FLIGHT MANUAL

USAF SERIES

C-118A AND VC-118A

AIRCRAFT

AF 09(603)-67-C-0515
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R. Sullivan
9 August 1975

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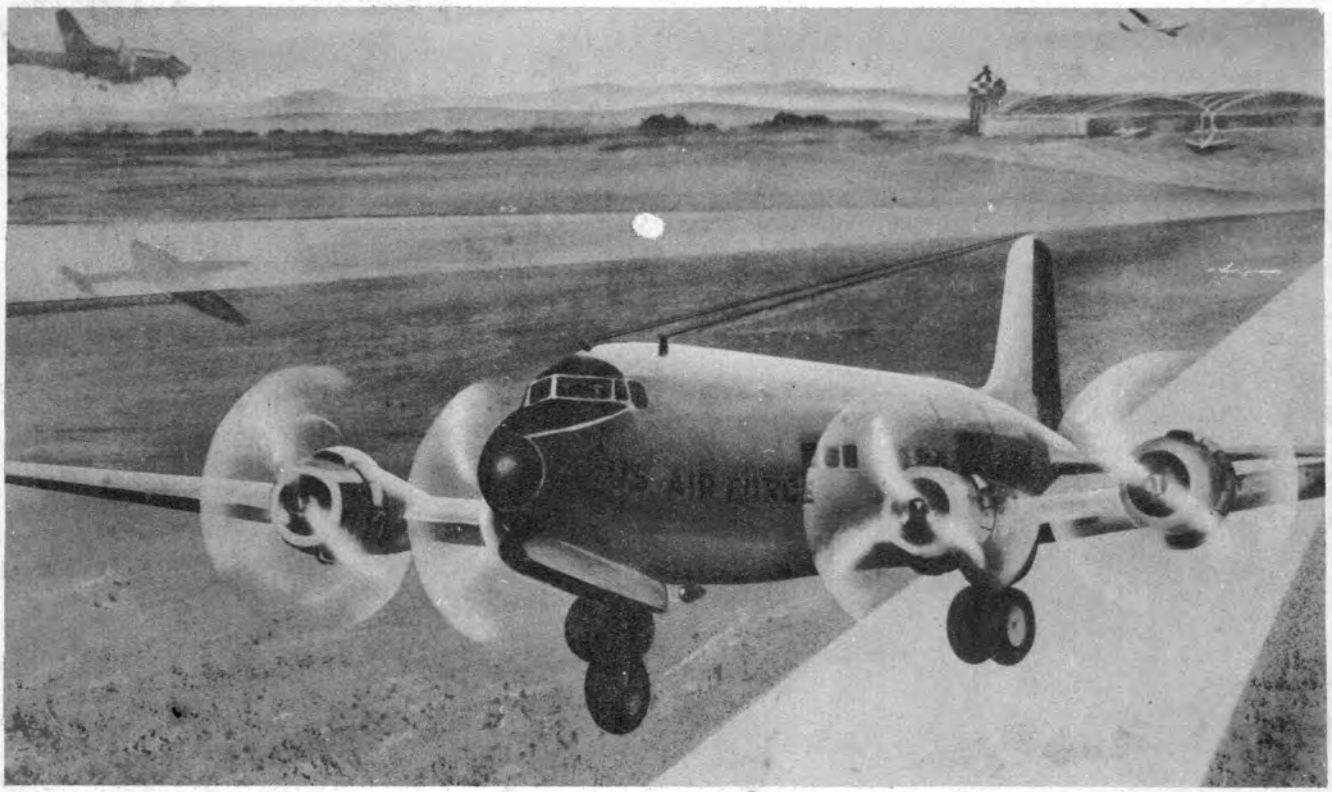

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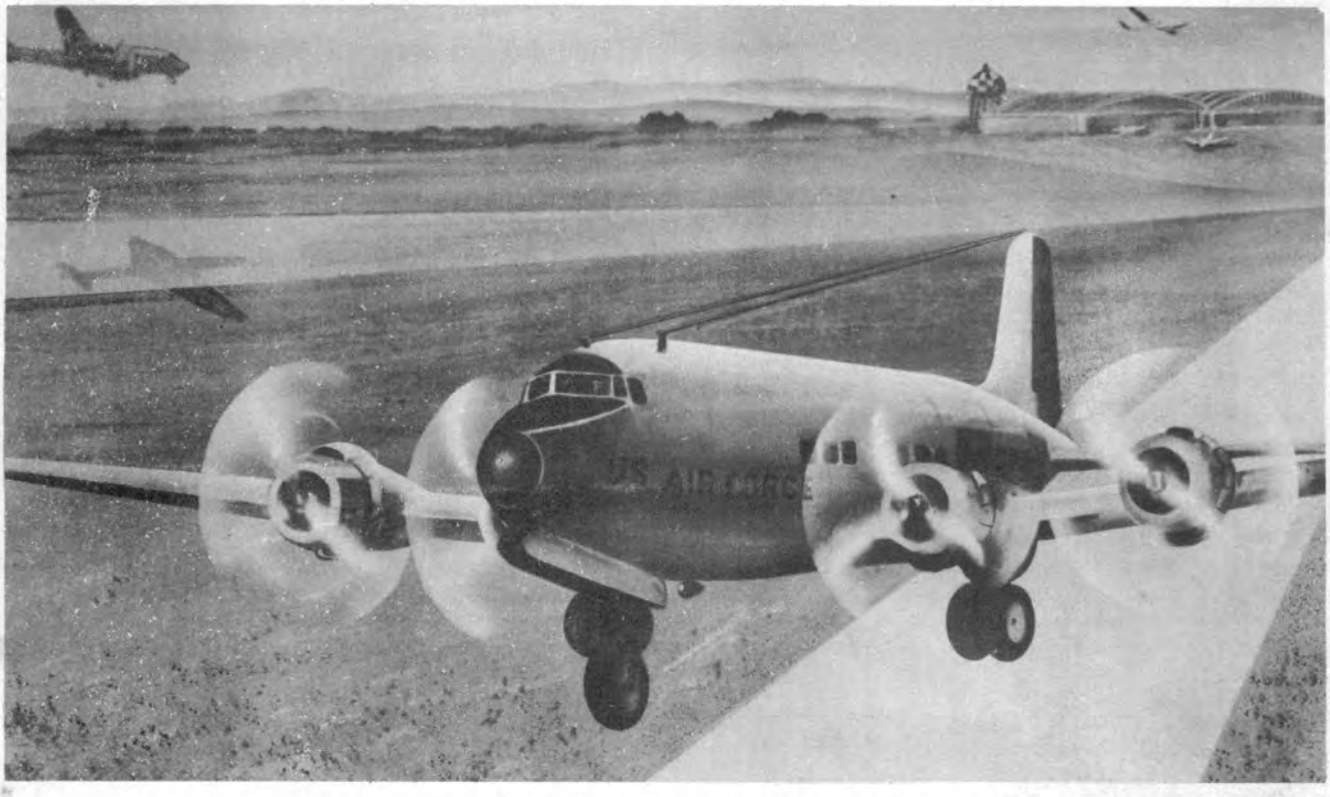

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FLIGHT MANUAL

USAF SERIES

C-118A AND VC-118A

AIRCRAFT

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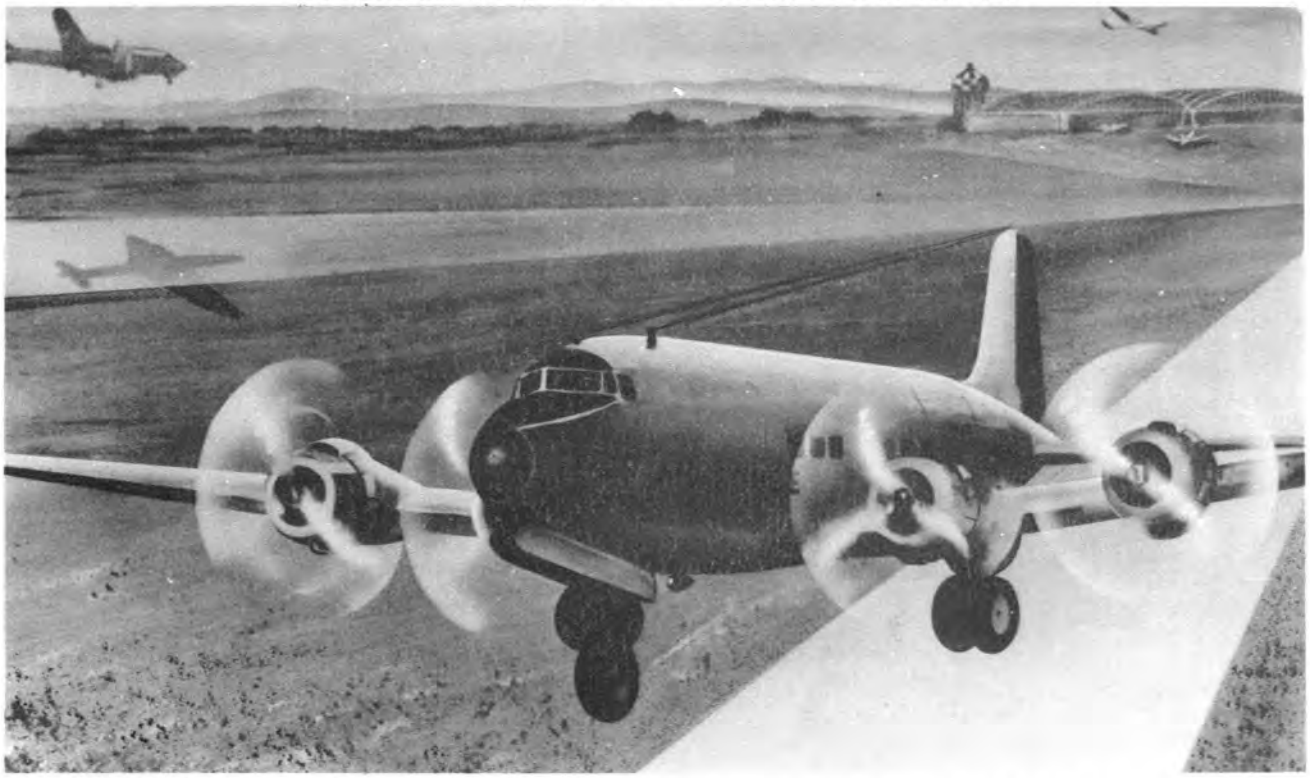

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Introduction

SCOPE. This manual contains instructions that will provide you with a general knowledge of the aircraft, its characteristics, and specific normal and emergency operating procedures. Your flying experience is recognized; therefore, basic flight principles are avoided. It provides the most acceptable operating instructions under most circumstances; however, conditions existing in multiple emergencies, adverse weather, terrain, or attenuating circumstances may require modification of any procedure(s).

PERMISSIBLE OPERATIONS. The Flight Manual takes a "positive approach" and normally states only what you can do. Unusual operations or configurations (such as assymmetrical loading) are prohibited unless specifically covered herein. Clearance must be obtained from the Flight Manual Manager (Warner Robins Air Materiel Area, Robins AFB, Georgia/ ATTN: MMEA) before any questionable operation which is not specifically permitted in this manual is attempted.

HOW TO BE ASSURED OF HAVING LATEST DATA. Refer to T.O. 0-1-1-3 which lists all current Flight Manuals, Safety Supplements, Operational Supplements, and Checklists. Its frequency of issue assures an accurate and up-to-date listing of these publications.

STANDARDIZATION AND ARRANGEMENT. Standardization assures that the scope and arrangement of all Flight Manuals are identical. The manual is divided into nine fairly independent sections to simplify reading it straight through or using it as a reference manual. Performance data is contained in T.O. 1C-118A-1-1.

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. Operational 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" preceeding the number. Operational supplement numbers are preceded by a single "S".

CHECKLISTS. The Flight Manual contains only amplified checklists; flight crew and scroll 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 with respect to arrangement and item numbers.

HOW TO GET PERSONAL COPIES. Each flight crewmember is entitled to personal copies of the Flight Manual, Safety and Operational Supplements, and Checklists. The required quantities should be ordered before you need them to assure their prompt receipt. Check with your supply personnel. It is their 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. Looseleaf 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 I). Binders are also available for carrying your checklist. These binders contain plastic envelopes into which individual checklist pages are inserted. They are available in three capacities and are obtained through normal Air Force supply under the following stock list numbers: 7510-766-4269 and 4270, 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 it is considered essential to emphasize.

DEFINITIONS. The following definitions apply to the words indicated. The words "shall" or "will" are to indicate a mandatory requirement. The word "should" indicates a nonmandatory desire or preferred method of accomplishment. The word "may" indicates an acceptable or suggested means of accomplishment.

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 welcomed. These should be submitted in accordance with AFR 60-9 and forwarded through your Command Headquarters to Warner Robins Air Logistic Center, Robins AFB, Georgia, 31098 (ATTN: MMEAP).

THE AIRCRAFT

C-118A

Figure 1-1

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description

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THE AIRCRAFT.

The C-118A and VC-118A aircraft, manufactured by Douglas Aircraft Company, Inc., are long-range, low-wing monoplanes, each equipped with a fully retractable tricycle landing gear and a pressurized cabin, and are designed for use as diversified cargo, personnel, ambulance, or staff transports (figures 1-1 through 1-4). The VC-118A aircraft are used as staff transports only.

AIRCRAFT DIMENSIONS.

The principal dimensions of the aircraft are:

Span . . . . . 117 feet 6 inches

Length (overall) . . . . . 106 feet 10 inches

Height . . . . . 28 feet 8 inches

Height (with anticollision light) . . . . . 29 feet 1 inch

Stabilizer span . . . . . 46 feet 6 inches

For turning radius and ground clearances, refer to Section II.

AIRCRAFT GROSS WEIGHT.

The aircraft design gross weight is 107,000 pounds. For complete weight information, see Section V.

INTERIOR ARRANGEMENT.

The aircraft is designed for carrying various loads; i.e., 79 troops when used as a personnel transport, 60 litter patients with provisions for 7 medical attendants when used as an ambulance transport, or cargo when used as a cargo transport.

NOTE

Not all the equipment configurations of various groups of aircraft numbers will be correct due to local, contract, and depot modifications. The majority of the aircraft are continuously being modified with new equipment to keep the operation as modern as possible.

FLIGHT CREW.

On C-118A aircraft, accommodations are provided for a crew of five members: pilot, copilot, flight

mechanic, radio operator, and navigator (figures 1-2 and 1-3), except on some aircraft which have no provisions for a radio operator.

ENGINE.

The aircraft is powered by four 18-cylinder, twin-row, air-cooled Pratt & Whitney R-2800-52W engines. Each engine is equipped with a single-stage, two-speed supercharger; a metering injection carburetor; a direct cranking starter; and an ADI (water injection) system.

THROTTLES.

The two banks of four throttles on the control pedestal (figure 1-6) are equipped with a friction-type throttle lock lever and are operated conventionally. In addition to conventional operation, the throttles also serve to control propeller reversing. The throttles have a range through the following positions:

OPEN	(Normal full throttle)
CLOSE	(Normal closed throttle)
REVERSE	(Entrance to propeller reverse thrust range of operation)
OPEN	(Open throttle for braking purposes)

The throttles are mechanically restrained by the control-surface lock (figure 1-23) through an interlock system, which prevents the application of maximum power to all four engines with the surface lock engaged. With the interlock engaged, both engines on one side, or both outboard engines, can be run up together; the other two throttles being limited to approximately 1700 rpm.

NOTE

On some aircraft , with the interlock engaged, both outboard or both inboard engines can be run up together; the other two throttles being limited to approximately 1700 rpm.

The propellers can be placed in reverse thrust for braking purposes on the ground by pulling the throttles aft of the CLOSE position.

WARNING

Propeller reversing during flight is prohibited.

A reverse throttle lock release bar, located on the control pedestal above the propeller control panel, prevents the throttles from moving into the reverse range unless the four throttles are in the CLOSE position and the reverse throttle lock release bar is pulled aft to the released position (figure 1-6).

NOTE

The throttle of any inoperative engine must be placed in either the full OPEN or full CLOSE position before the reverse throttle lock release bar can be actuated (figure 3-3).

The throttles may be moved past the detent into the reverse range and then further aft to apply reverse thrust power as required. After the reversing operation is completed, the reverse throttle lock release bar will automatically return to the forward or locked position when one or more throttles are advanced to the forward thrust idling position. Four amber propeller reverse indicator lights, one for each propeller, are installed on the propeller control panel (figure 1-6). When the blades of a propeller move to minus three (-3) degrees reverse pitch, a switch on the No. 2 cam is actuated, which closes a 28-vdc circuit and illuminates the respective indicator light. When the throttle is moved toward the forward thrust range and the blades of the propellers return to within 2 degrees of forward thrust, the indicator light will go out.

MIXTURE CONTROL LEVERS.

Four mixture control levers are located on the aft face of the control pedestal (figure 1-6) and are equipped with a friction-type lock lever. The levers have the placarded positions IDLE CUTOFF, AUTO LEAN, and AUTO RICH. In addition, some aircraft are equipped with a stop just above the IDLE CUTOFF position. This stop prevents inadvertent movement of the mixture controls to IDLE CUTOFF when the autopilot servos are manipulated.

COWL FLAP SWITCHES.

Four four-position cowl flap switches are mounted on the aft overhead panel (figure 1-10) and have the following placarded positions: POSITIONING, OFF, OPEN, and CLOSE. When in POSITIONING, the switch permits the cowl flap rheostats to function; when in OFF, the cowl flap door actuators are deenergized; and when in OPEN or CLOSE, the cowl flaps will move in the respective direction until the limit of travel is reached or until the switch is turned to OFF. The switches are spring loaded in the OPEN and CLOSE positions but hold in OFF and POSITIONING positions.

COWL FLAP RHEOSTATS.

Four cowl flap rheostats, mounted on the upper instrument panel (figure 1-9), provide a means of choosing various preset cowl flap positions (from -4

to +22 degrees). Each rheostat is calibrated in degrees between the OPEN and CLOSE positions. The cowl flap switches must be set to POSITIONING before the cowl flap remote control rheostats will function. The recommended cowl flap position for takeoff is plus three (+3) degrees and positioned as required for climb, cruise, descent, and approach.

CARBURETOR AIR CONTROL LEVERS.

Four mechanical carburetor air control levers (figure 1-6) are mounted on the right side of the control pedestal. The indicated positions are HOT and COLD, with intermediate positions available. A thumb latch lock is provided on each control lever to lock the controls in position.

ENGINE SUPERCHARGER SWITCHES.

Four two-position supercharger switches are mounted on the upper instrument panel (figure 1-9). The two positions are LOW for low blower ratio and HIGH for high-blower ratio.

ADI (WATER INJECTION) SYSTEM.

The antidetonation (water injection) system provides for an increase in engine maximum power. The injection of water serves as a detonation suppressant, allowing engine operation with best power mixture when operating in excess of the dry limits. The tendency to detonate is normally suppressed by enriching the mixture beyond best power and using the excess fuel for cooling. The volume of water injected replaces the volume of fuel normally used as a coolant. The fluid supply is carried in four tanks, one for each engine (figure 1-29).

Each outboard tank has a usable capacity of 9.4 gallons, and each inboard tank has a usable capacity of 10.24 gallons. The supply is adequate for approximately 5 minutes operation at maximum power.

ADI (Water Injection) System Switches.

Four ADI (water injection) system switches, one for each engine, are located on the aft overhead panel (figure 1-10) and have placarded positions ON and OFF. The switches close the 28 vdc ADI pump electrical circuits, energizing the pumps when the respective engine oil pressure switch is closed. The oil pressure switch will not permit the pump to operate when engine oil pressure is below 25 psi.

ADI (Water Injection) System Quantity Indicators.

Two dual ADI system quantity indicators, mounted on the upper instrument panel (figure 1-9), are energized by 28 vdc and indicate water-alcohol supply in US gallons.

IGNITION SWITCHES.

Four conventionally operated ignition switches, located on the forward overhead panel (figure 1-11), have placarded positions OFF, RIGHT, LEFT, and BOTH.

STARTING SYSTEM.

Engine Selector Switch.

Each engine is individually selected for starting by means of a selector switch on the forward overhead panel (figure 1-11). The switch must be set to the engine being started before the starter or priming switch will function for that engine.

Primer.

A spring-loaded priming switch is mounted on the forward overhead panel (figure 1-11). The priming switch will function in any position of the engine selector switch, except the OFF position. The priming system functions as an aid in starting the engines by injecting fuel into the engine blower case throat. On a normal engine start, it is necessary to operate the fuel booster pumps in LOW during priming to supply adequate fuel pressure.

Ignition Booster Switch.

A spring-loaded booster switch, mounted on the forward overhead panel (figure 1-11), provides additional electric boost to the distributor (R-1 ignition circuit) for engine starting only.

Starter and Starter Safety Switches.

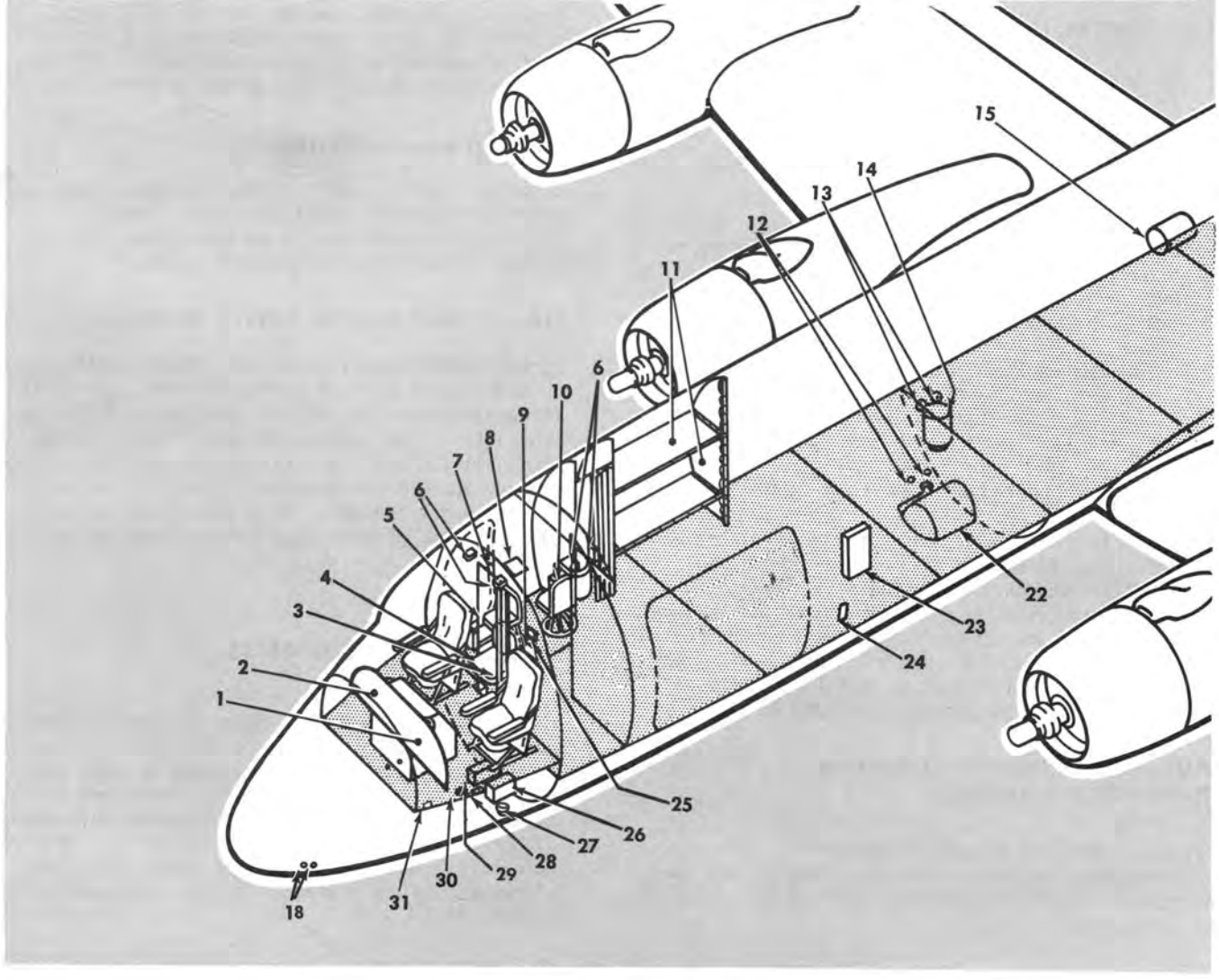
Spring-loaded starter and starter safety switches are mounted on the forward overhead panel (figure 1-11). The engine selector switch must be set to the engine being started, and the engine safety switch and the starter switch must be depressed simultaneously before the starter will function. This is true for any position of the engine selector switch, except the OFF position, whether or not the engines are running.

ENGINE INSTRUMENTS.

All engine instruments are dual indicating with the exception of the BMEP indicators. Two direct-reading dual manifold pressure gages on the main instrument panel indicate the pressure in inches Hg in each engine intake manifold. Two dual carburetor air temperature indicators, two dual oil temperature indicators, and two dual cylinder head temperature indicators, all calibrated in degrees centigrade, are mounted on the main instrument panel. Two dual oil

GENERAL ARRANGEMENT

1. PILOT'S STATION
2. COPILOT'S STATION
3. COCKPIT ANTIGLARE CURTAIN
4. FLIGHT MECHANIC'S STATION
5. NAVIGATOR'S SEAT
6. UTILITY POWER OUTLETS (5)
7. AIRCRAFT IDENTIFICATION PLATE
8. ASTRODOME COVER
9. SPARE LIGHT BULB CASE
10. RADIO OPERATOR'S SEAT (SOME AIRCRAFT)
11. RELIEF CREW'S QUARTERS
12. CO2 DISCHARGE INDICATOR DISCS — D-2 APU INSTALLATION (SOME AIRCRAFT)
13. MAIN HYDRAULIC PRESSURE ACCUMULATORS (2)
14. HYDRAULIC RESERVOIR
15. ALCOHOL TANK
16. AUXILIARY POWER UNIT, GTP70-6 OR GTP70-9 (SOME AIRCRAFT)
17. CO_2 DISCHARGE INDICATOR DISCS, GTP70-6 OR -9 (SOME AIRCRAFT)
18. CO_2 DISCHARGE INDICATOR DISCS
19. AFT CABIN WATER SUPPLY (2)
20. POWER RECEPTACLE
21. MISCELLANEOUS EQUIPMENT STOWAGE CONTAINER
22. AUXILIARY POWER UNIT, D-2 (SOME AIRCRAFT)
23. FORWARD CABIN WATER SUPPLY
24. POWER RECEPTACLE
25. LANDING GEAR WARNING HORN
26. LEFT BATTERY INSTALLATION
27. NOSE STEERING PRESSURE ACCUMULATOR
28. EXTERNAL POWER RECEPTACLE
29. RIGHT BATTERY INSTALLATION
30. PITOT (LEFT SIDE SHOWN)
31. STATIC PORT VENT (LEFT SIDE SHOWN)



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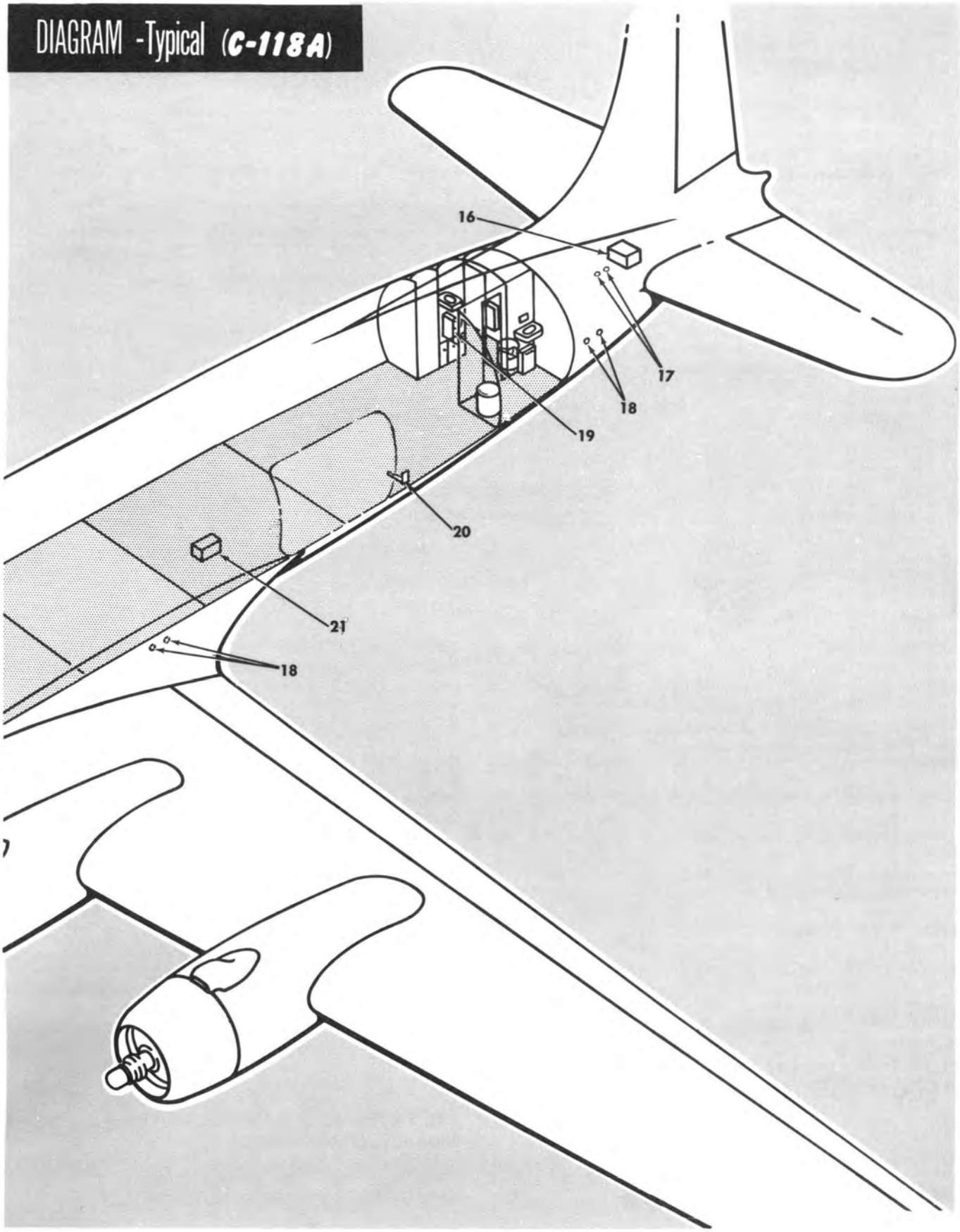

Figure 1-2 (Sheet 2 of 2)

PRESSURIZED AREAS

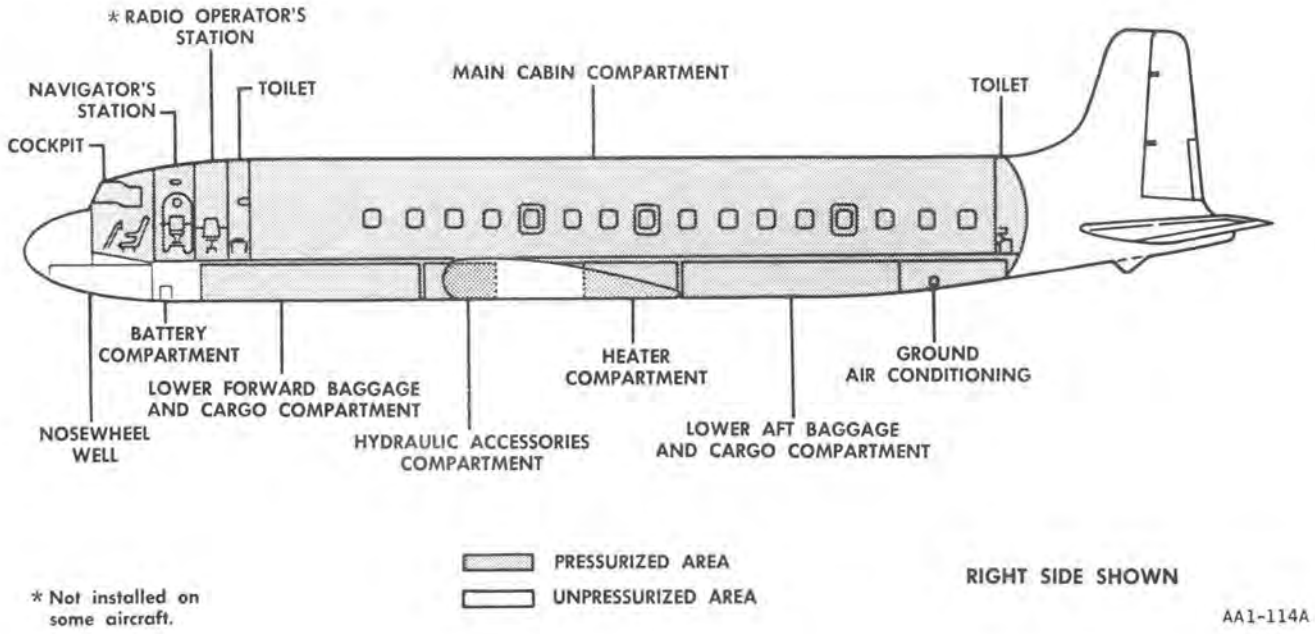

Figure 1-3

pressure indicators on the main instrument panel indicate in pounds per square inch (oil pressure is taken from the pressure side of each engine-driven pump). Four BMEP indicators are installed on the main instrument panel and indicate in pounds per square inch of bmep (torque pressure), a direct measure of the power being supplied to the propeller.

FUEL PRESSURE INDICATORS.

Two dual-indicating fuel pressure indicators, calibrated in pounds per square inch (0 to 35 psi) and operating at 26 vac, are installed on the main instrument panel (figures 1-7 and 1-8).

FUEL FLOWMETERS.

Two dual-indicating fuel flowmeters (figures 1-7 and 1-8), located in the center of the main instrument panel, are energized by 26 vac. Each indicator is calibrated in pounds per hour from 100 to 2000 pph.

FUEL PRESSURE WARNING LIGHT AND ISOLATION SWITCHES.

A red push-to-test fuel pressure warning light (figures 1-7 and 1-8), installed on the main instrument panel, will come on when the fuel pressure of any engine drops below approximately 18 psi.

On some aircraft, four fuel and oil pressure warning light isolation switches (figures 1-7 and 1-8) are located on the lower right section of the main instrument panel. Each isolation switch is safetied in the ON position; when the switch is placed in the OFF position, the circuit from the respective engine is deenergized and the lights will go out, permitting the fuel and oil pressure warning lights to function with one or more engines inoperative. The warning lights are energized by 28 vdc.

OIL PRESSURE INDICATORS.

Two dual-indicating oil pressure indicators (figures 1-7 and 1-8), located in the center of the main instrument panel, are energized by 26 vac. Each indicator is calibrated from 0 to 200 psi.

OIL TEMPERATURE INDICATORS.

Two dual-indicating oil temperature indicators (figures 1-7 and 1-8), located in the center of the main instrument panel, are energized by 28 vdc. Each indicator is calibrated from -70 to +150° C.

OIL PRESSURE WARNING LIGHT AND ISOLATION SWITCHES.

One push-to-test red oil pressure warning light is installed on the main instrument panel (figures 1-7

and 1-8) and comes on when the oil pressure of any engine drops below 50 (±5) psi. The oil pressure warning light and isolation switches are energized by 28 vdc.

On some aircraft, four fuel and oil pressure warning isolation switches (figures 1-7 and 1-8) are located on the lower right section of the main instrument panel. Each isolation switch is safetied in the ON position; when the switch is placed in the OFF position, the circuit from the respective engine is deenergized and the lights will go out, permitting the fuel and oil pressure warning lights to function with one or more engines inoperative.

TACHOMETERS.

Two self-energized, dual-indicating tachometers (figures 1-7 and 1-8) are installed in the center of the main instrument panel. Each tachometer is calibrated in rpm from 0 to 4500.

MANIFOLD PRESSURE GAGES.

Two direct-reading, dual-indicating manifold pressure gages, one for engines No. 1 and 2 and the other for engines No. 3 and 4 (figures 1-7 and 1-8), are installed in the center of the main instrument panel. Each gage is calibrated in inches Hg from 10 to 75.

MANIFOLD PRESSURE PURGE VALVES.

Four push-type purge valves are mounted below the left center section of the main instrument panel for use in purging or clearing the indicator supply lines of condensation.

BMEP INDICATORS.

Four BMEP indicators (figures 1-7 and 1-8), one for each engine, are located in the center of the main instrument panel and are energized by 26 vac. Each BMEP indicator is calibrated from 60 to 254 in psi of brake mean effective pressure.

CYLINDER HEAD TEMPERATURE INDICATORS.

Two dual-indicating cylinder head temperature indicators (figures 1-7 and 1-8), located in the center of the main instrument panel, are energized by 28 vdc. Each indicator is calibrated in degrees centigrade from -50 to +300.

CARBURETOR AIR TEMPERATURE INDICATORS.

Two dual-indicating carburetor air temperature indicators (figures 1-7 and 1-8), located in the center of the main instrument panel, are energized by 28 vdc. Each indicator is calibrated in degrees centigrade from -70 to +150.

ADI SYSTEM PRESSURE INDICATORS.

Two dual-indicating ADI (water) system pressure indicators (figures 1-7 and 1-8), located in the center of the main instrument panel, are energized by 26 vac. Each indicator is calibrated in psi from 0 to 35 and registers the ADI system pressure to its respective engine.

NOTE

Gage readings from 8 to 12 psi are normal when the ADI is turned OFF. A rapid indicated pressure drop to zero when the system is turned OFF indicates that leakage exists within the system.

ADI (Water Injection) System Pressure Warning Lights.

Four ADI system red pressure warning lights, one for each engine, located on the main instrument panel (figures 1-7 and 1-8), come on when water pressure is below the allowable limits of 18 psi. The lights are operated by the water pressure switches at 28 vdc.

PROPELLERS.

Each engine is equipped with a three-bladed, full-feathering, reversible-pitch, constant-speed-type propeller. Constant engine rpm can be maintained automatically or manually through changes in propeller blade angles. All four propellers are maintained in automatic synchronization by an electrical synchronizer system. The pilot is provided with a master synchronizing control and four manual selector switch controls. The controls consist of four individual selector switches, a master engine selector switch, a master rpm control lever, a resynchronizing switch, and four feathering buttons. The reversing switches are throttle controlled.

OVERSPEED PITCH LOCK.

Some aircraft are equipped with Model 43E80-535 propellers incorporating a hydraulic overspeed pitch lock. The pitch lock mechanism will cause a hydraulic lock in a runaway propeller within the 3000 to 3100 rpm range. A "locked-out" propeller can be considered a fixed pitch propeller and rpm can be controlled by throttle movement. Therefore, some positive thrust can be obtained from a runaway propeller during takeoff.

PROPELLER SELECTOR SWITCHES AND INDICATOR LIGHTS.

Four spring-loaded, three-position selector switches are mounted on the propeller control panel (figure 1-6). The INC and DEC positions provide speed

variation for any engine independently of the others with the system in either manual or automatic control. The center position is the OFF position.

NOTE

A blue indicator light, adjacent to each selector switch, illuminates when the corresponding propeller governor has reached its high or low rpm limit. A corresponding amber light illuminates when the respective propeller has reached the -3-degree blade angle (reverse pitch).

MASTER ENGINE SELECTOR SWITCH.

A three-position master engine selector switch, mounted on the propeller control panel (figure 1-6), provides a means of selecting either the No. 2 or No. 3 engine to serve as the master engine to which the remaining engines are slaved. The MANUAL position permits manual control of the propeller system. When the selector switch is in MANUAL position, the master rpm control lever is inoperative; and, therefore, automatic synchronization is also inoperative.

PROPELLER MASTER RPM CONTROL LEVER.

A master rpm control lever is installed on the control pedestal (figure 1-6) and serves to vary the rpm of all four engines simultaneously. The lever has full quadrant range, from INCREASE RPM to DECREASE RPM, with intermediate positions of master rpm selection available. In the full INCREASE RPM position, the synchronizer system is inoperative, allowing each engine to seek its maximum rpm. In automatic, if a selector switch is used to change the speed of a slave engine more than ±3 percent, the master engine will not pull the slave engine back into synchronization.

RESYNCHRONIZING BUTTON.

A resynchronizing button, mounted on the propeller control panel (figure 1-6), serves to synchronize the system without overshooting when one or more engines are out of synchronization with the master engine. Depressing the button allows each engine to progress approximately 3 percent toward the master engine speed each time the button is depressed and released. Wait 10 seconds for stabilization.

PROPELLER FEATHERING BUTTONS.

Four guarded push-pull-type propeller feathering buttons, one for each propeller, are mounted on the forward overhead panel (figure 1-11). When the desired feathering button is depressed to feather the selected propeller, a 28 vdc circuit is closed to energize the feathering pump motor. An electrical holding coil holds the feathering button in until the propeller is full feathered. The feathering button returns to normal position 12 to 15 seconds after being depressed.

NOTE

If the feathering button does not return to the normal (center) position, the button should be pulled out to normal position.

The feathering operation may be interrupted by pulling the feathering button to the center position. This allows propeller rpm to return to the previous control setting. When the feathering button is pulled full out to unfeather the propeller, it must be manually held out no longer than 2 seconds and then released. This procedure must be repeated until the tachometer indicates 600 rpm. For emergency operation, refer to Section III.

TACHOMETERS AND ISOLATION SWITCHES.

Two dual-indicating tachometers (figure 1-7), on the main instrument panel, calibrated in increments of 100, indicate engine rpm. Two isolation switches, placarded ON-DISCONNECT and ganged together, are mounted on the bulkhead aft of the pilot's seat (figure 1-5 sheet 1, and sheet 3). The switches are used to isolate the propeller synchronizer from the system in event of synchronizer or tachometer generator malfunctioning.

OIL SYSTEM.

An independent oil system is provided for each engine. Oil is supplied to the engine from an oil tank, with a usable capacity of 35 gallons, through an oil tank shutoff valve, and is returned to the tank through a free-flow type oil cooler. An auxiliary oil tank, with a usable capacity of 26 gallons of diluted oil, is installed for transferring oil to the engine oil tanks. Oil cannot be transferred without being diluted at temperatures below 2.0°C, OAT. An oil dilution system also is provided for dilution of oil when a cold weather start is anticipated. For oil grade and specification, see figure 1-26.

OIL QUANTITY INDICATORS.

Five engine oil quantity indicators, one for each engine, and one auxiliary oil quantity indicator (calibration in pounds) are located on the upper instrument panel (figure 1-9). The indicators are energized by 115 vac.

OIL COOLER AIR EXIT DOOR SWITCHES.

Each oil cooler is electrically controlled, either automatically or manually, by a four-position switch on the aft overhead panel (figure 1-10). The switches are normally placed in the AUTOMATIC position, which provides automatic compensation for oil temperature variations to maintain a constant temperature level. The doors may be opened or closed to manually control the temperature level by momentarily holding the respective switch in the OPEN or CLOSE position, repeating the operation until the desired temperature is attained. The switches have the following range of positions:

AUTOMATIC		(Automatic operation)
OFF		(Oil cooler air exit door actuator inoperative)
OPEN	CLOSE	(Manual operation)

NOTE

Approximately 20 seconds are required for the doors to travel through their full range from OPEN to CLOSE during flight.

OIL DILUTION SWITCHES.

Four spring-loaded oil dilution switches are installed on the aft overhead panel (figure 1-10).

OIL SYSTEM EMERGENCY SHUTOFF VALVE.

A mechanically actuated shutoff valve, controlled from the cockpit by means of the fire selector handle (figure 1-28), is installed at each engine section oil tank to shut off the flow of oil. Refer to Emergency Equipment in this section for detailed information concerning emergency shutoff valve handles.

AUXILIARY OIL TANK SELECTOR VALVE SWITCH.

A five-position auxiliary tank selector valve switch, located on the aft overhead panel (figure 1-10), directs auxiliary oil to any of the four engine nacelle oil tanks. The OFF position shuts off all oil flow from the auxiliary tank.

AUXILIARY OIL TANK PUMP SWITCH.

An auxiliary oil tank pump switch, located on the aft overhead panel (figure 1-10), has placarded positions ON and REVERSE and is spring loaded to off. The switch should be held in the REVERSE position for approximately 1 minute after transferring oil to an engine nacelle oil tank in order to purge the line and prevent stoppage resulting from congealed oil. The auxiliary oil tank selector valve switch must be positioned to an engine nacelle oil tank before the pump will function.

FUEL SYSTEM.

The fuel system (figure 1-12) furnishes fuel for the engines, for oil dilution, for the auxiliary power unit, and for the combustion heaters. The system includes eight fuel tanks (four main and four alternate); eight electrically driven booster pumps; four engine-driven fuel pumps; four firewall shutoff valves; and the necessary fuel flow, pressure, and quantity indicators. The system provides an independent supply of fuel (a main and an alternate tank) for each engine. With the tanks interconnected by a crossfeed system, numerous tank-to-engine fuel flow combinations are possible (figure 7-2). Each tank is vented overboard and is suitable for aromatic fuel. A fuel dump system also is provided (figure 1-13). See figure 1-29 for fuel grade and filler points and figure 7-3 for fuel quantity.

FUEL QUANTITY INDICATORS.

Eight fuel quantity indicators, energized by 115 vac power, one for each tank, and a fuel quantity totalizer are installed on the upper instrument panel (figure 1-9). Fuel quantity is registered by a capacitor indicating system in each tank. Since capacitor systems automatically compensate for fuel density changes, the weight in pounds, rather than the volume of the fuel, is indicated. A fuel quantity totalizer is mounted on the upper instrument panel.

NOTE

Malfunction or error in any of the eight fuel quantity indicators will reflect an equal error in the fuel quantity totalizer.

FUEL SELECTOR LEVERS.

Four fuel selector levers are located on the forward face of the control pedestal (figure 1-6). Each lever has the following positions:

MAIN AND ALTERNATE FUEL SELECTOR LEVERS.

MAIN ON	(Main tank supplying respective engine)
ALT ON	(Alternate tank supplying respective engine)
OFF	