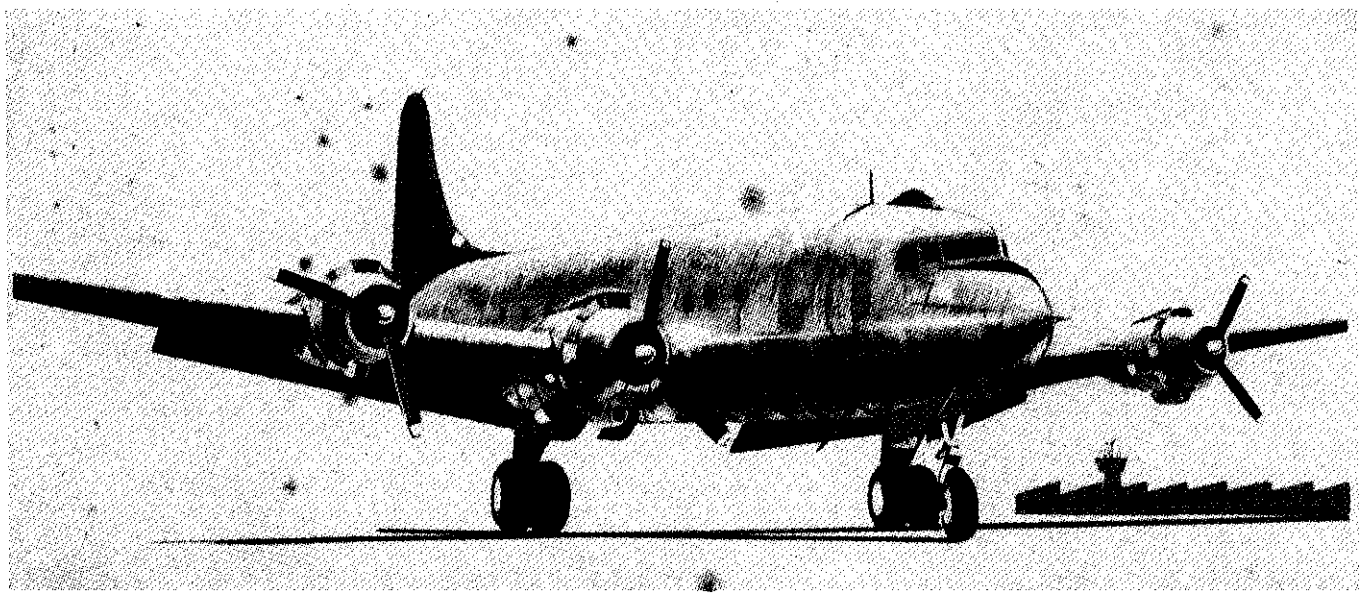


HOW TO GET COPIES. If you want to be sure of getting your manuals on time, order them before you need them. Early ordering will assure that enough copies are printed to cover your requirements. Technical Order 00-5-2 explains how to order flight manuals, classified supplements thereto, and Safety of Flight Supplements so that you automatically will get all original issues, changes, and revisions. Basically, all you have to do is order the required quantities in the Publications Requirement Table (T.O. 0-3-1). Talk to your Senior Materiel Staff Officer – it is his job to fulfill your Technical Order requests. Make sure to establish some system that will rapidly get the manuals and Safety of Flight Supplements to the flight crews once they are received on the base.

SAFETY OF FLIGHT SUPPLEMENTS. Safety of Flight Supplements are used to get information to you in a hurry. Safety of Flight Supplements use the same number as your flight manual, except for the addition of a suffix letter. Supplements covering loss of life will get to you in 48 hours; those concerning serious damage to equipment will make it in 10 days. You can determine the status of Safety of Flight Supplements by referring to the Weekly Supplemental Index (T.O. 0-1-1A). This is the only way you can determine whether a supplement has been rescinded. The title page of the flight manual and title block of each Safety of Flight Supplement should also be checked to determine the effect that these publications may have on existing Safety of Flight Supplements. It is critically important that you remain constantly aware of the status of all supplements – you must comply with all existing supplements but there is no point in restricting the operation of your aircraft by complying with a supplement that has been replaced or rescinded. Technical Order 00-5-1 covers some additional information regarding these supplements.

WARNINGS, CAUTIONS, AND NOTES. For your information, the following connotation will be applied to these items:

WARNING – Injury to personnel

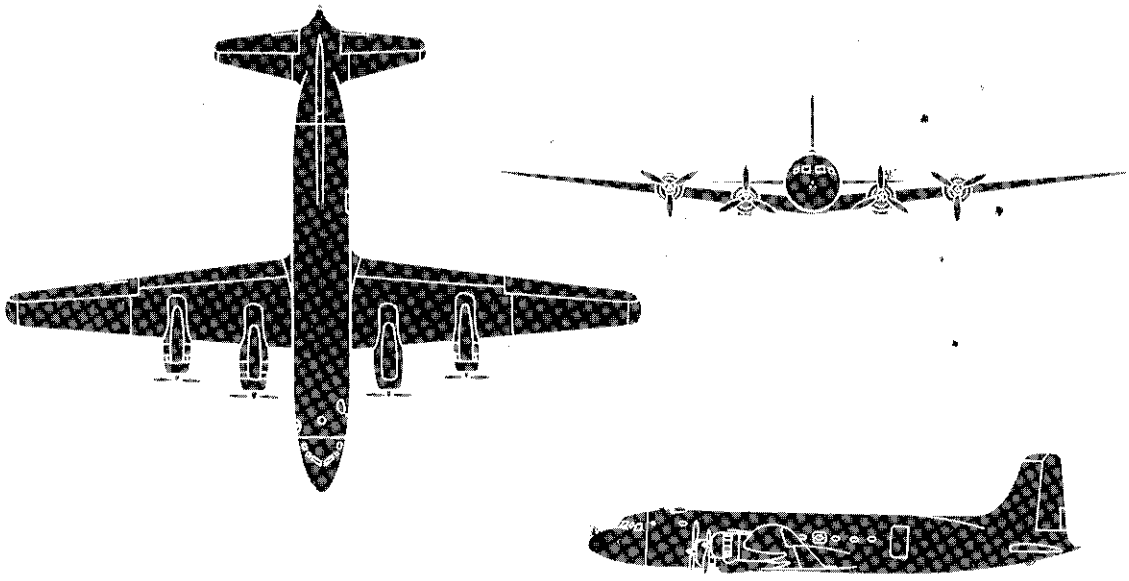
CAUTION – Damage to equipment

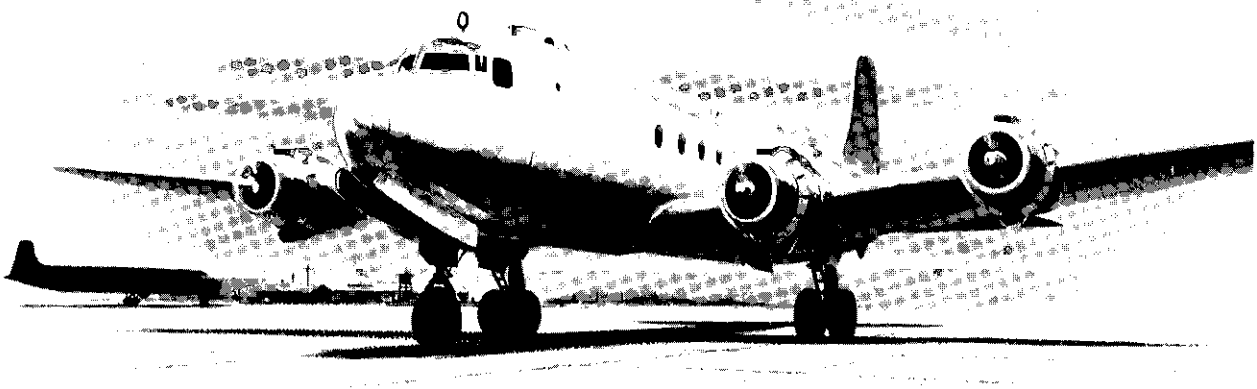
Note – Information requiring emphasis

COMMENTS AND QUESTIONS. Comments and questions regarding any phase of the Flight Manual program are invited and should be addressed (through appropriate channels) to Commander, Warner Robins Air Material Area, Service Engineering Division (WRNEO), Robins Air Force Base, Georgia.

AIRCRAFT SERIES DESIGNATION

Where text or illustrations in this manual are not specifically identified for a particular model, it may be assumed that such items are common to all models. When reference is made in the text to individual models, the model is specified. Each aircraft must be checked to determine the exact equipment installed and its location.



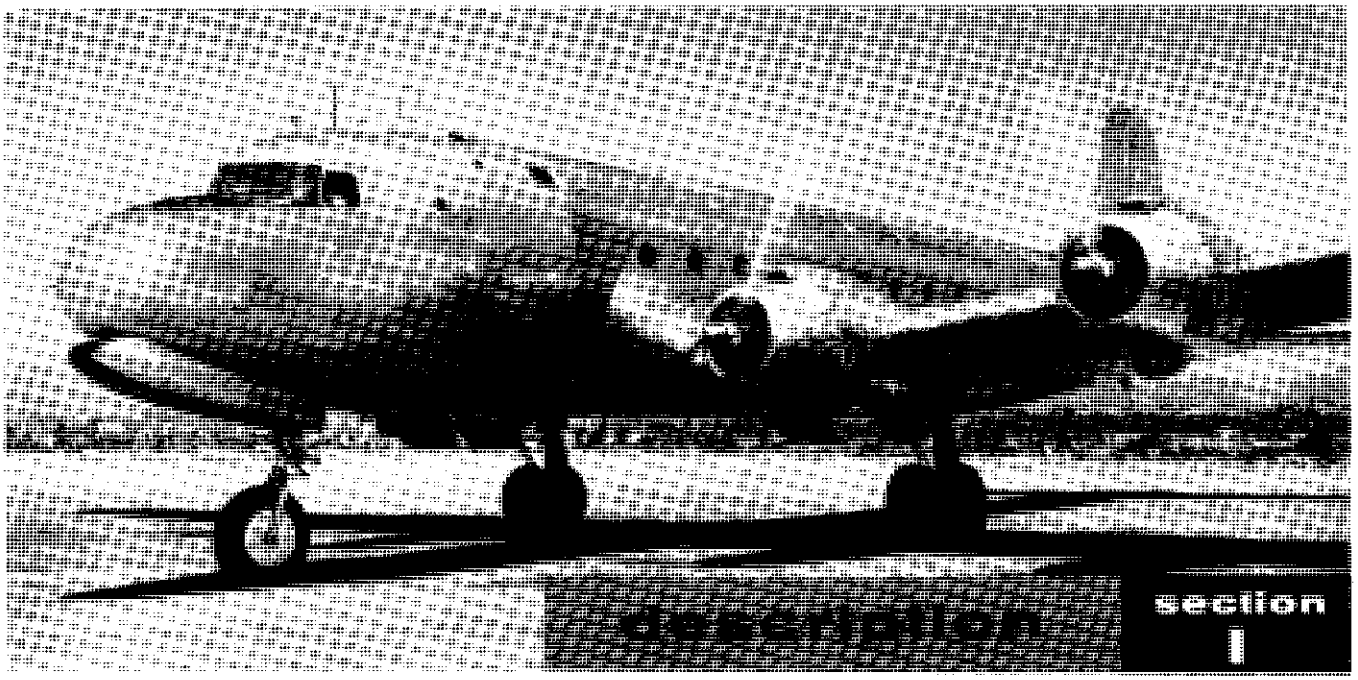


C-54
R5D

THE AIRCRAFT

Figure 1-1

20,959



20,960

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LIST OF ILLUSTRATIONS

THE AIRCRAFT.

The C-54 and R5D aircraft, manufactured by Douglas Aircraft Company, Inc., are four-engined, low-wing monoplanes with fully retractable tricycle landing gear. They are designed as long-range cargo, troop, or personnel transports *(figure 1-1)*.

AIRCRAFT DIMENSIONS.

The principal dimensions of the aircraft are:

Span	117 feet 6 inches
Length	93 feet 10 inches
Length with radome nose	94 feet 6¾ inches
Height	27 feet 6$^{5}/_{16}$ inches
Stabilizer span	39 feet 6 inches

AIRCRAFT GROSS WEIGHT.

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

INTERIOR ARRANGEMENT.

The aircraft is designed to carry various loads. On early aircraft, provisions are made to carry 35 to 49 troops, depending upon the arrangement of the fuselage fuel tanks. When used as an ambulance transport, provisions are made for the installation of from 28 to 36 litters, depending upon the arrangement of the fuselage fuel tanks and buffer installation. Late aircraft are designed as personnel transports by using removable commercial-type seats accommodating 44 passengers *(figure 4-21)*.

FLIGHT CREW.

Accommodations are provided for a regular crew of five members: pilot, copilot, crew engineer, radio operator, and navigator. On some aircraft, provision is made for a flight attendant.

MAIN DIFFERENCES TABLE.

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, FRICTION LOCK LEVER, AND WARNING HORN SWITCH.

Two banks of four mechanically interconnected throttle levers *(2, figure 1-9 and 1, figure 1-17)* with OPEN and CLOSED placarded positions, are installed on the control pedestal. The throttle levers are conven-

MAIN DIFFERENCES TABLE

ITEM	C-54M	C-54D AND R5D-3	C-54E AND R5D-4R	C-54G	SC-54	AC-54
FURNISHINGS	LITTERS OR TROOP BENCHES OR CARGO	TROOP BENCHES OR LITTERS OR CARGO	COMMERCIAL-TYPE PASSENGER SEATS OR CARGO	TROOP BENCHES OR LITTERS OR CARGO	AFT CABIN SEATS	TROOP BENCHES
FUEL SYSTEM	EIGHT WING TANKS	SIX WING AND TWO FUSELAGE TANKS	EIGHT WING TANKS	EIGHT WING TANKS	SIX WING AND TWO FUSELAGE TANKS	SIX WING AND TWO FUSELAGE TANKS
CABIN VENTILATION SYSTEM GROUND BLOWER	YES	NONE	NONE	NONE	NONE	NONE
CREW OXYGEN SYSTEM	DILUTER DEMAND	DILUTER DEMAND OR CONTINUOUS FLOW	DILUTER DEMAND	DILUTER DEMAND	DILUTER DEMAND	DILUTER DEMAND OR CONTINUOUS FLOW
BUFFET	AFT MAIN CABIN	NONE	AFT MAIN CABIN	NONE	NONE	NONE
AUTOMATIC DISINSECTION SYSTEM	YES	NONE	NONE	NONE	NONE	NONE
NURSE'S CABINET	YES	NONE	NONE	NONE	NONE	NONE
FACILITIES FLIGHT CHECK RECORDING SYSTEM	NONE	NONE	NONE	NONE	NONE	YES
DATA RECORDER OPERATOR'S STATION	NONE	NONE	NONE	NONE	NONE	YES
SCANNER'S STATION (2)	NONE	NONE	NONE	NONE	YES	NONE
SEARCH AND RESCUE EQUIPMENT	NONE	NONE	NONE	NONE	YES	NONE
ANTISKID BRAKE SYSTEM	NONE	NONE	NONE	NONE	YES	NONE

Figure 1-2

tionally operated and are equipped with a mechanical friction lock lever *(24, figure 1-9 and 21, figure 1-17)*. The landing gear warning horn switch is closed when one or more throttle levers are retarded to less than ¼ open. This completes a 28-volt d-c circuit which causes a warning horn to sound when the landing gear is not fully down and locked. No provision is made to silence the warning horn, other than advancing all four throttle levers beyond approximately ¼ open position.

MIXTURE LEVERS.

Four mixture levers, with IDLE CUT OFF, AUTO LEAN (CRUISE), and AUTO RICH (TAKE-OFF AND CLIMB) positions, and located on the aft face of the control pedestal *(17, figure 1-9)* are mechanically connected to the carburetor. The IDLE CUT OFF position cuts off all fuel flow to the engine except priming. The AUTO-LEAN (CRUISE) position automatically provides the lean fuel-air ratio required for cruising flight. The AUTO-RICH (TAKE-OFF AND CLIMB) position provides a rich fuel-air ratio for high power conditions.

CAUTION

Manually leaning the carburetor below the AUTO-LEAN (CRUISE) setting is not recommended. Operating in this range may cause detonation and torque pressure fluctuation. Normally the AUTO-LEAN (CRUISE) position will automatically supply the proper mixture.

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 *(figure 1-9 and figure 1-17)*, 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 pushrods 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 three sources: ram air, nonram filtered air, or preheated air. An airscoop on each nacelle has two openings. Cold ram air flows through the front scoop opening directly into the carburetor throat, cold nonram air is drawn through the aft opening of the fairing and flows through a filter unit (if installed) into the carburetor throat, and reheated air flows from inside the engine cowling, past the exhaust collector ring and into the carburetor throat. The source of air supply is determined by the positioning of the two ram air doors, the hot air door, and the nonram air door in the carburetor airscoop.

Carburetor Air Levers.

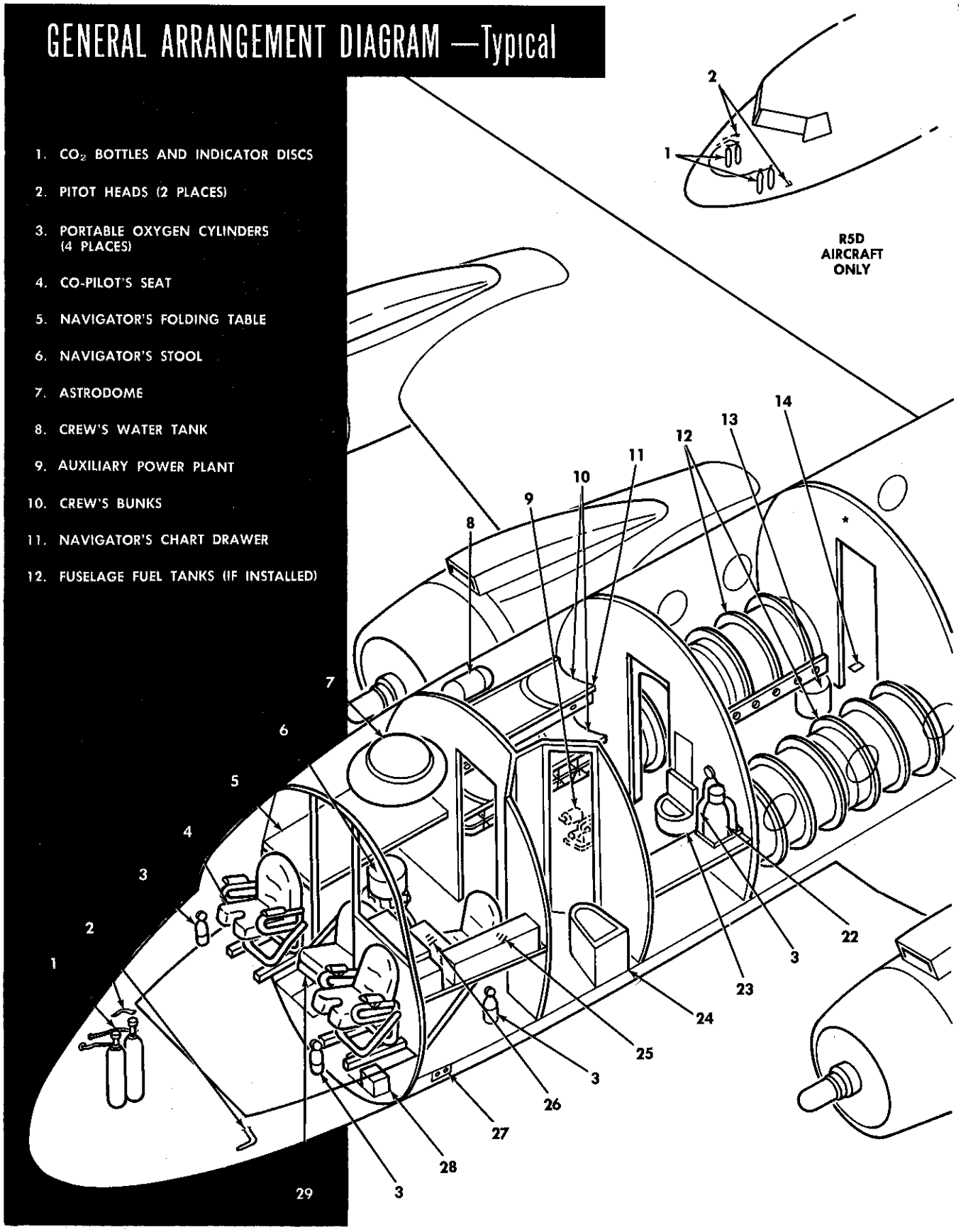
Four carburetor air levers *(27, figure 1-9)*, one for each engine, with HOT and COLD positions, are mounted on the control pedestal forward of the propeller levers. They mechanically control the movement of their respective preheat doors in the carburetor air duct. In the HOT position, the mechanical ram air door moves up to shut off the ram airflow and the hot air door is opened to allow preheated air to enter into 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, shutting off the supply of the preheated air. Intermediate positions are used to regulate the carburetor air temperature as required. One of the ram air doors is mechanically controlled and actuated through a cable system by the carburetor air preheat lever located in the cockpit. On airplanes with the carburetor air filter lever installed, the other ram air door is hydraulically actuated by fluid pressure from the main hydraulic system by means of the lever located in the cockpit.

Carburetor Air Filter Lever (If Installed).

A carburetor air filter lever, with FILTER, NEUTRAL, and RAM positions, is mounted on the control pedestal *(16, figure 1-9)*. The lever mechanically actuates a hydraulic valve which directs the flow of hydraulic pressure for the operation of the hydraulic ram air door and the nonram air door in each carburetor airscoop. In the FILTER position, the hydraulic ram air door shuts off the ram airflow and the nonram

GENERAL ARRANGEMENT DIAGRAM —Typical

1. CO_2 BOTTLES AND INDICATOR DISCS
2. PITOT HEADS (2 PLACES)
3. PORTABLE OXYGEN CYLINDERS (4 PLACES)
4. CO-PILOT'S SEAT
5. NAVIGATOR'S FOLDING TABLE
6. NAVIGATOR'S STOOL
7. ASTRODOME
8. CREW'S WATER TANK
9. AUXILIARY POWER PLANT
10. CREW'S BUNKS
11. NAVIGATOR'S CHART DRAWER
12. FUSELAGE FUEL TANKS (IF INSTALLED)

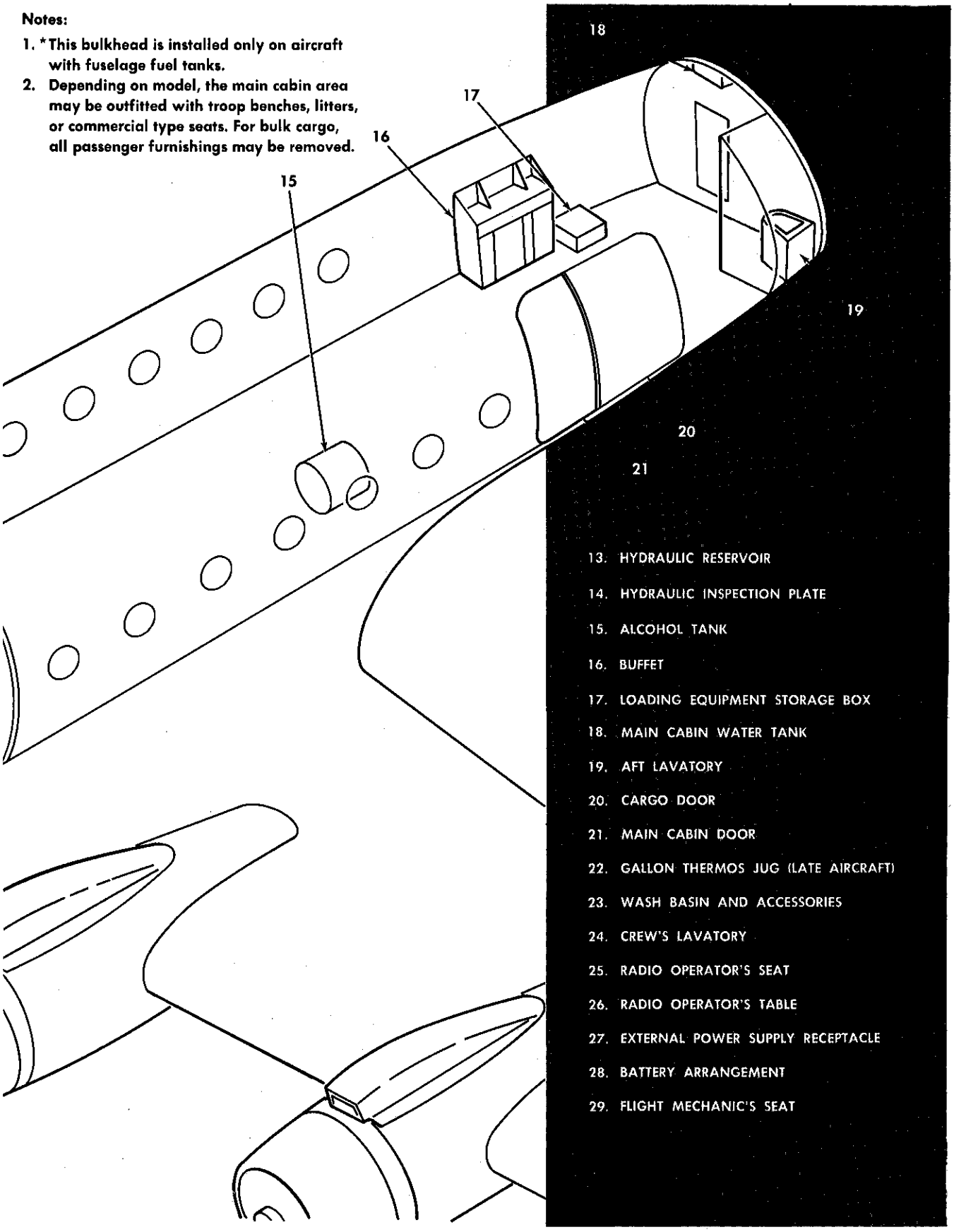


X1-99

Figure 1-3 (Sheet 1 of 2)

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 furnishings may be removed.



X1-100

Figure 1-3 (Sheet 2 of 2)

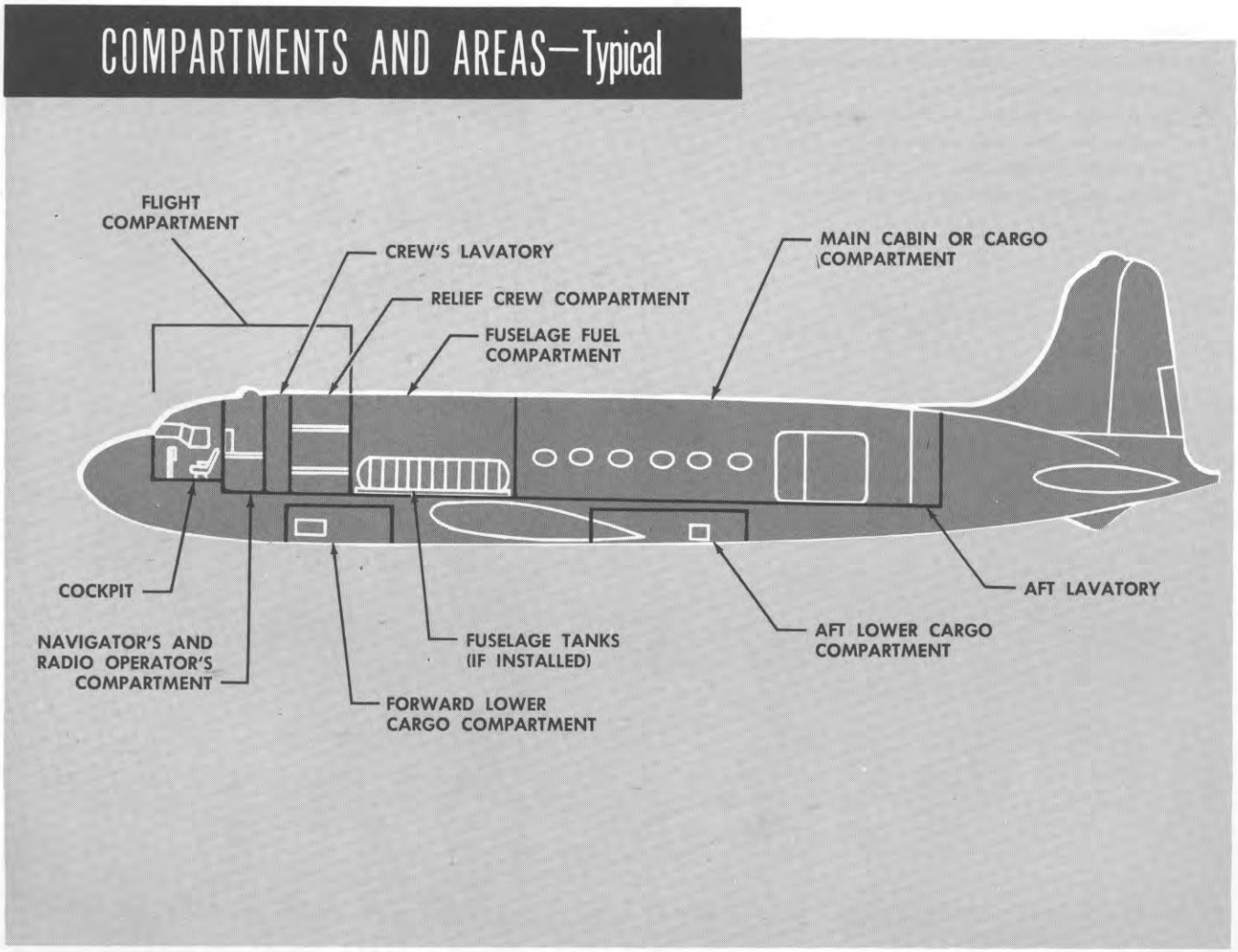


Figure 1-4

air door is opened to allow nonram filtered air to flow to the carburetor. In the RAM position, the nonram air door shuts off the nonram filtered airflow and the hydraulic ram air door is opened to permit ram air to flow to the carburetor. When the carburetor air filter lever is placed in a desired position, sufficient time is required for the door to reach that position before the lever may be returned to NEUTRAL. This is necessary because the hydraulic fluid must be trapped in the actuating cylinder to hold the door in the desired position.

CAUTION

Do not operate the carburetor air filter lever in the FILTER position unless the carburetor air preheat levers are in full COLD position, or damage to the doors will result.

Carburetor Air Temperature Indicators.

Two dual indicating carburetor air temperature indicators, calibrated in degrees centigrade, are installed on the upper instrument panel *(figure 1-16)*. A temperature bulb, installed in each carburetor air-scoop adapter, is connected through a 28-volt d-c circuit to the respective indicator.

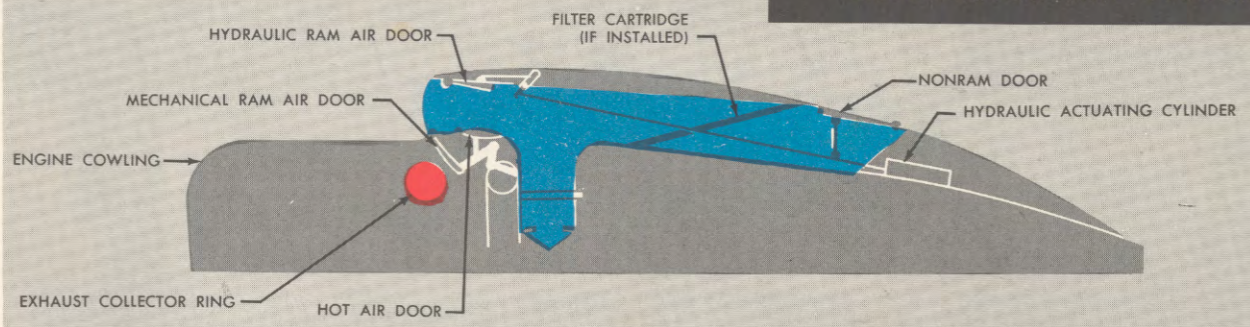
COWL FLAPS.

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.

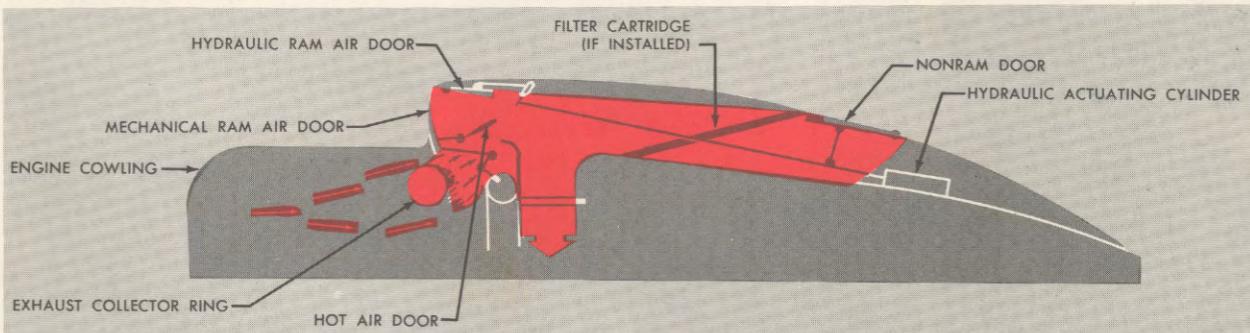
Four cowl flap levers, one for each engine *(13, figure 1-9)*, with OPEN, OFF, TRAIL, OFF, and CLOSE positions, are installed on the aft face of the control pedestal. Each lever mechanically actuates a cowl

CARBURETOR AIR SYSTEM



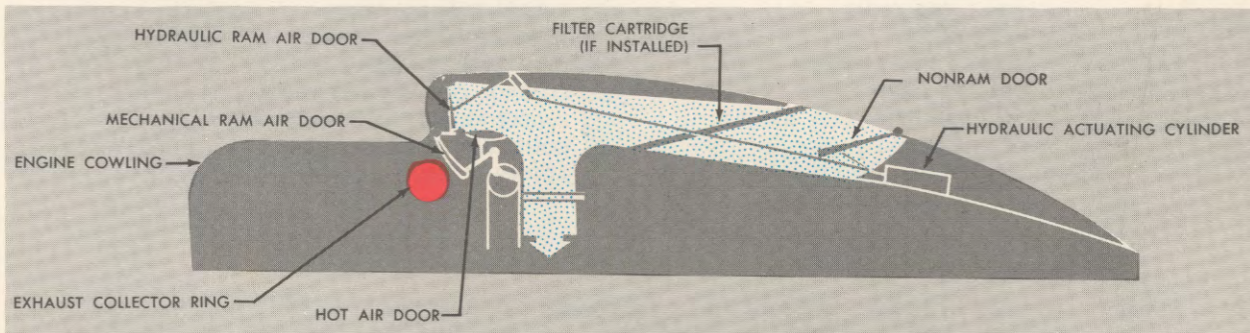
RAM AIR FLOW

NONRAM AIR DOOR CLOSED, HYDRAULIC RAM AIR DOOR OPEN.
HOT AIR DOOR CLOSED AND MECHANICAL RAM AIR DOOR OPEN.
DIRECT UNFILTERED RAM AIR TO CARBURETOR.



HOT AIR FLOW

NONRAM AIR DOOR CLOSED, HYDRAULIC RAM AIR DOOR OPEN.
HOT AIR DOOR OPEN AND MECHANICAL RAM AIR DOOR CLOSED.
HOT AIR TO CARBURETOR.



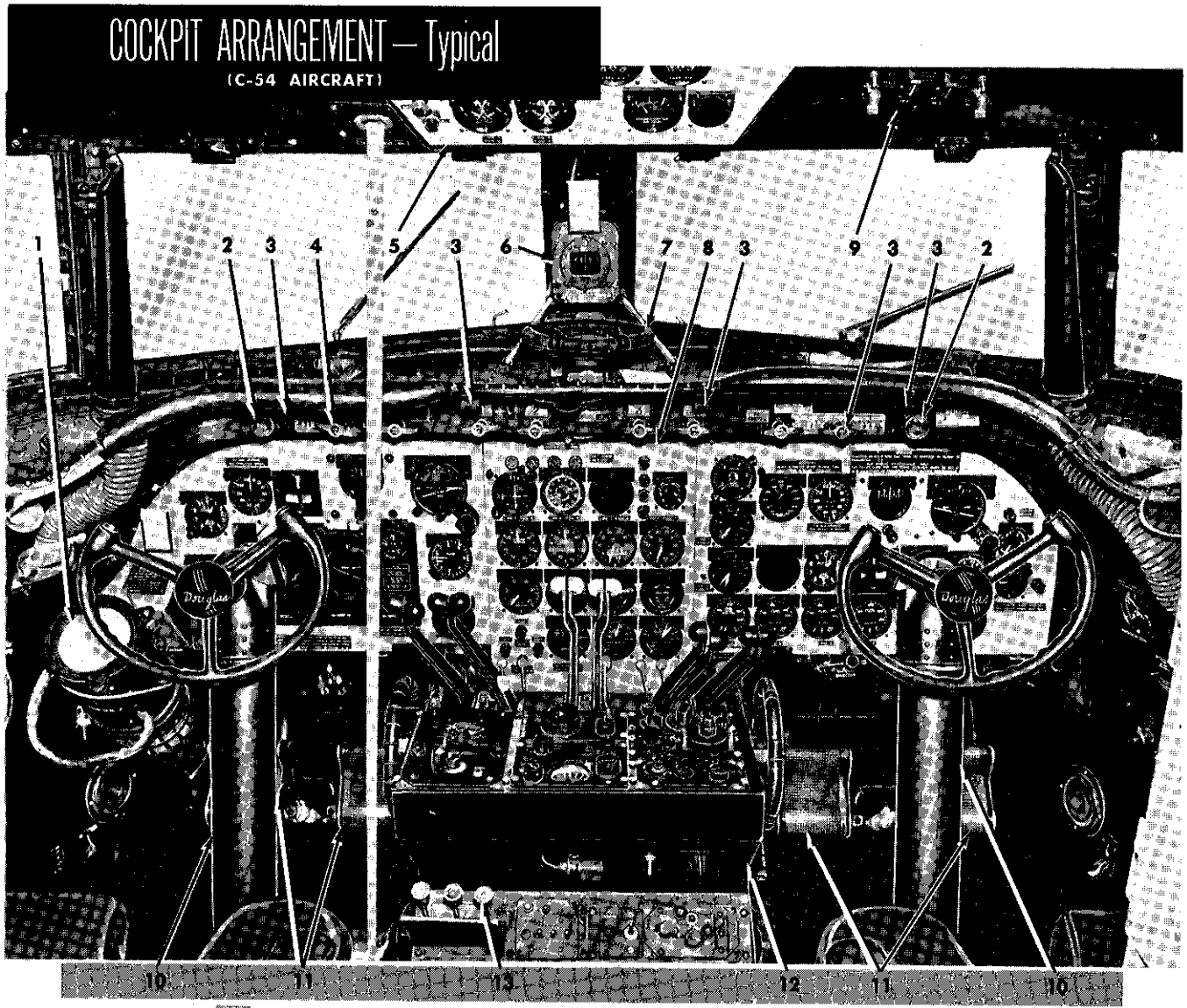
NONRAM FILTERED AIR FLOW

NONRAM AIR DOOR OPEN, HYDRAULIC RAM AIR DOOR CLOSED.
HOT AIR DOOR CLOSED AND MECHANICAL RAM AIR DOOR OPEN.
NONRAM FILTERED AIR TO CARBURETOR.

RAM AIR **HEATED AIR** **NONRAM AIR**

Figure 1-5

X1-13



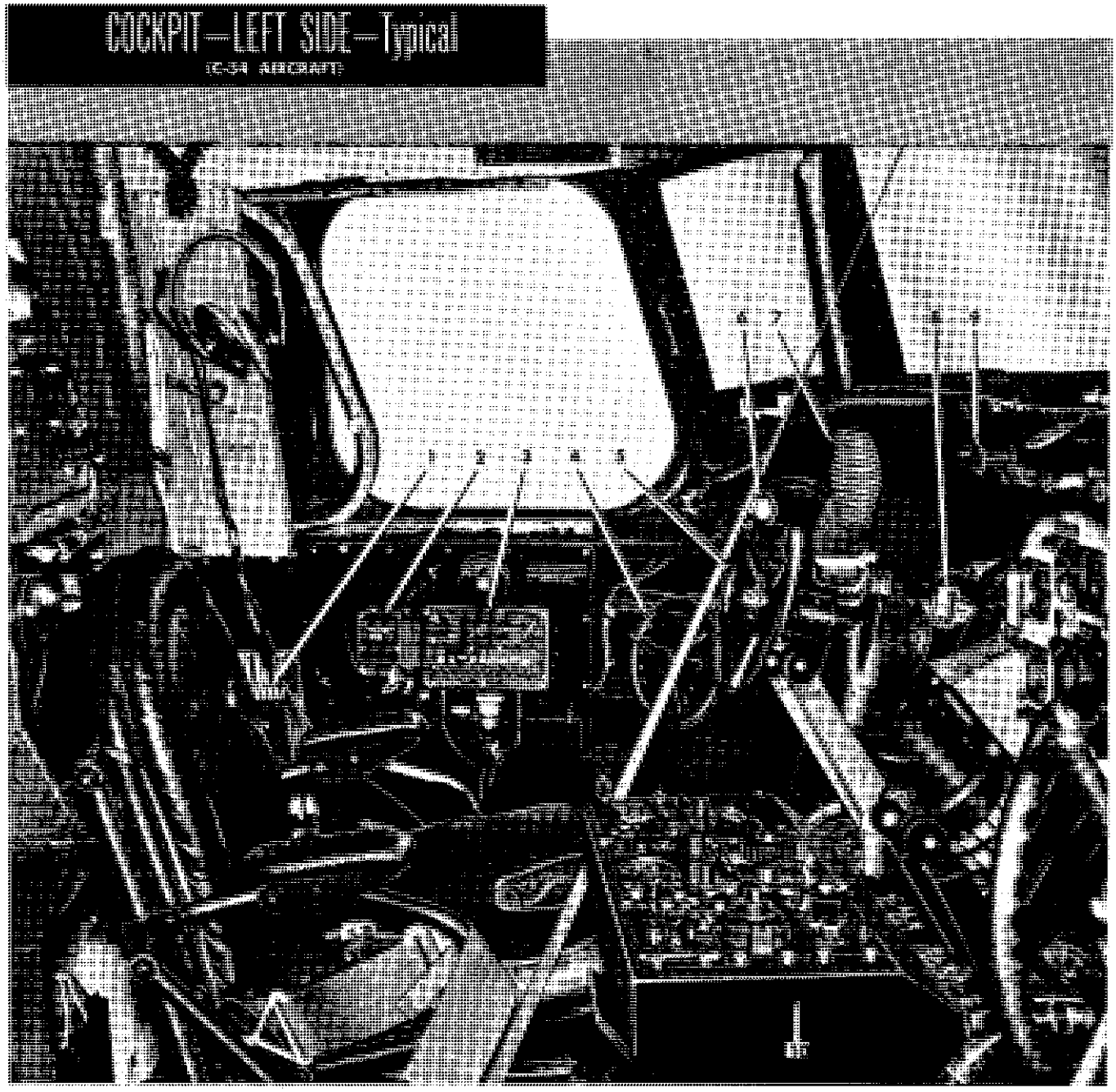
X1-12

Figure 1-6

flap selector 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.



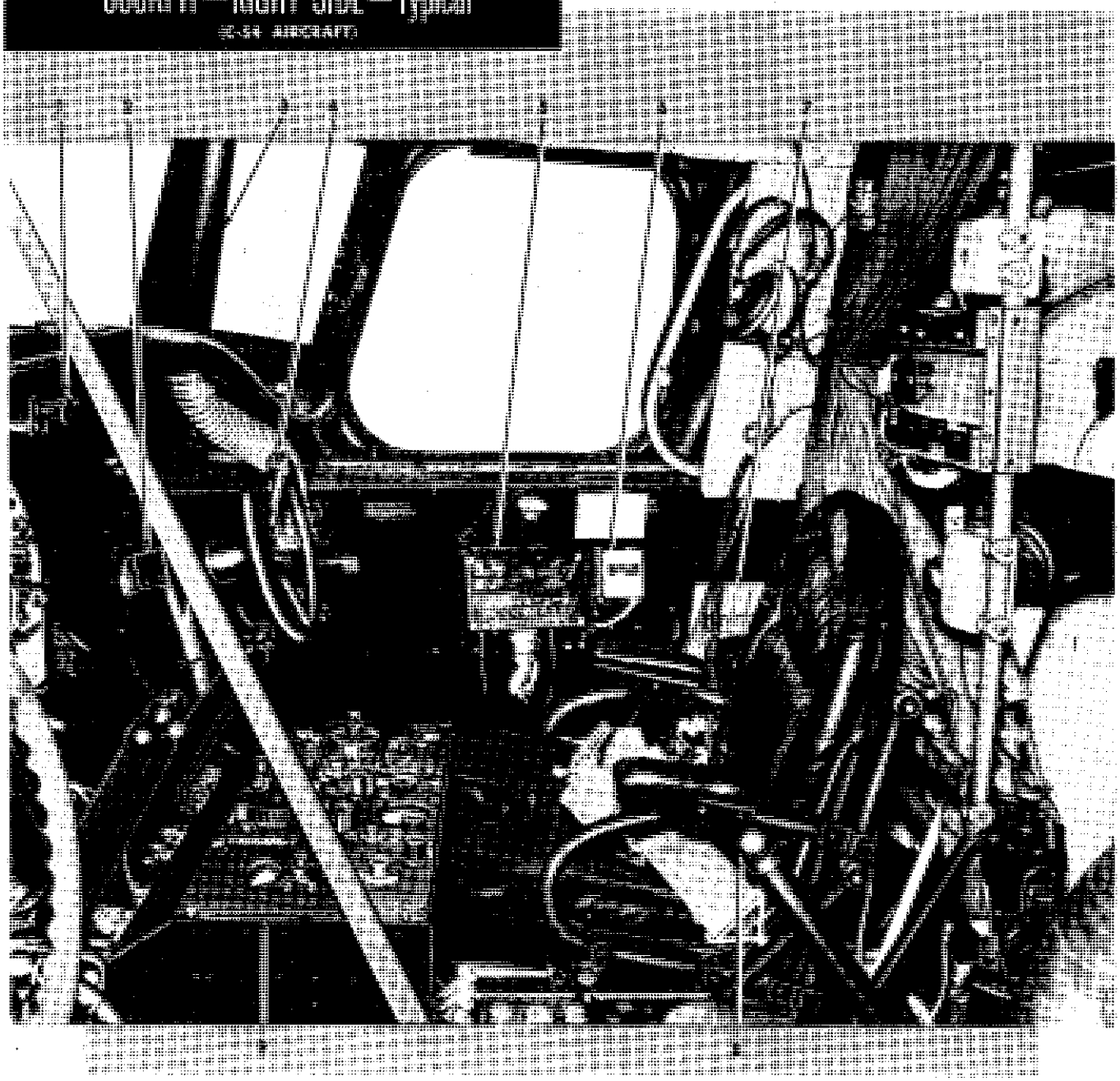
1. SUIT HEATER RHEOSTAT
2. FILTER
3. INTERPHONE CONTROL PANEL
4. NOSEWHEEL STEERING WHEEL
5. CONTROL COLUMN AND WHEEL
6. COLD AIR ORIFICE
7. WINDSHIELD DEFROSTER DUCT
8. STATIC SELECTOR SWITCH
9. EMERGENCY BRAKE HANDLE
10. CONTROL PEDESTAL

Figure 1-7

X1-11

COCKPIT — RIGHT SIDE — Typical

C-54 AIRCRAFT



1. EMERGENCY BRAKE HANDLE
2. CONTROL COLUMN AND WHEEL
3. WINDSHIELD DEFROSTER DUCT
4. MICROPHONE BUTTON
5. INTERPHONE CONTROL PANEL
6. FILTER BOX
7. SUIT HEATER RHEOSTAT
8. HYDRAULIC HAND PUMP
9. CONTROL PEDESTAL

X1-1

Figure 1-8

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, TRAIL, 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, one for each engine, with BOTH, R, L, and OFF positions, are mounted on the upper instrument panel *(figures 1-11 and 1-16)*. 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, 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 *(figures 1-11 and 1-16)* and is designed to ground out all four ignition switches simultaneously.

Primer Switches.

Four priming switches, spring loaded to the UP (off) position, are mounted on the electrical control panel *(figures 1-11 and 1-16)*. When a primer switch is moved to the DOWN (on) position, it closes a 28-volt d-c 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, spring loaded to the OFF (up) position, are mounted on the electrical control panel *(figures 1-11 and 1-16)*. When a starter switch is pressed to the ON (down) position, a 28-volt d-c 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 to the magneto during cranking. The starter switch and the induction vibrator switch are ganged together.

ENGINE INSTRUMENTS.

Manifold Pressure Gages and Purge Valves.

Two direct-reading dual manifold pressure gages *(17, 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 correspond to 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

The lines must be purged with the manifold pressure at less than barometric pressure; otherwise, the lines will fill rather than purge.

Cylinder Head Temperature Indicators.

Two dual, direct-reading cylinder head temperature indicators, calibrated in degrees centigrade, are located on the upper instrument panel *(figure 1-16)*. The No. 1 cylinder (the No. 3 cylinder on some aircraft)

CONTROL PEDESTAL — Typical

(C-54 AIRCRAFT)

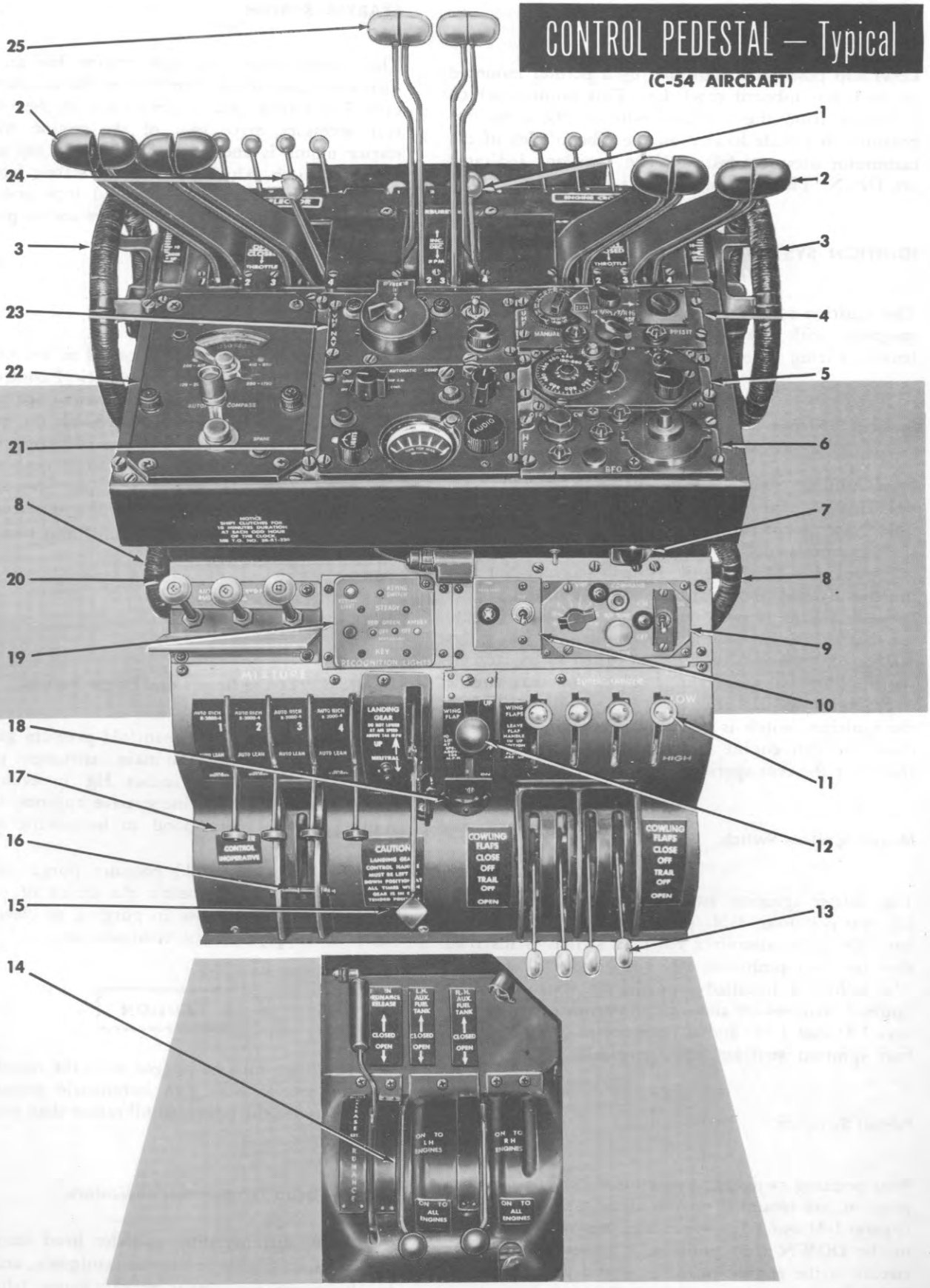
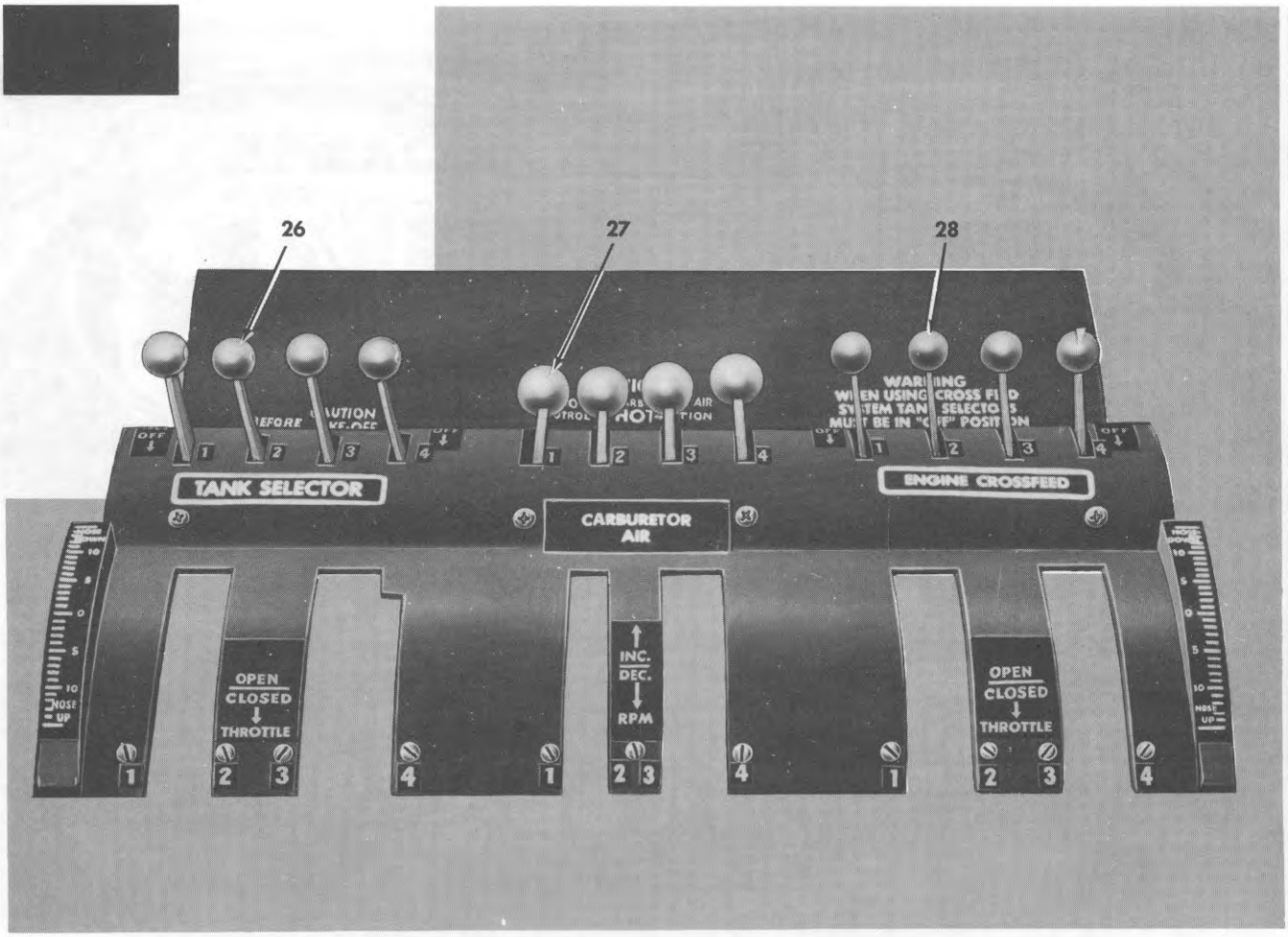


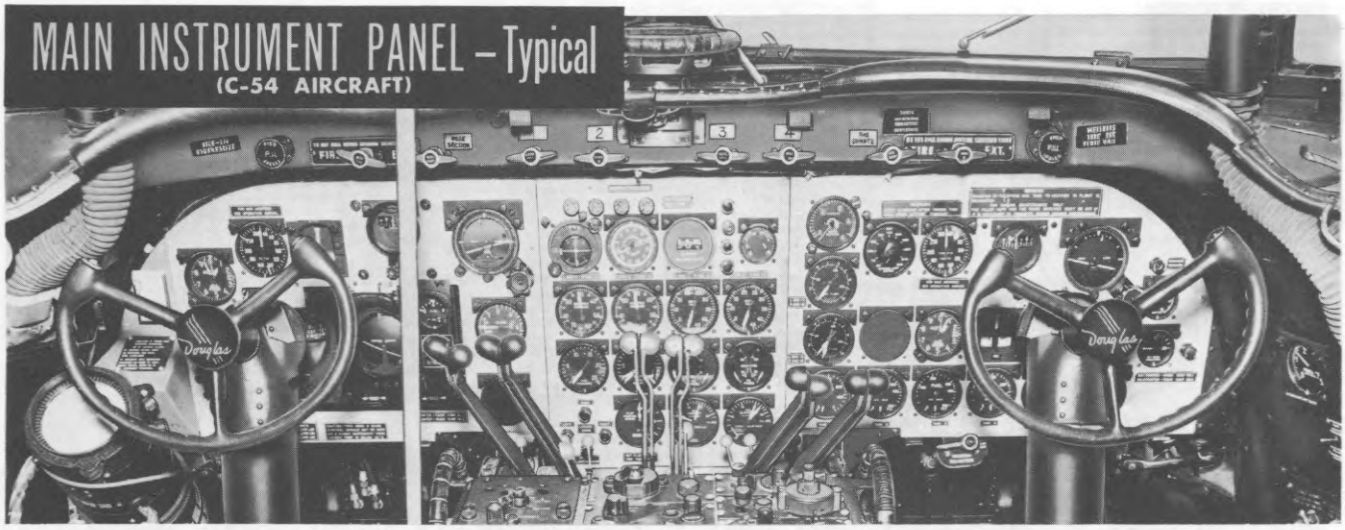
Figure 1-9 (Sheet 1 of 2)

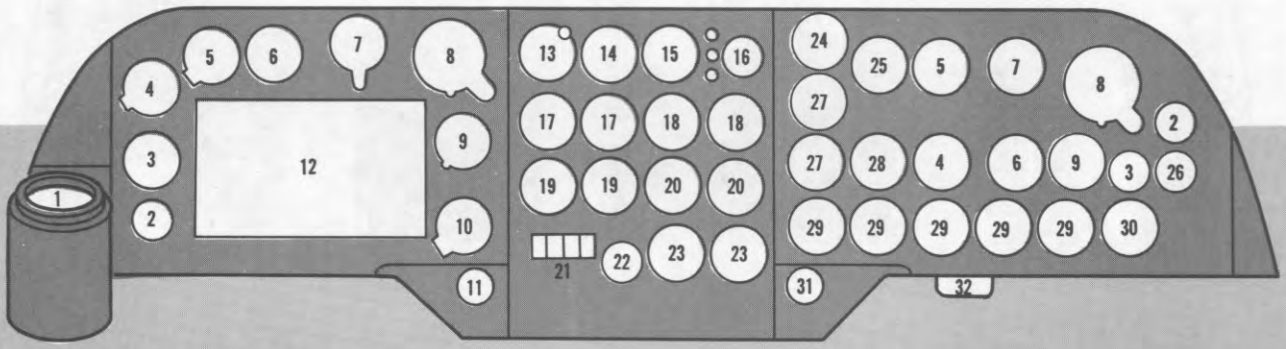


1. PROPELLER FRICTION LOCK LEVER
2. THROTTLE LEVERS
3. ELEVATOR TRIM TAB WHEEL
4. UHF COMMAND CONTROL PANEL
5. LF RADIO RECEIVER CONTROL PANEL
6. TRANSCEIVER CONTROL PANEL
7. PANEL LIGHT RHEOSTAT
8. AILERON TRIM TAB WHEEL
9. VHF COMMAND CONTROL PANEL
10. UHF-VHF MICROPHONE TRANSFER SWITCH
11. BLOWER LEVERS
12. WING FLAP LEVER
13. COWL FLAP LEVERS
14. AUXILIARY FUEL TANK SELECTOR LEVERS (6 WING TANK FUEL SYSTEM ONLY)
15. LANDING GEAR LEVER
16. CARBURETOR AIR FILTER LEVER (IF INSTALLED)
17. MIXTURE LEVERS
18. SOLENOID PIN ACCESS HOLE
19. RECOGNITION LIGHT PANEL
20. AUTOPILOT SERVO UNIT HANDLES
21. AUTOMATIC RADIO COMPASS TUNING CONTROL PANEL
22. AUTOMATIC RADIO COMPASS FREQUENCY SELECTOR CONTROL PANEL
23. VHF NAVIGATION OMNI CONTROL PANEL
24. THROTTLE FRICTION LOCK LEVER
25. PROPELLER LEVERS
26. MAIN FUEL TANK SELECTOR LEVERS
27. CARBURETOR AIR LEVERS
28. CROSS-FEED SELECTOR LEVERS (2 ONLY WITH EIGHT WING TANK FUEL SYSTEM)

Figure 1-9 (Sheet 2 of 2)

MAIN INSTRUMENT PANEL – Typical
(C-54 AIRCRAFT)





1. SEARCH RADAR SCOPE (IF INSTALLED)
2. VACUUM PRESSURE GAGES (2)
3. BEARING INDICATOR
4. ALTIMETER
5. AIRSPEED INDICATOR
6. TURN AND SLIP INDICATOR
7. DIRECTIONAL INDICATORS
8. ATTITUDE INDICATORS
9. VERTICAL VELOCITY INDICATOR
10. SPACE PROVISION
11. CLOCK
12. AUTOPILOT CONTROL PANEL
13. COURSE INDICATOR AND MARKER BEACON LIGHT
14. RADIO MAGNETIC INDICATORS
15. RANGE INDICATOR
16. SYNCHROSCOPE
17. MANIFOLD PRESSURE GAGES
18. TACHOMETERS
19. FUEL PRESSURE GAGES
20. OIL PRESSURE GAGES
21. LANDING GEAR INDICATOR LIGHTS
22. WING FLAP POSITION INDICATOR
23. OIL QUANTITY INDICATORS
24. RADIO ALTIMETER AND INDICATOR LIGHTS
25. RADIO ALTIMETER ALTITUDE LIMIT SWITCH
26. DE-ICING SYSTEM PRESSURE GAGE
27. FUEL FLOW INDICATORS
28. SPACE PROVISION
29. FUEL QUANTITY INDICATORS
30. SPACE PROVISION
31. AUTOPILOT OIL PRESSURE GAGE
32. VACUUM PUMP SELECTOR

Figure 1-10

ELECTRICAL CONTROL PANEL, UPPER INSTRUMENT PANEL AND GENERATOR CONTROL PANEL – Typical

(C-54 AIRCRAFT)

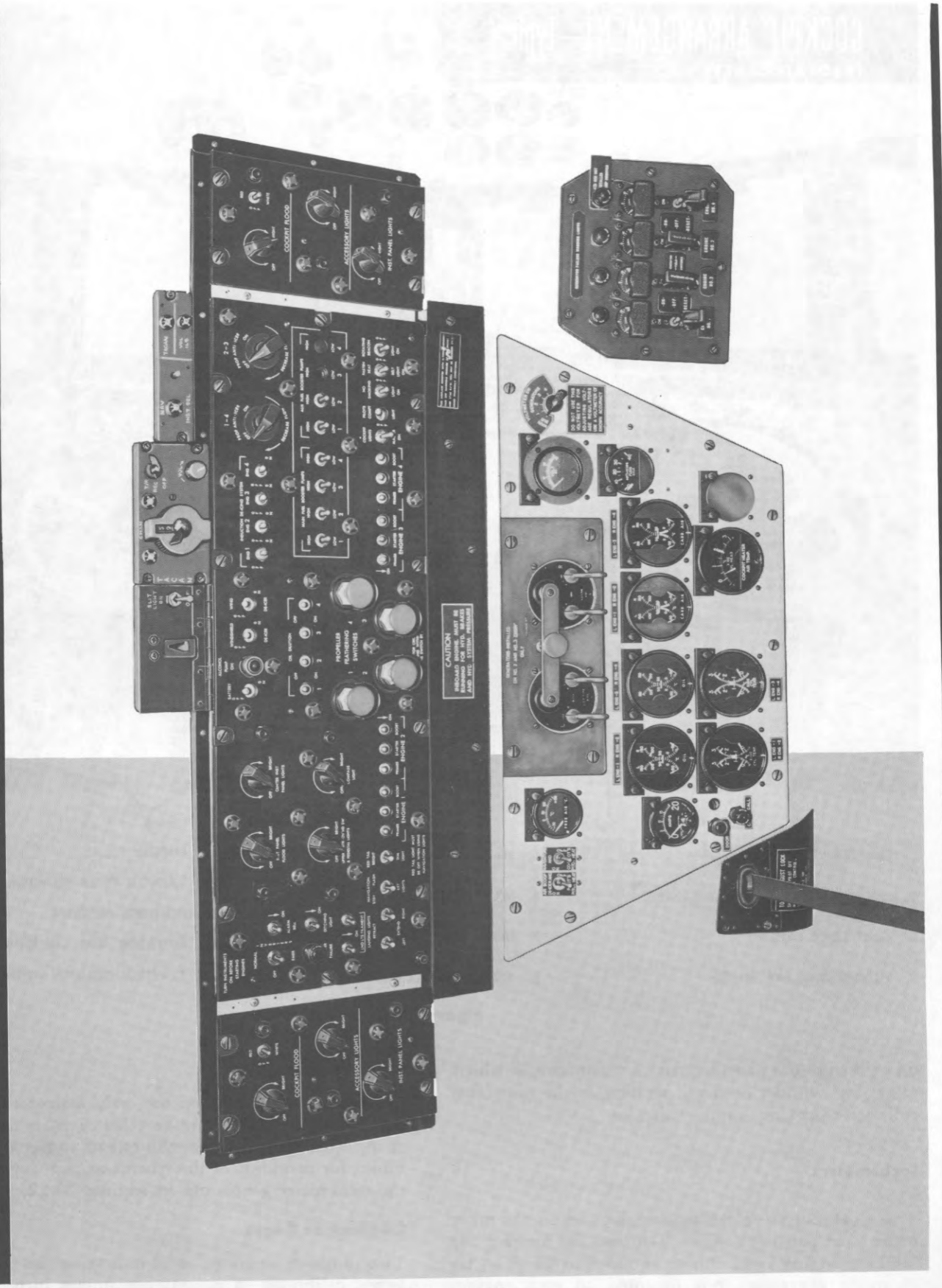
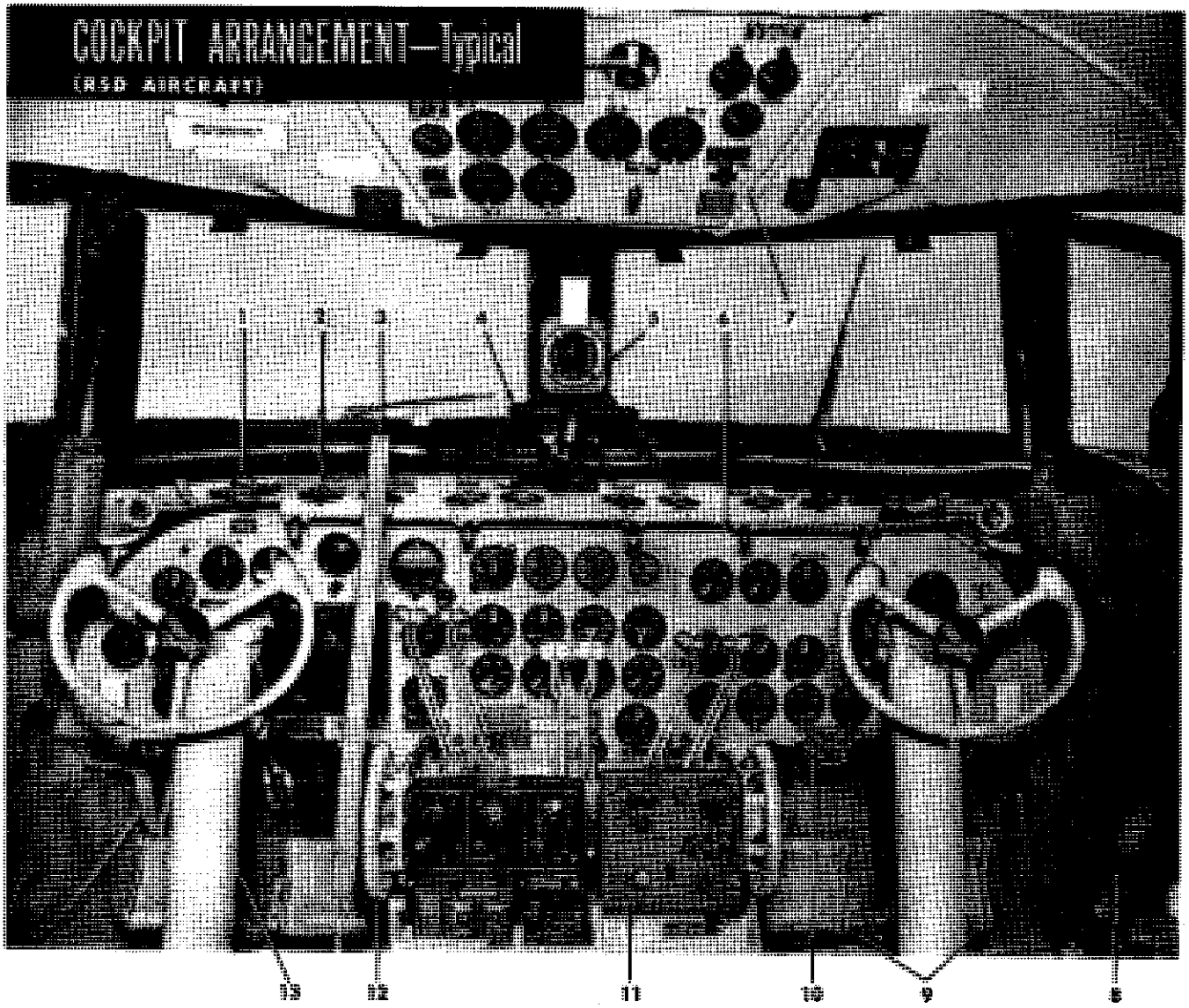


Figure 1-11



1. EMERGENCY BRAKE HANDLE
2. CO_2 CYLINDER DISCHARGE HANDLE
3. GUST LOCK TAPE
4. RUDDER TRIM TAB WHEEL
5. MAGNETIC COMPASS
6. MAIN INSTRUMENT PANEL
7. UPPER INSTRUMENT PANEL
8. SEARCH RADAR SCOPE
9. RUDDER PEDAL
10. VACUUM PUMP SELECTOR HANDLE
11. CONTROL PEDESTAL
12. ELEVATOR TRIM TAB WHEEL
13. CONTROL COLUMN AND WHEEL

Figure 1-12

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 *(18, figure 1-10 and 28, figure 1-18)* indicate engine rpm. Power is supplied by four tachometer generators, one mounted on each engine, which furnish current to the respective tachometer.

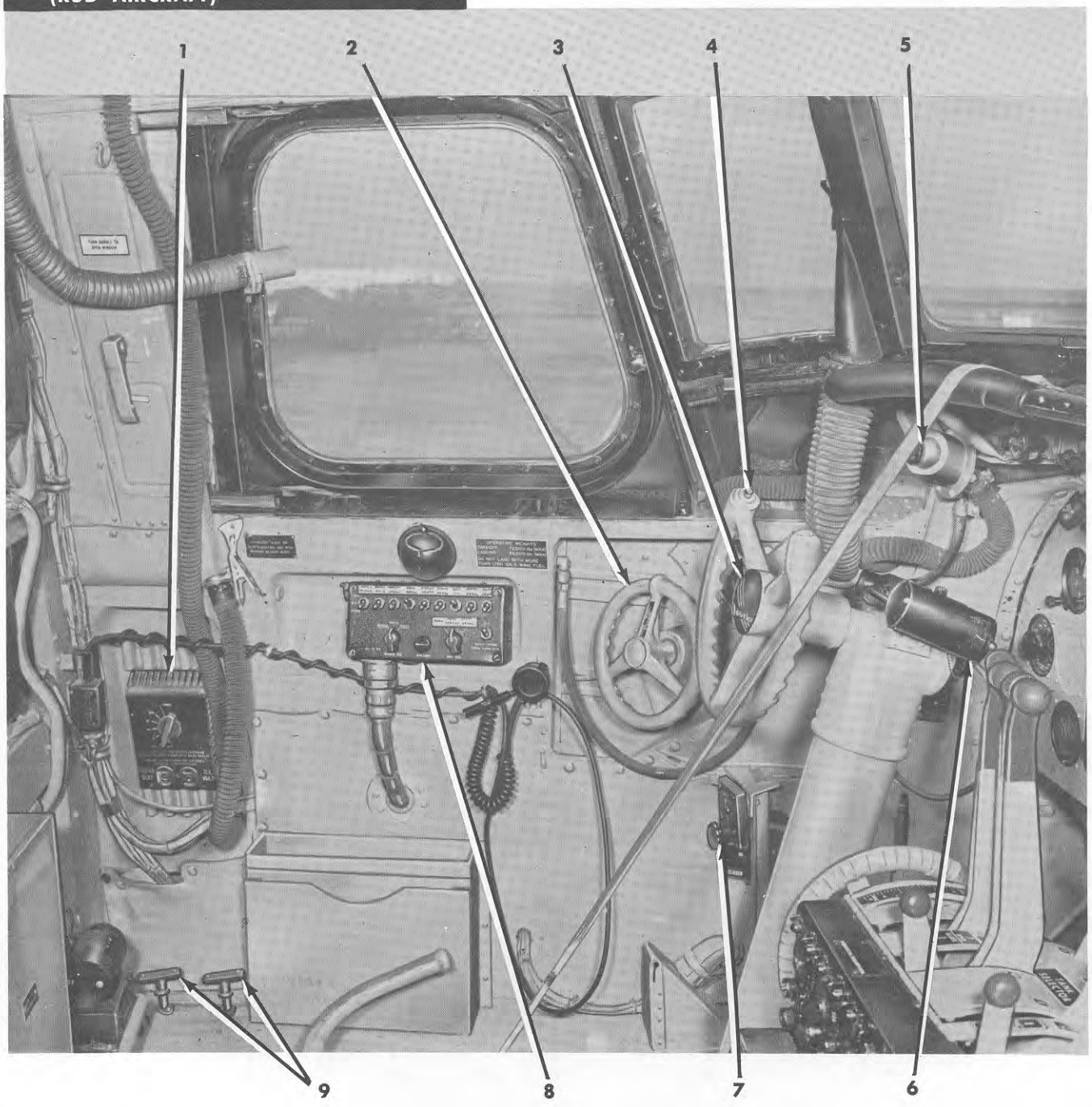
Synchroscope.

A synchroscope located on the main instrument panel *(16, figure 1-10 and 22, figure 1-18)* 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 engines No. 2, 3, and 4.

Oil Pressure Gages.

Two autosyn operated dual-indicating oil pressure gages, calibrated in pounds per square inch, are installed on the main instrument panel *(20, figure 1-10*

COCKPIT—LEFT SIDE—Typical
(R5D AIRCRAFT)



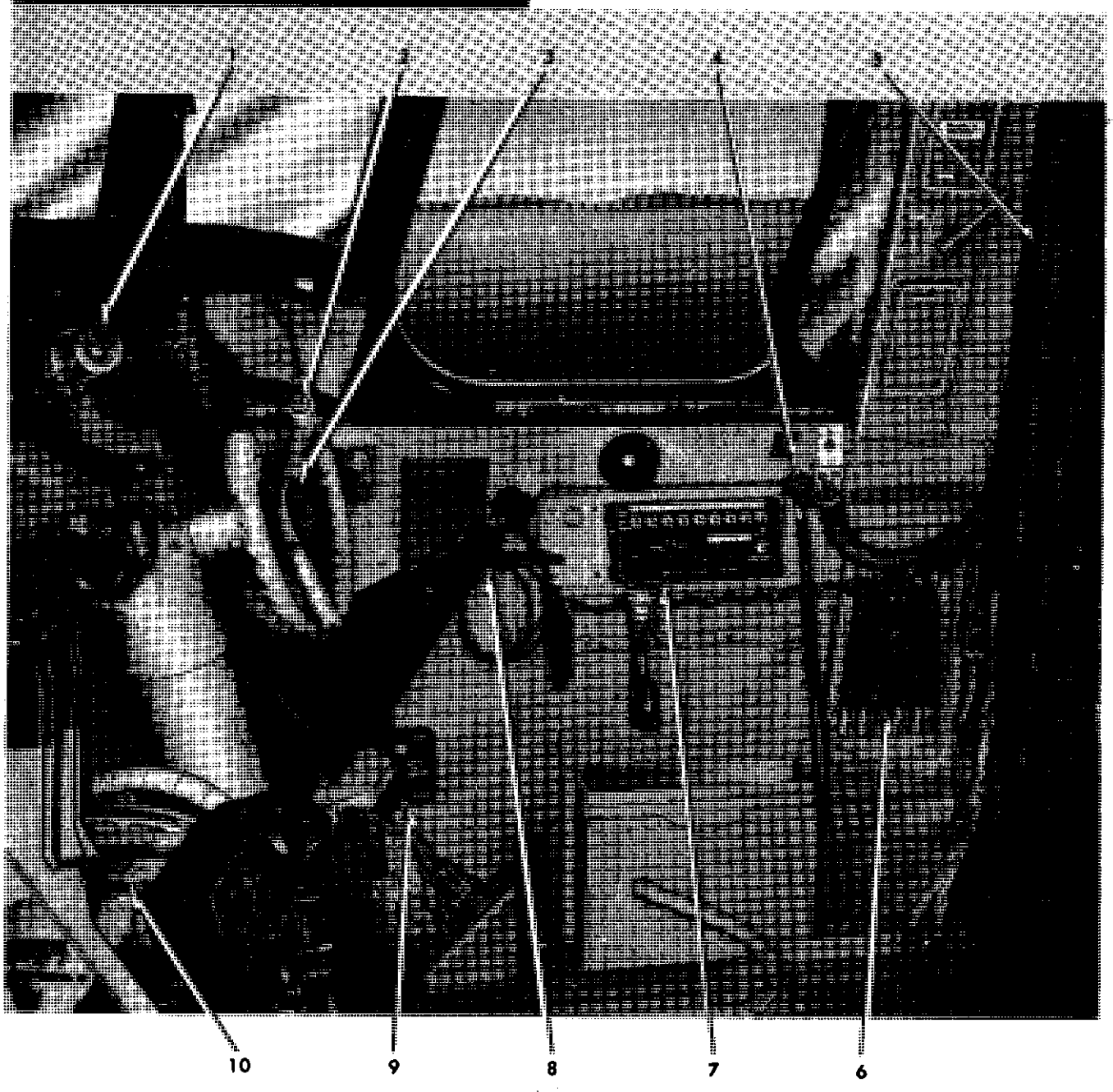
1. SUIT HEATER RHEOSTAT
2. NOSE WHEEL STEERING WHEEL
3. CONTROL COLUMN AND WHEEL
4. INSTRUMENT LIGHT MOMENTARY SWITCH
5. COLD AIR ORIFICE
6. INSTRUMENT LIGHT
7. COCKPIT HEATER REGULATOR KNOB
8. INTERPHONE CONTROL PANEL
9. EMERGENCY FLARE RELEASE HANDLES

20,969

Figure 1-13

COCKPIT — RIGHT SIDE — Typical

(R5D AIRCRAFT)



1. COLD AIR ORIFICE
2. INSTRUMENT LIGHT MOMENTARY SWITCH
3. CONTROL COLUMN AND WHEEL
4. PORTABLE OXYGEN RECHARGER
5. FLEXIBLE DEFROSTING DUCT
6. SUIT HEATER RHEOSTAT
7. INTERPHONE CONTROL PANEL
8. SEARCH RADAR SCOPE
9. WINDSHIELD DE-ICING AND DEFROSTING CONTROL HANDLE
10. CONTROL PEDESTAL

20,971

Figure 1-14

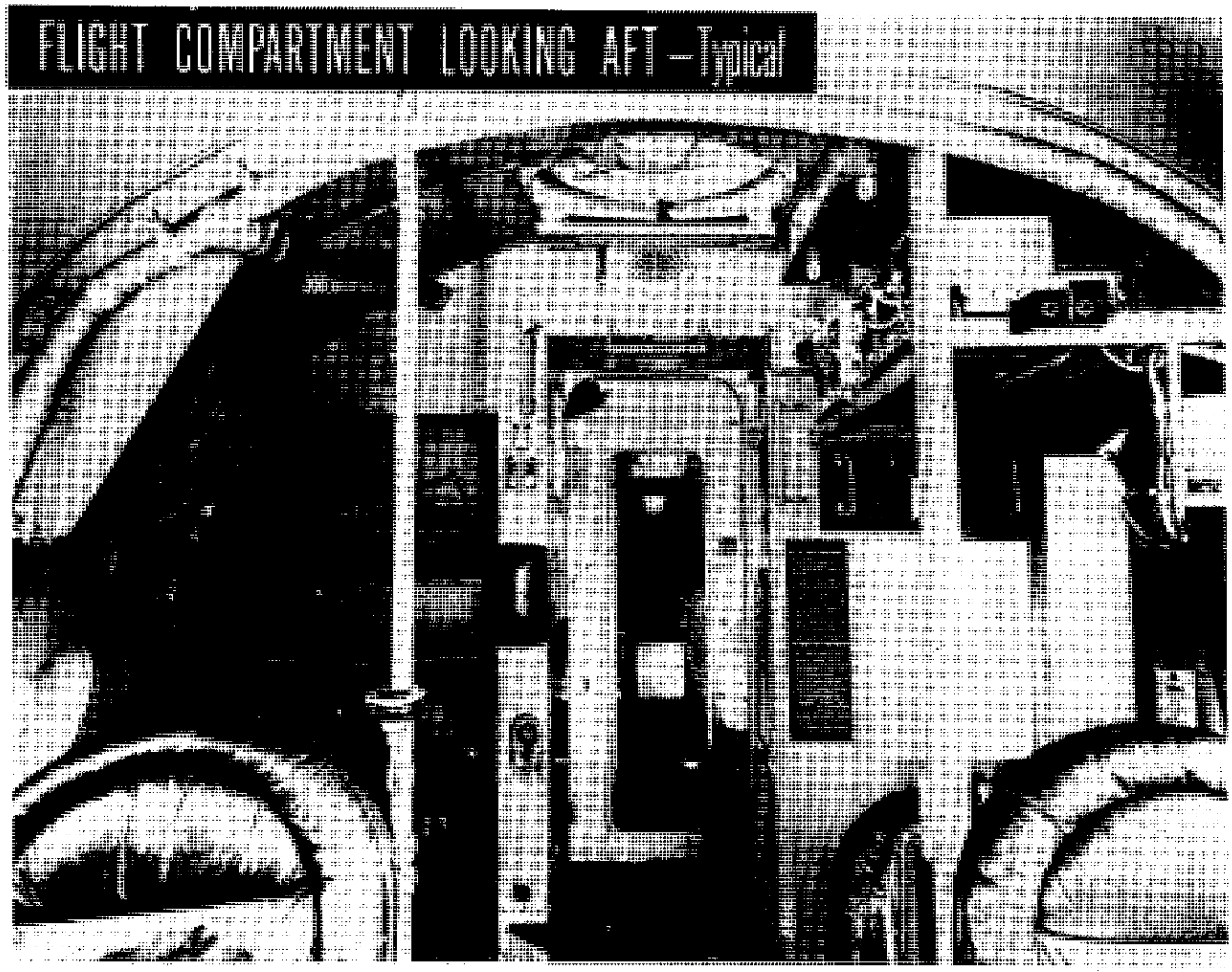


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Figure 1-15

and 30, figure 1-18). Oil pressure is taken from the pressure side of the engine-driven pump and connected to the hydrostatic line. On some aircraft the oil pressure gages are operated hydrostatically.

Oil Temperature Indicators.

Two dual-indicating oil temperature indicators, graduated in degrees centigrade, are installed on the upper instrument panel *(figures 1-11 and 1-16).* An oil temperature bulb, installed in the crankcase of each engine, is connected through a 28-volt d-c circuit to the respective indicator.

Fuel Flowmeters.

Two dual-indicating fuel flowmeters mounted on the main instrument panel *(27, figure 1-10 and 11, figure 1-18)* indicate the fuel flow to each engine in pounds and gallons per hour. Power for the fuel flowmeters is supplied by a 26-volt a-c circuit.

Fuel Pressure Gages.

Two dual-indicating autosyn operated fuel pressure gages are mounted on the main instrument panel *(19, figure 1-10 and 29, figure 1-18).* 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.

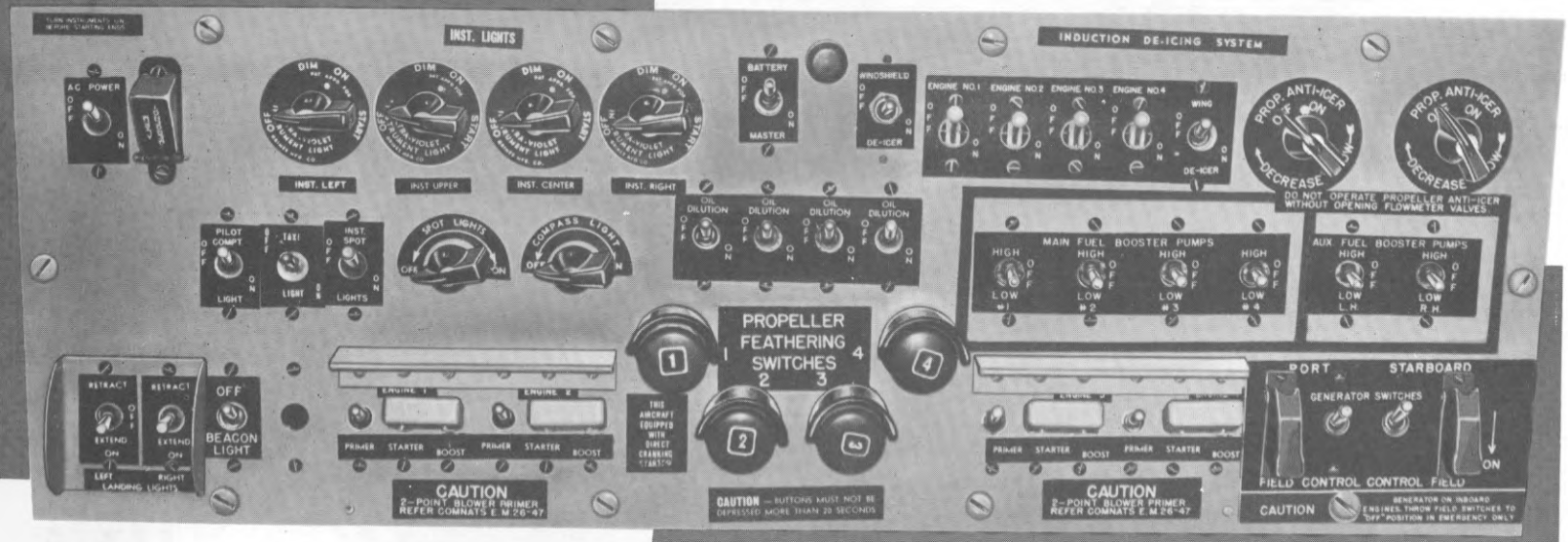
IGNITION ANALYZER (IF INSTALLED).

A portable airborne ignition analyzer is installed to permit continuous visual analysis of the complete aircraft power plant. The ignition analyzer isolates and identifies the malfunctions and failures that may occur

(Continued on Page 1-27)

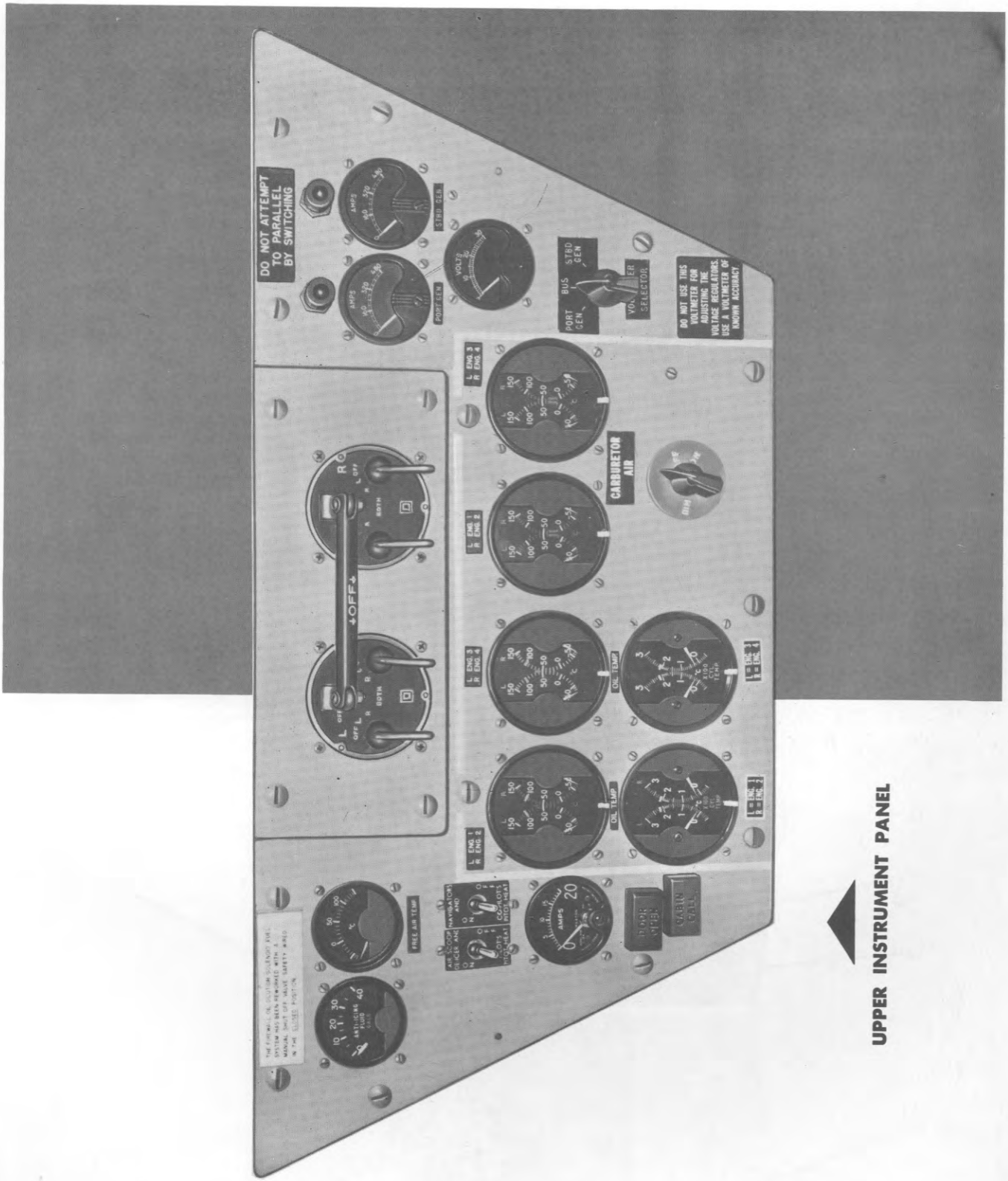
ELECTRICAL CONTROL PANEL, UPPER INSTRUMENT PANEL — Typical

(R5D AIRCRAFT)



ELECTRICAL CONTROL PANEL

Figure 1-16 (Sheet 1 of 2)



UPPER INSTRUMENT PANEL

Figure 1-16 (Sheet 2 of 2)

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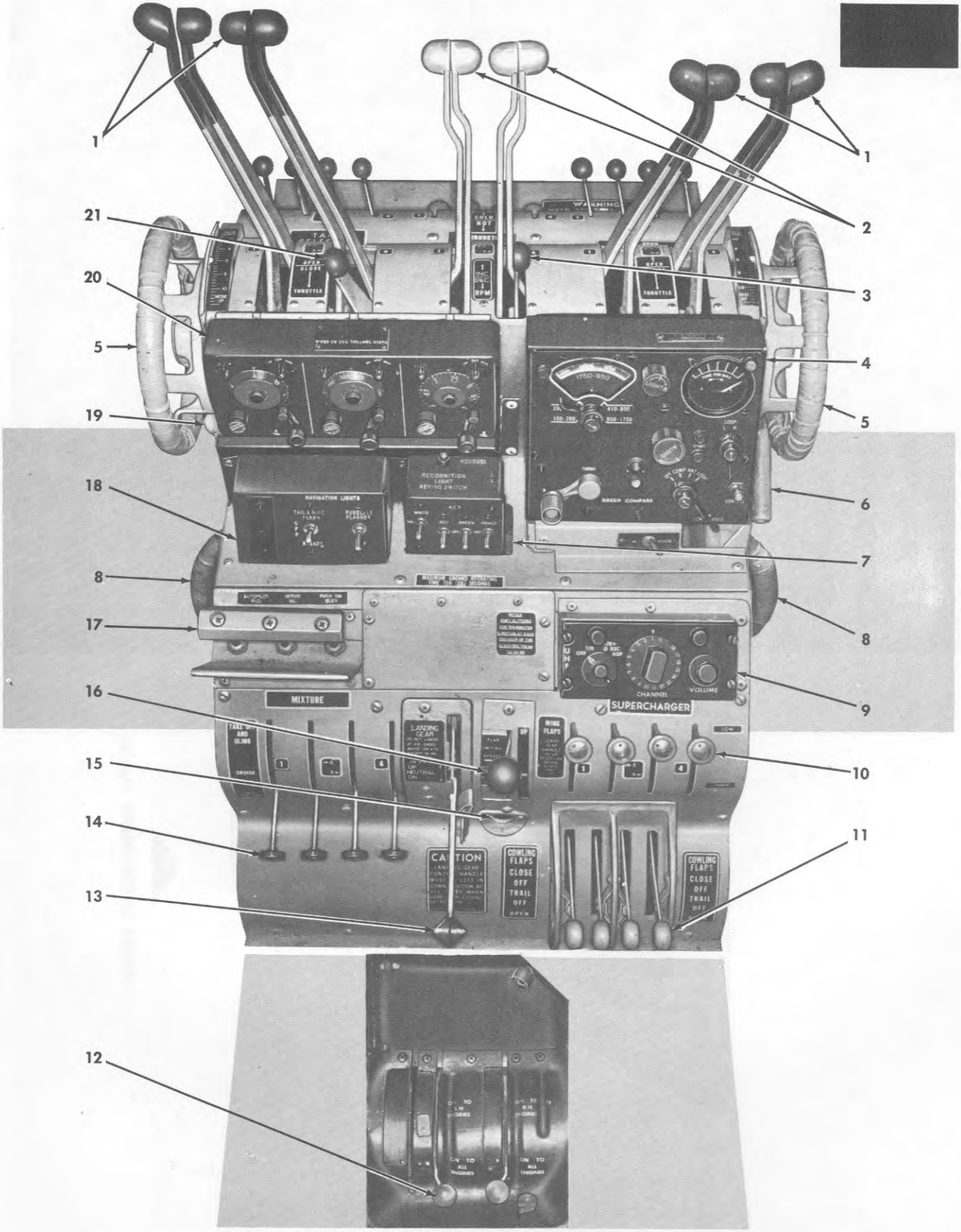

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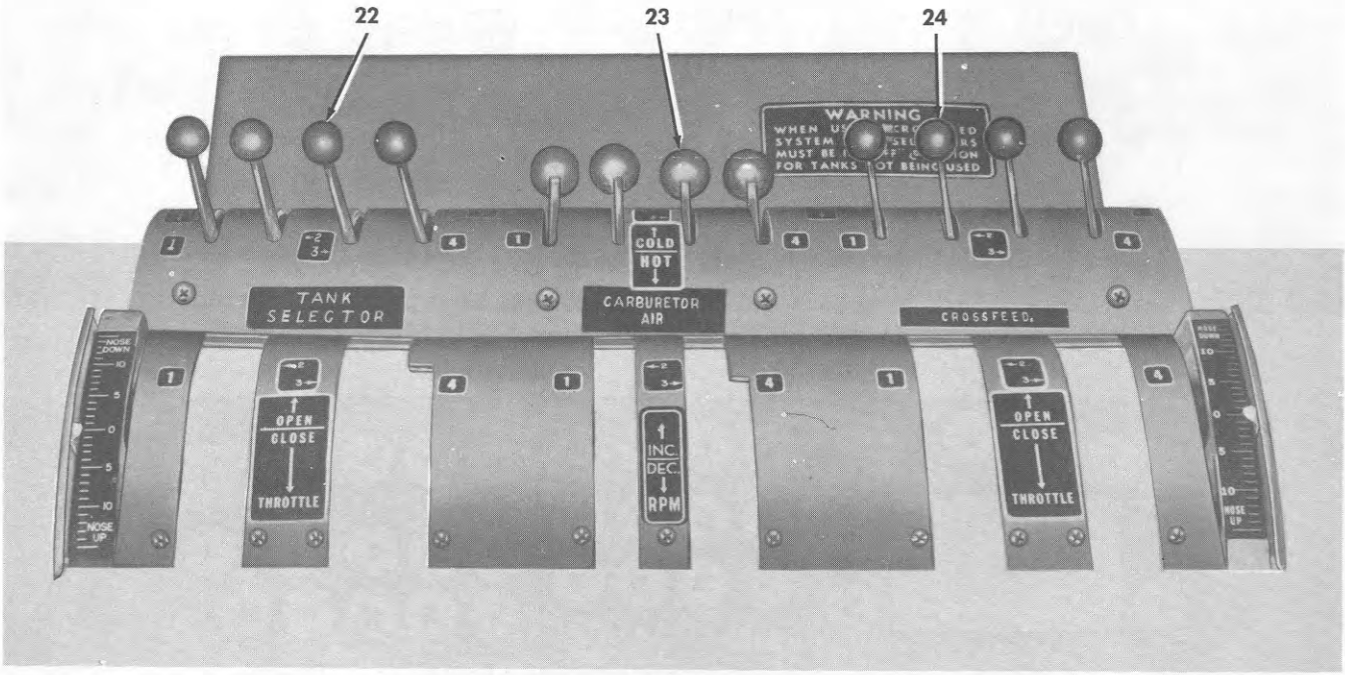
Figure 1-17 (Sheet 1 of 2)

CONTROL PEDESTAL—TYPICAL
(R5D AIRCRAFT)



1.	THROTTLE LEVERS	13.	LANDING GEAR LEVER
2.	PROPELLER LEVERS	14.	MIXTURE LEVERS
3.	PROPELLER FRICTION LOCK LEVER	15.	SOLENOID PIN ACCESS HOLE
4.	AUTOMATIC RADIO COMPASS CONTROL PANEL	16.	WING FLAP LEVER
5.	ELEVATOR TRIM TAB WHEEL	17.	AUTOPILOT SERVO UNIT HANDLE
6.	EMERGENCY LANDING GEAR EXTENSION HANDLE	18.	NAVIGATION LIGHTS CONTROL PANEL
7.	RECOGNITION LIGHTS CONTROL PANEL	19.	PARKING BRAKE LEVER
8.	AILERON TRIM TAB WHEEL	20.	COMMAND RECEIVER PANEL
9.	UHF COMMAND CONTROL PANEL	21.	THROTTLE FRICTION LOCK LEVER
10.	BLOWER LEVERS	22.	MAIN FUEL TANK SELECTOR LEVERS
11.	COWL FLAP LEVERS	23.	CARBURETOR AIR LEVERS
12.	AUXILIARY FUEL TANK SELECTOR LEVERS	24.	CROSS-FEED SELECTOR LEVERS

Figure 1-17 (Sheet 2 of 2)

29,950

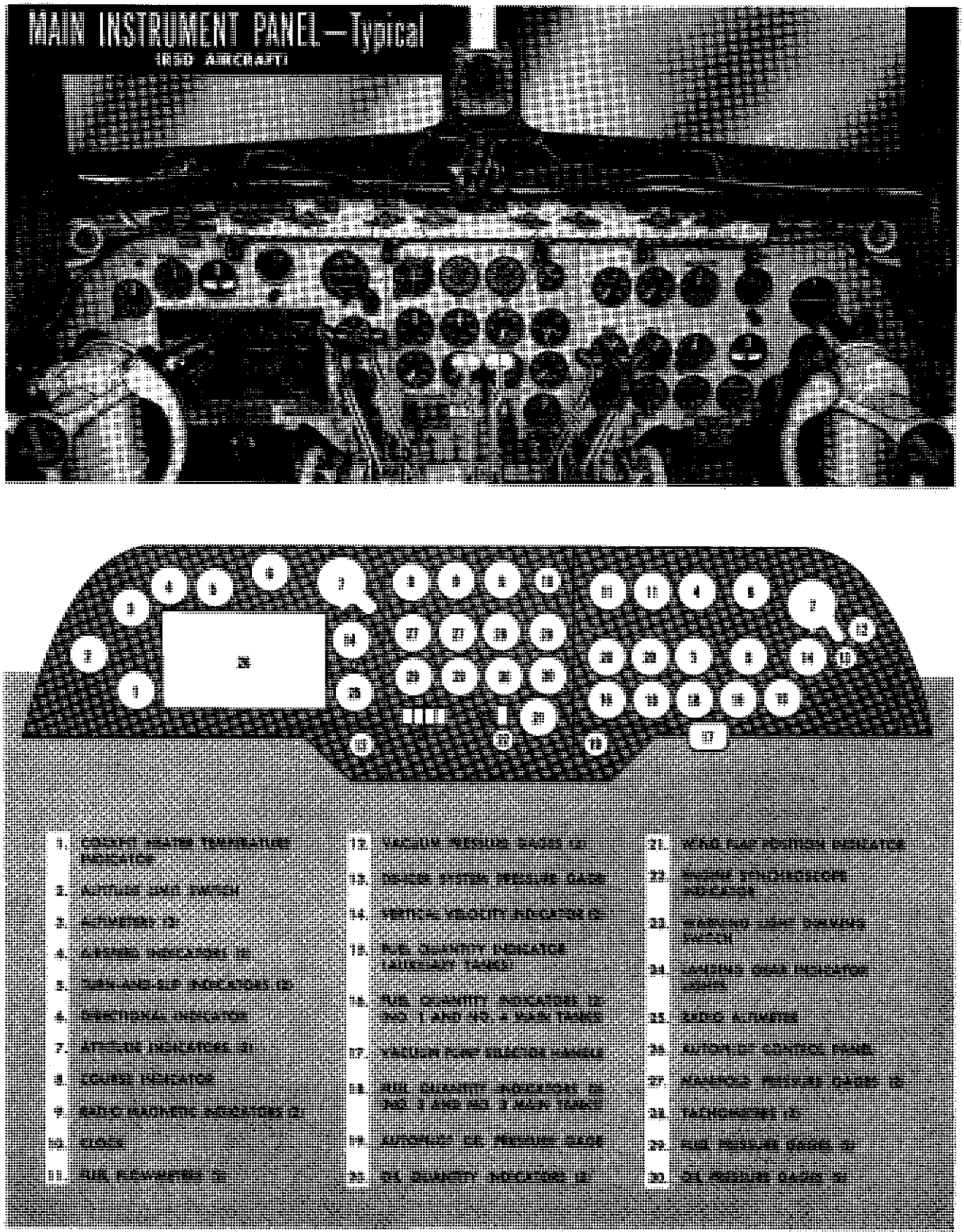


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Figure 1-18

(Continued from Page 1-21)

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 C-54 aircraft, and on the navigator's table on R5D 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 d-c and 115-volt a-c busses on C-54 aircraft and from the 115-volt a-c bus on R5D 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 *(25, figure 1-9 and 2, figure 1-17)*, with placarded INC (forward) and DEC (aft) positions, are located on the control pedestal and are equipped with a mechanical friction lock lever *(1, figure 1-9 and 3, figure 1-17)*. 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, one for each propeller, are mounted on the electrical control panel *(figures 1-11 and 1-16)*. When the desired feathering button is depressed to feather the selected propeller, a 28-volt d-c circuit is closed to energize the feathering pump motor. A 28-volt d-c 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 800 rpm is indicated on the tachometer.

OIL SYSTEM.

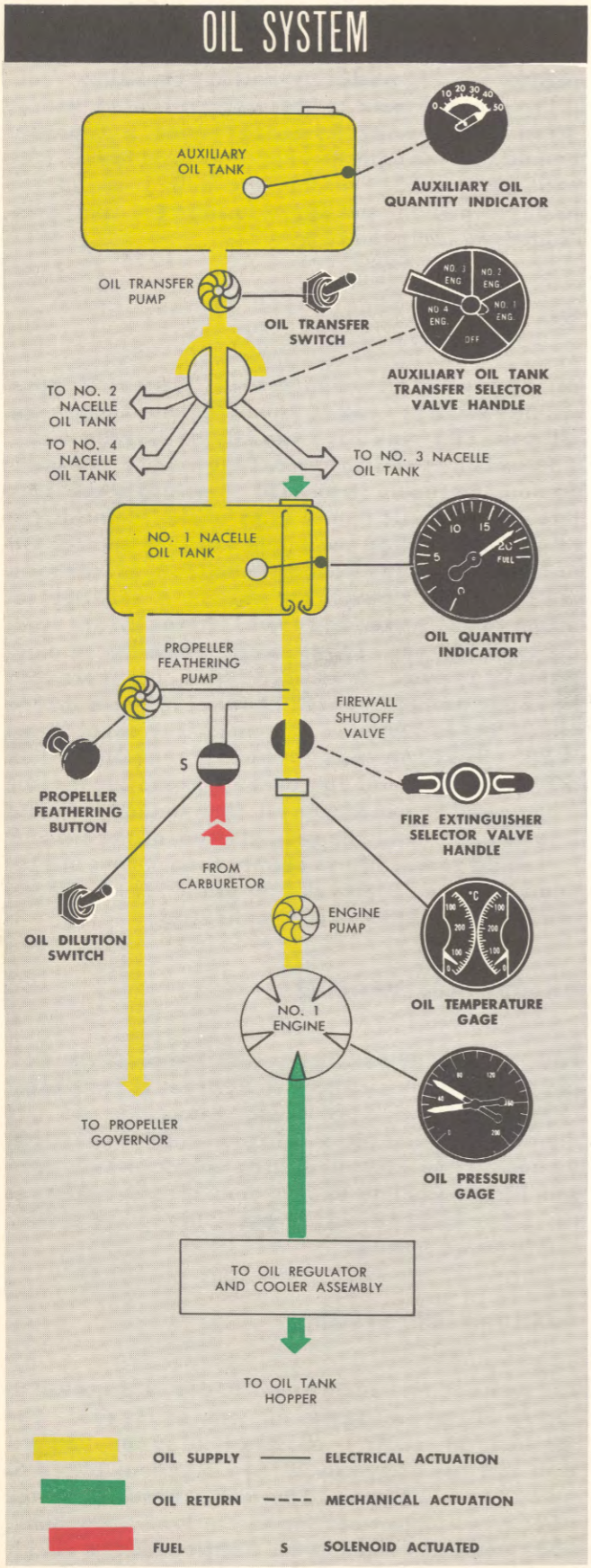
An independent oil system *(figure 1-19)* for each engine supplies oil to the engine from a nacelle hopper-type oil tank. Each tank has a capacity of 22 gallons plus a 3¾ gallon expansion space (for oil grade and specification, see figure 1-40). Oil flows from the tank through a firewall shutoff valve 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, in the rocker box sump, 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, spring loaded to the OFF position, are mounted on the electrical control panel *(figures 1-11 and 1-16)*. These switches, in the ON position, close 28-volt d-c 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 1-19)* 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 crew bunk. The system uses a pump, an electric motor, a circuit breaker, an actuating switch, and a selector valve to transfer oil when needed.



X1-8

Figure 1-19

AUXILIARY OIL TRANSFER HANDLE.

A mechanical auxiliary oil transfer handle *(figure 1-20)* is located on the bulkhead aft of the fuselage oil tank 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 1-20)* with ON and OFF positions is located on the bulkhead, near the floor, aft of the fuselage oil tank. This switch, when ON, closes a 28-volt d-c circuit to energize the oil transfer 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 Breaker.

A 28-volt d-c toggle-type, ON-OFF auxiliary oil transfer circuit protector *(figure 1-20)* is located on the bulkhead, near the floor, aft of 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 *(5, figure 1-39)*, is installed at each nacelle firewall to shut off the flow of oil forward of the firewall. (See the paragraph on fire extinguisher selector handles, this section.)

Oil Quantity Indicators.

Two dual oil quantity indicators, calibrated in gallons, are mounted on the main instrument panel *(23, figure 1-10 and 20, figure 1-18)*. The indicators are actuated electrically through a 26-volt a-c circuit by autosyn transmitters in the respective oil tanks.

FUEL SYSTEM—SIX WING TANK.

The fuel system furnishes fuel for the engines, for the primers, for engine oil dilution, and for the combustion heaters *(figure 1-22)*. The system includes six integral wing tanks (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 1-21 and 1-40 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.

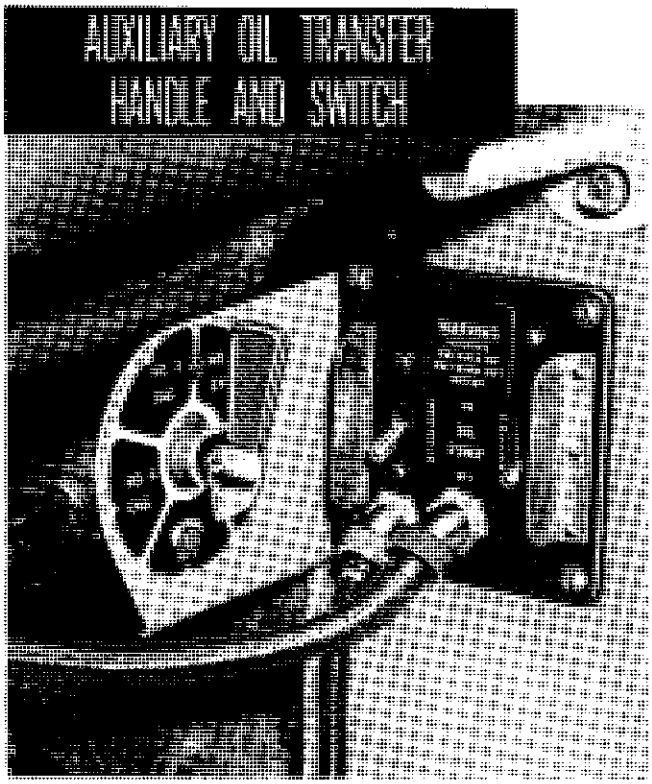
Four main fuel tank selector levers, one for each main tank, have ON and OFF positions, and are installed on the control pedestal *(26, figure 1-9 and 22, figure 1-17)*. Each lever mechanically controls its respective selector valve.

AUXILIARY FUEL TANK SELECTOR LEVERS.

Two auxiliary fuel tank selector levers *(14, figure 1-9 and 12, figure 1-17)* 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 *(figure 1-22)* 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.)



X1-2

Figure 1-20

CROSSFEED SELECTOR LEVERS.

Four crossfeed selector levers *(28, figure 1-9 and 24, figure 1-17)*, 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.

FUEL BOOSTER PUMP SWITCHES.

Fuel booster pump switches, with positions HIGH, OFF, and LOW, are mounted on the electrical control panel *(figures 1-11 and 1-16)*. Six of the booster pump switches are connected through a 28-volt d-c circuit to the booster pumps in the four main tanks and two auxiliary tanks. The remaining switches (when installed) control the booster pump, in the fuselage fuel tank supply line, that is installed under the floor of the fuselage fuel compartment. When these switches are in the LOW or HIGH position, a circuit to each respective booster pump motor is closed to operate the pump. The booster pumps maintain 12- to 14-psi fuel pressure in low boost operation and 22-psi fuel pressure in high boost operation. Refer to Section VII for use of fuel booster pumps.

FUEL QUANTITY DATA CHART

NOTE:
The capacity of each tank may be reduced as much as 10 gallons due to the amount of sealant used.

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	500	3000	506	3036
MAIN (Nos. 2 & 3)	2	490	2940	492	2952
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	500	3000	506	3036
AUXILIARY (Nos. 1 & 4)	2	420	2520	421	2526
MAIN (Nos. 2 & 3)	2	490	2940	492	2952
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

20,982

Figure 1-21

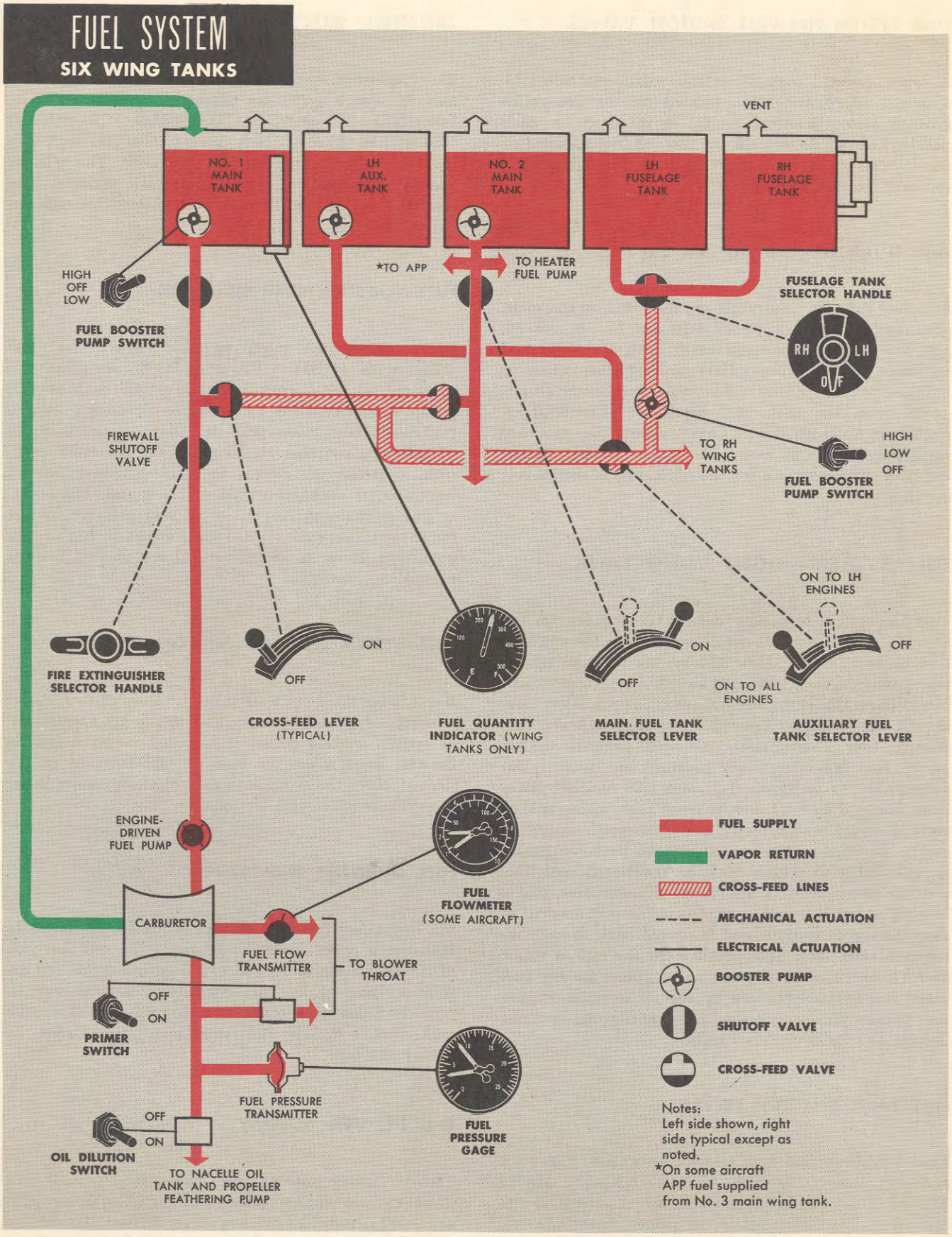


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Figure 1-22

FUEL SYSTEM FIREWALL SHUTOFF VALVES.

A cable-operated firewall shutoff valve, controlled by a handle *(5, figure 1-39)*, 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 fuel quantity indicators are mounted on the main instrument panel *(29, figure 1-10 and 15, 16, and 18, figure 1-18)*, one for each main tank and one dual indicator for the two auxiliary tanks. Fuel quantity in gallons is registered by a float-type transmitter (liquidometer) in each tank. Each fuselage fuel tank (if installed) is provided with a direct-reading fuel quantity sight gage which is mounted on the forward end of the tank. Power source for the indicators is the 28-volt d-c bus.

FUEL SYSTEM—EIGHT WING TANK.

The fuel system furnishes fuel for the engines, for the primers, for engine oil dilution, and for the combustion heaters *(figure 1-23)*. The system includes six integral wing tanks (four main and two auxiliary tanks), two collapsible (stub) 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 1-21 and 1-40 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 *(26, figure 1-9 and 22, figure 1-17)* 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 *(28, figure 1-9 and 24, figure 1-17)* 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 *(figures 1-11 and 1-16)*, with HIGH, OFF, and LOW positions, are mounted on the electrical control 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 d-c circuit to each respective booster pump motor is closed to operate the pump. The booster pumps maintain 12- to 14-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 *(5, figure 1-39)* 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 fuel quantity indicators are mounted on the main instrument panel *(figures 1-10 and 1-18)*, one for each of the four main tanks and two dual indicators for the four auxiliary tanks. Fuel quantity in gallons is registered by a float-type transmitter (liquidometer) in each tank. Power for the indicators is supplied from the 28-volt d-c bus.

D-C POWER SUPPLY.

The d-c electric power supply system is a 24- to 28-volt direct-current single-conductor system. D-c power *(figure 1-24)* 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 pow-

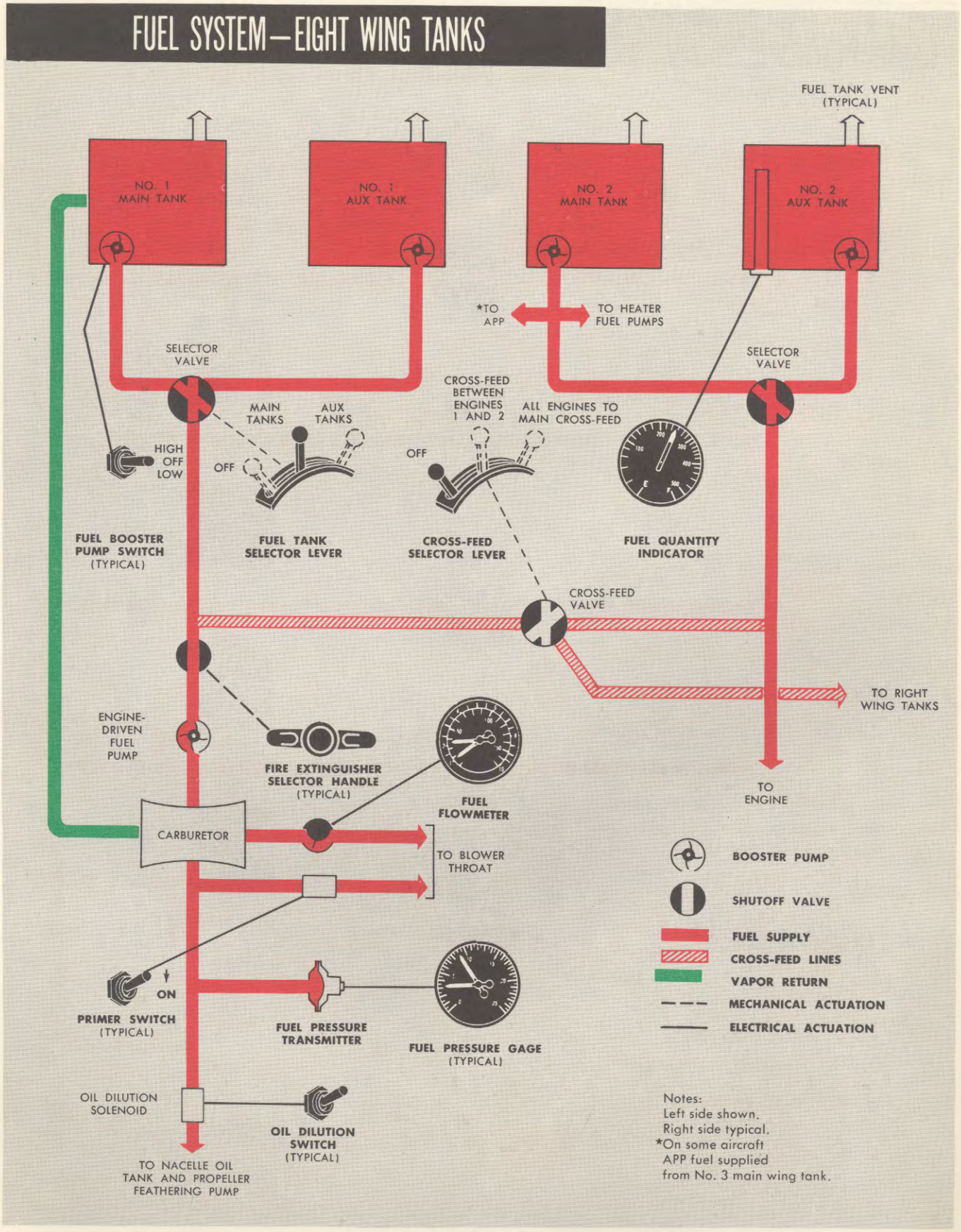

Figure 1-23

X1-128

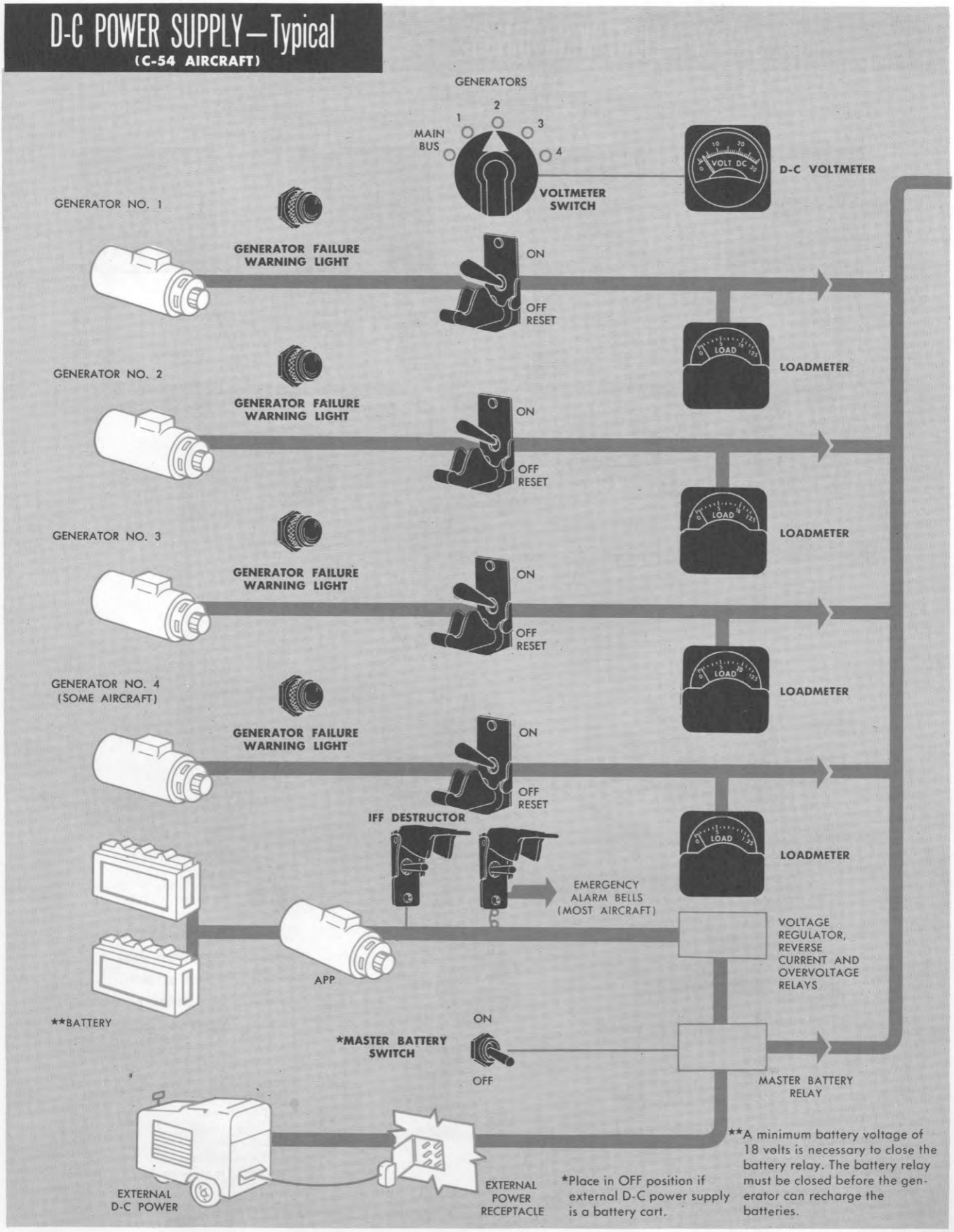

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Figure 1-24 (Sheet 1 of 2)

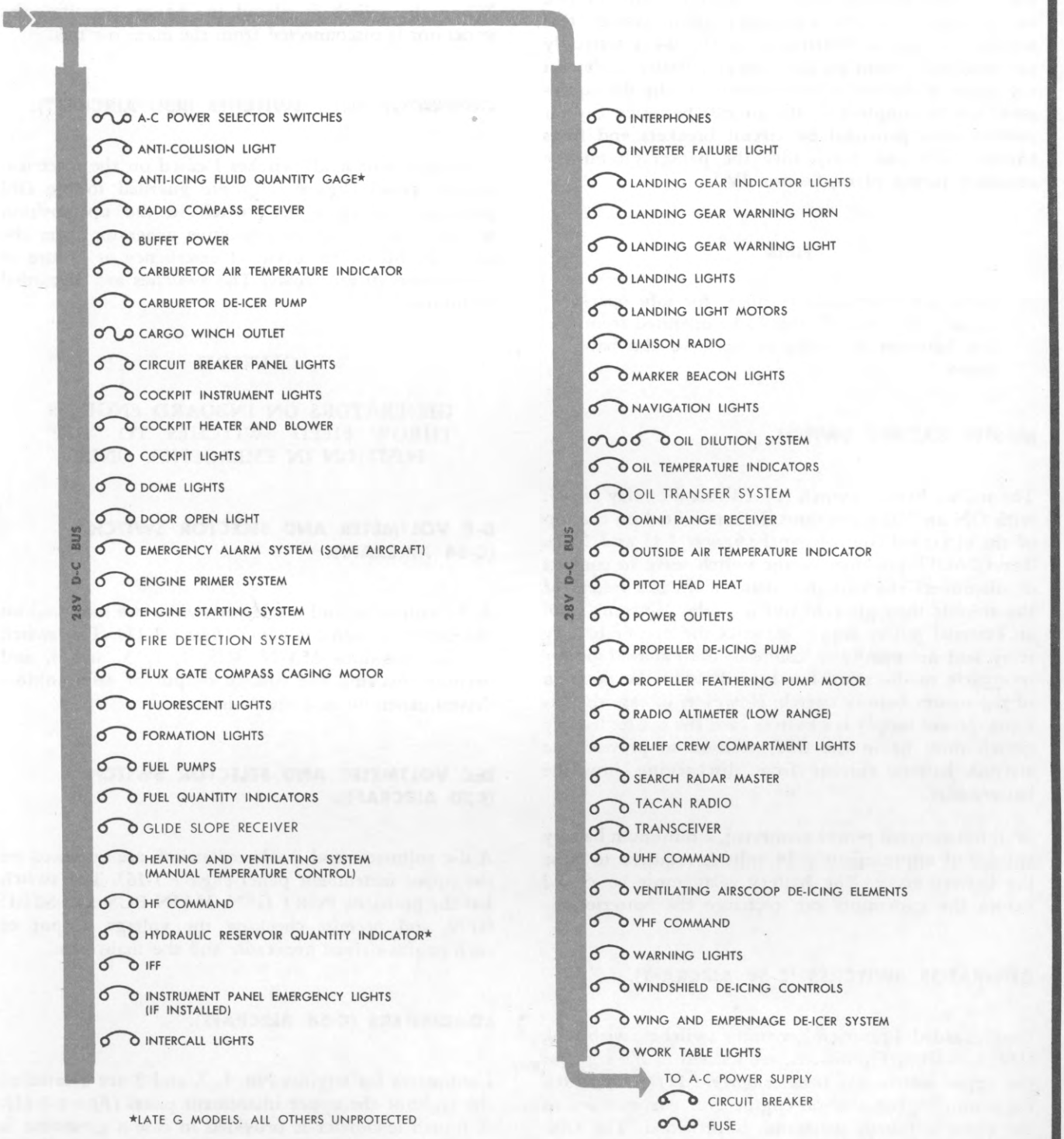

Figure 1-24 (Sheet 2 of 2)

er 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 *(27, figure 1-3)*. Each generator circuit includes a voltage regulator, a reverse current relay, and an overvoltage relay on circuit protector. On most aircraft the emergency alarm bell circuit and IFF destructor are operated directly from the aircraft batteries (see the paragraph on the emergency alarm system, this section). Power is distributed to the d-c electrically operated equipment by bus bars and feeder cables. In the event of failure of the generators, the d-c equipment can be supplied by the aircraft batteries. Circuit protection is provided by circuit breakers and fuses *(figures 1-29 and 1-30)*. (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 is a 28-volt d-c relay switch with ON and OFF positions. It is mounted on the top of the electrical control panel *(figures 1-11 and 1-16)*. 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 d-c relay. Current from an external power supply actuates the master battery 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.

Without external power connected, 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 (C-54 AIRCRAFT).

Four guarded 3-position generator switches, with ON, OFF, and RESET positions, are located to the right of the upper instrument panel *(figure 1-11)*. The switch for a fourth generator on engine No. 4 is installed in the event a fourth generator is provided. 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 (R5D AIRCRAFT).

Two 2-position generator switches are located on the electrical control panel *(figure 1-16)*. The switches have the placarded position ON. Placing the switch in the ON (down) position closes a 28-volt d-c circuit to connect the generator output to the main d-c bus. When the switch is placed in the up position, the generator is disconnected from the main d-c bus.

GENERATOR FIELD SWITCHES (R5D AIRCRAFT).

Two generator field switches located on the electrical control panel *(figure 1-16)* are guarded to the ON position. Placing either switch in the up position serves to disconnect its respective generator from the main d-c bus in the event of emergency or 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.

D-C VOLTMETER AND SELECTOR SWITCH (C-54 AIRCRAFT).

A d-c voltmeter and a selector switch are mounted on the upper instrument panel *(figure 1-11)*. 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.

D-C VOLTMETER AND SELECTOR SWITCH (R5D AIRCRAFT).

A d-c voltmeter and a selector switch are mounted on the upper instrument panel *(figure 1-16)*. 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 (C-54 AIRCRAFT).

Loadmeters for engines No. 1, 2, and 3 are located to the right of the upper instrument panel *(figure 1-11)*. A fourth loadmeter is provided in case a generator is installed on engine No. 4. Each loadmeter indicates the amperage output of its respective engine-driven generator.

LOADMETERS (R5D AIRCRAFT).

Loadmeters for engines No. 2 and 3 are located to the right of the upper instrument panel *(figure 1-16)*. Each loadmeter indicates the amperage output of its respective engine-driven generator.

GENERATOR WARNING LIGHTS (C-54 AIRCRAFT).

Generator warning lights for the generators mounted on engines No. 1, 2, and 3 are located to the right of the upper instrument panel *(figure 1-11)*. A fourth warning light is provided in case a generator is installed on engine No. 4. If the output voltage of a generator becomes less than ½ volt more than the voltage of the aircraft batteries, the respective generator reverse current relay will isolate the generator from the system and automatically illuminate the generator warning light. The generator warning light will be illuminated only when the generator reverse current relay is tripped and the generator switch is in the ON position.

GENERATOR WARNING LIGHTS (R5D AIRCRAFT).

R5D aircraft are provided with generator warning lights for each of two generators installed. The function is the same as the C-54 generator warning light system.

EXTERNAL POWER SUPPLY RECEPTACLE.

A 3-position, polarized, external power supply receptacle for 28-volt d-c 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 and reset switches are located in the main junction box *(figures 1-29 and 1-30)* in the passageway between the radio operator's compartment and the relief crew compartment. Circuit protectors for the radio equipment and interphone system are located in the main junction box and the radio junction box *(figure 1-31)*. Spare fuses are provided in a box located above the cabin heater control or on the radio rack.

A-C POWER SUPPLY (C-54 AIRCRAFT).

The a-c electrical power supply system is operated from the d-c system to supply 115-volt, 400-cycle, a-c power. Two inverters are installed *(figure 1-25)*, each inverter furnishing 115-volt and 26-volt a-c power through a transformer. Circuit protection is provided by circuit breakers and fuses located on the main circuit breaker panel.

INVERTER SWITCH (C-54 AIRCRAFT).

A 3-position inverter switch, with the placarded positions NORMAL, OFF, and EMER (NO. 1, OFF, and NO. 2), is located on the electrical control panel *(figure 1-11)*. Power source for the inverters is the 28-volt d-c bus. In case the NORMAL inverter fails, the inverter failure light will illuminate and the radar inverter may be used to supply 115-volt a-c power and 26-volt a-c power. However, if the radar inverter is used when the AN/APS-42 search radar is in operation, the AN/APS-42 equipment will be automatically disconnected. Normally, the radar inverter supplies a-c power to the AN/APS-42 equipment. When the inverter switch is in the NORMAL position, the radar inverter is turned on when the AN/APS-42 rotary power switch is moved from the OFF position.

INVERTER FAILURE LIGHT (C-54 AIRCRAFT).

A red press-to-test inverter failure light, located below the inverter switch on the electrical control panel *(figure 1-11)*, illuminates when 28-volt d-c power is supplied to the aircraft and the normal or emergency inverter is not furnishing power to the a-c bus.

A-C POWER SUPPLY (R5D AIRCRAFT).

The a-c electrical power supply system is operated from the d-c system to supply 115-volt, 400-cycle, a-c power and 26-volt a-c power. Most aircraft are provided with a two-inverter installation consisting of a radio inverter and a radar power inverter *(figure 1-27)*. The radar power inverter is installed in all aircraft whether radar is installed or not. In the two-inverter installation, the radar power inverter is a standby source of a-c power in event of failure of the radio inverter. Remaining R5D aircraft are provided with a four-inverter installation, consisting of normal and alternate instrument inverters, in addition to the radio and radar power inverters *(figure 1-28)*.

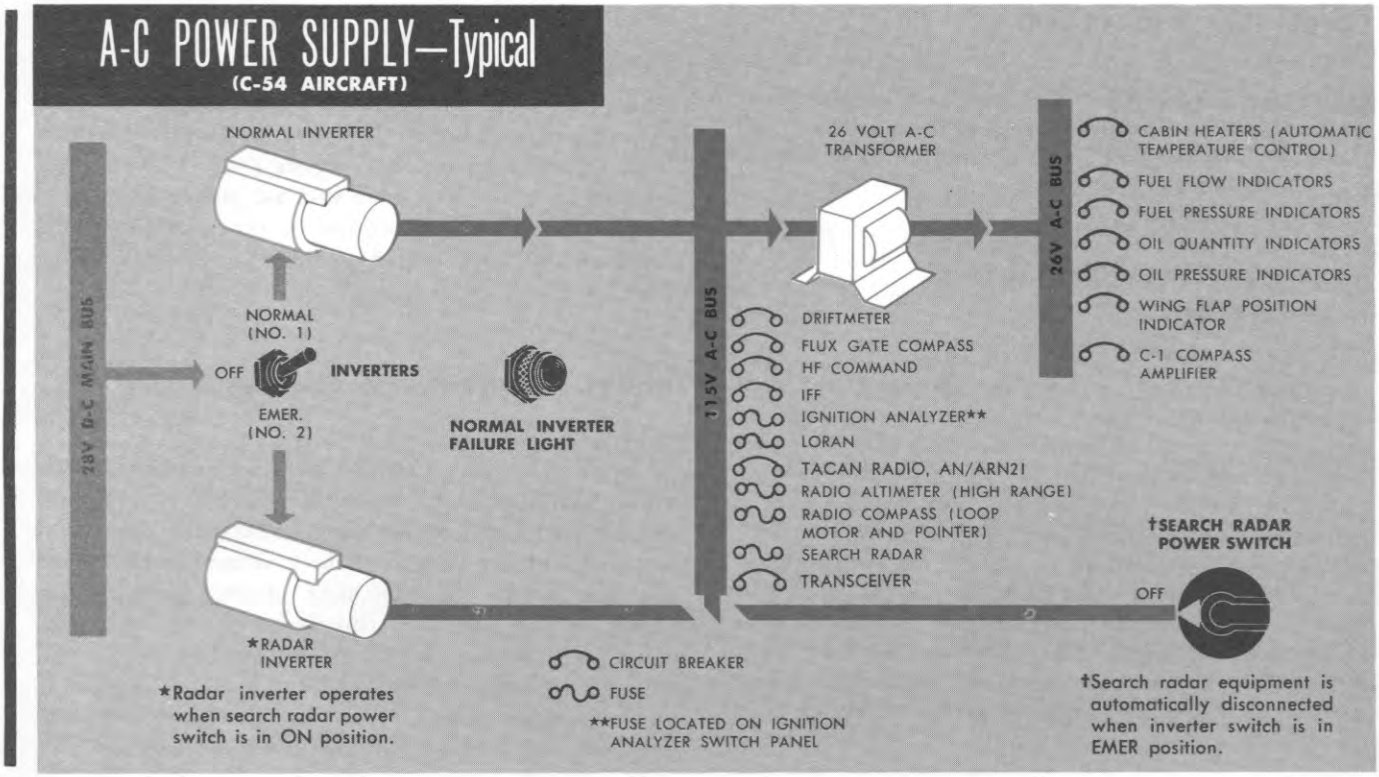

Figure 1-25

INVERTER SELECTOR SWITCH (R5D 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 a-c bus when the a-c 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.

A-C POWER SWITCH (R5D AIRCRAFT).

A 2-position a-c power switch, with the placarded positions ON and OFF, is located on the electrical control panel *(figure 1-16)*. Placing the switch in the ON position closes a 28-volt d-c circuit to connect the inverter selected on the inverter selector switch to the a-c 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 a-c power switch energizes the normal inverter regardless of the inverter selector switch position.

RADAR POWER SWITCH (R5D 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 d-c circuit to the radar power inverter.

RADIO INVERTER SWITCH (R5D AIRCRAFT).

A 2-position radio inverter switch, located adjacent to the cabin heater control panel on the main junction box *(figure 4-4)*, has ON and OFF positions. When the switch is in the ON position, a 28-volt d-c circuit is completed to energize the radio inverter.

HYDRAULIC POWER SUPPLY SYSTEM.

The hydraulic power supply system *(figures 1-32 and 1-33)* operates the retractable landing gear, the wheel brakes, the nosewheel steering system, the wing flaps, cowl flaps, carburetor air filter doors (if installed), and the windshield wipers. Pressure for the system is provided by two pumps, one mounted on each inboard engine. Some aircraft have a third engine-driven pump on engine No. 4. 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 and a system relief valve. Brake priority valves provide up to 1800-psi pressure priority to 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 5.5 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 1-40 for fluid specifications.

HYDRAULIC SYSTEM BYPASS VALVE HANDLE.

A hydraulic system bypass valve handle with positions DOWN (system operative) and UP (system bypass), is located on the floor of the cockpit. 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 1-34)* 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 1-34)* with CLOSED and OPEN positions, is located on the floor of the cockpit 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 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 *(5, figure 1-39)* 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.)

HYDRAULIC SYSTEM PRESSURE GAGE.

A direct-reading hydraulic system pressure gage 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 *(figures 1-32 and 1-33)*. 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 d-c hydraulic reservoir quantity indicator 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 (flying tab) for aerodynamic boost to reduce pilot forces.

RUDDER PEDALS.

The rudder is mechanically controlled by a duplicate set of adjustable rudder pedals *(12, figure 1-6 and 9, figure 1-12)* 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.

(Continued on Page 1-46)

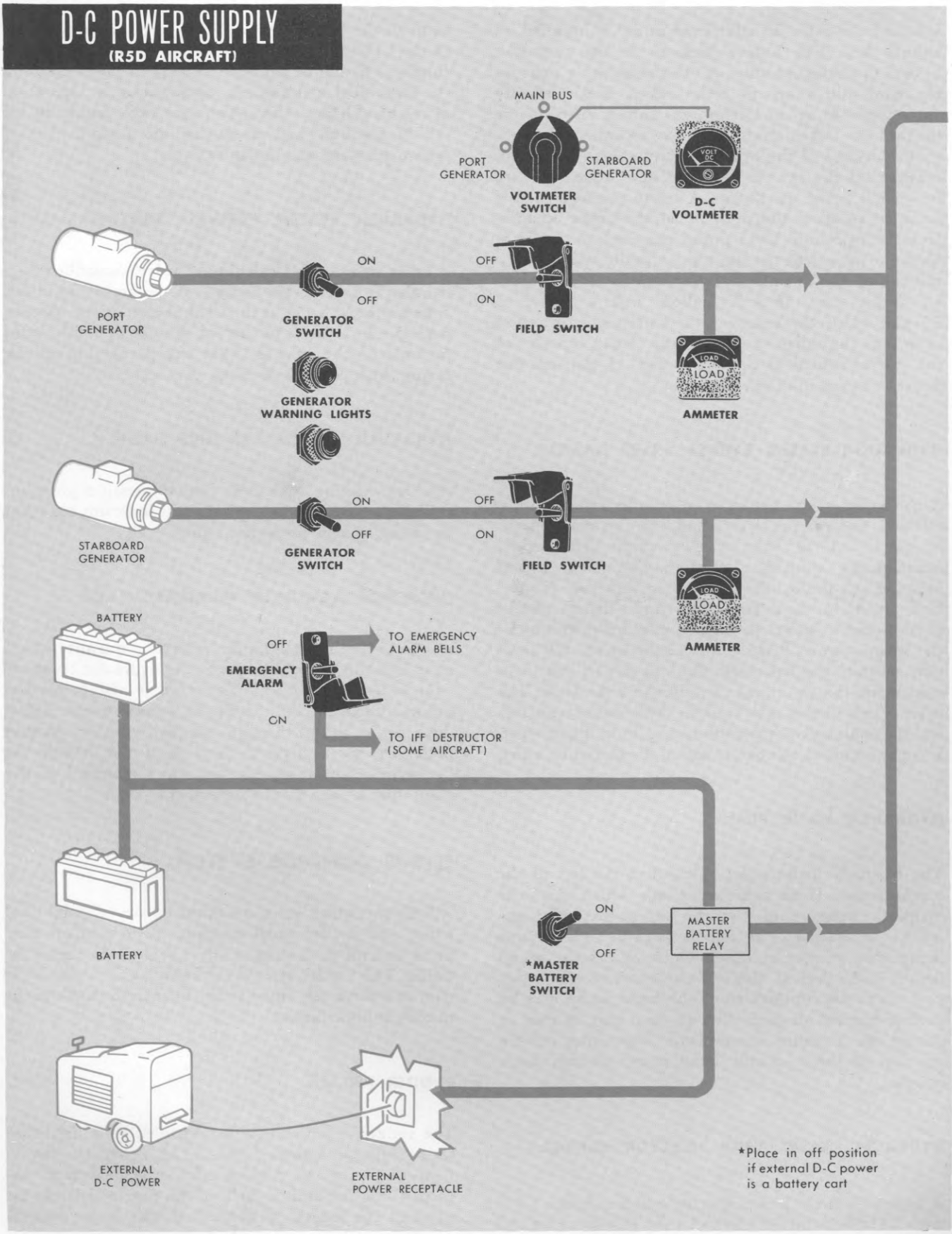

Figure 1-26 (Sheet 1 of 2)

Figure 1-26 (Sheet 2 of 2)

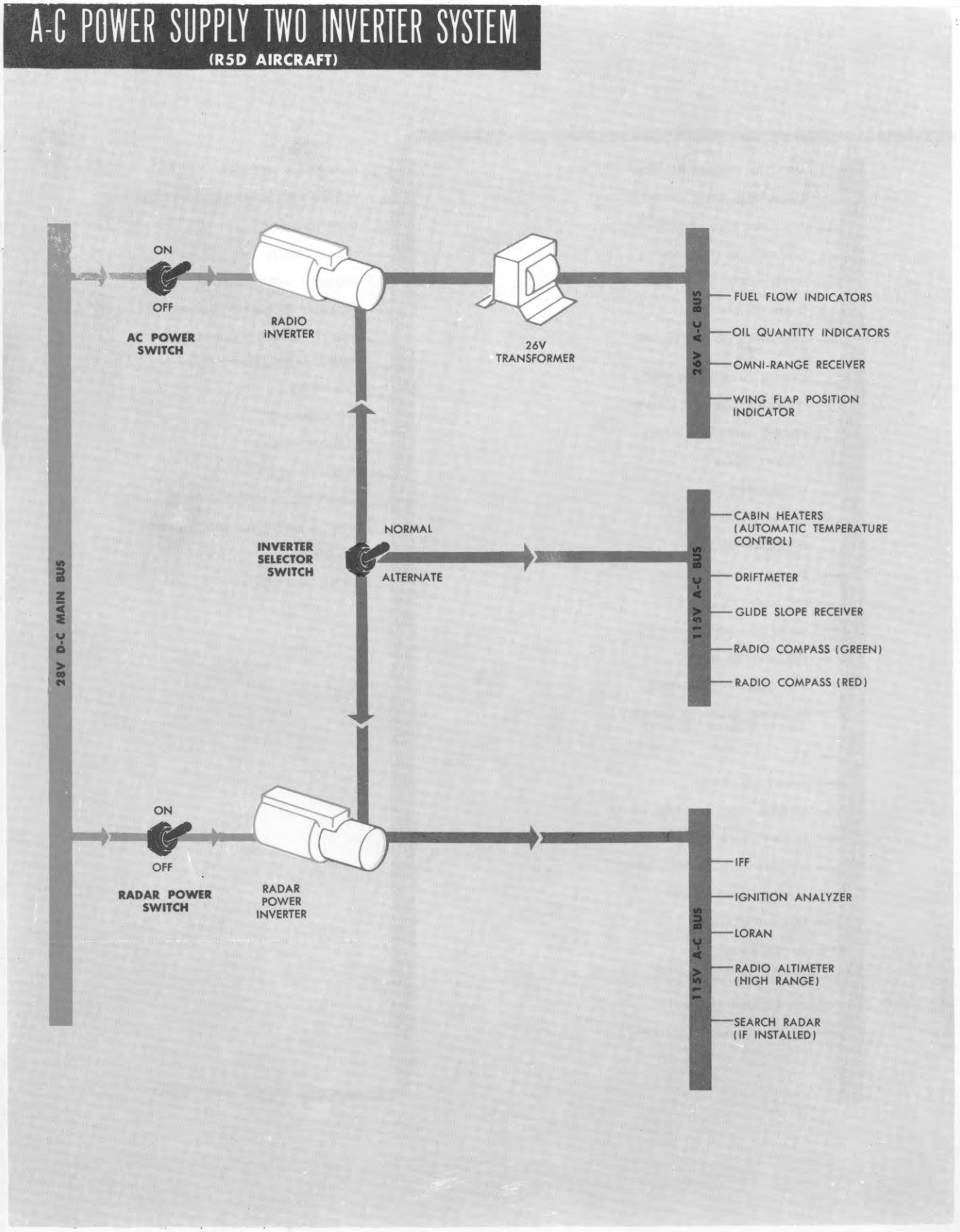
A-C POWER SUPPLY TWO INVERTER SYSTEM
(R5D AIRCRAFT)
28V D-C MAIN BUS
ON
OFF
AC POWER SWITCH
RADIO INVERTER
26V TRANSFORMER
26V A-C BUS
FUEL FLOW INDICATORS
OIL QUANTITY INDICATORS
OMNI-RANGE RECEIVER
WING FLAP POSITION INDICATOR
INVERTER SELECTOR SWITCH
NORMAL
ALTERNATE
115V A-C BUS
CABIN HEATERS (AUTOMATIC TEMPERATURE CONTROL)
DRIFTMETER
GLIDE SLOPE RECEIVER
RADIO COMPASS (GREEN)
RADIO COMPASS (RED)
ON
OFF
RADAR POWER SWITCH
RADAR POWER INVERTER
115V A-C BUS
IFF
IGNITION ANALYZER
LORAN
RADIO ALTIMETER (HIGH RANGE)
SEARCH RADAR (IF INSTALLED)
29,955

Figure 1-27