

### EXTERNAL POWER SELECTOR SWITCH

The external power selector switch (figure 1-22), located on the direct-current power control panel, has PLANE BATTERY and EXTERNAL positions. Before an external power source can supply power to the main distribution bus, the selector switch must be in the EXTERNAL position and the battery switch must be ON. If the switch is selected to PLANE BATTERY position while external power is plugged in, the aircraft's batteries supply power to the main distribution bus. If external power is disconnected when the battery switch is ON, the aircraft's batteries will be automatically connected to the bus by action of the changeover relay, regardless of the external power selector switch position.

### EXTERNAL-POWER-ON LIGHT

An amber external-power-on light (figure 1-22) is located adjacent to the external power selector switch on the direct-current power control panel. This light glows whenever external power is connected and the external power selector switch is in the EXTERNAL position. Power to operate the light is obtained from the external power source.

### EMERGENCY CUTOFF BAR.

A hinged emergency cutoff bar (figure 1-22) is provided on the direct-current power control panel to simultaneously trip the generator and battery switches to the OFF positions and the DC power switch and copilot's flight instrument power selector switch to the EMERG positions.

### DC VOLTMETER AND VOLTMETER SELECTOR SWITCH

A direct-current voltmeter (figure 1-22) is located on the direct-current power control panel. The voltage to be measured is selected by the direct-current voltmeter selector switch adjacent to the voltmeter. The switch positions

are OFF, LH GEN, RH GEN, and BUS. These positions produce voltage readings for the LH generator, RH generator or main DC distribution bus. The OFF position renders the voltmeter inoperative.

### AC Power Supply System

Two direct-current-operated 2500 VA, main inverters, and one 500 VA autopilot inverter are provided to supply single-phase, constant frequency, 115-volt alternating current for operation of radio equipment, flight and engine instruments, windshield anti-icing, and autopilot equipment. Also provided are two engine-driven, 100 VA alternators which supply emergency flight instrument power in the event of failure of both main inverters. The system incorporates phase adapters to convert single-phase to three-phase current for operation of certain flight instruments. Stepdown transformers are provided to supply 26-volt alternating current for operation of certain engine instruments, flight and navigation indicators. Refer to figure 1-24 for equipment operated by the alternating-current power supply system.

### INVERTER SELECTOR SWITCHES

The main inverters are controlled by the pilot's and copilot's inverter selector switches (figure 1-25), located on the overhead switch panel. Both selector switches are side-guarded and have #1 INV, #2 INV, and OFF positions. Each switch performs the dual function of turning on the selected inverter and of distributing inverter power output to specific circuits of the alternating-current system. (Refer to figure 1-24.) With the exception of full windshield anti-ice power, one main inverter can supply the needs of the entire alternating-current power supply system provided both switches are selected to the same (#1 INV or #2 INV) position. There is no

provision for automatic switchover when one inverter fails. Inverter control is also accomplished automatically by operation of the windshield anti-icing system controls when the increased loads of that system exceed the capacity of single inverter operation. Refer to Windshield Anti-Icing System, this Section for additional information.

#### INVERTER INOPERATIVE LIGHTS

Two red main inverter inoperative warning lights (figure 1-25) are located immediately above the pilot's and copilot's inverter selector switches on the overhead switch panel. The lights are powered by direct current from the main circuit breaker bus and illuminate when the corresponding inverter fails or is not operating.

#### AUTOPILOT INVERTER

The autopilot inverter is powered by direct current from the main bus and supplies a steady source of 115-volt, single-phase power for autopilot operation during simultaneous operation of the windshield anti-icing system. The main inverters cannot furnish steady power to autopilot circuits at the same time they are supplying power to the windshield anti-ice circuits due to the pulsating loads of the latter circuits. The autopilot inverter also furnishes power to that portion of No. 2 radio affecting the autopilot (automatic approach), the A-12 compass system, and the copilot's VHF navigation receiver, thus eliminating possible erratic operation of these systems due to feedback through the windshield anti-ice circuits.

#### AUTOPILOT INVERTER CONTROL

The windshield anti-ice selector switch (24, figure 1-9), located on the overhead switch panel, automatically starts the autopilot inverter when turned to any "on" position. If the autopilot is on, initial selection of wind-

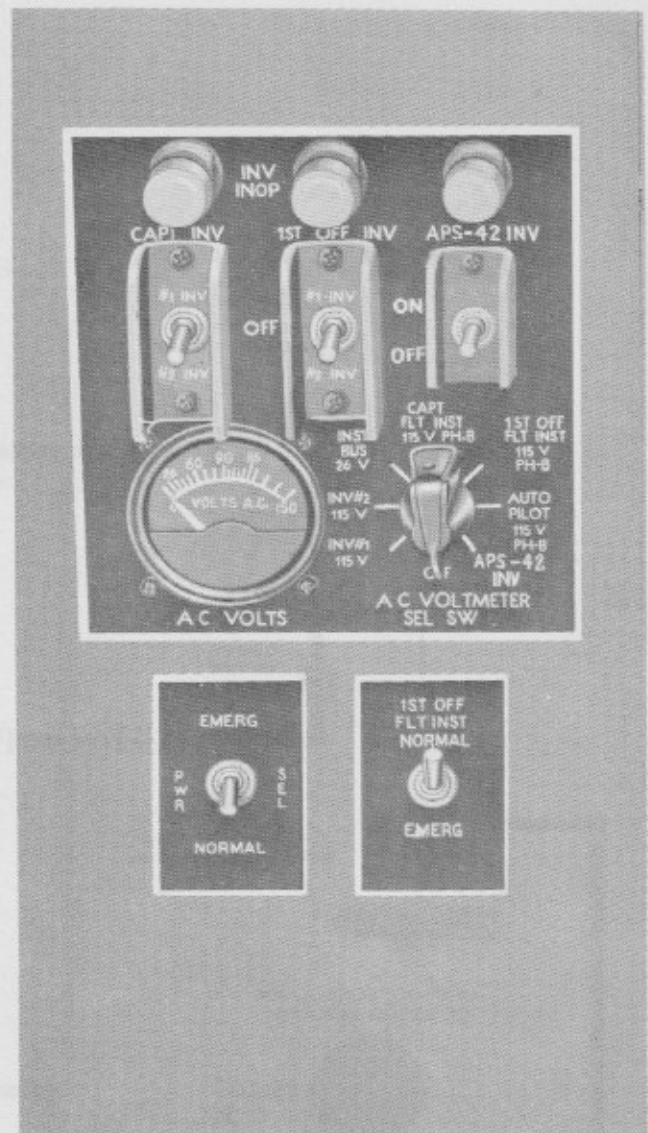


Figure 1-25. AC Controls

shield heat will cause the autopilot to drop out due to interruption of power supply during the shift from main inverter to autopilot inverter power. In this event, a two-minute warmup period is required before the autopilot can be re-engaged. When the windshield anti-ice switch is turned to the OFF position, the autopilot continues to operate and is supplied power from the autopilot inverter. The autopilot inverter control circuit is powered by direct current from the main bus and is protected by an autopilot inverter circuit breaker located on the main circuit breaker panel.

## ALTERNATORS

An engine-driven alternator is mounted on the accessory section of each engine. The purpose of the alternators is to furnish emergency alternating current power to the pilot's and copilot's flight instruments in the event of failure of both inverters. Accordingly, the alternators accomplish no useful work until one or both of them is switched on to take the place of inoperative inverters. Alternator-to-engine drive ratio is 1.4 to 1.0. No voltage or frequency stabilization is provided. Within a range of 2000 to 2800 engine rpm, alternator voltage varies from approximately 94 to 138 volts, and frequency varies from approximately 325 to 480 cps. At 2460 engine rpm, alternator output is approximately 115 volts, and 400 cps.

## FLIGHT INSTRUMENT POWER SELECTOR SWITCHES

Alternating-current power from each emergency alternator is connected to the flight instruments by separate flight instrument power selector switches. The pilot's flight instrument power selector switch (16, figure 1-8) is located on the pilot's flight instrument panel. The copilot's flight instrument power selector switch (figure 1-25) is located on the direct-current control panel. Both switches have two positions, NORMAL and EMERG. In the NORMAL position alternating current is furnished to the flight instruments from the main inverters as selected by the pilot's and copilot's inverter selector switches. Moving either switch from NORMAL to EMERG position delivers alternating current from the associated alternator to the respective flight instruments. It is not possible to interselect power output from the left engine alternator to the copilot's flight instruments or vice versa.

## AC VOLTMETER AND AC VOLTMETER SELECTOR SWITCH

Voltage output of each AC power source can be read selectively on the AC voltmeter (figure 1-25), located on the overhead switch panel. The alternating-current voltmeter selector switch (figure 1-25) is used to select the alternating-current voltage to be read on the voltmeter. The selector switch has the following eight positions: OFF, INV #1 115V, INV #2 115V, INST BUS 26V, CAPT FLT INST 115V PH-B, 1ST OFF FLT INST 115V PH-B, AUTOPILOT 115V PH-B, and APS-42. To read the autopilot inverter voltage, turn the windshield and anti-ice switch to any one of the five positions available. The windshield anti-ice switch energizes the autopilot inverter. If the windshield anti-ice system is not turned on, the autopilot inverter position as selected on the AC voltmeter selector switch will read the inverter voltage of the inverter as selected by the copilot's inverter selector switch. In the CAPT FLT INST 115V PH-B and 1ST OFF FLT INST 115V PH-B positions, the voltage output from either the phase adapters or the alternators may be read, depending upon the positions of the corresponding flight instrument power selector switches.

## HYDRAULIC POWER SUPPLY SYSTEM

The hydraulic power supply system (figure 1-26) is a semi-open center-type system. The hydraulic system contains one fixed displacement pump and one variable displacement pump. The semi-open system allows for relief of or bypassing of system pressure or system fluid respectively. The system is thus relieved of high pressure when there is no demand for it. This system is in the C-131F