREAKER AND JUNCTION



Note:
Panels and locations are typical as noted. Location and usage will vary with Aircraft configurations. Panels not numbered are not shown on key illustration. Item 7 not shown in detail views.

- | | |
|--|---|
| <ul style="list-style-type: none"> 1. ELECTRONIC CONTROL PANEL (NAVY C-54) 2. SEARCH RADAR JUNCTION BOX (HC-54) 3. NAVIGATOR'S CIRCUIT BREAKER PANEL (HC-54) 4. RADIO COMPASS AND TACAN RADIO CIRCUIT BREAKER PANEL (HC-54) 5. AUTOPILOT AND N-1 COMPASS CIRCUIT BREAKER PANEL (SOME AIRCRAFT) 6. ECM POWER PANEL (TC-54) 7. MAIN EQUIPMENT RACK JUNCTION BOXES (EC-54) | <ul style="list-style-type: none"> 8. RADIO JUNCTION BOX 9. GENERATOR JUNCTION BOX 10. MAIN JUNCTION BOX 11. GENERATOR RESET AND WARNING LIGHTS CIRCUIT BREAKER PANEL (EC-54) 12. MAIN JUNCTION BOX CIRCUIT BREAKER PANEL 13. RADAR POWER PANEL (NAVY C-54), AUXILIARY FUSE PANEL (USAF C-54) |
|--|---|



GALLEY CIRCUIT BREAKERS (SOME AIRCRAFT)

Figure 1-21 (Sheet 1 of 7)

X1-229

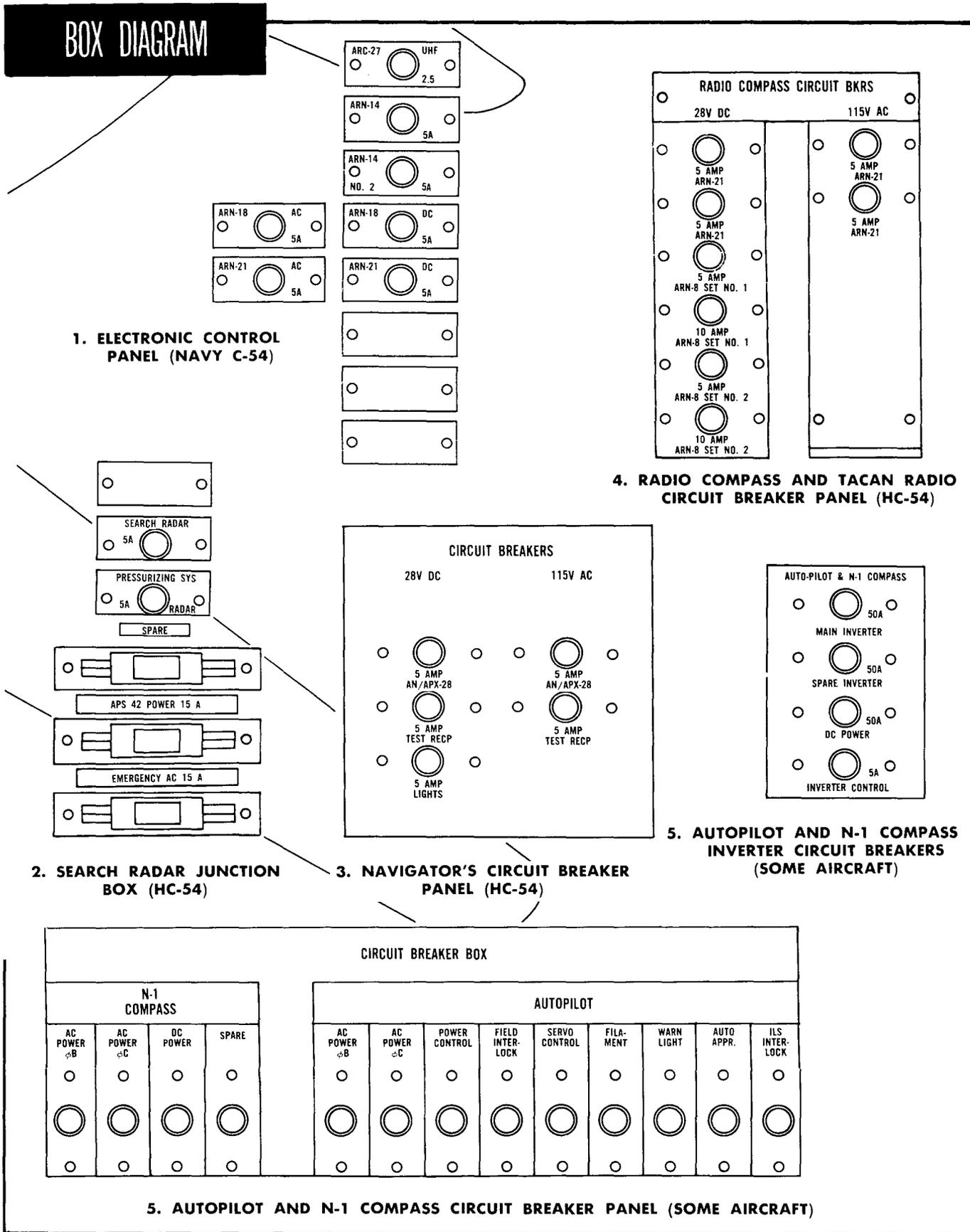
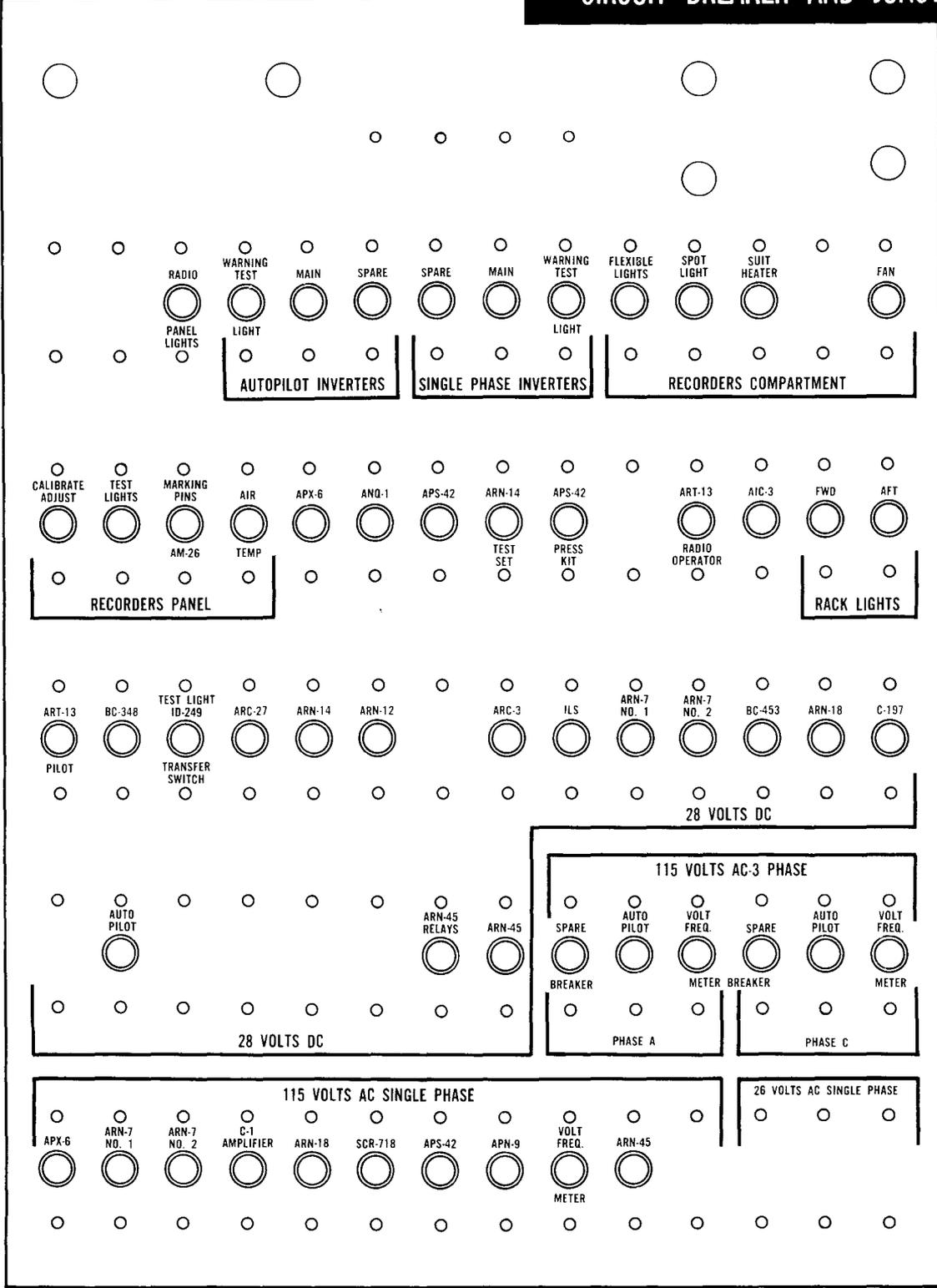


Figure 1-21 (Sheet 2 of 7)

CIRCUIT BREAKER AND JUNCTION

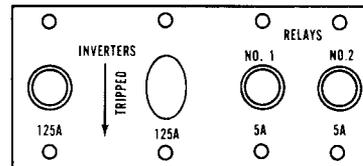
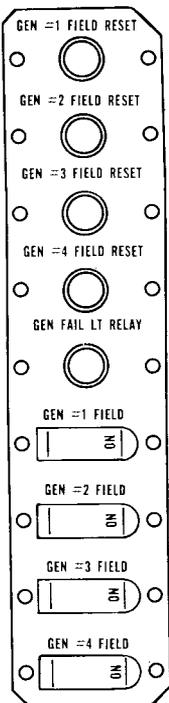
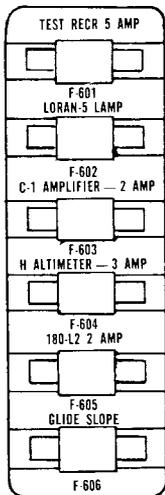


4. MISCELLANEOUS EQUIPMENT CIRCUIT BREAKER PANEL (EC-54)

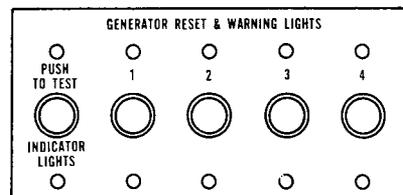
Figure 1-21 (Sheet 3 of 7)

X1-231

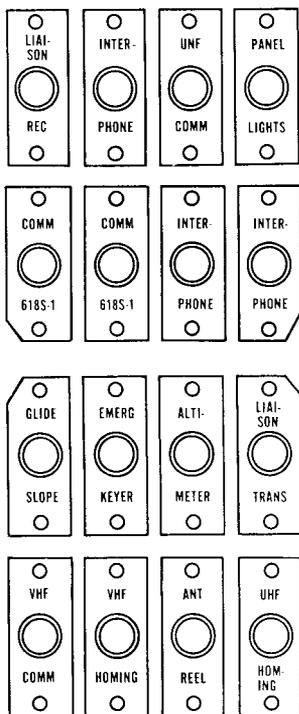
BOX DIAGRAM



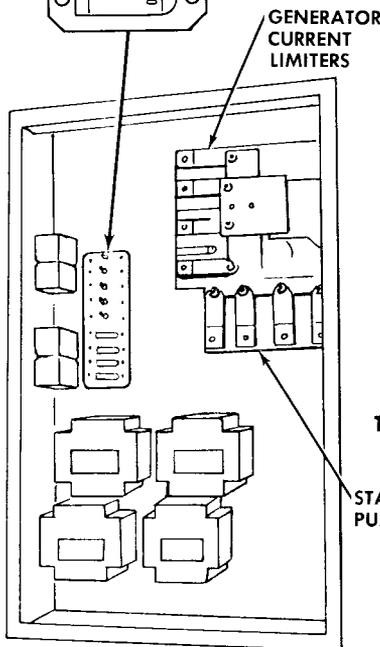
11. INVERTER RELAY PANEL (TYPICAL)



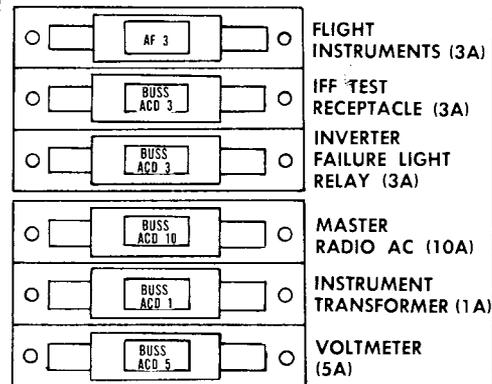
11. GENERATOR RESET & WARNING LIGHTS CIRCUIT BREAKERS (EC-54)



8. RADIO JUNCTION BOX CIRCUIT BREAKERS (TYPICAL)

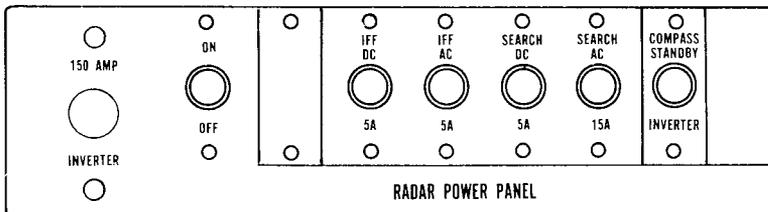
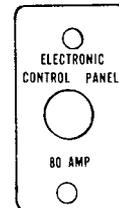


9. GENERATOR JUNCTION BOX (TYPICAL)



13. AUXILIARY FUSE PANEL (USAF C-54)

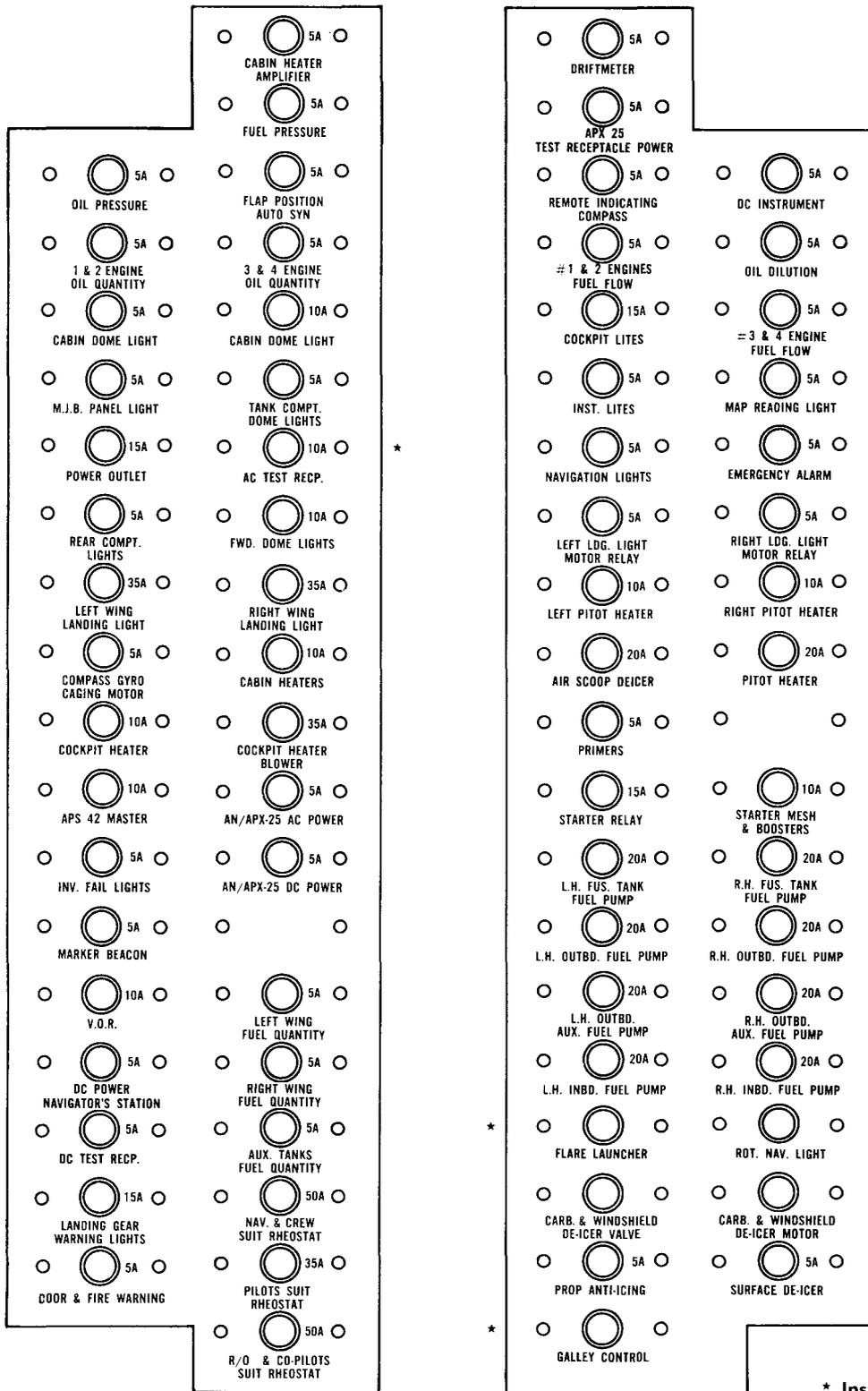
STARTER AND FEATHERING PUMP CURRENT LIMITERS



13. RADAR POWER PANEL (NAVY C-54)

Figure 1-21 (Sheet 4 of 7)

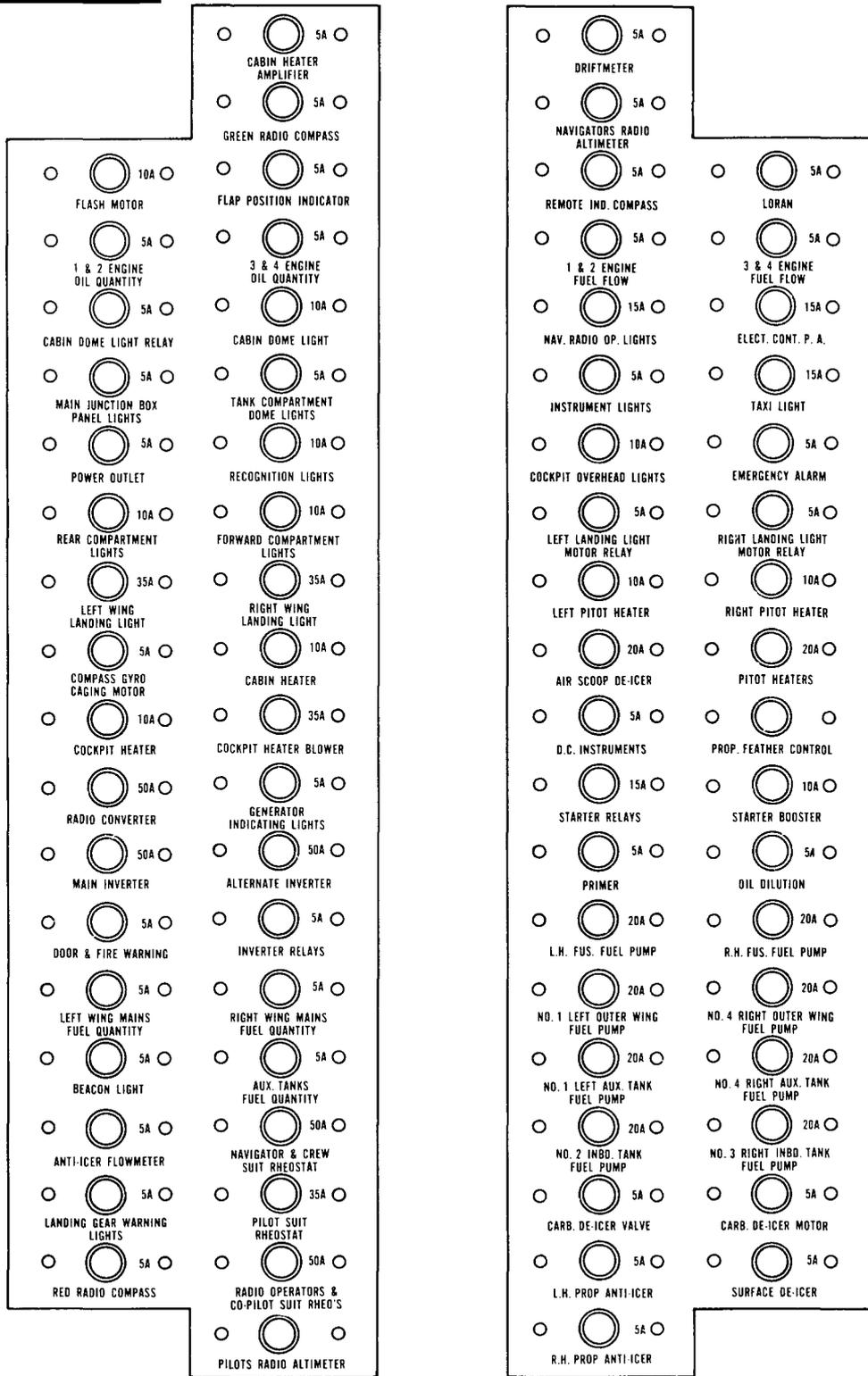
CIRCUIT BREAKER AND JUNCTION



12. MAIN JUNCTION BOX CIRCUIT BREAKER PANEL (TYPICAL EXCEPT NAVY C-54)

* Installed on HC-54

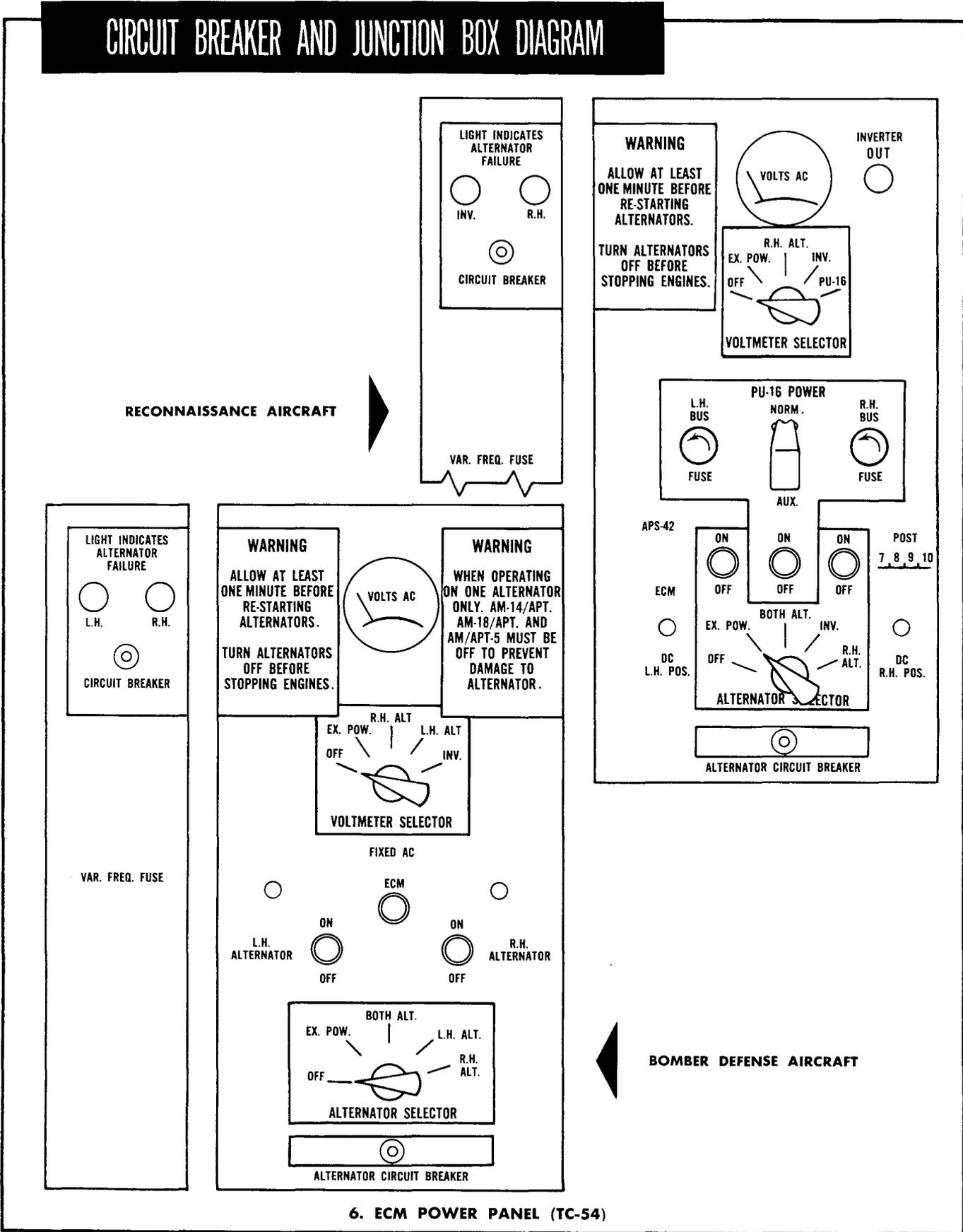
BOX DIAGRAM



**12. MAIN JUNCTION BOX CIRCUIT BREAKER
PANEL (TYPICAL NAVY C-54)**

Figure 1-21 (Sheet 6 of 7)

CIRCUIT BREAKER AND JUNCTION BOX DIAGRAM



6. ECM POWER PANEL (TC-54)

Figure 1-21 (Sheet 7 of 7)

Xi-343

Interior Lighting.

Pilots' compartment, crew compartment,
and cabin lights

Instrument panel lights

Work table lights

Warning lights (landing gear, inverters,
door open, fire detection, generator, anti-
skid, etc.)

Miscellaneous Equipment and Quantity
Indicators.

Alarm bell

Anti-icing fluid quantity gage

Auxiliary oil tank pump

Brake anti-skid system (HC-54)

Buffet (Galley)

Cargo winch outlet

Dc recording milliammeter (EC-54)

Flare launcher (HC-54)

Free air temperature indicator

Fuel quantity indicators

Heater ground blower

Hydraulic reservoir quantity indicator (if
installed)

Inverters

Nose heater

Suit heater rheostats

Wire recorder (EC-54)

AC OPERATED EQUIPMENT.

Communications and Navigation.

Driftmeter

Heading indicators

Glideslope receiver

Loran receiver

Radio magnetic indicators

Radar altimeter

Instruments.

Attitude indicators

Fuel flowmeters

Fuel pressure indicators

Oil pressure indicators

Oil quantity indicators

Wing flap position indicators

AC AND DC OPERATED EQUIPMENT.

Communications and Navigation.

Fluxgate compass caging motor (if in-
stalled)

Gyro stabilizer (HC-54)

~~IFF/SIF~~ AIMS/IFF ⁰⁵⁻¹⁴
_{sec. 3-A}

Interrogator (HC-54)

N-1 compass (if installed)

Radio compass (AN/ARN-7)

Search radar

Tacan

Transceiver

HYDRAULIC SYSTEM — WITH BRAKE PRIORITY VALVE

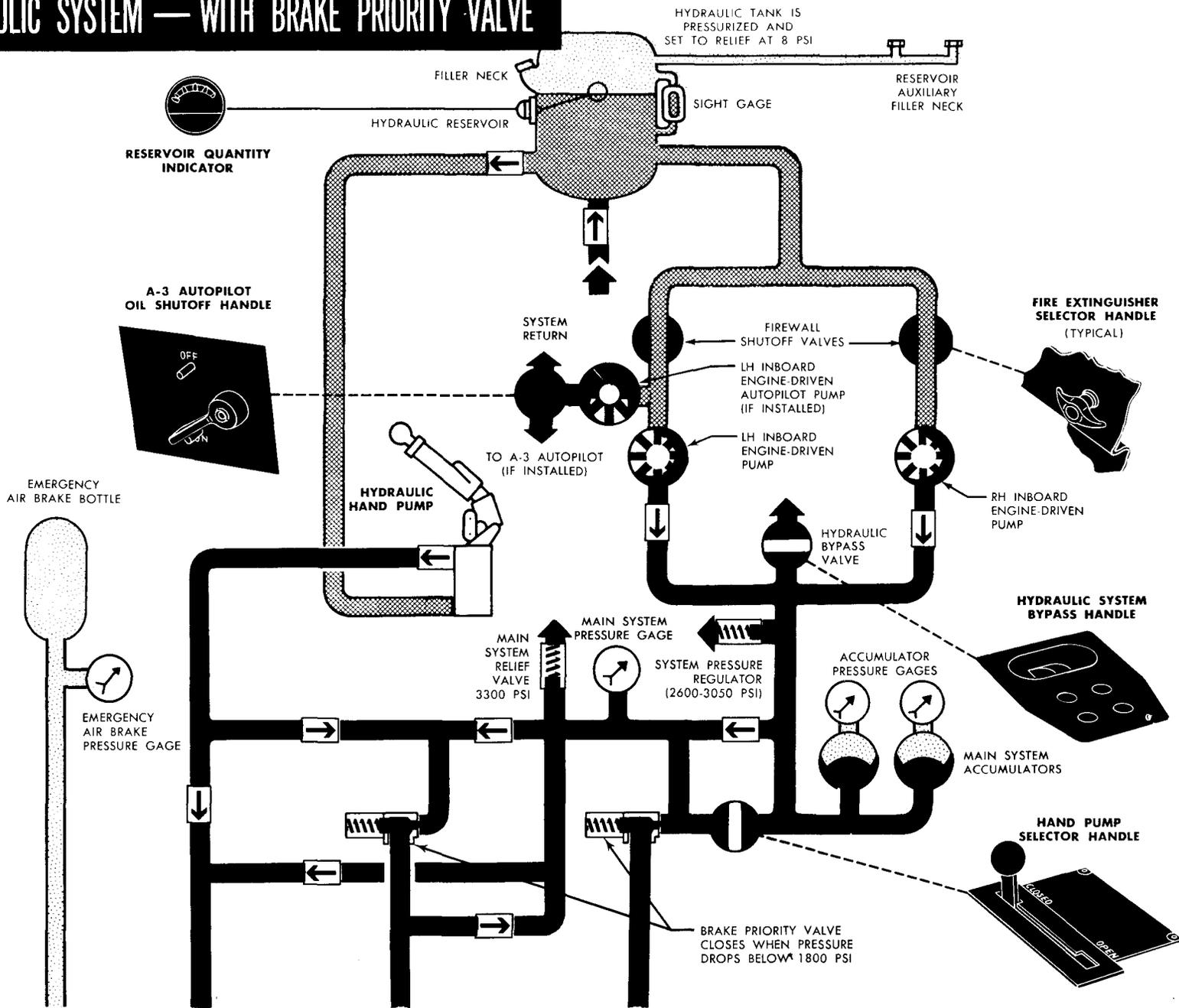
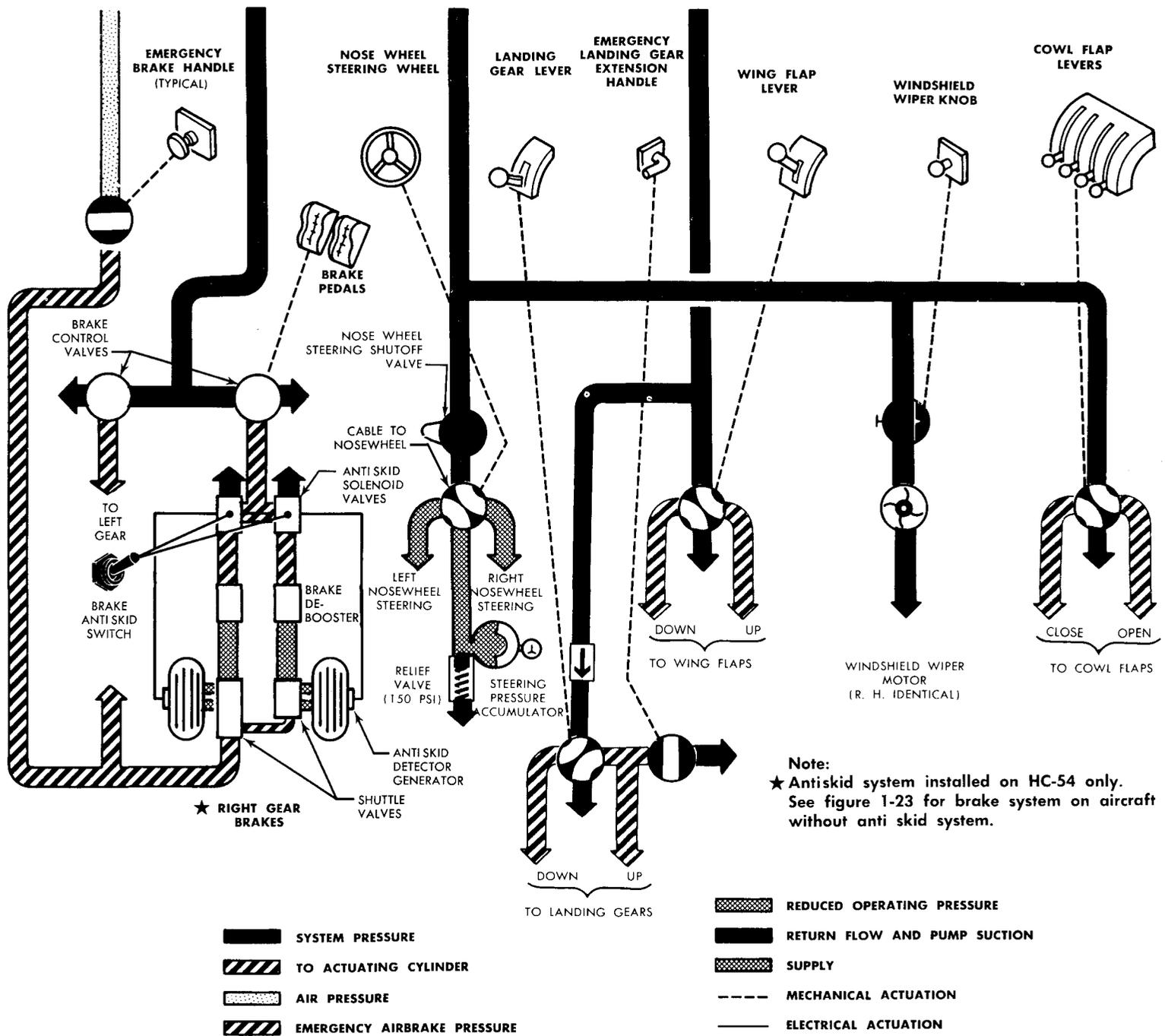


Figure I-22 (Sheet 1 of 2)



Note:
 ★ Antiskid system installed on HC-54 only.
 See figure 1-23 for brake system on aircraft without anti skid system.

- SYSTEM PRESSURE
- TO ACTUATING CYLINDER
- AIR PRESSURE
- EMERGENCY AIRBRAKE PRESSURE
- REDUCED OPERATING PRESSURE
- RETURN FLOW AND PUMP SUCTION
- SUPPLY
- MECHANICAL ACTUATION
- ELECTRICAL ACTUATION

Figure 1-22 (Sheet 2 of 2)

HYDRAULIC SYSTEM — WITH BRAKE ACCUMULATOR

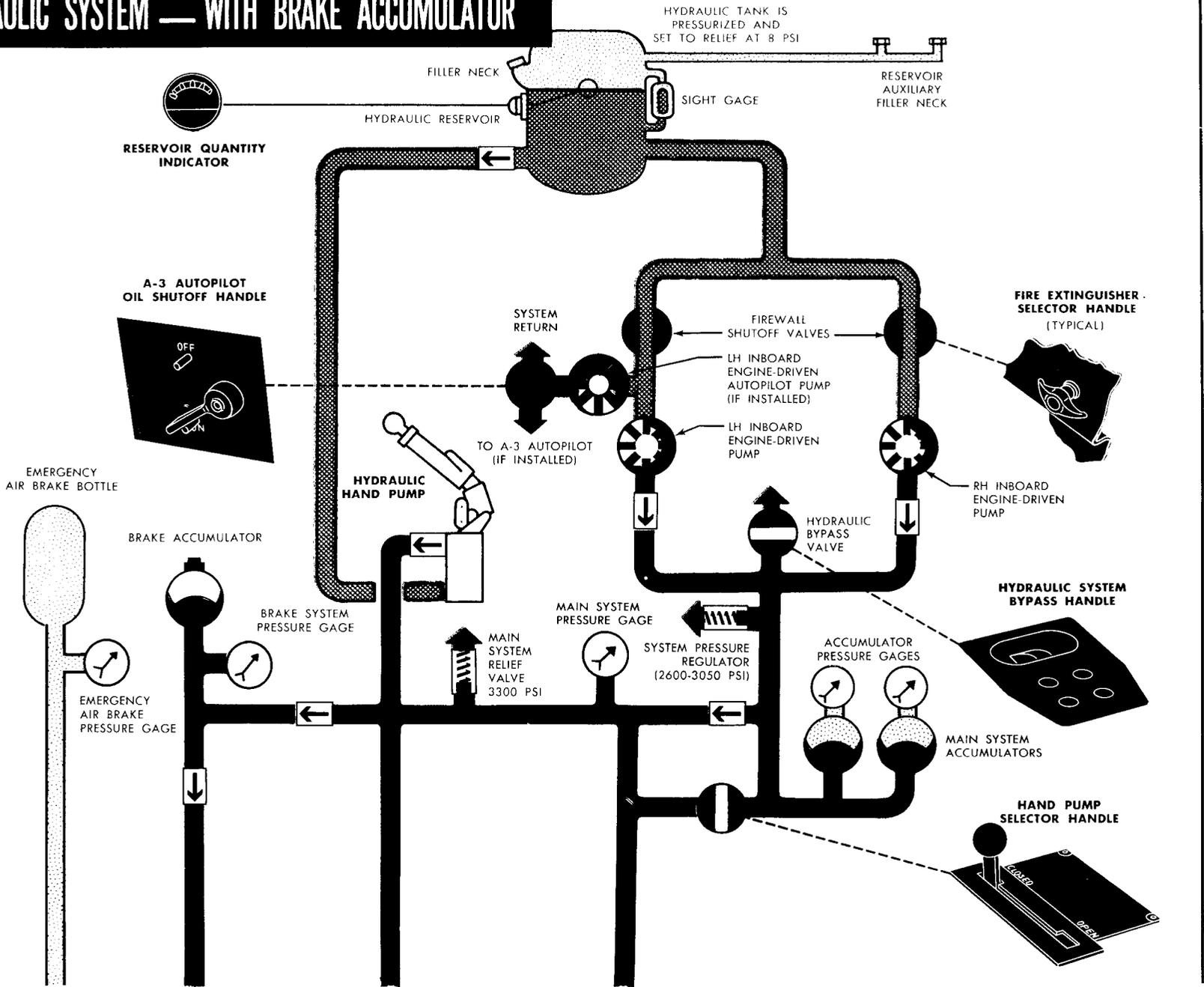


Figure 1-23 (Sheet 1 of 2)

X1-115

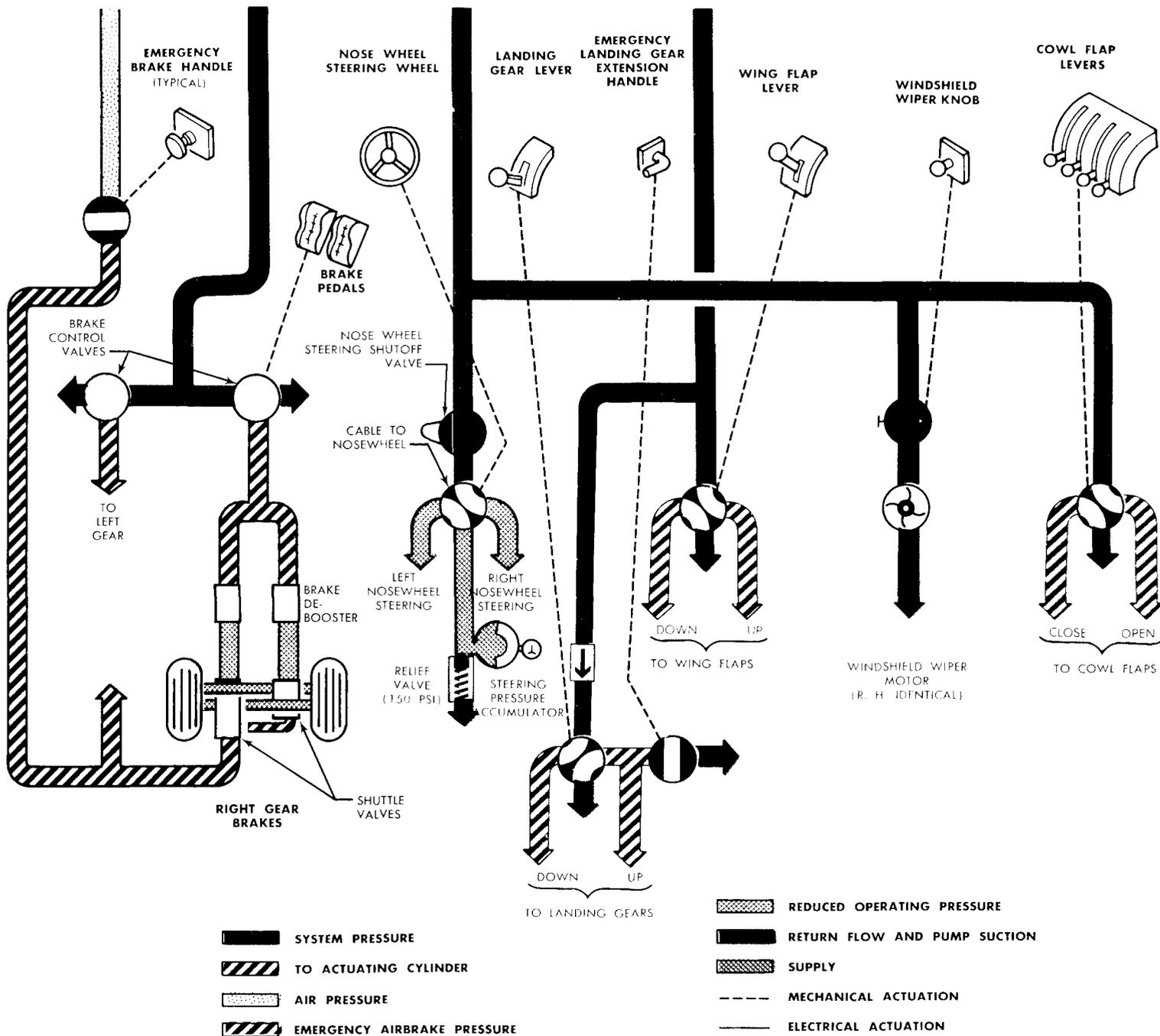


Figure 1-23 (Sheet 2 of 2)

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Miscellaneous Equipment.

Autopilot (E-4 or F-1 if installed)

ECM power panel (TC-54)

Cabin heating and ventilating system (manual control—dc, automatic control—ac)

Ignition analyzer

Note

The following equipment has a self contained power source:

Emergency impact lights

Emergency radio transceiver

Emergency radio transmitter

HYDRAULIC SYSTEM.

The hydraulic power supply system (figures 1-22 and 1-23) operates the retractable landing gear, the wheel brakes, the nosewheel steering system, the wing flaps, cowl flaps, and the windshield wipers. Pressure for the system is provided by two pumps, one mounted on each inboard engine. On aircraft with a hydraulically actuated autopilot, an additional pump is installed on engine No. 2 to supply pressure to the autopilot. System operating pressure is maintained by a pressure regulator with a relief valve installed to limit extreme pressure. If the pressure regulator should fail the relief valve will open between 3300 and 3400 psi. Dual pressure accumulators reserve 3000 psi hydraulic pressure for systems operation when engine driven pumps are inoperative. Brake priority valves provide up to 1800 psi pressure priority to the brakes.

Note

On early model aircraft pressures greater than 1800 psi are required for actuation of any hydraulic system other than the brakes.

On late aircraft, a brake accumulator is installed instead of the brake priority valves. The accumulator holds a reserve supply of fluid under pressure for operation of the brakes. A brake pressure gage is installed to show the pressure in the brake accumulator. A hydraulic hand pump provides an auxiliary source of power to operate the hydraulic system when the engine-driven pumps are inoperative. Fluid capacity of the reservoir is 5.4 gallons with a reserve of 2.5 gallons in the reservoir for emergency operation of any of the units by hand pump. Fluid capacity of the entire system is approximately 14 gallons. See figure 1-30 for fluid specifications.

HYDRAULIC SYSTEM BYPASS VALVE HANDLE.

A hydraulic system bypass valve handle (4, figure 1-22) with positions DOWN (system operative) and UP (system bypass), is located on the floor of the pilots' compartment. The handle mechanically controls the hydraulic system bypass valve. When the handle is placed in the DOWN position, hydraulic fluid from the engine-driven pumps is permitted to enter the main system for operation of the various units. Placing the handle in the UP position permits the hydraulic fluid to bypass the main system and to be pumped directly to the reservoir. The valve is provided to save wear on the pressure regulator and the engine-driven pumps during cruise flight when it is not necessary to operate any of the hydraulic units.

HYDRAULIC HAND PUMP.

The hydraulic hand pump, located to the left of the copilot's seat, is an auxiliary pump which furnishes hydraulic pressure in case the engine-driven pumps are not operating. The handle (figure 1-24) of this pump incorporates a swivel which allows the pump handle to be rotated into a position where it is accessible from the copilot's seat. The hand pump may be used to operate all units directly, or it may be used to charge the pressure accumulator, depending on the position of the hydraulic hand pump selector valve handle.

HYDRAULIC HAND PUMP SELECTOR HANDLE.

A hydraulic hand pump selector handle (figure 1-24) with CLOSED and OPEN positions, is located on the floor of the pilots' compartment left of the copilot's seat and forward of the hydraulic hand pump. It mechanically controls the selector valve. When the handle is placed in the CLOSED position, actuation of the hand pump furnishes hydraulic pressure directly to the brakes and the individual hydraulically operated units. Operation of the



X1-3

Figure 1-24

hand pump with the selector valve handle in the OPEN position will pressurize the main hydraulic system pressure accumulators.

HYDRAULIC SYSTEM FIREWALL SHUTOFF VALVES.

A cable-operated firewall shutoff valve, controlled by a handle (7, figure 1-29) located on the fire extinguisher system control panel, is installed at each of the inboard nacelle firewalls to shut off the flow of hydraulic fluid forward of the firewall. (See the paragraph on fire extinguisher selector handles, this section.)

CAUTION

The cowl flaps will still operate with the hydraulic system firewall shutoff valves closed, and it is possible to aggravate an engine fire with the cowl flap lever in any position other than OFF or TRAIL.

HYDRAULIC SYSTEM PRESSURE GAGE.

A direct-reading hydraulic system pressure gage (11, figure 1-8) installed outboard of the copilot's seat indicates the main hydraulic system pressure in psi.

HYDRAULIC RESERVOIR QUANTITY GAGE.

A direct-reading hydraulic reservoir quantity sight gage is mounted on the face of the hydraulic reservoir (10, figure 1-3). The gage is visible on the ground through the hydraulic compartment access door or in flight through the hydraulic inspection plate. On some aircraft, there is also a 28-volt dc hydraulic reservoir quantity indicator (50, Sheet 1, figure 1-11) mounted on the right side of the upper instrument panel.

FLIGHT CONTROL SYSTEM.

All flight controls are conventionally operated by dual wheel and rudder pedal controls. Trim tabs on each flight control are mechanically operated by means of cables. The rudder system incorporates a combination trim and servo tab for aerodynamic boost to reduce pilot forces.

RUDDER PEDALS.

The rudder is mechanically controlled by a duplicate set of adjustable rudder pedals (10, figure 1-6) of the conventional suspended type, incorporating toe brakes. Each of the four pedals can be adjusted for length by individual foot levers located on each pedal.

Rudder Trim Tab Wheel.

The rudder trim tab is controlled by a hand-wheel (7, figure 1-6) mounted on the glare-shield above the pilot's main instrument panel. The actuation is mechanical, using cables and pulleys.

Rudder Trim Tab Position Indicator.

A mechanically actuated rudder trim tab position indicator, marked in degrees of travel from the neutral position of 0 to 15 degrees left, and 15 degrees right, is mounted in the center of the fire extinguisher system control panel below the rudder trim tab wheel (7, figure 1-6).

CONTROL COLUMNS.

Dual control columns (9, figure 1-6), mounted forward of the pilot's and copilot's seats, provide mechanical control of the ailerons and elevators.

Aileron Trim Tab Wheels.

The aileron trim tab is mechanically controlled by dual interconnected wheels (7, fig-

ure 1-9) located on the control pedestal and are accessible to the pilot and copilot. The tab is actuated by cables and pulleys.

Aileron Trim Tab Position Indicator.

A mechanically actuated aileron trim tab position indicator, marked in degrees of travel from the neutral position of 0 to 12 degrees wing up and 12 degrees wing down, is located on each aileron trim tab wheel (7, figure 1-9).

Elevator Trim Tab Wheels.

The elevator trim tabs are mechanically controlled by dual interconnected wheels (5, figure 1-9) located on the control pedestal and are accessible to the pilot and copilot. The tabs are actuated by cables and pulleys.

Elevator Trim Tab Position Indicator.

A mechanically actuated elevator trim tab position indicator, marked in degrees of travel from the 0 position to 15 degrees nose up and 15 degrees nose down, is installed on the control pedestal above and inboard of each elevator trim tab wheel (5, figure 1-9).

CONTROL SURFACE LOCK LEVER (GUST LOCK).

While on the ground, control surfaces can be locked in the neutral position as a protection against damage from high wind velocities, by a closed cable-operated, spring-loaded over-center linkage on each flight control system. A 2- or a 3-position control surface lock lever (6, figure 1-13), located in the floor to the right of the pilot's seat, operates the control surface lock system and secures the controls in the neutral position. The lever is held in the locked position by the insertion of a pin (figure 1-25) which is attached to a red warning tape wound on a reel installed in the ceiling to the left of the upper instrument

panel. On Navy C-54 aircraft, the pin and tape are stowed on the glareshield.

Note

On aircraft with a 3-position control lock, care must be exercised to avoid the partially locked position.

WING FLAPS.

The hydraulically actuated metal wing flaps are in two sections, hinged to the trailing edge of the inner wing panels at two hinge points on each flap. The flaps extend from the in-board end of each aileron to the junction of the wing and fuselage. The flaps are lowered or raised as a unit, interconnected through mechanical linkage to insure positive synchronization. The wing flaps are extended to approximately 40 degrees in the full down position. The wing flap system incorporates a thermal relief valve in the wing flap upline which is set to relieve at 4500 psi.

GUST LOCK PIN

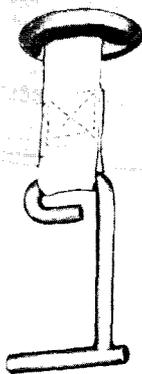


Figure 1-25

X1-4

Note

Approximately 11-1/2 to 12 seconds are required for the wing flaps to raise or lower through full travel.

WING FLAP LEVER.

The wing flap lever (9, figure 1-9) is located on the control pedestal and has UP, OFF, DOWN positions. The lever is mechanically linked to a flap selector valve which directs hydraulic fluid pressure to the four flap actuating cylinders. When the lever is placed in the DOWN position, hydraulic pressure is directed to each flap actuating cylinder downline to lower the flaps. When the lever is placed in the UP position, the flow is reversed to raise the wing flaps. In the OFF position, the wing flap system is isolated and hydraulic fluid is trapped in the system to maintain the flaps at the selected setting.

CAUTION

The wing flap lever will be left in the UP position when the aircraft is on the ground to prevent damage to the wing flap system by thermal expansion.

WING FLAP POSITION INDICATOR.

A single-indicating, remote-type wing flap position indicator (22, figure 1-10), calibrated in degrees of travel, is mounted on the main instrument panel. On some aircraft, dual indicator pointers placarded (L) left and (R) right are installed, indicating whether the flaps are synchronized. Power for the wing flap position indicator is supplied from the 26-volt ac circuit.

LANDING GEAR SYSTEM.

The landing gear, consisting of a single-wheel nose gear and dual-wheel main gear, is retracted and extended hydraulically. Both the nose gear and main gear extend down and in the direction of the airstream. The three sets of landing

gear doors are opened and closed by mechanical linkage actuated by the movement of the gear. The landing gear is maintained in the retracted position by mechanical latches. Landing gear ground safety locks (figure 1-26) will be installed in the landing gear retracting links to prevent inadvertent retraction of the gear while the aircraft is on the ground.

Note

Approximately 8 seconds are required for the landing gear to extend and lock and 7 seconds for the landing gear to retract.

LANDING GEAR LEVER.

A landing gear lever (11, figure 1-9) with UP, NEUTRAL, and DN positions is located on the control pedestal. The lever is mechanically linked to a hydraulic selector valve that controls landing gear operation by directing hydraulic pressure to the nose gear and the two main gear actuating cylinders.

When the lever is placed in the DN position, the landing gear uplatches are released mechanically through a system of cables and pulleys, and hydraulic pressure is directed to the downside of the landing gear actuating cylinder to lower the gear. When the lever is placed in the UP position, the landing gear downlatches are released hydraulically and hydraulic pressure is reversed to raise the landing gear. Placing the lever in the NEUTRAL position allows a slow bleeding of trapped fluid, relieving the pressure and allowing the landing gear to reset on the uplatches. Protection against inadvertent retraction of the landing gear on the ground is provided by a safety switch located on the right landing gear strut. The safety switch actuates a solenoid, which prevents the landing gear lever from being moved from the DN to the NEUTRAL position while any load remains on the landing gear. Should the solenoid pin fail to release when the aircraft has left the ground, it may be manually released through a fingerhole in the pedestal cover plate to the right of the landing gear lever. A metal spring safety latch is installed

below the landing gear lever quadrant and is designed to retain the lever in the DN position until the latch is manually moved aside.

EMERGENCY LANDING GEAR EXTENSION HANDLE.

An emergency landing gear extension handle (figure 1-27) is installed on the right side of the control pedestal and has OPEN (aft) and CLOSED (forward) positions. When the handle is placed in the OPEN position, it mechanically opens the landing gear emergency extension valve, and permits hydraulic fluid trapped in the landing gear upline to return to the reservoir, permitting the landing gear to extend by its own weight and lock by action of the bungee springs and cables when the landing gear control lever is in the DN position.

Note

- Approximately 13 seconds (maximum 1 minute) are required for the landing gear to extend and lock by its own weight.
- During flight, with the emergency extension handle in the OPEN (aft position), hydraulic pressure cannot be supplied to the up side of the retraction piston, therefore, the landing gear cannot be retracted when the landing gear lever is placed in the UP position.

LANDING GEAR INDICATOR LIGHTS.

Three landing gear indicator lights (21, figure 1-10) located on the main instrument panel, are placarded LEFT, NOSE, RIGHT, LANDING WHEELS LOCKED DOWN. The green lights are illuminated when the nose gear and left and right main gear are down and locked.

Note

The green lights will not illuminate unless the landing gear lever is in the full DN position, and the gear is down and locked.

Landing Gear Indicator Test Switch (Some Aircraft).

On some aircraft a test switch with the positions ON and OFF is mounted on the main instrument panel. The test switch provides a means of checking the operation of the landing gear indicator lights and warning light. This switch may also test the warning horn when the throttle is closed. The power source for the lights and switch is the 28-volt dc bus.

Landing Gear Indicator Lights Dimming Switch (Some Aircraft).

On some aircraft, a landing gear indicator lights dimming switch (25, figure 1-10) located on the main instrument panel, is provided to dim the landing gear indicator lights and warning light. The switch receives power from the 28-volt dc bus.

LANDING GEAR WARNING LIGHT.

A red landing gear warning light (21, figure 1-10) is located on the main instrument panel, to the left or below the landing gear position indicator lights, and is placarded LAND-WHEELS UNSAFE. The light comes on when the landing gear is in any position other than locked up or down, or when any throttle is retarded below 17 inches Hg (approximately 1/4 open position) if the gear is not fully down and locked, and the landing gear is not in the DN and locked position.

LANDING GEAR WARNING HORN.

A landing gear warning horn mounted above the pilots' overhead panel is connected to the

throttle switches and the landing gear UP and DN switches. The horn sounds when one or more throttles are retarded below 17 inches Hg (approximately 1/4 open) if the gear is not fully down and locked, and the landing gear lever is not in the DN and locked position. On HC-54 aircraft the warning horn may be shut off with a landing gear warning horn shutoff switch (38, sheet 5, figure 1-11) located on the pilots' overhead panel. On those aircraft without the warning horn shutoff switch, the only provision for silencing the warning horn is advancing all four throttles beyond 17 inches Hg (approximately 1/4 open). The landing gear warning horn receives power from the 28-volt dc bus.

WARNING

Once the landing gear warning horn has been silenced, the warning horn will not reactivate until the system has been rearmed by advancing the throttle(s) beyond 17 inches Hg.

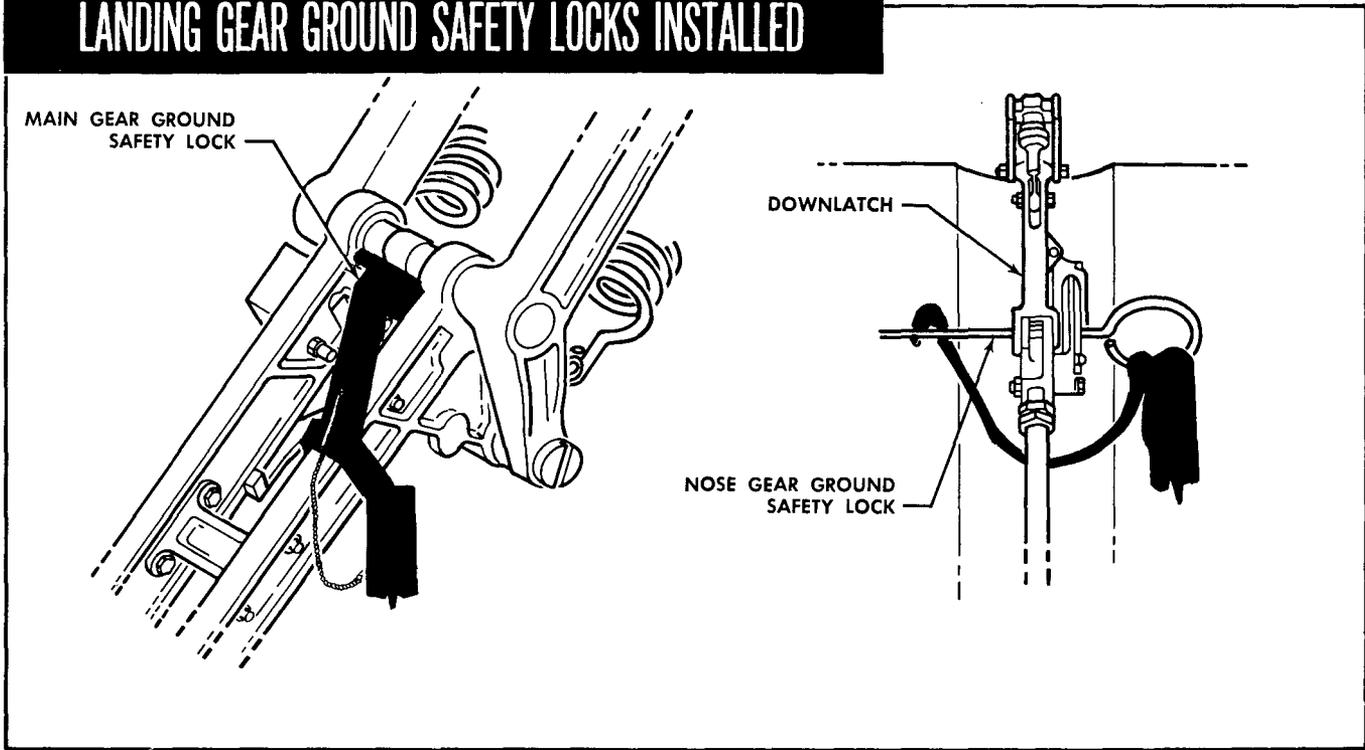
LANDING GEAR GROUND SAFETY LOCKS.

The ground safety locks (figure 1-26) for the nose and main gear are stowed in the aircraft during flight.

NOSEWHEEL STEERING SYSTEM.

The steerable single nosewheel is hydraulically operated and controlled by a nosewheel steering wheel (5, figure 1-7), located at the pilot's station. The nosewheel can be turned 45 degrees to either side of center. A centering cam device automatically locks the nosewheel in the straight forward position before landing gear retraction occurs. A steering pressure accumulator prevents nosewheel shimmy by maintaining constant pressure in the system. The Ahrens cable controls the nosewheel steering shutoff valve. This valve is fully open up to 7 inches of strut extension and gradually closes until 10-1/2 inches of strut extension is reached. After this point powered nosewheel steering is lost.

LANDING GEAR GROUND SAFETY LOCKS INSTALLED



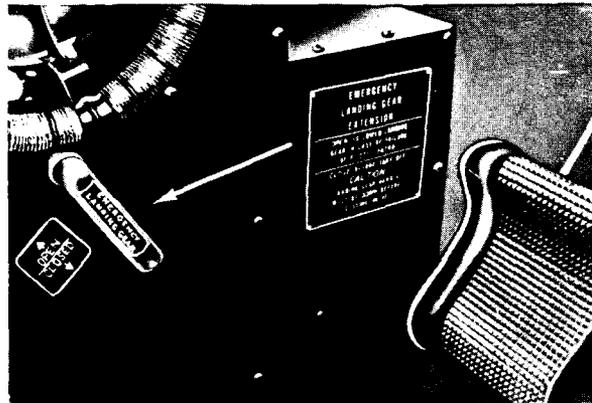
X1-211

Figure 1-26

BRAKE SYSTEM.

Both normal and emergency hydraulic system and the emergency airbrake system can be used to operate the disc-type or segmented rotor type brakes installed in each main gear wheel. Normally, hydraulic pressure for brake operation is supplied from the main hydraulic system. If hydraulic system pressure is low, the hydraulic hand pump can be used to supply an auxiliary source of power to operate the brakes. On early aircraft, brake priority valves are installed in the main hydraulic system to provide an 1800-psi pressure reserve to the brakes. On late aircraft, a brake accumulator is installed to hold a reserve supply of fluid under pressure for brake operation. A brake pressure gage is installed to show the pressure in the brake accumulator. The brake system hydraulic pressure is regulated by the brake control valve and reduced by four boosters, two mounted on each main landing gear strut. Each brake booster reduces the hydraulic pressure to the brake assemblies when the

EMERGENCY LANDING GEAR EXTENSION HANDLE



X1-271

Figure 1-27

brake pedals are depressed. In case of complete hydraulic system failure, the brakes can be applied using the emergency airbrake system. Some aircraft are equipped with an anti-skid system to prevent the wheels from skidding.

Note

A minimum of 1200 psi hydraulic pressure is required to fully set the parking brakes.

NORMAL HYDRAULIC BRAKE CONTROLS.

The hydraulic brakes are actuated by toe pressure applied to the hinged rudder pedals (10, figure 1-6), which are linked to the hydraulic brake control valves. When the pedals are depressed, the control valves are actuated to apply pressure to the brake discs.

Hydraulic Brake Pressure Gage.

On some aircraft, a hydraulic brake pressure gage is installed outboard of the copilot's seat and indicates the amount of pressure in the brake pressure accumulator.

PARKING BRAKE LEVER.

The parking brake lever (figure 1-28), located on the left side of the control pedestal, mechanically locks the brakes for parking. The parking brakes are set by depressing the brake pedals fully while placing the parking brake lever in the ON position, and then releasing the brake pedals. The parking brakes are released by depressing the brake pedals.

EMERGENCY AIRBRAKE SYSTEM.

The emergency airbrake system (see figures 1-22 and 1-23) substitutes air pressure for hydraulic pressure in the event of complete hydraulic system failure. The system is supplied pressure from a 1000-psi emergency airbrake supply bottle, located in the nose-wheel well. The emergency airbrake control valve and shuttle valves control the air pressure to the brakes.

WARNING

The hydraulic brake system must be bled after operation of the emergency airbrake system to eliminate air from the system which would cause erratic braking action.

Emergency Airbrake Handle.

Two mechanical emergency airbrake handles (1, figure 1-29) are located on the main instrument panel. Either handle, when pulled, will release compressed air into the brake system for emergency brake operation in the event hydraulic pressure is not available. The brake pedals need not be depressed. (See Section III).

EMERGENCY AIRBRAKE USE

On most airplanes the emergency airbrake is a one-shot system. When used, the emergency airbrake handles must not be released until the aircraft is completely stopped and chocked. On some airplanes, the emergency airbrake control valve is a metering valve which permits gradual application of brakes.

CAUTION

The emergency airbrake system on all airplanes should be applied as for the one-shot system.

Emergency Airbrake Pressure Gage.

A direct indicating emergency airbrake pressure gage (8, figure 1-8), located on the right at the copilot's station, indicates the pressure in the emergency airbrake supply bottle.

BRAKE ANTISKID SYSTEM (HC-54).

Antiskid equipment has been added to the brake system for use during landing on rough or slick fields. Antiskid detector generators installed on each wheel are used to detect skid conditions. When the output of a detector generator drops off too rapidly, it indicates that the wheel is approaching a skid. This rapid drop off actuates an antiskid solenoid valve in the brake line, cutting off hydraulic pressure to the affected wheel and



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Figure 1-28

opening the return port. Symmetrical wheel antiskid solenoids are connected electrically in parallel so that both solenoids operate even though only one wheel is approaching a skid. When the wheel regains its speed, the solenoids are deenergized and hydraulic brake pressure again reaches the two wheels. In the event a wheel does not pick up speed at a rate that will keep the solenoid energized, a time delay relay will hold the solenoid valve actuated for 2 seconds, preventing the wheels from locking. A fail-safe circuit deactivates the entire antiskid system and holds it deactivated if the antiskid solenoid valves are actuated for 3-1/2 seconds. The brake system is still operative even with an indication that the antiskid system is inoperative.

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Brake Antiskid Switch.

A brake antiskid switch (40, sheet 5, figure 1-11), located on the pilots' overhead panel, with ON and OFF positions, is used to control the brake antiskid system. When the brake antiskid switch is in the ON position the landing gear lever is moved to DOWN, and the main gear struts are compressed approximately 75 percent, 28-volt dc power is supplied to the antiskid system. When the switch is in the OFF position, the brake antiskid system is inoperative. The brake antiskid switch receives power through a circuit breaker switch in the main junction box.

Brake Antiskid System Warning Light.

A brake antiskid system warning light (27, sheet 3, figure 1-10), located on the main instrument panel, comes on when the fail-safe circuit timing relay renders the antiskid system inoperative. The antiskid switch should be turned off to insure normal braking if the warning light illuminates or if braking action is not obtained after depressing brake pedals for a period of 3.5 seconds. In either case, pedal pressure should be released prior to turning the antiskid switch off then reapplied as necessary for desired braking action. The brake antiskid system warning light receives 28-volt dc power through a circuit breaker switch in the main junction box.

INSTRUMENTS.

The flight instruments are vacuum and electrically operated. On some aircraft, the vacuum instruments have been replaced by electrical instruments.

FREE-AIR TEMPERATURE INDICATORS.

Two free-air temperature indicators (18, figures 1-11 and 45, figure 4-15) calibrated in degrees centigrade, are located as follows: one electrically operated temperature indicator on the pilots' overhead panel, and one direct-reading temperature indicator aft of

the instrument panel at the navigator's station. The temperature indicator on the upper instrument panel is connected through a 28-volt dc circuit to a temperature resistance bulb in the fuselage skin above the left nose gear door and registers changes of the outside air temperature by means of changes in the electrical current between the bulb and the indicator.

MAGNETIC (STANDBY) COMPASS.

A magnetic compass (6, figure 1-6), located above the pilots' instrument panel, indicates the magnetic heading of the aircraft. A compass correction card, adjacent to the magnetic compass, lists magnetic deviation.

CAUTION

The magnetic compass should be used as a standby instrument only. It is unreliable when certain electrical equipment of the aircraft is in use.

ELECTRICALLY OPERATED INSTRUMENTS.

For N-1/Fluxgate Compass Repeater and Radio Magnetic Indicators, refer to Section IV.

Heading Indicator (If Installed).

A type C-5 heading indicator (4, sheet 3, figure 1-10) is located on the main instrument panel. The heading indicator is a nontumbling type and operates on 115-volt three-phase 400-cycle alternating current. Caging knobs on the front of the case permits caging of the gyro and permits dial setting for any desired heading or compass card position. A red flag marked CAGED appears when the instrument is not completely uncaged. A red flag marked OFF appears when power supply to the instrument is cut off.

Turn And Slip Indicator (If Installed).

The turn and slip indicator (3, figure 1-10), located on the main instrument panel, is a combination of two flight instruments, the turn indicator and the slip indicator. The turn indicator is a rate instrument indicating rate of turn and is operated by 28-volt dc. When the needle is centered, it indicates that the aircraft is flying straight, disregarding drift, pitch, and bank. When the needle is off center, it indicates that the aircraft is turning in the direction shown on the needle. The slip indicator unit is a ball type inclinometer. The ball rolls in a curved glass tube filled with damping liquid and gives an indication of the lateral stability of the aircraft in straight flight and in turns.

Attitude Indicator (If Installed).

The type J-8 attitude indicator (5, figure 1-10), located on the main instrument panel, provides visual indication of the aircraft flight attitude. The instrument has complete freedom through 360 degrees of rotation about the roll and pitch axes. The instrument can be caged by pulling the caging knob. A red flag marked OFF appears when the power supply to the instrument is cut off. The attitude indicator receives 115-volt ac power through phase adapter.

VACUUM OPERATED INSTRUMENTS.

Turn And Slip Indicator.

The turn and slip indicator (3, figure 1-10), located on the main instrument panel, is a combination of two flight instruments, the turn indicator and the slip indicator. The turn indicator, limited to 45 degrees either side of the vertical position, is a rate instrument indicating rate of turn. Vacuum pressure for operation of the turn indicator is between the limits of 1.8 to 2.1 inches Hg. with 1.9 inches Hg. desired. When the needle is centered, it indicates that the aircraft is flying straight, disregarding drift, pitch, and

bank. When the needle is off center, it indicates that the aircraft is turning in the direction shown on the needle. The slip indicator unit is a ball type inclinometer. The ball rolls in a curved glass tube filled with damping liquid and gives an indication of the lateral stability of the aircraft in straight flight and in turns.

Attitude Indicator (If Installed).

The gyro contained in the attitude indicator (5, figure 1-10), located on the main instrument panel, is an air driven rotor universally mounted so that its spin axle can assume any position in space, thereby establishing a horizontal flight reference. When the caging knob is turned to the OFF position, the shield on the caging knob exposes a warning dot to show the pilot that the gyro is caged and the instrument is not indicating. When the caging knob is turned to the ON position, the shield covers the warning dot, showing that the instrument is indicating. Starting either inboard engine with the vacuum pump selector handle positioned to that engine starts the vacuum supply. About 5 minutes should be allowed for the gyro to come up to speed. If the horizon bar is not level after the engines are started, cage and immediately uncage the gyro at least 5 minutes before take-off. The attitude indicator operates on vacuum pressure between the limits of 3.75 and 4.25 inches Hg.

Note

The attitude indicator is limited to 60 degrees of pitch, nose up or nose down, and 100 degrees of roll, right or left.

There are certain inherent errors in the attitude indicator, but in most cases the magnitude is not more than 3 degrees of pitch or roll. When rolling out of a turn to straight and level flight, the instrument may indicate a turn in the opposite direction; if the turn has been steep, it may take as much as 3 minutes for the horizon bar to erect itself. A slight amount of pitch error in the indica-

tion of attitude will result from acceleration or deceleration. This error will appear as a slight climb indication after a forward acceleration, and as a slight dive indication after deceleration, when the aircraft is flying straight and level.

Heading Indicators (If Installed).

Two vacuum-powered heading indicators (4, figure 1-10) are provided for the pilot and copilot on the main instrument panel. The caging knob, on the front of the instrument, is used to cage the gyro and set the dial to the desired heading.

PITOT-STATIC OPERATED INSTRUMENTS.

Airspeed Indicators.

Three airspeed indicators (2, figure 1-10 and 8, figure 4-14) are installed, two located on the main instrument panel and one at the navigator's station. On EC-54 aircraft, an additional airspeed indicator is located at the data recorder operator's station. The airspeed indicators are calibrated in knots. On the L-7 type indicators, in addition to the regular airspeed pointer, a second pointer is incorporated which automatically compensates for density altitude and indicates maximum allowable airspeed. From the angle formed by the two pointers the pilot and copilot can ascertain how near the airspeed is to the point where the aircraft will approach the structural limits.

Altimeters.

Three type C-12 altimeters (1, figure 1-10 and 9, figure 4-14) are installed, two on the main instrument panel and one at the navigator's station. On EC-54 aircraft, an additional altimeter is located at the data recorder operator's station. In addition to the standard 100-foot and 1000-foot pointers the altimeters have a 10,000 foot pointer which is an extension of the segmented disc. The disc

will move to expose warning stripes when altitude is less than 16,000 feet. Field barometric pressure can be set into the altimeters by manually rotating the barometric scale pressure set knob adjacent to the dial face.

WARNING

*Sec 13 14
Sec 3 6 for
see warning*

The altimeters should be checked closely to assure that the 10,000-foot pointer is set correctly. Due to previous settings, the pressure set knob could have been rotated until the numbers reappeared in the altimeter setting window from the opposite side, thus indicating a 10,000-foot error.

Vertical Velocity Indicators.

Two type C-2 vertical velocity indicators (13, figure 1-10), located on the main instrument panel, indicate rate of climb or descent of the aircraft in feet per minute. When returning to level flight from a climb or descent, the pointer will lag approximately 6 seconds before indicating level flight. The indicator is not reliable in extremely rough air.

VACUUM SYSTEM.

A vacuum system incorporating two relief valves is provided for the operation of the turn and slip indicator and attitude indicator. Negative pressure in the vacuum system is supplied by the negative pressure side of the vacuum pump in each inboard nacelle. A vacuum line is routed from each vacuum pump, through a check valve and a relief valve in the corresponding nacelle, to the vacuum pump selector valve mounted below the main instrument panel. From the vacuum pump selector valve, the vacuum line is routed through a vacuum manifold and vacuum regulator.

Note

- Two regulators are required; one for system vacuum pressure of 3.75 to 4.25 inches Hg and another for the turn and slip indicator of 1.8 to 2.1 inches Hg.
- On all except Navy C-54 aircraft, if vacuum pressure is lost in flight on either No. 2 or No. 3 engine and the opposite engine also appears to have negative vacuum pressure, a check should be made of the manifold intake to the vacuum system. The manifold intake(s) is/are located forward of the main instrument panel and should be clear of foreign matter that may be blocking the intake.

VACUUM PUMP SELECTOR HANDLE (2-POSITION).

A 2-position vacuum pump selector handle (26, figure 1-10), mounted below the main instrument panel in front of the copilot's seat, mechanically selects either the left or the right inboard engine-driven vacuum pump to operate the gyro instruments. The selector handle has ALL INST. R. PUMP and ALL INST. L. PUMP positions.

VACUUM PUMP SELECTOR HANDLE (6-POSITION).

On some aircraft a 6-position vacuum pump selector handle, mounted below the main instrument panel in front of the copilot's seat, mechanically selects either the left or the right inboard engine-driven vacuum pump to operate the gyro instruments. The selector valve handle has L. INST. L. PUMP, ALL INST. L. PUMP, R. INST. L. PUMP, R. INST. R. PUMP, ALL INST. R. PUMP, and L. INST. R. PUMP positions.

Note

On some aircraft the vacuum inlet port is not guarded and should be frequently checked to insure it is clear of foreign matter.

VACUUM PRESSURE GAGE.

A vacuum pressure gage(s) (12, figure 1-10), located on the main instrument panel, indicates in inches of Hg the amount of suction that actuates the air driven gyroscopic instruments.

PITOT STATIC SYSTEM.

A dual pitot static system supplies the ram and static air pressures necessary for the operation of the airspeed, altimeter, and vertical velocity indicators. Two pitot heads, located on the nose of the aircraft, provide ram air pressure for operation of the pilot's, copilot's, and navigator's airspeed indicators. If search radar equipment is installed, the pitot heads are located on each side of the fuselage above the nose gear door. The normal source static vents, located on each side of the nose section, provide static air pressure through a selector valve for operation of the pilot's and copilot's airspeed, altimeter, and vertical velocity indicators and the navigator's airspeed and altimeter indicators. An ice-free alternate source static vent, located in the tail section of the fuselage, provides static air pressure through both selector valves to the instruments. A static system drain valve located in the nose gear well provides a means of draining the lines of water. The two pitot heads are protected from ice accretion by integral electrical heating elements.

STATIC SOURCE SELECTOR SWITCHES.

Two static source selector mechanical switches (8, figure 1-7 and 10, figure 1-8) are installed in the pilot's compartment, one outboard of each pilot's seat. Each selector switch has **STATIC SOURCE** and **ALTERNATE SOURCE** positions. In the **STATIC SOURCE** position of each switch, static air pressure is provided for the system by the normal static source. In the **ALTERNATE SOURCE** position, the static system is supplied from an alternate source located in the tail section of the fuselage.

CAUTION

The autopilot (E-4) altitude control switch must be turned off prior to changing the pilot's static source selector switch position. Failure to do so may result in an abrupt change of attitude up to the limit of 6 degrees.

EMERGENCY EQUIPMENT.**FIRE DETECTOR SYSTEMS.**

Fire detectors are located on the cowling inner ring, mount, firewalls and accessories section of each engine. Excessive heat in any of these areas closes the contact in the detectors, completing a 28-volt dc circuit to illuminate the respective engine fire warning light. Fire detectors, located in each lower baggage compartment, are connected through a 28-volt dc circuit to the forward and aft baggage compartment fire warning lights on the main instrument panel. On aircraft with AN/APS-42 installed, a detector system is provided in the nose section with a nose section fire warning light on the instrument panel; a single baggage compartment fire warning light is connected to detectors in both lower baggage compartments. On some aircraft, detectors are provided for auxiliary power plant protection, and are interconnected with the existing fire detection system for the forward baggage compartment.

Fire Warning Lights.

Red fire warning lights (4, figure 1-29), powered by 28-volt dc, are located on the fire extinguisher system control panel. Each engine has two lights. Both lights are activated by a fire in the cowl flap or firewall area. The forward and aft lower cargo compartments have one light and the nose section has one light. The nose section warning light is not installed on some Navy C-54 aircraft. Two fire warning lights are installed on the auxiliary power plant (APP) control panel. Refer to **AUXILIARY**

POWER PLANT (APP), Section IV. The engine fire warning lights are normally tested by a fire detector test switch (5, figure 1-29) located on the fire extinguisher system control panel. On some aircraft, the fire warning lights for each engine are capped, forming one light for each engine. On some aircraft, an additional fire warning light and test switch for the auxiliary power plant (APP) are installed on the main instrument panel. The fire warning lights receive power from the 28-volt ac bus.

Fire Detector Test Switch.

On most aircraft, a fire detector test switch (5, figure 1-29), with CIRCUIT 1, OFF, and CIRCUIT 2 positions, is located on the fire extinguisher system control panel. The switch is spring-loaded to the OFF position and is used to test the engine fire warning lights. When the switch is actuated to the CIRCUIT 1 position, an electrical circuit is completed to the fire detectors of zone 1, the power section, and the cowl flap area, and the engine fire warning lights will come on. When the switch is actuated to the CIRCUIT 2 position, an electrical circuit is completed to the fire detectors of zone 2, the accessory section, and zone 3, the firewall section, and the engine fire warning lights will come on. In case any fire detector is inoperative, the fire warning light for that engine will not come on. The fire detector test switch receives power from the 28-volt dc bus.

FIRE EYE DETECTION SYSTEM (SOME AIRCRAFT).

On some C-54 aircraft a Fire Eye detection system is installed for the APP compartment. The Fire Eye system consists of an amplifier, two Fire Eye detectors installed in the APP compartment, a station test switch located at the right side of the copilot's station, and a warning light located to the right and adjacent to the engine fire warning lights. The system is tested as follows:

- a. DC Power—ON.
- b. AC Power—ON.

- c. Allow approximately 5 minutes for amplifier warmup.
- d. Select No. 1 position of station test switch. Warning light should come on.

CAUTION

This system operates only when a flashing light, such as flame, is present in the APP compartment. No combination of APP overtemperature or excessive heat in the APP compartment will give indication of fire. Care should be taken when operating APP to check temperature regularly.

FIRE EXTINGUISHER SYSTEM.

A mechanically controlled carbon dioxide fire extinguishing system provides fire protection to each engine section and both lower cargo compartments. On USAF C-54 aircraft, the supply of CO₂ for the system is contained in two cylinders (2, figure 1-3), each mounted vertically on the right side of the nosewheel well. On Navy C-54 aircraft, the supply of CO₂ is contained in four cylinders, two located on each side of the nosewheel well. Two red plastic CO₂ discharge indicators are recessed into the skin of the aircraft, one above each nose gear door. If AN/APS-42 is installed, the indicators are on the right side. CO₂ escaping through either CO₂ cylinder safety valve due to thermal expansion blows the red plastic disc out of the unit, indicating that the CO₂ has been discharged and the cylinder must be recharged (on Navy C-54 aircraft, red indicators for thermal expansion and yellow for discharge). The cabin heaters are not protected by the fire extinguishing system. The nose heater is protected by the fire extinguisher system and will receive fire extinguishing agent simultaneously with the nose section.

CAUTION

The pilots' compartment (cockpit) heater switch must be placed in the OFF position; and both footwarmers and windshield deicing and defrosting valves closed prior to operating the fire extinguisher in the nose section.

Note

The CO₂ discharge indicators will not show a discharge condition initiated by the CO₂ cylinder discharge handles. Each CO₂ cylinder is equipped with a cutter head assembly and a red ball indicator. The red ball indicator is visible at the side of the operating head only after the cutter tube has been driven into the feed pipe. With the cutter tube in the retracted (charged) position, the red ball indicator will not be visible in the cage.

Portable Fire Extinguishers.

Hand-operated CB and CO₂ portable fire extinguishers (2, figure 3-4) are installed in the crews' compartments and cabin for use on interior fires.

WARNING

Prolonged exposure (5 minutes or more) to high concentrations (pronounced irritation of eye and nose) of Bromochloromethane (CB), or its decomposition products, should be avoided. CB is an anesthetic agent of moderate intensity. It is safer to use than previous fire extinguishing agents (carbon tetrachloride, methylbromide). However, especially in confined spaces, adequate respiratory and eye protection from excessive exposure, including the use of oxygen when available, should be sought as soon as the primary fire emergency will permit.

Fire Extinguisher Selector Handles.

Six fire extinguisher selector handles (6 and 7, figure 1-29) are located on the fire extinguisher control panel. Four handles are for the engines and are marked ENG. 1, ENG. 2, ENG. 3, and ENG. 4. Pulling any of these handles mechanically positions a valve that directs the flow of CO₂ to the selected engine accessory section and to the spray nozzle of

the carburetor air scoop; simultaneously, the individual fuel system, oil system, and hydraulic system (No. 2 and No. 3 engines) firewall shutoff valves for the selected engine are closed. The two other fire extinguisher selector handles are for the pilots' compartment heater and both lower cargo compartments, and are marked NOSE SECT. and BAG COMPTS. On some Navy C-54 aircraft, the handles are marked FWD BAG and AFT BAG respectively. Pulling the nose section fire extinguisher selector handle mechanically positions a valve to direct the flow of CO₂ to the nose section and to the nose heater. Pulling the baggage compartments fire extinguisher selector handle mechanically positions a valve to direct the flow of CO₂ to the forward and aft lower cargo compartments. The fire extinguisher selector handles for the engines must be pushed forward to open the firewall shutoff valves.

CAUTION

If any fire extinguisher selector handle has been pulled to extinguish a fire or as a shutoff precaution, the handle must be repositioned prior to discharge of CO₂ to another selected area, otherwise a split shot will result. Approximately 5 seconds after the system has been discharged, the fire extinguisher selector handle initially selected can be repositioned.

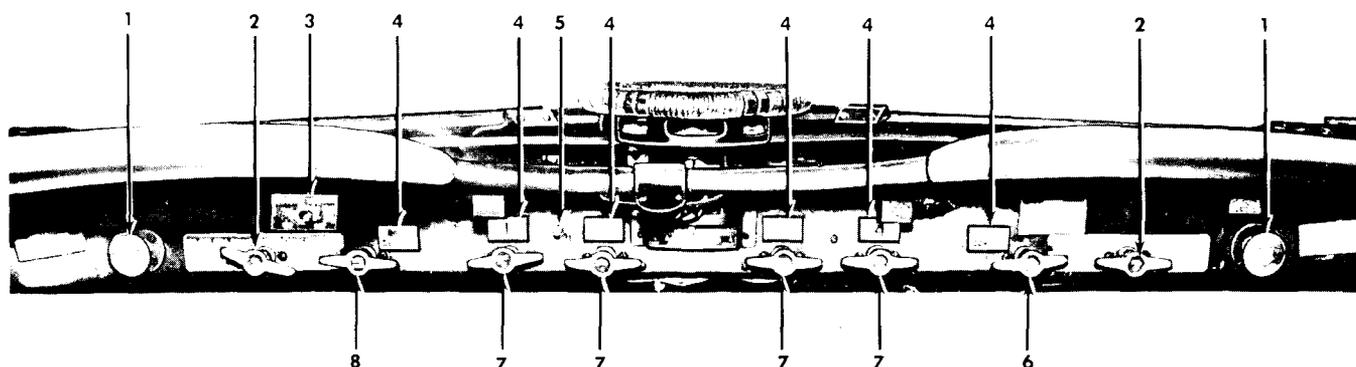
Note

Cowl flaps and propeller feathering lines are not affected by the firewall shutoff valves.

CO₂ Cylinder Discharge Handles.

Two CO₂ cylinder discharge handles (2, figure 1-29), one for each cylinder, are located at each end of the row of fire extinguisher selector handles on the pilots' instrument panel. Each discharge handle, when pulled, mechanically releases the flow of CO₂ through lines to the discharge points in the engine accessory section, carburetor air scoop, the lower cargo compartment, and nose section (some Navy C-54 aircraft).

FIRE EXTINGUISHER SYSTEM CONTROL PANEL



- | | |
|---|--|
| <ol style="list-style-type: none"> 1. EMERGENCY AIRBRAKE HANDLES (2) 2. CO₂ CYLINDER DISCHARGE HANDLES (2) 3. COCKPIT HEATER SWITCH 4. FIRE WARNING LIGHTS (6) 5. FIRE DETECTOR TEST SWITCH | <ol style="list-style-type: none"> 6. BAG COMPT. FIRE EXTINGUISHER SELECTOR HANDLE (AFT BAG — NAVY C-54) 7. ENGINE FIRE EXTINGUISHER SELECTOR HANDLES (4) 8. NOSE SECT. FIRE EXTINGUISHER SELECTOR HANDLE (FWD BAG NAVY C-54) |
|---|--|

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Figure 1-29

Note

On all except Navy C-54 aircraft it is recommended that each CO₂ cylinder be discharged separately during an engine fire. If the contents of one cylinder are insufficient to extinguish the fire, the other CO₂ cylinder should be discharged. Both cylinders must be discharged when a fire occurs in the lower cargo compartments.

EMERGENCY ALARM SYSTEM.

Emergency alarm bells are installed in strategic locations throughout the aircraft. The emergency alarm bells are controlled by a switch located on the pilots' overhead panel. The alarm bells are operated directly from the batteries.

EMERGENCY EXITS.

Five emergency exits (Figure 3-5) are provided in the main cabin for use during flight, on the ground or after ditching. The HC-54 aircraft is provided with three additional main cabin emergency exits. (The auxiliary cargo door and two scanner blisters.) The flight compartment is provided with four emergency exits for use on the ground, three of which can be used after ditching. (The crew entrance door is for on-the-ground exits only and should not be used as an exit after ditching.)

MISCELLANEOUS EMERGENCY EQUIPMENT.

Miscellaneous emergency equipment is shown in figure 3-4.

MAIN CARGO DOORS.

For description and dimensions of the main cargo doors, see Section IV.

CREW ENTRANCE DOOR.

The crew entrance door (6, figure 1-3) is located on the right side of the flight compartment. The door is hinged on the forward side and opens inward. The latches and locking mechanism are manually operated by a door handle.

PILOTS' SEATS.

The pilots' seats are installed on tracks and have forward, aft, and vertical adjustment provisions. Each seat is equipped with seat and backrest cushions, and safety belt.

Shoulder Harness (If installed).

On some aircraft, an inertia reel type shoulder harness is installed on the pilots' seats. Inertia reel lock levers located on the outboard side of the lower seat frames provide a means of locking or unlocking the shoulder harness.

Shoulder Harness Lock Lever (If installed).

A 2-position shoulder harness inertia reel lock lever is located on the inboard side of the pilot's and copilot's seats (figure 1-7 and 1-8). A latch is provided for positive retention of the control handle at either position of the quadrant. By pressing down on the top of the control handle, the latch is released and the control handle may then be moved freely from one position to another. When the control handle is in the UNLOCKED position, the reel harness cable will extend to allow the pilot to lean forward in the flight compartment; however, the reel cable will automatically lock when an impact force of 2 to 3g is encountered. When the reel is locked in this

manner, it will remain locked until the control handle is moved to the LOCKED position and then returned to the UNLOCKED position. When the control handle is in the LOCKED position, the reel harness cable is manually locked so that the pilot is prevented from bending forward. The LOCKED position is used only when a crash landing is anticipated. This position provides an added safety precaution over and above that of the automatic safety lock.

Pilot's Seats Forward and Aft Lever.

Each seat can be adjusted forward and aft on two horizontal tracks by pulling upward on the seat forward and aft lever. The lever is installed on the lower seat frame on the outboard side of the seat. Adjustment is accomplished by shifting body weight forward or aft to move the seat as desired. The seat may be locked in any position by releasing the lever.

Pilots' Seats Vertical Lever.

Either seat is spring-loaded and can be adjusted for height by pulling upward on the vertical control lever and increasing or decreasing body weight on the seat for desired adjustment. The lever is located directly above the forward and aft lever on the outboard side of the seat.

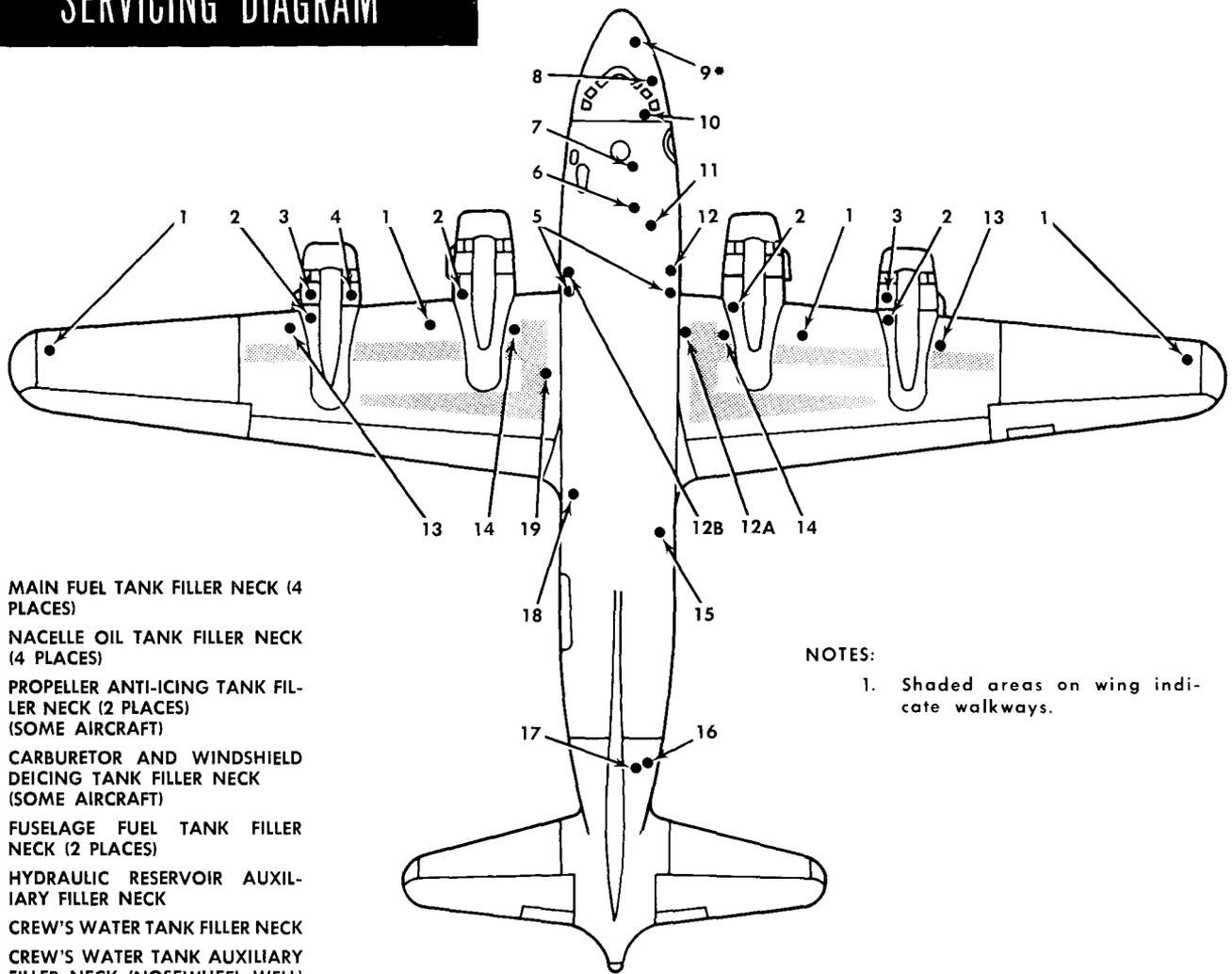
FLIGHT ENGINEER'S SEAT.

A flight engineer's seat (3, figure 1-3) is installed aft of the control pedestal between the pilot's and copilot's seats. It can be folded back against the radio operator's table when not in use. The seat is provided with a safety belt.

AUXILIARY EQUIPMENT.

Auxiliary equipment is described in Section IV.

SERVICING DIAGRAM



1. MAIN FUEL TANK FILLER NECK (4 PLACES)
2. NACELLE OIL TANK FILLER NECK (4 PLACES)
3. PROPELLER ANTI-ICING TANK FILLER NECK (2 PLACES) (SOME AIRCRAFT)
4. CARBURETOR AND WINDSHIELD DEICING TANK FILLER NECK (SOME AIRCRAFT)
5. FUSELAGE FUEL TANK FILLER NECK (2 PLACES)
6. HYDRAULIC RESERVOIR AUXILIARY FILLER NECK
7. CREW'S WATER TANK FILLER NECK
8. CREW'S WATER TANK AUXILIARY FILLER NECK (NOSEWHEEL WELL)
9. CO₂ CYLINDERS
10. EMERGENCY AIR BRAKE SUPPLY BOTTLE
11. HYDRAULIC RESERVOIR FILLER NECK (ACCESSORY COMPARTMENT)
12. AUXILIARY OIL TANK FILLER NECK (12A — HC-54, 12B — EC-54)
13. OUTBOARD (NO. 1 & 4) AUXILIARY FUEL TANK FILLER NECK (2 PLACES)
14. INBOARD (NO. 2 & 3) AUXILIARY FUEL TANK FILLER NECK (2 PLACES) (8-WING TANK SYSTEM)
15. OXYGEN FILLER VALVE
16. CABIN WATER TANK FILLER NECK (BOTTOM OF FUSELAGE) (SOME AIRCRAFT)
17. CABIN WATER TANK AUXILIARY FILLER NECK (SOME AIRCRAFT)
18. INTERIOR ANTI-ICING TANK FILLER NECK (SOME AIRCRAFT)
19. WING ANTI-ICING TANK FILLER NECK (SOME AIRCRAFT)

NOTES:

1. Shaded areas on wing indicate walkways.

FLUID SPECIFICATIONS AND GRADES				
FLUID	SPEC. NUMBER	GRADE	NATO SYMBOL	COMMERCIAL AVGAS
FUEL ALTERNATE	MIL-G-5572	115/145	F-22	115/145
	MIL-G-5572	100/130	F-18	100/130 108/135
OIL—ENGINE (USAF C-54) (NAVY C-54)	MIL-L-22851	TYPE II	0-128	
	MIL-L-22851	TYPE II	----	
OIL—AUXILIARY POWER PLANT	MIL-L-8383			
HYDRAULIC FLUID	MIL-H-5606		H-515	
ANTI-ICING ALCOHOL (ALTERNATE)	TT-I-735 MIL-A-6091			
OXYGEN	MIL-O-27210			
FIRE EXTINGUISHER (ENGINE) (CB)	----- BB-C-101	CO ₂ ----		

Figure 1-30

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1

2

3

4

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8

9

SECTION II
NORMAL PROCEDURES

Procedures outlined in this section are applicable to Air Force C-54, EC-54, HC-54 and TC-54 Aircraft.

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PREPARATION FOR FLIGHT.

Crew Checklist, T. O. 1C-54D-(CL)-1-1. Refer to the Appendix for instructions and method of filling out cards.

FLIGHT PLANNING.

Make certain that the gross weight, grades of fuel and oil, and any special equipment carried, are suitable to the mission to be performed. Determine cruise control data, such as expected airspeed, power settings, etc. from performance data in the Appendix.

Note

For touch-and-go landings, the take-off and landing data card is required only for the initial takeoff and final landing.

TAKEOFF AND LANDING DATA CARDS.

Takeoff and landing data cards will be completed for all flights except as noted below. The takeoff portion will be completed prior to takeoff, and the landing data portion will be completed prior to landing. These cards are contained in the Pilots' Abbreviated Flight

WEIGHT AND BALANCE.

Check the aircraft weight and balance (refer to the Manual of Weight and Balance, T. O. 1-1B-40). Refer to Section V for the weight limitations of the aircraft, and check the take-off and anticipated landing gross weights. Make certain that a current weight and balance clearance (Form 365F) is computed.

CHECKLISTS.

The Flight Manual contains only the amplified checklists; the abbreviated checklists are contained in two separate publications as follows:

Note

- a. T. O. 1C-54D-1CL-1 contains the Aircrew Visual Inspection, through the Before Leaving Aircraft checklists, the applicable parts of the Emergency Procedures checklists, the Takeoff and Landing Data Cards, and certain condensed performance data. See Section VIII for additions, crew checklists. On some aircraft a Scroll Checklist in a flight deck coordinator is mounted on the glareshield. The Scroll Checklist contains only the Before Starting Engines, through the Before Leaving Aircraft checklists.

Insofar as possible, it is intended that each phase of action described in a checklist be performed in conjunction with direct reference to the checklist. At times, however, it is both impractical and unsafe to refer to a checklist; for example during actual takeoff, landing, touch-and-go landing, or in certain emergency situations.

The pilots' Normal checklists and the Emergency Procedures checklists will be used on a challenge and reply basis. The flight engineer will read all operating checklists and will issue the challenge. Crew member(s) indicated will make the reply and either complete the necessary action or direct the appropriate crew member(s) to complete the action. At the pilot's discretion the flight engineer may complete his checklist items silently, without verification or assistance by the pilot or copilot. The flight engineer will report, "Checklist completed," after all items have been completed.

In the following procedures, P, CP, and FE denote pilot, copilot, or flight engineer as responsible for performing the action, and making the response. When a navigator or

radio operator is not on board, the alternate crew member shown in parentheses will accomplish the action normally accomplished by the assigned crew member.

Note

- The Aircrew Visual Inspection procedures outlined in this section are predicated on the assumption that maintenance personnel have completed all the requirements of the Manual of Inspection Requirements, T. O. 1C-54A-6, for preflight, basic post-flight, or thru-flight; therefore, duplicate inspections and operational checks of systems by aircrew members have been eliminated, except for certain items required in the interest of flying safety. These visual inspections are not intended to replace or supplement the responsibilities of maintenance personnel.
- THRU-FLIGHT CHECKLIST: The thru-flight checklist is to be accomplished only when the aircraft is assigned missions which require intermediate stops by the same flight crew and no maintenance is performed during these stops. Thru-flight checklist items are indicated by an asterisk (*). These items must be accomplished during an intermediate stop. The remaining items may be accomplished at the discretion of the pilot. All items under Engine Starting, Before Taxi, Before Takeoff, and subsequent checks, must be accomplished for all flights except as noted below for closed traffic patterns.
- When a closed traffic pattern is used during local training flights, only those items indicated by an asterisk (*) on the After Takeoff—Climb, and Descent (Phase I and Phase II) checklists need be accomplished. The Cruise checklist may be omitted.

ENTRANCE.

The crew will normally enter through the main cabin door on the left side of the aircraft. However, the aircraft may also be entered through the crew entrance door on the right side of the fuselage near the navigator's station.

STANDARD TERMINOLOGY.

To assure complete understanding by all crew members, the following terminology and procedures will be used.

STANDARD POWER TERMINOLOGY.

1. Max Power.
2. METO Power.
3. Climb Power.
4. Cruise Power.
5. On other than standard power settings, the pilot will call for desired power setting by using a definite rpm and manifold pressure figure:

Rpm Twenty-One Hundred

Manifold Two Eight

FLAP SETTINGS.

Flap settings will be requested in the following manner:

Flaps Twenty

CLIMATIC.

Whenever a checklist item is affected by climatic conditions or hours of darkness, "Climatic," or, "As Required," will be indicated on the checklists for the usual action entry. However, during accomplishment of the checklist, the actual position of the unit will be stated in the response.

AIRCREW VISUAL INSPECTIONS.

It is the responsibility of the pilot to insure that all visual inspections are performed as outlined in this section and Section VIII as applicable to the mission requirements.

BEFORE INTERIOR.

1. Tail Stand—In place.
 2. Wheel Chocks—In place.
 3. Landing Gear Ground Safety Locks—In place.
 4. Forward Lower Cargo Compartment—Checked.
- On aircraft with APP installed in forward lower cargo compartment, check cover plate (fire screen) to insure that cargo is not stowed against APP creating a potential fire hazard.
5. APU—Positioned.

WARNING

If an external power unit is being used, it should be at maximum cable length from the aircraft, on the pilot's side.

INTERIOR.

1. Form 781—Checked.
Check Form 781 for status of the aircraft, servicing, etc.
2. Aircraft Publications—Aboard.
Insure that all pertinent aircraft publications are stowed aboard. Check terminal charts, enroute charts, supplements, and checklists for currency.
3. Circuit Breakers and Fuses—As required.
Check that all appropriate circuit breakers are set and spare fuses are available.
4. Cabin Heater—OFF.
Check cabin heater rheostat and emergency switch in the OFF position.
5. Radio and Radar Equipment—OFF.
Check all switches.
6. Ignition Switches—OFF.
Check both master and engine switches.
7. Battery Switch—OFF.
8. Alarm Bell—Checked and OFF.
With electrical power off, check alarm bell for operation (power is supplied directly from battery).
9. Battery Switch—As required.
The battery switch will normally be in the ON position except it must be OFF if external power supply is a battery cart.
10. External Power or APP—ON.
Use external power or APP when available (see Electrical System, Section I).
11. Landing Gear Lever—DOWN and locked.
Check that lever is in the down position, spring clip is in place, solenoid is across the lever, and indicator lights for proper indication.
12. Oxygen Equipment and Pressure—Checked.
Check oxygen equipment for proper operation and oxygen system for desired service, normally 400 psi.
13. Navigator's Table—Secured.
Table must be secured during takeoff and landing.
14. Driftmeter—Positioned and caged.
Check for cleanliness of lens cover. Instrument should be properly positioned and caged.
15. Smoke Mask and Abestos Gloves—Aboard.
Check for availability and stowage.
16. Reserve Hydraulic Fluid and Funnel—Stowed.
Check for 5 gallons of reserve hydraulic fluid and stowage of funnel and wrench.
17. Fuselage Fuel Tank Compartment—Checked (if tanks installed).
Check for leaks at tank sumps, booster pump, and fuel lines. Check fuel tank selector valve handle in OFF position. Turn fuselage fuel tank sightgauge shut-off valve to OFF. Check for evidence of fuel leakage in the filler neck and scupper area. Visually check hydraulic fluid level by reference to sightgauge on reservoir.
18. Electronic Power Supply Panel Switches and Circuit Breakers (TC-54)—OFF.
Check main power control panel for proper position of switches and circuit breakers set.

WARNING

To avoid possible injury to personnel or damage to ground equipment, make certain that the propellers are clear before the battery switch is turned on.

INTERIOR. (Continued)

19. Emergency Exit Doors, Top of Wing, Gas and Oil Caps, and Anti-icing Filler Cap—Checked and secure.

Check fuel tank quantity. Secure fuel, oil, and anti-icing fluid tank caps. Secure all emergency exit doors.

20. Buffet—Checked.

Check hot cup and oven switches OFF.

21. Tail Cone Access Door—Checked and secured.

Check in tail cone for stowaways etc. Secure door.

22. Cargo Doors—Checked and pins installed.

Check for damage and proper safetying of hinge pins.

EXTERIOR.

Refer to Figure 2-1 for inspection route.

1. Exterior Inspection—Completed.

During exterior inspection the aircraft should be checked for evidence of damage, leaks, secureness of inspection plates and attachments, installations, position, and for presence of foreign matter.

WARNING

Prior to flight, make certain that all snow, ice, and frost is removed from the aircraft. Takeoff distances and climbout performance can be seriously affected, depending on the weight of snow and ice accumulated. The roughness and distribution of snow and ice could vary stalling airspeeds and characteristics to an extremely dangerous degree.

2. Pitot Covers—Removed

BEFORE STARTING ENGINES.

The Before Starting Engines Checklist consists of Phase I and Phase II. Phase I may be performed by the copilot or flight engineer before the pilot comes aboard.

Phase I.

1. Pitot Heater Switches—OFF (FE).
2. Deicer and Anti-Icer Switches—OFF (FE).
- *3. Ignition Switches—OFF (FE)
- *4. Battery Switch—As required (FE).

The battery switch will normally be in ON position except that it must be OFF if external power supply is a battery cart.

WARNING

To avoid possible injury to personnel or damage to ground equipment, make certain that the propellers are clear before the battery switch is turned on.

Note

A minimum battery voltage of approximately 18 volts is required to close the battery relay. The battery relay must be closed before the generators can recharge the batteries.

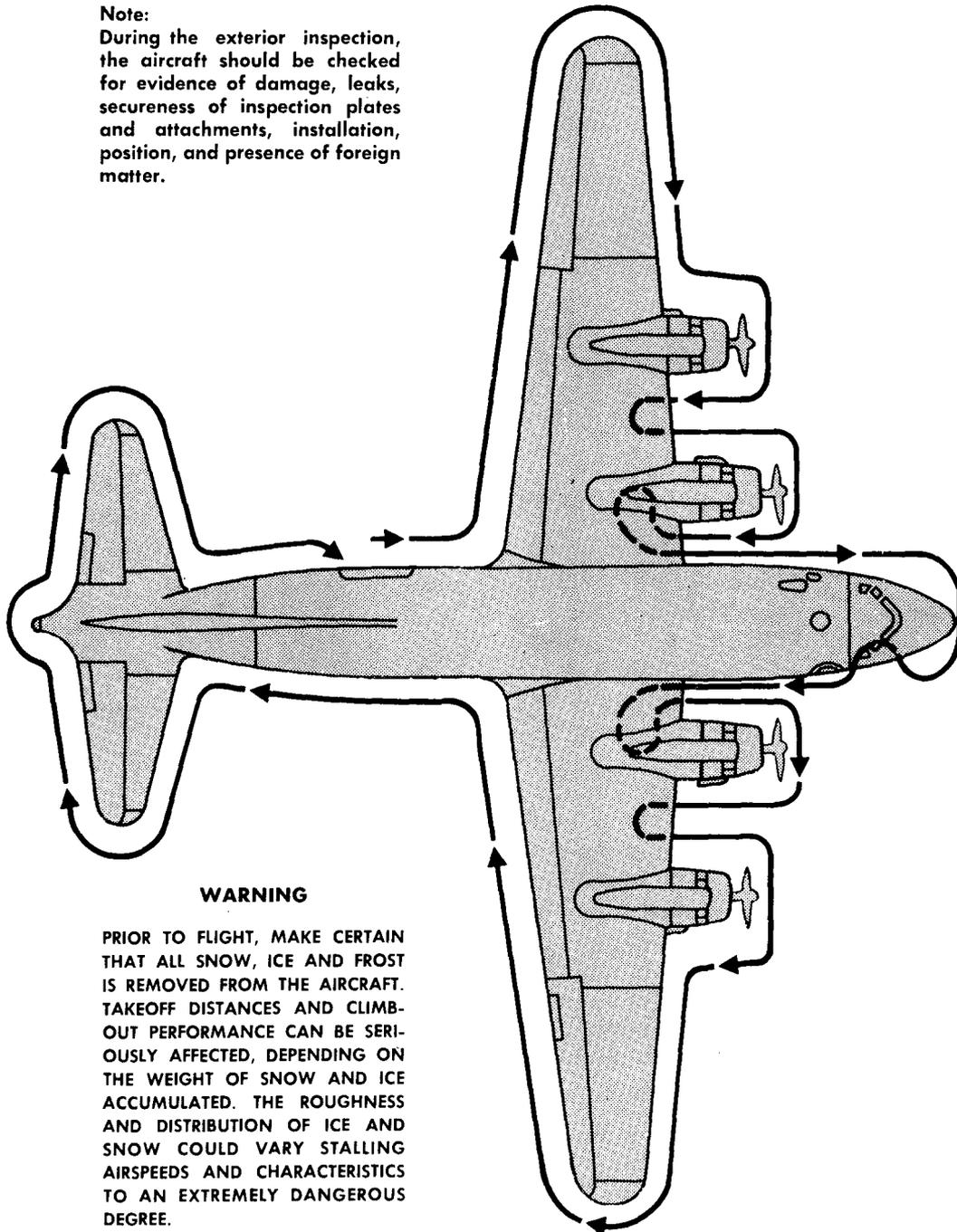
- *5. APP/APU—On the line (FE).

WARNING

If an external power unit is being used, it should be at a maximum cable length from the aircraft on the pilot's side.

EXTERIOR INSPECTION

Note:
During the exterior inspection, the aircraft should be checked for evidence of damage, leaks, secureness of inspection plates and attachments, installation, position, and presence of foreign matter.

**WARNING**

PRIOR TO FLIGHT, MAKE CERTAIN THAT ALL SNOW, ICE AND FROST IS REMOVED FROM THE AIRCRAFT. TAKEOFF DISTANCES AND CLIMB-OUT PERFORMANCE CAN BE SERIOUSLY AFFECTED, DEPENDING ON THE WEIGHT OF SNOW AND ICE ACCUMULATED. THE ROUGHNESS AND DISTRIBUTION OF ICE AND SNOW COULD VARY STALLING AIRSPEEDS AND CHARACTERISTICS TO AN EXTREMELY DANGEROUS DEGREE.

Figure 2-1

X1-36

BEFORE STARTING ENGINES. (Continued)

- *6. BUS Voltage—26-28 volts (FE).

Voltage reading of 26 to 28 volts indicates that APP or external power unit is delivering to the BUS.

- *7. Generator Switches—ON (FE).
- 8. Booster Pump Switches—OFF (FE).
- 9. Antiskid Switch—OFF (HC-54) (FE).
- 10. Navigator's and Pilots' Compartment (Cockpit) Lights—As Required (FE).

- *11. NO SMOKING and FASTEN SEAT BELT Sign Switches—ON (FE).

- *12. Warning and Position Lights—Checked (P, CP, FE).

Check that all fire warning, marker beacon indicator, UHF homing adapter indicator, landing gear position, radio low altimeter indicator, generator failure, inverter failure, door warning, antiskid (HC-54), and anti-icing pump indicator lights have been tested and are operational.



Correct inoperative fire detection circuits prior to flight. Fires in certain accessory areas could develop to a substantial degree before other methods of detection are evident.

- *13. Navigation Position Lights - As required (FE).
- 14. Fire Extinguisher Selector Handles- IN (FE).
- *15. Fuel Tank Selector Levers - Main tanks ON (FE).

Note

On eight-wing-tank systems, use extreme care to insure that the selectors are in the detent position.

- 16. Carburetor Air Levers—COLD (FE).

Check that carburetor air levers are in COLD position (full forward) and ram air door is fully retracted in carburetor or air scoop.

- 17. Crossfeed Selector Levers—OFF (FE).

- 18. Propeller Levers—Forward (FE).

- *19. Throttles—Set (FE).

Check that throttles are positioned for approximately 800 to 1000 rpm.

- 20. Autopilot—Disengaged/OFF (P, FE).

On A3-A autopilot check that autopilot servo unit handles are disengaged.

Note

Autopilot oil shutoff handle should remain on for system lubrication.

On E-4 autopilot check that autopilot servo engage switches are disengaged and autopilot power switch is OFF.

- 21. Mixture Levers—IDLE CUT OFF (FE).

- 22. Landing Gear Lever—DOWN and locked (FE).

Check that landing gear lever is in DOWN position, the spring clip is in place, and solenoid pin is across the lever.

- 23. Wing Flap Lever—OFF (FE).

- 24. Blower Levers—LOW and LOCKED (FE).

- 25. Cowl Flap Levers—OPEN (P, CP, FE).

Check cowl flaps OPEN.

- 26. Fuselage and Auxiliary Fuel Tank Selectors (if installed)—OFF (FE).

- 27. Bypass Handle—DOWN (FE).

28. Emergency Hand Pump Selector Handle—CLOSED (FE).
29. Emergency Landing Gear Extension Handle—OPEN (aft) (FE).
30. Emergency Airbrake Pressure—Checked (FE).

Check that emergency airbrake pressure to 950 to 1050 psi.

BEFORE STARTING ENGINES. (Continued)

31. Static Source Selector Switches—STATIC/NORMAL (P, CP).

Check that both pilot's and copilot's static source selector switches are in STATIC/NORMAL (up) position, and safetied in place with safety clip or safety wire.

Phase II.

- *1. Passenger Briefing—Complete (P).

Check that passengers have been briefed by the pilot or his designated representative. Refer to Passenger Briefing Checklist in Section VIII, and locally reproduced briefing cards located at each passenger position.

2. Aircrew Visual Inspections—Completed (P).

Ascertain that all crew members have completed applicable aircrew visual inspections.

- *3. Form 781 and Form 365F—Checked (P).

Check that all predeparture maintenance/inspections have been performed, all discrepancies have been noted, and that weight and balance is within limits.

- *4. Takeoff, Climb, and Landing Data—Computed (P).

5. Oxygen or Smoke Masks—In place (P, CP, FE, N, RO).

Check that respective oxygen or smoke masks are installed and regulator is set.

Note

To minimize time delay during an emergency when oxygen is required, it is suggested that the masks be kept installed in place and the oxygen regulator be set to 100% OXYGEN.

6. Seats and Rudder Pedals—Adjusted (P, CP).

- *7. Hydraulic Pressure—1200 psi (minimum) (FE).

Operate hydraulic hand pump to raise hydraulic pressure to minimum of 1200 psi so that parking brakes can be set.

Note

Use of the hand pump to raise the hydraulic pressure should be accomplished while the brake pedals are depressed.

- *8. Parking Brakes—Set (P).

- *9. Inverter Switch(s)—NORMAL/MAIN (FE).

Place inverter switch(s) to EMER/SPARE position and observe that inverter failure light goes off. Place switch(s) to OFF momentarily, then set switch(s) to NORMAL/MAIN and observe that inverter failure light goes off.

- *10. Auto Pilot Power Switch (if installed)—ON (P, FE).

11. Quantity Indicators—Checked (P, FE).

Check that flight engineer has compared fuel dip stick readings with fuel quantity indicators, and has compared oil quantity indicator and anti-icing fluid quantity gage readings with known quantities in tanks. The flight engineer will state any discrepancies.

BEFORE STARTING ENGINES. (Continued)

- *13. UHF/VHF Radios - ON and Checked. (CP)
One radio should be turned ON, tuned to tower frequency and radio contact established with tower prior to starting engines.
- 14. Flight Instruments—Uncaged (P, CP).
- *15. Manifold Pressure—Noted (P, CP, FE).
- *16. Ground Safety Locks, Tail Stand, Pitot; Covers, and Entrance Ladder—Aboard and stowed (FE).
- *17. Before Starting Engines Checklist—Completed (FE).

STARTING ENGINES.

- 1. Engines—Clear (P, CP).

The pilot and copilot will determine that area surrounding engines is clear of personnel and objects and that a fire guard is posted before starting engines.

- 2. Master Ignition Switch—ON (FE).

The flight engineer will place master ignition switch in ON position.

- 3. Engine No. 3—Start (CP, FE).

Note

An inboard engine is always started first in order to gain hydraulic pressure.

- a. At the command from pilot to start engines, flight engineer will place booster pump switch momentarily to LOW and then HIGH, and so state. The copilot will place No. 3 starter switch ON. As propeller rotates through 12 blades, watch for indication of hydraulic lock. If no hydraulic lock is evident, copilot will request, "Switch on."

Note

If less than one hour has elapsed since previous shutdown, allow propeller to turn freely for 6 blades before requesting ignition switch on.

- b. The flight engineer will turn No. 3 ignition switch to BOTH as directed.

CAUTION

If engine fails to start within 45 seconds of cranking, allow the starter to cool for 3 minutes before attempting another start.

- c. The flight engineer will handle throttles and retard in case of backfire.
- d. The copilot will prime as necessary until engine is running smoothly on constant prime. At a minimum of 800 rpm, copilot will state, "Mixture auto rich."
- e. The flight engineer will move mixture lever to AUTO RICH.

Note

The use of auto lean mixture is approved for ground operations. This is particularly advantageous for operations while taxiing and holding while awaiting takeoff clearance, while operating at high altitude airfields and/or during high temperature and humidity conditions.

- f. The copilot will release prime after rpm drop is noted (normally 50 to 100 rpm) thus assuring that carburetor is delivering fuel to power section.

Note

This procedure will reduce the tendency of the engine to backfire.

STARTING ENGINES. (Continued)

- g. After engine is running at approximately 1000 rpm, flight engineer will check oil pressure, turn booster pump switch OFF, check fuel and hydraulic pressure, and lower wing flaps.

CAUTION

If there is no indication of oil pressure after 30 seconds of operation, shut down the engine and have malfunction corrected.

4. Engine No. 4—Start (CP, FE).

Repeat starting procedure for No. 4 engine, leaving wing flaps down until all engines are started.

5. External Power Unit—Removed and clear (P).
6. Battery Switch—ON (FE).
7. Door Warning Light—OFF (P).
8. Engine No. 2—Start (P, FE).
9. Engine No. 1—Start (P, FE).
10. Starting Engines Checklist—Completed (FE).

BEFORE TAXI.

1. **RADIOS - ON**

Turn on required radio to allow sufficient time for warm up.

2. Windshield Wipers—Climatic (P, CP).

Check wipers for operation.

Note

Do not operate windshield wipers on dry glass.

3. Vacuum Pressure—Checked (P, CP).

Check vacuum pressure on both pumps. Leave vacuum pump selector in desired pump position.

NOTE

If vacuum pressure is not within limits, recheck vacuum pressure at 1500 rpm.

CAUTION

On aircraft with a six-position selector installed it is possible to position the selector where only the pilot's or copilot's flight instruments are receiving vacuum pressure. Refer to Section I for proper pump selector positions.

4. Flight Instruments—Set (P, CP, N/FE).

Check that all flight instruments are set and uncaged, fluxgate master compass is set for applicable variations (normally zero), and N-1 Compass (if installed) is correctly set and synchronized.

WARNING

05-14
sec. 3-D

Delete

All altimeters should be checked closely to assure that the 10,000 foot pointer is reading correctly. Due to previous settings, the setting knob could have been rotated until the numbers reappeared in the altimeter setting window from the opposite side, thus indicating a 10,000 foot error.

BEFORE TAXI. (Continued)

5. ~~OFF/SIF-STANDBY (P/FE).~~ *15 19*
~~NMS/IFF STANDBY (P/FE)~~ *15 19*

6. Seat Belts - Fastened (Crew).

7. Alarm Bell - Checked (P).

The alarm bell will be checked with engines running in order that crew and/or passengers will become familiar with the sound. This check is not required on aircraft equipped with a public address system or aircraft used in aeromedical operations.

8. Hydraulic Pressure - Checked (FE).

Check within limits.

9. Interphones - Checked (Crew).

10. Ignition Grounding - Check (FE).

Reduce power to 800 rpm and place master ignition switch handle to OFF, then ON. Check all ignition switches on LEFT, RIGHT, and OFF positions. All engines should cease firing momentarily when switches are placed in OFF position. If any engine continues running, investigate.

CAUTION

Perform this check as rapidly as possible to prevent backfiring when the ignition switch is returned to BOTH.

WARNING

If the engine does not cease firing during the check, the magneto ground wire is open at some point; warn personnel to keep clear of the propeller after the engine is shut down until the defect has been corrected.

11. Chocks - Removed (P, CP).

Pilot will direct removal of wheel chocks by hand signal to ground crew. Pilot and copilot will visually determine that chocks have been removed.

12. Ground Clearance - Clear left and right (P, CP).

At pilot's direction, copilot will contact control tower for taxi clearance. Check and set altimeters and clocks. Pilot and copilot will clear aircraft and answer, "Clear left," "Clear right." For minimum turning radius and ground clearance, see figure 2-2.

Note

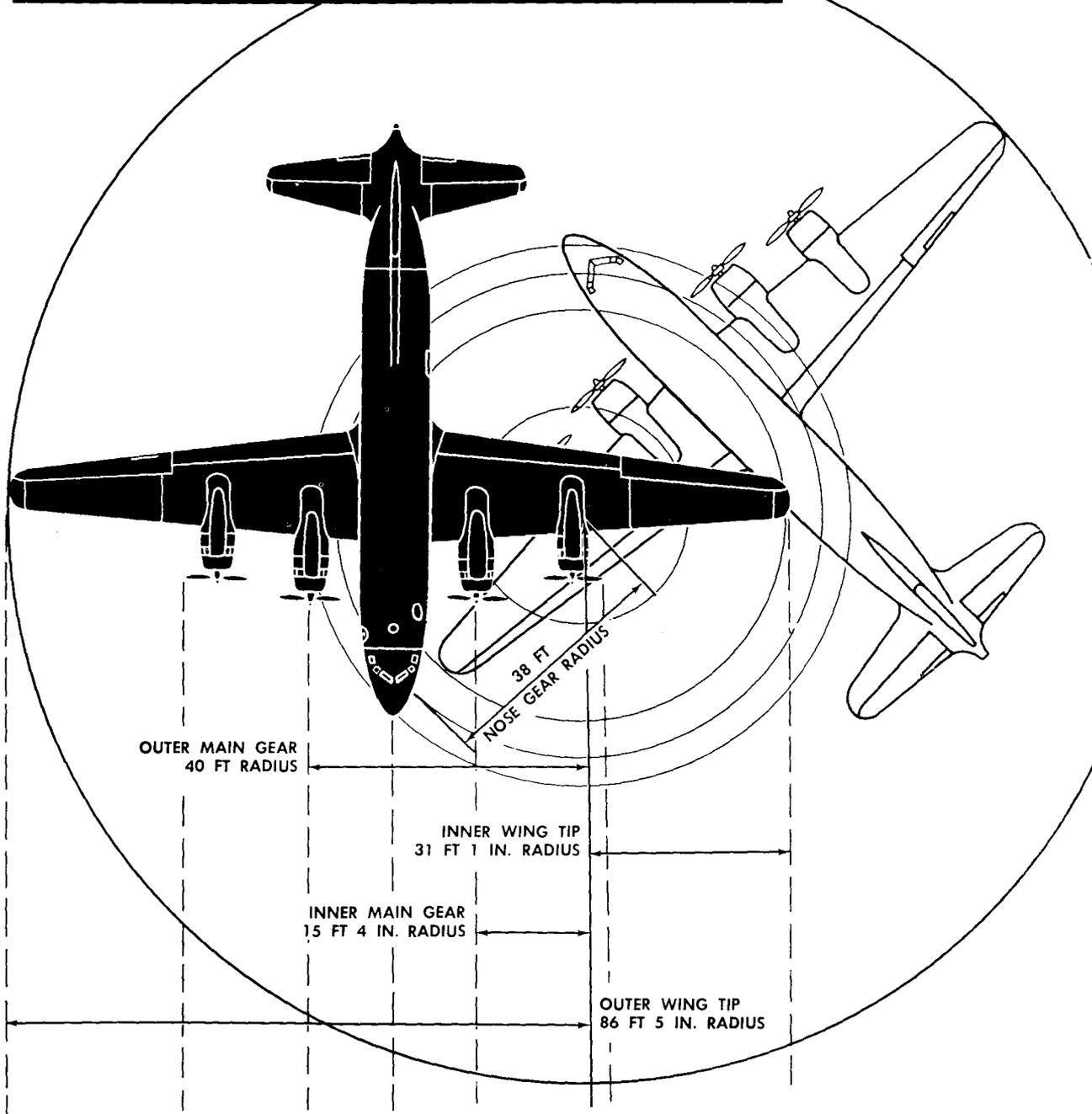
Use Aldis lamp for scanning area during ground operation at night.

13. Before Taxi Checklist - Completed (FE).

TAXI PROCEDURES.

Normal taxiing is accomplished with all operating engines set at 800 to 1000 rpm, depending upon gross weight and taxiway gradient. Turn by use of nosewheel steering. Use full flaps and as little power as necessary when moving away from the ramp to avoid dusting personnel and equipment. Avoid high taxiing speeds and excessive movement of the nosewheel. Begin a turn with a slight change in direction of the nosewheel and gradually increase it until the desired rate of turn is established. Use the same technique to straighten out the turn. The rolling inertia of the aircraft resists turning, which may cause sidewise skipping and skidding of the nosewheel, especially when the surface is slick. In this case, and only in this case, may outboard engines be used in turning. Avoid sharp turns at high speeds. Always stop with the nosewheel straight; otherwise,

TURNING RADIUS AND GROUND CLEARANCE — Typical



**APPROXIMATE WING
PIVOT POINT**

Note:
For ground maneuvering with nose wheel set at full left or full right, the aircraft pivots about a point outboard of the main gear and requires a circle approximately 175 ft. in diameter to turn.

VERTICAL CLEARANCES

VERTICAL STABILIZER TIP	27 FT 10 IN.
FUSELAGE	17 FT 6 IN.
PROPELLER INBOARD	13 IN.
PROPELLER OUTBOARD	30 IN.

Figure 2-2

N1-36

TAXI PROCEDURES. (Continued)

side loads and strain will be placed on the nosewheel tire and strut during engine runup. In stopping, depress the brake pedal, and, as the aircraft slows, gradually release brake pressure so that when the aircraft stops very little pressure is being applied to the pedals. Make certain the aircraft has stopped prior to setting the parking brake. Use caution at all times while taxiing, to avoid accidents.

CAUTION

Avoid sudden acceleration or deceleration of the engines to prevent stresses from being imposed on engines and mounts.

TAXI CHECK.***1. Brakes—Checked (P).**

To check brake operation, depress brake pedals lightly. If brakes are operating properly, pressure will be felt through pedals and aircraft will react. When clear of congested area complete the balance of the Taxi Check.

***2. Ignition Analyzer—ON (FE).**

Place ignition analyzer system power switch and ignition analyzer power switch to ON to allow sufficient time for warmup prior to engine runup.

***3. Flight Instruments—Checked (P, CP).**

Observe operation of turn-and-slip and heading indicators while making turns.

***4. Wing Flaps—15 Degrees (FE).**

Set wing flaps to 15 degrees during engine runup to reduce fuselage vibration. Any tendency of flaps to creep will be noted prior to takeoff.

5. Fuel System—Checked (FE).

Check fuel system for proper operation of auxiliary, fuselage, and crossfeed systems.

6. Carburetor Heat and Alcohol—Check (FE).

Place carburetor air levers for each engine to HOT and check for rise in carburetor air temperature. Then place carburetor anti-icing switch to ON and check for decrease in carburetor air temperature. After decrease in carburetor air temperature is noted, return carburetor anti-icing switches to OFF and return carburetor air levers to COLD.

7. Taxi Check—Completed (FE).*ENGINE RUNUP.*****1. Nosewheel—Centered (P).**

When power is applied during engine runup, pilot and copilot will monitor aircraft for movement due to brake slippage or slick surfaces. Aircraft movement can be detected readily by the pilot while resting his hand on nosewheel steering wheel.

2. Parking Brakes—Set (P).**3. Cowl Flaps—Checked and Open (P, CP, FE).**

ENGINE RUNUP. (Continued)

- c. TACAN—Check same as VOR plus range indicator.

4. Wing and Empennage Deicing System—
Check (P, CP, FE).

The flight engineer will turn wing deicing switch to ON and either the flight mechanic or scanner will observe the action of horizontal and vertical stabilizer boots through astrodome (or scanners blisters, HC-54). The pilot and copilot will observe action on wing deicing boots on their respective sides. Turn wing deicing switch OFF, upon completion of test.

- *5. APP—OFF (FE).

- *6. Radios and Search Radar—As required (P, CP, N).

During engine runup, pilot and copilot will monitor checks, receive airways clearance, tune radios, set radio low altimeter, observe search radar for departure weather and check navigation radios as follows:

- a. VOR, ILS, and radio compass—
Identified if station is available.
- (1) RMI—Check for proper bearing indication.
 - (2) Course Deviation Indicator—
Set bearing indication in the course selector window and CDI should center (VOR or TACAN).
 - (3) Course Deviation Indicator and Glide Slope Indicator—
If field has operational ILS, tune to appropriate frequency and check for proper displacement of CDI and glide slope indicator. Both OFF flags should be hidden.
- b. Radio Compass—Check for proper bearing indications. Check set on ANT, ADF, and loop positions.

WARNING

- On all aircraft, Occasionally TACAN equipment will "Lock-On" to a false bearing which will be 40 degrees or a multiple of 40 degrees in error. These errors can be on either side of the correct bearing. When the TACAN locks-on a false bearing, switching to another channel and then back to the desired channel, or turning the set off and then back on will recycle the search mode. This will most probably result in a correct lock-on.
- When using TACAN, cross check for false lock-on with ground radar, airborne radar, VOR, dead reckoning or other available means. These checks are especially important when switching channels or when turning the set on. When false lock-on is suspected follow procedure outlined in TACAN Operation, Section IV, for recycling the TACAN search mode.

ENGINE RUNUP. (Continued)**Note**

A false lock-on does not affect the DME display provided by the TACAN equipment.

- *7. Temperatures and Pressures—Within Limits (FE).

The flight engineer will check temperatures and pressures within normal limits. When engine oil temperature reaches a minimum of 40°C, the engine is sufficiently warm for runup regardless of cylinder head temperatures.

- *8. Mixture Levers—AUTO RICH (FE).

- *9. Throttles—1700 rpm (FE).

- *10. Blowers—HIGH (FE).

- *11. Propellers—Exercise (FE).

Move propeller levers through entire range to properly check propeller governor action. Normally two complete cycles are sufficient to check proper operation.

Note

The minimum propeller governing speed is 1200 ± 25 rpm with the propeller lever in the RPM DEC position.

- *12. Generators—Checked (FE).

Check generator output. Normally it is only necessary to check that bus

voltage is 27.5 to 28.0 volts. Amperage readings should be steady and within 10 percent of average loads of other generators. If more detailed check of each generator is desired, check no-load voltage of each generator by selecting desired generator on dc voltmeter selector switch, placing respective generator switch to OFF, and reading voltage output of that generator.

- *13. Feathering—Checked (FE).

Depress propeller feathering buttons, one at a time, until a 200 rpm drop is noted. Pull out feathering buttons and note that rpm returns to 1700.

- *14. Power/Magnetos—Check (P, CP, FE).

a. The flight engineer will retard No. 2, 3, and 4 throttles to 1000 rpm and state, "Ready for magneto check."

b. Pilot sets No. 1 throttle to barometric pressure and states, "Low blower one." Flight mechanic states, "Low blower," and shifts blower lever to LOW, then checks engine instruments. Pilot adjusts No. 1 throttle to barometric pressure. Tachometer should read 2200 ± 50 rpm.

Note

When making a power check in a headwind, approximately two rpm should be added to the above check rpm for each knot headwind. For example, if the wind were 25 knots, and the aircraft were headed into it, the rpm developed during the power check would be approximately 2250 ± 50 rpm.

c. During check pilot observes engine No. 1 visually for roughness, fuel and oil leaks, smoke, sparks, etc. Flight mechanic makes magneto check by moving No. 1 ignition switch from BOTH to RIGHT and

ENGINE RUNUP. (Continued)

back to BOTH, from BOTH to LEFT then back to BOTH. Normal drop is 50 to 75 rpm; drop should not exceed 100 rpm or a difference of 40 rpm between magnetoes. Retard No. 1 throttle to 1000 rpm and report amount of magneto drop and any discrepancies noted.

- d. Repeat for engines No. 2, 3, and 4. Pilot observes engine No. 1 and 2, copilot observes No. 3 and 4.

Note

Two symmetrical engines may be run up simultaneously at the pilot's discretion.

- *15. Engine Runup Checklist—Completed (FE).

BEFORE TAKEOFF.

1. Trim Tabs—Set (P).

Normally all trim tab indicators should be set at zero

2. Flight Instruments—Checked/Set (P, CP, N).

- a. Magnetic Compass—Checked (P).

Compass should indicate approximate aircraft heading. Test compass light and correct fluid level.

- b. Heading Indicators—Set and UNCAGED (P, CP).

The N-1 compass is set at navigator's station and cross checked with magnetic compass. Cage flux-gate compass.

- c. Attitude Indicator—Set and UNCAGED (P, CP).

Align the miniature aircraft on horizon bar.

WARNING

- To avoid possibility of takeoff with the J-8 attitude indicator erected in the inverted position, the instrument must be caged prior to takeoff to insure proper erection.
- To avoid damage to the instrument do not pull the caging knob violently.

- d. Airspeed Indicators—Checked (P, CP)

- e. Vertical Velocity Indicators Checked—(P, CP).

3. Altimeters—State Setting (P, CP, N).

Set altimeter to setting received and compare with known field elevation. If more than 75 feet in error have malfunction corrected before flight.

4. Fuel Tank Selector Levers—Main tanks ON (FE).

For all engine starts, takeoff, and landing operation, use a straight line system of each main tank to its respective engine, ie, main tank No. 1 to engine No. 1, main tank No. 2 to engine No. 2, etc.

5. Carburetor Air Levers—COLD (FE).

Normally, carburetor air levers will be in COLD position to prevent loss of power during takeoff. Refer to Section IX for cold weather operation.

6. Crossfeed Selector Levers—OFF (FE).

BEFORE TAKEOFF. (Continued)

- 7. Propeller Levers—Forward and locked (FE).

Adjust friction lock tension so that propeller control levers are snug enough to prevent creeping.

- 8. Wing Flaps—15 Degrees (P, FE).
- 9. Blower Levers—LOW and locked (FE).
- 10. Emergency Landing Gear Extension Handle—CLOSED (FE).

In the event that emergency gear extension handle is left in OPEN (aft) position, hydraulic pressure will not be supplied to uplines and gear will not retract when landing gear lever is placed in UP position. See Section III for emergency operation of the gear.

- 11. Wing Deicers—OFF (FE).



Operation of the wing deicers creates a turbulent effect in the airstream passing over the wing, thereby tending to increase stall speeds.

- 12. Booster Pumps—HIGH (FE).

Place fuel booster pump switches in HIGH position to assure adequate fuel supply during maximum power settings and in the event of engine-driven pump failure during critical phase of takeoff.

- 13. Brake Antiskid Switch (if installed)—ON (FE).

The flight engineer places brake anti-skid switch to ON position. If brake anti-skid system warning light comes on, normal braking is still available but anti-skid switch should be turned OFF.

- 14. Autopilot—DISENGAGED/OFF (P).

- 15. Lights—Climatic (P, CP, FE).

- 16. Windshield Defrosters—Climatic (P, CP).

- 17. Crew Briefing—Completed (P).

The pilot should brief the crew as necessary regarding any aspects of takeoff which might be unusual or not routine. Consider crews experience and avoid needless repetition.

- 18. Gust Lock—OFF (P, FE).

The pilot will steady controls. The flight engineer pulls gust lockpin and assures that lock handle is full down (Unlocked).



The gust lockpin tape is spring loaded and may cause injury to personnel if not handled with caution.

- 19. Flight Controls—Checked (P, CP).

The pilot will check controls for freedom of movement, pilot and copilot will visually check for correct movement. The copilot will take control of the yoke and steady the controls to prevent possible damage due to gusty surface winds.

- 20. Prop Anti-icers—Climatic (P).

- 21. APP—OFF (FE).

- 22. Before Takeoff Checklist—Completed (FE).

CREW BRIEFING — TYPICAL.

The pilot will brief the crew to assure they know their duties during takeoff. Deviations

BEFORE TAKEOFF. (Continued)

from normal procedure should be clearly defined. The following items will be covered:

- a. Review Takeoff and Landing Data.
- b. Pattern (or IFR route) to be followed in case an immediate landing is necessary after becoming airborne, and communications requirements.
- c. Air Traffic Control clearance and route to be flown after normal departure.

The following standard items will also be covered by a crew making its first flight together.

- a. The copilot will monitor control column, normally use slight forward pressure to keep nosewheel in firm contact with runway. During crosswind conditions, aileron displacement may be required to keep wings level.
- b. The pilot will advance throttles to maximum power and monitor until refusal speed is reached or exceeded. The flight engineer will follow up on throttles and adjust to maximum power.

WARNING

The throttle friction lock should not be applied so tight as to restrict the rapid power (throttle) reduction required in a rejected takeoff emergency.

- c. The flight engineer will monitor engine instruments and call out "Reject" when unacceptable condition is observed.
- d. The copilot will monitor acceleration check by use of airspeed and clock/or runway marker. If acceleration is below designated tolerance or any other unacceptable condition is noted, call out "Reject"

- e. At refusal speed, copilot calls out "Go" if refusal is below takeoff speed, and calls out "Lift off," when takeoff speed is reached.
- f. If an emergency/or malfunction occurs before refusal speed is attained, takeoff will be discontinued; after refusal speed, takeoff will be continued and treated as an inflight emergency.
- g. The copilot will acknowledge and retract gear on pilot's visual and oral signal.
- h. The flight engineer will monitor throttles, guard wing flap handle during gear retraction, and raise wing flaps on the pilot's command.
- i. The first power reduction after the wing flaps are retracted will be to METO power at pilot's command.
- j. If any emergency arises, either copilot or flight engineer will notify the pilot. Standard emergency procedures will be used. The flight engineer will not feather a propeller except on pilot's command. The copilot will monitor flight engineer's actions.

LINE UP.

After the aircraft has been cleared onto the runway prior to takeoff, complete the following:

1. Cockpit Windows—Closed and locked (P, CP, FE).
2. Cowl Flaps—TRAIL (FE).

The flight engineer will move cowl flap levers from OPEN, momentarily to CLOSE, and then TRAIL position.

3. Mixture Levers—AUTO RICH (FE).

The flight engineer will move and/or check mixture levers in AUTO RICH detent.

LINE UP. (Continued)

4. Anticollision Light — As Required.
(P)

WARNING

Use of the anticollision light during night weather operation may result in spatial disorientation.

5. Pitot Heaters—Climatic (P, FE).

Place pitot heater switches ON if precipitation or icing conditions are anticipated immediately after takeoff.

CAUTION

Do not operate pitot heaters for extended periods on the ground (1 minute maximum) as lack of cooling air will result in damage to the pitot heads. However, once the pitot heaters have been turned on, they should be left on for the remainder of the flight to prevent damage to the heating elements caused by initial current surges when the unit is turned on.

6. ~~HFF/SIF Set (Mode and Code as briefed) (P, FE). See 05-14 Sec 3-F for new SIFP.~~

7. Line Up Checklist—Completed (FE).

TAKEOFF.

The following techniques will be observed by all pilots.

NORMAL TAKEOFF.

- a. The aircraft will be maneuvered to a position that permits use of entire runway length. See Figure 2-3.

WARNING

Running takeoffs are not recommended because of possible pilot disorientation.

- b. In order to obtain results stated in take-off performance charts in Appendix, maximum power must be used from start of the ground run. A short hesitation prior to takeoff is recommended to avoid spillage and/or syphoning of fuel from fuel tank vents during takeoff and climb, especially with full fuel tanks. The technique of holding brakes until maximum power is attained can be modified without appreciably affecting performance. In takeoff position, the pilot will advance throttles while holding brakes and apply partial power. The pilot will then release brakes and smoothly apply maximum power. The flight engineer will follow pilot through on initial power application and guard throttles after maximum power is established.

Note

In order that maximum power be fully effective during the takeoff ground run, the throttles must be advanced to maximum power within 5 seconds after the brakes are released.

- c. During acceleration to takeoff speed, the pilot's left hand will be on the nosewheel steering wheel. Directional control will be maintained with nosewheel steering wheel until the rudder becomes effective (approximately 43 knots) at which time directional control should be maintained with rudder. The left hand should be shifted to the control column and slight back pressure applied to lighten load on the nosewheel.

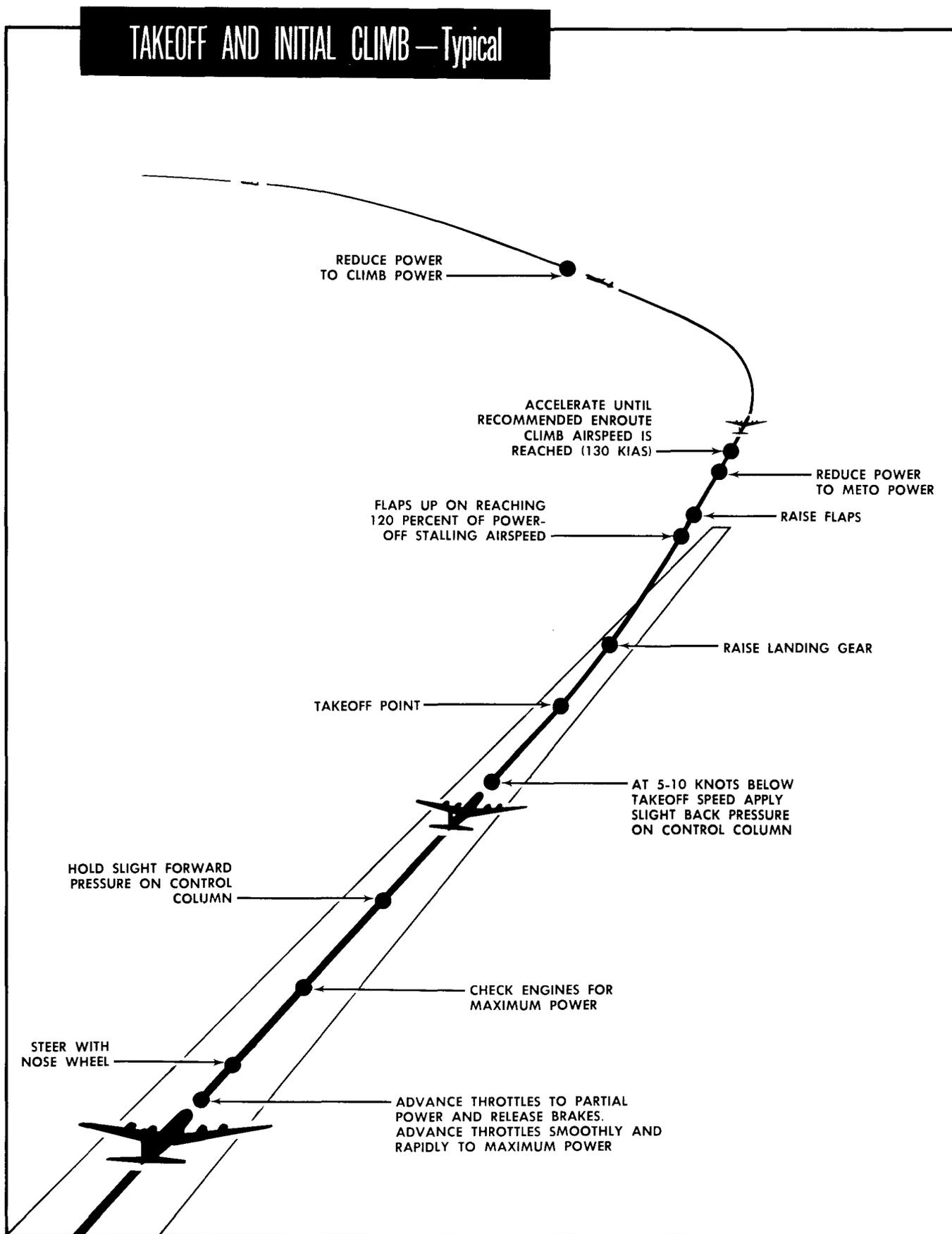


Figure 2-3

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TAKEOFF. (Continued)

At approximately 5 to 10 knots below computed takeoff speed, ease back on the control column gradually and smoothly in such a manner that aircraft produces a smooth transition to takeoff attitude and leaves ground at takeoff speed.

- d. Forward pressure should be maintained during initial portion of takeoff run. During crosswind takeoff, some aileron displacement may be required to keep wings level. These duties should be performed by the copilot until the pilot takes over control column.
- e. The copilot will call, "Reject," if computed acceleration is not met, or if any unacceptable condition is noted. He will call out, "Go," as refusal speed (if below takeoff speed) is attained, and, "Lift off," as takeoff speed is reached.
- f. The copilot will cross-check flight instruments on all night and instrument takeoffs. The flight engineer will monitor engine instruments for any indication of malfunction or overboost.

WARNING

When the nosewheel is raised from the runway below the minimum control speed (83 knots IAS), there is insufficient rudder force available at full deflection to overcome the yawing moment of a windmilling propeller until power is either reduced to a symmetrical condition or the nosewheel is lowered to the runway to provide directional control assistance. Lifting the nosewheel from the runway before this speed is attained places the aircraft in an uncontrollable condition in the event on an engine failure. In order to insure controllability throughout the takeoff run, the nosewheel will be monitored and allowed to remain on the runway until minimum control speed is attained.

MINIMUM RUN/OBSTACLE CLEARANCE TAKEOFF.

Compute takeoff performance and takeoff flight path from performance data in the Appendix. Complete the Before Takeoff and Line Up Checklists and position the aircraft so that all of the available runway can be used. Advance throttles to maximum power before releasing the brakes, then proceed as in a normal takeoff.

Maintain maximum power and takeoff speed, leaving the wing flaps set at 15 degrees. After the obstacle is cleared, level off and gain airspeed before retracting the wing flaps. Proceed as during a normal climbout.

CROSSWIND TAKEOFF.

In a crosswind, use ailerons to keep the wings level and keep the aircraft in a three-point attitude until reaching takeoff speed. This procedure will help in maintaining directional control. When airborne, the pilot will make a coordinated turn to crab into the wind in order to maintain a track over the runway. See Takeoff And Landing Crosswind Chart, Part 3 of the Appendix.

NIGHT TAKEOFF.

Instrument climb procedures are recommended to avoid flying back into the ground.

AFTER TAKEOFF — CLIMB.

The following procedure will be observed immediately after takeoff.

- *1. Landing Gear Lever—UP (CP).

When aircraft is definitely airborne, and positive rate of climb is established, pilot will indicate, "Gear up," by visual and oral signal. The copilot

AFTER TAKEOFF — CLIMB. (Continued)

will repeat command, "Gear up," then move landing gear level to UP position. The flight engineer will guard wing flap lever to prevent inadvertent retraction of wing flaps.

CAUTION

Do not apply brakes after takeoff as structural damage may result.

***2. Wing Flap Lever—UP (FE).**

Continue climb at maximum power and as minimum wing flap retraction airspeed (120 percent of power-off stalling speed) is reached, and flight engineer calls out, "Gear up, red light out," pilot will call for wing flap retraction. The flight engineer will retract wing flaps as directed by the pilot. See Characteristic Takeoff Speeds Chart, Part 3 of the Appendix.

Note

After landing gear retraction, allow the aircraft to accelerate. This may be accomplished by holding the aircraft in the takeoff attitude, thus allowing drag reduction from landing gear retraction and/or power change to affect the acceleration. It is not necessary, or advisable to decrease the angle of attack to increase airspeed. As soon as the landing gear has retracted and the minimum wing flap retraction airspeed has been reached, start wing flap retraction. If the wing flaps are retracted during a period of acceleration, no change in aircraft attitude will be required to maintain a relatively constant flight path slope; however, if wing flap retraction is delayed until a constant airspeed or slower rate of acceleration is attained, it will be necessary to increase the

angle of attack as the wing flaps retract. If the angle of attack is not increased, settling will occur. When the angle of attack is increased under these conditions, the result is not a reduction in airspeed; rather, the airspeed will continue to increase due to the resultant drag reduction as the wing flaps retract.

***3. Landing Light Switches—RETRACT and OFF (FE).**

***4. METO Power—Set (FE).**

After wing flaps have been retracted, pilot will state, "METO power." The flight engineer will adjust first the throttles, and then propeller levers to METO power and call out, "METO power set." The copilot will monitor power indications.

5. Landing Gear Lever—NEUTRAL (FE).

Monitor red landing gear warning light for possible landing gear uplatch failure. If landing gear uplatch has failed, red landing gear warning light will come on 3 to 5 minutes after hydraulic system has been bypassed.

6. Wing Flap Lever—OFF or as required (FE).

Hydraulic pressure bleed-off may allow wing flaps to droop after a period of time. The wing flap lever should be momentarily placed to UP position to correct droop. In severe cases, wing flap lever may be placed to UP position during entire flight. This condition should be noted in Form 781 for maintenance correction.

7. Hydraulic System Bypass Handle—UP (FE).

Monitor the red landing gear warning light.

AFTER TAKEOFF — CLIMB. (Continued)

8. Climb Power—As required (FE).

After METO power has been set, continue acceleration until the recommended enroute climb airspeed (130 knots IAS) is reached. At this time, as directed by the pilot, flight engineer will reduce METO power to desired climb power. This technique should be followed for both four- and three-engine initial climb as it results in minimum time requirement for high power settings and furnishes adequate cooling in shortest possible time.

8A. AIMS/IFF - NORM (PCP, FE)
OS 14 sec. 3G
Note

- If conditions require a higher rate of climb, METO power may be used until cruising altitude is reached.
- In the event a higher altitude is required over a given distance, METO power and an airspeed of 120 percent of power-off stall speed is recommended.

9. Generator Output—Check (FE).

Check generator output within limits.

10. Main Fuel Tank Booster Pump Switches—LOW (FE).

Refer to Fuel System Management, Section VII.

*11. Engine Instruments—Check (FE).

Check all engine instrument readings within limits.

12. Engines and Top of Wings—Scan (FE).

Scan engines and wings for evidence of loose cowling, oil or fuel leaks, and syphoning. Report condition to pilot.

13. FASTEN SEAT BELT/NO SMOKING Sign—As required (FE).

Turn sign off after cabin has been checked for fuel fumes, if flight conditions permit.

*14. After Takeoff—Climb Checklist—Completed (FE).

See Part 4 of the Appendix for climb performance and Section VII for blower operation.

CRUISE.

Level off upon reaching cruising altitude and maintain power setting until desired cruising airspeed is attained. At this time, notify the flight engineer and copilot to obtain the cruise condition desired.

1. Hydraulic System Bypass Handle—DOWN (FE).

Place bypass handle in DOWN position and check hydraulic pressure within limits.

2. Cowl Flap Levers—CLOSED (FE).

When leveling off, it is not necessary to wait until cruising speed is attained before closing cowl flaps.

3. Hydraulic System Bypass Handle—UP (FE).

4. Cruise Power—Set (FE).

The pilot will direct flight engineer to set power desired for cruise. See Section V for operating limits and the Appendix for power settings.

CRUISE. (Continued)

5. Mixture Levers—AUTO LEAN (FE).

Move mixture levers to the AUTO LEAN detent and note fuel flow indication.

6. Booster Pumps—As required (FE).

See Section VII for booster pump operation.

7. Fuel Tank Selector Levers—As required (FE).

8. Cruise Checklist—Completed (FE).

Note

It is recommended that once each hour a wing scan and ignition analyzer check be accomplished.

FLIGHT CHARACTERISTICS.

Refer to Section VI for detailed information on the aircraft flight characteristics.

SYSTEM OPERATION.

Refer to Section IV and VII for applicable detailed information on the operation of the aircraft systems.

DESCENT.

Passenger comfort, weather conditions, and turbulence should be taken into consideration during descent. The rate of descent is determined by altitude, distance from the field, terrain, and the weight of the aircraft. Power reductions will be made in order to maintain efficient and economical engine operation. A constant rate of descent should be

maintained. Brief the crew concerning the type of landing anticipated, threshold speed, and go-around procedure.

NORMAL DESCENT.

Whenever operating conditions permit, the clean configuration should be used for cruising descent, as this provides the greatest ability for the aircraft to withstand gust loads. For cruising descent in the clean configuration, observe the maximum level flight speed of 217 knots IAS. Gear and flaps down descent should be made in the vicinity of intended landing. Maximum speed with gear and flaps extended is 125 knots IAS. If descents are conducted at the long range airspeeds, the power reductions should be made on a coordinated basis by reducing the rpm and manifold pressure to obtain sufficient bmeP to maintain desired cylinder head temperatures. Low cylinder head temperature at long range airspeeds is usually caused by low bmeP resulting from establishing the descent manifold pressure with cruising rpm's. Do not enrich the mixture during long range descents in an attempt to increase cylinder head temperature. If auto rich mixture is used, there will be an increase in trip fuel consumption and a tendency to aggravate plug fouling, particularly if cylinder head temperatures are not kept at cruise levels during the descent. Whenever a power lower than normal cruise is required, it is recommended that the necessary power reduction be made with rpm rather than with the throttle for the following reasons:

- a. It is a simpler procedure, since only one set of controls need be moved in normal situations where cruise has been conducted at or near full throttle.
- b. With the lower cylinder head temperature resulting from reduced power and appreciable moisture content in the air, engine operation will be more stable at the lower rpm. Although reduction in rpm further reduces cylinder head temperatures, it provides a greater time period for each combustion cycle; this

NORMAL DESCENT. (Continued)

is the most important effect in maintaining stable operation under these conditions. Cold cylinder head temperature instability is largely the result of reduced manifold pressure and intake temperature, which in turn provides a slower burning mixture.

Rpm may be reduced as required with the throttles full open as they nearly always are during cruise; however, care should be exercised to avoid operation in the 1601 to 1699 rpm range, because of propeller restrictions. The bmepp will also drop with rpm when operating at full throttle. As altitude decreases, bmepp must be limited to 150 in low blower and 138 in high blower.

CAUTION

When maneuvering with low power or during descents with low power, it is important to cushion the high inertia loads on the master bearings which occur with high rpm and low manifold pressure. As a rule of thumb, each 100 rpm requires at least 1 inch Hg manifold pressure. Use high rpm and low manifold pressure ranges only when necessary.

DESCENT CHECK.**PHASE I.**

1. Ignition System—Analyze (FE).

The flight engineer should complete ignition analyzer check in order that malfunctioning units may be reported.

2. Approach and Landing Data—Computed (P).

Pilot or designated crew member will use weather conditions to complete landing data card.

- *3. Altimeters—State Setting (P, CP, N).

Set altimeters to barometric pressure plus or minus known correction.

4. Main Fuel Tank Selector Levers—ON (FE).

Place main fuel tank selector levers to ON, fuselage fuel tank selector handle (if installed) OFF, and auxiliary fuel tank selector levers to CLOSED (off).

5. Crossfeed Selector Levers—OFF (FE).

6. Hydraulic System Bypass Handle—DOWN (FE).

Easy operation of landing gear lever is provided if landing gear lever is placed in UP position at this time in order to raise landing gear off uplatches.

7. Hydraulic Pressure—Checked (FE).

Check hydraulic pressure within limits.

8. Airbrake Pressure—Checked (FE).

Check airbrake pressure within normal limits.

9. Trailing Wire Antenna—Retracted (RO, FE).

10. Blower Levers—LOW and locked (FE).

11. Driftmeter—Caged and OFF (N/FE).

12. Passenger Briefing—Completed (P).

Check that passengers have been briefed by pilot or his designated representative. Refer to Passenger Briefing Checklist in Section VIII.

- *13. Crew Briefing—Completed (P).

Pilot will accomplish crew briefing to include the following:

- a. Weather conditions and type of approach contemplated.

DESCENT CHECK. (Continued)

- b. Minimum instrument altitude and missed approach procedure.
- c. Review landing data.
- d. Instruct copilot and navigator (if applicable) to monitor approach.
- e. Brief copilot and flight engineer on procedures to be used in accomplishing a touch-and-go landing as applicable.

PHASE II.

- 14. Autopilot - Disengaged/OFF (P).
Disengaged the A3-A autopilot with servo unit handle. Disengaged the E-4 autopilot with the servo switches and turn off the power switch.
- 15. Mixture Levers - AUTO RICH (FE).
Move mixture levers to AUTO RICH position and check locks in detent.

- 16. Carburetor Air Levers - Climatic (FE).

Adjust carburetor air levers to maintain carburetor air temperature within safe operating limits.

- *17. Propeller Levers - Rpm 2100 (FE).

- *18. Wing Flaps - Set (FE).

Under normal conditions, wing flap setting of 10 degrees is desired for descent and downwind leg. This setting brings the nose of aircraft down to normal cruise attitude and also reduces stall speed. Wing flap setting of 20 degrees is desired for approach or base leg configuration.

- 19. Booster Pumps - HIGH (FE).
- 20. Hydraulic Fluid Quantity - Checked (FE).
- 21. AC Power Panel (TC-54) - OFF (FE).

- 22. Cabin Heater Switches - OFF (FE).

CAUTION

Do not operate the heaters below 105 knots IAS unless a cabin ground heater blower is installed and operating, to avoid overheating and possible heater damage.

- 23. Cockpit Heater/Blower - Climatic (P, FE).

Check ground blower circuit breaker switch ON if heater or defrosters are to be operated on the ground.

CAUTION

Do not operate the heater below 105 knots IAS unless the ground blower is operating, to avoid overheating and possible heater damage.

- 24. Navigator's Table - Stowed (FE).

- 25. APP(EC-54) - As required (FE).

- *26. FASTEN SEAT BELT/NO SMOKING Sign - ON (FE).

- *27. Crews Seat Belts - Fastened (Crew).

- *28. Descent Checklist - Completed (FE).

LANDING PATTERN.

See Figure 2-4 for landing pattern, power settings, and various aircraft configurations.

BEFORE LANDING.

- 1. Landing Gear Lever - DOWN (CP).

On pilot's command, the copilot will move landing gear lever to DOWN position (Maximum airspeed 125 knots IAS.)

BEFORE LANDING. (Continued)

- 2. Propeller Levers—Rpm as required (FE).

The flight engineer will set propeller levers for desired rpm at pilot's command. See Section III for emergency conditions.

- 3. Wing Flaps—As required (FE).

Normally, a wing flap setting of 40 degrees will be used on all landings. In the event of crosswind or water on runway, it may be desirable to use less than 40 degrees flap. See figure 2-4 for normal landing and Section III for emergency conditions.

- 4. Hydraulic Pressure—Checked (FE).

Check hydraulic pressure within limits.

- 5. Landing Lights—As required (P/FE).

- 6. Landing Gear Indicator Lights—Three green ON (P, CP, FE).

- 7. Cowl Flap Levers—As required (FE).

The cowl flap levers should be in TRAIL position; however, in cold weather, CLOSE position may be more desirable.

- 8. Wing Deicer Switch—OFF (FE).

The wing deicers must be turned off 1 minute prior to landing to allow deicer deicer distributor valve to complete its cycle.

- 9. Before Landing Checklist—Completed (FE).

LANDING.

NORMAL LANDING.

- a. Prior to entering downwind leg, complete descent checklist. On entering the downwind leg, reduce airspeed to 120 knots IAS. When wing flaps are extended from full up to 10 degrees, fly nose down elevator and trim forward to

prevent momentary increase in altitude. This effect can be lessened by extending wing flaps to 5 degrees, retrimming, and then extending wing flaps to 10 degrees.

- b. The downwind leg will be flown maintaining 120 knots IAS. Prior to turning base leg, the pilot states, Landing Gear Down, RPM 2300 and complete the Before Landing Checklist. On Base Leg flaps will be set at 20 degrees and airspeed reduced to 115 knots IAS. Complete the turn to final approach above 600 feet altitude.
- c. After turn to final approach, pilot states, "Pilot's throttles, flight engineer follow." The pilot then places his hand on throttles to insure a minimum of lost motion and time in the event rapid power adjustments are required. The pilot will continue to call for desired power settings and flight engineer will continue to follow up on copilot's throttles, adjusting manifold pressure as stated by pilot. The final wing flap setting (normally 40 degrees) should be made prior to reaching 200 feet in order that later part of the final approach will be made at landing configuration with gradual reduction of power.

Note

Control the descent by variations in power rather than by variations in airspeed.

- d. After final wing flap setting has been made, airspeed will be gradually reduced so as to cross threshold at 130 percent of power-off stalling airspeed at not less than 50 feet.
- e. Positive thrust (normally not less than 14 inches Hg manifold pressure) should be maintained on the aircraft until flareout is made and aircraft touches down at 120 percent of power-off stalling airspeed. Land aircraft on main landing gear holding nosewheel slightly off runway.
- f. After landing is made, retard throttles to full CLOSE position, and gently lower nose gear to contact runway. Maintain

LANDING. (Continued)

directional control primarily through use of rudder, using brakes only as necessary. Do not use nosewheel steering until near end of landing ground roll. Use of nosewheel steering during early phases of landing ground roll could result in abrupt yawing of aircraft.

CROSSWIND LANDING.

On final approach, align the axis of the aircraft with the runway and lower the upwind wing. Use opposite rudder as required to maintain a straight course. Contact the runway with the upwind main landing gear first. Continue turning the control wheel toward the wind as speed decreases. Lower the nosewheel and apply braking action as necessary. See Takeoff and Landing Crosswind, Part 3 of the Appendix.

MINIMUM RUN LANDING.

The procedure for a minimum run landing is the same as for a normal approach and landing except as follows:

- a. Make normal landing, touching down as near to the approach end of runway as possible.
- b. Retract wing flaps immediately after main landing gear has touched down in order to obtain maximum braking.
- c. Lower nosewheel as soon as possible and apply maximum braking.

Note

On HC-54 aircraft, the brake anti-skid system will prevent wheel skidding when brakes are applied.

- d. Be prepared to use emergency air-brakes.

LANDING ON SLIPPERY RUNWAY.

When landing on a slippery runway is anticipated, careful consideration must be made of conditions affecting all phases of the landing. By application of the reported Runway Condition Reading (RCR) to the computed landing ground roll, a reasonably accurate estimate can be made as to whether a landing can be made with normal approach and landing procedures in the available runway length, or whether additional precautions and measures will be required.

WARNING

It is important that proper correction of the landing ground roll be applied so that the crew will be aware of conditions which may be marginal.

Note

The pilot should not hesitate to execute a go-around or touch-and-go landing in the event the landing attempt must be abandoned, in the early stages of the approach and landing.

WARNING

Landings are made from a power-on approach condition, the critical phase of the approach being just prior to touchdown where there is a possibility of entry into the area known as the "backside of the power curve," that is, where airspeed is so low that with the available power the aircraft can not accelerate to a safe speed in the event of an emergency.

After touchdown, primary considerations are the maximum use of aerodynamic drag to slow the aircraft until brakes become effective and maintaining directional control. When low RCR numbers are reported the use of aerodynamic drag will be more effective than the use of brakes for slowing the aircraft. Use

LANDING PATTERN—Typical

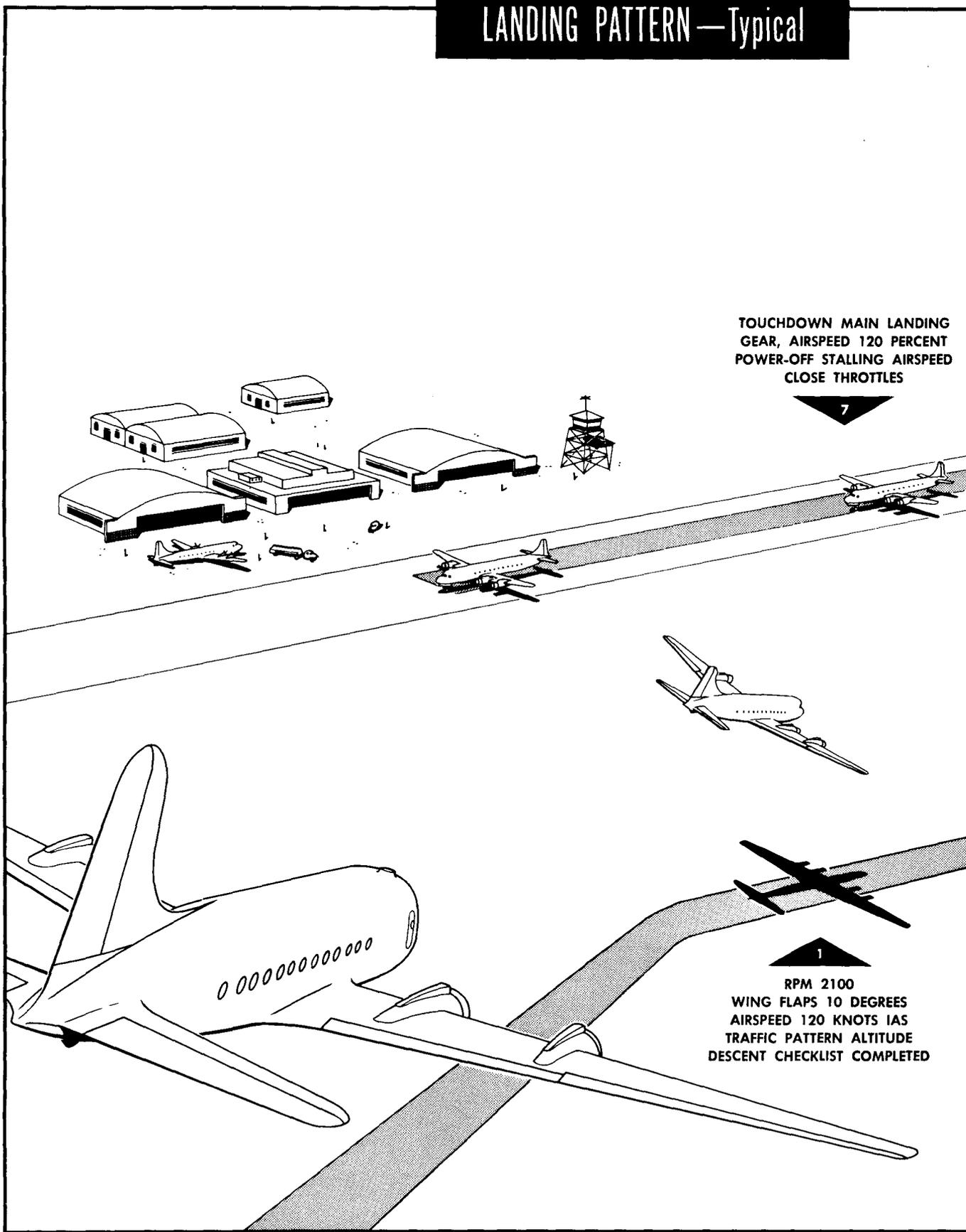


Figure 2-4 (Sheet 1 of 2)

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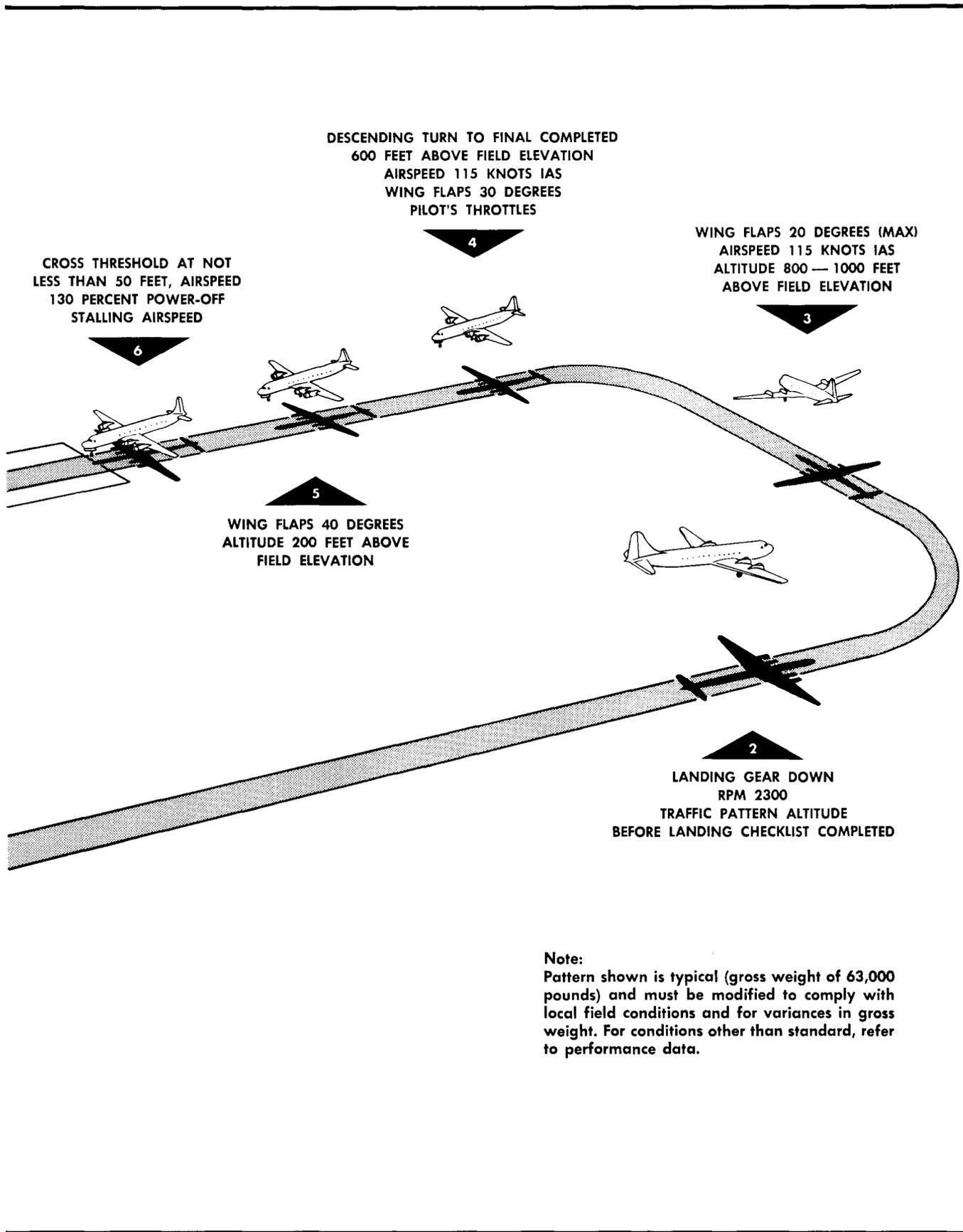


Figure 2-4 (Sheet 2 of 2)

LANDING. (Continued)

full flaps, open cowl flaps to full OPEN position immediately after touchdown, and maintain a nose high attitude until just prior to losing lift on the elevator. Maintain directional control with rudder.

After the nosewheel is lowered to the runway, raise flaps, use brakes cautiously. Overuse of brakes could result in a locked wheel and severe yaw of the aircraft and/or tire blow-out. Brakes should be applied intermittently with equal pressure to both brakes.

Landing On Wet Runway.

The procedures for landing on a wet runway are the same as for a normal approach and landing except as follows:

WARNING

Braking effectiveness of bald smooth tread tires on a wet runway will very nearly approach the same conditions as on icy runways (See Landing, Part 6 of the Appendix)

- a. Rpm 2550.
- b. Approach in power-on condition with flaps full down. Slow the aircraft for threshold speed of 120 percent of power-off stalling speed, touch down at 110 percent of power-off stalling speed.

CAUTION

During turbulence or gusty surface wind conditions, to insure greater lateral stability and runway directional control, add a correction factor to approach and touchdown speeds of 50 percent of the reported differences between constant and peak wind velocities. In no case will the correction factor be greater than 10 knots.

- c. Touchdown as near approach end of runway as possible.
- d. Cut all power and open cowl flaps to full OPEN immediately after touchdown.
- e. Maintain directional control with rudder and differential power.
- f. Maintain nose high attitude with elevator control. As lift is lost on elevator, lower nosewheel to runway.
- g. After nosewheel is lowered to runway apply brakes. Maintain sufficient up elevator to lighten load on nosewheel, thus increasing load on the main gear. Use brakes cautiously to avoid locking wheels. Apply brakes intermittently with equal pressure on both brakes.

Note

On HC-54 aircraft, the antiskid system will prevent wheel skidding.

Landing On Icy Runway.**Note**

If operation on icy runway is anticipated, the aircraft should be equipped with ice grip tires if possible.

Landing on ice covered runways is considered hazardous and should be attempted only when dictated by the nature of the mission. Primary considerations are decreased directional control and increased stopping distance. Landing should be made from a power-on approach at minimum safe speed possible. Where runway length versus stopping distance, as computed on the Landing Data Card is marginal, be prepared to initiate a go-around as soon as possible in the event that touchdown can not be made at the anticipated point on the runway.

LANDING. (Continued)

Use brakes only when aircraft has slowed sufficiently to lessen the danger of locking the wheels. Use caution when applying brakes, particularly when conditions are reported as patchy. Locking of the brakes could result in dangerous yawing of the aircraft and/or skidding.

Use same procedures for approach and landing as for landing on a wet runway except as follows:

Apply brakes only after aircraft has slowed sufficiently to lessen the danger of locking wheels.

WARNING

Apply brakes cautiously to avoid locking the wheels, particularly when ice is patchy. Even without the wheels locked, the difference in gripping action with one wheel going from ice to a bare patch of runway can result in a dangerous yawing condition.

TOUCH-AND-GO LANDING.

Touch-and-go landings will be accomplished only when authorized by the major air command concerned. The procedure for a touch-and-go landing is the same as for a normal landing except as follows:

- a. After nosewheel touches runway, pilot directs flight engineer to set wing flaps to 15 degrees, and copilot to return elevator trim to normal takeoff setting.
- b. The flight engineer advances the propeller levers to INCREASE RPM (full forward).
- c. The pilot states, "Max power," and advances throttles to maximum power.
- d. Proceed as during a normal takeoff.

GO-AROUND.

When a go-around is necessary, proceed as follows:

- a. The pilot gives oral command, "Go-around," and states power desired.

Note

If a go-around is initiated below 400 feet above the terrain, maximum power is mandatory. At 400 feet and above, power used will be at the pilot's discretion.

- b. The flight engineer immediately advances propeller levers to rpm required.
- c. The pilot advances the throttles.
- d. The flight engineer follows pilot through on copilot's throttles and sets desired manifold pressure.
- e. The pilot directs flight engineer to retract wing flaps to 15 degrees.
- f. The pilot directs copilot to raise landing gear.
- g. Proceed as in a normal takeoff, or maintain takeoff speed until obstacles are cleared, depending on the circumstances.

AFTER LANDING.

1. Propeller Levers—Forward (FE).
2. Cowl Flap Lever—OPEN (FE).
3. Emergency Landing Gear Extension Handle—OPEN (FE).
4. Wing Flap Lever—UP (FE).

AFTER LANDING. (Continued)

5. Pitot Heat Switches - OFF (FE).
6. Landing Light Switches - As Required (Daytime) (FE).
7. Booster Pumps - OFF (FE).
8. Anti-Icer Switches - OFF (FE).
9. Antiskid Switch (if installed HC-54) - OFF (FE).
10. Gust Lock - ON (FE).
11. Unnecessary Radios - OFF (CP).
12. Radar - OFF (P, N/FE).

Before turning radar power switch off, turn both scope intensity knobs fully counterclockwise.

13. ~~IFF/SIF - OFF (P/FE).~~ *See CS 14 sec. 3. H for SEP. Add note.*
~~Turn IFF/SIF OFF as soon after landing as possible. This eliminates emission of signals from taxiing or parked aircraft which would otherwise block controllers scope and interfere with control of airborne traffic.~~

14. Anticollision Light - OFF (FE).
15. Navigation Position Lights - FLASH-BRIGHT (FE).
16. Ignition Analyzer - OFF (FE).
17. APP - As required (FE).
18. Trim Tabs - Zero (CP),
19. After Landing Checklist - Completed (FE).

CAUTION

Nosewheel steering may be lost following landing due to CG change caused by combinations of fuel burn off and passenger/cargo loads. In the event this occurs it may be nec-

essary to move a few passengers and/or cargo forward to regain nose-wheel steering.

Note

After the final landing of a mission or when complete engine shutdown is anticipated at an intermediate point, No. 1 and 4 engines may be shutdown prior to parking. Place throttles at 1000 rpm for 30 seconds to effectively scavenge oil, then place No. 1 and 4 mixture levers to IDLE CUT OFF. After propellers stop turning, turn off No. 1 and 4 ignition switches.

ENGINE SHUTDOWN.

Prior to engine shutdown, the engines should be operated at approximately 1000 rpm with the cowl flaps full open to reduce cylinder head temperatures to 200° C or below. Shutting down a hot engine results in excessive heat being stored in the engine with no means of conducting it away except by means of convection currents. It is not recommended that the throttles be opened as the engines stop. (See Section IX for cold weather operation and oil dilution procedures.)

1. Nosewheel—Centered (P).
2. Parking Brakes—Set (P).

CAUTION

Do not set parking brakes if the brakes are overheated. Pressure on the brakes with excessive temperatures resulting from hard braking action will result in damage to the brakes or brake seizure.

3. Throttles—Set at 1000 rpm (FE).
4. Landing Light Switches—RETRACT and OFF (FE).

ENGINE SHUTDOWN. (Continued)

5. Mixture Levers—IDLE CUT OFF (FE).

Cut engines at pilot's command. Place throttles at 1000 rpm for 30 seconds, then place No. 1, 3 and 4 mixture levers to IDLE CUT OFF. Lower wing flaps to bleed off some hydraulic pressure, then raise flaps, noting hydraulic pressure build up from No. 2 engine hydraulic pump. As hydraulic pressure stabilizes, place No. 2 mixture lever to IDLE CUT OFF.

6. Ignition Switches—OFF (FE).

7. Cockpit Heater—OFF (P).

CAUTION

Do not turn off the heater blower until heater temperature has cooled to 50° C or less to prevent heat accumulation in the nose heater.

8. Engine Shutdown Checklist—Completed (FE).

BEFORE LEAVING AIRCRAFT.

1. Radios—OFF (CP).

2. Inverters—OFF (FE).

3. Autopilot Power Switch—OFF (FE).

4. Fuel Tank Selector Levers—OFF (FE).

5. Wheel Chocks—In place (P, CP).

6. Parking Brakes—OFF (P).

Release parking brakes slowly. On some ramps with pronounced slope, it is possible for an aircraft to jump the chocks by running against them suddenly.

7. Unnecessary Lights—OFF (P, CP, FE).

8. Form 781—Completed (P).

CAUTION

In addition to established requirements for reporting any system defects, unusual and excessive operations, the flight crew will also make entries in Form 781 to indicate when any limits in the Flight Manual have been exceeded.

9. APP—OFF (FE).

10. Battery Switch—OFF (FE).

11. Landing Gear Ground Safety Locks and Tail Support Stand—In place (FE).

12. Before Leaving Aircraft Checklist—Completed (FE).

1A. AIMS/IFF CLASSIFIED Codes - AS Required (CP) *US-14, sec 33*

ABBREVIATED CHECKLIST.

The pilots' and flight engineer's normal abbreviated checklist is contained in T. O. 1C-54D-1CL-1.



PASSENGER INFORMATION.

1. Smoking is prohibited during ground operation, takeoffs, landings, when any occupant detects fuel fumes, and when directed by the pilot.
2. Seat belts will be fastened for takeoffs, landings, or as directed by the pilot.
3. Operation of portable electrical or electronic devices is prohibited.
4. Refer to diagram on reverse side for location of emergency exits and equipment.
5. STANDARD ALARM BELL SIGNALS.
 - a. BAILOUT.

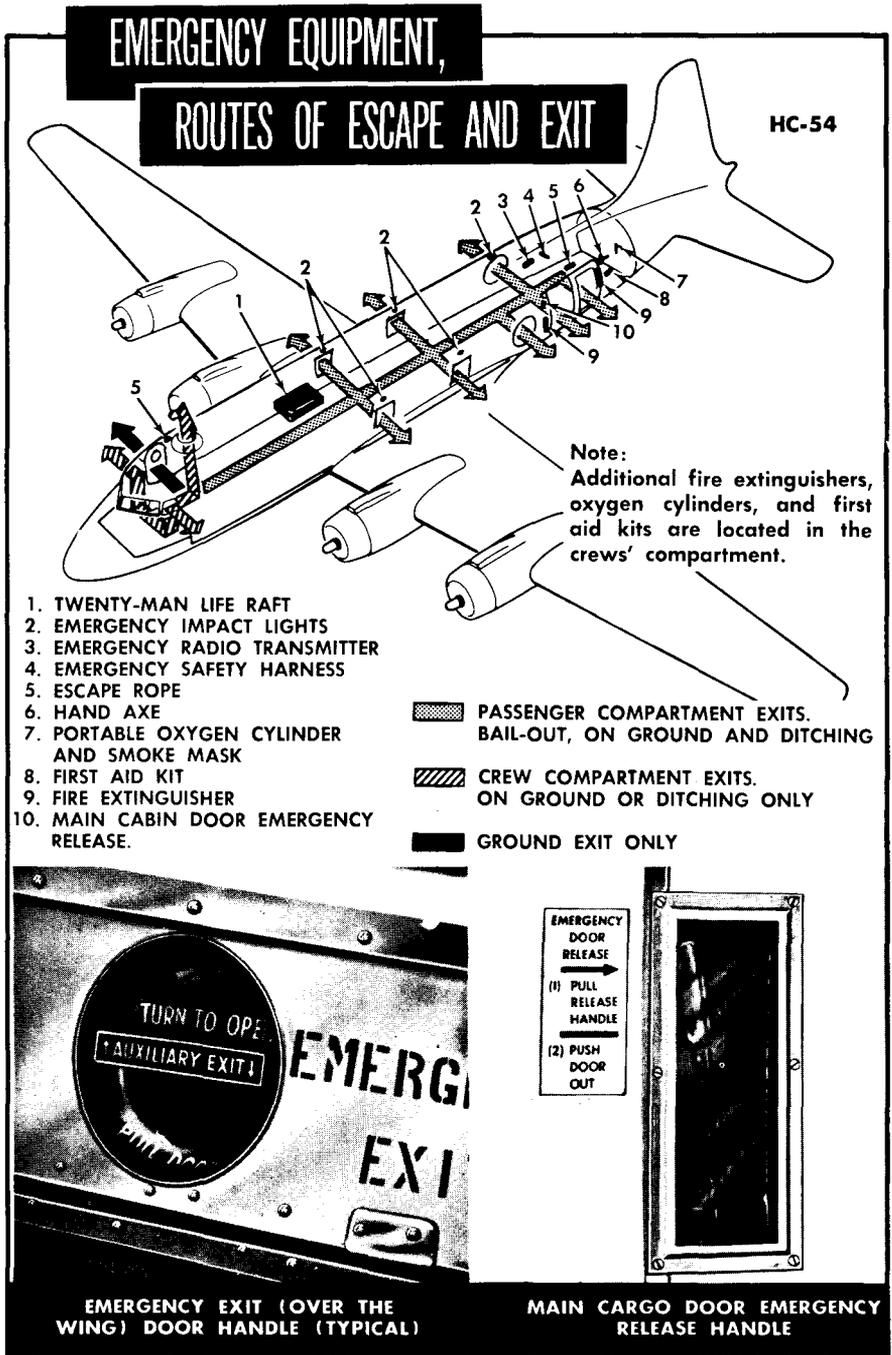
3 short rings—Don parachute.

1 long ring—Bail out.
 - b. CRASH LANDING/DITCHING.

6 short rings—Fasten seat belts securely.

1 long ring—Brace for impact.

During ditching or crash landing, just prior to contact with surface, passengers will fold arms, resting them on their knees. Bend body forward as far as possible and rest head firmly on arms. If available, hold pillow, blanket, or clothing in front of head to cushion impact forces.



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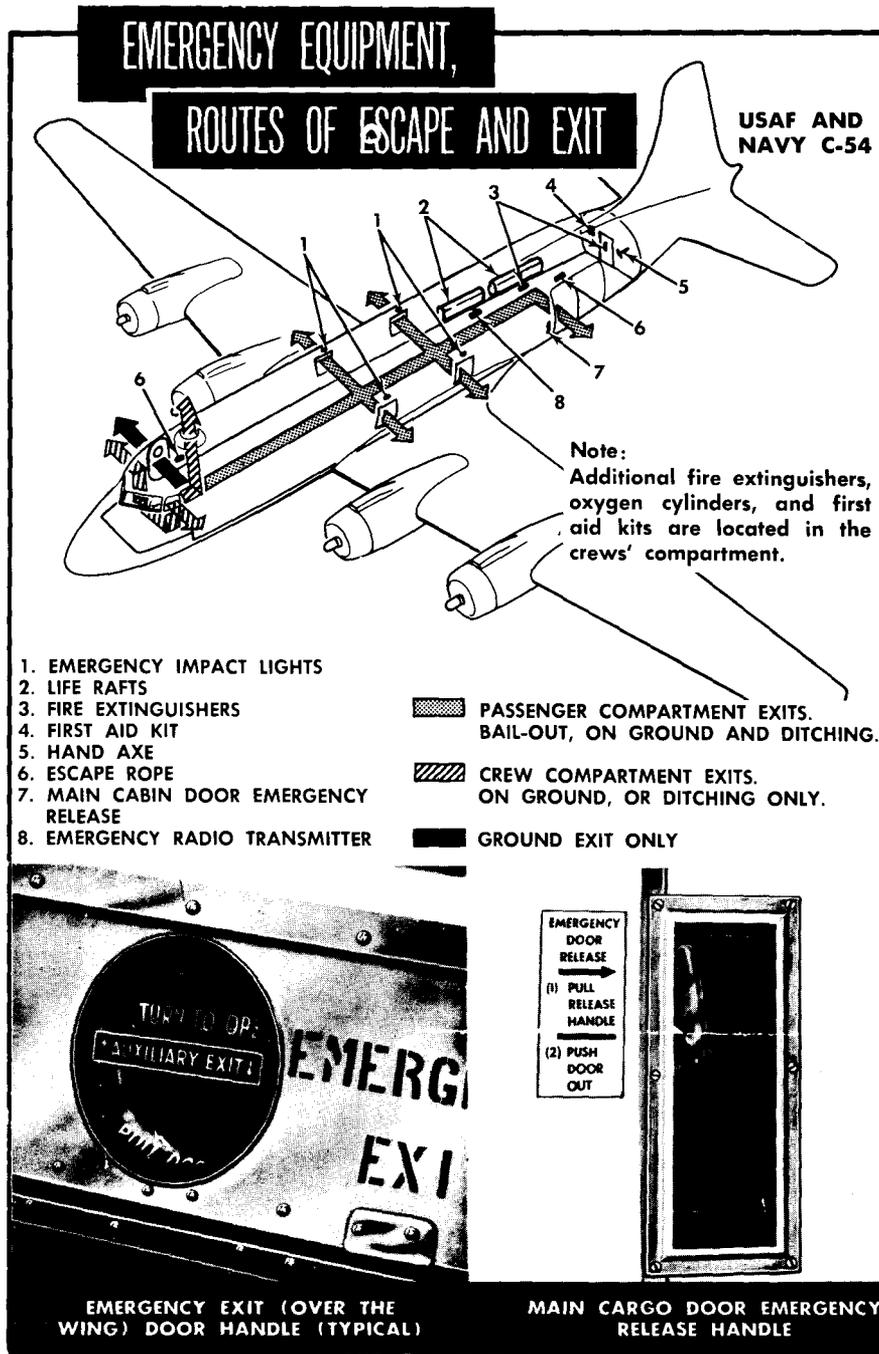
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Section IIN, Pages 2N-1 thru 2N-70 and Figures 2N-1 thru 2N-4 deleted.

X1-240

SECTION IIN

NORMAL PROCEDURES

Note

Air Force personnel may remove this Section (IIN) from their manuals, as it should never be used by Air Force personnel.

Procedures outlined in this section are applicable to Navy C-54 Aircraft.

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PREPARATION FOR FLIGHT.

FLIGHT PLANNING.

Make certain that the gross weight, grades of fuel and oil, and any special equipment carried, are suited to the mission to be performed. Determine cruise control data such as airspeed, power settings, etc., from information provided in the Appendix.

TAKEOFF AND LANDING DATA CARDS.

Takeoff and Landing Data Cards will be completed for all flights. The "TAKEOFF and LANDING IMMEDIATELY AFTER TAKEOFF" portion will be completed prior to takeoff and the landing portion computed prior to landing. During local training flights, when a closed traffic pattern is used, computations are required for initial takeoff and final landing, unless aircraft configuration varies. Any variation in configuration must be computed.

WEIGHT AND BALANCE.

Check the aircraft Weight and Balance Form F. Refer to Section V for the weight limitations and check takeoff and anticipated landing gross weights. Make certain that current Form F is computed.

ENTRANCE.

The crew will normally enter through the main cabin door.

CHECKLISTS.

The checklists in this section provide a chronological listing of procedures to be used for normal operation of the aircraft. Insofar as possible, it is intended that each phase of action described in a checklist be performed in conjunction with direct reference to the checklist (challenge and reply). At times, however, it is both impractical and unsafe to

AIRCREW VISUAL INSPECTIONS.**(Continued)**

refer to a checklist; for example, during actual takeoff, landing, waveoff, touch and go landing, or in certain emergency situations.

Note

It is mandatory that items in BOLD FACE TYPE on emergency checklists be memorized.

On aircraft with flight mechanics seat installed, the flight mechanic or the pilot occupying the flight mechanics seat, will read all checklists. On other aircraft they will be read by the pilot or copilot as appropriate.

Note

In addition to the scroll checklist a plastic enclosed copy of each checklist will be a part of the aircraft equipment.

THRU-FLIGHT.

The flight mechanic shall supervise all en-route servicing of fuel, oil and alcohol, to insure proper type, grade, and quantity, and shall check fuel strainers 30 minutes or more after servicing to insure that there is no water and/or contamination in the system.

STANDARD TERMINOLOGY.

To assure complete understanding by all crew members, the following terminology and procedures will be used.

STANDARD POWER TERMINOLOGY.

1. Max Power
2. METO Power
3. Climb Power

4. Cruise Power

5. On other than standard power settings, pilot will call for a desired power setting by using definite rpm and manifold pressure figure:

Rpm, Twenty One Hundred

Manifold Two Eight.

FLAP SETTINGS.

Flap settings will be requested in the following manner:

Flaps Twenty.

CLIMATIC.

The term is used in this section to indicate equipment operation or settings which vary, depending upon the atmospheric conditions in which the aircraft is operated, i. e., night, cold weather, IFR, etc. Although the checklist indicates "Climatic," the checklist response shall be the exact setting or operation of the item at that time.

AIRCREW VISUAL INSPECTIONS.

Prior to inspecting the aircraft the Plane Commander shall ascertain that the weight and balance data has been computed for the flight and that Form F is signed. It shall be the Plane Commander's personal responsibility to check the aircraft maintenance and the aircraft discrepancy form. Further, he shall insure that all crew members are listed on the yellow sheet or appropriate form and that the maintenance release has been signed. The Plane Commander shall insure that a visual inspection of the aircraft and its equipment is properly conducted in sufficient time to permit correction of discrepancies without incurring delays.

The Plane Commander shall personally check, or detail responsible crew members to check,

AIRCREW VISUAL INSPECTIONS.**(Continued)**

inspect and/or complete as applicable, the following items:

INITIAL INSPECTION.

1. Tail Stand In place.
2. Landing Gear Ground Safety Locks In plane.
3. Wheel Chocks In place.
4. Forward Lower Cargo Compartment Checked.

On aircraft with APP installed in forward lower cargo compartment, check cover plate (fire screen) to insure that cargo is not stowed against the APP, creating a potential fire hazard.

5. GPU (if available) Positioned.

WARNING

If an external power unit is used, it should be positioned at maximum cables length to the left of the nose gear, clearly visible to the pilot occupying the left seat.

6. Ladder and/or Loading Ramp—Checked secure
7. Ignition Switches and Battery Switch—OFF.
8. Landing Gear Lever—DOWN.
9. Trim Tabs—Neutral.

EXTERIOR INSPECTION.

Between Main Cabin Door and Left Wing Root.

1. Fuselage Skin and Fairing—Check.

Check for cuts, scratches, and possible damage by ground equipment.

2. Flare Chutes—Check.

Check chutes and covers for damage and security.

Trailing Edge, Left Wing.

1. Flaps—Check.

Check flap surfaces for general condition and signs of warping (warping is indicated by irregular trailing edge). Check flap doors for loose or missing rivets and cracks. Flap hinges should have 1-inch clearance.

2. Aileron—Check.

Check aileron surface for general condition. Note if drain grommets are open. Check that three static dischargers are in place and in good condition. Check bonding on aileron.

3. Inspection Plates—Check security.

Left Wing Tip to No. 1 Nacelle.

1. Navigation Lights—Check.

Check all navigation lights for operation (steady and flashing).

2. Inspection Doors and Plates—Check security.

3. Deicer Boots—Check.

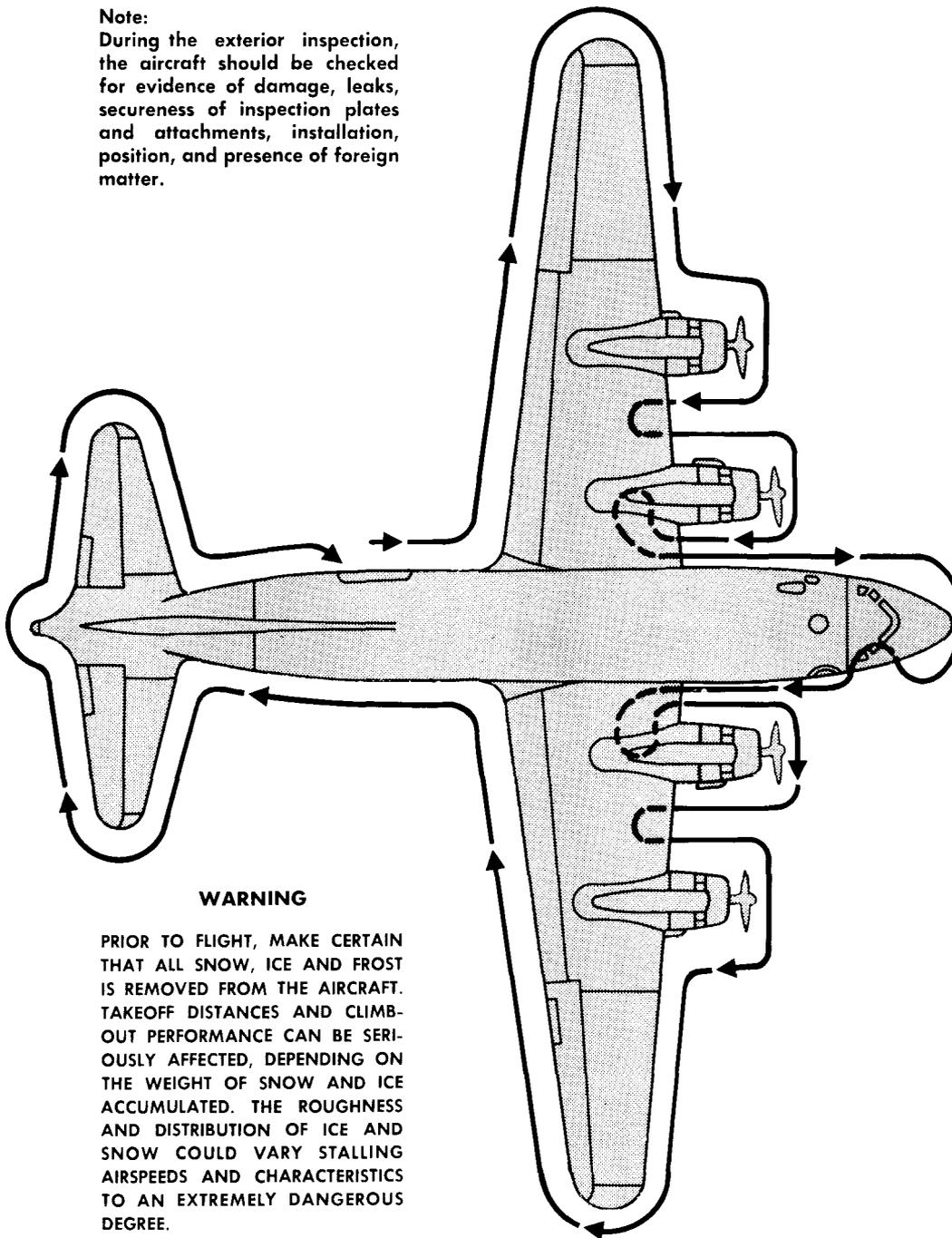
Check boots for cracks, tears and security. Check for evidence of dents in leading edge of wing that would be concealed by deicer boot. If there are no boots, check that holes are plugged.

4. Underside of Wing—Check.

Check for fuel leaks; especially rear side of main spar and around tank inspection plates.

EXTERIOR INSPECTION

Note:
During the exterior inspection, the aircraft should be checked for evidence of damage, leaks, secureness of inspection plates and attachments, installation, position, and presence of foreign matter.

**WARNING**

PRIOR TO FLIGHT, MAKE CERTAIN THAT ALL SNOW, ICE AND FROST IS REMOVED FROM THE AIRCRAFT. TAKEOFF DISTANCES AND CLIMB-OUT PERFORMANCE CAN BE SERIOUSLY AFFECTED, DEPENDING ON THE WEIGHT OF SNOW AND ICE ACCUMULATED. THE ROUGHNESS AND DISTRIBUTION OF ICE AND SNOW COULD VARY STALLING AIRSPEEDS AND CHARACTERISTICS TO AN EXTREMELY DANGEROUS DEGREE.

Figure 2N-1

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2N-5

EXTERIOR INSPECTION. (CONTINUED).**WARNING**

During ground operations, when there is evidence of leakage either by odor or sight of raw fuel, the aircraft will remain on the ground until an investigation determines the source and extent of the leak.

No. 1 Nacelle.

1. Fuel Strainer Drain—Check.

Open inspection door placarded FUEL STRAINER DRAIN and check for safetying (if required) and leakage. Secure inspection door.

2. Fuel Tank Drain Valve—Check.

Open inspection door placarded FUEL TANK DRAIN and check for leakage and safetying. Secure inspection door. Outboard tank drain valve cannot be reached when standing on ramp.

3. Fuel Sump Drain—Check.

Open inspection door placarded FUEL SUMP DRAIN and check for safetying (if required) and leakage. Secure inspection door.

4. Propeller Blades and Dome—Check.

Check blades for looseness, pitting, nicks, and cracks. Check dome for excessive oil leaks and check that dome retainer nut is safetyed. Check propeller anti-icer boots for condition and security.

5. Front of Engine—Check.

Check for loose or frayed ignition cables and leads, foreign matter lodged in front section of engine, and excessive oil leaks on reduction gear housing.

6. Carburetor Air and Oil Radiator Air-scoop—Check.

Check general condition of scoop and check for foreign matter obstructing scoop. Check condition of oil radiator shutters.

7. Cowling—Check.

Check for fit and security. One-half inch clearance is allowable where cowling joins.

8. Exhaust Stack—Check for cracks and security.

9. Cowl Flap, Rear of Engine, Exhaust Stack Retainer Rings—Check.

Check cowl flaps for excessive wear, binding, and loose or bent connecting links. Check rear of engine for loose articles or rags. Check as many exhaust stack retainer rings as possible for security.

10. Engine—Check nacelle and ground under engine for evidence of excessive oil leaks.

11. Oil Cap Door—Visually check that oil cap door is closed.

Wing Section Between No. 1 and No. 2 Nacelles.

1. Underside of Wing—Check.

Check for fuel leaks, especially rear side of main spar and around tank inspection plates.

2. Landing Light—Check.

Check that landing light is fully retracted, clean, and undamaged.

No. 2 Nacelle.

1. Repeat items 1 through 11, No. 1 Nacelle.

EXTERIOR INSPECTION (CONTINUED)

Inside Wheelwell No. 2 Nacelle.

1. Firewall Shutoff Valve—Check.

Check for security and position. Check that all three shutoff valves are connected by a link rod, and that valves are in a 45 degree up position.

2. Propeller Feathering Motor—Check.

Check for peeled paint or cracked housing, which may indicate a burned out motor.

3. Fuel, Oil and Hydraulic Lines—Check.

Check for leaks, damaged or chafed lines, and loose hose clamps.

4. Fuel Tank Drain—Check.

Check fuel tank drain for leakage and safetying.

5. Oiltank and Drain—Check.

Check for damage, security, and leakage. Check that oil tank drain is safetied in OFF position.

6. Electrical Junction Box Plate and Main Line Resistor—Check.

Check for position and security. Check main line resistor for evidence of burning, which may indicate overload or short circuit.

7. Gear Uplatch—Check.

Check that gear uplatch is in correct position (approximately 45 degrees down). Check for evidence of strain or damage from jamming.

8. Main Gear—Check.

Check strut inflation (the piston should be exposed approximately 3-1/4 inches). Check hydraulic lines and fittings for

leakage and general condition. Check that gear actuating cylinder is safetied, that gear lugs are tight and safetied. Check gear microswitches for cleanliness and operation. Check bulkhead plates for strain or fuel leaks from hard landings.

9. Brake Assembly—Check.

Check lines and fittings for evidence of leakage, looseness, and wear.

10. Brake Deboosters and Bleeds—Check.

Check that bleeds are safetied. Check all lines and fittings on both deboosters for condition. No leaks are permitted between deboosters and bleeds.

11. Shuttle Valves—Check.

Check for cracks. Check attachment of airbrake lines for security.

12. Tires and Wheels—Check tires for proper inflation and position of slip-page marks.

13. Wheelwell—Check general condition (miscellaneous wires, fittings, and actuation struts).

Wing Section, No. 2 Nacelle To Fuselage.

1. Wing—Check for general condition and fuel leaks.

2. Cross Feed Drain—Check.

Open inspection door placarded CROSS FEED DRAIN and check the drain for leakage and safetying (if required). Close inspection door.

3. Wing Deicer Boot—Check.

Check for general condition. If no boot is installed, check that holes are plugged.

EXTERIOR INSPECTION (CONTINUED)

4. Fuel Tank Drain Valve—Check.

Open inspection door placarded FUEL TANK DRAIN and check valve for leakage and safetying. Close inspection door.

Fuselage, Wing To Nosewheel Well.

1. Anti-Icing Pumps—Check.

Open anti-icing pump inspection door on fuselage and check pumps for leakage. Close inspection door.

2. Trailing and Fixed Antennas—Check.

If trailing antenna is installed, check guide and weight for security. On fixed antennas, check that masts are secure and that insulators and wires are clean and taut.

3. ADF Loop Housing—Check for security and evidence of damage.

4. Manual Loop—Check loop housing for warping, damage and alignment.

5. CO₂ Discharge Disc (if installed)—Check.

Check that left side disk is in place. If disk is blown, cylinders have been discharged.

Nosewheel Well.

1. Hydraulic Lines, Cables, Friction Brake, Wiring, Doors, and Actuation Struts—Check for general condition.

Note

Insure that brass plates are installed on friction brake if aircraft is equipped with snow tread tires.

2. CO₂ Cylinders—Check.

Check the ball in knife lever at the top of each cylinder for indication that cylinder has not been discharged. Insure that discharge cable is secure in cutter head.

3. Gear Uplatch—Check.

Check for proper position, evidence of damage, and general condition.

4. Nose Gear Strut, Tire Wheel Plate, and Static Ground Wire—Check.

Check for cracks in torque link collar and nosewheel collar. Check the nosewheel strut for wear and proper inflation (extended approximately 3-7/8 inches). Check nosewheel tire for general condition, for inflation and position of slippage marks, and condition of dust covers. Check static ground wire for installation.

5. Ground Safety Lock, Torque Link and Pin, Ahrens Cable—Check.

Check that ground safety lock is in place with red streamer attached. Check that torque link pins are properly seated and safetied (if required). Check that Ahrens cable is secured and in good condition.

6. Nose Heater and Ventilating Scoop—Check.

Check the nose heater assembly for general condition, security, and evidence of overheating. Check for obstruction of ventilating scoop.

7. Autopilot Oil Filter—Check for leaks.

8. Pitot Static Vent Drain—Check for water.

9. Pitot Tube—Remove covers and check tubes for damage and obstructions.

10. Radome and Radar (if installed)—Check.

EXTERIOR INSPECTION. (CONTINUED)

Nose to Right Wing.

1. CO₂ Discharge Disc (if installed)—Check.

Check that the right side disk is in place. If disk is blown, the cylinders have been discharged.

2. Battery Compartment Access Door—Check for security and flush with fuselage.
3. Driftmeter Lens and Reference Line—Check.

Check lens and lens housing for damage. Make certain that lens is clean. Check fore and aft reference pins and check that reference line is clean.

4. Forward Lower Cargo Compartment—Check.

Push compartment door and check that door is properly closed and locked.

5. Hydraulic Compartment—Check.

Check compartment for leaks, reservoir for fluid quantity, and hydraulic system pressure.

Right Wing

1. Wing Section—Repeat steps 1 through 4, Wing Section No. 2 Nacelle To Fuselage.
2. No. 3 Nacelle—Repeat steps 1 through 11, No. 1 Nacelle.
3. No. 3 Wheelwell—Repeat steps 1 through 13, Inside Wheelwell No. 2 Nacelle.
4. Wing Section Between No. 3 and No. 4 Nacelles—Repeat step 1, Wing Section Between No. 1 and No. 2 Nacelles.

5. No. 4 Nacelle—Repeat steps 1 through 11, No. 1 Nacelle.
6. No. 4 Nacelle to Right Wing Tip—Repeat steps 1 through 4, Left Wing Tip to No. 1 Nacelle.
7. Trailing Edge—Repeat steps 1 through 3, Trailing Edge, Left Wing.
8. Trim Tab—Check for centering and condition.

Wing To Tail Right Side.

1. Antennas—Check.

Check all antennas on fuselage for tautness and security. Check condition of leads and insulation.

2. Aft Lower Cargo Compartment Door—Check.

Push compartment door and check that door is properly closed and locked.

Tail Section.

1. Deicer Boots—Check.

Check general condition of boots on horizontal and vertical stabilizer. If boots not installed, check that holes are plugged. Check for evidence of dents in leading edge that would be concealed by the boots.

2. Elevators, Rudder, and Bonding—Check general condition and elevator bonding.
3. Trim Tabs—Check for centering and condition.
4. Static Dischargers—Check condition and security.
5. Taillight—Check condition and operation.

EXTERIOR INSPECTION. (CONTINUED)

6. Anticollision Light Check condition and operation.
7. Tail Skid and Support Check.
Check general condition, security, and proper position.
8. Cabin and Cargo Door Check fit of door and hinges.

INTERIOR INSPECTION.

Main Cabin and/or Cargo Compartment.

1. Main Door Emergency Releases and Hinges—Check.

Inspect emergency release pins, cables, hinges, and release handle mechanism. Ascertain that emergency release handle is properly safetied, or covered by readily removable, or breakable, transparent plastic covering.

2. Ditching Line—Check line secure and properly stowed.
3. Emergency Escape Slide—Aboard and stowed.
4. Fire Extinguishers—Check.

Check that two portable fire extinguishers, one CO₂, and one KIDDE water bottle, are stowed in aft section of aircraft. Check each for proper safetying and security, and assure that inspection date is within previous six month period.

5. Tail Cone—Check.

Check tail cone section for stowaways, loose gear, security of radio gear located in this section, general condition of control cables and wires, alternate static source lines clear, and proper extension of tail skid oleo. Light off, door secured.

6. Passenger Lavatory—Check.

Check general condition and cleanliness, necessary supplies aboard, lights operating and no stowaways aboard.

7. Aircraft Ladder and Cargo Tiedown Equipment—Check.

Check for proper stowage and security. Check for sufficient tiedown equipment for mission.

8. First Aid Kits—Check.

Check for location and number of kits on board. Insure that seals are not broken.

9. Life Rafts and Vests—Check.

Check for sufficient number of rafts and vests. Check for current inspection records and that all life vests have required equipment attached.

10. Emergency Radio—Check condition and stowage.

11. Flight Orderly Supplies—Check.

Check with flight orderly to insure that necessary forms, equipment, and lunches are aboard.

12. Cargo Distribution and Security—Check.

Check loading in accordance with Form F and cargo properly secured.

13. Seat Belts—Check.

Check to insure that all passengers and crew members have a seat belt available.

14. Passenger Oxygen—Check.

Check that sufficient oxygen equipment is aboard as determined by mission.

INTERIOR INSPECTION. (CONTINUED)

15. Emergency Exit Doors, Top of Wing, Fuel and Oil Tank Caps and Anti-Icing Filler Caps—Check.

Check fuel tank quantity. Secure fuel, oil, and anti-icing tank caps. Check wing clear of loose articles, and emergency exit doors in place and secure.

16. Battle Lanterns—Check location and stowage.
17. Cabin—Check general condition and cleanliness.
18. Cabin Lights—Check operation of all cabin lights.

Crew Compartments.

1. Fuselage Tanks (if installed)—Check.

Check security of compartments, quantity of fuel, operation of selectors, sight gage and tank selectors OFF.

2. Auxiliary Oil Tank—Check.

Check auxiliary oil supply system by selecting an engine with auxiliary oil transfer handle. Place circuit breaker in ON position, and operate pump. Return pump switch, oil transfer handle, and circuit breaker, to OFF position. Normal auxiliary oil supply is 50 gallons.

3. Reserve Hydraulic Fluid, Funnel, and Wrench—Check.

Check that 5 gallons of reserve hydraulic fluid is on board and stowed. Check stowage of funnel and wrench.

4. Tool Kit—Check that a tool kit is on board for all transport missions.

5. Emergency Hand Axe—Check for stowage and availability.

6. Crew's Lavatory—Check general condition and cleanliness.

7. Asbestos Gloves—Check gloves aboard.

8. Crew Compartment Lights—Check operation of all compartment lights.

9. Water Availability—Check that sufficient drinking and wash water is aboard.

10. Cabin Heaters—Check.

Check heaters OFF. Insure cabin heater hot air door handle, or adjustment screw, is OPEN, and emergency cold air duct plate is available.

11. Circuit Breakers and Fuses—Check.

Check all circuit breakers for proper position. Insure that fuses are good and spares available.

12. Very Pistol—Check that Very pistol and ample cartridges are available.

13. Navigator's Table—Check table aboard and secured.

14. Driftmeter—Check CAGED and positioned.

15. Astrodome—Check for cleanliness and security.

16. Emergency Escape Line (forward)—Check secured and stowed.

17. Navigation Equipment—Check.

Check necessary equipment and publications to complete assigned mission aboard, checked, and stowed. Check two sets each of, terminal charts, enroute charts, and supplements aboard and current; also one each, Pilot's Handbook, Erection and Maintenance Manual, and plastic enclosed checklists.

18. Flashlights—Check aboard.

Each pilot and flight mechanic shall have an operating flashlight on all night flights.

INTERIOR INSPECTION. (CONTINUED)

19. Curtain—Check night curtains installed and in place for all night flights.
20. Ditching Placards—Check that placards are located near each crew station.
21. Electronic Equipment—Check.
Check and set inverters. Check pilots' compartment autosyn instruments for proper operation. Loran and Loran inverter OFF. Fuselage tank booster pumps OFF. Radar altimeter OFF. UHF remote.
22. Radio and Communications Equipment—Check.
Check with flight radio operator on functional check of equipment and necessary supplies aboard.
23. Windshields—Check.
Check cleanliness of the pilots' compartment windows and operation of both weather windows.
24. Oxygen—Check.
Check oxygen system pressure normal, 400 psi. Smoke masks in place.
25. Pitot Heaters—Check.
Turn pitot heaters ON, check ammeter to insure operation, turn pitot heaters OFF.
26. Emergency Alarm Bell—Check.
Check alarm bell with electrical power off. Power to the alarm bell is supplied directly from the battery.
27. Windshield Anti-Icer Pumps—Check.
Open windshield alcohol control knob and turn windshield deice switch ON. Check for flow and that indicator light comes on, then turn switch OFF and close control knob.
28. Propeller Anti-Icing Pumps—Check.
Open flowmeter needle valves and turn anti-icing rheostats ON. Check by noting float levels at the flowmeters and visual flow at propeller blades. Turn rheostats OFF and close needle valves.
29. Instrument and Warning Lights—Check for illumination.
30. Deicer Fluid—Check quantity.
Check sufficient quantity for mission. Normally, tank should be full.
31. Hydraulic Fluid—Check quantity gage if installed.
32. Trim Tabs—Check and set.
Check trim tabs through 5 degrees on each side and set on neutral (0 degrees).
33. Magnetic Compass—Check.
Remove any metal objects from immediate proximity. Shake bowl slightly to check fluid level and freedom of card movement.
34. Emergency Airbrake Pressure—Check 1000 ± 50 psi.
35. Autopilot Oil Shutoff Valve—Check for leakage and safety wired ON.
36. Aldis Lamp—Check lamp cord plugged in and lamp operating.
37. Auxiliary Hydraulic Hand Pump—Operate hand pump and check for buildup of hydraulic pressure.
38. Pilots' Compartment (Cockpit) Heater and Blower—Check.
Turn blower ON, turn No. 2 (No. 3 on some aircraft) fuel booster pump switch ON, open ventilators, then turn cockpit heater switch ON. Check for indication of heat rise. Turn heater switch OFF, and allow temperature to cool (below 50° C if heater temperature indicator is installed) before turning blower OFF.

INTERIOR INSPECTION. (CONTINUED)

39. Fuel and Oil Quantity—Check.

Check that required quantity of fuel and oil is aboard, and fuel properly distributed.

PRECOCKPIT CHECK.

At the discretion of the Plane Commander the precockpit checklist may be completed by the copilot and flight mechanic. The flight mechanic will read the checklist in a clear and distinct manner and challenge the pilot or the copilot for the accomplishment of each item on the checklist. Accomplishment of each item will be indicated by the proper response.

WARNING

Whenever the aircraft has been exposed to excessive windgust velocities, a careful control system check shall be made. This check shall be conducted by the pilot, or copilot, and the flight mechanic, and shall be accomplished in the following manner: The flight mechanic shall disengage the control surface locks, then, while occupying the pilot's seat, shall move the controls through full travel for a coordinated climbing right turn, followed by a descending left turn, on the pilot's signal that all control surfaces have been observed. The pilot or copilot on the ground shall insure proper displacement and direction of deflection of all surfaces, for the maneuver. Final check is all surfaces neutral.

This check should be made any time that control surfaces have undergone repair as well as under conditions stated above.

If control surfaces do not respond precisely and smoothly during the above check, a thorough inspection of the control systems involved should be accomplished.

1. Radar, Radios, SIF Switches—OFF.
2. Battery Switch—As required.

The battery switch will normally be in ON position, except it must be OFF, if external power supply is a battery cart.

Note

A minimum voltage of approximately 18 volts is required to close the battery relay. The battery relay must be closed before the generators can recharge the batteries.

3. Instrument Switch (Inverter Switches)—Checked and set.
4. Pilots' Compartment (Cockpit) and Cabin Warning Lights—Checked.

Note

This check indicates that all fire warning, marker beacon indicator, UHF homing adapter indicator, generator failure, inverter failure, door warning, and anti-icing pump indicator lights, have been tested and are operational.

5. Navigation, Pilots' Compartment (Cockpit) and Landing Lights—Climatic.
6. FASTEN SEAT BELT and NOSMOKING signs—ON.
7. Deicer and Anti-Icing Switches—OFF. Check windshield, wing, and prop anti-deicers OFF.
8. Engine Starter Selector Switch (C-54S)—OFF.
9. Booster Pump Switches—OFF.
10. Generator Switches—ON.
11. Pitot Heaters—OFF.
12. Ignition Switches—OFF.

PRECOCKPIT CHECK. (Continued)

13. Pilots' Compartment (Cockpit) Heater and Blower—Climatic.
14. Emergency Airbrake Handles—OFF and safetied.
15. Fire Extinguisher Selector Handles—IN and safetied.
16. Gyros—Uncaged.
17. Vacuum Pump Selector—Set, No. 3 Engine.
18. Static Selectors—NORMAL.

Check that pilot and copilot static source selector switches are in NORMAL (up) position, and safetied with safety clip or safety wire.
19. Emergency Airbrake Pressure—1000 ±50 psi.
20. Trim Tabs—Set.
21. Fuel Tank Selector Levers—MAIN TANKS ON.

Note

On eight wing tank system, use extreme care to insure that the selectors are in the detent position.

22. Carburetor Air Levers—COLD.
23. Crossfeed Selector Levers—OFF.
24. Propeller Levers—Forward.
25. Throttles—Set.

Check that the throttles are positions for approximately 800 to 1000 rpm.
26. Mixture Levers—IDLE CUT-OFF.
27. Landing Gear Lever—DOWN and Locked.

Check that landing gear lever is in DOWN position, spring clip in place, and solenoid pin is across the lever.

28. Wing Flap Lever—UP.
29. Blower Levers—LOW and locked.
30. Cowl Flap Levers—OPEN.

Check visually cowl flaps open.
31. Auxiliary Fuel Tank Selectors—OFF.

Check selectors OFF and in detent to insure that fuel does not flow to these tanks.
32. Hydraulic Bypass Handle—DOWN.
33. Hydraulic Hand Pump Selector Handle CLOSED (forward).
34. Emergency Landing Gear Extension Handle—OPEN (aft).
35. Precockpit Checklist—Completed.

BEFORE STARTING ENGINES.

1. Passenger Briefing—Completed.

Check that all passengers have been briefed by pilot or his designated representative.

2. Aircrew Inspections and Checklists—Completed.

Ascertain that all crew members have completed applicable inspections and checklists.

3. Weight and Balance Form F and Manifests—Aboard.

Check that Form F figures are those used on Takeoff and Landing Data Card. Check that one copy of correct manifest is on file with appropriate ground personnel and sufficient copies aboard aircraft.

BEFORE STARTING ENGINE. (Continued)

4. Takeoff, Climb, and Landing Data—Computed.
5. Oxygen and Smoke Masks—Installed.
Check that respective smoke or oxygen masks are in place and regulator set.

Note

To minimize time delay during an emergency when oxygen is required, it is suggested that the smoke mask be kept in place, microphone cord connected, and oxygen regulator set to 100% OXYGEN.

6. Seats and Rudder Pedals—Adjusted.
7. Hydraulic Pressure 1200 psi (minimum).

Note

A minimum of 1200 psi is required to set the parking brakes. If pressure is below this, operate the hydraulic hand pump until pressure is 1200 psi or above. This should be accomplished while the brake pedals are depressed.

8. Parking Brakes—Set.
9. GPU/APP—On the line.

The ground power unit should be positioned at cables length to the left and slightly forward of nose gear, clearly visible to pilot.

Note

If the power has not been turned on, the pilot shall signal the ground crew by holding his left hand open and horizontal with the right fist closed and thumb sticking up into the palm of the left hand. A GPU should be used for all starts when available.

10. Bus Voltage—26 to 28 volts.

This indicates that external power unit or APP is on bus and delivering power.

11. Instrument/Inverter Switches—ON.
12. Interphone Switch—ON.
13. VHF or UHF Radio—ON.

Check one radio ON and tuned to tower/ground frequency.

14. Quantity Indicators—Fuel, Oil, and alcohol checked.

Check that flight mechanic has compared fuel dipstick reading with fuel quantity indicators, and has compared oil quantity indicator and anti-icing fluid quantity gage readings with known quantities in tank, stating discrepancies.

15. Manifold pressures—Noted.

Check field barometric pressure indicated and state, "Noted ___ inches."

16. Autopilot—Set/DISENGAGED.

Electrical autopilot power switches should be ON at this time. Hydraulic autopilots will be disengaged.

17. Chocks—In place.

18. Before Starting Engines—Checklist Completed.

STARTING ENGINES PROCEDURES.

- a. Engines—Clear.

The pilot shall receive a ready signal (3 fingers held up by the left hand and a rotating motion with the right hand).

- b. Master Ignition Switch—ON.
- c. Engine No. 3—Start.

(1) At the command from pilot to start engines, flight mechanic/copilot

STARTING ENGINE PROCEDURES.**(Continued)**

turns booster pump switch LOW momentarily, then HIGH, and engages No. 3 starter. As propeller rotates through twelve blades watch for indication of hydraulic lock. If no hydraulic lock is evident call, "Switch on No. 3 engine."

Note

If less than one hour has elapsed since shutdown, let propeller turn freely through six blades.

- (2) The pilot/flight mechanic will turn ignition switch to BOTH.

Note

If engine fails to start within 45 seconds of cranking, allow starter to cool 3 minutes before attempting another start.

- (3) The pilot/flight mechanic will handle throttles, and retard in case of backfire.
- (4) The copilot/flight mechanic will prime as necessary until engine is running smoothly on constant prime. At minimum of 800 rpm, check oil pressure normal, pilot/flight mechanic will bring mixture control to AUTO RICH. Prime is released as rpm drop is noted (normally 50 to 100 rpm). Copilot will turn booster pump switch OFF, check fuel pressure and hydraulic pressure and state, "Fuel, oil, and hydraulic pressure up, booster pump off."

CAUTION

If there is no indication of oil pressure within 30 seconds, shut down the engine and have malfunction corrected.

- d. Engine No. 4—Start.

Repeat steps for Engine No. 3, step c, as applicable.

- e. GPU—Removed and clear.

After starting No. 3 and No. 4 engines, the pilot in left seat shall signal ground crew to remove power unit and landing gear ground safety locks. The signal for removing the power unit will be the same as for plugging unit in, except that right thumb will be pulled away from the left palm. The signal for removing ground safety locks is to form a circle with index finger and thumb of left hand, around index finger of right hand, then pull index finger of right hand from the circle.

CAUTION

The pilot shall make certain that the power unit is removed from the area prior to starting the remaining engines.

- f. Battery Switch—ON.

- g. Door Warning Light—OFF.

- h. Engine No. 2—Start

Repeat steps for Engine No. 3, step c, as applicable.

- i. Engine No. 1—Start.

Repeat steps for Engine No. 3, step c, as applicable.

- j. Starting Engines Checklist—Completed.

BEFORE TAXI.**Note**

Before the signal has been given to remove the chocks, or brakes are released, or any attempt to set the aircraft in motion, the Before Taxi Checklist shall be completed in its entirety.

1. Starter Selector Switch (C-54S) OFF.

BEFORE TAXI. (Continued)**WARNING**

2. External Power—Removed and Clear.
3. Battery Switch—ON.
4. Booster Pump Switches—OFF.
5. Radar Inverter—ON.
6. Radios, Radio Altimeter, and SIF—ON.

Turn all required radios and radio altimeter ON, and SIF to STANDBY, to allow sufficient time for warmup.

7. Hydraulic Pressure—Checked within limits.
8. Door Warning Light—OFF.
9. APP—Climatic
If not required for taxiing or runup, the flight mechanic will set APP control on IDLE position to allow APP to cool prior to shutdown.
10. Vacuum Pressure—Checked and set on No. 3 Engine.

The vacuum selector valve handle shall be rotated through the six positions, with proper pressure indications noted on both pilot's and copilot's pressure gage, and indications noted.

11. Fluxgate—Erected.
Warmup period prior to erecting is 5 minutes after radar inverter is turned on.
12. Flight Instruments—Set and UNCAGED.
Check that all flight instruments are set and uncaged, fluxgate master compass is set for applicable variations, and if installed, N-1/S-2 compass is correctly set and synchronized.

All altimeters should be checked closely to assure that the 10,000 foot pointer is reading correctly. Due to previous settings, the setting knob could have been rotated until the numbers reappeared in the altimeter setting window from the opposite side, thus indicating a 10,000 foot error.

13. Cabin Report—Secure, 3 pins and post aboard.

The flight orderly will report that the cabin is secure and all three ground safety locks and tail stand are aboard.

14. Ignition Grounding—Checked.

Accomplish the ignition grounding check near idling (600) rpm. Move the ignition switch from BOTH to L, BOTH, R, BOTH, OFF, and back to BOTH. Proper connection of the ignition leads will be indicated by a slight drop in rpm when operating on each magneto, and by complete cutting out of the engine in the OFF position.

WARNING

If the engine does not cease firing during the check, the magnetoground wire is open at some point; shut down and warn personnel to remain clear of the propeller until defect is corrected.

15. Chocks—Removed.

Pilot will direct removal of chocks by hand signal to ground crew. Pilot and copilot visually check chocks removed, area clear.

BEFORE TAXI. (Continued)

16. Before Taxi Checklist—Completed.

Check with tower/ground control for taxi clearance.

Note

The minimum engine speed at which engine driven generators will produce rated output is approximately 1450 rpm. Minimum engine speed for usable output is 1250 rpm.

TAXIING PROCEDURES.

When departing a parking area, in close proximity (within 10 feet) of other aircraft or fixed objects, a wing walker for each wing, in addition to a taxi director, shall be in position. Normal taxiing is accomplished with all engines operating at 800 to 1000 rpm, depending upon gross weight and taxiway gradient. Use full flaps and as little power as possible when moving away from the ramp to avoid dusting personnel and equipment. Avoid high taxiing speeds and excessive movement of the nosewheel. Begin a turn with a slight movement of the nosewheel, and gradually increase until the desired rate of turn is established. The same technique should be used in stopping a turn. The rolling inertia of the aircraft resists turning, which may cause side skipping or skidding of the nosewheel, especially when the surface is slick. In this case, judicious use of the outboard engine may be beneficial. Avoid sharp turns at high speeds. Always stop with the nosewheel fore and aft; otherwise side loads and strain will be placed on the nosewheel tire and strut during engine runup. Generally all braking will be done while the aircraft is moving straight ahead. Braking in turns will be held to an absolute minimum. In stopping, depress the brake pedals, and as the aircraft slows, gradually release the brake pressure so that when the aircraft stops, very little pressure is being applied. The best method to prevent rough stops is to scan outside the aircraft through

a side window. Make sure aircraft is completely stopped prior to setting parking brakes.

CAUTION

Avoid sudden acceleration or deceleration of the engines to prevent stresses from being imposed on the engines and mounts.

Note

The use of auto-lean mixture is approved for ground operation. This is advantageous for extended ground operations, high altitude operations, and operations during high temperature and humidity conditions.

TAXI CHECK.

1. Brakes—Checked.

Check brake operation, depress brake pedals lightly. If brakes are operating properly, pressure will be felt through the pedals, and the aircraft will react. This check should be conducted smoothly and with light pressures applied.

2. Engine Analyzer—ON.

Turn ON power switch, to allow sufficient warmup time prior to engine run-up.

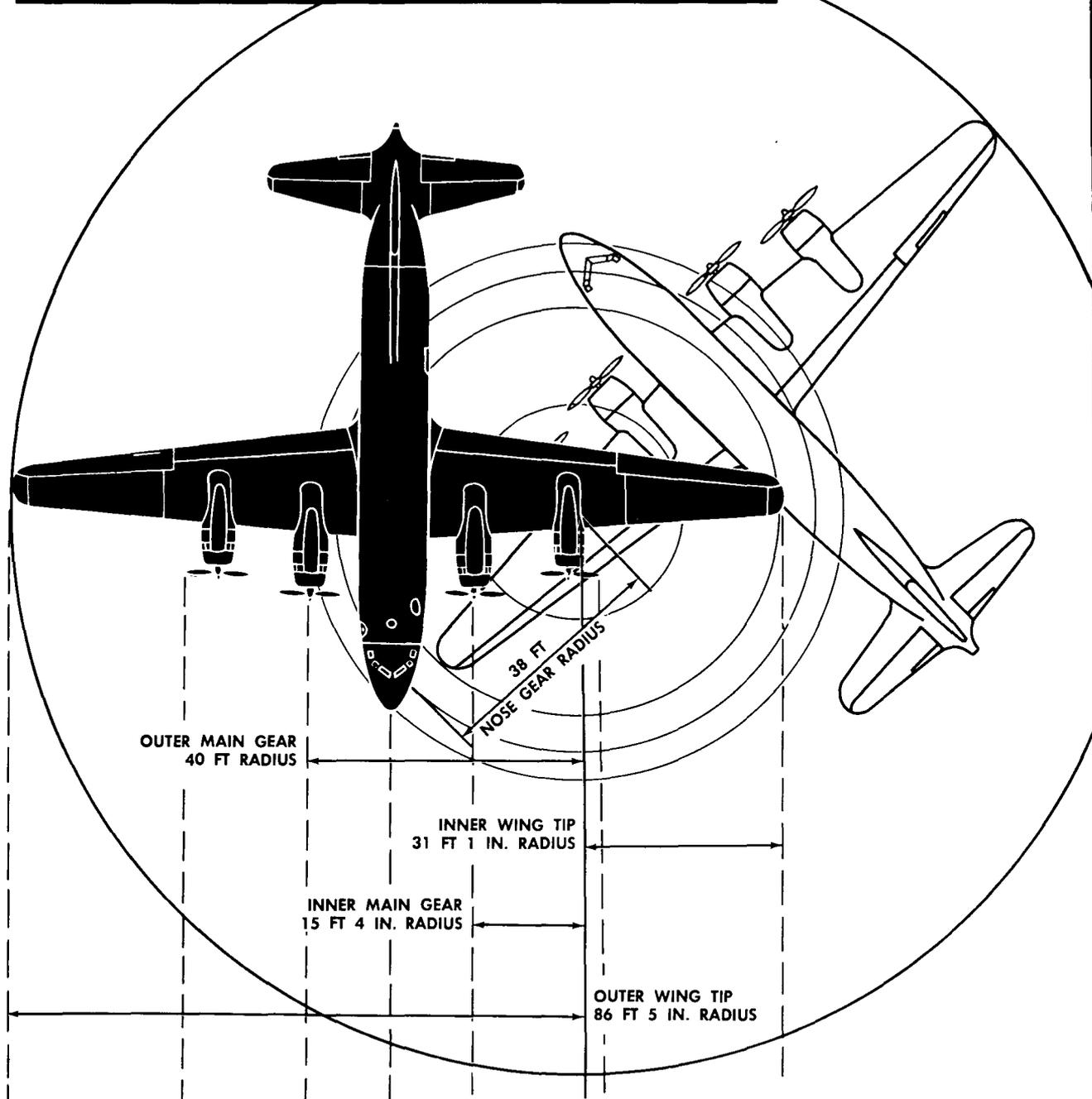
Note

When clear of congested area, complete taxi check.

3. Flaps—UP.

The copilot will place flap selector lever in the UP position.

TURNING RADIUS AND GROUND CLEARANCE — Typical



Note:
 For ground maneuvering with nose wheel set at full left or full right, the aircraft pivots about a point outboard of the main gear and requires a circle approximately 175 ft. in diameter to turn.

APPROXIMATE WING PIVOT POINT

VERTICAL CLEARANCES	
VERTICAL STABILIZER TIP	27 FT 10 IN.
FUSELAGE	17 FT 6 IN.
PROPELLER INBOARD	13 IN.
PROPELLER OUTBOARD	30 IN.

Figure 2N-2

X1-35

TAXI CHECK. (Continued)

4. Fuel Tank Selectors and Crossfeeds—Checked and set for takeoff.

Check fuel system for proper operation of the auxiliary, fuselage, and cross-feed systems. Set on main tanks for takeoff.

5. Flight Instruments—Checked.

Observe operation of turn-and-slip and heading indicators while making turns.

6. Taxi Checklist—Completed.

ENGINE RUNUP.**Note**

Only items marked with asterisk (*) need be accomplished on thru-flight.

Check clear of all obstructions, nosewheel centered, and brakes set. The copilot and flight mechanic shall be directed to monitor aircraft movement due to brake slippage or slick surfaces. Copilot will contact tower/clearance delivery for ATC clearance.

- *1. Parking Brakes—Set.
- *2. Wing Flaps—Set 15 degrees.
3. Airfoil Deicers—Checked and OFF.
- Check all deicer boots for proper inflation and cycling sequence. Turn wing deicer switch OFF.
- *4. Temperatures and Pressures—Checked.

The pilot will check temperature and pressures within normal limits. When engine oil temperature reaches a minimum of 40°C, the engine is sufficiently warm for runup, regardless of cylinder head temperature.

- *5. Mixture Levers—AUTO RICH.

- *6. Engines—Set 1700 rpm.

Pilot advances No. 1 and 2 throttles to 1700 rpm. Copilot advances No. 3 and 4.

7. Blower Levers—HIGH.

Copilot/flight mechanic shifts blower levers to HIGH position noting fluctuation in oil pressure.

CAUTION

Blower levers must be locked in the HIGH or LOW position at all times. Intermediate positions will result in engine damage.

8. Generators—Checked.

Check generator output by selecting desired generator on the dc voltmeter selector switch. Normal voltage is 27.5 to 28.0 volts. Amperage readings should be steady and within 10 percent of each other.

- *9. Propellers—Checked and Forward.

The pilot will move the propeller control levers to the low pitch position noting the low pitch rpm (1200 ± 50). The flight mechanic/pilot will then move carburetor air levers to full HOT position noting a rise on carburetor air temperature indicators. The carburetor air levers will then be moved to COLD position and propeller control levers moved forward to INCREASE RPM position. Propellers should be exercised a minimum of two times to recirculate the oil.

Note

The carburetor deicing alcohol need only be checked on test flights and on flight that may require its use.

10. Carburetor Air—Checked COLD.

Pilot and copilot visually check that the carburetor air doors are open.

ENGINE RUNUP. (Continued)

11. Propeller Feathering—Checked.

With propellers set at 1700 rpm, pilot will direct the flight mechanic to stand by battery and generator switches. The flight mechanic will be prepared to turn these switches OFF should feathering buttons stick or fall off. The pilot will depress each feathering button for drop of approximately 200 rpm. The flight mechanic will note amperage load and the pilot shall observe tachometer and oil pressure. After a drop of 200 rpm is reached feathering button will be pulled out and rpm return to 1700 noted. During cold weather, the prop controls will be exercised again to insure that distributor valve has returned to its proper position and that propeller dome oil will be sufficiently warm to preclude prop surging or runaway propeller during takeoff.

*12. Throttles—Field barometric.

Pilot will advance No. 1 throttle until manifold pressure is equal to field barometric pressure as noted prior to engine start. Copilot will retard No. 2, 3, and 4 throttles to 1000 rpm. Pilot will direct flight mechanic/copilot to shift blower lever to LOW, noting the drop in manifold pressure and fluctuation in oil pressure which indicates the blower has shifted. The pilot will reset No. 1 throttle to field barometric pressure and note power check; rpm 2200 \pm 50, temperatures, pressures, and fuel flow within limits. The pilot will then check the magnetos as follows: BOTH, L, BOTH, R, BOTH. The normal rpm drop is 50 to 75 with a maximum allowable of 100 rpm and a maximum difference of 40 rpm between magnetos. During the propeller and magneto check, the flight mechanic will monitor the engine analyzer. The pilot will observe No. 1 and No. 2 engines for vibration, loose cowling, or possible oil leaks. The copilot will observe No. 3 and No. 4 engines for the same discrepancies. When the check is complete

on No. 1 engine, the pilot will direct the copilot to retard that throttle to 1000 rpm while he advances No. 2 throttle. The advancing and retarding of throttles should be accomplished so that throttles cross at approximately 1500 rpm. The same procedure will be repeated for No. 2, No. 3, and No. 4 engines. At the discretion of the Plane Commander two engines may be checked simultaneously.

Note

When making a power check in a headwind, approximately two rpm should be added to the power check rpm for each mile per hour headwind.

- *13. Magnetos—Checked.
- 14. Blowers—Checked LOW.
- 15. APP—OFF.
- *16. Engine Runup Checklist—Completed.

BEFORE TAKEOFF.

The Before Takeoff Checklist is divided into two phases and shall normally be completed after receipt of airways clearance.

Phase I to be completed prior to taking runway.

Phase II to be completed after receiving clearance to take runway.

BEFORE TAKEOFF.**PHASE I.**

1. Trim Tabs—Set.

Normally all tabs will be set on zero.

BEFORE TAKEOFF. (Continued)**Note**

2. Navigation Radios and Radar—ON and checked.
 - a. VOR, ILS, and radio compasses identified, if station is available. RMI check for proper bearing indication. Course deviation indicator Set bearing indication in the course selector window, and CDI should center (VOR or TACAN).
 - b. Course deviation indicator and glide slope receiver—If field has operational ILS, tune to appropriate frequency, and check for proper displacement of CDI and glide slope indicators. Both OFF flags should be hidden.
 - c. Radio Compasses—Check for proper bearing indication. Check set on ANT, ADF, and LOOP.
 - d. TACAN—Check same as VOR plus range receiver.

WARNING

Occasionally TACAN equipment will "Lock-On" to a false bearing which will be 40 degrees or a multiple of 40 degrees in error. These errors can be on either side of the correct bearing. When the TACAN locks-on a false bearing, switching to another channel and then back to the desired channel, or turning the set off and then back on will recycle the search mode. This will most probably result in a correct lock-on.

When using TACAN, cross check for false lock-on with ground radar, airborne radar, VOR, dead reckoning or other available means. These checks are especially important when switching channels or when turning the set on. When false lock-on is suspected follow procedure outlined in TACAN Operation, section IV, for recycling the TACAN search mode.

A false lock-on does not effect the DME display provided by the TACAN equipment.

- e. Insure radios set up for departure route and/or for return to field in event of emergency.
 - f. Radar—Set for weather or terrain presentation as desired.
3. Flight Instruments—Set.
Check and/or align flight instruments and N-1/S2 compass. Attitude indicators—Align the miniature aircraft on the horizon bar. Vertical velocity indicators—Set.

WARNING

To avoid the possibility of takeoff with J-8 attitude indicator erected in the inverted position, the instrument must be caged prior to takeoff. To avoid damage to the instrument, do not pull the caging knob violently.

4. Crew Briefing—Completed.
Pilot should brief crew as necessary regarding any aspects of takeoff which might be unusual or not routine; consider the crew's experience and avoid needless repetition.
5. Emergency Landing Gear Extension Handle—CLOSED (forward)

In event emergency landing gear extension handle is left in OPEN (aft) position, hydraulic pressure will not be supplied to uplines and gear will not retract when landing gear lever is placed in UP position.
6. Fuel Booster Pump Switches—HIGH.
Place fuel booster pump switches in HIGH position, to assure adequate fuel

BEFORE TAKEOFF. (Continued)

supply during maximum power settings, and in the event of engine driven pump failure during critical phase of takeoff.

7. Gust Lock—OFF.

8. Flight Controls—Checked.

Check flight controls for free and correct movement.

9. Prop Anti-Icing—Climatic.

Set for desired flow and turn ON to wet down props if required on climb out.

10. Seat Belt and Shoulder Harness—Fastened.

Seat belts fastened, shoulder harness on and snug. The shoulder harness assembly has an inertia reel that locks on impact, therefore may be left unlocked to provide free movement of the pilots.

11. Phase I Checklist Completed.

PHASE II (LINE UP).

After the aircraft has been cleared onto the runway prior to takeoff, and before leaving the runway spot, complete the following:

1. Pilots' Compartment Windows—Closed and locked.
2. Cowl Flaps—TRAIL.

Move cowl flap levers from OPEN momentarily to CLOSE, and then to TRAIL position.

CAUTION

Cylinder head temperature should not exceed 170°C before start of takeoff, or exceed 260°C during the takeoff, to reduce possibility of detonation and subsequent engine damage.

3. Wing Flaps—Checked 15 degrees.

4. Mixture Levers—AUTO RICH.

Move levers to the AUTO RICH position and check that levers are in the detent.

5. Anticollision Light—ON.

6. Pitot Heaters—Climatic.

At pilot's discretion, on local or short VFR flights, pitot heater switches may be left OFF. On extended or IFR flights, they will be turned ON.

CAUTION

Do not operate pitot heaters for extended periods on the ground (1 minute maximum); lack of cooling air will result in damage to the heating units. However, once the heaters have been turned ON they should be left on during the remainder of the flight to prevent damages to the heating elements caused by initial current surges when the unit is turned on.

7. SIF—NORMAL (Mode and Code as briefed).

8. Before Takeoff Checklist—Completed.

CREW BRIEFING — TYPICAL.

The pilot will brief the copilot and flight mechanic to assure they know their duties during takeoff. Any deviations from normal procedure should be clearly defined. The following items will be covered:

- a. Review Takeoff and Landing data.
- b. Pattern (or IFR route), to be followed in case immediate landing is necessary after becoming airborne, also communications that will be required.

BEFORE TAKEOFF. (Continued)

- c. Air Traffic Control clearance, and route to be flown after normal departure.

The following standard items will be covered when crew is not made up of permanent crew members (pilots, copilots, and flight mechanic) making regular scheduled flights together:

- a. The copilot will "fly" control column, normally using a slight forward pressure to keep nosewheel in firm contact with runway and correcting for crosswind conditions by aileron displacement to keep wings level.
- b. The pilot will advance throttles to maximum power and monitor until refusal speed is reached or exceeded. The flight mechanic/copilot will follow up on throttles and adjust to maximum power.

WARNING

The throttle friction lock should not be applied so tight as to restrict the rapid power (throttle) reduction required in a rejected takeoff emergency.

- c. The flight mechanic will monitor engine instruments and call out, "Abort," when an unacceptable condition is observed.
- d. The copilot will monitor acceleration check by use of the airspeed and clock/or runway marker. If acceleration is less than computed data, or any other unacceptable condition is noted, call out, "Abort."
- e. At refusal speed, copilot calls, "Go," if refusal speed is below takeoff speed. Calls, "Lift off," when takeoff speed is reached.

- f. If emergency or malfunction occurs before refusal speed is attained, takeoff will be discontinued. After refusal speed, takeoff will be continued and treated as an inflight emergency.
- g. The copilot will acknowledge and retract gear on pilot's visual and oral signal; and flaps on oral command.
- h. The first power reduction will be to METO power at pilot's command.
- i. If any emergency arises, either copilot or flight mechanic will notify pilot. If engine failure or power loss occurs, pilot shall identify engine and copilot will verify and feather on pilot's command. The flight mechanic shall monitor action.

TAKEOFF.

The following technique will be observed by all pilots:

NORMAL TAKEOFF.

The aircraft will be maneuvered to a position that permits use of the entire runway. A short hesitation prior to takeoff is recommended to avoid spillage and/or syphoning of fuel from the fuel tank vents during takeoff and climb, especially with full fuel tanks. The takeoff performance charts in the Appendix are based on maximum power being applied at the start of the ground run, on dry concrete runway. The technique of holding the brakes until maximum power is attained can be modified without appreciably affecting performance. In the takeoff position, the pilot will advance the throttles smoothly to 30 inches Hg., checking the engine instruments, and continuing smooth application of the throttles to maximum power. The flight mechanic/copilot will follow

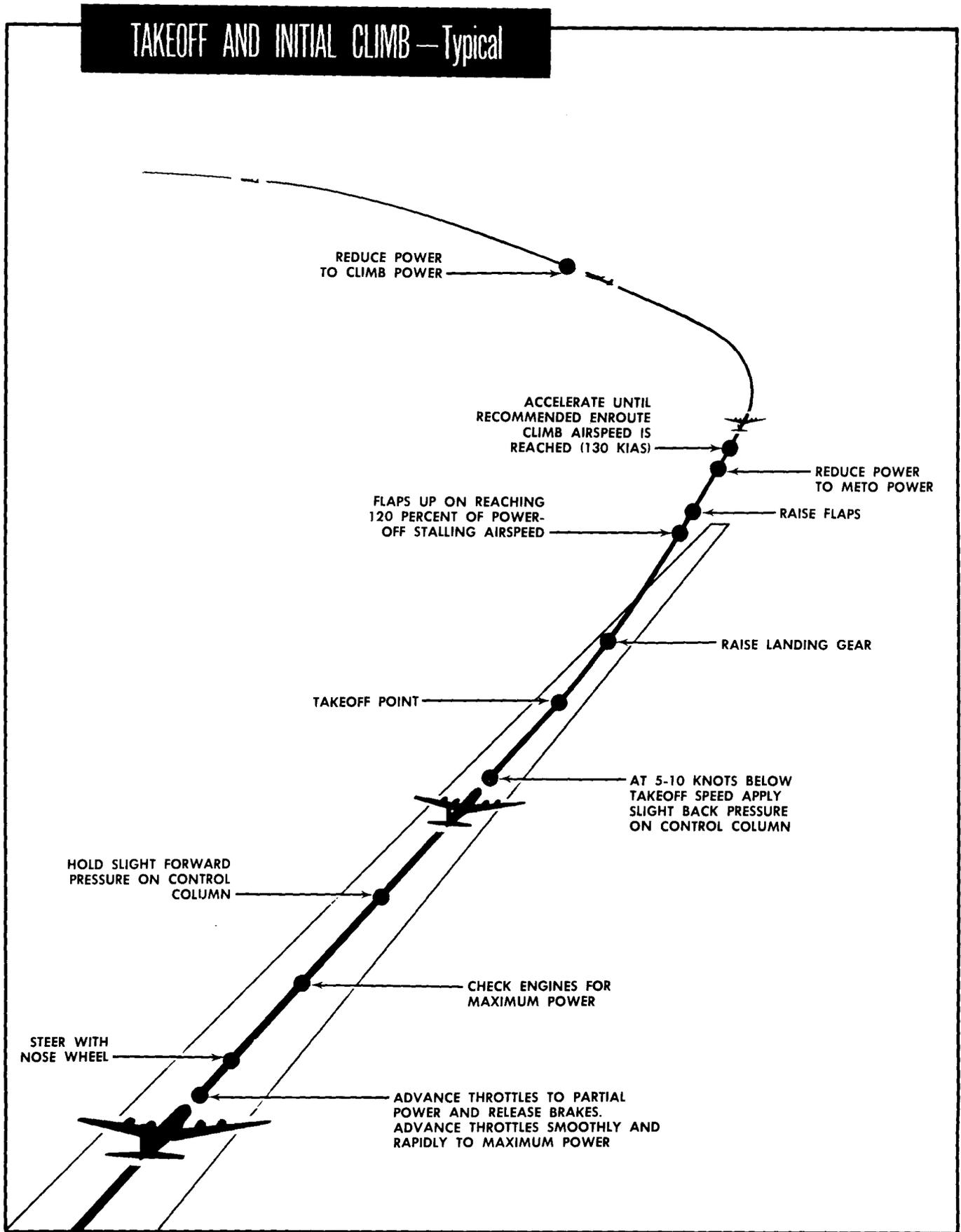


Figure 2N-3

TAKEOFF. (Continued)

through on initial power application and adjust the throttles at maximum power.

Note

To obtain full effectiveness of maximum power, throttles must be advanced to maximum allowable manifold pressure, in approximately 5 seconds from time brakes are released.

During acceleration to takeoff speed, the pilot's left hand will be on the nosewheel steering wheel. Directional control will be maintained with nosewheel steering until rudder becomes effective (approximately 43 knots IAS), at which time directional control should be maintained with the rudder. The nosewheel steering should be monitored until 83 knots IAS (minimum control speed) is reached. The right hand will monitor the throttles until refusal speed is attained. After passing 83 knots IAS the left hand should be shifted to the control column, and a slight back pressure applied to lighten the load on the nosewheel. At approximately 10 knots below computed takeoff speed, easeback on the control column gradually and smoothly in such a manner that the aircraft produces a smooth transition to the takeoff attitude, and leaves the ground at takeoff speed. Forward pressure should be maintained on the control column during initial portion of the takeoff run. During a crosswind takeoff, some aileron displacement may be required to keep the wings level. These duties shall be performed by the copilot until the pilot takes over the control column.

The copilot will call, "Abort," if computed acceleration is not met or any other unacceptable condition is noted. He will call out, "Go," as the refusal speed (if below takeoff speed) is attained, and "Lift off," when takeoff speed is reached.

The copilot will cross-check flight instruments on all night and instrument takeoffs. The flight mechanic will monitor engine in-

struments for any indications of malfunction or overboost.

WARNING

If the nosewheel is raised from the runway below the minimum control airspeed (83 knots IAS), there is insufficient rudder force available at full deflection to overcome the yawing moment of a windmilling propeller, until power is either reduced to a symmetrical condition, or the nosewheel is lowered to the runway to provide directional control assistance.

Lifting the nosewheel from the runway before this speed is attained, places the aircraft in an uncontrollable condition in the event of an engine failure. In order to insure controllability throughout the takeoff run, the nosewheel will be monitored, and allowed to remain on the runway until minimum control speed (83 knots IAS) is attained.

MINIMUM RUN/OBSTACLE CLEARANCE TAKEOFF.

Compute takeoff performance and takeoff flight path, from performance data in the Appendix. Complete Before Takeoff Checklist, and position the aircraft so all of the available runway can be used. Advance throttles to maximum power before releasing the brakes, then proceed as during a normal takeoff. Establish normal takeoff attitude, and become airborne at precomputed takeoff speed. When definitely airborne, raise landing gear and establish climb at 115 percent of stalling speed for the given gross weight with wing flaps set at 15 degrees. Use maximum power until obstacle is cleared, then proceed as during normal climb.

TAKEOFF. (Continued)**CROSSWIND TAKEOFF.**

In a severe crosswind, use aileron to keep wings level, and keep the aircraft in a three-point attitude until reaching takeoff speed. This procedure will help maintain directional control. When airborne, the pilot will make a coordinated turn to crab into the wind in order to maintain track over the runway.

NIGHT TAKEOFF.

Instrument climb procedures are recommended to avoid flying back into the ground when visual reference is lost immediately after takeoff.

AFTER TAKEOFF — CLIMB.

The following procedures will be observed immediately after takeoff. When the aircraft is definitely airborne, and a positive rate of climb is established, the pilot will indicate, "Gear up," by visual and oral signal. The copilot will repeat the command, "Gear up," then move the landing gear lever to the UP position.

CAUTION

Do not apply brakes after takeoff as structural damage may result.

Continue climb at maximum power, and as minimum flap retraction airspeed (120 percent power-off stalling speed) is reached, and the flight mechanic/copilot calls, "Gear up, red light out," the pilot will call for wing flap retraction. The copilot will retract the wing flaps as directed by the pilot.

Note

After landing gear retraction, allow the aircraft to accelerate. This may be accomplished by holding the aircraft in the takeoff attitude, thus allowing drag reduction from landing gear retraction and/or power change

to affect the acceleration. It is not necessary, or advisable, to decrease the angle of attack to increase airspeed. As soon as the landing gear has retracted, and the minimum wing flap retraction airspeed has been reached, start wing flap retraction. If the wing flaps are retracted during a period of acceleration, no change in aircraft attitude will be required to maintain a relatively constant flight path slope; however, if wing flap retraction is delayed until a constant airspeed or slower rate of acceleration is attained, it will be necessary to increase the angle of attack as the wing flaps retract. If the angle of attack is not increased, settling will occur. When the angle of attack is increased under these conditions, the result is not a reduction in airspeed; rather, the airspeed will continue to increase due to the resultant drag reduction as the wing flaps retract.

After the wing flaps have been retracted, the pilot will state, "METO power." The flight mechanic/copilot will adjust the throttles and then the propeller levers to METO power and call, "METO power set."

After METO power has been set, continue acceleration until the recommended enroute climb airspeed is reached (128 knots IAS). At this time, reduce to climb power as pre-computed from Appendix. This technique should be followed for both four- and three-engine initial climb, as it results in the minimum time requirement for high power settings, and furnishes adequate cooling in the shortest possible time.

Note

- If condition require a higher rate of climb, METO power may be used until reaching cruising altitude.
- In event a higher altitude is required over a given distance, METO power, and an airspeed of 120 percent of stall speed, is recommended.

CLIMB CHECKLIST.

1. Landing Light Switches—RETRACT and OFF.

2. Landing Gear Lever—NEUTRAL.

Monitor red landing gear warning light for possible landing gear uplatch failure. If uplatch has failed, red landing gear warning light will come on in 3 to 5 minutes after hydraulic system has been bypassed.

3. Wing Flaps—UP.

When hydraulic pressure bleeds off, flaps may droop, causing a loss in airspeed. If this happens, pressure will have to be maintained by periodically closing hydraulic bypass.

4. Hydraulic Bypass Handle—UP.

5. Fuel Flow Indicators—Checked.

Check for normal reading appropriate for power being used.

6. Generators—Checked.

Check generator output by use of the voltmeter selector switch, and compare amperage within 10 percent.

7. FASTEN SEAT BELT and NO SMOKING Signs—As required.

Turn signs off, after fuel fumes, and wing tank syphoning are checked, and flight conditions permit.

8. Climb Checklist—Completed.

CRUISE.

Level off upon reaching cruising altitude and maintain power setting until desired cruising airspeed is attained. At this time, notify the flight mechanic and copilot to establish cruise power to obtain cruise condition desired (See Part 2 and Part 5 of the Appendix for power settings for Cruise).

1. Cowl Flaps—CLOSED.

When leveling off, it is not necessary to wait until cruising airspeed is attained before closing cowl flaps.

2. Cruise Power—Set.

3. Mixtures—AUTO LEAN.

Move mixture levers to AUTO LEAN detent, and note fuel flow indication.

4. Radio Altimeter—OFF.

5. Altimeters—Set.

Set at 29.92 or area pressure as appropriate.

6. Fuel Tank Selectors—As required.

Set fuel tank selectors as required by mission and directed by pilot (See Fuel System Management, Section VII).

7. Booster Pumps—As required.

Set fuel booster pumps as required (See Fuel System Management, Section VII).

8. Cruise Checklist—Completed.

Note

It is recommended that once each hour a wing scan; engine analyzer check; and fuel, oil, and power readings be taken by the flight mechanic.

FLIGHT CHARACTERISTICS.

Refer to Section VI for detailed information on the aircraft flight characteristics.

SYSTEM OPERATION.

Refer to Sections IV and VII for detailed information on the operation of the aircraft systems.

DESCENT.

Passenger comfort, weather conditions, and turbulence should be taken into consideration during descent. The rate of descent is determined by altitude, distance from the field, terrain, and the weight of the aircraft. Power reductions will be made to maintain efficient and economical engine operation. Maintain BMEP and cylinder head temperature. Do not enrich mixtures during descent to increase cylinder head temperature, since this will increase fuel consumption and aggravate plug fouling. A constant airspeed and rate of descent should be maintained. Clean configuration should be used for cruising descent, maintaining long range airspeed or cruising airspeed. This provides the greatest ability for the aircraft to withstand gust loads. Under certain conditions higher rates of descent may be necessary. This may be obtained by increasing airspeed, or lowering flaps and/or gear.

CAUTION

If the flying conditions during descent require a large reduction in power, reduce rpm as well as manifold pressure. For descent or other low power maneuvers, such as simulated engine failures, it is important to cushion the high inertia loads on the master rod bearings, which occur at settings of high rpm combined with low manifold pressure. As a rule, reduction of 100 rpm requires a reduction of 1 inch Hg. manifold pressure.

DESCENT/ARRIVAL PASSENGER BRIEFING — TYPICAL.

We will be landing at (airfield) in approximately (time) minutes. The temperature on the ground is ° F. Please comply with the FASTEN SEAT BELT and NO SMOKING signs when they appear. Passengers may claim their baggage at the baggage counter in the terminal. Information about billets, messing facilities, and transportation will be

provided by ground personnel. Through passengers will have approximately (time) at this station. Smoking is not permitted on the ramp. Remain seated, with seat belt fastened, until the aircraft and engines have come to a complete stop. Thank you.

DESCENT CHECK.

The Descent Check is divided into two phases, Cruising Descent Check (Phase I), which should be initiated in sufficient time to allow completion prior to arriving over the initial approach fix, and the Approach Check, which should be initiated over the fix.

CRUISING DESCENT CHECK.

1. Approach and Landing Data—Computed.

The destination weather will be used to compute landing data card information. This duty should be delegated to the copilot.

2. Radio Altimeter—ON.
3. Main Fuel Tank Selector Levers—ON.

Place main fuel tank selector levers ON. Place fuselage and auxiliary fuel tank selector levers OFF.

4. Crossfeed Levers—OFF.
5. Blowers—Exercised and LOW.

On thru-flights this will provide blower check and eliminate requirement on engine runup.

6. Hydraulic Bypass Handle—DOWN.

Place landing gear lever in UP position at this time, to raise gear off uplatches.

7. Hydraulic and Emergency Airbrake Pressure—Checked.
8. Emergency Landing Gear Extension Handle—CLOSED (forward).

DESCENT CHECK. (Continued)**CREW'S BEFORE LANDING BRIEFING — TYPICAL.**

9. Fuel Booster Pump Switches—HIGH.
10. Trailing Antenna—In.
11. Navigator's Compartment—Secured.
Check navigator's table secured. Sextant removed and in case, driftmeter caged and OFF, loose gear stowed.
12. Passenger Briefing—Completed.
Check that all passengers have been briefed by pilot or his designated representative.
13. FASTEN SEAT BELT and NO SMOKING Signs—ON.
14. Seat Belts and Shoulder Harness—Fastened.
15. Autopilot—OFF.
16. Crew Briefing—Complete.
Accomplish crew briefing to include the following:
 - a. Weather conditions and type approach. Each pilot shall have a set of approach plates available.
 - b. Review terrain and obstructions.
 - c. Runway length and field elevation.
 - d. Review landing data.
 - e. Minimum instrument altitude and missed approach procedures.
 - f. Instruct copilot and navigator (if applicable) to monitor approach.
 - g. Brief copilot and flight mechanic on touch-and-go landing procedures if applicable.
17. Cruising Descent Checklist—Completed.

Briefing should include, but is not limited to the following:

"This will be an (type) approach to runway No. , which is feet long and feet wide. Field elevation is feet, and the minimums for this approach are feet and mile. The threshold airspeed is knots, touchdown speed knots, and go-around speed is knots. Copilot call out 100 feet above all assigned, or procedure turn altitudes, and minimum altitude. Call out minimum feet, and/or, field in sight. If field is not in sight at minimums, we shall execute a missed approach as published or as directed by (the controlling agency). In the event of a wave-off or missed approach, the flight mechanic/copilot will advance the propellers; the pilot will advance the throttles and the copilot will raise the flaps and gear as directed by the pilot. I desire backup frequencies for all approach frequencies. Any questions?"

APPROACH CHECK.

1. Mixture Levers—AUTO RICH.
2. Propeller Levers—Rpm 2100 set.
3. Wing Flaps—Set.
Copilot sets wing flaps when directed by the pilot. Under normal conditions a wing flap setting of 10 degrees is desired for descent and downwind leg. A wing flap setting of 20 degrees or more may be used to help expedite descents.
4. Carburetor Air Levers—Climatic
5. Cabin Heaters—OFF.
6. Pilots' Compartment (cockpit) Heater—Climatic.

CAUTION

Do not operate below 105 knots unless ground blower is operating.

7. Secondary Emergency Bus (C-54S) — ON.

DESCENT CHECK. (Continued)

8. Landing Lights—Climatic.
9. Approach Checklist—Completed.

BEFORE LANDING.

When executing this checklist, pilot should call, "Gear Down, Before Landing Checklist." This will normally allow the gear to extend and pressure to stabilize prior to reaching this item on the checklist.

1. Propellers—Rpm 2300 set.

Normally 2300 rpm, however, additional rpm may be used at pilot's discretion.

2. Landing Gear Lever—DOWN.

Copilot checks landing gear lever DOWN, gear indicator light(s) green and hydraulic pressure normal and states, "Three green, pressure up," at which time pilot checks brake pedals for pressure.

3. Cowl Flaps—Climatic.

The cowl flap levers should be in TRAIL position, however, in cold weather, CLOSED position may be more desirable.

4. Wing Deicers—OFF.

Wing deicers must be turned OFF one minute prior to landing.

5. Before Landing Checklist—Completed.

Note

Normally 40 degrees of flaps will be used for landing. In event of a strong crosswind, it may be desirable to use less than 40 degrees of flaps.

LANDING.**NORMAL LANDING.**

- a. Prior to entering downwind leg, complete Approach Checklist. On entering downwind leg, reduce airspeed to 140 percent of power-off stalling airspeed.
- b. Upon turning base leg, pilot states "Landing gear down, wing flaps 20 degrees, Before Landing Checklist." Complete checklist and reduce airspeed to maintain 140 percent of power-off stalling airspeed, completing turn to final approach not below 600 feet above field elevation.
- c. After the turn to final approach, pilot states, "Pilot's throttles." The pilot then places his hand on throttles to insure minimum of lost motion and time in the event rapid power adjustments are required. The pilot will continue to call for desired power settings and flight mechanic/copilot will continue to follow up on copilot's throttles, adjusting manifold pressure as stated by pilot. The final wing flap setting (normally 40 degrees) should be made at approximately 200 feet (this allows approach flap settings to be used to minimum altitudes) in order that latter part of final approach be made in landing configuration with a gradual reduction of power.

Note

Control the descent by variation in power while maintaining desired airspeed.

- d. After final wing flap setting has been made, the airspeed will be gradually reduced to cross threshold at 130 percent of power-off stalling airspeed and 50 feet of altitude.
- e. Positive thrust (normally not less than 14 inches Hg. manifold pressure) should be maintained until flare-out is

LANDING PATTERN—Typical

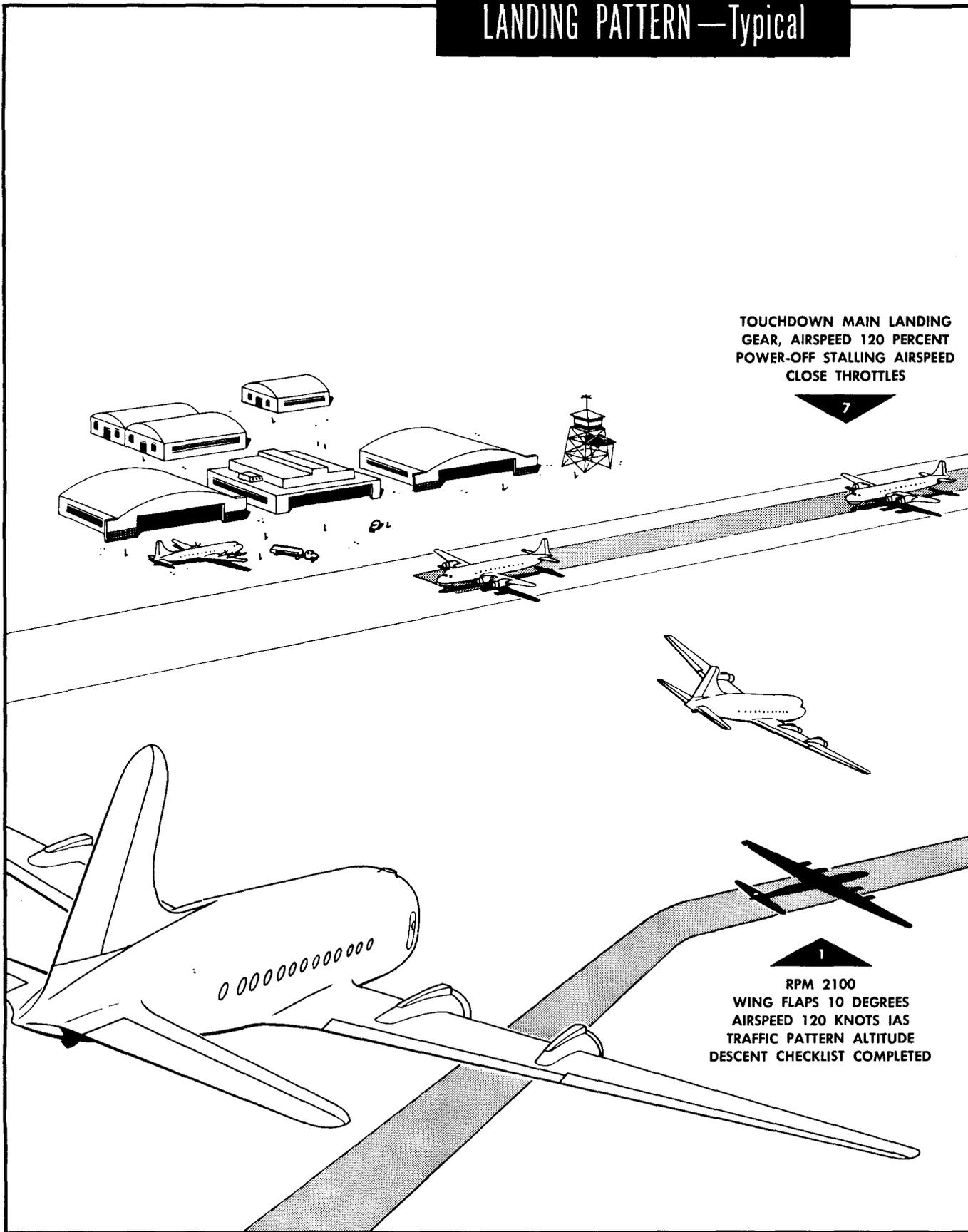


Figure 2N-4 (Sheet 1 of 2)

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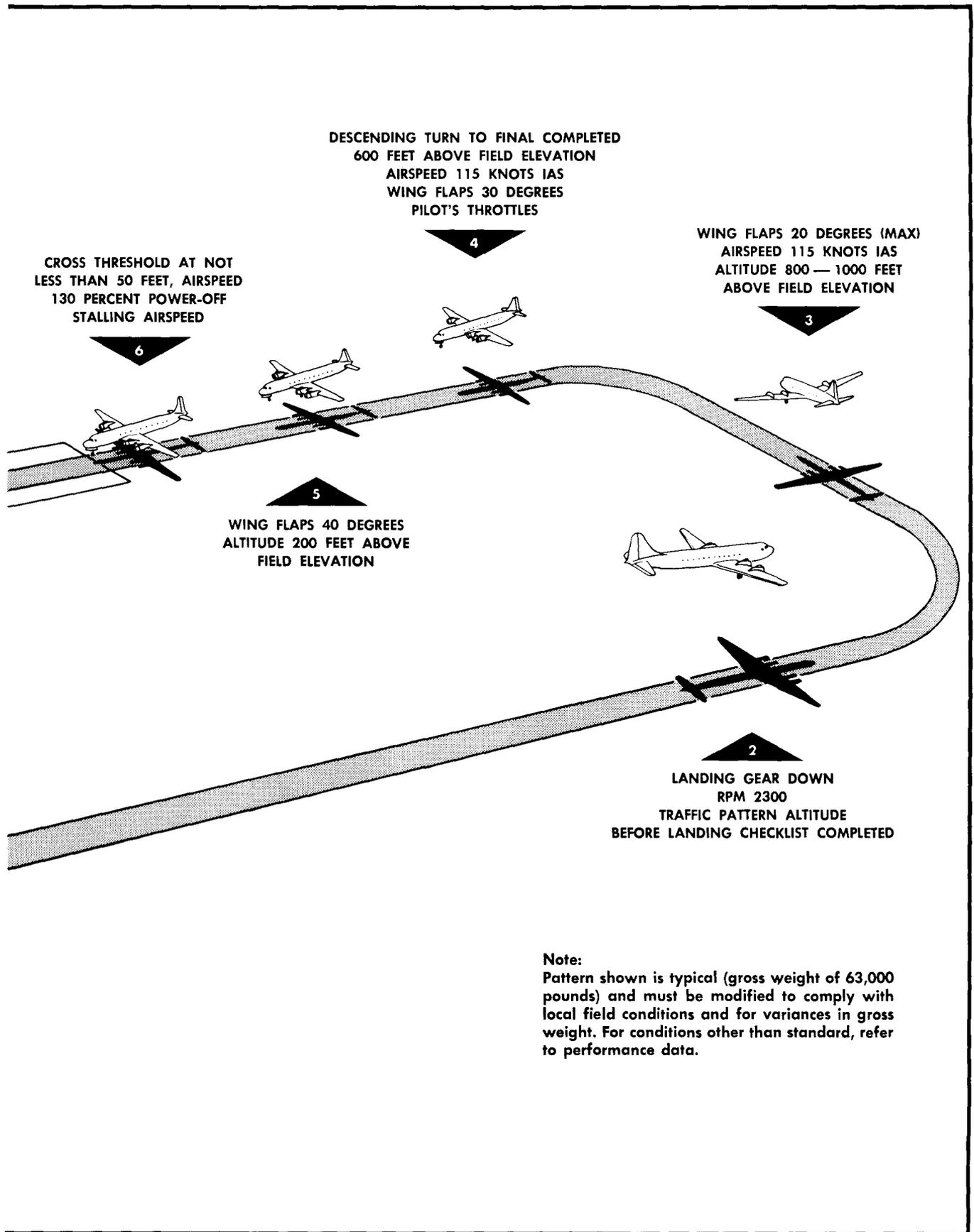


Figure 2N-4 (Sheet 2 of 2)

LANDING. (Continued)

made and aircraft touches down at 120 percent of power-off stalling airspeed. Land aircraft on main landing gear, holding nosewheel slightly off runway.

- f. After landing is made, retard throttles to CLOSE position, and gently lower nosewheel to runway. Maintain directional control primarily through the use of rudder, braking only as necessary. Do not use nosewheel steering at high speeds, use near end of landing ground roll or as conditions require.

- c. Touchdown as near approach end of runway as possible.
- d. Retract flaps immediately after touchdown to allow maximum braking.
- e. Lower nosewheel as soon as possible and apply maximum braking.
- f. Be prepared to use emergency airbrakes.

CROSSWIND LANDING.

On final approach, at approximately 200 feet, the same as on actual minimum approach, align the axis of the aircraft with the runway and lower the upwind wing. Use opposite rudder, as required, to maintain a straight course. Contact the runway with the upwind gear. Continue rolling the aileron control wheel toward the wind as the speed decreases. Lower nosewheel and apply braking action as necessary.

MINIMUM RUN LANDING.

The procedures for a minimum run landing (short field) are the same as for a normal approach and landing with the following exceptions:

- a. Rpm—2550.
- b. Slow aircraft for threshold speed of 120 percent, touchdown at 110 percent of power-off stalling airspeed.

WARNING

Be alert to avoid entry into the area known as "Backside of the Power Curve".

TOUCH AND GO LANDING.

The procedure for a touch and go landing is the same as for a normal landing except for the following:

- a. Advance rpm to full increase prior to touchdown.
- b. After nosewheel touches down, pilot will direct copilot to raise flaps to 15 degrees.
- c. The pilot states, "Maximum power," and advances throttles to maximum power.
- d. Proceed as with normal takeoff.

NO FLAP LANDING.

No flap landings are usually made following flap system hydraulic failure, however, for pilot training the procedures are the same as for normal approach and landing with the exception of the use of aerodynamic drag to the slowest possible speed.

LANDING ON ICY RUNWAY.**Note**

If operation on icy runway is anticipated, the aircraft should be equipped with ice grip tires if possible.

LANDING. (Continued)

Landing on ice-covered runway is considered hazardous and should be attempted only when dictated by the nature of the mission. Primary considerations in landing on icy runways are increased stopping distances and poor directional control. The approach and landing should be the same as for a minimum run landing. After touchdown, hold the nosewheel off as long as possible for maximum aerodynamic drag. Maintain directional control with rudder (and differential power if required). Use wheel brakes cautiously, and only after the aircraft has slowed sufficiently to lessen the danger of locking the wheels.

FOUR ENGINE GO-AROUND.

If the pilot considers it necessary to make a go-around proceed as follows:

- a. Pilot gives oral command, "Go-around," and states power desired.
- b. Flight mechanic/copilot immediately advances propeller levers to rpm required.
- c. Pilot advances throttles.

Note

If go-around is initiated below 500 feet above the terrain, maximum power is mandatory. At 500 feet, or above, power used will be at the pilot's discretion.

- d. Adjust trim tabs as necessary.
- e. The pilot will direct copilot to raise flaps to 15 degrees.
- f. When definite climb is established, pilot directs copilot to raise landing gear.

- g. Proceed as in normal climb out, or maintain takeoff speed until obstacles are cleared, depending on circumstances.

AFTER LANDING.**Note**

At no time shall any portion of the After Landing Checklist be accomplished until the aircraft has cleared the active runway or completed the 180 degree turn to taxi up the runway.

1. Propeller Levers—Forward.

Flight mechanic/copilot moves levers forward to INC RPM position.

2. Cowl Flap Levers—OPEN.

Flight mechanic moves cowl flap levers down to OPEN position.

3. Emergency Landing Gear Extension Handle—OPEN (aft).

Copilot pulls extension handle aft to OPEN position.

4. Wing Flap Lever—UP.

Copilot move lever to UP position.

5. Pitot Heater Switches—OFF.

Pilot turns switches OFF.

6. Anticollision Light—OFF.

Flight mechanic turns anticollision light switch OFF.

7. SIF—OFF.

Copilot secures SIF. Turn SIF OFF as soon as possible to eliminate signals from taxiing or parked aircraft which would otherwise block controller's scope and interfere with control of airborne aircraft.

AFTER LANDING. (Continued)

8. Booster Pump Switches—OFF.
Flight mechanic turns switches of OFF.
9. Gust Lock—ON.
Copilot centers flight controls while flight mechanic engages lockpin.
10. Unnecessary Radios—OFF.
Copilot secures all unnecessary radios.
11. Radio Altimeter—OFF.
Pilot secures radio altimeter.
12. Radar—OFF.
13. Engine Analyzer—OFF.
14. APP—As required.
15. After Landing Checklist—Completed.

CAUTION

Nosewheel steering may be lost following landing due to center of gravity change caused by combinations of fuel burn off and passenger or cargo loads. In event this occurs it may be necessary to move a few passengers or cargo forward to regain nosewheel steering.

Note

After final landing of the mission or when complete engine shutdown is anticipated at an intermediate point, No. 1 and No. 4 engines may be shutdown prior to parking. Place throttles at 1000 rpm for 30 seconds to effectively scavenge oil, then place No. 1 and 4 mixture levers to IDLE CUT OFF. When propellers stop turning, turn ignition switches No. 1 and 4 OFF.

SECURE AIRCRAFT.

Prior to engine shutdown, the engines should be operated at approximately 1000 rpm with the cowl flaps open to reduce cylinder head temperature to 200° C or below. Shutting down a hot engine, results in excessive heat being stored in the engine, with no means of conducting it away except by means of convection currents. It is not recommended that the throttles be opened as the engine stops. (See Section IX, Cold Weather Operation, for oil dilution procedures.)

1. Parking Brakes—Set.

CAUTION

Do not set parking brakes if the brakes are overheated. Pressure on the brakes with excessive temperatures resulting from hard braking action will result in damage to the brakes or brake seizure.

2. Throttles—Set 1000 rpm.

If rpm is set at 1000 rpm for shutdown and no other adjustment made thereafter, adequate scavenging will be accomplished prior to shutdown and engine backfiring during starting will be kept at a minimum.

3. Mixture Levers—IDLE CUT OFF.

Flight mechanic/copilot place mixture control levers on engines No. 1, 3, and 4 to IDLE CUT OFF. Lower wing flaps to bleed off some hydraulic pressure, then raise flaps, noting hydraulic pressure buildup from No. 2 engine hydraulic pump. As hydraulic pressure stabilizes, place No. 2 engine mixture control to IDLE CUT OFF.

4. Ignition Switches—OFF.

Turn all engine ignition switches and master ignition switch OFF.

SECURE AIRCRAFT. (Continued)

5. Landing Lights—RETRACT and OFF.

The landing lights should be deflected downward or turned off when approaching parking area to avoid blinding ground personnel.

6. Navigation and Pilots' Compartment Lights—OFF.

Turn off all unnecessary lights.

7. Pilots' Compartment (Cockpit) Heater—OFF.

CAUTION

Do not turn off heater blower until heater temperature is 50° C or below.

8. Radios—OFF.
9. Instruments Switches—OFF.
10. Inverters—OFF.
11. Interphone Switch—OFF.
12. Autopilot Power Switch—OFF.

13. Fuel Tank Selectors—OFF.

14. Wheel Chocks—In place, visually checked.

15. Parking Brakes—OFF.

Release parking brakes slowly. On some ramps with pronounced slope, it is possible for aircraft to jump chocks by running against them suddenly.

16. APP—OFF.

17. Landing Gear Ground Safety Locks and Tail Stand—In place.

18. Battery Switch—OFF.

19. Secure Checklist—Completed.

Note

All discrepancies, and flight time forms shall be completed and manifest turned in prior to crew securing.

ABBREVIATED CHECKLISTS.

The Pilots' and Flight Mechanics Abbreviated Checklists are reproduced on pages 2N-39 through 2N-70.



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INITIAL INSPECTION.

1. Tail Stand — In place.
2. Landing Gear Ground Safety Locks — In place.
3. Wheel Chocks — In place.
4. Forward Lower Cargo Compartment Checked.
5. GPU (if available) — Positioned.
6. Ladder/Loading Ramp — Checked secure.
7. Ignition Switches and Battery Switch — OFF.
8. Landing Gear Lever — DOWN.
9. Trim Tabs — Neutral.

EXTERIOR INSPECTION.

Between Main Cabin Door and Left Wing Root.

1. Fuselage Skin and Fairing — Check.
2. Flare Chutes — Check.

Trailing Edge Left Wing.

1. Flaps — Check.
2. Aileron — Check.
3. Inspection Plates — Check security.

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Left Wing Tip to No. 1 Nacelle.

1. Navigation Lights — Check.
2. Inspection Doors and Plates — Check security.
3. Deicer Boots — Check.
4. Underside of Wing — Check.

No. 1 Nacelle.

1. Fuel Strainer Drain — Check.
2. Fuel Tank Drain Valve — Check.
3. Fuel Sump Drain — Check.
4. Propeller Blades and Dome — Check.
5. Front of Engine — Check.
6. Carburetor Air and Oil Radiator Airscoop — Check.
7. Cowling — Check.
8. Exhaust Stack — Check.
9. Cowl Flap, Rear of Engine, Exhaust Stack Retainer Rings — Check.
10. Engine — Check for oil leaks.
11. Oil Cap Door — Visually check closed.

Wing Section Between No. 1 and No. 2 Nacelles.

1. Underside of Wing — Check.
2. Landing Light — Check.

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No. 2 Nacelle.

1. Repeat items for No. 1 Nacelle.

Inside Wheel Well No. 2 Nacelle.

1. Firewall Shutoff Valve — Check.
2. Propeller Feathering Motor — Check.
3. Fuel, Oil, and Hydraulic Lines — Check.
4. Fuel Tank Drain — Check.
5. Oil Tank Drain — Check.
6. Electrical Junction Box Plate and Main Line Resistor — Check.
7. Gear Uplatch — Check.
8. Main Gear — Check.
9. Brake Assembly — Check.
10. Brake Deboosters and Bleeds — Check.
11. Shuttle Valves — Check.
12. Tires and Wheels — Check.
13. Wheel Well — Check.

Wing Section No. 2 Nacelle to Fuselage.

1. Wing — Check.
2. Cross Feed Drain — Check.
3. Wing Deicer Boot — Check.
4. Fuel Tank Drain Valve — Check.

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Fuselage, Wing to Nosewheel Well.

1. Anti-Icing Pumps — Check.
2. Trailing and Fixed Antennas — Check.
3. ADF Loop Housing — Check.
4. Manual Loop — Check.
5. CO₂ Discharge Disc (if installed) — Check.

Nosewheel Well.

1. Hydraulic Lines, Cables, Friction Brake, Wiring, Doors, and Actuation Struts — Check.
2. CO₂ Cylinders — Check.
3. Gear Uplatch — Check.
4. Nose Gear Strut, Tire Wheel Plate, and Static Ground Wire — Check.
5. Ground Safety Lock, Torque Link and Pin, Ahrens Cable — Check.
6. Nose Heater and Ventilating Scoop — Check.
7. Autopilot Oil Filter — Check for leaks.
8. Pitot Static Vent Drain — Check.
9. Pitot Tube — Remove covers and check for damage.
10. Radome and Radar (if installed) — Check.

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Nose to Right Wing.

1. CO₂ Discharge Disc (if installed) — Check.
2. Battery Compartment Access Door — Check.
3. Driftmeter Lens and Reference Line — Check.
4. Forward Lower Cargo Compartment Door — Check.
5. Hydraulic Compartment — Check for leaks, fluid quantity and pressure.

Right Wing

1. Wing Section — Repeat Wing Section No. 2 Nacelle to Fuselage.
2. No. 3 Nacelle — Repeat No. 1 Nacelle.
3. No. 3 Wheel Well — Repeat Inside Wheel Well No. 2 Nacelle.
4. Wing Section Between No. 3 and No. 4 Nacelles — Repeat Wing Section Between No. 1 and No. 2 Nacelles.
5. No. 4 Nacelle — Repeat No. 1 Nacelle.
6. No. 4 Nacelle to Right Wing Tip — Repeat Left Wing Tip to No. 1 Nacelle.
7. Trailing Edge — Repeat Trailing Edge Left Wing.
8. Trim Tab — Check for centering and condition.

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Wing to Tail Right Side.

1. Antennas — Check.
2. Aft Lower Cargo Compartment Door — Check.

Tail Section.

1. Deicer Boots — Check.
2. Elevators, Rudder, and Bonding — Check.
3. Trim Tabs — Check for centering and condition.
4. Static Dischargers — Check.
5. Tail Light — Check.
6. Anticollision Light — Check.
7. Tail Skid and Support — Check.
8. Cabin and Cargo Door — Check.

INTERIOR INSPECTION.

Main Cabin/Cargo Compartment.

1. Main Door Emergency Releases and Hinges — Check.
2. Ditching Line — Check secure and stowed.
3. Emergency Escape Slide — Aboard and stowed.
4. Fire Extinguishers — Check.
5. Tail Cone — Check.
6. Passenger Lavatory — Check.

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7. Aircraft Ladder and Cargo Tiedown Equipment — Check.
8. First Aid Kits — Check.
9. Life Rafts and Vests — Check.
10. Emergency Radio — Check, condition and stowed.
11. Flight Orderly Supplies — Check.
12. Cargo Distribution and Security — Check.
13. Seat Belts — Check.
14. Passenger Oxygen — Check.
15. Emergency Exit Doors, Top of Wing, Fuel, Oil, and Anti-Icing Caps — Check.
16. Battle Lanterns — Check.
17. Cabin — Check general condition.
18. Cabin Lights — Check operation.

Crew Compartments.

1. Fuselage Tanks (if installed) — Check.
2. Auxiliary Oil Tank — Check pump operation and oil quantity.
3. Reserve Hydraulic Fluid Funnel and Wrench — Check.
4. Tool Kit — Check on board for transport missions.
5. Emergency Hand Axe — Check.

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6. Crew's Lavatory — Check.
7. Asbestos Gloves — Check aboard.
8. Crew Compartment Lights — Check operation.
9. Water Availability — Check.
10. Cabin Heaters — Check, OFF, hot air door OPEN.
11. Circuit Breakers and Fuses — Check.
12. Very Pistol — Check, pistol and cartridges available.
13. Navigator's Table — Check.
14. Driftmeter — Check, caged and positioned.
15. Astrodome — Check.
16. Emergency Escape Line — Check secured and stowed.
17. Navigation Equipment — Check.
18. Flashlights — Check aboard.
19. Curtain — Check.
20. Ditching Palacards — Check.
21. Electronic Equipment — Check.
22. Radio and Communications Equipment — Check.
23. Windshields — Check.
24. Oxygen — Check.
25. Pitot Heaters — Check, then OFF.

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26. Emergency Alarm Bell — Check.
27. Windshield Anti-Icer Pumps — Check, then OFF.
28. Propeller Anti-Icing Pumps — Check, then OFF.
29. Instrument and Warning Lights — Check.
30. Deicer Fluid — Check.
31. Hydraulic Fluid — Check.
32. Trim Tabs — Check and set.
33. Magnetic Compass — Check.
34. Emergency Airbrakes Pressure — Check 950 to 1050 psi.
35. Autopilot Oil Shutoff Valve — Check for leakage, safety wired ON.
36. Aldis Lamp — Check, plugged in, lamp operating.
37. Auxiliary Hydraulic Hand Pump — Check.
38. Pilots' Compartment Heater and Blower — Check, then OFF.
39. Fuel and Oil Quantity — Check.

PRE — COCKPIT CHECK.

1. Radar, Radios, SIF — OFF.
2. Battery Switch — OFF.

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3. Instrument (Inverter) Switch — OFF.
4. Pilots' Compartment and Cabin Warning Lights — Checked.
5. Navigation, Pilots' Compartment and Landing Lights — Checked.
6. FASTEN SEAT BELT/NO SMOKING Sign — ON.
7. Deicers and Anti-Icers — OFF.
8. Engine Selector (C-54S) — OFF.
9. Booster Pumps — OFF.
10. Generators — ON.
11. Pitot Heaters — OFF.
12. Ignition — OFF.
13. Pilots' Compartment Heater and Blower — Climatic.
14. Emergency Airbrake Handles — OFF and safetied.
15. Fire Extinguisher Selector Handles — IN and safetied.
16. Gyros — Uncaged.
17. Vacuum Pump Selector — Set, No. 3 Engine.
18. Static Selectors — NORMAL.
19. Emergency Airbrake Pressure — 1000 (± 50) psi.
20. Trim Tabs — Set.
21. Fuel Tank Selectors — MAIN TANKS ON.

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22. Carburetor Air — COLD.
23. Crossfeeds — OFF.
24. Propellers — Forward.
25. Throttles — Set.
26. Mixtures — IDLE CUT OFF.
27. Landing Gear Lever — DOWN.
28. Wing Flaps — UP.
29. Blowers — LOW and locked.
30. Cowl Flaps — OPEN.
31. Auxiliary Fuel Tanks — OFF.
32. Hydraulic Bypass — DOWN.
33. Hydraulic Hand Pump Selector — CLOSED (forward).
34. Emergency Gear Extension Handle — OPEN (aft).
35. Pre-Cockpit Checklist — Completed.

BEFORE STARTING ENGINES.

1. Passenger Briefing — Completed.
2. Aircrew Inspections — Completed.
3. Weight and Balance Form F and Manifest — Aboard.
4. Takeoff, Climb, and Landing Data — Computed.

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5. Oxygen and Smoke Masks — Installed.
6. Seats and Rudder Pedals — Adjusted.
7. Hydraulic Pressure — 1200 psi (minimum).
8. Parking Brakes — Set.
9. GPU/APP — On the line.
10. Bus Voltage — 26 to 28 volts.
11. Instrument/Inverters — ON.
12. Interphone — ON.
13. VHF/UHF — ON.
14. Quantity Indicators — Fuel, oil, and alcohol checked.
15. Manifold Pressures — Noted.
16. Autopilot — Set/DISENGAGED.
17. Chocks — In place.
18. Before Starting Engines Checklist — Completed.

BEFORE TAXI.

1. Starter Selector (C-54S) — OFF.
2. External Power — Removed and clear.
3. Battery Switch — ON.
4. Booster Pumps — OFF.
5. Radar Inverter — ON.

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6. Radios, Radio Altimeter, SIF — ON.
7. Hydraulic Pressure — Checked.
8. Door Warning Light — OFF.
9. APP — Climatic.
10. Vacuum Pressure — Checked, set on No. 3 engine.
11. Fluxgate — Erected.
12. Flight Instruments — Set and UNCAGED.
13. Cabin Report — Secure, 3 pins and post aboard.
14. Ignition Grounding — Checked.
15. Chocks — Removed.
16. Before Taxi Checklist — Completed.

TAXI CHECK.

1. Brakes — Checked.
2. Engine Analyzer — ON.
3. Flaps — UP.
4. Fuel Tank Selectors — Checked, set for takeoff.
5. Flight Instruments — Checked.
6. Taxi Checklist — Completed.

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ENGINE RUNUP.**Note**

Only items marked with asterisk (*) need be accomplished on thru-flight.

- *1. Parking Brakes — Set.
- *2. Wing Flaps — Set, 15 degrees.
3. Airfoil Deicers — Checked and OFF.
- *4. Temperatures and Pressures — Checked.
- *5. Mixtures — AUTO RICH.
- *6. Engines — Set, 1700 rpm.
7. Blower Levers — HIGH.
8. Generators — Checked.
- *9. Propellers — Checked and forward.
10. Carburetor Air — Checked COLD.
11. Propeller Feathering — Checked.
- *12. Throttles — Field barometric.
- *13. Magnetos — Checked.
14. Blowers — Checked LOW.
15. APP — OFF.
- *16. Engine Runup — Completed.

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BEFORE TAKEOFF — PHASE I.

1. Trim Tabs — Set.
2. Navigation Radios and Radar — ON and checked.
3. Flight Instruments — Set.
4. Crew Briefing — Completed.
5. Emergency Gear Extension Handle — CLOSED (forward).
6. Booster Pumps — HIGH.
7. Gust Lock — OFF.
8. Controls — Checked.
9. Prop Anti-Icing — Climatic.
10. Seat Belt and Shoulder Harness — Fastened.
11. Phase I Checklist — Completed.

BEFORE TAKEOFF — PHASE II (LINE UP)

1. Pilots' Compartment Windows — Closed and locked.
2. Cowl Flaps — TRAIL.
3. Wing Flaps — Checked, 15 degrees.
4. Mixtures — AUTO RICH.
5. Anticollision Light — ON.
6. Pitot Heaters — Climatic.

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7. SIF — NORMAL (Mode and code as briefed).
8. Before Takeoff Checklist — Completed.

CLIMB.

1. Landing Lights — RETRACT and OFF.
2. Gear Lever — NEUTRAL.
3. Wing Flaps — UP.
4. Hydraulic Bypass — UP.
5. Fuel Flow — Checked.
6. Generators — Checked.
7. FASTEN SEAT BELT/NO SMOKING Signs —
As required.
8. Climb Checklist — Completed.

CRUISE.

1. Cowl Flaps — CLOSED.
2. Cruise Power — Set.
3. Mixtures — AUTO LEAN.
4. Radio Altimeter — OFF.
5. Altimeter — Set.
6. Tank Selectors — As required.

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7. Booster Pumps — As required.
8. Cruise Checklist — Completed.

CRUISING DESCENT.

1. Approach and Landing Data — Computed.
2. Radio Altimeter — ON.
3. Main Tank Selectors — ON.
4. Crossfeeds — OFF.
5. Blowers — Exercised and LOW.
6. Hydraulic Bypass — DOWN.
7. Hydraulic and Emergency Airbrake Pressures — Checked.
8. Emergency Gear Extension Handle — CLOSED. (forward).
9. Booster Pumps — HIGH.
10. Trailing Antenna — IN.
11. Navigator's Compartment — Secured.
12. Passenger Briefing — Completed.
13. FASTEN SEAT BELT/NO SMOKING Signs — ON.
14. Seat Belts and Shoulder Harness — Fastened.
15. Autopilot — OFF.

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16. Crew Briefing — Completed.
17. Cruising Descent Checklist — Completed.

APPROACH .

1. Mixtures — AUTO RICH.
2. Propellers — Rpm 2100, set.
3. Wing Flaps — Set.
4. Carburetor Air — Climatic.
5. Cabin Heaters — OFF.
6. Pilots' Compartment Heater — Climatic.
7. Secondary Emergency Bus (C-54S) — ON.
8. Landing Lights — Climatic.
9. Approach Checklist — Completed.

BEFORE LANDING.

1. Propellers — Rpm 2300, Set.
2. Landing Gear — DOWN.
3. Cowl Flaps — Climatic.
4. Wing Deicers — OFF.
5. Before Landing Checklist — Completed.

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AFTER LANDING.

1. Propellers — Forward.
2. Cowl Flaps — OPEN.
3. Emergency Gear Extension Handle — OPEN (aft).
4. Wing Flaps — UP.
5. Pitot Heaters — OFF.
6. Anticollision Light — OFF.
7. SIF — OFF.
8. Booster Pumps — OFF.
9. Gust Lock — ON.
10. Unnecessary Radios — OFF.
11. Radio Altimeter — OFF.
12. Radar — OFF.
13. Engine Analyzer — OFF.
14. APP — OFF.
15. After Landing Checklist — Completed.

SECURE AIRCRAFT.

1. Parking Brakes — Set.
2. Throttles — Set, 1000 rpm.
3. Mixtures — IDLE CUT OFF.

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4. Ignition Switches — OFF.
5. Landing Lights — RETRACT and OFF.
6. Navigation and Pilots' Compartment Lights — OFF.
7. Pilots' Compartment Heater — OFF.
8. Radios — OFF.
9. Instruments Switches — OFF.
10. Inverters — OFF.
11. Interphone Switch — OFF.
12. Autopilot Power Switch — OFF.
13. Fuel Tank Selectors — OFF.
14. Wheel Chocks — In place.
15. Parking Brakes — OFF.
16. APP — OFF.
17. Landing Gear Safety Locks and Tail Stand — In place.
18. Battery Switch — OFF.
19. Secure Checklist — Completed.

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T. O. 1C-54D-1

C-54 LANDING DATA CARD

CONDITIONS

GROSS WEIGHT	Pounds
RUNWAY LENGTH	Feet
RUNWAY SLOPE	.....	Percent
FIELD ELEVATION	.....	Feet
PRESSURE ALTITUDE	.....	Feet
DENSITY ALTITUDE	.....	Feet
OAT	..... ° C CAT	° C
DEW POINT	.....	° F
WIND COMPONENT	.....
RUNWAY CONDITION READING (RCR)	.....

TAKEOFF

PREDICTED MANIFOLD PRESSURE	.....	In. Hg
BRAKE HORSEPOWER AVAILABLE	.....	BHP
TAKEOFF GROUND RUN	.....	Feet
CRITICAL FIELD LENGTH	.....	Feet
ACCELERATION CHECK MARKER/TIME	.....
ACCELERATION CHECK SPEED	.....	Knots
REFUSAL SPEED	.....	Knots
TAKEOFF SPEED (LIFTOFF)	.....	Knots
FLAP RETRACTION SPEED	.....	Knots

LANDING IMMEDIATELY AFTER TAKEOFF

THRESHOLD SPEED (130%)	Knots
TOUCHDOWN SPEED (120%)	Knots
TOTAL LANDING DISTANCE	Feet

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T.O. 1C-54D-1

C-54 LANDING DATA CARD

CONDITIONS

GROSS WEIGHT	Pounds
RUNWAY LENGTH	Feet
RUNWAY SLOPE	Percent
FIELD ELEVATION	Feet
PRESSURE ALTITUDE	Feet
DENSITY ALTITUDE	Feet
TEMPERATURE	° C
WIND COMPONENT	
RUNWAY CONDITION READING (RCR)	

LANDING

THRESHOLD SPEED (130%)	Knots
TOUCHDOWN SPEED (120%)	Knots
GO-AROUND SPEED (TAKEOFF)	Knots
TOTAL LANDING DISTANCE	Feet

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T.O. 1C-54D-1

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Note

Refer to Section III for emergency procedures and Checklists not outlined in this section.

T.O. 1C-54D-1

ENGINE FAILURE, FIRE AND FEATHERING.

1. **THROTTLES — CLOSED.**

WARNING

Do not retard throttle in case of fire.

2. **FEATHERING BUTTON — PUSH IN.**
3. **MIXTURE LEVER — IDLE CUT OFF.**

Note

Steps 4 through 7 may be omitted if fire is not evident. Accomplish steps 8 through 14 when time permits.

4. **FIREWALL SELECTOR — PULLED.**
5. **COWL FLAPS — TRAIL.**
6. **CREW OXYGEN — MASK ON, 100%.**
7. **CO₂ HANDLE — PULLED.**
8. Vacuum Selector — Set.
9. Booster Pump — OFF.
10. Cowl Flaps — CLOSED.
11. Generator — OFF.
12. Ignition — OFF.
13. Fuel Tank Selector Levers — Set.
14. Propeller Anti-Icing — As required.

E-2

T.O. 1C-54D-1

UNFEATHERING.

1. Airspeed — 120-125 KIAS.
2. Firewall Selector — In.
3. Fuel Tank Selector Levers — Set.
4. Carburetor Air — COLD.
5. Crossfeed — Set.
6. Propeller Control — Aft (DECREASE RPM).
7. Throttle — Set.
8. Mixture — IDLE CUT OFF.
9. Booster Pump — LOW.
10. Propeller — Turn 6 blades with starter.
11. Feathering Button — Depress.
12. Ignition — ON BOTH.
13. Mixture — AUTO RICH.
14. Engine Instruments — Check.
15. Generator — ON.
16. Booster Pump — OFF.
17. Cowl Flaps — Set.

E-3

T.O. 1C-54D-1

PROPELLER OVERSPEEDING.

1. Throttle — CLOSED.
2. Airspeed — 125 KIAS.
3. Feathering Button — As required.
4. Propeller Control — Aft (DECREASE RPM).
5. Engine Feathering Procedure — As required.

ENGINE FIRE ON GROUND.

1. **STARTER SWITCH — ENGAGED.**
2. **PRIMER SWITCH — OFF.**
3. **MIXTURE — IDLE CUT OFF.**
4. **THROTTLE — OPEN.**

If Fire Continues:

5. **STARTER SWITCH — DISENGAGED.**
6. **COMBAT FIRE.**
7. Shutdown All Engines.
8. Secure Aircraft.
9. Abandon Aircraft.

E-4

T.O. 1C-54D-1

EMERGENCY DESCENT.

1. **CLOSE THROTTLES.**
2. **PROPELLERS — FORWARD (FULL INCREASE).**
3. Do not exceed a maximum of 290 knots IAS with the gear and flaps up.
4. If this procedure cannot be used, descend as rapidly as possible with gear and flaps down, power off, props full INC. RPM (forward), cowl flaps open, observing gear and flaps down airspeed restriction of 127 knots IAS.

E-5

T.O. 1C-54D-1

FUSELAGE FIRE .

1. ALL EXITS, DOORS, AND VENTILATION DUCTS — CLOSED.
2. CREW OXYGEN — MASKS ON, 100%.
3. COMBAT FIRE — USE PORTABLE HAND FIRE EXTINGUISHERS.

LOWER COMPARTMENT FIRE .

1. COMPARTMENT SELECTOR — PULLED.
2. HYDRAULIC BYPASS — UP.
3. CREW OXYGEN — MASKS ON, 100%.

COCKPIT HEATER FIRE.

1. COCKPIT HEATER SWITCH — OFF.
2. COCKPIT HEATER BLOWER CIRCUIT BREAKER — TRIPPED/OFF.
3. BLOWER MANUAL SWITCH — ON.
4. RADAR — OFF.
5. HYDRAULIC BYPASS — UP.
6. FOOTWARMER AND DEFROSTER — CLOSED.
7. CREW OXYGEN — MASKS ON, 100%.
8. CO₂ HANDLE — PULLED.

Note

Line from CO₂ bottle to selection manifold is drilled to allow CO₂ to be discharged in the nosewheel well when no selection is made.

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T.O. 1C-54D-1

WING FIRE.

1. EMERGENCY DESCENT.
2. ALERT CREW FOR BAILOUT OR DITCHING.
3. ATTEMPT TO EXTINGUISH FIRE BY SIDESLIPPING THE AIRCRAFT AWAY FROM THE FIRE.
4. MAKE AND EMERGENCY LANDING OR ABANDON THE AIRCRAFT.

ELECTRICAL FIRE.

1. GENERATORS SWITCHES — OFF.
2. BATTERY SWITCH — OFF.
3. APP — OFF.
4. ALL CIRCUIT BREAKERS — TRIPPED.
5. CREW OXYGEN — MASKS ON, 100%.
6. ISOLATE AND FIGHT FIRE.

Note

When source of smoke or fire has been found and fire extinguished, leave the involved circuit inoperative and restore power to the remaining circuits.

7. Battery Switch ON.
8. Generator Switches ON (one at a time).
9. Circuit Breakers ON (one at a time).

Note

Watch for recurrence of smoke or fire while resetting circuit breakers.

E-7

T.O. 1C-54D-1

CABIN HEATER FIRE.

1. **CABIN HEATER CONTROL REHOSTAT AND EMERGENCY SWITCHES — OFF.**
2. **CREW OXYGEN — MASKS ON, 100%.**
3. **ISOLATE AND FIGHT FIRE.**

Note

If smoke is emanating from the heater duct, insert nozzle of CO₂ hand fire extinguisher and discharge CO₂. If smoke is emanating from around the heater duct, expose the burning materials and extinguish the fire with CO₂.

APP FIRE (CABIN MOUNTED).

1. **BATTERY AND GENERATOR SWITCHES — OFF.**
2. **APP IGNITION SWITCH — OFF.**
3. **CREW OXYGEN — MASKS ON, 100%.**
4. **FIRE — COMBAT.**

E-8

T.O. 1C-54D-1

SMOKE ELIMINATION .

1. **CREW OXYGEN — MASKS ON, 100%.**
2. **COMPANIONWAY DOOR — OPEN.**
3. **FWD. EMERGENCY EXITS OVER WINGS — OPEN.**
4. **FORWARD NAV. STATION WINDOW — OPEN.**

Note

Under no circumstances shall the pilots' side windows be opened prior to the removal of the aft exit or door. This will cause smoke to be drawn into the pilots' compartment.

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